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 4, 2020

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

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Domestic Economic Developments and Outlook

The incoming data indicate that economic activity has been recovering much faster than we had projected in the July Tealbook. The surprising strength has been evident in the labor market and across nearly all spending categories, leading us to reassess our estimates of the damage to economic activity from the pandemic. Amid the recent downturn in new COVID-19 cases, the recent economic data and a marked improvement in financial conditions have led us to significantly strengthen our projection. Nonetheless, we still have a lot of ground to cover in this recovery. Despite our assumptions about additional fiscal support, a vaccine next year, and accommodative monetary policy, we project that the unemployment rate will not return to its pre-pandemic level until 2023.

After plunging in the first half of the year, GDP is now expected to reverse more than one-half of that decline in the current quarter. The recovery in spending has been broad based, with a strong recovery in consumer spending and housing activity now accompanied by a partial turnaround in business investment. We view the surprising strength as partly pulling forward increases that we had expected to come later, so we have tempered our growth outlook in the coming quarters. Still, the resilience of spending and the buoyancy in financial markets point to a stronger trajectory for the economy. For this year as a whole—and given our assumption that another round of fiscal support is forthcoming—we now expect that GDP will register a decline of 3.2 percent, compared with a 5.6 percent decline in our previous forecast. Next year, as the recovery continues, we expect GDP growth to move up to 4.2 percent before slowing to 3 percent, on average, in 2022 and 2023, against a backdrop of highly supportive monetary policy. With the stronger pace of output growth in this forecast, we now expect the unemployment rate to fall to 7.0 percent in December, 1.4 percentage points below our July Tealbook projection, and to 3.2 percent by the end of 2023.

Following sizable declines in March and April, monthly PCE prices posted robust increases over the three months ending in July, and the 12-month change in total PCE prices picked up from 0.5 percent in April to 1 percent in July. Over the same period, core PCE price inflation picked up from 0.9 percent to 1.3 percent. These readings on inflation were higher than we had projected in July, primarily reflecting a larger-than-expected increase in durable goods prices. Assuming underlying inflation stays constant

over the medium term, we expect that the improvement in real activity will lead core inflation to rise from 1.3 percent this year to 1.7 percent in 2021 and to 1.9 percent by 2023. Total inflation runs below core this year but in line with it thereafter.

Uncertainty about the path of the COVID-19 pandemic and its implications for economic activity remains a defining feature of the current economic environment. In light of the significant upward revisions we have made to the baseline forecast since the July Tealbook, we see less scope for further upside surprises, and thus we view the risks to our outlook as more skewed to the downside than in the previous projection. As a result, the Risks and Uncertainty section now includes a new "Slower Recovery" scenario, where we explore the possibility that the better-than-expected data might be obscuring some persistent damage induced by the pandemic. We also again consider a "Second Waves" scenario, though we now think this scenario is less likely than our baseline, as measures taken by the public and private sectors in response to the June–July upturn in cases appear to have been effective at reducing caseloads without materially damping the recovery.

The Staff's Baseline Forecast and Alternative Scenarios for the Level of Real GDP
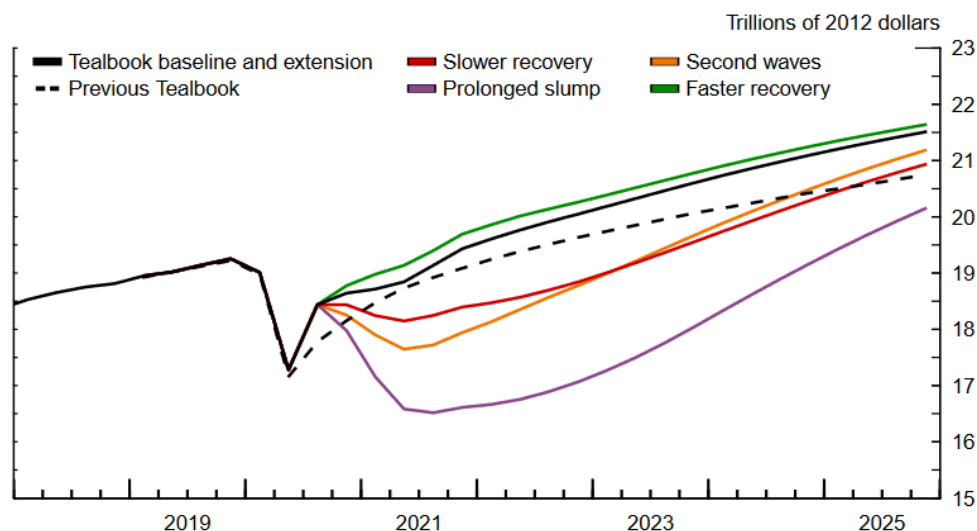
KEY BACKGROUND FACTORS

COVID-19 Pandemic and Response

The staff's baseline forecast continues to be predicated on assumptions about the development of medical interventions to treat and prevent COVID-19 infections, the extent of public health measures needed to limit the spread of the virus, and how households and firms react to the containment measures and to the pandemic itself. Regarding medical interventions, vaccine development is proceeding briskly, and it now appears that one or more vaccines may become available by early 2021 for limited numbers of people. However, as in the July Tealbook, we assume that vaccines do not become *widely* available until the fall of 2021, as mass vaccine production requires additional time.
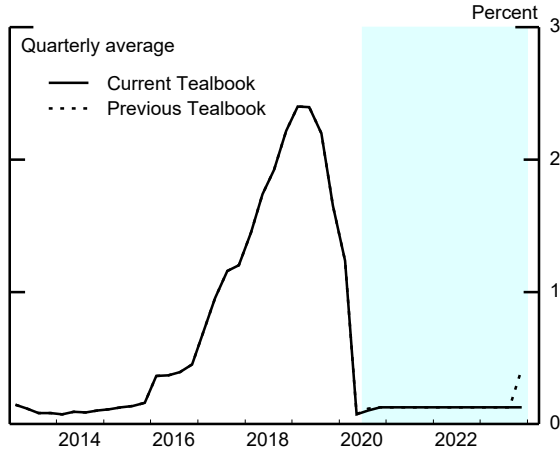
In response to the rapid rise in cases in June and early July, some states paused reopenings, shut down some businesses, restricted in-restaurant dining, increased restrictions on large group gatherings, and mandated or encouraged mask wearing. Likely in response to these public health measures and, importantly, the voluntary actions taken by households and firms, the COVID-19 situation has improved since our previous projection. New cases have been steadily declining since mid-July, and this decline has led to fewer people being hospitalized, thus alleviating some of the pressure on the health-care system. That said, the risk of more negative outcomes is still high. The level of new cases remains above the levels seen in the spring. With some schools reopening for in-person education, additional flare-ups are being reported and local lockdowns are possible, though our baseline projection currently assumes that such lockdowns are not widespread. In addition, we anticipate that many households and firms will continue to refrain from risky or high-contact activities even in the absence of mandates until vaccines are widely available.
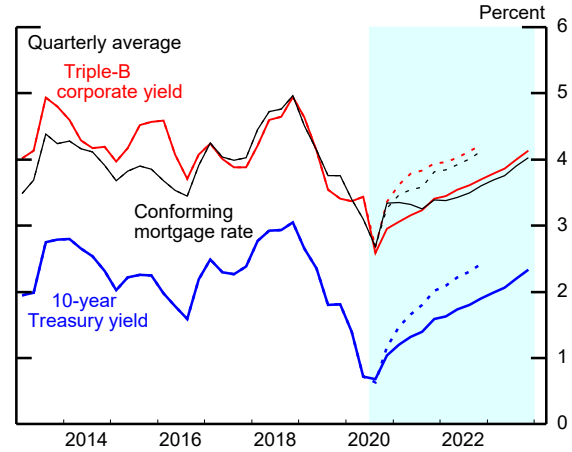
Fiscal Policy

We continue to expect fiscal policy to boost GDP growth significantly in 2020 and to restrain output growth from 2021 through 2023 as the effects of the stimulus unwind. To date, policymakers have implemented approximately $3 trillion of federal COVID-19-related policies, including the recent executive actions taken by the Administration. We assume that another $1 trillion will be enacted this fall, including enhanced unemployment benefits and stimulus checks for households, business tax cuts, and aid to state and local governments. However, policymakers have yet to reach a

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Key Background Factors Underlying the Baseline Staff Projection

Federal Funds Rate

Percent

Quarterly average

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

Long-Term Interest Rates

Percent

Quarterly average

Triple-B
corporate yield

Conforming
mortgage rate

10-year
Treasury yield

Equity Prices

Ratio scale, 2013:Q1 = 100

Quarter-end

Dow Jones
U.S. Total Stock Market
Index

House Prices

4-quarter percent change

Quarterly

CoreLogic
Index

Oil Prices

Dollars per barrel

Quarterly average

Imported oil

Broad Real Dollar

2013:Q1 = 100

Quarterly average
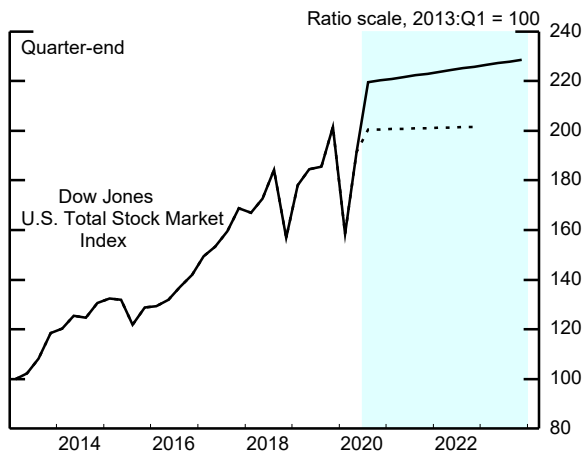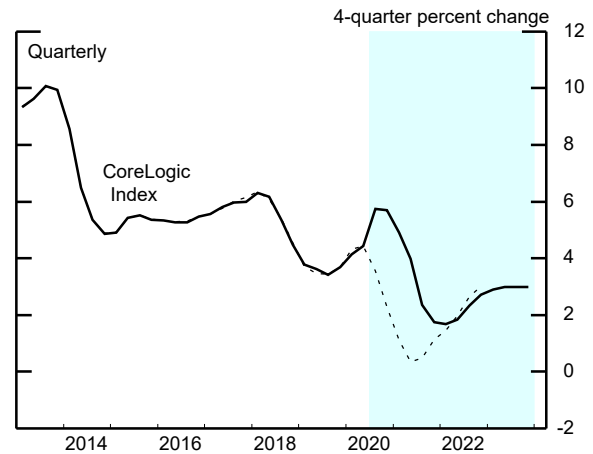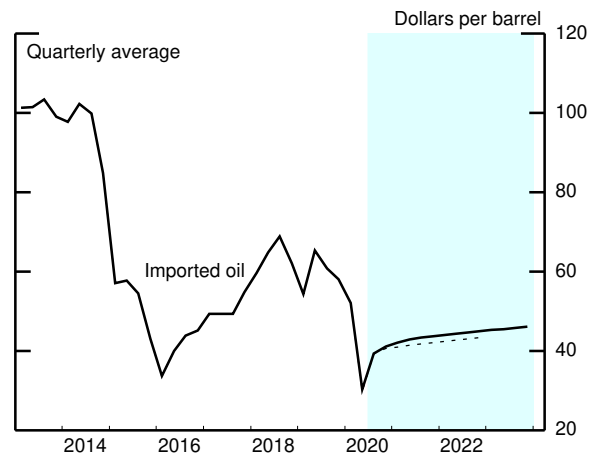
consensus on the next round of stimulus legislation, so we shifted some of the impetus to aggregate demand from the third quarter to the fourth quarter.[1] The possibility that n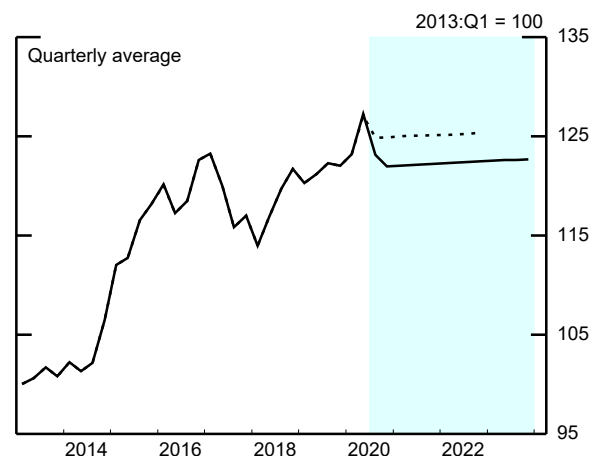o further fiscal action occurs represents a major risk to our near-term projection. Without a deal, aggregate demand for 2020 as a whole would be 1½ percentage points lower.[2]

Effects of COVID-19 Fiscal Policies on Aggregate Demand (FI)
(Percentage point contribution to real GDP growth, annual rate)

		2020				Q4/Q4			
		Q1	Q2	Q3	Q4	2020	2021	2022	2023
(1)	Total	.0	14.8	1.9	5.4	5.4	-3.6	-.7	-.7
(2)	*July Tealbook*	.0	15.1	5.8	.6	5.2	-3.6	-.6	-.8
(3)	Current COVID-19 policies	.0	14.8	1.9	-.6	3.9	-3.1	-.4	-.3
(4)	Yet-to-be-enacted stimulus	.0	.0	.0	6.0	1.4	-.5	-.3	-.4

Note: FI is fiscal impetus.

Notwithstanding our assumption that state and local governments will ultimately receive around $550 billion in federal stimulus aid, we expect budget pressures to hold back spending over the next several years. (For more information, see the box "The Uncertain State of the State and Local Government Sector.")

Monetary Policy

In this Tealbook, the federal funds rate is assumed to follow the prescriptions of a new Taylor-type interest rate rule, which is meant to be broadly consistent with key aspects of the updated Statement on Longer-Run Goals and Monetary Policy Strategy.

As always, our new rule is not meant to prescribe how policymakers should make decisions but merely to yield a path that provides a reasonable underpinning for our projected economic trajectory. According to the new baseline policy rule, the federal funds rate departs from the ELB in the quarter after the unemployment rate is below 4.1 percent *and* the four-quarter inflation rate is above 2.0 percent. Thereafter, the federal funds rate follows an inertial version of the Taylor (1999) rule, but with no

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[1] We continue to assume that the additional unemployment benefit of $600 per week steps down to $300 per week in the third quarter. However, we now assume that there will be a disruption of just over a month in these payments owing to their lapse at the end of July and the time it has taken to begin implementing the new program associated with the President's executive order.

[2] At the end of September, appropriations bills that fund the federal government will expire. We assume that funding legislation will be enacted and that there will be no meaningful disruption of government operations due to a shutdown.

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response to the output gap when the gap is positive. To allow inflation to temporarily overshoot the 2 percent objective, the intercept in the new rule is notably lower than in previous Tealbooks for a number of years. As a result, the path for the federal funds rate is less steep than it otherwise would be after departing from the ELB, as can be seen in the materials accompanying the Long-Term Outlook section. As always, additional rules and considerations are covered in the Monetary Policy Strategies section, and our assumptions for the SOMA portfolio will be detailed in Tealbook B.

The monetary policy actions taken in response to COVID-19 and the revision to our assumptions about monetary policy are expected to substantially cushion the blow to economic activity over the next few years. In all, we estimate that GDP growth will be boosted about 1½ percentage points this year, 1¾ percentage points next year, and nearly 1 percentage point in 2022.

Revisions since the January Tealbook to GDP Forecast due to the Effect of Monetary Policy on Financial Variables
(Percentage point contribution to Q4/Q4 growth)

	2020	2021	2022	2023	2020–23 total
Total	1.5	1.8	.9	.0	4.2
Total effect due to:					
Expected path for short rates	.6	1.1	.7	.2	2.7
Balance sheet policy	.5	.5	.2	.0	1.2
Corporate bond facilities	.3	.1	- .1	- .1	.3
Memo: Effect of the new rule	.0	.2	.3	.2	.7

Note: Items may not sum to total because of rounding.

- The change we made to the policy rule has contributed to a further decline in the projected path of the federal funds rate over the next 15 years. Consequently, the downward revision in the expected path for short-term interest rates since the January Tealbook is now estimated to boost the level of GDP at the end of 2023 by 2.7 percent, ¾ percentage point more than in the July projection. Changes in balance sheet policies are estimated to increase GDP by 1.2 percent at the end of 2023, largely through their effects on longer-term interest rates and equity prices. The corporate bond facilities provide a small additional boost to economic activity by reducing interest rates on private bonds and by raising equity prices (via a lower equity premium).

- Because our estimates do not fully account for the effects of monetary policy on financial market functioning and economic uncertainty, they likely understate the total effect on real activity. It is hard to know the counterfactual of what might have happened to household and business confidence, for example, had the Federal Reserve taken no policy actions in the current economic situation.

Financial Conditions

Financial conditions also contribute to the stronger outlook in this projection. Investor sentiment has improved significantly since the July Tealbook in response to better-than-expected data on domestic economic activity and corporate earnings, the downturn in domestic new COVID-19 cases, and favorable news about vaccine development. U.S. equity prices have climbed, while longer-term Treasury yields are a touch higher on net. Corporate bond spreads have narrowed somewhat, and mortgage rate spreads declined a bit more than expected in the July Tealbook. On net, the dollar is down about 2.5 percent.

Low interest rates and stock price increases have promoted generally accommodative financial conditions for large companies. However, financing conditions for small businesses have remained strained, with depressed lending activity and signs of an ongoing deterioration in loan performance. While financing appears readily available to consumers with strong credit histories, the supply of credit to those with lower credit scores is tighter than usual.

- We project the 10-year Treasury rate to gradually increase from 0.7 percent in 2020:Q3 to 2.3 percent in 2023:Q4, as the term premium is projected to increase over the medium term. Relative to the July Tealbook, the projected path for the 10-year Treasury yield is notably lower throughout the forecast period due to lower short-term rates through the valuation period brought about by the new baseline policy rule. The path for the term premium is unchanged relative to the July Tealbook, as term premiums have come in as expected and factors driving the net supply of Treasury securities have not moved much.

- After the next few quarters, private-sector borrowing rates are revised down essentially in line with the 10-year Treasury yield.
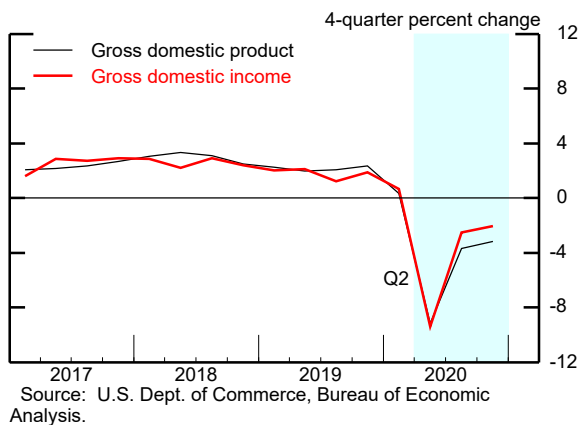
Domestic Econ Devel & Outlook

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

Measure	2020:Q2		2020:Q3		2020:Q4	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
Real GDP	**-33.2**	**-31.8**	**15.2**	**29.7**	**8.7**	**4.5**
Private domestic final purchases	-34.6	-32.9	15.1	32.0	8.3	4.4
Personal consumption expenditures	-35.2	-34.1	21.4	37.4	8.4	4.1
Residential investment	-39.6	-36.3	8.5	45.9	14.3	13.7
Nonres. private fixed investment	-30.0	-25.7	-11.5	4.2	6.0	3.2
Government purchases	1.8	2.9	3.3	1.1	-.6	-2.7
Contributions to change in real GDP						
Inventory investment[1]	-3.3	-4.2	1.1	5.6	2.9	.8
Net exports[1]	-1.3	.7	.6	-3.4	-1.2	.4

1. Percentage points.

Recent Nonfinancial Developments (1)

Real GDP and GDI

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

Manufacturing IP ex. Motor Vehicles and Parts

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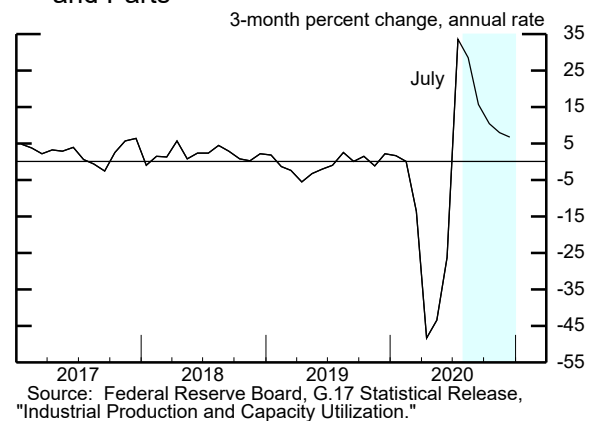
Sales and Production of Light Motor Vehicles

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

Real PCE Growth

Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.
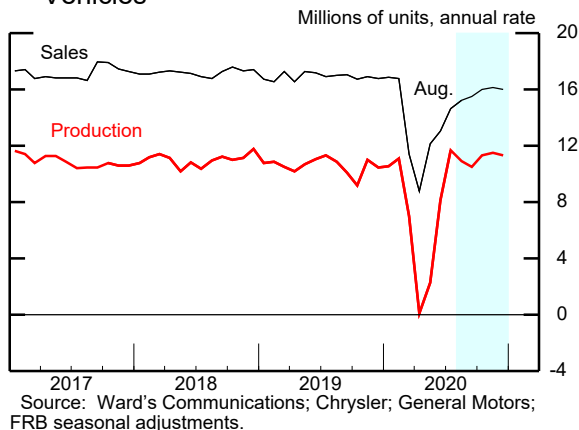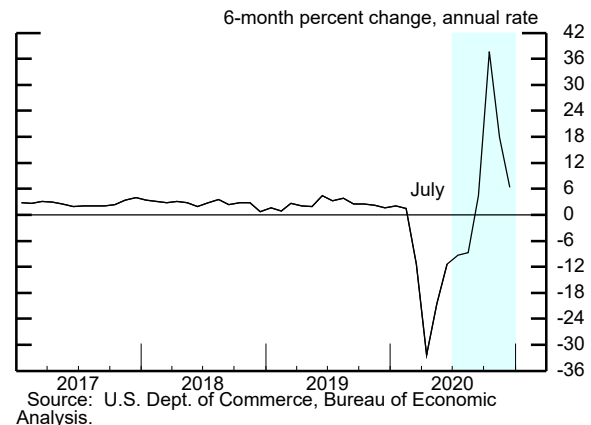
- Stock prices are about 10 percent higher than projected in the July Tealbook. Going forward, we expect equity prices to rise only modestly over the forecast period in light of valuation pressures.

- House prices have increased about 5 percent over the most recent four quarters, a higher reading than we had anticipated, reflecting much-stronger-than-expected demand for housing. In response, we marked up our projection for house price increases over the next couple of quarters. Nevertheless, over the medium term, we expect prices to grow at a slower pace than in recent years, as they return to their long-run relationship with rents.

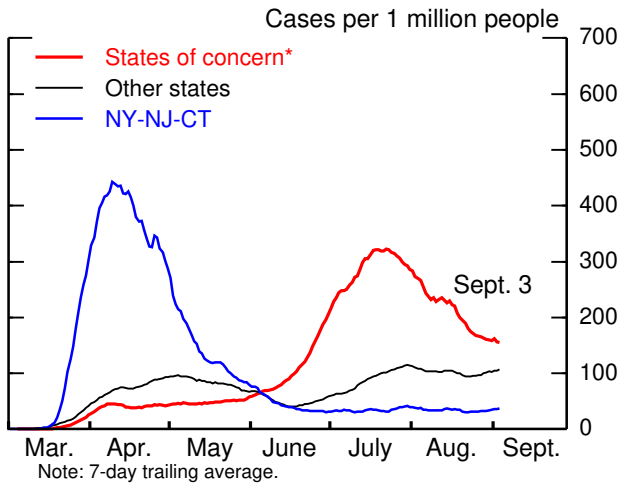## RECENT DEVELOPMENTS AND NEAR-TERM OUTLOOK

Spending and Production

Following the unprecedented contraction in economic activity in the first half of the year, we expect a rapid but incomplete recovery in the second half. Compared with the July Tealbook, the pace of growth is on track to be much stronger, as a wide variety of spending indicators have surprised us to the upside, often to a considerable degree. As a result, we now expect GDP to increase at annual rates of nearly 30 percent in the third quarter and 4.5 percent in the fourth. Folding in the first-half data, we now project GDP to register a decline of 3.2 percent in 2020, compared with a 5.6 percent decline in the July Tealbook and a 7.1 percent decline in the May/June Tealbook.

