

Prefatory Note

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

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

Class II FOMC – Restricted (FR)

Report to the FOMC on Economic Conditions and Monetary Policy



Book A

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

September 8, 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 above the projections from both the Survey of Professional Forecasters (SPF) and the Blue Chip consensus forecast in 2017 but matches the Blue Chip forecast in 2018. The staff's unemployment rate forecast is below Blue Chip in 2017 and 2018 but matches the SPF forecast in 2017. The staff's projection for CPI inflation is above Blue Chip in 2017 and 2018 and is above SPF in 2017. The staff's projections for overall and core PCE price inflation are in line with the SPF forecasts in both 2017 and 2018.

Comparison of Tealbook and Outside Forecasts

	2017	2018
GDP (Q4/Q4 percent change)		
September Tealbook	2.6	2.3
Blue Chip ¹ (9/10/17)	2.3	2.3
SPF median (8/11/17)	2.2	n.a.
Unemployment rate (Q4 level)		
September Tealbook	4.2	3.8
Blue Chip ¹ (9/10/17)	4.3	4.1
SPF median (8/11/17)	4.2	n.a.
CPI inflation (Q4/Q4 percent change)		
September Tealbook	1.8	2.2
Blue Chip ¹ (9/10/17)	1.7	2.1
SPF median (8/11/17)	1.7	2.2
PCE price inflation (Q4/Q4 percent change)		
September Tealbook	1.5	1.9
SPF median (8/11/17)	1.5	1.9
Core PCE price inflation (Q4/Q4 percent change)		
September Tealbook	1.5	1.9
SPF median (8/11/17)	1.5	1.8

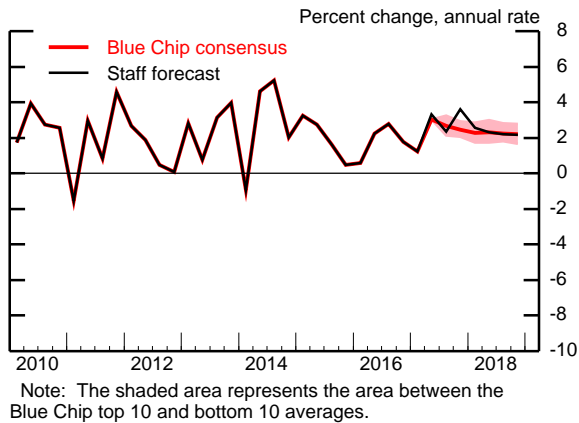
Note: SPF is the Survey of Professional Forecasters, CPI is the consumer price index, and PCE is personal consumption expenditures. Blue Chip does not provide results for PCE price inflation. The Blue Chip consensus forecast includes input from about 50 panelists, and the SPF about 40. Roughly 20 panelists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

1. This information is embargoed for use only within the Federal Reserve System until its public release date, September 10, 2017.

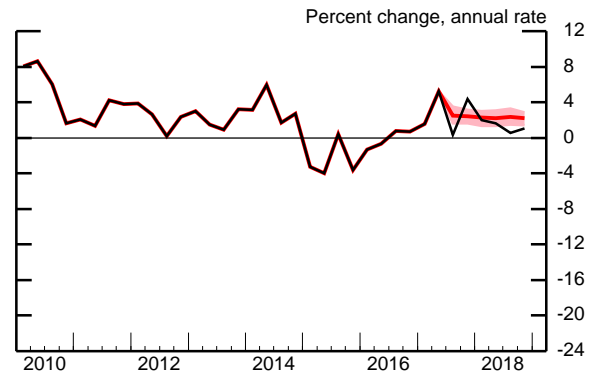
Source: Blue Chip Economic Indicators; Federal Reserve Bank of Philadelphia.

Tealbook Forecast Compared with Blue Chip (Blue Chip survey released August 10, 2017)

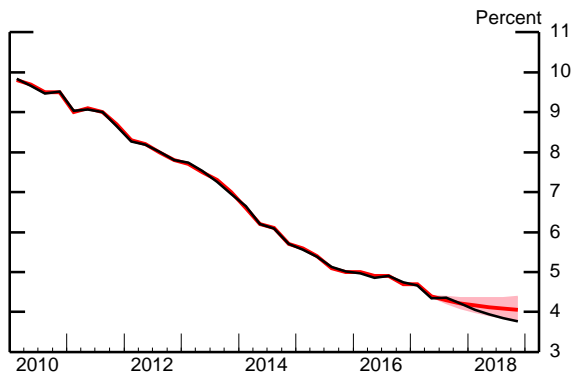
Real GDP



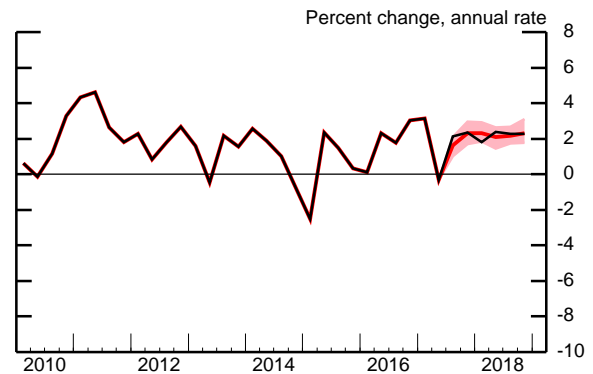
Industrial Production



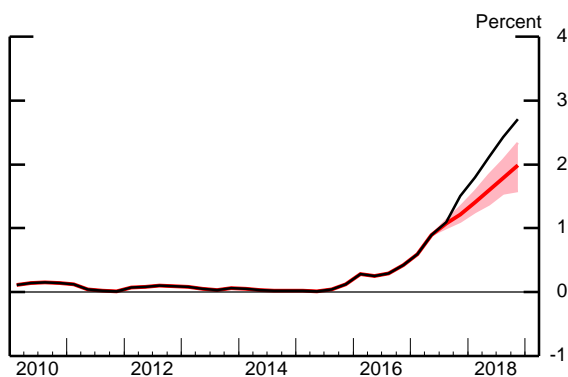
Unemployment Rate



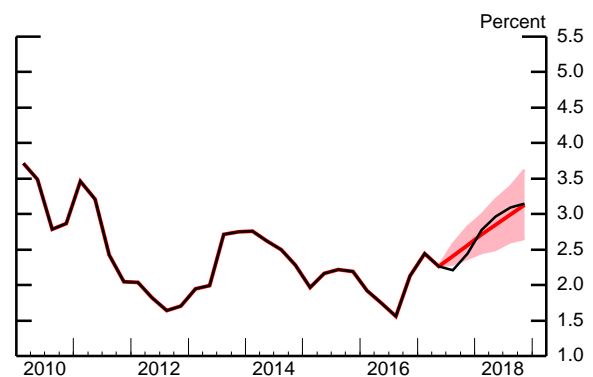
Consumer Price Index



Treasury Bill Rate



10-Year Treasury Yield



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

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

Revisions to the Staff Projection since the Previous SEP

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

Since June, we have revised up our projection for the increase in real GDP slightly in 2017 and by a similar amount over the next few years. This upward revision comes despite the fact that in the July Tealbook we reduced the size of our assumed fiscal policy expansion. The unemployment rate falls somewhat more than in the June forecast and stands at 3.7 percent at the end of 2020, reflecting both the somewhat faster pace of GDP growth and a 0.1 percentage point downward revision to our estimate of the natural rate to 4.8 percent. On balance, resource utilization, as measured by the gap between the unemployment rate and its natural rate, is a little tighter in this projection.

The news since June led to a slightly lower forecast for core PCE price inflation this year, but as we continue to view this year's weak inflation readings as importantly reflecting idiosyncratic and transitory factors, inflation is essentially unrevised thereafter. Total PCE inflation is still projected to move up modestly, reaching 2 percent in 2019 and 2020.

Despite showing a marginally tighter GDP gap, the federal funds rate path from the intercept-adjusted inertial Taylor (1999) rule that we use in our baseline forecast is below that of the June Tealbook, reflecting a downward revision to our estimate of r^* .¹

Staff Economic Projections Compared with the June Tealbook

Variable	2017		2017	2018	2019	2020	Longer run
	H1	H2					
Real GDP ¹	2.3	3.0	2.6	2.3	1.9	1.6	1.7
June Tealbook	1.9	2.9	2.4	2.2	1.8	1.4	1.7
Unemployment rate ²	4.4	4.2	4.2	3.8	3.7	3.7	4.8
June Tealbook	4.3	4.2	4.2	3.9	3.8	4.0	4.9
PCE inflation ¹	1.2	1.9	1.5	1.9	2.0	2.0	2.0
June Tealbook	1.4	1.7	1.6	1.9	2.0	2.1	2.0
Core PCE inflation ¹	1.4	1.6	1.5	1.9	2.0	2.0	n.a.
June Tealbook	1.6	1.7	1.6	1.9	2.0	2.1	n.a.
Federal funds rate ²	.95	1.42	1.42	2.62	3.47	3.93	2.50
June Tealbook	.92	1.48	1.48	2.70	3.67	4.17	3.00
Memo:							
Federal funds rate,							
end of period	1.13	1.44	1.44	2.64	3.49	3.94	2.50
June Tealbook	.94	1.51	1.51	2.73	3.68	4.17	3.00
GDP gap ^{2,3}	.8	1.4	1.4	2.1	2.2	2.0	n.a.
June Tealbook	.7	1.3	1.3	1.9	2.0	1.6	n.a.

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

2. Percent, final quarter of period indicated.

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

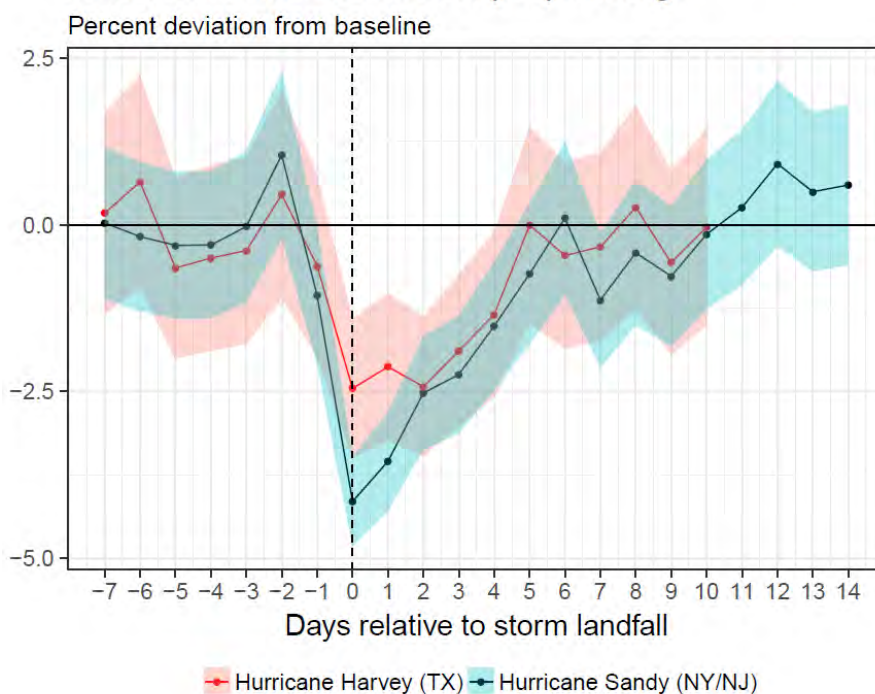
n.a. Not available.

¹ In the July Tealbook we revised down our estimate of r^* in the long run by 50 basis points. Half of this downward revision reflected the smaller and less durable boost that we now expect from fiscal stimulus.

industrial production in the third quarter and about 0.3 percentage point from the growth of GDP. We have assumed that industrial production returns to normal by the end of the year.

We also anticipate that the hurricane will reduce consumer spending in the third quarter. Consistent with this expectation, daily payment transactions since the hurricane showed a sharp drop in retail sales in the state of Texas (see figure below) and in Houston in particular.⁴ We expect the consumer spending channel to subtract $\frac{1}{4}$ percentage point from GDP growth in the third quarter, with an offsetting boost to growth in the fourth quarter as spending returns to normal.⁵

The Effect of Hurricanes Harvey and Sandy on National Retail Sales Group Spending



Source: First Data retail volume aggregates.

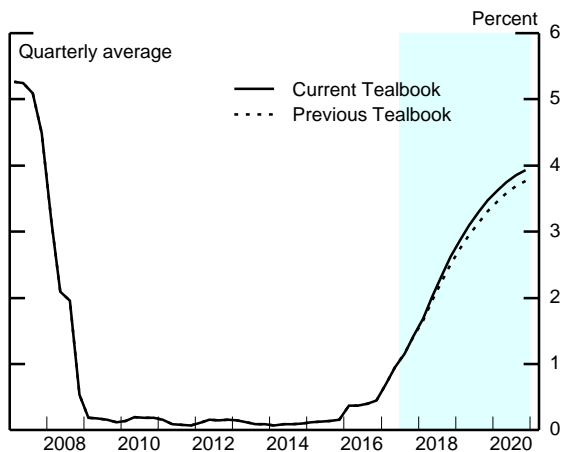
Note: These estimates come from state-level indexes of retail sales spending constructed using First Data electronic transaction data. The Hurricane Harvey estimates use Texas retail spending, which constitutes 8 percent of national retail spending. The Hurricane Sandy estimates use data from New York and New Jersey, which together compose 10 percent of national retail spending. These data are received with a 3-day lag.

⁴ These daily, geographically detailed spending series from credit and debit transactions are the outcome of our collaboration with Palantir Technologies and First Data Corporation as part of our effort to expand the range of economic indicators we rely on to measure economic activity and price inflation.

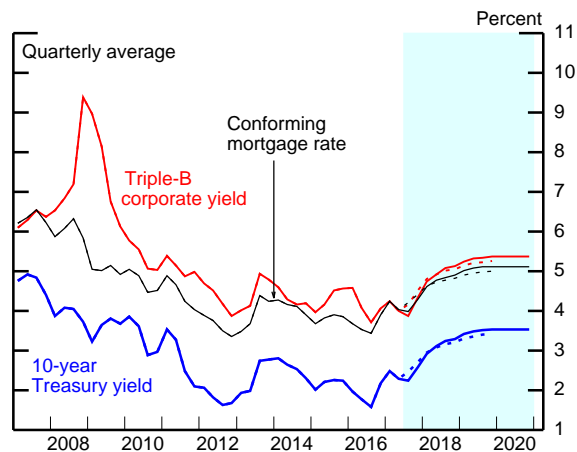
⁵ This estimate also reflects a drag from higher gasoline prices, a relatively modest effect on monthly new light vehicle sales, and a small assumed offset from government transfers to households for disaster relief.

Key Background Factors underlying the Baseline Staff Projection

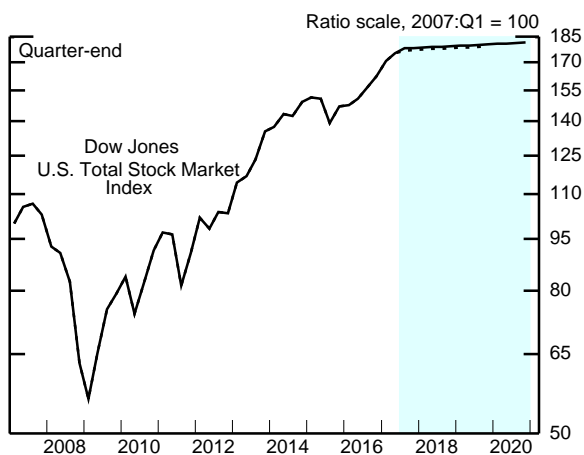
Federal Funds Rate



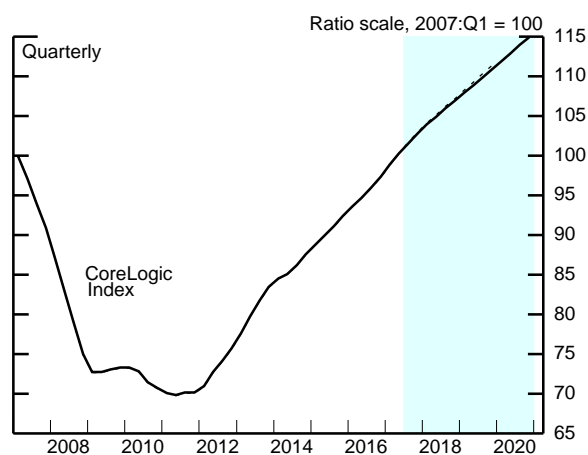
Long-Term Interest Rates



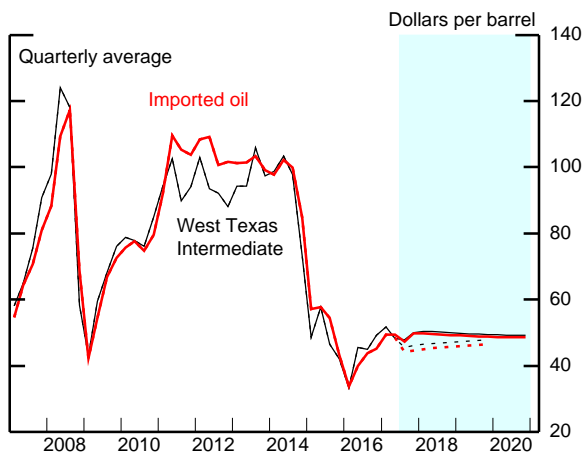
Equity Prices



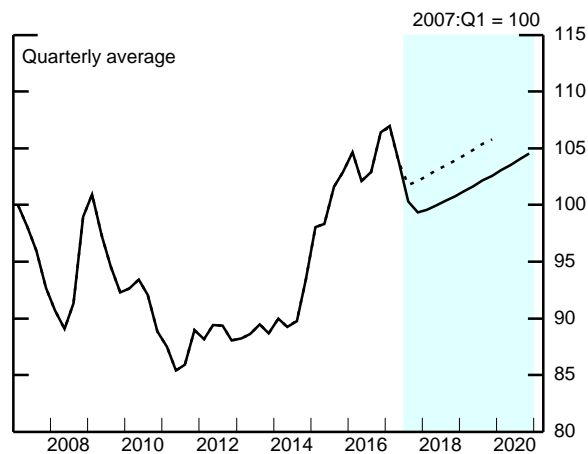
House Prices



Crude Oil Prices



Broad Real Dollar



Federal Reserve System Nowcasts of 2017:Q3 Real GDP Growth
(Percent change at annual rate from previous quarter)

Federal Reserve entity	Type of model	Nowcast as of Sept. 6, 2017
Federal Reserve Bank		
Boston	<ul style="list-style-type: none"> Mixed-frequency BVAR 	3.2
New York	<ul style="list-style-type: none"> Factor-augmented autoregressive model combination Factor-augmented autoregressive model combination, financial factors only Dynamic factor model 	1.9 2.3 2.1
Cleveland	<ul style="list-style-type: none"> Bayesian regressions with stochastic volatility Tracking model 	2.5 2.5
Atlanta	<ul style="list-style-type: none"> Tracking model combined with Bayesian vector autoregressions (VARs), dynamic factor models, and factor-augmented autoregressions (known as GDPNow) 	2.9
Chicago	<ul style="list-style-type: none"> Dynamic factor models Bayesian VARs 	3.4 2.7
St. Louis	<ul style="list-style-type: none"> Dynamic factor models News index model Let-the-data-decide regressions 	2.0 3.7 2.3
Kansas City	<ul style="list-style-type: none"> Accounting-based tracking estimate 	2.4
Board of Governors	<ul style="list-style-type: none"> Board staff's forecast (judgmental tracking model) Monthly dynamic factor models (DFM-45) Mixed-frequency dynamic factor model (DFM-BM) 	2.3 3.0 2.7
Memo: Median of Federal Reserve System nowcasts		2.5

Summary of the Near-Term Outlook

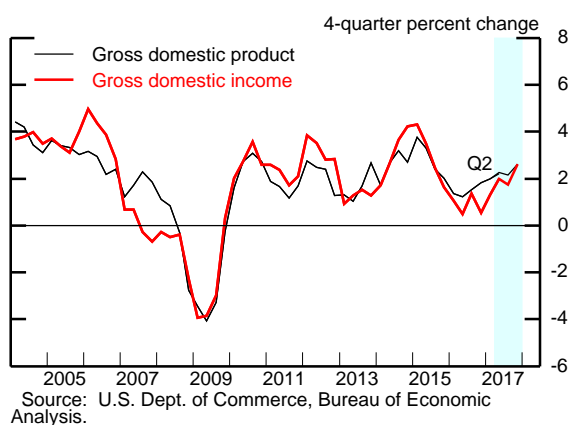
(Percent change at annual rate except as noted)

Measure	2017:Q2		2017:Q3		2017:H2	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
Real GDP	2.5	3.3	2.7	2.3	2.7	3.0
Private domestic final purchases	2.8	3.5	2.7	2.0	2.9	2.9
Personal consumption expenditures	3.1	3.4	2.7	2.0	2.8	2.7
Residential investment	-6.4	-6.3	-5.4	-4.2	-8	-1.2
Nonres. private fixed investment	4.1	7.3	5.2	4.0	4.8	5.6
Government purchases	-.1	.1	1.8	.6	1.8	.8
<i>Contributions to change in real GDP</i>						
Inventory investment ¹	.2	.2	.3	.2	.1	.2
Net exports ¹	-.1	.2	-.1	.3	-.1	.2
Unemployment rate	4.4	4.4	4.3	4.4	4.2	4.2
PCE chain price index	.2	.3	1.2	1.8	1.5	1.9
Ex. food and energy	.8	.9	1.5	1.4	1.6	1.6

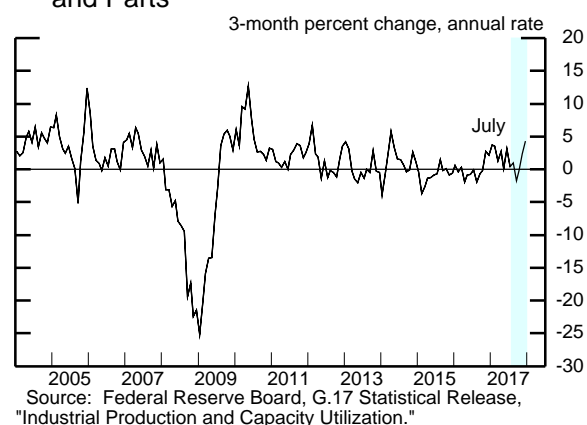
1. Percentage points.

Recent Nonfinancial Developments (1)

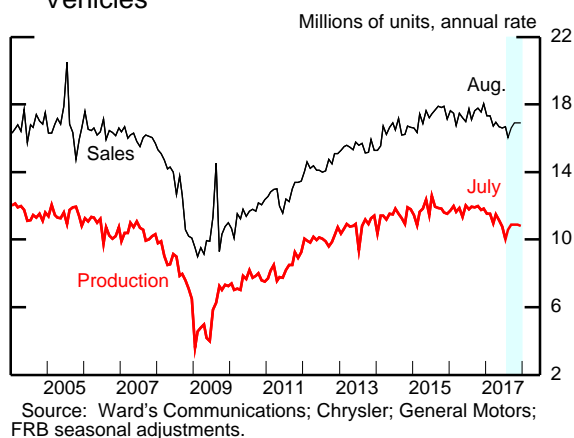
Real GDP and GDI



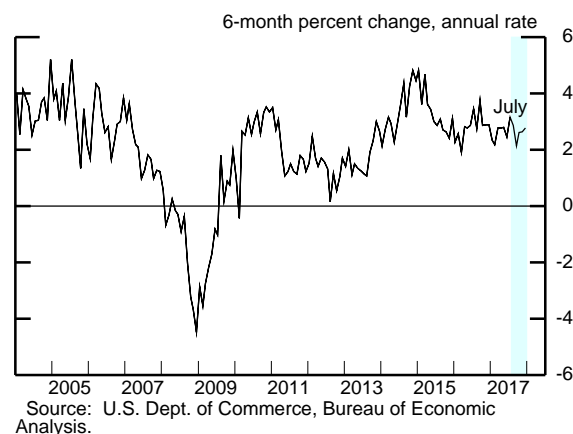
Manufacturing IP ex. Motor Vehicles and Parts



Sales and Production of Light Motor Vehicles

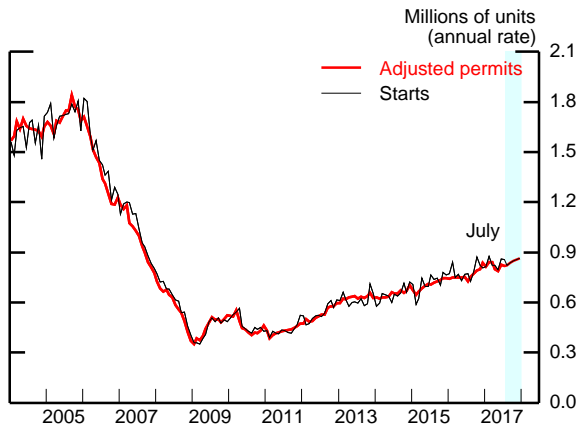


Real PCE Growth



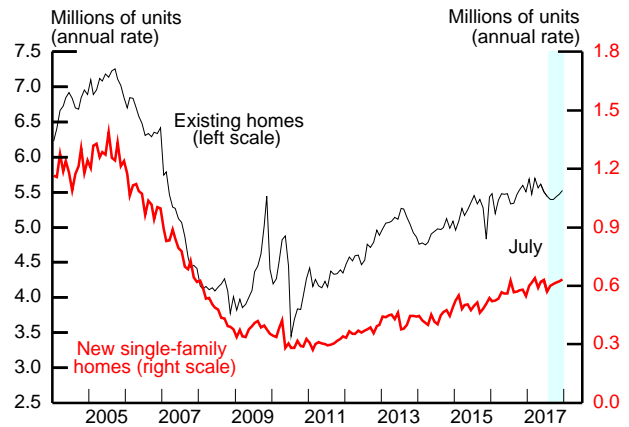
Recent Nonfinancial Developments (2)

Single-Family Housing Starts and Permits



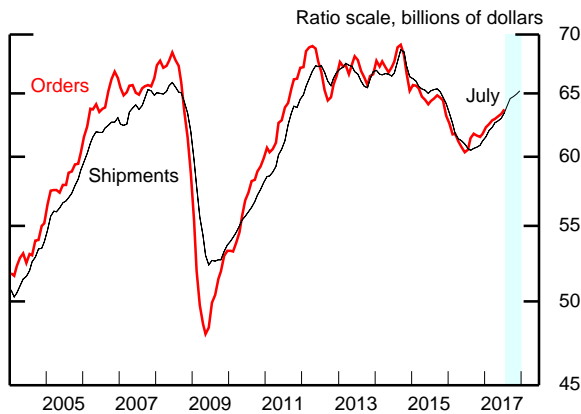
Note: Adjusted permits equal permit issuance plus total starts outside of permit-issuing areas.
Source: U.S. Census Bureau.

Home Sales



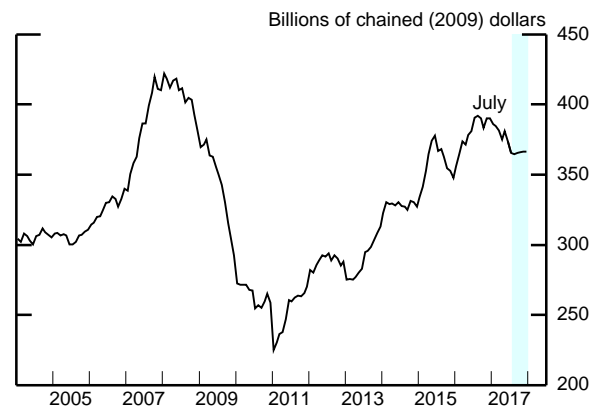
Source: For existing, National Association of Realtors; for new, U.S. Census Bureau.

Nondefense Capital Goods ex. Aircraft



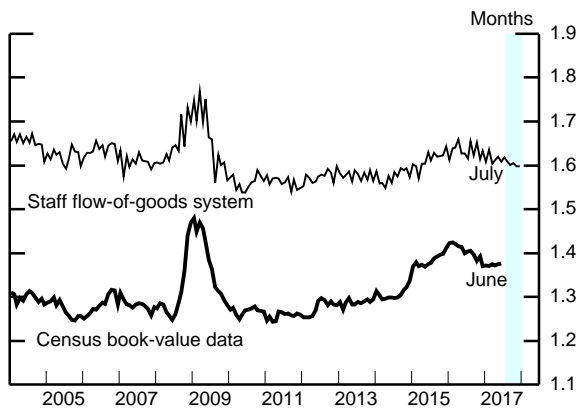
Note: Data are 3-month moving averages.
Source: U.S. Census Bureau.

Nonresidential Construction Put in Place



Note: Nominal CPIP deflated by BEA prices through 2017:Q1 and by the staff's estimated deflator thereafter.
Source: U.S. Census Bureau.

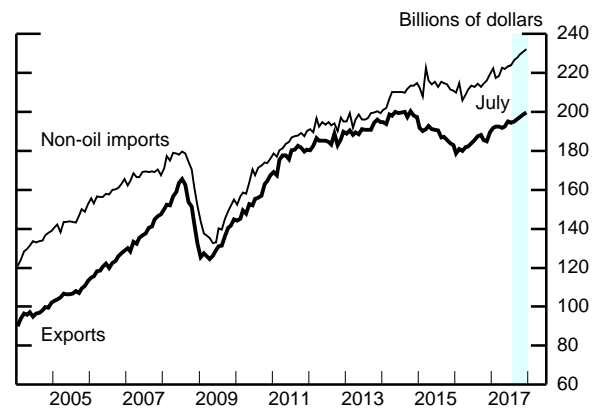
Inventory Ratios



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

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

Exports and Non-oil Imports



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

Supply Constraints in the Single-Family Housing Market

The pace of single-family housing construction, the blue line in figure 1, remains fairly slow by historical standards and appears insufficient to accommodate population growth, further economic expansion, and demographic changes.¹ In recent years, much of the increase in home demand has been absorbed by declining vacancy rates (figure 2). Meanwhile, house prices—the black line in figure 1—and rents have been rising at a steady clip, and the market for existing homes appears especially tight. In combination, these patterns and the evidence presented in this discussion suggest that supply conditions in the single-family housing market are tighter today than before the recession.

The Beige Book and other sources report claims by homebuilders that they face shortages in the supply of construction labor; however, empirical evidence on such claims is mixed. On the one hand, the workweek for production workers in the construction industry, shown in figure 3, is above the levels observed during the housing boom in the mid-2000s. On the other hand, the elevated workweek has not translated to a sustained pickup in wage growth (figure 4).

Figure 1. Single-Family Starts and House Price Growth

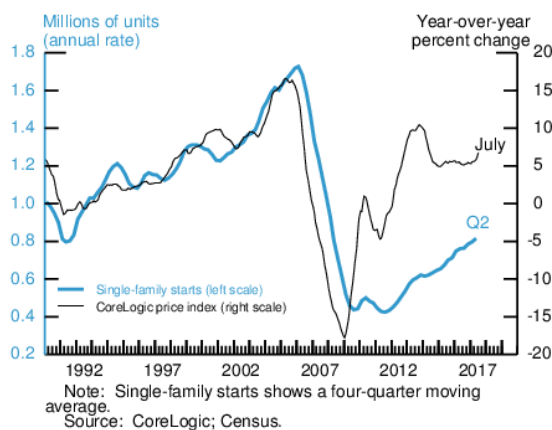


Figure 2. Single-Family Homeowner Vacancy Rate

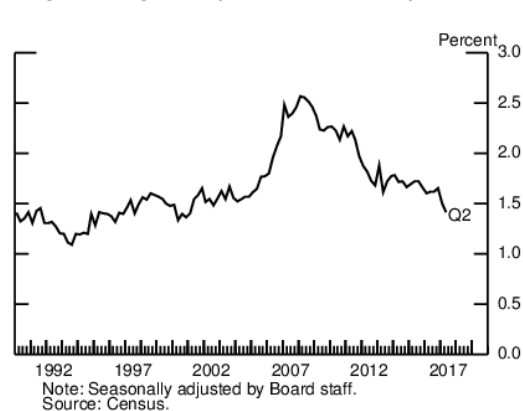


Figure 3. Workweek in the Construction Industry

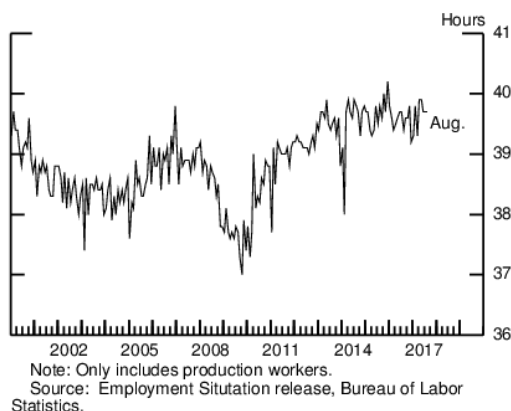


Figure 4. Average Hourly Earnings, Residential Construction



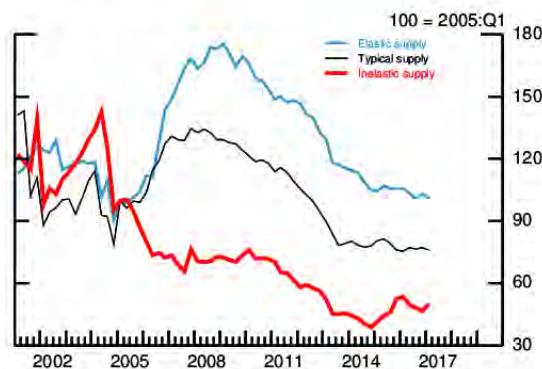
¹ This discussion focuses on single-family homes to ensure consistency between data sources. Single-family homes account for the bulk of new construction and, with their relatively high value per unit, are an even larger share of residential investment.

Anecdotal reports have also pointed to short supplies of vacant developed lots—that is, graded parcels with road and plumbing connections. The supply of such lots remains somewhat elevated in the aggregate, but this aggregate masks substantial geographic heterogeneity. In particular, as shown by the red line in figure 5, the supply of vacant developed lots in “inelastic” metropolitan areas—those facing geographic or regulatory barriers to development—has fallen substantially relative to pre-recession levels.² Price changes (not shown) are consistent with lot availability inhibiting construction: Since the national house price trough in 2012, house prices have risen faster in inelastic metropolitan areas, such as New York and San Francisco, and slower in elastic areas, such as Houston and Atlanta. These patterns suggest that limited lot availability is restraining construction activity in a subset of areas.

Supply conditions vary *within* metropolitan areas as well. Over the period from 2000 to 2015, Census tracts between 2 and 10 miles from the city center—neighborhoods that are, for the most part, already built out—saw faster price growth but smaller net increases in the number of single-family homes than tracts beyond 10 miles (figure 6).³ This pattern is suggestive of more-restrictive supply in the 2- to 10-mile band. These close-in neighborhoods face potentially binding regulatory constraints: With existing lots already built out, restrictive zoning laws commonly prevent the subdivision of large lots into townhouse or other dense development. Tracts beyond 10 miles, by contrast, are more likely to include vacant land and thus have lower development costs. At the fringes of cities, regulations may include density or other restrictions but generally allow single-family construction.

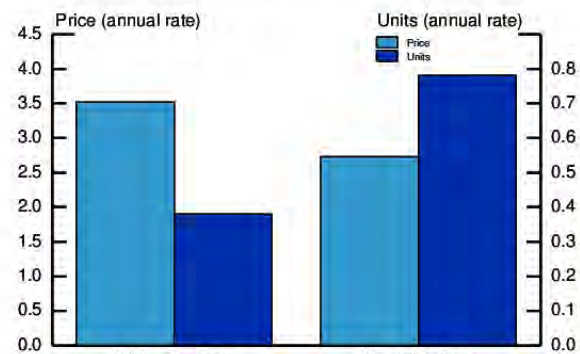
The staff’s medium-term construction and house price projections are consistent with supply constraints restraining investment now and loosening somewhat over the projection period. Although it is difficult to precisely quantify the effects of easing supply constraints, the staff forecast calls for a continued strengthening in construction activity toward the pace we estimate to be consistent with demographic requirements and for a deceleration in house price growth.

Figure 5. Lot Availability by Metropolitan Area Supply Constraints



Note: Lot availability for 41 large metropolitan areas for which lot and elasticity data are available.
Source: Census; Metrostudy; Saiz (2010).

Figure 6. Single-Family House Price and Unit Growth Rates, 2000-2015



Note: Census tract averages for 41 large metropolitan areas for which lot and elasticity data are available.
Source: Census; Federal Housing Finance Agency.

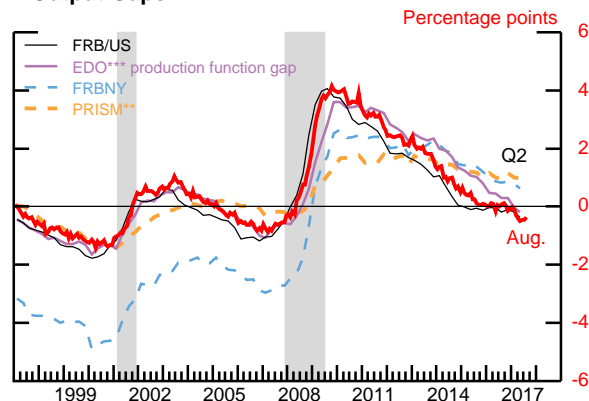
² The elasticity estimates come from Albert Saiz (2010), “The Geographic Determinants of Housing Supply,” *Quarterly Journal of Economics*, vol. 125 (3), pp. 1253–96. Saiz estimates city supply elasticities as functions of geographic features (for example, coastlines and mountains) and regulation (for instance, zoning laws). From 2000 to 2015, the 11 inelastic metropolitan areas accounted for 22 percent of total net unit growth.

³ Tracts within two miles are excluded; they are difficult to compare because of an abundance of multifamily housing, a different regulatory environment, and growing demand for urban amenities (see Victor Couture and Jessie Handbury (2017), “Urban Revival in America, 2000 to 2010,” working paper, University of Pennsylvania, July).

Alternative Measures of Slack

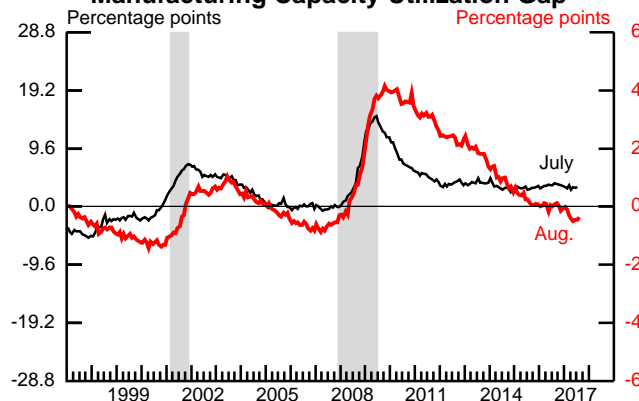
The red line in each panel is the staff's measure of the unemployment rate gap (right axis).

