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.

Content last modified 1/10/2025.

Authorized for Public Release

Class II FOMC – Restricted (FR)

Report to the FOMC on Economic Conditions and Monetary Policy

Book A

Economic and Financial Conditions: Outlook, Risks, and Policy Strategies

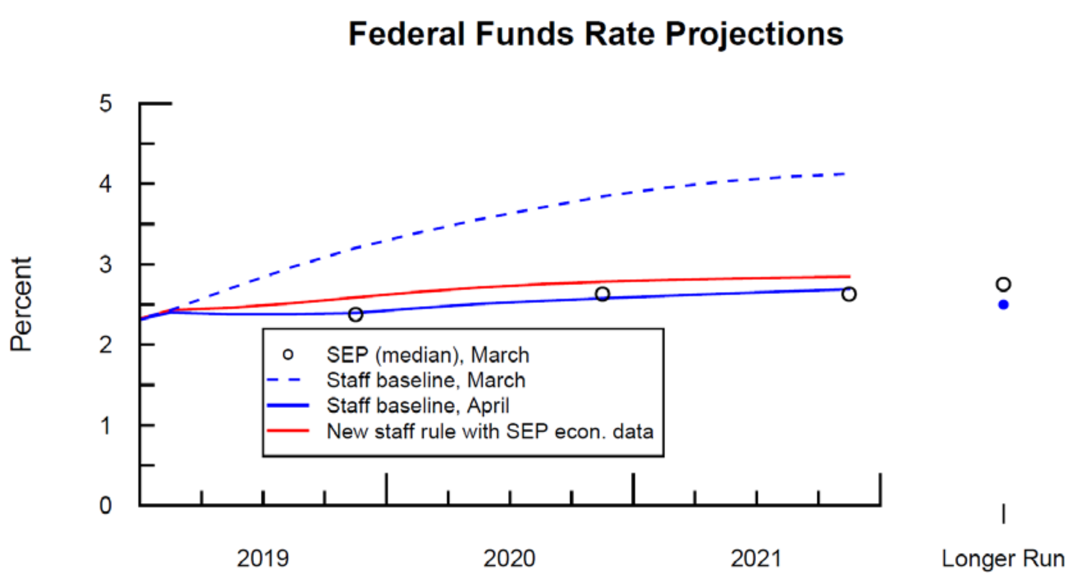
April 19, 2019

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

inflation objective (π^{LR}), and the current-quarter estimate of the output gap ($ygap_t$). In this rule, policymakers' longer-run inflation objective is equal to the Committee's goal of 2 percent, the total weight on inflation is 1.5 (the sum of the coefficients on π_t in the two places it appears in the rule), and the coefficient on the output gap (α) has previously been assumed to be 1.0.[2]

In this Tealbook, we continue to use this basic framework for our baseline policy rule but have reduced the assumed value for α, the coefficient on the output gap, from 1.0 to 0.2.[3] As shown in the figure, this adjustment to our baseline rule—incorporating the median economic projections from the March SEP—yields an implied path for the federal funds rate (the red line) close to the median federal funds rate path in the SEP (the hollow dots).

With this adjustment to our assumed policy rule, the current baseline path for the federal funds rate (the solid blue line) is much lower than in the previous forecast (the dashed blue line), and it is quite close to the SEP path. The slight difference partly reflects that the assumed longer-run nominal federal funds rate of 2.5 percent in the Tealbook baseline (the blue dot) is a bit below the median in the March SEP of 2.8 percent (the hollow dot to the far right).



Note: "New staff rule with SEP econ. data" is computed using the new staff rule and the SEP paths for inflation and the inferred output gap. The output gap is inferred from the unemployment rate projection of the SEP using Okun's law. It is assumed that the natural rate of unemployment corresponds to the longer−run normal unemployment rate projection of the SEP, and that the neutral rate of interest corresponds to the longer−run funds rate projection of the SEP.

[2] Alternatively, the output gap can be replaced in the policy rule by the unemployment gap ($ugap_t$), which is defined here as the difference between an estimate of the natural rate of unemployment (u^*_t) and the unemployment rate (u_t):

$$R_t = 0.85R_{t-1} + 0.15[r^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + \alpha \times ugap_t].$$

In this case, the coefficient α on the $ugap_t$ would be 2.0—using a typical Okun's law relationship—rather than 1.0 when the rule is described in terms of the $ygap_t$.

[3] With this change, if the rule was described in terms of the $ugap_t$, then the corresponding coefficient α would be 0.4.

Domestic Econ Devel & Outlook

Comparing the Staff Projection with Other Forecasts

The staff's projection for GDP growth is close to the projections from both the Survey of Professional Forecasters (SPF) and the Blue Chip consensus in 2019, but it is ½ percentage point higher than the Blue Chip in 2020. Correspondingly, the staff's unemployment rate forecast is similar to the SPF and Blue Chip in 2019 but is 0.3 percentage point below the Blue Chip in 2020.

With regard to inflation, the staff's forecast of CPI inflation in 2019 is a bit higher than outside forecasters. The staff and Blue Chip both project CPI inflation of 2.1 percent in 2020; the projection from the SPF is a touch higher. The staff's projections of both total and core PCE inflation are 0.1 to 0.2 percentage point lower than the SPF in both years.

Comparison of Tealbook and Outside Forecasts

	2019	2020
GDP (Q4/Q4 percent change)		
April Tealbook	2.2	2.2
Blue Chip (04/10/19)	2.1	1.7
SPF median (3/22/19)	2.1	n.a.
Unemployment rate (Q4 level)		
April Tealbook	3.6	3.5
Blue Chip (04/10/19)	3.6	3.8
SPF median (3/22/19)	3.7	n.a.
CPI inflation (Q4/Q4 percent change)		
April Tealbook	2.2	2.1
Blue Chip (04/10/19)	2.1	2.1
SPF median (3/22/19)	2.0	2.2
PCE price inflation (Q4/Q4 percent change)		
April Tealbook	1.8	1.8
SPF median (3/22/19)	1.9	2.0
Core PCE price inflation (Q4/Q4 percent change)		
April Tealbook	1.8	1.9
SPF median (3/22/19)	2.0	2.1

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

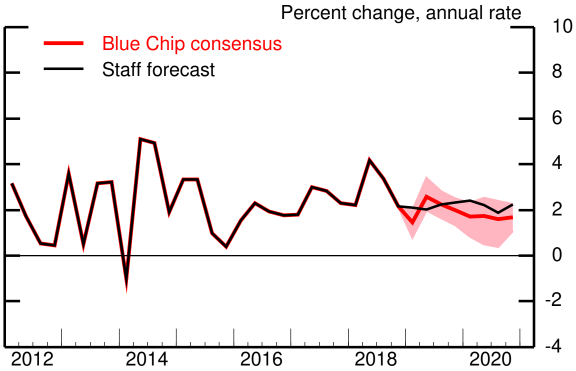
n.a. Not available.

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

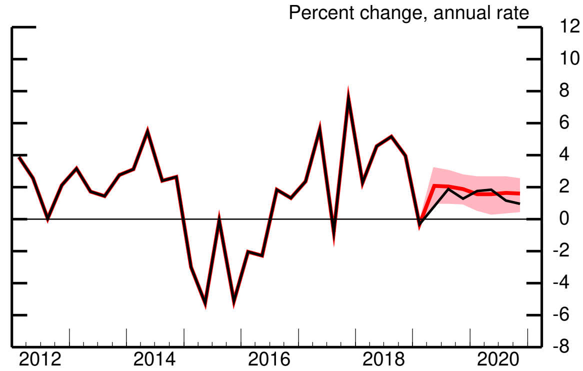
Tealbook Forecast Compared with Blue Chip

(Blue Chip survey released April 10, 2019)

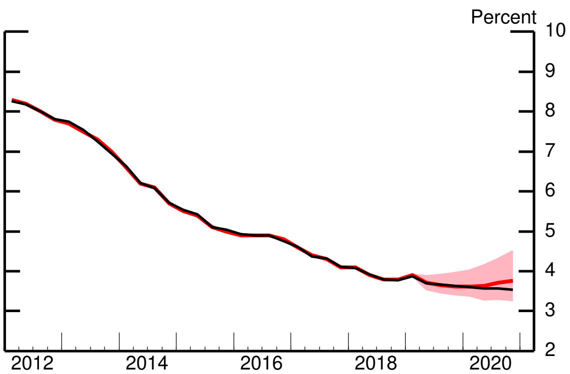
Real GDP



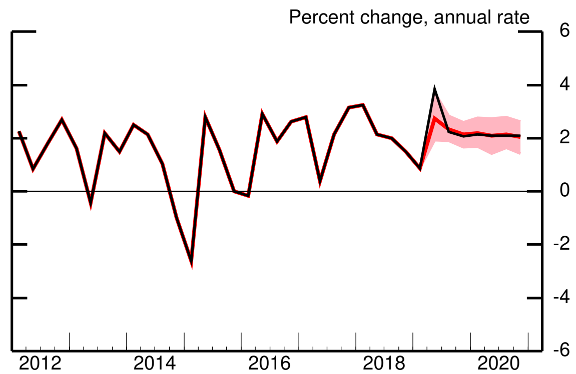
Industrial Production



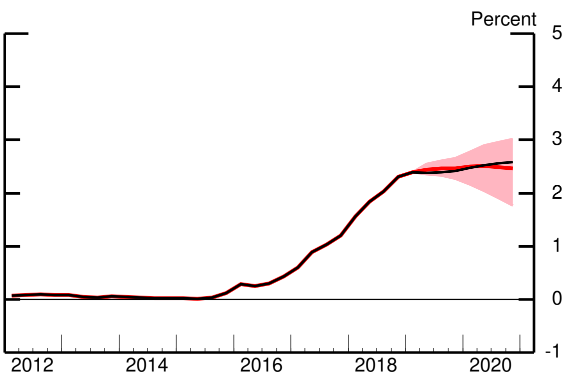
Unemployment Rate



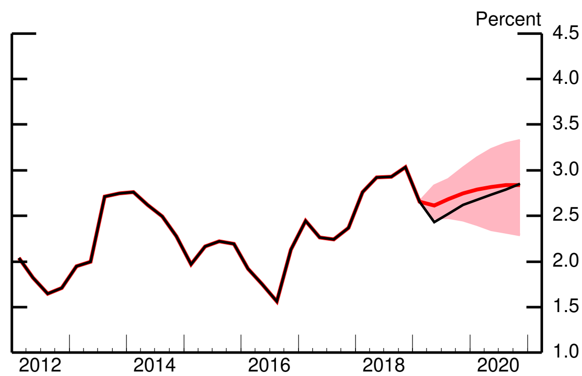
Consumer Price Index



Treasury Bill Rate



10-Year Treasury Yield

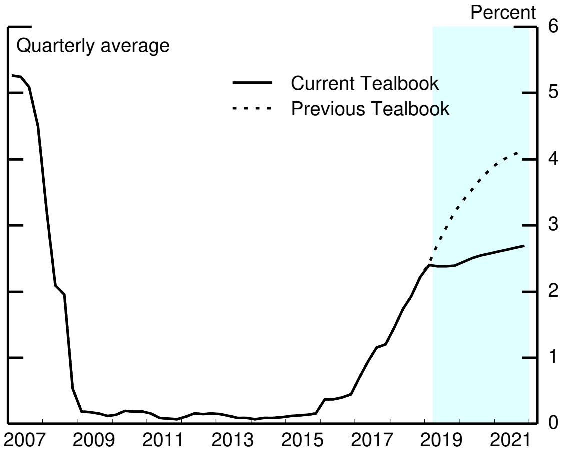


Note: The yield is for on-the-run Treasury securities. Over the forecast period, the staff's projected yield is assumed to be 15 basis points below the off-the-run yield.

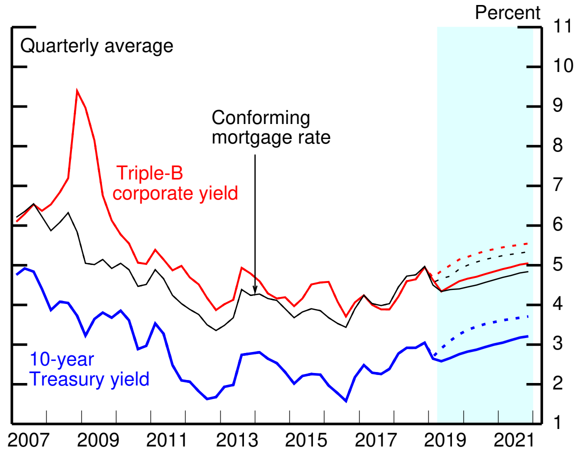
Note: The shaded area represents the area between the Blue Chip top 10 and bottom 10 averages.

Key Background Factors underlying the Baseline Staff Projection

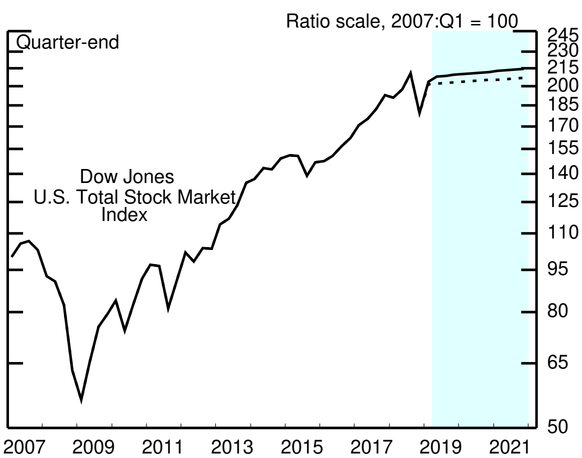
Federal Funds Rate



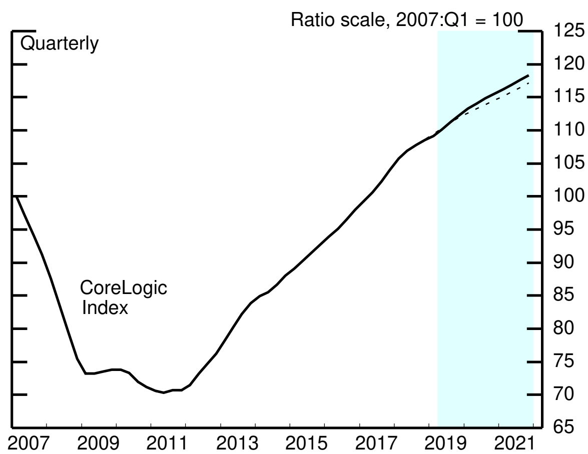
Long-Term Interest Rates



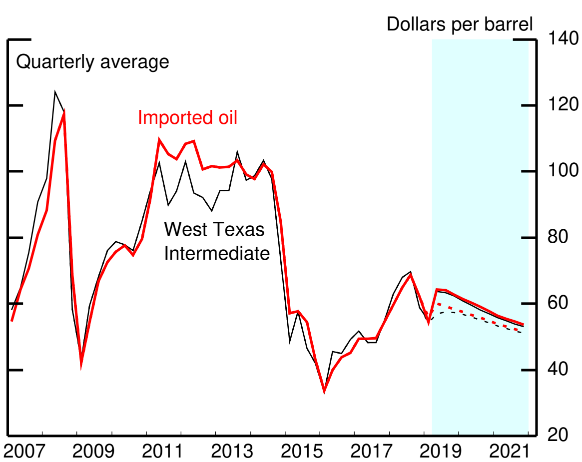
Equity Prices



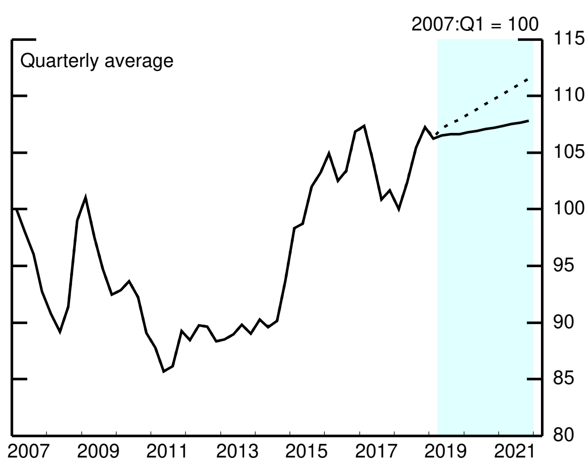
House Prices



Crude Oil Prices



Broad Real Dollar

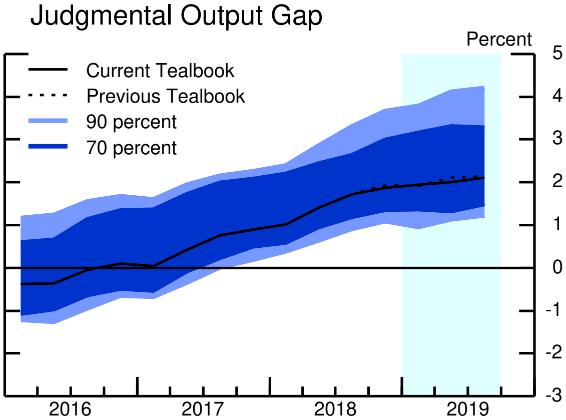


Cyclical Position of the U.S. Economy: Near-Term Perspective
(Percent change at annual rate from final quarter of preceding period except as noted)

Measure	2017	2018	2019	2018 Q4	2019 Q1	2019 Q2
Output gap[1]	**.9**	**1.9**	**2.2**	**1.9**	**1.9**	**2.0**
Previous Tealbook	.9	1.9	2.1	1.9	1.9	2.1
Real GDP	2.5	3.0	2.2	2.2	2.1	2.0
Previous Tealbook	2.5	3.1	1.8	2.6	1.0	2.6
Measurement error in GDP	.0	.2	.0	-.2	.0	.0
Previous Tealbook	.0	.3	-.2	.0	-.8	.0
Potential output	1.7	1.8	1.8	1.8	1.8	1.8
Previous Tealbook	1.7	1.8	1.8	1.8	1.8	1.8

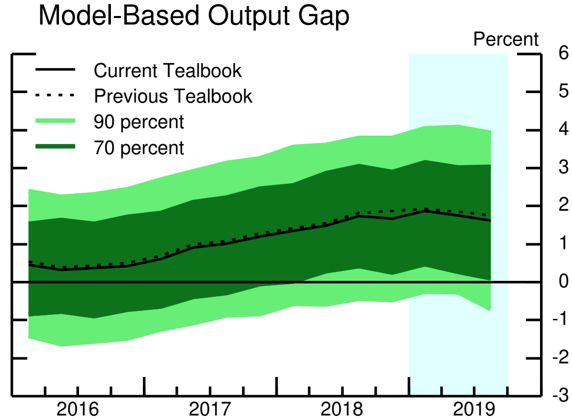
Note: The output gap is the percent difference between actual and potential output; a negative number indicates that the economy is operating below potential. The change in the output gap is equal to real GDP growth less the contribution of measurement error less the growth rate of potential output. 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



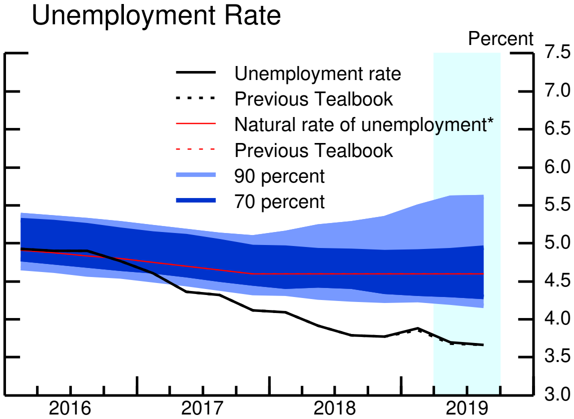
Note: Shaded regions show the distribution of historical revisions to the staff's estimates of the output gap.
Source: Various macroeconomic data; staff assumptions.

Model-Based Output Gap



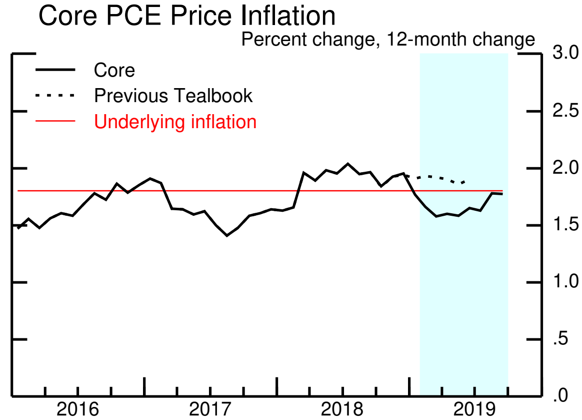
Note: Shaded regions denote model-computed uncertainty bands.
Source: Various macroeconomic data; staff assumptions.

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.

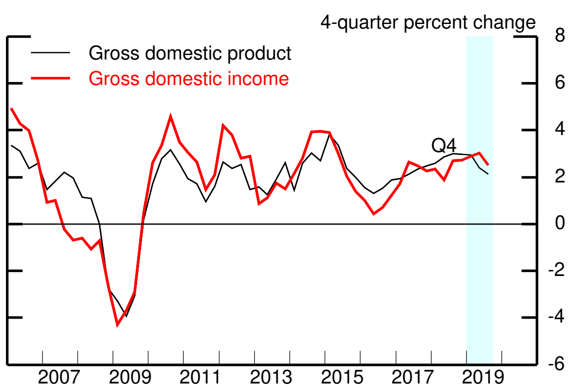
Summary of the Near-Term Outlook for GDP
(Percent change at annual rate except as noted)

Measure	2018:Q4		2019:Q1		2019:Q2	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
Real GDP	**2.6**	**2.2**	**1.0**	**2.1**	**2.6**	**2.0**
Private domestic final purchases	2.9	2.6	1.0	1.0	2.7	2.3
Personal consumption expenditures	2.8	2.5	1.0	1.1	2.8	2.6
Residential investment	-4.9	-4.7	-8.6	-.3	1.3	-2.6
Nonres. private fixed investment	5.5	5.4	3.4	.6	2.1	2.2
Government purchases	.0	-.4	.7	2.6	4.0	2.9
Contributions to change in real GDP						
Inventory investment[1]	.4	.1	.2	.2	-.1	.3
Net exports[1]	-.2	-.1	-.1	.6	-.3	-.7

1. Percentage points.

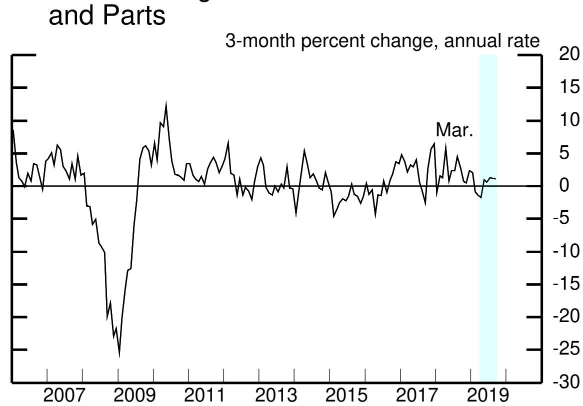
Recent Nonfinancial Developments (1)

Real GDP and GDI



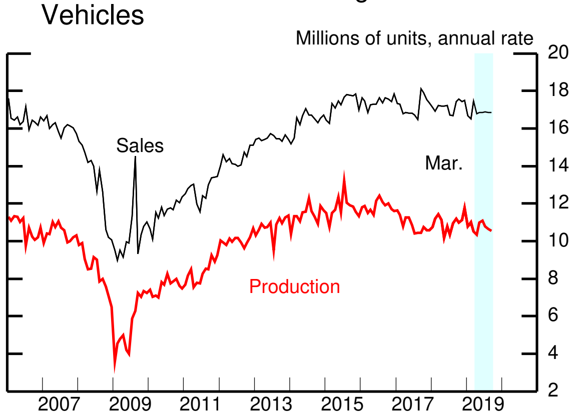
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Manufacturing IP ex. Motor Vehicles and Parts



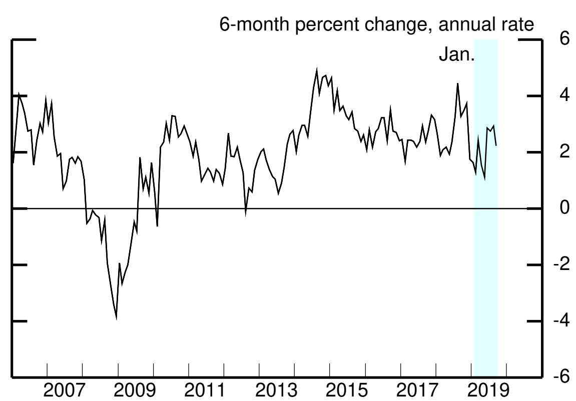
Source: Federal Reserve Board, G.17 Statistical Release, "Industrial Production and Capacity Utilization."

Sales and Production of Light Motor Vehicles



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

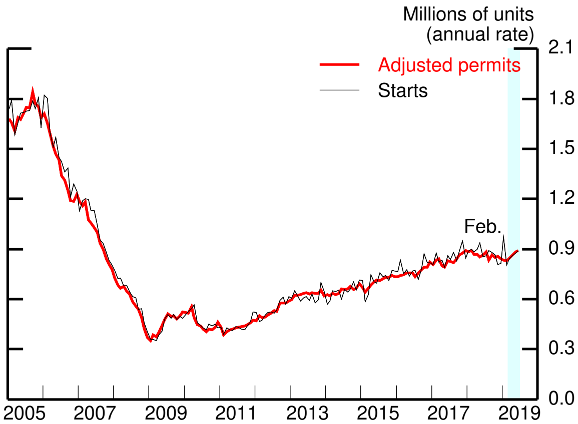
Real PCE Growth



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

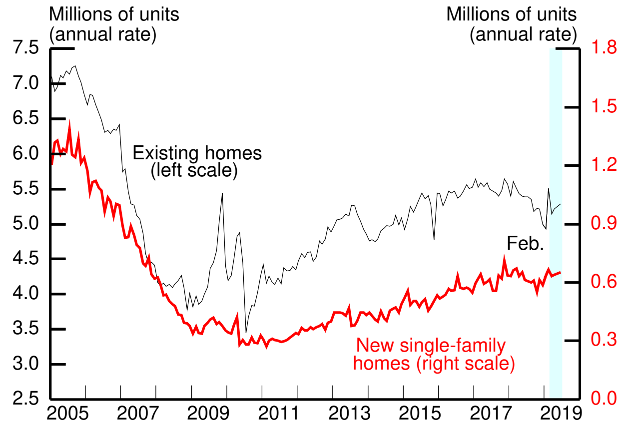
Recent Nonfinancial Developments (2)

Single-Family Housing Starts and Permits



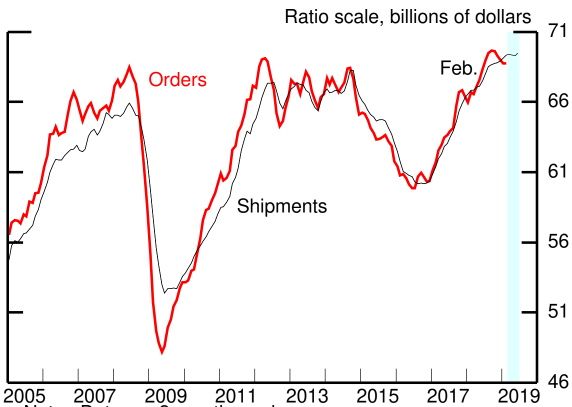
Note: Adjusted permits equal permit issuance plus starts outside of permit-issuing areas.
Source: U.S. Census Bureau.

Home Sales



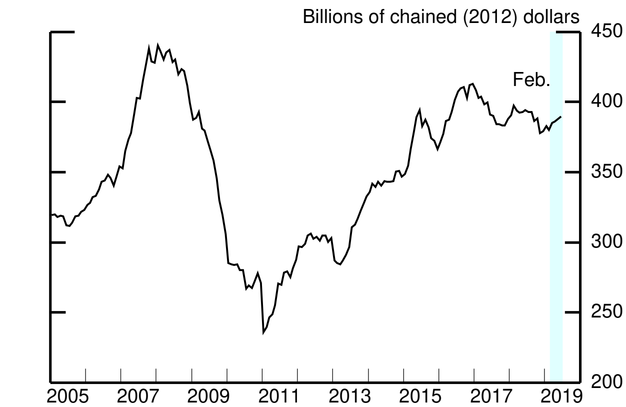
Source: For existing, National Association of Realtors; for new, U.S. Census Bureau.

Nondefense Capital Goods ex. Aircraft



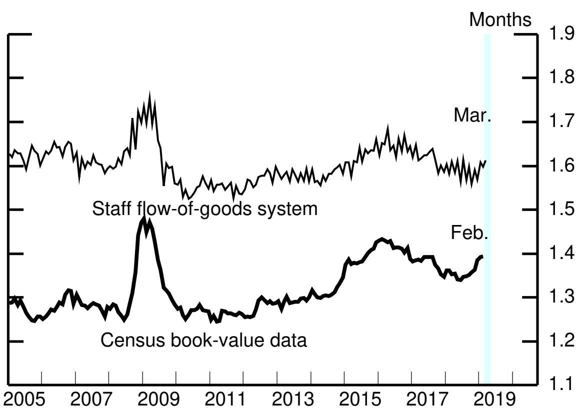
Note: Data are 3-month moving averages.
Source: U.S. Census Bureau.

Nonresidential Construction Put in Place



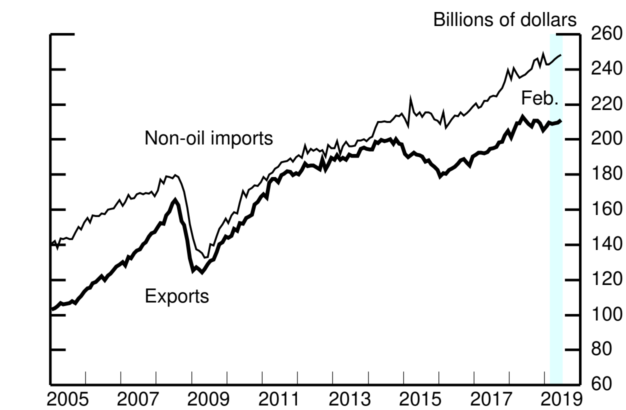
Note: Nominal CPIP deflated by BEA prices through 2018:Q4 and by the staff's estimated deflator thereafter.
Source: U.S. Census Bureau.

Inventory Ratios



Note: Flow-of-goods system inventories include manufacturing and mining industries and are relative to consumption. Census data cover manufacturing and trade, and inventories are relative to sales.
Source: U.S. Census Bureau; staff calculations.

Exports and Non-oil Imports

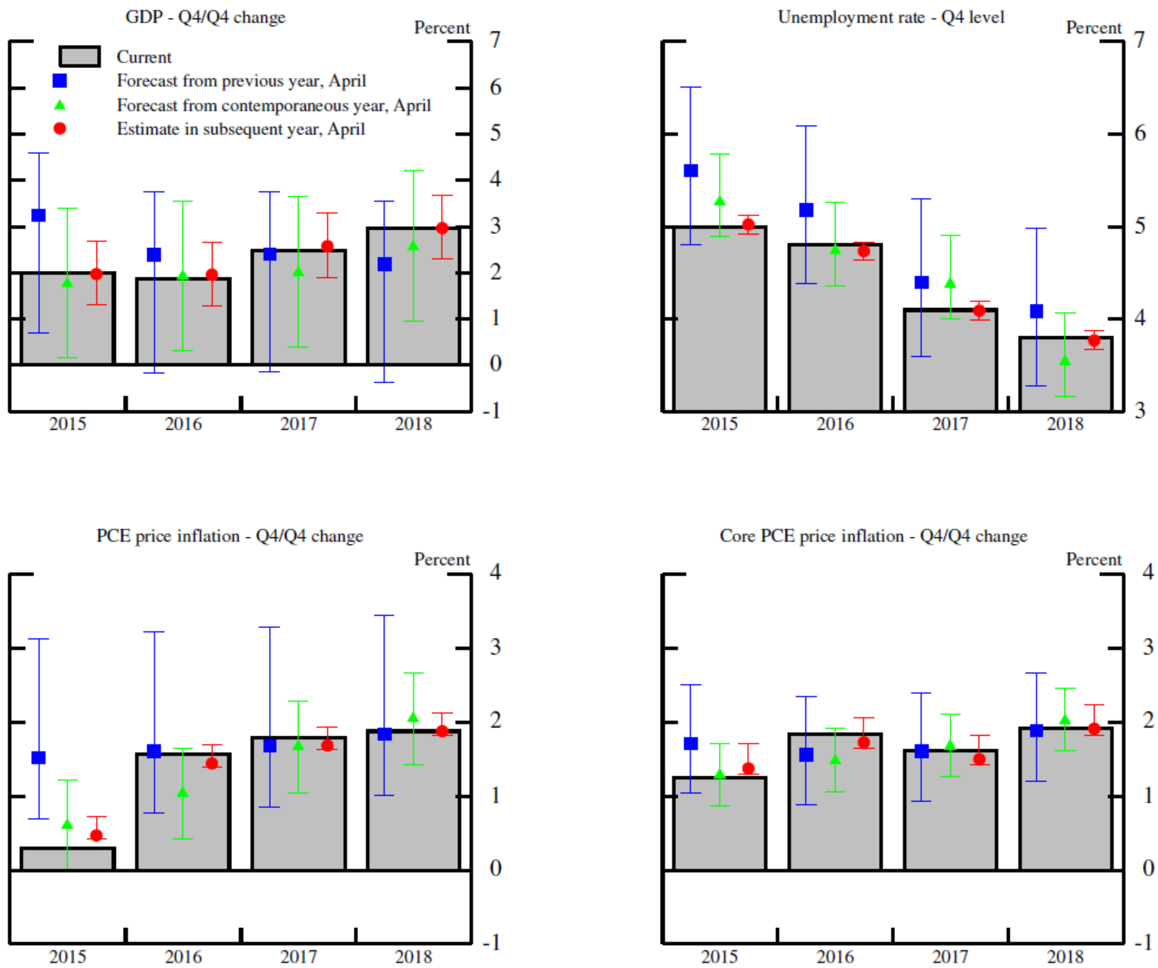


Note: Forecasts are linear interpolations of quarterly values.
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis; U.S. Census Bureau.

Federal Reserve System Nowcasts of 2019:Q1 Real GDP Growth
(Percent change at annual rate from previous quarter)

Federal Reserve Entity	Type of model	Nowcast as of April 17, 2019
Federal Reserve Bank		
Boston	• Mixed-frequency BVAR	2.4
New York	• Factor-augmented autoregressive model combination	3.0
	• Factor-augmented autoregressive model combination, financial factors only	2.4
	• Dynamic factor model	1.3
Cleveland	• Bayesian regressions with stochastic volatility	2.0
	• Tracking model	1.9
Atlanta	• Tracking model combined with Bayesian vector autoregressions (VARs), dynamic factor models, and factor-augmented autoregressions (known as GDPNow)	2.4
Chicago	• Dynamic factor models	2.7
	• Bayesian VARs	2.1
St. Louis	• Dynamic factor models	1.7
	• News index model	1.9
	• Let-the-data-decide regressions	1.7
Kansas City	• Accounting-based tracking estimate	2.5
Board of Governors	• Tealbook estimate (judgmental)	2.1
	• Monthly dynamic factor models (DFM-45)	2.3
	• Mixed-frequency dynamic factor model (DFM-BM)	1.5
Memo: Median of Federal Reserve System nowcasts		2.1

Tealbook Forecasts, 2015 to 2018



Source: Staff forecast; Bureau of Economic Analysis; and Bureau of Labor Statistics.

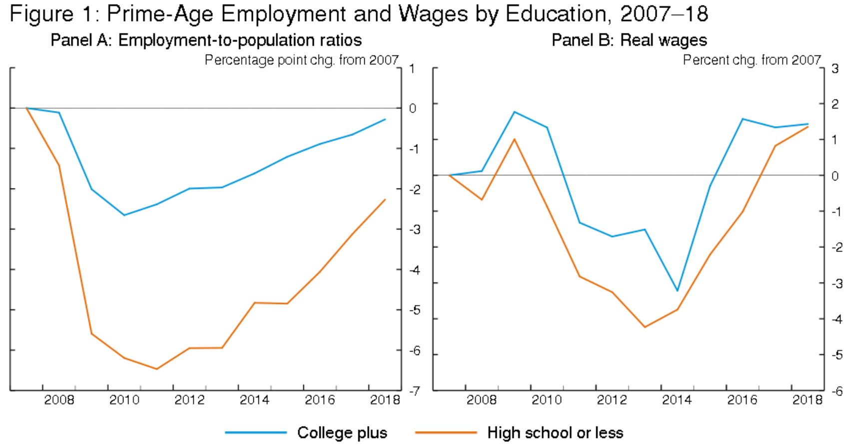
How Have Lower-Educated Workers Fared in the Current Expansion?

Labor market outcomes in the current economic expansion have been quite different for lower- and higher-educated individuals. The employment-to-population ratio (EPOP) for higher-educated workers—namely, college graduates, aged 25 through 54 (prime age)—declined about 2.5 percentage points during the recession but began a steady and sustained recovery in 2010 and was nearly at its pre-recession level by 2018 (see panel A of figure 1). In contrast, the EPOP for lower-educated prime-age individuals—namely, those with a high school degree or less—fell much more sharply during the recession and lingered near its trough for several years before beginning to recover in earnest in 2014. As of 2018, the EPOP of lower-educated workers remained well below its pre-recession level.

At the same time, real hourly wages for lower-educated workers fell more over the 2007–13 period than real wages for college graduates (see panel B of figure 1). Real wages subsequently picked up for both groups, and wages are now above their pre-recession levels for both groups. However, cumulative real wage gains for lower-educated workers have only recently caught up, in percentage terms, to those with college degrees.

The relative underperformance of employment and wages for lower-educated workers has been a characteristic of all business cycles at least since 1978. However, this pattern is likely due, at least in part, to a long-term downward trend in the demand for lower-educated workers that is unrelated to the business cycle and caused, perhaps, by changes in technology and globalization. To isolate the effects of the business cycle and control for changes in the relative demand of lower-educated workers and other long-term trends, we take advantage of the variation from state-level business cycles since 1978 and estimate the "typical" cyclical decline and recovery of employment across education groups. Examining state-level recessions allows us to control for national- and state-level trends and leverages the different severities of business cycles across states to identify the typical patterns of labor market behavior across educational groups.

Figure 1: Prime-Age Employment and Wages by Education, 2007–18

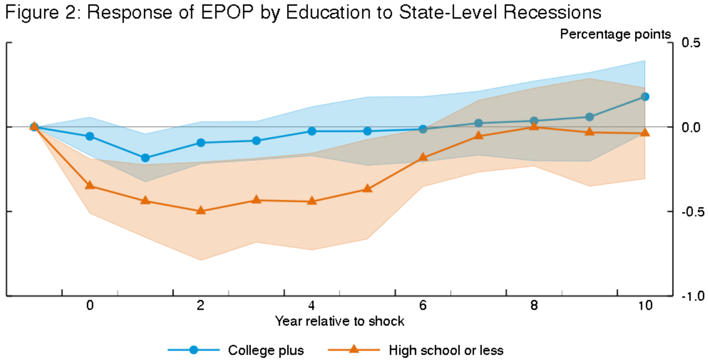


Source: Author's calculations using the Current Population Survey.

We find a starkly different evolution of employment over the business cycle for lower-educated workers compared to those with college degrees even after controlling for national and state trends. In response to a one-time, temporary 1 percent decline in state output growth that returns to normal in the next year, the EPOP declines immediately for both groups.[1] However, that decline is considerably steeper and longer lasting for those with high school degrees or less (see figure 2). Part of this difference is due to the deeper initial decline in lower-educated employment, but part is also due to a delayed start to the recovery for the lower-educated group. Once that group's EPOP begins a sustained recovery, though, it increases at a more rapid pace than the EPOP for those with a college degree. If we extrapolate those estimates to an 8.5 percent output shock, roughly equal to the change in the output gap from peak to trough in the previous recession, the predicted decline and recovery in EPOP would be similar to what was actually observed over the 2007–18 period, suggesting that the recent behavior of EPOPs by educational attainment has been similar to the typical business cycle after controlling for the size of the recessionary shock.

The difference in the magnitude of employment declines and timing of recovery across education groups may be due to employers changing their hiring standards over the business cycle. Evidence from research by Hershbein and Kahn (2018) and Modestino, Shoag, and Ballance (2016) shows that employers raise skill requirements for new hires when an adverse shock hits a local labor market and slowly lower skill requirements as the local labor market recovers.[2] Barnichon and Zylberberg (2019) show that, during recessions, increased competition for high-skilled jobs causes higher-skilled workers to take jobs that require fewer skills, making work more difficult to find for the less skilled.[3] This pattern could explain the differences in labor market outcomes for lower- and higher-educated workers since the previous recession.

