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.

Report to the FOMC
on Economic Conditions
and Monetary Policy

Book A

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

April 21, 2017

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

Comparing the Staff Projection with Other Forecasts

The staff's projection for real GDP growth is below the projections from the Survey of Professional Forecasters (SPF) and the Blue Chip consensus forecast in 2017 and lower than the Blue Chip in 2018. The staff's forecast for the unemployment rate is a bit below the Blue Chip and SPF surveys in 2017 and below the Blue Chip in 2018. The staff's CPI inflation projection is below those of outside forecasters in 2017 and is the same as them in 2018. The staff's projections for both overall and core PCE price inflation are below the SPF forecasts in 2017 and 2018.

Comparison of Tealbook and Outside Forecasts

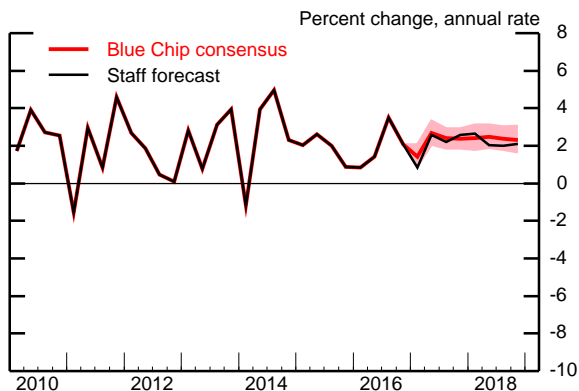|	2016	2017	2018
GDP (Q4/Q4 percent change)			
April Tealbook	2.0	2.1	2.2
Blue Chip (4/10/17)	2.0	2.2	2.4
SPF median (2/10/17)	1.9	2.3	n.a.
Unemployment rate (Q4 level)			
April Tealbook	4.7	4.4	4.1
Blue Chip (4/10/17)	4.7	4.5	4.3
SPF median (2/10/17)	4.7	4.5	n.a.
CPI inflation (Q4/Q4 percent change)			
April Tealbook	1.8	2.2	2.3
Blue Chip (4/10/17)	1.8	2.4	2.3
SPF median (2/10/17)	1.8	2.4	2.3
PCE price inflation (Q4/Q4 percent change)			
April Tealbook	1.4	1.7	1.8
SPF median (2/10/17)	1.5	2.0	2.0
Core PCE price inflation (Q4/Q4 percent change)			
April Tealbook	1.7	1.7	1.9
SPF median (2/10/17)	1.7	1.9	2.0

    Note: SPF is the Survey of Professional Forecasters, CPI is the consumer price index, and PCE is personal consumption expenditures. Blue Chip does not provide results for 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.
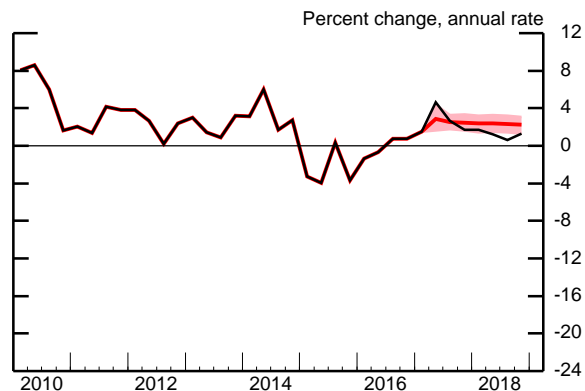
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Tealbook Forecast Compared with Blue Chip
(Blue Chip survey released April 10, 2017)

Real GDP

Percent change, annual rate

— Blue Chip consensus
— Staff forecast

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

Industrial Production

Percent change, annual rate

Unemployment Rate

Percent

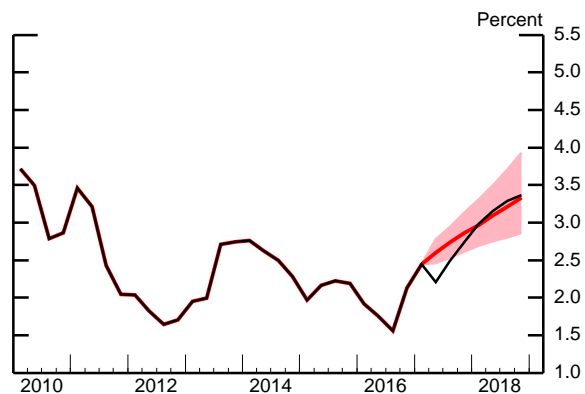## Consumer Price Index

Percent change, annual rate
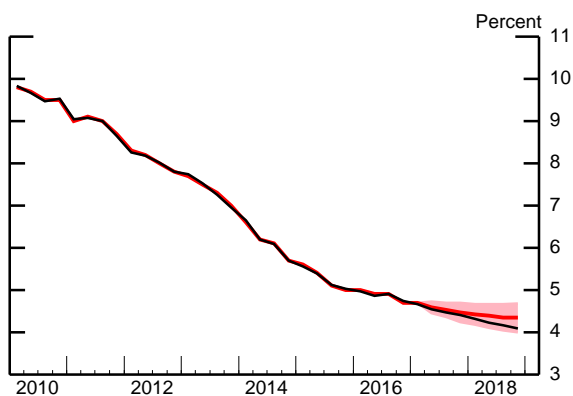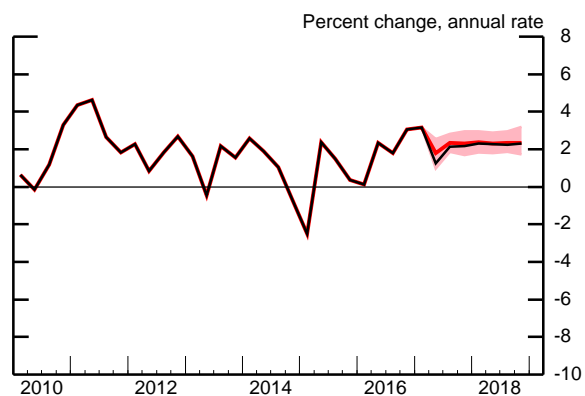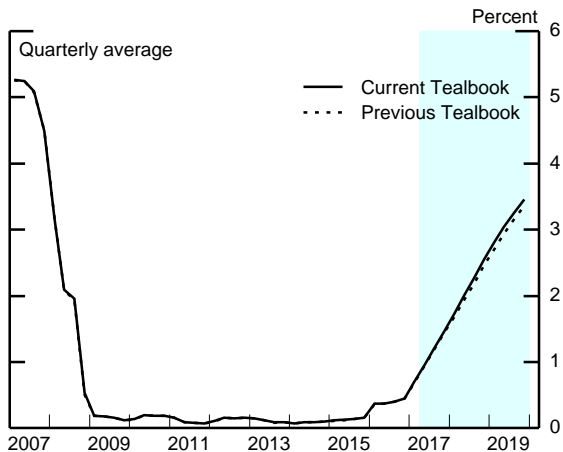
Treasury Bill Rate
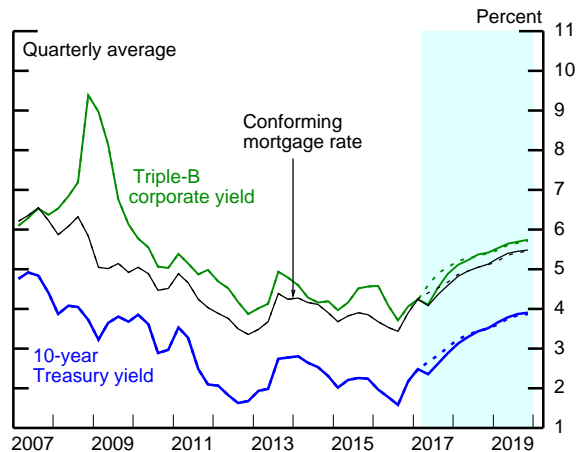
Percent

10-Year Treasury Yield

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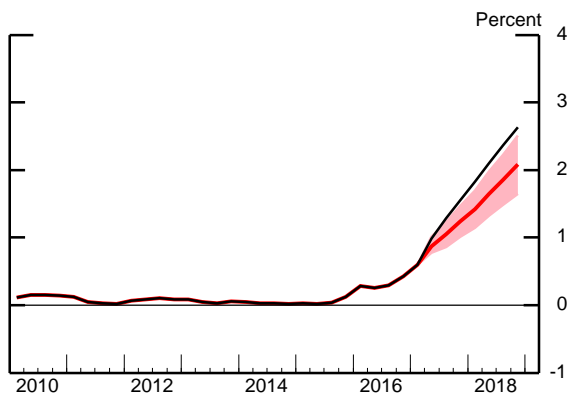
Note: The yield is for on-the-run Treasury securities. Over the forecast period, the staff's projected yield is assumed to be 15 basis points below the off-the-run yield.

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Key Background Factors underlying the Baseline Staff Projection

Federal Funds Rate

Quarterly average

Percent

—— Current Tealbook
········ Previous Tealbook

2007 2009 2011 2013 2015 2017 2019

Long-Term Interest Rates

Quarterly average

Percent

Conforming
mortgage rate

Triple-B
corporate yield

10-year
Treasury yield

2007 2009 2011 2013 2015 2017 2019

Equity Prices

Ratio scale, 2007:Q1 = 100

Quarter-end

Dow Jones
U.S. Total Stock Market
Index

2007 2009 2011 2013 2015 2017 2019

House Prices

Ratio scale, 2007:Q1 = 100

Quarterly

CoreLogic
Index

2007 2009 2011 2013 2015 2017 2019

Crude Oil Prices

Dollars per barrel

Quarterly average

Imported oil

West Texas
Intermediate

2007 2009 2011 2013 2015 2017 2019

Broad Real Dollar

2007:Q1 = 100

Quarterly average

2007 2009 2011 2013 2015 2017 2019

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Federal Reserve System Nowcasts of 2017:Q1 Real GDP Growth
(Percent change at annual rate from previous quarter)

Federal Reserve entity	Type of model	Nowcast as of Apr. 19, 2017
Federal Reserve Bank		
Boston	• Mixed-frequency BVAR	3.1
New York	• Factor-augmented autoregressive model combination	1.6
	• Factor-augmented autoregressive model combination, financial factors only	1.6
	• Dynamic factor model	2.7
Cleveland	• Bayesian regressions with stochastic volatility	2.8
	• Tracking model	-0.3
Atlanta	• Tracking model combined with Bayesian vector autoregressions (VARs), dynamic factor models, and factor-augmented autoregressions (known as GDPNow)	.5
Chicago	• Dynamic factor models	2.7
	• Bayesian VARs	1.2
St. Louis	• Dynamic factor models	2.6
	• News index model	3.3
	• Let-the-data-decide regressions	2.7
Kansas City	• Accounting-based tracking estimate	.5
Board of Governors	• Board staff's forecast (judgmental tracking model)	.9
	• Monthly dynamic factor models (DFM-45)	2.8
	• Mixed-frequency dynamic factor model (DFM-BM)	2.9
Memo: Median of Federal Reserve System nowcasts		2.7

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

Measure	2016:Q4		2017:Q1		2017:Q2	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
Real GDP	**1.9**	**2.1**	**1.4**	**.9**	**2.1**	**2.6**
Private domestic final purchases	3.1	3.4	2.4	1.8	2.8	3.0
Personal consumption expenditures	3.0	3.5	1.5	.6	3.0	3.1
Residential investment	9.4	9.6	8.0	11.4	-2.5	-1.3
Nonres. private fixed investment	1.9	.9	5.7	5.4	3.7	4.4
Government purchases	.0	.2	-.4	-1.8	1.8	2.4
Contributions to change in real GDP						
Inventory investment[1]	.9	1.0	.0	.0	.0	-.1
Net exports[1]	-1.7	-1.8	-.6	-.3	-.6	-.3
Unemployment rate	**4.7**	**4.7**	**4.7**	**4.7**	**4.7**	**4.5**
PCE chain price index	**1.9**	**2.0**	**2.6**	**2.4**	**1.4**	**1.2**
Ex. food and energy	1.2	1.3	2.3	2.0	1.7	1.6

1. Percentage points.

Recent Nonfinancial Developments (1)

Real GDP and GDI

Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.
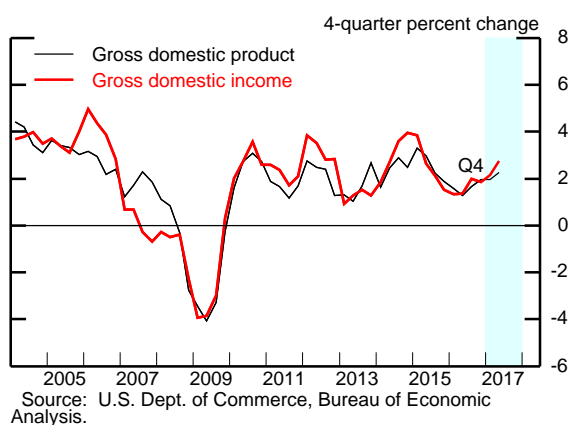
Manufacturing IP ex. Motor Vehicles and Parts

Source: Federal Reserve Board, G.17 Statistical Release, "Industrial Production and Capacity Utilization."
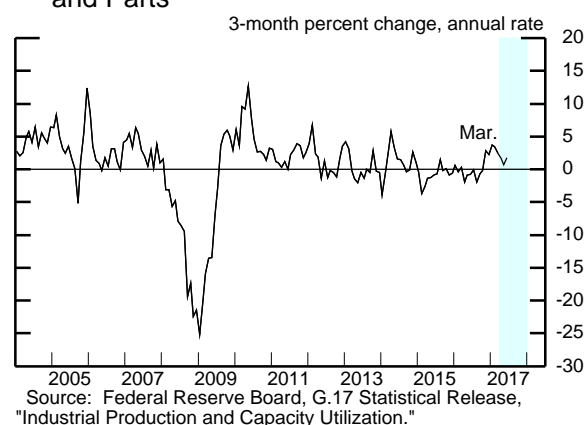
Sales and Production of Light Motor Vehicles

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

Real PCE Growth

Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.
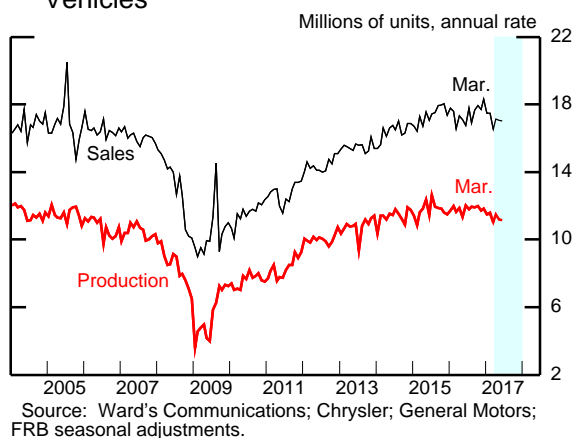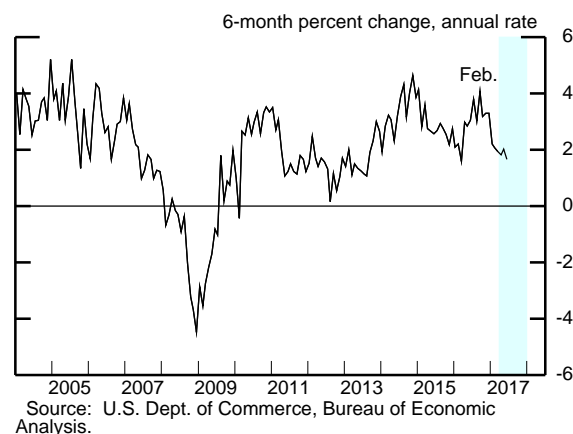
Recent Nonfinancial Developments (2)

Single-Family Housing Starts and Permits
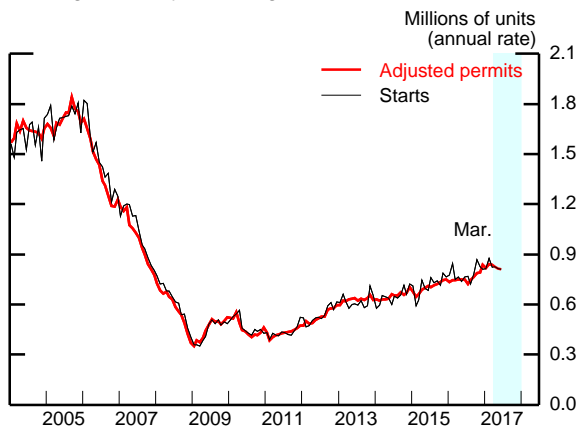
Note: Adjusted permits equal permit issuance plus total starts outside of permit-issuing areas.
Source: U.S. Census Bureau.

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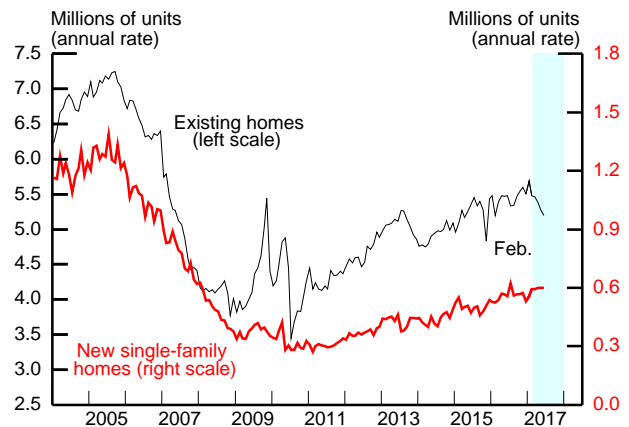
Source: For existing, National Association of Realtors; for new, U.S. Census Bureau.

Nondefense Capital Goods ex. Aircraft
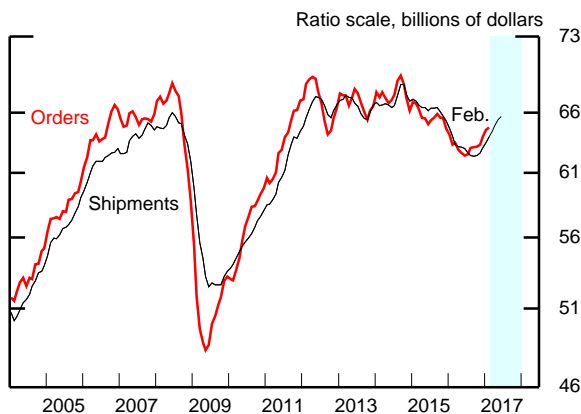
Note: Data are 3-month moving averages.
Source: U.S. Census Bureau.

Nonresidential Construction Put in Place
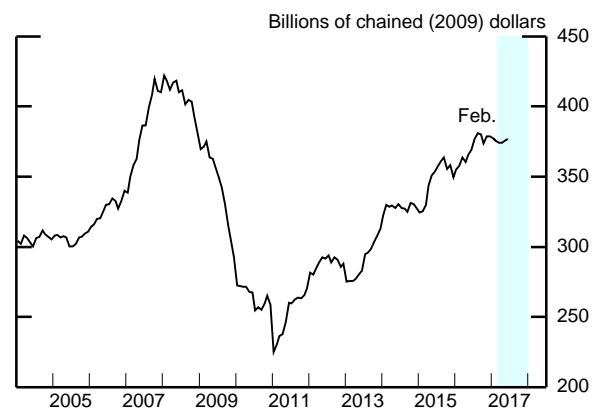
Note: Nominal CPIP deflated by BEA prices through 2016:Q4 and by the staff's estimated deflator thereafter.
Source: U.S. Census Bureau.

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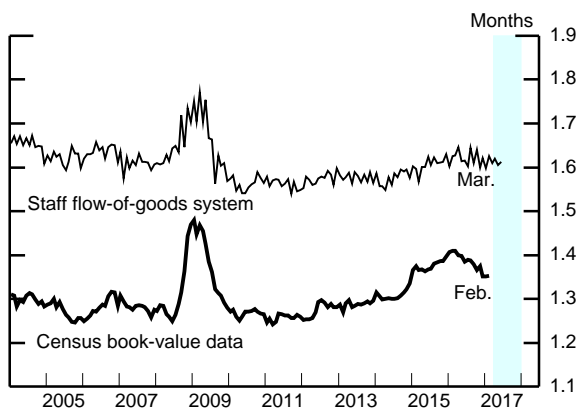
Note: Flow-of-goods system inventories include manufacturing and mining industries and are relative to consumption. Census data cover manufacturing and trade, and inventories are relative to sales.
Source: U.S. Census Bureau; staff calculations.

Exports and Non-oil Imports
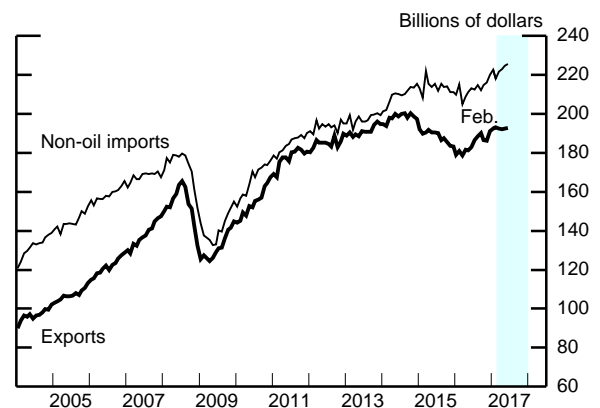
Note: Forecasts are linear interpolations of quarterly values.
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis; U.S. Census Bureau.

Domestic Econ Devel & Outlook

Tealbook Forecast Errors: An Update through 2016

The staff's forecast errors for 2016 were relatively small. Real gross domestic product (GDP) growth in 2016, although still subject to sizable revisions, is currently estimated to be close to staff forecasts from one and two years ago. As was the case in recent years, the unemployment rate finished 2016 lower than the staff's prior-year forecast, though it was in line with the staff forecast from April 2016. Tealbook forecasts of core personal consumption expenditures (PCE) price inflation in 2016 were slightly too low. Here we discuss these recent forecast errors.

In the left panel of figure 1, the gray bars show the currently published Q4/Q4 percent changes in real GDP from 2013 to 2016, the blue squares show the forecasts for GDP growth made in the April Tealbook one year prior, and the green triangles show the forecast from the April Tealbook in the contemporaneous year. The whisker bands demarcate 70 percent forecast error bands, so that unusually large forecast errors are represented by cases where the top edge of a gray bar falls outside of the whisker band.[1] The red dots show the GDP growth estimates for each year from mid-April of the subsequent year, along with 70 percent bands computed from past revisions to those estimates. Staff forecast errors for real GDP growth in 2016 are small, well within the 70 percent whisker bands, although the staff's prior-year GDP projection was too high for the third consecutive year.

The right panel shows the same information for the unemployment rate. The April 2016 forecast was on the mark, a notable improvement over projections from earlier years.[2] However, the April 2015 Tealbook forecast of the unemployment rate in 2016:Q4 was too high, continuing a pattern of one-sided errors in forecasts. Unlike forecasts from earlier in the expansion, when the labor force participation rate was

Figure 1: Real Activity Forecast Errors
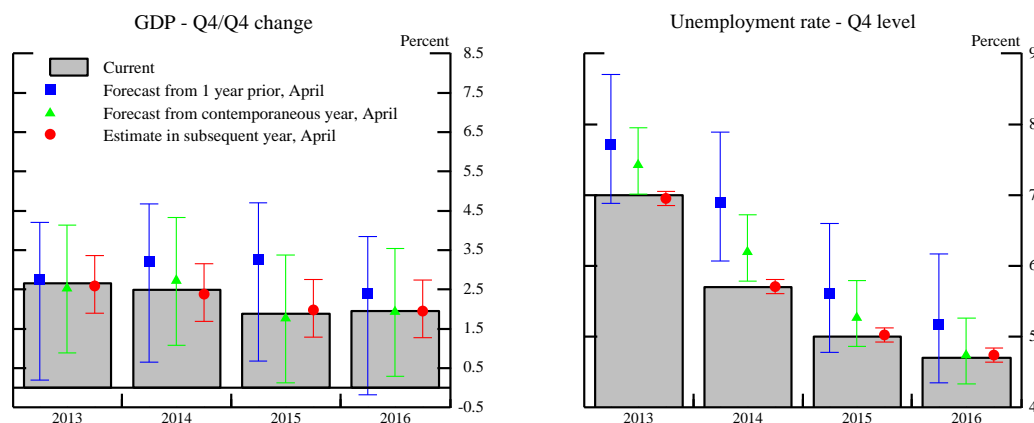
Source: Staff forecast and U.S. Dept. of Commerce, Bureau of Economic Analysis, Bureau of Labor Statistics.

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[1] The whisker bands for real activity variables are calculated using forecast errors since 1980; whisker bands around the inflation projections are calculated using forecast errors since 1998.

[2] The staff subsequently raised its unemployment rate forecast for 2016 in the next few Tealbooks, making them too high again. However, the resulting forecast errors (0.1 to 0.2 percentage point) are small by historical standards.

persistently lower than the staff expected (not shown), the labor force participation rate finished 2016 slightly higher than the staff anticipated in 2015. Accordingly, staff prior-year forecasts of the employment-to-population ratio (also not shown) were somewhat more accurate in the few preceding years than in 2016, as forecast errors in the unemployment and labor force participation rates were offsetting in 2013 through 2015 but not in 2016.

The combination of lower-than-expected GDP growth and a lower-than-expected unemployment rate over the past few years has prompted the staff to make a series of adjustments to its supply-side assumptions. Most notably, the staff has lowered its estimate of structural productivity growth on several occasions over this period.

Figure 2 shows the same information for the Q4/Q4 percent changes in total and core PCE prices. The staff's prior-year forecast of 2016 total PCE price inflation was close to the currently published reading, whereas the forecast made in April 2016 was too low. The difference between the forecasts made in April 2015 and April 2016 importantly reflects the staff's oil price projections. Oil prices unexpectedly fell early in 2016 and then rebounded later that year. The staff projection in April 2015 anticipated neither the early-2016 decline nor the later rebound and proved more accurate for oil price inflation than the staff projection in April 2016, which had taken onboard the early 2016 decline but had forecast a smaller rebound.

Staff forecasts for core PCE price inflation in 2016 were a couple of tenths of a percentage point too low. The misses were concentrated in services prices and, in particular, nonmarket prices, which wound up higher than expected. From 2013 to 2015, the staff's year-ahead core inflation forecasts were slightly too high. As it turns out, those forecast errors can be explained by core goods import prices that came in lower than expected. Conditioning on the actual path of import prices and other observable factors, core inflation from 2013 to 2015 was, as in 2016, slightly higher than the staff can explain. These positive residuals might reflect, among other things, a higher inflation trend than the staff assumes or a larger contribution to core inflation from resource utilization, or they may simply be the result of idiosyncratic shocks.

Figure 2: Price Inflation Forecast Errors
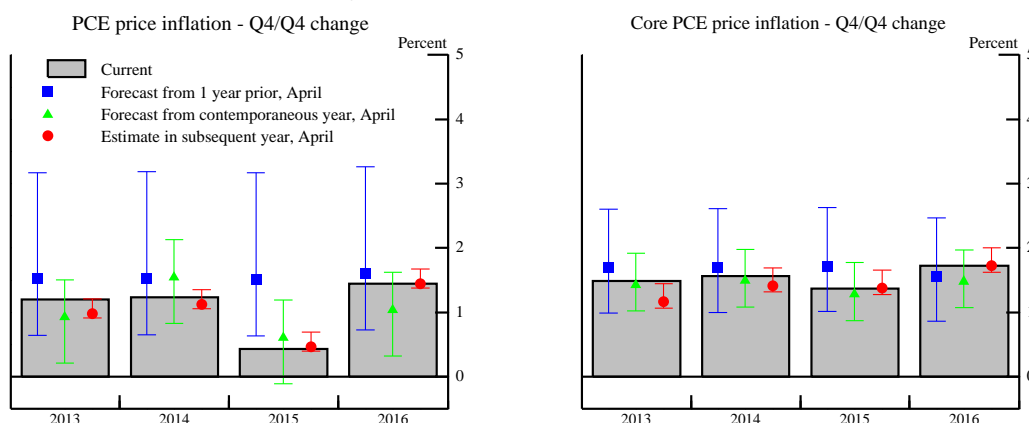
Source: Staff forecast and U.S. Dept. of Commerce, Bureau of Economic Analysis.

amount of capital available per worker, all else being equal, and might therefore boost average productivity, offsetting to some extent the negative effect on potential GDP from the lower population. Taking into account general equilibrium effects would further complicate the analysis. Of particular interest might be how changes in immigration policy affect capital investment, new firm creation, and the employment of non-immigrant workers.

Finally, it is worth noting that a change in immigration policy would likely have, at most, a small effect on the aggregate statistics used to measure slack in the economy. While labor force participation rates and unemployment rates among the foreign-born population differ somewhat from those of the native-born population, these differences are sufficiently small that a modest change in immigration would not generate large differences in these aggregate statistics.

Figure 1: Composition of Potential GDP Growth
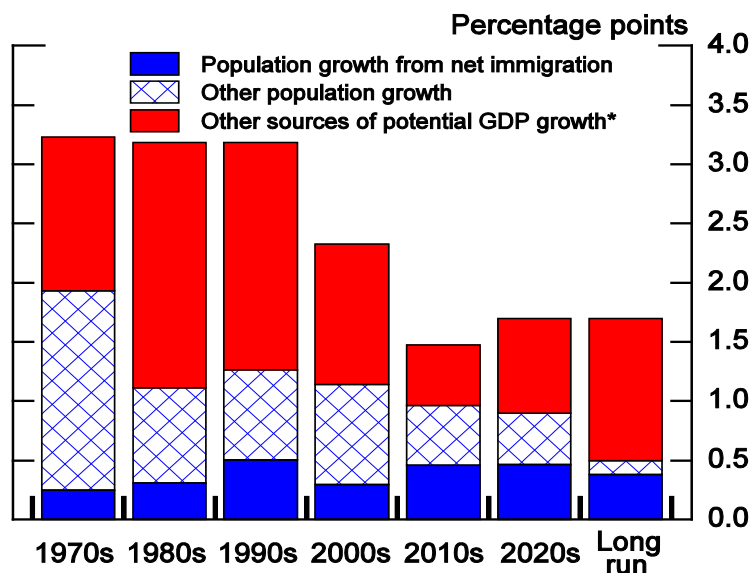
*Other sources of potential GDP growth include the combined contribution of the trends in the labor force participation rate, the average workweek, and labor productivity.

Source: Staff estimates based on Census Bureau data and projections.

Survey Measures of Longer-Term Inflation Expectations

CPI Next 10 Years

Dec.

Q1

SPF median

Livingston Survey median

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

CPI Forward Expectations

Mar.

Q1

Oct.

Mar.

SPF median, 6 to 10 years ahead
Blue Chip mean, 7 to 11 years ahead
Primary dealers median, 5 to 10 years ahead
Consensus Economics mean, 6 to 10 years ahead

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

PCE Next 10 Years

SPF median

Q1

Source: Federal Reserve Bank of Philadelphia.

PCE Forward Expectations

SPF median, 6 to 10 years ahead
Primary dealers median, longer run

Q1

Jan.

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

Surveys of Consumers

Mar.