Output Gaps



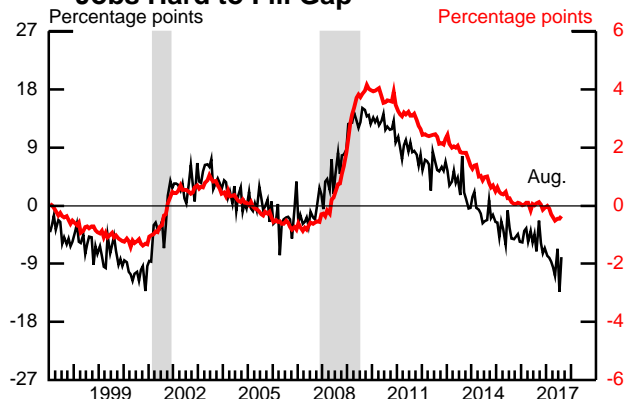
** PRISM uses a flex-price output gap.
 *** EDO is Estimated, Dynamic, Optimization-based model.
 Source: Federal Reserve Board; PRISM: Federal Reserve Board Bank of Philadelphia, PRISM Model Documentation (June 2011); FRBNY: Federal Reserve Bank of New York Staff Report 618 (May 2013, revised April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

Manufacturing Capacity Utilization Gap*



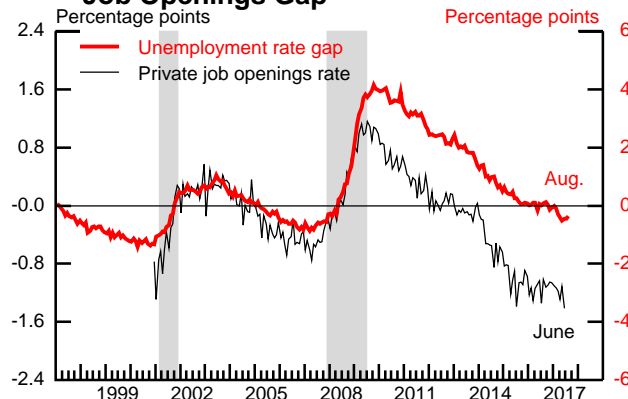
Source: Federal Reserve Board.

Jobs Hard to Fill Gap*



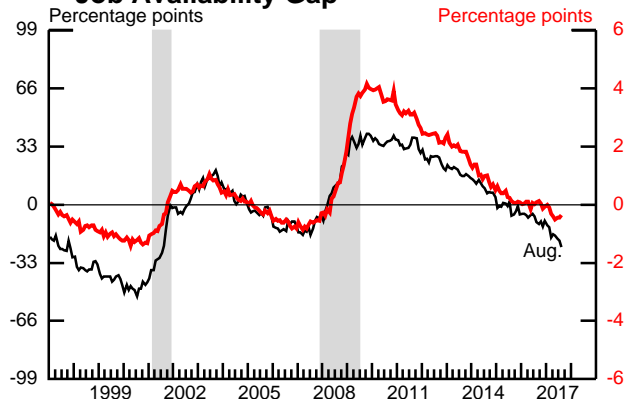
Note: Percent of small businesses surveyed with at least one "hard to fill" job opening. Seasonally adjusted by Federal Reserve Board Staff.
 Source: National Federation of Independent Business, Small Business Economic Trends Survey.

Job Openings Gap*



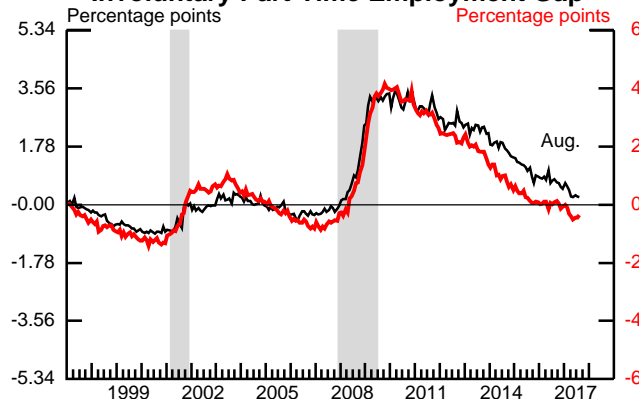
Note: Job openings rate is the number of job openings divided by employment plus job openings.
 Source: Job Openings and Labor Turnover Survey; U.S. Department of Labor, Bureau of Labor Statistics, Current Employment Statistics; Conference Board, Help Wanted OnLine.

Job Availability Gap*



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

Involuntary Part-Time Employment Gap



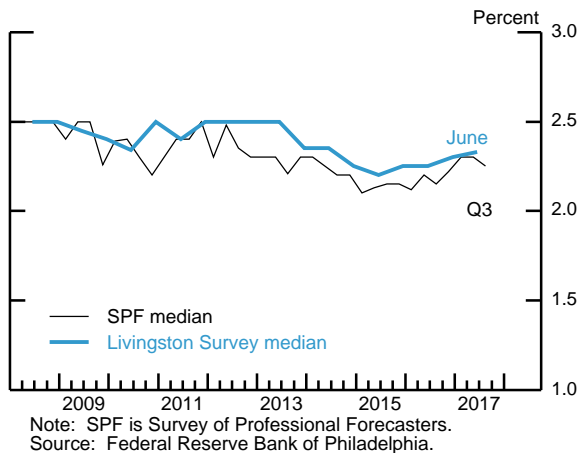
Note: Percent of employment.
 Source: U.S. Department of Labor, Bureau of Labor Statistics, Current Population Survey.

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

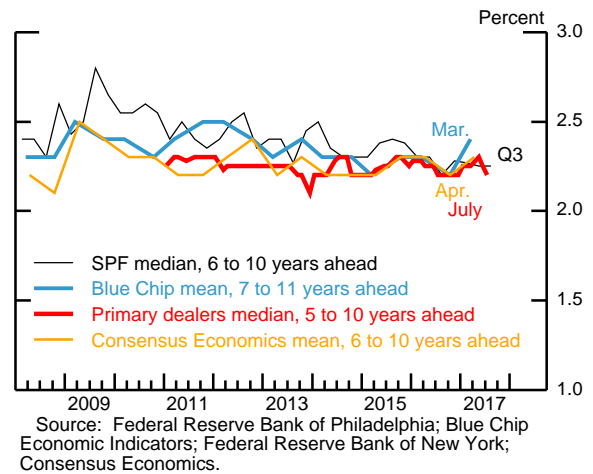
Note: The shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research. Output gaps are multiplied by negative 0.54 to facilitate comparison with the unemployment rate gap. Manufacturing capacity utilization gap is constructed by subtracting its average rate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

Survey Measures of Longer-Term Inflation Expectations

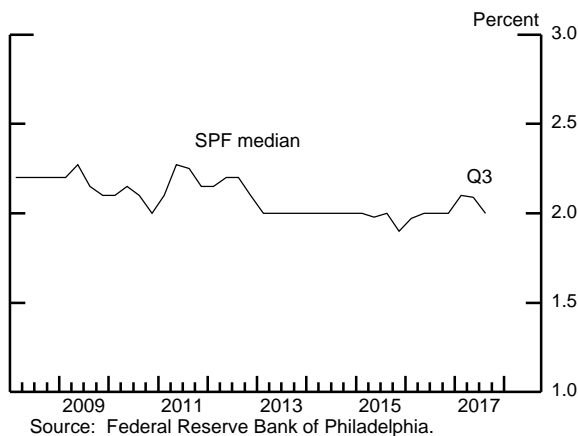
CPI Next 10 Years



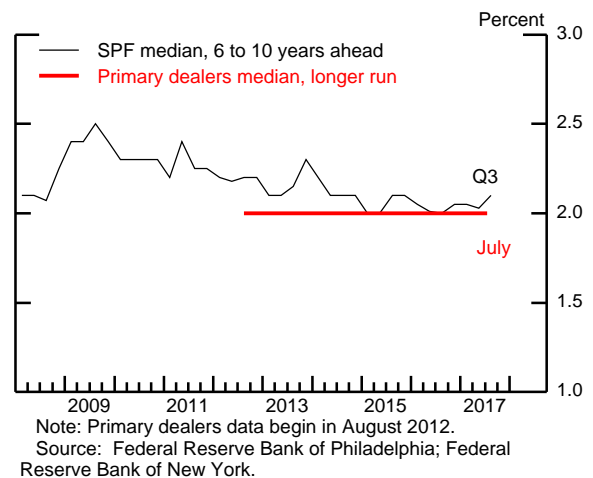
CPI Forward Expectations



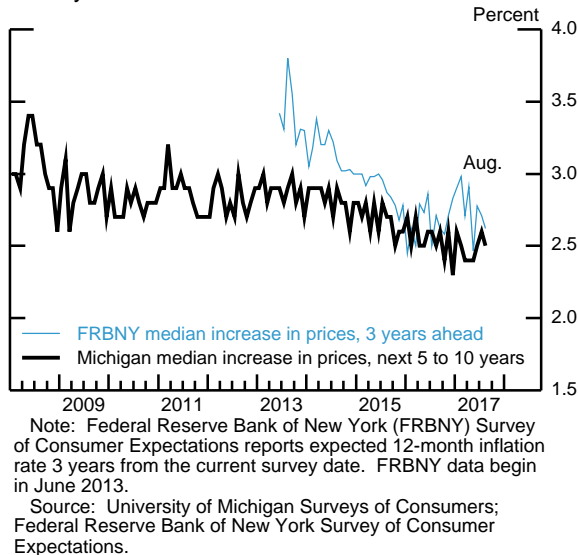
PCE Next 10 Years



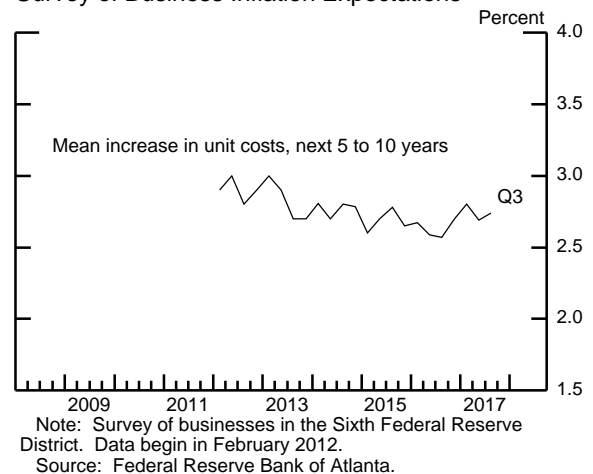
PCE Forward Expectations



Surveys of Consumers



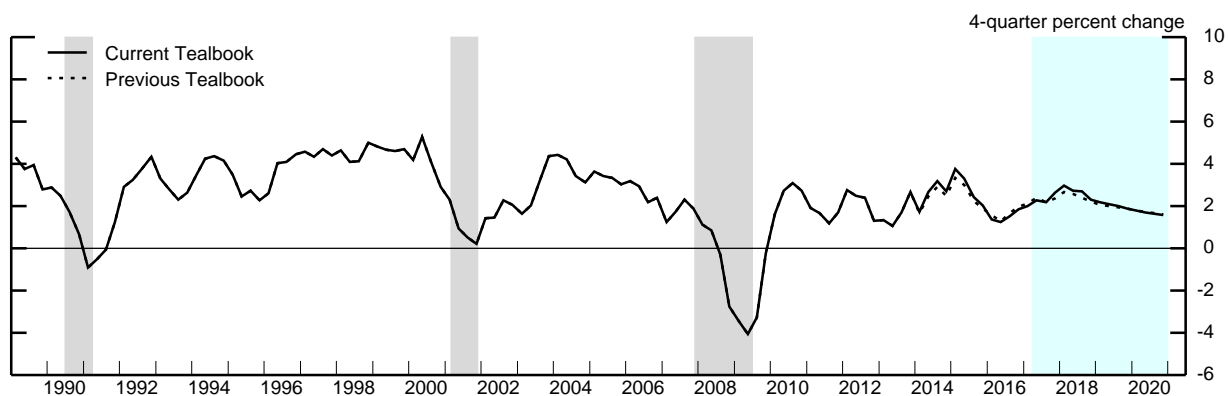
Survey of Business Inflation Expectations



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

Measure	2016	2017		2017	2018	2019	2020
		H1	H2				
Real GDP	1.8	2.3	3.0	2.6	2.3	1.9	1.6
Previous Tealbook	2.0	1.9	2.7	2.3	2.2	1.9	1.6
Final sales	1.9	2.9	2.8	2.9	2.4	1.9	1.6
Previous Tealbook	2.0	2.4	2.7	2.6	2.2	1.9	
Personal consumption expenditures	2.8	2.7	2.7	2.7	2.6	2.3	2.1
Previous Tealbook	3.1	2.1	2.8	2.4	2.6	2.4	
Residential investment	2.5	2.0	-1.2	.4	3.4	2.5	3.7
Previous Tealbook	1.1	2.8	-.8	1.0	3.8	5.1	
Nonresidential structures	3.5	11.0	-1.9	4.3	1.6	-.3	-1.2
Previous Tealbook	1.9	12.1	5.7	8.9	.8	-.2	
Equipment and intangibles	-.1	6.2	7.9	7.0	3.6	1.7	1.1
Previous Tealbook	-.6	5.9	4.6	5.2	3.4	1.9	
Federal purchases	-.3	-.3	.9	.3	-.4	.4	.2
Previous Tealbook	-.2	-.8	2.1	.6	-.2	.2	
State and local purchases	.8	-.3	.7	.2	.9	.9	.9
Previous Tealbook	.4	-.3	1.6	.6	.8	.8	
Exports	.6	5.4	3.9	4.6	4.6	4.2	2.9
Previous Tealbook	1.5	4.0	2.9	3.5	3.5	3.3	
Imports	2.7	3.0	2.1	2.6	3.8	3.8	3.7
Previous Tealbook	2.6	2.8	3.1	2.9	4.2	4.1	
Contributions to change in real GDP (percentage points)							
Inventory change	.0	-.7	.2	-.2	-.1	.0	.0
Previous Tealbook	.0	-.5	.1	-.2	.0	.0	
Net exports	-.3	.2	.2	.2	.0	-.1	-.2
Previous Tealbook	-.2	.1	-.1	.0	-.2	-.2	

Real GDP

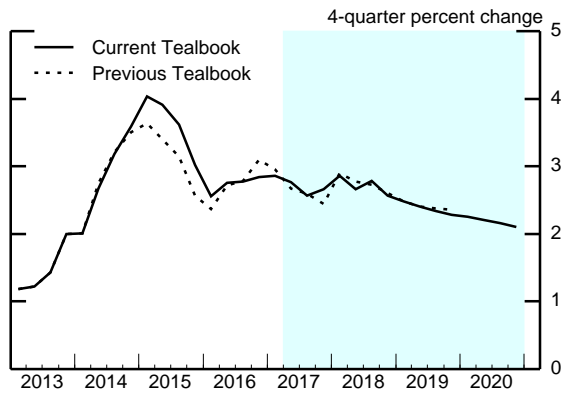


Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

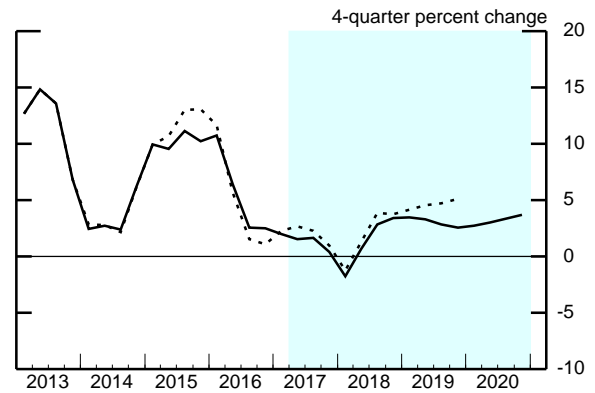
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Components of Final Demand

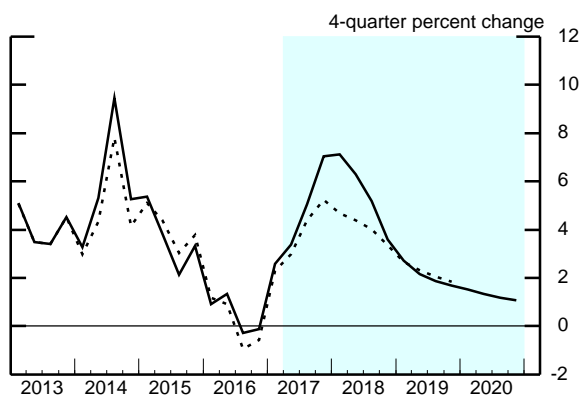
Personal Consumption Expenditures



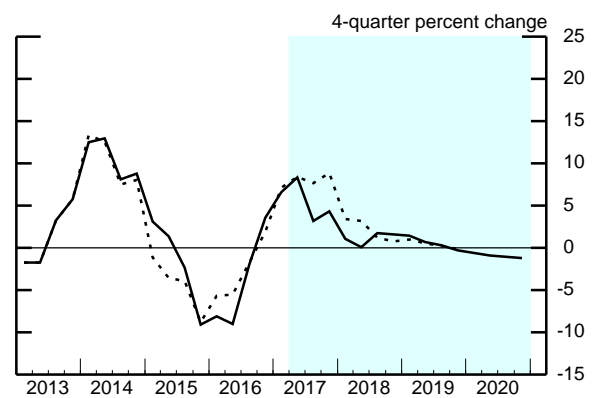
Residential Investment



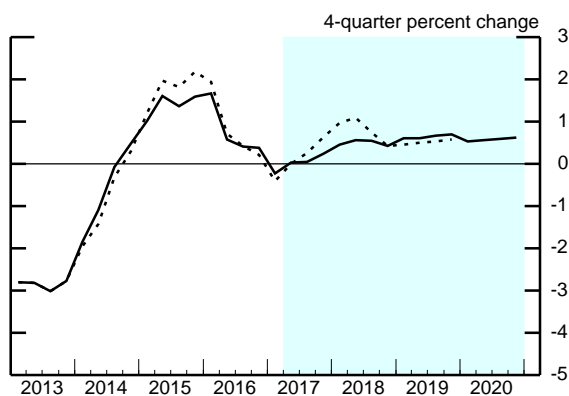
Equipment and Intangibles



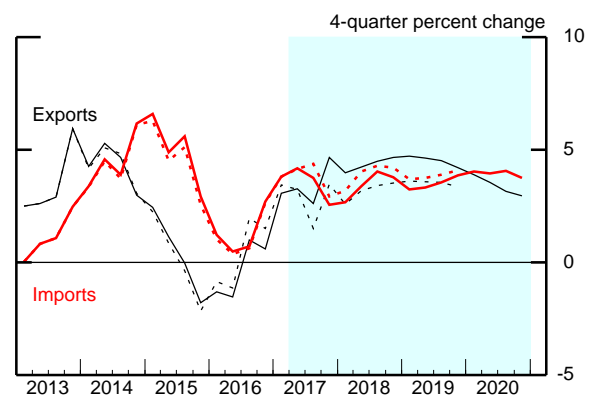
Nonresidential Structures



Government Consumption and Investment



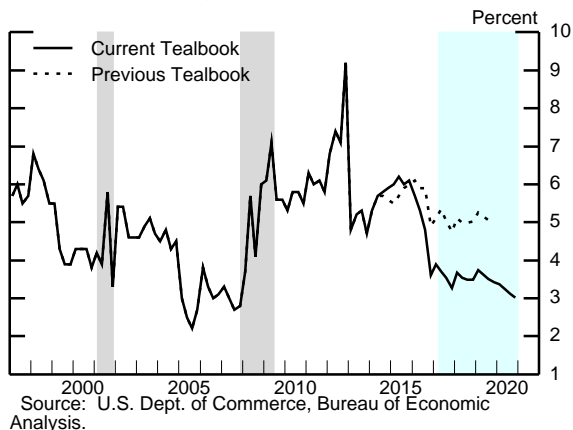
Exports and Imports



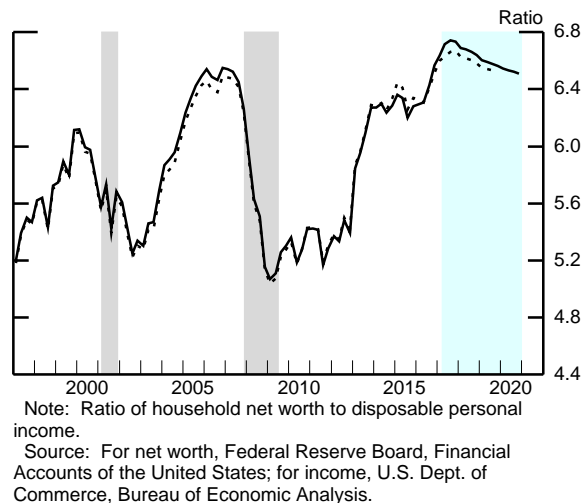
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Aspects of the Medium-Term Projection

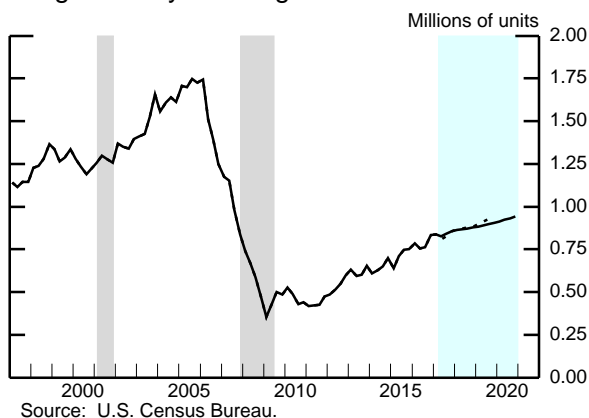
Personal Saving Rate



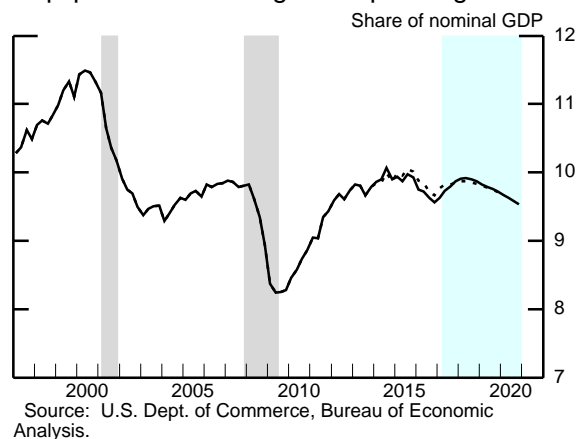
Wealth-to-Income Ratio



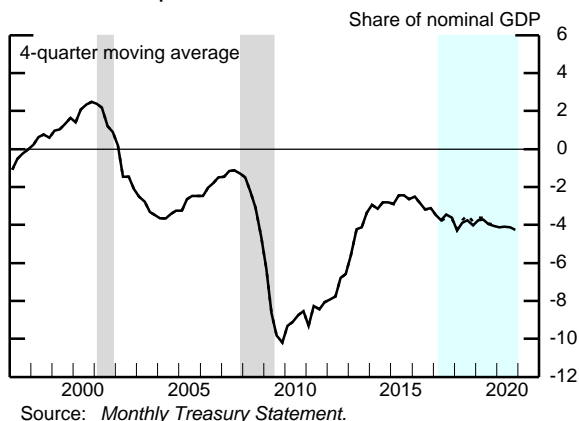
Single-Family Housing Starts



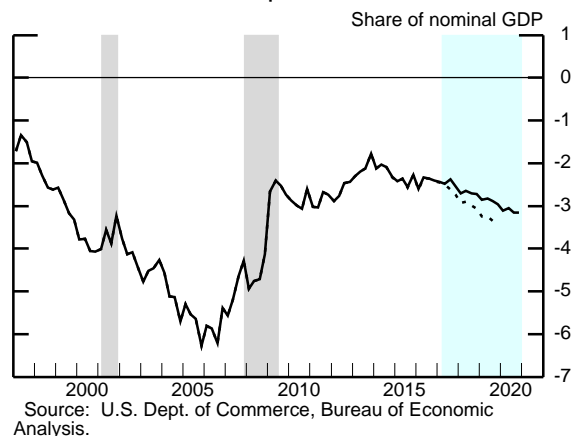
Equipment and Intangibles Spending



Federal Surplus/Deficit



Current Account Surplus/Deficit



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	2020
Potential real GDP	3.1	3.4	2.6	1.6	1.2	1.4	1.5	1.6	1.7	1.7
Previous Tealbook	3.1	3.4	2.6	1.6	1.1	1.4	1.5	1.6	1.7	1.7
<i>Selected contributions¹</i>										
Structural labor productivity ²	1.6	2.9	2.8	1.4	.8	.8	1.1	1.2	1.3	1.3
Previous Tealbook	1.6	2.9	2.8	1.4	.8	.9	1.1	1.2	1.3	1.3
Capital deepening	.6	1.5	1.0	.3	.5	.5	.5	.5	.5	.4
Multifactor productivity	.7	1.0	1.5	.9	.1	.1	.4	.4	.6	.7
Structural hours	1.6	1.2	.8	.0	.6	.8	.1	.5	.5	.5
Previous Tealbook	1.6	1.2	.8	.0	.6	.7	.1	.4	.4	.5
Labor force participation	.4	-.1	-.2	-.5	-.6	-.3	-.3	-.4	-.4	-.4
Previous Tealbook	.4	-.1	-.2	-.5	-.6	-.4	-.4	-.4	-.4	-.4
Memo:										
GDP gap ³	-1.9	2.4	.8	-4.2	-.1	.3	1.4	2.1	2.2	2.0
Previous Tealbook	-1.9	2.4	.8	-4.2	.0	.5	1.3	1.9	2.0	1.9

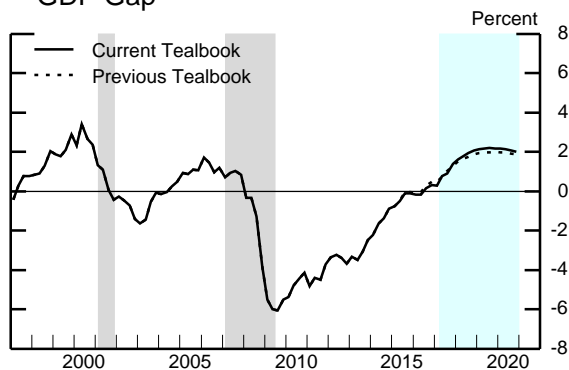
Note: For multiyear periods, the percent change is the annual average from Q4 of the year preceding the first year shown to Q4 of the last year shown.

1. Percentage points.

2. Total business sector.

3. Percent difference between actual and potential GDP in the final quarter of the period indicated. A negative number indicates that the economy is operating below potential.

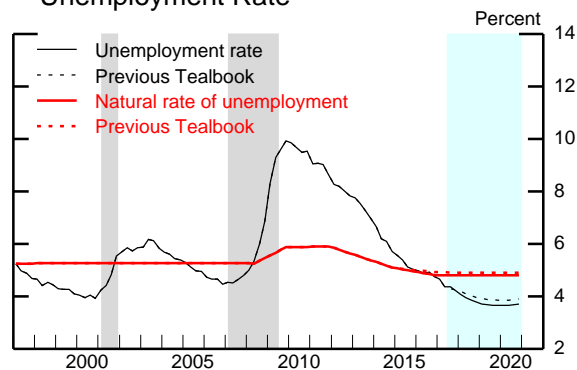
GDP Gap



Note: The GDP gap is the percent difference between actual and potential GDP; a negative number indicates that the economy is operating below potential.

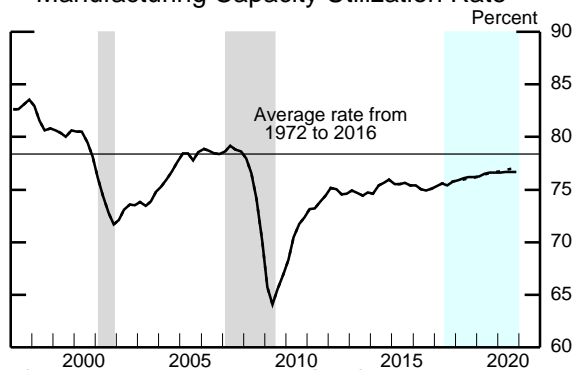
Source: U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

Unemployment Rate



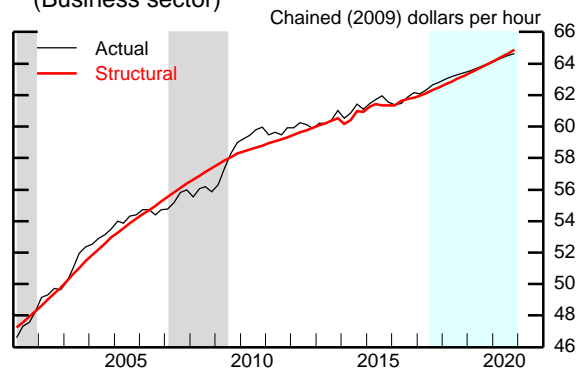
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

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	2020
		H1	H2				
Output per hour, business ¹	1.0	.4	1.7	1.0	.9	.9	1.0
Previous Tealbook	1.2	.0	2.0	1.0	.9	.9	
Nonfarm payroll employment ²	187	177	186	181	179	122	109
Previous Tealbook	187	180	174	177	167	122	
Private employment ²	170	174	185	179	170	113	100
Previous Tealbook	170	171	162	167	158	113	
Labor force participation rate ³	62.7	62.8	62.8	62.8	62.6	62.5	62.4
Previous Tealbook	62.7	62.8	62.7	62.7	62.5	62.3	
Civilian unemployment rate ³	4.7	4.4	4.2	4.2	3.8	3.7	3.7
Previous Tealbook	4.7	4.4	4.2	4.2	4.0	3.8	3.9

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	2020
		H1	H2				
<i>Percent change at annual rate from final quarter of preceding period</i>							
PCE chain-weighted price index	1.6	1.2	1.9	1.5	1.9	2.0	2.0
	1.4	1.3	1.5	1.4	1.9	2.0	2.0
Food and beverages	-1.7	1.2	1.4	1.3	2.2	2.3	2.2
	-1.7	1.3	1.7	1.5	2.2	2.3	
Energy	2.2	-1.5	8.4	3.4	-8	.9	1.2
	.8	-1.5	-1.5	-1.5	2.2	1.7	
Excluding food and energy	1.9	1.4	1.6	1.5	1.9	2.0	2.0
	1.7	1.4	1.6	1.5	1.9	2.0	2.0
Prices of core goods imports ¹	-.2	1.2	3.8	2.5	1.1	.7	.7
	.0	1.2	2.8	2.0	.7	.7	
	June 2017	July 2017	Aug. 2017 ²	Sept. 2017 ²	Oct. 2017 ²	Nov. 2017 ²	Dec. 2017 ²
<i>12-month percent change</i>							
PCE chain-weighted price index	1.4	1.4	1.5	1.9	1.7	1.5	1.5
	1.4	1.5	1.5	1.4	1.3	1.4	1.4
Excluding food and energy	1.5	1.4	1.3	1.4	1.4	1.5	1.5
	1.4	1.4	1.4	1.4	1.4	1.5	1.5

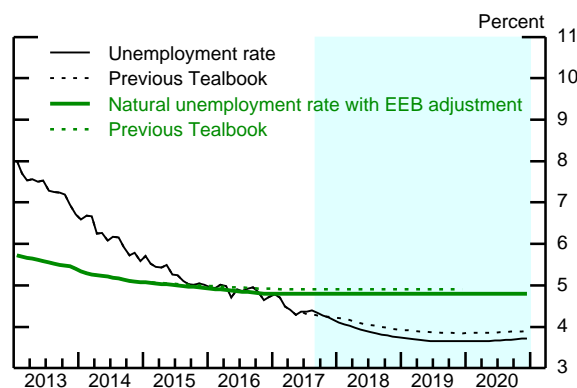
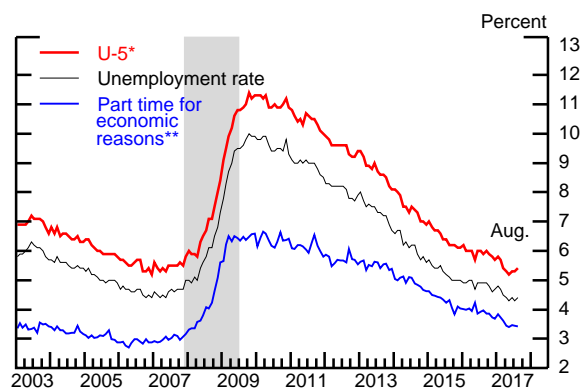
1. Core goods imports exclude computers, semiconductors, oil, and natural gas.

2. Staff forecast.

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

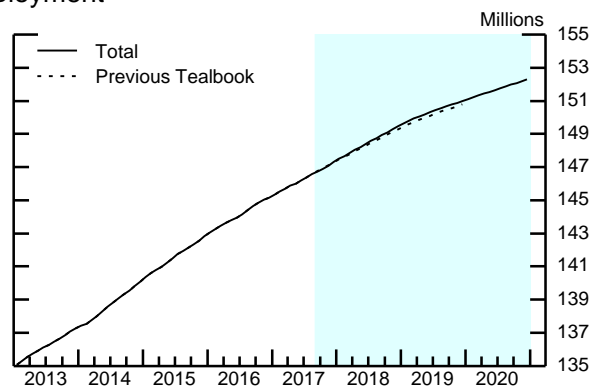
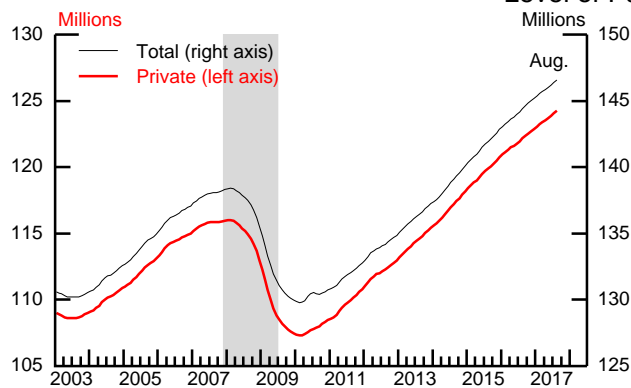
Labor Market Developments and Outlook (1)

Measures of Labor Underutilization



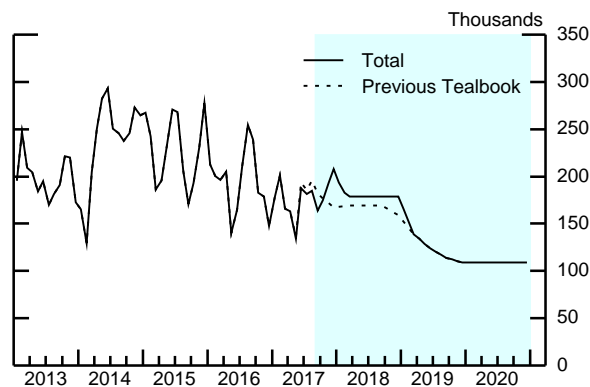
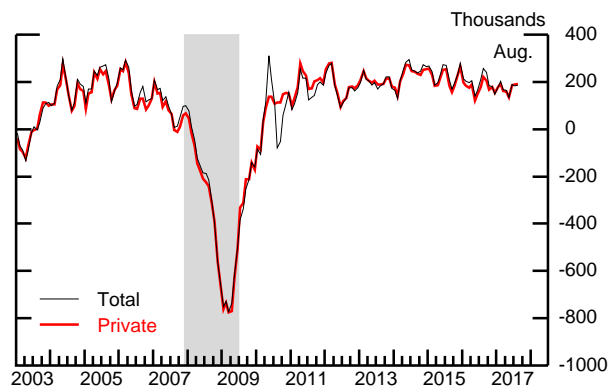
* U-5 measures total unemployed persons plus all marginally attached to the labor force, as a percent of the labor force plus persons marginally attached to the labor force.
 ** Percent of Current Population Survey employment.
 EEB Extended and emergency unemployment benefits.
 Source: U.S. Department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

Level of Payroll Employment*



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

Change in Payroll Employment*

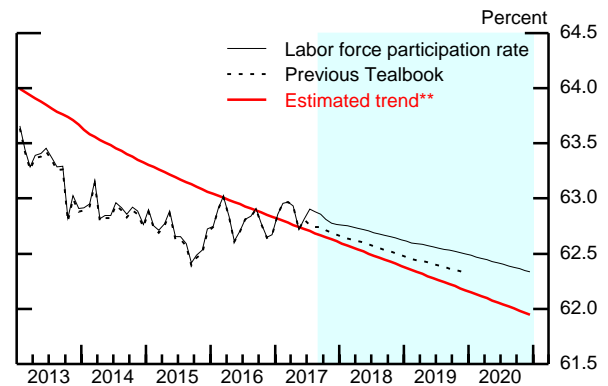
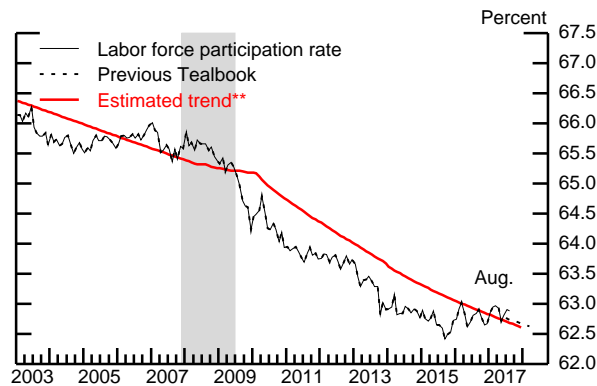


* 3-month moving averages.
 Source: U.S. Department of Labor, Bureau of Labor Statistics.

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

Labor Market Developments and Outlook (2)

Labor Force Participation Rate*

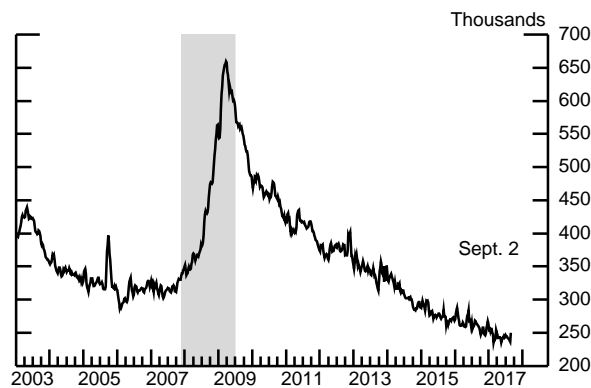


* Published data adjusted by staff to account for changes in population weights.

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

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

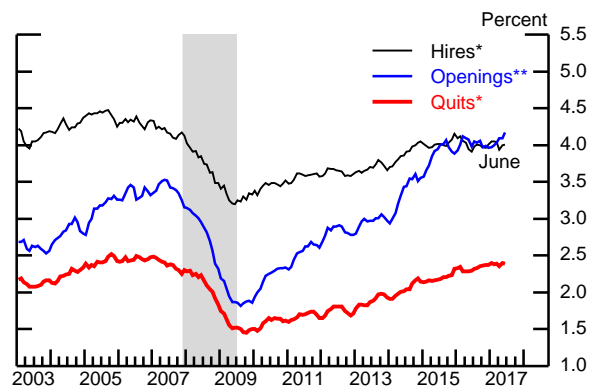
Initial Unemployment Insurance Claims*



* 4-week moving average.