- As of July, **consumer spending** had recovered about three-fourths of its March–April decline, reflecting a stronger- and earlier-than-projected rebound in spending. We think that much of the upward surprise is due to a faster reduction in the effects of social distancing on consumption than we assumed in the previous Tealbook. That said, we expect the restraint on consumption from social distancing will remain close to its current levels through the remaining months of the year, and, consequently, we expect consumption growth to slow materially. On a quarterly average basis, we project PCE to increase at a 37 percent rate in the third quarter—with that gain reflecting the rapid spending increases in May, June, and July—and 4.1 percent in the fourth quarter.

  o By the end of July, goods spending was well above its pre-pandemic level, bolstered by the massive fiscal stimulus, the low interest rates, and a shift

Consumer Spending

New U.S. Cases of COVID-19

Cases per 1 million people

— States of concern*
— Other states
— NY-NJ-CT
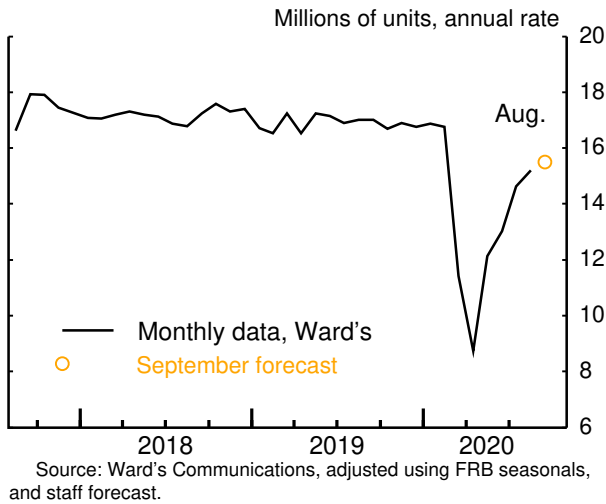
Sept. 3

Note: 7-day trailing average.

Daily Credit/Debit Spending

Year-over-year percent change

Sept. 2

— Retail sales group
— Clothing stores
— Food services

Note: 7-day moving average. Retail sales group excludes non-store merchants.
Source: Fiserv, Inc.

U.S. Light Vehicle Sales

Millions of units, annual rate

Aug.

— Monthly data, Ward's
○ September forecast

Source: Ward's Communications, adjusted using FRB seasonals, and staff forecast.
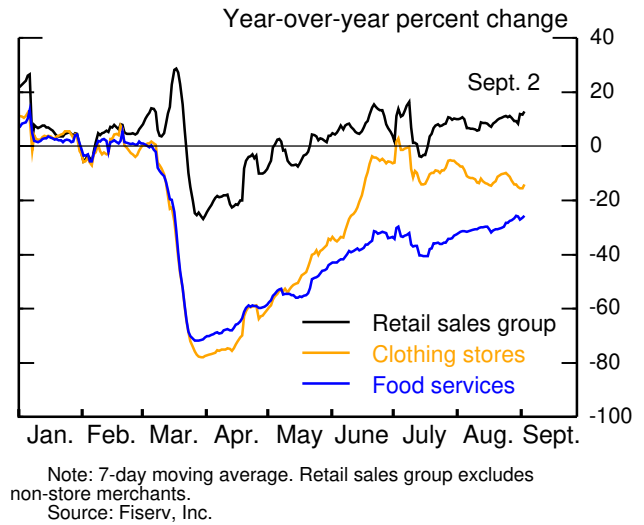
Spending on Non-food Retail Goods

Year-over-year percent change

First stimulus tranche

Aug. 22

— Total
— Brick and mortar

Source: NPD Group.

Visits to Restaurants

Year-over-year percent change

Aug. 30

Source: SafeGraph.
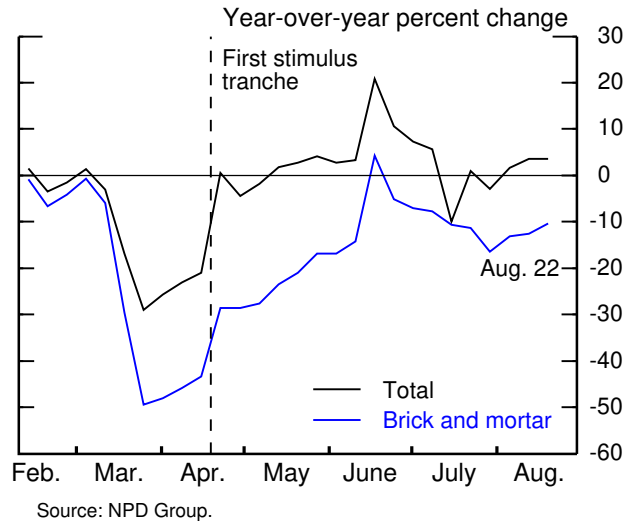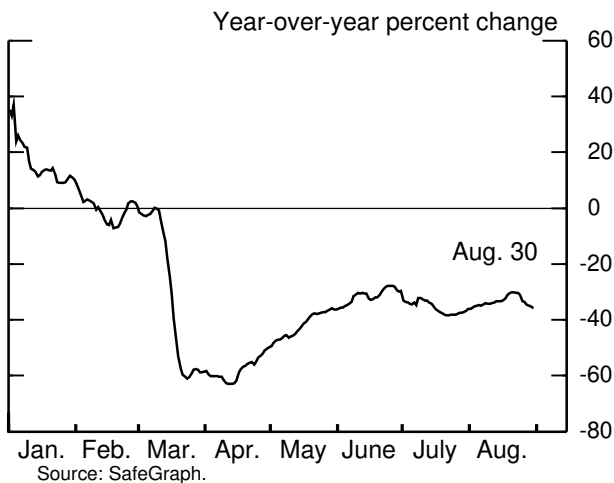
Hotel, Restaurants, and Air Travel

Year-over-year percent change

— Hotel occupancy rate
— Restaurant reservations
— Airline departures

Aug. 29
Sep. 3
Sep. 3

Source: OpenTable.com accessed through Haver; STR; Transportation Security Administration.
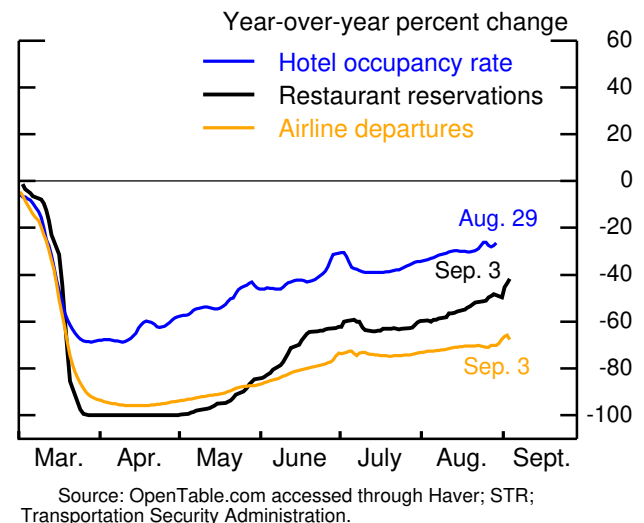
* Includes states that, as of late June, exhibited a 7-day trailing average of new cases that was above the national average and increasing. States include AL, AR, AZ, CA, FL, GA, IA, LA, MS, NC, NV, OK, SC, SD, TN, TX, and UT.
Note: States of concern, Other states, and NY-NJ-CT comprise 48%, 41%, and 10% of the population, respectively.

away from services spending, which was restrained by the pandemic. Indeed, despite large increases in recent months, spending on services remains depressed, with spending on discretionary services—such as hotel stays, air travel, and in-person restaurant dining—still quite weak.

  o In August, high-frequency spending indicators, such as weekly data from the market research company NPD, suggest retail spending has held up surprisingly well even as UI paymen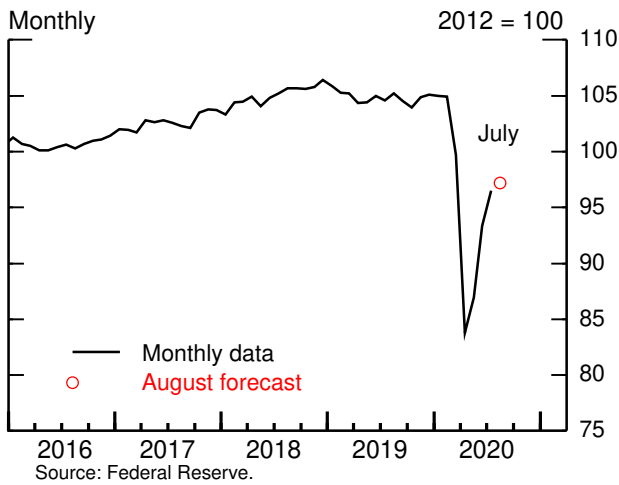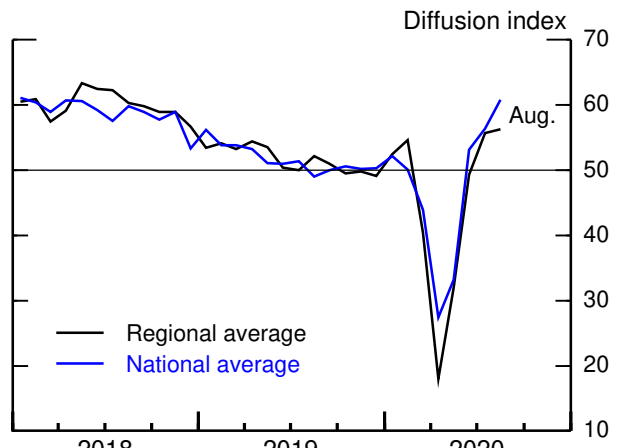ts have declined, perhaps because of the cushion provided by earlier fiscal support. (Some of our high-frequency indicators of spending are displayed in nearby exhibits.)

- The rebound in **residential investment,** supported by both low interest rates and the sector's agility in adopting new business practices in response to the pandemic, has been surprisingly robust. Both new residential construction and home sales have surprised us to the upside and recovered to pre-pandemic levels. Consequently, we now expect residential investment to increase 46 percent at an annual rate in the third quarter and to post a solid increase for 2020 as a whole.

- Businesses' **fixed investment** plummeted at an annual rate of about 25 percent in the second quarter. However, based on data through July and recent improvements in key fundamentals (receding business uncertainty, an upturn in near-term profit expectations, and some easing in supply chain disruptions), we now project spending to post a 4.2 percent gain in the third quarter, compared with a 12 percent *decline* in the July Tealbook, and to increase another 3.2 percent in the fourth quarter.

  o We now project **E&I spending** to increase 10 percent in the second half of the year, well above our July Tealbook projection, as orders, shipments, and imports of nondefense capital goods recovered further in July and other indicators point to a recovery in R&D expenditures.

  o In contrast, investment in **nonresidential structures** remains on a downward trajectory. Drilling investment has fallen sharply in response to low oil prices and is expected to continue falling through the rest of the year. Elsewhere, the collapse in the start of new construction projects

Industrial Sector & Housing

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Industrial Production Index: Manufacturing

Monthly   2012 = 100

July

— Monthly data
○ August forecast

Source: Federal Reserve.

Manufacturing New Orders Indexes

Diffusion index

Aug.

— Regional average
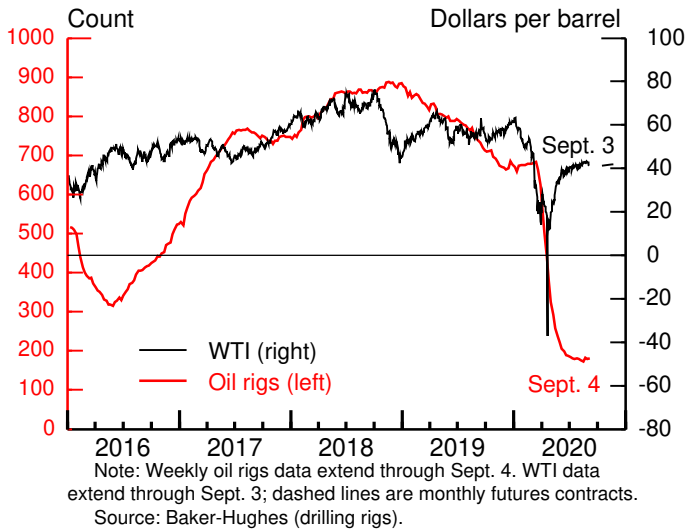— National average

Note: The national average is composed of the ISM and Markit; the regional average contains the orders indexes from Chicago, Dallas, Kansas City, New York, Philadelphia, and Richmond.

Oil Price and Drilling Rigs

Count   Dollars per barrel

Sept. 3

— WTI (right)
— Oil rigs (left)

Sept. 4

Note: Weekly oil rigs data extend through Sept. 4. WTI data extend through Sept. 3; dashed lines are monthly futures contracts.
Source: Baker-Hughes (drilling rigs).

Change in Expected Near-Term Profits

Percent

— Capital goods producers (ex. transportation)

Aug.

Note: Percentage change in 12-month forward earnings expectations from three months earlier. Aug. data are as of Aug. 27.
Source: Staff calculations from Thomson Reuters I/B/E/S.
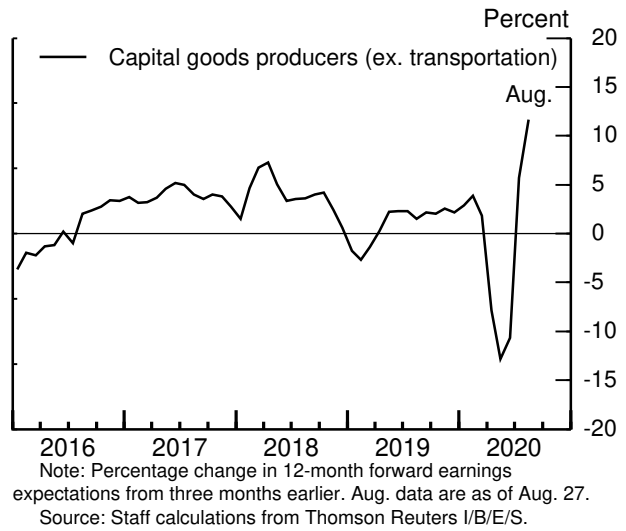
Weekly Steel and Motor Vehicle Indicators

Thousand tons   Index, Feb. 1, 2020 = 100

— U.S. steel production (left)
— Railcar loads: motor vehicles (right)

Note: Data are seasonally adjusted. Steel data end the week of August 29 and railcar data end the week of August 29.
Source: American Iron and Steel Institute; staff estimates of data from the Association of American Railroads (motor vehicles).
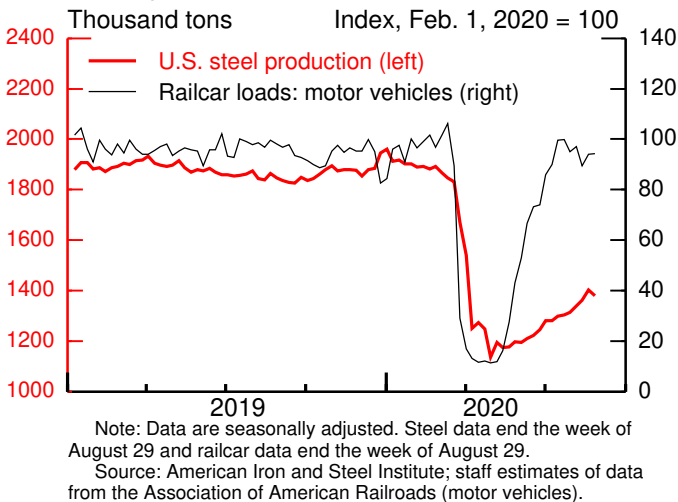
Pending and Existing Home Sales

52-week percent change

— Pending
— Existing

Feb.   Mar.   Apr.   May   June   July   Aug.

Note: Data are based on 28-day sums. Last value is week of Aug. 23.
Source: Data provided by Redfin, a national real estate brokerage.
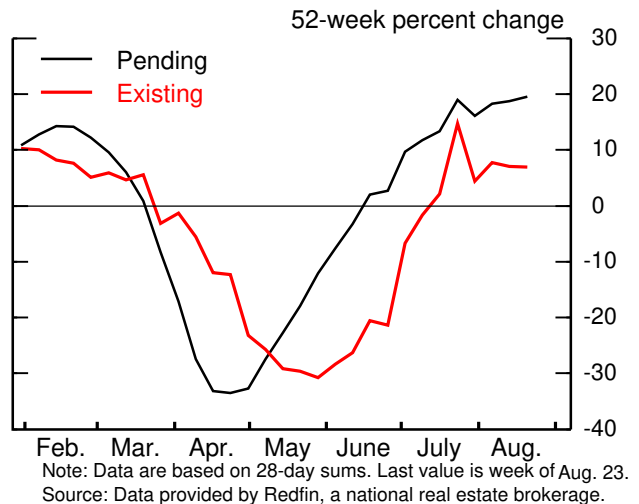
during the spring suggests further declines in outlays for nonresidential buildings.

- **Manufacturing output** increased at a solid pace in May, June, and July, supported by a return to normal for automakers following widespread shutdowns this spring. We expect that factory output will increase at a more moderate pace in the coming months, in line with recent readings on new orders, the subdued outlook for both the energy sector and the civilian aerospace industries, and a slowdown in the ramp-up in motor vehicle production.[3] Indeed, based on production-worker hours and available physical product data, the initial estimates of industrial production (IP) suggests a slowing of manufacturing IP growth in August. Relative to earlier in the year, there are few reports of major ongoing supply chain disruptions.

- After plunging at an annual rate of 64 percent in the second quarter, **real exports** are expected to increase at a 39 percent rate in the second half of the year, as foreign activity partially recovers. In July, exports rose for the second consecutive month with broad-based strength across goods categories and especially in automotive products. Exports to China were little changed in July, after holding up better than exports elsewhere in the first half of 2020, and are discussed further in the box "Export Perspectives: Progress on the Phase One Deal and Agricultural Exports."

- Consistent with the strong recovery in domestic demand, **imports** are expected to bounce back strongly in the second half of the year after plunging 54 percent in the second quarter. We expect net exports to make a negative 1.5 percentage point contribution to U.S. GDP growth in the second half of the year as imports recover faster than exports.

The Labor Market and Aggregate Supply

The labor market continued to recover through August, though at a somewhat diminished pace compared with the rapid reopening in May and June. Both the July and August labor market reports (received after the July Tealbook) suggest more momentum than we had been projecting. Reflecting the broad-based improvement in the economic

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[3] We think the Gulf Coast hurricanes and other natural disasters had only a minimal effect on manufacturing in August. The reduction in mining was larger, but the effect on overall industrial production was still small.

Labor Market

Domestic Econ Devel & Outlook

Cumulative Job Loss since February 15, 2020

Weekly, s.a.   Millions of jobs

— ADP-FRB paid employment   – – BLS CES

Aug.

Aug. 22

Feb.   Mar.   Apr.   May   June   July   Aug.
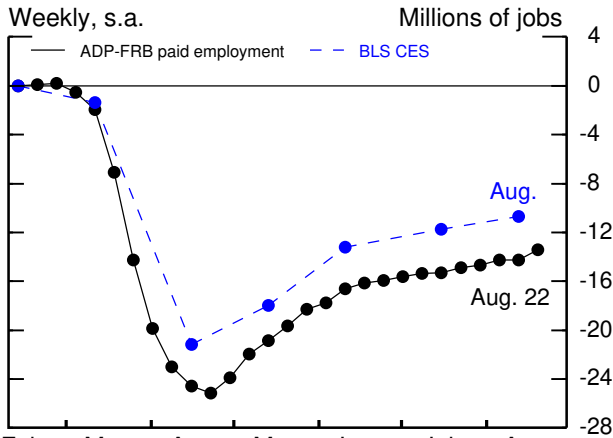
Note: Paid employment denotes workers who were issued a paycheck in a given pay period.
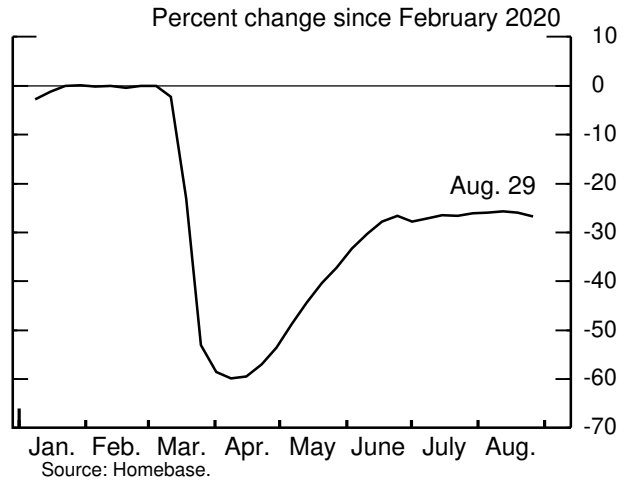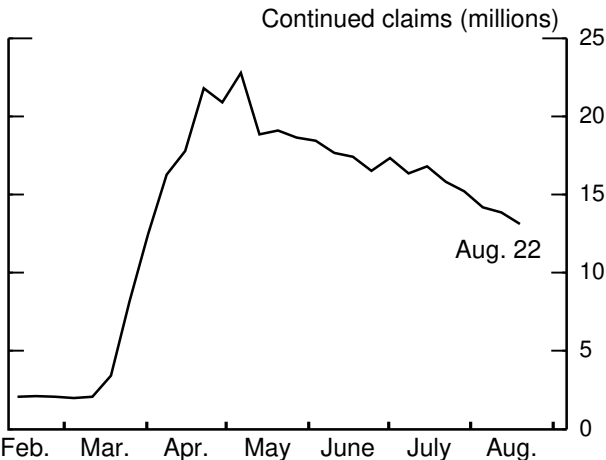   Source: BLS; ADP; staff estimates.

U.S. Employment at Small Businesses

Percent change since February 2020

Aug. 29

Jan. Feb. Mar. Apr. May June July Aug.

Source: Homebase.

Insured Unemployment in Regular State UI

Continued claims (millions)

Aug. 22

Feb.   Mar.   Apr.   May   June   July   Aug.

Note: Data are not seasonally adjusted.
   Source: Department of Labor, Employment & Training Administration.

Unemployment Insurance Outlays

Billions of dollars

Sept. 3

Cumulative outlays April 1 to
September 3: $426.61 billion

Mar.   Apr.   May   June   July   Aug.   Sept.

Note: Data are a moving average of the past 5 business days.
   Source: Daily Treasury Statement data.

Job Postings

Year-over-year percent change

Aug. 28

Feb.   Mar.   Apr.   May   June   July   Aug.