Apr. (p)

FRBNY median increase in prices, 3 years ahead
Michigan median increase in prices, next 5 to 10 years

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

Mean increase in unit costs, next 5 to 10 years

Q1

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

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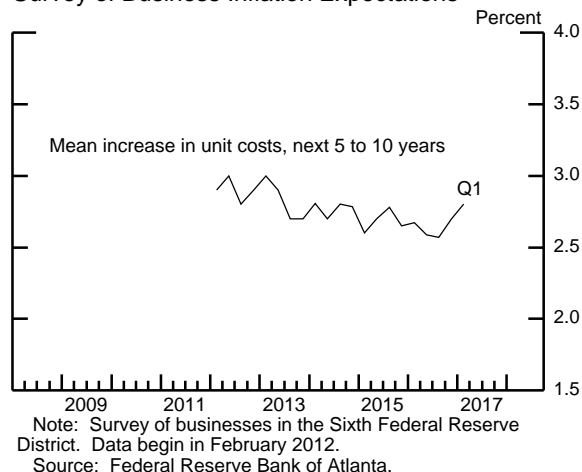
Projections of Real GDP and Related Components
(Percent change at annual rate from final quarter
of preceding period except as noted)

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Measure	2016	2017 H1	2017 H2	2017	2018	2019
Real GDP	**2.0**	**1.7**	**2.4**	**2.1**	**2.2**	**1.8**
Previous Tealbook	1.9	1.7	2.2	2.0	2.2	1.9
Final sales	2.0	1.8	2.5	2.1	2.2	1.9
Previous Tealbook	1.9	1.7	2.3	2.0	2.2	2.0
Personal consumption expenditures	3.1	1.8	2.9	2.4	2.9	2.5
Previous Tealbook	3.0	2.2	2.8	2.5	3.0	2.5
Residential investment	1.1	4.8	3.3	4.1	2.7	4.4
Previous Tealbook	1.1	2.6	1.1	1.9	4.6	5.5
Nonresidential structures	1.9	14.2	3.3	8.6	.2	-.6
Previous Tealbook	1.8	5.2	2.0	3.6	.3	.0
Equipment and intangibles	-.6	2.4	3.6	3.0	3.9	1.8
Previous Tealbook	-.3	4.5	4.3	4.4	3.7	2.3
Federal purchases	-.2	.2	2.0	1.1	.0	-.1
Previous Tealbook	-.2	1.1	.9	1.0	.0	-.1
State and local purchases	.4	.3	1.6	.9	.8	.9
Previous Tealbook	.4	.5	1.8	1.1	1.1	1.1
Exports	1.5	3.3	1.8	2.6	2.6	2.9
Previous Tealbook	1.6	1.2	1.3	1.3	2.3	2.8
Imports	2.6	4.8	4.0	4.4	4.7	4.2
Previous Tealbook	2.5	5.0	4.0	4.5	5.0	4.4
Contributions to change in real GDP (percentage points)						
Inventory change	.0	-.1	-.1	-.1	.0	-.1
Previous Tealbook	.0	.0	-.1	-.1	.0	-.1
Net exports	-.2	-.3	-.4	-.3	-.4	-.3
Previous Tealbook	-.2	-.6	-.4	-.5	-.5	-.3

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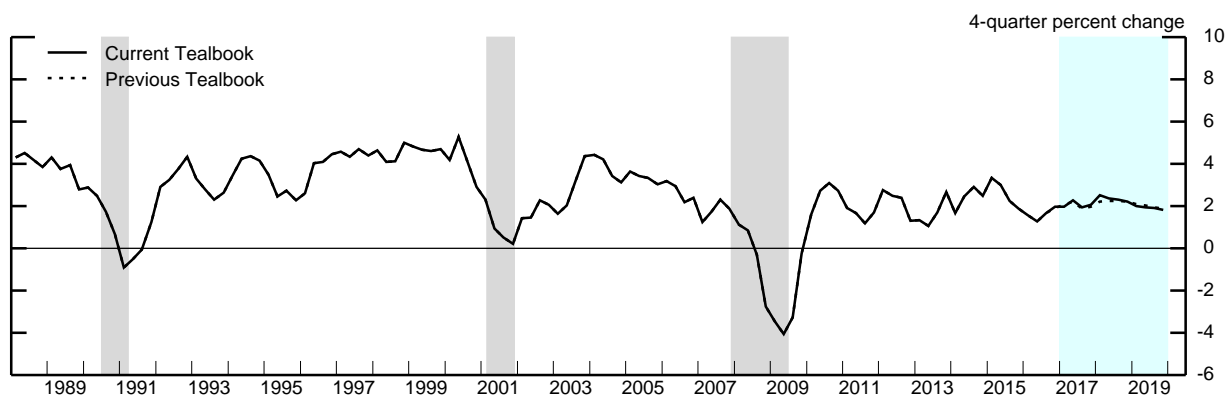
Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

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

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Components of Final Demand

Personal Consumption Expenditures

4-quarter percent change

Current Tealbook
Previous Tealbook

Residential Investment

4-quarter percent change

Equipment and Intangibles

4-quarter percent change

Nonresidential Structures

4-quarter percent change
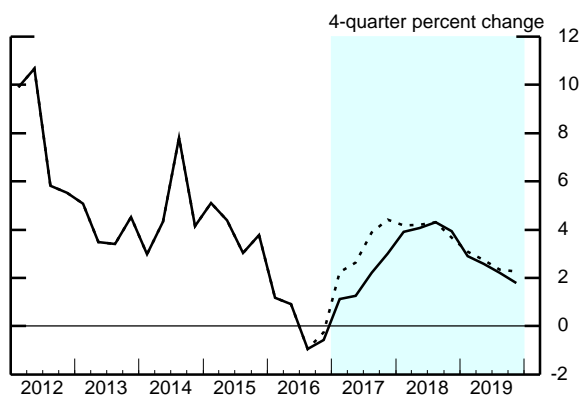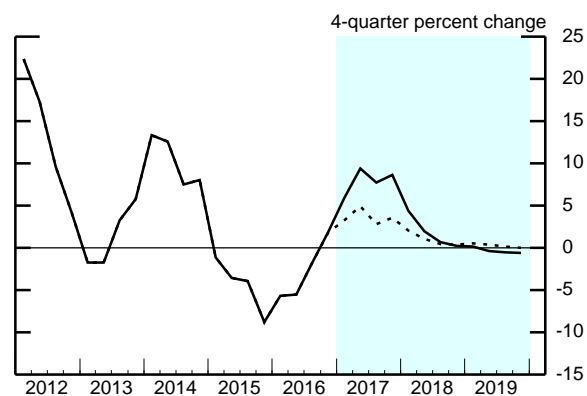
Government Consumption and Investment

4-quarter percent change

Exports and Imports

4-quarter percent change
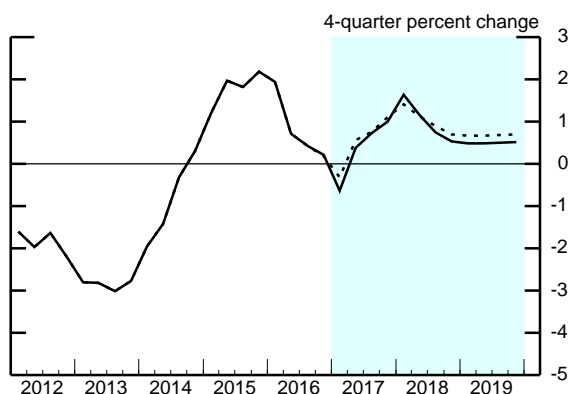
Exports

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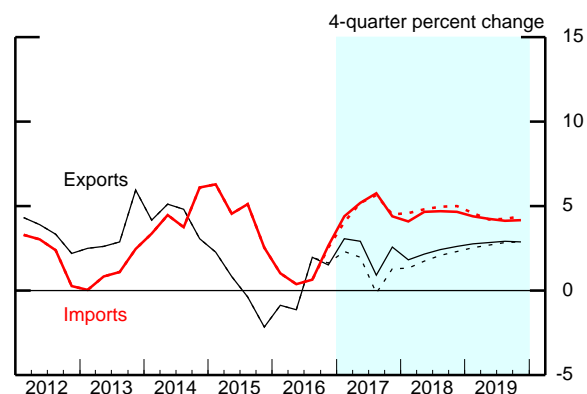
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Aspects of the Medium-Term Projection

Personal Saving Rate

Percent

- —— Current Tealbook
- ······ Previous Tealbook

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

Wealth-to-Income Ratio

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

Millions of units

Source: U.S. Census Bureau.
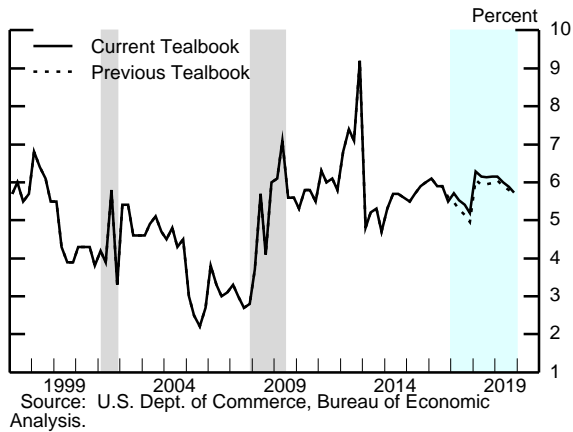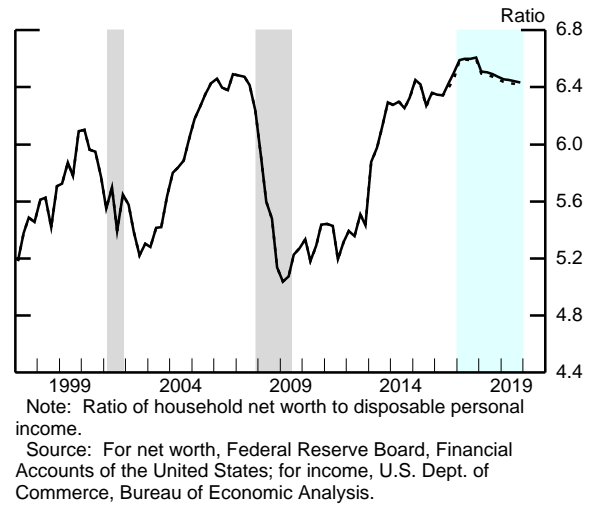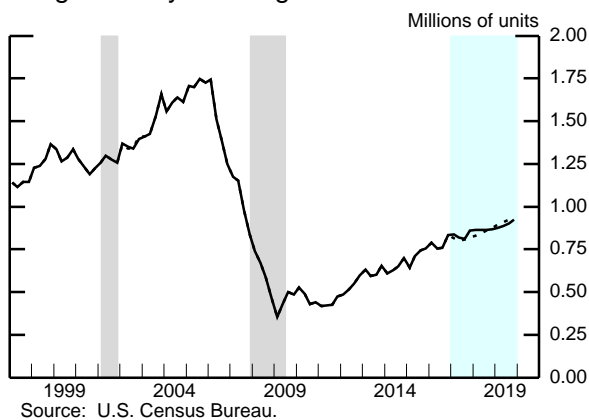
Equipment and Intangibles Spending

Share of nominal GDP

Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.
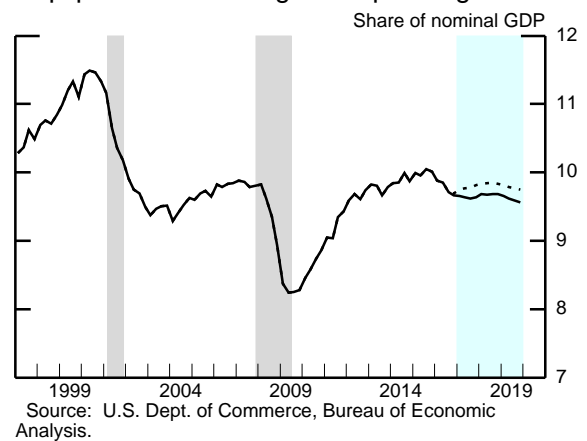
Federal Surplus/Deficit

Share of nominal GDP

4-quarter moving average

Source: *Monthly Treasury Statement.*
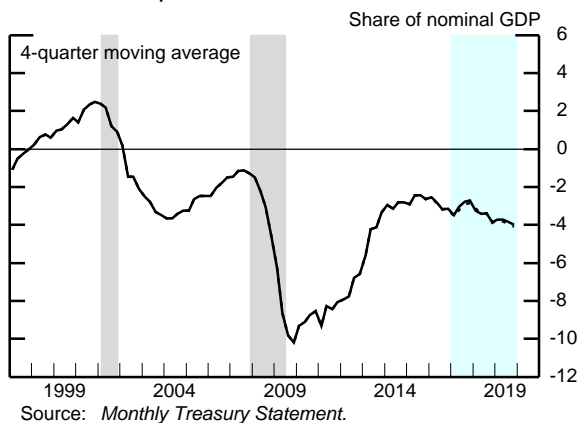
Current Account Surplus/Deficit
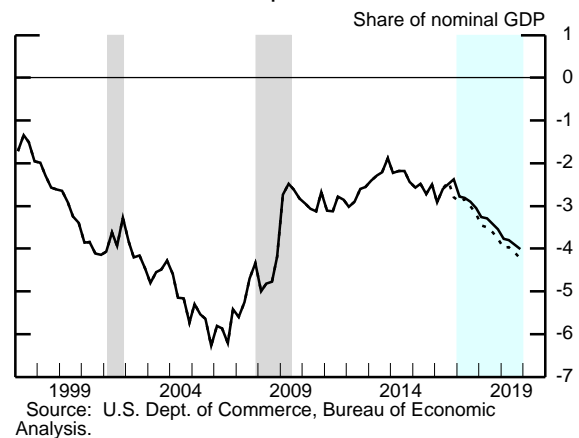
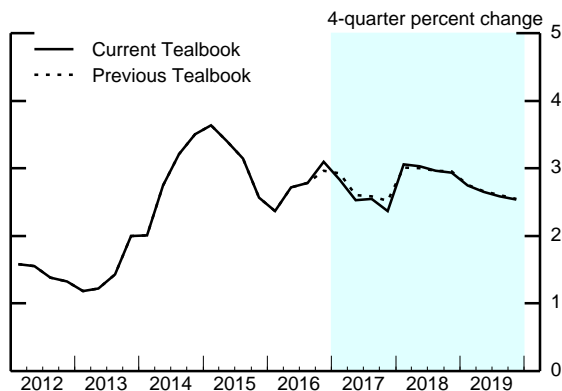Share of nominal GDP

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.

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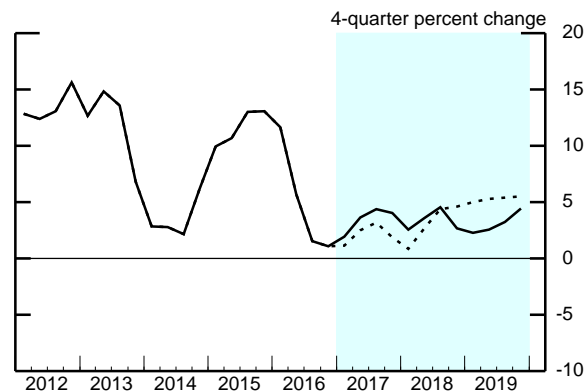(Percent change, Q4 to Q4, except as noted)

Measure	1974-95	1996-2000	2001-07	2008-10	2011-15	2016	2017	2018	2019
Potential real GDP	3.1	3.4	2.6	1.6	1.1	1.4	1.5	1.6	1.7
Previous Tealbook	3.1	3.4	2.6	1.6	1.1	1.4	1.5	1.6	1.7
Selected contributions[1]									
Structural labor productivity[2]	1.6	2.9	2.8	1.4	.8	.9	1.1	1.1	1.2
Previous Tealbook	1.6	2.9	2.8	1.4	.8	.9	1.1	1.1	1.2
Capital deepening	.6	1.5	1.0	.3	.5	.5	.4	.4	.4
Multifactor productivity	.6	1.0	1.5	.9	.0	.2	.5	.5	.7
Structural hours	1.6	1.2	.8	.0	.6	.7	.1	.4	.4
Previous Tealbook	1.6	1.2	.8	.1	.6	.6	.0	.3	.3
Labor force participation	.4	-.1	-.2	-.5	-.6	-.4	-.4	-.4	-.4
Previous Tealbook	.4	-.1	-.2	-.5	-.6	-.5	-.5	-.5	-.5
Memo:									
GDP gap[3]	-1.9	2.4	.8	-4.2	.0	.5	1.0	1.6	1.8
Previous Tealbook	-1.9	2.4	.8	-4.2	.0	.4	.9	1.5	1.7

Note: For multiyear periods, the percent change is the annual average from Q4 of the year preceding the first year shown to Q4 of the last year shown.
 1. Percentage points.
 2. Total business sector.
 3. Percent difference between actual and potential GDP in the final quarter of the period indicated. A negative number indicates that the economy is operating below potential.

GDP Gap
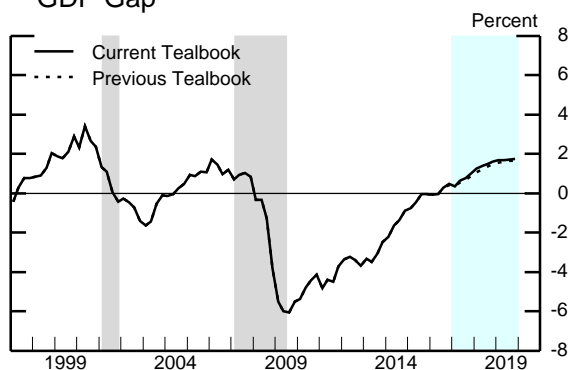
Note: The GDP gap is the percent difference between actual and potential GDP; a negative number indicates that the economy is operating below potential.
 Source: U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

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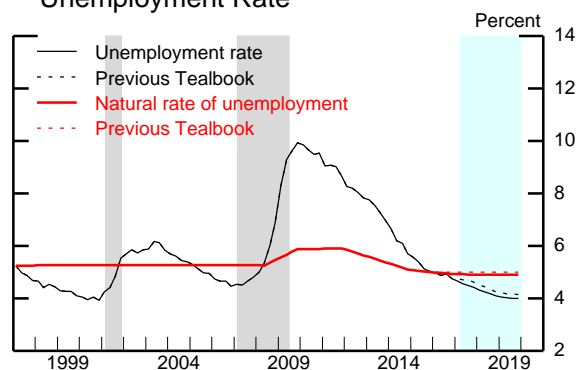
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

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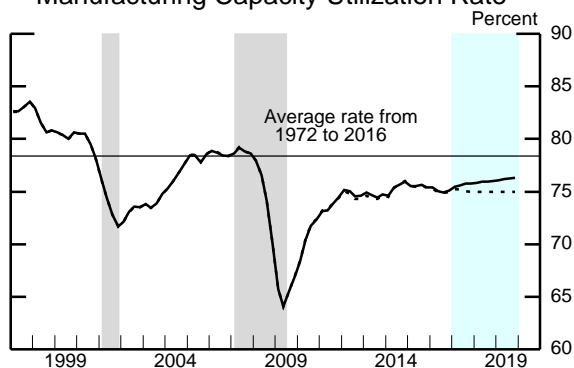
Source: Federal Reserve Board, G.17 Statistical Release, "Industrial Production and Capacity Utilization."

Structural and Actual Labor Productivity
(Business sector)
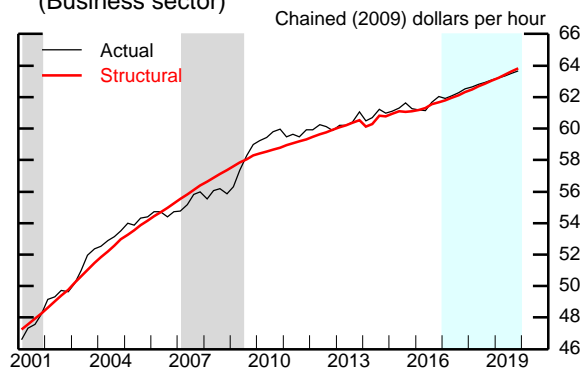
Source: U.S. Department of Labor, Bureau of Labor Statistics; U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

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

The Outlook for the Labor Market

Measure	2016	2017		2017	2018	2019
		H1	H2			
Output per hour, business[1]	1.3	.1	1.5	.8	.9	.9
Previous Tealbook	1.3	.6	1.1	.9	.9	.9
Nonfarm payroll employment[2]	187	179	174	176	169	122
Previous Tealbook	187	187	157	172	157	122
Private employment[2]	170	172	165	168	160	113
Previous Tealbook	171	187	153	170	150	113
Labor force participation rate[3]	62.7	62.8	62.7	62.7	62.5	62.3
Previous Tealbook	62.7	62.7	62.6	62.6	62.3	62.1
Civilian unemployment rate[3]	4.7	4.5	4.4	4.4	4.1	4.0
Previous Tealbook	4.7	4.7	4.6	4.6	4.2	4.1

1. Percent change from final quarter of preceding period at annual rate.
2. Thousands, average monthly changes.
3. Percent, average for the final quarter in the period.
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

Inflation Projections

Measure	2016	2017		2017	2018	2019
		H1	H2			
Percent change at annual rate from final quarter of preceding period						
PCE chain-weighted price index	1.4	1.8	1.6	1.7	1.8	1.9
Previous Tealbook	1.4	2.0	1.5	1.7	1.8	1.9
Food and beverages	-1.7	1.3	2.0	1.7	2.1	2.2
Previous Tealbook	-1.7	1.0	2.2	1.6	2.1	2.2
Energy	.8	2.6	.2	1.4	.3	.7
Previous Tealbook	.8	3.8	-.7	1.5	.2	.6
Excluding food and energy	1.7	1.8	1.6	1.7	1.9	2.0
Previous Tealbook	1.7	2.0	1.5	1.8	1.9	2.0
Prices of core goods imports[1]	.0	1.4	1.3	1.3	.7	.7
Previous Tealbook	.0	.9	1.4	1.2	.8	.7

	Mar. 2017[2]	Apr. 2017[2]	May 2017[2]	June 2017[2]	July 2017[2]	Aug. 2017[2]
12-month percent change						
PCE chain-weighted price index	1.9	1.7	1.8	1.8	1.9	1.8
Previous Tealbook	2.1	1.9	1.8	1.8		
Excluding food and energy	1.6	1.6	1.6	1.7	1.7	1.6
Previous Tealbook	1.8	1.7	1.7	1.8		

1. Core goods imports exclude computers, semiconductors, oil, and natural gas.
2. Staff forecast.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Domestic Econ Devel & Outlook

Domestic Econ Devel & Outlook

Labor Market Developments and Outlook (1)

Measures of Labor Underutilization

Percent

Mar.
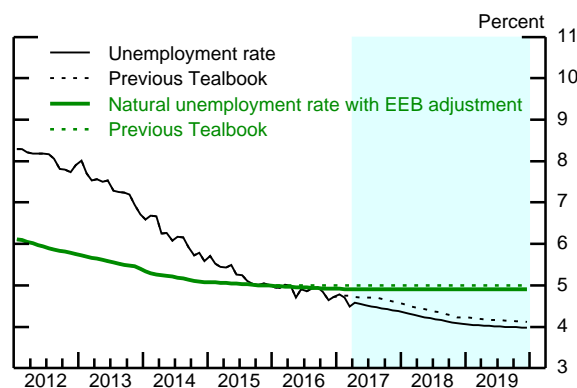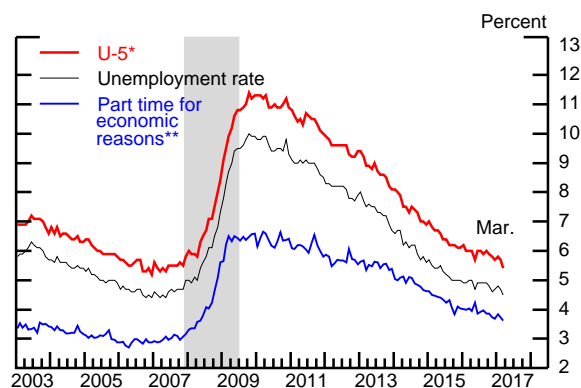
Percent

* 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*

Millions

Millions

Mar.

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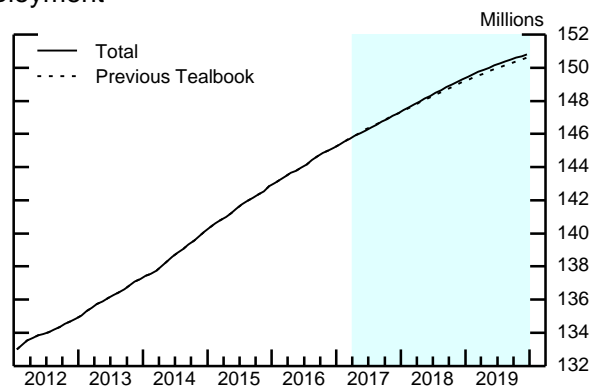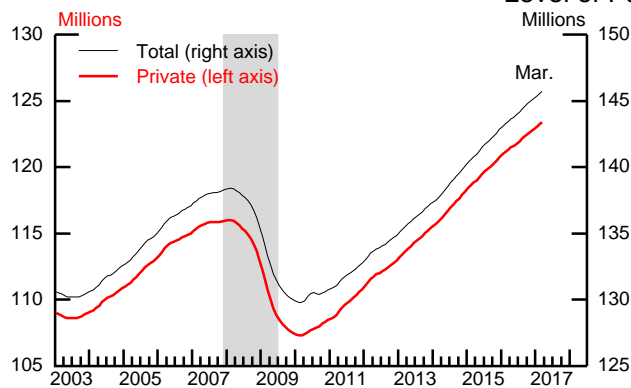
* 3-month moving averages.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Change in Payroll Employment*
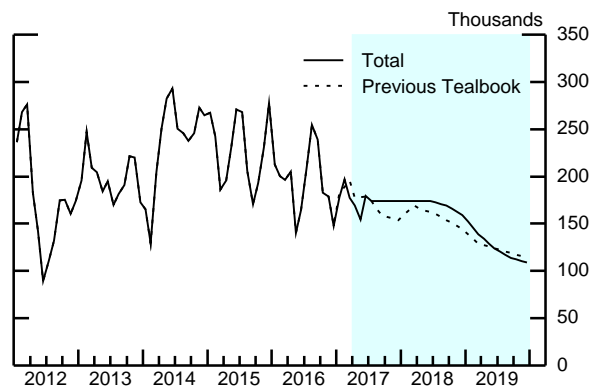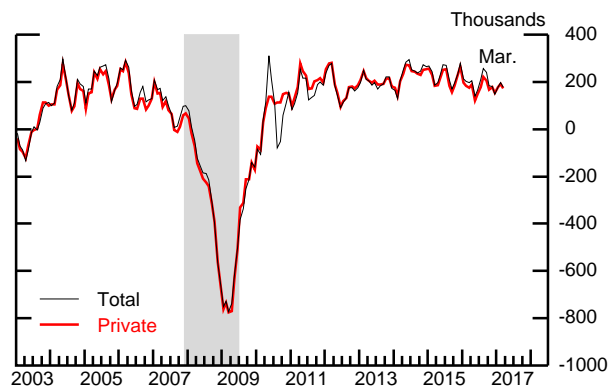
Thousands

Mar.

Thousands

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

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

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Labor Market Developments and Outlook (2)

Domestic Econ Devel & Outlook

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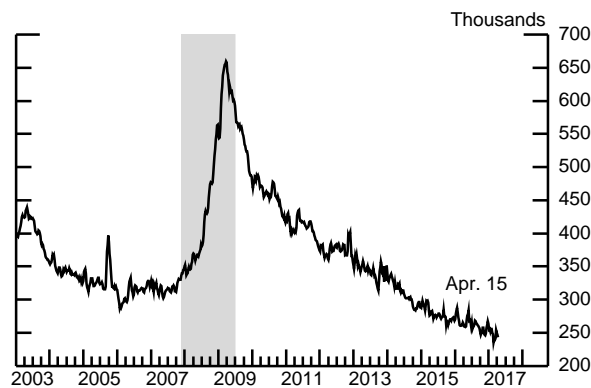
* 4-week moving average.
Source: U.S. Department of Labor, Employment and Training Administration.

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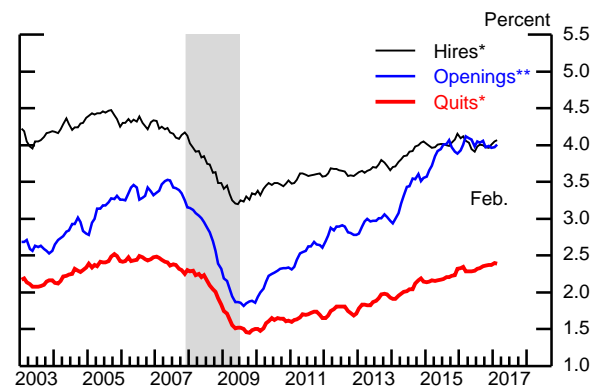
* Percent of private nonfarm payroll employment, 3-month moving average.
** Percent of private nonfarm payroll employment plus unfilled jobs, 3-month moving average.
Source: Job Openings and Labor Turnover Survey.

Average Monthly Change in Labor Market Conditions Index
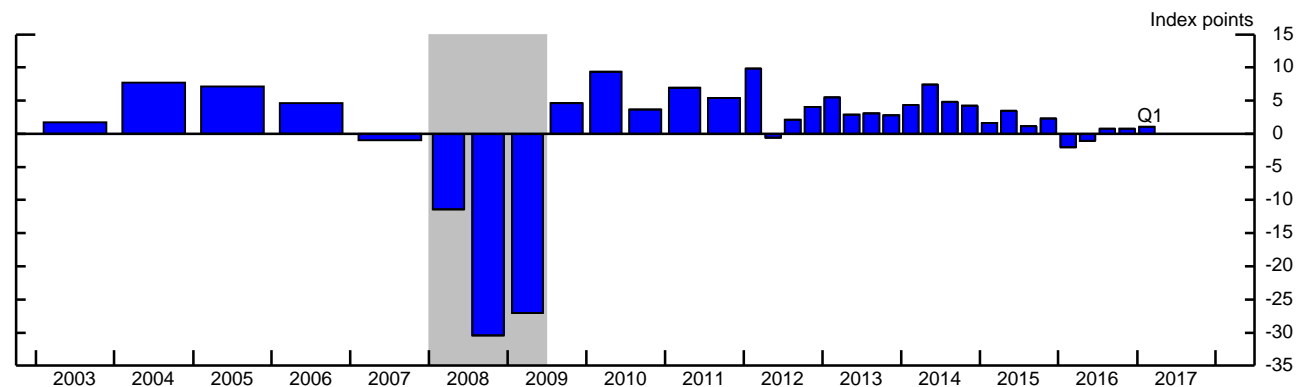
Source: Labor market conditions index estimated by staff.

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

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Domestic Econ Devel & Outlook

Inflation Developments and Outlook (1)
(Percent change from year-earlier period)

Headline Consumer Price Inflation
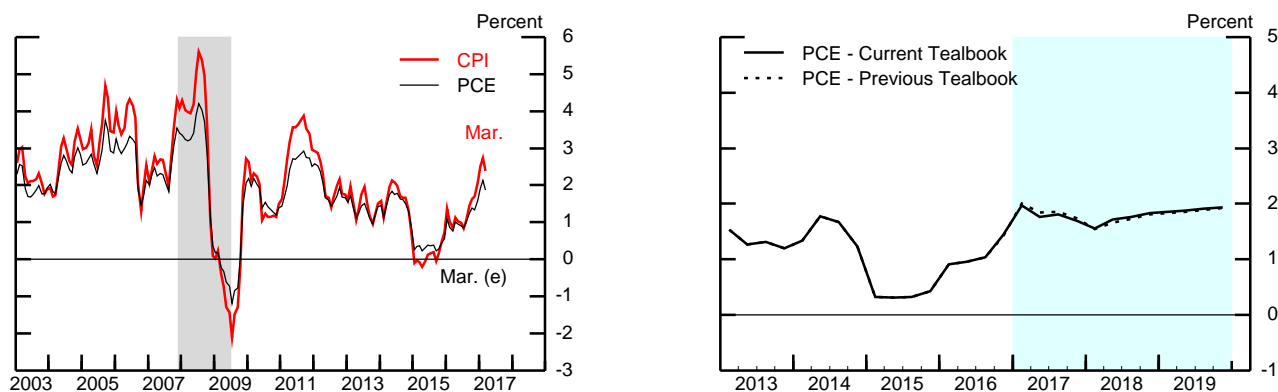
Note: PCE prices from January to March 2017 are staff estimates (e).
Source: For CPI, U.S. Department of Labor, Bureau of Labor Statistics; for PCE, U.S. Department of Commerce, Bureau of Economic Analysis.

Measures of Underlying PCE Price Inflation
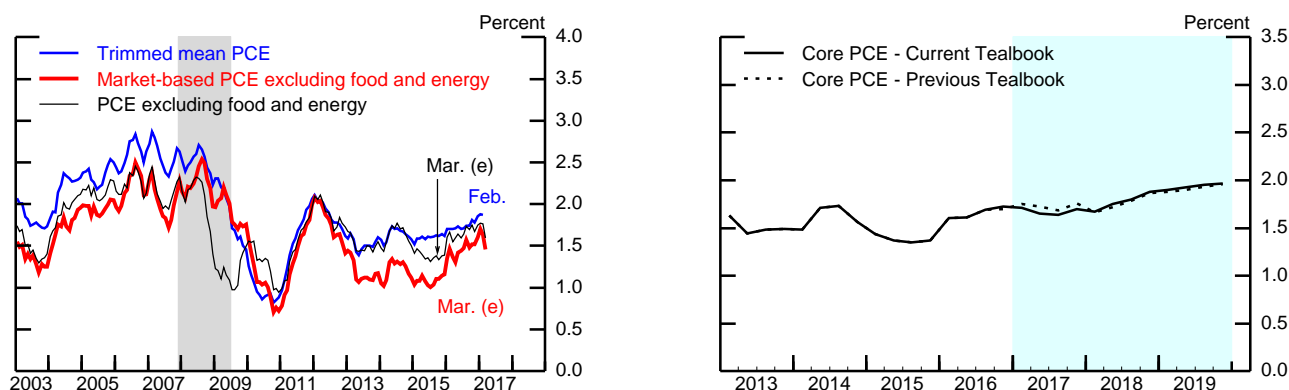
Note: Core PCE prices from January to March 2017 are staff estimates (e).
Source: For trimmed mean PCE, Federal Reserve Bank of Dallas; otherwise, U.S. Department of Commerce, Bureau of Economic Analysis.

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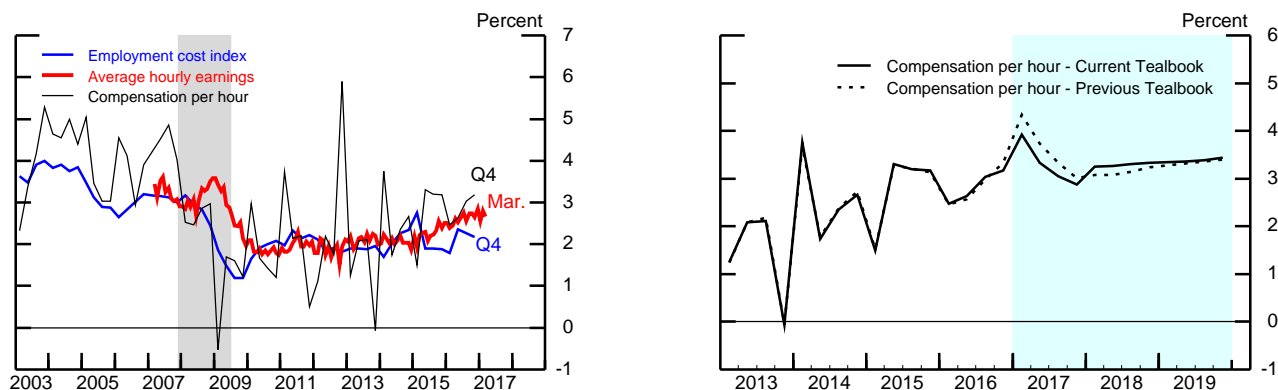
Note: Compensation per hour is for the business sector. Average hourly earnings are for the private nonfarm sector. The employment cost index is for the private sector.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

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

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Domestic Econ Devel & Outlook

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).
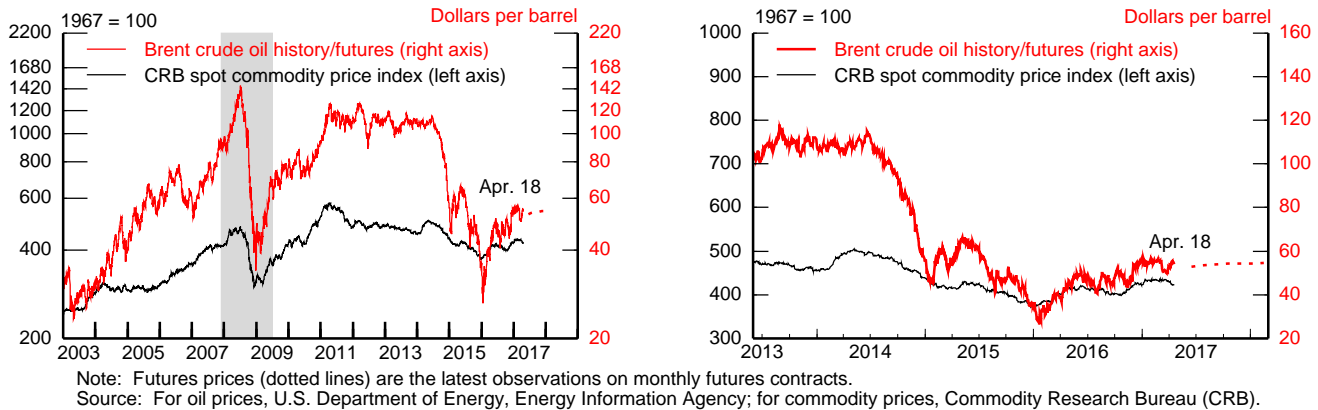
Energy and Import Price Inflation

(e) Estimate.
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.
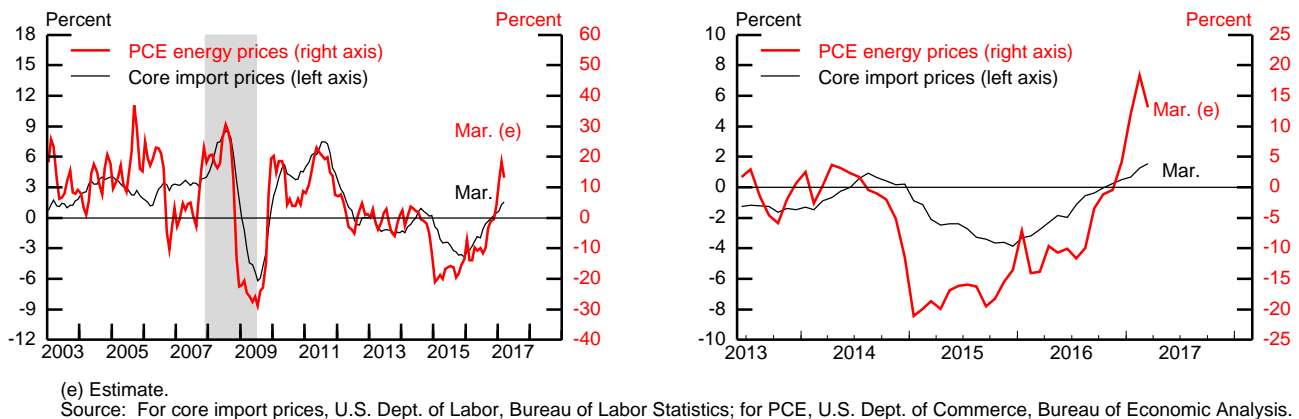
Long-Term Inflation Expectations and Compensation
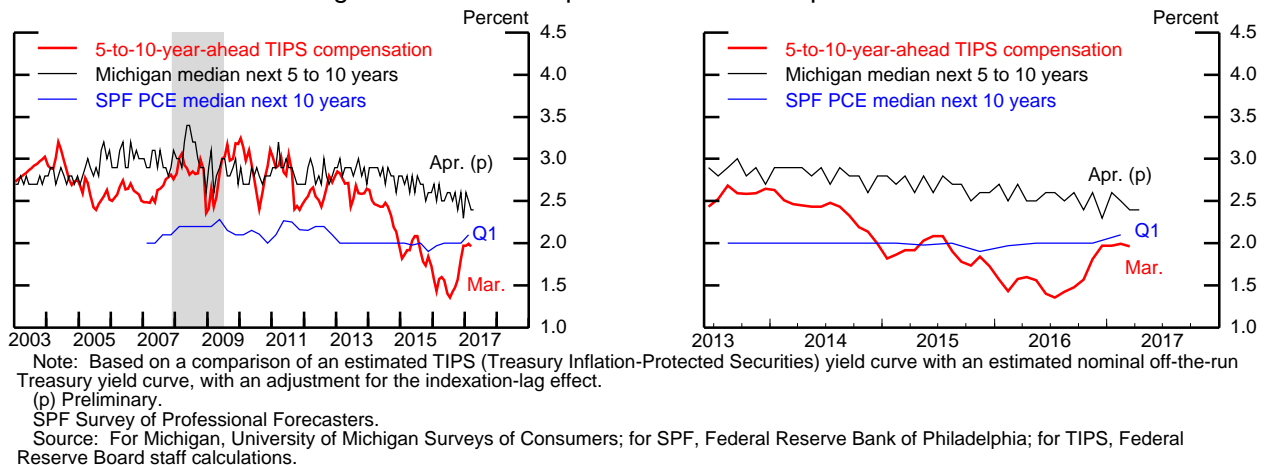
Note: Based on a comparison of an estimated TIPS (Treasury Inflation-Protected Securities) yield curve with an estimated nominal off-the-run Treasury yield curve, with an adjustment for the indexation-lag effect.
(p) Preliminary.
SPF Survey of Professional Forecasters.
Source: For Michigan, University 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.