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

Hires, Quits, and Job Openings

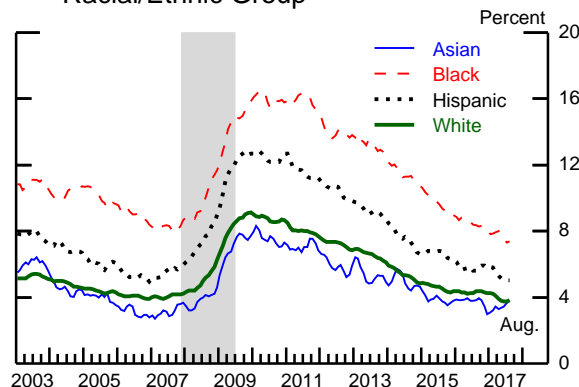


* Percent of private nonfarm payroll employment, 3-month moving average.

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

Source: Job Openings and Labor Turnover Survey.

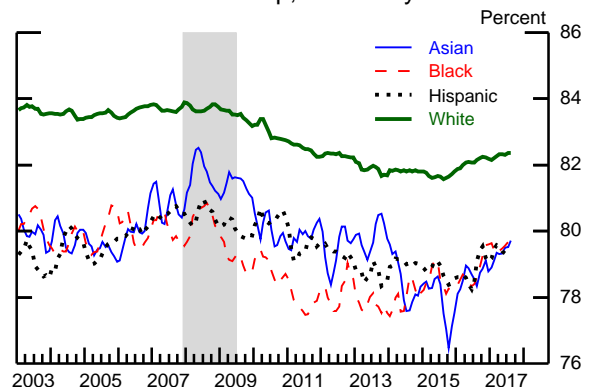
Unemployment Rate by Racial/Ethnic Group



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

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

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



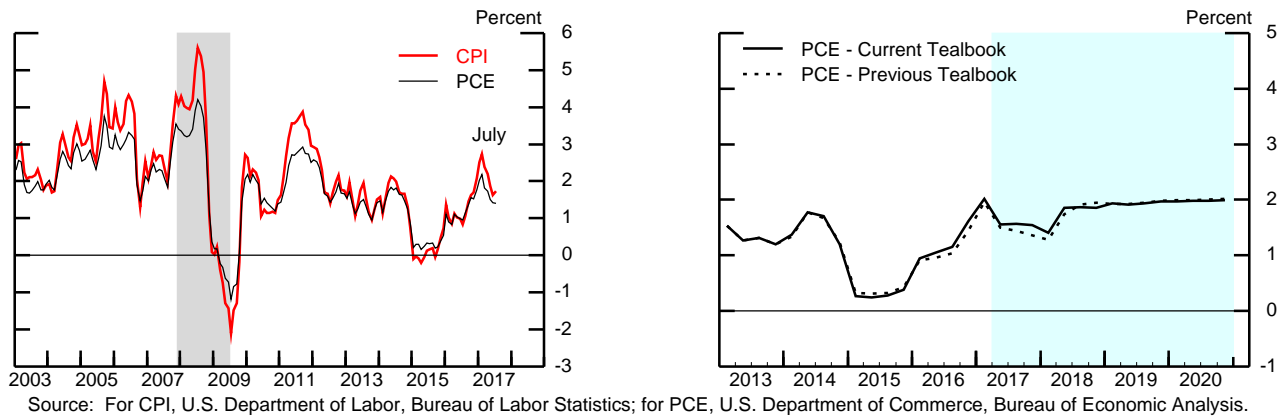
Note: These categories are not mutually exclusive, as the ethnicity Hispanic may include people of any race. The Current Population Survey defines Hispanic ethnicity as those who report their origin is Mexican, Puerto Rican, Cuban, Central American, or South American (and some others). 3-month moving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

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

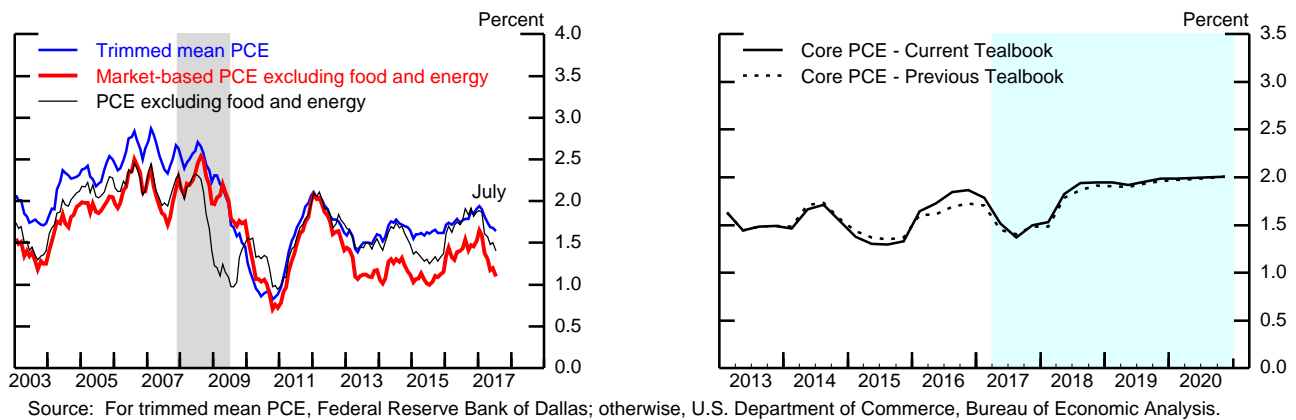
Inflation Developments and Outlook (1)

(Percent change from year-earlier period)

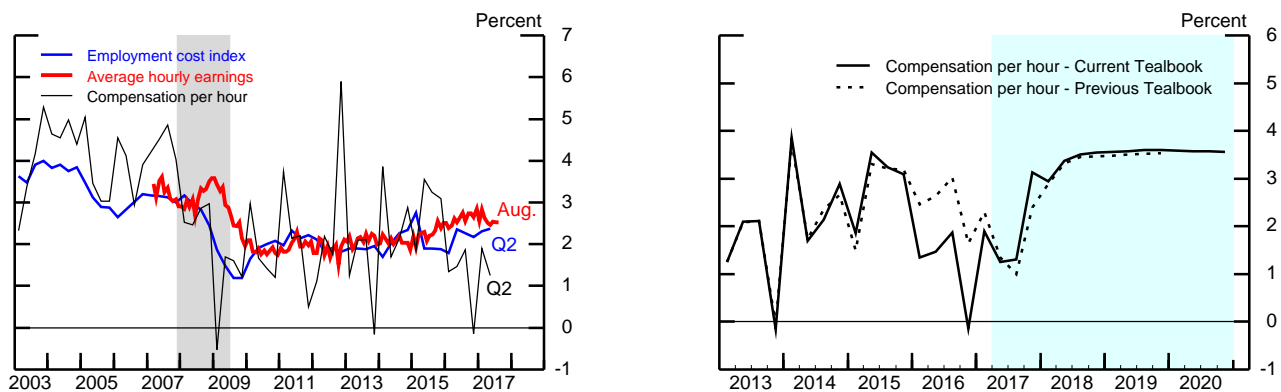
Headline Consumer Price Inflation



Measures of Underlying PCE Price Inflation



Labor Cost Growth

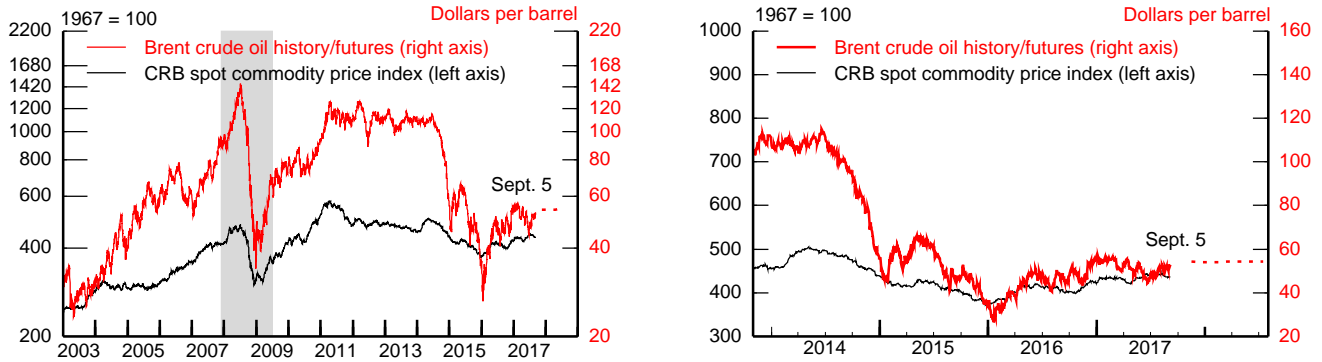


Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

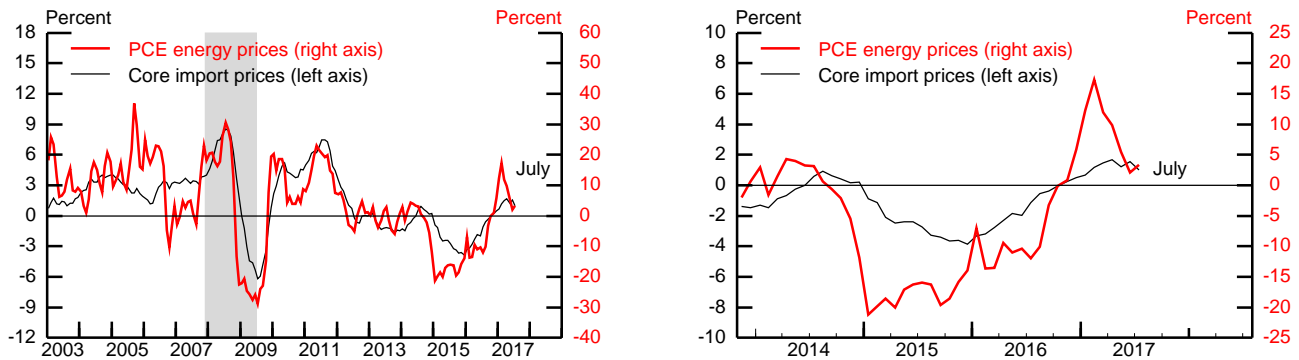
Inflation Developments and Outlook (2)

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

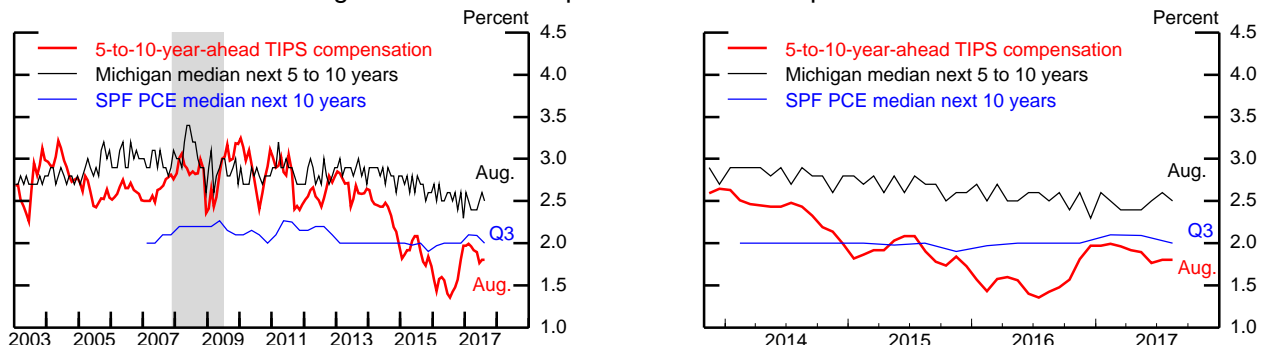
Commodity and Oil Price Levels



Energy and Import Price Inflation



Long-Term Inflation Expectations and Compensation



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

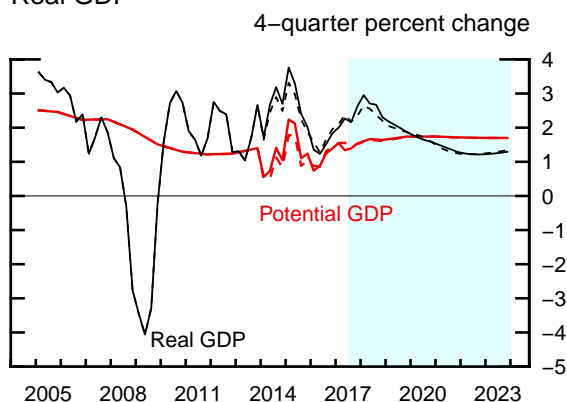
The Long–Term Outlook

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

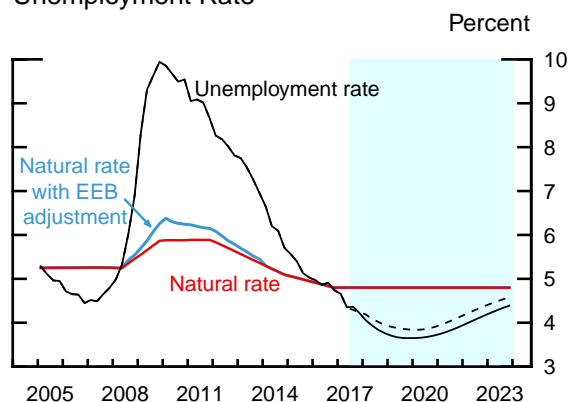
Measure	2017	2018	2019	2020	2021	2022	2023	Longer run
Real GDP	2.6	2.3	1.9	1.6	1.3	1.2	1.3	1.7
Previous Tealbook	2.3	2.2	1.9	1.6	1.2	1.2	1.3	1.7
Civilian unemployment rate ¹	4.2	3.8	3.7	3.7	3.9	4.2	4.4	4.8
Previous Tealbook	4.2	4.0	3.8	3.9	4.1	4.4	4.6	4.9
PCE prices, total	1.5	1.9	2.0	2.0	2.1	2.1	2.1	2.0
Previous Tealbook	1.4	1.9	2.0	2.0	2.1	2.1	2.1	2.0
Core PCE prices	1.5	1.9	2.0	2.0	2.1	2.1	2.1	2.0
Previous Tealbook	1.5	1.9	2.0	2.0	2.1	2.1	2.1	2.0
Federal funds rate ¹	1.42	2.62	3.47	3.93	4.05	3.93	3.69	2.50
Previous Tealbook	1.41	2.51	3.31	3.77	3.87	3.75	3.51	2.50
10-year Treasury yield ¹	2.6	3.3	3.5	3.5	3.4	3.3	3.2	2.9
Previous Tealbook	2.7	3.2	3.4	3.4	3.3	3.2	3.2	2.9

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

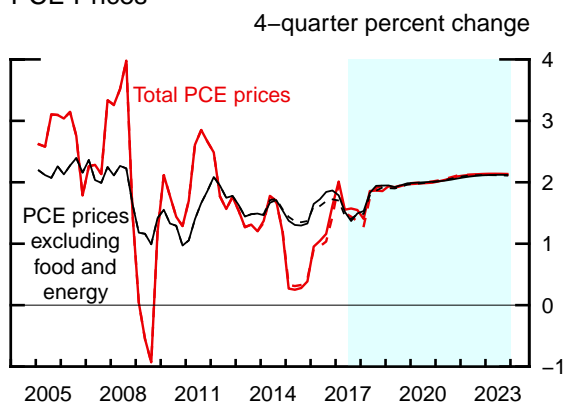
Real GDP



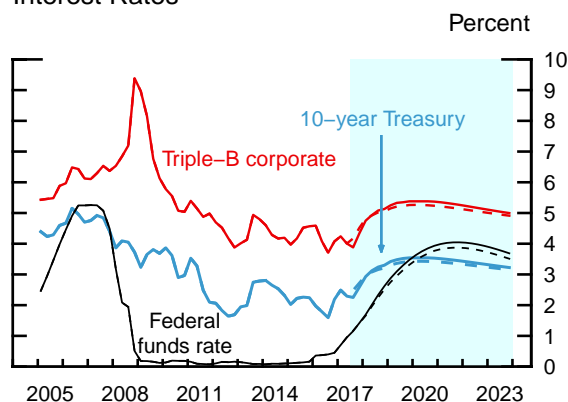
Unemployment Rate



PCE Prices



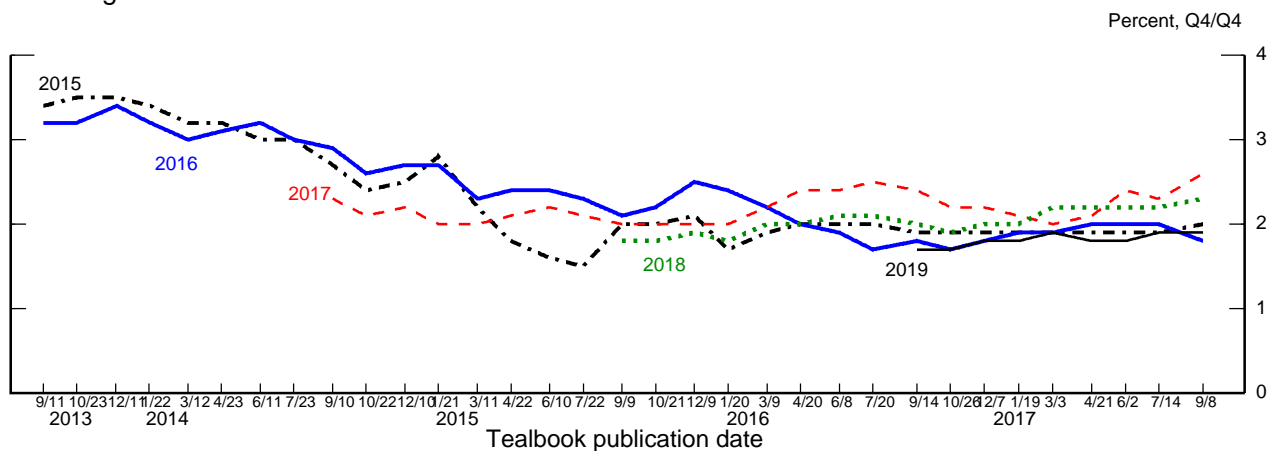
Interest Rates



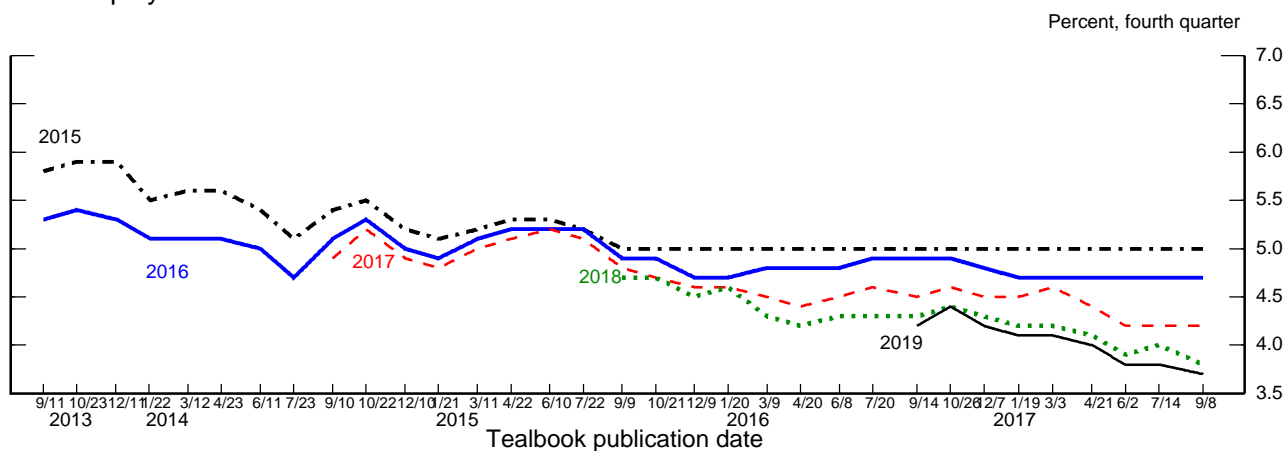
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

Evolution of the Staff Forecast

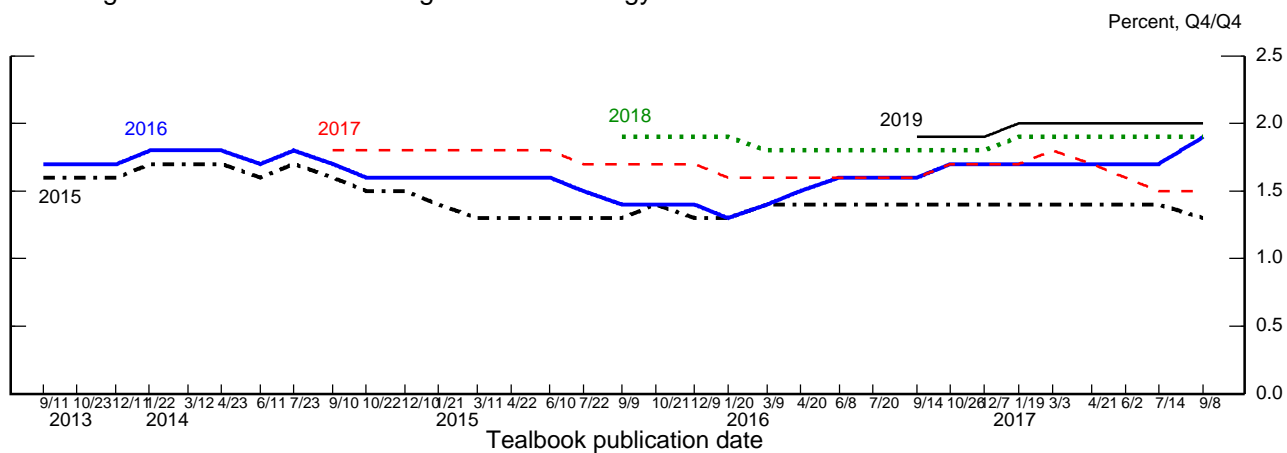
Change in Real GDP



Unemployment Rate



Change in PCE Prices excluding Food and Energy



The Foreign GDP Outlook

Real GDP*

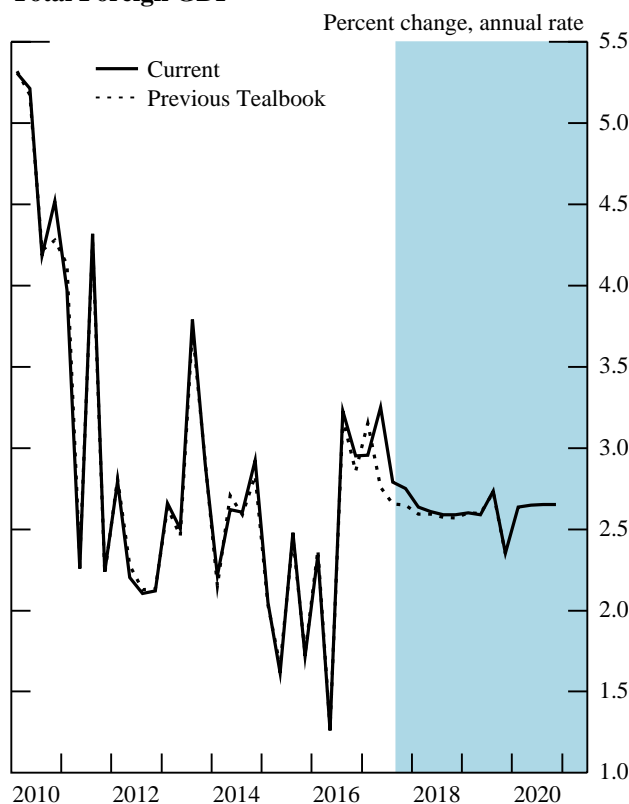
Percent change, annual rate

	2016	2017				2018	2019	2020
		Q1	Q2	Q3	Q4			
1. Total Foreign	2.4	3.0	3.3	2.8	2.8	2.6	2.6	2.6
Previous Tealbook	2.4	3.2	2.8	2.7	2.6	2.6	2.6	...
2. Advanced Foreign Economies	1.9	2.6	3.3	2.4	2.1	1.7	1.6	1.7
Previous Tealbook	1.9	2.6	2.4	2.1	1.9	1.7	1.6	...
3. Canada	2.0	3.7	4.5	2.7	2.4	1.7	1.7	1.7
4. Euro Area	1.9	2.2	2.6	2.3	2.1	1.8	1.7	1.7
5. Japan	1.7	1.2	2.5	1.8	1.5	1.0	.0	.5
6. United Kingdom	1.9	.9	1.2	1.4	1.7	1.7	1.7	1.7
7. Emerging Market Economies	2.9	3.3	3.2	3.2	3.4	3.5	3.5	3.6
Previous Tealbook	2.9	3.7	3.1	3.2	3.3	3.4	3.5	...
8. China	6.8	7.1	6.8	6.5	6.3	6.1	6.0	5.8
9. Emerging Asia ex. China	3.5	4.3	3.4	3.6	3.9	3.7	3.6	3.5
10. Mexico	2.3	2.7	2.3	2.0	2.3	2.6	2.7	2.9
11. Brazil	-2.4	4.2	1.0	1.6	1.9	2.0	2.2	2.3

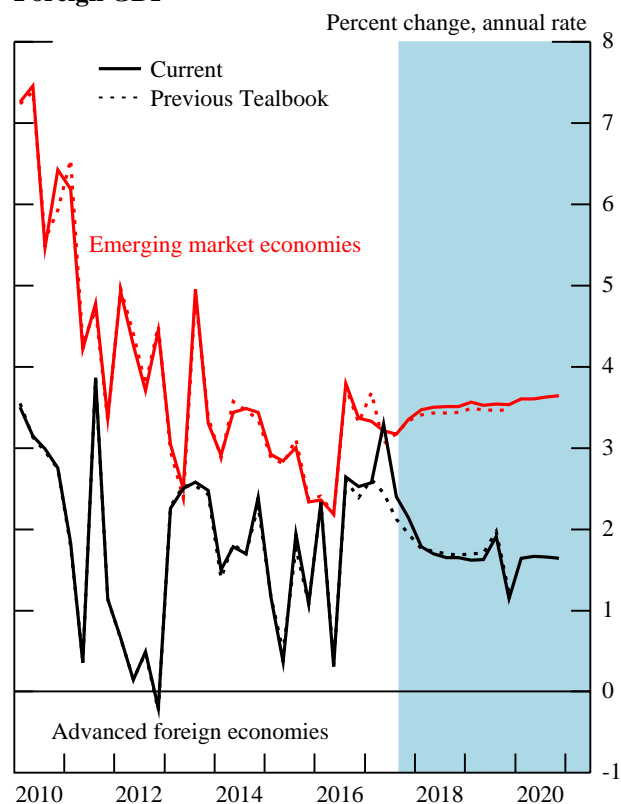
* GDP aggregates weighted by shares of U.S. merchandise exports.

... indicates not applicable. This is the first time we have included a Tealbook forecast for 2020.

Total Foreign GDP



Foreign GDP



The Foreign Inflation Outlook

Consumer Prices*

Percent change, annual rate

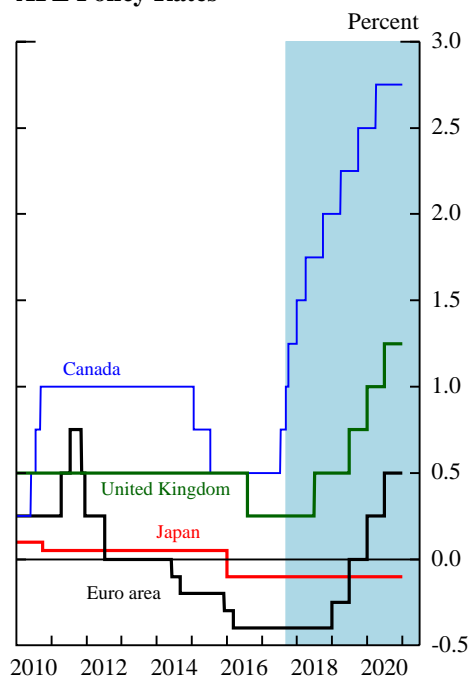
	2016	2017				2018	2019	2020
		Q1	Q2	Q3	Q4			
1. Total Foreign	1.9	2.9	2.0	1.9	2.4	2.4	2.5	2.5
Previous Tealbook	1.9	3.0	2.2	2.2	2.3	2.4	2.5	...
2. Advanced Foreign Economies	.9	2.3	.3	1.0	1.4	1.5	1.9	1.7
Previous Tealbook	.9	2.3	.6	1.1	1.3	1.5	1.9	...
3. Canada	1.4	2.6	.1	1.6	1.9	2.0	2.0	2.0
4. Euro Area	.7	2.8	.1	.7	1.3	1.4	1.6	1.8
5. Japan	.3	-.1	-.3	.3	.5	.7	2.3	1.1
6. United Kingdom	1.2	3.9	3.0	2.0	2.6	2.3	2.1	2.0
7. Emerging Market Economies	2.7	3.3	3.2	2.5	3.0	3.1	3.0	3.0
Previous Tealbook	2.7	3.4	3.3	3.0	3.1	3.0	3.0	...
8. China	2.2	-.6	2.3	1.5	2.5	2.5	2.5	2.5
9. Emerging Asia ex. China	1.8	3.6	.6	1.5	2.7	3.1	3.1	3.1
10. Mexico	3.2	9.9	6.9	4.7	3.4	3.2	3.2	3.2
11. Brazil	7.1	3.2	2.3	2.8	4.4	4.3	4.3	4.3

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

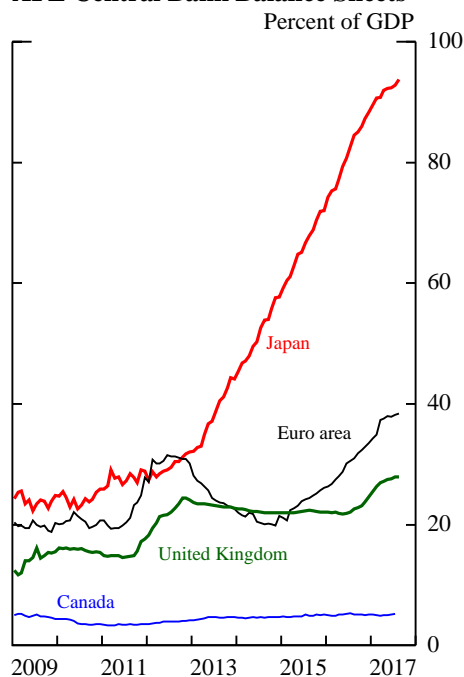
... indicates not applicable. This is the first time we have included a Tealbook forecast for 2020.

Foreign Monetary Policy

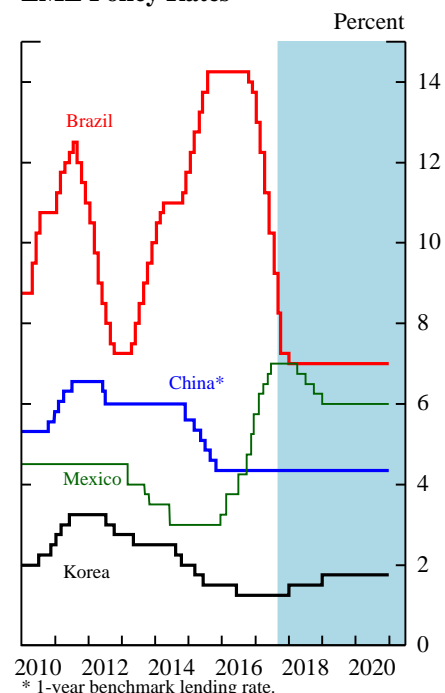
AFE Policy Rates



AFE Central Bank Balance Sheets



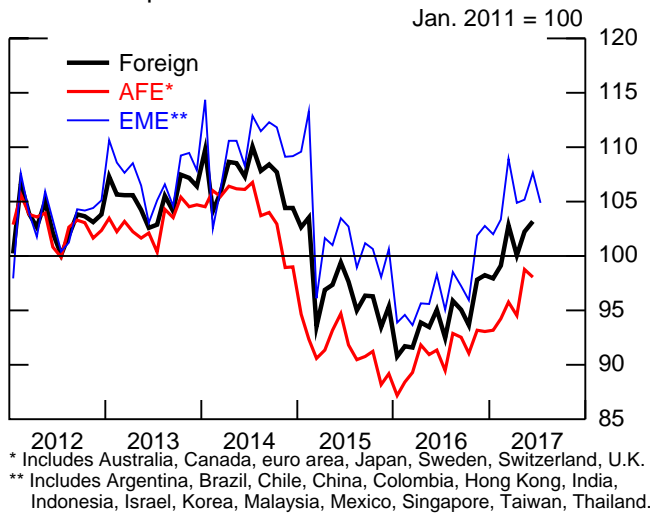
EME Policy Rates



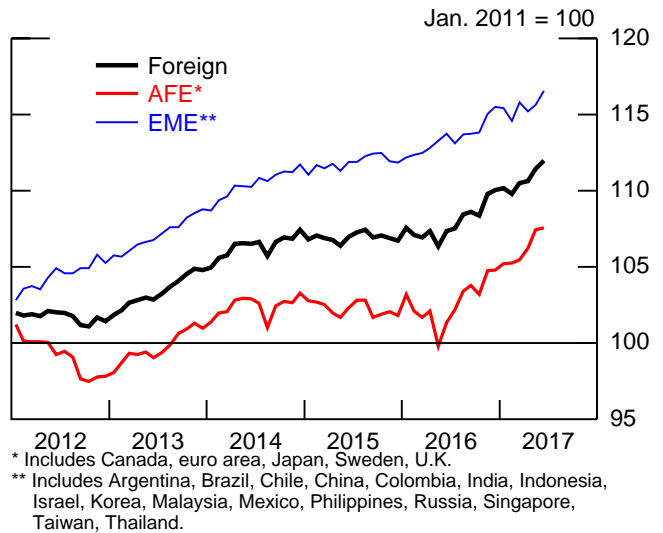
* 1-year benchmark lending rate.