Source: Indeed.
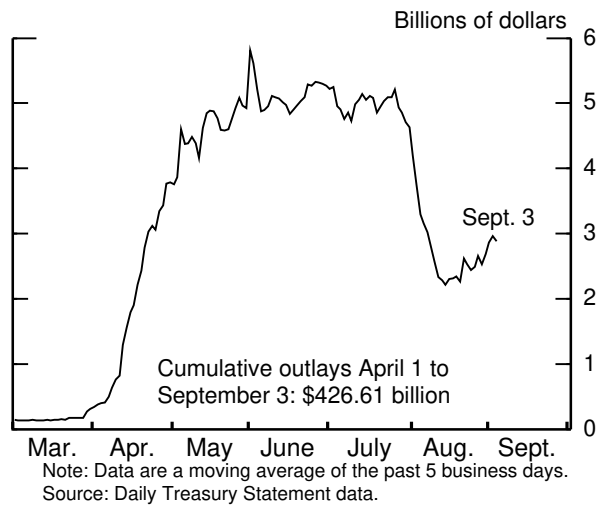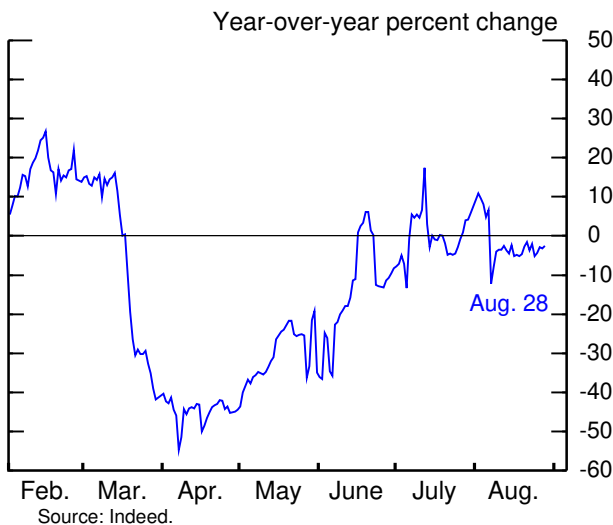
Median 12-month Wage Growth

Percent

— Atlanta Fed Wage Growth Tracker
— ADP, hourly wage*

July

July

2010   2012   2014   2016   2018   2020

* Includes tips and commissions.
   Source: Federal Reserve Bank of Atlanta; ADP; staff calculations.
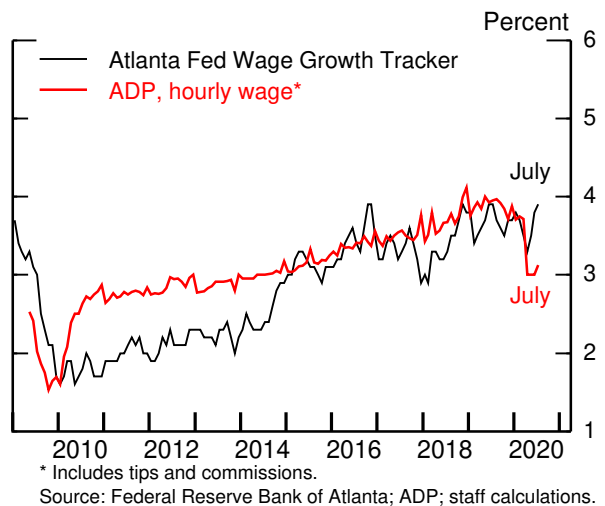
landscape, we now expect a higher level of payrolls and a lower unemployment rate at the end of the year than in the previous Tealbook.

- According to both BLS estimates and ADP-FRB estimates, private employers added, on average, 1.25 million jobs per month in July and August. Despite the continued improvement, private **payrolls** have so far retraced only about half of the decline that occurred in March and April. Government payrolls (excluding temporary Census workers) posted solid increases in the past three months but have retraced only about 25 percent of their sharp decline from February through May.[4]

    o The latest **UI claims** data are more difficult to interpret than usual because of program changes. Initial UI claims fell by roughly 40 percent between mid-July and mid-August and have plateaued at about 850 thousand per week in data through the end of August.[5] We attribute a portion of these declines to lower take-up rates in reaction to the July 31 expiration of the $600/week supplemental benefits provided in the CARES Act, with the remainder likely reflecting a reduced pace of layoffs.

    o Given our outlook for aggregate demand and the further relaxation of social-distancing measures, we expect private employment gains of nearly 1 million per month through the end of the year.

- The reported **unemployment rate** has continued to fall rapidly, dropping from 11.1 percent in June to 8.4 percent in August, as businesses continued to recall workers from temporary layoffs.[6] In contrast, the number of those who have suffered permanent job losses has nearly tripled since February to 3.4 million; the rise in permanent layoffs has been similar to that observed

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[4] A significant portion of the increase in overall government employment reflects temporary census hiring, which ramped up over July and August and which we expect will peak in September.

[5] We continue to report initial claims and insured unemployment on a not-seasonally-adjusted basis. Although the Department of Labor announced that they were switching seasonal adjustment methodologies, they only published data with the improved seasonal factors for the most recent week. They did not publish revised data for earlier in the year, when seasonal adjustment had been most problematic.

[6] Because of measurement problems, the true level of the unemployment rate was still likely higher than reported in August, but the extent of the misclassification issue has fallen significantly since the early months of the COVID-19 crisis. For further discussion, see the box "Unemployment and Participation Rates: Recent Measurement Issues" in the July Tealbook.

early in the GFC. With solid job gains expected over the rest of the year, fueled by additional recalls, we anticipate that the unemployment rate will fall to 7.0 percent by December.

o   The steep drop in the unemployment rate in August was much larger than we were expecting. The drop largely reflected a nearly 3.8 million increase in employment as measured in the household survey, which brought the reported net job losses from the household and payroll surveys—which had been misaligned since the spring—into close alignment.

	Mar. 2020	Apr. 2020	May 2020	June 2020	July 2020	Aug. 2020	Sept. 2020	Oct. 2020	Nov. 2020	Dec. 2020	Q3 2020	Q4 2020
Total payroll employment[1]	-1,373	-20,787	2,725	4,781	1,734	1,371	863	646	796	846	1,323	763
July Tealbook	*-1,373*	*-20,787*	*2,699*	*4,800*	*1,453*	*851*	*617*	*874*	*907*	*935*	*974*	*905*
Private payroll employment[1]	-1,356	-19,835	3,236	4,729	1,481	1,027	975	950	925	900	1,161	925
July Tealbook	*-1,356*	*-19,835*	*3,232*	*4,767*	*675*	*605*	*859*	*980*	*986*	*989*	*713*	*985*
Unemployment rate (percent)	4.4	14.7	13.3	11.1	10.2	8.4	8.1	7.8	7.4	7.0	8.9	7.4
July Tealbook	*4.4*	*14.7*	*13.3*	*11.1*	*10.6*	*10.4*	*10.1*	*9.4*	*8.9*	*8.4*	*10.3*	*8.9*
LFPR (percent)	62.7	60.2	60.8	61.5	61.4	61.7	61.7	61.8	61.9	62.0	61.6	61.9
July Tealbook	*62.7*	*60.2*	*60.8*	*61.5*	*61.7*	*61.9*	*62.0*	*62.1*	*62.1*	*62.2*	*61.9*	*62.1*
EPOP (percent)	60.0	51.3	52.8	54.6	55.1	56.5	56.7	57.0	57.3	57.7	56.1	57.3
July Tealbook	*60.0*	*51.3*	*52.8*	*54.6*	*55.2*	*55.4*	*55.8*	*56.2*	*56.6*	*56.9*	*55.5*	*56.6*

Note: LFPR is labor force participation rate; EPOP is employment-to-population ratio.

1. Average monthly change, thousands.

•   The **labor force participation rate** (LFPR) continued to climb from its trough in April, rising another 0.2 percentage point between June and August, but has recovered less than half of its March–April plunge. Although we expect the LFPR to continue to tick up in coming months as labor demand improves, the shift to virtual learning at most schools this fall is expected to weigh more heavily on the labor supply of parents of school-aged children than we had previously assumed. In particular, as described in the box "The Implications of K–12 Virtual Learning in the Fall on Parental Labor Supply," we project that the prevalence of virtual learning will hold down both actual and trend LFPR by 0.3 percentage point through the end of the year and by diminishing amounts through the fall of 2021.

The upward revision to our outlook has also led us now to project that the pandemic will cause less persistent (though still severe) supply-side damage than we previously thought. Specifically, we now project that the level of potential output at the end of 2023 will be 1.3 percent below our pre-pandemic projection, about 0.8 percentage point less negative than previously expected.

- With the more-rapid-than-expected rebound in activity since the trough in April, we expect that permanent layoffs and business closures in coming months will be a little less numerous than we had previously anticipated. As a result, we now expect the natural rate of unemployment to reach a lower peak and to return to its longer-run level of 4.3 percent at the end of 2023, a full year earlier than we had previously assumed.[7]

- Compared with our May/June forecast (the last time we revised our aggregate supply assumptions), we now project a higher level of business investment spending over the medium term and thus a higher capital stock. Indeed, a larger contribution from capital deepening accounts for most of the upward revision to structural productivity and potential output through the end of 2023.

THE MEDIUM-TERM OUTLOOK FOR REAL ACTIVITY

We project that economic activity will continue to rebound over the medium term as a further waning of social distancing (and its end once a vaccine becomes widely available) along with highly accommodative monetary policy more than offset the significant headwinds from the unwinding of fiscal stimulus and recessionary dynamics.

- By the end of 2021, when we assume a vaccine is widely available, social distancing is projected to no longer hold down the level of activity to any appreciable extent.

- However, the recovery remains incomplete even in late 2021 because of the additional dynamics engendered by the downturn. Standard macro

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[7] We estimate that the unemployment rate consistent with the Committee's 2 percent inflation objective is 2.8 percent under the assumption that underlying inflation remains constant at 1.8 percent, the long-term natural rate of unemployment is 4.3 percent, and import and energy prices increase at the same rate as core PCE prices. If, instead, underlying inflation adjusts towards the Committee's objective, the unemployment rate consistent with the inflation objective will be closer to the staff's natural rate assumption.

dynamics—the usual response of household and business spending to changes in income, profits, and wealth—contribute to the recovery in 2021 after holding back demand this year. But what we call recessionary dynamics—the additional negative forces that are particularly active during recessions, including heightened pessimism, risk aversion, and reduced access to credit—are assumed to continue to weigh on growth through next year.

The Contour of Real GDP Growth and COVID-19 Effects
(Contribution to annualized percent change)

	2020				2021				2020	2021	2022
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q4/Q4	Q4/Q4	Q4/Q4
Real GDP	- 5.0	-31.8	29.7	4.5	1.6	2.8	6.3	6.3	- 3.2	4.2	3.2
July Tealbook	*- 5.0*	*-33.2*	*15.2*	*8.7*	*7.2*	*5.8*	*4.0*	*3.5*	*- 5.6*	*5.1*	*2.9*
COVID-19 effects	**- 7.2**	**-34.4**	**27.0**	**2.1**	**- .6**	**.9**	**4.3**	**4.2**	**- 5.6**	**2.2**	**1.5**
1. Social distancing and other disruptions[1]	- 7.2	-48.7	33.3	4.5	5.3	6.2	7.1	5.7	- 6.6	6.1	.5
2. Fiscal policy	.0	15.8	4.1	5.0	- 6.6	- 5.8	- 3.0	- 1.7	6.1	- 4.3	- .7
3. Monetary policy	.0	2.0	2.0	2.0	1.8	1.8	1.8	1.8	1.5	1.8	.9
4. Standard macro dynamics	.0	- .9	- 6.0	- .7	.6	.3	.2	.6	- 1.9	.4	.6
5. Recessionary dynamics	.0	- .9	- 4.8	- 7.1	- 1.4	- 1.3	- 1.5	- 1.9	- 3.4	- 1.5	.1
6. Potential output	.0	- 1.6	- 1.6	- 1.6	- .3	- .3	- .3	- .3	- 1.2	- .3	.1

Note: This table is not directly comparable to the version in the July Tealbook, given changes in methodology.

1. Includes effect of foreign growth on U.S. exports.

THE OUTLOOK FOR INFLATION

Following sharp declines in March and April, monthly PCE prices moved up in May and rose more appreciably in June and July. The acceleration since April has been widespread and was somewhat larger than we expected. We now project core PCE price inflation to be 1.3 percent in 2020, 0.2 percentage point higher than in the previous Tealbook. About half of the upward revision to our projection reflects surprisingly strong recent increases in the prices of a few goods categories, which we largely view as transitory, and the rest reflects our forecast for a faster rebound in the prices of the categories most affected by the pandemic. With energy prices recovering only partially from their earlier collapse, we project total PCE prices to rise 1.1 percent this year. Importantly, we assume that the inflation expectations relevant for wage and price setting will continue to hold reasonably stable, as they appeared to do during the financial crisis. Thus, with economic slack diminishing and COVID-19-related effects reversing, we expect both total and core inflation to move up to 1.7 percent in 2021 and to reach 1.9 percent by 2023.

- The strong June and July readings on **core PCE price** inflation were driven by several categories of prices. First, the price index for portfolio management services, which tends to follow stock market fluctuations,

increased sharply, retracing its declines in March and April. Second, the price indexes for both used motor vehicles and other types of durable goods posted unusually large increases, on net, over these two months, which we see as unlikely to persist, given our projection for a slowdown in spending growth.[8] Finally, some of the categories most affected by voluntary social distancing— accommodations and apparel—continued to reverse their sharp declines in previous months.

- Following several months of unusually large increases, prices for **food at home** fell markedly in July, driven by large declines in meat prices as production at the meat processing plants has been returning to normal. Nevertheless, the July decline in food prices reverses only partially the strong increases in previous months, and the 12-month change, at 4.3 percent in July, still remains well above its pre-COVID-19 level. We expect food price inflation to step down only slightly by the end of the year as supply chain issues continue to ease but demand for food at grocery stores remains strong.

- **Energy** prices moved up in July, for a second consecutive month, but remain well below their pre-COVID-19 levels. We expect these prices to post only small increases over the rest of the year, resulting in a net decline of 11 percent for this year.

    o The spot price of Brent crude oil is currently $44 per barrel, about unchanged from the July Tealbook and still well below January's average of $64 per barrel, as recovering global oil demand has been balanced with the gradual easing of supply cuts by OPEC and its partners. Oil prices are expected to rise to $51 per barrel by December 2023, consistent with the expected slow recovery in global oil demand and continued production restraint. This limited rise in oil prices contributes to only modest increases in consumer energy prices over the medium term.

- The effective (that is, tariff-inclusive) **price for imported core goods** fell at a 1.2 percent pace in the first half of 2020 because of downward pressure from February tariff cuts, dollar appreciation, and a drop in commodity prices. For

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[8] In addition, the strong recent increases in the PCE price index for used motor vehicles trace back to a surge in the source data used to deflate used vehicle dealer margins, which have been very noisy in the last few months and are currently far above their pre-crisis level.

the second half, as the global economy recovers, we expect import price inflation to run temporarily high at a 2.7 percent pace, reflecting the lower dollar and rebounding commodity prices, and assuming no additional tariff changes. In 2021, import price inflation moderates to 1.4 percent.

- Despite the tumultuous economic situation, measures of **longer-term inflation expectations** have changed little, on balance, this year. In surveys, professional forecasters lowered their expectations and households raised them slightly. Among market measures, 5-to-10-year TIPS-based inflation compensation, at 1.6 percent, is up about 0.2 percentage point from the July Tealbook, having returned to near its pre-pandemic level. The staff's common inflation expectations measure, which synthesizes the information from many different measures of inflation expectations, has held steady in recent months.

Labor Compensation

On balance, the available indicators point to downward pressure on wages from the weak labor market, consistent with the bulk of anecdotal evidence. Accordingly, we project the employment cost index (ECI) will rise only 1.9 percent in 2020, down from 2.7 percent last year. With slack diminishing over the next two years, we expect ECI growth to pick up gradually to a 2.6 percent rate in 2023.

- We now have data from three wage measures that we see as relatively free from distortions caused by recent changes in the composition of the workforce.[9] ECI growth was 1.7 percent over the three months ending in June, down markedly from the 2.8 percent pace over the 12 months ending in March. In addition, the staff's measure of the median of 12-month wage changes based on worker-level microdata from ADP dropped from around 4 percent at the end of last year to about 3 percent in July. However, a similar measure from the Atlanta Fed, based on the Current Population Survey, has not shown any significant slowing during this period.

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[9] Recent movements in the BLS's measures of average hourly earnings and compensation per hour have been dominated by changes in the composition of the workforce. The enormous employment losses were largest among lower-wage workers, leading to large increases in *average* earnings and compensation.

Domestic Econ Devel & Outlook

THE LONG-TERM OUTLOOK

- In this Tealbook, the changes to the assumed monetary policy rule described earlier in the Key Background Factors section lead to a much lower path for the federal funds rate after 2023 than in the previous Tealbook. In particular, the federal funds rate remains at the ELB until 2025:Q2, the quarter in which the four-quarter change in PCE prices reaches its 2 percent objective. After departure from the ELB, the federal funds rate continues to rise, reaching 1.4 percent at the end of 2027, and rises further toward its long-run value of 2.5 percent thereafter.

- As monetary policy continues to be accommodative beyond 2023, and with COVID-19 effects fully behind us, the unemployment rate falls to 2.8 percent in 2025 before rising slowly to its long-run value. GDP growth slows from 2.8 percent in 2023 to 1.6 percent in 2027 and moves up to its long-run value of 1.7 percent thereafter.

- The real long-run equilibrium federal funds rate is 0.5 percent, and the nominal yield on 10-year Treasury securities is 3.3 percent in the longer run; both values are unrevised from the previous Tealbook.

- Core PCE price inflation gradually increases from 1.9 percent at the end of the medium term to 2.2 percent in 2026 and stays at about that level for a number of years.

- We have not revised our assumption that the natural rate of unemployment is 4.3 percent in the longer run and that real GDP will grow at a rate of 1.7 percent.

The Long–Term Outlook

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

Measure	2020	2021	2022	2023	2024	2025	2026	2027	Longer run
Real GDP	-3.2	4.2	3.2	2.8	2.4	2.0	1.7	1.6	1.7
Previous Tealbook	*-5.6*	*5.1*	*2.9*	*2.2*	*1.8*	*1.6*	*1.5*	*1.5*	*1.7*
Civilian unemployment rate[1]	7.4	4.9	3.8	3.2	2.9	2.8	2.8	2.8	4.3
Previous Tealbook	*8.9*	*5.4*	*4.7*	*4.2*	*3.9*	*4.0*	*4.0*	*4.1*	*4.3*
PCE prices, total	1.1	1.7	1.8	1.9	1.9	2.1	2.2	2.2	2.0
Previous Tealbook	*1.0*	*1.7*	*1.7*	*1.9*	*1.9*	*1.9*	*1.9*	*1.9*	*2.0*
Core PCE prices	1.3	1.7	1.8	1.9	1.9	2.1	2.2	2.2	2.0
Previous Tealbook	*1.1*	*1.7*	*1.7*	*1.9*	*1.9*	*1.9*	*1.9*	*1.9*	*2.0*
Federal funds rate[1]	.13	.13	.13	.13	.13	.52	1.06	1.39	2.50
Previous Tealbook	*.13*	*.13*	*.13*	*.42*	*1.29*	*1.85*	*2.16*	*2.30*	*2.50*
10-year Treasury yield[1]	1.0	1.6	1.9	2.3	2.5	2.6	2.8	2.8	3.3
Previous Tealbook	*1.2*	*2.0*	*2.4*	*2.9*	*3.1*	*3.2*	*3.2*	*3.2*	*3.3*

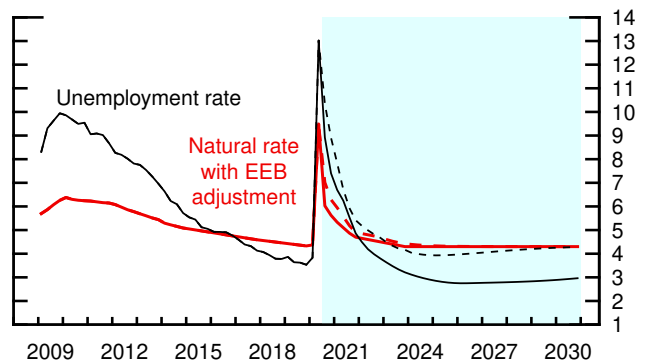1. Percent, average for the final quarter of the period.
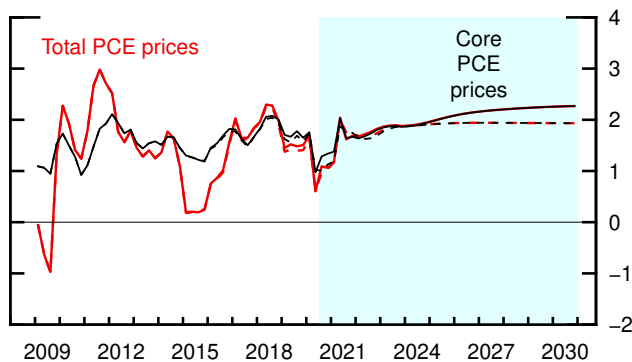
Real GDP
4–quarter percent change
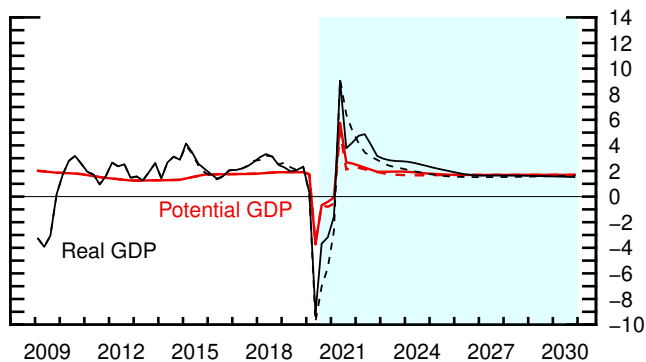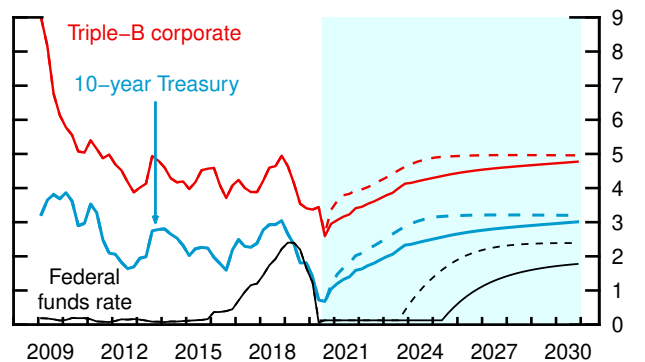
Unemployment Rate
Percent

PCE Prices
4–quarter percent change

Interest Rates
Percent

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

Revisions to the Staff Projection since the Previous SEP

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

The current projection for economic activity is stronger than in the May Tealbook, primarily reflecting that the economic disruptions caused by the coronavirus pandemic have been less severe than previously expected and those developments have been carried forward in the forecast. Accordingly, the projected path for the unemployment rate is lower and now moves below the staff's estimate of its longer-run natural rate in 2022, about a year earlier than in the May Tealbook. Total and core inflation are higher in 2020 than in the May Tealbook, as inflation appears to be bouncing back more in the second half than previously forecast. As we continue to assume that longer-term inflation expectations will remain roughly stable, we still project inflation to move up further after this year. Even so, inflation is projected to be slightly below 2 percent at the end of the medium term, reflecting both the flat Phillips curve and the staff's estimate that underlying inflation is 1.8 percent.

Despite the stronger projection, the federal funds rate is now assumed to be at the effective lower bound throughout the medium term, reflecting both the staff's assumptions in response to the updated Statement on Longer-Run Goals and Monetary Policy Strategy and a projected inflation rate below the FOMC's 2 percent objective.

Staff Economic Projections Compared with the May Tealbook for the June FOMC Meeting

Variable	2020		2020	2021	2022	2023	Longer run
	H1	H2					
Real GDP[1]	-19.5	16.4	-3.2	4.2	3.2	2.8	1.7
May Tealbook	*-25.1*	*15.3*	*-7.1*	*6.7*	*3.6*	*2.4*	*1.7*
Unemployment rate[2]	13.0	7.4	7.4	4.9	3.8	3.2	4.3
May Tealbook	*14.8*	*9.3*	*9.3*	*5.7*	*4.5*	*3.9*	*4.3*
PCE inflation[1]	-.3	2.4	1.1	1.7	1.8	1.9	2.0
May Tealbook	*-.2*	*1.8*	*.8*	*1.6*	*1.7*	*1.9*	*2.0*
Core PCE inflation[1]	.3	2.4	1.3	1.7	1.8	1.9	n.a.
May Tealbook	*.3*	*1.9*	*1.1*	*1.6*	*1.7*	*1.9*	*n.a.*
Federal funds rate[2]	.07	.13	.13	.13	.13	.13	2.50
May Tealbook	*.08*	*.13*	*.13*	*.13*	*.13*	*.91*	*2.50*
Memo: Federal funds rate, end of period	.06	.13	.13	.13	.13	.13	2.50
May Tealbook	*.05*	*.13*	*.13*	*.13*	*.13*	*.93*	*2.50*
Output gap[2,3]	-4.5	-1.3	-1.3	.3	1.5	2.3	n.a.
May Tealbook	*-6.9*	*-5.0*	*-5.0*	*-1.0*	*.7*	*1.4*	*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.

The Uncertain State of the State and Local Government Sector

States and localities experienced a steep decline in tax receipts in the second quarter as a result of the COVID-19 pandemic, and state and local (S&L) government payrolls nosedived. In this note, we highlight the institutional factors that make the S&L government sector cyclically sensitive, explore the economic and financial effects of the pandemic on the sector to date, and discuss the S&L outlook, with a particular focus on the role played by federal aid.