Authorized for Public Release   April 21, 2017

The Long–Term Outlook

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

Measure	2017	2018	2019	2020	2021	2022	Longer run
Real GDP	2.1	2.2	1.8	1.5	1.3	1.3	1.7
Previous Tealbook	2.0	2.2	1.9	1.5	1.3	1.3	1.7
Civilian unemployment rate[1]	4.4	4.1	4.0	4.1	4.3	4.5	4.9
Previous Tealbook	4.6	4.2	4.1	4.2	4.4	4.6	5.0
PCE prices, total	1.7	1.8	1.9	2.1	2.1	2.1	2.0
Previous Tealbook	1.7	1.8	1.9	2.0	2.1	2.1	2.0
Core PCE prices	1.7	1.9	2.0	2.0	2.1	2.1	2.0
Previous Tealbook	1.8	1.9	2.0	2.0	2.1	2.1	2.0
Federal funds rate[1]	1.47	2.55	3.46	3.97	4.10	3.99	3.00
Previous Tealbook	1.45	2.46	3.36	3.87	4.02	3.95	3.00
10-year Treasury yield[1]	2.9	3.5	3.9	3.9	3.9	3.8	3.5
Previous Tealbook	3.0	3.5	3.9	3.9	3.9	3.8	3.5

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

Real GDP

4–quarter percent change

Unemployment Rate

Percent

PCE Prices

4–quarter percent change

Interest Rates

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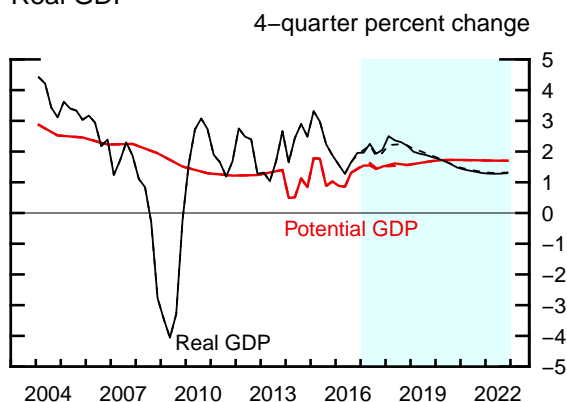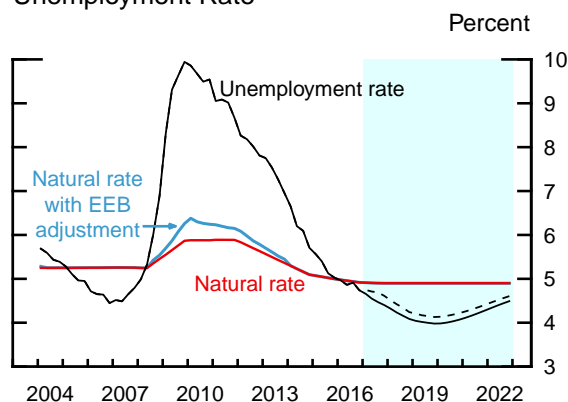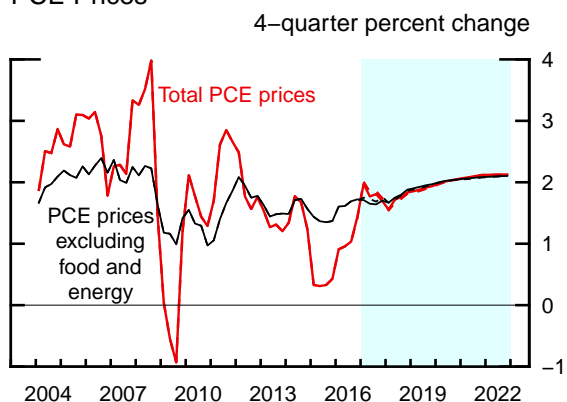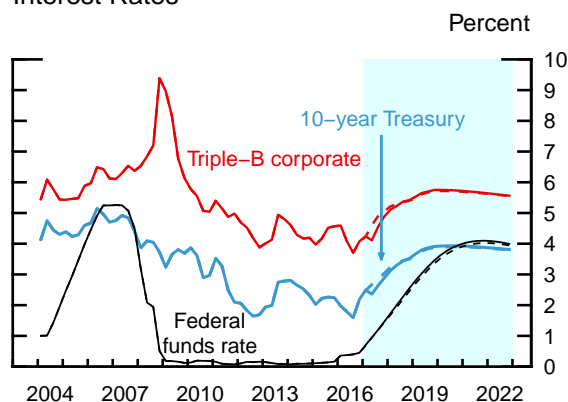
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

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Domestic Econ Devel & Outlook

Evolution of the Staff Forecast

Change in Real GDP

Percent, Q4/Q4

Tealbook publication date

Unemployment Rate

Percent, fourth quarter
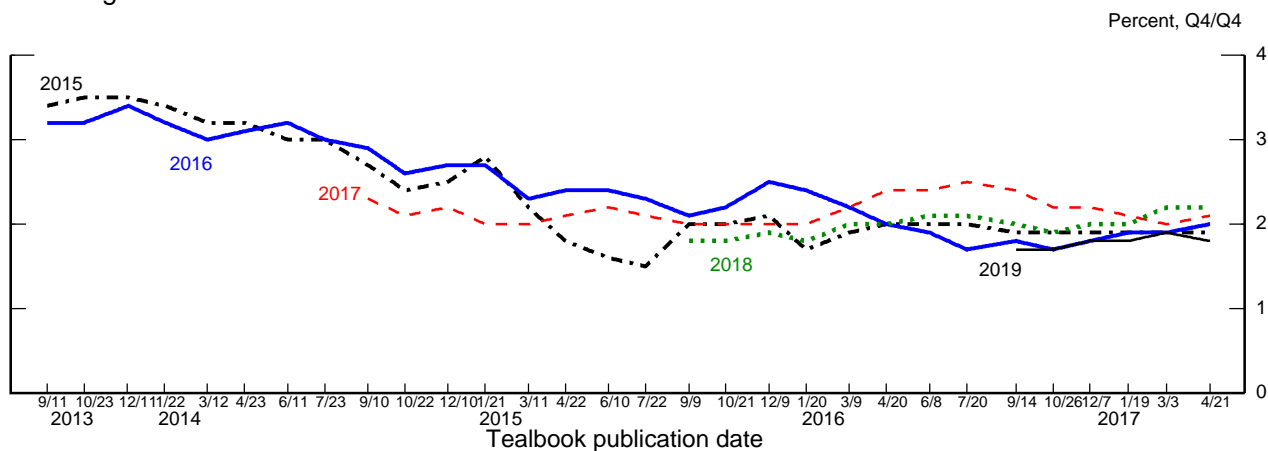
Tealbook publication date
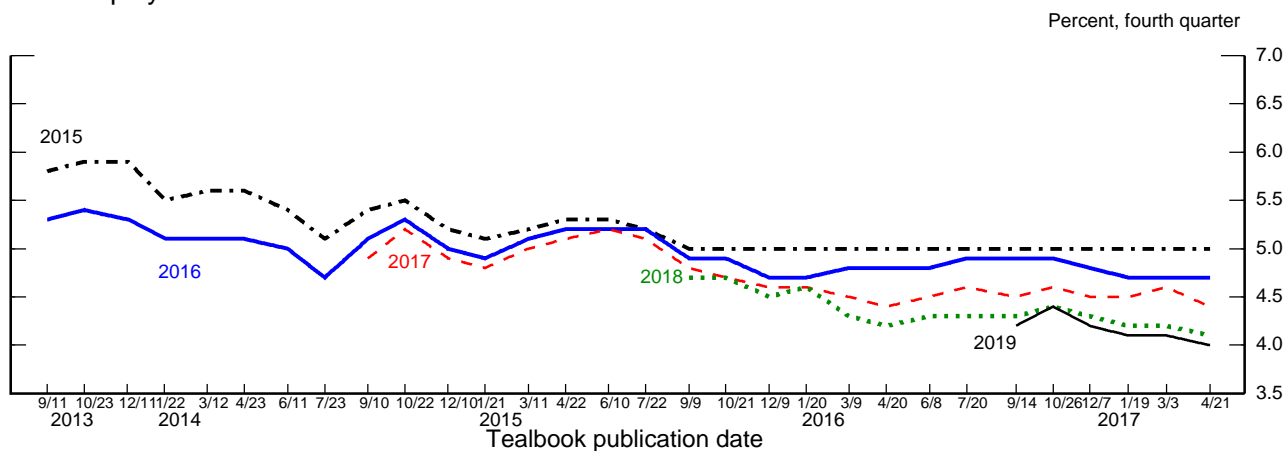
Change in PCE Prices excluding Food and Energy

Percent, Q4/Q4

Tealbook publication date
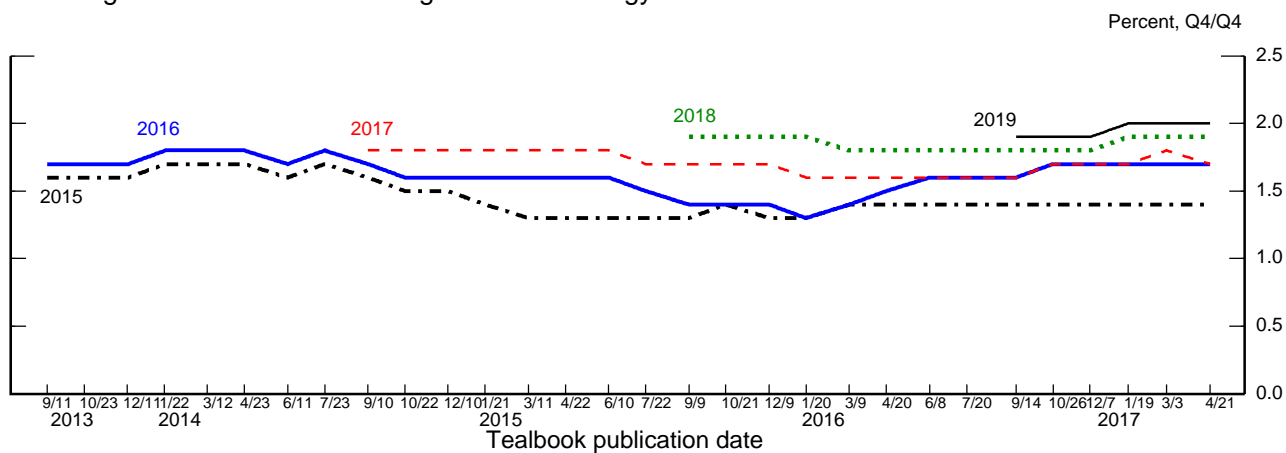
The Foreign GDP Outlook

Real GDP*

Percent change, annual rate

	2016			2017			2018	2019
	H1	Q3	Q4	Q1	Q2	H2		
1. Total Foreign	1.9	3.1	2.8	2.9	2.7	2.5	2.6	2.6
Previous Tealbook	1.9	3.1	2.7	2.5	2.5	2.5	2.6	2.6
2. Advanced Foreign Economies	1.4	2.4	2.3	2.4	2.0	1.8	1.8	1.7
Previous Tealbook	1.3	2.5	2.2	2.1	1.9	1.8	1.8	1.7
3. Canada	0.7	3.8	2.6	3.0	2.3	1.9	1.8	1.8
4. Euro Area	1.8	1.7	1.9	1.9	1.8	1.8	1.8	1.8
5. Japan	2.0	1.2	1.2	1.3	1.3	1.1	0.9	0.1
6. United Kingdom	1.5	2.0	2.7	2.0	1.9	1.8	1.6	1.6
7. Emerging Market Economies	2.4	3.7	3.3	3.4	3.3	3.2	3.4	3.5
Previous Tealbook	2.4	3.6	3.2	2.8	3.1	3.3	3.4	3.5
8. China	6.8	6.8	6.6	7.1	6.6	6.0	5.8	5.7
9. Emerging Asia ex. China	3.6	3.7	3.6	3.9	4.0	3.6	3.6	3.5
10. Mexico	1.1	4.4	2.9	1.9	1.8	2.3	2.4	2.6
11. Brazil	-1.8	-2.9	-3.4	2.5	2.3	2.0	2.1	2.2

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

Total Foreign GDP
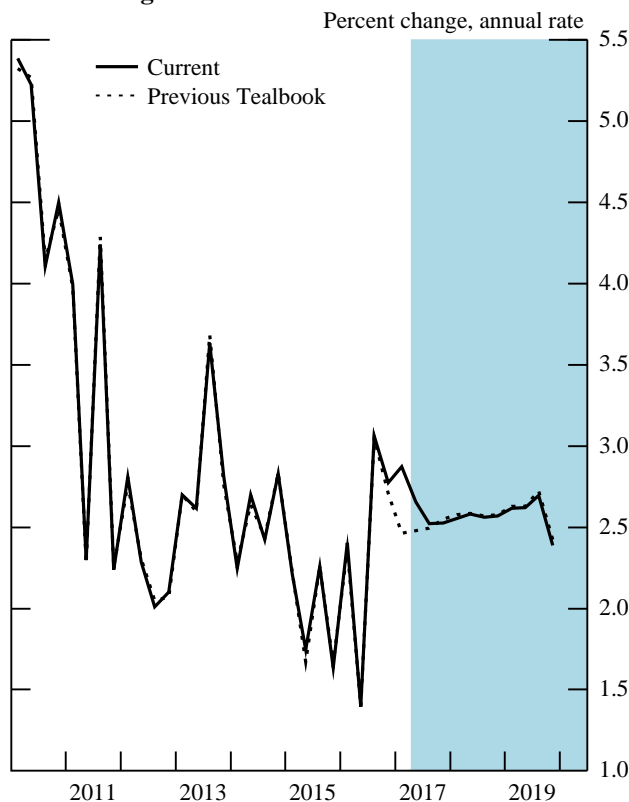
Foreign GDP
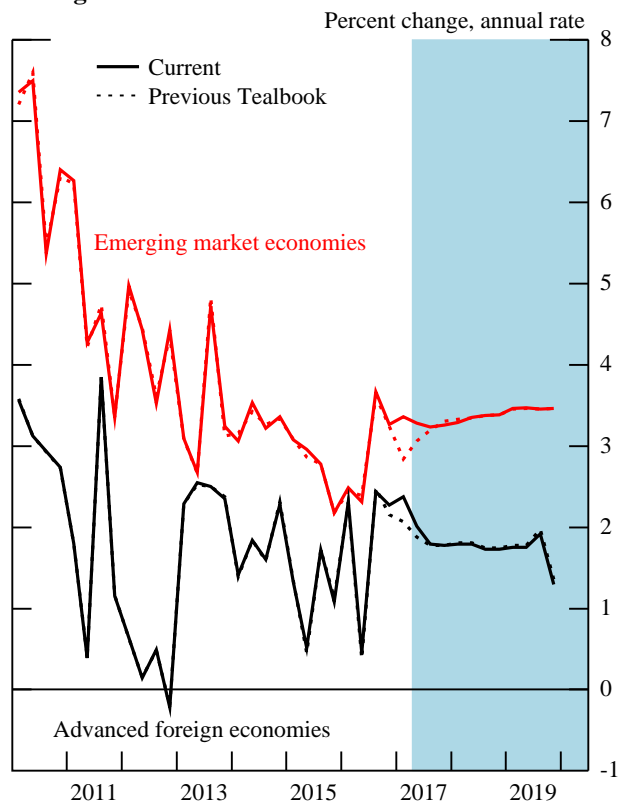
The Foreign Inflation Outlook

Consumer Prices*   Percent change, annual rate

		2016			2017			2018	2019
		H1	Q3	Q4	Q1	Q2	H2		
1.	Total Foreign	1.7	1.6	2.6	3.0	2.4	2.4	2.4	2.6
	Previous Tealbook	1.7	1.6	2.6	3.6	2.6	2.4	2.5	2.6
2.	Advanced Foreign Economies	0.4	0.9	1.8	2.5	1.4	1.4	1.6	1.9
	Previous Tealbook	0.4	0.8	1.8	2.4	1.5	1.4	1.6	1.9
3.	Canada	1.4	1.0	1.7	2.9	2.0	1.7	1.9	2.0
4.	Euro Area	-0.0	1.2	1.9	3.0	1.3	1.3	1.4	1.6
5.	Japan	-0.3	-0.5	2.4	0.0	0.4	0.7	1.1	2.5
6.	United Kingdom	0.4	2.0	2.0	4.0	2.8	2.4	2.2	2.1
7.	Emerging Market Economies	2.7	2.2	3.1	3.4	3.0	3.2	3.1	3.1
	Previous Tealbook	2.7	2.2	3.1	4.4	3.4	3.2	3.1	3.1
8.	China	2.4	1.3	2.6	-0.6	1.5	2.5	2.5	2.5
9.	Emerging Asia ex. China	1.7	1.1	2.7	3.6	3.1	3.0	3.2	3.4
10.	Mexico	2.6	3.6	4.1	9.9	5.0	3.6	3.2	3.2
11.	Brazil	9.6	6.5	2.6	3.2	4.3	4.9	4.4	4.4

* 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.

Int'l Econ Devel & Outlook

Recent Foreign Indicators

Int'l Econ Devel & Outlook

Nominal Exports

Jan. 2011 = 100

- Foreign (black)
- AFE* (red)
- EME** (blue)

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

Industrial Production

Jan. 2011 = 100

- Foreign (black)
- AFE* (red)
- EME** (blue)

* 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

12-month percent change

- Foreign (black)
- AFE* (red)
- EME** (blue)

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

Employment

4-quarter percent change

- Foreign (black)
- AFE* (red)
- EME** (blue)

* Includes Australia, Canada, euro area, Japan, Sweden, Switzerland, U.K.
** Includes Chile, Colombia, Hong Kong, Israel, Korea, Mexico, Philippines, Russia, Singapore, Taiwan, Thailand, Turkey.

Consumer Prices: Advanced Foreign Economies

12-month percent change

- Headline (black)
- Core* (red)

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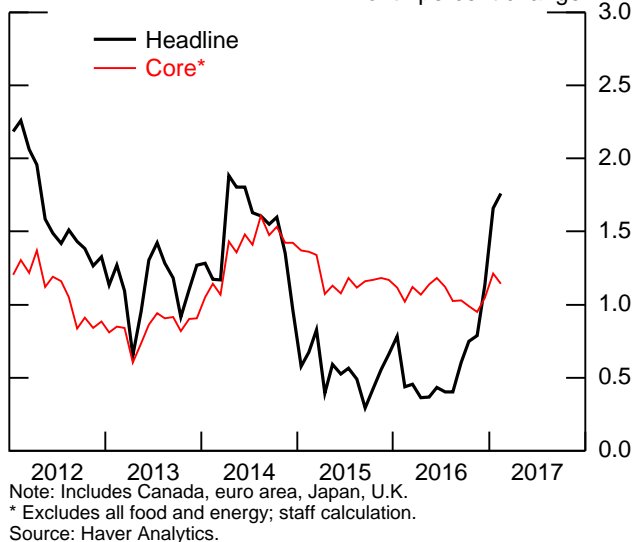
Consumer Prices: Emerging Market Economies

12-month percent change

- Headline* (black)
- Ex. food--Emerging Asia** (red)
- Ex. food--Latin America** (blue)

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

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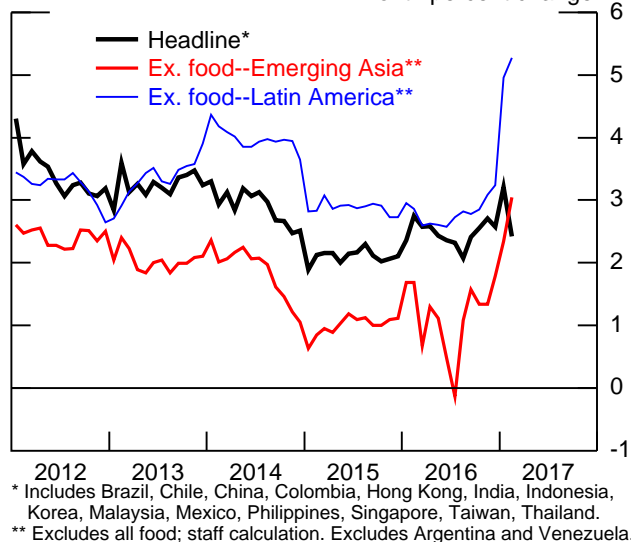
Evolution of Staff's International Forecast

Total Foreign GDP

Percent change, Q4/Q4

Tealbook publication date

Total Foreign CPI

Percent change, Q4/Q4

Tealbook publication date

U.S. Current Account Balance

Percent of GDP

Tealbook publication date

Int'l Econ Devel & Outlook
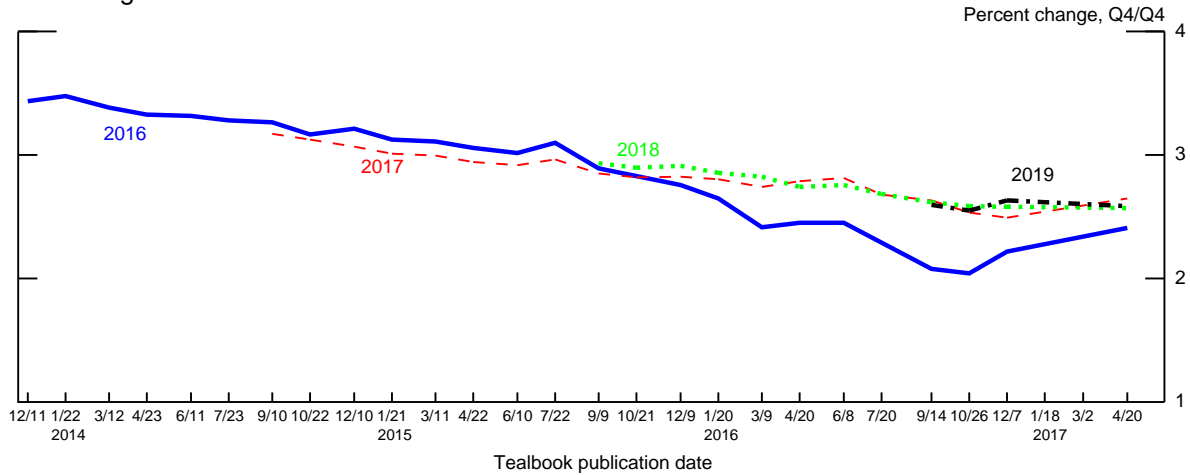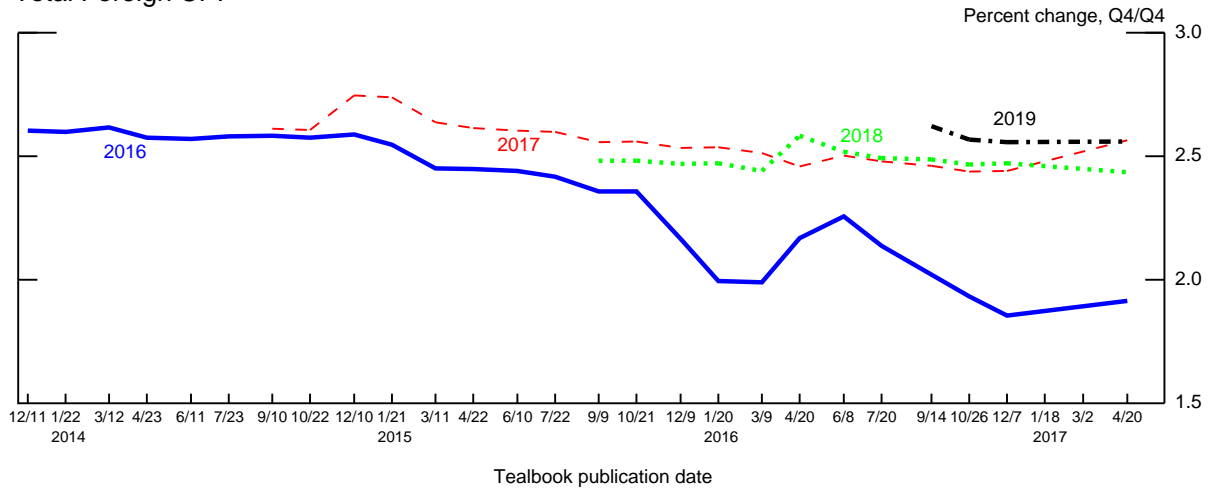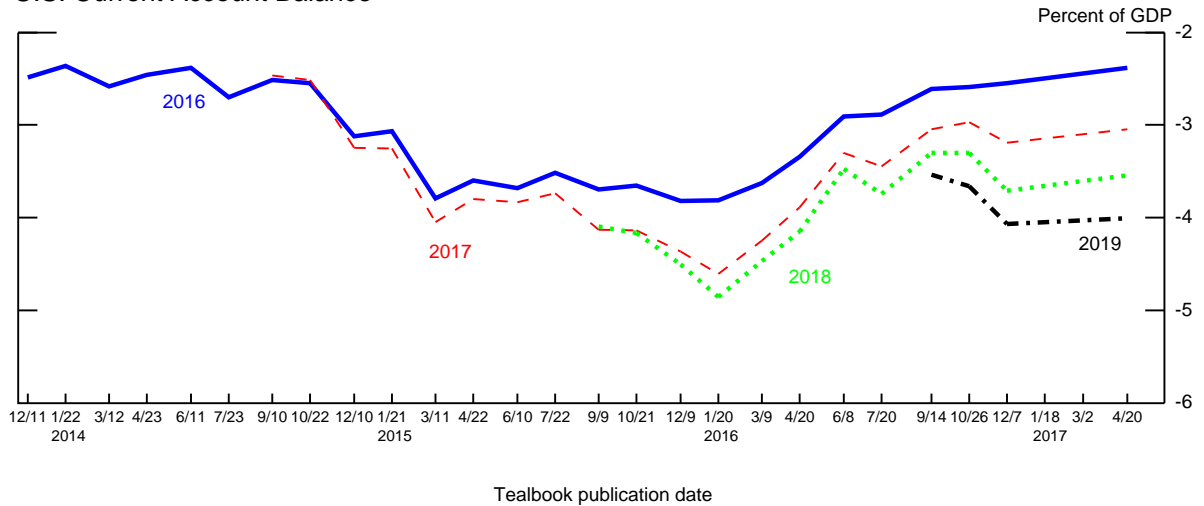
Policy Expectations and Treasury Yields

Selected Interest Rates
Percent

Mar. FOMC

Canceled vote on AHCA

Dec. 2017 Eurodollar (left scale)

Mar. FOMC minutes

Mar. empl. report

10-year Treasury yield (right scale)

Apr. 20

Percent
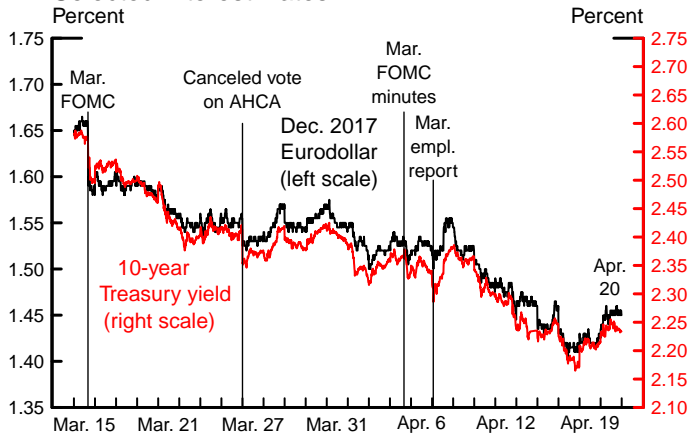
Note: 5–minute intervals, 8:00 a.m. to 4:00 p.m. Data shown are for 2017.
Source: Bloomberg.

Market–Implied Probability Distribution of the Timing of Next Rate Increase
Percent
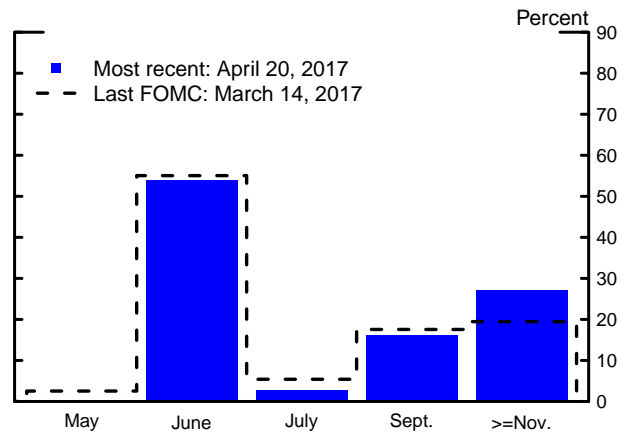
■ Most recent: April 20, 2017
- - Last FOMC: March 14, 2017

May   June   July   Sept.   >=Nov.

Note: Probabilities implied by a binomial tree fitted to settlement prices on fed funds futures contracts, assuming the next policy action is either no change or a 25 basis point increase in rates and no intermeeting moves. The effective federal funds rate until the next FOMC meeting is assumed to be equal to the observed rate on the previous non–month–end business day. The dashed line shows the probability distribution of the next rate hike after the March meeting.
Source: CME Group; Federal Reserve Board staff estimates.

Implied Federal Funds Rate
Percent

—— Most recent: April 20, 2017
- - - Last FOMC: March 14, 2017

With model–based term premium

With zero term premium

2017   2018   2019   2020   2021
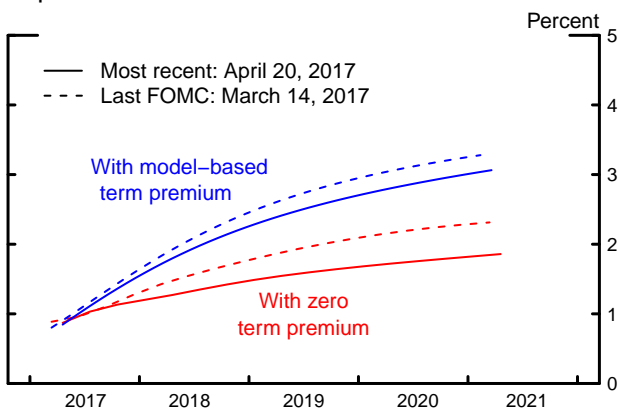
Note: Zero term premium path is estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points. Model–based term premium path is estimated using a term structure model maintained by Board staff and corrects for term premium.
Source: Bloomberg; Federal Reserve Board staff estimates.

Treasury Yield Curve
Percent

—— Most recent: April 20, 2017
- - - Last FOMC: March 14, 2017

2   5   10   20   30
Maturity in years
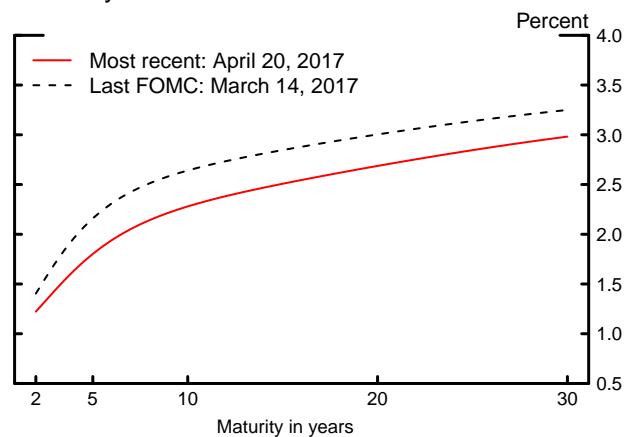
Note: Smoothed yield curve estimated from off-the-run Treasury coupon securities. Yields shown are those on notional par Treasury securities with semiannual coupons.
Source: Federal Reserve Bank of New York; Federal Reserve Board staff estimates.