Recent Foreign Indicators

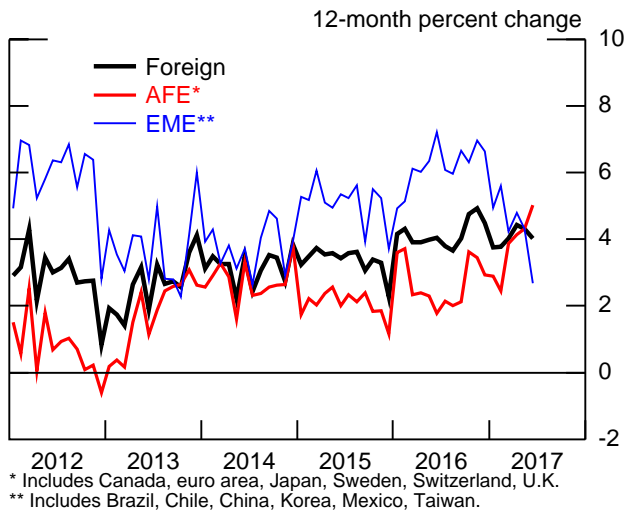
Nominal Exports



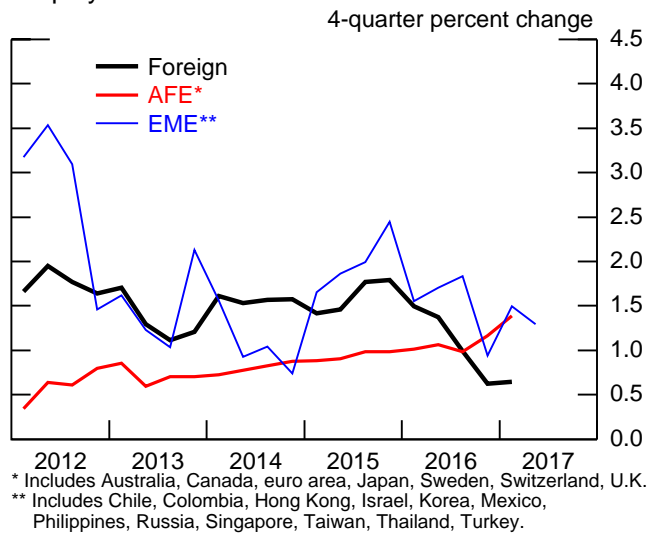
Industrial Production



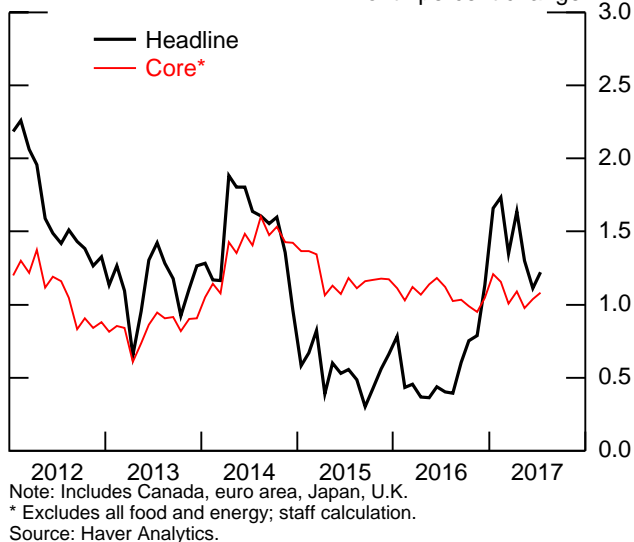
Retail Sales



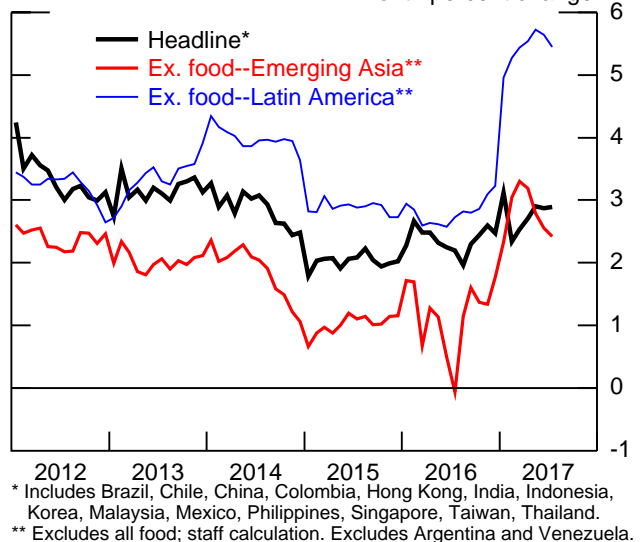
Employment



Consumer Prices: Advanced Foreign Economies

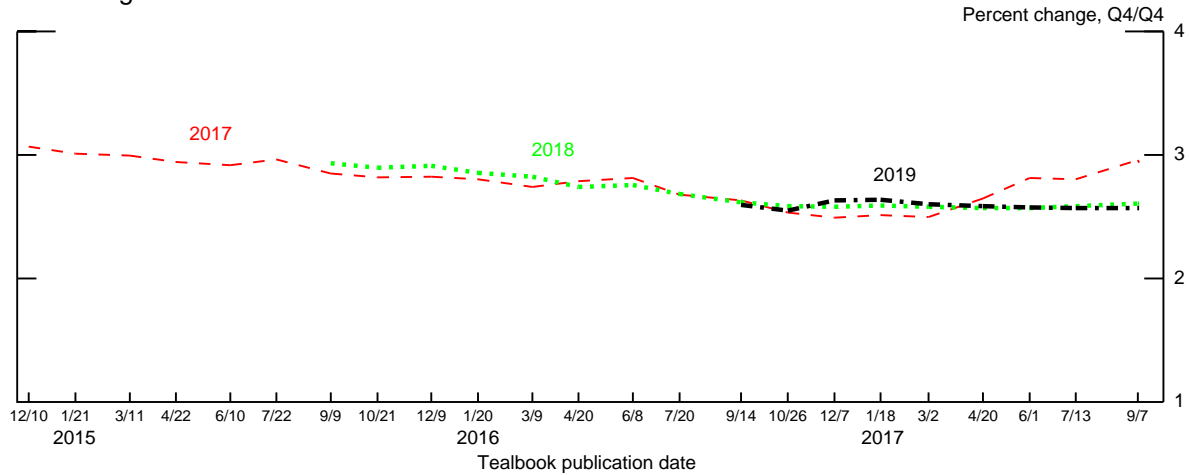


Consumer Prices: Emerging Market Economies

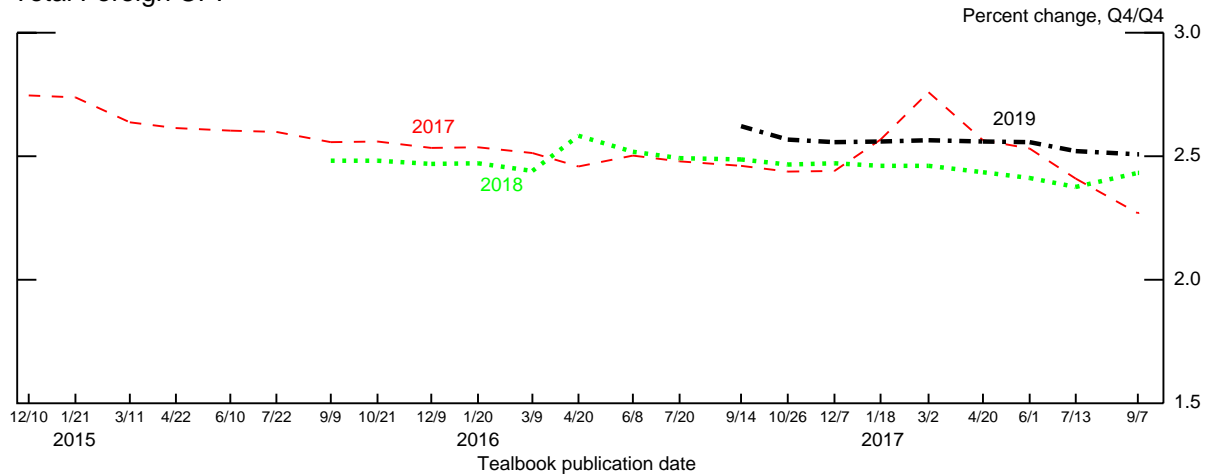


Evolution of Staff's International Forecast

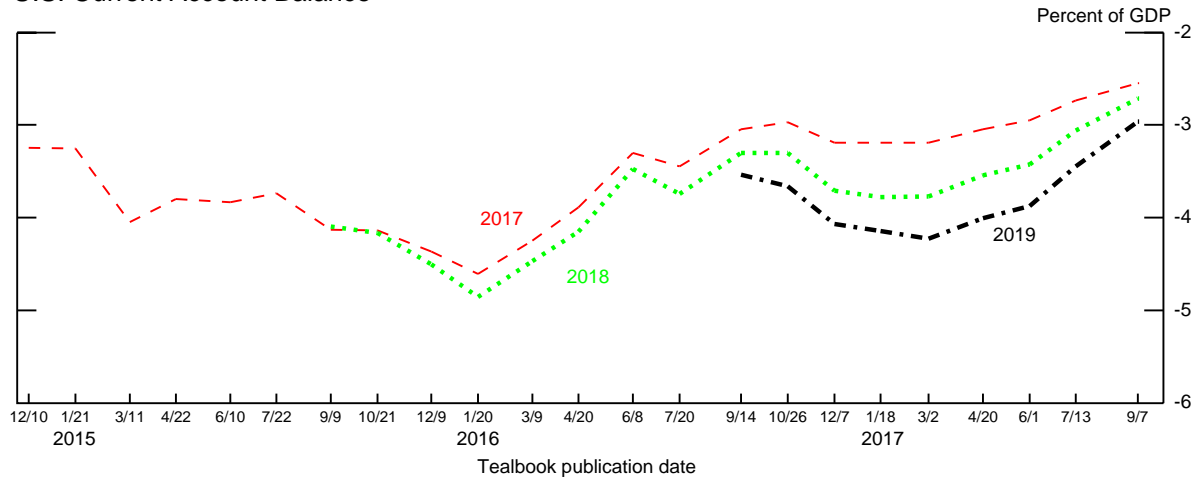
Total Foreign GDP



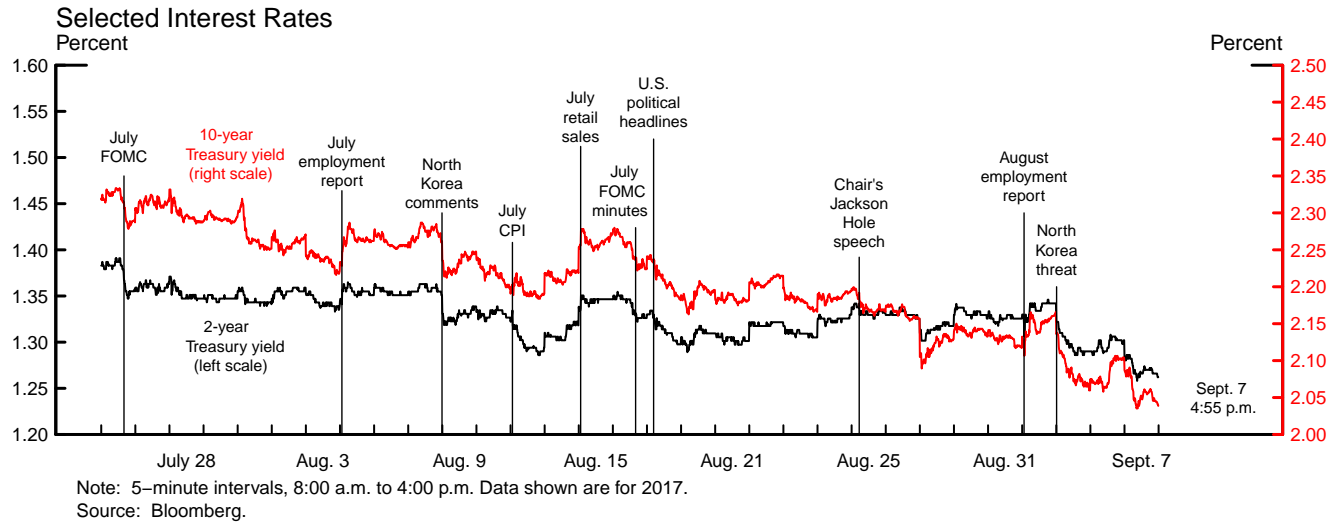
Total Foreign CPI



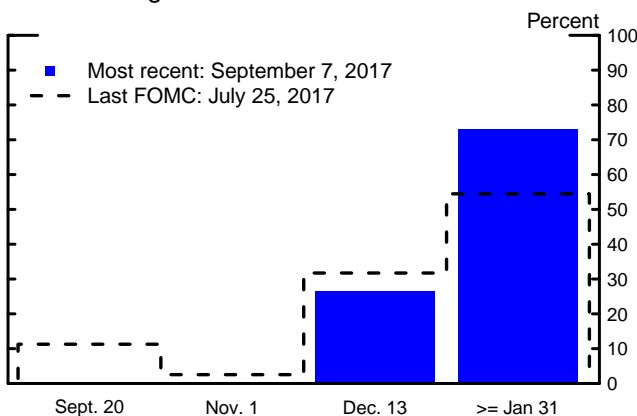
U.S. Current Account Balance



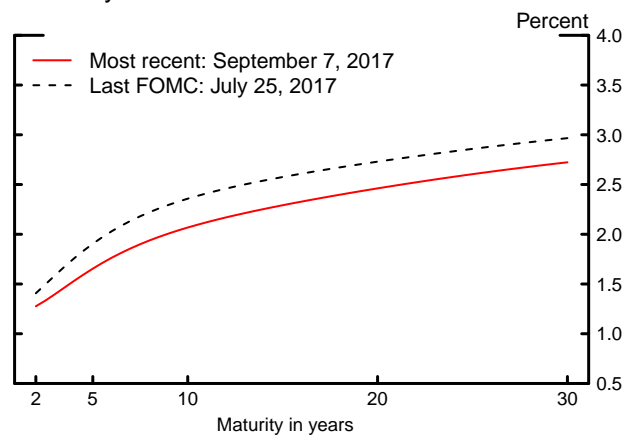
Policy Expectations and Treasury Yields



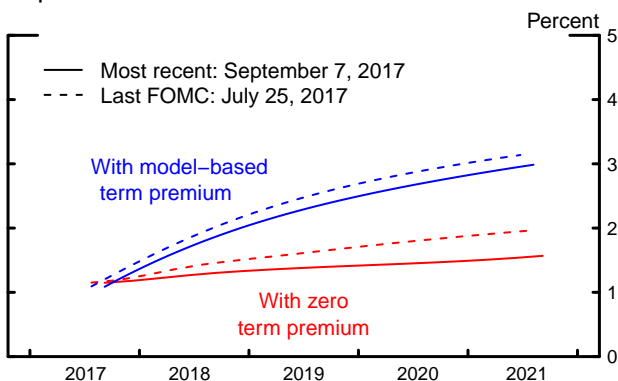
Market-Implied Probability Distribution of the Timing of Next Rate Increase



Treasury Yield Curve



Implied Federal Funds Rate

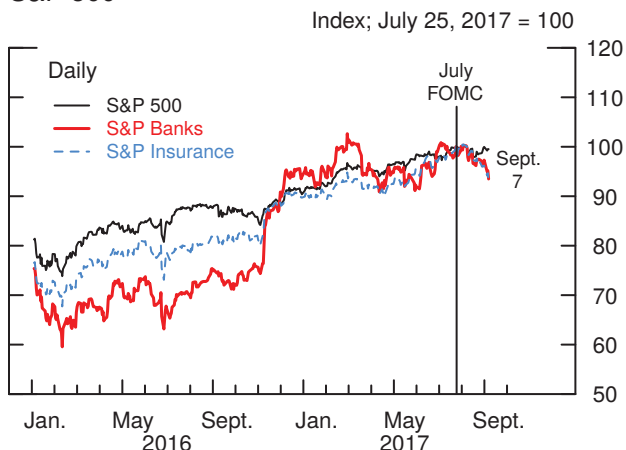


Inflation Compensation



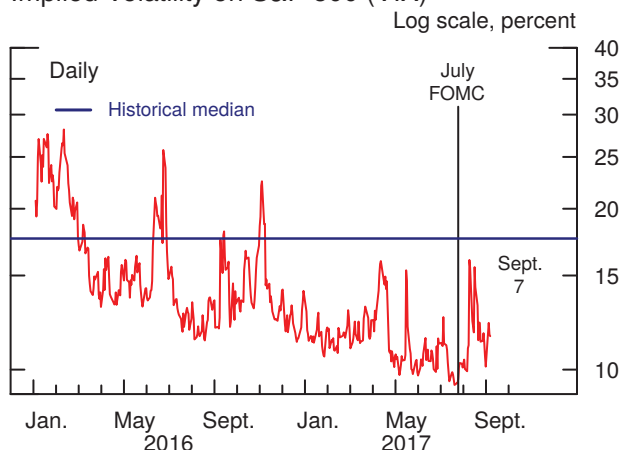
Corporate Asset Market Developments

S&P 500



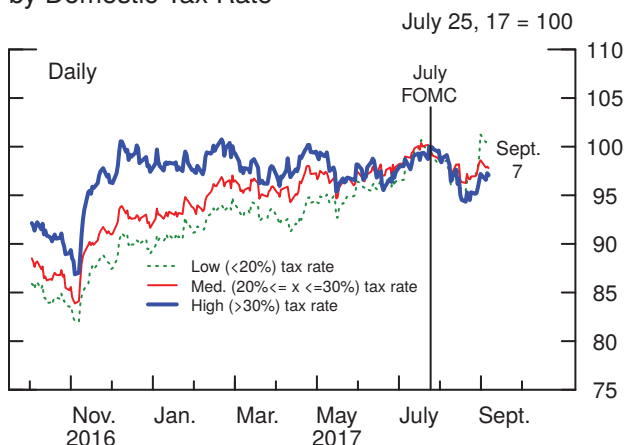
Source: Bloomberg.

Implied Volatility on S&P 500 (VIX)



Note: Historical median is taken from 1990 onward.
Source: Chicago Board Options Exchange.

Equal-Weighted Stock Returns, by Domestic Tax Rate



Note: The data include large firms excluding those in the financial and energy sectors. Tax rates are measured as U.S. taxes over pretax income.

Source: Bloomberg.

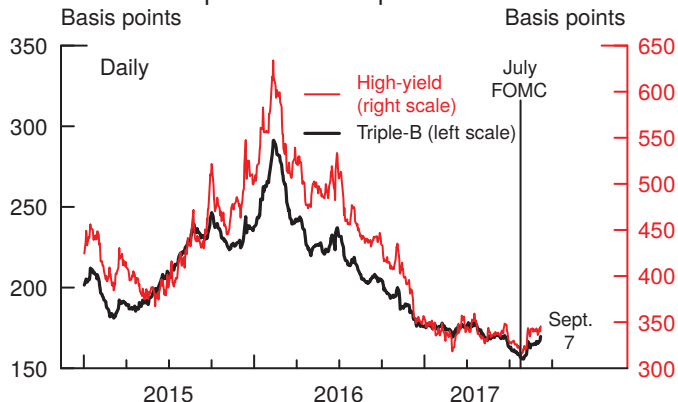
Equity Risk Premium



* 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.

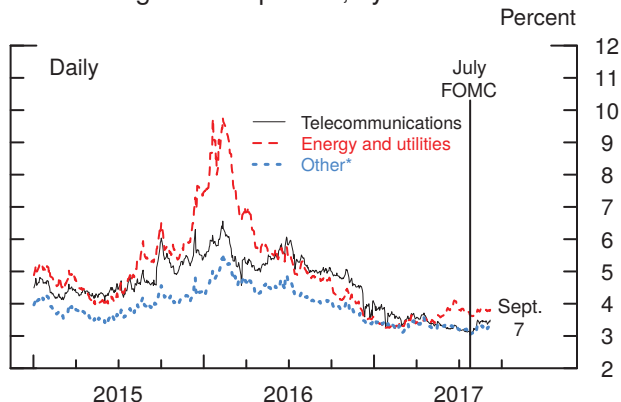
10-Year Corporate Bond Spreads



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.

10-Year High-Yield Spreads, by Sector



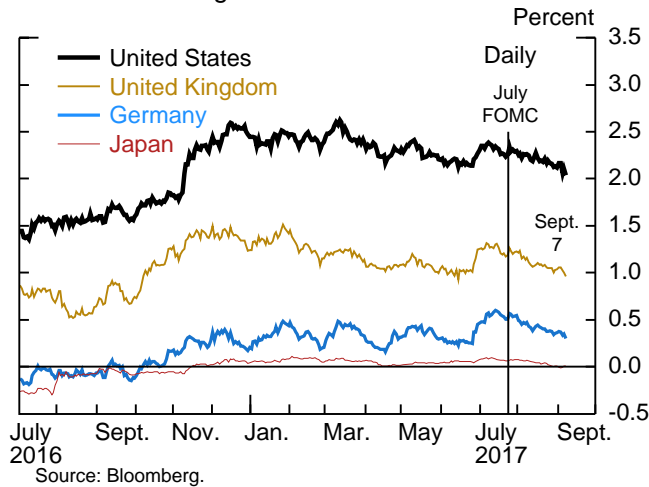
Note: Spreads over 10-year Treasury yield.

* Includes high-yield firms that are not in the energy, utility, or telecommunications sector.

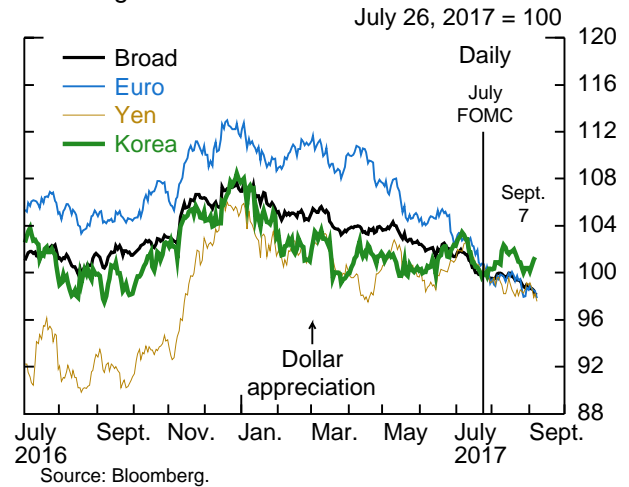
Source: Staff estimates of smoothed corporate yield curves based on Merrill Lynch data and smoothed Treasury yield curve.

Foreign Developments

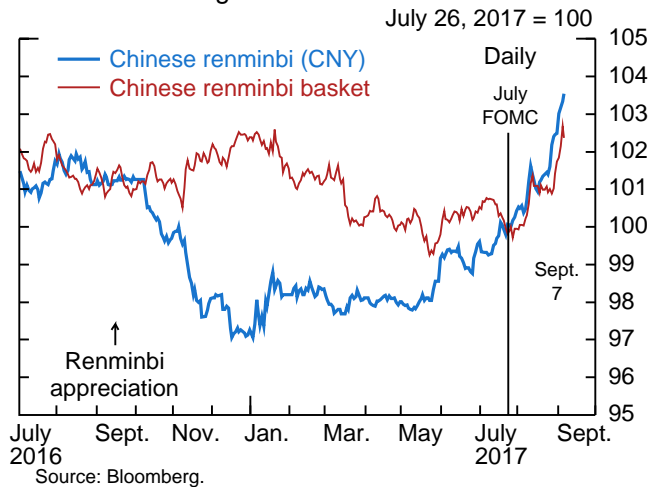
10-Year Sovereign Yields



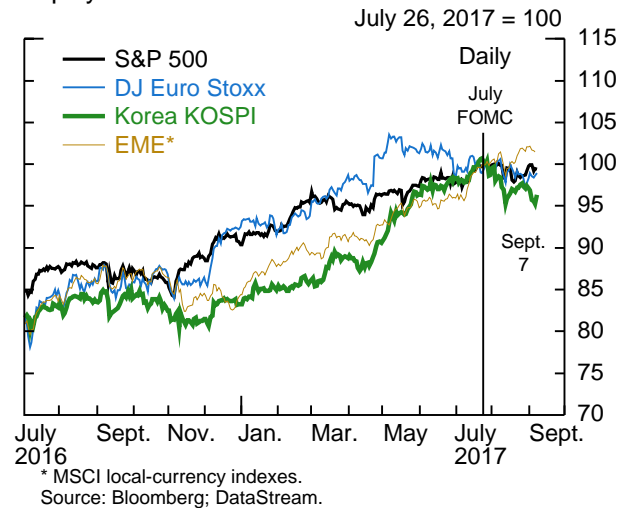
Exchange Rates



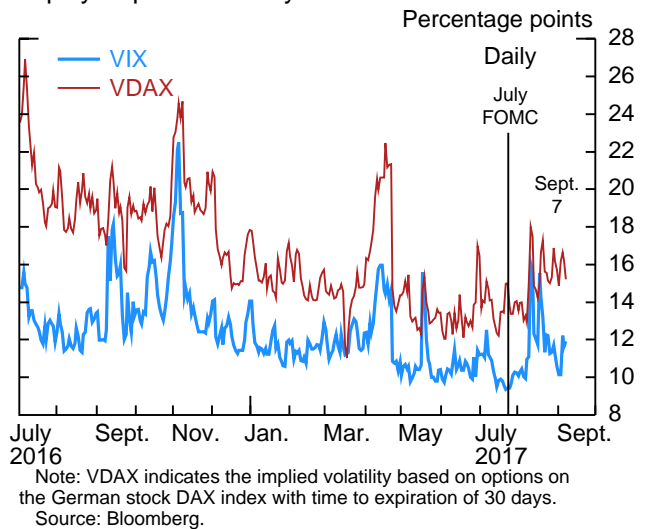
Chinese Exchange Rates



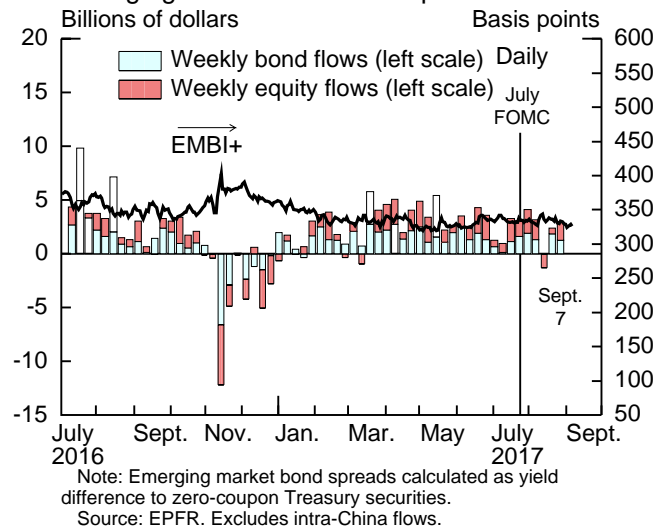
Equity Market Indexes



Equity-Implied Volatility



Emerging Market Flows and Spreads

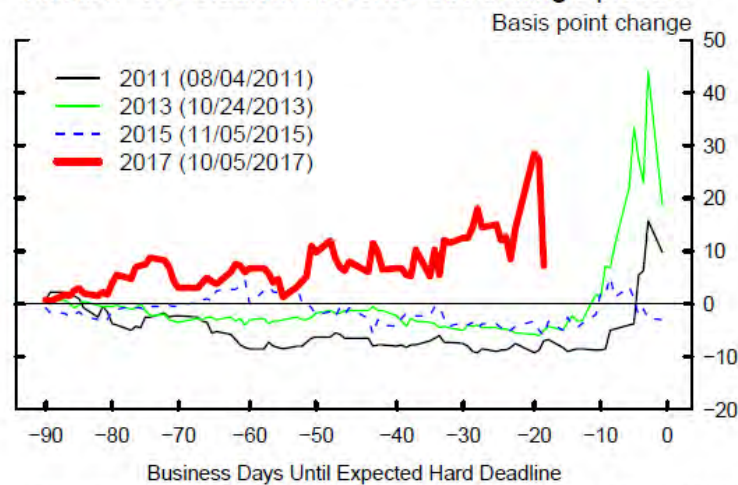


Debt Ceiling

On September 6, the Administration and congressional leaders announced an agreement to extend the debt ceiling by three months.¹ The U.S. Treasury had announced earlier that it would be critical for the Congress to act by September 29; the Board staff had estimated that the Treasury could operate with the cash it would have on hand without breaching the debt ceiling until mid-October.

Concerns about the possibility of an October debt ceiling impasse were apparent in Treasury yields during most of the intermeeting period. As shown by the red line in figure 1, yields on Treasury bills maturing in October increased by as many as 20 basis points, with one-week-forward bill rates (the red line in figure 2) showing the largest increase for the first week in October. Yields on Treasury coupon securities maturing around early October appeared to increase for some time as well.² These increases were generally consistent with moves seen in previous debt limit episodes, though the rise in bill yields began much earlier than in previous episodes. Immediately following reports on September 6 of the forthcoming agreement, however, yields on bills maturing in early October retraced much of these moves (the black line in figure 2).

Figure 1: Cumulative Change in Yield on Treasury Bills "At Risk" of Default in Recent Debt Ceiling Episodes



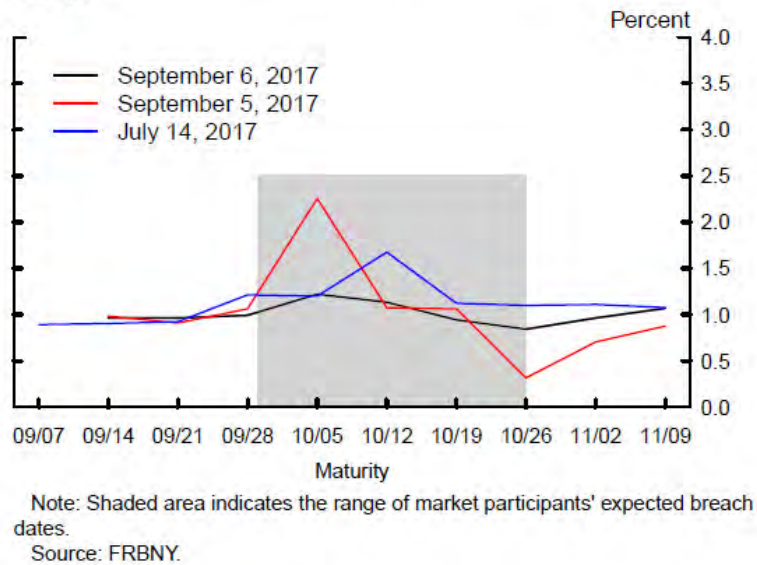
Note: Bill maturity dates are in parentheses. Data updated as of September 6, 2017.

Source: FRBNY.

¹ At the time of writing this box, specific details on the agreement had not yet been released.

² Of note, yields on Treasury coupon securities can be volatile as they approach their maturity date, and it is therefore difficult to identify debt ceiling effects.

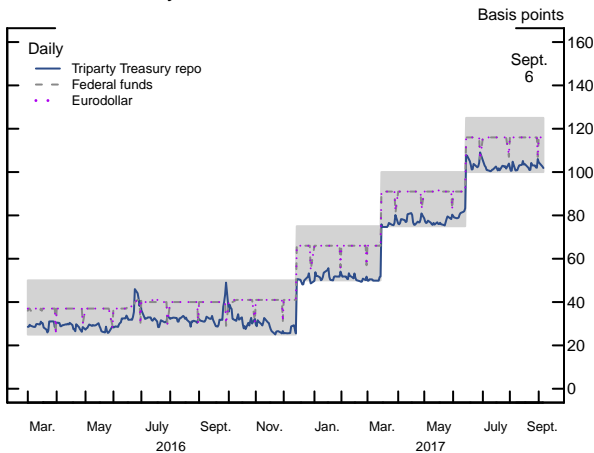
Figure 2: One-Week-Forward Treasury Bill Yield Curve



During the 2011 and 2013 debt ceiling impasses, money market funds (MMFs) experienced sizable net redemptions and made significant portfolio shifts. No evidence of serious concerns emerged among MMFs during the intermeeting period, although anecdotal reports indicated that some funds were avoiding Treasury securities maturing in October, and MMFs remain vulnerable to potential debt ceiling risks. Following the Securities and Exchange Commission’s MMF reforms, the government MMF sector today is much larger, with substantially greater holdings of Treasury securities than two years ago. As such, MMF redemptions and portfolio shifts could be sizable if a debt ceiling impasse extends close to an anticipated breach date. Moreover, “flight to quality” shifts in MMF portfolios could result in greater MMF usage of the Federal Reserve ON RRP facility than in past debt ceiling episodes, which would drain cash from the market.

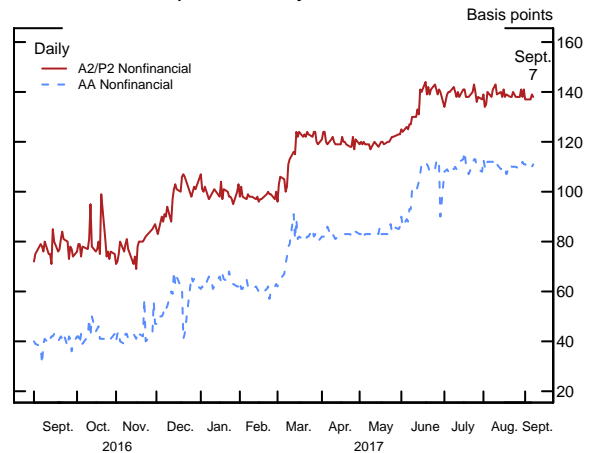
Short-Term Funding Markets and Federal Reserve Operations

Selected Money Market Rates



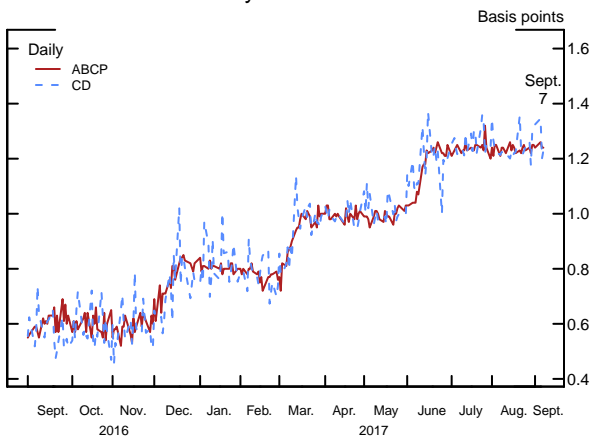
Note: Effective federal funds rate is a weighted median; shaded area is the target range for the federal funds rate.
Source: Federal Reserve Bank of New York; Federal Reserve Board, Form FR 2420, Report of Selected Money Market Rates.

Commercial Paper: 30-Day Rates



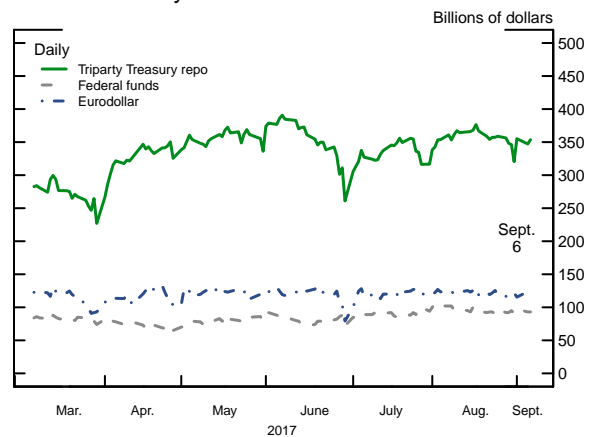
Note: Rates are for domestic issuers.
Source: Depository Trust & Clearing Corporation.

ABCP and CD: 30-Day Rates



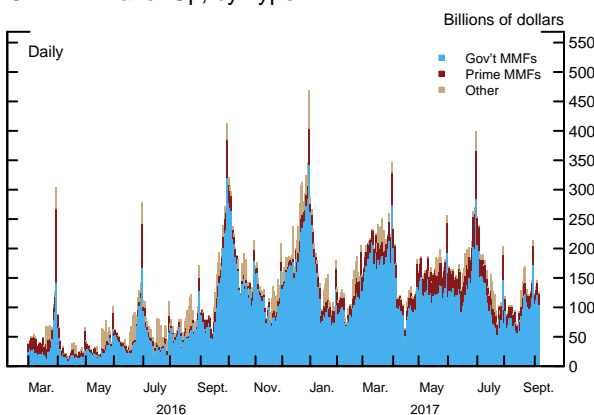
Note: Rates are for domestic issuers.
Source: Depository Trust & Clearing Corporation.

Selected Money Market Volumes



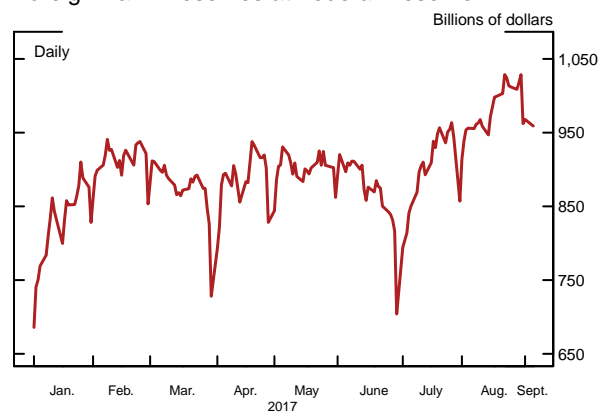
Source: For federal funds and Eurodollar, Federal Reserve Board, Form FR 2420, Report of Selected Money Market Rates; for triparty Treasury repurchase agreement (repo), Federal Reserve Bank of New York.

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.

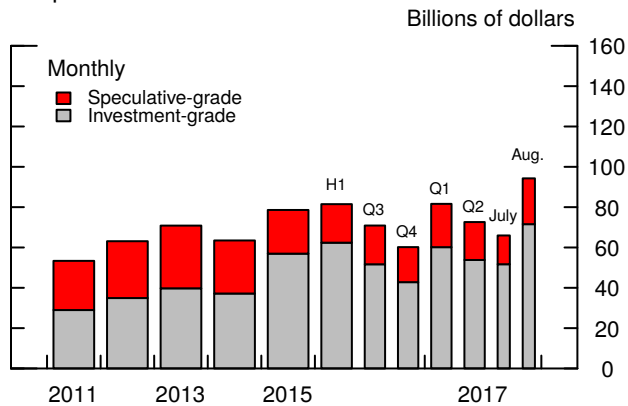
Foreign Bank Reserves at Federal Reserve



Source: Federal Reserve Bank of New York.

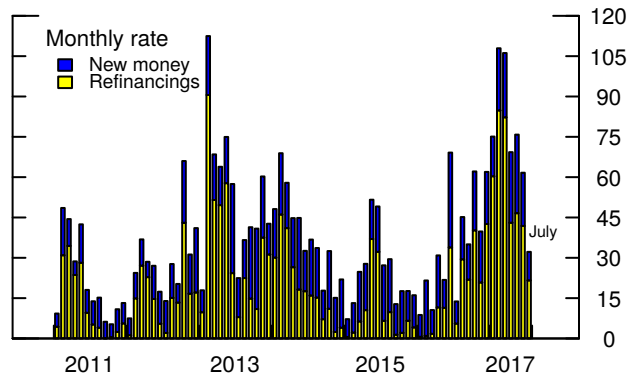
Business Finance

Gross Issuance of Nonfinancial Corporate Bonds



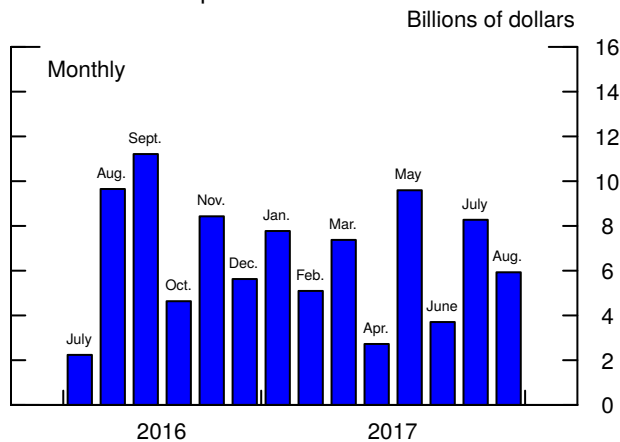
Note: Bonds are categorized by Moody's, Standard & Poor's, and Fitch.
Source: Mergent Fixed Income Securities Database.

Institutional Leveraged Loan Issuance, by Purpose



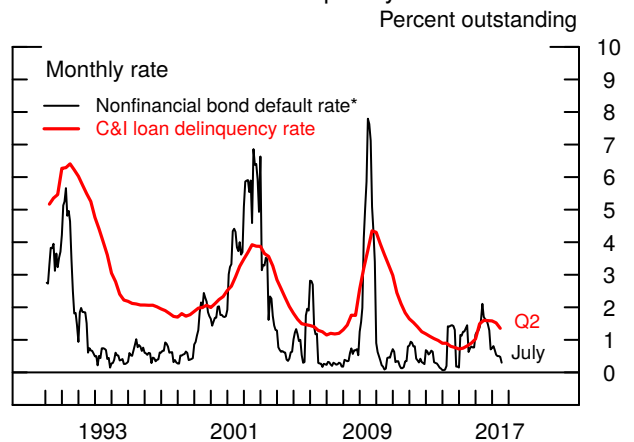
Source: Thomson Reuters LPC LoanConnector.

SEO Issuance by Domestic Nonfinancial Corporations



Note: SEO is secondary equity offering.
Source: Securities Data Company.

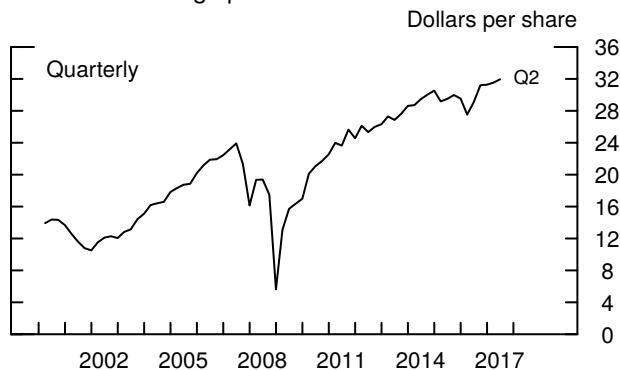
Selected Default and Delinquency Rates



* 6-month trailing defaults divided by beginning-of-period outstanding, at an annual rate.

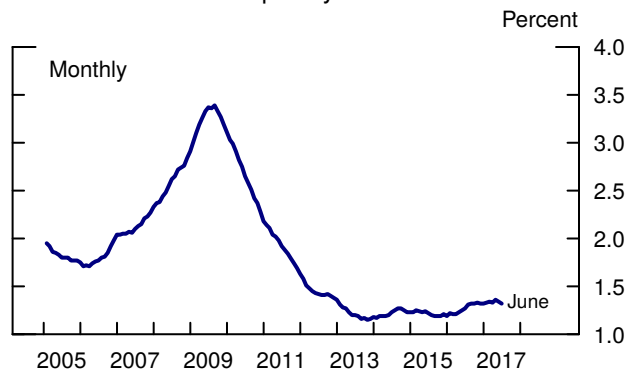
Source: For default rate and outstanding amount of nonfinancial bonds, Moody's Investors Service; for delinquency rate and outstanding amount of commercial and industrial (C&I) loans, Call Report.

S&P 500 Earnings per Share



Note: The data are seasonally and bias adjusted by Federal Reserve Board staff.
Source: Thomson Reuters Financial.

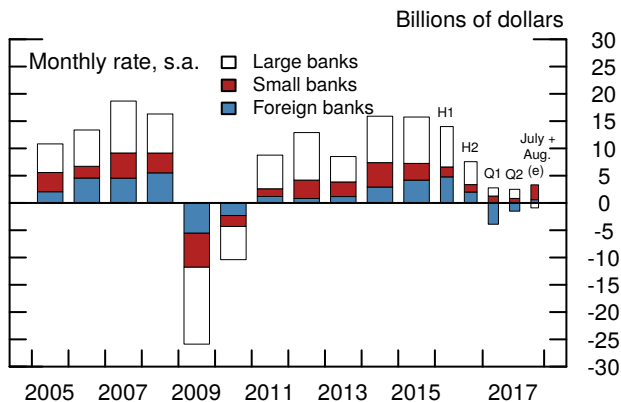
Small Business Delinquency Index



Note: Percent of loans between 30 and 90 days past due.
Source: PayNet.