Figure 2: Response of EPOP by Education to State-Level Recessions



Note: EPOP refers to the employment-to-population ratio. Shaded areas are 95% confidence bands.
Source: Cajner, Coglianese, and Montes (2019).

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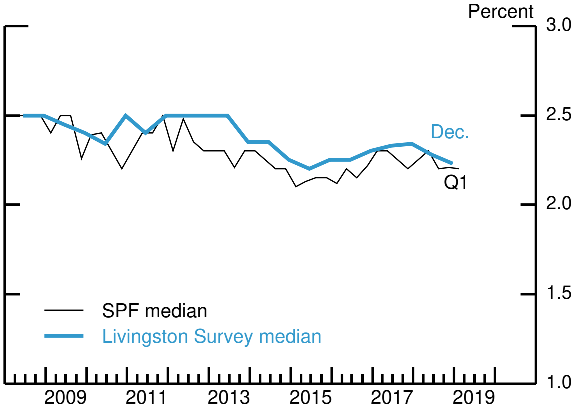
[1] We also estimate cumulative wage growth for lower-educated workers to be lower than for higher-educated workers following an adverse shock to output, but these estimates are quite imprecise, and the difference is not statistically significant.

[2] Brad Hershbein and Lisa B. Kahn (2018), "Do Recessions Accelerate Routine-Biased Technological Change? Evidence from Vacancy Postings," *American Economic Review,* vol. 108 (July), pp. 1737–72; Alicia Sasser Modestino, Daniel Shoag, and Joshua Ballance (2016), "Downskilling: Changes in Employer Skill Requirements over the Business Cycle," *Labour Economics,* vol. 41 (August), pp. 333–47.

[3] Regis Barnichon and Yanos Zylberberg (2019), "Underemployment and the Trickle-Down of Unemployment," *American Economic Journal: Macroeconomics,* vol. 11 (April), pp. 40–78.

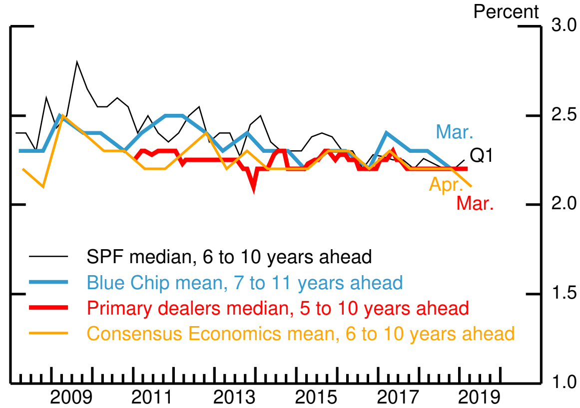
Survey Measures of Longer-Term Inflation Expectations

CPI Next 10 Years



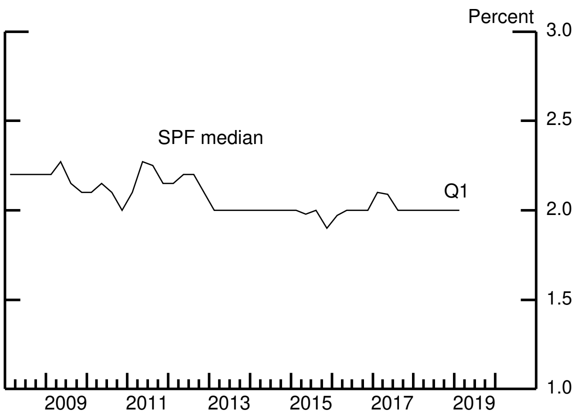
Note: SPF is Survey of Professional Forecasters.
Source: Federal Reserve Bank of Philadelphia.

CPI Forward Expectations



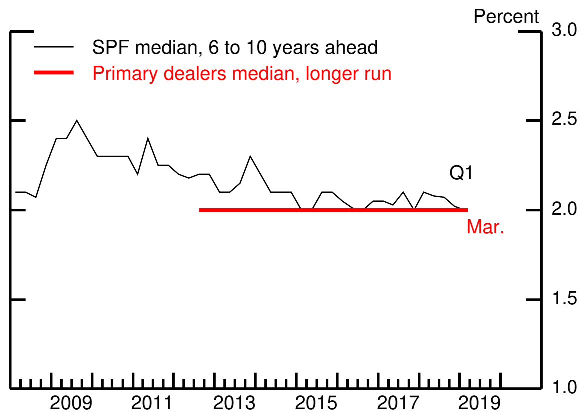
Source: Federal Reserve Bank of Philadelphia; Blue Chip Economic Indicators; Federal Reserve Bank of New York; Consensus Economics.

PCE Next 10 Years



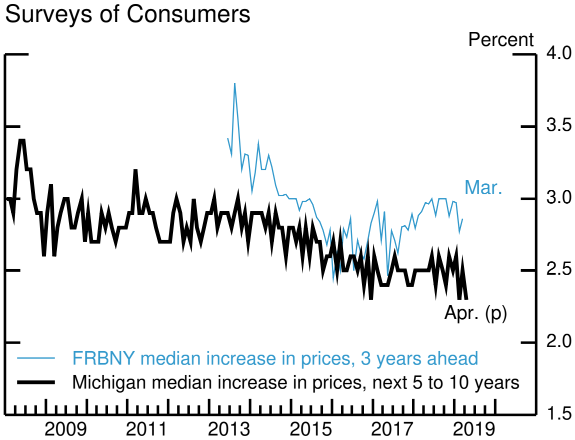
Source: Federal Reserve Bank of Philadelphia.

PCE Forward Expectations



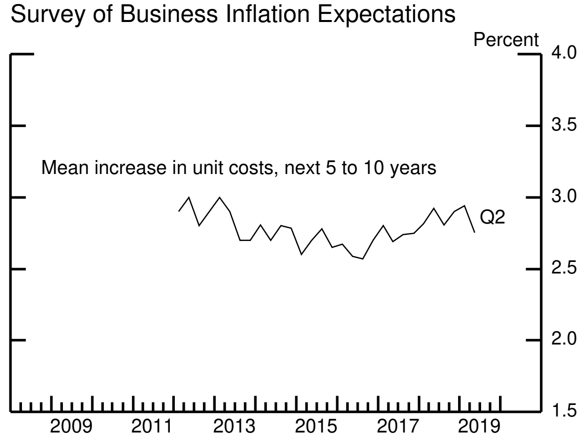
Note: Primary dealers data begin in August 2012.
Source: Federal Reserve Bank of Philadelphia; Federal Reserve Bank of New York.

Surveys of Consumers



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

Survey of Business Inflation Expectations



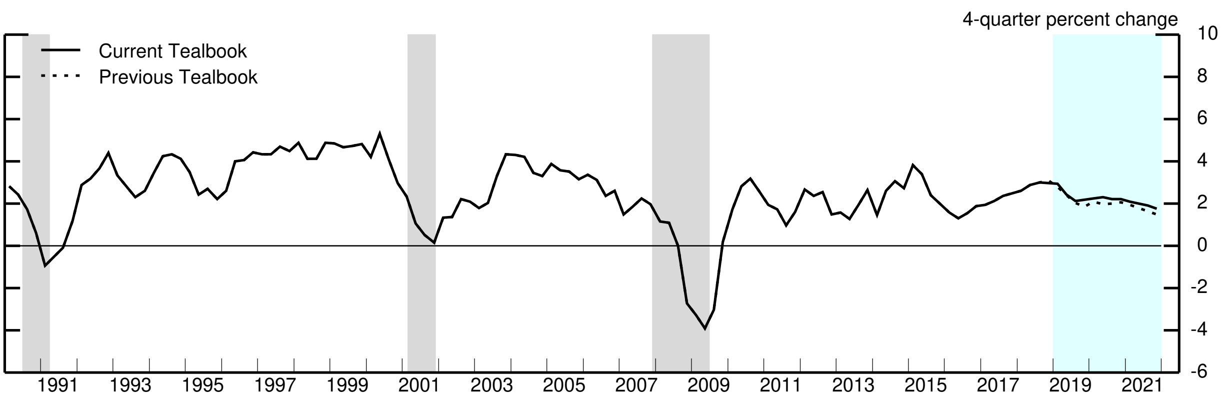
Note: Survey of businesses in the Sixth Federal Reserve District. Data begin in February 2012.
Source: Federal Reserve Bank of Atlanta.

Domestic Econ Devel & Outlook

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

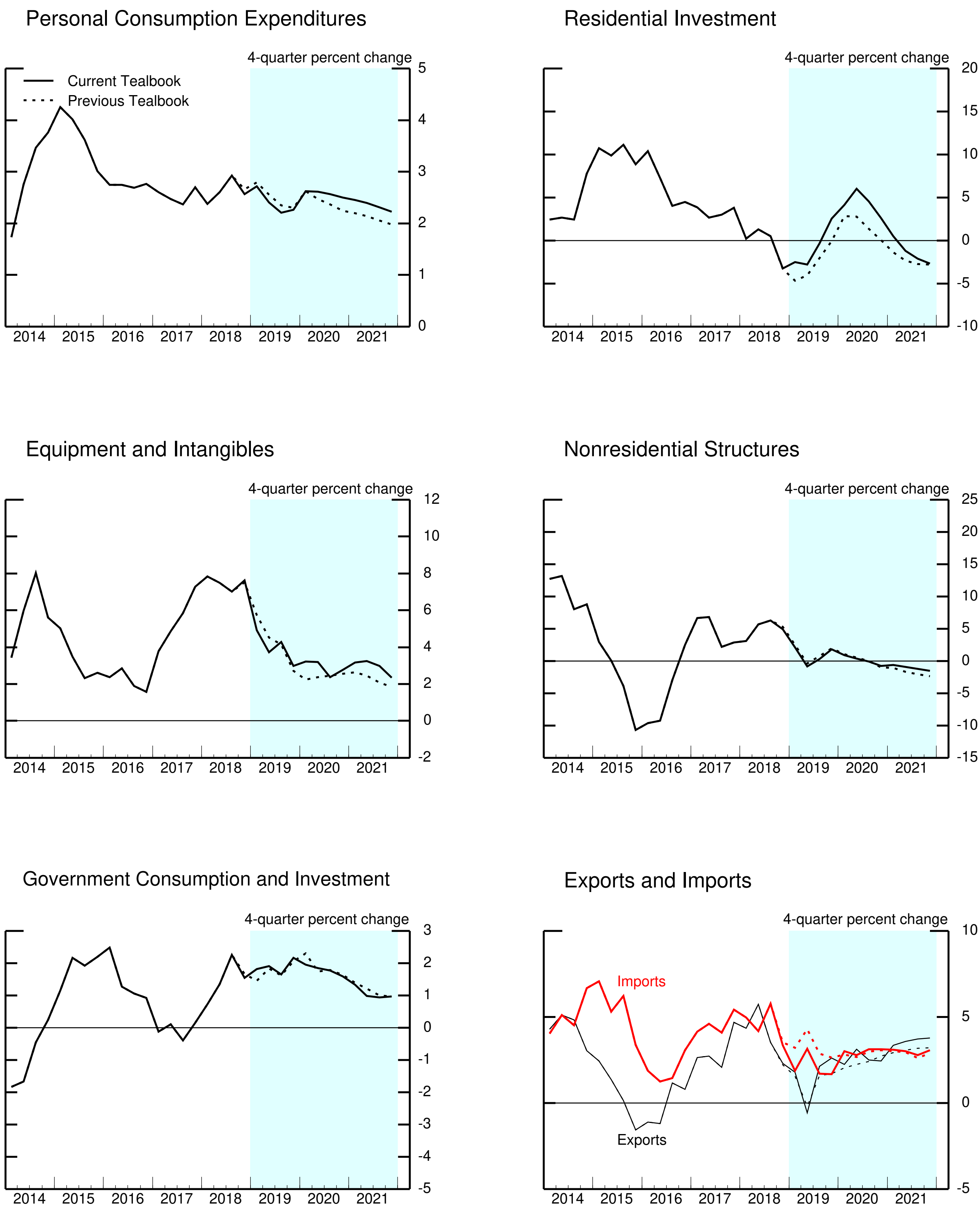
Measure	2018	2018 H2	2019 H1	2019	2020	2021
Real GDP	**3.0**	**2.8**	**2.0**	**2.2**	**2.2**	**1.7**
Previous Tealbook	3.1	3.0	1.8	1.8	2.0	1.5
Final sales	2.6	1.5	1.8	2.4	2.2	1.8
Previous Tealbook	2.6	1.6	1.7	2.1	1.9	1.5
Personal consumption expenditures	2.6	3.0	1.8	2.3	2.5	2.2
Previous Tealbook	2.7	3.2	1.9	2.3	2.2	2.0
Residential investment	-3.3	-4.1	-1.5	2.5	2.6	-2.7
Previous Tealbook	-3.3	-4.2	-3.8	-.1	.1	-2.8
Nonresidential structures	4.9	-3.7	2.0	1.8	-.7	-1.5
Previous Tealbook	5.3	-2.9	2.2	2.0	-1.0	-2.3
Equipment and intangibles	7.6	6.3	1.2	3.0	2.8	2.4
Previous Tealbook	7.5	6.1	2.9	2.7	2.5	1.8
Federal purchases	2.7	2.3	4.7	3.6	2.6	1.0
Previous Tealbook	2.8	2.5	4.3	3.5	2.7	1.0
State and local purchases	.8	.3	1.6	1.3	1.0	1.0
Previous Tealbook	1.0	.6	1.2	1.2	1.0	1.0
Exports	2.3	-1.6	.5	2.6	2.4	3.8
Previous Tealbook	2.2	-1.8	1.4	1.7	2.7	3.2
Imports	3.4	5.6	.8	1.7	3.1	3.0
Previous Tealbook	3.5	5.9	2.7	2.6	3.1	2.9
	Contributions to change in real GDP (percentage points)					
Inventory change	.4	1.2	.3	-.3	.0	.0
Previous Tealbook	.5	1.4	.1	-.2	.1	.0
Net exports	-.2	-1.0	-.1	.1	-.2	.0
Previous Tealbook	-.3	-1.1	-.2	-.2	-.1	.0

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.

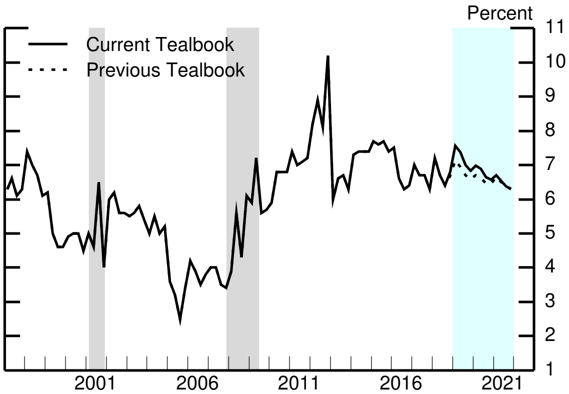
Components of Final Demand



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

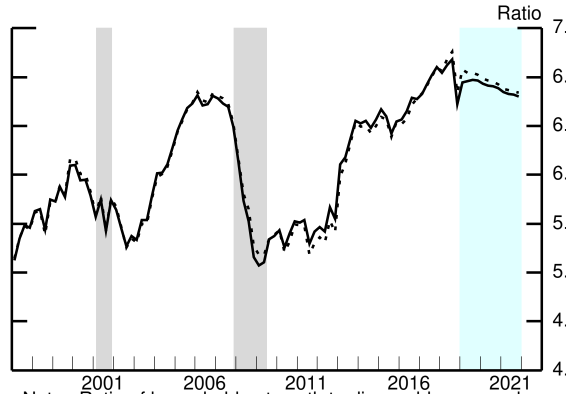
Aspects of the Medium-Term Projection

Personal Saving Rate



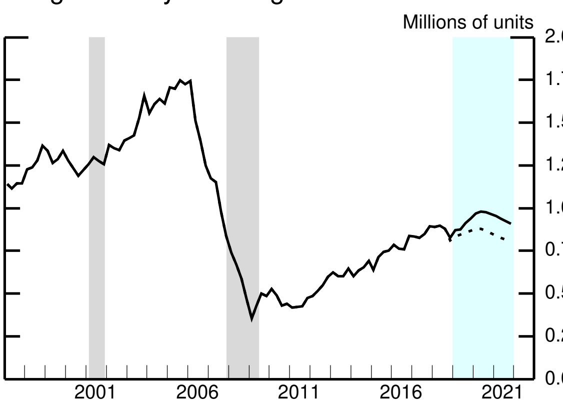
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Wealth-to-Income Ratio



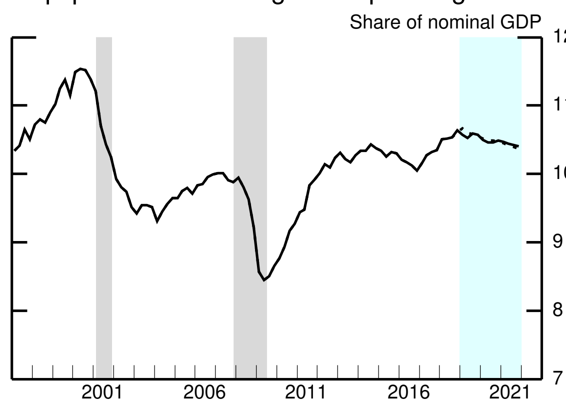
Note: Ratio of household net worth to disposable personal income.
Source: For net worth, Federal Reserve Board, Financial Accounts of the United States; for income, U.S. Dept. of Commerce, Bureau of Economic Analysis.

Single-Family Housing Starts



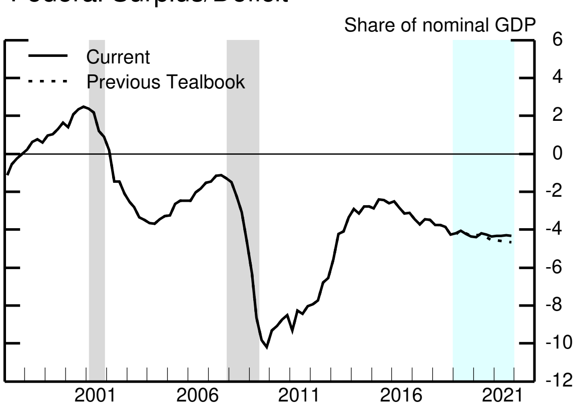
Source: U.S. Census Bureau.

Equipment and Intangibles Spending



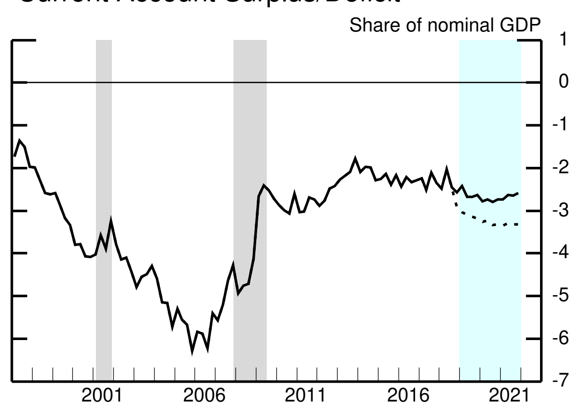
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Federal Surplus/Deficit



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

Current Account Surplus/Deficit

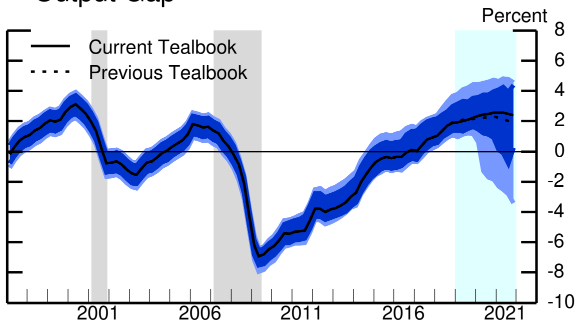


Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

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

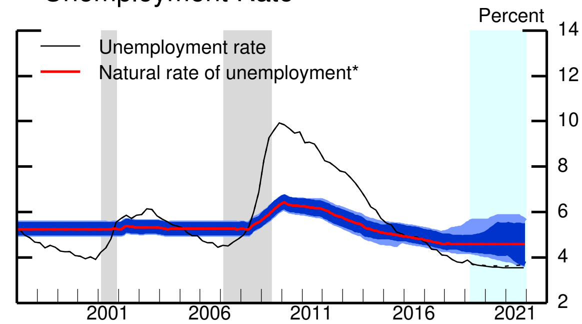
Output Gap



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.

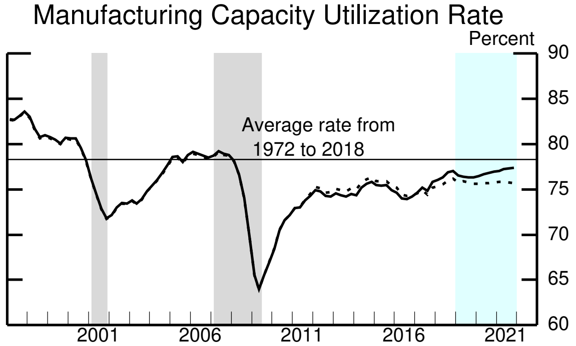
Source: Various macroeconomic data; staff assumptions.

Unemployment Rate



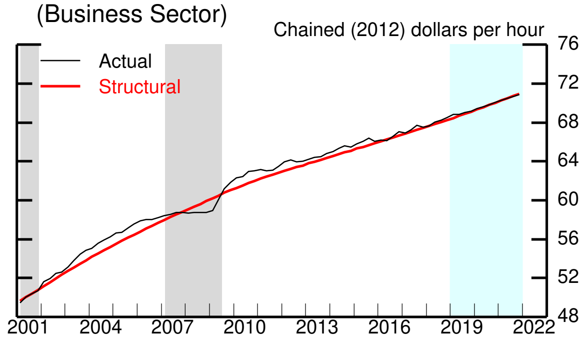
Note: Shaded regions show the 70 percent and 90 percent confidence intervals of the distribution of historical revisions to the staff's estimates of the natural rate.
*Staff estimate including the effect of extended and emergency unemployment insurance benefits.
Source: Various macroeconomic data; staff assumptions.

Manufacturing Capacity Utilization Rate



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

Actual and Structural Labor Productivity
(Business Sector)



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

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

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

Measure	1974-95	1996-2000	2001-07	2008-10	2011-16	2017	2018	2019	2020	2021
Potential output	3.1	3.6	2.7	1.9	1.4	1.7	1.8	1.8	1.9	1.9
Previous Tealbook	3.1	3.6	2.7	1.9	1.4	1.7	1.8	1.8	1.9	1.9
Selected contributions[1]										
Structural labor productivity[2]	1.7	2.9	2.7	1.8	1.2	1.2	1.2	1.3	1.3	1.4
Previous Tealbook	1.7	2.9	2.7	1.8	1.2	1.2	1.2	1.3	1.3	1.4
Capital deepening	.7	1.4	1.0	.5	.8	.6	.7	.7	.6	.5
Multifactor productivity	.8	1.1	1.4	1.1	.2	.3	.3	.3	.5	.6
Structural hours	1.5	1.3	.8	.5	.4	.3	.8	.2	.6	.5
Previous Tealbook	1.5	1.3	.8	.5	.4	.3	.8	.2	.6	.5
Labor force participation	.4	-.1	-.2	-.4	-.5	-.3	-.2	-.2	-.2	-.2
Previous Tealbook	.4	-.1	-.2	-.4	-.5	-.3	-.2	-.2	-.2	-.2
Memo:										
Output gap[3]	-1.2	2.5	.3	-5.4	.1	.9	1.9	2.2	2.6	2.4
Previous Tealbook	-1.2	2.5	.3	-5.4	.1	.9	1.9	2.1	2.3	1.9

Note: For multiyear periods, the percent change is the annual average from Q4 of the year preceding the first year shown to Q4 of the last year shown.
1. Percentage points.
2. Total business sector.
3. Percent difference between actual and potential 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	2018 H2	2019 H1	2019	2020	2021
Nonfarm payroll employment[1]	223	211	178	173	151	103
Previous Tealbook	223	211	164	150	131	77
Private employment[1]	215	206	167	162	142	93
Previous Tealbook	215	206	159	143	121	67
Labor force participation rate[2]	63.0	63.0	63.0	63.0	63.0	62.8
Previous Tealbook	63.0	63.0	63.1	63.0	62.9	62.7
Civilian unemployment rate[2]	3.8	3.8	3.7	3.6	3.5	3.5
Previous Tealbook	3.8	3.8	3.7	3.6	3.6	3.7
Employment to population ratio[2]	60.6	60.6	60.7	60.7	60.8	60.6
Previous Tealbook	60.6	60.6	60.8	60.7	60.7	60.4

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

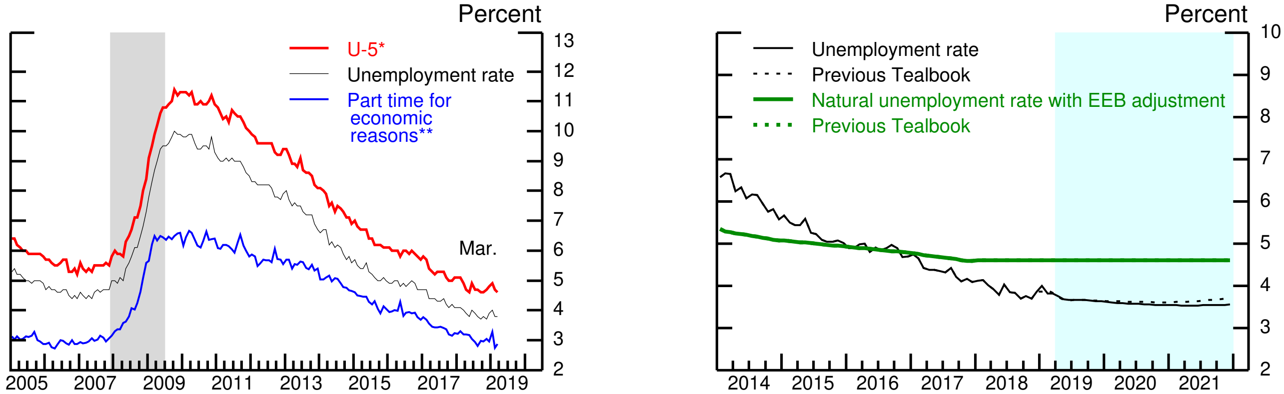
Measure	2018	2018 H2	2019 H1	2019	2020	2021
Percent change at annual rate from final quarter of preceding period						
PCE chain-weighted price index	1.9	1.5	1.6	1.8	1.8	1.8
Previous Tealbook	1.9	1.5	1.8	1.8	1.9	1.9
Food and beverages	.5	.3	2.9	2.9	2.6	2.6
Previous Tealbook	.5	.3	2.0	2.2	2.3	2.3
Energy	3.5	.6	1.2	-.4	-1.5	-.9
Previous Tealbook	3.5	.6	-5.0	-2.2	-1.0	-.7
Excluding food and energy	1.9	1.7	1.6	1.8	1.9	1.9
Previous Tealbook	1.9	1.7	2.1	2.0	2.0	2.0
Prices of core goods imports[1]	.5	-.6	.4	.9	1.1	.9
Previous Tealbook	.5	-.6	.4	.6	.8	.7

	Mar. 2019[2]	Apr. 2019[2]	May 2019[2]	June 2019[2]	July 2019[2]	Aug. 2019[2]
12-month percent change						
PCE chain-weighted price index	1.5	1.6	1.6	1.6	1.6	1.7
Previous Tealbook	1.7	1.7	1.6	1.7	...	...
Excluding food and energy	1.6	1.6	1.6	1.7	1.6	1.8
Previous Tealbook	1.9	1.9	1.9	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.

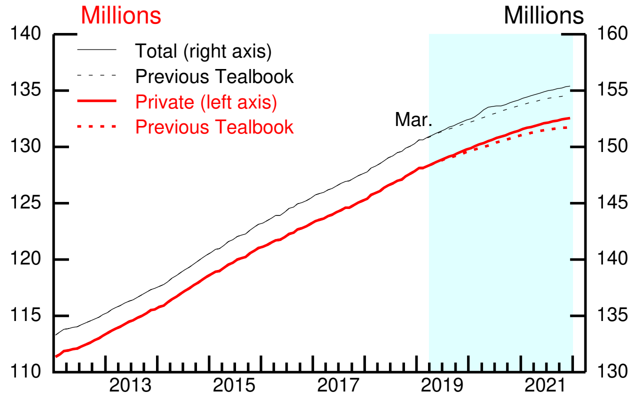
Labor Market Developments and Outlook (1)

Measures of Labor Underutilization



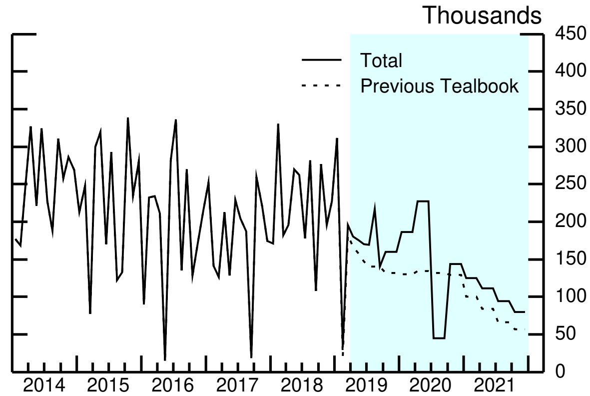
* U-5 measures total unemployed persons plus all marginally attached to the labor force as a percent of the labor force plus persons marginally attached to the labor force.
** Percent of Current Population Survey employment.
EEB Extended and emergency unemployment benefits.
Source: U.S. Department of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

Level of Payroll Employment



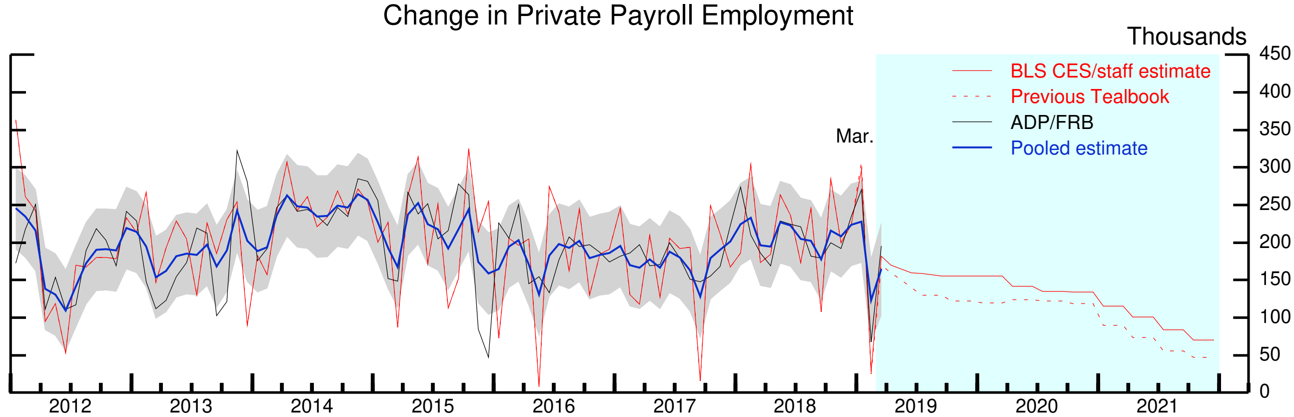
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Change in Total Payroll Employment



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

Change in Private Payroll Employment

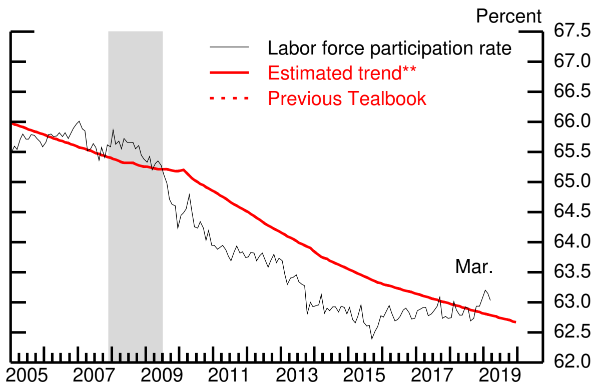


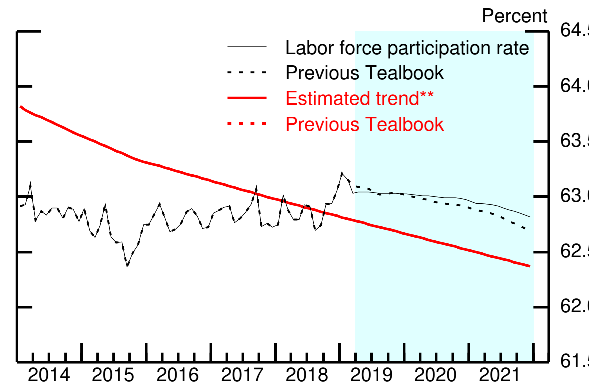
Note: Gray shaded area around blue line is 90 percent confidence interval around pooled estimate.
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff calculations using microdata from ADP.

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

Labor Market Developments and Outlook (2)

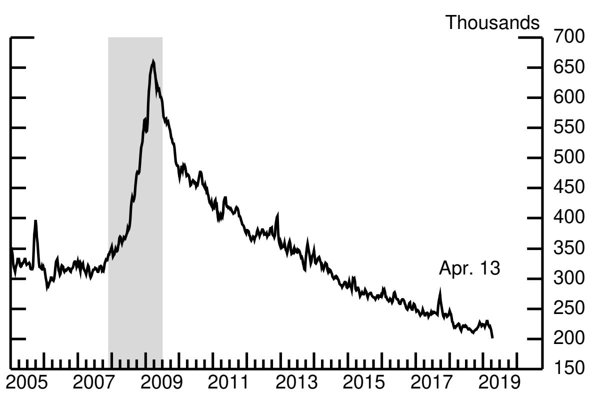
Labor Force Participation Rate*





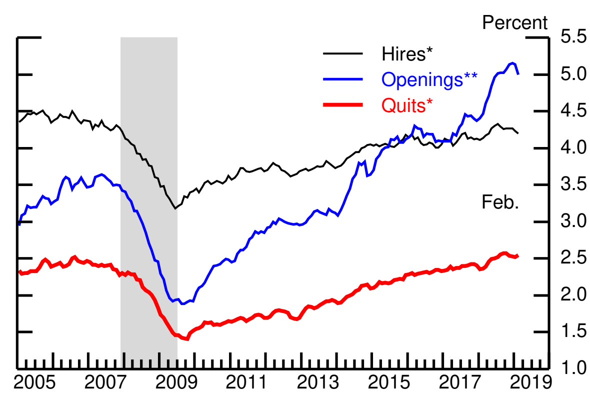
* Published data adjusted by staff to account for changes in population weights.
** Includes staff estimate of the effect of extended and emergency unemployment benefits.
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

Initial Unemployment Insurance Claims*



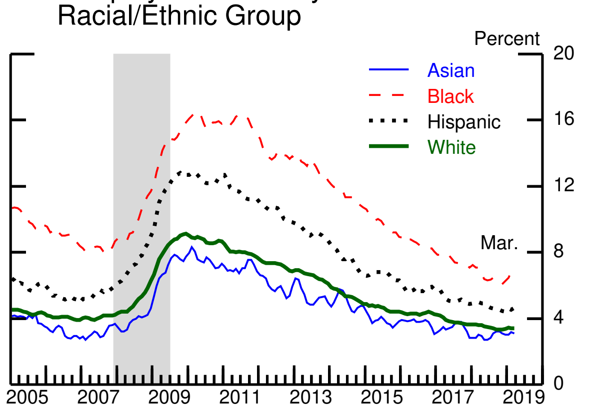
* 4-week moving average.
Source: U.S. Department of Labor, Employment and Training Administration.

Hires, Quits, and Job Openings



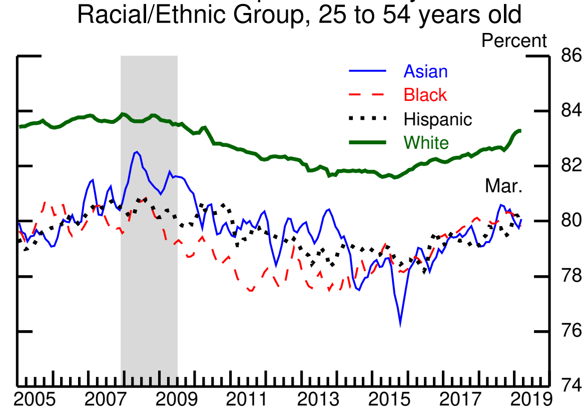
* Percent of private nonfarm payroll employment, 3-month moving average.
** Percent of private nonfarm payroll employment plus unfilled jobs, 3-month moving average.
Source: Job Openings and Labor Turnover Survey.

Unemployment Rate by Racial/Ethnic Group



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

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

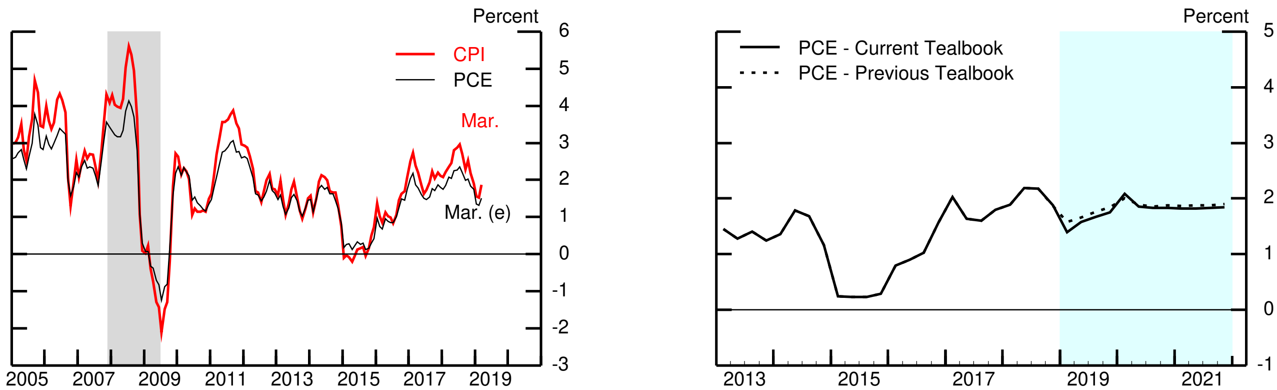


Note: These categories are not mutually exclusive, as the ethnicity Hispanic may include people of any race. The Current Population Survey defines Hispanic ethnicity as those who report their origin is Mexican, Puerto Rican, Cuban, Central American, or South American (and some others). 3-month moving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

Inflation Developments and Outlook (1)

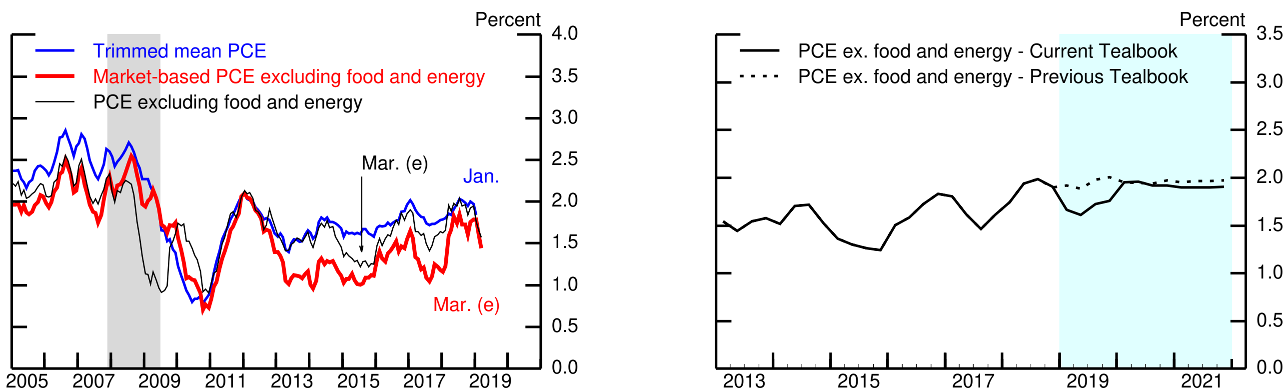
(Percent change from year-earlier period)

Headline Consumer Price Inflation



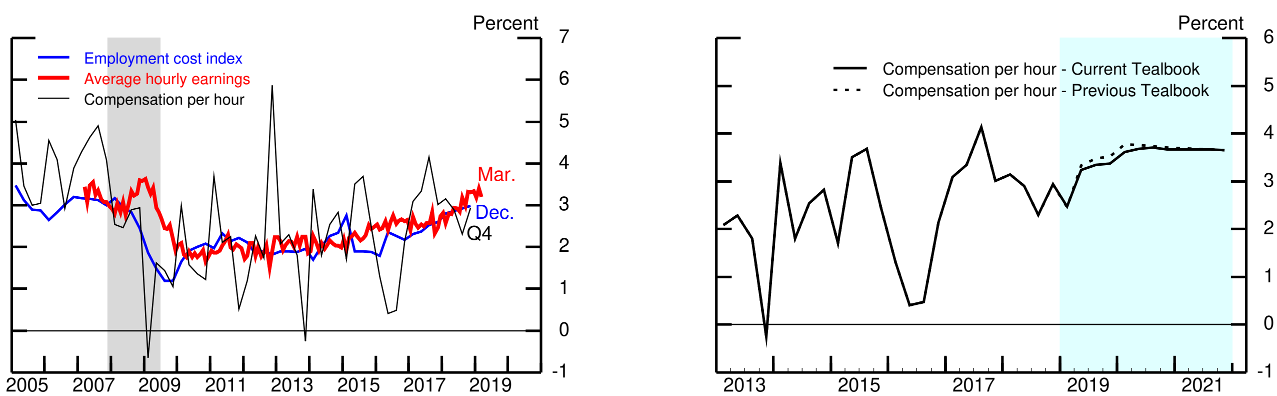
Note: PCE prices from February to March 2019 are staff estimates (e).
Source: For CPI, U.S. Department of Labor, Bureau of Labor Statistics; for PCE, U.S. Department of Commerce, Bureau of Economic Analysis.