Inflation Compensation
Percent

Daily

5 to 10 years ahead

Mar. FOMC

Apr. 20

Next 5 years*

2014   2015   2016   2017

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

Option–Implied Volatilities on 10–Year Swap Rate
Basis points

—— 1 month ahead
—— 1 year ahead

Mar. FOMC

Apr. 20

2014   2015   2016   2017
Years
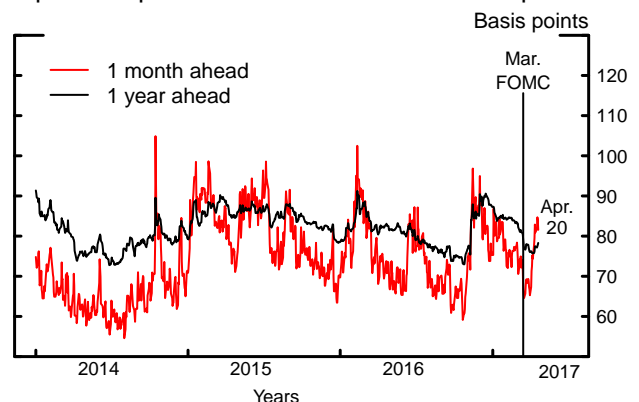
Note: Implied volatility on the 10–year swap rate one month and one year ahead is derived from swaptions.
Source: Barclays; Federal Reserve Board staff estimates.

Financial Markets

Corporate Asset Markets and Banking Developments

S&P 500 Sectors

Mar. 14, 2017 = 100

Weekly

— S&P 500 Financials Index
-- S&P 500 Utilities Index
···· S&P 500

Mar. FOMC

Apr. 20
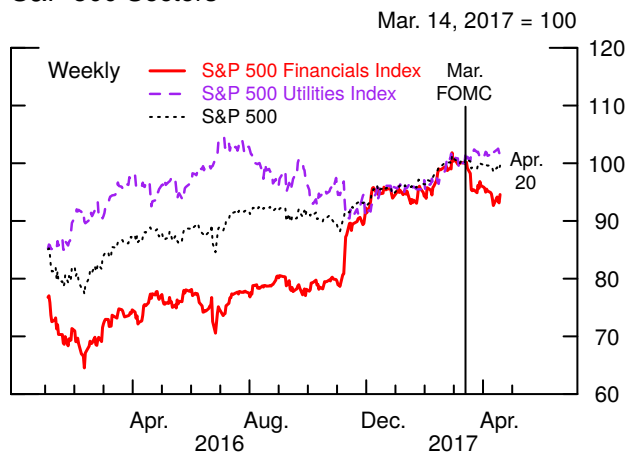
Source: Bloomberg.

Implied Volatility on S&P 500 (VIX)

Log scale, percent

Daily

— Historical average

Mar. FOMC

Apr. 20
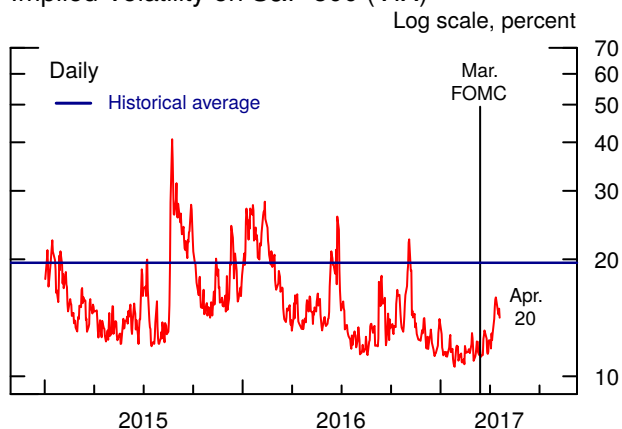
Note: Historical average is taken from 1990 onward.
Source: Chicago Board Options Exchange.

Equity Risk Premium

Percent

Monthly

— Expected real yield on 10-year Treasury*
— Expected 10-year real equity return

Mar. FOMC

Apr. 20
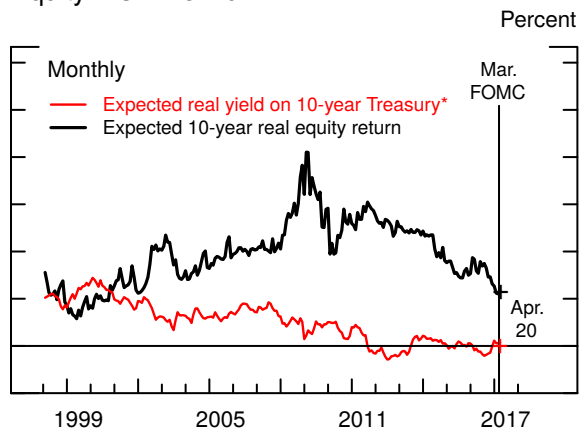
* Off-the-run 10-year Treasury yield less Philadelphia Fed 10-year expected inflation.
+ Denotes latest observation using daily interest rates and stock prices as well as staff forecast of corporate profits.
Source: Staff projections.

10-Year Corporate Bond Spreads

Basis points

Basis points

Daily

— Triple-B (left scale)
— High-yield (right scale)

Mar. FOMC

Apr. 20
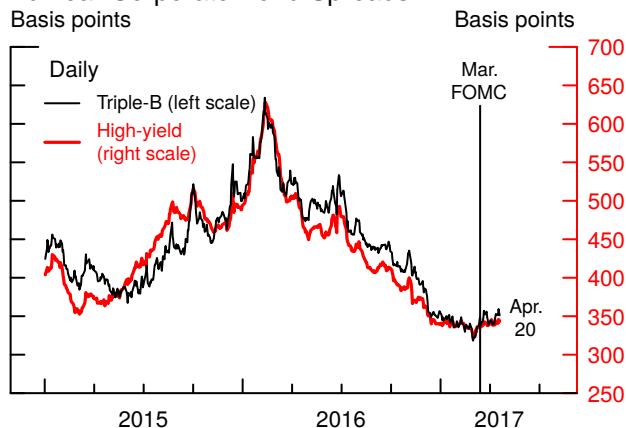
Note: Spreads over 10-year Treasury yield.
Source: Staff estimates of smoothed yield curves based on Merrill Lynch bond data and smoothed Treasury yield curve.

S&P 500 and ABA Indexes
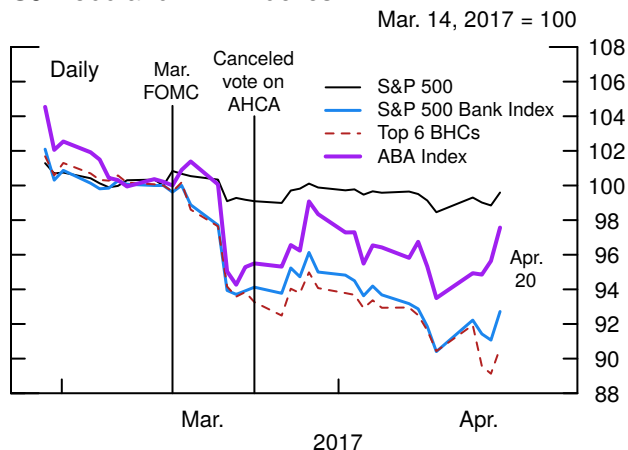
Mar. 14, 2017 = 100

Daily

Mar. FOMC

Canceled vote on AHCA

— S&P 500
— S&P 500 Bank Index
-- Top 6 BHCs
— ABA Index

Apr. 20

Note: Top 6 bank holding companies (BHCs) are Bank of America, Citigroup, Goldman Sachs, Morgan Stanley, JPMorgan Chase, and Wells Fargo. ABA is the American Bankers Association. AHCA is the American Health Care Act.
Source: Bloomberg, Google Finance.

CDS Spreads
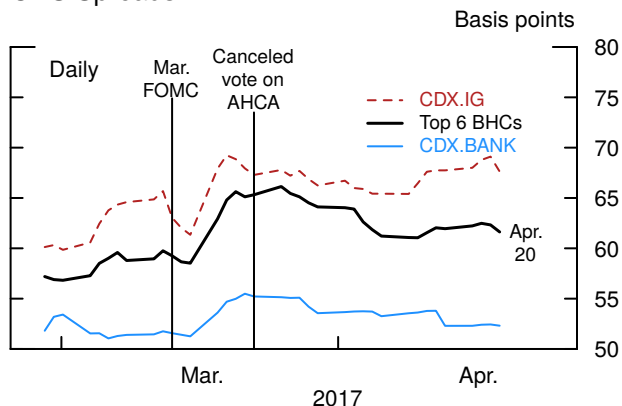
Basis points

Daily

Mar. FOMC

Canceled vote on AHCA

-- CDX.IG
— Top 6 BHCs
— CDX.BANK

Apr. 20

Note: Top 6 bank holding companies (BHCs) are Bank of America, Citigroup, Goldman Sachs, Morgan Stanley, JPMorgan Chase, and Wells Fargo. Dashed curve plots the median 5-year spread. CDX.IG is the on-the-run investment-grade credit default swap (CDS) index. CDX.BANK is the median of all available quotes. AHCA is the American Health Care Act.
Source: Markit.

Financial Markets

Authorized for Public Release

Foreign Developments

10-Year Nominal Yields

Percent

- United States
- United Kingdom
- Germany
- Japan

Mar. FOMC

Apr. 20

3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5

Jan. Apr. July Oct. Jan. Apr.
2016 2017

Source: Bloomberg.

Exchange Rates

Mar. 14, 2017 = 100

- Broad
- Advanced foreign economies
- Emerging market economies

Mar. FOMC

Apr. 20

106
104
102
100
98
96
94
92
90

Jan. Apr. July Oct. Jan. Apr.
2016 2017

Source: Bloomberg.

Euro-USD Risk Reversals

Percent

Contract matures after 2nd round of French elections

Mar. FOMC

Apr. 20

More costly to insure against euro fall than euro rise

-1
-2
-3
-4
-5
-6

Jan. Feb. Mar. Apr.
2017

* Derived from 3-month 10-delta options.
Source: Bloomberg.

Equity Market Indexes

Mar. 14, 2017 = 100

- UK FTSE 100
- Euro Stoxx
- Nikkei
- EME*

Mar. FOMC

Apr. 20

110
105
100
95
90
85
80
75

Jan. Apr. July Oct. Jan. Apr.
2016 2017

* Emerging market economies. MSCI local currency index.
Source: Bloomberg; Datastream.

Implied Volatility

Percent

- United States
- United Kingdom
- Europe
- Japan

Mar. FOMC

Apr. 20

60
50
40
30
20
10
0

Jan. Apr. July Oct. Jan. Apr.
2016 2017

Source: Bloomberg.

Emerging Market Flows and Spreads

Billions of dollars

Basis points

- Bond flows (left scale)
- Equity flows (left scale)

Mar. FOMC

Apr. 20

EMBI+

25
20
15
10
5
0
-5
-10
-15

500
400
300
200
100

July Oct. Jan. Apr.
2016 2017

Note: Emerging market bond spreads over zero-coupon Treasury securities. Excludes intra-China flows. EMBI+ is the J.P. Morgan Emerging Markets Bond Index Plus.
Source: Bloomberg; Emerging Portfolio Fund Research.

Financial Markets

Short-Term Funding Markets and Federal Reserve Operations

Selected Money Market Rates

Note: Federal funds rate is a weighted median, and shaded area is the target range for the federal funds rate. Repo is repurchase agreement.
Source: Federal Reserve Bank of New York; Federal Reserve Board, Form FR 2420, Report of Selected Money Market Rates.

ON RRP Take-Up, by Type

Note: ON RRP is overnight reverse repurchase agreement; MMFs are money market funds.
Source: Federal Reserve Bank of New York.

Eurodollar Volumes

Note: From each series, we subtract the volume recorded on the day prior to quarter-end.
Source: Federal Reserve Board, Form FR 2420, Report of Selected Money Market Rates.

MMF Net Yields

Note: Net yields are the annualized average yield, net of expense ratio, earned over the past 7 days without reinvesting dividends. MMF is money market fund.
Source: iMoneyNet.

CP and CDs: Totals and Amounts Held by MMFs

Note: Commercial paper (CP) includes asset-backed commercial paper. MMF is money market fund; CD is certificate of deposit.
Source: Depository Trust & Clearing Corporation; iMoneyNet.

Change in Large Time Deposits

Note: Yearly rates are Q4 to Q4. Half-years are based on Q4 and Q2 average levels, and quarterly and monthly annual rates use corresponding average levels.
Source: Federal Reserve Board, Form FR 2644, Weekly Report of Selected Assets and Liabilities of Domestically Chartered Commercial Banks and U.S. Branches and Agencies of Foreign Banks.

Financial Markets

Business Finance

Gross Issuance of Nonfinancial Corporate Bonds

Billions of dollars

Monthly

- ▨ Investment-grade
- ▮ Speculative-grade

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

Selected Components of Net Debt Financing, Nonfinancial Firms

Billions of dollars

Monthly rate

- ☐ Commercial paper
- ▮ C&I loans*
- ▮ Institutional leveraged loans
- ▨ Bonds
- — Total
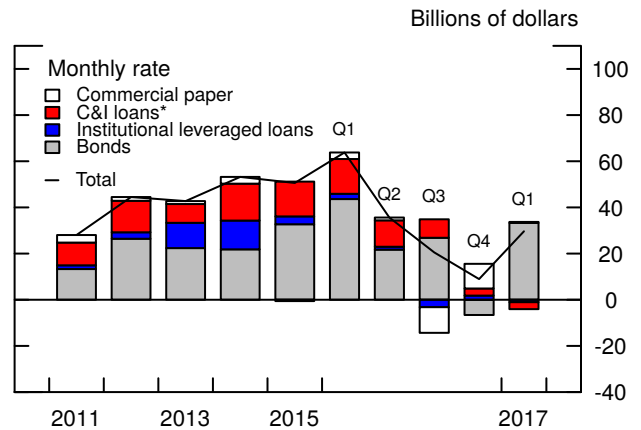
Note: C&I is commercial and industrial.
* Period-end basis, seasonally adjusted.
Source: Depository Trust & Clearing Corporation; Mergent Fixed Income Securities Database; Federal Reserve Board; Thomson Reuters LPC.

Institutional Leveraged Loan Issuance, by Purpose

Billions of dollars

Monthly rate

- ▮ New money
- ▮ Refinancings
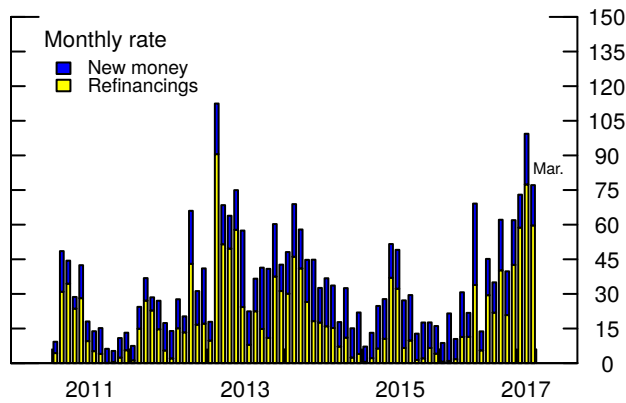
Source: Thomson Reuters LPC LoanConnector.

Average New-Issue Institutional Spreads

Basis points

Monthly

- — B+/B
- — BB/BB-
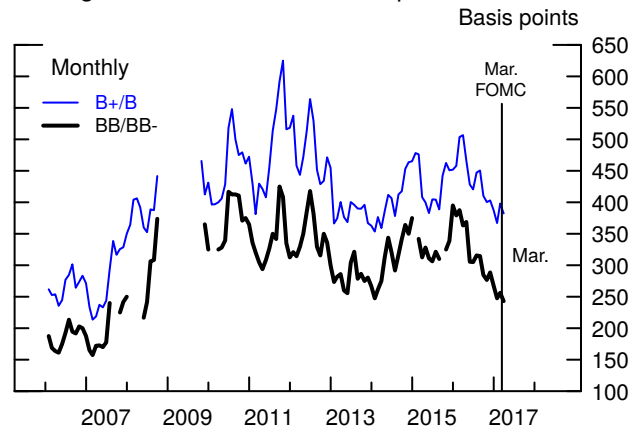
Note: Breaks in the series represent periods with no issuance. Spreads are calculated against 3-month LIBOR. The spreads do not include upfront fees.
Source: S&P LCD.

CMBS Issuance

Billions of dollars

Annual rate

- ▮ Multifamily
- ▮ Nonresidential
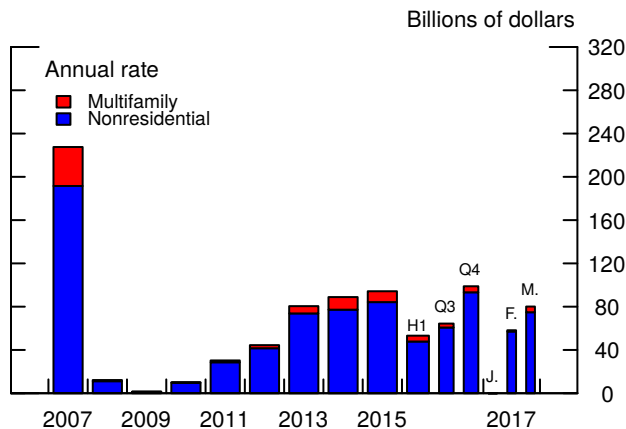
Note: Multifamily excludes agency issuance.
Source: Consumer Mortgage Alert.

NFIB Small Business Optimism Index

1986 = 100
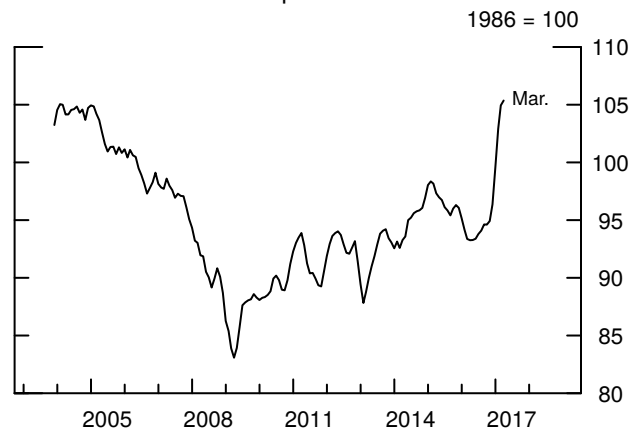
Note: NFIB (National Federation of Independent Business) data are monthly and seasonally adjusted; a 3-month moving average is reported.
Source: National Federation of Independent Business (NFIB), Small Business Economic Trends Data.

Financing Conditions

markets in recent years. According to figure 4, close to 6 percent of these firms started to carry long-term debt on their books between 2011 and 2015; in sharp contrast, less than 1 percent of their non-middle-market counterparts started to carry long-term debt during this period.[7]

While the analysis is limited to public firms because of data availability, it has a broad application, as publicly traded firms constitute about half of nonfinancial domestic firms in terms of total assets.[8] In addition, the trend in credit demand is likely to hold for private firms as well: Direct-lending funds are likely more important for private firms because such firms generally are smaller, are more financially constrained, and have a narrower spectrum of credit sources.

Taken together, recent developments indicate that direct-lending funds are becoming an important source of funding for middle-market firms, which appear to have increasing demand for credit. These nonbank lenders, which typically extend longer-term loans than commercial banks, add to the pool of long-term liquidity for middle-market firms, helping them diversify their sources of credit and possibly become less dependent on bank-intermediated credit.

Figure 1: Total Capital Deployed

Billions of 2016 dollars

Source: Pitchbook.

Figure 2: Dry Powder

Billions of 2016 dollars

Source: Pitchbook.
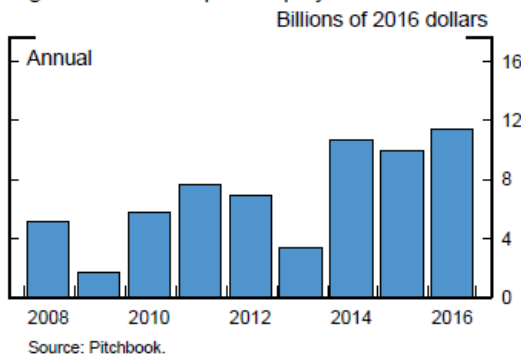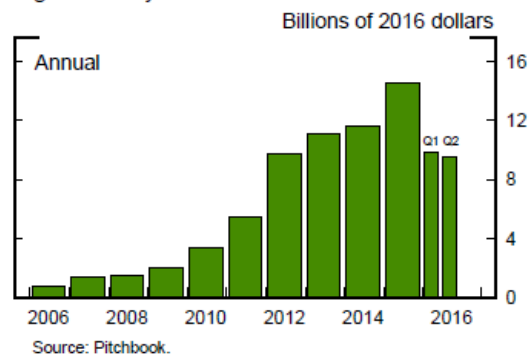
Figure 3: Long−Term Debt of Unrated Middle−Market Firms

Billions of dollars

Note: Data are inflation−adjusted to 2016 dollars. Annual data for 2016 are estimated from total assets. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.
Source: Compustat.
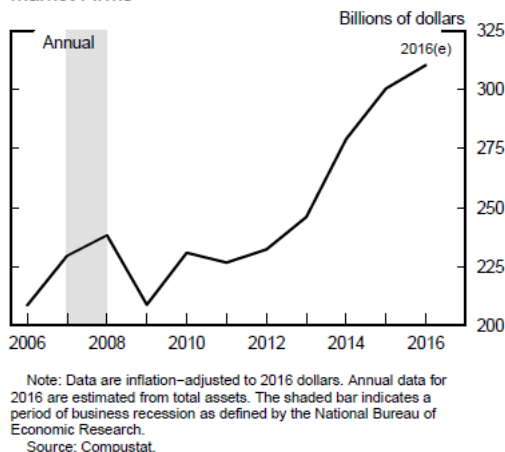
Figure 4: Fraction of Firms with Long−Term Debt

Note: The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.
Source: Compustat.

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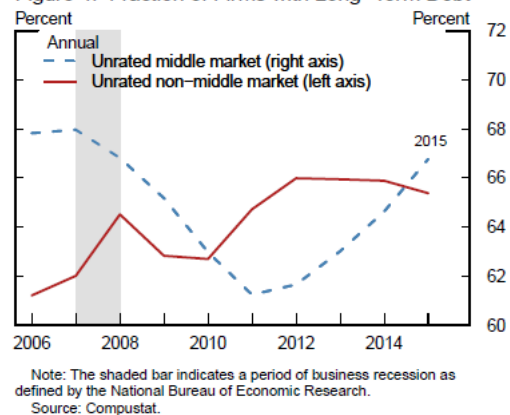
[7] Among unrated firms, middle-market firms constitute about 70 percent of publicly traded firms.

[8] For instance, in 2013, publicly traded firms held about $25 trillion in assets, while the Financial Accounts of the United States report nonfinancial domestic firms in aggregate held about $50 trillion.

Financing Conditions

Bank Lending Conditions

Core Loan Growth

Percent

Year over year

- Business
- RRE
- Consumer
- Total

Mar.

2001 2005 2009 2013 2017
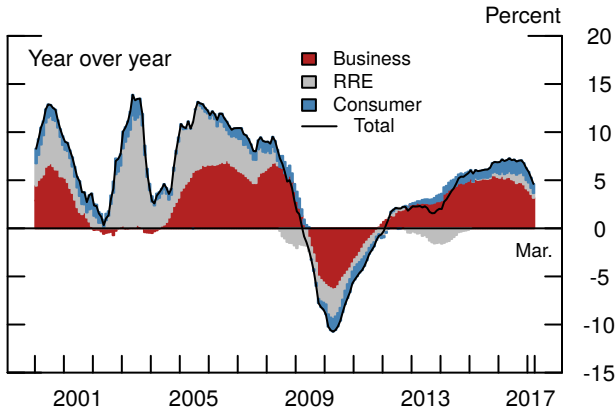
Note: Business loans include commercial and industrial as well as commercial real estate. Consumer loans include credit card, auto, and other consumer loans. RRE is residential real estate.
Source: Federal Reserve Board, Form 2644, Weekly Report of Selected Assets and Liabilities of Domestically Chartered Commercial Banks and U.S. Branches and Agencies of Foreign Banks.

Weighted Changes in Standards and Demand across All Loan Categories for Domestic Respondents
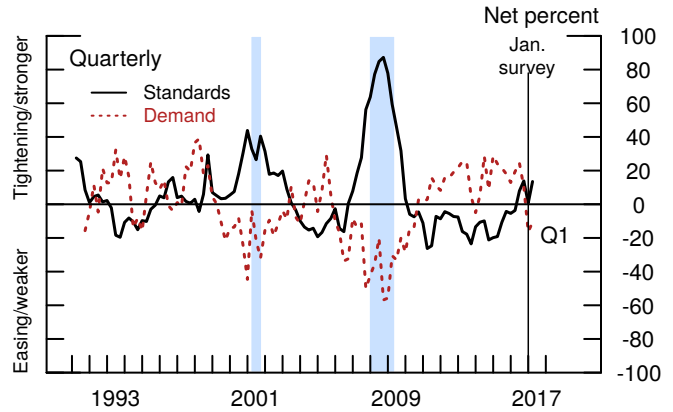
Net percent

Quarterly

Tightening/stronger

Jan. survey

- Standards
- Demand

Easing/weaker

Q1

1993 2001 2009 2017

Note: Shaded bars indicate periods 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.

Commercial and Industrial Loans
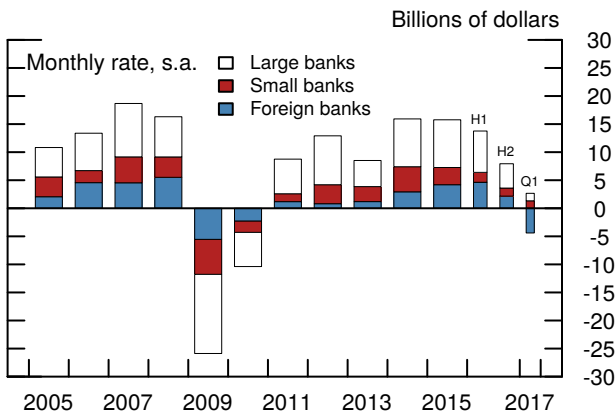
Billions of dollars

Monthly rate, s.a.

- Large banks
- Small banks
- Foreign banks

H1
H2
Q1

2005 2007 2009 2011 2013 2015 2017

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

Demand for C&I Loans
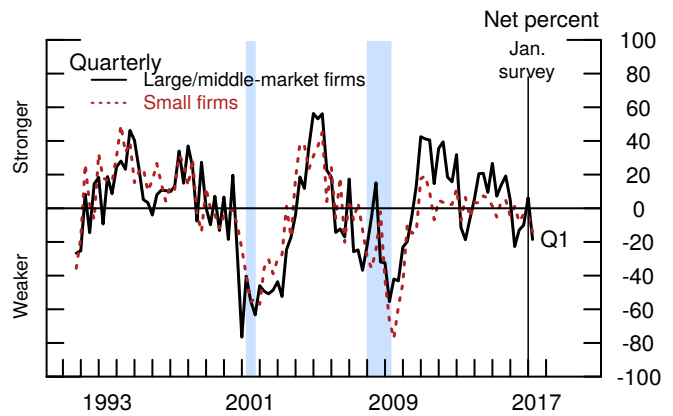
Net percent

Quarterly

Stronger

Jan. survey

- Large/middle-market firms
- Small firms

Weaker

Q1

1993 2001 2009 2017

Note: Shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research. C&I is commercial and industrial.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

Commercial Real Estate Loans
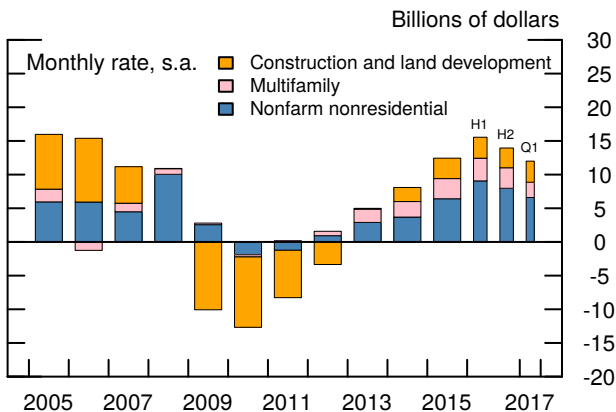
Billions of dollars

Monthly rate, s.a.

- Construction and land development
- Multifamily
- Nonfarm nonresidential

H1
H2
Q1

2005 2007 2009 2011 2013 2015 2017

Note: Yearly rates are Q4 to Q4. Half-years are based on Q4 and Q2 average levels, and quarterly and monthly annual rates use corresponding average levels.
Source: Federal Reserve Board, Form 2644, Weekly Report of Selected Assets and Liabilities of Domestically Chartered Commercial Banks and U.S. Branches and Agencies of Foreign Banks.

Standards for CRE Loans

Net percent

Quarterly

Tightening

Jan. survey

- Construction and land development
- Nonfarm nonresidential
- Multifamily

Easing

Q1

2013 2014 2015 2016 2017
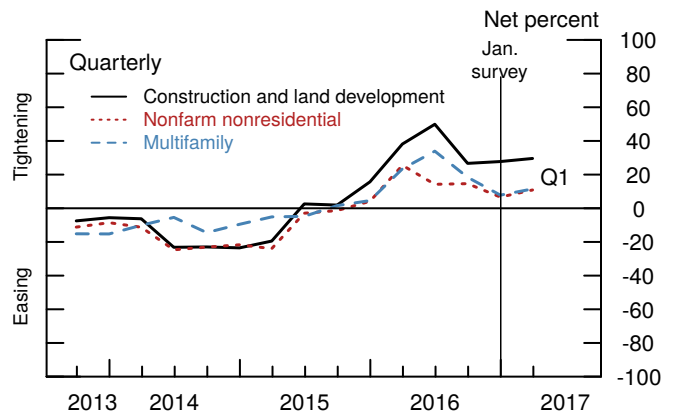
Note: CRE is commercial real estate.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

Financing Conditions

Household Finance

Mortgage Rate and MBS Yield

Percent

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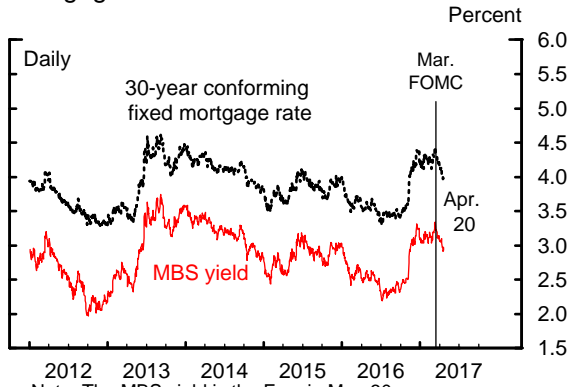
Note: The MBS yield is the Fannie Mae 30-year current-coupon rate.
Source: For MBS yield, Barclays; for mortgage rate, Loansifter.

Changes in Standards for Residential Real Estate Loans at Banks

Net percent
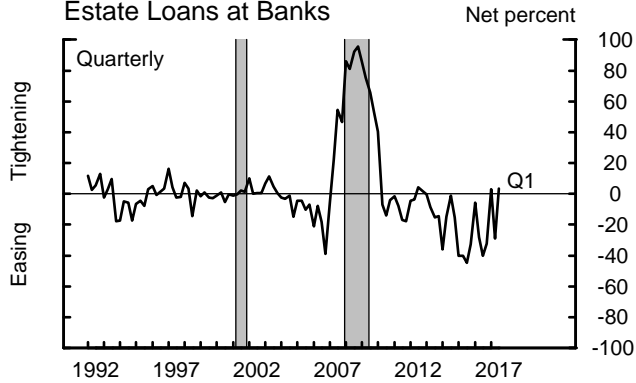
Quarterly

Note: Series constructed by taking an average of net percentages across all residential real estate asked about in each quarter. Shaded bars indicate periods 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.

Changes in Standards for Consumer Loans at Banks

Net percent

Quarterly
Credit cards
Auto
Other

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

Purchase and Refinance Activity

Thousands of originations

Monthly

Note: The data are seasonally adjusted by Federal Reserve Board staff. Points represent staff projections.
Source: For values prior to 2016, data reported under the Home Mortgage Disclosure Act of 1975; for values in 2016 and 2017, staff estimates.

Consumer Credit

Percent change from a year earlier

Monthly

Note: The data are not seasonally adjusted.
Source: Federal Reserve Board.

Gross Consumer ABS Issuance

Billions of dollars

Monthly rate

Subprime auto
Prime auto
Credit card
Student loan
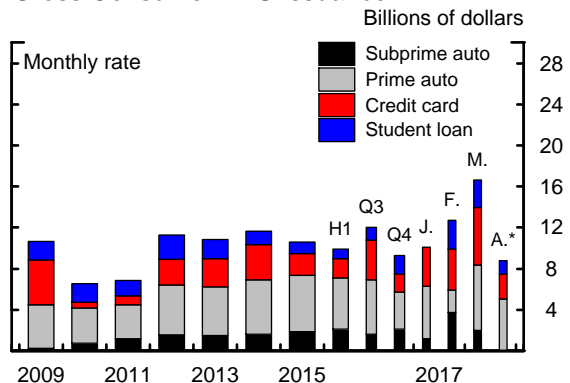
* Month to date.
Source: Inside MBS & ABS; Merrill Lynch; Bloomberg.

Financing Conditions

A Guidepost for Dropping Effective Lower Bound Risk from the Assessment of Risks

The staff has, for some time, judged that the risks to the projection for real activity are skewed to the downside due to the effective lower bound (ELB) constraint on the federal funds rate. All else being equal, a higher expected path for the federal funds rate lowers the probability that policymakers will be constrained by the ELB in the near future, which reduces downside macroeconomic risks. With the federal funds rate having risen to the range of ¾ to 1 percent and expected to rise further going forward, we will face a decision about when to drop the ELB reference from the Tealbook's assessment of risks. In this discussion, we describe how one specific measure of ELB risk has evolved since liftoff and is expected to evolve in the future. We then lay out one possible way to use this measure to inform our decision on when to drop our reference to the downside economic risk stemming from the ELB.