Bank Lending, CMBS, and Municipal Finance

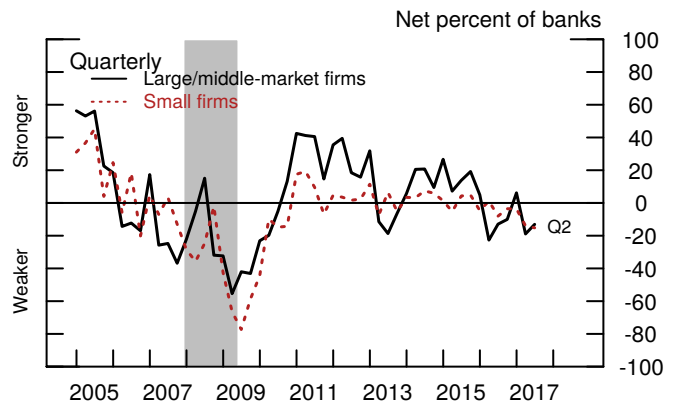
Commercial and Industrial Loans



Note: Yearly rates are Q4 to Q4; half-years are based on Q4 and Q2 average levels; quarterly and monthly annual rates use corresponding average levels. Large banks are defined as the largest 25 banks by assets.

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

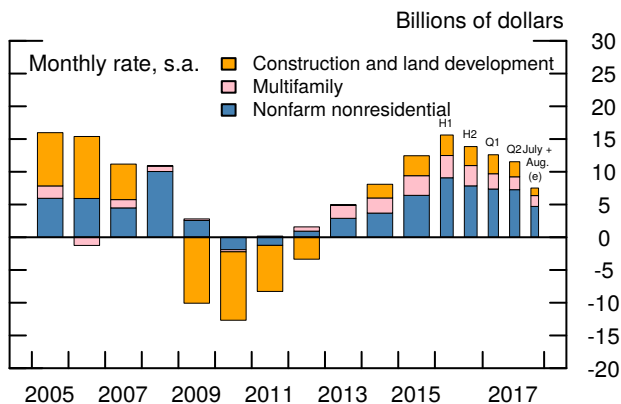
Change in Demand for C&I Loans



Note: Banks' responses are weighted by their sizes in the relevant loan categories. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.

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

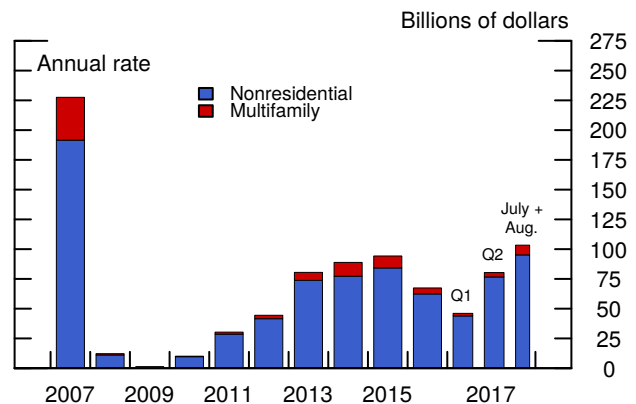
Commercial Real Estate Loans



Note: Yearly rates are Q4 to Q4; half-years are based on Q4 and Q2 average levels; quarterly and monthly annual rates use corresponding average levels. Large banks are defined as the largest 25 banks by assets.

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

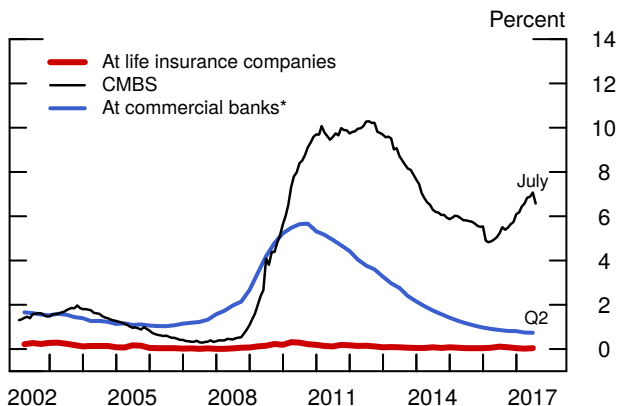
CMBS Issuance



Note: Multifamily excludes agency issuance.

Source: Consumer Mortgage Alert.

Delinquency Rates on Commercial Mortgages on Existing Properties

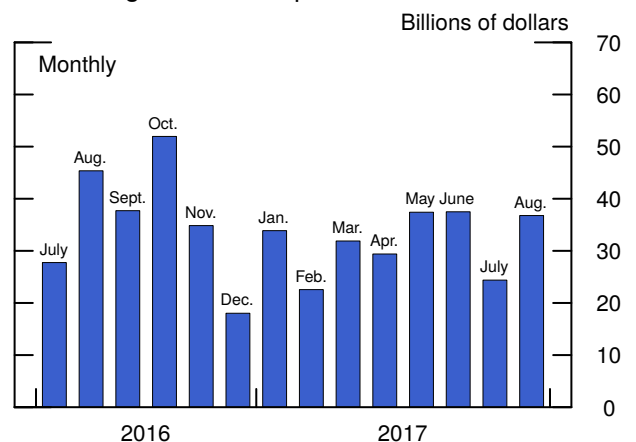


Note: For life insurance companies and commercial banks, the data are quarterly; for CMBS, the data are monthly.

*Excluding farmland.

Source: Citigroup; Call Report data; American Council of Life Insurers.

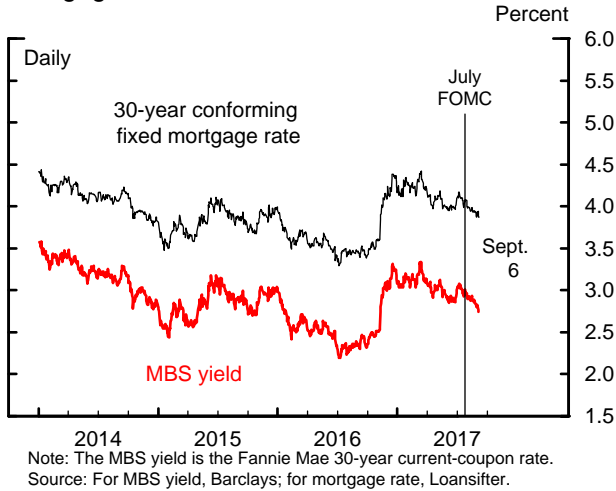
Total Long-Term Municipal Bond Issuance



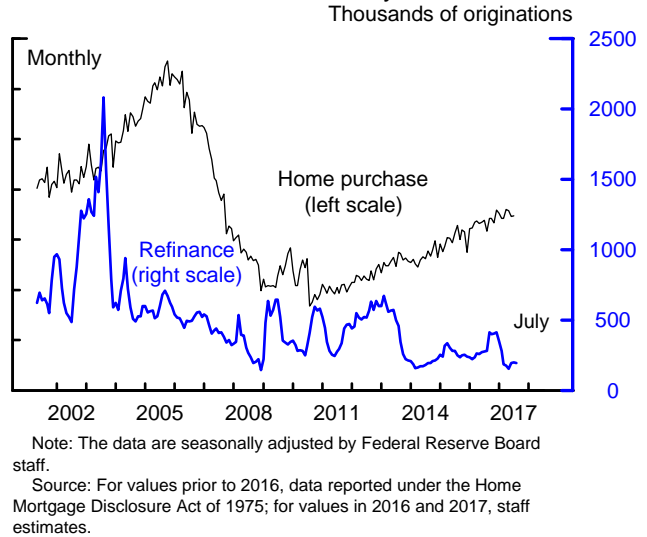
Source: Bond Buyer; Thomson Financial; Mergent.

Household Finance

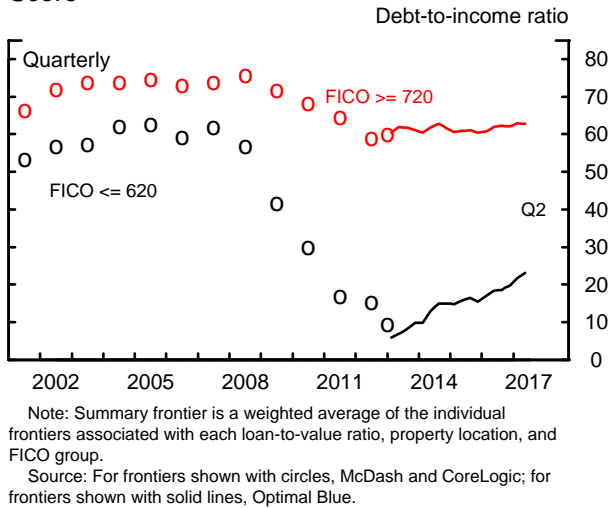
Mortgage Rate and MBS Yield



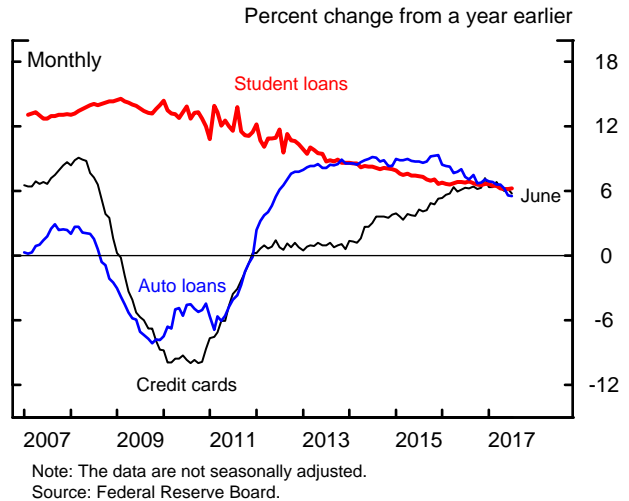
Purchase and Refinance Activity



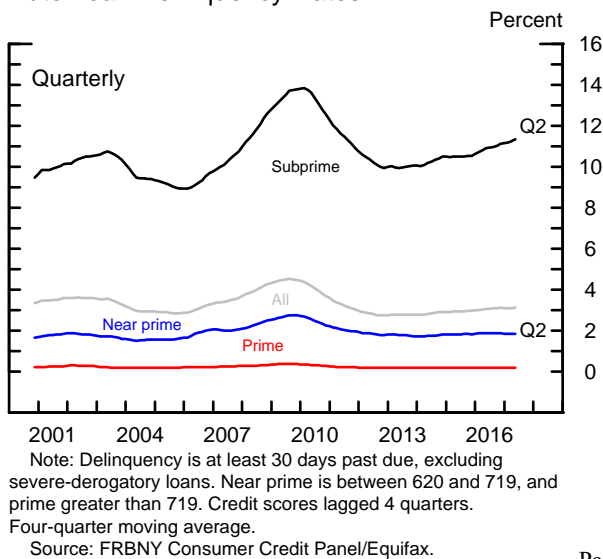
Mortgage Credit Summary Frontiers, by FICO Score



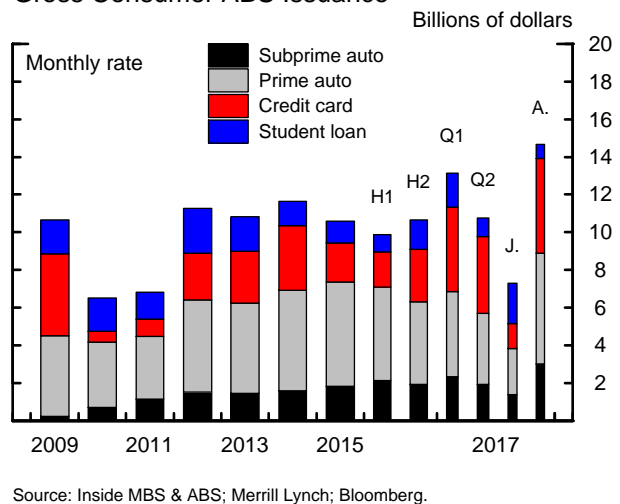
Consumer Credit



Auto Loan Delinquency Rates

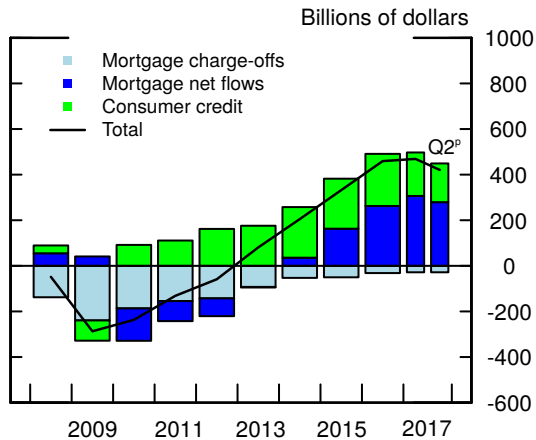


Gross Consumer ABS Issuance



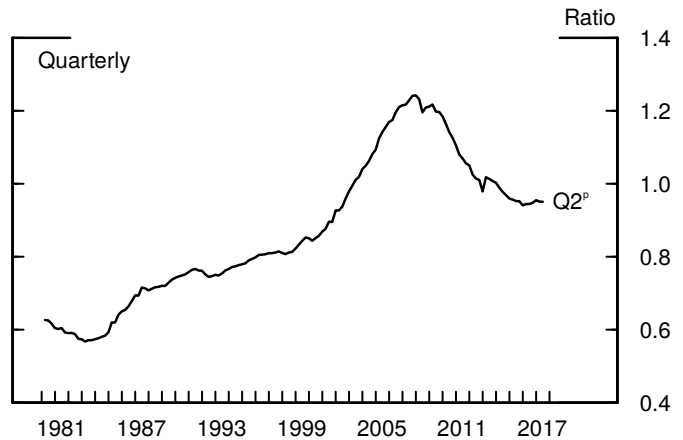
Household Net Worth and Liabilities

Changes in Household Debt



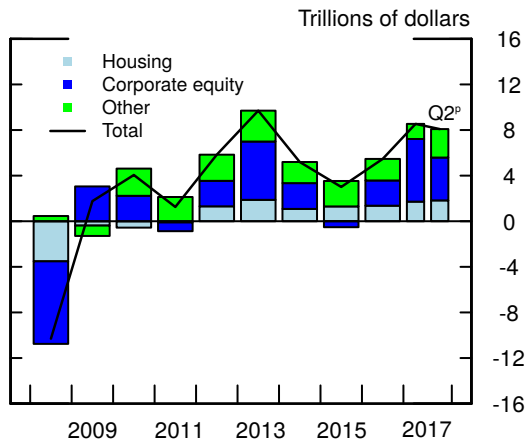
Note: Includes only home mortgage debt and consumer credit. Quarterly flows are annualized.
p Preliminary.
Source: Financial Accounts of the United States.

Debt relative to Disposable Personal Income



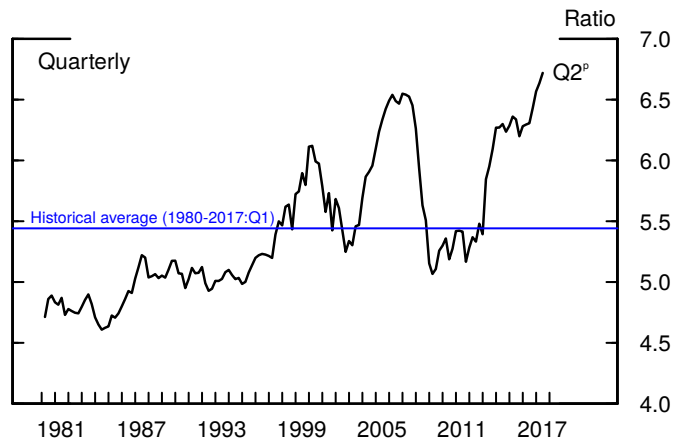
Note: Includes only home mortgage debt and consumer credit.
p Preliminary.
Source: Financial Accounts of the United States.

Changes in Household Net Worth



Note: Quarterly flows are annualized.
p Preliminary.
Source: Financial Accounts of the United States.

Net Worth relative to Disposable Personal Income



p Preliminary.
Source: Financial Accounts of the United States.

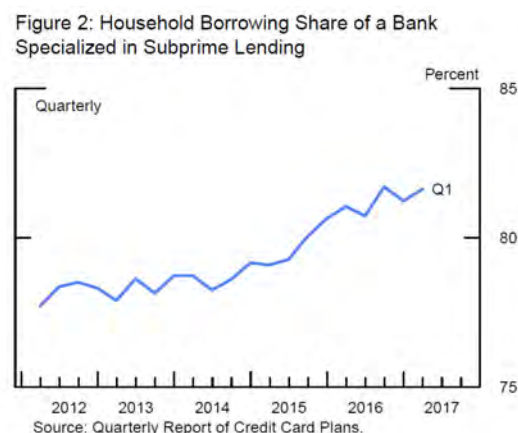
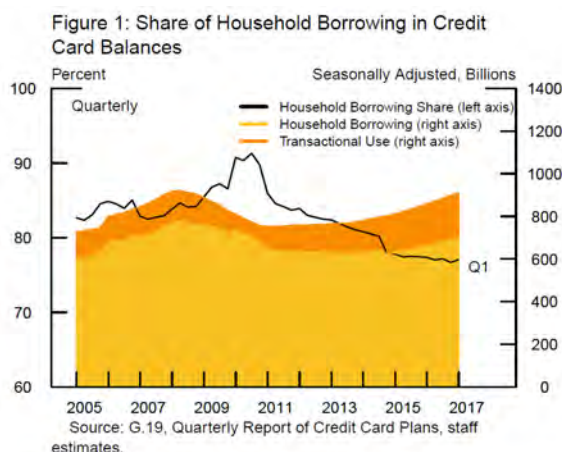
Recent Trends in Credit Card Borrowing and Convenience Use

Outstanding balances on credit cards have risen 5½ percent at an annual rate for the past three years, raising concerns that some households are becoming overextended. Unlike other types of household borrowing, however, not all increases in credit card balances represent higher household indebtedness. Aggregate credit card balances can rise when households use credit cards to pay for a larger share of their purchases even if such a shift in use generates additional “convenience balances” that are paid in full each month.

This discussion introduces a new measure of the share of outstanding credit card balances that represents actual borrowing as opposed to convenience balances. The measure uses data collected from the *Quarterly Report of Credit Card Plans*. As shown by the black line in figure 1, this “borrowing share” of outstanding credit card balances hovered above 80 percent before the financial crisis. It then stepped up to more than 90 percent in the immediate aftermath of the financial crisis, likely reflecting card holders tapping credit cards to meet spending needs during this period of financial stress. Since early 2011 the share has been trending down, reaching about 77 percent in early 2017.

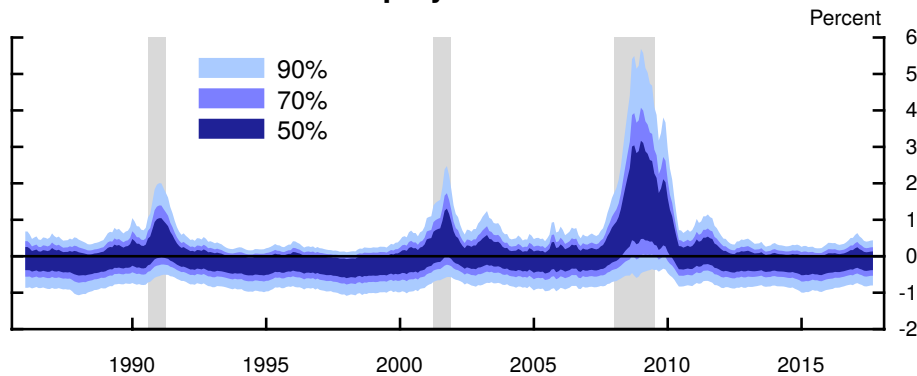
Accordingly, although both convenience balances (the orange area in figure 1) and total balances have expanded to historical highs, balances associated with actual borrowing (the yellow area in figure 1) remain a bit below the pre-crisis peak level. The subdued increase in actual borrowing may reflect two factors. First, tight lending standards since the financial crisis made credit cards less available for borrowers with subprime credit histories. Such borrowers are more likely to be budget constrained than prime borrowers, and they are particularly likely to deploy their cards for borrowing rather than convenience use. Second, consistent with the broad post-crisis trend of household deleveraging, credit card holders, in aggregate, may have become more cautious about accumulating debt.

This trend, however, is not uniform across all lenders and households. Figure 2 shows our borrowing share measure for a particular institution whose credit card lending is concentrated in the subprime sector. In contrast to the aggregate measure, this measure has been rising steadily for three years. This heavy borrowing among the subset of subprime borrowers who are able to access credit card debt may help explain the recent rise in delinquencies among such borrowers.



Time-Varying Macroeconomic Risk

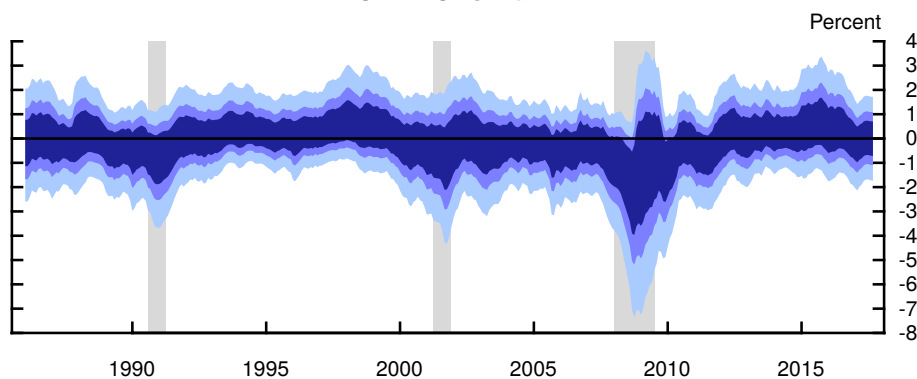
Unemployment Rate



September 2017

95th	0.4
85th	0.2
50th	-0.1
15th	-0.5
5th	-0.8

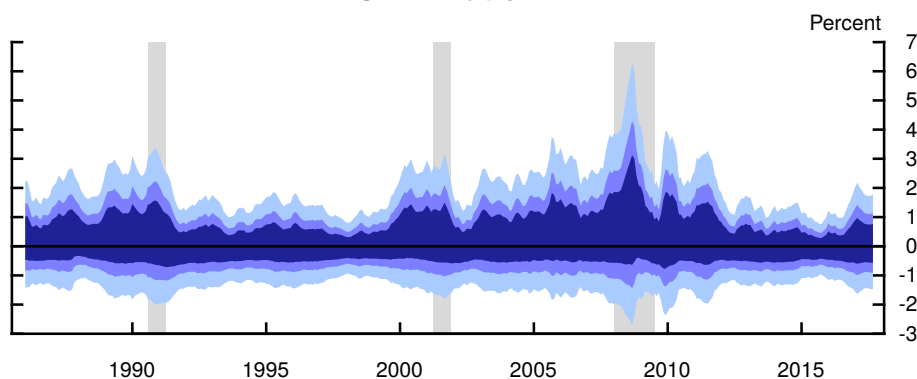
GDP Growth



September 2017

95th	1.7
85th	1.1
50th	0.0
15th	-1.1
5th	-1.7

CPI Inflation

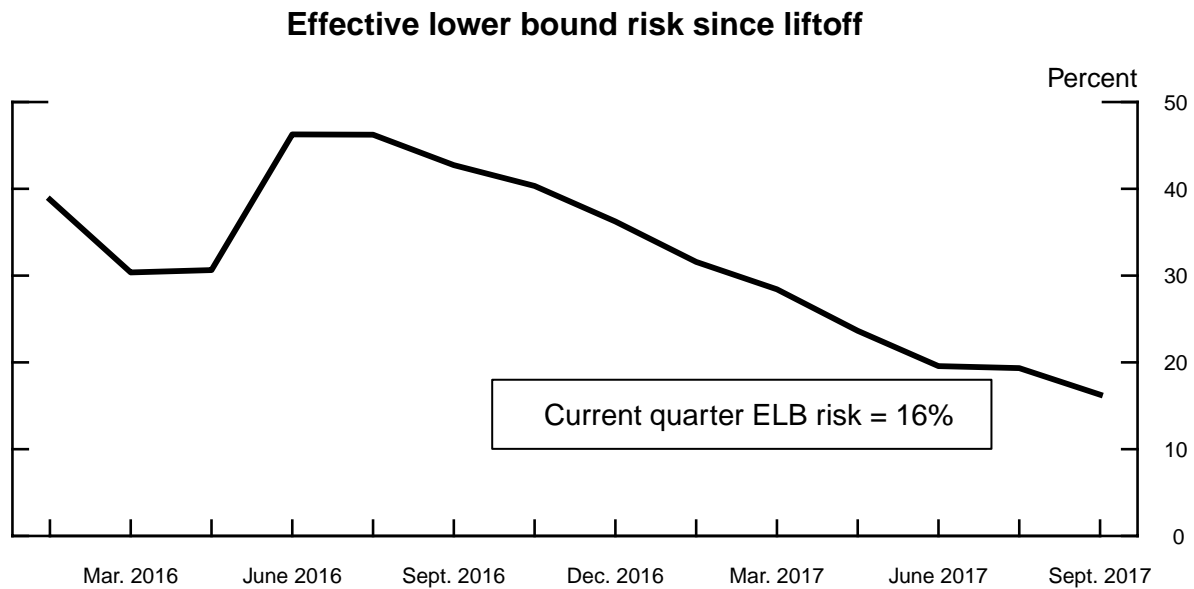


September 2017

95th	1.8
85th	1.1
50th	0.1
15th	-0.9
5th	-1.5

Note: The exhibit shows estimates of quantiles of the distribution of errors for four-quarter-ahead staff forecasts. The estimates are conditioned on indicators of real activity, inflation, financial market strain, and the volatility of high-frequency macroeconomic indicators. The tables show selected quantiles of the predictive distributions for the respective variables as of the current Tealbook.

Effective Lower Bound Risk Estimate



Note: The figure shows the probability that the federal funds rate reaches the effective lower bound (ELB) over the next 3 years starting in the given quarter. Details behind the computation of the ELB risk measure are provided in the box "A Guidepost for Dropping the Effective Lower Bound Risk from the Assessment of Risks" in the Risks and Uncertainty section of the April 2017 Tealbook A.

Source: Calculation based on FRB/US stochastic simulations around the staff baseline projection.

Alternative Scenarios

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

Measure and scenario	2017		2018	2019	2020	2021-22
	H1	H2				
<i>Real GDP</i>						
Extended Tealbook baseline	2.3	3.0	2.3	1.9	1.6	1.3
Different inflation process	2.3	3.0	2.4	2.0	1.7	1.3
Steeper Phillips curve	2.3	3.0	2.3	1.8	1.5	1.1
Lower inflation exp. and agg. demand	2.3	1.8	1.8	2.2	1.8	1.3
Broad policy disappointment	2.3	2.8	.7	1.0	2.0	2.0
Stronger growth, lower infl. in AFEs	2.3	3.1	2.6	2.0	1.5	1.1
China-driven EME turbulence	2.3	2.7	1.2	1.5	1.8	1.5
<i>Unemployment rate¹</i>						
Extended Tealbook baseline	4.4	4.2	3.8	3.7	3.7	4.2
Different inflation process	4.4	4.2	3.7	3.6	3.6	4.0
Steeper Phillips curve	4.4	4.2	3.8	3.7	3.9	4.5
Lower inflation exp. and agg. demand	4.4	4.5	4.2	3.8	3.7	4.1
Broad policy disappointment	4.4	4.3	4.5	4.8	4.7	4.5
Stronger growth, lower infl. in AFEs	4.4	4.2	3.6	3.4	3.5	4.1
China-driven EME turbulence	4.4	4.3	4.2	4.3	4.4	4.6
<i>Total PCE prices</i>						
Extended Tealbook baseline	1.2	1.9	1.9	2.0	2.0	2.1
Different inflation process	1.2	1.7	1.5	1.6	1.6	1.8
Steeper Phillips curve	1.2	1.9	2.2	2.5	2.6	2.7
Lower inflation exp. and agg. demand	1.2	1.8	1.5	1.6	1.7	1.9
Broad policy disappointment	1.2	1.9	1.8	1.9	1.9	1.9
Stronger growth, lower infl. in AFEs	1.2	1.9	2.1	2.3	2.1	2.1
China-driven EME turbulence	1.2	1.3	1.1	1.7	1.9	2.1
<i>Core PCE prices</i>						
Extended Tealbook baseline	1.4	1.6	1.9	2.0	2.0	2.1
Different inflation process	1.4	1.4	1.6	1.6	1.6	1.7
Steeper Phillips curve	1.4	1.7	2.3	2.5	2.6	2.6
Lower inflation exp. and agg. demand	1.4	1.5	1.6	1.6	1.7	1.8
Broad policy disappointment	1.4	1.6	1.9	1.9	1.9	1.9
Stronger growth, lower infl. in AFEs	1.4	1.6	2.1	2.2	2.2	2.1
China-driven EME turbulence	1.4	1.3	1.4	1.7	1.9	2.0
<i>Federal funds rate¹</i>						
Extended Tealbook baseline	.9	1.4	2.6	3.5	3.9	3.9
Different inflation process	.9	1.4	2.4	3.2	3.7	3.7
Steeper Phillips curve	.9	1.4	2.8	3.8	4.4	4.4
Lower inflation exp. and agg. demand	.9	1.3	2.0	2.7	3.3	3.6
Broad policy disappointment	.9	1.4	2.1	2.2	2.3	2.8
Stronger growth, lower infl. in AFEs	.9	1.4	2.9	4.0	4.6	4.3
China-driven EME turbulence	.9	1.3	2.2	2.7	3.1	3.4

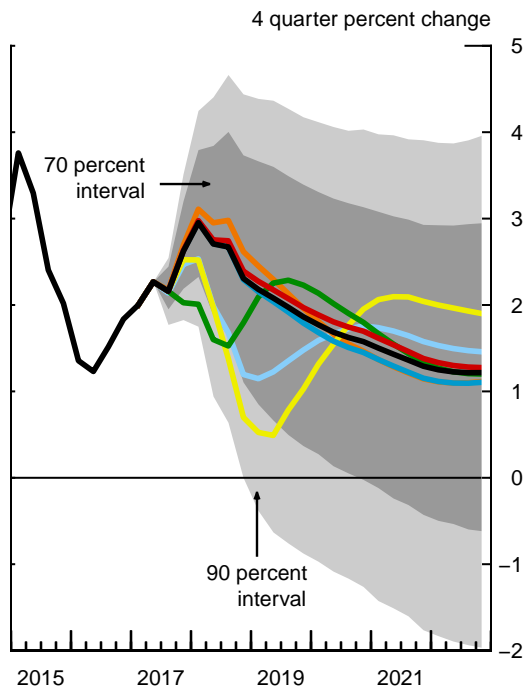
1. Percent, average for the final quarter of the period.

Forecast Confidence Intervals and Alternative Scenarios

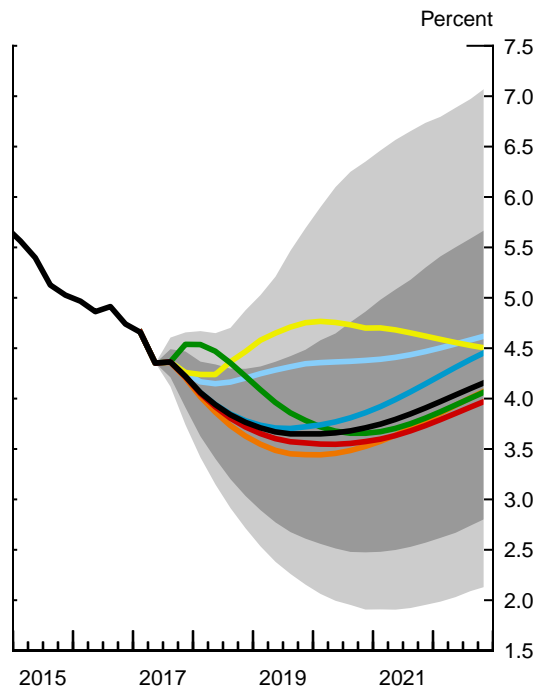
Confidence Intervals Based on FRB/US Stochastic Simulations

- Extended Tealbook baseline
- Lower inflation exp. and agg. demand
- Stronger growth, lower infl. in AFEs
- Different inflation process
- Broad policy disappointment
- China-driven EME turbulence
- Steeper Phillips curve

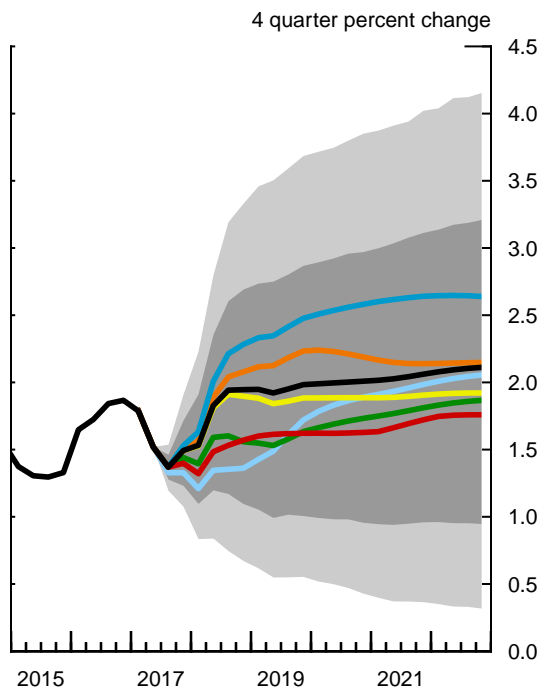
Real GDP



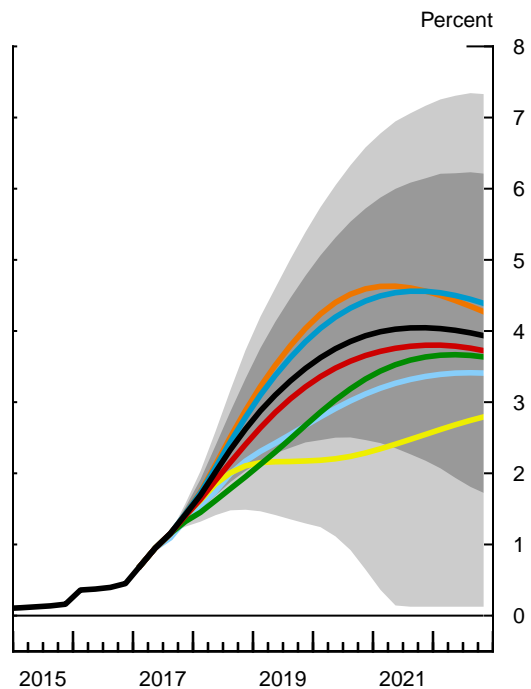
Unemployment Rate



PCE Prices excluding Food and Energy



Federal Funds Rate



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

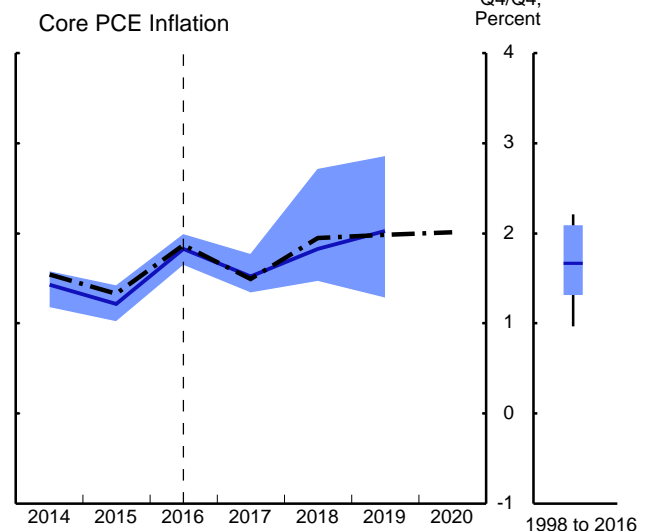
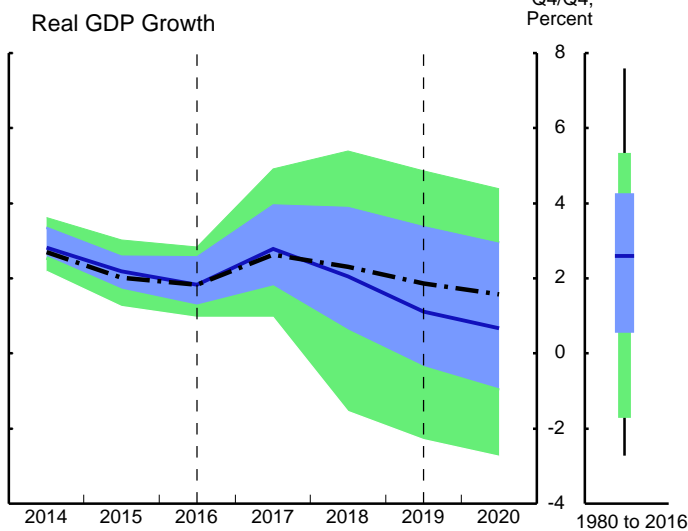
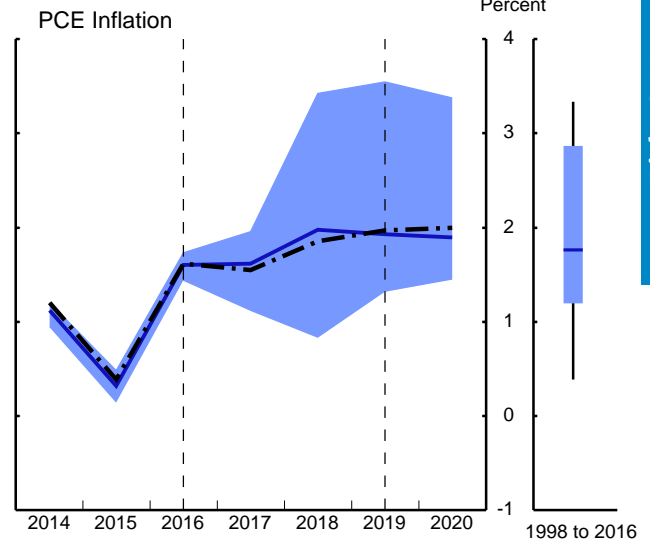
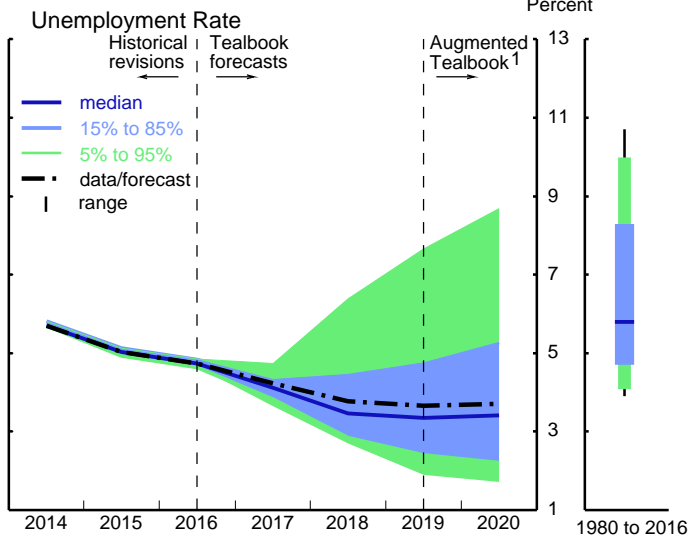
Measure	2017	2018	2019	2020	2021	2022
<i>Real GDP</i> (percent change, Q4 to Q4)						
Projection	2.6	2.3	1.9	1.6	1.3	1.2
Confidence interval						
Tealbook forecast errors	1.8–4.0	.6–3.9	-.4–3.4	-1.0–2.9
FRB/US stochastic simulations	2.2–3.2	1.1–3.7	.4–3.4	.0–3.1	-.4–2.9	-.6–2.9
<i>Civilian unemployment rate</i> (percent, Q4)						
Projection	4.2	3.8	3.7	3.7	3.9	4.2
Confidence interval						
Tealbook forecast errors	3.8–4.3	2.8–4.5	2.4–4.8	2.2–5.3
FRB/US stochastic simulations	3.9–4.5	3.0–4.3	2.6–4.5	2.5–4.9	2.6–5.3	2.8–5.7
<i>PCE prices, total</i> (percent change, Q4 to Q4)						
Projection	1.5	1.9	2.0	2.0	2.1	2.1
Confidence interval						
Tealbook forecast errors	1.1–2.0	.8–3.4	1.3–3.6	1.4–3.4
FRB/US stochastic simulations	1.2–1.8	.9–2.7	.9–3.0	.9–3.0	.9–3.2	.9–3.3
<i>PCE prices excluding food and energy</i> (percent change, Q4 to Q4)						
Projection	1.5	1.9	2.0	2.0	2.1	2.1
Confidence interval						
Tealbook forecast errors	1.3–1.8	1.5–2.7	1.3–2.8
FRB/US stochastic simulations	1.2–1.7	1.1–2.7	1.0–2.9	1.0–3.0	1.0–3.1	.9–3.2
<i>Federal funds rate</i> (percent, Q4)						
Projection	1.4	2.6	3.5	3.9	4.0	3.9
Confidence interval						
FRB/US stochastic simulations	1.3–1.5	2.0–3.3	2.4–4.8	2.5–5.7	2.2–6.1	1.7–6.2

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

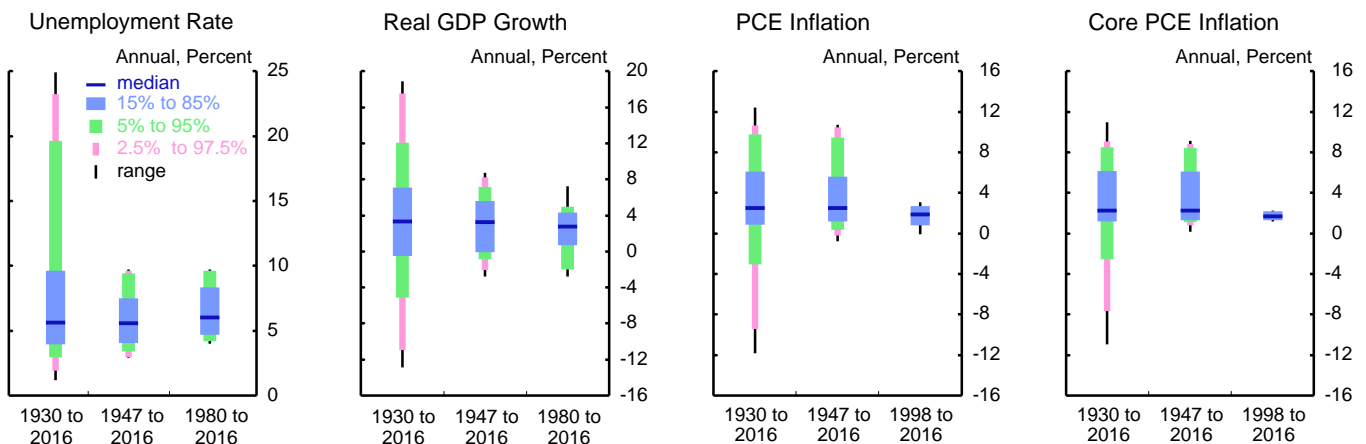
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Prediction Intervals Derived from Historical Tealbook Forecast Errors

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 2- and 3-year-ahead forecast errors from Blue Chip, CBO, and CEA to extend the Tealbook prediction intervals through 2020.