Measures of Core PCE Price Inflation



Note: Core PCE prices from February to March 2019 are staff estimates (e).
Source: For trimmed mean PCE, Federal Reserve Bank of Dallas; otherwise, U.S. Department of Commerce, Bureau of Economic Analysis.

Labor Cost Growth



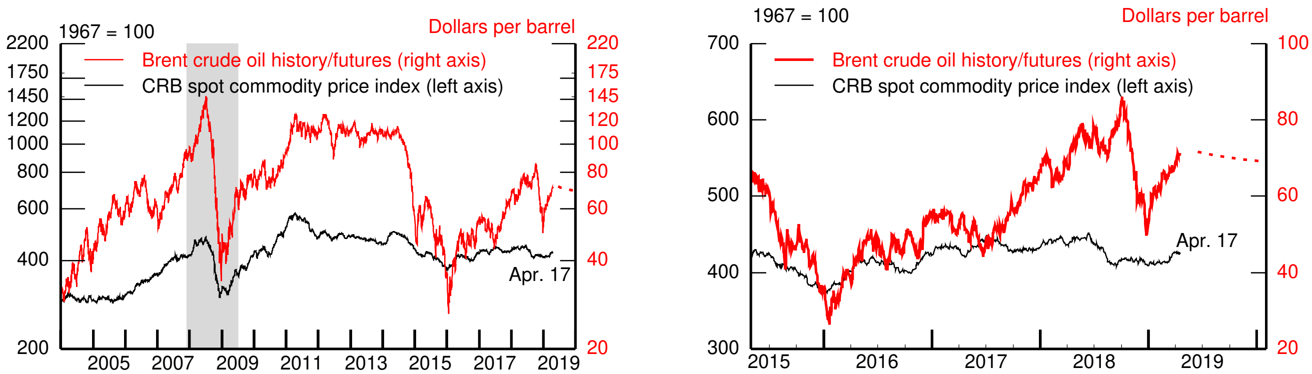
Note: Compensation per hour is for the business sector. Average hourly earnings are for the private nonfarm sector. The employment cost index is for the private sector.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

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

Inflation Developments and Outlook (2)

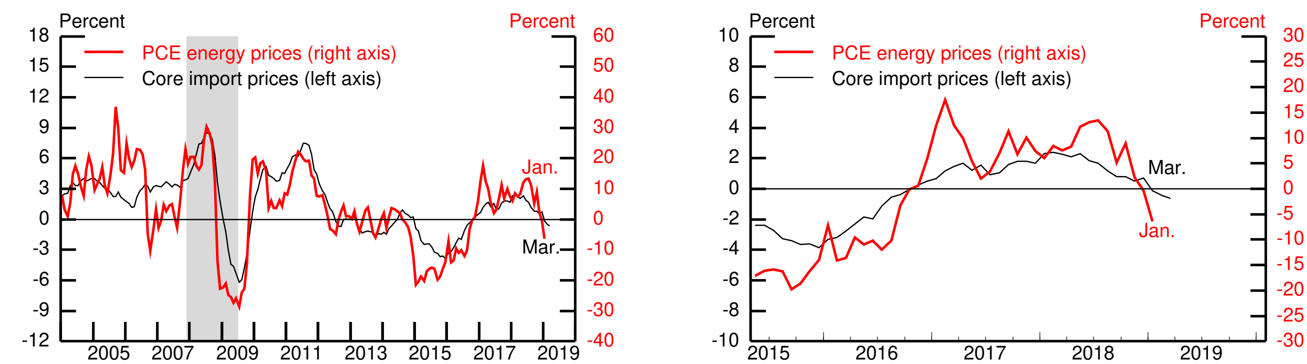
(Percent change from year-earlier period, except as noted)

Commodity and Oil Price Levels



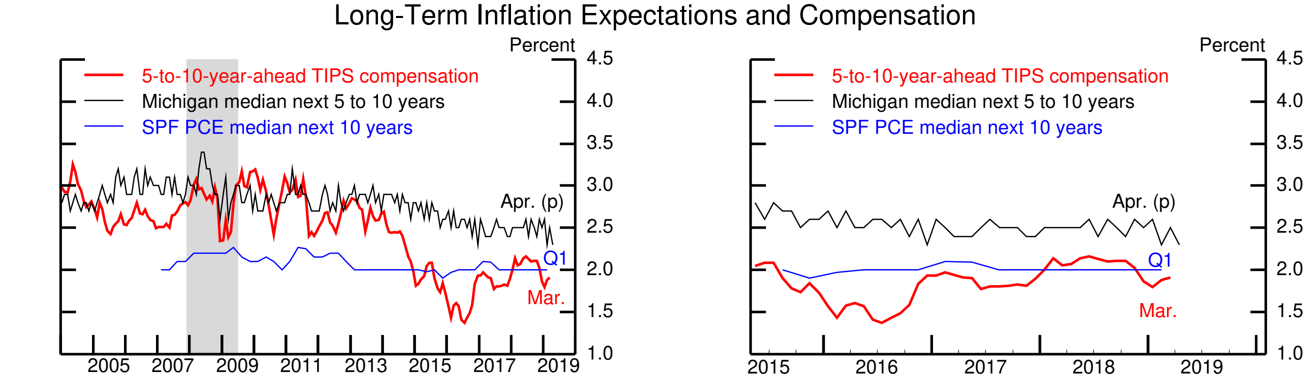
Note: Futures prices (dotted lines) are the latest observations on monthly futures contracts.
Source: For oil prices, U.S. Department of Energy, Energy Information Agency; for commodity prices, Commodity Research Bureau (CRB).

Energy and Import Price Inflation



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

Long-Term Inflation Expectations and Compensation



Note: Based on a comparison of an estimated TIPS (Treasury Inflation-Protected Securities) yield curve with an estimated nominal off-the-run Treasury yield curve, with an adjustment for the indexation-lag effect.
(p) Preliminary.
SPF Survey of Professional Forecasters.
Source: For Michigan, University of Michigan Surveys of Consumers; for SPF, Federal Reserve Bank of Philadelphia; for TIPS, Federal Reserve Board staff calculations.

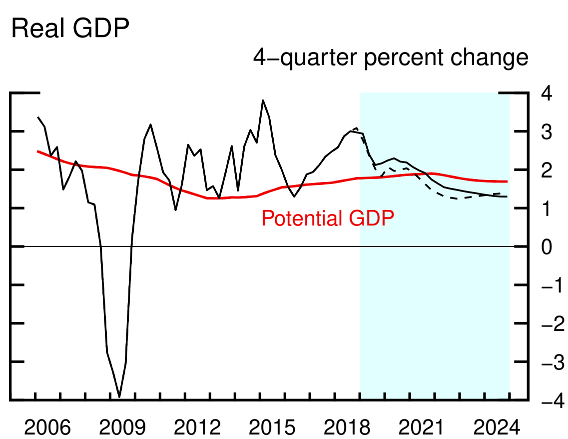
Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

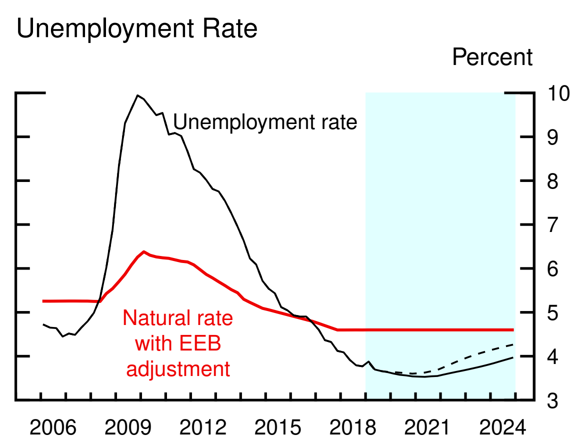
The Long–Term Outlook

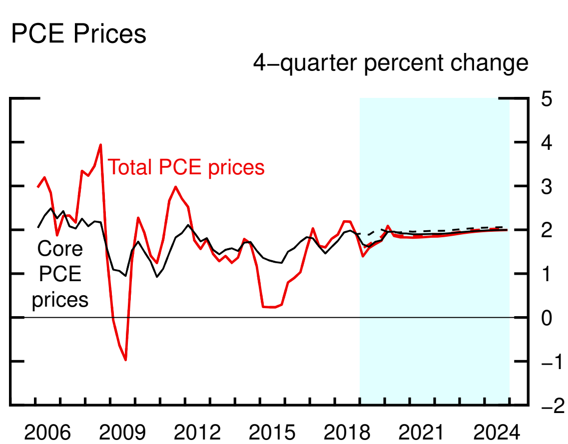
(Percent change, Q4 to Q4, except as noted)

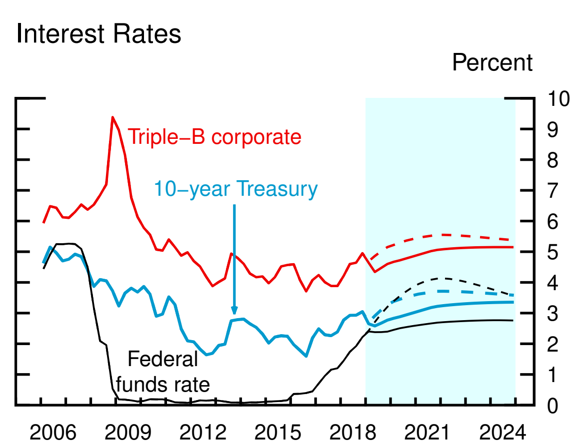
Measure	2019	2020	2021	2022	2023	2024	Longer run
Real GDP	2.2	2.2	1.7	1.5	1.4	1.3	1.7
Previous Tealbook	1.8	2.0	1.5	1.2	1.3	1.4	1.7
Civilian unemployment rate[1]	3.6	3.5	3.5	3.7	3.8	4.0	4.6
Previous Tealbook	3.6	3.6	3.7	3.9	4.1	4.3	4.6
PCE prices, total	1.8	1.8	1.8	1.9	2.0	2.0	2.0
Previous Tealbook	1.8	1.9	1.9	1.9	2.0	2.0	2.0
Core PCE prices	1.8	1.9	1.9	1.9	2.0	2.0	2.0
Previous Tealbook	2.0	2.0	2.0	2.0	2.0	2.1	2.0
Federal funds rate[1]	2.39	2.58	2.69	2.74	2.76	2.76	2.50
Previous Tealbook	3.20	3.84	4.12	4.04	3.82	3.57	2.50
10-year Treasury yield[1]	2.8	3.0	3.2	3.3	3.3	3.4	3.4
Previous Tealbook	3.3	3.6	3.7	3.7	3.6	3.6	3.4

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





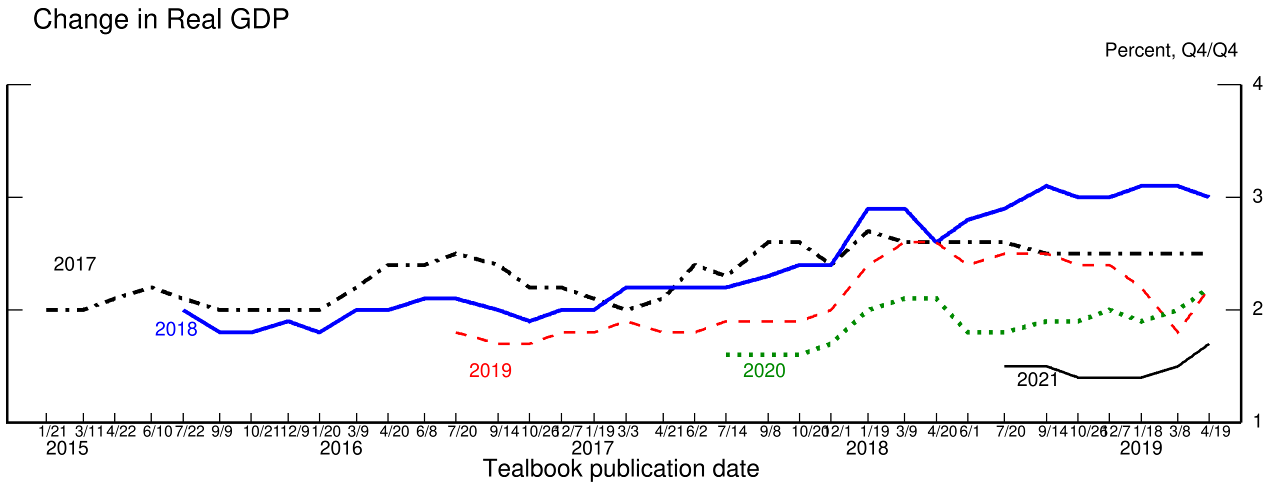


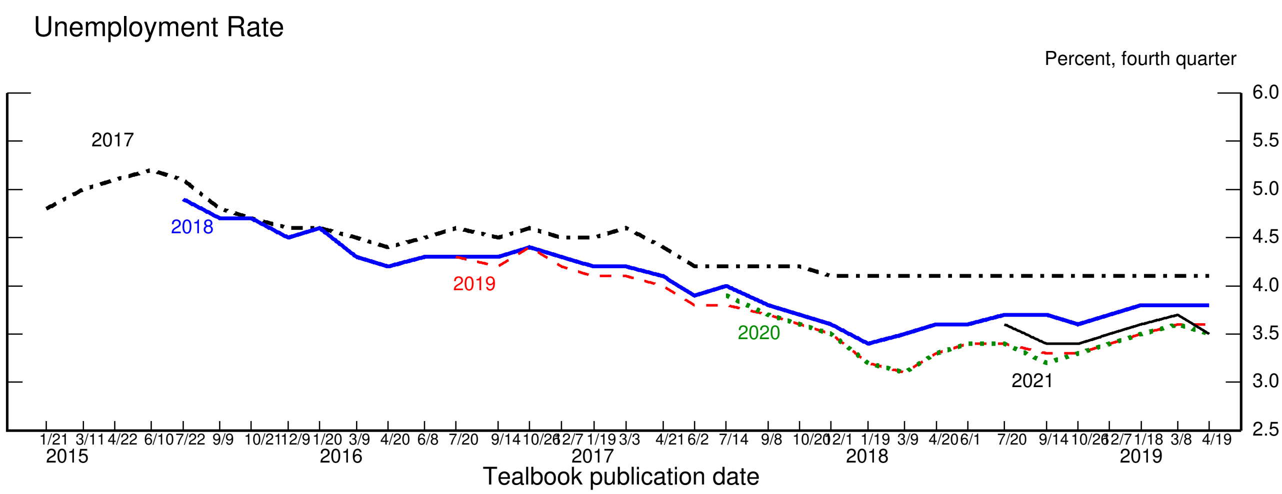


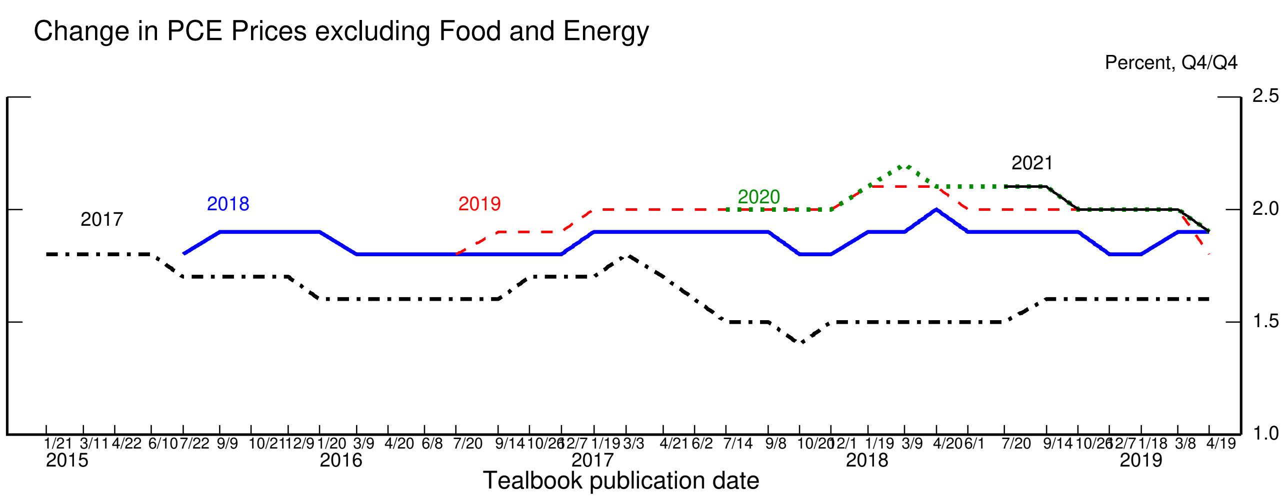
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

Domestic Econ Devel & Outlook

Evolution of the Staff Forecast







The Foreign GDP Outlook

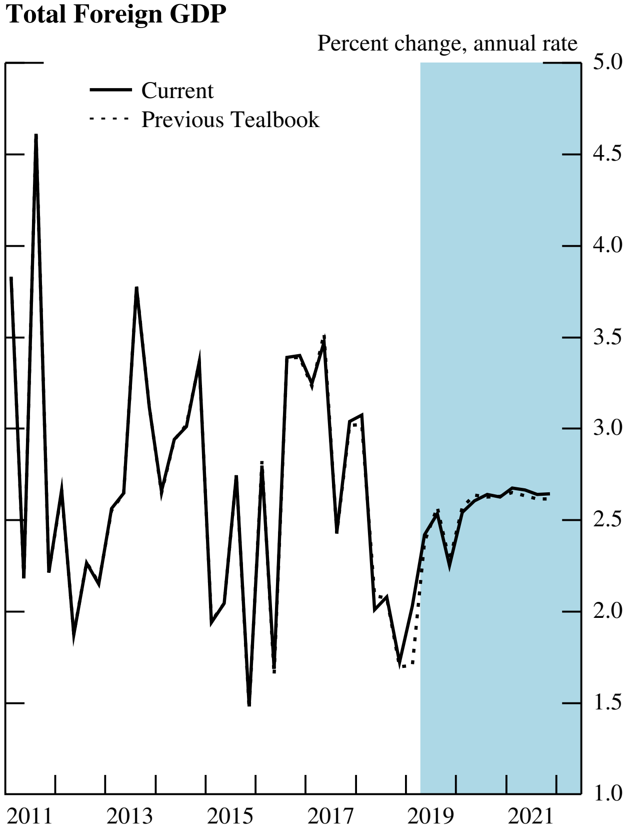
Real GDP* Percent change, annual rate

	2018 H1	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 H2	2020	2021
1. Total Foreign	2.5	2.1	1.7	2.0	2.4	2.4	2.6	2.7
Previous Tealbook	2.6	2.1	1.7	1.7	2.4	2.4	2.6	2.6
2. Advanced Foreign Economies	1.7	1.0	.8	1.2	1.4	1.3	1.6	1.7
Previous Tealbook	1.7	1.0	.8	.9	1.4	1.3	1.6	1.7
3. Canada	1.9	2.0	.4	1.0	2.1	1.7	1.9	1.8
4. Euro Area	1.6	.6	.9	1.4	1.1	1.0	1.4	1.7
5. Japan	.8	-2.4	1.9	.3	.6	-.1	.9	.8
6. United Kingdom	.9	2.8	.9	1.5	.5	1.4	1.7	1.6
7. Emerging Market Economies	3.3	3.1	2.6	2.9	3.4	3.5	3.6	3.6
Previous Tealbook	3.4	3.1	2.6	2.5	3.4	3.5	3.6	3.6
8. China	6.8	5.8	6.0	7.1	6.6	6.1	6.0	5.8
9. Emerging Asia ex. China	4.1	2.6	2.8	2.6	3.3	3.6	3.6	3.5
10. Mexico	1.7	2.4	1.0	1.3	2.1	2.2	2.5	2.7
11. Brazil	.9	2.2	.5	.0	1.5	2.3	2.6	2.8

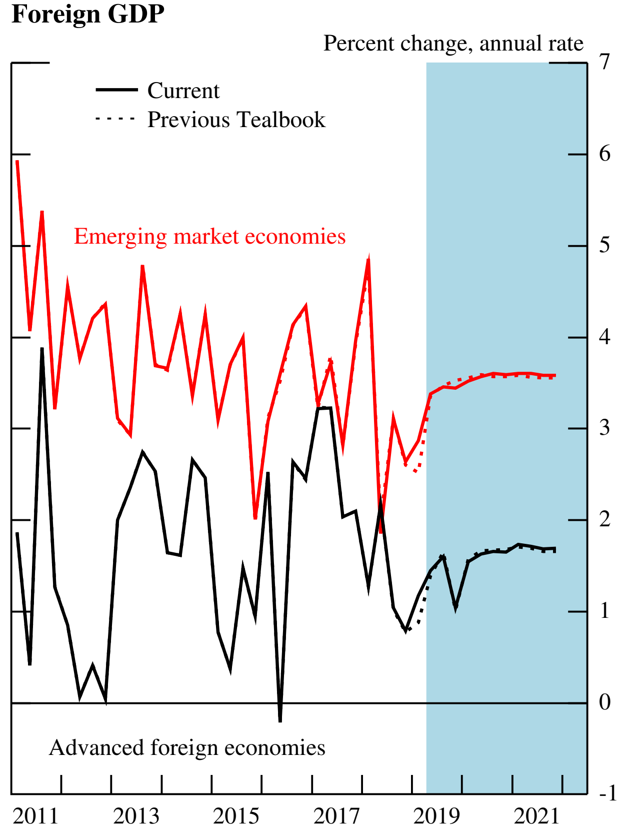
* GDP aggregates weighted by shares of U.S. merchandise exports.

Int'l Econ Devel & Outlook

Total Foreign GDP



Foreign GDP



The Foreign Inflation Outlook

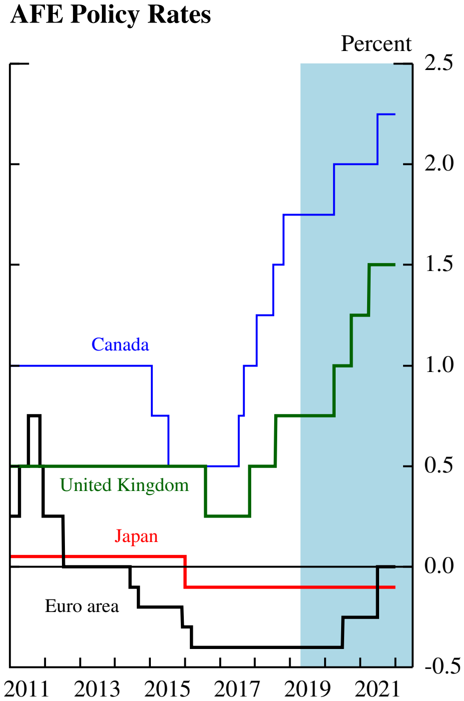
Consumer Prices* — Percent change, annual rate

	2018 H1	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 H2	2020	2021
1. Total Foreign	2.2	3.4	1.9	.7	2.5	2.4	2.3	2.3
Previous Tealbook	2.1	3.6	2.0	.5	2.3	2.4	2.3	2.3
2. Advanced Foreign Economies	1.9	2.4	.8	.6	1.6	1.9	1.4	1.5
Previous Tealbook	1.9	2.5	.7	.5	1.6	1.9	1.5	1.5
3. Canada	2.2	2.6	1.1	1.5	3.0	2.0	1.9	1.9
4. Euro Area	2.2	2.6	.7	-.1	1.1	1.3	1.2	1.3
5. Japan	.6	2.0	-.1	.9	.8	3.7	.9	1.0
6. United Kingdom	2.2	2.8	2.0	.7	2.0	2.2	2.2	2.2
7. Emerging Market Economies	2.5	4.1	2.7	.8	3.0	2.7	2.8	2.8
Previous Tealbook	2.3	4.3	2.8	.6	2.7	2.7	2.8	2.8
8. China	1.5	3.7	2.0	.6	3.4	2.1	2.5	2.5
9. Emerging Asia ex. China	2.2	2.0	1.2	-.0	2.1	2.7	2.8	2.7
10. Mexico	4.0	6.5	4.9	1.1	2.8	3.3	3.2	3.2
11. Brazil	3.7	6.6	2.5	2.9	4.8	4.2	4.3	4.3

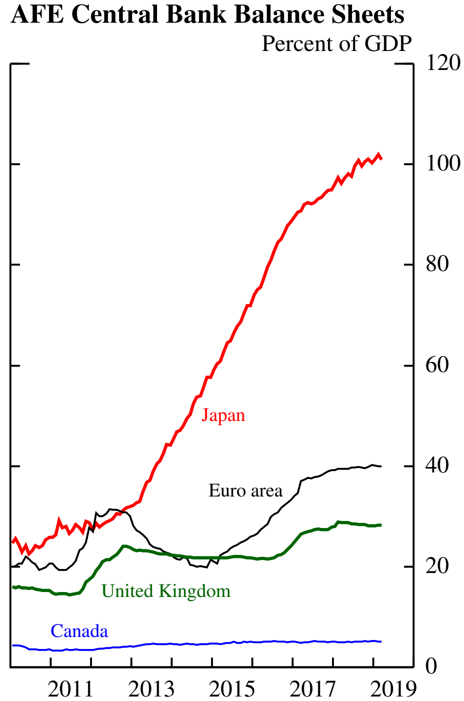
* CPI aggregates weighted by shares of U.S. non-oil imports.

Foreign Monetary Policy

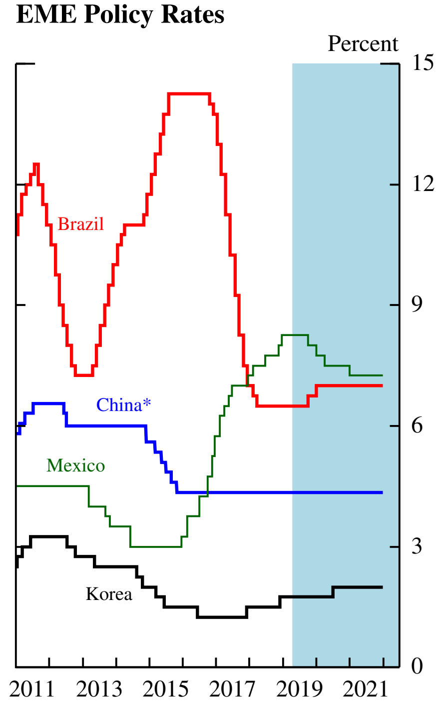
AFE Policy Rates



AFE Central Bank Balance Sheets



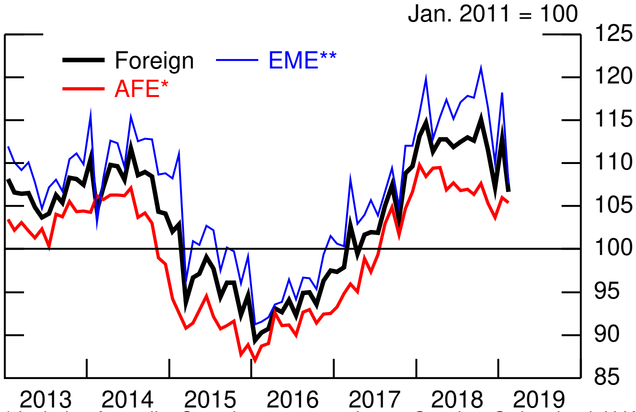
EME Policy Rates



* 1-year benchmark lending rate.

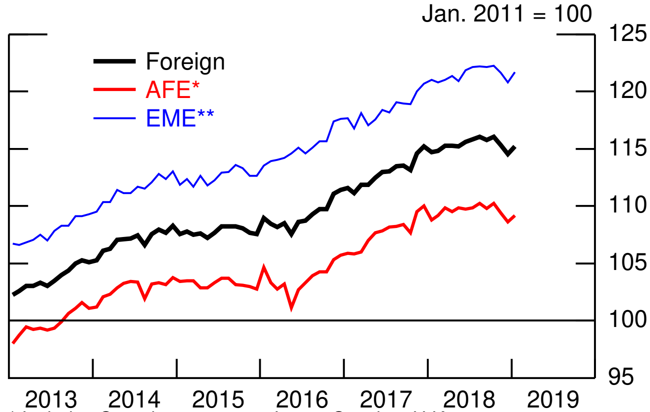
Recent Foreign Indicators

Nominal Exports



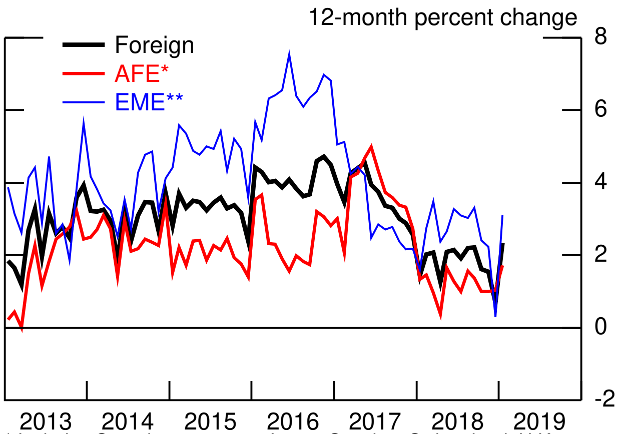
* Includes Australia, Canada, euro area, Japan, Sweden, Switzerland, U.K.
** Includes Argentina, Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Israel, Korea, Malaysia, Mexico, Singapore, Taiwan, Thailand.

Industrial Production



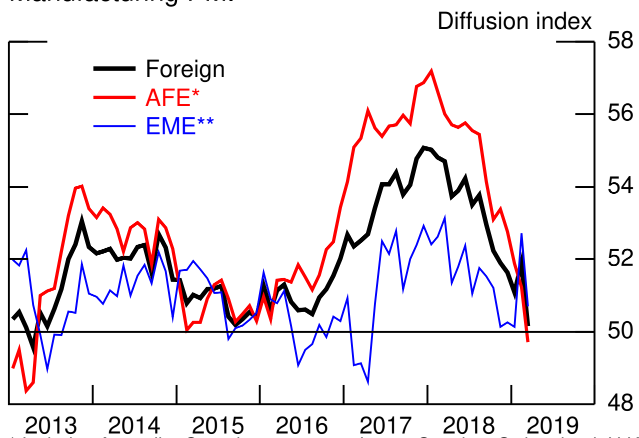
* Includes Canada, euro area, Japan, Sweden, U.K.
** Includes Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Israel, Korea, Malaysia, Mexico, Philippines, Russia, Singapore, Taiwan, Thailand.

Retail Sales



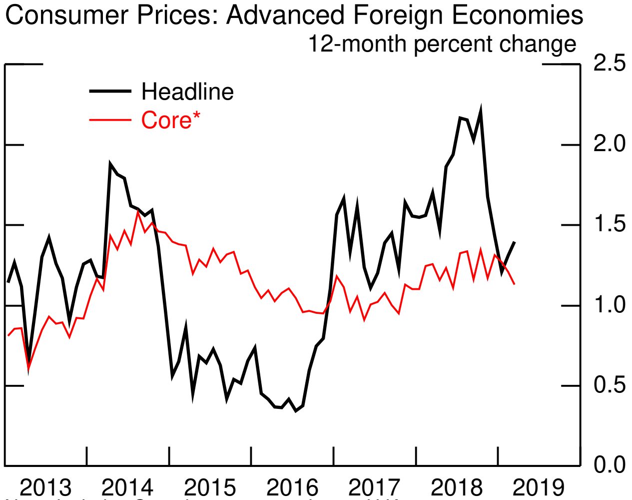
* Includes Canada, euro area, Japan, Sweden, Switzerland, U.K.
** Includes Brazil, Chile, China, Korea, Mexico, Singapore, Taiwan.

Manufacturing PMI



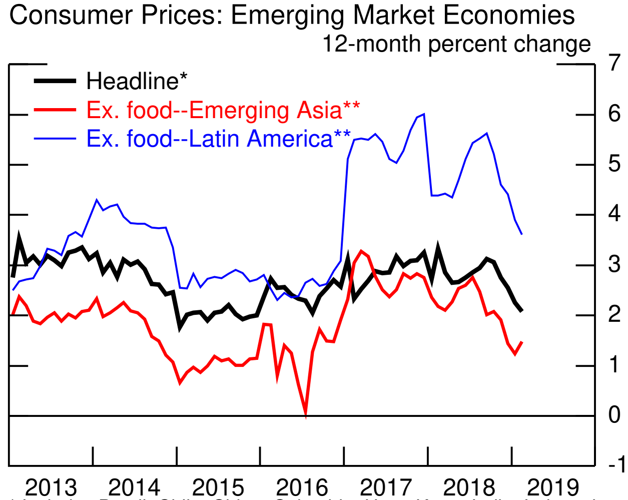
* Includes Australia, Canada, euro area, Japan, Sweden, Switzerland, U.K.
** Includes Brazil, China, India, Indonesia, Israel, Korea, Mexico, Russia, Singapore, Taiwan, and Turkey.

Consumer Prices: Advanced Foreign Economies



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

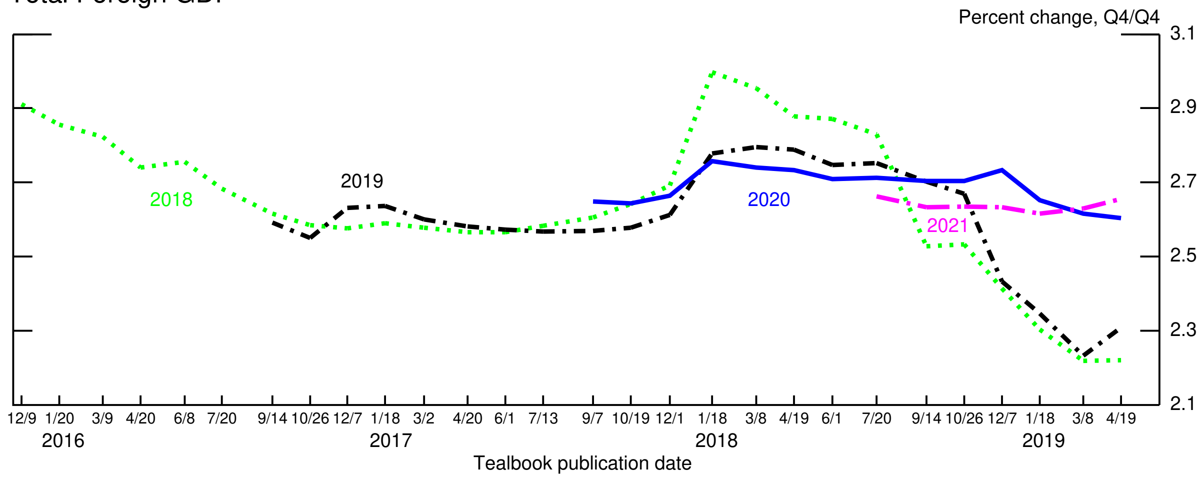
Consumer Prices: Emerging Market Economies



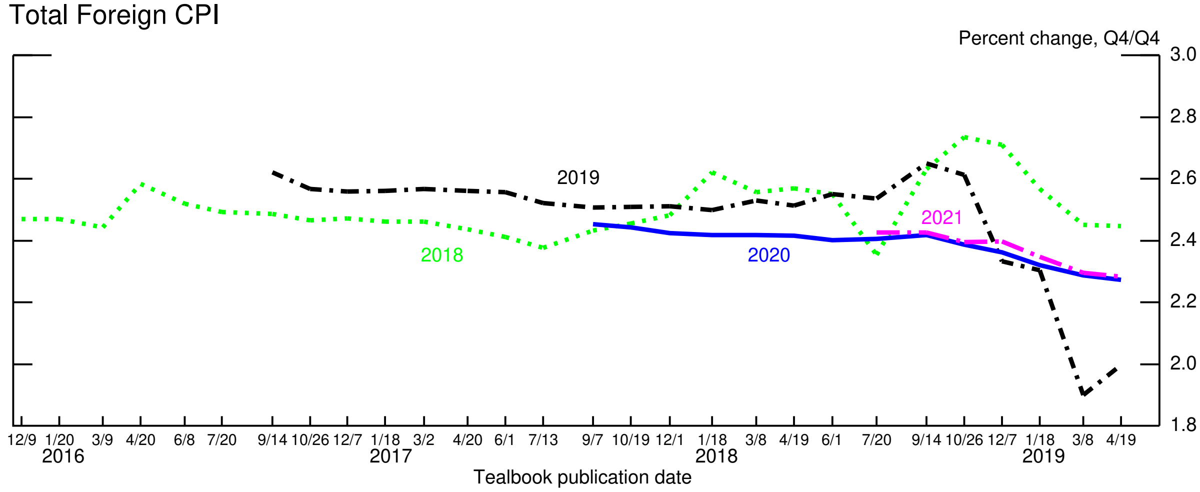
* Includes Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Singapore, Taiwan, Thailand.
** Excludes all food; staff calculation. Latin America excludes Argentina and Venezuela.