Figure 1 shows a measure of ELB risk—the probability that the federal funds rate will be at the ELB for at least one quarter during the next three years—computed from 20,000 stochastic simulations of FRB/US around the Tealbook baseline projection using the non-inertial version of the Taylor rule.[1] According to figure 1, the ELB risk measure was above 30 percent throughout 2016 but then moved below 30 percent early this year. The ELB risk measure based on the April 2017 Tealbook projection is 26 percent.[2]
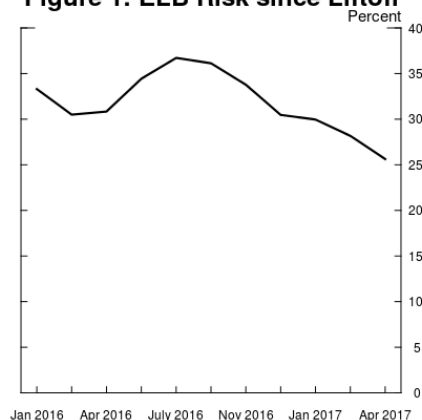
Figure 1: ELB Risk since Liftoff
Source: Staff calculation based on FRB/US stochastic simulations.
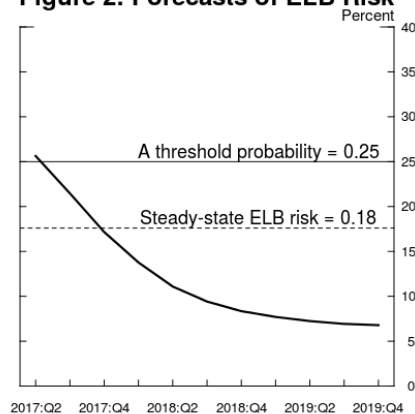
Figure 2: Forecasts of ELB Risk
A threshold probability = 0.25
Steady-state ELB risk = 0.18
Source: Staff calculation based on FRB/US stochastic simulations.

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[1] We use the non-inertial Taylor rule to capture the fact that policymakers typically cut interest rates aggressively in the face of a looming recession, even though they often increase interest rates gradually in the aftermath of a recession. In sticky-price models that account for the ELB, this asymmetric behavior is consistent with the prescription of optimal commitment policy and other well-performing rules, such as the price-level targeting rule and the rule proposed in David Reifschneider and John C. Williams (2000), "Three Lessons for Monetary Policy in a Low-Inflation Era," *Journal of Money, Credit and Banking,* vol. 32 (November), pp. 936–66.

[2] In the stochastic simulation, many of the ELB episodes are short lived, with the federal funds rate touching the ELB in only one or two quarters. According to the April 2017 Tealbook projection, the probability that the federal funds rate will be at the ELB for at least *four quarters* (not necessarily consecutive) during the next three years is about 10 percent.

Authorized for Public Release

Alternative Scenarios

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

Measure and scenario	2017 H1	2017 H2	2018	2019	2020	2021-22
Real GDP						
Extended Tealbook baseline	1.7	2.4	2.2	1.8	1.5	1.3
Steeper wage Phillips curve	1.7	2.4	2.1	1.7	1.4	1.2
Lower valuation pressures	1.7	2.4	2.1	1.7	1.4	1.2
Broad policy disappointment	1.7	2.4	1.1	1.6	1.6	1.6
Lower natural rate, no misperception	1.7	2.5	2.4	2.1	1.7	1.4
Lower natural rate, misperception	1.7	2.4	2.2	1.8	1.5	1.4
EME turbulence and stronger dollar	1.6	1.7	1.5	1.8	1.7	1.5
Stronger foreign growth and tighter policy	1.8	2.7	2.6	1.9	1.2	1.1
Unemployment rate[1]						
Extended Tealbook baseline	4.5	4.4	4.1	4.0	4.1	4.5
Steeper wage Phillips curve	4.5	4.4	4.1	4.1	4.2	4.8
Lower valuation pressures	4.5	4.4	4.1	4.0	4.2	4.6
Broad policy disappointment	4.5	4.4	4.6	4.6	4.7	4.8
Lower natural rate, no misperception	4.5	4.2	3.6	3.3	3.2	3.5
Lower natural rate, misperception	4.5	4.2	3.8	3.6	3.6	3.8
EME turbulence and stronger dollar	4.6	4.5	4.5	4.6	4.6	4.9
Stronger foreign growth and tighter policy	4.5	4.3	3.9	3.6	3.8	4.3
Total PCE prices						
Extended Tealbook baseline	1.8	1.6	1.8	1.9	2.1	2.1
Steeper wage Phillips curve	1.9	1.9	2.2	2.5	2.8	3.0
Lower valuation pressures	1.8	1.6	1.9	2.0	2.1	2.1
Broad policy disappointment	1.8	1.6	1.8	1.8	1.9	2.0
Lower natural rate, no misperception	1.8	1.6	1.9	2.0	2.1	2.1
Lower natural rate, misperception	1.8	1.6	1.8	1.9	2.0	2.0
EME turbulence and stronger dollar	1.5	.9	1.2	1.7	2.0	2.0
Stronger foreign growth and tighter policy	1.9	2.1	2.4	2.1	2.0	2.1
Core PCE prices						
Extended Tealbook baseline	1.8	1.6	1.9	2.0	2.0	2.1
Steeper wage Phillips curve	1.9	1.9	2.3	2.6	2.8	3.0
Lower valuation pressures	1.8	1.6	1.9	2.0	2.1	2.1
Broad policy disappointment	1.8	1.6	1.8	1.9	1.9	1.9
Lower natural rate, no misperception	1.8	1.6	1.9	2.0	2.1	2.1
Lower natural rate, misperception	1.8	1.6	1.9	1.9	2.0	2.0
EME turbulence and stronger dollar	1.6	1.1	1.4	1.7	1.9	2.0
Stronger foreign growth and tighter policy	1.8	1.9	2.3	2.2	2.1	2.2
Federal funds rate[1]						
Extended Tealbook baseline	.9	1.5	2.6	3.5	4.0	4.0
Steeper wage Phillips curve	1.0	1.5	2.8	3.9	4.6	4.7
Lower valuation pressures	1.0	1.5	2.5	3.4	3.9	3.8
Broad policy disappointment	.9	1.5	2.1	2.6	2.8	3.0
Lower natural rate, no misperception	.8	1.2	2.2	3.1	3.8	4.0
Lower natural rate, misperception	1.0	1.5	2.8	3.6	4.0	3.8
EME turbulence and stronger dollar	.9	1.3	1.9	2.5	3.1	3.5
Stronger foreign growth and tighter policy	1.0	1.6	3.0	4.1	4.5	4.3

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

Risks & Uncertainty

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Risks & Uncertainty

Forecast Confidence Intervals and Alternative Scenarios

Confidence Intervals Based on FRB/US Stochastic Simulations

- **Extended Tealbook baseline** (black)
- **Steeper wage Phillips curve** (green)
- **Lower valuation pressures** (yellow)
- **Broad policy disappointment** (red)
- **Lower natural rate, no misperception** (blue)
- **Lower natural rate, misperception** (light blue)
- **EME turbulence and stronger dollar** (orange)
- **Stronger foreign growth and tighter policy** (purple)

Real GDP
4 quarter percent change

70 percent interval

90 percent interval

Unemployment Rate
Percent
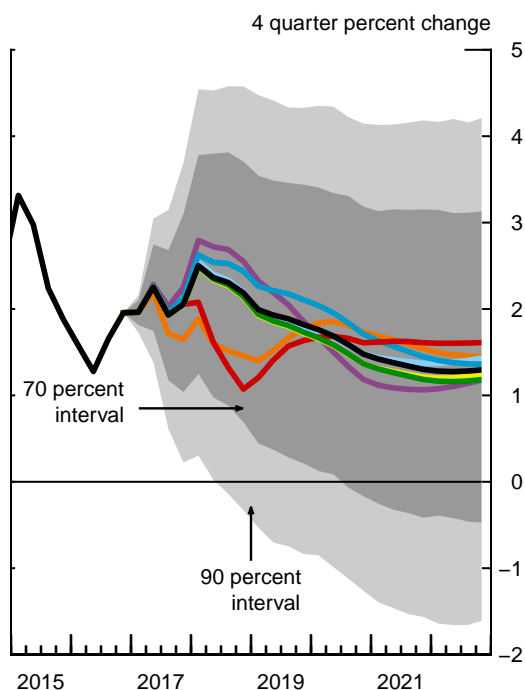
PCE Prices excluding Food and Energy
4 quarter percent change
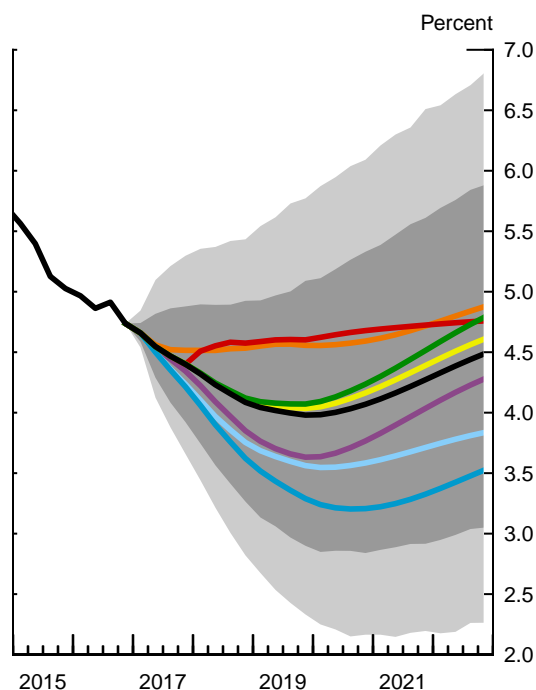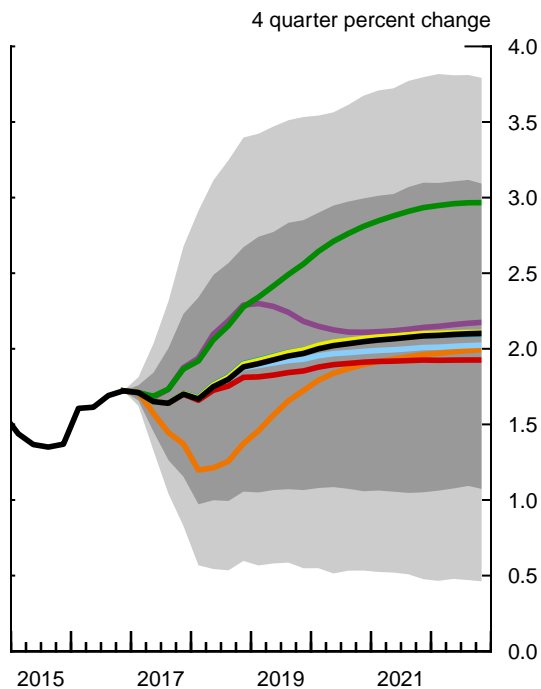
Federal Funds Rate
Percent
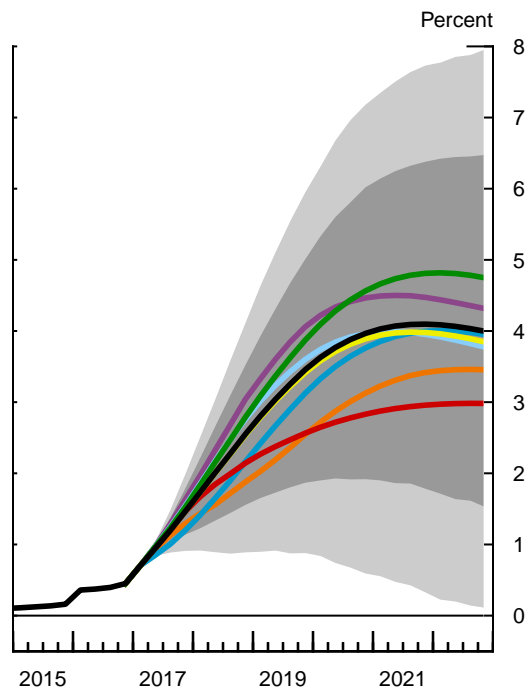
Selected Tealbook Projections and 70 Percent Confidence Intervals Derived from Historical Tealbook Forecast Errors and FRB/US Simulations

Measure	2017	2018	2019	2020	2021	2022
Real GDP						
(percent change, Q4 to Q4)						
Projection	2.1	2.2	1.8	1.5	1.3	1.3
Confidence interval						
Tealbook forecast errors	.4–3.6	-.4–3.6	-1.1–3.2	. . .	. . .	. . .
FRB/US stochastic simulations	1.0–3.1	.7–3.7	.2–3.4	-.2–3.2	-.4–3.2	-.5–3.1
Civilian unemployment rate						
(percent, Q4)						
Projection	4.4	4.1	4.0	4.1	4.3	4.5
Confidence interval						
Tealbook forecast errors	4.0–4.9	3.3–5.1	2.8–5.4	. . .	. . .	. . .
FRB/US stochastic simulations	3.9–4.9	3.3–4.9	2.9–5.1	2.8–5.3	2.9–5.6	3.1–5.9
PCE prices, total						
(percent change, Q4 to Q4)						
Projection	1.7	1.8	1.9	2.1	2.1	2.1
Confidence interval						
Tealbook forecast errors	1.0–2.2	1.0–3.5	1.1–3.4	. . .	. . .	. . .
FRB/US stochastic simulations	1.1–2.3	.9–2.8	.9–2.9	1.0–3.1	1.0–3.3	1.0–3.2
PCE prices excluding						
food and energy						
(percent change, Q4 to Q4)						
Projection	1.7	1.9	2.0	2.0	2.1	2.1
Confidence interval						
Tealbook forecast errors	1.3–2.2	1.2–2.8	. . .	. . .	. . .	. . .
FRB/US stochastic simulations	1.2–2.2	1.1–2.7	1.1–2.9	1.1–3.0	1.1–3.1	1.1–3.1
Federal funds rate						
(percent, Q4)						
Projection	1.5	2.6	3.5	4.0	4.1	4.0
Confidence interval						
FRB/US stochastic simulations	1.1–1.8	1.6–3.5	1.9–5.0	1.9–6.0	1.8–6.4	1.5–6.5

  Note: Shocks underlying FRB/US stochastic simulations are randomly drawn from the 1969–2016 set of model equation residuals. Intervals derived from Tealbook forecast errors are based on projections made from 1980 to 2016 for real GDP and unemployment and from 1998 to 2016 for PCE prices. The intervals for real GDP, unemployment, and total PCE prices are extended into 2019 using information from the Blue Chip survey and forecasts from the CBO and CEA.

 . . . Not applicable.

Prediction Intervals Derived from Historical Tealbook Forecast Errors

Forecast Error Percentiles
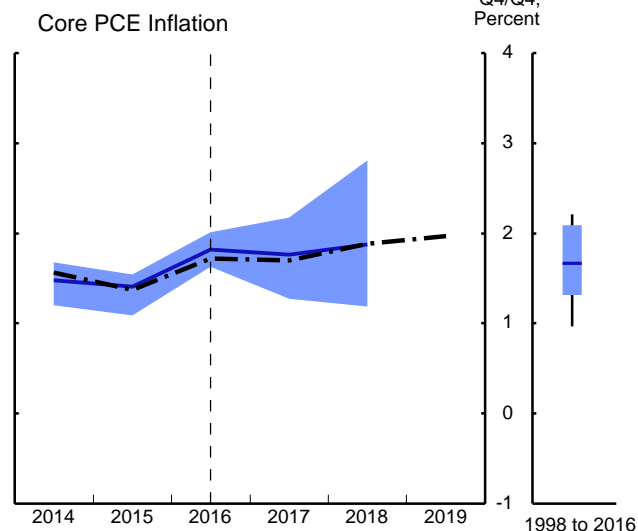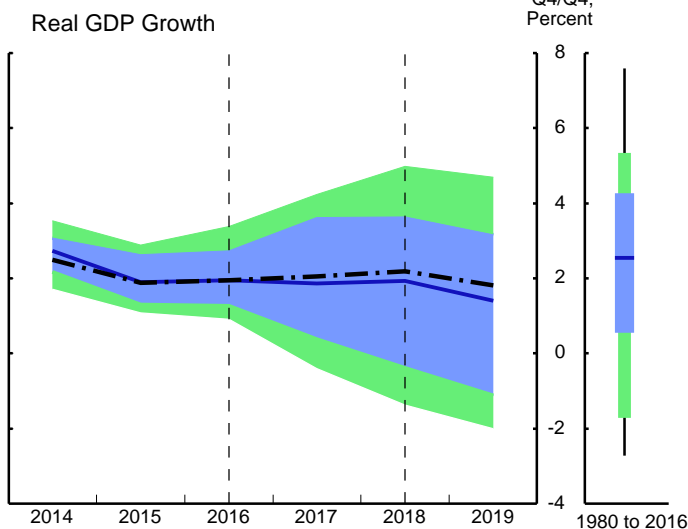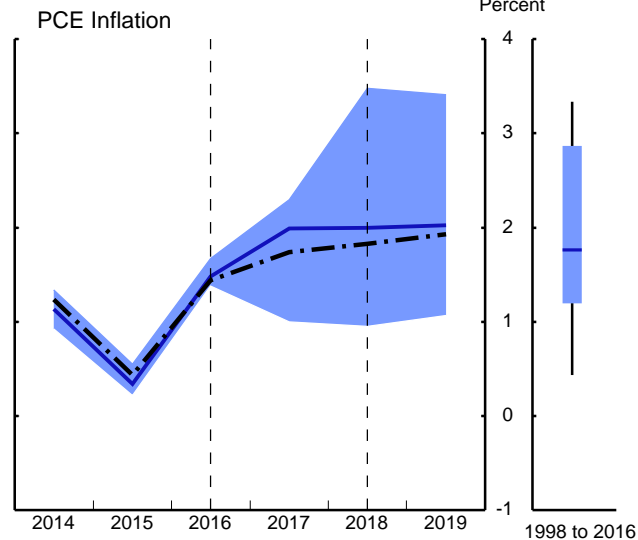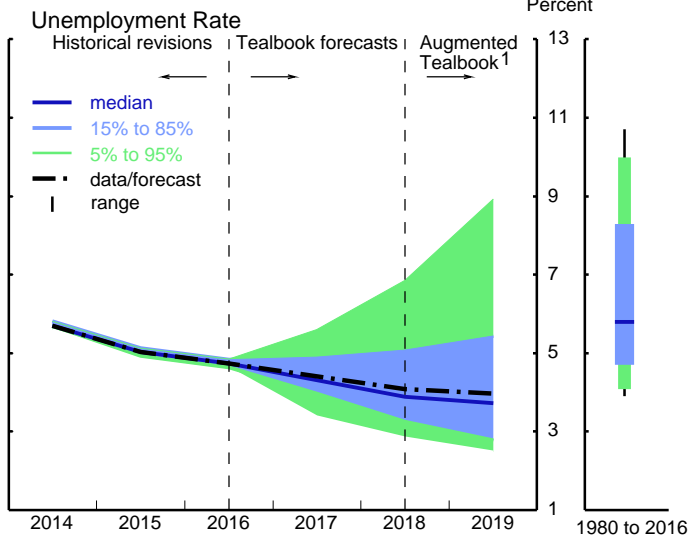
Historical Distributions
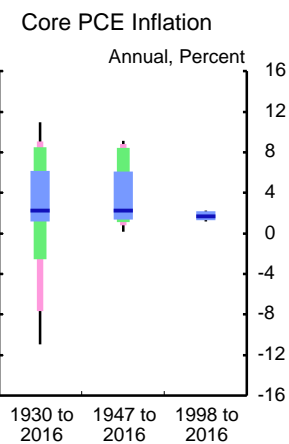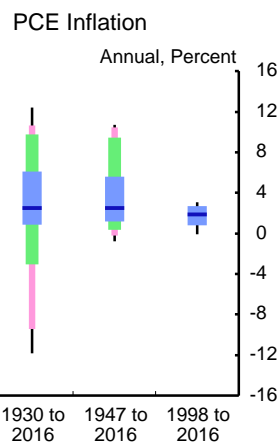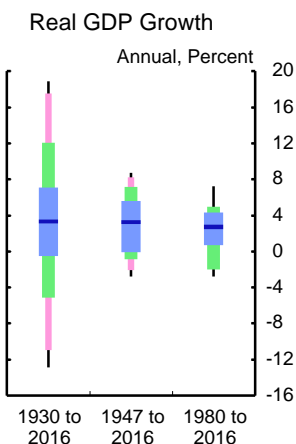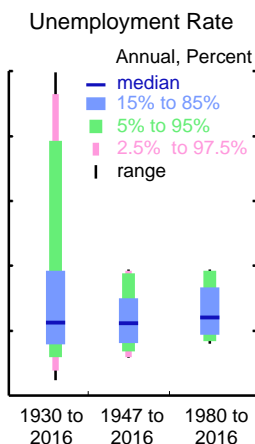
Note: See the technical note in the appendix for more information on this exhibit.

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 2019.

Assessment of Key Macroeconomic Risks (1)

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	.05	.07	.12	.06
Previous Tealbook	.05	.08	.13	.07
Less than 1 percent				
Current Tealbook	.24	.14	.02	.16
Previous Tealbook	.24	.13	.02	.16

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	.02	.02	.14	.05
Previous Tealbook	.03	.04	.14	.06
Decrease by 1 percentage point				
Current Tealbook	.11	.09	.11	.03
Previous Tealbook	.08	.06	.12	.03

Probability of Near-Term Recession

Probability that real GDP declines in the next two quarters	Staff	FRB/US	EDO	BVAR	Factor Model
Current Tealbook	.02	.02	.04	.12	.01
Previous Tealbook	.02	.03	.04	.10	.00

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

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Risks & Uncertainty

Assessment of Key Macroeconomic Risks (2)

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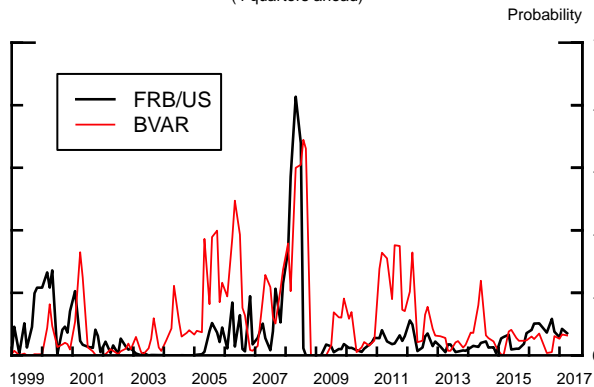
Probability

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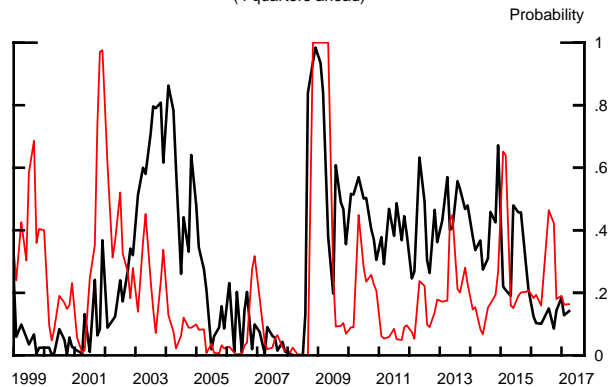
Probability

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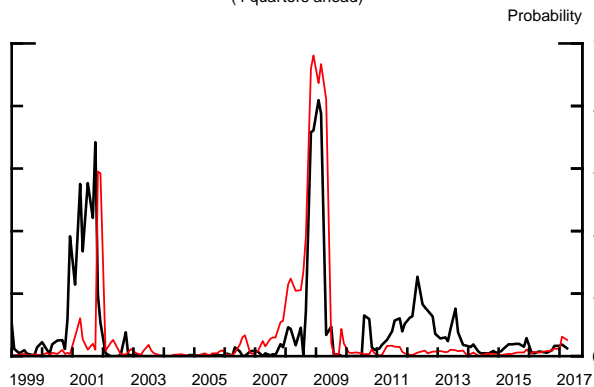
Probability

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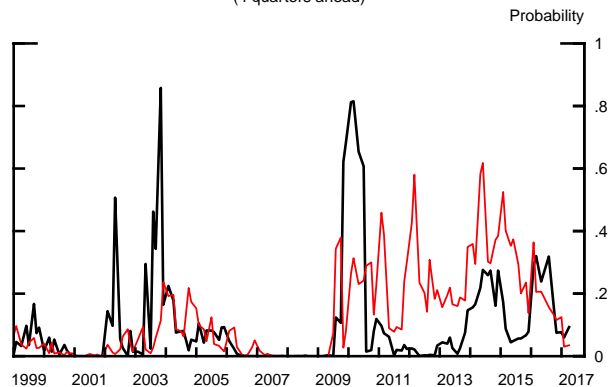
Probability

Probability that Real GDP Declines in Each of the Next Two Quarters
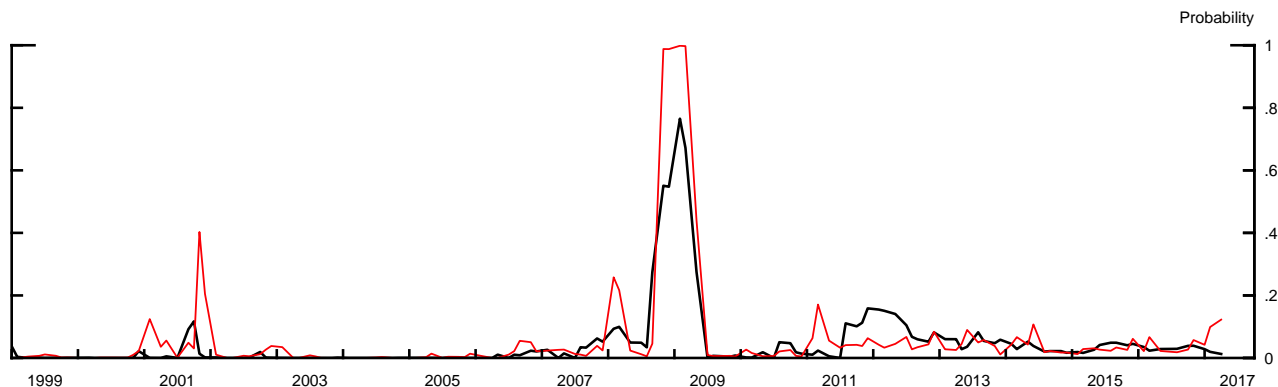
Probability

Note: See notes on facing page. Recession and inflation probabilities for FRB/US and the BVAR are real–time estimates. See Robert J. Tetlow and Brian Ironside (2007), "Real–Time Model Uncertainty in the United States: The Fed, 1996–2003," *Journal of Money, Credit and Banking*, vol. 39 (October), pp. 1533–61.

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Policy Rules and the Staff Projection

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

(Percent)

	2017:Q2	2017:Q3
Taylor (1993) rule	**2.79**	**2.85**
Previous Tealbook	*2.85*	*2.87*
Taylor (1999) rule	**3.10**	**3.22**
Previous Tealbook	*3.11*	*3.19*
Inertial Taylor (1999) rule	**1.07**	**1.39**
Previous Tealbook projection	*1.07*	*1.39*
First–difference rule	**1.00**	**1.24**
Previous Tealbook projection	*0.88*	*1.07*
Addendum:		
Tealbook baseline	**0.95**	**1.20**

Key Elements of the Staff Projection
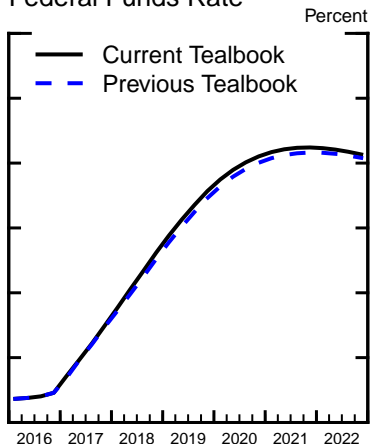
Federal Funds Rate

GDP Gap
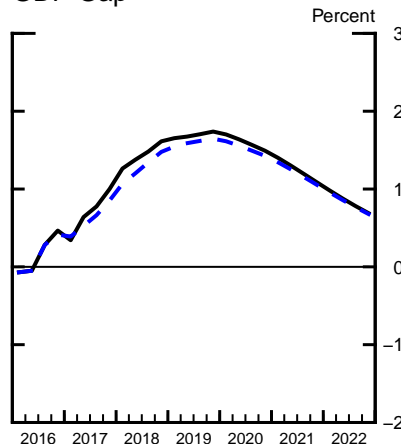
PCE Prices Excluding Food and Energy
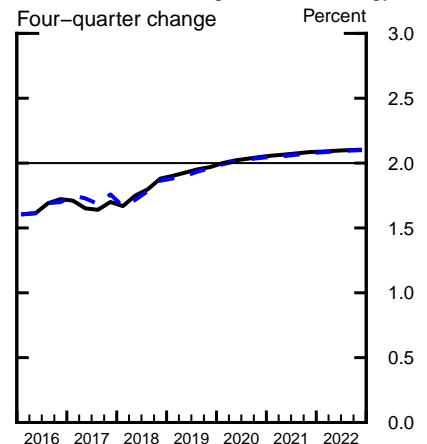
A Medium–Term Equilibrium Real Federal Funds Rate[2]

(Percent)

	Current Tealbook	*Current–Quarter Estimate Based on Previous Tealbook*	*Previous Tealbook*
Tealbook–consistent FRB/US *r**	1.76	*1.62*	*1.42*
Average projected real federal funds rate	0.56	*0.49*	*0.27*

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

2. The "Tealbook–consistent 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. The "average projected real federal funds rate" is calculated under the Tealbook baseline projection over the same 12–quarter period as the Tealbook–consistent FRB/US *r**.

Simple Policy Rule Simulations
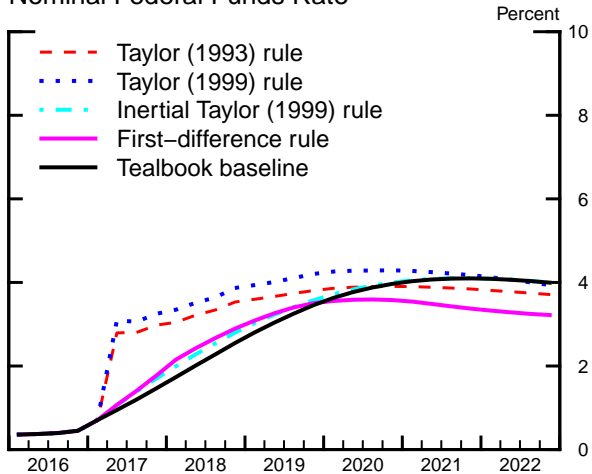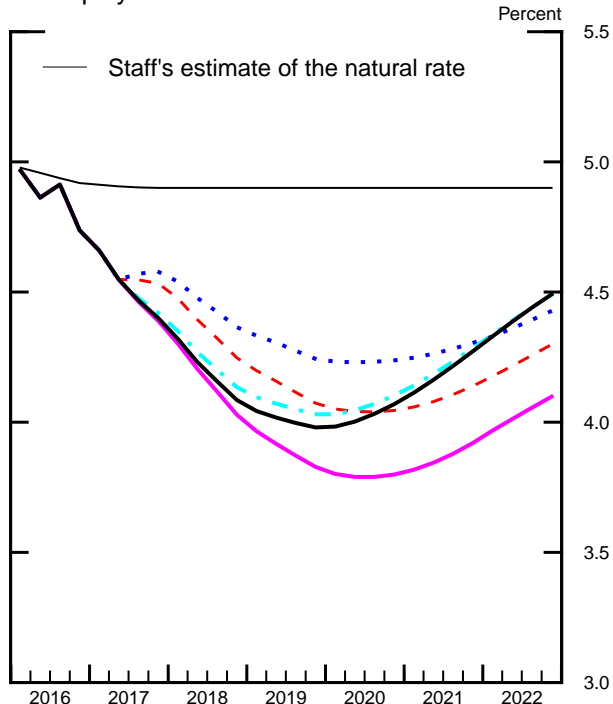
Monetary Policy Strategies

Nominal Federal Funds Rate

Percent

- – – Taylor (1993) rule
- ······ Taylor (1999) rule
- –·–· Inertial Taylor (1999) rule
- —— First–difference rule
- —— Tealbook baseline

Real Federal Funds Rate

Percent

Real 10–year Treasury Yield

Percent

Unemployment Rate

Percent

—— Staff's estimate of the natural rate

PCE Inflation
Four–quarter average

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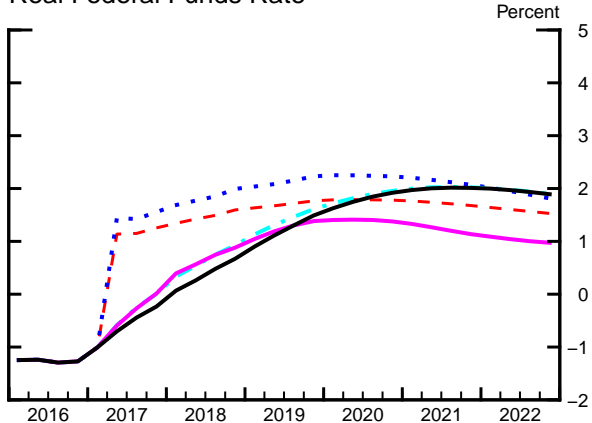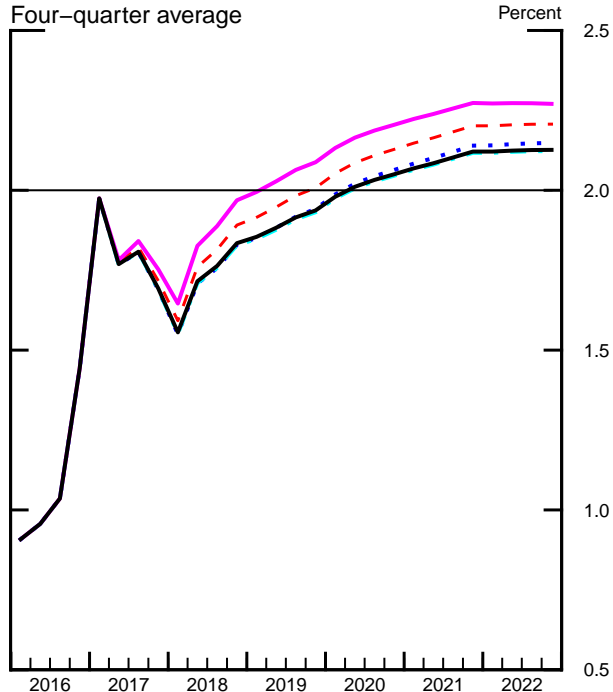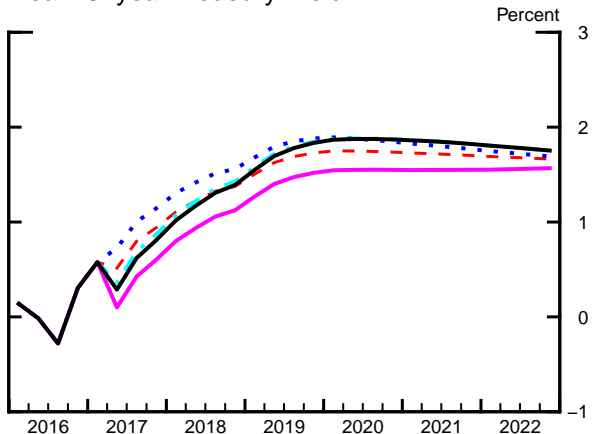
Note: The policy rule simulations in this exhibit are based on rules that respond to core inflation. This choice of rule specification was made in light of a tendency for current and near–term core inflation rates to outperform headline inflation rates as predictors of the medium–term behavior of headline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