Sources of FRB/US and EDO Forecast Errors

This discussion reports real-time forecast errors for the FRB/US and EDO models over the past three years and compares them to the errors of the judgmental Tealbook projection.¹ The forecast errors are then decomposed into contributions from the structural shocks inferred by the models. Such decompositions are useful, in part, because they can be used to understand the economics behind both forecast errors and revisions to models' projections.

Tables 1 and 2 report the forecast errors of the judgmental projection and of the FRB/US and EDO models in 2014, 2015, and 2016, computed using the judgmental and model forecasts as of the April Tealbook of the corresponding year. The tables also report the revisions to the 2017 projections since April 2016.

The FRB/US and EDO forecast errors are, on average, somewhat larger than the judgmental forecast errors, and neither model uniformly dominates the other one in forecasting performance. FRB/US slightly overpredicted GDP growth in 2016 as it did in 2015, while EDO projections were very close to the observed data. Like the judgmental projection, both models underpredicted the decline in unemployment in 2014 and 2015.² In 2016, while the EDO model

Table 1: Forecast Errors (2014–16) and Revisions (2017) for Real Activity

	GDP				Unemployment rate			
	2014	2015	2016	2017	2014	2015	2016	2017
Judgmental	-0.4	0.2	0.0	-0.1	-0.5	-0.3	0.0	-0.2
FRB/US	0.5	-0.4	-0.1	-0.3	-0.8	-0.4	0.4	0.1
EDO	0.0	0.1	0.1	0.4	-1.1	-0.9	-0.1	-0.8

Table 2: Forecast Errors (2014–16) and Revisions (2017) for Inflation

	Total PCE Inflation				Core PCE Inflation			
	2014	2015	2016	2017	2014	2015	2016	2017
Judgmental	-0.4	-0.2	0.4	-0.3	-0.1	0.1	0.2	-0.1
FRB/US	-0.2	-0.2	-0.1	-0.7	0.1	0.0	-0.2	-0.5
EDO	-0.3	-0.3	-0.3	-1.0	0.1	-0.1	-0.5	-1.1

Note: The forecast errors are computed similarly to the judgmental forecast errors presented in the box “Tealbook Forecast Errors: An Update through 2016” in the Domestic Economic Developments and Outlook section of the April 2017 Tealbook A. The errors are computed for Q4/Q4 percent changes in real GDP, in total and core PCE inflation, and for the Q4 forecast for the unemployment rate.

Source: Staff forecast; U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Labor, Bureau of Labor Statistics.

¹ Current model forecasts can be found on the exhibit “Alternative Model Forecasts,” which follows this box.

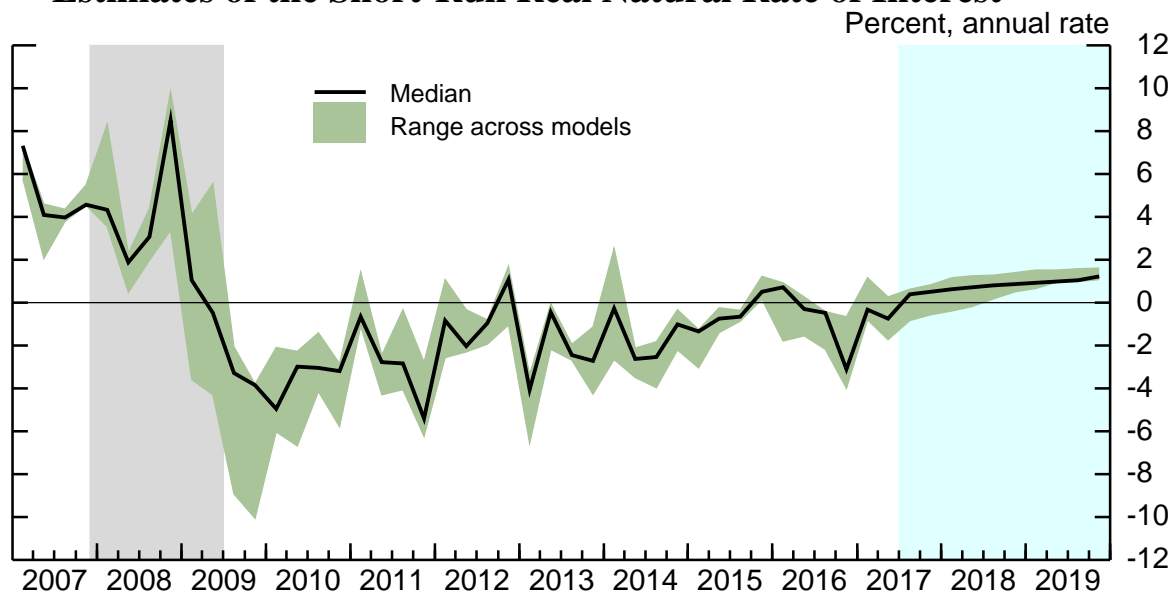
² The improvement in the forecasting accuracy for unemployment in the EDO model in 2016 relative to the two previous years is linked to a revision of the steady-state level of unemployment to align it with the Tealbook assumptions about the natural rate of unemployment at that time.

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

Measure and projection	2017		2018		2019	
	June Tealbook	Current Tealbook	June Tealbook	Current Tealbook	June Tealbook	Current Tealbook
<i>Real GDP</i>						
Staff	2.4	2.6	2.2	2.3	1.8	1.9
FRB/US	2.3	2.6	2.3	2.7	1.6	2.0
EDO	2.5	2.7	2.3	2.6	2.3	2.4
<i>Unemployment rate¹</i>						
Staff	4.2	4.2	3.9	3.8	3.8	3.7
FRB/US	4.2	4.2	4.1	3.9	4.2	3.9
EDO	4.3	4.3	4.5	4.4	4.8	4.6
<i>Total PCE prices</i>						
Staff	1.6	1.5	1.9	1.9	2.0	2.0
FRB/US	1.5	1.4	2.0	1.6	2.0	1.8
EDO	1.6	1.3	2.2	1.8	2.3	2.1
<i>Core PCE prices</i>						
Staff	1.6	1.5	1.9	1.9	2.0	2.0
FRB/US	1.6	1.4	2.0	1.7	2.0	1.9
EDO	1.7	1.3	2.2	1.8	2.3	2.1
<i>Federal funds rate¹</i>						
Staff	1.5	1.4	2.7	2.6	3.7	3.5
FRB/US	1.5	1.4	2.6	2.4	3.4	3.2
EDO	1.8	1.6	3.0	2.7	3.6	3.4

1. Percent, average for Q4.

Estimates of the Short-Run Real Natural Rate of Interest



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

Assessment of Key Macroeconomic Risks**Probability of Inflation Events**

(4 quarters ahead)

Probability that the 4-quarter change in total PCE prices will be . . .	Staff	FRB/US	EDO	BVAR
<i>Greater than 3 percent</i>				
Current Tealbook	.06	.04	.03	.04
Previous Tealbook	.06	.04	.01	.02
<i>Less than 1 percent</i>				
Current Tealbook	.12	.23	.19	.21
Previous Tealbook	.16	.25	.17	.30

Probability of Unemployment Events

(4 quarters ahead)

Probability that the unemployment rate will . . .	Staff	FRB/US	EDO	BVAR
<i>Increase by 1 percentage point</i>				
Current Tealbook	.01	.01	.12	.01
Previous Tealbook	.03	.02	.13	.01
<i>Decrease by 1 percentage point</i>				
Current Tealbook	.22	.10	.10	.32
Previous Tealbook	.08	.12	.09	.26

Probability of Near-Term Recession

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

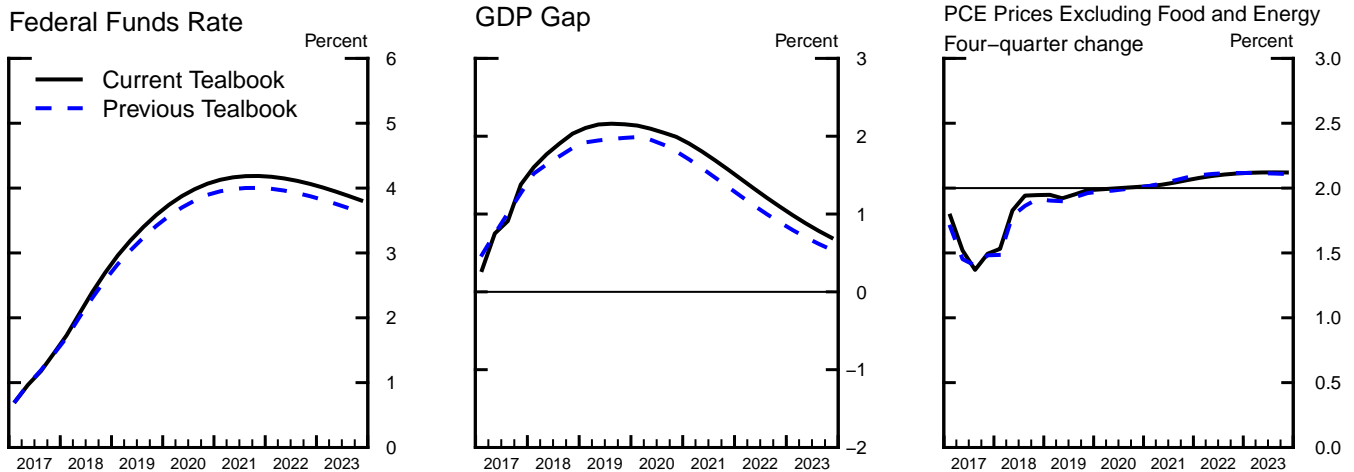
Policy Rules and the Staff Projection

Near-Term Prescriptions of Selected Simple Policy Rules¹

(Percent)

	<u>2017:Q4</u>	<u>2018:Q1</u>
Taylor (1993) rule	2.42	2.58
<i>Previous Tealbook</i>	2.35	2.47
Taylor (1999) rule	3.08	3.34
<i>Previous Tealbook</i>	2.96	3.20
First-difference rule	1.60	1.88
<i>Previous Tealbook projection</i>	1.44	1.67
Nominal income targeting rule	1.07	1.03
<i>Previous Tealbook projection</i>	1.03	0.98
<i>Addendum:</i>		
Tealbook baseline	1.42	1.69

Key Elements of the Staff Projection



A Medium-Term Equilibrium Real Federal Funds Rate²

(Percent)

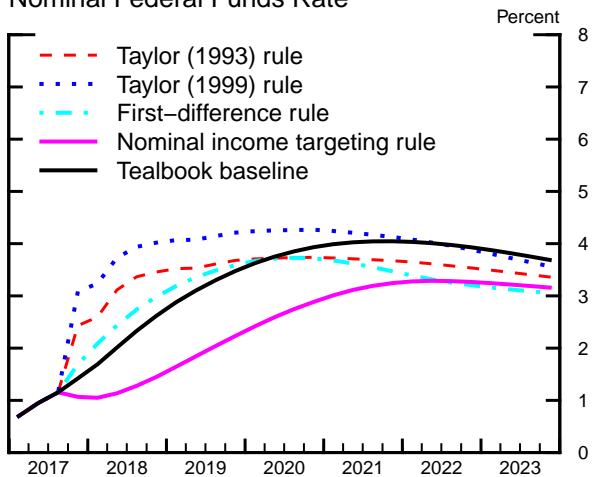
	<i>Current Tealbook</i>	<i>Previous Tealbook</i>
Tealbook-consistent FRB/US r^*	2.32	2.16
Average projected real federal funds rate	0.80	0.73

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.

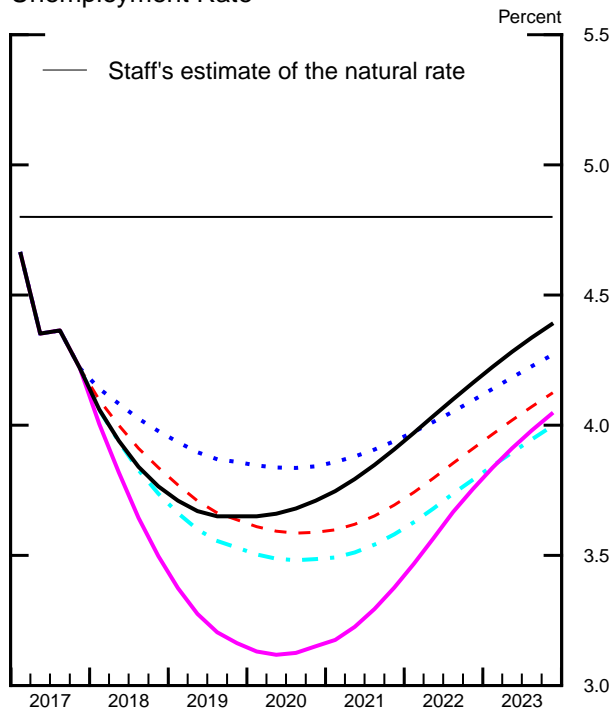
2. The "Tealbook-consistent FRB/US r^* " is the level of the real federal funds rate that, if maintained over a 12-quarter period (beginning in the current quarter) in the FRB/US model, sets the output gap equal to zero in the final quarter of that period. The "average projected real federal funds rate" is calculated under the Tealbook baseline projection over the same 12-quarter period as the Tealbook-consistent FRB/US r^* .

Simple Policy Rule Simulations

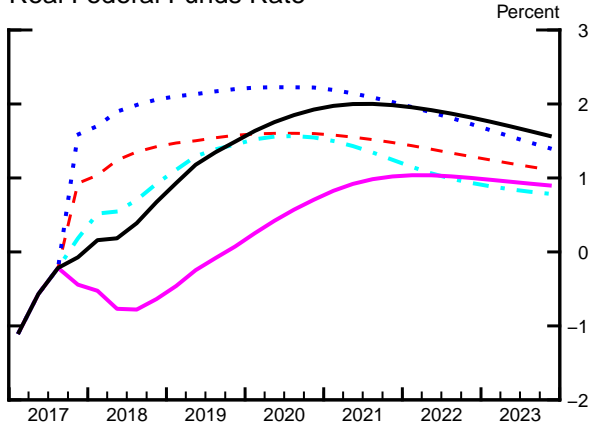
Nominal Federal Funds Rate



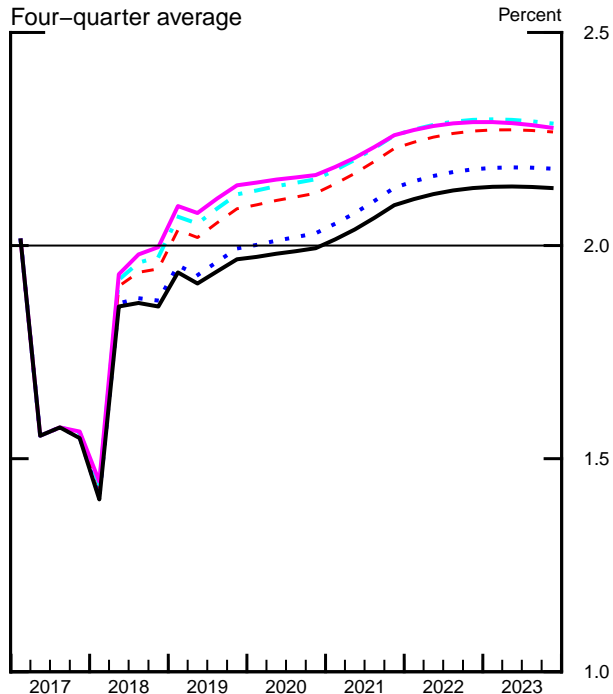
Unemployment Rate



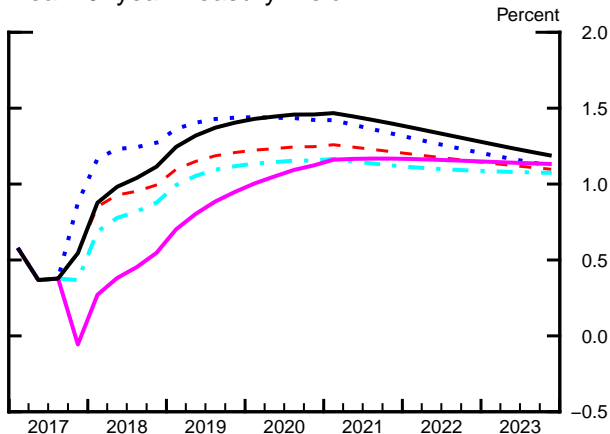
Real Federal Funds Rate



PCE Inflation
Four-quarter average



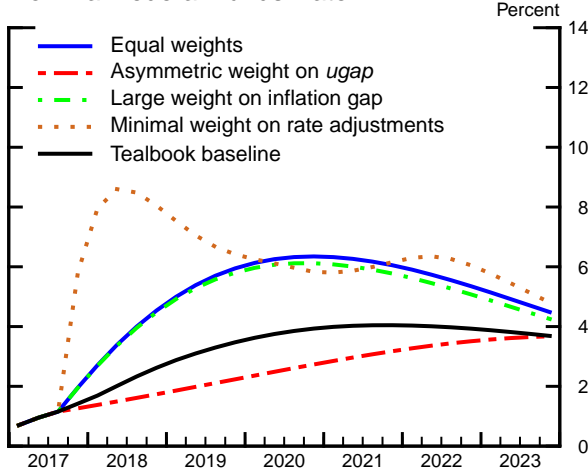
Real 10-year Treasury Yield



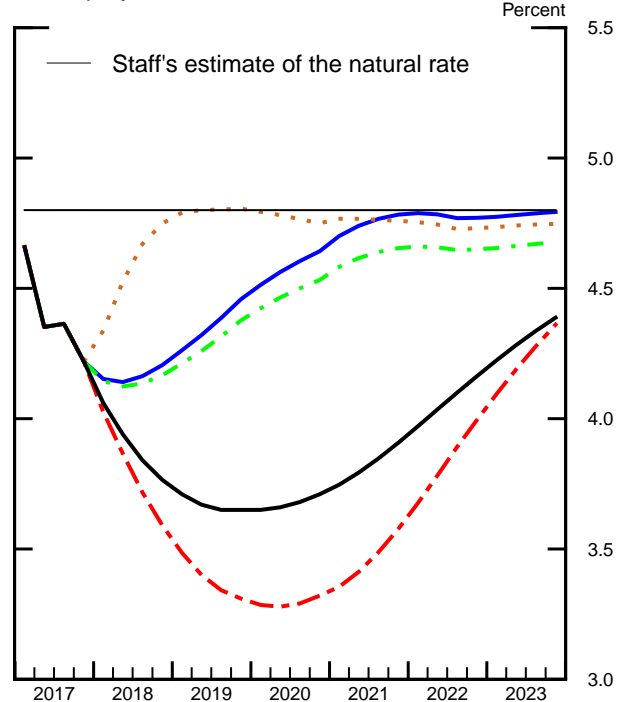
Note: The policy rule simulations in this exhibit are based on rules that respond to core inflation rather than to headline inflation. This choice of rule specification was made in light of a tendency for current and near-term core inflation rates to outperform headline inflation rates as predictors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

Optimal Control Simulations under Commitment

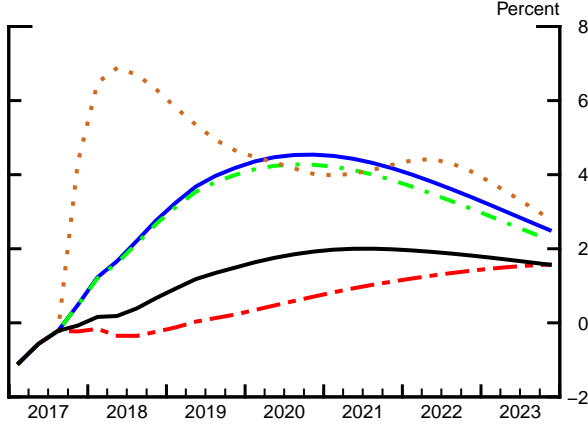
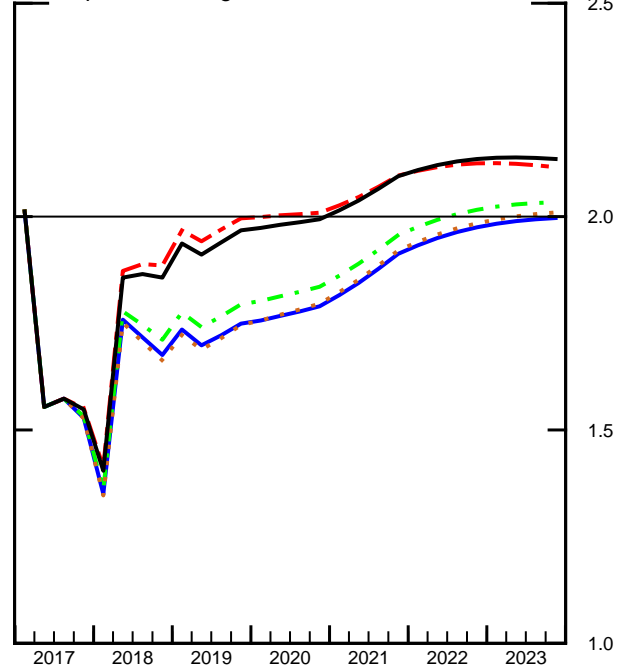
Nominal Federal Funds Rate



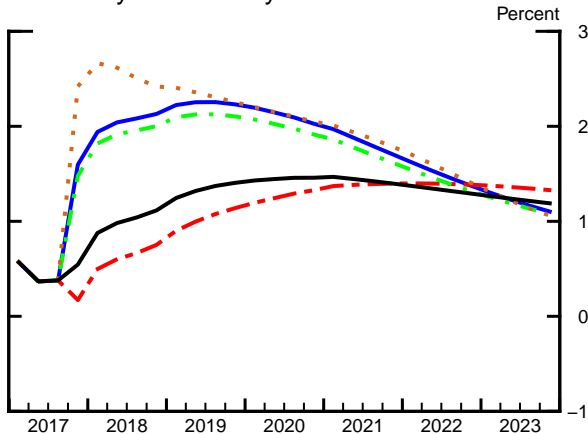
Unemployment Rate



Real Federal Funds Rate

PCE Inflation
Four-quarter average

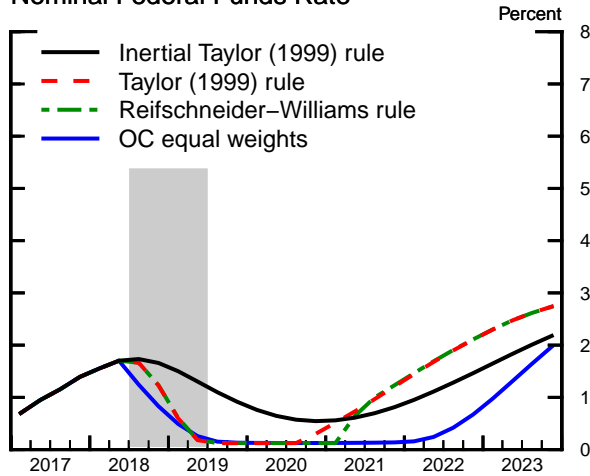
Real 10-year Treasury Yield



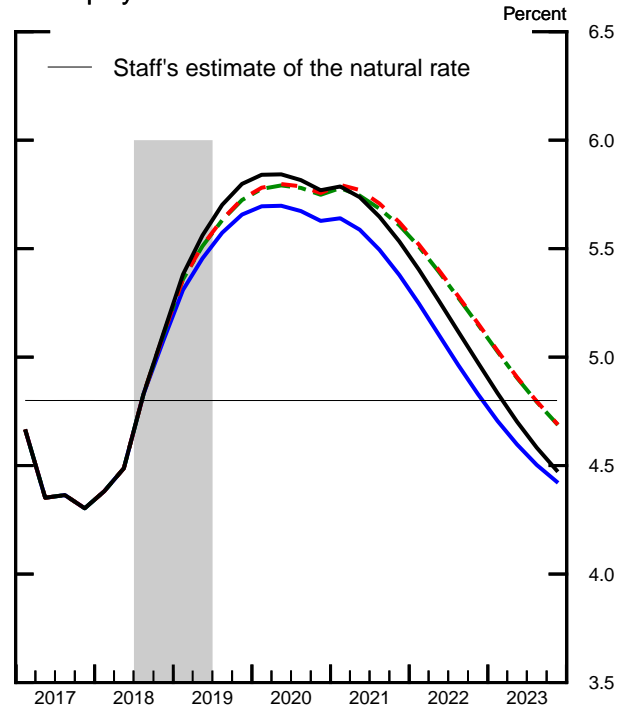
Note: Each set of lines corresponds to an optimal control policy under commitment in which policymakers minimize a discounted weighted sum of squared deviations of four-quarter headline PCE inflation from the Committee's 2 percent objective, of squared deviations of the unemployment rate from the staff's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

Implications of Policy Inertia in a Recession

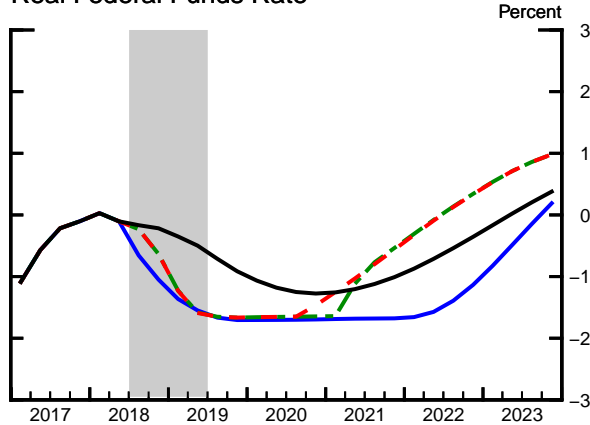
Nominal Federal Funds Rate



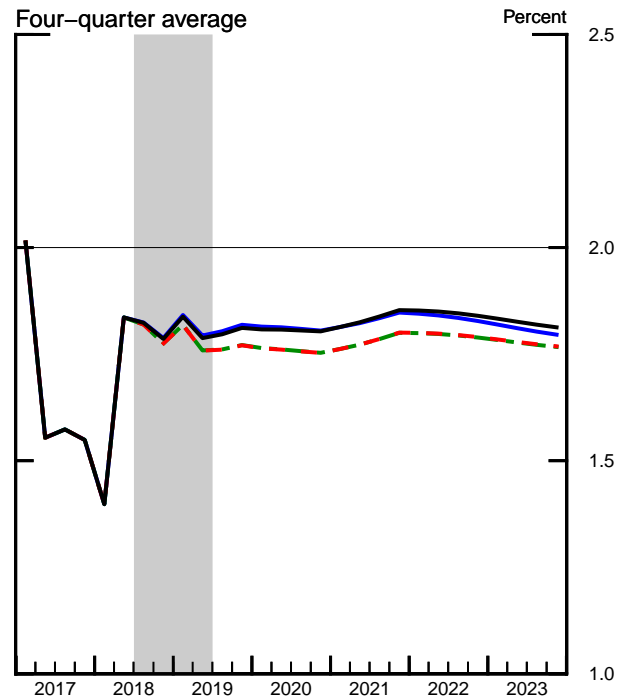
Unemployment Rate



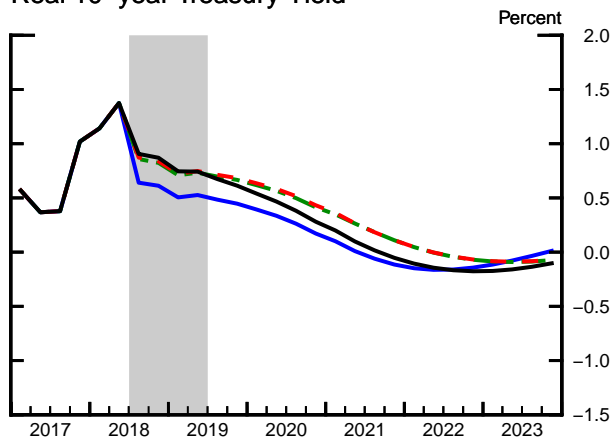
Real Federal Funds Rate



PCE Inflation
Four-quarter average



Real 10-year Treasury Yield



Note: The gray-shaded areas represent quarters in which real GDP growth is negative in the recession scenario under the assumption that policymakers follow the prescriptions of the inertial Taylor (1999) rule.

Outcomes of Simple Policy Rule Simulations

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

Outcome and strategy	2017	2018	2019	2020	2021	2022	2023
<i>Nominal federal funds rate¹</i>							
Taylor (1993)	2.4	3.5	3.7	3.7	3.7	3.5	3.4
Taylor (1999)	3.1	4.0	4.2	4.3	4.1	3.9	3.6
First-difference	1.7	3.0	3.6	3.7	3.5	3.2	3.1
Nominal income targeting	1.1	1.4	2.2	2.9	3.2	3.3	3.2
Extended Tealbook baseline	1.4	2.6	3.5	3.9	4.0	3.9	3.7
<i>Real GDP</i>							
Taylor (1993)	2.6	2.2	2.0	1.8	1.5	1.3	1.4
Taylor (1999)	2.6	1.9	1.8	1.7	1.5	1.4	1.4
First-difference	2.6	2.4	2.1	1.8	1.5	1.3	1.4
Nominal income targeting	2.6	2.9	2.3	1.7	1.2	1.1	1.3
Extended Tealbook baseline	2.6	2.3	1.9	1.6	1.3	1.2	1.3
<i>Unemployment rate¹</i>							
Taylor (1993)	4.2	3.8	3.6	3.6	3.7	3.9	4.1
Taylor (1999)	4.2	4.0	3.9	3.8	3.9	4.1	4.3
First-difference	4.2	3.7	3.5	3.5	3.6	3.8	4.0
Nominal income targeting	4.2	3.5	3.2	3.2	3.4	3.8	4.0
Extended Tealbook baseline	4.2	3.8	3.7	3.7	3.9	4.2	4.4
<i>Total PCE prices</i>							
Taylor (1993)	1.6	1.9	2.1	2.1	2.2	2.3	2.3
Taylor (1999)	1.5	1.9	2.0	2.0	2.1	2.2	2.2
First-difference	1.6	2.0	2.1	2.2	2.3	2.3	2.3
Nominal income targeting	1.6	2.0	2.1	2.2	2.3	2.3	2.3
Extended Tealbook baseline	1.5	1.9	2.0	2.0	2.1	2.1	2.1
<i>Core PCE prices</i>							
Taylor (1993)	1.5	2.0	2.1	2.1	2.2	2.2	2.3
Taylor (1999)	1.5	2.0	2.0	2.0	2.1	2.2	2.2
First-difference	1.5	2.1	2.1	2.2	2.2	2.3	2.3
Nominal income targeting	1.5	2.1	2.2	2.2	2.2	2.3	2.3
Extended Tealbook baseline	1.5	1.9	2.0	2.0	2.1	2.1	2.1

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

Outcomes of Simple Policy Rule Simulations, Quarterly

(Four-quarter percent change, except as noted)

Outcome and strategy	2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Nominal federal funds rate¹</i>								
Taylor (1993)	0.7	0.9	1.2	2.4	2.6	3.1	3.4	3.5
Taylor (1999)	0.7	0.9	1.2	3.1	3.2	3.7	3.9	4.0
First-difference	0.7	0.9	1.2	1.7	2.1	2.4	2.7	3.0
Nominal income targeting	0.7	0.9	1.2	1.1	1.0	1.1	1.3	1.4
Extended Tealbook baseline	0.7	0.9	1.2	1.4	1.7	2.0	2.3	2.6
<i>Real GDP</i>								
Taylor (1993)	2.0	2.3	2.2	2.6	2.9	2.6	2.6	2.2
Taylor (1999)	2.0	2.3	2.2	2.6	2.8	2.5	2.4	1.9
First-difference	2.0	2.3	2.2	2.6	3.0	2.7	2.7	2.4
Nominal income targeting	2.0	2.3	2.2	2.6	3.1	3.0	3.1	2.9
Extended Tealbook baseline	2.0	2.3	2.2	2.6	3.0	2.7	2.7	2.3
<i>Unemployment rate¹</i>								
Taylor (1993)	4.7	4.4	4.4	4.2	4.1	4.0	3.9	3.8
Taylor (1999)	4.7	4.4	4.4	4.2	4.1	4.1	4.0	4.0
First-difference	4.7	4.4	4.4	4.2	4.1	3.9	3.8	3.7
Nominal income targeting	4.7	4.4	4.4	4.2	4.0	3.8	3.6	3.5
Extended Tealbook baseline	4.7	4.4	4.4	4.2	4.1	3.9	3.8	3.8
<i>Total PCE prices</i>								
Taylor (1993)	2.0	1.6	1.6	1.6	1.4	1.9	1.9	1.9
Taylor (1999)	2.0	1.6	1.6	1.5	1.4	1.9	1.9	1.9
First-difference	2.0	1.6	1.6	1.6	1.4	1.9	2.0	2.0
Nominal income targeting	2.0	1.6	1.6	1.6	1.4	1.9	2.0	2.0
Extended Tealbook baseline	2.0	1.6	1.6	1.5	1.4	1.9	1.9	1.9
<i>Core PCE prices</i>								
Taylor (1993)	1.8	1.5	1.4	1.5	1.6	1.9	2.0	2.0
Taylor (1999)	1.8	1.5	1.4	1.5	1.5	1.8	2.0	2.0
First-difference	1.8	1.5	1.4	1.5	1.6	1.9	2.0	2.1
Nominal income targeting	1.8	1.5	1.4	1.5	1.6	1.9	2.1	2.1
Extended Tealbook baseline	1.8	1.5	1.4	1.5	1.5	1.8	1.9	1.9