Unlike the federal government, most states and localities face relatively binding balanced budget rules that require them to bring operating expenditures into line with revenues over time.[1] During an economic downturn, states and localities typically confront budget shortfalls, as tax revenues decline and demand for services like Medicaid increases. To the extent that federal aid does not cover such shortfalls, states and localities must impose some combination of spending cuts, tax increases, and drawdowns of their "rainy day" reserve funds. In the wake of the Great Recession, the budget shortfalls that remained after federal aid was received were mostly closed by reducing S&L government spending. In particular, the number of workers employed in the sector fell by about 600,000 between 2008 and 2013 (figure 1).

In contrast to the somewhat lagged response during the Great Recession, the contraction in S&L tax revenues and employment at the onset of the COVID-19 pandemic was immediate and large. S&L tax receipts declined 2.8 percent in the second quarter, primarily driven by slumping sales tax revenues.[2]

Figure 1. State and Local Government Employment
Millions of workers, seasonally adjusted
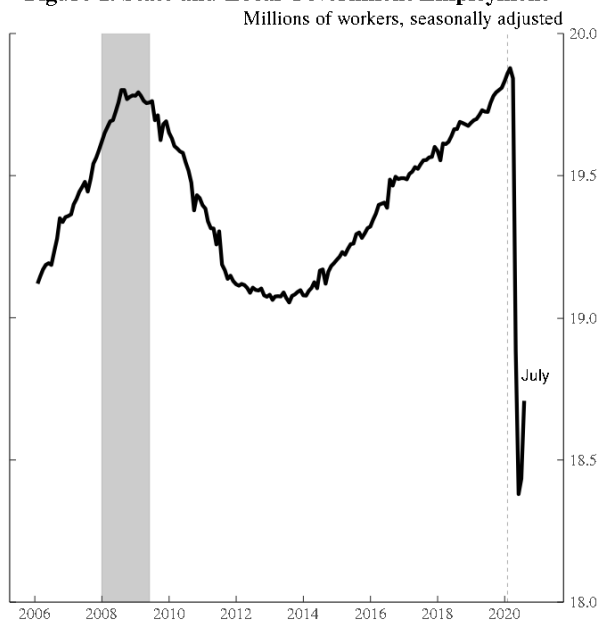
Note: Gray shaded area indicates period of economic recession as defined by the National Bureau of Economic Research. Dashed vertical line indicates onset of pandemic.
Source: Bureau of Labor Statistics.

Figure 2. State and Local Government Purchases
Average annual contribution to real GDP growth (percentage point)
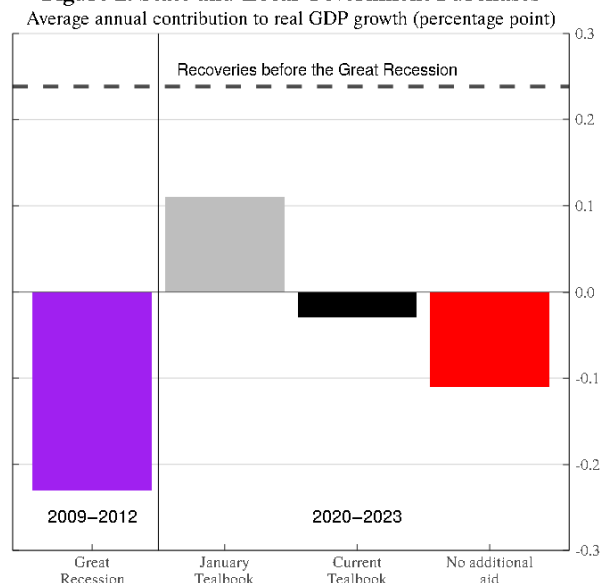
Note: The dashed line shows the average annual contribution over the time periods 1970–1973, 1975–1978, 1980–1985, 1991–1994, and 2001–2004. These periods include the year of a business cycle trough as defined by the National Bureau of Economic Research plus the three years following the trough.
Source: Bureau of Economic Analysis; staff calculations.

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[1] The stringency of these balanced budget requirements varies by state. The requirements typically apply to operating budgets, while capital expenditures and pension funds are usually exempt. Many of the balanced budget provisions allow states to run small, short-term deficits—for example, borrowing to smooth through lumpy tax revenue within a fiscal year.

[2] The 2.8 percent decline in S&L tax receipts in 2020:Q2 is not annualized. The largest quarterly decline in S&L tax receipts during the Great Recession was 4.1 percent in 2008:Q4.

In addition, seasonally adjusted S&L employment has fallen, on net, by a whopping 1.2 million in the five months since February, double the total decline observed over the five years following the Great Recession (figure 1).

Whether employment will remain persistently low or bounce back is quite uncertain. On the upside, through July, three-fourths of unemployed S&L workers classified themselves as on temporary layoff.[3] A quick rebound in tax revenues and the full reopening of schools and universities for in-classroom instruction would likely prompt a substantial bounceback in employment levels.[4] On the downside, temporary layoffs could become permanent if the pandemic hinders tax revenues for an extended period and budget shortfalls are not plugged by additional federal aid. Indeed, the National Association of State Budget Officers reports many governors have directed agencies to develop contingency plans to sharply reduce their budgets in the absence of additional federal aid.

Our projection currently assumes a middle path in which a sizable S&L tax revenue shortfall materializes over the next few years but is mostly plugged by federal aid. Through 2023, we project cumulative S&L own-source revenues will be $775 billion less than our pre-pandemic projection in the January Tealbook.[5] We assume roughly $550 billion in total federal aid to help bridge this gap, implying a net revenue shortfall of about $225 billion. Consequently, we expect the average annual contribution of S&L government purchases to GDP will be slightly negative through 2023 (figure 2, black bar), as a sharp reduction in purchases in 2020 is largely offset by modest growth over each of the next three years. This contribution is somewhat below the sector's contribution in our pre-pandemic projection (gray bar).

One major downside risk to the forecast is that just $230 billion of the staff's assumed $550 billion in federal aid has been enacted to date. Moreover, the risk that the additional aid will fail to materialize appears to have increased in recent weeks, given policymakers' lack of progress in negotiations over further aid. In the absence of additional aid, the staff expects the S&L sector would exert a modestly larger drag on aggregate demand over the next few years (red bar). While we do not anticipate the drag would be as large or prolonged as it was following the Great Recession (purple bar), the sector's contribution would fall a good bit below its historical average of about 0.25 percentage point during economic recoveries before the Great Recession (dashed horizontal line).

Beyond the real economic effects of the pandemic on the S&L sector, there were also strains observed in municipal bond markets in the pandemic's early days. The market has since largely returned to normal, coinciding with the broader improvement in financial market conditions and supported by the announcement of the Municipal Liquidity Facility (MLF). That said, the weakness of S&L government finances, coupled with the possibility that additional federal aid fails to materialize, poses a risk of further market turbulence. In such a scenario, use of the MLF, which the market views as a backstop, may increase beyond its current low level. Return to Domestic text

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[3] Temporary layoffs are those in which workers receive a return date or expect to return within six months.

[4] Layoffs in the education sector accounted for over one-half of S&L employment declines through July. The staff projection assumes widespread adoption of virtual education at the K–12 and postsecondary levels through the end of the 2020–21 academic year, which restrains S&L employment by roughly 325,000 through the middle of next year.

[5] Our projection is in line with announcements by some state governments and other research within the Federal Reserve System. See Stephen Whitaker (2020), "How Much Help Do States and Local Governments Need? Updated Estimates of Revenue Losses from Pandemic Mitigation," unpublished paper, Federal Reserve Bank of Cleveland, June.

Export Perspectives:
Progress on the Phase One Deal and Agricultural Exports

In January's U.S.–China Phase One Agreement, China made a commitment to spend an additional $77 billion in 2020 and $123 billion in 2021, relative to 2017 levels, on specific categories of U.S. services and agricultural, energy, and manufacturing goods, which would boost these exports to China more than 90 percent in 2020. To date, China's spending is well behind the pace needed to meet the 2020 targets. However, exports of Phase One goods to China have performed better than U.S. exports of the same goods to other countries and non–Phase One goods to China. The relative strength of Phase One exports may explain why the lack of progress toward the targets has not been a source of tension between the two nations.

China's purchases of Phase One goods through June were less than half of the prorated target for the first half of the year, partially because of low demand due to the COVID-19 pandemic and related shutdowns (see table).[1] Although China's economy is now well into recovery, the target will be difficult to meet. Achieving the overall target for 2020 would require that exports from August to December be almost three times greater than for the same months in 2017. Even achieving just the prorated targets for the second half of 2020 would require that exports be about two times the relevant 2017 levels.[2]

Although meeting the annual targets is unlikely, the Phase One deal still seems to have boosted U.S. exports of Phase One goods to China relative to other exports. Exports to China of goods covered by the Phase One agreement in the first half of 2020 were about 5 percent higher than in the first half of 2019 despite the COVID-related trade collapse. For the same goods, exports elsewhere were down about 11 percent. Although China's GDP in the first half of the year held up better than elsewhere, Phase One exports appear to have been better than one might have expected given weak Chinese GDP growth. Indeed, for non–Phase One goods, exports to China were down about 15 percent and exports elsewhere were down almost 20 percent.

Phase One Exports to China

(billions of U.S. dollars)

Export category	2019:H1	2020:H1	Target for 2020:H1	Percentage of target
Agriculture	5.9	6.5	14.7	44.2
Energy	2.0	2.9	13.1	22.1
Manufacturing	23.8	23.7	41.8	56.7
Total	31.6	33.1	69.6	47.6

Source: U.S. Census Bureau; Federal Reserve Board staff calculations.

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[1] U.S. Bureau of Economic Analysis data on services exports are available only for the first quarter of 2020 and the categories of services included in the Phase One deal do not map directly into the data, which makes it difficult to assess progress this year. However, we can say that first-quarter total services exports were $1.6 billion below first-quarter exports in 2017, with much of the drop due to reduced travel.

[2] Although these prorated targets are not in any official documents, they are helpful to track progress and would be a useful benchmark if the Administration were to reset the deadline. We set the half-year prorated targets for manufacturing and energy goods at half of the annual target. We adjusted the prorated target for agricultural goods to reflect that agricultural exports to China in the first half of the year tend to be smaller than in the second half. From 2015 to 2017, first-half agricultural exports accounted for only 38 percent of annual exports on average.

Crucial to the success of Phase One is its effect on agricultural exports to China, a sector harmed by earlier tariff hikes. Here, too, agricultural exports to China have lagged behind the Phase One target but have held up better than agricultural exports to other countries. Figure 1 shows cumulative Phase One agricultural exports to China for 2019 and 2020 and the average from 2015 to 2017. Because U.S. agricultural exports have strong seasonal patterns, the cumulative target for Phase One exports to China imposes the seasonality exhibited from 2015 to 2017. Through June, agricultural exports to China were only 44 percent of the year-to-date target and below average 2015–17 levels. That said, agricultural exports to China were 10 percent higher than in the first half of 2019, when the Chinese were targeting these goods for retaliation, and outperformed agricultural exports elsewhere, which fell 4 percent relative to the first half of 2019.[3]

Although weak, overall U.S. agricultural exports have held up better than other goods exports in 2020. Total nominal agricultural exports fell 9 percent from January to June, whereas nominal exports of all goods fell 25 percent (figure 2). In contrast, during the Global Financial Crisis (GFC), agricultural exports fell by roughly the same percentage as total goods exports. The disparity reflects the greater drop in prices during the GFC due to both a drop in demand and a better U.S. harvest in fall 2008.

Prospects for overall U.S. agricultural exports appear positive. Overall U.S. agricultural production may be disrupted by social-distancing regulations and international travel restrictions for migrant workers. However, agricultural exports should hold up better than overall agricultural production, as the production of export-intensive products such as soybeans and corn is highly automated in the United States. Furthermore, production of these goods in more labor-intensive countries may suffer from COVID-related disruptions, which could increase foreign demand for U.S. agricultural products and raise prices. In addition, recent floods have disrupted agricultural production in China, which should further bolster demand for U.S. agricultural products. Return to Domestic text

Figure 1: U.S. Cumulative Phase One Agricultural Exports to China

Billions of U.S. dollars

- - - 2020 cumulative monthly targets*
—— 2020 data
—— 2019 data
—— 2015–17 average

*Seasonally adjusted.
Source: U.S. Census Bureau; Federal Reserve Board staff calculations.

Figure 2: Nominal Goods Exports

Billions of dollars, seasonally adjusted monthly rates

Total goods

Agricultural goods

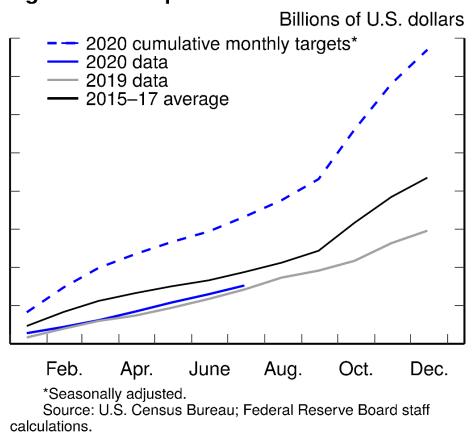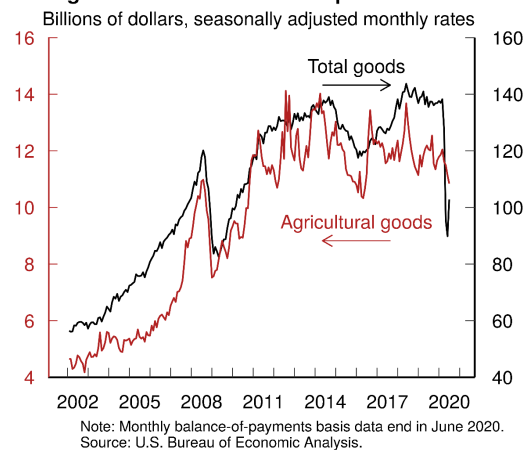Note: Monthly balance-of-payments basis data end in June 2020.
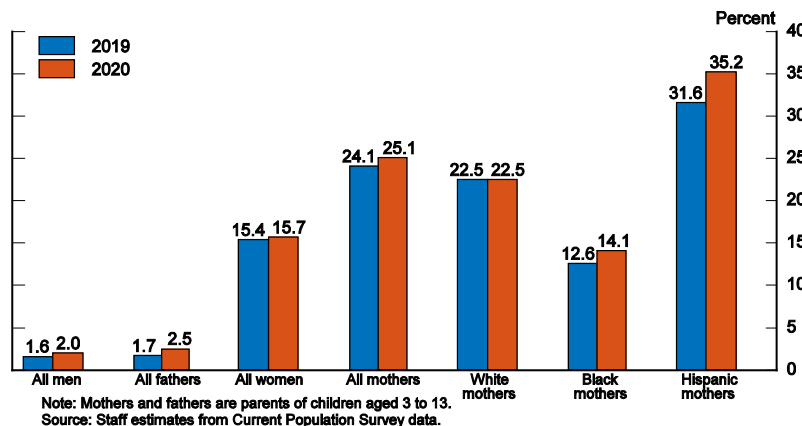Source: U.S. Bureau of Economic Analysis.

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[3] U.S. supply of agricultural goods did not play a key role in the change in agricultural exports between the first half of 2019 and the first half of 2020, as crop production was similar in both periods.

The Implications of K–12 Virtual Learning in the Fall on Parental Labor Supply

Two-thirds of public K–12 students are expected to start school this fall with fully virtual instruction, and another 20 percent will begin with a mix of in-person and virtual education.[1] This situation will force many parents to find ways to manage their children's at-home learning and their own work schedules, with possibly substantial adverse implications for aggregate labor supply. Taking into account experience from the spring, the total number of parents likely to be affected in the fall, and recent survey results from the Survey of Household Economics and Decisionmaking (SHED), we project that the widespread reliance on virtual learning in the fall will depress the labor force participation rate (LFPR) 0.3 percentage point, although we see reasons why the effect could be smaller or larger.

In the spring, all public K–12 schools were closed to in-person education. While we expect that at least some children will be learning in person in the fall, assessing the effect of schools being closed to in-person learning in the spring on parental labor supply can nonetheless provide a useful benchmark. To do this, we use the Current Population Survey (CPS) to estimate the percent of the population aged 25 to 54 (prime-age) that reports being out of the labor force for caregiving reasons in April through June and compare it with that percent in 2019 (see the figure). We interpret the increase in this measure as likely reflecting difficulties associated with childcare.[2] The share of people who were out of the labor force for caregiving reasons in April through June increased notably for prime-age fathers (¾ percentage point) and mothers (1 percentage point) and about 0.3 percentage point for prime-age men and women overall; the increases were substantially larger for Black and Hispanic mothers.[3] All told, if the entire increase in the percent of prime-age people who were out of the labor force for caregiving reasons in the spring reflects the effect of their school-aged children's virtual learning, then schools being closed to in-person learning would have depressed the aggregate LFPR in the spring about 0.2 percentage point.

Percent of People Aged 25 to 54 that are out of the Labor Force for Caregiving Reasons, April through June average

Note: Mothers and fathers are parents of children aged 3 to 13.
Source: Staff estimates from Current Population Survey data.

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[1] We calculate the share of students with fully or partial virtual learning using information on public school districts compiled by Education Week (public schools account for about 90 percent of total enrollment for K–12 students nationwide). Estimates are based on available information as of August 28, 2020. More information is available on the *Education Week* website at https://www.edweek.org/ew/section/multimedia/school-districts-reopening-plans-a-snapshot.html.

[2] A number of real-time household surveys during the pandemic (for example, the Household Pulse Survey and the COVID Impact Survey) asked respondents specifically about whether their employment decisions have been affected by childcare responsibilities. However, the surveys' limited histories make it difficult to infer how much of the responses reflect childcare difficulties during the pandemic versus what is typical during normal times.

[3] Also from the CPS, we estimate a small increase relative to previous years in both the fraction of workers who are usually full time but report being part time for childcare reasons and the fraction of working parents who report being absent from work due to childcare reasons.

The effect on parental labor supply in the fall may be somewhat smaller or substantially larger than what we estimated to have occurred in the spring. On the one hand, fewer students will likely be learning virtually in the fall, and parents may be better at adapting family behavior to accommodate their children's virtual learning. On the other hand, parents may now expect virtual learning to extend well into the coming school year, and they may be unable to use sick time or other flexible work provisions that were available during the early months of the pandemic.

To provide an upper bound on the possible effects, we estimate the number of parents whose employment and participation decisions might be affected by in-person education being unavailable (see the table). Of the 36 million parents of school-aged children who were working before COVID-19 (line 1), many working parents will not have an option for in-person learning for their children (line 2). Additionally, some working parents may not have partners who can care for their kids, either because they are single parents or their partner works more hours (line 3). Of those parents who lack alternative caregivers in the house, some will lack the flexibility to work remotely and thus the option to try to balance work with childcare (line 4). After adjusting for these factors, we estimate that the employment and labor force participation decisions of about 7 million parents (2.3 million fathers and 4.7 million mothers) may be affected because of childcare responsibilities associated with students learning virtually (line 4)—nearly 3 percent of the population aged 16 and older.

We anticipate, however, that the labor supply effects will be much smaller than the upper bound estimate suggests (as appears to have been the case in the spring), with many parents making adjustments along other margins to minimize the effect on their labor supply (for example, adjusting their hours or using caregivers outside the home). Indeed, the results from July 2020 supplement to the SHED indicate that 3 percent of working parents would stop working if schools were closed to in-person education, which is considerably smaller than the 7 million parents at risk for labor supply disruptions as previously described.[4]

Taking into account all this information, the staff forecast assumes that virtual education for most K–12 students in the fall will depress the LFPR about 0.3 percentage point through at least the end of the year, which happens to be in line with the SHED findings but somewhat larger than what we estimate occurred in the spring despite fewer students being affected than in the spring.[5] Return to Domestic text

Men and Women Employed Pre-COVID with at least One School-Aged Child (Millions)

	Men	Women
(1) Total working parents with school-aged children	18.8	17.3
(2) Without an option for in-person learning	12.6	11.6
(3) And without an available caregiving partner in the household*	3.9	7.8
(4) And without the ability to telework	2.3	4.7

Note: We define school-aged children as those between the ages of 3 and 13. Pre-COVID employment is calculated as the 12-month average from March 2019 through February 2020.

* A working parent without an available caregiver is defined here as either a single parent or a parent that is part of a dual-earning couple and works fewer hours than their partner (including not working at all).

Source: Staff calculations using CPS data.

[4] The SHED results imply that about one-half of1 percent of the population would have to stop work if schools were closed, which, combined with the staff estimate that two-thirds of K–12 students will be engaged in virtual education, is consistent with an effect on the LFPR of about 0.3 percentage point. Note that the SHED results are confidential until public release after the FOMC meeting.

[5] In the previous Tealbook, we assumed more K–12 schools would provide in-person education than are now likely to and that the effects of virtual learning in the fall on parental labor supply would be smaller.

Domestic Econ Devel & Outlook

Tealbook Forecast Compared with Blue Chip
(Blue Chip survey released August 10, 2020)

Real GDP
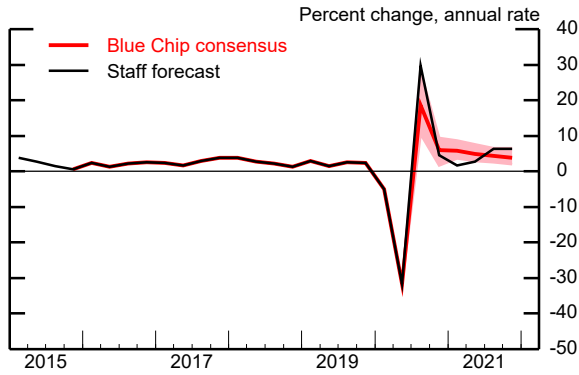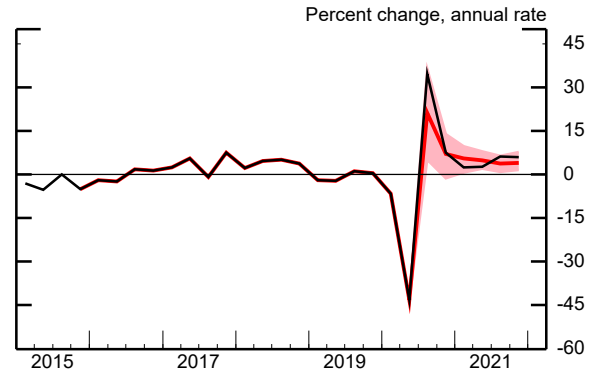
Percent change, annual rate

— Blue Chip consensus
— Staff forecast

Industrial Production

Percent change, annual rate

Unemployment Rate

Percent

Core PCE Prices

Percent change, annual rate

Treasury Bill Rate

Percent

10-Year Treasury Yield

Percent
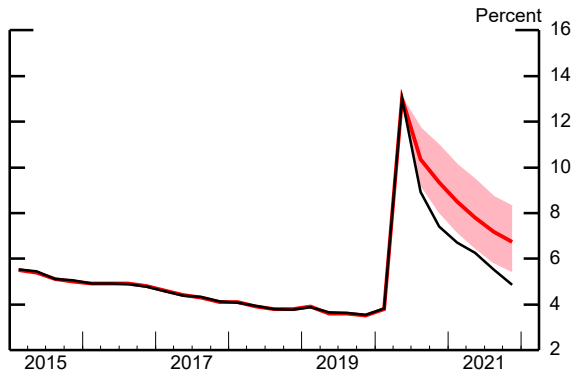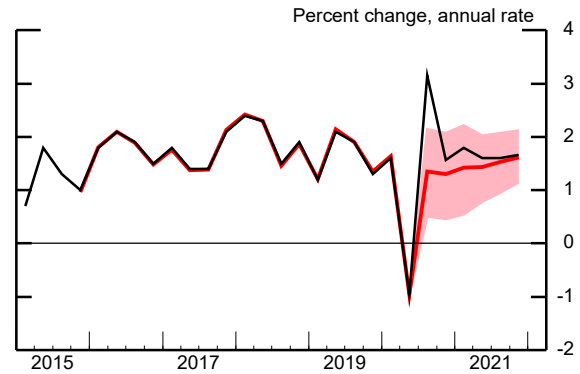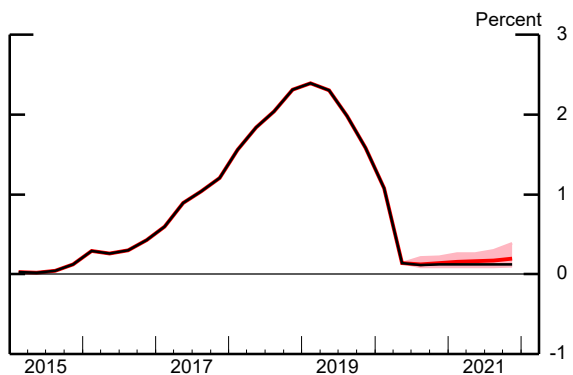
Note: The yield is for on-the-run Treasury securities. Over the forecast period, the staff's projected yield is assumed to be 3 basis points below the off-the-run yield.