Evolution of Staff’s International Forecast

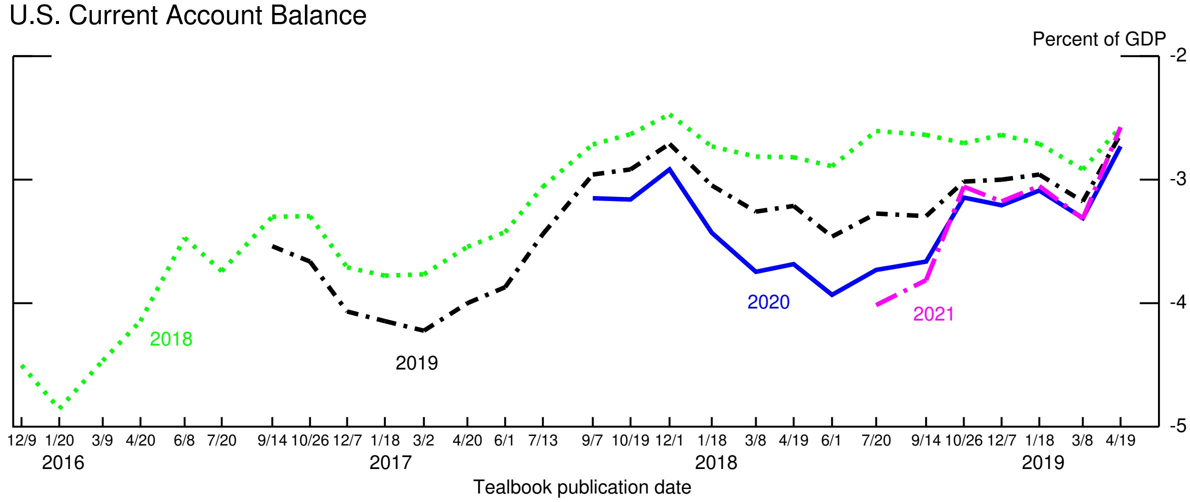
Total Foreign GDP



Total Foreign CPI

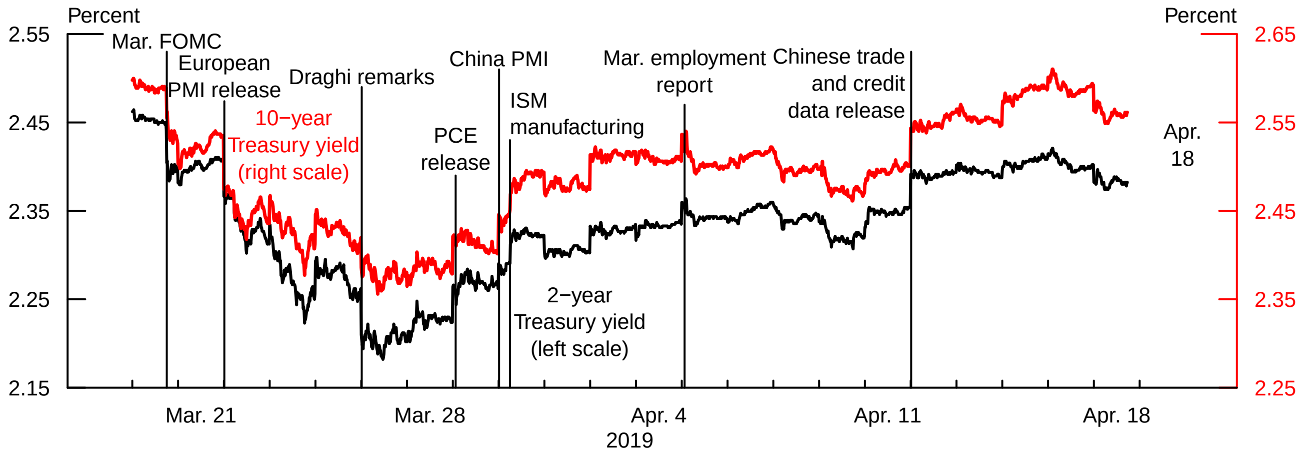


U.S. Current Account Balance



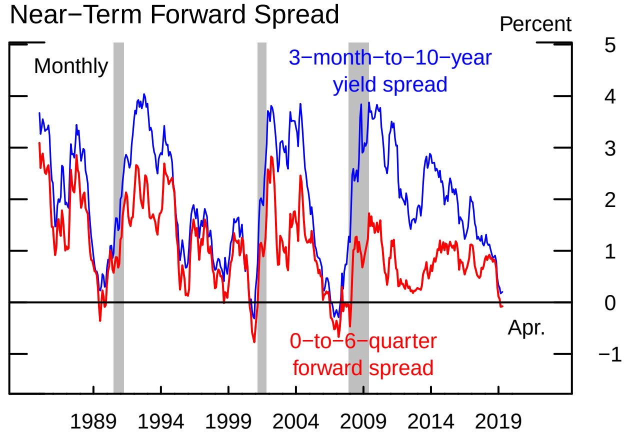
Policy Expectations and Treasury Yields

Selected Interest Rates



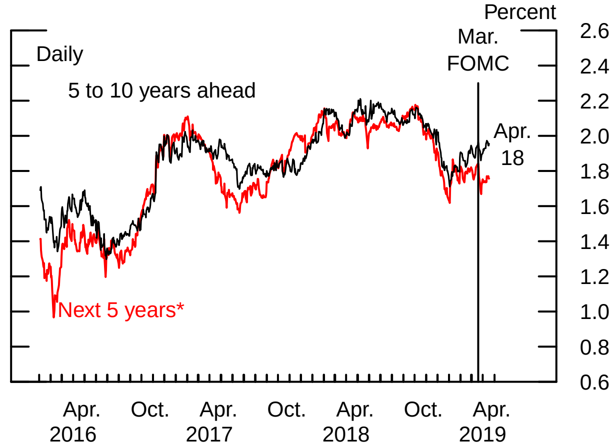
Note: 5−minute intervals, 8:00 a.m. to 4:00 p.m.
Source: Bloomberg.

Long−Term Yield Spread and Near−Term Forward Spread



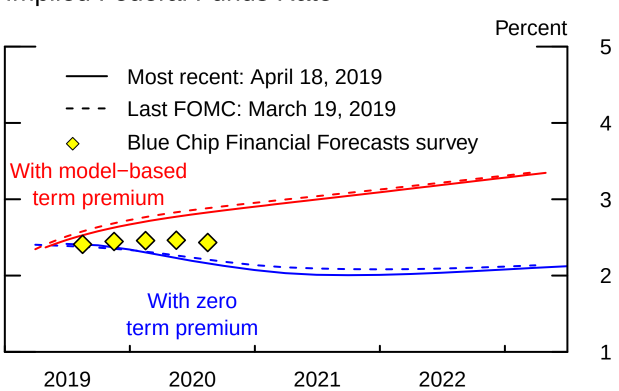
Note: The 0−to−6−quarter forward spread is the difference between the 3−month Treasury bill yield and the implied forward rate between 6 and 7 quarters ahead based on a smoothed Treasury yield curve. Data through March 2019 are monthly averages. Data for April 2019 are based on values for April 18. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.
Source: Federal Reserve Bank of New York; Board staff calculations.

TIPS−Based Inflation Compensation



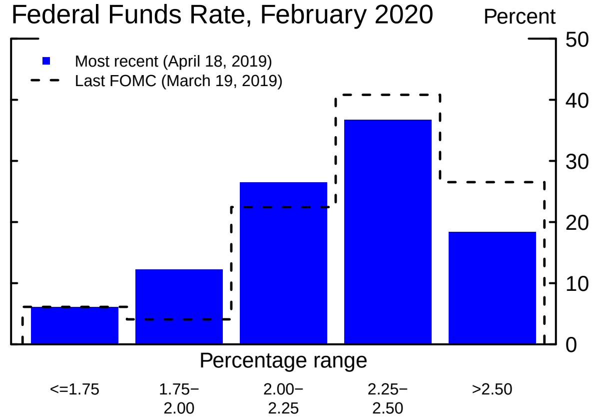
Note: Estimates based on smoothed nominal and inflation−indexed Treasury yield curves.
* Adjusted for lagged indexation of Treasury Inflation−Protected Securities (carry effect).
Source: Federal Reserve Bank of New York; Board staff calculations.

Implied Federal Funds Rate



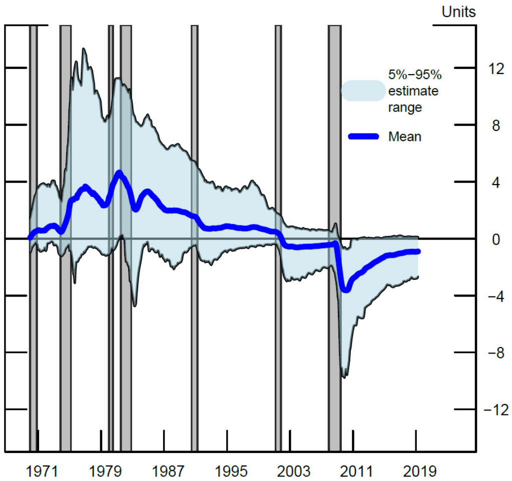
Note: Zero term premium path is estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points. Model−based term premium path is estimated using a term structure model maintained by Board staff and corrects for term premium. The Blue Chip path is the average of respondents' expectations for the federal funds rate in the survey published April 1.
Source: Bloomberg; Wolters Kluwer Legal and Regulatory Solutions U.S., Blue Chip Financial Forecasts; Board staff calculations.

Market−Implied Probability Distribution of the Federal Funds Rate, February 2020



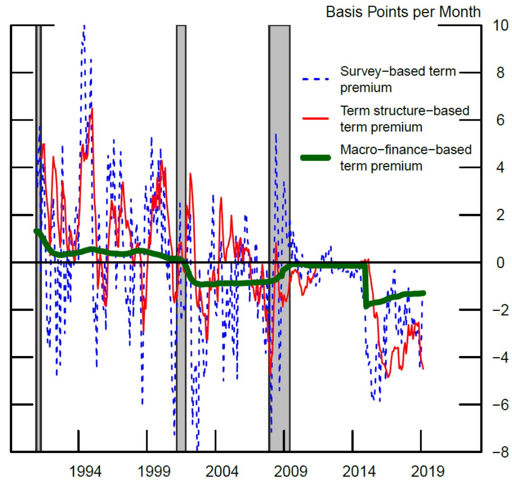
Note: Estimated from federal funds futures options, not adjusted for risk premiums.
Source: CME Group; Board staff calculations.

Figure 1: Measure of Covariance−based Risk*



*Covariance−based risk is estimated by the negative covariance between real activity and nominal measures.
Source: BLS; ICM.

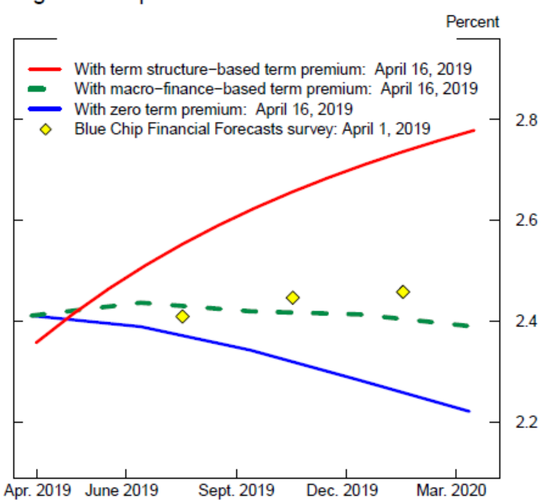
Figure 2: Measures of Term Premiums at 6−Month Horizon



Source: Wolters Kluwer Legal and Regulatory Solutions U.S., Blue Chip Financial Forecasts; CME Group.

Figure 3 shows the implications of the macro-finance model for the current path of the federal funds rate. A straight read from OIS contracts (the blue line) currently implies that the federal funds rate will decline 12 basis points by the end of 2019. In contrast, the staff's standard term structure model (the red line) suggests 29 basis points of tightening. By subtracting the term premium estimates of the macro-finance model from the straight read from OIS contracts, one can obtain an alternative estimate of the term premium–adjusted path for the near term. Such a path (the dashed green line) currently suggests no additional tightening through year-end. That said, the true expected path for the federal funds rate likely lies somewhere in the range of the red and green lines, as both the staff model and the macro-finance model embed model uncertainty. Furthermore, like all models, the macro-finance method is not without drawbacks. In particular, it mainly captures lower-frequency movements based on macro data that are only available monthly. Therefore, it has less to say about movements in risk premiums on a daily or intermeeting period basis than, for example, the staff's standard term structure model.

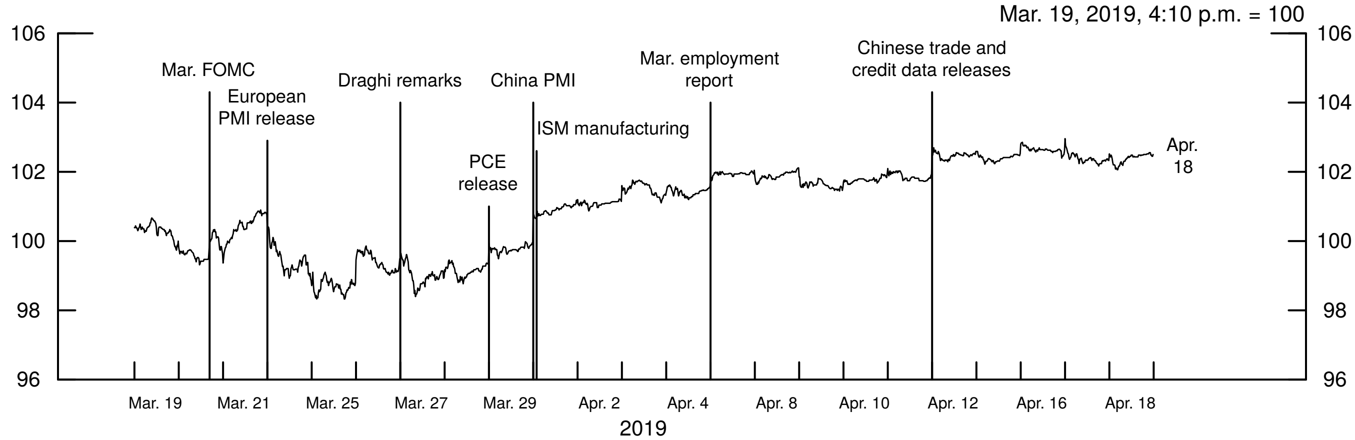
Figure 3: Implied Federal Funds Rate



Note: Zero term premium path is estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points. The Blue Chip path is the average of respondents' expectations for the federal funds rate in the survey published April 1.
Source: Bloomberg; Wolters Kluwer Legal and Regulatory Solutions U.S., Blue Chip Financial Forecasts; Board staff calculations.

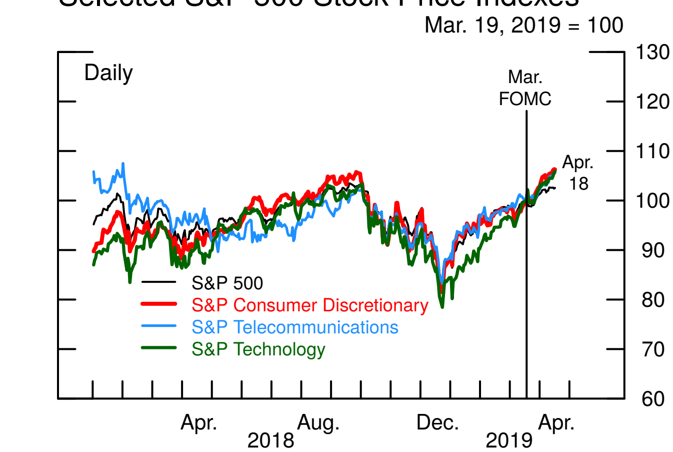
Corporate Asset Market Developments

Intraday S&P 500 Futures



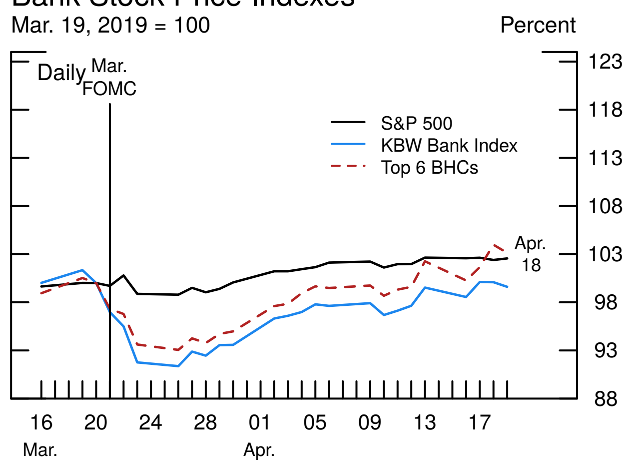
Note: Data are spaced at 5-minute intervals from 9:30 a.m. to 4:10 p.m.
Source: Bloomberg.

Selected S&P 500 Stock Price Indexes



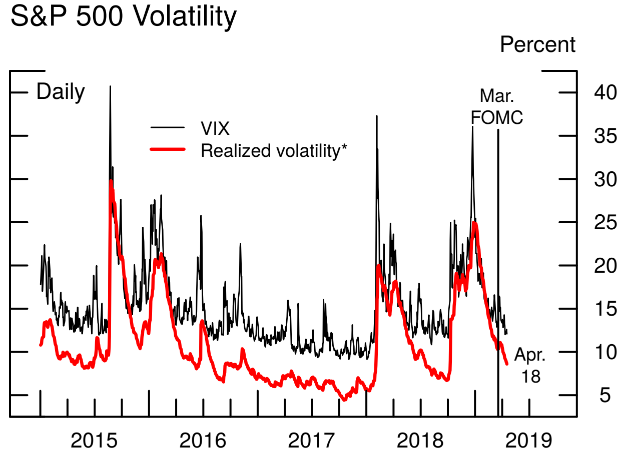
Source: Bloomberg.

Bank Stock Price Indexes



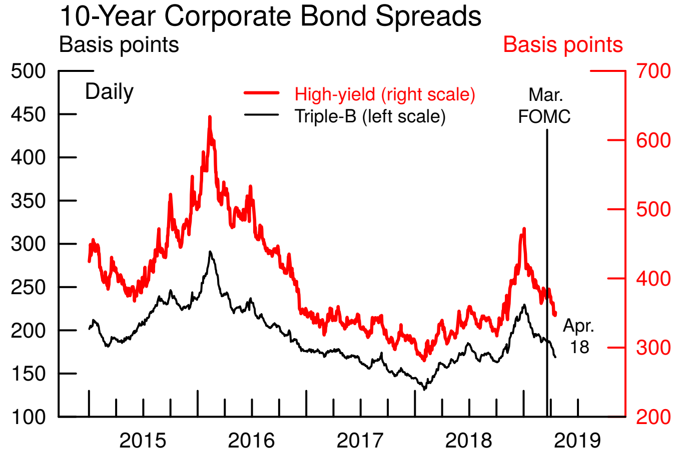
Note: Top 6 bank holding companies (BHCs) are Bank of America, Citi, Goldman Sachs, Morgan Stanley, JPMorgan Chase, and Wells Fargo.
Source: Bloomberg.

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

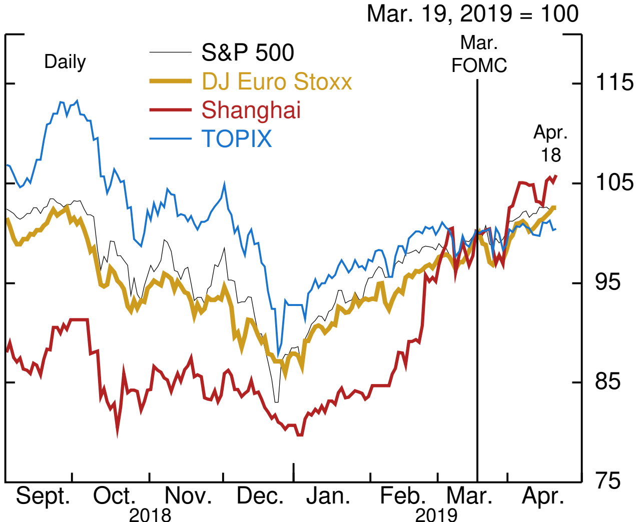


Note: Spreads over 10-year Treasury yield.
Source: Merrill Lynch; Federal Reserve Bank of New York; Board staff calculations.

Financial Markets

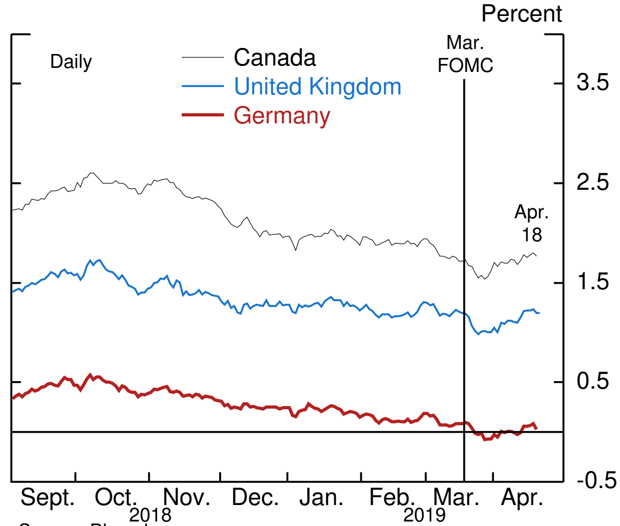
Recent International Developments

Equity Indexes



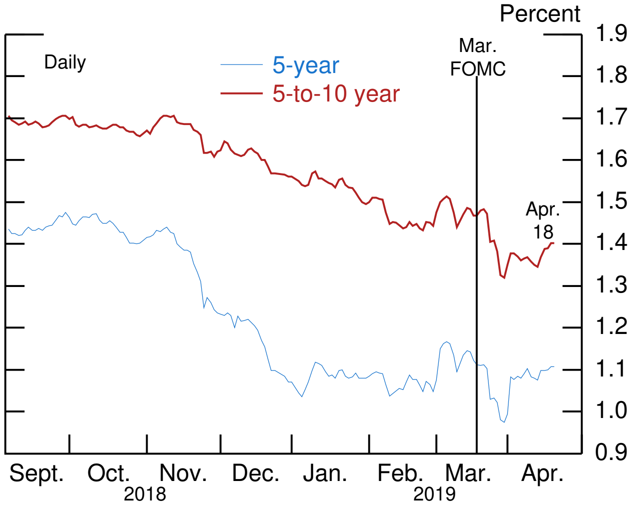
Note: Indexes denominated in local currency.
Source: Bloomberg.

10-Year AFE Sovereign Yields



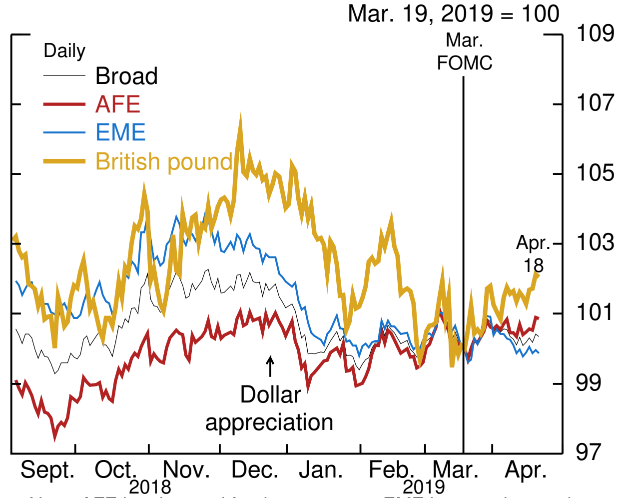
Source: Bloomberg.

Euro-Area Inflation Compensation



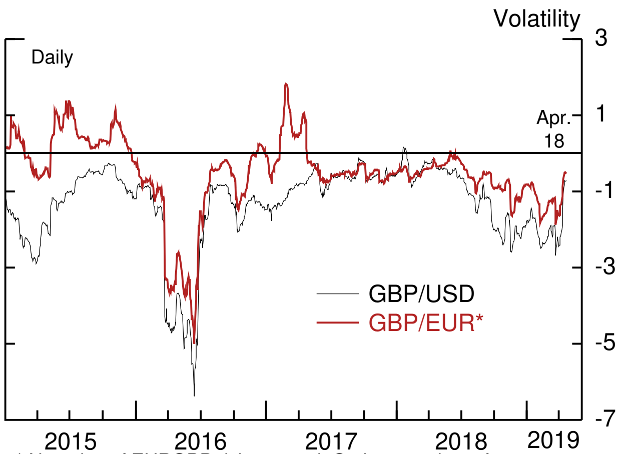
Source: Zero-coupon inflation swaps.

Exchange Rates



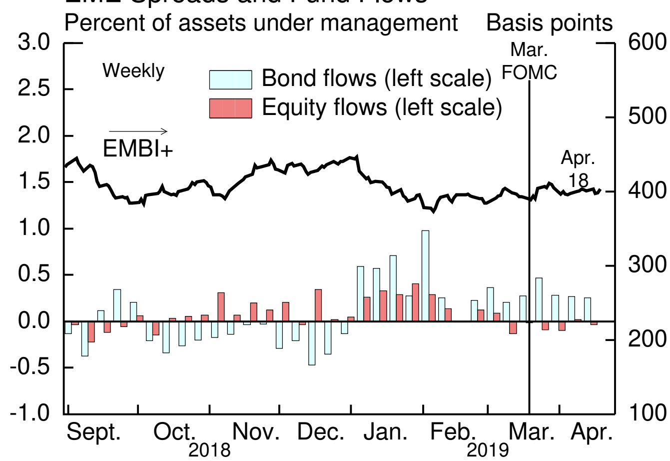
Note: AFE is advanced foreign economy. EME is emerging market economy.
Source: Bloomberg; Federal Reserve Bank of New York; Board staff calculations.

3-Month FX Risk Reversals



* Negative of EURGBP risk reversal. Option premiums for insuring against pound depreciation.
Source: Bloomberg.

EME Spreads and Fund Flows*

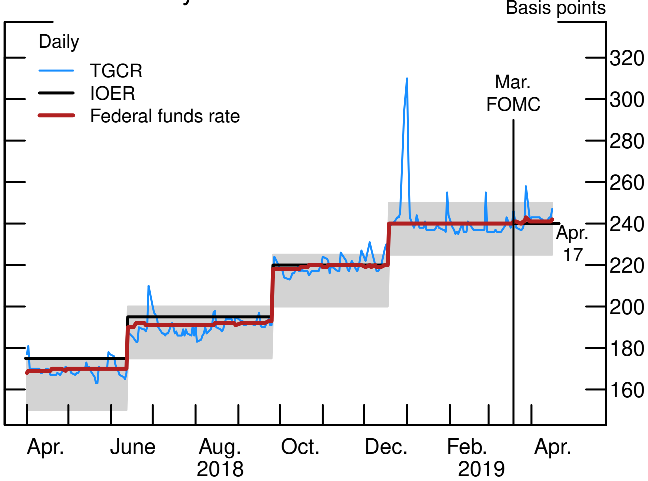


Note: EMBI+ refers to emerging market bond spreads to Treasury securities.
* Average weekly flow by month.
Source: Emerging Portfolio Fund Research. Excludes intra-China flows.

Financial Markets

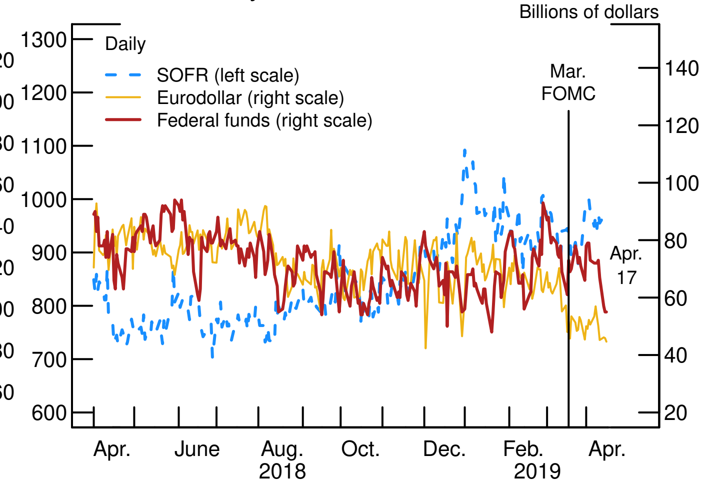
Short–Term Funding Markets

Selected Money Market Rates



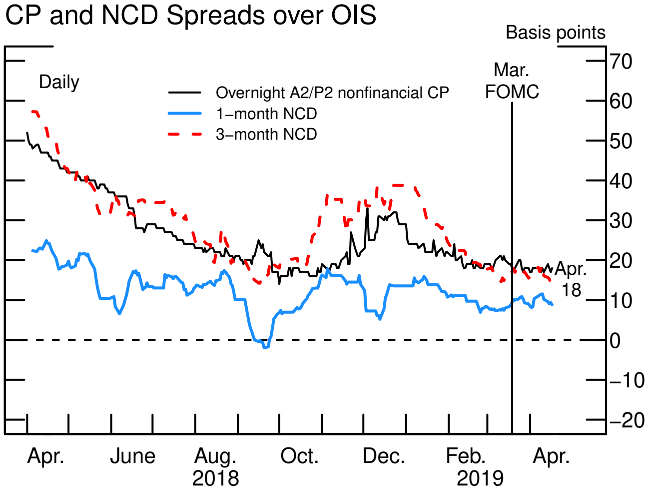
Note: Federal funds rate is a weighted median. Shaded area is the target range for the federal funds rate. IOER is interest on excess reserves. TGCR is triparty general collateral rate.
Source: Federal Reserve Board, Form FR 2420, Report of Selected Money Market Rates.

Selected Money Market Volumes



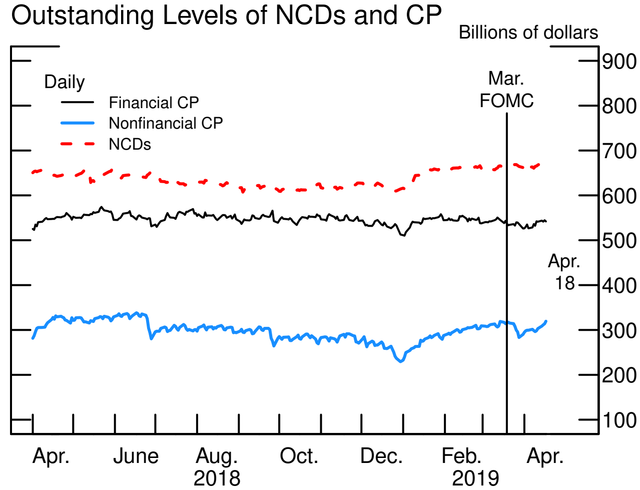
Note: SOFR is Secured Overnight Financing Rate.
Source: Federal Reserve Board, Form FR 2420, Report of Selected Money Market Rates.

CP and NCD Spreads over OIS



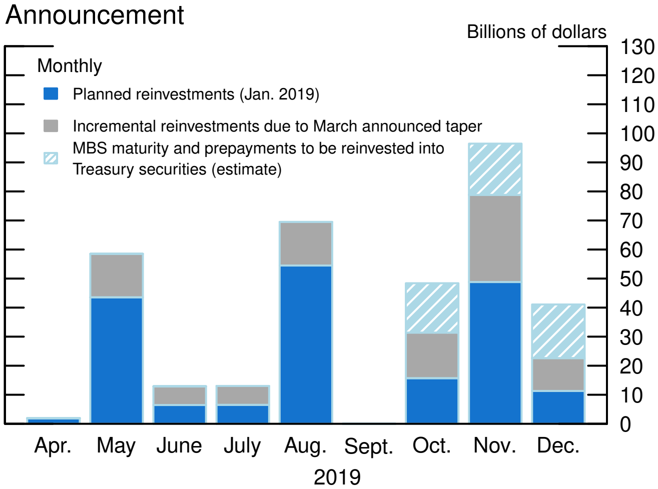
Note: CP is commercial paper; NCD is negotiable certificate of deposit. Overnight CP spread is to federal funds rate. 3−month NCD spread is computed as a 5−day moving average.
Source: Depository Trust & Clearing Corporation.

Outstanding Levels of NCDs and CP



Note: CP is commercial paper; NCD is negotiable certificate of deposit. Levels are not seasonally adjusted and include both foreign and domestic issuers. The chart considers only outstanding NCDs maturing in one year or less.
Source: Depository Trust & Clearing Corporation.

Fed Reinvestments Before and After March 2019 Announcement

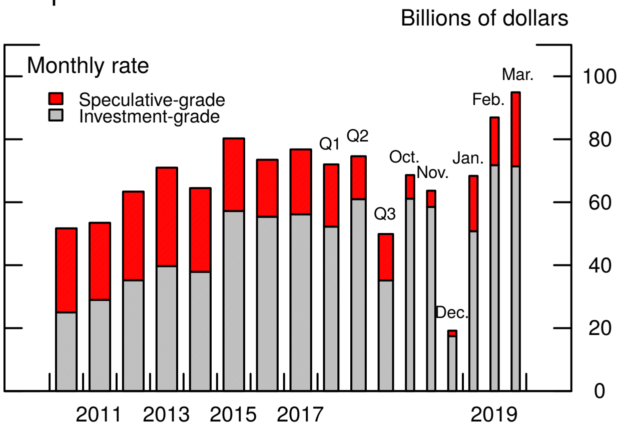


Note: There are no anticipated reinvestments in September 2019.
Source: Board staff estimates as of April 2019.

Financial Markets

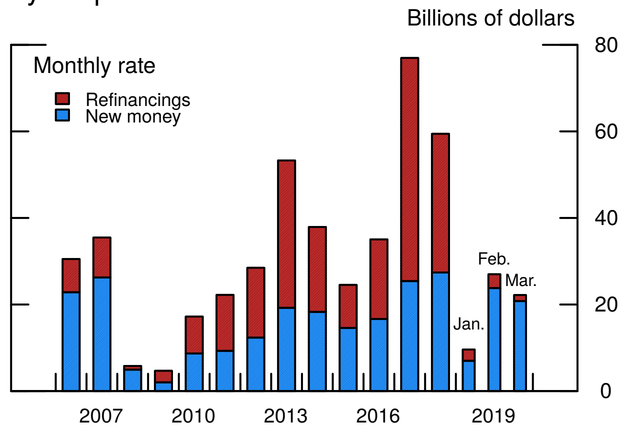
Business Finance

Gross Issuance of Nonfinancial Corporate Bonds



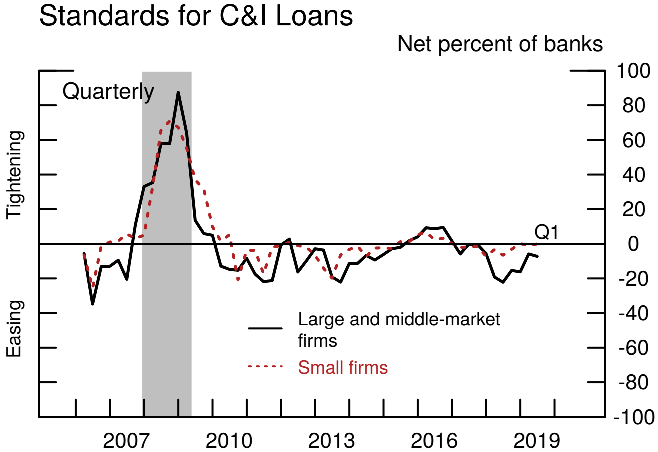
Note: Bonds are categorized by Moody's, Standard & Poor's, and Fitch.
Source: Mergent Fixed Income Securities Database.

Institutional Leveraged Loan Issuance, by Purpose



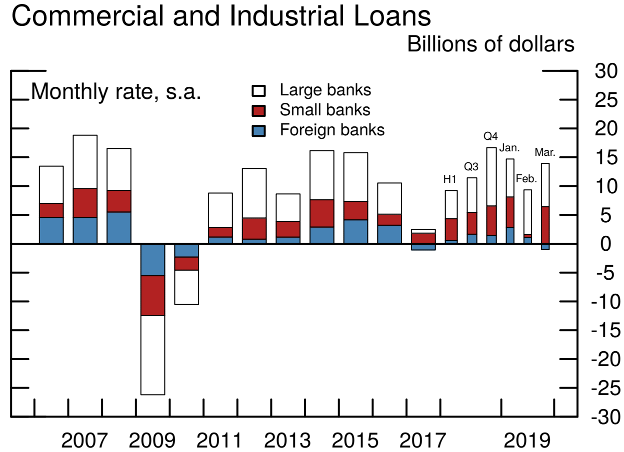
Note: The annual bars are divided by 12 to arrive at monthly averages.
Source: Thomson Reuters LPC.

Standards for C&I Loans



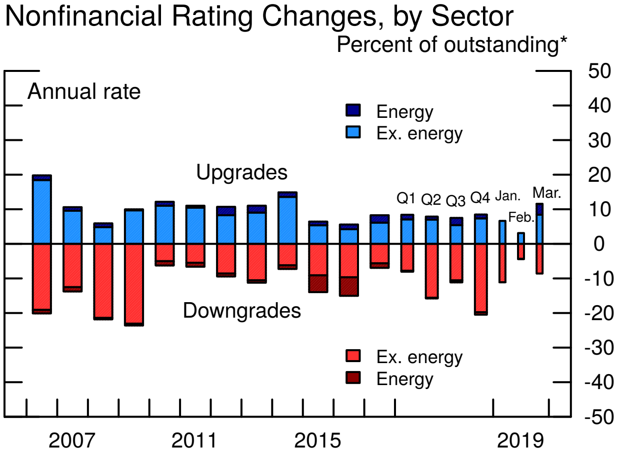
Note: C&I is commercial and industrial. Banks' responses are weighted by the outstanding amount of C&I loans on their balance sheets at the end of the previous quarter. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS).

Commercial and Industrial Loans



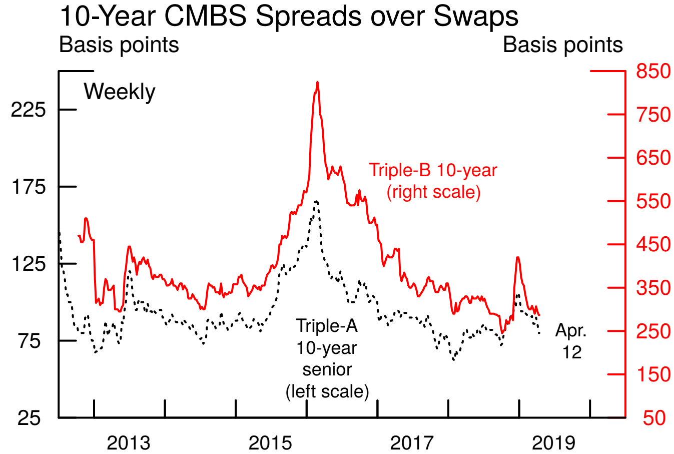
Note: Yearly rates are Q4 to Q4; half-years are based on Q4 and Q2 average levels; quarterly and monthly annual rates use corresponding average levels. Large banks are defined as the largest 25 banks by assets.
Source: Federal Reserve Board, FR 2644, Weekly Report of Selected Assets and Liabilities of Chartered Commercial Banks and U.S. Branches and Agencies of Foreign Banks.

Nonfinancial Rating Changes, by Sector



* Computed as a percent of nonfinancial bonds outstanding.
Source: Board staff calculations using Moody's ratings from Mergent Fixed Income Securities Database.

10-Year CMBS Spreads over Swaps



Note: CMBS is commercial mortgage-backed securities.
Source: J.P. Morgan.

How Did Banks Manage Their Leveraged Loan Pipelines during the Market Turmoil in Late 2018?

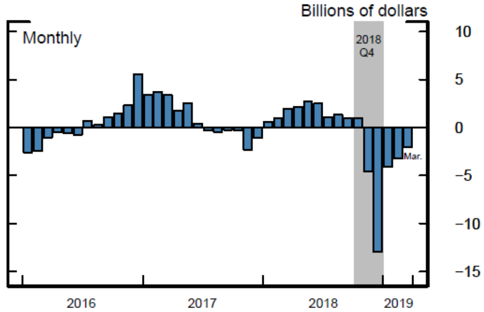
In the primary market for leveraged loans, arranging banks typically form a syndication and place a substantial fraction of loans with institutional investors. When banks struggle to attract enough investor interest for loans they have committed to underwrite, the size of their underwriting pipelines can increase unexpectedly, reducing their balance sheet capacity and potentially discouraging them from arranging new syndicated loans or making other types of loans.[1] Thus, the size of banks' leveraged loan pipelines can have important implications for financing conditions for a wide range of borrowers.

In this discussion we present evidence consistent with arranging banks actively reducing the size of their pipelines toward the end of last year, largely in response to the weakening of the demand for leveraged loans by institutional investors. We argue that, while the reduction in pipelines might have temporarily amplified the price declines in the leveraged loans market, it potentially helped avoid prolonged credit supply disruptions.

In late 2018, credit market conditions worsened considerably and investor risk sentiment deteriorated. Open-ended bank loan mutual funds, which held about 15 percent of institutional leveraged loans outstanding, experienced large net redemptions from investors in the last two months of 2018 (figure 1), leaving investors' demand in the new issue market substantially weaker. Market anecdotes suggest that some banks struggled to place loans, raising concerns of outsized bank pipelines and posing risks to future financing conditions.

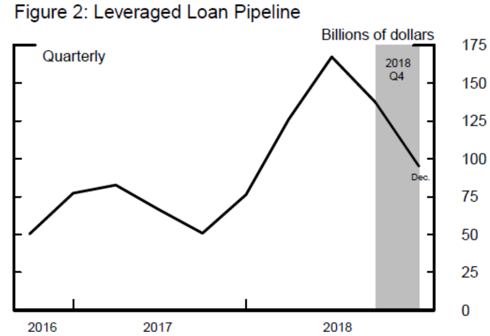
Contrary to these concerns, figure 2 shows that banks managed to end the year with significantly smaller pipeline positions than the levels seen in the middle of the year. In addition to reflecting weaker demand for credit from borrowing firms, the decline in pipelines also appeared to reflect active management of pipeline risks by banks during this period.

Figure 1: Bank Loan Mutual Fund Net Flows



Source: Investment Company Institute.

Figure 2: Leveraged Loan Pipeline



Source: Federal Reserve Board, FR Y−14, Capital Assessments and Stress Testing Information.

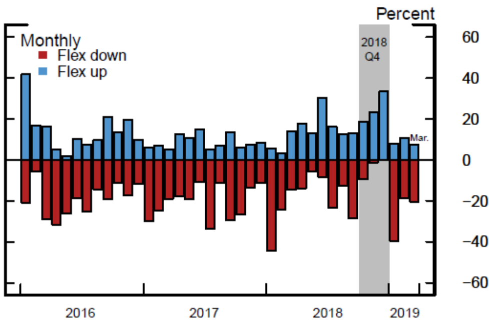
[1] Leveraged pipeline loans refer to loans in the syndication process that have not been funded. These loans remain in the pipeline until they are issued or withdrawn from the primary market. Arranging banks often guarantee at least part of these loans, especially for loans related to acquisitions.