1. Percent, average for the quarter.

Outcomes of Optimal Control Simulations under Commitment

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

Outcome and strategy	2017	2018	2019	2020	2021	2022	2023
<i>Nominal federal funds rate¹</i>							
Equal weights	2.0	4.5	5.9	6.3	6.1	5.4	4.5
Aymmetric weight on <i>ugap</i>	1.3	1.7	2.2	2.7	3.2	3.5	3.7
Large weight on inflation gap	2.0	4.5	5.8	6.1	5.8	5.1	4.3
Minimal weight on rate adjustments	5.8	8.0	6.4	5.8	6.2	6.1	4.8
Extended Tealbook baseline	1.4	2.6	3.5	3.9	4.0	3.9	3.7
<i>Real GDP</i>							
Equal weights	2.6	1.3	1.1	1.3	1.5	1.6	1.5
Aymmetric weight on <i>ugap</i>	2.6	2.7	2.2	1.7	1.2	1.0	1.1
Large weight on inflation gap	2.6	1.4	1.2	1.4	1.5	1.6	1.5
Minimal weight on rate adjustments	2.6	0.4	1.3	1.8	1.7	1.6	1.4
Extended Tealbook baseline	2.6	2.3	1.9	1.6	1.3	1.2	1.3
<i>Unemployment rate¹</i>							
Equal weights	4.2	4.2	4.5	4.6	4.8	4.8	4.8
Aymmetric weight on <i>ugap</i>	4.2	3.6	3.3	3.3	3.6	4.0	4.4
Large weight on inflation gap	4.2	4.2	4.4	4.5	4.7	4.6	4.7
Minimal weight on rate adjustments	4.2	4.7	4.8	4.7	4.8	4.7	4.7
Extended Tealbook baseline	4.2	3.8	3.7	3.7	3.9	4.2	4.4
<i>Total PCE prices</i>							
Equal weights	1.5	1.7	1.7	1.8	1.9	2.0	2.0
Aymmetric weight on <i>ugap</i>	1.6	1.9	2.0	2.0	2.1	2.1	2.1
Large weight on inflation gap	1.5	1.7	1.8	1.8	2.0	2.0	2.0
Minimal weight on rate adjustments	1.5	1.7	1.7	1.8	1.9	2.0	2.0
Extended Tealbook baseline	1.5	1.9	2.0	2.0	2.1	2.1	2.1
<i>Core PCE prices</i>							
Equal weights	1.5	1.8	1.8	1.8	1.9	2.0	2.0
Aymmetric weight on <i>ugap</i>	1.5	2.0	2.0	2.0	2.1	2.1	2.1
Large weight on inflation gap	1.5	1.8	1.8	1.9	1.9	2.0	2.0
Minimal weight on rate adjustments	1.5	1.8	1.8	1.8	1.9	2.0	2.0
Extended Tealbook baseline	1.5	1.9	2.0	2.0	2.1	2.1	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)

Outcome and strategy	2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Nominal federal funds rate¹</i>								
Equal weights	0.7	0.9	1.2	2.0	2.7	3.4	4.0	4.5
Asymmetric weight on <i>ugap</i>	0.7	0.9	1.2	1.3	1.4	1.5	1.6	1.7
Large weight on inflation gap	0.7	0.9	1.2	2.0	2.7	3.4	4.0	4.5
Minimal weight on rate adjustments	0.7	0.9	1.2	5.8	8.0	8.6	8.5	8.0
Extended Tealbook baseline	0.7	0.9	1.2	1.4	1.7	2.0	2.3	2.6
<i>Real GDP</i>								
Equal weights	2.0	2.3	2.2	2.6	2.7	2.3	2.0	1.3
Asymmetric weight on <i>ugap</i>	2.0	2.3	2.2	2.6	3.0	2.9	2.9	2.7
Large weight on inflation gap	2.0	2.3	2.2	2.6	2.8	2.3	2.0	1.4
Minimal weight on rate adjustments	2.0	2.3	2.2	2.6	2.5	1.7	1.2	0.4
Extended Tealbook baseline	2.0	2.3	2.2	2.6	3.0	2.7	2.7	2.3
<i>Unemployment rate¹</i>								
Equal weights	4.7	4.4	4.4	4.2	4.2	4.1	4.2	4.2
Asymmetric weight on <i>ugap</i>	4.7	4.4	4.4	4.2	4.0	3.9	3.7	3.6
Large weight on inflation gap	4.7	4.4	4.4	4.2	4.1	4.1	4.1	4.2
Minimal weight on rate adjustments	4.7	4.4	4.4	4.2	4.3	4.5	4.7	4.7
Extended Tealbook baseline	4.7	4.4	4.4	4.2	4.1	3.9	3.8	3.8
<i>Total PCE prices</i>								
Equal weights	2.0	1.6	1.6	1.5	1.4	1.8	1.7	1.7
Asymmetric weight on <i>ugap</i>	2.0	1.6	1.6	1.6	1.4	1.9	1.9	1.9
Large weight on inflation gap	2.0	1.6	1.6	1.5	1.4	1.8	1.7	1.7
Minimal weight on rate adjustments	2.0	1.6	1.6	1.5	1.3	1.8	1.7	1.7
Extended Tealbook baseline	2.0	1.6	1.6	1.5	1.4	1.9	1.9	1.9
<i>Core PCE prices</i>								
Equal weights	1.8	1.5	1.4	1.5	1.5	1.7	1.8	1.8
Asymmetric weight on <i>ugap</i>	1.8	1.5	1.4	1.5	1.5	1.8	2.0	2.0
Large weight on inflation gap	1.8	1.5	1.4	1.5	1.5	1.7	1.8	1.8
Minimal weight on rate adjustments	1.8	1.5	1.4	1.5	1.5	1.7	1.8	1.8
Extended Tealbook baseline	1.8	1.5	1.4	1.5	1.5	1.8	1.9	1.9

1. Percent, average for the quarter.

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

Interval	Nominal GDP		Real GDP		PCE price index		Core PCE price index		Unemployment rate ¹	
	07/14/17	09/07/17	07/14/17	09/07/17	07/14/17	09/07/17	07/14/17	09/07/17	07/14/17	09/07/17
<i>Quarterly</i>										
2017:Q1	3.4	3.3	1.4	1.2	2.4	2.2	2.0	1.8	4.7	4.7
Q2	3.0	4.3	2.5	3.3	0.2	0.3	0.8	0.9	4.4	4.4
Q3	4.2	4.1	2.7	2.3	1.2	1.8	1.5	1.4	4.3	4.4
Q4	4.4	5.2	2.7	3.6	1.7	1.9	1.6	1.8	4.2	4.2
2018:Q1	4.9	4.5	2.6	2.5	2.0	1.6	2.0	2.0	4.2	4.1
Q2	4.2	4.6	2.1	2.3	2.0	2.1	2.0	2.1	4.1	3.9
Q3	4.1	4.3	2.0	2.2	1.9	1.9	1.8	1.9	4.0	3.8
Q4	4.0	4.2	2.0	2.2	1.9	1.9	1.8	1.9	4.0	3.8
2019:Q1	4.2	4.3	2.0	2.0	2.0	2.0	1.9	2.0	3.9	3.7
Q2	4.0	4.1	1.8	1.9	2.0	2.0	2.0	2.0	3.9	3.7
Q3	3.9	3.9	1.8	1.8	2.0	2.0	2.0	2.0	3.9	3.7
Q4	3.9	3.8	1.8	1.7	2.0	2.0	2.0	2.0	3.8	3.7
<i>Two-quarter²</i>										
2017:Q2	3.2	3.8	1.9	2.3	1.3	1.2	1.4	1.4	-0.3	-0.3
Q4	4.3	4.6	2.7	3.0	1.5	1.9	1.6	1.6	-0.2	-0.2
2018:Q2	4.6	4.5	2.4	2.4	2.0	1.9	2.0	2.0	-0.1	-0.3
Q4	4.0	4.2	2.0	2.2	1.9	1.9	1.8	1.9	-0.1	-0.1
2019:Q2	4.1	4.2	1.9	2.0	2.0	2.0	2.0	2.0	-0.1	-0.1
Q4	3.9	3.9	1.8	1.7	2.0	2.0	2.0	2.0	-0.1	0.0
<i>Four-quarter³</i>										
2016:Q4	3.5	3.4	2.0	1.8	1.4	1.6	1.7	1.9	-0.3	-0.3
2017:Q4	3.7	4.2	2.3	2.6	1.4	1.5	1.5	1.5	-0.5	-0.5
2018:Q4	4.3	4.4	2.2	2.3	1.9	1.9	1.9	1.9	-0.2	-0.4
2019:Q4	4.0	4.0	1.9	1.9	2.0	2.0	2.0	2.0	-0.2	-0.1
2020:Q4	3.8	3.8	1.6	1.6	2.0	2.0	2.0	2.0	0.1	0.0
<i>Annual</i>										
2016	3.0	2.8	1.6	1.5	1.1	1.2	1.7	1.8	4.9	4.9
2017	3.8	4.0	2.3	2.3	1.6	1.7	1.5	1.5	4.4	4.4
2018	4.3	4.5	2.4	2.7	1.7	1.7	1.8	1.8	4.1	3.9
2019	4.1	4.2	2.0	2.0	1.9	1.9	1.9	2.0	3.9	3.7
2020		3.9	1.7	1.7	2.0	2.0	2.0	2.0	3.9	3.7

1. Level, except for two-quarter and four-quarter intervals.

2. Percent change from two quarters earlier; for unemployment rate, change is in percentage points.

3. Percent change from four quarters earlier; for unemployment rate, change is in percentage points.

Changes in Real Gross Domestic Product and Related Items

(Percent, annual rate except as noted)

Item	2017			2018				2019				2017 ¹	2018 ¹	2019 ¹	2020 ¹
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP <i>Previous Tealbook</i>	3.3 2.5	2.3 2.7	3.6 2.7	2.5 2.6	2.3 2.1	2.2 2.0	2.2 2.0	2.0 2.0	1.9 1.8	1.8 1.8	1.7 1.8	2.6 2.3	2.3 2.2	1.9 1.9	1.6 1.6
Final sales <i>Previous Tealbook</i>	3.2 2.3	2.1 2.5	3.4 2.9	2.4 2.3	2.4 2.1	2.3 2.1	2.4 2.1	2.2 2.2	1.8 1.8	1.8 1.8	1.8 1.8	2.9 2.6	2.4 2.2	1.9 1.9	1.6
Priv. dom. final purch. <i>Previous Tealbook</i>	3.5 2.8	2.0 2.7	3.8 3.2	2.9 3.0	2.8 2.7	2.6 2.5	2.5 2.4	2.2 2.4	2.2 2.4	2.1 2.3	2.0 2.3	3.1 2.9	2.7 2.7	2.1 2.3	1.9
Personal cons. expend. <i>Previous Tealbook</i>	3.4 3.1	2.0 2.7	3.3 2.9	2.7 2.9	2.6 2.7	2.5 2.5	2.5 2.4	2.3 2.4	2.3 2.4	2.3 2.3	2.2 2.3	2.7 2.4	2.6 2.6	2.3 2.4	2.1
Durables	8.9	5.2	7.9	4.9	4.7	4.2	3.7	1.8	1.8	1.8	1.7	5.4	4.4	1.8	1.5
Nondurables	4.3	2.0	3.0	2.9	2.8	2.7	2.7	2.4	2.4	2.3	2.3	2.6	2.8	2.4	2.2
Services	2.2	1.5	2.7	2.3	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.2	2.2	2.3	2.2
Residential investment <i>Previous Tealbook</i>	-6.3 -6.4	-4.2 -5.4	1.8 4.0	2.0 3.4	3.2 3.5	4.4 4.6	3.9 3.6	2.2 4.9	2.6 5.2	2.8 5.4	2.6 5.1	.4 1.0	3.4 3.8	2.5 5.1	3.7
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	7.3 4.1	4.0 5.2	7.2 4.5	4.3 3.7	3.9 3.0	2.3 2.3	2.1 2.0	1.4 1.8	1.4 1.5	1.2 1.3	.9 1.0	6.4 6.0	3.1 2.8	1.2 1.4	.5
Equipment & intangibles <i>Previous Tealbook</i>	7.4 4.6	7.1 4.2	8.7 5.0	5.3 4.9	4.1 3.4	2.8 2.8	2.2 2.3	1.7 2.2	1.9 1.9	1.7 1.8	1.4 1.5	7.0 5.2	3.6 3.4	1.7 1.9	1.1
Nonres. structures <i>Previous Tealbook</i>	7.2 2.5	-5.8 8.8	2.2 2.7	.9 -3	3.1 1.7	.8 .8	1.5 .8	.4 .5	-1 -1	-6 -4	-9 -6	4.3 8.9	1.6 .8	-3 -2	-1.2
Net exports ² <i>Previous Tealbook</i> ²	-616 -600	-602 -607	-603 -612	-611 -628	-618 -643	-617 -652	-606 -652	-598 -653	-609 -671	-616 -685	-621 -696	-611 -604	-613 -644	-611 -676	-649
Exports	3.5	3.7	4.0	4.5	4.6	4.7	4.7	4.8	4.3	4.3	3.4	4.6	4.6	4.2	2.9
Imports	1.8	.9	3.2	4.7	4.6	3.5	2.2	2.6	5.0	4.4	3.4	2.6	3.8	3.8	3.7
Gov't. cons. & invest. <i>Previous Tealbook</i>	.1 -1	.6 1.8	1.0 1.7	.2 .4	.5 .4	.5 .4	.5 .4	.8 .6	.6 .6	.7 .6	.6 .6	.2 .6	.4 .4	.7 .6	.6
Federal	1.9	.6	1.2	-1.2	-2	-1	-1	.8	.1	.4	.2	.3	-4	.4	.2
Defense	4.7	1.5	2.1	.3	.9	1.2	1.1	1.4	.8	1.1	1.0	1.2	.9	1.1	.4
Nondefense	-1.9	-6	-1	-3.2	-1.9	-2.0	-1.9	-2	-9	-8	-9	-1.0	-2.3	-7	-1
State & local	-1.0	.6	.8	1.0	1.0	.9	.9	.9	.9	.9	.9	.2	.9	.9	.9
Change in priv. inventories ² <i>Previous Tealbook</i> ²	6 8	15 20	23 12	31 25	29 25	24 24	12 20	4 13	11 16	10 16	7 14	11 11	24 23	8 15	11

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

2. Billions of chained (2009) dollars.

Changes in Real Gross Domestic Product and Related Items
(Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise noted)

Item	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Real GDP <i>Previous Tealbook</i>	1.7 1.7	1.3 1.3	2.7 2.7	2.7 2.5	2.0 1.9	1.8 2.0	2.6 2.3	2.3 2.2	1.9 1.9	1.6 1.6
Final sales <i>Previous Tealbook</i>	1.5 1.5	1.7 1.7	2.0 2.0	2.9 2.7	2.0 2.0	1.9 2.0	2.9 2.6	2.4 2.2	1.9 1.9	1.6 1.6
Priv. dom. final purch. <i>Previous Tealbook</i>	2.6 2.6	2.3 2.3	2.6 2.6	4.1 3.8	2.9 2.7	2.5 2.5	3.1 2.9	2.7 2.7	2.1 2.3	1.9 2.3
Personal cons. expend. <i>Previous Tealbook</i>	1.5 1.5	1.3 1.3	2.0 2.0	3.6 3.5	3.0 2.6	2.8 3.1	2.7 2.4	2.6 2.6	2.3 2.4	2.1 2.4
Durables	4.8	7.2	5.2	8.7	6.4	7.0	5.4	4.4	1.8	1.5
Nondurables	.4	.8	2.6	2.8	2.8	2.5	2.6	2.8	2.4	2.2
Services	1.4	.6	1.3	3.0	2.6	2.3	2.2	2.2	2.3	2.2
Residential investment <i>Previous Tealbook</i>	6.0 6.0	15.7 15.7	6.8 6.8	6.3 6.2	10.3 13.1	2.5 1.1	.4 1.0	3.4 3.8	2.5 5.1	3.7
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	9.0 9.0	5.2 5.2	4.8 4.8	6.1 5.0	.3 .8	.7 -1	6.4 6.0	3.1 2.8	1.2 1.4	.5
Equipment & intangibles <i>Previous Tealbook</i>	9.2 9.2	5.5 5.5	4.5 4.5	5.3 4.1	3.3 3.8	-1 -6	7.0 5.2	3.6 3.4	1.7 1.9	1.1
Nonres. structures <i>Previous Tealbook</i>	8.0 8.0	4.1 4.1	5.8 5.8	8.8 8.0	-9.1 -8.8	3.5 1.9	4.3 8.9	1.6 .8	-3 -2	-1.2
Net exports ¹ <i>Previous Tealbook</i> ¹	-459 -459	-447 -447	-405 -405	-428 -426	-545 -540	-586 -563	-611 -604	-613 -644	-611 -676	-649
Exports	4.2	2.2	5.9	3.0	-1.8	.6	4.6	4.6	4.2	2.9
Imports	3.5	.3	2.5	6.2	2.9	2.7	2.6	3.8	3.8	3.7
Gov't. cons. & invest. <i>Previous Tealbook</i>	-3.0 -3.0	-2.2 -2.2	-2.8 -2.8	.5 .3	1.6 2.2	.4 .2	.2 .6	.4 .4	.7 .6	.6
Federal	-4.0	-2.1	-6.7	-1.2	1.2	-3	.3	-4	.4	.2
Defense	-4.1	-3.9	-7.1	-4.0	.0	-1.4	1.2	.9	1.1	.4
Nondefense	-3.9	1.0	-6.0	3.5	2.9	1.2	-1.0	-2.3	-7	-1
State & local	-2.3	-2.3	-1	1.5	1.9	.8	.2	.9	.9	.9
Change in priv. inventories ¹ <i>Previous Tealbook</i> ¹	38 38	55 55	79 79	68 58	101 84	33 22	11 11	24 23	8 15	11

1. Billions of chained (2009) dollars.

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

Item	2017			2018				2019				2017 ¹	2018 ¹	2019 ¹	2020 ¹
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP <i>Previous Tealbook</i>	3.3 2.5	2.3 2.7	3.6 2.7	2.5 2.6	2.3 2.1	2.2 2.0	2.2 2.0	2.0 2.0	1.9 1.8	1.8 1.8	1.7 1.8	2.6 2.3	2.3 2.2	1.9 1.9	1.6 1.6
Final sales <i>Previous Tealbook</i>	3.2 2.3	2.1 2.5	3.4 2.9	2.4 2.3	2.4 2.1	2.3 2.1	2.4 2.1	2.2 2.2	1.8 1.8	1.8 1.8	1.8 1.8	2.9 2.5	2.4 2.2	1.9 1.9	1.6 1.6
Priv. dom. final purch. <i>Previous Tealbook</i>	3.0 2.4	1.7 2.3	3.2 2.7	2.5 2.6	2.4 2.3	2.2 2.2	2.1 2.1	1.9 2.1	1.9 2.0	1.8 2.0	1.8 1.9	2.6 2.5	2.3 2.3	1.8 2.0	1.7
Personal cons. expend. <i>Previous Tealbook</i>	2.4 2.1	1.4 1.8	2.3 2.0	1.9 2.0	1.8 1.8	1.7 1.7	1.7 1.7	1.6 1.7	1.6 1.6	1.6 1.6	1.5 1.6	1.8 1.7	1.8 1.8	1.6 1.6	1.5
Durables	.7	.4	.6	.4	.4	.3	.3	.1	.1	.1	.1	.4	.3	.1	.1
Nondurables	.6	.3	.4	.4	.4	.4	.4	.4	.3	.3	.3	.4	.4	.3	.3
Services	1.1	.7	1.3	1.1	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.0
Residential investment <i>Previous Tealbook</i>	-.3 -.3	-.2 -.2	.1 .2	.1 .1	.1 .1	.2 .2	.2 .1	.1 .2	.1 .2	.1 .2	.1 .2	.0 .0	.1 .1	.1 .2	.1
Nonres. priv. fixed invest. <i>Previous Tealbook</i>	.9 .5	.5 .7	.9 .6	.5 .5	.5 .4	.3 .3	.3 .3	.2 .2	.2 .2	.1 .2	.1 .1	.8 .7	.4 .4	.2 .2	.1
Equipment & intangibles <i>Previous Tealbook</i>	.7 .4	.7 .4	.8 .5	.5 .5	.4 .3	.3 .2	.2 .2	.2 .2	.2 .2	.2 .2	.1 .1	.7 .5	.4 .3	.2 .2	.1
Nonres. structures <i>Previous Tealbook</i>	.2 .1	-.2 .2	.1 .1	.0 .0	.1 .0	.0 .0	.0 .0	.0 .0	.0 .0	.0 .0	.0 .0	.1 .2	.0 .0	.0 .0	.0
Net exports <i>Previous Tealbook</i>	.2 -.1	.3 -.1	.0 -.1	-.2 -.3	-.1 -.3	.0 -.2	.2 .0	.2 .0	-.2 -.4	-.1 -.3	-.1 -.2	.2 .0	.0 -.2	-.1 -.2	-.2
Exports	.4	.4	.5	.5	.6	.6	.6	.6	.5	.5	.4	.6	.6	.5	.4
Imports	-.3	-.1	-.5	-.7	-.7	-.5	-.3	-.4	-.7	-.6	-.5	-.4	-.6	-.6	-.6
Gov't. cons. & invest. <i>Previous Tealbook</i>	.0 .0	.1 .3	.2 .3	.0 .1	.1 .1	.1 .1	.1 .1	.1 .1	.1 .1	.1 .1	.1 .1	.0 .1	.1 .1	.1 .1	.1
Federal	.1	.0	.1	-.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Defense	.2	.1	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
Nondefense	-.1	.0	.0	-.1	.0	-.1	.0	.0	.0	.0	.0	.0	-.1	.0	.0
State & local	-.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.0	.1	.1	.1
Change in priv. inventories <i>Previous Tealbook</i>	.2 .2	.2 .3	.2 -.2	.2 .3	-.1 .0	-.1 .0	-.3 -.1	-.2 -.1	.2 .1	.0 .0	-.1 .0	-.2 -.2	-.1 .0	.0 .0	.0

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

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

Item	2017				2018				2019				2017 ¹	2018 ¹	2019 ¹	2020 ¹
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
GDP chain-wt. price index <i>Previous Tealbook</i>	1.0 .5	1.7 1.4	1.5 1.6	1.9 2.2	2.2 2.1	2.0 2.0	2.0 2.0	1.9 2.0	2.2 2.1	2.1 2.1	2.1 2.1	2.2 2.1	1.5 1.4	2.0 2.1	2.1 2.1	2.2
PCE chain-wt. price index <i>Previous Tealbook</i>	.3 .2	1.8 1.2	1.9 1.7	1.6 2.0	2.1 2.0	1.9 1.9	1.9 1.9	1.9 2.0	2.0 2.0	2.0 2.0	2.0 2.0	2.0 2.0	1.5 1.4	1.9 1.9	2.0 2.0	2.0 2.0
Energy <i>Previous Tealbook</i>	-16.0 -16.0	14.0 -6.1	3.1 3.4	-6.7 2.6	1.5 2.4	1.2 2.0	1.1 1.8	1.1 1.8	.9 1.8	.8 1.7	1.0 1.8	.9 1.6	3.4 -1.5	-8 2.2	.9 1.7	1.2
Food <i>Previous Tealbook</i>	2.0 2.3	.9 1.5	1.9 1.9	2.3 2.3	2.1 2.1	2.1 2.1	2.3 2.3	2.3 2.3	2.3 2.3	2.3 2.3	2.3 2.3	2.3 2.3	1.3 1.5	2.2 2.2	2.3 2.3	2.2 2.2
Ex. food & energy <i>Previous Tealbook</i>	.9 .8	1.4 1.5	1.8 1.6	2.0 2.0	2.1 2.0	1.9 1.8	1.9 1.8	1.9 1.8	2.0 1.9	2.0 2.0	2.0 2.0	2.0 2.0	1.5 1.5	1.9 1.9	2.0 2.0	2.0 2.0
Ex. food & energy, market based <i>Previous Tealbook</i>	.2 .3	1.1 1.3	1.8 1.6	1.7 1.9	1.9 1.9	1.6 1.8	1.6 1.8	1.6 1.8	1.8 1.9	1.8 1.9	1.8 1.9	1.8 1.9	1.3 1.3	1.7 1.8	1.8 1.9	1.9
CPI <i>Previous Tealbook</i>	-3 -2	2.1 1.4	2.4 2.3	1.8 2.5	2.4 2.5	2.3 2.4	2.3 2.4	2.3 2.4	2.4 2.4	2.4 2.4	2.4 2.5	2.4 2.5	1.8 1.7	2.2 2.4	2.4 2.4	2.4
Ex. food & energy <i>Previous Tealbook</i>	.6 .6	1.5 1.9	2.3 2.3	2.3 2.5	2.5 2.5	2.3 2.4	2.3 2.5	2.3 2.5	2.5 2.5	2.5 2.5	2.5 2.5	2.5 2.5	1.7 1.8	2.4 2.5	2.5 2.5	2.5
ECL, hourly compensation ² <i>Previous Tealbook</i> ²	2.2 2.3	2.3 2.3	2.4 2.4	2.6 2.6	2.4 2.4	2.5 2.4	2.5 2.5	2.5 2.5	2.6 2.5	2.6 2.5	2.6 2.6	2.6 2.6	2.5 2.5	2.5 2.5	2.6 2.6	2.6
Business sector Output per hour <i>Previous Tealbook</i>	1.6 .6	2.2 2.3	1.1 1.8	1.3 1.2	.9 .7	.8 .7	.8 .7	.8 .7	.9 .9	1.0 .9	.9 1.0	.9 1.0	1.0 1.0	.9 .9	.9 .9	1.0
Compensation per hour <i>Previous Tealbook</i>	1.8 1.8	3.0 2.9	3.5 3.5	3.5 3.5	3.5 3.5	3.5 3.5	3.6 3.5	3.6 3.5	3.6 3.5	3.6 3.6	3.6 3.6	3.6 3.6	3.1 2.4	3.5 3.5	3.6 3.5	3.6
Unit labor costs <i>Previous Tealbook</i>	.2 1.2	.8 .6	2.3 1.7	2.2 2.2	2.6 2.7	2.7 2.7	2.8 2.7	2.8 2.7	2.7 2.6	2.6 2.6	2.7 2.5	2.7 2.5	2.1 1.4	2.6 2.6	2.7 2.6	2.5
Core goods imports chain-wt. price index ³ <i>Previous Tealbook</i> ³	2.5 2.0	3.6 3.5	4.0 2.1	1.9 .8	1.1 .8	.8 .7	.7 .7	.7 .7	.7 .7	.7 .7	.7 .7	.7 .7	2.5 2.0	1.1 .7	.7 .7	.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.

Greensheets

Changes in Prices and Costs

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

Item	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GDP chain-wt. price index <i>Previous Tealbook</i>	1.9 1.9	1.9 1.9	1.6 1.6	1.6 1.5	1.0 1.1	1.5 1.6	1.5 1.4	2.0 2.1	2.1 2.1	2.2
PCE chain-wt. price index <i>Previous Tealbook</i>	2.7 2.7	1.8 1.8	1.2 1.2	1.2 1.2	.4 .4	1.6 1.4	1.5 1.4	1.9 1.9	2.0 2.0	2.0 2.0
Energy <i>Previous Tealbook</i>	12.0 12.0	2.3 2.3	-2.5 -2.5	-6.5 -6.2	-16.2 -15.8	2.2 .8	3.4 -1.5	-8 2.2	.9 1.7	1.2
Food <i>Previous Tealbook</i>	5.1 5.1	1.2 1.2	.7 .7	2.6 2.7	.3 .3	-1.7 -1.7	1.3 1.5	2.2 2.2	2.3 2.3	2.2
Ex. food & energy <i>Previous Tealbook</i>	1.9 1.9	1.8 1.8	1.5 1.5	1.5 1.6	1.3 1.4	1.9 1.7	1.5 1.5	1.9 1.9	2.0 2.0	2.0 2.0
Ex. food & energy, market based <i>Previous Tealbook</i>	1.9 1.9	1.5 1.5	1.1 1.1	1.2 1.2	1.1 1.1	1.5 1.5	1.3 1.3	1.7 1.8	1.8 1.9	1.9
CPI <i>Previous Tealbook</i>	3.3 3.3	1.9 1.9	1.2 1.2	1.2 1.2	.4 .4	1.8 1.8	1.8 1.7	2.2 2.4	2.4 2.4	2.4
Ex. food & energy <i>Previous Tealbook</i>	2.2 2.2	1.9 1.9	1.7 1.7	1.7 1.7	2.0 2.0	2.2 2.2	1.7 1.8	2.4 2.5	2.5 2.5	2.5
ECL, hourly compensation ¹ <i>Previous Tealbook</i> ¹	2.2 2.2	1.8 1.8	2.0 2.0	2.3 2.3	1.9 1.9	2.2 2.2	2.5 2.5	2.5 2.5	2.6 2.6	2.6
Business sector Output per hour <i>Previous Tealbook</i>	-1 -1	-1 -1	1.9 1.9	.1 -1	.7 .5	1.0 1.2	1.0 1.0	.9 .9	.9 .9	1.0
Compensation per hour <i>Previous Tealbook</i>	.5 .5	5.9 5.9	-2 -1	2.9 2.7	3.1 3.2	-1 1.6	3.1 2.4	3.5 3.5	3.6 3.5	3.6
Unit labor costs <i>Previous Tealbook</i>	.6 .6	6.0 6.0	-2.0 -2.0	2.7 2.8	2.4 2.6	-1.2 .4	2.1 1.4	2.6 2.6	2.7 2.6	2.5
Core goods imports chain-wt. price index ² <i>Previous Tealbook</i> ²	4.3 4.3	.1 .1	-1.5 -1.5	.3 .5	-3.7 -3.3	-2 .0	2.5 2.0	1.1 .7	.7 .7	.7

1. Private-industry workers.

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

Other Macroeconomic Indicators

Item	2017				2018				2019				2017 ¹	2018 ¹	2019 ¹	2020 ¹
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	2017 ¹	2018 ¹	2019 ¹	2020 ¹
<i>Employment and production</i>																
Nonfarm payroll employment ²	187	164	208	179	179	179	179	139	124	114	109	139	181	179	122	109
Unemployment rate ³	4.4	4.4	4.2	4.1	3.9	3.8	3.8	3.7	3.7	3.7	3.7	3.7	4.2	3.8	3.7	3.7
<i>Previous Tealbook³</i>	4.4	4.3	4.2	4.2	4.1	4.0	4.0	3.9	3.9	3.9	3.8	3.9	4.2	4.0	3.8	3.9
Natural rate of unemployment ³	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
<i>Previous Tealbook³</i>	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	4.9	4.9
Employment-to-Population Ratio ³	60.1	60.1	60.1	60.2	60.2	60.3	60.3	60.3	60.3	60.3	60.2	60.3	60.1	60.3	60.2	60.0
Employment-to-Population Trend ³	59.7	59.7	59.6	59.6	59.5	59.5	59.4	59.4	59.3	59.3	59.2	59.4	59.6	59.4	59.2	59.0
GDP gap ⁴	.8	.9	1.4	1.6	1.8	1.9	2.1	2.1	2.2	2.2	2.2	2.1	1.4	2.1	2.2	2.0
<i>Previous Tealbook⁴</i>	.7	1.0	1.3	1.5	1.7	1.8	1.9	1.9	2.0	2.0	2.0	1.9	1.3	1.9	2.0	2.0
Industrial production ⁵	5.2	.3	4.4	2.0	1.6	.5	1.1	1.2	1.4	1.1	.7	1.2	2.9	1.3	1.1	.5
<i>Previous Tealbook⁵</i>	5.5	2.8	1.9	1.5	.9	.6	1.4	1.4	.9	1.0	.8	1.4	2.9	1.1	1.0	1.0
Manufacturing industr. prod. ⁵	1.9	-5	2.8	1.2	1.8	1.1	.7	.9	1.5	1.1	.5	.9	1.6	1.2	1.0	.3
<i>Previous Tealbook⁵</i>	1.8	.6	1.5	.8	1.0	1.0	.9	1.0	1.0	1.1	.9	1.0	1.5	.9	1.0	1.0
Capacity utilization rate - mfg. ³	75.6	75.4	75.8	75.9	76.1	76.2	76.2	76.3	76.5	76.6	76.6	76.3	75.8	76.2	76.6	76.7
<i>Previous Tealbook³</i>	75.6	75.6	75.8	75.9	76.0	76.0	76.1	76.3	76.4	76.6	76.7	76.3	75.8	76.1	76.7	76.7
Housing starts ⁶	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.4
Light motor vehicle sales ⁶	16.8	16.4	16.9	16.8	16.8	16.7	16.7	16.7	16.7	16.6	16.5	16.7	16.8	16.8	16.7	16.5
<i>Income and saving</i>																
Nominal GDP ⁵	4.3	4.1	5.2	4.5	4.6	4.3	4.2	4.3	4.1	3.9	3.8	4.3	4.2	4.4	4.0	3.8
Real disposable pers. income ⁵	3.3	1.4	2.1	4.4	2.0	2.2	2.4	3.4	1.8	1.8	1.8	3.4	2.4	2.7	2.2	1.7
<i>Previous Tealbook⁵</i>	4.2	1.4	1.6	4.4	2.2	2.4	2.6	3.4	1.9	1.8	1.9	3.4	2.2	2.9	2.2	2.2
Personal saving rate ³	3.7	3.5	3.3	3.7	3.5	3.5	3.5	3.7	3.6	3.5	3.4	3.7	3.3	3.5	3.4	3.0
<i>Previous Tealbook³</i>	5.3	5.0	4.7	5.1	5.0	5.0	5.0	5.3	5.2	5.1	5.0	5.3	4.7	5.0	5.0	5.0
Corporate profits ⁷	5.2	13.6	3.7	6.7	4.4	2.4	1.2	1.7	3.5	4.0	3.0	1.7	3.3	3.6	3.1	4.7
Profit share of GNP ³	11.0	11.2	11.2	11.2	11.3	11.2	11.1	11.1	11.1	11.1	11.1	11.1	11.2	11.1	11.1	11.2
Gross national saving rate ³	17.3	17.6	17.1	17.2	17.2	17.1	17.1	17.0	17.0	16.9	16.8	17.0	17.1	17.1	16.8	16.6
Net national saving rate ³	2.3	2.7	2.2	2.2	2.2	2.1	2.0	1.8	1.8	1.6	1.5	1.8	2.2	2.0	1.5	1.2

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.

Greensheets

Other Macroeconomic Indicators

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

Item	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<i>Employment and production</i>										
Nonfarm payroll employment ¹	174	179	192	250	226	187	181	179	122	109
Unemployment rate ²	8.7	7.8	7.0	5.7	5.0	4.7	4.2	3.8	3.7	3.7
<i>Previous Tealbook²</i>	8.7	7.8	7.0	5.7	5.0	4.7	4.2	4.0	3.8	3.9
Natural rate of unemployment ²	5.9	5.6	5.4	5.1	4.9	4.8	4.8	4.8	4.8	4.8
<i>Previous Tealbook²</i>	5.9	5.6	5.4	5.1	5.0	4.9	4.9	4.9	4.9	4.9
Employment-to-Population Ratio ²	58.5	58.7	58.5	59.2	59.4	59.7	60.1	60.3	60.2	60.0
Employment-to-Population Trend ²	60.7	60.3	60.2	60.1	59.9	59.8	59.6	59.4	59.2	59.0
GDP gap ³	-3.7	-3.7	-2.5	-9	-1	.3	1.4	2.1	2.2	2.0
<i>Previous Tealbook³</i>	-3.7	-3.7	-2.5	-9	.0	.5	1.3	1.9	2.0	2.0
Industrial production ⁴	2.8	2.3	2.2	3.4	-2.7	-1	2.9	1.3	1.1	.5
<i>Previous Tealbook⁴</i>	2.8	2.3	2.2	3.4	-2.7	-1	2.9	1.1	1.0	.3
Manufacturing industr. prod. ⁴	2.5	1.7	.9	1.5	-6	.3	1.6	1.2	1.0	.3
<i>Previous Tealbook⁴</i>	2.5	1.7	.9	1.5	-6	.3	1.5	.9	1.0	.3
Capacity utilization rate - mfg. ²	74.4	74.6	74.7	75.9	75.4	75.1	75.8	76.2	76.6	76.7
<i>Previous Tealbook²</i>	74.4	74.6	74.7	75.9	75.4	75.1	75.8	76.1	76.7	76.7
Housing starts ⁵	.6	.8	.9	1.0	1.1	1.2	1.2	1.3	1.3	1.4
Light motor vehicle sales ⁵	12.7	14.4	15.5	16.5	17.4	17.5	16.8	16.8	16.7	16.5
<i>Income and saving</i>										
Nominal GDP ⁴	3.6	3.2	4.3	4.3	3.1	3.4	4.2	4.4	4.0	3.8
Real disposable pers. income ⁴	1.7	5.1	-2.8	4.9	3.2	.2	2.4	2.7	2.2	1.7
<i>Previous Tealbook⁴</i>	1.7	5.1	-2.8	4.5	3.0	1.9	2.2	2.9	2.2	1.7
Personal saving rate ²	5.8	9.2	4.7	5.9	6.1	3.6	3.3	3.5	3.4	3.0
<i>Previous Tealbook²</i>	5.8	9.2	4.7	5.6	6.0	4.9	4.7	5.0	5.0	3.0
Corporate profits ⁶	6.8	.6	4.7	7.4	-11.1	8.7	3.3	3.6	3.1	4.7
Profit share of GNP ²	12.3	12.0	12.0	12.4	10.7	11.3	11.2	11.1	11.1	11.2
Gross national saving rate ²	16.1	18.0	18.2	19.5	19.0	17.2	17.1	17.1	16.8	16.6
Net national saving rate ²	.8	2.9	3.1	4.7	4.1	2.1	2.2	2.0	1.5	1.2

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.