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

Projections of Real GDP and Related Components

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

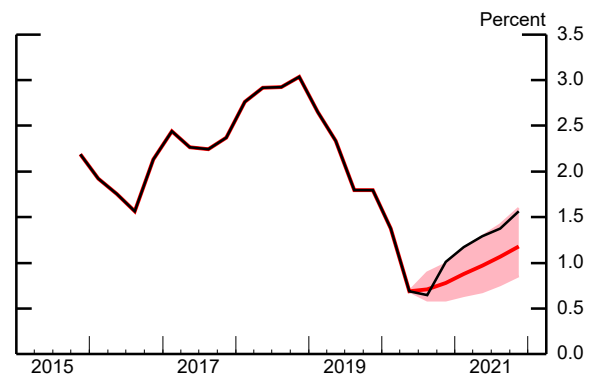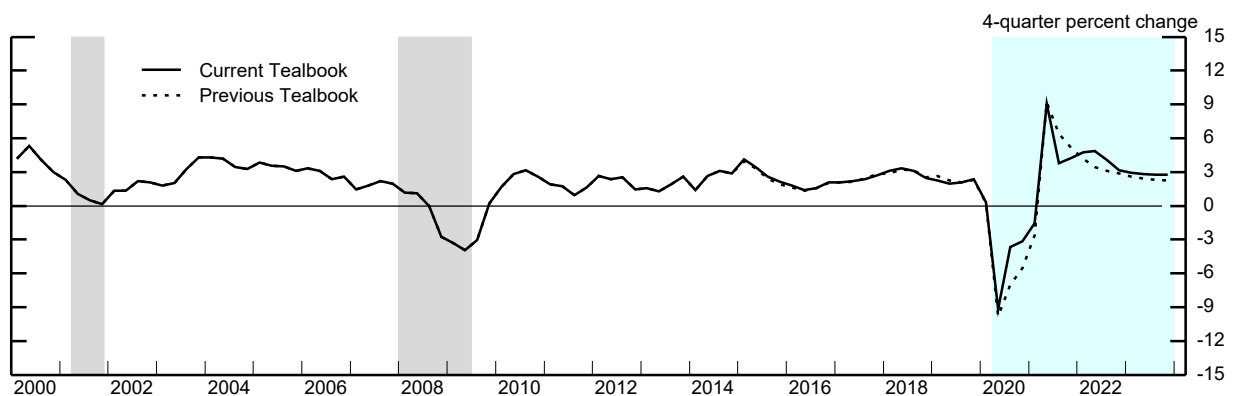| Measure	2019	2020 H1	2020 H2	2020	2021	2022	2023
Real GDP	**2.3**	**-19.5**	**16.4**	**-3.2**	**4.2**	**3.2**	**2.8**
Previous Tealbook	*2.3*	*-20.3*	*11.9*	*-5.6*	*5.1*	*2.9*	*2.2*
Final sales	2.8	-17.0	12.7	-3.3	4.1	3.1	2.7
Previous Tealbook	*2.7*	*-18.2*	*9.6*	*-5.3*	*4.5*	*2.5*	*...*
Personal consumption expenditures	2.5	-21.7	19.6	-3.2	4.2	3.4	3.0
Previous Tealbook	*2.7*	*-22.3*	*14.7*	*-5.6*	*5.3*	*3.1*	*...*
Residential investment	1.6	-13.0	28.8	5.9	9.6	5.6	3.0
Previous Tealbook	*1.7*	*-15.5*	*11.3*	*-3.0*	*5.4*	*3.6*	*...*
Nonresidential structures	1.9	-19.1	-16.7	-17.9	4.4	4.3	7.3
Previous Tealbook	*-6.2*	*-18.4*	*-16.2*	*-17.3*	*9.8*	*3.6*	*...*
Equipment and intangibles	1.3	-16.0	9.9	-3.9	7.3	6.7	5.1
Previous Tealbook	*1.3*	*-19.2*	*.5*	*-9.9*	*9.9*	*5.6*	*...*
Federal purchases	4.8	9.3	7.2	8.2	.6	-2.0	-2.0
Previous Tealbook	*4.3*	*13.6*	*2.6*	*8.0*	*-.6*	*-2.3*	*...*
State and local purchases	1.9	-2.2	-5.9	-4.1	1.0	.9	1.0
Previous Tealbook	*2.2*	*-5.6*	*.4*	*-2.6*	*-.9*	*-1.0*	*...*
Exports	.4	-42.9	38.6	-11.1	11.3	4.5	4.4
Previous Tealbook	*.3*	*-45.7*	*31.5*	*-15.5*	*12.9*	*4.4*	*...*
Imports	-1.9	-37.5	42.9	-5.5	10.1	5.5	4.8
Previous Tealbook	*-2.1*	*-38.0*	*26.0*	*-11.6*	*12.6*	*5.0*	*...*
Contributions to change in real GDP (percentage points)							
Inventory change	-.4	-2.5	3.5	.1	.2	.1	.1
Previous Tealbook	*-.4*	*-2.1*	*2.2*	*-.3*	*.6*	*.4*	*...*
Net exports	.3	.3	-1.5	-.5	-.2	-.3	-.2
Previous Tealbook	*.4*	*.0*	*-.3*	*-.1*	*-.3*	*-.2*	*...*

... Not applicable.

Real GDP

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

Domestic Econ Devel & Outlook

The Outlook for the Labor Market

Measure	2019	2020 H1	2020 H2	2020	2021	2022	2023
Nonfarm payroll employment[1]	178	-2,365	1,028	-669	505	311	266
Previous Tealbook	*178*	*-2,366*	*940*	*-713*	*521*	*244*	*...*
Private employment[1]	162	-2,138	1,043	-547	470	281	239
Previous Tealbook	*162*	*-2,132*	*849*	*-642*	*525*	*256*	*...*
Labor force participation rate[2]	63.2	60.8	61.9	61.9	62.5	62.7	62.8
Previous Tealbook	*63.2*	*60.8*	*62.1*	*62.1*	*62.3*	*62.5*	*...*
Civilian unemployment rate[2]	3.5	13.0	7.4	7.4	4.9	3.8	3.2
Previous Tealbook	*3.5*	*13.0*	*8.9*	*8.9*	*5.4*	*4.7*	*4.2*
Employment-to-population ratio[2]	61.0	52.9	57.3	57.3	59.4	60.3	60.8
Previous Tealbook	*61.0*	*52.9*	*56.6*	*56.6*	*58.9*	*59.6*	*...*

... Not applicable.
1. Thousands, average monthly changes.
2. Percent, average for the final quarter in the period.
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

Inflation Projections

Measure	2019	2020 H1	2020 H2	2020	2021	2022	2023
Percent change at annual rate from final quarter of preceding period							
PCE chain-weighted price index	1.5	-.3	2.4	1.1	1.7	1.8	1.9
Previous Tealbook	*1.4*	*-.2*	*2.2*	*1.0*	*1.7*	*1.7*	*1.9*
Food and beverages	.9	9.1	-1.3	3.8	1.3	2.0	2.0
Previous Tealbook	*.9*	*9.2*	*2.3*	*5.7*	*1.3*	*2.0*	*...*
Energy	-.6	-29.6	12.9	-10.8	3.2	1.8	1.9
Previous Tealbook	*-1.3*	*-28.5*	*11.0*	*-10.9*	*2.9*	*2.2*	*...*
Excluding food and energy	1.6	.3	2.4	1.3	1.7	1.8	1.9
Previous Tealbook	*1.6*	*.4*	*1.9*	*1.1*	*1.7*	*1.7*	*1.9*
Prices of core goods imports[1]	-1.4	-.6	2.7	1.0	1.4	1.0	1.0
Previous Tealbook	*-1.1*	*-.1*	*.0*	*.0*	*1.2*	*1.0*	*...*

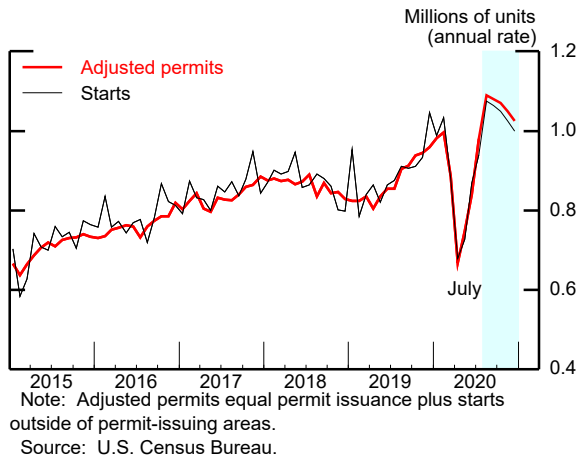|	June 2020	July 2020	Aug. 2020[2]	Sept. 2020[2]	Oct. 2020[2]	Nov. 2020[2]	Dec. 2020[2]
12-month percent change							
PCE chain-weighted price index	.9	1.0	1.1	1.2	1.1	1.1	1.0
Previous Tealbook	*.8*	*.9*	*1.0*	*1.1*	*1.0*	*1.1*	*1.0*
Excluding food and energy	1.1	1.3	1.3	1.3	1.3	1.4	1.3
Previous Tealbook	*1.0*	*1.0*	*1.0*	*1.1*	*1.1*	*1.2*	*1.1*

... Not applicable.
1. Core goods imports exclude computers, semiconductors, oil, and natural gas.
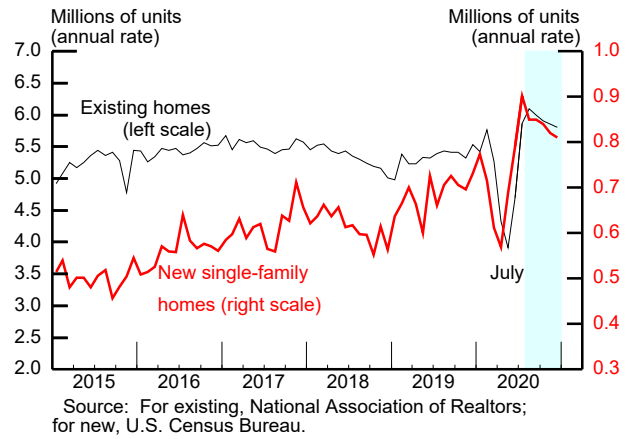2. Staff forecast.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.
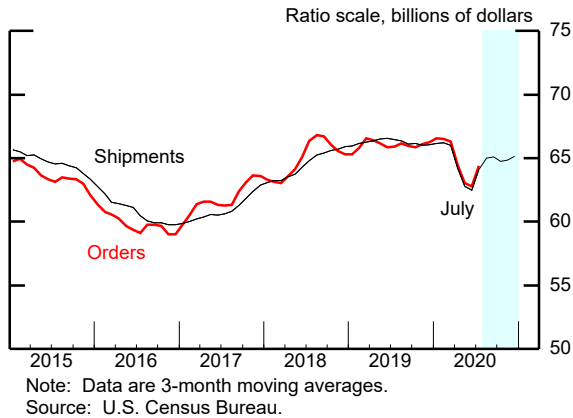
Recent Nonfinancial Developments (2)

Single-Family Housing Starts and Permits

Millions of units
(annual rate)

— Adjusted permits
— Starts

July

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

Home Sales

Millions of units
(annual rate)

Millions of units
(annual rate)

Existing homes
(left scale)

New single-family
homes (right scale)

July

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

Nondefense Capital Goods ex. Aircraft

Ratio scale, billions of dollars

Shipments

Orders

July

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

Nonresidential Construction Put in Place

Billions of chained (2012) dollars

July

Note: Nominal CPIP deflated by BEA prices through 2020:Q1 and by the staff's estimated deflator thereafter.
Source: U.S. Census Bureau.

Inventory Ratios

Months

July

Staff flow-of-goods system

Census book-value data

June

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

Billions of dollars

Non-oil imports

Exports

July

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

Domestic Econ Devel & Outlook
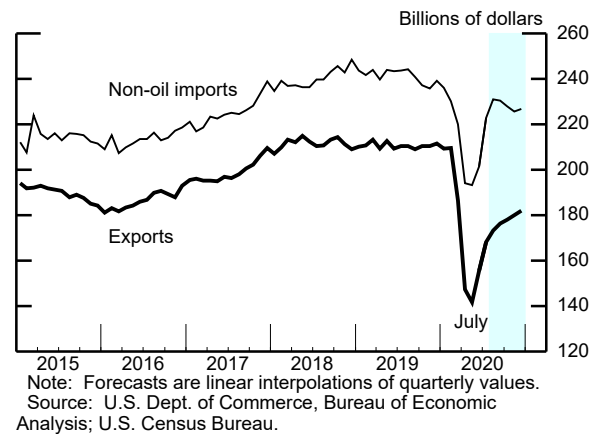
Components of Final Demand

Personal Consumption Expenditures
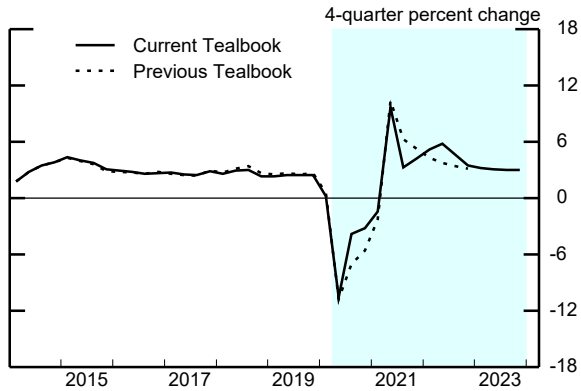
4-quarter percent change

Residential Investment

4-quarter percent change

Equipment and Intangibles

4-quarter percent change

Nonresidential Structures

4-quarter percent change
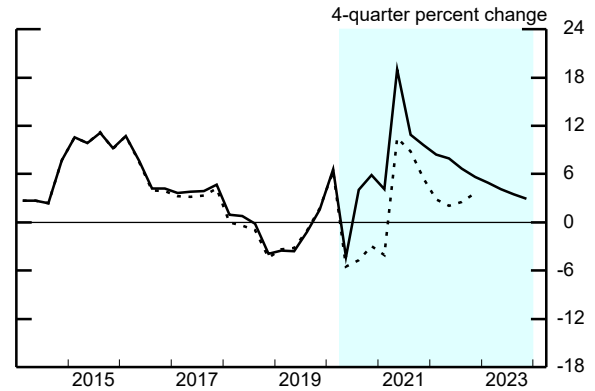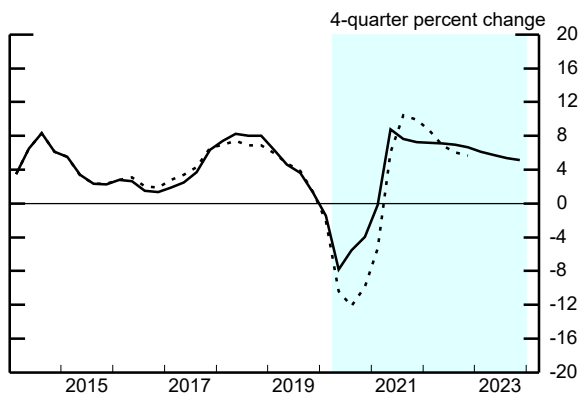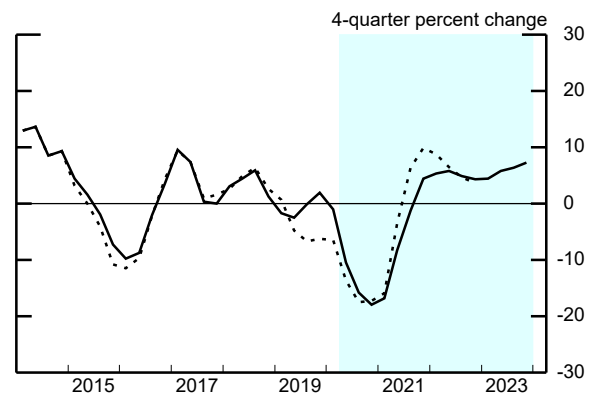
Government Consumption and Investment

4-quarter percent change

Exports and Imports

4-quarter percent change
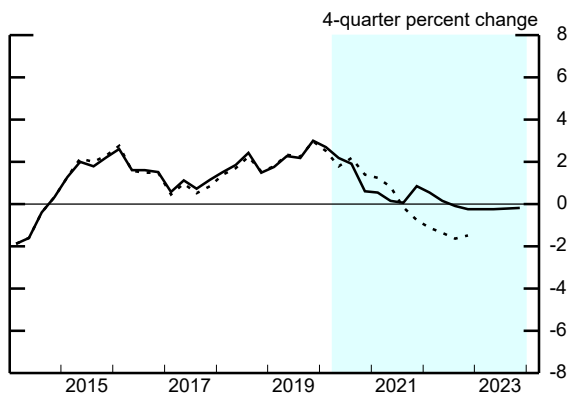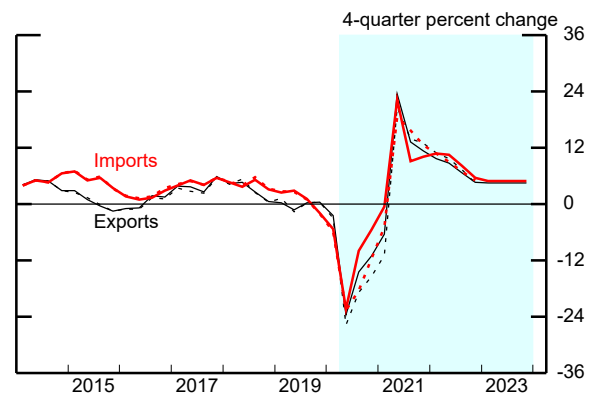
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Aspects of the Medium-Term Projection

Personal Saving Rate

Percent

- Current Tealbook
- ····· Previous Tealbook
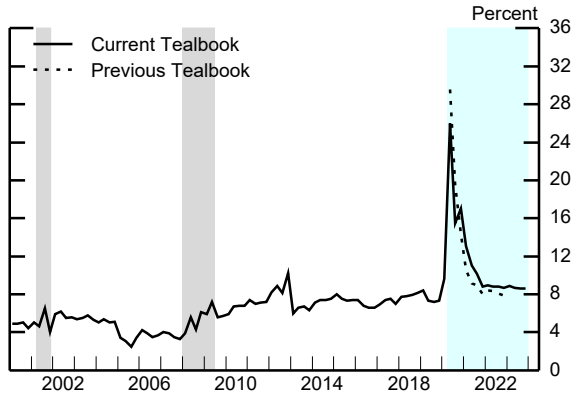
Source: U.S. Dept. of Commerce, Bureau of Economic
Analysis.

Wealth-to-Income Ratio
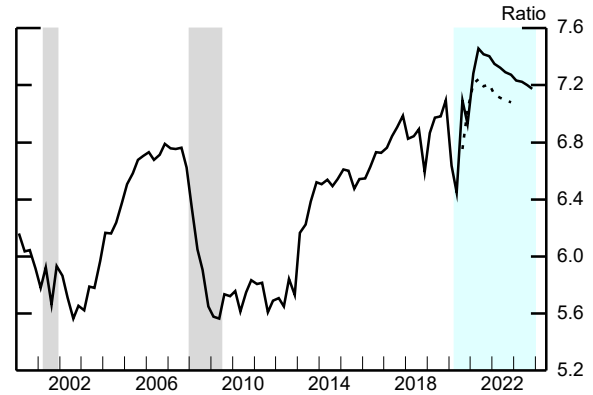
Ratio

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

Single-Family Housing Starts

Millions of units
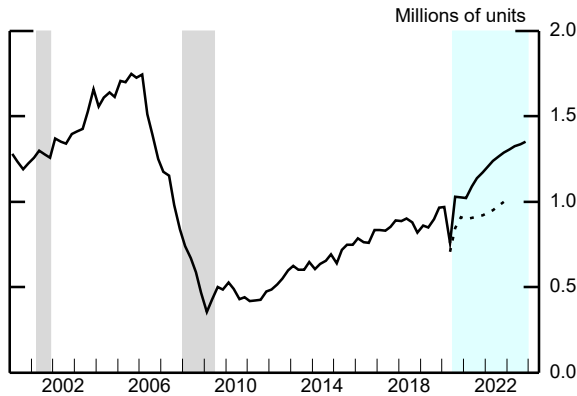
Source: U.S. Census Bureau.

Equipment and Intangibles Spending

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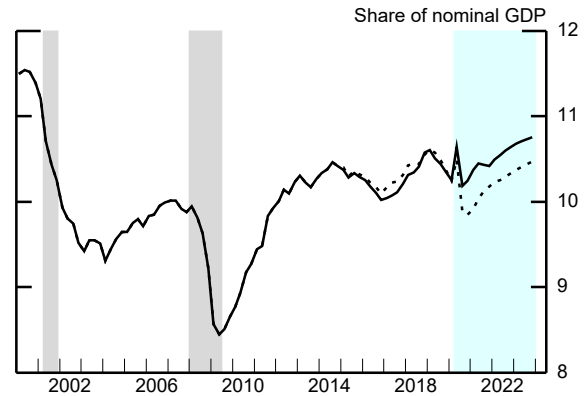
Source: U.S. Dept. of Commerce, Bureau of Economic
Analysis.

Federal Surplus/Deficit

Share of nominal GDP
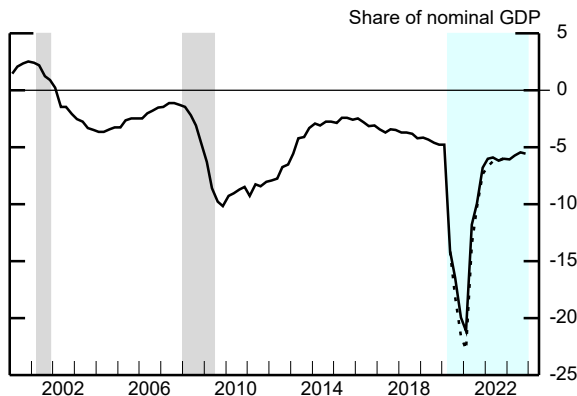
Note: 4-quarter moving average.
Source: Monthly Treasury Statement.

Current Account Surplus/Deficit
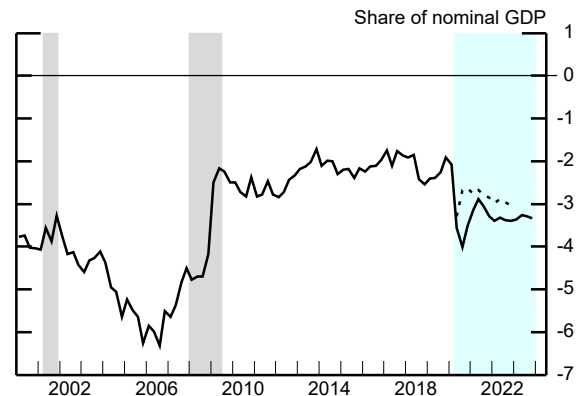
Share of nominal GDP

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

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

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

Measure	2019	2020	2020 Q1	2020 Q2	2020 Q3	2020 Q4
Output gap[1]	**1.5**	**-1.3**	**-.1**	**-4.5**	**-1.7**	**-1.3**
Previous Tealbook	*1.5*	*-3.4*	*-.1*	*-5.1*	*-5.1*	*-3.4*
Real GDP	2.3	-3.2	-5.0	-31.8	29.7	4.5
Previous Tealbook	*2.3*	*-5.6*	*-5.0*	*-33.2*	*15.2*	*8.7*
Measurement error in GDP	.2	.0	.1	.0	.0	.0
Previous Tealbook	*.2*	*.0*	*.0*	*.0*	*.0*	*.0*
Potential output	1.9	-.4	1.2	-18.3	15.5	3.0
Previous Tealbook	*1.9*	*-.8*	*1.3*	*-18.0*	*14.9*	*1.4*

Note: The output gap is the percent difference between actual and potential output; a negative number indicates that the economy is operating below potential. The change in the output gap is equal to real GDP growth less the contribution of measurement error less the growth rate of potential output. For quarterly figures, the growth rates are at an annual rate, and this calculation needs to be multiplied by 1/4 to obtain the quarterly change in the output gap.