Financing Conditions

Banks that originate leveraged loans with an intent to place some fraction with institutional investors have an obvious incentive to manage pipelines, especially when investor demand for leveraged loans is weakening. Standard origination arrangements often give banks a range of options to do so: They can adjust the spreads on loans (spread flex), mark up or down the issuance prices relative to par (Original Issuance Discounts flex, or OID flex), or pull loans from the market.[2] As shown in figure 3, the fraction of loans with upward spread flexes (blue bars)—those with increases in loan spreads during the syndication process—rose from 13 percent in September 2018 to 33 percent in December 2018. Similarly, the fraction of upward OID flexes increased from 7 percent to 53 percent in the same period (blue bars, figure 4). Moreover, the fraction of pulled loans relative to launched loans (not shown) picked up notably at year-end. A regression analysis suggests that arranging banks that reported more upward spread and OID flexes or pulled more loans from the market also saw larger declines in their pipelines, consistent with them actively managing their pipelines.

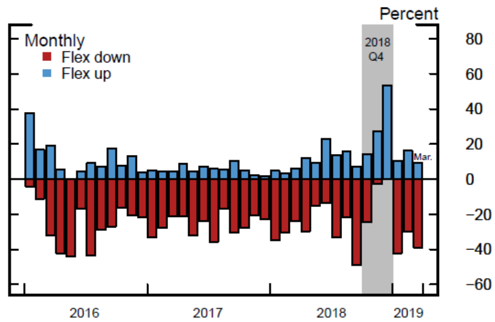
In the short run, banks' active pipeline management may potentially amplify price declines and reduce credit supply during market downturns. For example, the monthly average loan spread for B-rated loans at the time of issuance (not shown) increased to 507 basis points in December 2018 after staying under 400 basis points for over a year. However, this precautionary behavior by banks should help avoid prolonged credit supply disruptions and limit further amplifications of credit cycle fluctuations.

Figure 3: Spread Flex Activity, by Count



Note: Flex down (up) is defined as the fraction of institutional leveraged loans that have a reduction (increase) in spreads during the syndication process.
Source: S&P LCD.

Figure 4: OID Flex Activity, by Count

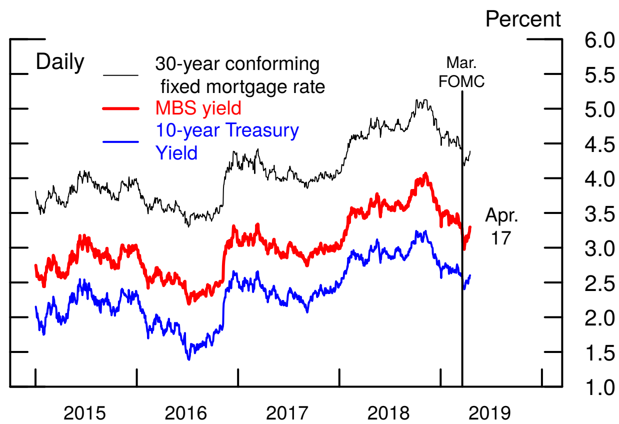


Note: Flex down (up) is defined as the fraction of institutional leveraged loans that have a reduction (increase) in original issue discount (OID) during the syndication process.
Source: S&P LCD.

[2] When investor demand is weak, banks can widen issuance spreads and increase OIDs, which mark down loan prices further away from par value, to help attract investors. Widening of issuance spread and increasing OID is called "flex up," and narrowing of issuance spread and decreasing OID is called "flex down."

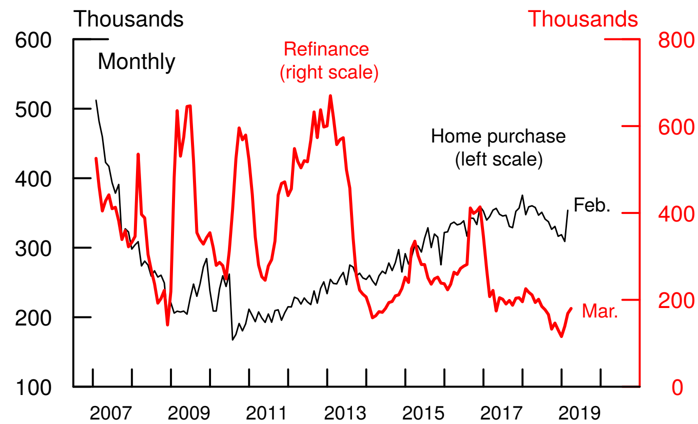
Household Finance

Mortgage Rate and MBS Yield



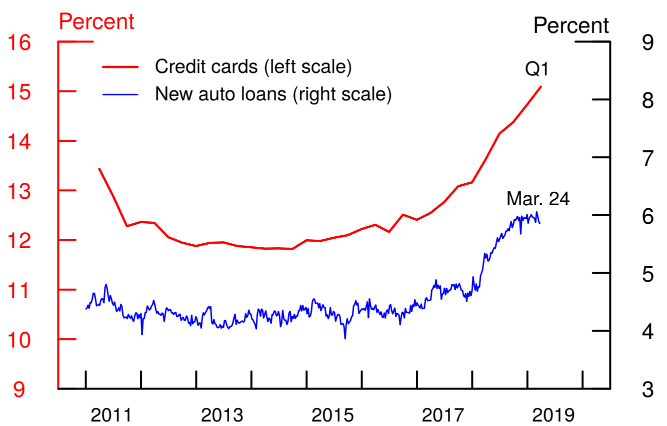
Note: The mortgage-backed securities (MBS) yield is the Fannie Mae 30-year current-coupon rate.
Source: For MBS yield, Barclays; for mortgage rate, Loansifter.

Purchase and Refinance Originations



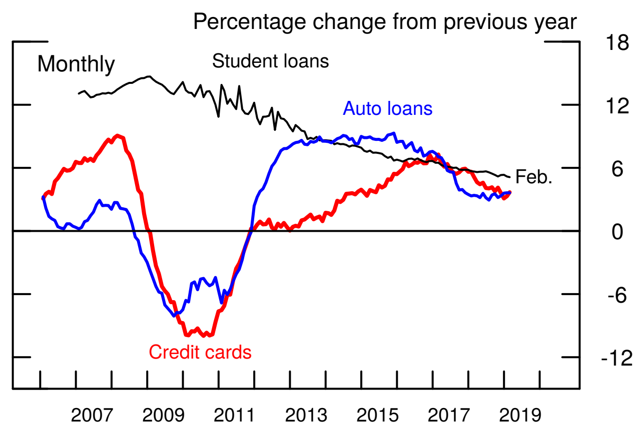
Note: The data are seasonally adjusted by Federal Reserve Board staff.
Source: For values through 2017, data reported under the Home Mortgage Disclosure Act of 1975; for values from 2018 onward, staff estimates.

Consumer Interest Rates



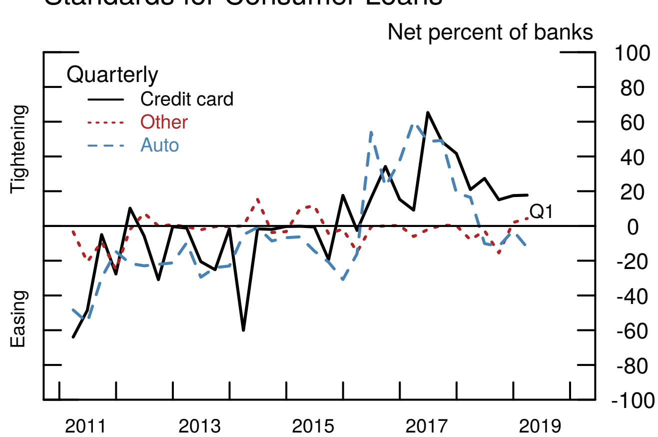
Note: Credit card data reflect rates at commercial banks on all credit card plans; data are reported quarterly and not seasonally adjusted. Auto loans data are reported weekly and seasonally adjusted.
Source: For credit cards, Federal Reserve Board; for auto loans, J.D. Power.

Consumer Credit



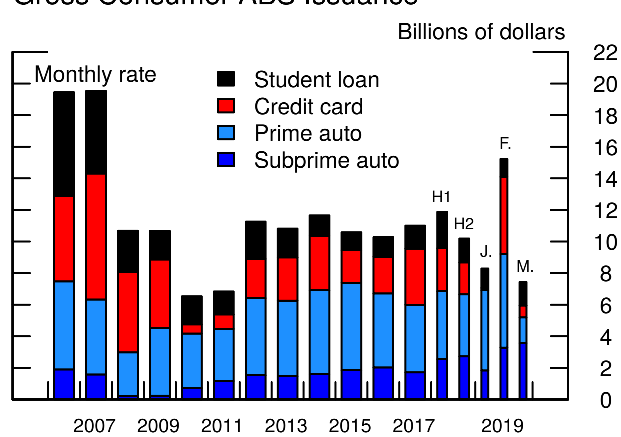
Source: Federal Reserve Board.

Standards for Consumer Loans



Note: Banks' responses are weighted by the outstanding amount of the relevant loan categories on their balance sheets at the end of the previous quarter.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS).

Gross Consumer ABS Issuance



Source: Merrill Lynch; Bloomberg.

Financing Conditions

Appendix

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.”

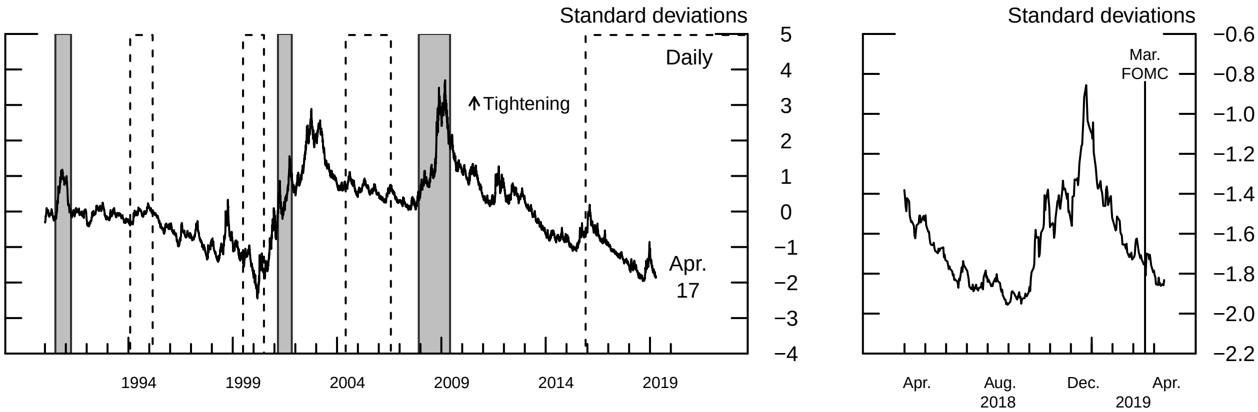
Overview of Selected FCIs

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, breakeven inflation rate, and the S&P 500 index
Kancas 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.

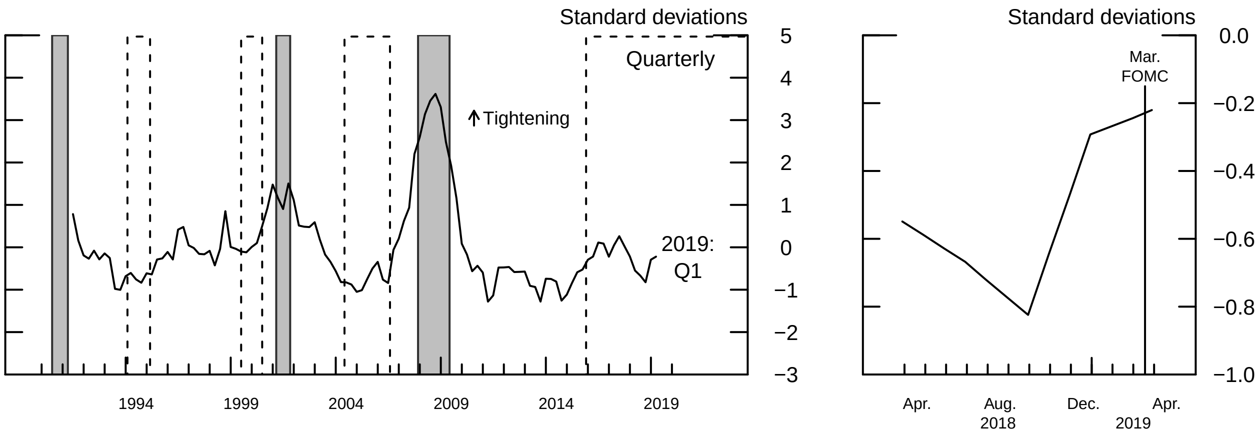
Selected Financial Conditions Indexes

Staff FCI for Nonfinancial Corporations



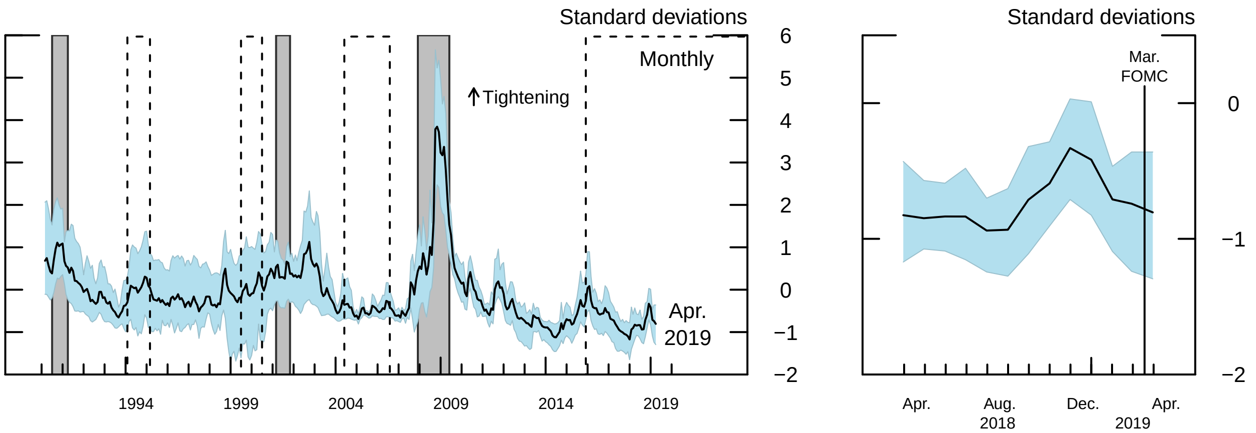
Note: The financial conditions index (FCI) is the deviation from the long−run relation between the systematic components of the cumulative log returns of 2 portfolios of firms with credit ratings above and just below investment grade. The systematic components are derived from the 5−factor Fama−French 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

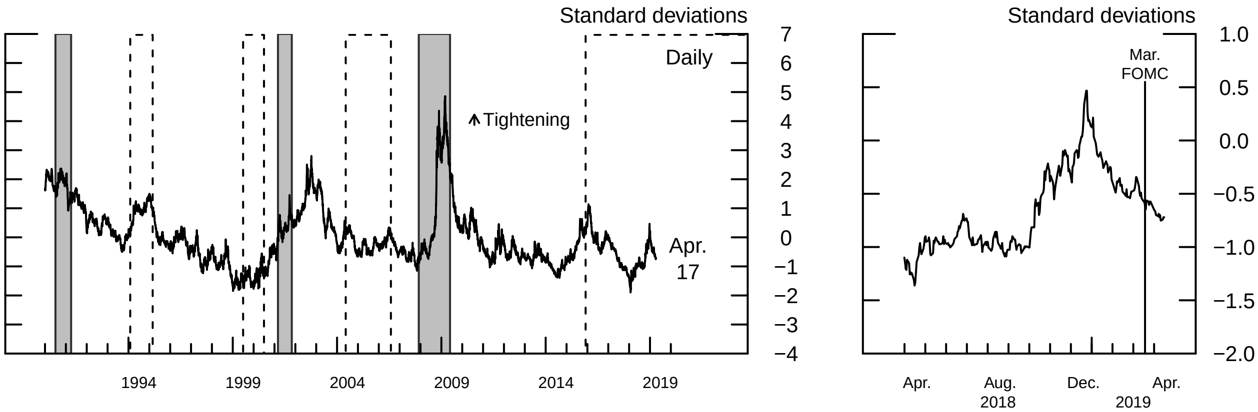


Note: Mean FCI represents the mean of FCIs developed by Goldman Sachs and the Federal Reserve Banks of Chicago, St. Louis, and Kansas City. The blue shaded region represents the range of these 4 standardized FCIs.
Source: Bloomberg; The Federal Reserve Banks of Chicago, St. Louis, and Kansas City.

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.

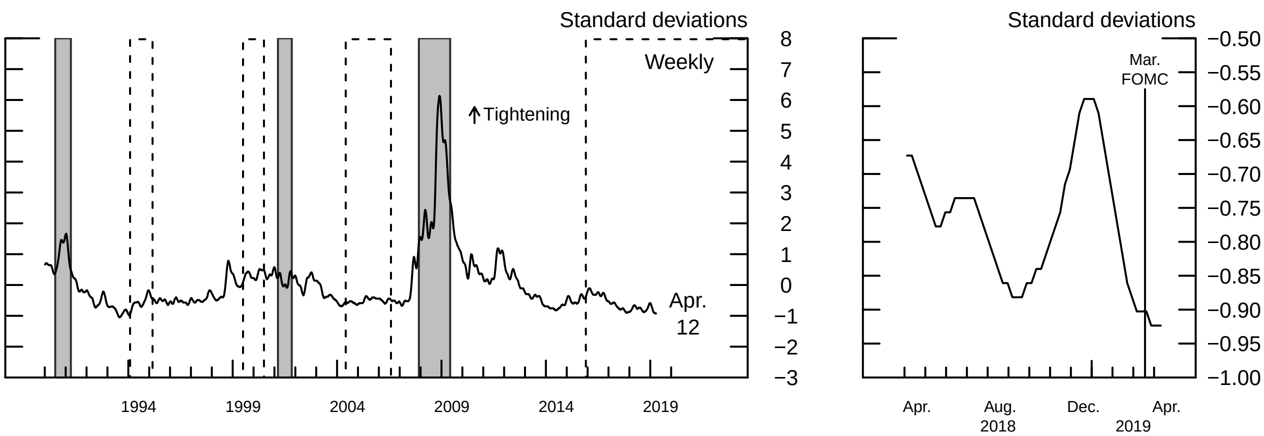
Selected Financial Conditions Indexes (continued)

Goldman Sachs FCI



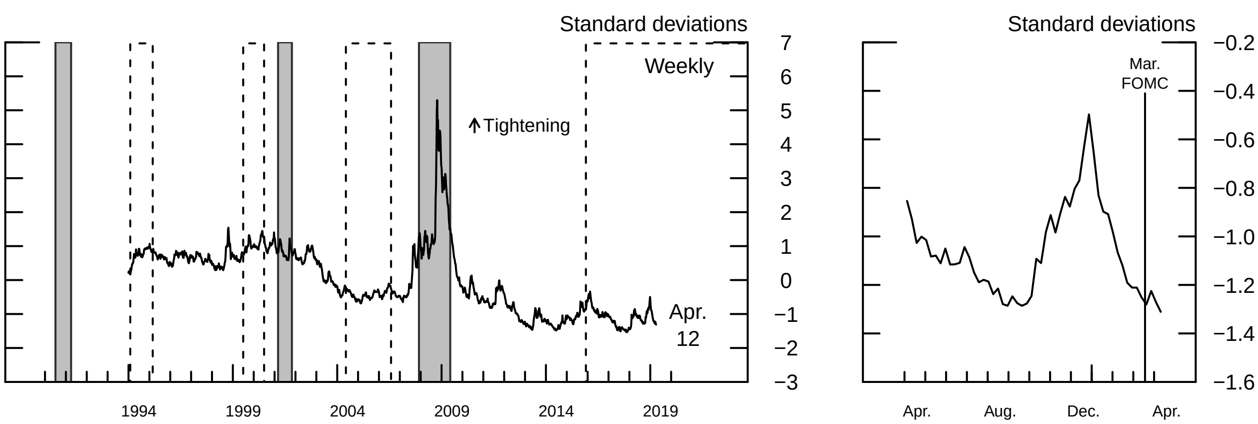
Note: The index is a weighted average of 5 financial variables: the federal funds rate, the 10−year Treasury yield, the triple−B yields spreads to Treasury, the S&P price−to−earnings ratio, the broad value of the U.S. dollar. Weights are pinned down by the contribution of each financial variable on real 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

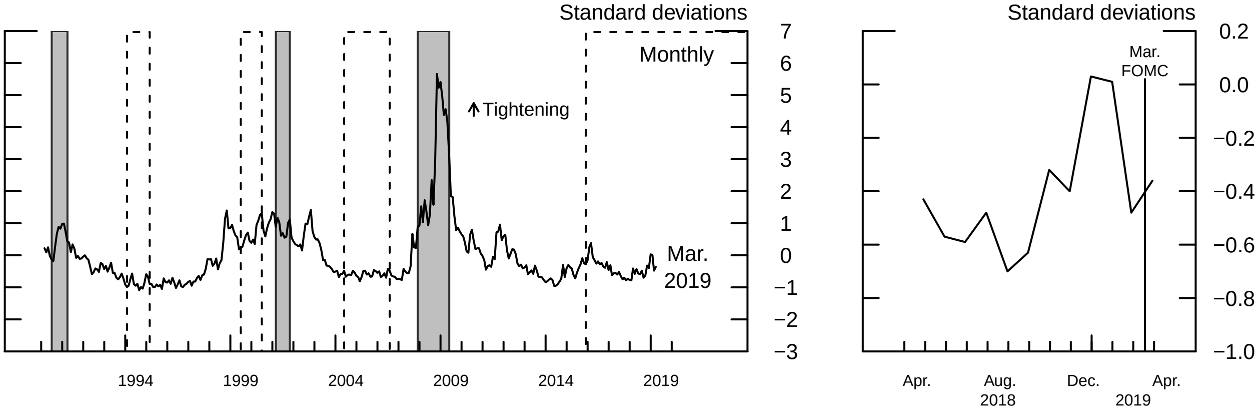


Note: The index is the principal component of 18 variables including short− and long−term Treasury yields, corporate yields, money market and corporate bond spreads, bond and stock market volatility indicators, breakeven inflation rate, and the S&P 500 index.
Source: Federal Reserve Bank of St. Louis.

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

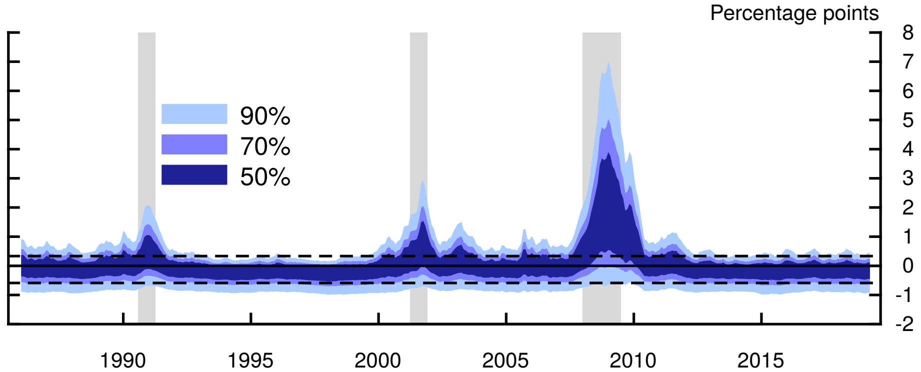


Note: The index is the principal component of 11 financial variables including short− and long−term interest rates, corporate and consumer yield spreads, the VIX, and and the volatility of bank stock prices.
Source: Federal Reserve Bank of Kansas City.

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.

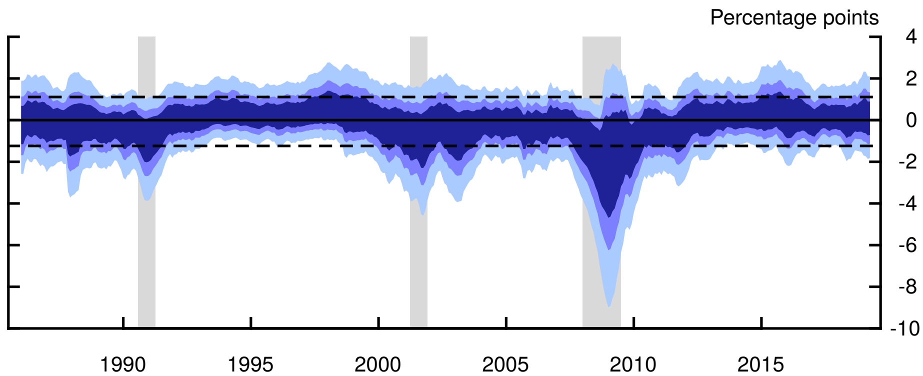
Time-Varying Macroeconomic Risk 1 Year Ahead

Unemployment Rate



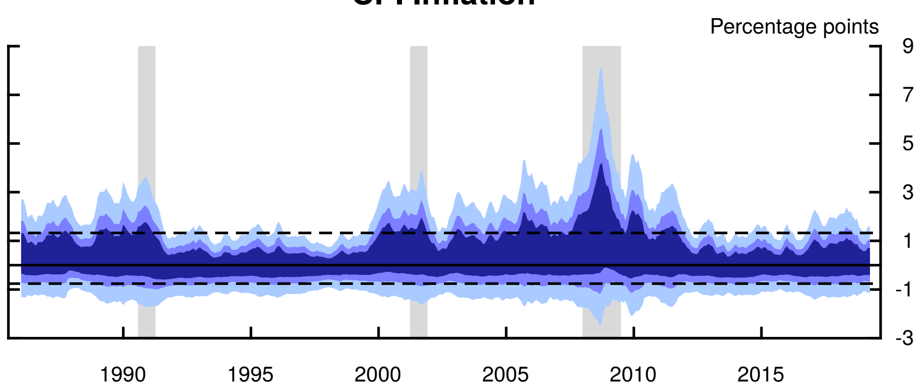
	April 2019
95th	.4
85th	.2
50th	- .1
15th	- .6
5th	- .9

GDP Growth



	April 2019
95th	2.1
85th	1.3
50th	.1
15th	-1.1
5th	-1.8

CPI Inflation

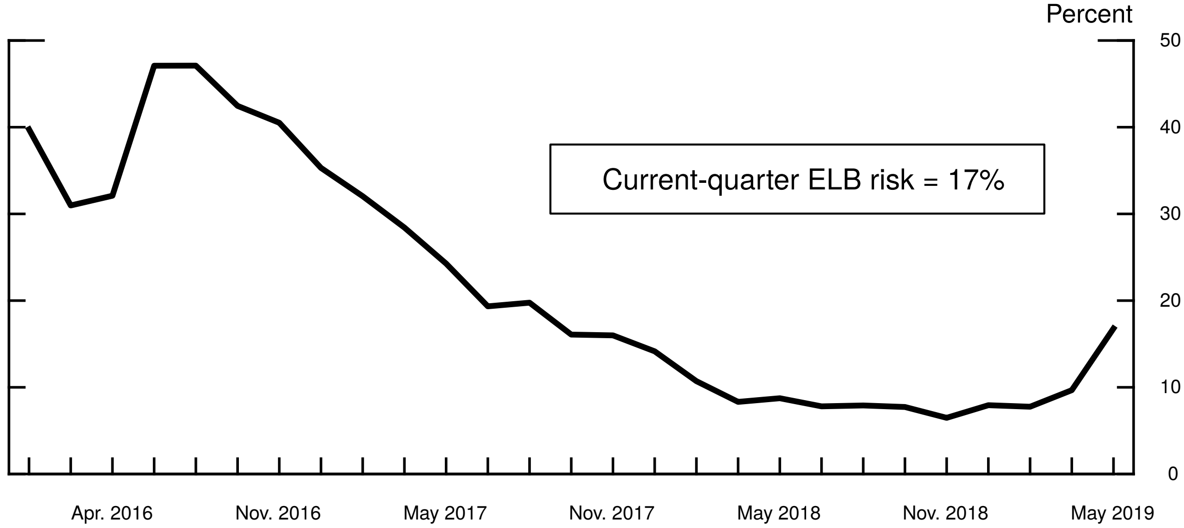


	April 2019
95th	1.6
85th	1.0
50th	.1
15th	- .7
5th	-1.1

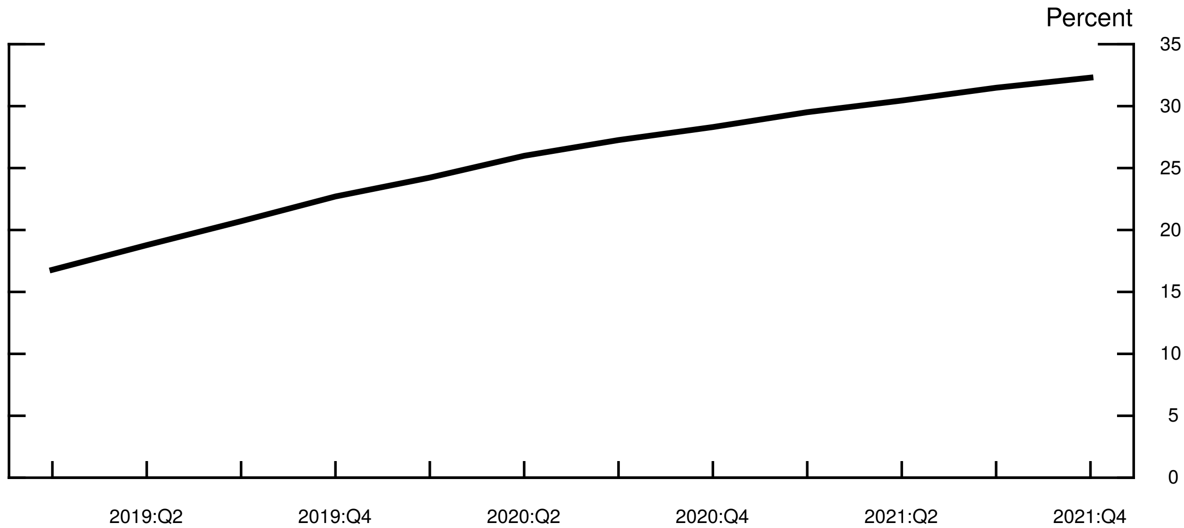
Note: The exhibit shows estimates of quantiles of the distribution of errors for four-quarter-ahead staff forecasts. The estimates are conditioned on indicators of real activity, inflation, financial market strain, and the volatility of high-frequency macroeconomic indicators. The tables show selected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

Effective Lower Bound Risk Estimate

ELB Risk since Liftoff



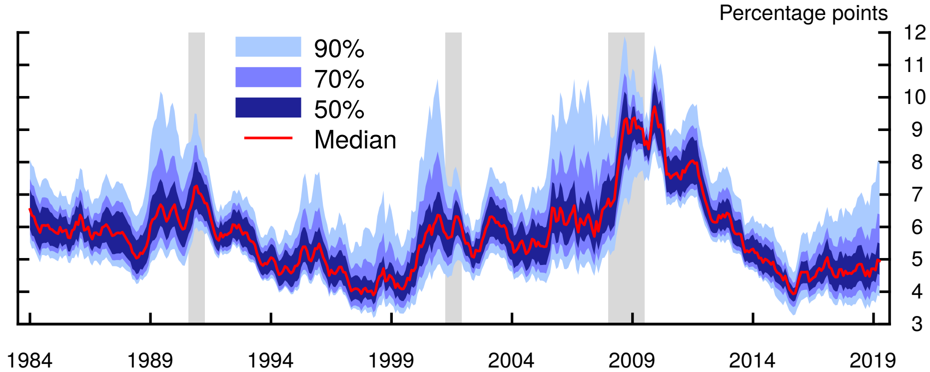
ELB Risk over the Projection Period



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

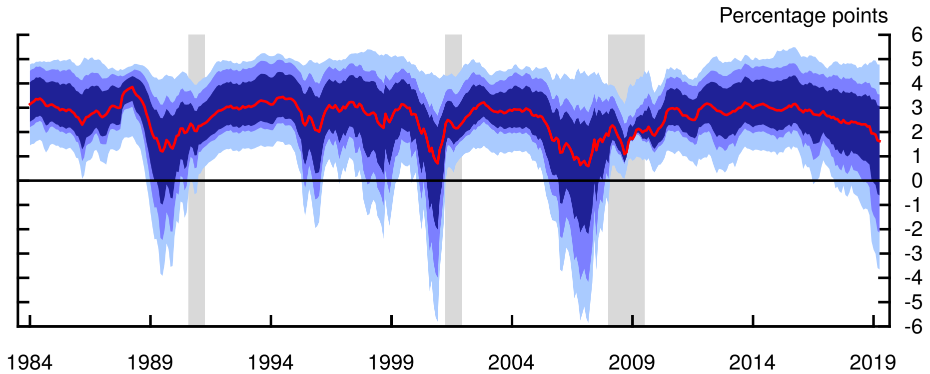
Conditional Distributions of Macroeconomic Variables 2 Years Ahead

Unemployment Rate



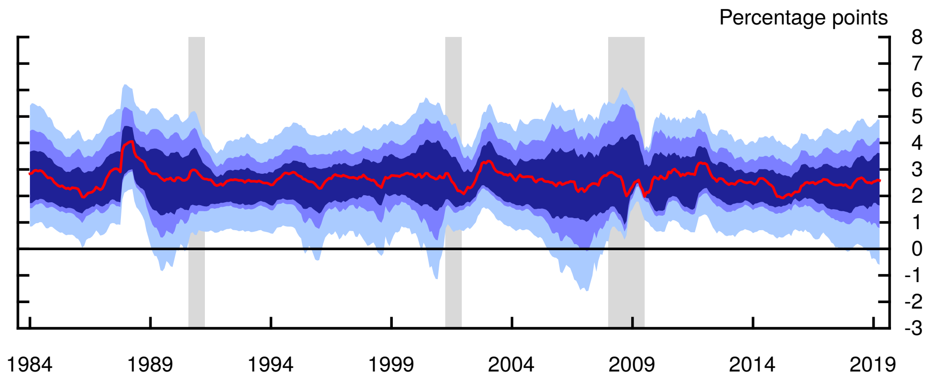
	April 2019
95th	8.0
85th	6.4
50th	5.0
15th	4.2
5th	3.9

GDP Growth



	April 2019
95th	4.8
85th	3.5
50th	1.6
15th	-2.1
5th	-3.7

CPI Inflation



	April 2019
95th	4.9
85th	4.2
50th	2.6
15th	.8
5th	- .6

Risks & Uncertainty

Alternative Scenarios

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

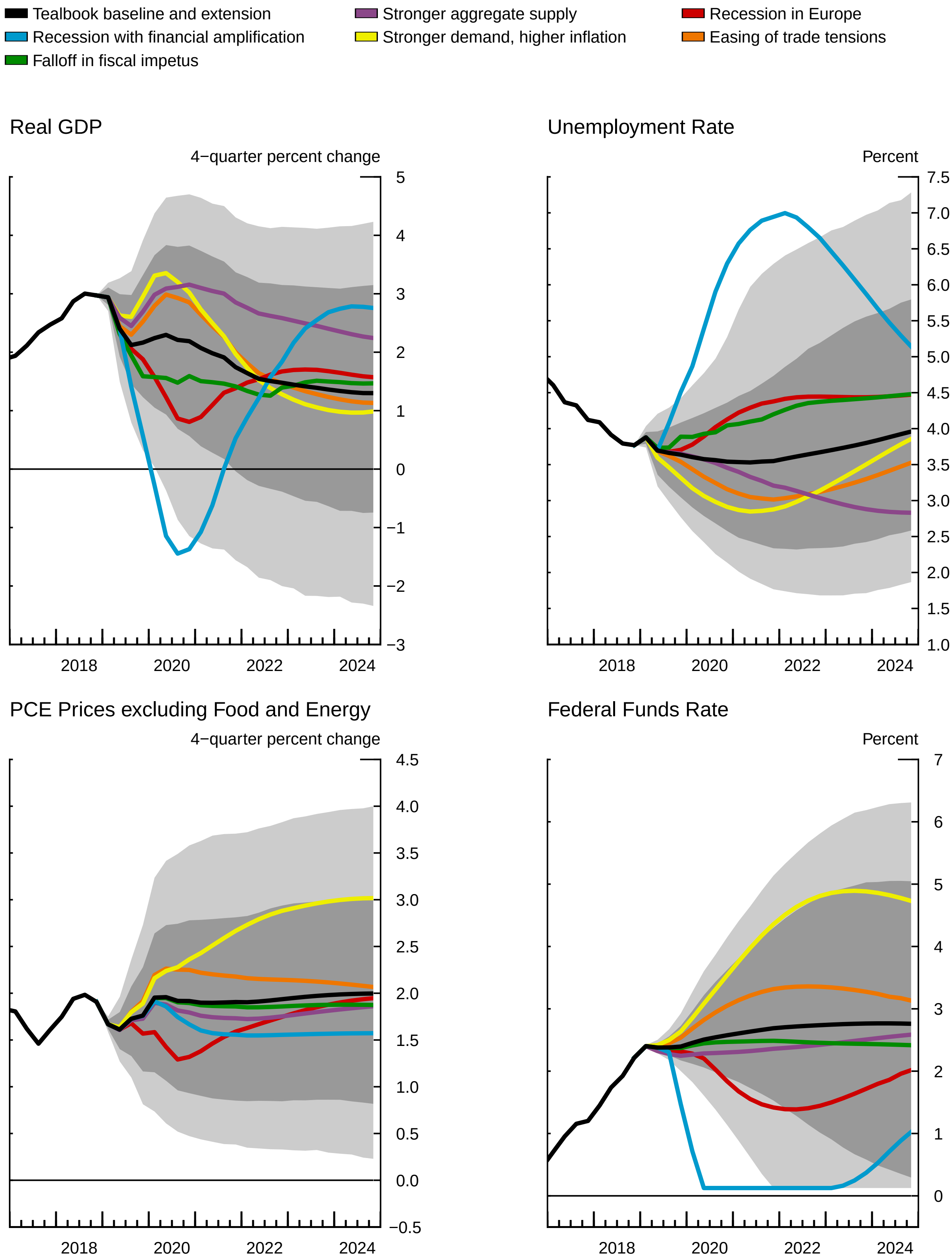
Measure and scenario	2019 H1	2019 H2	2020	2021	2022	2023-24
Real GDP						
Tealbook baseline and extension	2.0	2.3	2.2	1.7	1.5	1.3
Recession with financial amplification	2.0	-.9	-1.4	.5	1.8	2.7
Falloff in fiscal impetus	1.9	1.3	1.6	1.4	1.4	1.5
Stronger aggregate supply	2.4	3.0	3.2	2.9	2.6	2.3
Stronger demand, higher inflation	2.5	3.4	3.0	2.0	1.3	1.0
Recession in Europe	2.0	1.7	.8	1.4	1.7	1.6
Easing of trade tensions	2.1	2.9	2.9	2.0	1.5	1.2
Unemployment rate[1]						
Tealbook baseline and extension	3.7	3.6	3.5	3.5	3.7	4.0
Recession with financial amplification	3.7	4.5	6.3	6.9	6.7	5.1
Falloff in fiscal impetus	3.7	3.9	4.0	4.2	4.4	4.5
Stronger aggregate supply	3.7	3.7	3.5	3.2	3.0	2.8
Stronger demand, higher inflation	3.6	3.3	2.9	2.9	3.1	3.9
Recession in Europe	3.7	3.7	4.1	4.4	4.4	4.5
Easing of trade tensions	3.7	3.5	3.2	3.0	3.1	3.5
Total PCE prices						
Tealbook baseline and extension	1.6	1.9	1.8	1.8	1.9	2.0
Recession with financial amplification	1.6	1.9	1.6	1.5	1.5	1.6
Falloff in fiscal impetus	1.6	1.9	1.8	1.8	1.8	1.9
Stronger aggregate supply	1.6	1.8	1.7	1.7	1.7	1.8
Stronger demand, higher inflation	1.7	2.1	2.3	2.6	2.8	3.0
Recession in Europe	1.6	1.2	1.1	1.5	1.8	1.9
Easing of trade tensions	1.7	2.2	2.2	2.1	2.1	2.1
Core PCE prices						
Tealbook baseline and extension	1.6	2.0	1.9	1.9	1.9	2.0
Recession with financial amplification	1.6	2.0	1.7	1.6	1.6	1.6
Falloff in fiscal impetus	1.6	2.0	1.9	1.9	1.9	1.9
Stronger aggregate supply	1.5	1.9	1.8	1.7	1.8	1.8
Stronger demand, higher inflation	1.6	2.2	2.4	2.7	2.9	3.0
Recession in Europe	1.6	1.6	1.3	1.6	1.7	1.9
Easing of trade tensions	1.6	2.2	2.2	2.2	2.1	2.1
Federal funds rate[1]						
Tealbook baseline and extension	2.4	2.4	2.6	2.7	2.7	2.8
Recession with financial amplification	2.4	1.5	.1	.1	.1	1.0
Falloff in fiscal impetus	2.4	2.4	2.5	2.5	2.5	2.4
Stronger aggregate supply	2.3	2.2	2.3	2.4	2.4	2.6
Stronger demand, higher inflation	2.4	2.6	3.5	4.4	4.8	4.7
Recession in Europe	2.3	2.3	1.8	1.4	1.4	2.0
Easing of trade tensions	2.4	2.5	3.0	3.3	3.4	3.1

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

Risks & Uncertainty

Forecast Confidence Intervals and Alternative Scenarios

Confidence Intervals Based on FRB/US Stochastic Simulations*



* 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.