Staff Projections of Government-Sector Accounts and Related Items

Item	2015	2016	2017	2018	2019	2020	2017			
							Q1	Q2	Q3	Q4
Unified federal budget¹										
Receipts	3,250	3,268	3,321	3,370	3,586	3,772	732	1,035	813	763
Outlays	3,688	3,853	3,980	4,124	4,410	4,666	1,049	1,031	950	1,010
Surplus/deficit	-438	-585	-660	-754	-824	-894	-317	4	-137	-248
<i>Percent of GDP</i>										
Surplus/deficit	-2.4	-3.2	-3.4	-3.8	-3.9	-4.1	-6.7	.1	-2.8	-5.0
<i>Previous Tealbook</i>	-2.4	-3.2	-3.6	-3.5	-3.9	-4.4	-6.7	.1	-2.8	-5.0
Primary surplus/deficit	-1.2	-1.9	-2.1	-2.2	-2.1	-1.9	-5.1	1.8	-2.0	-3.1
Net interest	1.2	1.3	1.4	1.6	1.9	2.2	1.5	1.7	.8	1.9
Cyclically adjusted surplus/deficit	-1.9	-2.8	-3.3	-4.2	-4.7	-4.9	-6.3	.2	-2.8	-5.2
Federal debt held by public	72.9	76.7	76.0	77.4	79.0	80.7	75.3	74.5	74.9	75.2
Government in the NIPA²										
Purchases	1.6	.4	.2	.4	.7	.6	-.6	.1	.6	1.0
Consumption	1.9	.6	-.2	.0	.3	.3	-1.7	.3	.2	.5
Investment	.4	-.5	2.0	2.2	2.1	1.7	4.1	-1.5	2.5	2.9
State and local construction	.0	-2.3	-3.1	1.5	1.0	1.0	-2.3	-14.2	3.0	2.0
Real disposable personal income	3.2	.2	2.4	2.7	2.2	1.7	2.9	3.3	1.4	2.1
Contribution from transfers ³	.7	.3	.4	1.0	.8	.6	.6	.1	.1	.6
Contribution from taxes ³	-1.4	.2	-.6	-.6	-.6	-.6	-1.6	-.2	.0	-.6
Government employment										
Federal	3	4	-1	0	0	0	-2	-1	-1	0
State and local	10	13	3	9	9	9	6	4	-3	6
Fiscal indicators²										
Fiscal effect (FE) ⁴							Average net change in monthly payrolls, thousands			
Discretionary policy actions (FI)							Percentage point contribution to change in real GDP, annual rate			
<i>Previous Tealbook</i>	.3	.6	.2	.5	.4	.2	.1	.2	.2	.3
Federal purchases	.4	.2	.0	.3	.3	.2	-.2	.0	.1	.2
State and local purchases	.6	.2	.1	.3	.2	.2	-.2	.0	.4	.3
Taxes and transfers	.1	.0	.0	.0	.0	.0	-.2	.1	.0	.1
Cyclical	.2	.1	.0	.1	.1	.1	.1	-.1	.1	.1
Other	.1	.1	.0	.2	.2	.1	-.1	.0	.0	.0
	-.3	.0	-.2	-.3	-.1	.0	.0	-.3	-.3	-.4
	.2	.3	.1	.3	.3	.2	.0	.2	.1	.2

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

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

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

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

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

Measure and country	2017				2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Real GDP¹												
Total foreign	3.0	3.3	2.8	2.8	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.4
<i>Previous Tealbook</i>	3.2	2.8	2.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.7	2.3
Advanced foreign economies	2.6	3.4	2.4	2.1	1.8	1.7	1.6	1.6	1.6	1.6	1.9	1.1
Canada	3.7	4.5	2.7	2.4	1.8	1.7	1.6	1.6	1.6	1.6	1.7	1.7
Japan	1.5	4.0	1.8	1.5	1.2	1.1	.9	.8	.7	.8	3.3	-4.4
United Kingdom	.9	1.2	1.4	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Euro area	2.2	2.6	2.3	2.1	1.9	1.8	1.7	1.7	1.7	1.7	1.7	1.7
Germany	2.9	2.5	2.2	2.1	1.6	1.5	1.4	1.4	1.4	1.4	1.4	1.4
Emerging market economies	3.3	3.2	3.2	3.4	3.5	3.5	3.5	3.5	3.6	3.5	3.5	3.5
Asia	5.4	4.7	4.7	4.8	4.7	4.7	4.6	4.6	4.6	4.5	4.5	4.5
Korea	4.3	2.4	3.3	3.3	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0
China	7.1	6.8	6.5	6.3	6.2	6.2	6.1	6.1	6.1	6.0	6.0	5.9
Latin America	2.3	2.0	1.9	2.2	2.5	2.5	2.5	2.5	2.7	2.6	2.7	2.7
Mexico	2.7	2.3	2.0	2.3	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.7
Brazil	4.2	1.0	1.6	1.9	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.2
Consumer prices²												
Total foreign	2.9	2.0	1.8	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.8
<i>Previous Tealbook</i>	3.0	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.8
Advanced foreign economies	2.3	.3	.9	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.7	2.6
Canada	2.6	.1	1.3	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Japan	-1.1	-.3	.3	.5	.6	.7	.8	.9	.9	1.0	1.0	6.3
United Kingdom	3.9	3.0	2.0	2.6	2.4	2.3	2.3	2.3	2.2	2.2	2.1	2.1
Euro area	2.8	.1	.7	1.3	1.4	1.4	1.4	1.5	1.5	1.6	1.6	1.7
Germany	2.1	.2	1.2	1.6	1.8	1.8	1.8	1.9	2.0	2.0	2.1	2.2
Emerging market economies	3.3	3.2	2.5	3.0	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0
Asia	.9	1.7	1.5	2.6	2.7	2.7	2.8	2.8	2.7	2.7	2.7	2.7
Korea	2.9	.4	1.9	2.5	3.1	3.2	3.2	3.2	3.1	3.0	3.0	3.0
China	-.6	2.3	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Latin America	9.4	7.1	5.1	4.1	4.0	3.9	3.8	3.8	3.6	3.5	3.5	3.5
Mexico	9.9	6.9	4.7	3.4	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Brazil	3.2	2.3	2.8	4.4	4.4	4.3	4.3	4.3	4.3	4.3	4.3	4.3

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

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

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

Measure and country	-----Projected-----									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Real GDP¹										
Total foreign	3.2	2.3	3.0	2.6	2.0	2.4	3.0	2.6	2.6	2.6
<i>Previous Tealbook</i>	3.2	2.3	2.9	2.6	2.0	2.4	2.8	2.6	2.6	2.6
Advanced foreign economies	1.8	.3	2.5	1.8	1.1	1.9	2.6	1.7	1.6	1.7
Canada	3.1	.7	3.6	2.2	.4	2.0	3.3	1.7	1.7	1.7
Japan	.2	.3	2.8	-.2	1.1	1.7	2.2	1.0	.0	.5
United Kingdom	1.3	1.3	2.4	3.5	1.7	1.9	1.3	1.7	1.7	1.7
Euro area	.5	-1.1	.8	1.4	1.9	1.9	2.3	1.8	1.7	1.7
Germany	2.4	.2	1.6	1.9	1.3	1.9	2.4	1.5	1.4	1.4
Emerging market economies	4.6	4.3	3.4	3.3	2.8	2.9	3.3	3.5	3.5	3.6
Asia	5.1	5.7	5.4	5.0	4.4	4.8	4.9	4.7	4.5	4.4
Korea	2.9	2.1	3.5	2.8	3.3	2.4	3.3	3.1	3.0	2.9
China	8.7	8.0	7.6	7.1	6.8	6.8	6.7	6.1	6.0	5.8
Latin America	4.1	3.4	1.6	1.9	1.3	1.2	2.1	2.5	2.7	2.9
Mexico	4.2	3.4	1.0	2.7	2.5	2.3	2.3	2.6	2.7	2.9
Brazil	2.7	2.5	2.6	-.2	-5.7	-2.4	2.2	2.0	2.2	2.3
Consumer prices²										
Total foreign	3.4	2.3	2.4	2.0	1.4	1.9	2.3	2.4	2.5	2.5
<i>Previous Tealbook</i>	3.4	2.3	2.4	2.0	1.4	1.9	2.4	2.4	2.5	2.5
Advanced foreign economies	2.2	1.3	1.0	1.2	.5	.9	1.2	1.5	1.9	1.7
Canada	2.7	1.0	1.0	2.0	1.3	1.4	1.5	2.0	2.0	2.0
Japan	-.3	-.2	1.4	2.6	.2	.3	.1	.7	2.3	1.1
United Kingdom	4.6	2.6	2.1	.9	.1	1.2	2.9	2.3	2.1	2.0
Euro area	2.9	2.3	.8	.2	.2	.7	1.2	1.4	1.6	1.8
Germany	2.6	1.9	1.4	.4	.2	1.0	1.3	1.8	2.1	2.3
Emerging market economies	4.3	3.1	3.4	2.7	2.1	2.7	3.0	3.1	3.0	3.0
Asia	4.4	2.6	3.1	1.8	1.5	2.0	1.7	2.7	2.7	2.7
Korea	3.9	1.7	1.1	1.0	.9	1.5	1.9	3.2	3.1	3.0
China	4.6	2.1	2.9	1.5	1.5	2.2	1.4	2.5	2.5	2.5
Latin America	4.1	4.4	4.1	4.8	3.4	4.3	6.4	3.9	3.5	3.5
Mexico	3.5	4.1	3.6	4.2	2.3	3.2	6.2	3.2	3.2	3.2
Brazil	6.7	5.6	5.8	6.5	10.4	7.1	3.2	4.3	4.3	4.3

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

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

Greensheets

U.S. Current Account

Quarterly Data

	2017				2018				2019			
	-----				-----				-----			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<i>Billions of dollars, s.a.a.r.</i>												
U.S. current account balance	-463.6	-478.3	-463.3	-501.8	-539.9	-533.8	-549.3	-558.6	-593.9	-593.2	-612.0	-633.1
<i>Previous Tealbook</i>	<i>-467.1</i>	<i>-478.1</i>	<i>-505.8</i>	<i>-535.9</i>	<i>-579.3</i>	<i>-580.2</i>	<i>-604.3</i>	<i>-624.3</i>	<i>-669.4</i>	<i>-675.8</i>	<i>-703.1</i>	<i>-731.3</i>
Current account as percent of GDP	-2.4	-2.5	-2.4	-2.5	-2.7	-2.7	-2.7	-2.7	-2.9	-2.8	-2.9	-3.0
<i>Previous Tealbook</i>	<i>-2.5</i>	<i>-2.5</i>	<i>-2.6</i>	<i>-2.7</i>	<i>-2.9</i>	<i>-2.9</i>	<i>-3.0</i>	<i>-3.1</i>	<i>-3.2</i>	<i>-3.2</i>	<i>-3.3</i>	<i>-3.4</i>
Net goods & services	-552.4	-549.2	-546.0	-566.0	-590.0	-574.1	-564.9	-556.9	-562.3	-552.4	-553.4	-564.0
Investment income, net	204.2	196.5	210.5	187.9	182.8	161.9	143.4	122.1	101.1	80.9	69.1	54.6
Direct, net	288.2	278.7	300.8	297.7	310.5	310.4	313.5	313.2	312.4	311.8	319.6	323.6
Portfolio, net	-84.0	-82.1	-90.3	-109.8	-127.7	-148.5	-170.1	-191.1	-211.3	-230.9	-250.4	-268.9
Other income and transfers, net	-115.4	-125.6	-127.8	-123.8	-132.7	-121.7	-127.8	-123.8	-132.7	-121.7	-127.8	-123.8

Annual Data

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
	-----Projected-----									
	Billions of dollars									
U.S. current account balance	-444.6	-426.2	-349.5	-373.0	-434.6	-451.7	-476.8	-545.4	-608.0	-683.0
Previous Tealbook	-444.6	-426.2	-349.5	-373.0	-434.6	-451.7	-496.8	-597.0	-694.9	
Current account as percent of GDP	-2.9	-2.6	-2.1	-2.1	-2.4	-2.4	-2.5	-2.7	-2.9	-3.1
Previous Tealbook	-2.9	-2.6	-2.1	-2.1	-2.4	-2.4	-2.6	-3.0	-3.3	
Net goods & services	-548.6	-536.8	-461.9	-489.5	-500.4	-504.8	-553.4	-571.5	-558.0	-587.5
Investment income, net	219.2	216.1	215.4	221.3	192.7	186.8	199.8	152.6	76.4	31.0
Direct, net	288.7	285.5	283.3	276.7	266.5	258.8	291.3	311.9	316.8	339.4
Portfolio, net	-69.5	-69.4	-67.9	-55.4	-73.8	-72.0	-91.6	-159.3	-240.4	-308.5
Other income and transfers, net	-115.1	-105.5	-103.1	-104.8	-126.9	-133.7	-123.1	-126.5	-126.5	-126.5

Abbreviations

ABS	asset-backed securities
AFE	advanced foreign economy
AHE	average hourly earnings
BEA	Bureau of Economic Analysis
BOC	Bank of Canada
BOE	Bank of England
BOJ	Bank of Japan
BOM	Bank of Mexico
CDS	credit default swaps
C&I	commercial and industrial
CMBS	commercial mortgage-backed securities
CPI	consumer price index
CRE	commercial real estate
ECB	European Central Bank
ECI	employment cost index
ELB	effective lower bound
EME	emerging market economy
FOMC	Federal Open Market Committee; also, the Committee
GDP	gross domestic product
GST	Goods and Services Tax
MBS	mortgage-backed securities
Michigan survey	University of Michigan Surveys of Consumers
MMF	money market fund
NI	nominal income
OIS	overnight index swap

ON RRP	overnight reverse repurchase agreement
OPEC	Organization of the Petroleum Exporting Countries
PCE	personal consumption expenditures
PMI	purchasing managers index
repo	repurchase agreement
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
WTI	West Texas intermediate

Class I FOMC – Restricted Controlled (FR)

Report to the FOMC on Economic Conditions and Monetary Policy

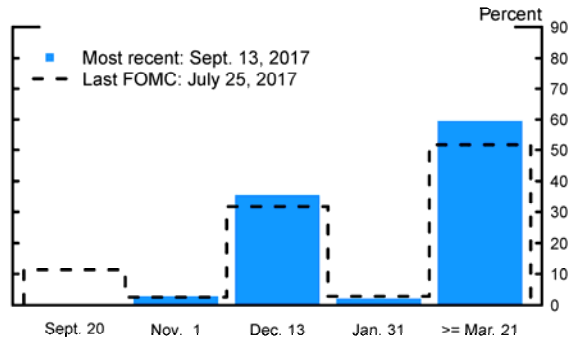


Book B Monetary Policy Alternatives

September 14, 2017

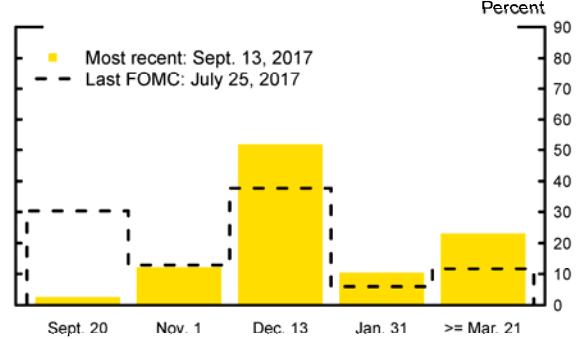
Prepared for the Federal Open Market Committee
by the staff of the Board of Governors of the Federal Reserve System

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



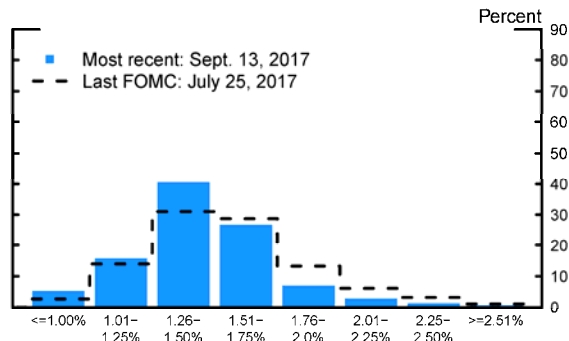
Note: Probabilities implied by a binomial tree fitted to settlement prices on fed funds futures contracts, assuming the next policy action is either no change or a 25 basis point increase in rates and no intermeeting moves. The effective federal funds rate until the next FOMC meeting is assumed to be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

Figure 2: Term-Premium-Adjusted Probability Distribution of the Timing of Next Rate Increase



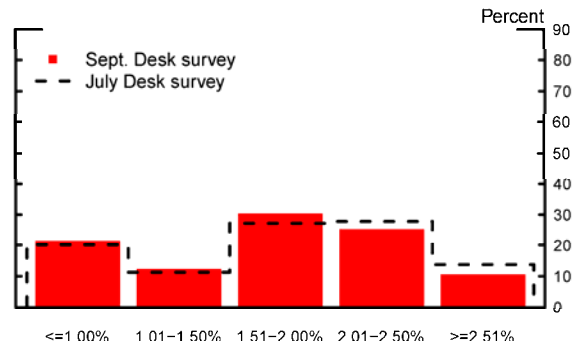
Note: Probabilities from figure 1 have been adjusted using forward term premium estimates from a term structure model maintained by Board staff.
Source: CME Group; Federal Reserve Board staff estimates.

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



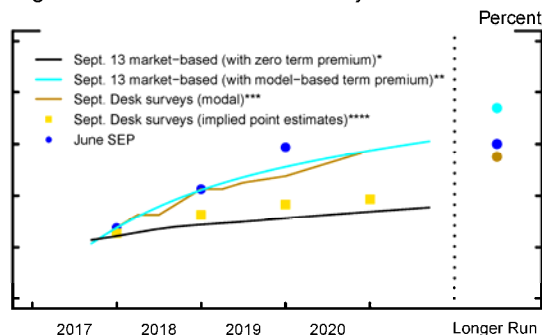
Note: Estimated from Eurodollar futures options, accounting for the differences in the levels and option-implied volatilities of LIBOR and the federal funds rate, but not adjusted for risk premiums.
Source: CME Group; Federal Reserve Board staff estimates.

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



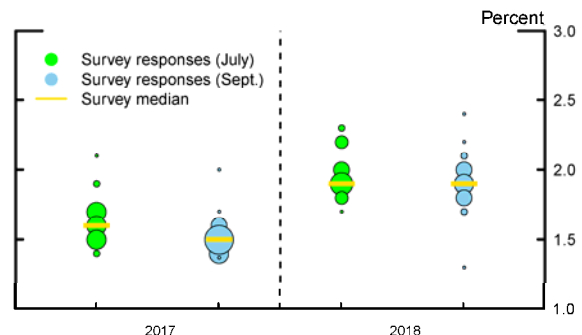
Note: Average unconditional probabilities across primary dealers and market participants for different ranges of the federal funds rate at the end of 2018.
Source: FRBNY.

Figure 5: Federal Funds Rate Projections



* 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.
**** Estimated from respondents' year-end probability distributions conditional on returning and not returning to the zero lower bound by 2020.
Source: Bloomberg; Blue Chip Financial Forecasts; Federal Reserve Board staff estimates; FRBNY.

Figure 6: Dealer Survey Estimates of Core PCE Inflation



Note: Based on all responses from the Survey of Primary Dealers. Dots scaled by number of respondents.
Source: FRBNY.

Projected Reinvestment and Redemptions (\$ Billions)

	2017:Q4	2018	Cumulative*
Treasury securities			
Reinvestments	27	197	485
Redemptions	18	229	838
Agency securities			
Reinvestments	47	41	88
Redemptions	12	146	541

*through normalization of the balance sheet size

As shown in the upper left panel of the exhibit titled “Total Assets and Selected Balance Sheet Items,” once the cap for monthly reductions in SOMA holdings of Treasury securities has been fully phased in, reinvestment of some principal from maturing Treasury securities would occur mostly in the middle month of each quarter, when large amounts of such securities held in the SOMA will mature. In contrast, the \$20 billion fully phased-in cap for agency securities is not projected to bind with the assumed path for interest rates. MBS paydowns, which are uncertain, are projected to run at a fairly steady monthly pace, even though, as shown by the blue bars in the figure, receipts and reinvestments of principal from MBS securities have historically displayed considerable variability. In light of the projected rise in longer-term interest rates, they are also expected to run at lower monthly amounts further along the projection horizon. Realized MBS paydowns will reflect the evolution of interest rates and other factors, and thus could differ significantly from projected values.

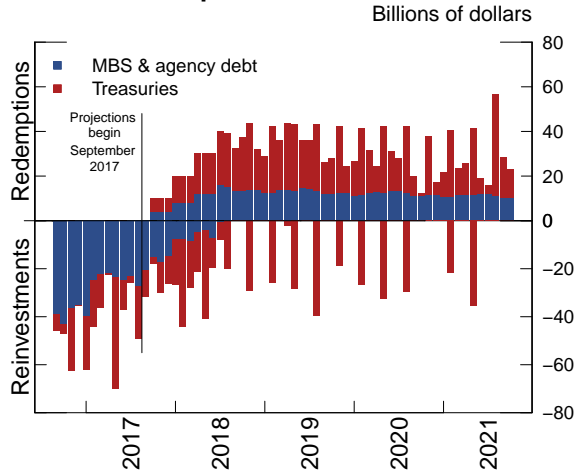
- **Balance sheet.** Normalization of the size of the balance sheet is projected to occur in the third quarter of 2021, one quarter earlier than projected in the July Tealbook, with the revision reflecting the assumed increase in the level of the TGA (see the exhibit titled “Total Assets and Selected Balance Sheet Items” and the table that follows the exhibit). At the time reserve balances reach \$500 billion, total assets are projected to stand at roughly \$3 trillion, with about \$2.9 trillion in total SOMA securities holdings composed of \$1.6 trillion of Treasury securities and \$1.2 trillion of MBS. Total assets and SOMA holdings rise thereafter, keeping pace with the projected increases in Federal Reserve notes in circulation, the TGA, and Federal Reserve Bank capital.

When the size of the balance sheet is normalized, assets and liabilities are each projected to stand at roughly 13 percent of nominal GDP, after having reached a peak of 23 percent in the third quarter of 2017. Focusing on liabilities, the assumed

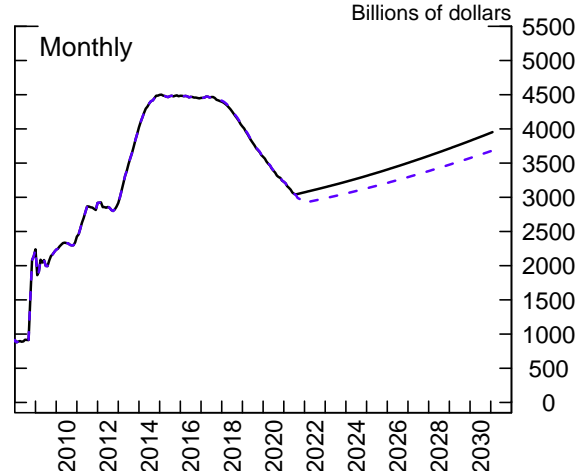
Total Assets and Selected Balance Sheet Items

— September Tealbook baseline - - - July Tealbook baseline

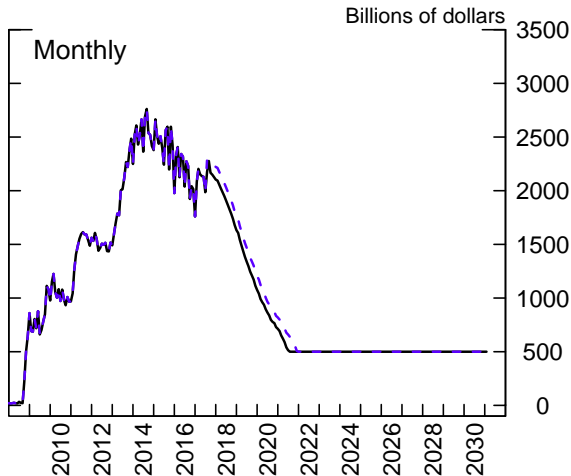
SOMA Redemptions and Reinvestments



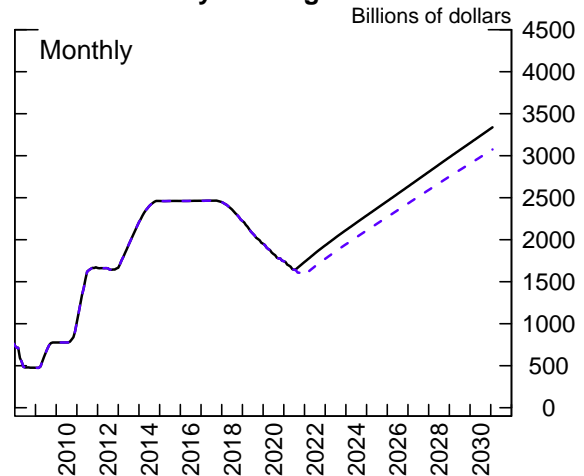
Total Assets



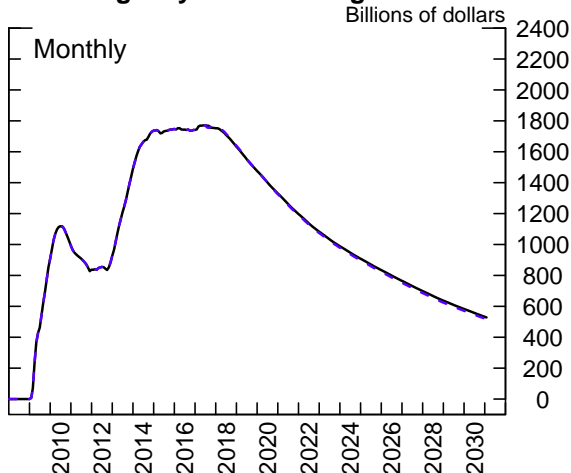
Reserve Balances



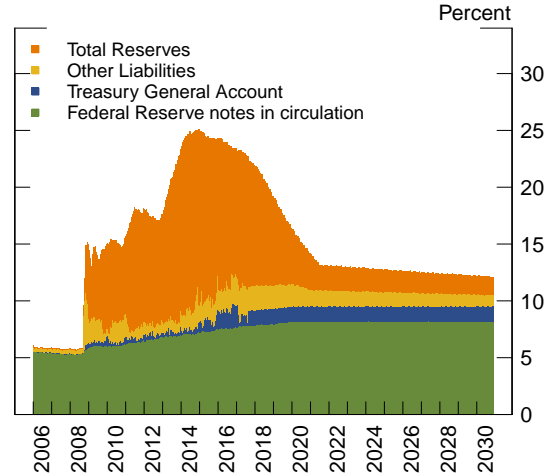
SOMA Treasury Holdings



SOMA Agency MBS Holdings



Liabilities as a Share of GDP



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

	Aug 31, 2017	2017	2019	2021	2023	2025	2030
Total assets	4,451	4,397	3,592	3,073	3,227	3,405	3,943
Selected assets							
Loans and other credit extensions*	2	0	0	0	0	0	0
Securities held outright	4,240	4,205	3,430	2,934	3,105	3,296	3,858
U.S. Treasury securities	2,465	2,449	1,952	1,735	2,114	2,459	3,324
Agency debt securities	7	4	2	2	2	2	2
Agency mortgage-backed securities	1,768	1,752	1,476	1,197	989	834	532
Unamortized premiums	164	158	124	99	81	67	41
Unamortized discounts	-15	-14	-11	-9	-7	-6	-4
Total other assets	39	41	41	41	41	41	41
Total liabilities	4,410	4,356	3,548	3,025	3,175	3,348	3,871
Selected liabilities							
Federal Reserve notes in circulation	1,525	1,563	1,761	1,892	2,021	2,170	2,620
Reverse repurchase agreements	460	345	345	245	245	245	245
Deposits with Federal Reserve Banks	2,419	2,442	1,436	882	903	927	1000
Reserve balances held by depository institutions	2,277	2,104	1,075	500	500	500	500
U.S. Treasury, General Account	55	263	286	307	328	352	425
Other deposits	81	75	75	75	75	75	75
Earnings remittances due to the U.S. Treasury	1	0	0	0	0	0	0
Total Federal Reserve Bank capital**	41	41	44	48	52	57	72

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

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

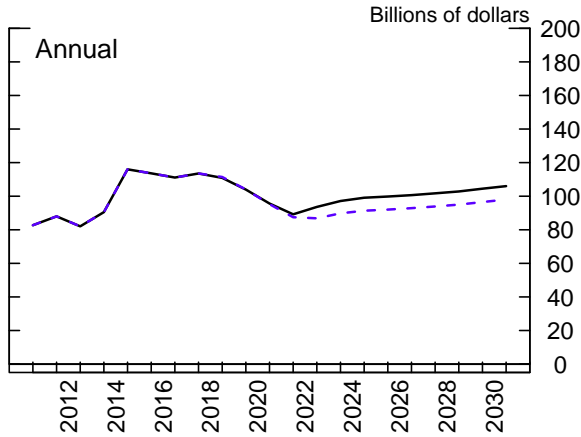
*Loans and other credit extensions includes primary, secondary, and seasonal credit; central bank liquidity swaps; and net portfolio holdings of Maiden Lane LLC.

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

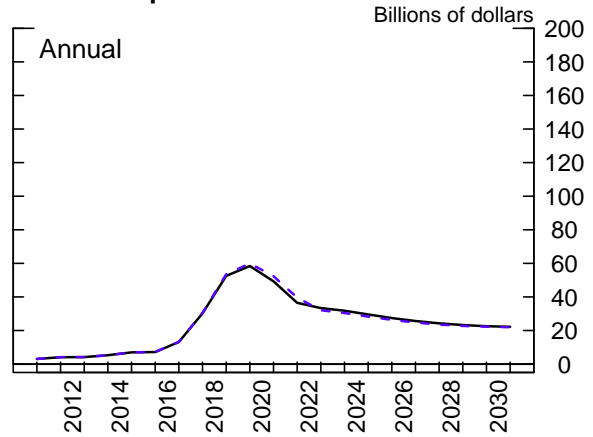
Income Projections

— September Tealbook baseline - - - July Tealbook baseline

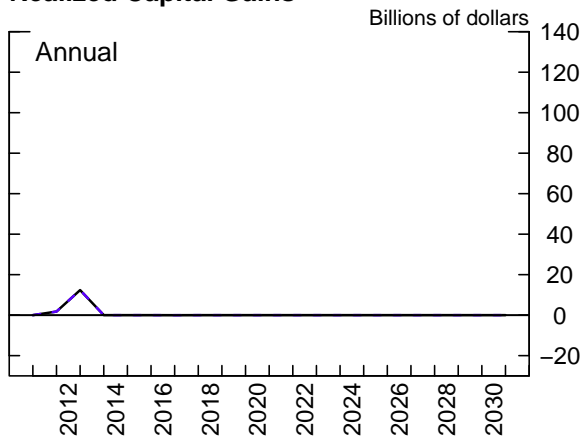
Interest Income



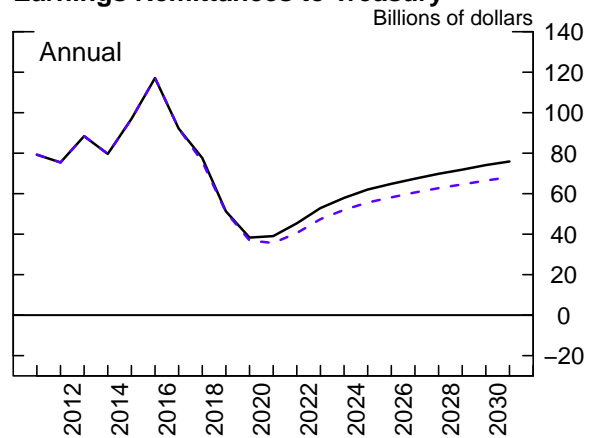
Interest Expense



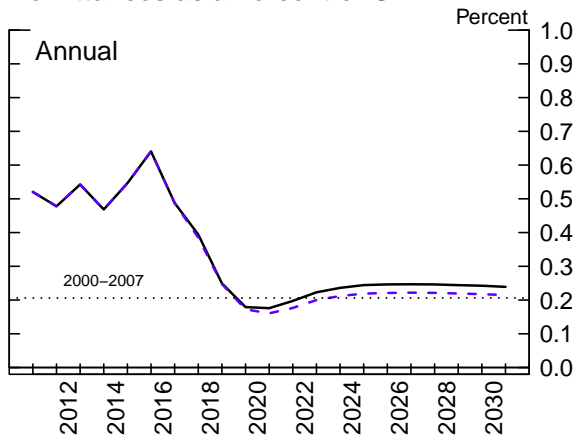
Realized Capital Gains



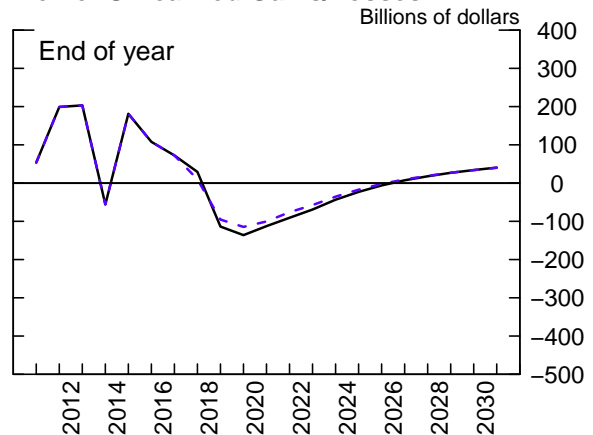
Earnings Remittances to Treasury



Remittances as a Percent of GDP



Memo: Unrealized Gains/Losses

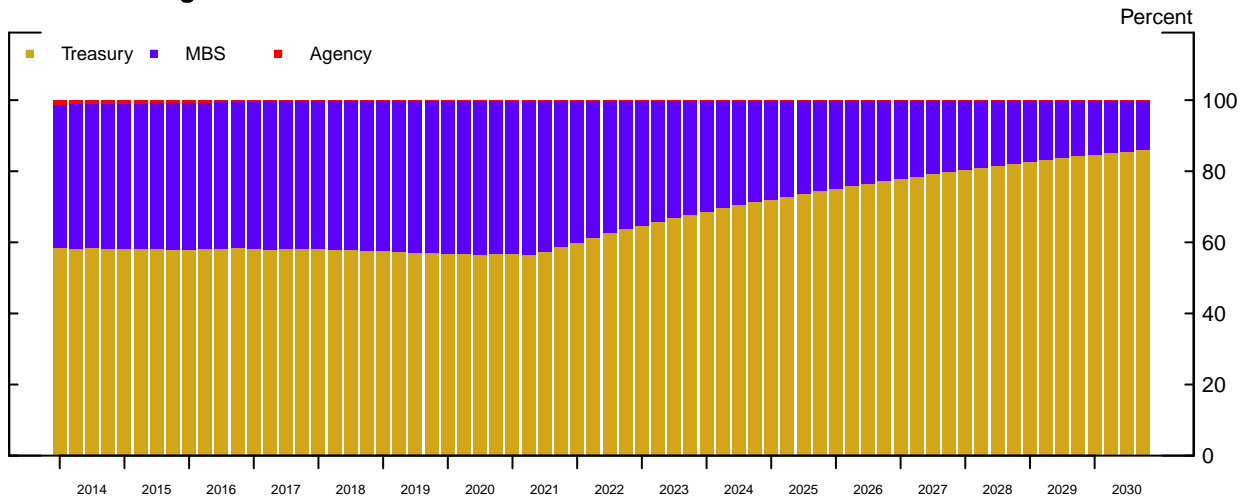


Projections for the 10-Year Treasury Term Premium Effect
(Basis Points)

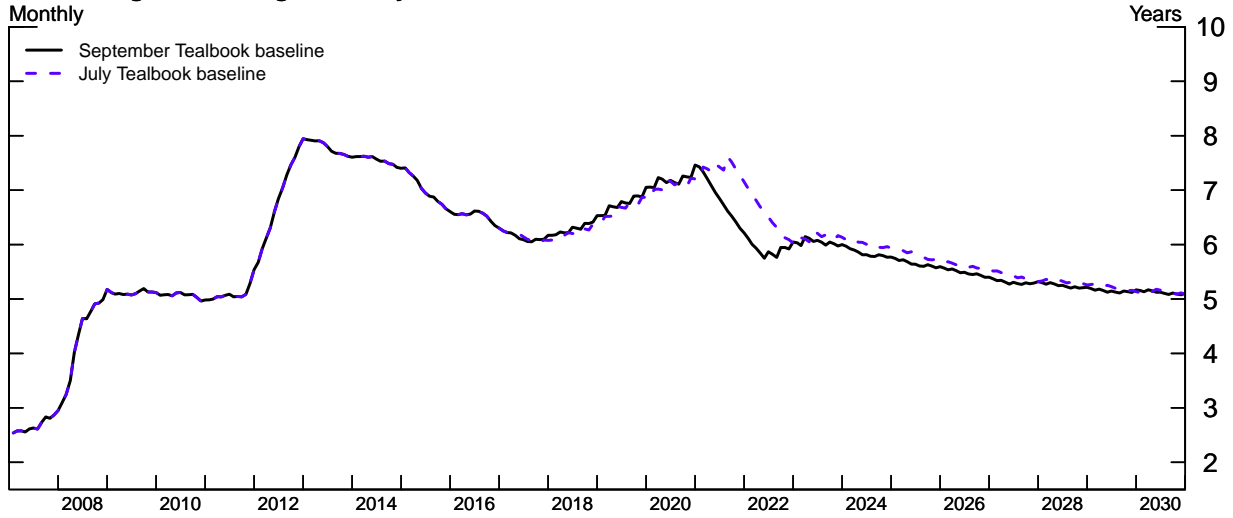
Date	September Tealbook baseline	July Tealbook baseline
Quarterly Averages		
2017:Q3	-90	-90
Q4	-87	-87
2018:Q4	-75	-74
2019:Q4	-65	-63
2020:Q4	-57	-55
2021:Q4	-51	-49
2022:Q4	-48	-44
2023:Q4	-45	-41
2024:Q4	-42	-38
2025:Q4	-39	-35
2026:Q4	-36	-32
2027:Q4	-34	-30
2028:Q4	-32	-28
2029:Q4	-31	-26
2030:Q4	-29	-24

Projections for the Characteristics of SOMA Holdings

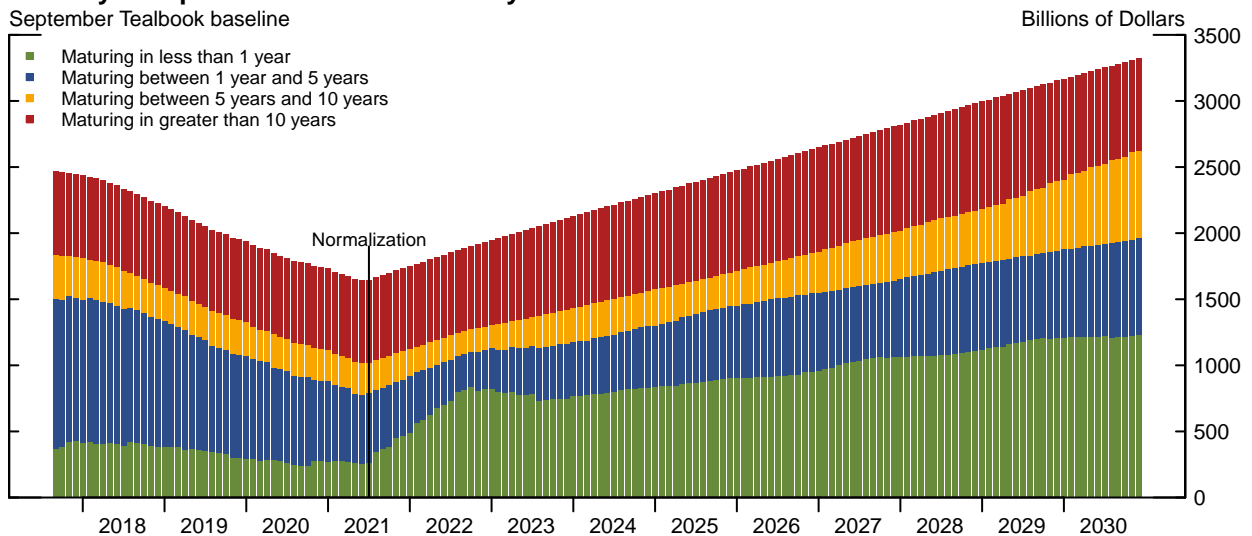
SOMA Holdings



SOMA Weighted-Average Treasury Duration



Maturity Composition of SOMA Treasury Portfolio



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
DFMU	Designated Financial Market Utilities
ECB	European Central Bank
ELB	effective lower bound
EME	emerging market economy
EU	European Union
FAST Act	Fixing America’s Surface Transportation Act
FDIC	Federal Deposit Insurance Corporation
FOMC	Federal Open Market Committee; also, the Committee
GCF	general collateral finance
GDI	gross domestic income
GDP	gross domestic product
GSIBs	globally systemically important banking organizations
HQLA	high-quality liquid assets
IOER	interest on excess reserves
ISM	Institute for Supply Management
LIBOR	London interbank offered rate

LSAPs	large-scale asset purchases
MBS	mortgage-backed securities
MMFs	money market funds
NBER	National Bureau of Economic Research
NI	nominal income
NIPA	national income and product accounts
OIS	overnight index swap
ON RRP	overnight reverse repurchase agreement
PCE	personal consumption expenditures
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