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

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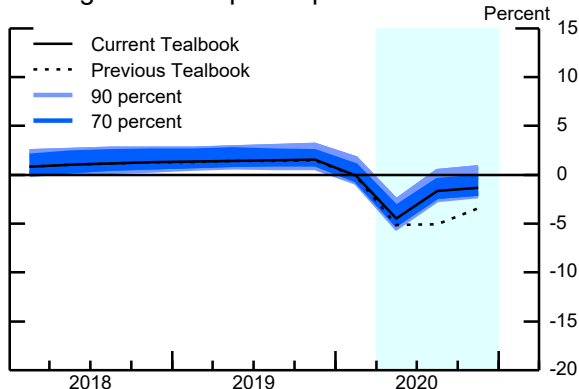
Note: Shaded regions show the distribution of historical revisions to the staff's estimates of the output gap.
Source: Various macroeconomic data; staff assumptions.

Model-Based Output Gap
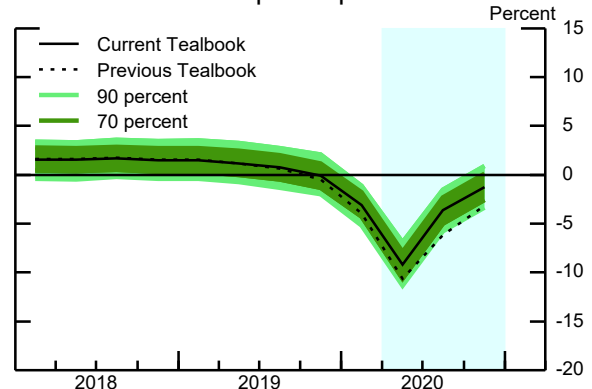
Note: Shaded regions denote model-computed uncertainty bands.
Source: Various macroeconomic data; staff assumptions.
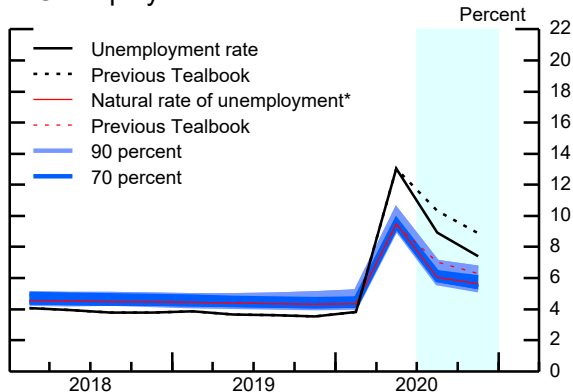
Unemployment Rate

Note: Shaded regions show the distribution of historical revisions to the staff's estimates of the natural rate.
 *Staff estimate including the effect of extended and emergency unemployment insurance benefits.
 Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

Core PCE Price Inflation
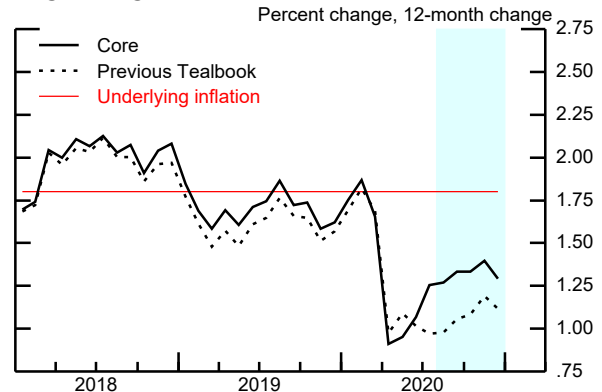
Source: U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

Cyclical Position of the U.S. Economy: Longer-Term Perspective
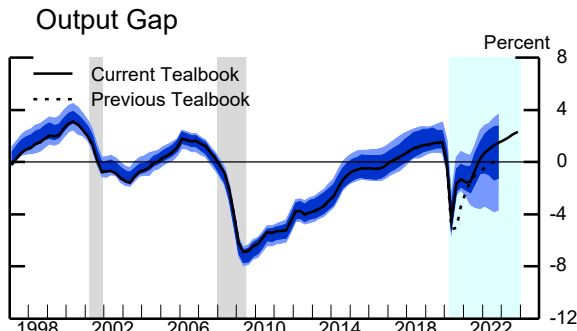
Output Gap

Note: Shaded regions show the 70 percent and 90 percent confidence intervals of the distribution of historical revisions to the staff's estimates of the output gap.
Source: Various macroeconomic data; staff assumptions.

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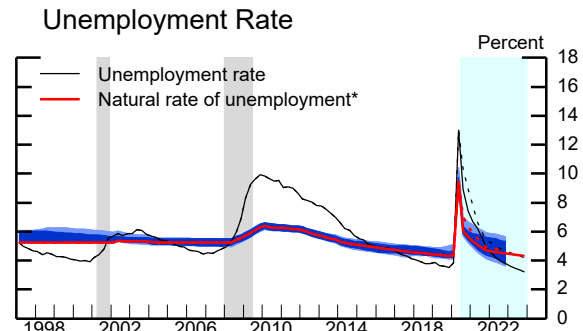
Note: Shaded regions show the 70 percent and 90 percent confidence intervals of the distribution of historical revisions to the staff's estimates of the natural rate.
*Staff estimate including the effect of extended and emergency unemployment insurance benefits.
Source: Various macroeconomic data; staff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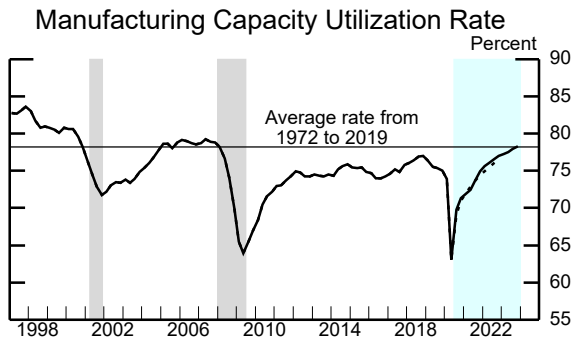
Manufacturing Capacity Utilization Rate

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

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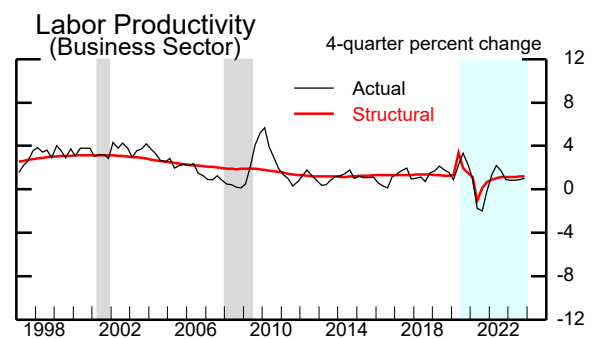
Source: U.S. Department of Labor, Bureau of Labor Statistics; U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

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

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

| Measure	1975-96	1997-2001	2002-08	2009-11	2012-18	2019	2020	2021	2022	2023
Potential output	3.1	3.6	2.5	1.7	1.6	1.9	-.4	2.6	1.9	2.0
Previous Tealbook	*3.1*	*3.6*	*2.5*	*1.7*	*1.6*	*1.9*	*-.8*	*2.4*	*1.9*	*...*
Selected contributions:[1]										
Structural labor productivity[2]	1.7	3.2	2.4	1.6	1.3	1.3	1.5	.6	1.2	1.2
Previous Tealbook	*1.7*	*3.2*	*2.4*	*1.6*	*1.3*	*1.3*	*1.2*	*.2*	*.9*	*...*
Capital deepening	.7	1.5	1.0	.4	.8	.7	1.4	-.3	.4	.5
Multifactor productivity	.8	1.3	1.2	1.0	.2	.4	-.1	.7	.5	.5
Structural hours	1.5	1.2	.8	.4	.5	.5	-2.4	2.4	1.0	.9
Previous Tealbook	*1.5*	*1.2*	*.8*	*.4*	*.5*	*.5*	*-2.8*	*2.8*	*1.0*	*...*
Labor force participation	.4	-.1	-.2	-.5	-.4	.0	-1.4	.7	.1	.0
Previous Tealbook	*.4*	*-.1*	*-.2*	*-.5*	*-.4*	*.0*	*-1.2*	*.6*	*.1*	*...*
Memo:										
Output gap[3]	-.4	-.8	-4.2	-4.6	1.3	1.5	-1.3	.3	1.5	2.3
Previous Tealbook	*-.4*	*-.8*	*-4.2*	*-4.6*	*1.3*	*1.5*	*-3.4*	*-.8*	*.2*	*...*

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.
... Not applicable.
1. Percentage points.
2. Total business sector.
3. Percent difference between actual and potential output in the final quarter of the period indicated. A negative number indicates that the economy is operating below potential.

Labor Market Developments and Outlook (1)

Domestic Econ Devel & Outlook

Measures of Labor Underutilization

Percent

- U-5*
- Unemployment rate
- Part time for economic reasons**

Aug.

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

Unemployment Rate

Percent

- Unemployment rate
- Previous Tealbook
- Natural unemployment rate
- Previous Tealbook

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

Employment-to-Population Ratio

Percent

- Total (current Tealbook)
- Total (previous Tealbook)
- EPOP trend

Aug.

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

Unemployed Workers on Temporary and Permanent Layoff
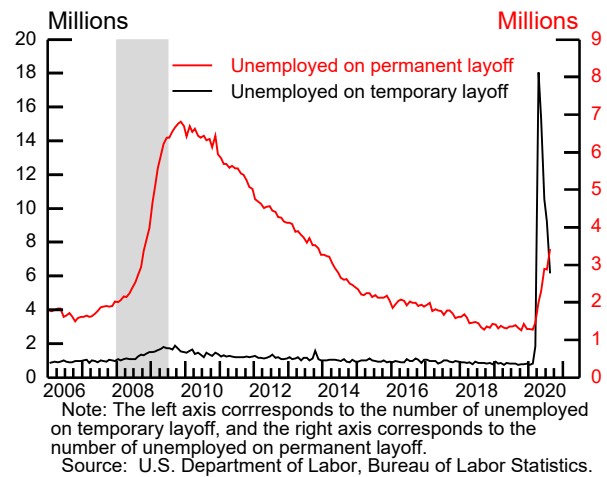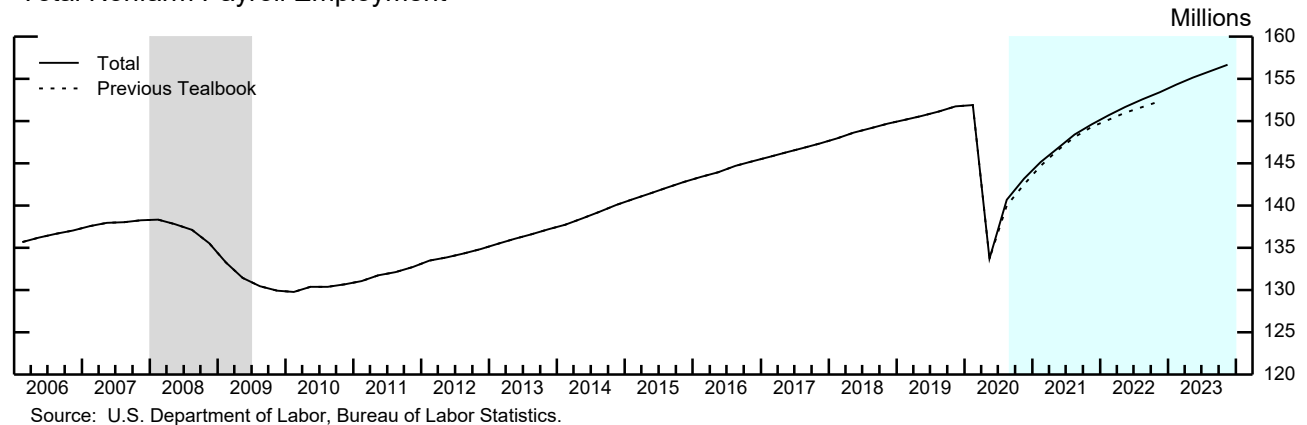
Millions   Millions

- Unemployed on permanent layoff
- Unemployed on temporary layoff

Note: The left axis corrresponds to the number of unemployed
on temporary layoff, and the right axis corresponds to the
number of unemployed on permanent layoff.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Total Nonfarm Payroll Employment

Millions

- Total
- Previous Tealbook

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

Note: 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

Note: 4-week moving average. Series plots values that are not seasonally adjusted.
Source: U.S. Department of Labor, Employment and Training Administration.

Hires, Quits, and Job Openings

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

Unemployment Rate by Racial/Ethnic Group

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

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

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

Measures of Longer-Term Inflation Expectations

Index of Common Inflation Expectations

- CIE Index, scaled by SPF, 10-year PCE inflation
- Alternative index, scaled by Michigan, next 5-10 years

Note: Index of 21 inflation expectations indicators.
p Preliminary estimate based on data available to date.
Source: Staff calculations.

Next 10 Years

- SPF median, CPI
- Livingston Survey median, CPI
- SPF median, PCE

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

CPI Forward Expectations

- SPF median, 6 to 10 years ahead
- Blue Chip mean, 7 to 11 years ahead
- Primary dealers median, 5 to 10 years ahead
- 5-to-10-year-ahead TIPS infl. compensation

Source: Federal Reserve Bank of Philadelphia; Blue Chip
Economic Indicators; Federal Reserve Bank of New York;
Federal Reserve Board staff calculations.

PCE Forward Expectations

SPF median, 6 to 10 years ahead

Primary Dealers long run

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

Surveys of Consumers

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

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

Survey of Business Inflation Expectations

Mean increase in unit costs, next 5 to 10 years

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

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

Headline Consumer Price Inflation

Source: For CPI, U.S. Department of Labor, Bureau of Labor Statistics; for PCE, U.S. Department of Commerce, Bureau of Economic Analysis.
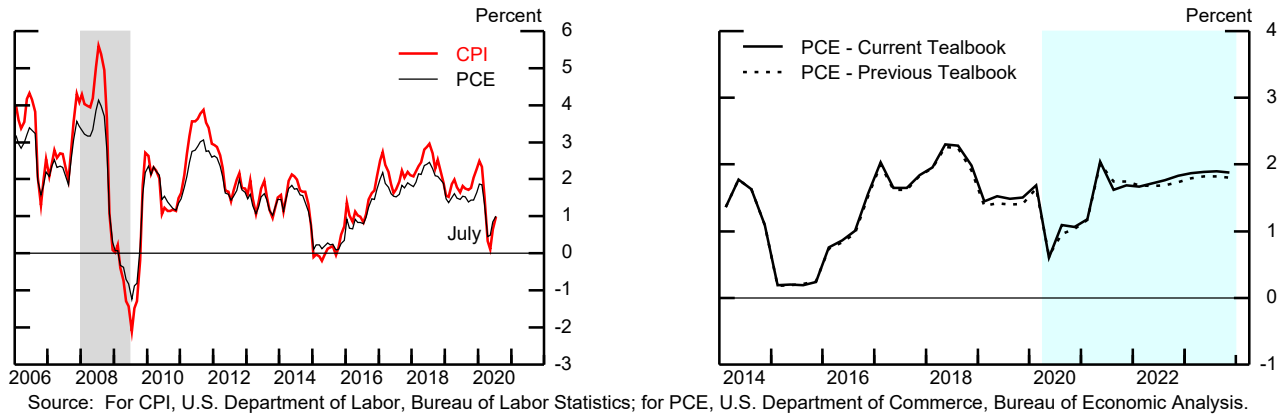
Measures of Core PCE Price Inflation
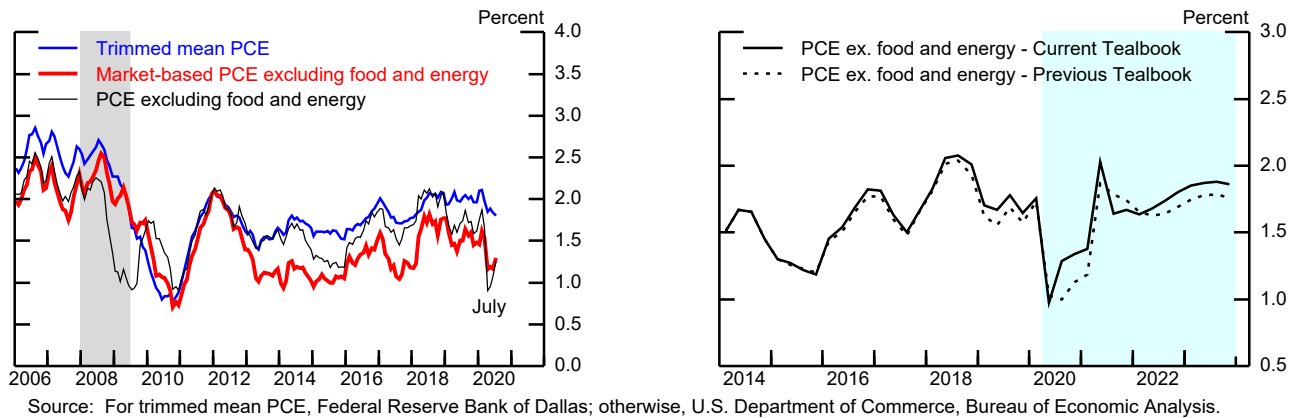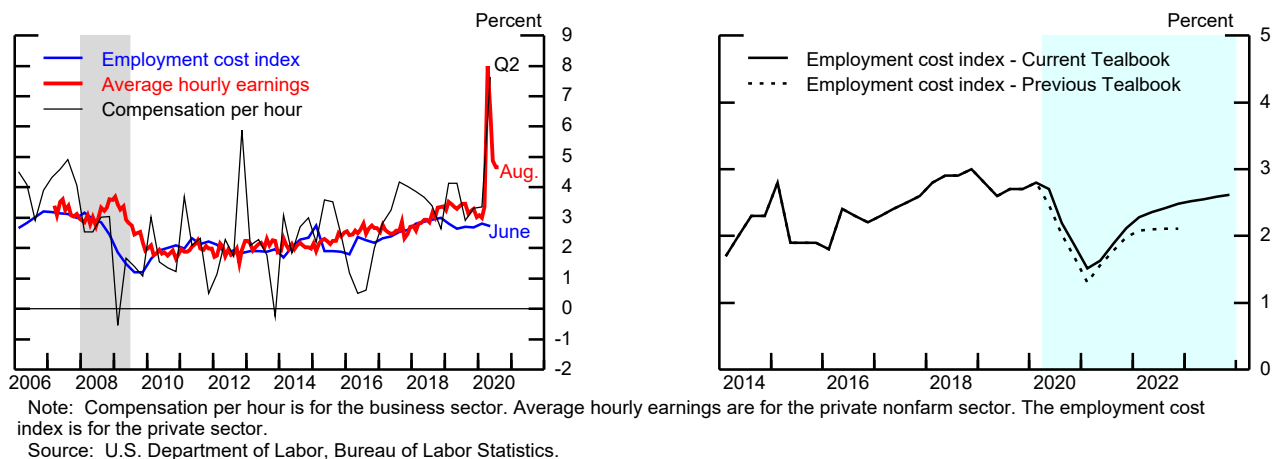
Source: For trimmed mean PCE, Federal Reserve Bank of Dallas; otherwise, U.S. Department of Commerce, Bureau of Economic Analysis.

Labor Cost Growth

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

Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.
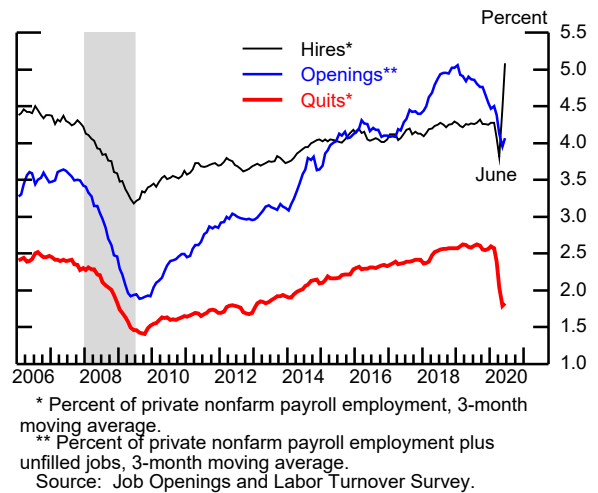
Inflation Developments and Outlook (2)
(Percent change from year-earlier period, except as noted)

Commodity and Oil Price Levels

1967 = 100

Dollars per barrel

Brent crude oil history/futures (right axis)
CRB spot commodity price index (left axis)

Sept. 2
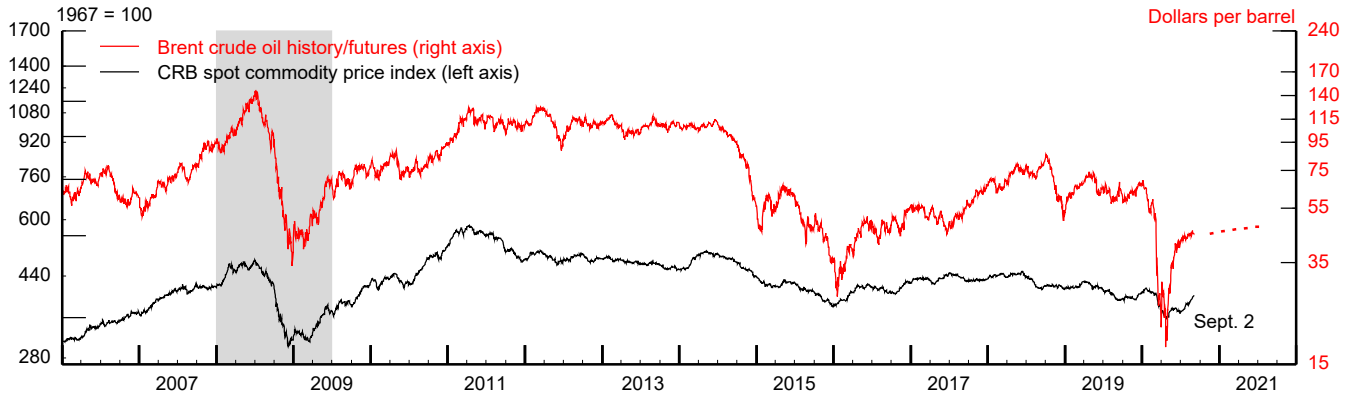
Note: Futures prices (dotted lines) are the latest observations on monthly futures contracts.
Source: For oil prices, U.S. Department of Energy, Energy Information Agency; for commodity prices, Commodity Research Bureau (CRB).

Energy and Import Price Inflation

Percent

Percent

PCE energy prices (right axis)
Core import prices (left axis)
Core import prices with tariff effects (left axis)

Q2

Q2

July
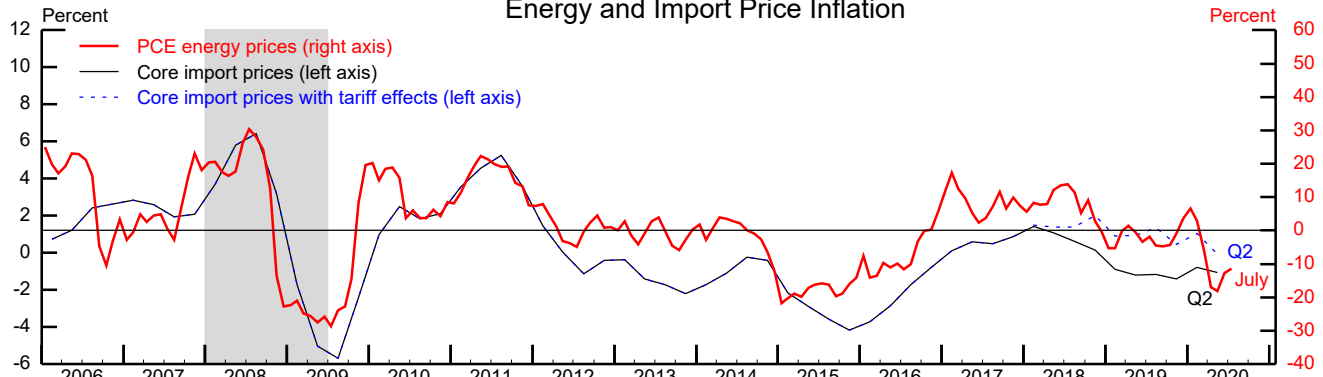
Source: For core import prices and for PCE, U.S. Dept. of Commerce, Bureau of Economic Analysis. For core import prices with a tariff effect, Federal Reserve Board staff calculations.