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

Measure	2019	2020	2021	2022	2023	2024
Real GDP						
(percent change, Q4 to Q4)						
Projection	2.2	2.2	1.7	1.5	1.4	1.3
Confidence interval						
Tealbook forecast errors	.5–3.8	-.4–3.5	-1.1–3.0	. . .	. . .	. . .
FRB/US stochastic simulations	1.2–3.3	.6–3.8	.0–3.4	-.4–3.1	-.6–3.1	-.7–3.2
Civilian unemployment rate						
(percent, Q4)						
Projection	3.6	3.5	3.5	3.7	3.8	4.0
Confidence interval						
Tealbook forecast errors	3.2–4.1	2.7–4.4	2.4–4.9	. . .	. . .	. . .
FRB/US stochastic simulations	3.0–4.1	2.6–4.4	2.3–4.7	2.3–5.2	2.4–5.6	2.6–5.8
PCE prices, total						
(percent change, Q4 to Q4)						
Projection	1.8	1.8	1.8	1.9	2.0	2.0
Confidence interval						
Tealbook forecast errors	1.1–2.3	1.0–3.4	1.1–3.3	. . .	. . .	. . .
FRB/US stochastic simulations	1.0–2.4	.7–2.8	.7–2.9	.7–3.0	.8–3.1	.7–3.1
PCE prices excluding food and energy						
(percent change, Q4 to Q4)						
Projection	1.8	1.9	1.9	1.9	2.0	2.0
Confidence interval						
Tealbook forecast errors	1.3–2.2	1.2–2.7	. . .	. . .	. . .	. . .
FRB/US stochastic simulations	1.2–2.3	.9–2.8	.9–2.8	.8–2.9	.9–3.0	.8–3.0
Federal funds rate						
(percent, Q4)						
Projection	2.4	2.6	2.7	2.7	2.8	2.8
Confidence interval						
FRB/US stochastic simulations	2.2–2.7	1.9–3.6	1.5–4.3	1.0–4.8	.6–5.0	.3–5.0

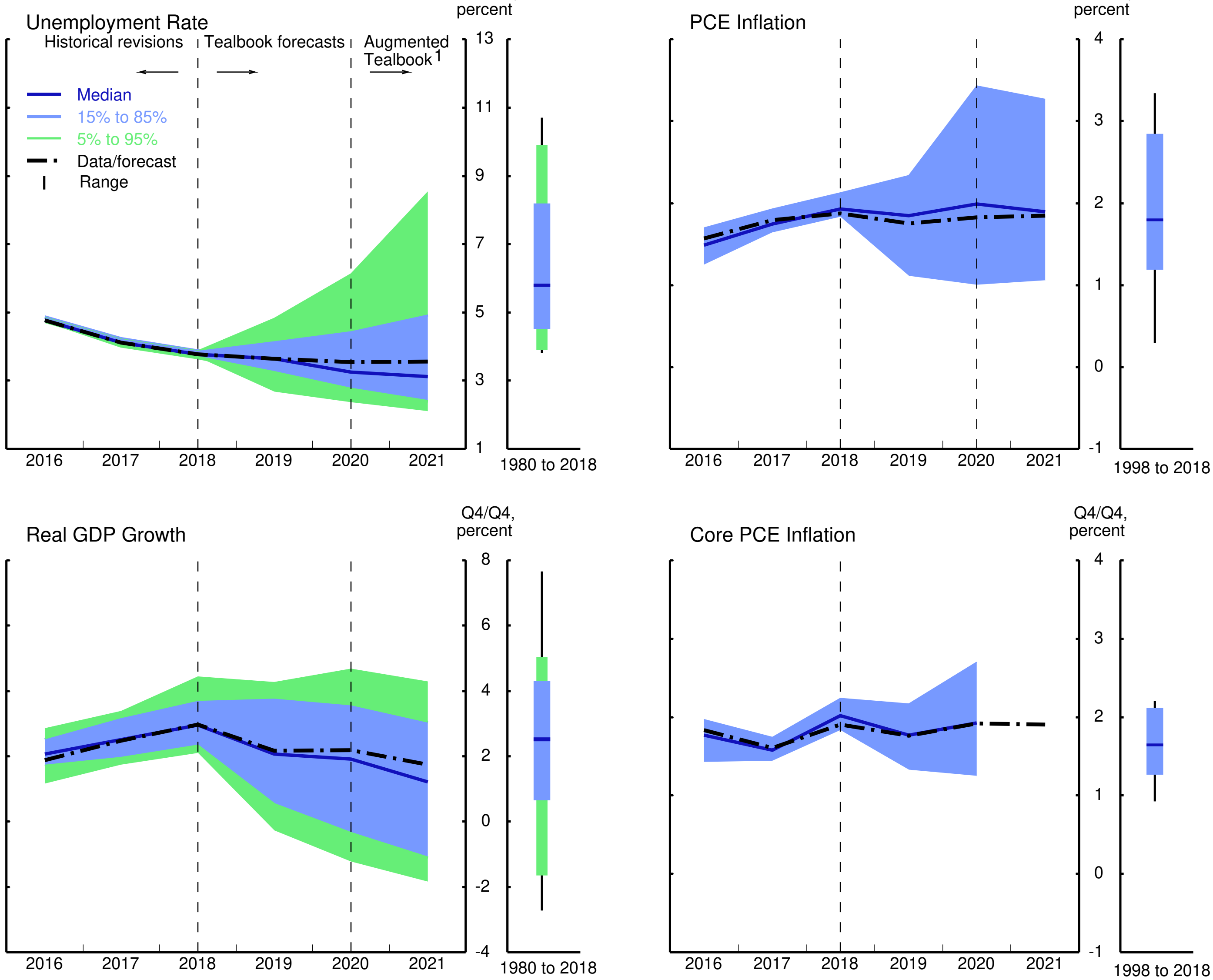
Note: Shocks underlying FRB/US stochastic simulations are randomly drawn from the 1969–2018 set of model equation residuals. Intervals derived from Tealbook forecast errors are based on projections made from 1980 to 2018 for real GDP and unemployment and from 1998 to 2018 for PCE prices. The intervals for real GDP, unemployment, and total PCE prices are extended into 2021 using information from the Blue Chip survey and forecasts from the CBO and CEA.
. . . Not applicable.

Risks & Uncertainty

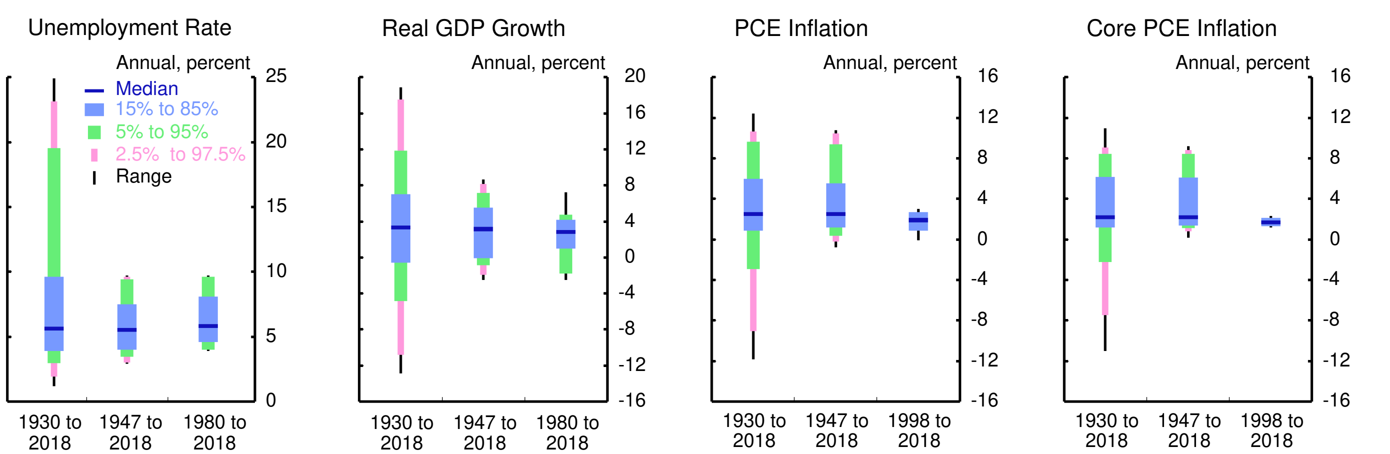
Prediction Intervals Derived from Historical Tealbook Forecast Errors

Forecast Error Percentiles

Historical Distributions



Historical Distributions



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

1. Augmented Tealbook prediction intervals use 1- and 2-year-ahead forecast errors from Blue Chip, CBO, and CEA to extend the Tealbook prediction intervals through 2021.

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
Greater than 3 percent				
Current Tealbook	.13	.09	.00	.06
Previous Tealbook	.10	.14	.09	.10
Between 1 3/4 and 2 1/4 percent				
Current Tealbook	.25	.24	.23	.25
Previous Tealbook	.25	.26	.29	.25
Less than 1 percent				
Current Tealbook	.10	.15	.17	.16
Previous Tealbook	.12	.08	.03	.12

Probability of Unemployment Events
(4 quarters ahead)

Probability that the unemployment rate will . . .	Staff	FRB/US	EDO	BVAR
Increase by 1 percentage point				
Current Tealbook	.03	.11	.22	.04
Previous Tealbook	.02	.10	.30	.06
Decrease by 1 percentage point				
Current Tealbook	.14	.02	.01	.06
Previous Tealbook	.11	.01	.01	.03

Probability of Recession Over Next 4 Quarters

Probability of transitioning into or remaining in a recession	Staff	FRB/US	BMA	Term Spread	Unconditional
Current Tealbook	.08	.13	.16	.60	.23
Previous Tealbook	.08	.13	.13	.58	.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 "BMA" model uses model averaging techniques 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.

Risks & Uncertainty

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

Measure and projection	2019 Previous Tealbook	2019 Current Tealbook	2020 Previous Tealbook	2020 Current Tealbook	2021 Previous Tealbook	2021 Current Tealbook
Real GDP						
Staff	1.8	2.2	2.0	2.2	1.5	1.7
FRB/US	1.2	1.5	1.3	1.7	1.2	1.5
EDO[1]	1.5	2.1	1.9	2.1	2.2	2.3
Unemployment rate[2]						
Staff	3.6	3.6	3.6	3.5	3.7	3.5
FRB/US	4.1	4.1	4.5	4.3	4.8	4.5
EDO[1]	4.3	4.2	4.7	4.5	4.9	4.8
Total PCE prices						
Staff	1.8	1.8	1.9	1.8	1.9	1.8
FRB/US	2.0	1.6	1.9	1.9	1.9	2.0
EDO[1]	2.0	1.5	2.2	2.1	2.2	2.2
Core PCE prices						
Staff	2.0	1.8	2.0	1.9	2.0	1.9
FRB/US	2.2	1.6	2.0	2.0	1.9	2.0
EDO[1]	2.2	1.6	2.2	2.1	2.2	2.2
Federal funds rate[2]						
Staff	3.2	2.4	3.8	2.6	4.1	2.7
FRB/US	3.0	2.2	3.1	2.3	2.9	2.5
EDO[1]	3.1	2.9	3.5	3.4	3.8	3.8

1. The EDO projections labeled "Previous Tealbook" and "Current Tealbook" integrate over the posterior distribution of model parameters.
2. Percent, average for Q4.

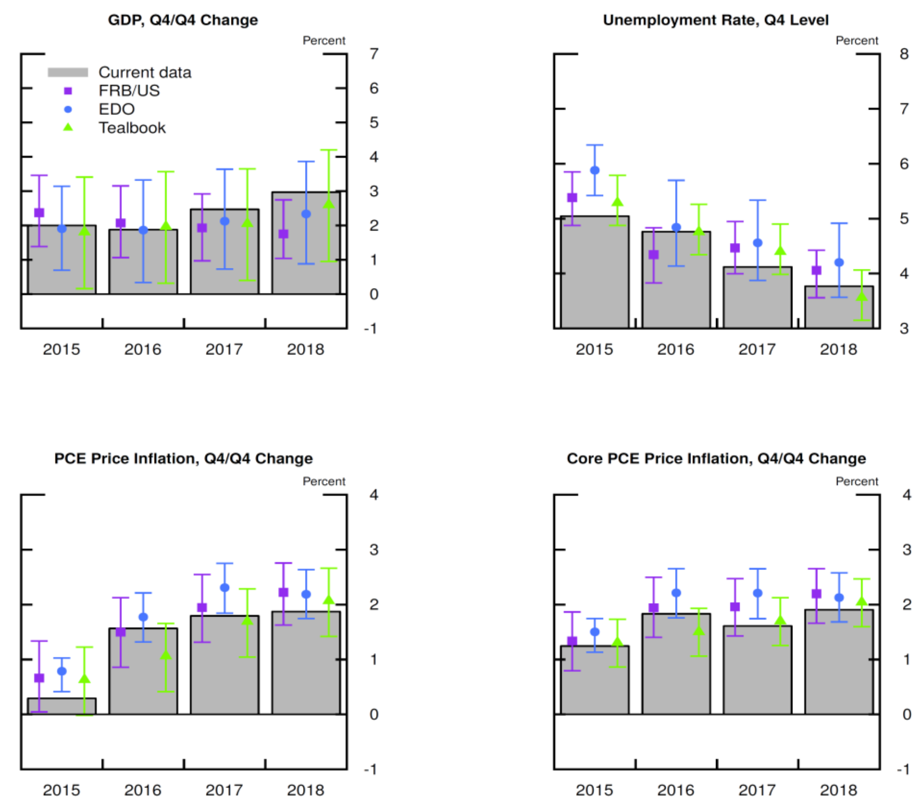
FRB/US and EDO Forecast Errors

This discussion reports real-time forecast errors for the FRB/US and EDO models over the past four years and compares them with the errors in the judgmental Tealbook projection.

The figure reports the point forecasts and 70 percent confidence intervals of the Tealbook projection and of the FRB/US and EDO model projections of real GDP growth, the unemployment rate, and total and core PCE price inflation for 2015 through 2018. Unlike the box "Tealbook Forecast Errors: An Update through 2018" in the Domestic Economic Developments and Outlook section, this discussion focuses solely on forecasts for the fourth quarter that were made as of the April Tealbook of the same year.

In the figure, the gray bars represent the currently published data, the purple squares and whisker bands show the forecasts and 70 percent confidence intervals for FRB/US, the blue circles and whisker bands show the counterparts for EDO, and the green triangles and whisker bands show the counterparts for the judgmental Tealbook forecasts.[1]

Model Forecasts



Note: Green triangles and whisker bands correspond to those shown in the box "Tealbook Forecast Errors: An Update through 2018" in the Domestic Economic Developments and Outlook section.
Source: Staff forecast; Bureau of Economic Analysis; Bureau of Labor Statistics.

[1] The confidence intervals for FRB/US and EDO are generated via stochastic simulations. For FRB/US, the simulations sample from historical equation residuals. For EDO, they draw from the distributions of shocks, model parameters, and latent state variables.

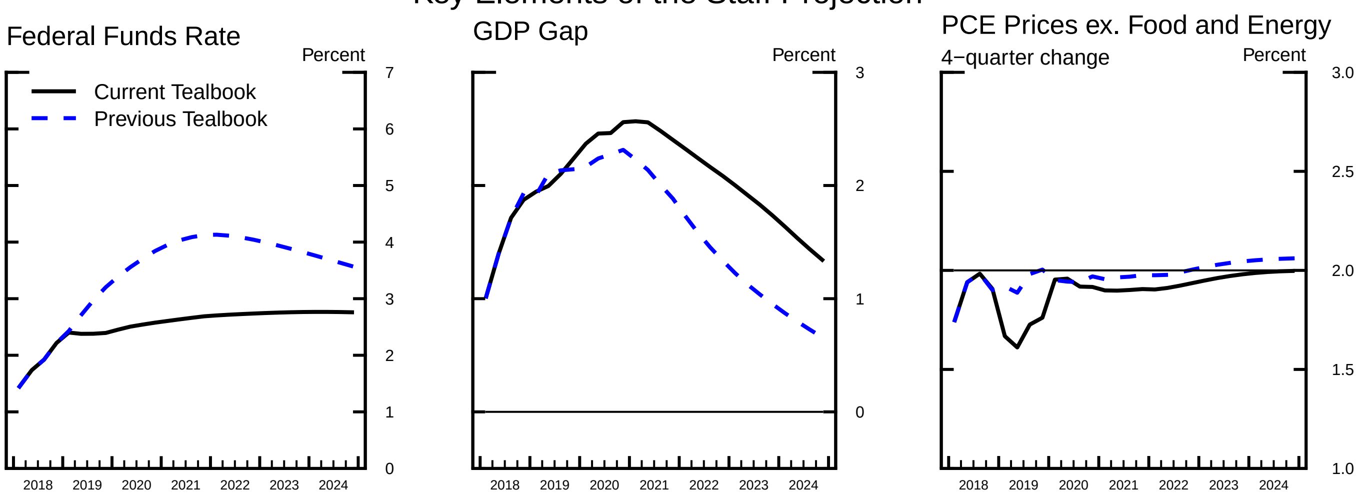
Policy Rules and the Staff Projection

Near−Term Prescriptions of Selected Simple Policy Rules[1]

(Percent)

	2019:Q2	2019:Q3
Inertial Taylor (1999) rule	**2.63**	**2.86**
Previous Tealbook projection	*2.70*	*2.98*
Taylor (1993) rule	**2.90**	**3.12**
Previous Tealbook projection	*3.36*	*3.51*
First−difference rule	**2.59**	**2.80**
Previous Tealbook projection	*2.50*	*2.54*
Flexible price−level targeting rule	**2.09**	**1.85**
Previous Tealbook projection	*2.17*	*2.00*
Addendum:		
Tealbook baseline	**2.38**	**2.38**

Key Elements of the Staff Projection



A Medium−Term Notion of the Equilibrium Real Federal Funds Rate[2]

(Percent)

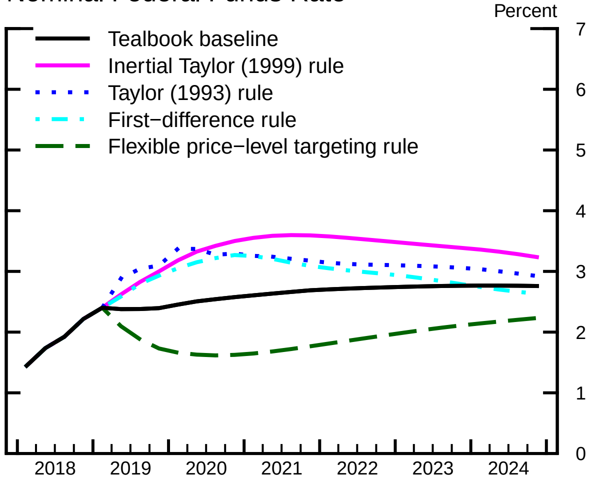
	Current Value	*Current−Quarter Estimate Based on Previous Tealbook*	*Previous Tealbook*
Tealbook baseline			
FRB/US *r**	2.02	*2.65*	*2.60*
Average projected real federal funds rate	.70	*1.70*	*1.56*
SEP−consistent baseline			
FRB/US *r**	.91		
Average projected real federal funds rate	.54		

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.

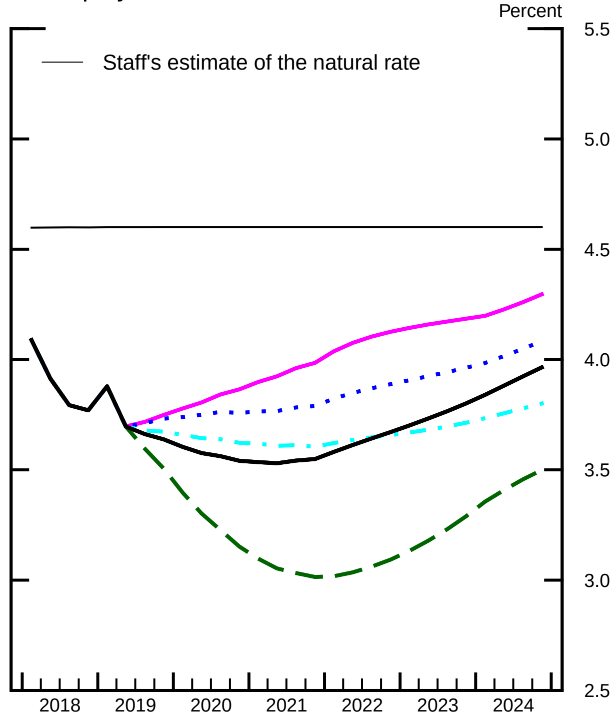
2. The "FRB/US *r**" is the level of the real federal funds rate that, if maintained over a 12−quarter period (beginning in the current quarter) in the FRB/US model, sets the output gap equal to zero in the final quarter of that period given either the Tealbook or SEP−consistent projection. The SEP−consistent baseline corresponds to the March 2019 median SEP responses. The "Average projected real federal funds rate" is calculated under the Tealbook and SEP−consistent baseline projections over the same 12−quarter period as FRB/US *r**.

Simple Policy Rule Simulations

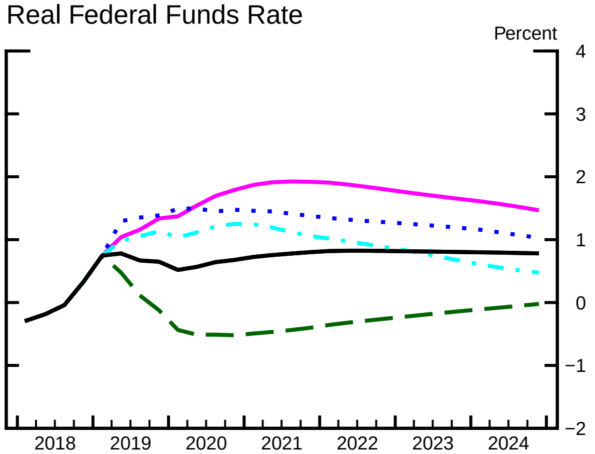
Nominal Federal Funds Rate



Unemployment Rate

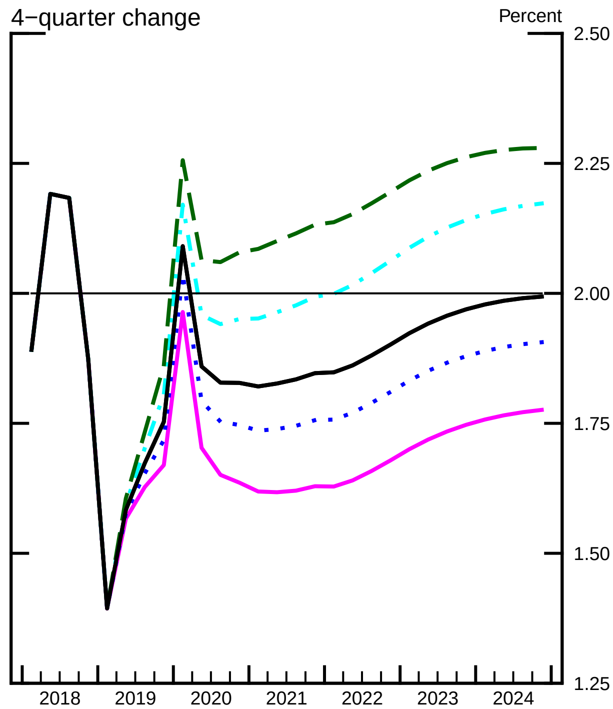


Real Federal Funds Rate

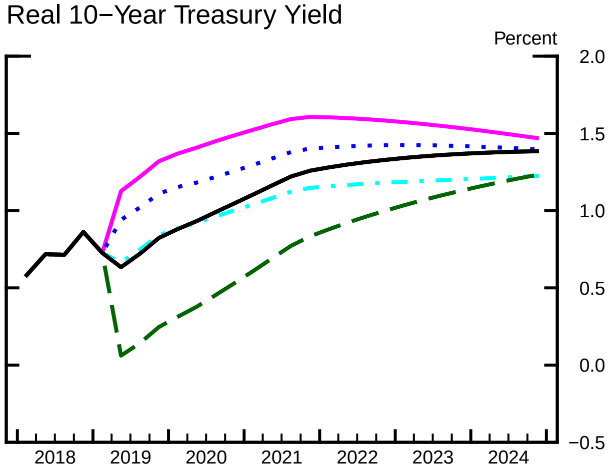


PCE Inflation

4−quarter change

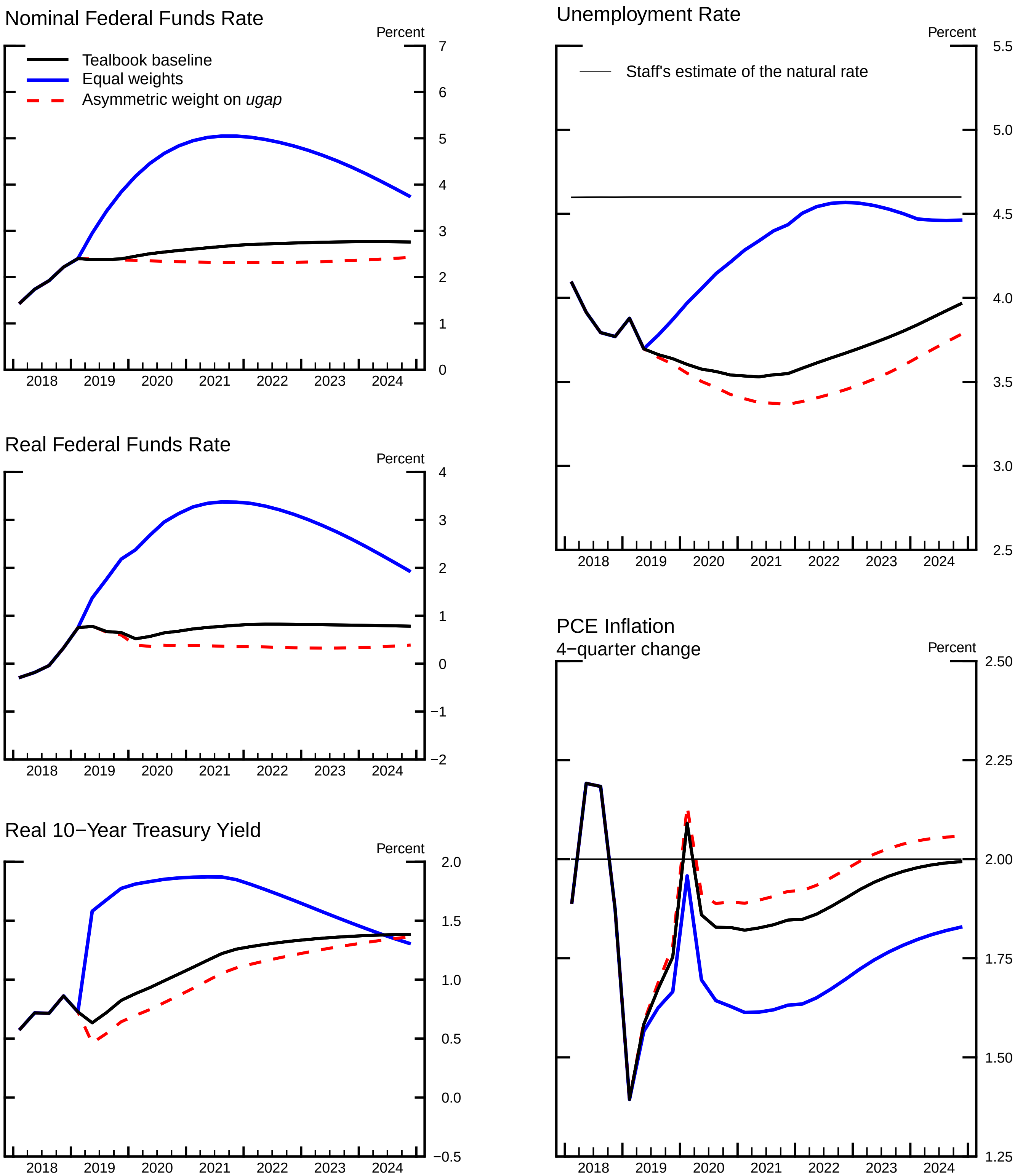


Real 10−Year Treasury Yield



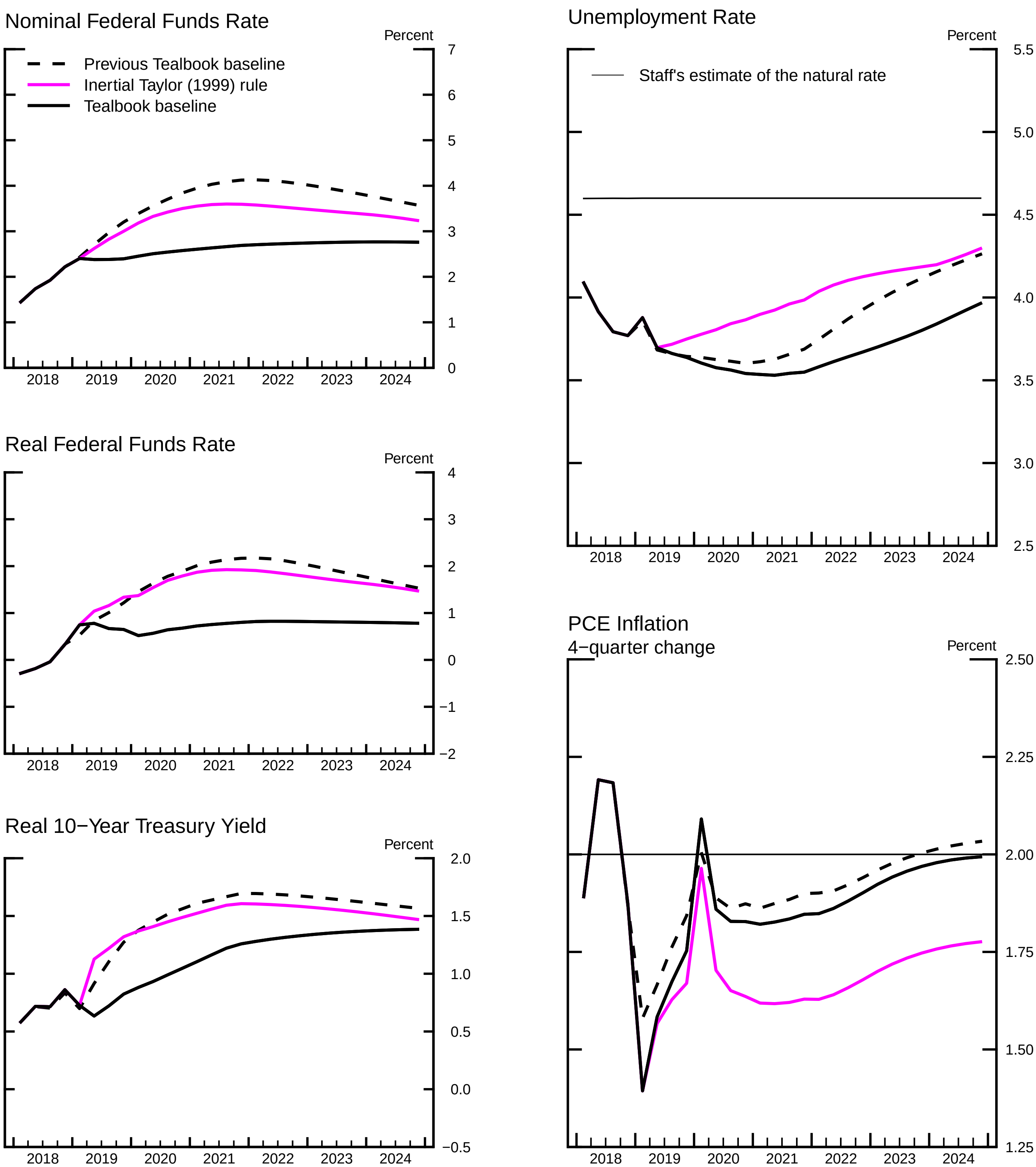
Note: The policy rule simulations in this exhibit are based on rules that respond to core inflation rather than to headline inflation. This choice of rule specification was made in light of a tendency for current and near−term core inflation rates to outperform headline inflation rates as predictors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

Optimal Control Simulations under Commitment



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.

Implications of Adopting the Conditional Attenuated Rule and of Other Forecast Revisions



Note: The "Inertial Taylor (1999) rule" simulation uses the current Tealbook baseline projection and is identical to the simulation in the exhibit titled "Simple Policy Rule Simulations."

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
Nominal federal funds rate[1]						
Inertial Taylor (1999)	3.0	3.5	3.6	3.5	3.4	3.2
Taylor (1993)	3.1	3.3	3.2	3.1	3.1	2.9
First-difference	2.9	3.3	3.1	3.0	2.8	2.6
Flexible price-level targeting	1.7	1.6	1.8	1.9	2.1	2.2
Extended Tealbook baseline	2.4	2.6	2.7	2.7	2.8	2.8
Real GDP						
Inertial Taylor (1999)	1.9	1.7	1.5	1.4	1.5	1.3
Taylor (1993)	2.0	1.9	1.7	1.5	1.5	1.3
First-difference	2.1	2.1	1.8	1.6	1.5	1.5
Flexible price-level targeting	2.5	2.8	2.0	1.6	1.3	1.3
Extended Tealbook baseline	2.2	2.2	1.7	1.5	1.4	1.3
Unemployment rate[1]						
Inertial Taylor (1999)	3.7	3.9	4.0	4.1	4.2	4.3
Taylor (1993)	3.7	3.8	3.8	3.9	4.0	4.1
First-difference	3.7	3.6	3.6	3.7	3.7	3.8
Flexible price-level targeting	3.5	3.2	3.0	3.1	3.3	3.5
Extended Tealbook baseline	3.6	3.5	3.5	3.7	3.8	4.0
Total PCE prices						
Inertial Taylor (1999)	1.7	1.6	1.6	1.7	1.7	1.8
Taylor (1993)	1.7	1.7	1.8	1.8	1.9	1.9
First-difference	1.8	2.0	2.0	2.1	2.1	2.2
Flexible price-level targeting	1.9	2.1	2.1	2.2	2.3	2.3
Extended Tealbook baseline	1.8	1.8	1.8	1.9	2.0	2.0
Core PCE prices						
Inertial Taylor (1999)	1.7	1.7	1.7	1.7	1.8	1.8
Taylor (1993)	1.7	1.8	1.8	1.8	1.9	1.9
First-difference	1.8	2.0	2.1	2.1	2.2	2.2
Flexible price-level targeting	1.9	2.2	2.2	2.2	2.3	2.3
Extended Tealbook baseline	1.8	1.9	1.9	1.9	2.0	2.0

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

Monetary Policy Strategies

Outcomes of Simple Policy Rule Simulations, Quarterly

(4-quarter percent change, except as noted)

Outcome and strategy	2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nominal federal funds rate[1]								
Inertial Taylor (1999)	2.4	2.6	2.8	3.0	3.2	3.3	3.4	3.5
Taylor (1993)	2.4	2.9	3.0	3.1	3.4	3.4	3.3	3.3
First-difference	2.4	2.6	2.8	2.9	3.1	3.2	3.2	3.3
Flexible price-level targeting	2.4	2.1	1.9	1.7	1.7	1.6	1.6	1.6
Extended Tealbook baseline	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.6
Real GDP								
Inertial Taylor (1999)	2.9	2.4	2.0	1.9	1.9	1.8	1.7	1.7
Taylor (1993)	2.9	2.4	2.0	2.0	2.0	1.9	1.9	1.9
First-difference	2.9	2.4	2.1	2.1	2.2	2.2	2.1	2.1
Flexible price-level targeting	2.9	2.4	2.3	2.5	2.7	2.9	2.8	2.8
Extended Tealbook baseline	2.9	2.4	2.1	2.2	2.2	2.3	2.2	2.2
Unemployment rate[1]								
Inertial Taylor (1999)	3.9	3.7	3.7	3.7	3.8	3.8	3.8	3.9
Taylor (1993)	3.9	3.7	3.7	3.7	3.7	3.7	3.8	3.8
First-difference	3.9	3.7	3.7	3.7	3.7	3.6	3.6	3.6
Flexible price-level targeting	3.9	3.7	3.6	3.5	3.4	3.3	3.2	3.2
Extended Tealbook baseline	3.9	3.7	3.7	3.6	3.6	3.6	3.6	3.5
Total PCE prices								
Inertial Taylor (1999)	1.4	1.6	1.6	1.7	2.0	1.7	1.7	1.6
Taylor (1993)	1.4	1.6	1.7	1.7	2.0	1.8	1.8	1.7
First-difference	1.4	1.6	1.7	1.8	2.2	2.0	1.9	2.0
Flexible price-level targeting	1.4	1.6	1.7	1.9	2.3	2.1	2.1	2.1
Extended Tealbook baseline	1.4	1.6	1.7	1.8	2.1	1.9	1.8	1.8
Core PCE prices								
Inertial Taylor (1999)	1.7	1.6	1.7	1.7	1.8	1.8	1.7	1.7
Taylor (1993)	1.7	1.6	1.7	1.7	1.9	1.9	1.8	1.8
First-difference	1.7	1.6	1.8	1.8	2.0	2.1	2.0	2.0
Flexible price-level targeting	1.7	1.6	1.8	1.9	2.1	2.2	2.2	2.2
Extended Tealbook baseline	1.7	1.6	1.7	1.8	2.0	2.0	1.9	1.9

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
Nominal federal funds rate[1]						
Equal weights	3.8	4.8	5.0	4.8	4.4	3.8
Asymmetric weight on *ugap*	2.4	2.3	2.3	2.3	2.4	2.4
Extended Tealbook baseline	2.4	2.6	2.7	2.7	2.8	2.8
Real GDP						
Equal weights	1.7	1.2	1.3	1.5	1.7	1.6
Asymmetric weight on *ugap*	2.2	2.4	1.9	1.5	1.3	1.3
Extended Tealbook baseline	2.2	2.2	1.7	1.5	1.4	1.3
Unemployment rate[1]						
Equal weights	3.9	4.2	4.4	4.6	4.5	4.5
Asymmetric weight on *ugap*	3.6	3.4	3.4	3.5	3.6	3.8
Extended Tealbook baseline	3.6	3.5	3.5	3.7	3.8	4.0
Total PCE prices						
Equal weights	1.7	1.6	1.6	1.7	1.8	1.8
Asymmetric weight on *ugap*	1.8	1.9	1.9	2.0	2.0	2.1
Extended Tealbook baseline	1.8	1.8	1.8	1.9	2.0	2.0
Core PCE prices						
Equal weights	1.7	1.7	1.7	1.7	1.8	1.8
Asymmetric weight on *ugap*	1.8	2.0	2.0	2.0	2.0	2.1
Extended Tealbook baseline	1.8	1.9	1.9	1.9	2.0	2.0

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			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nominal federal funds rate[1]								
Equal weights	2.4	3.0	3.4	3.8	4.2	4.5	4.7	4.8
Asymmetric weight on *ugap*	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3
Extended Tealbook baseline	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.6
Real GDP								
Equal weights	2.9	2.4	1.9	1.7	1.4	1.3	1.2	1.2
Asymmetric weight on *ugap*	2.9	2.4	2.2	2.2	2.4	2.5	2.4	2.4
Extended Tealbook baseline	2.9	2.4	2.1	2.2	2.2	2.3	2.2	2.2
Unemployment rate[1]								
Equal weights	3.9	3.7	3.8	3.9	4.0	4.1	4.1	4.2
Asymmetric weight on *ugap*	3.9	3.7	3.6	3.6	3.6	3.5	3.5	3.4
Extended Tealbook baseline	3.9	3.7	3.7	3.6	3.6	3.6	3.6	3.5
Total PCE prices								
Equal weights	1.4	1.6	1.6	1.7	2.0	1.7	1.6	1.6
Asymmetric weight on *ugap*	1.4	1.6	1.7	1.8	2.1	1.9	1.9	1.9
Extended Tealbook baseline	1.4	1.6	1.7	1.8	2.1	1.9	1.8	1.8
Core PCE prices								
Equal weights	1.7	1.6	1.7	1.7	1.8	1.8	1.7	1.7
Asymmetric weight on *ugap*	1.7	1.6	1.7	1.8	2.0	2.0	2.0	2.0
Extended Tealbook baseline	1.7	1.6	1.7	1.8	2.0	2.0	1.9	1.9

1. Percent, average for the quarter.

Monetary Policy Strategies

Computation of Optimal Control Policies under Commitment

The optimal control simulations posit that policymakers choose a path for the federal funds rate to minimize a discounted weighted sum of squared inflation gaps (measured as the difference between four-quarter headline PCE price inflation, π_t^{PCE}, and the Committee's 2 percent objective), squared unemployment gaps ($ugap_t$, measured as the difference between the unemployment rate and the staff's estimate of the natural rate), and squared changes in the federal funds rate. In the following equation, the resulting loss function embeds the assumption that policymakers discount the future using a quarterly discount factor, $\beta = 0.9963$:

$$\boldsymbol{L_t} = \sum_{\boldsymbol{\tau=0}}^{T} \boldsymbol{\beta^\tau} \{\lambda_\pi\,(\pi_{t+\tau}^{PCE} - \pi^{LR})^{\mathbf{2}} + \lambda_{u,t+\tau}(ugap_{t+\tau})^{\mathbf{2}} + \lambda_R(R_{\boldsymbol{t+\tau}} - R_{\boldsymbol{t+\tau-1}})^{\mathbf{2}}\}.$$

The exhibit "Optimal Control Simulations under Commitment" considers two specifications of the weights on the inflation gap, the unemployment gap, and the rate change components of the loss function. The box "Optimal Control and the Loss Function" in the Monetary Policy Strategies section of the June 2016 Tealbook B provides motivations for the specifications of the loss function. The table "Loss Functions" shows the weights used in the two specifications.