Optimal Control Simulations under Commitment

Nominal Federal Funds Rate
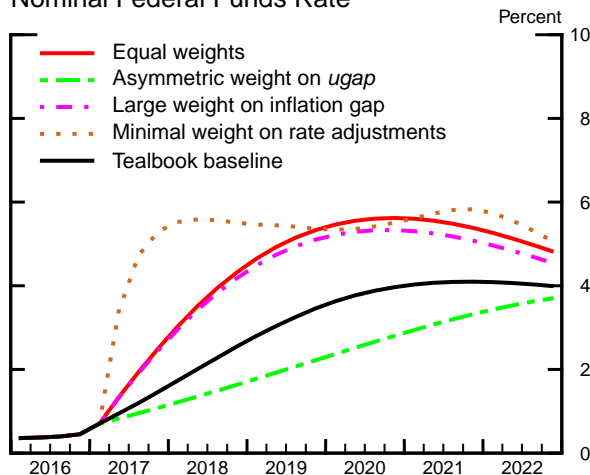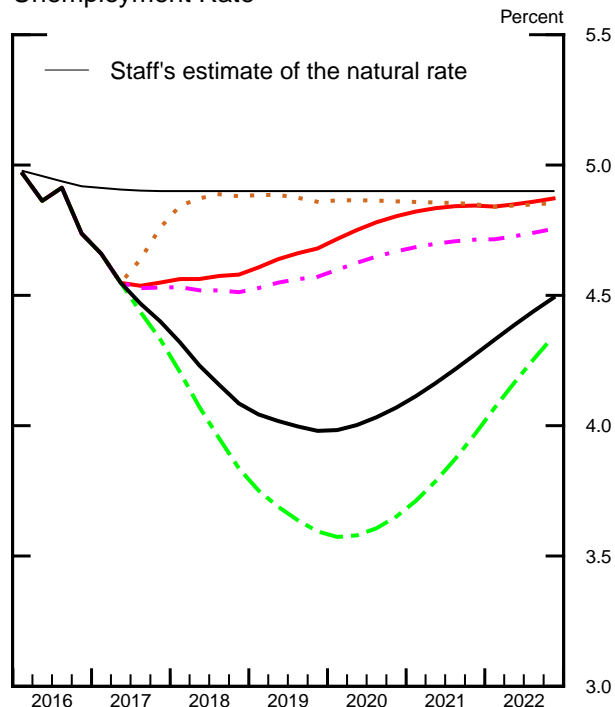
Percent

- Equal weights
- Asymmetric weight on *ugap*
- Large weight on inflation gap
- Minimal weight on rate adjustments
- Tealbook baseline

Real Federal Funds Rate

Percent

Real 10–year Treasury Yield

Percent

Unemployment Rate

Percent

Staff's estimate of the natural rate

PCE Inflation
Four–quarter average

Percent
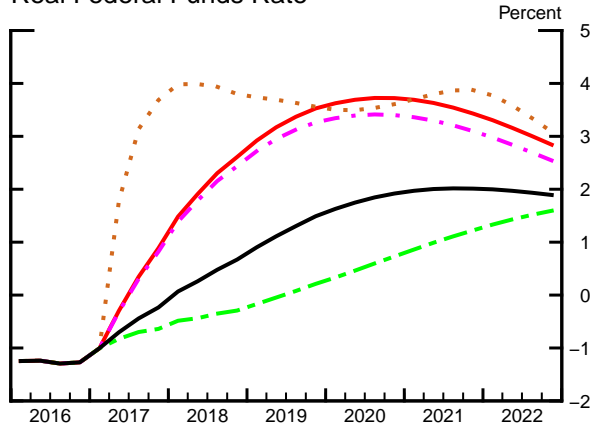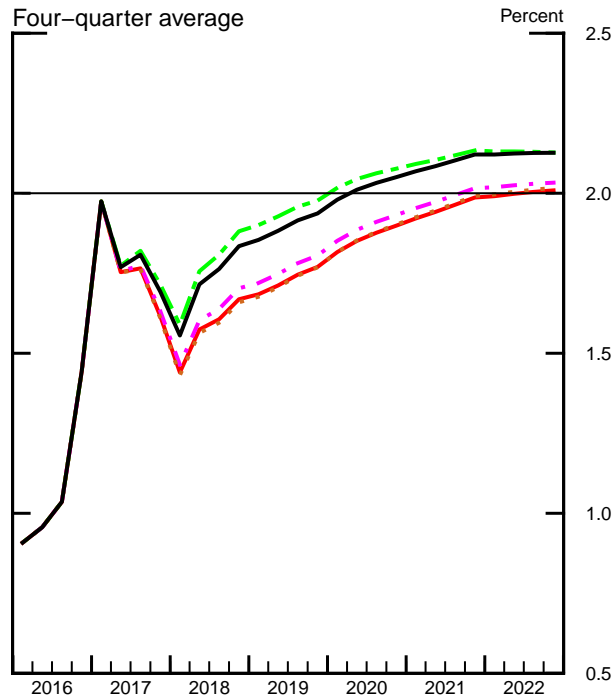
Note: Each set of lines corresponds to an optimal control policy under commitment in which policymakers minimize a discounted weighted sum of squared deviations of four–quarter headline PCE inflation from the Committee's 2 percent objective, of squared deviations of the unemployment rate from the staff's 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.

Monetary Policy Strategies

Simulations with a Steeper Wage Phillips Curve

Nominal Federal Funds Rate

Percent

- ⋯⋯ Taylor (1999) rule
- ─·─ Inertial Taylor (1999) rule
- ─── Change rule
- ─── Tealbook baseline

Unemployment Rate

Percent

─── Staff's estimate of the natural rate

Real Federal Funds Rate

Percent

PCE Inflation

Four–quarter average

Percent

Real 10–year Treasury Yield

Percent

Monetary Policy Strategies

Outcomes of Simple Policy Rule Simulations

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

Measure and policy	2017	2018	2019	2020	2021
Nominal federal funds rate[1]					
Taylor (1993)	3.0	3.5	3.8	3.9	3.8
Taylor (1999)	3.3	3.9	4.2	4.3	4.2
Inertial Taylor (1999)	1.7	2.8	3.6	4.0	4.1
First-difference	1.8	2.9	3.5	3.6	3.4
Extended Tealbook baseline	1.5	2.6	3.5	4.0	4.1
Real GDP					
Taylor (1993)	1.9	2.1	2.0	1.7	1.5
Taylor (1999)	1.8	1.9	1.9	1.7	1.5
Inertial Taylor (1999)	2.0	2.1	1.8	1.5	1.3
First-difference	2.1	2.3	2.0	1.7	1.5
Extended Tealbook baseline	2.1	2.2	1.8	1.5	1.3
Unemployment rate[1]					
Taylor (1993)	4.5	4.2	4.1	4.0	4.1
Taylor (1999)	4.6	4.4	4.2	4.2	4.3
Inertial Taylor (1999)	4.4	4.1	4.0	4.1	4.3
First-difference	4.4	4.0	3.8	3.8	3.9
Extended Tealbook baseline	4.4	4.1	4.0	4.1	4.3
Total PCE prices					
Taylor (1993)	1.7	1.9	2.0	2.1	2.2
Taylor (1999)	1.7	1.8	1.9	2.1	2.1
Inertial Taylor (1999)	1.7	1.8	1.9	2.0	2.1
First-difference	1.8	2.0	2.1	2.2	2.3
Extended Tealbook baseline	1.7	1.8	1.9	2.1	2.1
Core PCE prices					
Taylor (1993)	1.7	1.9	2.0	2.1	2.2
Taylor (1999)	1.7	1.9	2.0	2.1	2.1
Inertial Taylor (1999)	1.7	1.9	2.0	2.0	2.1
First-difference	1.8	2.0	2.1	2.2	2.2
Extended Tealbook baseline	1.7	1.9	2.0	2.0	2.1

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

Monetary Policy Strategies

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

Measure and policy	2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nominal federal funds rate[1]								
Taylor (1993)	0.7	2.8	2.8	3.0	3.0	3.2	3.3	3.5
Taylor (1999)	0.7	3.1	3.1	3.3	3.3	3.5	3.6	3.9
Inertial Taylor (1999)	0.7	1.1	1.4	1.7	2.0	2.3	2.5	2.8
First-difference	0.7	1.1	1.4	1.8	2.2	2.4	2.7	2.9
Extended Tealbook baseline	0.7	0.9	1.2	1.5	1.7	2.0	2.3	2.6
Real GDP								
Taylor (1993)	2.0	2.3	1.8	1.9	2.3	2.1	2.1	2.1
Taylor (1999)	2.0	2.3	1.8	1.8	2.1	1.9	1.9	1.9
Inertial Taylor (1999)	2.0	2.3	1.9	2.0	2.4	2.3	2.2	2.1
First-difference	2.0	2.3	2.0	2.1	2.6	2.5	2.4	2.3
Extended Tealbook baseline	2.0	2.3	1.9	2.1	2.5	2.4	2.3	2.2
Unemployment rate[1]								
Taylor (1993)	4.7	4.5	4.5	4.5	4.5	4.4	4.3	4.2
Taylor (1999)	4.7	4.5	4.6	4.6	4.5	4.5	4.4	4.4
Inertial Taylor (1999)	4.7	4.5	4.5	4.4	4.3	4.3	4.2	4.1
First-difference	4.7	4.5	4.5	4.4	4.3	4.2	4.1	4.0
Extended Tealbook baseline	4.7	4.5	4.5	4.4	4.3	4.2	4.2	4.1
Total PCE prices								
Taylor (1993)	2.0	1.8	1.8	1.7	1.6	1.8	1.8	1.9
Taylor (1999)	2.0	1.8	1.8	1.7	1.5	1.7	1.8	1.8
Inertial Taylor (1999)	2.0	1.8	1.8	1.7	1.6	1.7	1.8	1.8
First-difference	2.0	1.8	1.8	1.8	1.6	1.8	1.9	2.0
Extended Tealbook baseline	2.0	1.8	1.8	1.7	1.6	1.7	1.8	1.8
Core PCE prices								
Taylor (1993)	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.9
Taylor (1999)	1.7	1.6	1.6	1.7	1.7	1.7	1.8	1.9
Inertial Taylor (1999)	1.7	1.7	1.6	1.7	1.7	1.7	1.8	1.9
First-difference	1.7	1.7	1.7	1.8	1.8	1.9	1.9	2.0
Extended Tealbook baseline	1.7	1.7	1.6	1.7	1.7	1.7	1.8	1.9

1. Percent, average for the quarter.

Monetary Policy Strategies

Outcomes of Optimal Control Simulations under Commitment

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

Measure and policy	2017	2018	2019	2020	2021
Nominal federal funds rate[1]					
Equal weights	2.5	4.3	5.3	5.6	5.4
Aymmetric weight on *ugap*	1.1	1.6	2.2	2.8	3.3
Large weight on inflation gap	2.5	4.2	5.1	5.3	5.1
Minimal weight on rate adjustments	5.3	5.5	5.4	5.5	5.8
Extended Tealbook baseline	1.5	2.6	3.5	4.0	4.1
Real GDP					
Equal weights	1.7	1.5	1.4	1.5	1.5
Aymmetric weight on *ugap*	2.2	2.6	2.0	1.5	1.1
Large weight on inflation gap	1.8	1.6	1.5	1.5	1.5
Minimal weight on rate adjustments	1.4	1.2	1.6	1.7	1.6
Extended Tealbook baseline	2.1	2.2	1.8	1.5	1.3
Unemployment rate[1]					
Equal weights	4.5	4.6	4.7	4.8	4.8
Aymmetric weight on *ugap*	4.3	3.8	3.6	3.7	4.0
Large weight on inflation gap	4.5	4.5	4.6	4.7	4.7
Minimal weight on rate adjustments	4.8	4.9	4.9	4.9	4.8
Extended Tealbook baseline	4.4	4.1	4.0	4.1	4.3
Total PCE prices					
Equal weights	1.6	1.7	1.8	1.9	2.0
Aymmetric weight on *ugap*	1.7	1.9	2.0	2.1	2.1
Large weight on inflation gap	1.6	1.7	1.8	1.9	2.0
Minimal weight on rate adjustments	1.6	1.7	1.8	1.9	2.0
Extended Tealbook baseline	1.7	1.8	1.9	2.1	2.1
Core PCE prices					
Equal weights	1.6	1.7	1.8	1.9	2.0
Aymmetric weight on *ugap*	1.7	1.9	2.0	2.1	2.1
Large weight on inflation gap	1.6	1.7	1.8	1.9	2.0
Minimal weight on rate adjustments	1.6	1.7	1.8	1.9	2.0
Extended Tealbook baseline	1.7	1.9	2.0	2.0	2.1

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

Outcomes of Optimal Control Simulations under Commitment, Quarterly

(Four-quarter percent change, except as noted)

Measure and policy	2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nominal federal funds rate[1]								
Equal weights	0.7	1.3	1.9	2.5	3.0	3.5	3.9	4.3
Asymmetric weight on *ugap*	0.7	0.8	1.0	1.1	1.2	1.4	1.5	1.6
Large weight on inflation gap	0.7	1.3	1.9	2.5	3.0	3.4	3.8	4.2
Minimal weight on rate adjustments	0.7	3.4	4.7	5.3	5.5	5.6	5.6	5.5
Extended Tealbook baseline	0.7	0.9	1.2	1.5	1.7	2.0	2.3	2.6
Real GDP								
Equal weights	2.0	2.3	1.8	1.7	2.0	1.6	1.6	1.5
Asymmetric weight on *ugap*	2.0	2.3	2.0	2.2	2.8	2.7	2.7	2.6
Large weight on inflation gap	2.0	2.3	1.8	1.8	2.0	1.7	1.7	1.6
Minimal weight on rate adjustments	2.0	2.3	1.6	1.4	1.5	1.1	1.2	1.2
Extended Tealbook baseline	2.0	2.3	1.9	2.1	2.5	2.4	2.3	2.2
Unemployment rate[1]								
Equal weights	4.7	4.5	4.5	4.5	4.6	4.6	4.6	4.6
Asymmetric weight on *ugap*	4.7	4.5	4.4	4.3	4.2	4.1	4.0	3.8
Large weight on inflation gap	4.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Minimal weight on rate adjustments	4.7	4.5	4.6	4.8	4.8	4.9	4.9	4.9
Extended Tealbook baseline	4.7	4.5	4.5	4.4	4.3	4.2	4.2	4.1
Total PCE prices								
Equal weights	2.0	1.8	1.8	1.6	1.4	1.6	1.6	1.7
Asymmetric weight on *ugap*	2.0	1.8	1.8	1.7	1.6	1.8	1.8	1.9
Large weight on inflation gap	2.0	1.8	1.8	1.6	1.5	1.6	1.6	1.7
Minimal weight on rate adjustments	2.0	1.8	1.8	1.6	1.4	1.6	1.6	1.7
Extended Tealbook baseline	2.0	1.8	1.8	1.7	1.6	1.7	1.8	1.8
Core PCE prices								
Equal weights	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.7
Asymmetric weight on *ugap*	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.9
Large weight on inflation gap	1.7	1.6	1.6	1.6	1.6	1.6	1.7	1.7
Minimal weight on rate adjustments	1.7	1.6	1.6	1.6	1.5	1.6	1.6	1.7
Extended Tealbook baseline	1.7	1.7	1.6	1.7	1.7	1.7	1.8	1.9

1. Percent, average for the quarter.

Monetary Policy Strategies

Authorized for Public Release

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]	
	03/03/17	04/20/17	03/03/17	04/20/17	03/03/17	04/20/17	03/03/17	04/20/17	03/03/17	04/20/17
Quarterly										
2016:Q1	1.3	1.3	.8	.8	.3	.3	2.1	2.1	5.0	5.0
Q2	3.7	3.7	1.4	1.4	2.0	2.0	1.8	1.8	4.9	4.9
Q3	5.0	5.0	3.5	3.5	1.5	1.5	1.7	1.7	4.9	4.9
Q4	4.0	4.2	1.9	2.1	1.9	2.0	1.2	1.3	4.7	4.7
2017:Q1	4.3	3.3	1.4	.9	2.6	2.4	2.3	2.0	4.7	4.7
Q2	3.7	3.9	2.1	2.6	1.4	1.2	1.7	1.6	4.7	4.5
Q3	3.8	4.1	2.1	2.2	1.5	1.6	1.6	1.7	4.7	4.5
Q4	4.0	4.4	2.3	2.6	1.5	1.6	1.5	1.6	4.6	4.4
2018:Q1	4.5	4.8	2.4	2.6	1.8	1.9	1.9	1.9	4.5	4.3
Q2	4.1	4.1	2.1	2.0	1.8	1.8	1.9	1.9	4.4	4.2
Q3	4.1	4.0	2.1	2.0	1.8	1.8	1.8	1.9	4.3	4.2
Q4	4.1	4.1	2.1	2.1	1.8	1.8	1.8	1.9	4.2	4.1
Two-quarter[2]										
2016:Q2	2.5	2.5	1.1	1.1	1.1	1.1	1.9	1.9	-.1	-.1
Q4	4.5	4.6	2.7	2.8	1.7	1.7	1.5	1.5	-.2	-.2
2017:Q2	4.0	3.6	1.7	1.7	2.0	1.8	2.0	1.8	.0	-.2
Q4	3.9	4.2	2.2	2.4	1.5	1.6	1.5	1.6	-.1	-.1
2018:Q2	4.3	4.4	2.3	2.3	1.8	1.8	1.9	1.9	-.2	-.2
Q4	4.1	4.0	2.1	2.0	1.8	1.8	1.8	1.9	-.2	-.1
Four-quarter[3]										
2015:Q4	3.0	3.0	1.9	1.9	.4	.4	1.4	1.4	-.7	-.7
2016:Q4	3.5	3.5	1.9	2.0	1.4	1.4	1.7	1.7	-.3	-.3
2017:Q4	3.9	3.9	2.0	2.1	1.7	1.7	1.8	1.7	-.1	-.3
2018:Q4	4.2	4.2	2.2	2.2	1.8	1.8	1.9	1.9	-.4	-.3
2019:Q4	4.0	3.9	1.9	1.8	1.9	1.9	2.0	2.0	-.1	-.1
Annual										
2015	3.7	3.7	2.6	2.6	.3	.3	1.4	1.4	5.3	5.3
2016	2.9	3.0	1.6	1.6	1.1	1.1	1.7	1.7	4.9	4.9
2017	4.1	4.0	2.0	2.0	1.9	1.8	1.7	1.7	4.7	4.5
2018	4.1	4.3	2.2	2.3	1.7	1.7	1.8	1.8	4.4	4.2
2019	4.0	4.0	2.0	1.9	1.9	1.9	1.9	1.9	4.2	4.0

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

Greensheets

Greensheets

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

Item	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2016¹	2017¹	2018¹	2019¹
Real GDP	1.4	3.5	2.1	.9	2.6	2.2	2.6	2.6	2.0	2.0	2.1	2.0	2.1	2.2	1.8
Previous Tealbook	1.4	3.5	1.9	1.4	2.1	2.1	2.3	2.4	2.1	2.1	2.1	1.9	2.0	2.2	1.9
Final sales	2.6	3.0	1.1	.9	2.7	2.3	2.7	2.7	2.0	2.0	2.1	2.0	2.1	2.2	1.9
Previous Tealbook	2.6	3.0	.9	1.4	2.1	2.1	2.4	2.5	2.1	2.2	2.1	1.9	2.0	2.2	2.0
Priv. dom. final purch.	3.2	2.4	3.4	1.8	3.0	2.8	3.2	3.6	2.9	2.7	2.6	2.5	2.7	2.9	2.4
Previous Tealbook	3.2	2.4	3.1	2.4	2.8	2.8	3.0	3.5	3.0	2.9	2.7	2.5	2.7	3.0	2.6
Personal cons. expend.	4.3	3.0	3.5	.6	3.1	3.0	2.8	3.4	3.0	2.8	2.7	3.1	2.4	2.9	2.5
Previous Tealbook	4.3	3.0	3.0	1.5	3.0	2.9	2.7	3.4	3.0	2.7	2.7	3.0	2.5	3.0	2.5
Durables	9.8	11.6	11.4	-1.0	5.4	4.7	5.5	5.6	5.0	4.5	4.0	7.9	3.6	4.8	2.0
Nondurables	5.7	-.5	3.3	1.5	3.6	3.3	2.7	3.6	3.1	3.0	2.9	2.6	2.8	3.1	2.6
Services	3.0	2.7	2.4	.6	2.5	2.7	2.4	2.9	2.6	2.4	2.4	2.5	2.0	2.6	2.6
Residential investment	-7.7	-4.1	9.6	11.4	-1.3	-1.5	8.3	5.2	2.6	2.1	.9	1.1	4.1	2.7	4.4
Previous Tealbook	-7.7	-4.1	9.4	8.0	-2.5	-1.6	3.9	3.8	4.5	5.2	4.9	1.1	1.9	4.6	5.5
Nonres. priv. fixed invest.	1.0	1.4	.9	5.4	4.4	3.0	4.1	4.6	2.6	2.5	2.5	-.1	4.2	3.1	1.2
Previous Tealbook	1.0	1.4	1.9	5.7	3.7	3.4	4.2	3.5	3.0	3.2	2.1	.2	4.2	2.9	1.8
Equipment & intangibles	1.8	-1.3	1.7	2.4	2.4	2.4	4.9	6.0	3.0	3.3	3.4	-.6	3.0	3.9	1.8
Previous Tealbook	1.8	-1.3	3.0	5.7	3.4	3.5	5.1	4.6	3.6	3.9	2.6	-.3	4.4	3.7	2.3
Nonres. structures	-2.1	12.0	-1.9	17.1	11.4	5.3	1.4	-.2	1.5	-.1	-.5	1.9	8.6	.2	-.6
Previous Tealbook	-2.1	12.0	-2.1	5.8	4.6	3.1	.9	-.3	.7	.6	.4	1.8	3.6	.3	.0
Net exports²	-558	-522	-605	-619	-635	-657	-670	-693	-718	-737	-747	-563	-645	-724	-785
Previous Tealbook²	-558	-522	-600	-626	-655	-677	-696	-725	-752	-773	-788	-562	-663	-759	-828
Exports	1.8	10.0	-4.5	5.5	1.3	1.6	2.1	2.4	2.5	2.7	2.7	1.5	2.6	2.6	2.9
Imports	.2	2.2	9.0	6.4	3.3	4.4	3.5	5.1	5.4	4.7	3.4	2.6	4.4	4.7	4.2
Gov't cons. & invest.	-1.7	.8	.2	-1.8	2.4	2.2	1.3	.7	.5	.5	.4	.2	1.0	.5	.5
Previous Tealbook	-1.7	.8	.0	-.4	1.8	1.6	1.4	.8	.7	.7	.6	.2	1.1	.7	.7
Federal	-.4	2.4	-1.2	-2.7	3.1	3.2	.8	.4	-.1	-.1	-.3	-.2	1.1	.0	-.1
Defense	-3.2	2.0	-3.6	-5.6	4.5	4.5	1.0	.5	.5	.5	.5	-2.0	1.0	.5	.5
Nondefense	3.8	3.0	2.3	1.6	1.2	1.3	.5	.3	-.9	-.9	-1.3	2.5	1.2	-.7	-.8
State & local	-2.5	-.2	1.0	-1.3	2.0	1.6	1.6	.8	.8	.8	.8	.4	.9	.8	.9
Change in priv. inventories²	-9	7	50	46	42	39	34	30	29	28	28	22	40	29	22
Previous Tealbook²	-9	7	46	48	46	43	37	36	35	33	31	21	44	34	15

1. Change from fourth quarter of previous year to fourth quarter of year indicated.
2. Billions of chained (2009) dollars.

Changes in Real Gross Domestic Product and Related Items

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

Item	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Real GDP	2.7	1.7	1.3	2.7	2.5	1.9	2.0	2.1	2.2	1.8
Previous Tealbook	2.7	1.7	1.3	2.7	2.5	1.9	1.9	2.0	2.2	1.9
Final sales	2.0	1.5	1.7	2.0	2.7	2.0	2.0	2.1	2.2	1.9
Previous Tealbook	2.0	1.5	1.7	2.0	2.7	2.0	1.9	2.0	2.2	2.0
Priv. dom. final purch.	3.5	2.6	2.3	2.6	3.8	2.7	2.5	2.7	2.9	2.4
Previous Tealbook	3.5	2.6	2.3	2.6	3.8	2.7	2.5	2.7	3.0	2.6
Personal cons. expend.	3.1	1.5	1.3	2.0	3.5	2.6	3.1	2.4	2.9	2.5
Previous Tealbook	3.1	1.5	1.3	2.0	3.5	2.6	3.0	2.5	3.0	2.5
Durables	9.3	4.8	7.2	5.2	8.6	5.5	7.9	3.6	4.8	2.0
Nondurables	3.3	.4	.8	2.6	2.8	2.3	2.6	2.8	3.1	2.6
Services	2.0	1.4	.6	1.3	2.9	2.2	2.5	2.0	2.6	2.6
Residential investment	-5.2	6.0	15.7	6.8	6.2	13.1	1.1	4.1	2.7	4.4
Previous Tealbook	-5.2	6.0	15.7	6.8	6.2	13.1	1.1	1.9	4.6	5.5
Nonres. priv. fixed invest.	8.1	9.0	5.2	4.8	5.0	.8	-.1	4.2	3.1	1.2
Previous Tealbook	8.1	9.0	5.2	4.8	5.0	.8	.2	4.2	2.9	1.8
Equipment & intangibles	12.0	9.2	5.5	4.5	4.1	3.8	-.6	3.0	3.9	1.8
Previous Tealbook	12.0	9.2	5.5	4.5	4.1	3.8	-.3	4.4	3.7	2.3
Nonres. structures	-4.0	8.0	4.1	5.8	8.0	-8.8	1.9	8.6	.2	-.6
Previous Tealbook	-4.0	8.0	4.1	5.8	8.0	-8.8	1.8	3.6	.3	.0
Net exports[1]	-459	-459	-447	-405	-426	-540	-563	-645	-724	-785
Previous Tealbook[1]	-459	-459	-447	-405	-426	-540	-562	-663	-759	-828
Exports	10.1	4.2	2.2	5.9	3.1	-2.2	1.5	2.6	2.6	2.9
Imports	12.0	3.5	.3	2.5	6.1	2.5	2.6	4.4	4.7	4.2
Gov't. cons. & invest.	-1.1	-3.0	-2.2	-2.8	.3	2.2	.2	1.0	.5	.5
Previous Tealbook	-1.1	-3.0	-2.2	-2.8	.3	2.2	.2	1.1	.7	.7
Federal	3.2	-4.0	-2.1	-6.7	-1.3	1.7	-.2	1.1	.0	-.1
Defense	2.0	-4.1	-3.9	-7.1	-4.1	.6	-2.0	1.0	.5	.5
Nondefense	5.5	-3.9	1.0	-6.0	3.4	3.4	2.5	1.2	-.7	-.8
State & local	-4.0	-2.3	-2.3	-.1	1.3	2.5	.4	.9	.8	.9
Change in priv. inventories[1]	58	38	55	79	58	84	22	40	29	22
Previous Tealbook[1]	58	38	55	79	58	84	21	44	34	15

1. Billions of chained (2009) dollars.

Greensheets

Greensheets

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

Item	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2016[1]	2017[1]	2018[1]	2019[1]
Real GDP	1.4	3.5	2.1	.9	2.6	2.2	2.6	2.6	2.0	2.0	2.1	2.0	2.1	2.2	1.8
Previous Tealbook	1.4	3.5	1.9	1.4	2.1	2.1	2.3	2.4	2.1	2.1	2.1	1.9	2.0	2.2	1.9
Final sales	2.6	3.0	1.1	.9	2.7	2.3	2.7	2.7	2.0	2.0	2.1	2.0	2.1	2.2	1.9
Previous Tealbook	2.6	3.0	.9	1.4	2.1	2.1	2.4	2.5	2.1	2.2	2.1	1.9	2.0	2.2	2.0
Priv. dom. final purch.	2.7	2.1	2.9	1.5	2.6	2.4	2.7	3.1	2.5	2.3	2.2	2.1	2.3	2.5	2.1
Previous Tealbook	2.7	2.1	2.6	2.0	2.4	2.3	2.6	2.9	2.6	2.5	2.3	2.1	2.3	2.6	2.2
Personal cons. expend.	2.9	2.0	2.4	.4	2.1	2.1	1.9	2.3	2.0	1.9	1.9	2.1	1.6	2.0	1.8
Previous Tealbook	2.9	2.0	2.1	1.0	2.0	2.0	1.9	2.4	2.0	1.9	1.9	2.0	1.7	2.0	1.8
Durables	.7	.8	.8	-.1	.4	.4	.4	.4	.4	.3	.3	.6	.3	.4	.1
Nondurables	.8	-.1	.5	.2	.5	.5	.4	.5	.4	.4	.3	.4	.4	.5	.4
Services	1.4	1.3	1.1	.3	1.2	1.2	1.1	1.4	1.2	1.1	1.1	1.2	1.0	1.2	1.2
Residential investment	-.3	-.2	.4	.4	-.1	-.1	.3	.2	.1	.1	.0	.0	.2	.1	.2
Previous Tealbook	-.3	-.2	.3	.3	-.1	-.1	.2	.1	.2	.2	.2	.0	.1	.2	.2
Nonres. priv. fixed invest.	.1	.2	.1	.7	.5	.4	.5	.6	.3	.3	.3	.0	.5	.4	.2
Previous Tealbook	.1	.2	.2	.7	.5	.4	.5	.4	.4	.4	.3	.0	.5	.4	.2
Equipment & intangibles	.2	-.1	.2	.2	.2	.2	.5	.6	.3	.3	.3	-.1	.3	.4	.2
Previous Tealbook	.2	-.1	.3	.5	.3	.3	.5	.4	.4	.4	.3	.0	.4	.4	.2
Nonres. structures	-.1	.3	-.1	.4	.3	.1	.0	.0	.0	.0	.0	.0	.2	.0	.0
Previous Tealbook	-.1	.3	-.1	.2	.1	.1	.0	.0	.0	.0	.0	.0	.1	.0	.0
Net exports	.2	.9	-1.8	-.3	-.3	-.5	-.3	-.5	-.5	-.4	-.2	-.2	-.3	-.4	-.3
Previous Tealbook	.2	.9	-1.7	-.6	-.6	-.5	-.4	-.6	-.6	-.4	-.3	-.2	-.5	-.5	-.3
Exports	.2	1.2	-.6	.6	.2	.2	.3	.3	.3	.3	.3	.2	.3	.3	.3
Imports	.0	-.3	-1.3	-.9	-.5	-.7	-.5	-.8	-.8	-.7	-.5	-.4	-.7	-.7	-.6
Gov't. cons. & invest.	-.3	.1	.0	-.3	.4	.4	.2	.1	.1	.1	.1	.0	.2	.1	.1
Previous Tealbook	-.3	.1	.0	-.1	.3	.3	.2	.1	.1	.1	.1	.0	.2	.1	.1
Federal	.0	.2	-.1	-.2	.2	.2	.1	.0	.0	.0	.0	.0	.1	.0	.0
Defense	-.1	.1	-.1	-.2	.2	.2	.0	.0	.0	.0	.0	-.1	.0	.0	.0
Nondefense	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
State & local	-.3	.0	.1	-.1	.2	.2	.2	.1	.1	.1	.1	.0	.1	.1	.1
Change in priv. inventories	-1.2	.5	1.0	.0	-.1	-.1	-.1	-.1	.0	.0	.0	.0	-.1	.0	-.1
Previous Tealbook	-1.2	.5	.9	.0	.0	-.1	-.1	.0	.0	-.1	.0	.0	-.1	.0	-.1

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	2016 Q2	Q3	Q4	2017 Q1	Q2	Q3	Q4	2018 Q1	Q2	Q3	Q4	2016[1]	2017[1]	2018[1]	2019[1]
GDP chain-wt. price index	2.3	1.4	2.1	2.4	1.3	1.8	1.8	2.1	2.0	2.0	2.0	1.6	1.8	2.0	2.1
Previous Tealbook	2.3	1.4	2.0	2.8	1.6	1.7	1.7	2.0	2.0	1.9	1.9	1.6	1.9	2.0	2.1
PCE chain-wt. price index	2.0	1.5	2.0	2.4	1.2	1.6	1.6	1.9	1.8	1.8	1.8	1.4	1.7	1.8	1.9
Previous Tealbook	2.0	1.5	1.9	2.6	1.4	1.5	1.5	1.8	1.8	1.8	1.8	1.4	1.7	1.8	1.9
Energy	15.5	2.1	26.3	15.2	-8.5	-.4	.8	.6	.4	.0	.3	.8	1.4	.3	.7
Previous Tealbook	15.5	2.1	26.1	16.0	-7.1	-.8	-.6	.0	.4	.1	.4	.8	1.5	.2	.6
Food	-1.8	-2.1	-1.2	.4	2.3	1.9	2.0	2.2	2.1	2.1	2.2	-1.7	1.7	2.1	2.2
Previous Tealbook	-1.8	-2.1	-1.2	.0	2.0	2.3	2.0	2.2	2.1	2.1	2.2	-1.7	1.6	2.1	2.2
Ex. food & energy	1.8	1.7	1.3	2.0	1.6	1.7	1.6	1.9	1.9	1.9	1.9	1.7	1.7	1.9	2.0
Previous Tealbook	1.8	1.7	1.2	2.3	1.7	1.6	1.5	1.9	1.9	1.8	1.8	1.7	1.8	1.9	2.0
Ex. food & energy, market based	1.6	1.6	1.3	2.0	1.4	1.5	1.5	1.8	1.8	1.8	1.8	1.5	1.6	1.8	1.9
Previous Tealbook	1.6	1.6	1.2	2.3	1.6	1.5	1.4	1.8	1.8	1.8	1.8	1.5	1.7	1.8	1.9
CPI	2.3	1.8	3.0	3.1	1.3	2.1	2.2	2.3	2.3	2.2	2.3	1.8	2.2	2.3	2.4
Previous Tealbook	2.3	1.8	3.0	3.6	1.7	2.1	2.0	2.2	2.3	2.2	2.3	1.8	2.4	2.3	2.4
Ex. food & energy	2.1	2.1	2.0	2.5	1.9	2.3	2.2	2.4	2.4	2.4	2.5	2.2	2.2	2.4	2.5
Previous Tealbook	2.1	2.1	2.0	2.9	2.3	2.3	2.2	2.4	2.4	2.4	2.4	2.2	2.4	2.4	2.5
ECI, hourly compensation[2]	2.3	1.9	1.9	2.5	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.2	2.3	2.4	2.5
Previous Tealbook[2]	2.3	1.9	1.9	2.5	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.2	2.3	2.4	2.5
Business sector															
Output per hour	-.3	3.7	2.4	-.8	1.0	1.4	1.5	.9	.8	.9	.9	1.3	.8	.9	.9
Previous Tealbook	-.4	3.9	2.3	.4	.8	1.0	1.2	.9	.7	.9	1.0	1.3	.9	.9	.9
Compensation per hour	5.7	4.3	3.9	1.8	3.3	3.2	3.2	3.3	3.4	3.4	3.4	3.2	2.9	3.3	3.4
Previous Tealbook	5.6	4.6	4.3	2.9	3.2	3.0	3.0	3.1	3.2	3.3	3.3	3.3	3.0	3.2	3.4
Unit labor costs	6.0	.6	1.5	2.6	2.3	1.8	1.6	2.4	2.5	2.4	2.4	1.9	2.1	2.4	2.5
Previous Tealbook	6.0	.7	2.0	2.4	2.4	2.0	1.7	2.2	2.4	2.4	2.3	2.0	2.1	2.4	2.5
Core goods imports chain-wt. price index[3]	.5	2.0	-.4	1.1	1.7	1.9	.7	.6	.8	.7	.7	.0	1.3	.7	.7
Previous Tealbook[3]	.5	2.0	-.4	-.1	2.0	1.7	1.0	.8	.8	.7	.7	.0	1.2	.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.