Food Price Inflation
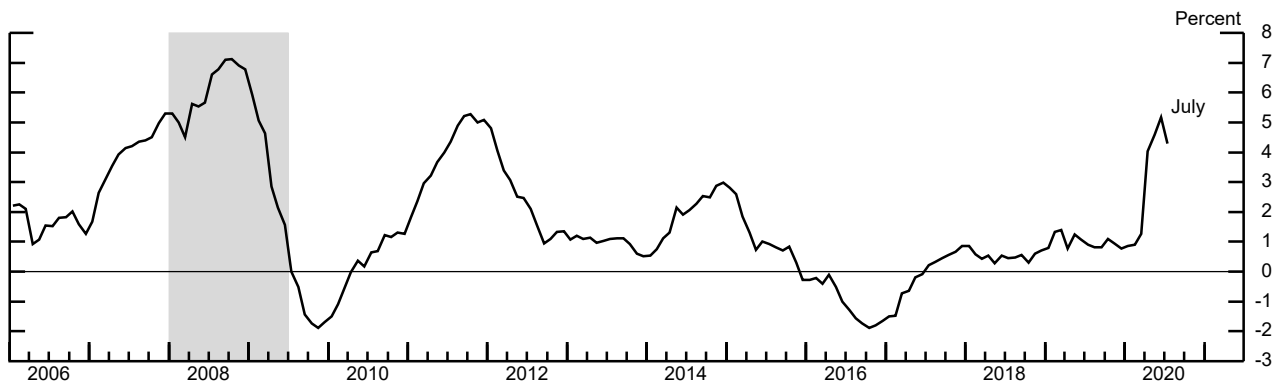
Percent

July

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

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

Evolution of the Staff Forecast

Change in Real GDP

Percent, Q4/Q4

Tealbook publication date

Unemployment Rate

Percent, fourth quarter
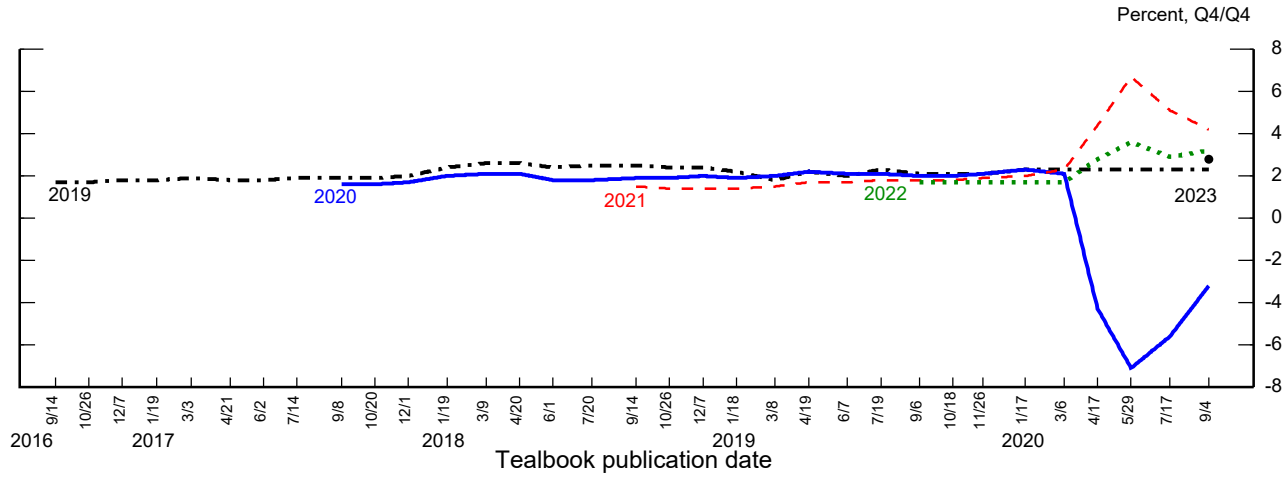
Tealbook publication date

Change in PCE Prices excluding Food and Energy

Percent, Q4/Q4

Tealbook publication date
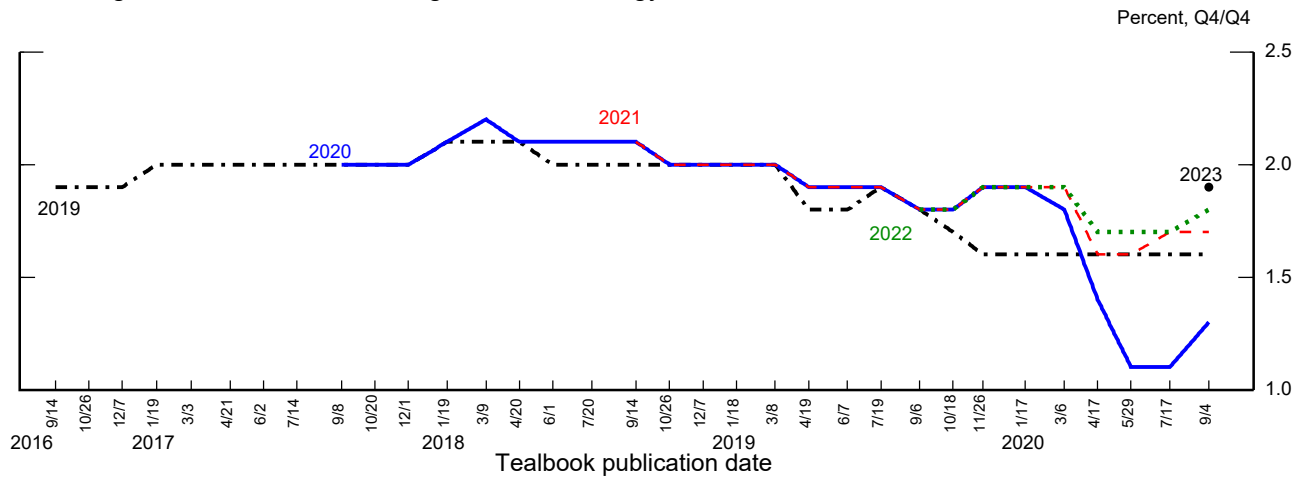
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International Economic Developments and Outlook

After a historic second-quarter plunge in foreign GDP . . .

      Second-quarter releases of foreign gross domestic product (GDP) confirm a drop of Brobdingnagian proportions. Foreign real GDP plummeted at an annualized 35 percent, with economy-specific declines as high as nearly 70 percent in India. The second-quarter decline was 5 percentage points larger than estimated in the July Tealbook, with the negative surprise being broad based across economies, as shown in the bar chart. (For country details, see the box "Regional Developments and Outlook.")

. . . economic indicators point to a large, but partial, rebound in activity this quarter

      Despite the second-quarter underperformance, we have scarcely changed our forecast for the level of third-quarter GDP, as we anticipate a large overall bounceback in this quarter, even larger than in the July Tealbook (see the line chart). Monthly indicators of household spending and industrial production have charged up from their early spring nadirs and are near pre-coronavirus (COVID-19) levels in some economies, particularly in advanced foreign economies (AFE). Recent readings of retail sales in the euro area and Canada were already above their December levels, and industrial production has rebounded strongly in Europe (see the top figures on the next page). Indicators released more recently, such as purchasing managers indexes through August, have continued to point to expansion in economic activity. Canadian data have been particularly strong, and the country has likely benefited from the resurgent activity in the United States. All told, recent improvement in foreign data has been somewhat stronger than we and market analysts anticipated, though the surprise is smaller than seen for the United States, as indicated by the Citi Economic Surprise Indexes (see the next figure).
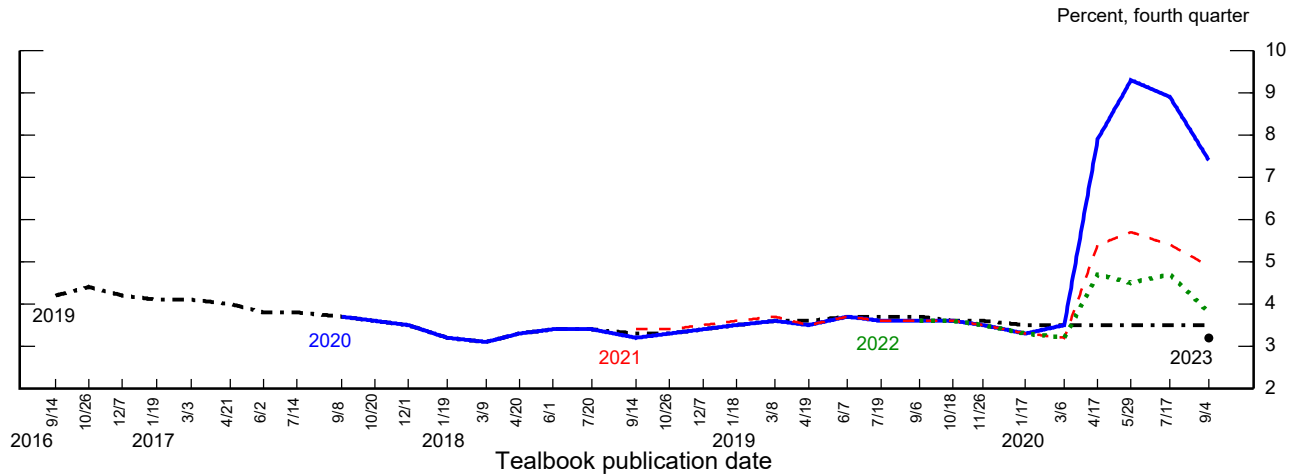
GDP Growth in 2020:Q2
Quarter over quarter, annual rate
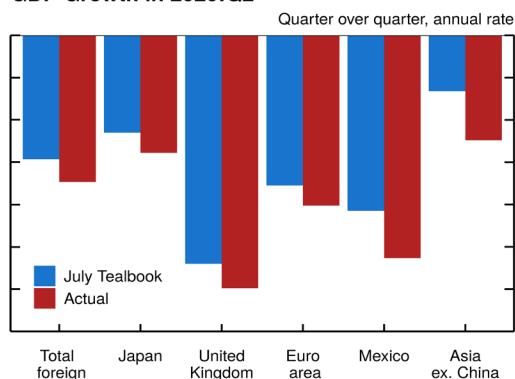
Note: GDP is gross domestic product.
Source: Haver Analytics; Federal Reserve Board staff forecasts.

Foreign Aggregate GDP
2019:Q4 GDP = 100

Note: GDP is gross domestic product.
Source: Federal Reserve Board staff forecasts and calculations.

Real Retail Sales

Dec. 2019 = 100

Legend: Canada, Euro area, Mexico, South Korea
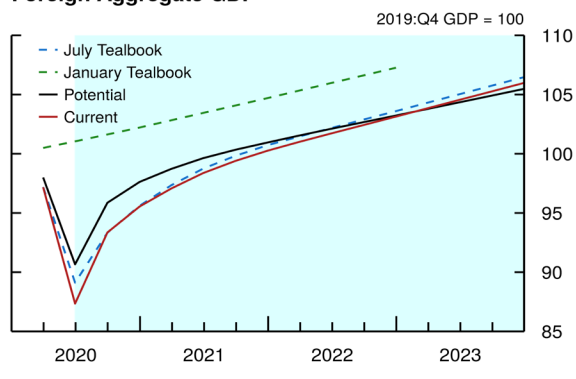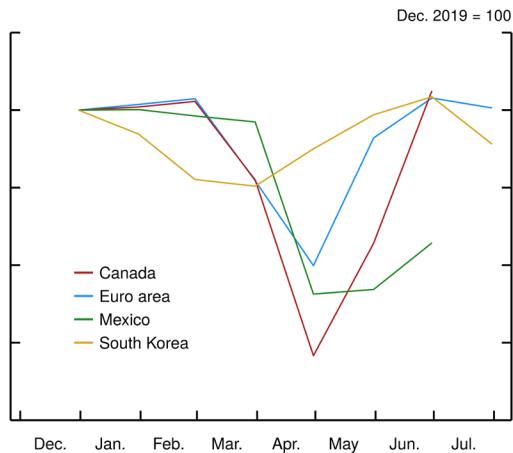
Source: Haver Analytics; Federal Reserve Board staff calculations.

Industrial Production

Dec. 2019 = 100

Legend: China, Euro area, Latin America, United Kingdom
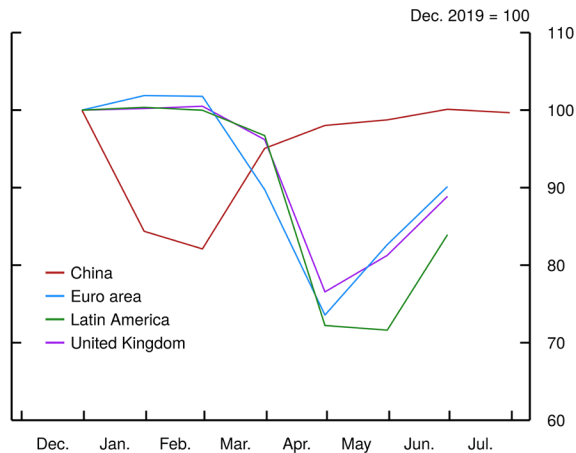
Note: The Latin America index is a weighted average, based on
U.S. trade weights, of Argentina, Brazil, Colombia, Chile, and Mexico.
Source: Haver Analytics; Federal Reserve Board staff calculations.

Citi Economic Surprise Index

Index, normalized data surprises

Legend: Foreign economies, United States
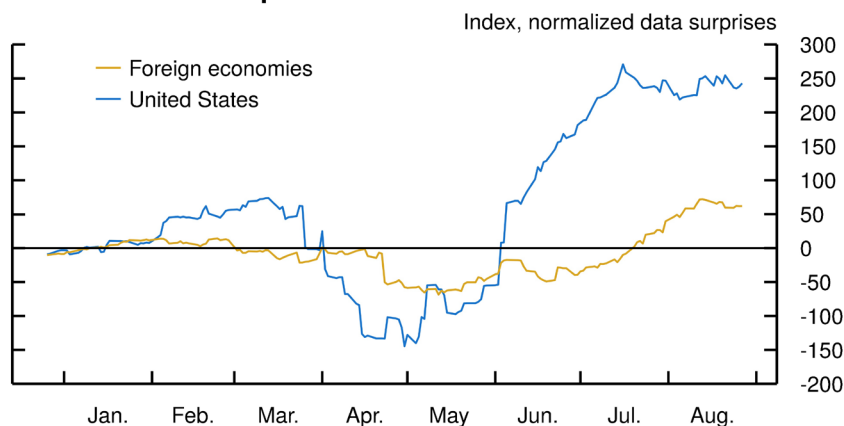
Note: The index is defined as a weighted average of normalized data surprises
(actual releases versus Bloomberg median survey) in a rolling three-month
window. Normalized data surprises are measured in standard deviations.
The final index is multiplied by 100.
Source: Citigroup; Federal Reserve Board staff calculations.

That said, for some important emerging market economies where the virus continues to spread, our assessment has become more downbeat

While we still see the incoming monthly data in emerging market economies (EME) as consistent with a rebound in activity, the sizable downside misses in the second quarter in a number of EMEs, including in India and Mexico, were among the largest in the foreign economies. Our read is that for these economies the virus and the measures to combat it are taking a somewhat larger economic toll than we expected. Thus, despite recent data implying a substantial rebound, we project the path of GDP over the forecast for these economies to be a little lower than in the July Tealbook.

Moreover, flare-ups of COVID-19 cases in Europe and some parts of Asia, where the virus previously seemed under control, pose headwinds in the near term

We had expected flare-ups of COVID-19 cases across the foreign economies in our baseline forecast in July. However, the increase of cases in Europe and parts of Asia is more substantial than we had envisioned (see the figures to the left). In Europe, infection rates in France and Spain are rising very rapidly and have passed or are approaching their previous peaks. Hong Kong, Japan, Korea, and Vietnam also saw a marked increase in daily new cases in recent weeks. That said, the increase in caseloads is not universal, and daily new cases in some of the economies where we have seen flare-ups are either stabilizing or already decreasing.

New COVID-19 Cases: Europe

Per million; 7-day moving average

France
Italy
Spain
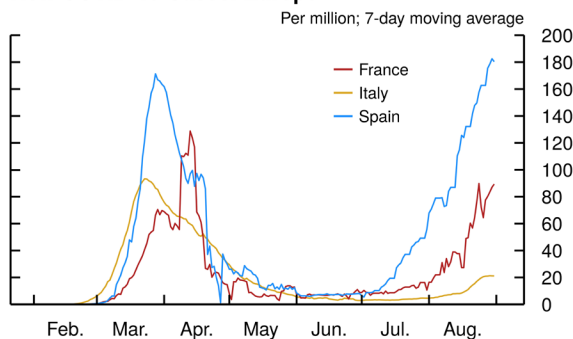
Source: Johns Hopkins Center for Systems Science and Engineering.

Mobility Index: Europe
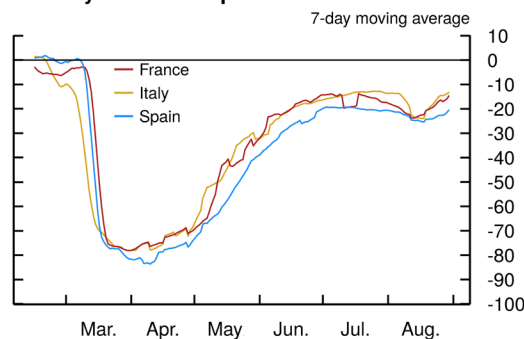
7-day moving average

France
Italy
Spain

Note: The mobility index is an average of retail, recreation, grocery, pharmacy, transit, and workplace mobility.
Source: Google Community Mobility Reports.

New COVID-19 Cases: Asia
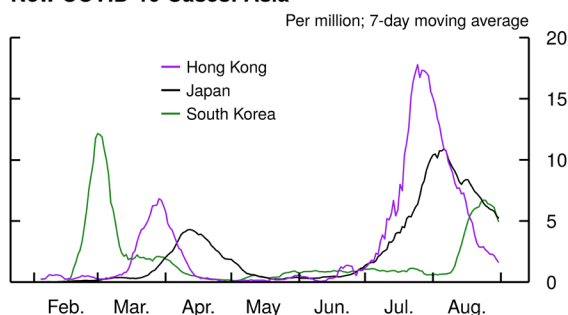
Per million; 7-day moving average

Hong Kong
Japan
South Korea

Source: Johns Hopkins Center for Systems Science and Engineering.

Mobility Index: Asia

7-day moving average

Hong Kong
Japan
South Korea

Note: The mobility index is an average of retail, recreation, grocery, pharmacy, transit, and workplace mobility.
Source: Google Community Mobility Reports.

Int'l Econ Devel & Outlook
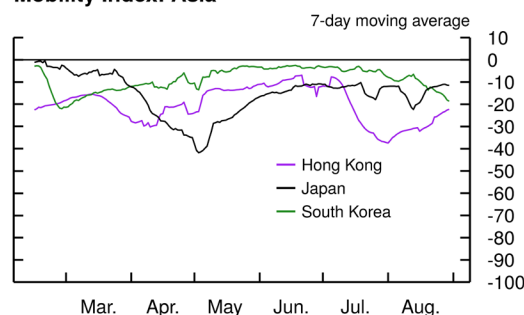
Accordingly, we revised down our forecast for economies where the resurgence in cases has been most notable. These markdowns are only modest, however, reflecting our assessment that measures taken to control the recent resurgence appear less economically damaging than in the first waves of infections. Indeed, cross-country correlations between the stringency of lockdown measures and soft indicators have decreased noticeably this quarter. Mobility indexes, which in the past have correlated well with economic activity, have only edged down in European countries (see the earlier figures to the right). Mobility in the Asian economies with flare-ups moved down somewhat more. So far, we view these outbreaks as reinforcing our assumption that flare-ups will likely reappear until a vaccine is widely available in late 2021, and the size and frequency of these flare-ups may be worse than we assume in our baseline forecast.

We expect continued policy support in foreign countries going forward, albeit with less impetus, though emerging market economies are likely to have less policy space

Swift and strong macroeconomic policies have provided unprecedented economic support so far this year. With this substantial fiscal support winding down, we expect that governments will likely enact further measures, albeit under less-generous terms. In turn, we expect that fiscal impulses will become somewhat negative in 2021 (see the two figures on the next page). For instance, Germany and Italy have already extended their current short-term work (STW) programs, and we see their take-up tapering next year as these economies gradually recover. Additionally, the French government introduced a new longer-term program while reverting some terms of its emergency one to pre-pandemic standards, and Canada approved a longer-term replacement for its STW emergency program with less-favorable terms. In contrast, many EMEs have more limited fiscal space going forward, as they face market pressures for some fiscal consolidation.

Effect of 2020 Fiscal Policies on GDP
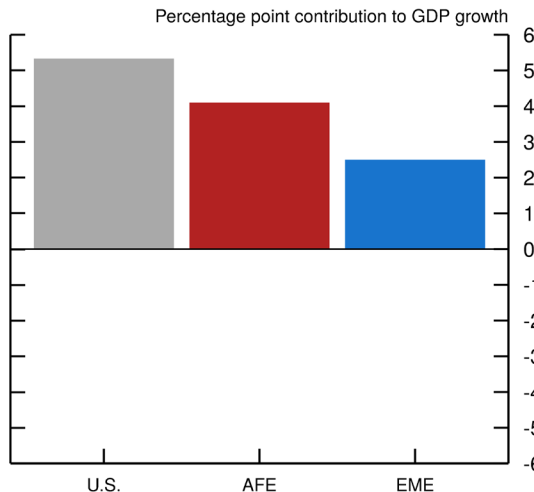
Percentage point contribution to GDP growth

U.S.   AFE   EME

Note: GDP is gross domestic product. AFE is advanced foreign
economy. EME is emerging market economy.
Source: Federal Reserve Board staff estimates.

Effect of 2021 Fiscal Policies on GDP
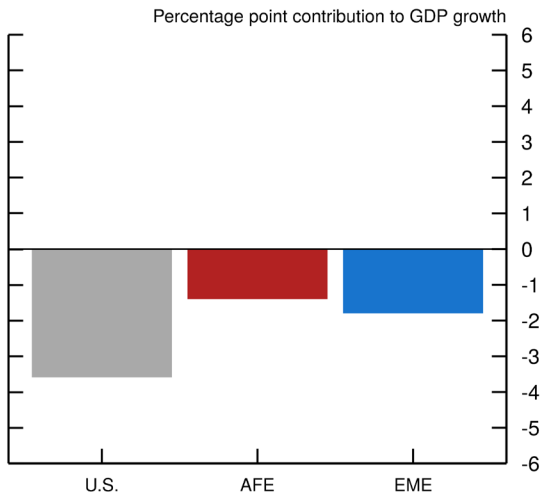
Percentage point contribution to GDP growth

U.S.   AFE   EME

Note: GDP is gross domestic product. AFE is advanced foreign
economy. EME is emerging market economy.
Source: Federal Reserve Board staff estimates.

Int'l Econ Devel & Outlook

Foreign central banks have continued to provide monetary stimulus by cutting policy rates, giving forward guidance that rates will stay low for long, and communicating that asset purchases will play larger roles in monetary accommodation. During the intermeeting period, central banks in several EMEs—including Brazil, Colombia, Mexico, Russia, and South Africa—lowered policy rates further. Several, however, noted that space for additional monetary stimulus was limited. In the AFEs, although the central banks of major economies have not announced significant measures since the July Tealbook, policies unveiled since February should provide a significant contribution to GDP growth. We estimate that policies, such as short-term interest rate cuts and asset purchases, should boost the level of GDP over 2020 to 2022 by roughly 3 percent in Canada and the United Kingdom and about 1 percent in the euro area and Japan. Finally, communications about asset purchases by many AFE central banks have moved away from the goal of restoring market functioning toward providing stimulus to support the economic recovery. For more details about AFE monetary policy, see the box "Recent Communications by Major Foreign Central Banks."

Foreign economic activity should continue to recover over the remainder of the forecast period, though the pace of recovery will vary across countries

Overall, the level of foreign GDP returns to its pre-COVID level only in the fourth quarter of 2021, and GDP is still well below the level projected in the January Tealbook at the end of the forecast period. The level of GDP over the forecast period is slightly lower than in the July Tealbook, as the headwinds from flare-ups and the lower

trajectory of the forecast for hard-hit EMEs slightly outweigh the stronger data we have seen in a number of countries. (For a review of the staff's outlook versus those of the International Monetary Fund and private forecasters, see the box "Comparing the Staff International Growth Outlook with Other Forecasts.")