Loss Functions

	λ_π	$\lambda_{u,t+\tau}$		λ_R
		$ugap_{t+\tau} < 0$	$ugap_{t+\tau} \geq 0$	
Equal weights	1	1	1	1
Asymmetric weight on *ugap*	1	0	1	1

The first specification, "Equal weights," assigns equal weights to all three components at all times. The second specification, "Asymmetric weight on *ugap*," uses the same weights as the equal-weights specification whenever the unemployment rate is above the staff's estimate of the natural rate, but it assigns no penalty to the unemployment rate falling below the natural rate. The optimal control policy and associated outcomes depend on the relative (rather than the absolute) values of the weights.

For each of these specifications of the loss function, the optimal control policy is subject to the effective lower bound constraint on nominal interest rates. Policy tools other than the federal funds rate are taken as given and subsumed within the Tealbook baseline. The path chosen by policymakers today is assumed to be credible, meaning that the public sees this path as a binding commitment on policymakers' future decisions; the optimal control policy takes as given the initial lagged value of the federal funds rate but is otherwise unconstrained by policy decisions made prior to the simulation period.

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[1]	
	03/08/19	04/18/19	03/08/19	04/18/19	03/08/19	04/18/19	03/08/19	04/18/19	03/08/19	04/18/19
Quarterly										
2018:Q1	4.3	4.3	2.2	2.2	2.5	2.5	2.2	2.2	4.1	4.1
Q2	7.6	7.6	4.2	4.2	2.0	2.0	2.1	2.1	3.9	3.9
Q3	4.9	4.9	3.4	3.4	1.6	1.6	1.6	1.6	3.8	3.8
Q4	4.6	4.1	2.6	2.2	1.5	1.5	1.7	1.8	3.8	3.8
2019:Q1	2.7	3.2	1.0	2.1	1.3	.5	2.3	1.2	3.9	3.9
Q2	4.6	4.0	2.6	2.0	2.3	2.7	2.0	1.9	3.7	3.7
Q3	4.1	4.2	1.9	2.2	2.0	1.9	2.0	2.0	3.7	3.7
Q4	3.8	4.3	1.8	2.3	1.8	1.8	1.8	1.9	3.6	3.6
2020:Q1	4.1	4.4	2.0	2.4	1.9	1.9	2.0	2.0	3.6	3.6
Q2	4.4	4.4	2.2	2.2	1.9	1.8	2.0	1.9	3.6	3.6
Q3	4.1	3.9	2.0	1.9	1.8	1.8	1.9	1.9	3.6	3.6
Q4	4.0	4.2	2.0	2.2	1.8	1.8	1.9	1.9	3.6	3.5
Two-quarter[2]										
2018:Q2	5.9	5.9	3.2	3.2	2.2	2.2	2.1	2.1	-.2	-.2
Q4	4.7	4.5	3.0	2.8	1.5	1.5	1.7	1.7	-.1	-.1
2019:Q2	3.6	3.6	1.8	2.0	1.8	1.6	2.1	1.6	-.1	-.1
Q4	3.9	4.2	1.9	2.3	1.9	1.9	1.9	2.0	-.1	-.1
2020:Q2	4.2	4.4	2.1	2.3	1.9	1.9	2.0	1.9	.0	.0
Q4	4.0	4.0	2.0	2.1	1.8	1.8	1.9	1.9	.0	-.1
Four-quarter[3]										
2017:Q4	4.5	4.5	2.5	2.5	1.8	1.8	1.6	1.6	-.7	-.7
2018:Q4	5.3	5.2	3.1	3.0	1.9	1.9	1.9	1.9	-.3	-.3
2019:Q4	3.8	3.9	1.8	2.2	1.8	1.8	2.0	1.8	-.2	-.2
2020:Q4	4.1	4.2	2.0	2.2	1.9	1.8	2.0	1.9	.0	-.1
2021:Q4	3.6	3.8	1.5	1.7	1.9	1.8	2.0	1.9	.1	.0
Annual										
2017	4.2	4.2	2.2	2.2	1.8	1.8	1.6	1.6	4.4	4.4
2018	5.2	5.2	2.9	2.9	2.0	2.0	1.9	1.9	3.9	3.9
2019	4.2	4.2	2.2	2.4	1.7	1.6	1.9	1.7	3.7	3.7
2020	4.1	4.3	2.0	2.2	1.9	1.9	2.0	1.9	3.6	3.6
2021	3.8	3.9	1.7	1.9	1.9	1.8	2.0	1.9	3.6	3.5

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

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

Item	2018			2019				2020				2018[1]	2019[1]	2020[1]	2021[1]
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP	4.2	3.4	2.2	2.1	2.0	2.2	2.3	2.4	2.2	1.9	2.2	3.0	2.2	2.2	1.7
Previous Tealbook	4.2	3.4	2.6	1.0	2.6	1.9	1.8	2.0	2.2	2.0	2.0	3.1	1.8	2.0	1.5
Final sales	5.4	1.0	2.1	1.9	1.7	3.3	2.9	2.0	2.3	2.0	2.4	2.6	2.4	2.2	1.8
Previous Tealbook	5.4	1.0	2.2	.8	2.7	2.4	2.5	2.0	2.0	1.8	1.9	2.6	2.1	1.9	1.5
Priv. dom. final purch.	4.3	3.0	2.6	1.0	2.3	3.3	2.9	2.4	2.4	2.4	2.4	3.0	2.3	2.4	1.9
Previous Tealbook	4.3	3.0	2.9	1.0	2.7	2.7	2.6	2.1	2.2	2.1	1.9	3.1	2.2	2.1	1.6
Personal cons. expend.	3.8	3.5	2.5	1.1	2.6	2.7	2.7	2.6	2.5	2.5	2.4	2.6	2.3	2.5	2.2
Previous Tealbook	3.8	3.5	2.8	1.0	2.8	2.7	2.7	2.3	2.3	2.2	2.2	2.7	2.3	2.2	2.0
Durables	8.6	3.7	3.6	-5.4	6.3	2.7	2.2	2.0	1.9	1.9	1.8	3.4	1.4	1.9	1.6
Nondurables	4.0	4.6	2.1	1.0	2.3	2.9	2.8	2.7	2.6	2.6	2.5	2.7	2.2	2.6	2.3
Services	3.0	3.2	2.4	2.1	2.1	2.7	2.7	2.6	2.6	2.6	2.5	2.4	2.4	2.5	2.3
Residential investment	-1.3	-3.6	-4.7	-.3	-2.6	6.6	6.9	6.2	4.5	.7	-.8	-3.3	2.5	2.6	-2.7
Previous Tealbook	-1.3	-3.6	-4.9	-8.6	1.3	4.5	3.0	2.5	1.0	-1.1	-2.1	-3.3	-.1	.1	-2.8
Nonres. priv. fixed invest.	8.7	2.5	5.4	.6	2.2	5.4	2.7	.5	1.6	2.4	3.4	7.0	2.7	2.0	1.5
Previous Tealbook	8.7	2.5	5.5	3.4	2.1	2.5	2.2	1.0	2.0	2.3	1.5	7.0	2.6	1.7	.9
Equipment & intangibles	7.1	4.4	8.3	.1	2.3	6.7	3.0	1.1	2.1	3.3	4.6	7.6	3.0	2.8	2.4
Previous Tealbook	7.1	4.4	7.9	3.7	2.2	2.9	2.1	1.8	2.6	3.3	2.5	7.5	2.7	2.5	1.8
Nonres. structures	14.5	-3.4	-3.9	2.3	1.8	1.1	1.9	-1.4	-.3	-.6	-.7	4.9	1.8	-.7	-1.5
Previous Tealbook	14.5	-3.4	-2.3	2.3	2.1	1.2	2.4	-1.4	.0	-.9	-1.5	5.3	2.0	-1.0	-2.3
Net exports[2]	-841	-950	-956	-922	-963	-955	-948	-969	-982	-1002	-996	-912	-947	-987	-1000
Previous Tealbook[2]	-841	-950	-964	-973	-992	-1009	-1013	-1020	-1030	-1053	-1053	-914	-997	-1039	-1062
Exports	9.3	-4.9	1.8	1.4	-.4	5.8	3.8	.0	2.9	3.3	3.5	2.3	2.6	2.4	3.8
Imports	-.6	9.3	2.0	-2.8	4.5	3.3	1.9	2.3	3.6	4.7	1.9	3.4	1.7	3.1	3.0
Gov't. cons. & invest.	2.5	2.6	-.4	2.6	2.9	1.6	1.6	1.7	2.5	1.2	.9	1.5	2.2	1.6	1.0
Previous Tealbook	2.5	2.6	.0	.7	4.0	1.8	1.7	1.7	1.8	1.9	1.1	1.7	2.1	1.6	1.0
Federal	3.7	3.5	1.1	1.3	8.1	2.8	2.5	3.0	5.0	1.7	.8	2.7	3.6	2.6	1.0
Defense	6.0	4.9	6.3	7.0	1.9	2.6	2.5	2.7	3.0	3.0	1.3	5.0	3.5	2.5	.6
Nondefense	.5	1.6	-6.1	-6.5	18.0	3.1	2.5	3.3	7.9	-.1	.3	-.5	3.9	2.8	1.5
State & local	1.8	2.0	-1.3	3.4	-.2	.8	1.1	1.0	1.0	1.0	1.0	.8	1.3	1.0	1.0
Change in priv. inventories[2]	-37	90	97	107	124	69	40	61	56	51	45	45	85	53	41
Previous Tealbook[2]	-37	90	97	100	96	72	38	35	43	56	65	45	77	50	60

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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Real GDP	1.5	2.6	2.7	2.0	1.9	2.5	3.0	2.2	2.2	1.7
Previous Tealbook	1.5	2.6	2.7	2.0	1.9	2.5	3.1	1.8	2.0	1.5
Final sales	1.9	2.0	3.0	1.9	2.1	2.6	2.6	2.4	2.2	1.8
Previous Tealbook	1.9	2.0	3.0	1.9	2.1	2.6	2.6	2.1	1.9	1.5
Priv. dom. final purch.	2.6	2.6	4.3	2.7	2.7	3.3	3.0	2.3	2.4	1.9
Previous Tealbook	2.6	2.6	4.3	2.7	2.7	3.3	3.1	2.2	2.1	1.6
Personal cons. expend.	1.6	1.9	3.8	3.0	2.8	2.7	2.6	2.3	2.5	2.2
Previous Tealbook	1.6	1.9	3.8	3.0	2.8	2.7	2.7	2.3	2.2	2.0
Durables	6.3	5.0	9.2	6.0	6.8	7.7	3.4	1.4	1.9	1.6
Nondurables	.7	2.8	3.0	3.0	2.0	3.0	2.7	2.2	2.6	2.3
Services	1.2	1.1	3.2	2.6	2.4	1.8	2.4	2.4	2.5	2.3
Residential investment	15.4	7.1	7.8	8.9	4.5	3.8	-3.3	2.5	2.6	-2.7
Previous Tealbook	15.4	7.1	7.8	8.9	4.5	3.8	-3.3	-.1	.1	-2.8
Nonres. priv. fixed invest.	5.6	5.4	6.4	-.7	1.8	6.3	7.0	2.7	2.0	1.5
Previous Tealbook	5.6	5.4	6.4	-.7	1.8	6.3	7.0	2.6	1.7	.9
Equipment & intangibles	6.1	5.1	5.6	2.6	1.6	7.3	7.6	3.0	2.8	2.4
Previous Tealbook	6.1	5.1	5.6	2.6	1.6	7.3	7.5	2.7	2.5	1.8
Nonres. structures	4.0	6.7	8.8	-10.7	2.5	2.9	4.9	1.8	-.7	-1.5
Previous Tealbook	4.0	6.7	8.8	-10.7	2.5	2.9	5.3	2.0	-1.0	-2.3
Net exports[1]	-569	-533	-578	-725	-786	-859	-912	-947	-987	-1000
Previous Tealbook[1]	-569	-533	-578	-725	-786	-859	-914	-997	-1039	-1062
Exports	2.1	6.0	3.0	-1.6	.8	4.7	2.3	2.6	2.4	3.8
Imports	.6	3.0	6.7	3.4	3.1	5.4	3.4	1.7	3.1	3.0
Gov't. cons. & invest.	-2.1	-2.4	.2	2.2	.9	.1	1.5	2.2	1.6	1.0
Previous Tealbook	-2.1	-2.4	.2	2.2	.9	.1	1.7	2.1	1.6	1.0
Federal	-2.6	-6.1	-1.2	1.2	.2	1.3	2.7	3.6	2.6	1.0
Defense	-4.7	-6.5	-3.6	-.2	-.7	1.3	5.0	3.5	2.5	.6
Nondefense	1.2	-5.5	2.7	3.4	1.5	1.3	-.5	3.9	2.8	1.5
State & local	-1.7	.2	1.1	2.8	1.4	-.5	.8	1.3	1.0	1.0
Change in priv. inventories[1]	71	109	87	129	23	23	45	85	53	41
Previous Tealbook[1]	71	109	87	129	23	23	45	77	50	60

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

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

Item	2018			2019				2020				2018[1]	2019[1]	2020[1]	2021[1]
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP	4.2	3.4	2.2	2.1	2.0	2.2	2.3	2.4	2.2	1.9	2.2	3.0	2.2	2.2	1.7
Previous Tealbook	4.2	3.4	2.6	1.0	2.6	1.9	1.8	2.0	2.2	2.0	2.0	3.1	1.8	2.0	1.5
Final sales	5.3	1.0	2.1	1.9	1.7	3.3	2.9	2.0	2.3	2.0	2.4	2.6	2.4	2.2	1.8
Previous Tealbook	5.3	1.0	2.2	.8	2.6	2.4	2.5	2.0	2.0	1.8	1.9	2.6	2.1	1.9	1.5
Priv. dom. final purch.	3.7	2.6	2.2	.8	1.9	2.8	2.5	2.1	2.1	2.1	2.1	2.5	2.0	2.1	1.6
Previous Tealbook	3.7	2.6	2.5	.8	2.3	2.3	2.2	1.8	1.9	1.8	1.6	2.6	1.9	1.8	1.4
Personal cons. expend.	2.6	2.4	1.7	.8	1.7	1.8	1.8	1.7	1.7	1.7	1.7	1.8	1.5	1.7	1.5
Previous Tealbook	2.6	2.4	1.9	.7	1.9	1.8	1.8	1.6	1.5	1.5	1.5	1.8	1.6	1.5	1.4
Durables	.6	.3	.3	-.4	.4	.2	.1	.1	.1	.1	.1	.2	.1	.1	.1
Nondurables	.6	.6	.3	.1	.3	.4	.4	.4	.4	.4	.3	.4	.3	.4	.3
Services	1.4	1.5	1.1	1.0	1.0	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.2	1.1
Residential investment	-.1	-.1	-.2	.0	-.1	.2	.3	.2	.2	.0	.0	-.1	.1	.1	-.1
Previous Tealbook	-.1	-.1	-.2	-.3	.0	.2	.1	.1	.0	.0	-.1	-.1	.0	.0	-.1
Nonres. priv. fixed invest.	1.2	.4	.7	.1	.3	.7	.4	.1	.2	.3	.5	.9	.4	.3	.2
Previous Tealbook	1.2	.4	.7	.5	.3	.3	.3	.1	.3	.3	.2	.9	.3	.2	.1
Equipment & intangibles	.7	.5	.9	.0	.2	.7	.3	.1	.2	.3	.5	.8	.3	.3	.2
Previous Tealbook	.7	.5	.8	.4	.2	.3	.2	.2	.3	.3	.3	.8	.3	.3	.2
Nonres. structures	.4	-.1	-.1	.1	.1	.0	.1	.0	.0	.0	.0	.1	.1	.0	.0
Previous Tealbook	.4	-.1	-.1	.1	.1	.0	.1	.0	.0	.0	.0	.2	.1	.0	-.1
Net exports	1.2	-2.0	-.1	.6	-.7	.2	.2	-.4	-.2	-.3	.1	-.2	.1	-.2	.0
Previous Tealbook	1.2	-2.0	-.2	-.1	-.3	-.3	-.1	-.1	-.1	-.4	.0	-.3	-.2	-.1	.0
Exports	1.1	-.6	.2	.2	-.1	.7	.5	.0	.4	.4	.4	.3	.3	.3	.5
Imports	.1	-1.4	-.3	.4	-.7	-.5	-.3	-.4	-.5	-.7	-.3	-.5	-.3	-.5	-.5
Gov't. cons. & invest.	.4	.4	-.1	.4	.5	.3	.3	.3	.4	.2	.2	.3	.4	.3	.2
Previous Tealbook	.4	.4	.0	.1	.7	.3	.3	.3	.3	.3	.2	.3	.4	.3	.2
Federal	.2	.2	.1	.1	.5	.2	.2	.2	.3	.1	.1	.2	.2	.2	.1
Defense	.2	.2	.2	.3	.1	.1	.1	.1	.1	.1	.0	.2	.1	.1	.0
Nondefense	.0	.0	-.2	-.2	.4	.1	.1	.1	.2	.0	.0	.0	.1	.1	.0
State & local	.2	.2	-.1	.4	.0	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1
Change in priv. inventories	-1.2	2.3	.1	.2	.3	-1.0	-.6	.4	-.1	-.1	-.1	.4	-.3	.0	.0
Previous Tealbook	-1.2	2.3	.4	.2	-.1	-.4	-.6	-.1	.1	.2	.2	.5	-.2	.1	.0

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

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

Item	2018			2019				2020							
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2018[1]	2019[1]	2020[1]	2021[1]
GDP chain-wt. price index	3.0	1.8	1.7	1.3	2.0	1.9	1.9	2.0	2.2	2.0	1.9	2.1	1.8	2.0	2.0
Previous Tealbook	3.0	1.8	1.8	1.8	2.0	2.1	1.9	2.1	2.2	2.0	1.9	2.2	2.0	2.1	2.1
PCE chain-wt. price index	2.0	1.6	1.5	.5	2.7	1.9	1.8	1.9	1.8	1.8	1.8	1.9	1.8	1.8	1.8
Previous Tealbook	2.0	1.6	1.5	1.3	2.3	2.0	1.8	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.9
Energy	.7	3.3	-2.0	-17.0	23.3	-2.4	-1.4	-1.7	-1.5	-1.3	-1.4	3.5	-.4	-1.5	-.9
Previous Tealbook	.7	3.3	-2.0	-18.5	10.7	1.1	.0	-.8	-1.0	-1.2	-1.2	3.5	-2.2	-1.0	-.7
Food	1.2	.4	.3	3.0	2.9	3.1	2.6	2.6	2.6	2.6	2.6	.5	2.9	2.6	2.6
Previous Tealbook	1.2	.4	.3	1.8	2.1	2.4	2.4	2.3	2.3	2.3	2.3	.5	2.2	2.3	2.3
Ex. food & energy	2.1	1.6	1.8	1.2	1.9	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.8	1.9	1.9
Previous Tealbook	2.1	1.6	1.7	2.3	2.0	2.0	1.8	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0
Ex. food & energy, market based	2.2	1.2	1.5	1.6	1.5	2.0	1.7	1.9	1.8	1.7	1.7	1.7	1.7	1.8	1.8
Previous Tealbook	2.2	1.2	1.5	2.3	1.9	1.8	1.6	1.9	1.8	1.8	1.8	1.7	1.9	1.8	1.8
CPI	2.1	2.0	1.5	.9	3.8	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2
Previous Tealbook	2.1	2.0	1.5	.9	3.0	2.3	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2
Ex. food & energy	1.9	2.0	2.2	2.3	2.4	2.5	2.3	2.4	2.3	2.3	2.3	2.2	2.4	2.3	2.3
Previous Tealbook	1.9	2.0	2.2	2.6	2.4	2.4	2.3	2.4	2.4	2.4	2.4	2.2	2.4	2.4	2.4
ECI, hourly compensation[2]	2.4	3.0	2.4	2.7	2.8	2.8	2.8	2.7	2.7	2.7	2.7	3.0	2.8	2.7	2.7
Previous Tealbook[2]	2.4	3.0	2.4	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.0	2.8	2.8	2.8
Business sector															
Output per hour	3.4	1.4	1.2	1.9	.2	.9	1.1	1.4	1.1	1.1	1.4	1.7	1.0	1.3	1.2
Previous Tealbook	3.4	1.4	1.8	.4	.7	.6	.8	1.2	1.5	1.3	1.3	1.9	.6	1.3	1.1
Compensation per hour	.3	3.2	3.7	2.7	3.4	3.6	3.8	3.7	3.7	3.7	3.7	2.9	3.4	3.7	3.7
Previous Tealbook	.3	3.2	3.6	2.7	3.8	3.8	3.8	3.7	3.7	3.7	3.7	2.9	3.5	3.7	3.7
Unit labor costs	-3.0	1.8	2.4	.8	3.2	2.7	2.7	2.2	2.5	2.5	2.2	1.2	2.3	2.4	2.5
Previous Tealbook	-3.0	1.8	1.8	2.3	3.1	3.2	3.0	2.4	2.2	2.4	2.4	1.0	2.9	2.4	2.5
Core goods imports chain-wt. price index[3]	.6	-1.2	.1	-.5	1.3	1.4	1.2	1.2	1.1	1.0	1.0	.5	.9	1.1	.9
Previous Tealbook[3]	.6	-1.2	.0	-.1	.8	.8	.8	.9	.9	.8	.8	.5	.6	.8	.7

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.

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

Item	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
GDP chain-wt. price index	2.1	1.8	1.6	.9	1.5	2.0	2.1	1.8	2.0	2.0
Previous Tealbook	2.1	1.8	1.6	.9	1.5	2.0	2.2	2.0	2.1	2.1
PCE chain-wt. price index	1.8	1.2	1.2	.3	1.6	1.8	1.9	1.8	1.8	1.8
Previous Tealbook	1.8	1.2	1.2	.3	1.6	1.8	1.9	1.8	1.9	1.9
Energy	2.1	-2.9	-6.9	-16.4	2.1	8.1	3.5	-.4	-1.5	-.9
Previous Tealbook	2.1	-2.9	-6.9	-16.4	2.1	8.1	3.5	-2.2	-1.0	-.7
Food	1.3	.7	2.8	.3	-1.8	.7	.5	2.9	2.6	2.6
Previous Tealbook	1.3	.7	2.8	.3	-1.8	.7	.5	2.2	2.3	2.3
Ex. food & energy	1.8	1.6	1.5	1.2	1.8	1.6	1.9	1.8	1.9	1.9
Previous Tealbook	1.8	1.6	1.5	1.2	1.8	1.6	1.9	2.0	2.0	2.0
Ex. food & energy, market based	1.5	1.1	1.2	1.1	1.5	1.2	1.7	1.7	1.8	1.8
Previous Tealbook	1.5	1.1	1.2	1.1	1.5	1.2	1.7	1.9	1.8	1.8
CPI	1.9	1.2	1.2	.4	1.8	2.1	2.2	2.2	2.1	2.2
Previous Tealbook	1.9	1.2	1.2	.4	1.8	2.1	2.2	2.1	2.2	2.2
Ex. food & energy	1.9	1.7	1.7	2.0	2.2	1.8	2.2	2.4	2.3	2.3
Previous Tealbook	1.9	1.7	1.7	2.0	2.2	1.8	2.2	2.4	2.4	2.4
ECI, hourly compensation[1]	1.8	2.0	2.3	1.9	2.2	2.6	3.0	2.8	2.7	2.7
Previous Tealbook[1]	1.8	2.0	2.3	1.9	2.2	2.6	3.0	2.8	2.8	2.8
Business sector										
Output per hour	.1	1.8	.2	.7	1.1	.7	1.7	1.0	1.3	1.2
Previous Tealbook	.1	1.8	.2	.7	1.1	.7	1.9	.6	1.3	1.1
Compensation per hour	5.9	-.3	2.8	2.5	2.1	3.0	2.9	3.4	3.7	3.7
Previous Tealbook	5.9	-.3	2.8	2.5	2.1	3.0	2.9	3.5	3.7	3.7
Unit labor costs	5.7	-2.0	2.7	1.8	1.0	2.3	1.2	2.3	2.4	2.5
Previous Tealbook	5.7	-2.0	2.7	1.8	1.0	2.3	1.0	2.9	2.4	2.5
Core goods imports chain-wt. price index[2]	-.4	-2.2	-.4	-4.4	-.7	1.1	.5	.9	1.1	.9
Previous Tealbook[2]	-.4	-2.2	-.4	-4.4	-.7	1.1	.5	.6	.8	.7

1. Private-industry workers.
2. Core goods imports exclude computers, semiconductors, oil, and natural gas.

Other Macroeconomic Indicators

Item	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2018[1]	2019[1]	2020[1]	2021[1]
Employment and production															
Nonfarm payroll employment[2]	243	189	233	180	175	175	160	187	227	45	144	223	173	151	103
Unemployment rate[3]	3.9	3.8	3.8	3.9	3.7	3.7	3.6	3.6	3.6	3.6	3.5	3.8	3.6	3.5	3.5
Previous Tealbook[3]	3.9	3.8	3.8	3.9	3.7	3.7	3.6	3.6	3.6	3.6	3.6	3.8	3.6	3.6	3.7
Natural rate of unemployment[3]	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
Previous Tealbook[3]	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[3]	60.4	60.4	60.6	60.7	60.7	60.7	60.7	60.7	60.8	60.8	60.8	60.6	60.7	60.8	60.6
Employment-to-Population Trend[3]	60.0	60.0	59.9	59.9	59.9	59.8	59.8	59.8	59.7	59.7	59.7	59.9	59.8	59.7	59.5
Output gap[4]	1.4	1.7	1.9	1.9	2.0	2.1	2.2	2.4	2.5	2.5	2.6	1.9	2.2	2.6	2.4
Previous Tealbook[4]	1.4	1.7	1.9	1.9	2.1	2.1	2.1	2.2	2.2	2.3	2.3	1.9	2.1	2.3	1.9
Industrial production[5]	4.6	5.2	4.0	-.3	.8	1.9	1.3	1.8	1.8	1.1	1.0	4.0	.9	1.4	1.0
Previous Tealbook[5]	5.2	4.9	4.6	.5	2.8	.6	1.0	1.7	1.5	1.1	1.0	4.3	1.2	1.3	.7
Manufacturing industr. prod.[5]	2.0	3.6	1.7	-1.1	.3	1.1	1.2	1.6	1.7	1.6	1.3	2.2	.4	1.6	1.1
Previous Tealbook[5]	2.3	3.8	2.6	-.7	2.0	.5	.9	.9	1.0	1.2	1.1	2.6	.7	1.0	.5
Capacity utilization rate - mfg.[3]	76.4	76.9	77.0	76.6	76.4	76.3	76.3	76.5	76.7	76.8	76.9	77.0	76.3	76.9	77.4
Previous Tealbook[3]	75.5	76.0	76.2	75.8	75.9	75.7	75.7	75.6	75.7	75.7	75.8	76.2	75.7	75.8	75.7
Housing starts[6]	1.3	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3
Light motor vehicle sales[6]	17.2	16.9	17.5	16.9	16.8	16.9	17.0	17.0	17.0	16.9	16.9	17.2	16.9	16.9	16.9
Income and saving															
Nominal GDP[5]	7.6	4.9	4.1	3.2	4.0	4.2	4.3	4.4	4.4	3.9	4.2	5.2	3.9	4.2	3.8
Real disposable pers. income[5]	1.8	2.6	4.3	4.9	1.8	1.0	1.9	3.2	2.0	1.4	2.1	3.3	2.4	2.2	1.9
Previous Tealbook[5]	1.8	2.6	4.2	3.3	2.1	1.5	2.2	2.8	1.8	1.5	2.2	3.3	2.3	2.1	1.8
Personal saving rate[3]	6.7	6.4	6.8	7.6	7.4	7.0	6.8	7.0	6.9	6.6	6.6	6.8	6.8	6.6	6.3
Previous Tealbook[3]	6.7	6.4	6.7	7.1	7.0	6.7	6.6	6.7	6.6	6.5	6.5	6.7	6.6	6.5	6.3
Corporate profits[7]	12.5	14.7	-1.7	-3.3	1.4	2.3	-5.1	-3.5	3.3	3.0	4.4	7.4	-1.2	1.7	1.9
Profit share of GNP[3]	10.8	11.1	10.9	10.8	10.7	10.7	10.4	10.2	10.2	10.2	10.2	10.9	10.4	10.2	10.0
Gross national saving rate[3]	18.5	18.8	18.7	19.4	19.0	18.9	18.8	18.7	18.7	18.7	18.7	18.7	18.8	18.7	18.6
Net national saving rate[3]	3.3	3.6	3.4	4.6	4.1	4.0	3.8	3.5	3.6	3.5	3.5	3.4	3.8	3.5	3.2

1. Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise indicated.
2. Average monthly change, thousands.
3. Percent; annual values are for the fourth quarter of the year indicated.
4. Percent difference between actual and potential output; a negative number indicates that the economy is operating below potential. Annual values are for the fourth quarter of the year indicated.
5. Percent change, annual rate.
6. Level, millions; annual values are annual averages.
7. Percent change, annual rate, with inventory valuation and capital consumption adjustments.

Other Macroeconomic Indicators

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

Item	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Employment and production										
Nonfarm payroll employment[1]	181	192	251	227	193	179	223	173	151	103
Unemployment rate[2]	7.8	7.0	5.7	5.0	4.8	4.1	3.8	3.6	3.5	3.5
Previous Tealbook[2]	7.8	7.0	5.7	5.0	4.8	4.1	3.8	3.6	3.6	3.7
Natural rate of unemployment[2]	5.6	5.4	5.1	4.9	4.8	4.6	4.6	4.6	4.6	4.6
Previous Tealbook[2]	5.6	5.4	5.1	4.9	4.8	4.6	4.6	4.6	4.6	4.6
Employment-to-Population Ratio[2]	58.7	58.5	59.3	59.4	59.8	60.2	60.6	60.7	60.8	60.6
Employment-to-Population Trend[2]	60.5	60.4	60.3	60.2	60.1	60.1	59.9	59.8	59.7	59.5
Output gap[3]	-3.8	-3.0	-1.0	-.4	.1	.9	1.9	2.2	2.6	2.4
Previous Tealbook[3]	-3.8	-3.0	-1.0	-.4	.1	.9	1.9	2.1	2.3	1.9
Industrial production	2.1	2.3	3.4	-3.4	-.3	3.6	4.0	.9	1.4	1.0
Previous Tealbook	2.2	2.3	3.4	-3.3	-.5	3.0	4.3	1.2	1.3	.7
Manufacturing industr. prod.	1.4	1.1	1.4	-1.7	.3	2.5	2.2	.4	1.6	1.1
Previous Tealbook	1.4	1.1	1.4	-1.6	-.1	1.9	2.6	.7	1.0	.5
Capacity utilization rate - mfg.[2]	74.2	74.5	75.8	74.9	74.2	75.8	77.0	76.3	76.9	77.4
Previous Tealbook[2]	74.7	75.1	76.3	75.4	74.4	75.2	76.2	75.7	75.8	75.7
Housing starts[4]	.8	.9	1.0	1.1	1.2	1.2	1.2	1.3	1.3	1.3
Light motor vehicle sales[4]	14.4	15.5	16.5	17.4	17.5	17.1	17.2	16.9	16.9	16.9
Income and saving										
Nominal GDP	3.6	4.4	4.4	2.9	3.4	4.5	5.2	3.9	4.2	3.8
Real disposable pers. income	4.9	-2.5	5.2	3.1	1.6	2.8	3.3	2.4	2.2	1.9
Previous Tealbook	4.9	-2.5	5.2	3.1	1.6	2.8	3.3	2.3	2.1	1.8
Personal saving rate[2]	10.2	6.3	7.4	7.4	6.4	6.3	6.8	6.8	6.6	6.3
Previous Tealbook[2]	10.2	6.3	7.4	7.4	6.4	6.3	6.7	6.6	6.5	6.3
Corporate profits[5]	.7	3.9	5.9	-10.7	7.6	3.3	7.4	-1.2	1.7	1.9
Profit share of GNP[2]	11.9	11.8	12.0	10.4	10.8	10.7	10.9	10.4	10.2	10.0
Gross national saving rate[2]	18.8	19.2	20.2	19.4	18.3	18.3	18.7	18.8	18.7	18.6
Net national saving rate[2]	3.7	4.0	5.1	4.3	3.0	3.1	3.4	3.8	3.5	3.2

1. Average monthly change, thousands.
2. Percent; values are for the fourth quarter of the year indicated.
3. Percent difference between actual and potential output; a negative number indicates that the economy is operating below potential. Values are for the fourth quarter of the year indicated.
4. 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	2016	2017	2018	2019	2020	2021	2018 Q4	2019 Q1	2019 Q2	2019 Q3
Unified federal budget[1]	Nominal dollars, billions									
Receipts	3,268	3,316	3,330	3,482	3,703	3,854	771	736	1,121	854
Outlays	3,853	3,982	4,109	4,376	4,640	4,841	1,090	1,108	1,109	1,069
Surplus/deficit	-585	-665	-779	-895	-937	-987	-319	-372	12	-215
	Percent of GDP									
Surplus/deficit	-3.2	-3.5	-3.9	-4.2	-4.3	-4.3	-6.2	-7.2	.2	-4.1
Previous Tealbook	*-3.2*	*-3.5*	*-3.8*	*-4.2*	*-4.4*	*-4.6*	*-6.2*	*-7.5*	*.6*	*-4.0*
Primary surplus/deficit	-1.9	-2.1	-2.2	-2.5	-2.4	-2.5	-4.3	-5.5	2.3	-2.8
Net interest	1.3	1.4	1.6	1.7	1.8	1.8	1.9	1.7	2.0	1.2
Cyclically adjusted surplus/deficit	-3.0	-3.6	-4.4	-5.1	-5.3	-5.5	-7.0	-8.0	-.7	-5.0
Federal debt held by public	76.4	76.1	77.8	77.0	79.8	81.3	78.5	78.1	77.4	77.0
Government in the NIPA[2]	Real percent change, annual rate									
Purchases	.9	.1	1.5	2.2	1.6	1.0	-.4	2.6	2.9	1.6
Consumption	.9	-.1	1.4	1.6	1.2	.7	.0	.3	3.6	1.2
Investment	.7	1.4	2.3	4.5	3.0	2.1	-1.3	12.6	-.5	2.7
State and local construction	1.8	-2.9	.4	3.3	1.0	1.0	-11.3	20.0	-7.0	.0
Real disposable personal income	1.6	2.8	3.3	2.4	2.2	1.9	4.3	4.8	1.8	1.0
Contribution from transfers[3]	.3	.2	.5	.8	.6	.8	.4	2.3	.3	-.1
Contribution from taxes[3]	-.1	-.6	.0	-.7	-.6	-.5	-.2	-1.5	-.4	-.4
Government employment	Average net change in monthly payrolls, thousands									
Federal	3	-2	0	1	0	1	0	-1	1	9
State and local	14	9	8	10	9	9	-3	12	9	9
Fiscal indicators[2]	Percentage point contribution to change in real GDP, annual rate									
Fiscal effect (FE)[4]	.4	.1	.4	.7	.6	.4	.2	.9	1.0	.5
Discretionary policy actions (FI)	.3	.2	.6	.6	.5	.2	.3	.8	.8	.5
Previous Tealbook	*.3*	*.2*	*.6*	*.6*	*.5*	*.2*	*.4*	*.5*	*1.0*	*.5*
Federal purchases	.0	.1	.2	.2	.2	.1	.1	.1	.5	.2
State and local purchases	.1	-.1	.1	.1	.1	.1	-.1	.4	.0	.1
Taxes and transfers	.1	.1	.3	.3	.2	.0	.3	.3	.3	.2
Cyclical	-.1	-.1	-.2	-.1	-.1	.0	-.2	-.1	-.1	-.1
Other	.2	.1	.0	.2	.2	.2	.1	.3	.3	.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).