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

Item	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
GDP chain-wt. price index	1.8	1.9	1.9	1.6	1.5	1.1	1.6	1.8	2.0	2.1
Previous Tealbook	1.8	1.9	1.9	1.6	1.5	1.1	1.6	1.9	2.0	2.1
PCE chain-wt. price index	1.3	2.7	1.8	1.2	1.2	.4	1.4	1.7	1.8	1.9
Previous Tealbook	1.3	2.7	1.8	1.2	1.2	.4	1.4	1.7	1.8	1.9
Energy	6.4	12.0	2.3	-2.5	-6.2	-15.8	.8	1.4	.3	.7
Previous Tealbook	6.4	12.0	2.3	-2.5	-6.2	-15.8	.8	1.5	.2	.6
Food	1.3	5.1	1.2	.7	2.7	.3	-1.7	1.7	2.1	2.2
Previous Tealbook	1.3	5.1	1.2	.7	2.7	.3	-1.7	1.6	2.1	2.2
Ex. food & energy	1.0	1.9	1.8	1.5	1.6	1.4	1.7	1.7	1.9	2.0
Previous Tealbook	1.0	1.9	1.8	1.5	1.6	1.4	1.7	1.8	1.9	2.0
Ex. food & energy, market based	.7	1.9	1.5	1.1	1.2	1.1	1.5	1.6	1.8	1.9
Previous Tealbook	.7	1.9	1.5	1.1	1.2	1.1	1.5	1.7	1.8	1.9
CPI	1.2	3.3	1.9	1.2	1.2	.4	1.8	2.2	2.3	2.4
Previous Tealbook	1.2	3.3	1.9	1.2	1.2	.4	1.8	2.4	2.3	2.4
Ex. food & energy	.6	2.2	1.9	1.7	1.7	2.0	2.2	2.2	2.4	2.5
Previous Tealbook	.6	2.2	1.9	1.7	1.7	2.0	2.2	2.4	2.4	2.5
ECI, hourly compensation[1]	2.1	2.2	1.8	2.0	2.3	1.9	2.2	2.3	2.4	2.5
Previous Tealbook[1]	2.1	2.2	1.8	2.0	2.3	1.9	2.2	2.3	2.4	2.5
Business sector										
Output per hour	1.6	-.1	-.1	1.9	-.1	.5	1.3	.8	.9	.9
Previous Tealbook	1.6	.0	-.2	2.0	-.1	.5	1.3	.9	.9	.9
Compensation per hour	1.2	.5	5.9	-.1	2.7	3.2	3.2	2.9	3.3	3.4
Previous Tealbook	1.2	.5	5.8	.0	2.7	3.1	3.3	3.0	3.2	3.4
Unit labor costs	-.4	.6	6.0	-2.0	2.8	2.6	1.9	2.1	2.4	2.5
Previous Tealbook	-.4	.6	6.0	-2.0	2.8	2.6	2.0	2.1	2.4	2.5
Core goods imports chain-wt. price index[2]	2.3	4.3	.1	-1.5	.5	-3.3	.0	1.3	.7	.7
Previous Tealbook[2]	2.3	4.3	.1	-1.5	.5	-3.3	.0	1.2	.8	.7

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

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Other Macroeconomic Indicators

Item	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2016[1]	2017[1]	2018[1]	2019[1]
Employment and production															
Nonfarm payroll employment[2]	164	239	148	178	180	174	174	174	174	169	159	187	176	169	122
Unemployment rate[3]	4.9	4.9	4.7	4.7	4.5	4.5	4.4	4.3	4.2	4.2	4.1	4.7	4.4	4.1	4.0
Previous Tealbook[3]	4.9	4.9	4.7	4.7	4.7	4.7	4.6	4.5	4.4	4.3	4.2	4.7	4.6	4.2	4.1
Natural rate of unemployment[3]	5.0	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Previous Tealbook[3]	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Employment-to-Population Ratio[3]	59.7	59.8	59.7	60.0	59.9	59.9	59.9	59.9	60.0	59.9	59.9	59.7	59.9	59.9	59.8
Employment-to-Population Trend[3]	59.8	59.7	59.7	59.6	59.6	59.5	59.5	59.4	59.3	59.3	59.2	59.7	59.5	59.2	59.0
GDP gap[4]	-.1	.3	.5	.3	.6	.8	1.0	1.3	1.4	1.5	1.6	.5	1.0	1.6	1.8
Previous Tealbook[4]	-.1	.3	.4	.4	.5	.7	.9	1.1	1.2	1.4	1.5	.4	.9	1.5	1.7
Industrial production[5]	-.7	.8	.7	1.5	4.6	2.7	1.7	1.7	1.2	.6	1.3	-.1	2.6	1.2	.8
Previous Tealbook[5]	-.8	1.7	.4	1.4	2.6	.4	1.0	1.5	1.1	.7	1.3	-.1	1.4	1.2	1.0
Manufacturing industr. prod.[5]	-1.1	-.1	1.7	2.7	1.3	1.3	.8	.7	1.0	.7	.6	.3	1.5	.7	.7
Previous Tealbook[5]	-1.1	.4	1.4	2.4	1.2	.2	.6	.8	.9	.8	.8	.2	1.1	.8	.9
Capacity utilization rate - mfg.[3]	75.1	74.9	75.1	75.4	75.6	75.7	75.8	75.8	75.9	76.0	76.0	75.1	75.8	76.0	76.3
Previous Tealbook[3]	74.9	74.9	75.0	75.2	75.2	75.1	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Housing starts[6]	1.2	1.1	1.2	1.3	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.4
Light motor vehicle sales[6]	17.1	17.5	18.0	17.2	17.1	17.0	16.9	17.0	16.9	16.8	16.8	17.5	17.0	16.8	16.6
Income and saving															
Nominal GDP[5]	3.7	5.0	4.2	3.3	3.9	4.1	4.4	4.8	4.1	4.0	4.1	3.5	3.9	4.2	3.9
Real disposable pers. income[5]	2.9	2.9	2.0	1.7	2.3	2.4	1.8	8.3	2.4	2.7	2.8	2.5	2.1	4.0	2.1
Previous Tealbook[5]	2.9	2.9	2.0	.9	2.2	2.3	2.0	8.4	2.4	2.8	2.9	2.5	1.9	4.1	2.3
Personal saving rate[3]	5.9	5.9	5.5	5.7	5.5	5.4	5.2	6.3	6.2	6.1	6.1	5.5	5.2	6.1	5.7
Previous Tealbook[3]	5.9	5.9	5.6	5.5	5.3	5.1	5.0	6.1	5.9	6.0	6.0	5.6	5.0	6.0	5.7
Corporate profits[7]	-2.4	25.4	2.1	-7.5	.8	.5	.4	2.7	2.3	2.4	2.5	9.3	-1.5	2.5	2.3
Profit share of GNP[3]	10.8	11.3	11.2	11.0	10.9	10.8	10.7	10.7	10.6	10.6	10.6	11.2	10.7	10.6	10.4
Gross national saving rate[3]	18.2	18.6	18.3	18.4	18.5	18.3	18.1	17.9	17.9	17.8	17.7	18.3	18.1	17.7	17.2
Net national saving rate[3]	3.1	3.7	3.5	3.6	3.8	3.5	3.4	3.2	3.1	3.0	2.9	3.5	3.4	2.9	2.2

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 GDP; 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.

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Other Macroeconomic Indicators

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

Item	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Employment and production										
Nonfarm payroll employment[1]	88	174	179	192	250	226	187	176	169	122
Unemployment rate[2]	9.5	8.7	7.8	7.0	5.7	5.0	4.7	4.4	4.1	4.0
Previous Tealbook[2]	9.5	8.7	7.8	7.0	5.7	5.0	4.7	4.6	4.2	4.1
Natural rate of unemployment[2]	5.9	5.9	5.6	5.4	5.1	5.0	4.9	4.9	4.9	4.9
Previous Tealbook[2]	5.9	5.9	5.6	5.4	5.1	5.0	5.0	5.0	5.0	5.0
Employment-to-Population Ratio[2]	58.3	58.5	58.7	58.5	59.2	59.4	59.7	59.9	59.9	59.8
Employment-to-Population Trend[2]	61.1	60.7	60.3	60.2	60.1	59.9	59.7	59.5	59.2	59.0
GDP gap[3]	-4.2	-3.7	-3.7	-2.5	-.9	.0	.5	1.0	1.6	1.8
Previous Tealbook[3]	-4.2	-3.7	-3.7	-2.5	-.9	.0	.4	.9	1.5	1.7
Industrial production[4]	6.0	2.8	2.3	2.2	3.4	-2.7	-.1	2.6	1.2	.8
Previous Tealbook[4]	5.9	2.6	2.3	2.0	3.5	-1.6	-.1	1.4	1.2	1.0
Manufacturing industr. prod.[4]	5.9	2.5	1.7	.9	1.5	-.6	.3	1.5	.7	.7
Previous Tealbook[4]	5.9	2.5	1.7	.8	2.0	.0	.2	1.1	.8	.9
Capacity utilization rate - mfg.[2]	72.3	74.4	74.6	74.7	75.9	75.4	75.1	75.8	76.0	76.3
Previous Tealbook[2]	72.4	74.4	74.3	74.6	76.0	75.4	75.0	75.0	75.0	75.0
Housing starts[5]	.6	.6	.8	.9	1.0	1.1	1.2	1.3	1.3	1.4
Light motor vehicle sales[5]	11.6	12.7	14.4	15.5	16.5	17.4	17.5	17.0	16.8	16.6
Income and saving										
Nominal GDP[4]	4.6	3.6	3.2	4.3	4.1	3.0	3.5	3.9	4.2	3.9
Real disposable pers. income[4]	2.6	1.7	5.1	-2.8	4.5	3.0	2.5	2.1	4.0	2.1
Previous Tealbook[4]	2.6	1.7	5.1	-2.8	4.5	3.0	2.5	1.9	4.1	2.3
Personal saving rate[2]	5.5	5.8	9.2	4.7	5.6	6.0	5.5	5.2	6.1	5.7
Previous Tealbook[2]	5.5	5.8	9.2	4.7	5.6	6.0	5.6	5.0	6.0	5.7
Corporate profits[6]	18.0	6.8	.6	4.7	6.6	-11.2	9.3	-1.5	2.5	2.3
Profit share of GNP[2]	12.0	12.3	12.0	12.0	12.4	10.7	11.2	10.7	10.6	10.4
Gross national saving rate[2]	15.2	16.1	18.0	18.2	19.2	18.8	18.3	18.1	17.7	17.2
Net national saving rate[2]	-.3	.8	2.9	3.1	4.3	3.9	3.5	3.4	2.9	2.2

1. Average monthly change, thousands.
2. Percent; values are for the fourth quarter of the year indicated.
3. Percent difference between actual and potential GDP; a negative number indicates that the economy is operating below potential. Values are for the fourth quarter of the year indicated.
4. Percent change.
5. Level, millions; values are annual averages.
6. Percent change, with inventory valuation and capital consumption adjustments.

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Staff Projections of Federal Sector Accounts and Related Items
(Billions of dollars except as noted)

Item	Fiscal year				2016				2017				2018			
	2016	2017	2018	2019	Q1a	Q2a	Q3a	Q4a	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
											Not seasonally adjusted					
Unified budget																
Receipts	3,267	3,410	3,427	3,585	711	993	798	741	732	1,103	834	793	691	1,122	822	802
Outlays	3,852	3,940	4,104	4,383	956	932	984	951	1,049	967	973	997	1,115	1,026	967	1,106
Surplus/deficit	-586	-530	-677	-798	-245	61	-186	-210	-317	136	-138	-204	-424	96	-145	-304
Previous Tealbook	*-587*	*-554*	*-673*	*-817*	*-245*	*61*	*-186*	*-208*	*-329*	*112*	*-129*	*-202*	*-393*	*61*	*-138*	*-309*
Means of financing:																
Borrowing	1,052	240	924	926	251	8	241	259	-68	-13	62	302	488	-49	183	339
Cash decrease	-155	289	-127	-8	20	-50	10	-46	419	-104	20	-68	-34	-17	-8	-4
Other[1]	-311	1	-120	-120	-25	-18	-65	-5	-33	-18	56	-30	-30	-30	-30	-30
Cash operating balance, end of period	353	64	192	199	314	364	353	399	-19	84	64	132	166	183	192	196
NIPA federal sector											Seasonally adjusted annual rates					
Receipts	3,495	3,585	3,614	3,737	3,442	3,485	3,537	3,561	3,564	3,594	3,620	3,668	3,553	3,602	3,634	3,674
Expenditures	4,124	4,269	4,495	4,775	4,111	4,137	4,189	4,215	4,270	4,262	4,329	4,373	4,478	4,529	4,600	4,668
Consumption expenditures	974	995	1,020	1,033	969	975	985	984	990	999	1,008	1,013	1,020	1,023	1,025	1,027
Defense	589	590	604	613	587	586	591	586	586	592	597	599	604	605	607	608
Nondefense	386	405	417	420	382	389	394	397	404	408	411	414	416	417	419	419
Other spending	3,150	3,274	3,475	3,742	3,142	3,163	3,204	3,232	3,280	3,263	3,321	3,360	3,458	3,507	3,574	3,640
Current account surplus	-629	-684	-881	-1,038	-668	-652	-652	-655	-706	-668	-709	-705	-924	-928	-965	-994
Gross investment	266	271	281	287	265	265	267	269	267	272	277	278	280	282	283	284
Gross saving less gross investment[2]	-623	-683	-887	-1,049	-662	-646	-647	-652	-700	-667	-713	-709	-931	-935	-973	-1,003
Fiscal indicators																
High-employment (HEB) surplus/deficit[3]	-636.7	-728.1	-981.1	-1,180.6	-670.2	-657.4	-671.5	-689.3	-731.4	-716.7	-775.0	-784.7	-1,018.4	-1,035.7	-1,085.8	-1,128.3
Change in HEB, percent of potential GDP	.4	.4	1.2	.8	.7	-.1	.0	.1	.2	-.1	.3	.0	1.2	.0	.2	.2
Fiscal impetus (FI), percent of GDP[4]	.2	.3	.4	.3	.5	-.1	.3	.2	-.2	.5	.5	.3	.7	.3	.3	.3
Previous Tealbook	*.2*	*.3*	*.4*	*.3*	*.5*	*-.7*	*.3*	*.2*	*.0*	*.4*	*.4*	*.3*	*.8*	*.3*	*.3*	*.3*
Federal purchases	.0	.1	.0	.0	-.1	.0	.2	-.1	-.2	.2	.2	.1	.0	.0	.0	.0
State and local purchases	.0	.1	.1	.1	.4	-.3	.0	.1	-.1	.2	.2	.2	.1	.1	.1	.1
Taxes and transfers	.2	.1	.3	.2	.2	.2	.2	.2	.1	.1	.1	.1	.6	.2	.2	.2

1. Other means of financing include checks issued less checks paid, accrued items, and changes in other financial assets and liabilities.
2. Gross saving is the current account surplus plus consumption of fixed capital of the general government as well as government enterprises.
3. HEB is gross saving less gross investment (NIPA) of the federal government in current dollars, with cyclically sensitive receipts and outlays adjusted to the staff's measure of potential output and the natural rate of unemployment. The sign on Change in HEB, as a percent of nominal potential GDP, is reversed. Quarterly figures for change in HEB are not at annual rates.
4. Fiscal impetus measures the contribution to growth of real GDP from fiscal policy actions at the general government level (excluding multiplier effects). It equals the sum of the direct contributions to real GDP growth from changes in federal purchases and state and local purchases, plus the estimated contribution from real consumption and investment that is induced by discretionary policy changes in transfers and taxes.
a Actual.

Greensheets

Greensheets

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

Measure and country	2016				2017 (Projected)				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Real GDP[1]												
Total foreign	2.4	1.4	3.1	2.8	2.9	2.7	2.5	2.5	2.6	2.6	2.6	2.6
Previous Tealbook	*2.4*	*1.4*	*3.1*	*2.7*	*2.5*	*2.5*	*2.5*	*2.6*	*2.6*	*2.6*	*2.6*	*2.6*
Advanced foreign economies	2.3	.5	2.4	2.3	2.4	2.0	1.8	1.8	1.8	1.8	1.7	1.7
Canada	2.7	-1.2	3.8	2.6	3.0	2.3	1.9	1.9	1.9	1.9	1.8	1.8
Japan	1.9	2.2	1.2	1.2	1.3	1.3	1.1	1.0	1.0	.9	.8	.9
United Kingdom	.6	2.4	2.0	2.7	2.0	1.9	1.9	1.7	1.6	1.6	1.6	1.6
Euro area	2.2	1.3	1.7	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Germany	2.9	1.9	.5	1.7	2.2	2.0	1.8	1.8	1.7	1.6	1.6	1.6
Emerging market economies	2.5	2.3	3.7	3.3	3.4	3.3	3.2	3.3	3.3	3.3	3.4	3.4
Asia	4.4	5.2	4.9	4.7	5.2	5.0	4.6	4.5	4.5	4.5	4.5	4.5
Korea	2.0	3.7	1.9	2.0	2.9	3.2	3.1	3.0	3.0	3.0	3.0	3.0
China	6.6	7.1	6.8	6.6	7.1	6.6	6.1	6.0	5.9	5.9	5.8	5.8
Latin America	.8	-.5	3.0	1.8	1.9	1.9	2.1	2.2	2.3	2.4	2.4	2.4
Mexico	1.9	.3	4.4	2.9	1.9	1.8	2.2	2.3	2.3	2.3	2.4	2.5
Brazil	-2.4	-1.3	-2.9	-3.4	2.5	2.3	2.0	2.0	2.1	2.1	2.1	2.1
Consumer prices[2]												
Total foreign	1.4	2.0	1.6	2.6	3.0	2.4	2.4	2.4	2.4	2.4	2.4	2.5
Previous Tealbook	*1.4*	*2.1*	*1.6*	*2.6*	*3.6*	*2.6*	*2.5*	*2.4*	*2.4*	*2.5*	*2.5*	*2.5*
Advanced foreign economies	-.3	1.1	.9	1.8	2.5	1.4	1.4	1.4	1.5	1.5	1.6	1.6
Canada	.5	2.2	1.0	1.7	2.9	2.0	1.8	1.7	1.8	1.9	1.9	1.9
Japan	-.3	-.4	-.5	2.4	.0	.4	.6	.8	1.0	1.1	1.2	1.3
United Kingdom	.2	.7	2.0	2.0	4.0	2.8	2.5	2.3	2.2	2.2	2.1	2.1
Euro area	-1.1	1.1	1.2	1.9	3.0	1.3	1.3	1.4	1.4	1.4	1.5	1.5
Germany	-1.2	1.1	1.3	3.0	2.2	1.5	1.6	1.7	1.7	1.8	1.9	2.0
Emerging market economies	2.7	2.7	2.2	3.1	3.4	3.0	3.2	3.1	3.1	3.1	3.1	3.1
Asia	2.0	2.3	1.2	2.6	.9	2.0	2.7	2.7	2.8	2.8	2.8	2.8
Korea	.5	1.0	.4	4.0	2.9	2.6	2.4	2.4	2.8	3.0	3.0	3.0
China	2.5	2.3	1.3	2.6	-.6	1.5	2.5	2.5	2.5	2.5	2.5	2.5
Latin America	4.3	3.9	4.5	4.5	9.8	5.5	4.4	4.1	3.9	3.8	3.7	3.7
Mexico	2.8	2.4	3.6	4.1	9.9	5.0	3.8	3.4	3.2	3.2	3.2	3.2
Brazil	11.8	7.5	6.5	2.6	3.2	4.3	4.9	4.9	4.6	4.4	4.4	4.4

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

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

Measure and country	2011	2012	2013	2014	2015	2016	2017	2018	2019
							---------Projected---------		
Real GDP[1]									
Total foreign	3.2	2.3	2.9	2.6	2.0	2.4	2.6	2.6	2.6
Previous Tealbook	3.2	2.3	2.9	2.5	2.0	2.4	2.5	2.6	2.6
Advanced foreign economies	1.8	.3	2.4	1.8	1.2	1.9	2.0	1.8	1.7
Canada	3.1	.7	3.6	2.2	.4	1.9	2.3	1.8	1.8
Japan	.2	.3	2.7	-.3	1.2	1.6	1.2	.9	.1
United Kingdom	1.3	1.3	2.4	3.5	1.7	1.9	1.9	1.6	1.6
Euro area	.5	-1.1	.7	1.3	2.0	1.8	1.8	1.8	1.8
Germany	2.4	.2	1.6	1.6	1.3	1.8	1.9	1.6	1.4
Emerging market economies	4.6	4.3	3.4	3.3	2.7	2.9	3.3	3.4	3.5
Asia	5.1	5.7	5.4	5.0	4.4	4.8	4.8	4.5	4.4
Korea	2.9	2.1	3.5	2.8	3.3	2.4	3.0	3.0	2.9
China	8.7	8.0	7.6	7.1	6.8	6.8	6.5	5.8	5.7
Latin America	4.1	3.4	1.6	1.9	1.3	1.3	2.0	2.4	2.6
Mexico	4.2	3.4	1.0	2.6	2.4	2.4	2.1	2.4	2.6
Brazil	2.7	2.6	2.6	-.3	-5.8	-2.5	2.2	2.1	2.2
Consumer prices[2]									
Total foreign	3.4	2.3	2.4	2.0	1.4	1.9	2.6	2.4	2.6
Previous Tealbook	3.4	2.3	2.4	2.0	1.4	1.9	2.8	2.5	2.6
Advanced foreign economies	2.2	1.3	1.0	1.2	.5	.9	1.7	1.6	1.9
Canada	2.7	1.0	1.0	2.0	1.3	1.4	2.1	1.9	2.0
Japan	-.3	-.2	1.4	2.6	.2	.3	.4	1.1	2.5
United Kingdom	4.6	2.6	2.1	.9	.1	1.2	2.9	2.2	2.1
Euro area	2.9	2.3	.8	.1	.2	.7	1.7	1.4	1.6
Germany	2.6	1.9	1.4	.4	.2	1.0	1.7	1.8	2.0
Emerging market economies	4.3	3.1	3.4	2.7	2.1	2.7	3.2	3.1	3.1
Asia	4.4	2.6	3.1	1.8	1.5	2.0	2.1	2.8	2.9
Korea	3.9	1.7	1.1	1.0	.9	1.5	2.6	3.0	3.0
China	4.6	2.1	2.9	1.5	1.5	2.2	1.5	2.5	2.5
Latin America	4.1	4.4	4.1	4.8	3.4	4.3	5.9	3.8	3.5
Mexico	3.5	4.1	3.6	4.2	2.3	3.2	5.5	3.2	3.2
Brazil	6.7	5.6	5.8	6.5	10.4	7.1	4.3	4.4	4.4

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

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U.S. Current Account

Quarterly Data

Billions of dollars, s.a.a.r.

	2016				2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
U.S. current account balance	**-532.3**	**-479.0**	**-464.0**	**-449.5**	**-527.9**	**-539.1**	**-562.7**	**-596.8**	**-645.2**	**-658.9**	**-691.6**	**-724.2**
Previous Tealbook	*-531.6*	*-477.3*	*-456.0*	*-528.2*	*-551.3*	*-547.0*	*-583.2*	*-625.1*	*-684.5*	*-699.6*	*-732.2*	*-770.0*
Current account as percent of GDP	-2.9	-2.6	-2.5	-2.4	-2.8	-2.8	-2.9	-3.0	-3.3	-3.3	-3.4	-3.5
Previous Tealbook	*-2.9*	*-2.6*	*-2.4*	*-2.8*	*-2.9*	*-2.8*	*-3.0*	*-3.2*	*-3.5*	*-3.5*	*-3.6*	*-3.8*
Net goods & services	-504.8	-503.2	-464.9	-529.3	-563.4	-578.3	-600.8	-621.9	-653.4	-661.2	-674.6	-690.9
Investment income, net	146.0	186.5	177.5	257.1	218.5	211.2	216.2	199.2	191.2	174.3	161.1	140.8
Direct, net	218.6	254.5	254.0	343.2	298.5	303.0	324.6	326.5	338.8	343.4	353.0	355.8
Portfolio, net	-72.6	-68.1	-76.5	-86.1	-80.0	-91.7	-108.4	-127.3	-147.6	-169.1	-192.0	-215.0
Other income and transfers, net	-173.4	-162.2	-176.6	-177.3	-183.0	-172.0	-178.1	-174.1	-183.0	-172.0	-178.1	-174.1

(-------Projected-------)

Annual Data

Billions of dollars

	2011	2012	2013	2014	2015	2016	2017	2018	2019
U.S. current account balance	**-460.4**	**-446.5**	**-366.4**	**-392.1**	**-463.0**	**-481.2**	**-556.6**	**-680.0**	**-810.4**
Previous Tealbook	*-460.4*	*-446.5*	*-366.4*	*-392.1*	*-463.0*	*-498.3*	*-576.7*	*-721.6*	*-850.5*
Current account as percent of GDP	-3.0	-2.8	-2.2	-2.3	-2.6	-2.6	-2.9	-3.4	-3.9
Previous Tealbook	*-3.0*	*-2.8*	*-2.2*	*-2.3*	*-2.6*	*-2.7*	*-3.0*	*-3.6*	*-4.1*
Net goods & services	-548.6	-536.8	-461.9	-490.2	-500.4	-500.6	-591.1	-670.0	-725.8
Investment income, net	229.0	224.4	228.4	234.3	193.4	191.8	211.3	166.8	92.2
Direct, net	298.6	293.8	296.3	289.0	265.4	267.6	313.1	347.8	364.9
Portfolio, net	-69.5	-69.4	-67.9	-54.8	-72.0	-75.8	-101.8	-180.9	-272.8
Other income and transfers, net	-140.8	-134.2	-132.9	-136.1	-156.0	-172.4	-176.8	-176.8	-176.8

(-------Projected-------)

Abbreviations

ABS	asset-backed securities
AFE	advanced foreign economy
AHCA	American Health Care Act
BHC	bank holding company
BOE	Bank of England
BOJ	Bank of Japan
CDS	credit default swaps
C&I	commercial and industrial
CMBS	commercial mortgage-backed securities
CPH	compensation per hour
CPI	consumer price index
CRE	commercial real estate
ECB	European Central Bank
ECI	employment cost index
E&I	equipment and intangibles
EME	emerging market economy
EU	European Union
FOMC	Federal Open Market Committee; also, the Committee
FX	foreign exchange
GDP	gross domestic product
GSE	government-sponsored enterprise
M&A	mergers and acquisitions
MBS	mortgage-backed securities
MMF	money market fund
LFPR	labor force participation rate
NFIB	National Federation of Independent Business
OIS	overnight index swap
ON RRP	overnight reverse repurchase agreement

OPEC	Organization of the Petroleum Exporting Countries
PCE	personal consumption expenditures
PMI	purchasing managers index
PPI	producer price index
QM	qualified mortgage
QS assessment	QS Assessment of Financial Stability
SEP	Summary of Economic Projections
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SOMA	System Open Market Account
S&P	Standard & Poor's
TIPS	Treasury Inflation-Protected Securities

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM
DIVISION OF RESEARCH AND STATISTICS

Date: May 12, 2017

To: Federal Open Market Committee

From: David Wilcox

Subject: Corrected Probabilities of Returning to the Effective Lower Bound

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       In the Risk and Uncertainty section of the April Tealbook A, the box "A Guidepost for Dropping Effective Lower Bound Risk from the Assessment of Risks" (on pages 68-69) presented calculations of the probability that the federal funds rate would return to the effective lower bound (ELB). The calculations were constructed using stochastic simulations of the FRB/US model around the staff baseline projection and were shown in figures 1 and 2 of the box.

       During the process of preparing to show updated versions of these probabilities in subsequent Tealbooks, a small error was found in the code that constructed these calculations. This note provides corrected calculations of the probabilities that had been shown in the box. The red lines in figures 1 and 2 show the correct probabilities, and the black lines show what was in the April Tealbook. In a few places in the text, the correct calculations are shown in red and the incorrect ones are shown in black strikeout. Even with these corrections, the main point of the box is unchanged: Given the baseline April forecast, the probability of returning to the ELB will probably be low enough around the third quarter of this year that we will consider dropping it as a factor that contributes importantly to our assessment of a downside skew in the risks for our projection of economic activity.

A Guidepost for Dropping Effective Lower Bound Risk from the Assessment of Risks

The staff has for some time judged that the risks to the projection for real activity are skewed to the downside due to the effective lower bound (ELB) constraint on the federal funds rate. All else being equal, a higher expected path for the federal funds rate lowers the probability that policymakers will be constrained by the ELB in the near future, which reduces downside macroeconomic risks. With the federal funds rate having risen to the range of ¾ to 1 percent and expected to rise further going forward, we will face a decision about when to drop the ELB reference from the Tealbook's assessment of risks. In this discussion, we describe how one specific measure of ELB risk has evolved since liftoff and is expected to evolve in the future. We then lay out one possible way to use this measure to inform our decision on when to drop our reference to the downside economic risk stemming from the ELB.
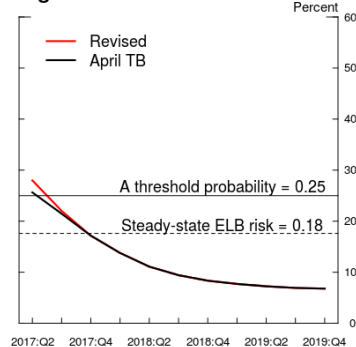
Figure 1 shows a measure of ELB risk—the probability that the federal funds rate will be at the ELB for at least one quarter during the next three years—computed from 20,000 stochastic simulations of FRB/US around the Tealbook baseline projection using the non-inertial version of the Taylor rule.[1] According to figure 1, the ELB risk measure was above 40 ~~30~~ percent throughout most of 2016 but then moved below 40 ~~30~~ percent early this year. The ELB risk measure based on the April 2017 Tealbook projection is 28 ~~26~~ percent.[2]

Figure 1: ELB Risk since Liftoff

Figure 2: Forecasts of ELB Risk

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[1] We use the non-inertial Taylor rule to capture the fact that policymakers typically cut interest rates aggressively in the face of a looming recession, even though they often increase interest rates gradually in the aftermath of a recession. In sticky-price models that account for the ELB, this asymmetric behavior is consistent with the prescription of optimal commitment policy and other well-performing rules, such as the price-level targeting rule and the rule proposed in David Reifschneider and John C. Williams (2000), "Three Lessons for Monetary Policy in a Low-Inflation Era," *Journal of Money, Credit and Banking,* vol. 32 (November), pp. 936–66.

[2] In the stochastic simulation, many of the ELB episodes are short lived, with the federal funds rate touching the ELB in only one or two quarters. According to the April 2017 Tealbook projection, the probability that the federal funds rate will be at the ELB for at least *four quarters* (not necessarily consecutive) during the next three years is about 10 percent.

Note that ELB risk fluctuated during 2016 even though the actual federal funds rate remained constant in the range of ¼ to ½ percent. These movements reflect the fact that the ELB risk measure depends not only on the current federal funds rate, but also on the projected path of the federal funds rate. When the projected path of the federal funds rate becomes flatter (steeper), ELB risk increases (decreases). For example, when the staff reduced its estimate of the long-run equilibrium value of the federal funds rate—the intercept in the Taylor rule—in the June 2016 Tealbook projection, the projected path of the federal funds rate flattened appreciably. As a result, the ELB risk increased, from about 37 ~~31~~ percent in April 2016 to more than 52 ~~34~~ percent in June 2016.

Figure 2 shows the projected path of the ELB risk according to the current Tealbook forecast. In this figure, the ELB risk at any given date shows the model-implied probability that the federal funds rate will be at the ELB for at least one quarter during the subsequent three years if the economy has evolved according to the current Tealbook projection up to that time. Because the federal funds rate is expected to rise, ELB risk is expected to decline further from its current level. It declines even below its steady-state value of 18 percent—shown by the dashed line—reflecting the projected overshooting of the federal funds rate above its long-run value of 3 percent.[3] Indeed, as a result of the forward-looking nature of the ELB risk measure, the ELB risk is expected to decline below its steady-state value in late 2017 ~~early 2018~~, when the federal funds rate is still expected to be substantially below its long-run value of 3 percent.

We plan to consult this ELB risk measure to inform our decision about when to drop the ELB reference in our assessment of risks in the Tealbook. Our provisional plan is to stop highlighting the ELB risk sometime after our measure of ELB risk is below 25 percent. The choice of 25 percent is somewhat arbitrary, and others may see a different threshold level as more appropriate. As can be seen in figure 2, according to the April Tealbook projection, the ELB risk measure is likely to dip below 25 percent for the first time in 2017:Q3, when the federal funds rate is projected to be a little above 1 percent. The date when this measure moves below 25 percent will depend on the actual evolution of the economy as well as the evolution of the staff projection. If the federal funds rate rises more slowly or the staff projection of the funds rate path becomes flatter than anticipated by the current Tealbook projection—possibly because the staff further lowers its estimate of the long-run equilibrium natural rate—the threshold will be breached later than 2017:Q3.

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[3] The steady-state value of the ELB risk is the model-implied probability that the federal funds rate will be at the ELB for at least one quarter during the next three years, conditional on the economy being at its steady state today. This concept is distinct from the unconditional probability that the federal funds rate is at the ELB. To compute the steady-state ELB risk shown in figure 2, we begin stochastic simulations from a steady state consistent with that shown in the Long-Term Outlook exhibit of the April Tealbook projection.