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

					-----	-----	-----	-----Projected-----	-----	-----	-----	-----
	2018				2019				2020			
Measure and country	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Real GDP[1]												
Total foreign	3.1	2.0	2.1	1.7	2.0	2.4	2.5	2.3	2.5	2.6	2.6	2.6
Previous Tealbook	*3.0*	*2.1*	*2.1*	*1.7*	*1.7*	*2.4*	*2.6*	*2.3*	*2.6*	*2.6*	*2.6*	*2.6*
Advanced foreign economies	1.3	2.2	1.0	.8	1.2	1.4	1.6	1.0	1.5	1.6	1.7	1.7
Canada	1.3	2.6	2.0	.4	1.0	2.1	1.7	1.7	1.9	1.9	1.8	1.8
Japan	-.4	1.9	-2.4	1.9	.3	.6	3.0	-3.0	.8	1.0	1.0	.9
United Kingdom	.2	1.6	2.8	.9	1.5	.5	1.3	1.5	1.6	1.7	1.7	1.7
Euro area	1.5	1.7	.6	.9	1.4	1.1	1.0	1.1	1.2	1.4	1.5	1.6
Germany	1.5	1.8	-.8	.1	1.5	1.3	1.3	1.3	1.3	1.3	1.4	1.4
Emerging market economies	4.9	1.9	3.1	2.6	2.9	3.4	3.5	3.4	3.5	3.6	3.6	3.6
Asia	6.0	4.2	3.8	4.0	4.3	4.6	4.6	4.5	4.5	4.5	4.5	4.5
Korea	4.1	2.4	2.3	3.9	1.9	2.2	2.6	2.6	2.6	2.6	2.6	2.6
China	7.1	6.5	5.8	6.0	7.1	6.6	6.2	6.0	6.0	6.0	6.0	6.0
Latin America	3.7	-.8	2.2	1.0	1.3	2.1	2.3	2.3	2.5	2.6	2.7	2.6
Mexico	4.2	-.6	2.4	1.0	1.3	2.1	2.2	2.2	2.4	2.5	2.6	2.5
Brazil	1.7	.2	2.2	.5	.0	1.5	2.2	2.4	2.4	2.6	2.6	2.8
Consumer prices[2]												
Total foreign	2.6	1.9	3.4	1.9	.7	2.5	2.2	2.6	2.3	2.3	2.3	2.3
Previous Tealbook	*2.5*	*1.7*	*3.6*	*2.0*	*.5*	*2.3*	*2.2*	*2.6*	*2.3*	*2.3*	*2.3*	*2.3*
Advanced foreign economies	2.4	1.3	2.4	.8	.6	1.6	1.5	2.4	1.4	1.4	1.4	1.5
Canada	3.3	1.2	2.6	1.1	1.5	3.0	2.0	2.0	1.9	1.9	1.9	1.9
Japan	2.8	-1.6	2.0	-.1	.9	.8	1.1	6.3	.9	.9	1.0	1.0
United Kingdom	2.3	2.1	2.8	2.0	.7	2.0	2.2	2.2	2.3	2.2	2.2	2.2
Euro area	1.8	2.5	2.6	.7	-.1	1.1	1.3	1.3	1.2	1.2	1.2	1.2
Germany	1.9	2.6	2.9	1.2	-.4	1.7	1.7	1.8	1.8	1.9	1.9	2.0
Emerging market economies	2.7	2.2	4.1	2.7	.8	3.0	2.7	2.7	2.8	2.8	2.8	2.8
Asia	2.1	1.4	3.0	1.7	.3	2.9	2.3	2.4	2.6	2.6	2.6	2.6
Korea	1.6	2.2	1.9	1.5	-3.3	.2	1.9	1.9	2.0	2.1	2.1	2.1
China	1.9	1.1	3.7	2.0	.6	3.4	2.1	2.1	2.4	2.5	2.5	2.5
Latin America	4.1	4.2	6.8	5.4	1.7	3.4	3.6	3.6	3.4	3.4	3.4	3.4
Mexico	4.0	4.0	6.5	4.9	1.1	2.8	3.3	3.3	3.2	3.2	3.2	3.2
Brazil	3.1	4.3	6.6	2.5	2.9	4.8	4.1	4.3	4.3	4.3	4.3	4.3

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	2012	2013	2014	2015	2016	2017	2018	2019 (Projected)	2020 (Projected)	2021 (Projected)
Real GDP[1]										
Total foreign	2.2	3.0	3.0	2.1	2.8	3.0	2.2	2.3	2.6	2.7
Previous Tealbook	*2.2*	*3.0*	*3.0*	*2.0*	*2.8*	*3.0*	*2.2*	*2.2*	*2.6*	*2.6*
Advanced foreign economies	.3	2.4	2.1	.9	1.8	2.6	1.3	1.3	1.6	1.7
Canada	.7	3.4	2.8	-.4	1.8	2.9	1.6	1.6	1.9	1.8
Japan	.3	2.8	-.4	1.0	1.2	2.4	.3	.2	.9	.8
United Kingdom	1.6	2.6	3.1	2.2	1.7	1.6	1.4	1.2	1.7	1.6
Euro area	-1.1	.7	1.6	2.0	2.1	2.7	1.2	1.1	1.4	1.7
Germany	.2	1.6	2.3	1.3	1.9	2.8	.6	1.3	1.3	1.5
Emerging market economies	4.2	3.6	3.9	3.2	3.8	3.4	3.1	3.3	3.6	3.6
Asia	5.8	5.4	5.1	4.5	5.1	5.2	4.5	4.5	4.5	4.4
Korea	2.1	3.5	2.8	3.2	2.6	2.8	3.2	2.3	2.6	2.4
China	8.0	7.6	7.1	6.8	6.8	6.7	6.4	6.5	6.0	5.8
Latin America	2.9	1.7	2.8	1.9	2.5	1.7	1.5	2.0	2.6	2.8
Mexico	3.0	1.2	3.4	2.8	3.3	1.5	1.7	1.9	2.5	2.7
Brazil	2.5	2.6	-.1	-5.5	-2.3	2.3	1.1	1.5	2.6	2.8
Consumer prices[2]										
Total foreign	2.3	2.4	2.0	1.4	1.9	2.5	2.4	2.0	2.3	2.3
Previous Tealbook	*2.3*	*2.4*	*2.0*	*1.4*	*1.9*	*2.5*	*2.5*	*1.9*	*2.3*	*2.3*
Advanced foreign economies	1.3	1.0	1.2	.5	.9	1.5	1.7	1.5	1.4	1.5
Canada	1.0	1.0	2.0	1.3	1.4	1.8	2.1	2.1	1.9	1.9
Japan	-.2	1.4	2.6	.1	.3	.6	.8	2.2	.9	1.0
United Kingdom	2.6	2.1	.9	.1	1.2	3.0	2.3	1.8	2.2	2.2
Euro area	2.3	.8	.2	.3	.7	1.4	1.9	.9	1.2	1.3
Germany	2.0	1.4	.4	.5	1.1	1.6	2.2	1.2	1.9	2.1
Emerging market economies	3.1	3.4	2.6	2.0	2.6	3.2	2.9	2.3	2.8	2.8
Asia	2.7	3.2	1.8	1.5	2.1	2.0	2.1	2.0	2.6	2.6
Korea	1.7	1.1	1.0	.9	1.4	1.4	1.8	.2	2.0	2.1
China	2.1	2.9	1.5	1.4	2.1	1.8	2.2	2.1	2.5	2.5
Latin America	4.3	4.0	4.7	3.2	4.0	6.4	5.1	3.1	3.4	3.3
Mexico	4.1	3.6	4.2	2.3	3.3	6.6	4.8	2.6	3.2	3.2
Brazil	5.6	5.8	6.5	10.4	7.1	2.8	4.1	4.0	4.3	4.3

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

U.S. Current Account

Quarterly Data

	2018				Projected 2019				Projected 2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Billions of dollars, s.a.a.r.											
U.S. current account balance	**-495.7**	**-414.3**	**-506.4**	**-537.5**	**-509.7**	**-569.2**	**-573.5**	**-571.2**	**-610.5**	**-607.3**	**-625.5**	**-617.5**
Previous Tealbook	*-496.7*	*-414.8*	*-509.2*	*-609.3*	*-636.9*	*-656.9*	*-673.8*	*-689.5*	*-713.7*	*-714.1*	*-745.8*	*-748.3*
Current account as percent of GDP	-2.5	-2.0	-2.5	-2.6	-2.4	-2.7	-2.7	-2.6	-2.8	-2.7	-2.8	-2.7
Previous Tealbook	*-2.5*	*-2.0*	*-2.5*	*-2.9*	*-3.0*	*-3.1*	*-3.1*	*-3.2*	*-3.3*	*-3.2*	*-3.3*	*-3.3*
Net goods & services	-625.0	-547.5	-648.1	-667.9	-622.6	-674.8	-660.4	-650.2	-674.2	-670.4	-681.1	-674.7
Investment income, net	258.3	263.2	255.2	255.7	233.8	215.6	202.9	191.0	184.6	173.1	171.6	169.3
Direct, net	310.4	316.3	314.9	314.1	304.5	299.7	301.9	305.0	313.2	315.8	325.1	333.4
Portfolio, net	-52.1	-53.1	-59.6	-58.4	-70.6	-84.1	-99.0	-114.0	-128.6	-142.8	-153.5	-164.2
Other income and transfers, net	-129.0	-129.9	-113.6	-125.4	-120.9	-109.9	-116.0	-112.0	-120.9	-109.9	-116.0	-112.0

Annual Data

								Projected		
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
	Billions of dollars									
U.S. current account balance	**-426.8**	**-348.8**	**-365.2**	**-407.8**	**-432.9**	**-449.1**	**-488.5**	**-555.9**	**-615.2**	**-612.0**
Previous Tealbook	*-426.8*	*-348.8*	*-365.2*	*-407.8*	*-432.9*	*-449.1*	*-507.5*	*-664.3*	*-730.5*	*-766.2*
Current account as percent of GDP	-2.6	-2.1	-2.1	-2.2	-2.3	-2.3	-2.4	-2.6	-2.8	-2.6
Previous Tealbook	*-2.6*	*-2.1*	*-2.1*	*-2.2*	*-2.3*	*-2.3*	*-2.5*	*-3.1*	*-3.3*	*-3.3*
Net goods & services	-537.4	-461.1	-489.6	-498.5	-502.0	-552.3	-622.1	-652.0	-675.1	-667.8
Investment income, net	216.1	215.4	229.0	214.7	205.7	235.1	258.1	210.8	174.6	170.6
Direct, net	285.5	283.3	284.2	284.6	272.6	298.4	313.9	302.8	321.9	359.3
Portfolio, net	-69.4	-67.9	-55.3	-70.0	-66.9	-63.3	-55.8	-91.9	-147.3	-188.7
Other income and transfers, net	-105.5	-103.1	-104.6	-123.9	-136.6	-132.0	-124.5	-114.7	-114.7	-114.7

Report to the FOMC on Economic Conditions and Monetary Policy

Book B

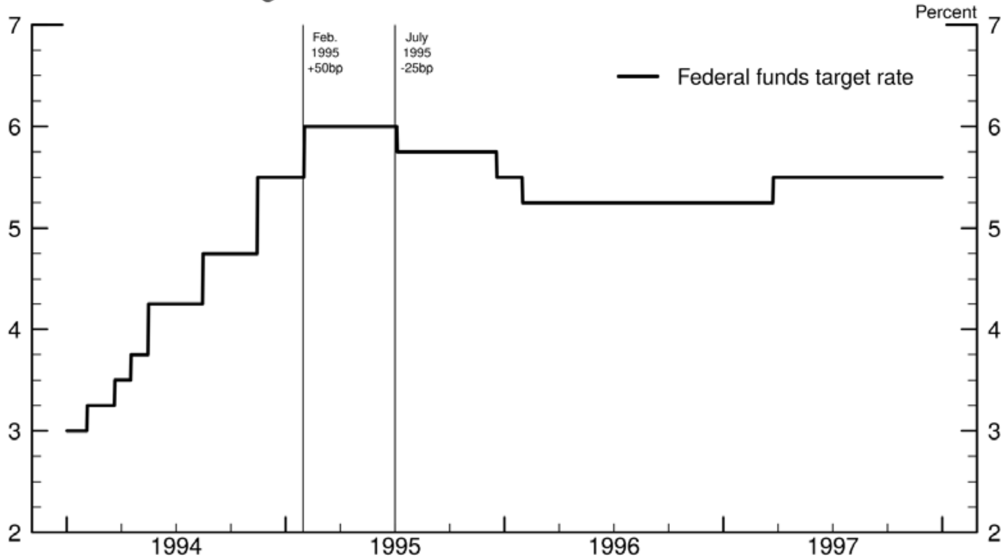
Monetary Policy Alternatives

April 25, 2019

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

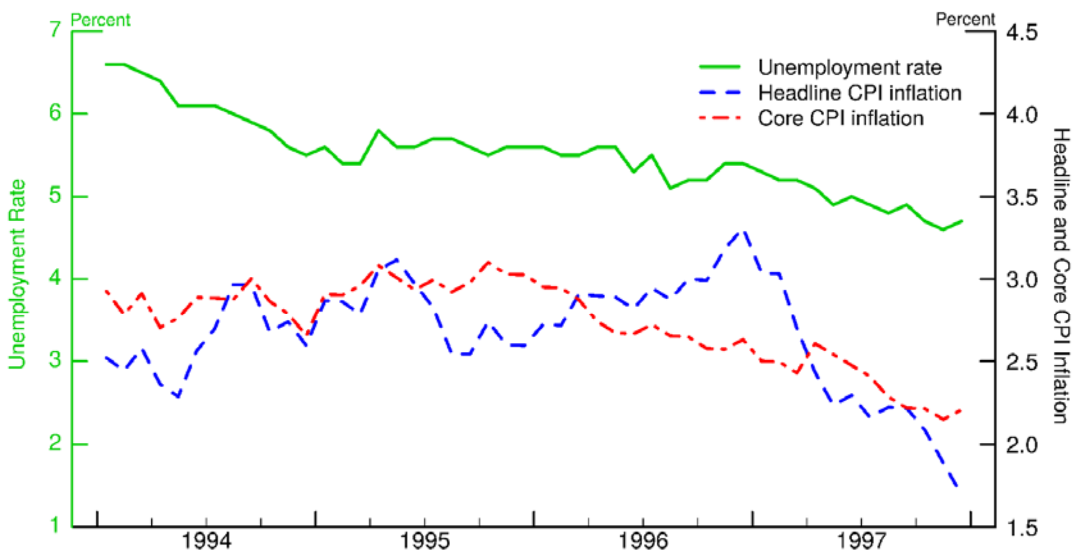
Alternatives

Figure 1: Federal Funds Target Rate



Source: Board of Governors of the Federal Reserve System.

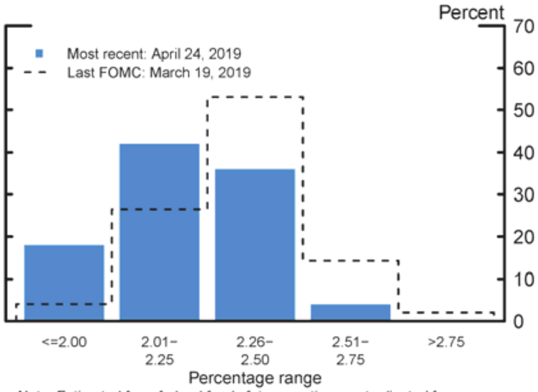
Figure 2: Unemployment Rate, Headline and Core CPI Inflation



Note: Headline inflation is measured as the 12-month percent change in the consumer price index (CPI). Core inflation is measured as the 12-month percent change in CPI, excluding food and energy. Headline and core inflation data are taken from the November 1998 vintage release.

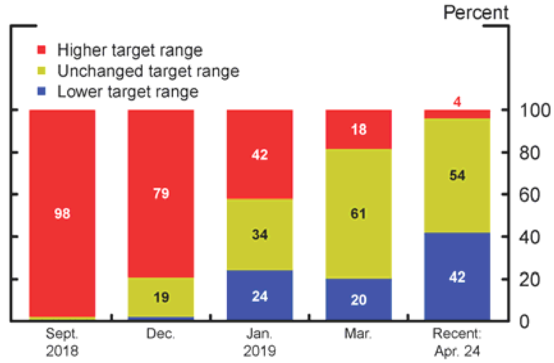
Source: Bureau of Labor Statistics (unemployment rate); Federal Reserve Bank of Philadelphia (inflation).

Figure 1: Market−Implied Probability Distribution of the Federal Funds Rate, Year−End 2019



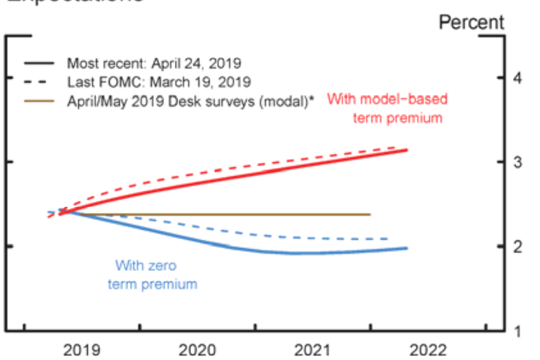
Note: Estimated from federal funds futures options, not adjusted for risk premiums.
Source: CME Group; Federal Reserve Board staff estimates.

Figure 2: Option−Implied Distribution of Policy Rate Six Months Ahead



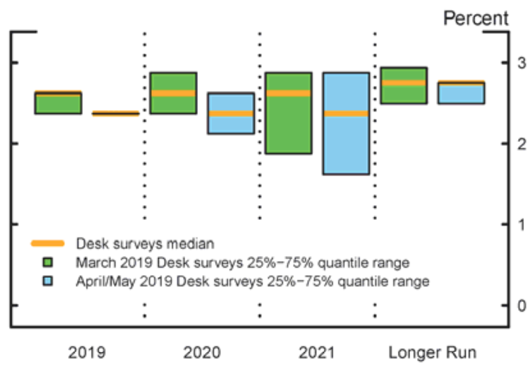
Note: Bars represent the option−implied probabilities, as of the day before the indicated FOMC meeting, that the average federal funds rate during the contract month six months after the month of the meeting will be below, within, or above the target range in effect on the eve of the meeting. The Nov. 2018 meeting is omitted.
Source: CME Group; Board staff calculations.

Figure 3: Measures of Federal Funds Rate Expectations



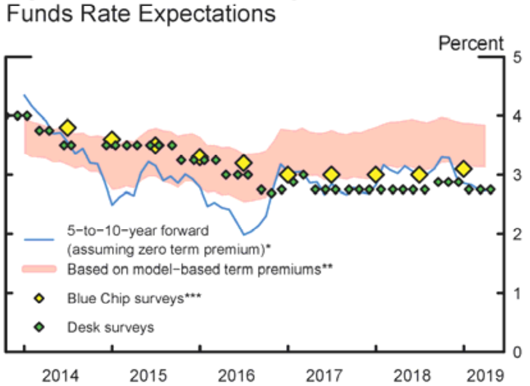
Note: Zero term premium path is estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points. Model−based term premium path is estimated using a term structure model maintained by Board staff and corrects for term premium.
* Median of respondents' modal paths for the federal funds rate.
Source: Bloomberg; Board staff calculations; FRBNY.

Figure 4: Desk Surveys Modal Projections for the Federal Funds Rate



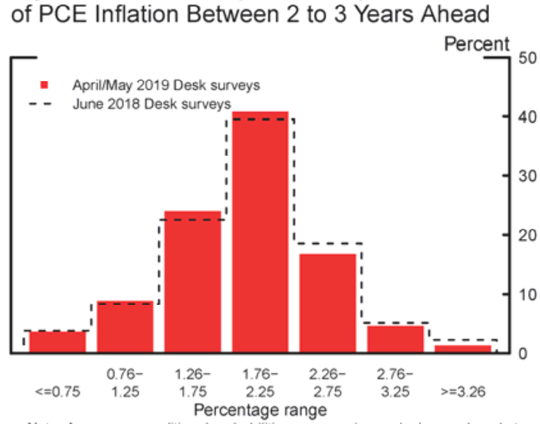
Note: Based on all responses from the March and April/May 2019 Desk surveys.
Source: FRBNY.

Figure 5: 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 Priebsch (2017).
*** Most recent long−run survey value is from the December 2018 Blue Chip survey.
Source: Blue Chip; FRBNY; Federal Reserve Board staff estimates.

Figure 6: Desk Survey Probability Distribution of PCE Inflation Between 2 to 3 Years Ahead



Note: Average unconditional probabilities across primary dealers and market participants for different ranges of the PCE inflation rate from April 1, 2021 to March 31, 2022 (April/May 2019 Desk surveys) and June 1, 2020 to May 31, 2021 (June 2018 Desk surveys).
Source: FRBNY.

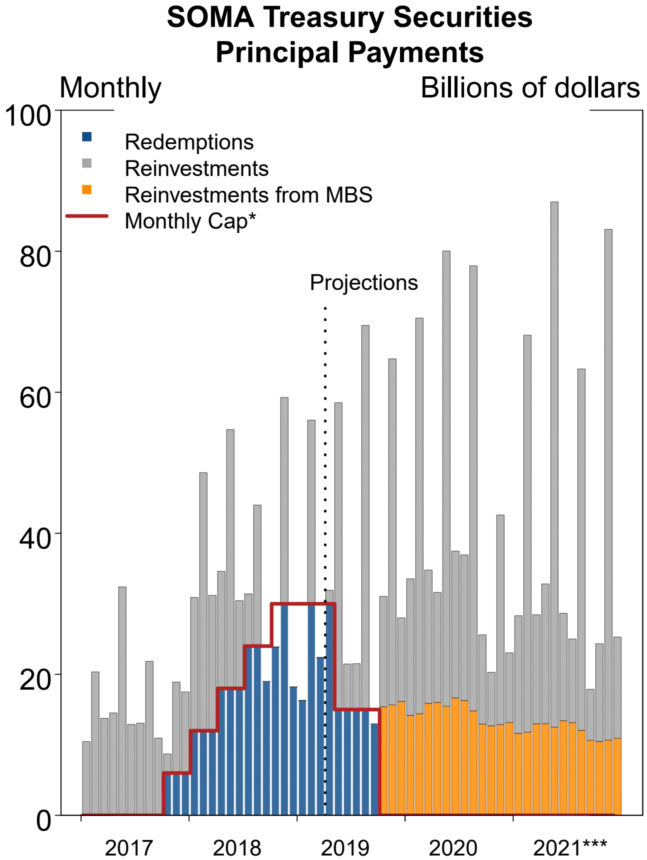
Redemptions and Reinvestments of SOMA Principal Payments

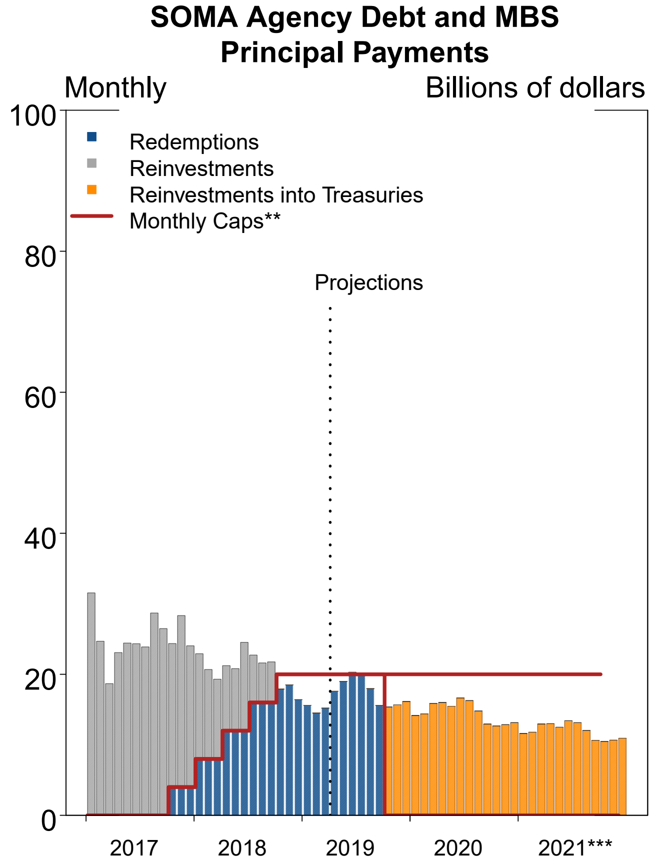
Projections for Treasury Securities
(Billions of dollars)

	Redemptions		Reinvestments*	
	Period	Since Oct. 2017	Period	Since Oct. 2017
2019:Q2	60.0	375.7	51.9	302.2
2019:Q3	43.0	418.7	61.0	363.2
2019:Q4	0	418.7	76.6	439.8
2018	229.1	247.1	197.1	224.2
2019	171.6	418.7	215.6	439.8
2020	0	418.7	339.1	779.0
2021***	0	418.7	369.1	1148.1

Projections for Agency Securities
(Billions of dollars)

	Redemptions		Reinvestments** (Agency/Treasury)	
	Period	Since Oct. 2017	Period	Since Oct. 2017
2019:Q2	56.6	274.7	0.3 / 0	152.6 / 0
2019:Q3	53.4	328.1	0 / 0	152.6 / 0
2019:Q4	0	328.1	0 / 47.2	152.6 / 47.2
2018	160.8	172.8	87.6 / 0	152.3 / 0
2019	155.3	328.1	0.3 / 47.2	152.6 / 47.2
2020	0	328.1	0 / 175.2	152.6 / 222.4
2021***	0	328.1	0 / 143.2	152.6 / 365.6





* Starting in May 2019, principal payments from maturing Treasury securities below $15 billion per month are redeemed, while those above are reinvested into Treasury securities. Starting in October 2019, all principal payments from maturing Treasury securities are reinvested into Treasury securities.

** Starting in October 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.

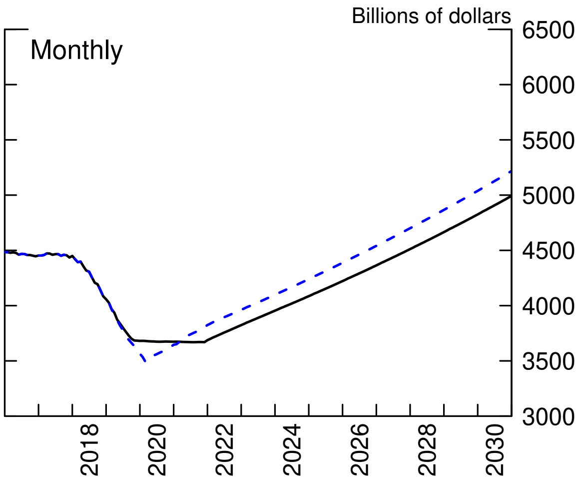
*** Reserves are projected to reach $1 trillion in November 2021. After this date, all principal payments received from all security holdings are reinvested into Treasury securities.

Balance Sheet & Income

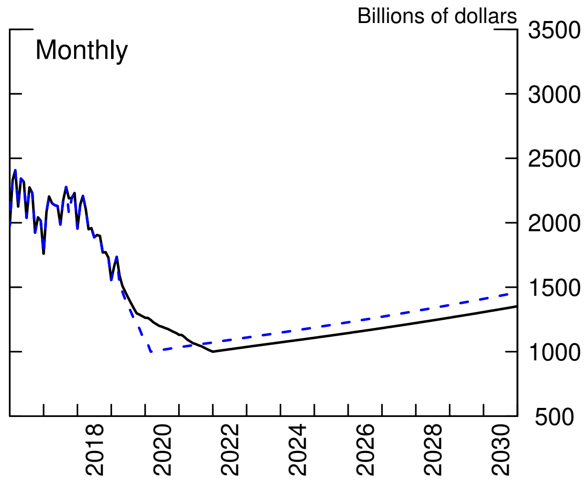
Total Assets and Selected Balance Sheet Items

April Tealbook baseline — March Tealbook baseline

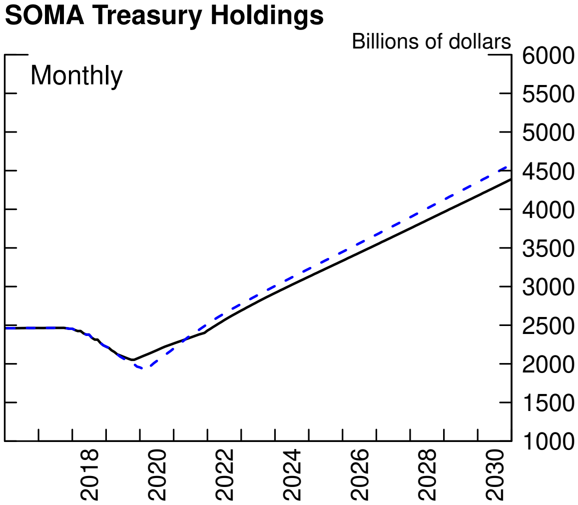
Total Assets



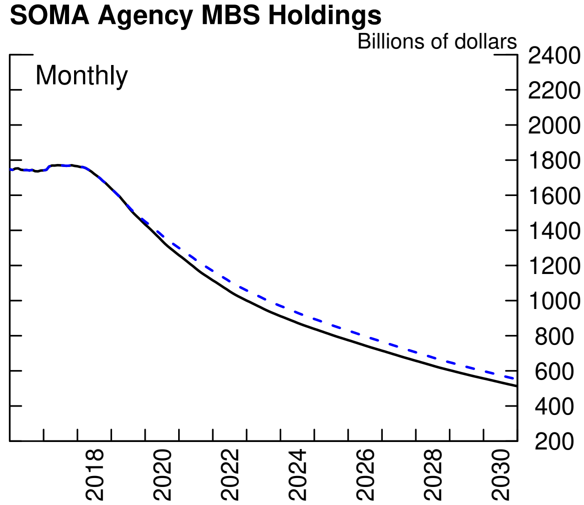
Reserve Balances



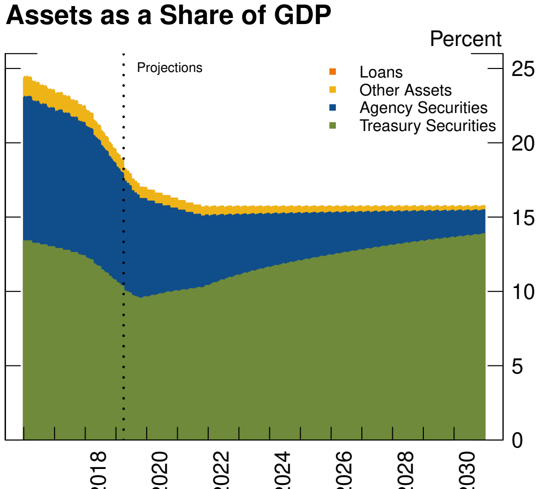
SOMA Treasury Holdings



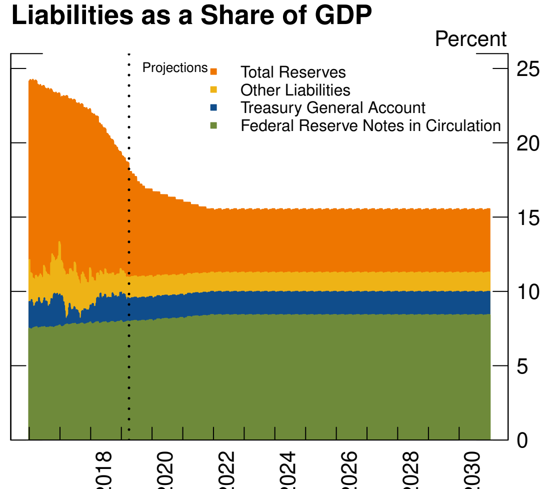
SOMA Agency MBS Holdings



Assets as a Share of GDP



Liabilities as a Share of GDP



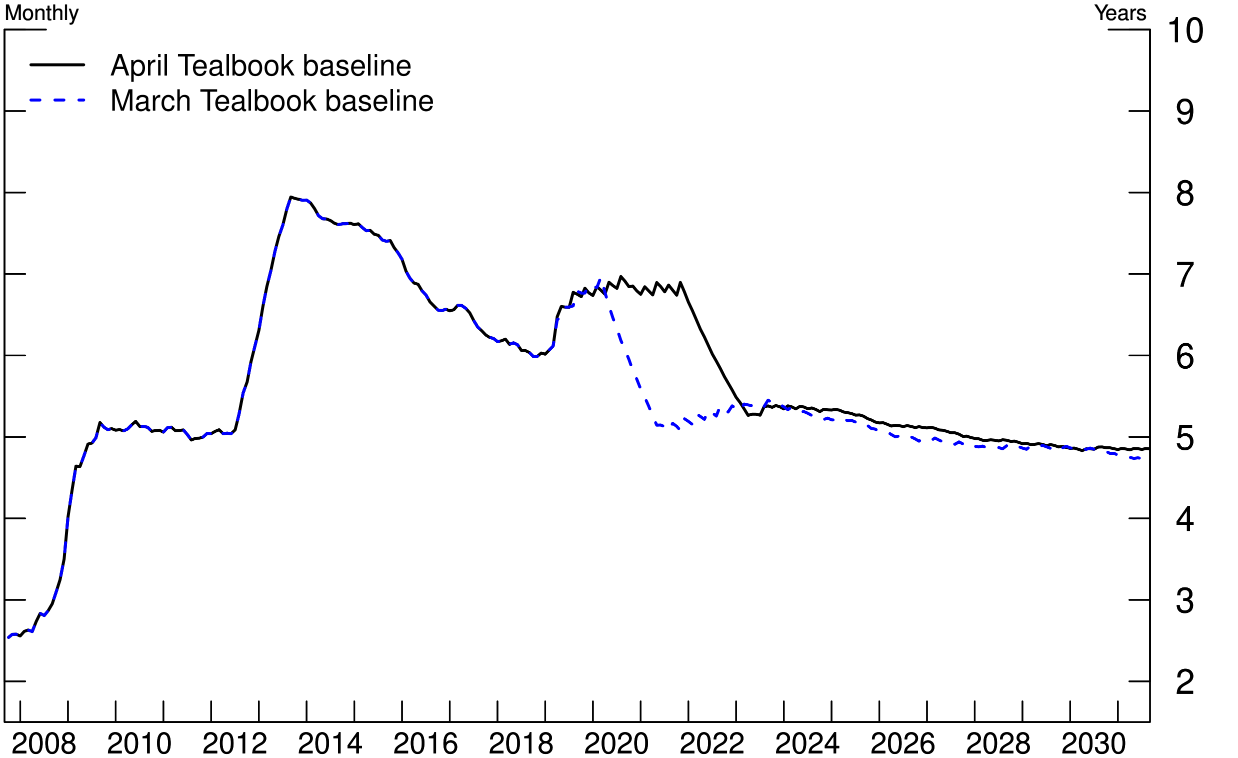
Federal Reserve Balance Sheet
Month-end Projections -- April Tealbook
(Billions of dollars)

	Historical*			Projections				
	Aug 2014	Sep 2017	Mar 2019	Dec 2019	Dec 2020	Dec 2022	Dec 2025	Dec 2030
Total assets	4,416	4,460	3,935	3,681	3,673	3,824	4,222	4,992
Selected assets								
Loans and other credit extensions**	2	6	2	0	0	0	0	0
Securities held outright	4,157	4,240	3,748	3,519	3,524	3,692	4,111	4,905
U.S. Treasury securities	2,437	2,465	2,153	2,083	2,263	2,689	3,333	4,390
Agency debt securities	42	7	2	2	2	2	2	2
Agency mortgage-backed securities	1,678	1,768	1,593	1,434	1,258	1,000	775	513
Unamortized premiums	209	162	136	123	111	91	68	41
Unamortized discounts	-19	-14	-13	-12	-12	-10	-8	-5
Total other assets	66	66	63	51	51	51	51	51
Total liabilities	4,360	4,419	3,896	3,659	3,649	3,780	4,172	4,928
Selected liabilities								
Federal Reserve notes in circulation	1,249	1,533	1,677	1,749	1,857	2,044	2,256	2,665
Reverse repurchase agreements	277	432	248	240	240	249	275	324
Deposits with Federal Reserve Banks	2,825	2,447	1,966	1,666	1,548	1,483	1,637	1,934
Reserve balances held by depository institutions	2,762	2,190	1,589	1,263	1,131	1,037	1,144	1,352
U.S. Treasury, General Account	49	176	307	342	357	384	423	500
Other deposits	15	82	69	60	60	62	69	81
Earnings remittances due to the U.S. Treasury	3	2	1	0	0	0	0	0
Total Federal Reserve Bank capital***	56	41	39	40	40	44	50	64

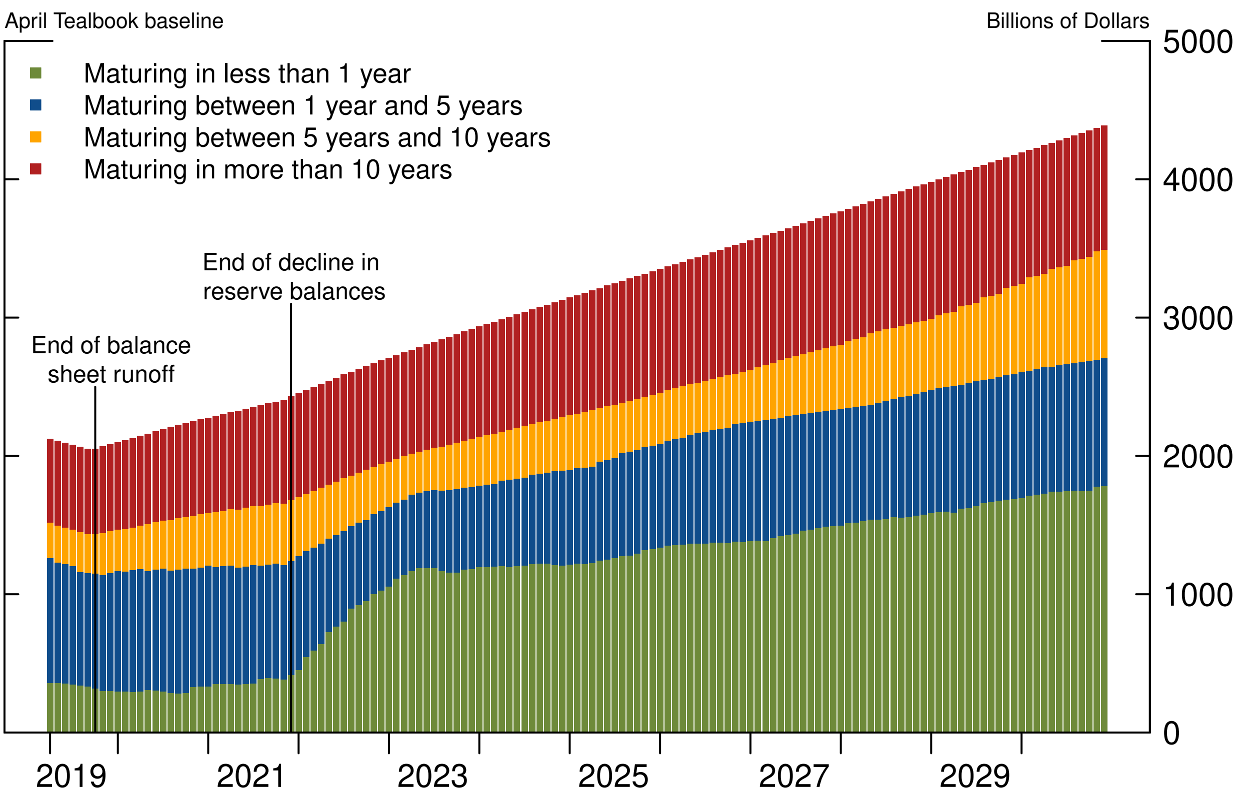
Source: Federal Reserve H.4.1 daily data and staff calculations.
Note: Components may not sum to totals due to rounding.
*August 2014 corresponds to the peak month-end value of reserve balances; September 2017 corresponds to the last month-end before the initiation of the normalization program; March 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

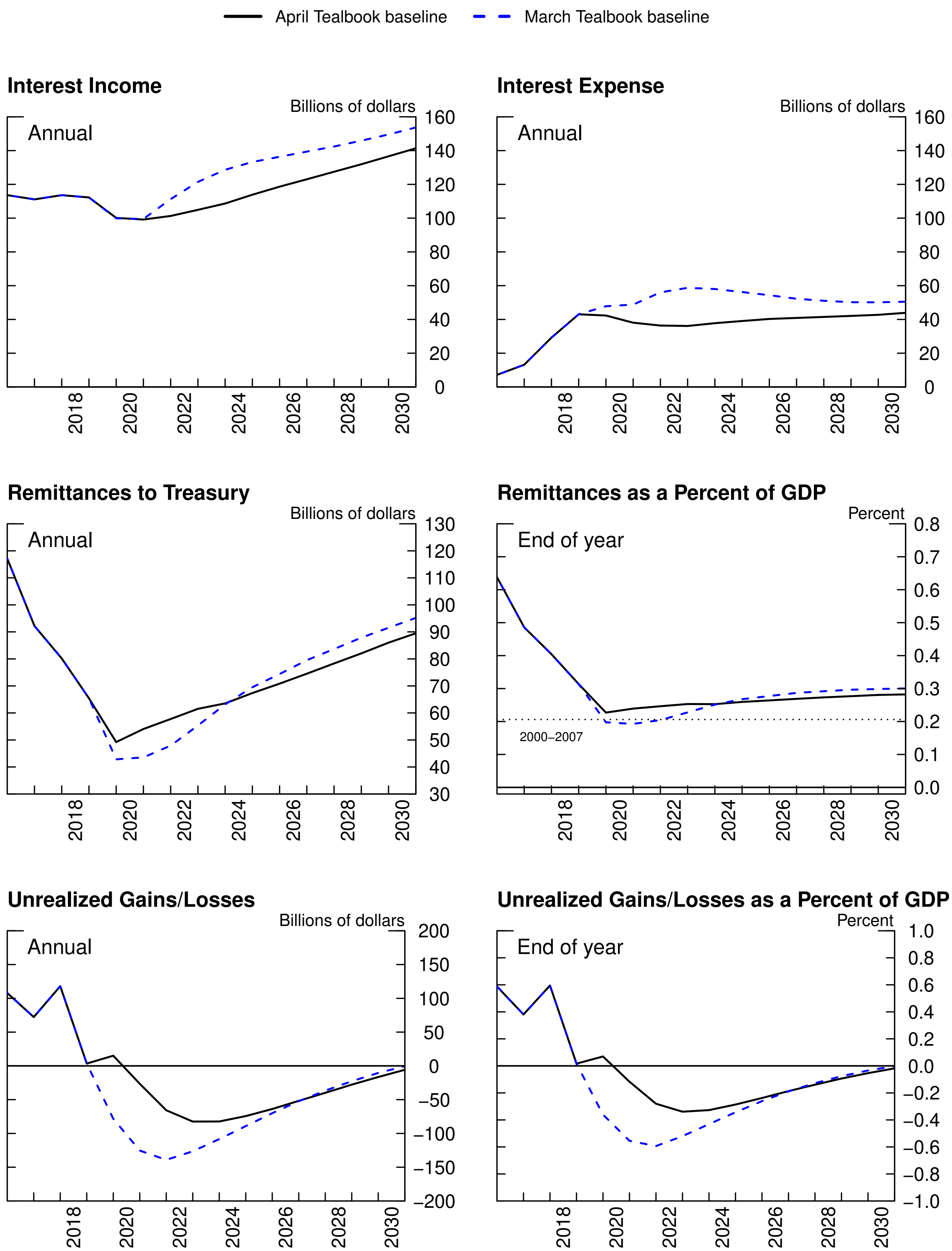
SOMA Weighted−Average Treasury Duration



Maturity Composition of SOMA Treasury Portfolio



Income Projections



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

Date	April Tealbook	March Tealbook
Quarterly Averages		
2019:Q2	-131	-129
Q3	-130	-127
Q4	-129	-126
2020:Q4	-123	-122
2021:Q4	-118	-120
2022:Q4	-114	-119
2023:Q4	-112	-116
2024:Q4	-110	-114
2025:Q4	-109	-112
2026:Q4	-107	-110
2027:Q4	-105	-109
2028:Q4	-104	-108
2029:Q4	-102	-106
2030:Q4	-101	-105