Report to the FOMC
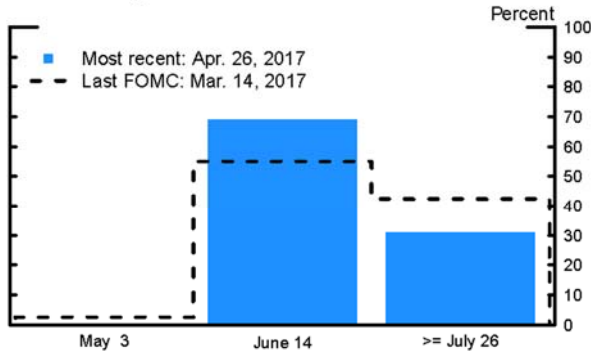# on Economic Conditions
and Monetary Policy

Book B
Monetary Policy Alternatives

April 27, 2017

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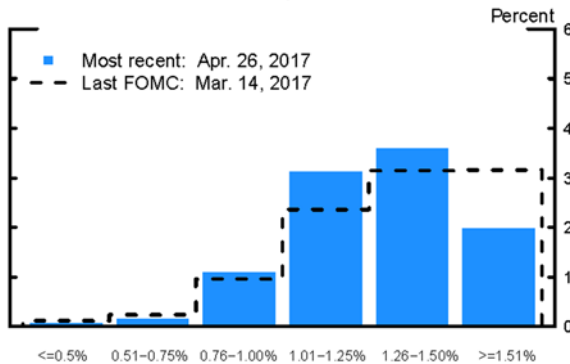by the staff of the Board of Governors of the Federal Reserve System

Alternatives

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

Percent

- Most recent: Apr. 26, 2017
- - - Last FOMC: Mar. 14, 2017

May 3   June 14   >= July 26

Note: Probabilities implied by a binomial tree fitted to settlement prices on fed funds futures contracts, assuming the next policy action is either no change or a 25 basis point increase in rates and no intermeeting moves. The effective federal funds rate until the next FOMC meeting is assumed to be equal to the observed rate on the previous non−month−end business day. The dashed line shows the probability distribution of the next rate hike after the March meeting.
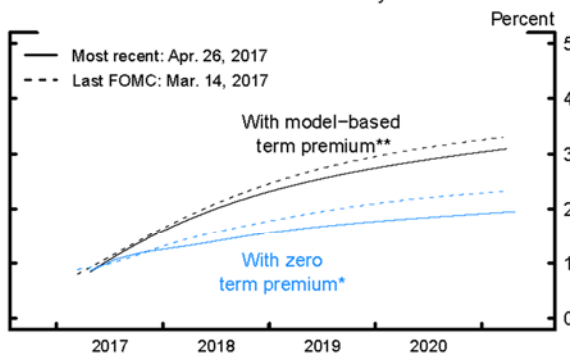Source: CME Group; Federal Reserve Board staff estimates.

Figure 2: Probability Distribution of the Timing of Next Rate Increase from the Desk Surveys

Percent

- May Desk Surveys

May 3   June 14   >= July 26

Note: Average probabilities across the surveys of primary dealers and market participants, conditional on the next policy action being an increase in rates.
Source: FRBNY.

Figure 3: Market−Implied Probability Distribution of the Federal Funds Rate, Year−End 2017

Percent

- Most recent: Apr. 26, 2017
- - - Last FOMC: Mar. 14, 2017

<=0.5%   0.51−0.75%   0.76−1.00%   1.01−1.25%   1.26−1.50%   >=1.51%

Note: Estimated from Eurodollar futures options, accounting for the differences in the levels and option−implied volatilities of LIBOR and the federal funds rate, but not adjusted for risk premiums.
Source: CME Group; Federal Reserve Board staff estimates.

Figure 4: Probability Distribution of the Federal Funds Rate, Year−End 2017, from the Desk Surveys

Percent

- May Desk Surveys
- - - Mar. Desk Surveys

<=0.5%   0.51−0.75%   0.76−1.00%   1.01−1.25%   1.26−1.50%   >=1.51%

Note: Average unconditional probabilities across the surveys of primary dealers and market participants for different ranges of the federal funds rate at the end of 2017.
Source: FRBNY.

Figure 5: Market−Implied Rate Expectations with and without Term Premium Adjustment

Percent

Most recent: Apr. 26, 2017
- - - Last FOMC: Mar. 14, 2017

With model−based term premium**
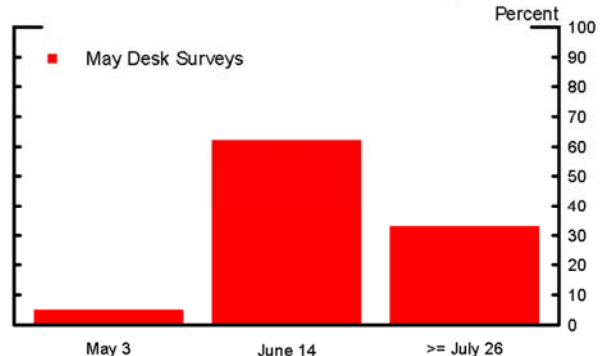
With zero term premium*

2017   2018   2019   2020

* Estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points.
** Estimated using a term structure model maintained by Board staff and adjusted for term premiums.
Source: Bloomberg; Blue Chip Financial Forecasts; Federal Reserve Board staff estimates.
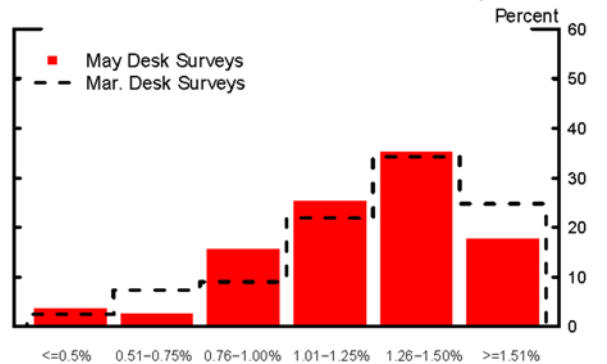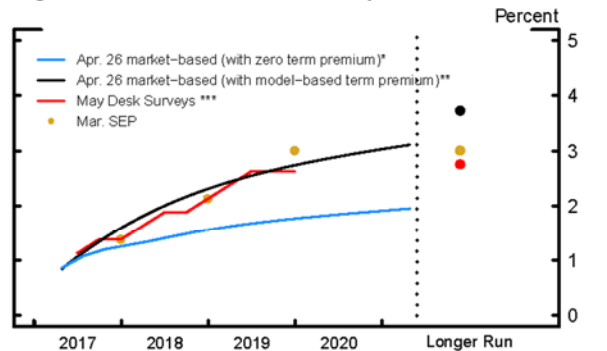
Figure 6: Federal Funds Rate Projections

Percent

— Apr. 26 market−based (with zero term premium)*
— Apr. 26 market−based (with model−based term premium)**
— May Desk Surveys ***
• Mar. SEP

2017   2018   2019   2020   Longer Run

* Estimated using overnight index swap quotes with a spline approach and a term premium of zero basis points.
** Estimated using a term structure model maintained by Board staff and adjusted for term premiums. The longer−run model−implied forecast is for the expected federal funds rate 5 to 10 years ahead.
*** Median of the respondents' modal paths for the federal funds rate.
Source: Bloomberg; Blue Chip Financial Forecasts; Federal Reserve Board staff estimates; FRBNY.
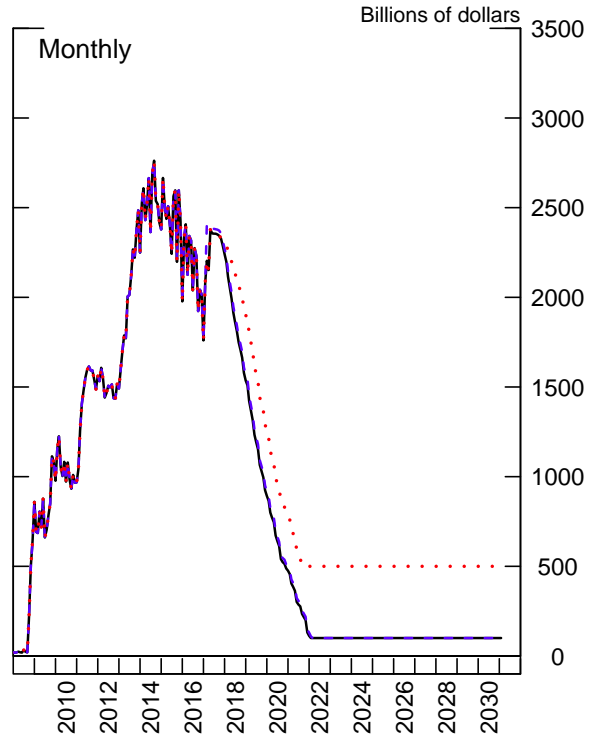
Total Assets and Selected Balance Sheet Items

—— April Tealbook baseline (LR RB $100 B)   · · · 18–month phaseout (LR RB $500 B)
– – March Tealbook baseline
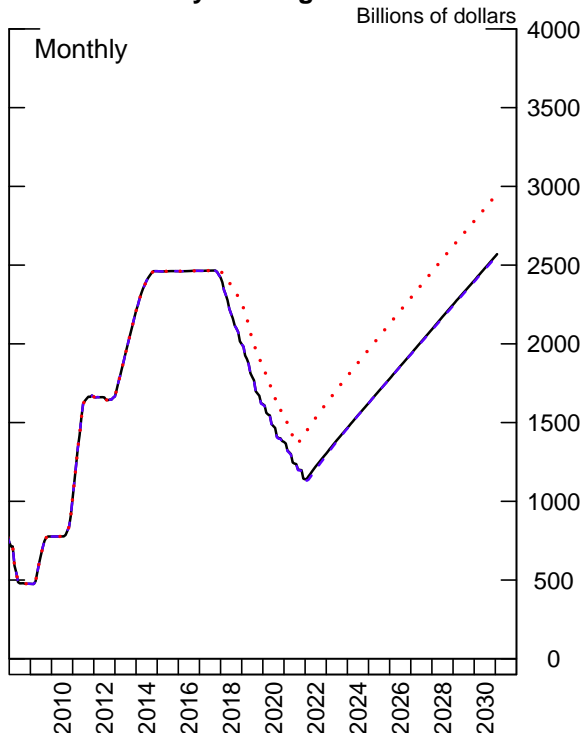
Total Assets
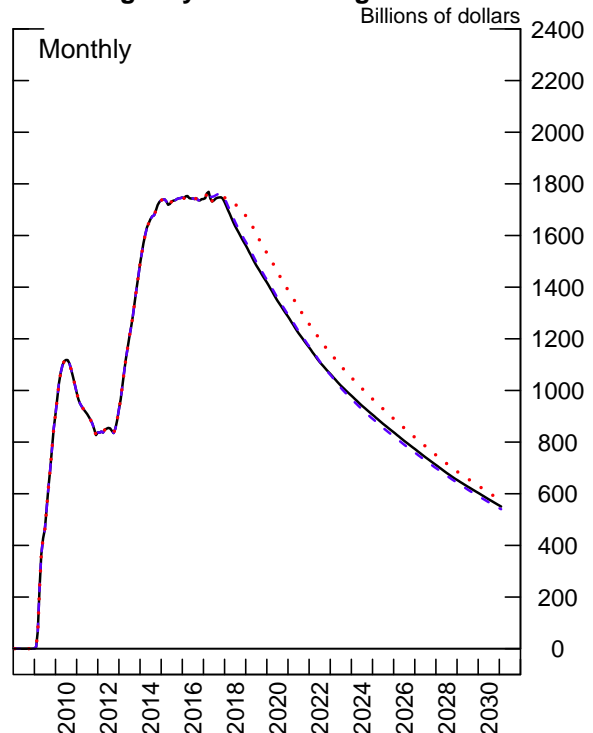
Monthly

Billions of dollars

Reserve Balances

Monthly
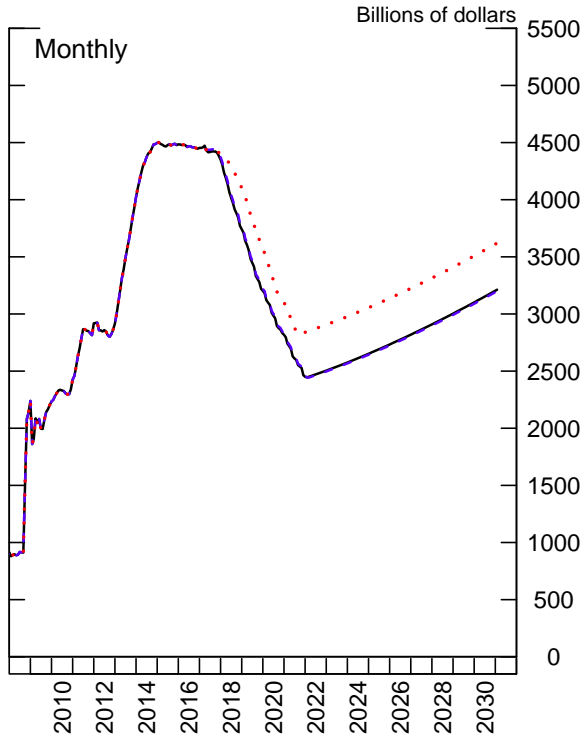
Billions of dollars

SOMA Treasury Holdings

Monthly

Billions of dollars

SOMA Agency MBS Holdings

Monthly

Billions of dollars

Balance Sheet & Income

Federal Reserve Balance Sheet
End-of-Year Projections -- April Tealbook baseline (LR RB $100 B)
(Billions of dollars)

	Mar 31, 2017	2017	2019	2021	2023	2025	2030
Total assets	4,473	4,351	3,202	2,451	2,575	2,733	3,203
Selected assets							
Loans and other credit extensions*	7	0	0	0	0	0	0
Securities held outright	4,247	4,155	3,038	2,309	2,448	2,619	3,113
U.S. Treasury securities	2,464	2,421	1,617	1,140	1,466	1,778	2,556
Agency debt securities	13	4	2	2	2	2	2
Agency mortgage-backed securities	1,769	1,729	1,419	1,167	980	838	555
Unamortized premiums	169	156	122	97	80	67	41
Unamortized discounts	-15	-14	-11	-8	-7	-6	-4
Total other assets	45	47	47	47	47	47	47
Total liabilities	4,432	4,310	3,159	2,403	2,523	2,676	3,133
Selected liabilities							
Federal Reserve notes in circulation	1,489	1,556	1,752	1,877	2,010	2,163	2,619
Reverse repurchase agreements	600	353	353	253	253	253	253
Deposits with Federal Reserve Banks	2,336	2,396	1,048	268	255	255	255
Reserve balances held by depository institutions	2,152	2,241	893	112	100	100	100
U.S. Treasury, General Account	92	150	150	150	150	150	150
Other deposits	92	5	5	5	5	5	5
Earnings remittances due to the U.S. Treasury	2	0	0	0	0	0	0
Total capital**	41	41	44	47	52	56	71

Source: Federal Reserve H.4.1 statistical releases and staff calculations.
Note: Components may not sum to totals due to rounding.
*Loans and other credit extensions includes primary, secondary, and seasonal credit; central bank liquidity swaps; and net portfolio holdings of Maiden Lane LLC.
**Total capital includes capital paid-in and capital surplus accounts.

Federal Reserve Balance Sheet
End-of-Year Projections -- 18-month phaseout (LR RB $500 B)
(Billions of dollars)

	Mar 31, 2017	2017	2019	2021	2023	2025	2030
Total assets	4,473	4,408	3,562	2,840	2,977	3,137	3,611
Selected assets							
Loans and other credit extensions*	7	0	0	0	0	0	0
Securities held outright	4,247	4,210	3,392	2,693	2,847	3,020	3,520
U.S. Treasury securities	2,464	2,460	1,857	1,434	1,795	2,127	2,940
Agency debt securities	13	4	2	2	2	2	2
Agency mortgage-backed securities	1,769	1,746	1,532	1,257	1,050	891	578
Unamortized premiums	169	158	127	101	84	69	42
Unamortized discounts	-15	-14	-11	-8	-7	-6	-4
Total other assets	45	47	47	47	47	47	47
Total liabilities	4,432	4,367	3,518	2,792	2,926	3,080	3,541
Selected liabilities							
Federal Reserve notes in circulation	1,489	1,556	1,752	1,879	2,012	2,167	2,627
Reverse repurchase agreements	600	353	353	253	253	253	253
Deposits with Federal Reserve Banks	2,336	2,453	1,408	655	655	655	655
Reserve balances held by depository institutions	2,152	2,297	1,253	500	500	500	500
U.S. Treasury, General Account	92	150	150	150	150	150	150
Other deposits	92	5	5	5	5	5	5
Earnings remittances due to the U.S. Treasury	2	0	0	0	0	0	0
Total capital**	41	41	44	47	52	56	71

Source: Federal Reserve H.4.1 statistical releases and staff calculations.
Note: Components may not sum to totals due to rounding.
*Loans and other credit extensions includes primary, secondary, and seasonal credit; central bank liquidity swaps; and net portfolio holdings of Maiden Lane LLC.
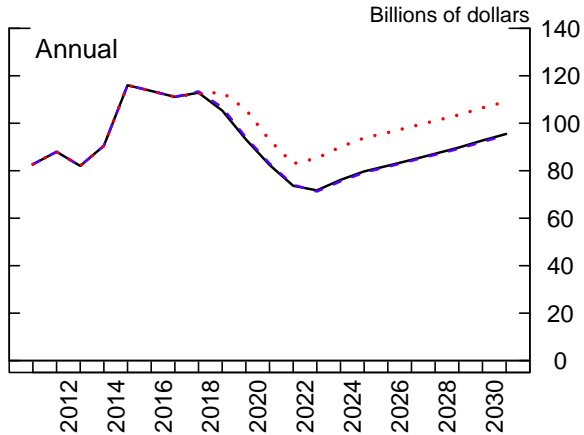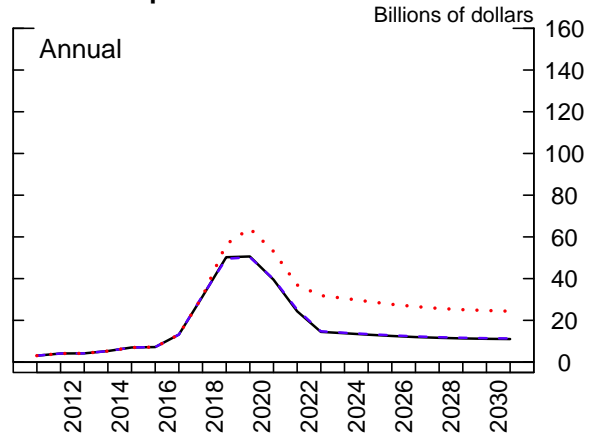**Total capital includes capital paid-in and capital surplus accounts.

Income Projections

— April Tealbook baseline (LR RB $100 B)   · · · 18–month phaseout (LR RB $500 B)
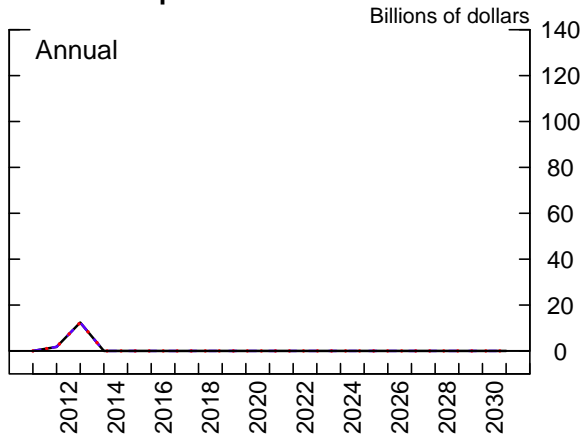— — March Tealbook baseline

Interest Income

Annual

Billions of dollars

Interest Expense

Annual

Billions of dollars

Realized Capital Gains

Annual

Billions of dollars

Earnings Remittances to Treasury

Annual

Billions of dollars

Deferred Asset

End of year

Billions of dollars
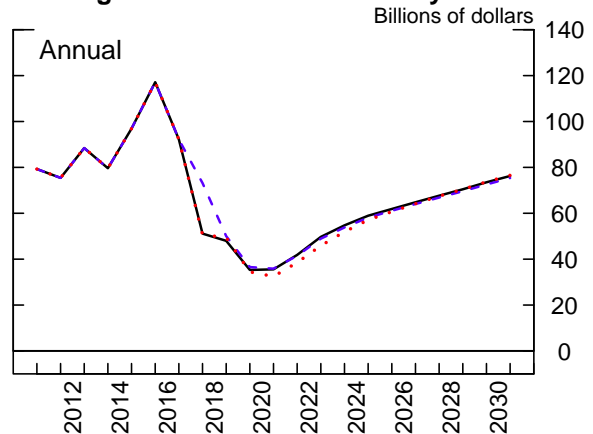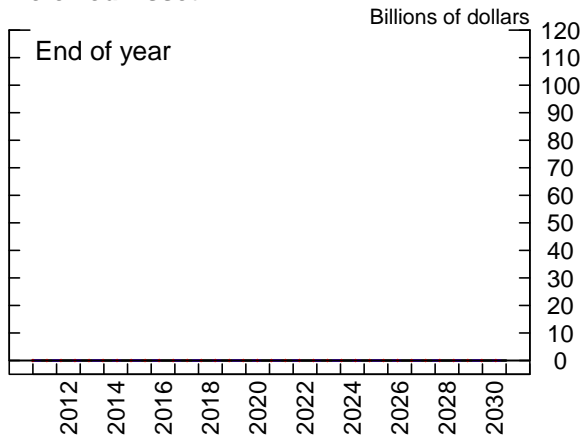
Memo: Unrealized Gains/Losses

End of year

Billions of dollars

Balance Sheet & Income
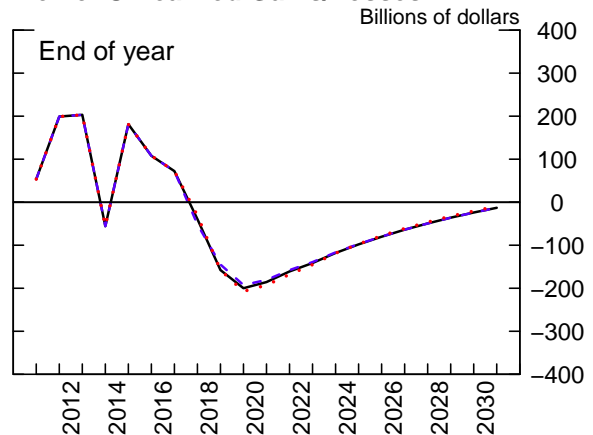
Projections for the 10-Year Treasury Term Premium Effect
(Basis Points)

Date	April Tealbook baseline (LR RB $100 B)	March Tealbook baseline	18-month phaseout (LR RB $500 B)
	Quarterly Averages		
2017:Q2	-83	-83	-91
Q3	-79	-79	-88
Q4	-75	-75	-84
2018:Q4	-61	-61	-71
2019:Q4	-50	-50	-59
2020:Q4	-42	-41	-51
2021:Q4	-36	-36	-45
2022:Q4	-33	-32	-42
2023:Q4	-30	-29	-38
2024:Q4	-26	-26	-35
2025:Q4	-24	-23	-32
2026:Q4	-21	-21	-30
2027:Q4	-19	-18	-27
2028:Q4	-17	-16	-25
2029:Q4	-15	-15	-23
2030:Q4	-14	-13	-21

Balance Sheet & Income

Redemptions

April Tealbook (Full Cessation)

Monthly   Billions of dollars

■ MBS   ■ Treasuries
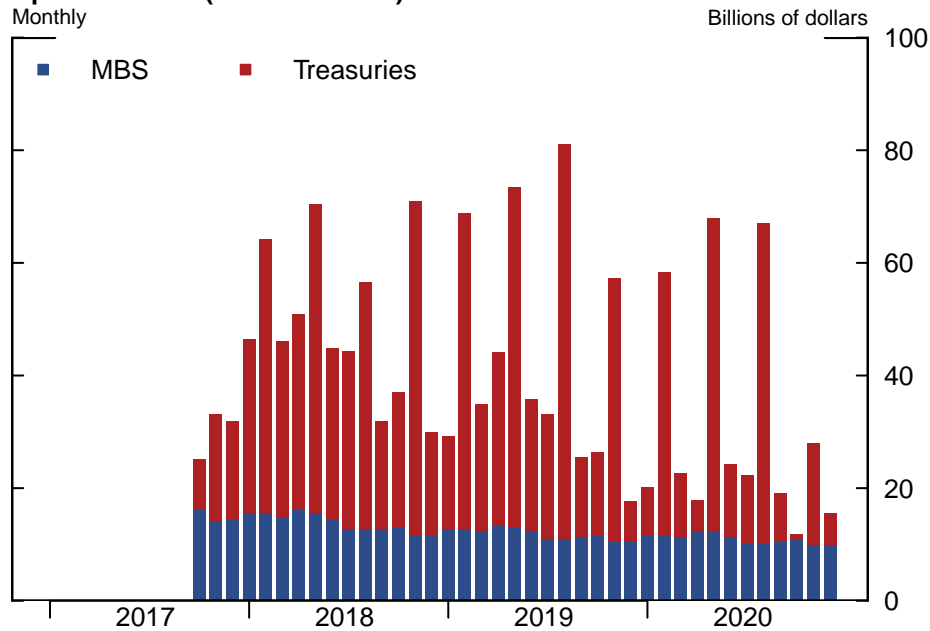
Redemptions ($ bil)		
Year	MBS	TSY
2018	167	426
2019	144	384
2020	132	243

Rollovers ($ bil)		
Year	MBS	TSY
2018	0	0
2019	0	0
2020	0	0

18–Month Phaseout

Monthly   Billions of dollars

■ MBS   ■ Treasuries

End of phaseout
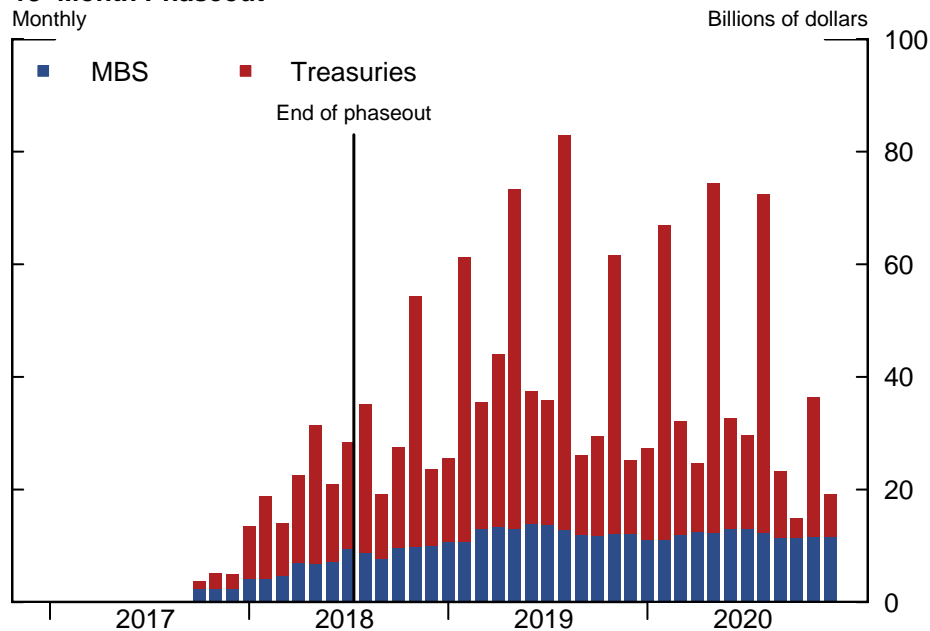
Redemptions ($ bil)		
Year	MBS	TSY
2018	89	220
2019	150	388
2020	143	310

Rollovers ($ bil)		
Year	MBS	TSY
2018	83	207
2019	2	7
2020	0	0

Balance Sheet & Income

Projections for the Characteristics of SOMA Holdings

SOMA Weighted–Average Treasury Duration

Monthly   Years

Legend:
- April Tealbook baseline (LR RB $100 B)
- 18–month phaseout (LR RB $500 B)

April Tealbook baseline Normalization
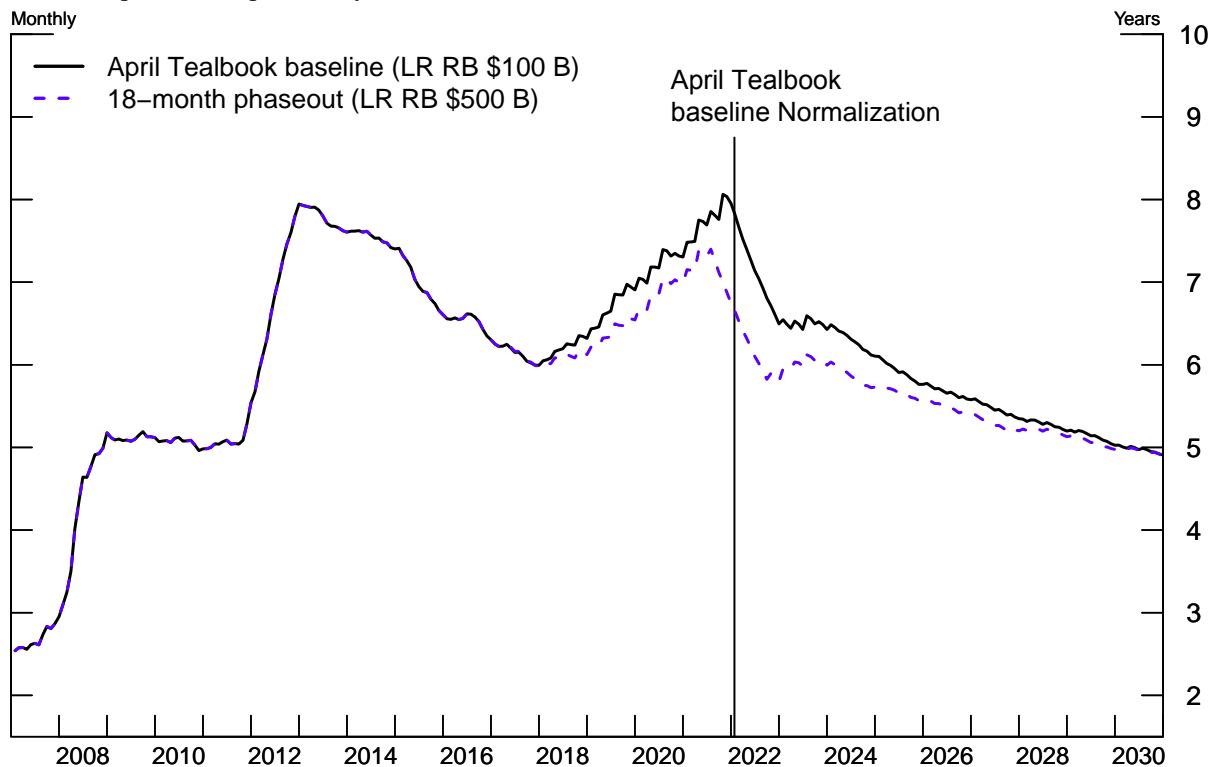
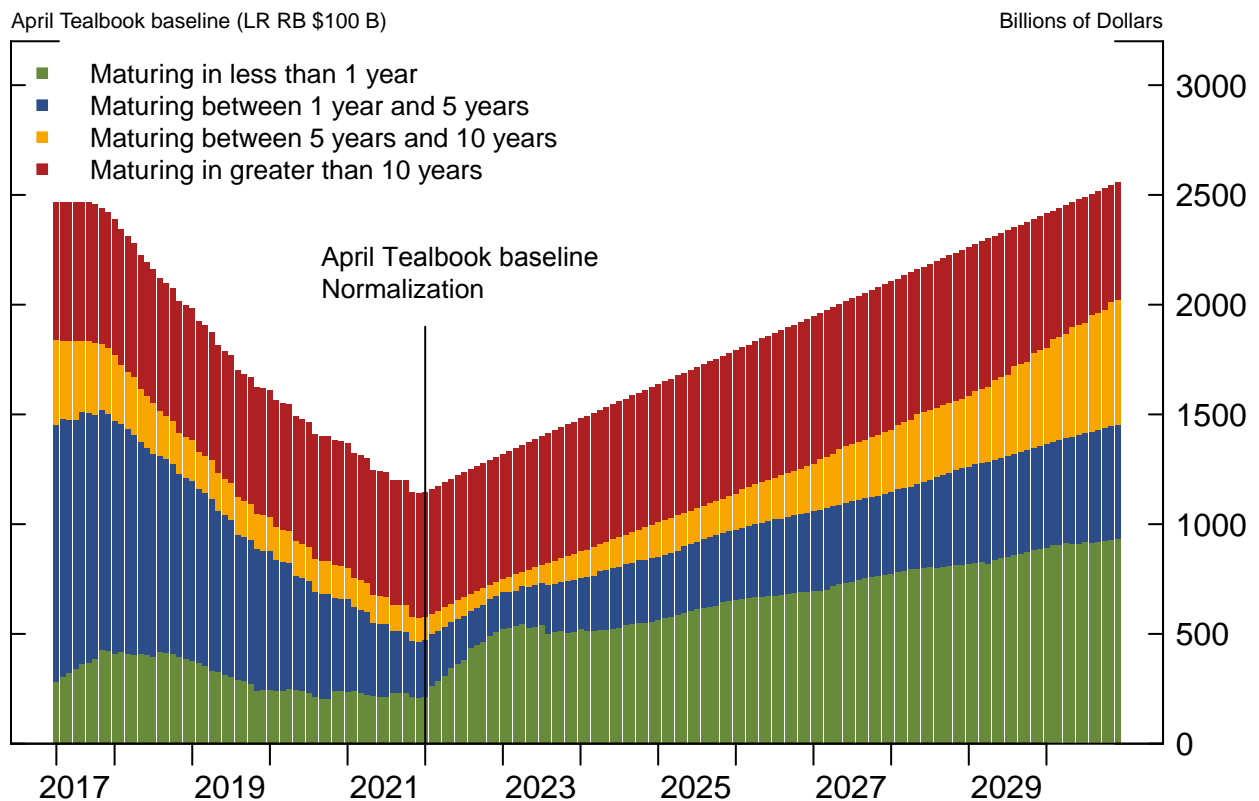**Maturity Composition of SOMA Treasury Portfolio**

April Tealbook baseline (LR RB $100 B)   Billions of Dollars

Legend:
- Maturing in less than 1 year
- Maturing between 1 year and 5 years
- Maturing between 5 years and 10 years
- Maturing in greater than 10 years

April Tealbook baseline Normalization

Balance Sheet & Income

Abbreviations

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

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