The strength of the economic recovery should still vary across regions, reflecting in part differences in the course of the virus as well as country-specific economic conditions and structural characteristics (see the figures below). Despite recent flare-ups in some economies, we expect the recovery to progress faster in China and higher-income Asian economies, where initial outbreaks were more limited and where extensive testing and tracing have enabled flare-ups to be contained quickly. In Europe and other AFEs, recovery should be somewhat slower, as restrictions and social distancing, as well as recessionary dynamics and some persistent scarring of labor and production markets, hamper growth. Finally, in several EMEs (South Asia and Latin America), we expect an even slower recovery as the virus continues to prove difficult to contain and social distancing eases more gradually.

Global Lockdown Restrictions and GDP
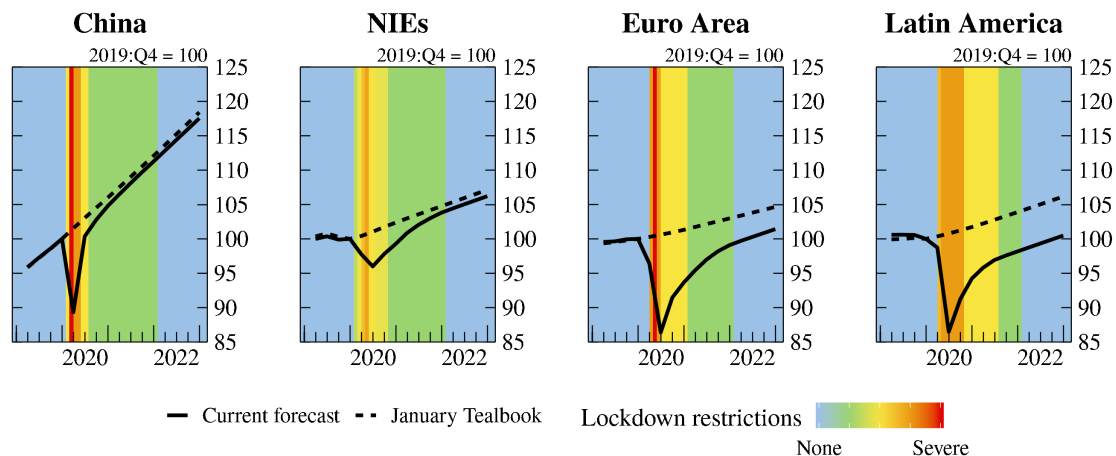
Note: NIE is newly industrialized economies. GDP is gross domestic product.
Source: Federal Reserve Board staff calculations.

The uncertainty around our forecast remains elevated, and the risks to our baseline forecast are still tilted to the downside

We still view our baseline forecast as more probable relative to the other scenarios. However, we are slightly less confident in this baseline forecast than we were in July, when the earlier decline in case counts in Europe and parts of Asia had left us a little more hopeful. Greater-than-expected flare-ups in new cases of the virus have led us to raise modestly the probability of a scenario where we see a large "second wave" of infections (see the next figure).

However, conditional on a second-wave scenario arising, we see its occurrence as imposing a bit less economic damage than we previously thought, representing the balance of two opposing factors. On the one hand, greater concern about the limits to fiscal and monetary policy space raise our expectations of the economic costs of a second-wave outcome. On the other hand, some economies have experienced faster-than-anticipated rebounds even with some resurgence in cases, which suggests they have been able to manage the virus better. For instance, businesses seem more adapted to remain open despite the pandemic, and politicians seem reluctant to impose a second round of widespread lockdowns but instead are focusing on better testing, wider usage of masks, and more guidance on social distancing. The second-wave scenario also envisages substantial deterioration of financial conditions, which has not occurred so far.

Foreign GDP: Baseline and Scenarios

Note: GDP is gross domestic product.
Source: Federal Reserve Board staff calculations.
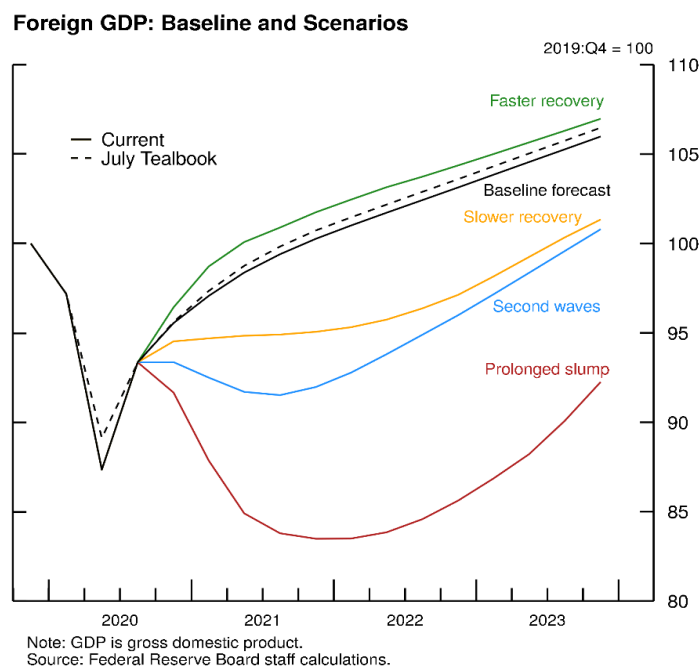
An "earlier recovery" scenario also remains possible, with several factors leading to faster GDP growth: households and business learning to cope with the virus while engaging in economic activity, more effective therapeutic interventions, and the virus becoming less harmful than anticipated. Conversely, there is the possibility of a "slower recovery," driven by larger-than-anticipated recessionary dynamics, while the course of the virus remains the same as in our baseline. Finally, the search for vaccines may take much longer than in the baseline, and recurrent flare-ups of the virus may depress consumer and business sentiment, spur large capital outflows, and raise risk of sovereign default, triggering widespread financial distress and a severe global recession. We believe this "prolonged slump" scenario is somewhat less likely than the other scenarios, though that may be too optimistic.

Inflation has remained subdued across advanced foreign economies, and surveys point to elevated downside risks to euro-area inflation expectations

Recent readings of both headline and core inflation in AFEs remain quite low amid subdued demand pressures and lower energy prices from earlier this year (see the top two figures on the next page). However, the weakness in AFE inflation also appears to reflect large idiosyncratic declines in the prices of a few goods categories, which we largely view as temporary. Indeed, a measure of core inflation for the AFEs that focuses on the common factor in the components of each economy's consumer price index, thus purging out idiosyncratic movements of these components, shows a much smaller decline than the one in the official data.[1] Even so, inflation may take some time to bounce back from its current low levels, as swings in the common factor of core inflation have been historically quite persistent. Accordingly, we see AFE inflation reaching only 1.4 percent by the end of the forecast period.

Risks to the inflation outlook remain tilted to the downside, particularly in the euro area. Market-based measures of euro-area inflation expectations remain at still-low levels, despite having risen considerably of late (see bottom-left figure on the next page). In addition, survey-based measures of long-term inflation expectations have continued to trend down amid elevated concerns that the COVID crisis and its depressing effect on output and prices will lead inflation expectations of firms and households to become

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[1] This measure follows similar methodology implemented by Research and Statistics for the U.S. PCE price index and documented in Matteo Luciani (2020), "Common and Idiosyncratic Inflation," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, May 5), https://doi.org/10.17016/2380-7172.2508.

unanchored from the European Central Bank's (ECB) inflation target. The ECB Survey

of Professional Forecasters for longer-term inflation expectations (four to five years

ahead) shows a mean forecast of 1.6 percent in the third quarter of 2020, which

represents a historical low. Moreover, perceived downside risks to longer-run inflation

expectations have increased significantly, with 20 percent of respondents expecting long-

run inflation to be below 1 percent. Going forward, we and outside analysts expect euro-

area inflation to be well under the ECB's target of below, but close to, 2 percent for years

to come.

Inflation in the Advanced Foreign Economies
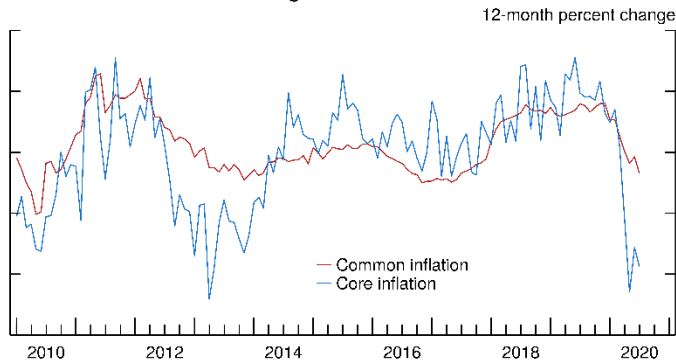
Source: Federal Reserve Board staff estimates

Inflation in the Advanced Foreign Economies
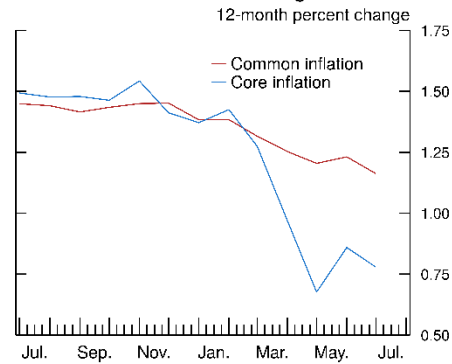
Source: Federal Reserve Board staff estimates

Long-Term Inflation Expectations in the Euro Area
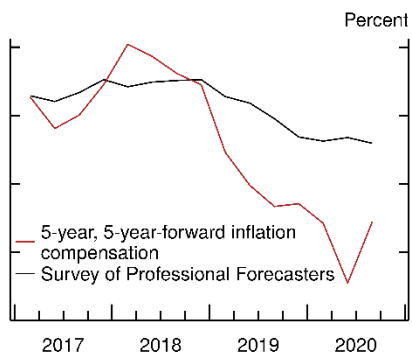
Note: The Survey of Professional Forecasters is the mean of point forecasts for headline inflation 4 to 5 years ahead of survey respondents. Inflation compensation is for Germany.
Source: Federal Reserve Board staff estimates.

Distribution of Longer-Term Inflation Expectations in the Euro Area
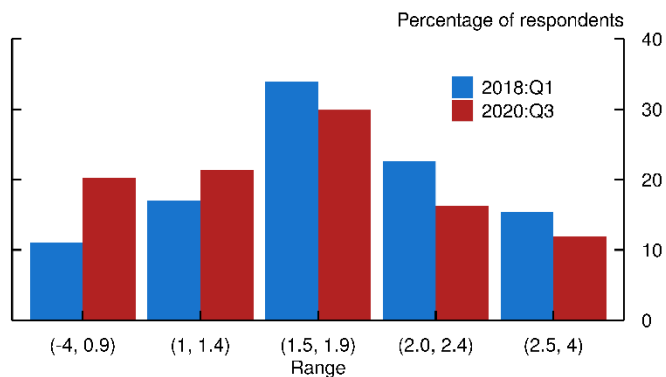
Note: The Survey of Professional Forecasters asks respondents to report their point forecasts for headline inflation 4 to 5 years ahead. The percentage of point forecast responses are within certain bins.
Source: Federal Reserve Board staff estimates.

Int'l Econ Devel & Outlook

Regional Developments and Outlook

ADVANCED FOREIGN ECONOMIES

- ***Euro Area.*** Real GDP plunged 40.3 percent at an annual rate (a.r.) in the second quarter, reflecting lockdown measures that restrained economic activity early in the spring. As nonessential businesses reopened and social-distancing measures eased, economic activity has picked up. Indeed, recent indicators through August—including retail sales, industrial production, and purchasing managers indexes (PMIs)—are consistent with a very large, albeit partial, 40 percent rebound in the level of GDP, 14 percentage points stronger than in the July Tealbook. However, the reopening of businesses and travel also brought flare-ups in COVID-19 cases, especially in France and Spain. With governments showing no signs of implementing widespread lockdowns and mobility data only edging down in the region, we expect the economic toll of this flare-up to be much smaller than in the spring. Accordingly, we modestly marked down the forecast for the fourth quarter, with larger downward revisions in France and Spain. All told, for 2020 as a whole, we see growth at negative 6 percent, up 0.3 percentage points since the July Tealbook, and the level of GDP returning to its pre-COVID-19 level only in mid-2022.

  The euro-area recovery should benefit from strong policy support. We estimate that fiscal policy will provide a 4 percent boost to GDP this year and only a small drag next year, as governments provide some additional stimulus. Short-term work programs, which have helped contain the increase in unemployment to only 7.9 percent, have already been extended in Germany and Italy through 2020 and 2021, respectively, and other countries are likely to follow suit. In addition, the resources of the European Union (EU) recovery package of €750 billion (about 5 percent of EU GDP) should become available sometime in 2021. We expect governments to lower the generosity of their programs over time, but we only see a small likelihood of a fiscal cliff. On the monetary policy front, we estimate that ECB actions, including asset purchases and funding for lending, will boost the level of GDP over the 2020–22 period about 1 percent. Notwithstanding this policy support, we see the ECB struggling to materially move inflation expectations and inflation to near target. Accordingly, we forecast inflation to recover slowly, rising to only 1.3 percent in 2023 from its 12-month rate of negative 0.2 percent in August.

- ***United Kingdom.*** GDP nosedived 59.8 percent (a.r.) in the second quarter, the deepest quarterly contraction among the advanced economies, largely as a result of the relatively long lockdown imposed by the U.K. authorities to contain the COVID-19 pandemic. Restrictions started being lifted in mid-May and, accordingly, activity began to recover. Recent indicators—including solid monthly GDP for June, retail sales in July, and stronger-than-expected PMIs through August—point to a rapid, though still partial, recovery. Furthermore, the labor market remained unexpectedly resilient, with the unemployment rate holding at its pre-COVID-19 level of 3.9 percent through June. The surprisingly strong tone of the incoming data led us to mark up our third-quarter growth forecast substantially to almost 80 percent. Even with this extraordinary bounceback, and notwithstanding a 6.3 percent boost from fiscal policy, we expect GDP to contract 8.3 percent in 2020. Although we expect the recovery to continue next

year, risks to the outlook are importantly tilted to the downside, in part because the lack of progress in U.K.–EU trade negotiations is making a "no trade deal" Brexit increasingly likely.

At its August 4 meeting, the Bank of England (BOE) updated its forward guidance to indicate that it does not intend to tighten its policy stance until significant progress is made in eliminating the output gap and its 2 percent inflation target is achieved sustainably. The BOE also signaled that there were no immediate plans to cut the policy rate further into negative territory. In line with this communication, and given our weak economic outlook for the United Kingdom, we expect the BOE to raise its policy rate from the current 0.1 percent only in 2023.

- *Japan.* Second-quarter GDP contracted 27.8 percent (a.r.), as social-distancing measures took a toll on household spending and the decline in global trade resulted in an unprecedented fall in Japanese exports. The GDP contraction was the largest quarterly decline in the postwar era and nearly 5 percentage points larger than we had expected in the July Tealbook. That said, it was smaller than in other major advanced economies, consistent with Japan's relatively less severe COVID-19 experience. Incoming data, including consumer confidence and PMIs through August, point to a bounceback in the current quarter, though not as strong as in other countries, perhaps reflecting a temporary resurgence of new cases, which, though still at low levels compared with Europe, exceeded the peak for Japan in the spring. We now expect GDP to contract 4.3 percent this year, 1.2 percentage points lower than in the July Tealbook. Going forward, we expect real GDP growth of just 3.8 percent in 2021, a modest recovery consistent with Japan's chronically low potential growth rate.

  Prime Minister Shinzo Abe announced in late August that he is stepping down as prime minister a year before the end of his term for health reasons. With Abe's long-time ally Yoshihide Suga favored to win the elections for the governing-party leader scheduled on September 14, we do not currently foresee that the succession will substantially change government policies. However, this development adds further uncertainty to the Japanese outlook.

- *Canada.* GDP contracted 38.7 percent (a.r.) in the second quarter, reflecting both the effects of social-distancing measures on economic activity and the collapse in global oil markets. However, monthly GDP data indicate that a robust recovery has been under way since May—with the July official nowcast surprising us to the upside by reporting 3 percent growth (monthly rate)—and the COVID-19 outbreak appears to have been fairly well contained. Labor market conditions have also improved notably, with nearly two-thirds of the employment losses in March and April recovered through August. In addition, the government announced in August a new set of stimulus measures (of around 1¾ percent of GDP) to continue supporting workers affected by COVID-19.

  We expect GDP to rise 24 percent in the second half of the year, 5.5 percentage points stronger than in the July Tealbook, with some of the revision due to the faster projected U.S. recovery. We see GDP recovering to its pre-COVID level only in the second half of 2021, as consumer spending is restrained by the cautious behavior of households and the low level of oil prices weighs on exports and investment.

Int'l Econ Devel & Outlook

EMERGING MARKET ECONOMIES

- **China.** After fully returning to its pre-COVID-19 level in the second quarter, Chinese GDP appears to be expanding at a moderate pace this quarter. Industrial production held steady in July, and the PMIs through August continue to indicate moderate growth. Easy liquidity conditions and low interest rates are supporting a recovery in auto demand and a rebound in the property market, while fiscal stimulus is driving a surge in infrastructure investment. In addition, we see further gains in production and exports in the second half of the year as economies across the globe rebound from their lockdowns. That said, the recovery in consumption continues to lag, likely reflecting a lack of fiscal support for households and continued social distancing. All told, we expect Chinese GDP growth to average around 9 percent in the second half of the year and return to its pre-COVID projected growth rates over the rest of the forecast period. A resurgence of U.S.–China trade tensions represents a key downside risk to the Chinese outlook.

- **Asia ex. China.** Real GDP in the region contracted 24.7 percent (a.r.) in the second quarter, more than we expected, reflecting very sharp declines in some countries in the region that imposed economy-wide lockdowns to contain the virus—notably India, which contracted at a stunning 68.4 percent annual rate. By contrast, Hong Kong, Korea, Taiwan, and Vietnam suffered less severe contractions as they were able to control the virus in its early stages with limited lockdowns and benefited from strong demand for high-tech equipment.

  Recent data on industrial production, PMIs, and exports point to a sharp though uneven rebound in the region. Taiwan and Vietnam are among only a handful of countries in the world expected to post positive growth for 2020. In Hong Kong and, to a lesser extent, Korea, an initially strong recovery has been set back by a second outbreak that has necessitated some reimposition of social-distancing measures (including school closures) and is hampering economic activity. Among countries that implemented strict lockdowns, some—such as Malaysia—have rebounded sharply as the virus has been brought under control, while others—such as India and the Philippines—have been less successful in containing the virus and are expected to experience slower momentum in the next few quarters.

  For the region as a whole, we now see GDP growing around 16.5 percent in the third quarter, substantially faster than in the July Tealbook projection, reflecting a sharper rebound from the larger-than-expected second-quarter declines. Growth continues to rebound in the fourth quarter as private consumption strengthens further and external demand picks up, and GDP is expected to reach its pre-virus level around mid-2021.

- **Mexico.** Real GDP contracted an unprecedented 52.7 percent (a.r.) in the second quarter amid COVID-19-related restrictions, scant fiscal support, and lower U.S. demand. Recent indicators, such as PMIs, data on vehicle production, and exports, suggest that industrial production took off in June and July, helped by the pickup in U.S. demand. However, the weakness in retail sales and services activity indicates that the paucity of fiscal support is curtailing the recovery of household demand. In addition, while the spread of the virus as measured by official data has been stabilizing of late, lack of testing suggests that these statistics are likely to underestimate the number of infections, raising questions about the extent to which authorities have brought the virus under control. Overall, while the normalization of U.S. manufacturing output should

support Mexican industrial activity, other data indicate a more sluggish recovery, falling short of making up for the larger-than-expected contraction in the second quarter. All told, we expect the Mexican economy to contract 8.2 percent this year, notably worse than the July Tealbook forecast, and to remain about 8 percentage points below the level projected in the January Tealbook at the end of 2022.

- **Brazil.** GDP contracted 33.5 percent (a.r.) in the second quarter—a record contraction but less than other countries in the region due, in part, to stronger fiscal stimulus and relatively fewer restrictions on mobility during the pandemic. Moreover, recent monthly data (such as PMIs, electricity consumption, industrial production, and retail sales) portend a faster-than-expected recovery. The recovery is being supported by fiscal stimulus measures—especially monthly emergency aid payments to lower-income households—that have boosted consumer spending. In addition, the number of new daily cases of COVID-19 has shown signs of stabilizing in recent weeks, albeit at a deleteriously high level. Notwithstanding these positive developments, Brazilian assets came under renewed pressure in the intermeeting period, as concerns rose about the government's commitment to fiscal consolidation and reform ahead of the 2022 elections and given bloated public debt that is set to rise above 100 percent of GDP this year. All told, we expect the economy to contract 7 percent this year—a larger contraction than in the July Tealbook as a result of revisions to past data—and expand a meager 3.6 percent next year, with the government ultimately removing some stimulus to avoid a large investor pullback.

- **Turkey.** Turkish assets came under considerable pressure in the intermeeting period, reflecting unsustainable monetary and credit expansion policies. These policies, together with a large drop in tourism revenues, caused the current account deficit to swell, putting downward pressure on the lira. To defend the currency, the Central Bank of the Republic of Turkey (CBRT) intervened heavily in the foreign exchange market, further depleting its foreign exchange reserves, which largely consist of foreign currency borrowed from Turkish banks via short-term swaps. Although the CBRT was reluctant to increase its main policy rate, it reduced the amount of liquidity it provided to the banking system, which helped stabilize the lira. While not imminent, risk of a financial crisis in Turkey is higher, especially if the authorities maintain the current policy mix.
Return to International text

Int'l Econ Devel & Outlook

Recent Communications by Major Foreign Central Banks

The initial market disruptions, unprecedented decline in economic activity, and degree of uncertainty associated with the COVID-19 recession have posed significant policy and communication challenges for policymakers around the world. This discussion reviews the evolution of communications by major foreign central banks during the current recession, with a focus on how central banks have described uncertainty around their economic outlooks, how they have provided guidance about the future stance of monetary policy, and how their communications about asset purchases have evolved.

This past spring, as the virus spread and governments implemented strict lockdown measures, many major foreign central banks refrained from publishing economic forecasts. Before the COVID pandemic, most central banks had typically published a baseline forecast and a range of uncertainty. In the spring of this year, foreign central banks instead released illustrative scenarios to communicate the extraordinary degree of uncertainty around the outlook without making a commitment to a baseline (table 1).[1] As health and economic conditions have begun to improve, some central banks, including the Bank of Japan (BOJ) and the Bank of England (BOE), have recently reverted to pre-COVID communication formats. The European Central Bank (ECB) and the Reserve Bank of Australia (RBA), however, have continued to present only scenarios around the baseline. All major central banks continue to highlight a sizable degree of uncertainty and downside risks to the outlook.

Central banks have also provided information about the future stance of policy through enhanced guidance on policy rates and asset purchases. In addition to bringing policy rates to their effective lower bound (ELB), central banks have indicated that they will remain low for an extended period (table 2). In most cases, exit from the ELB is linked to progress in sustainably achieving the inflation objective, typically specified at a 2 percent target (outcome-based forward guidance). The BOE, Bank of Canada (BOC), and RBA also mentioned improvements in terms of economic slack or employment as an additional condition for exiting the ELB without providing numerical targets.

Table 1: Macroeconomic Forecasts of Major Foreign Central Banks

Central bank	Pre-COVID-19	Spring 2020*	Current**
ECB	Baseline with uncertainty range	Three scenarios for GDP only	Baseline and two scenarios No uncertainty range
BOJ	Range with median	Range with no median	Same as pre-COVID-19
BOE	Baseline with uncertainty range	Scenario for GDP and inflation No baseline or uncertainty range	Same as pre-COVID-19
BOC	Baseline	Two scenarios for GDP and inflation No baseline	Central scenario Range of scenarios from April report
RBA	Baseline with uncertainty range	Baseline and two scenarios No uncertainty range	Baseline and two scenarios No uncertainty range

Note: Macroeconomic forecasts typically include projections for gross domestic product (GDP), inflation, and the unemployment rate. The Bank of Japan (BOJ) does not produce an unemployment rate forecast. The European Central Bank (ECB) typically publishes only a baseline unemployment rate forecast, without an uncertainty range.
* ECB: May 7, 2020 (off cycle); BOJ: May 1, 2020; Bank of England (BOE): Apr. 15, 2020; Bank of Canada (BOC): Apr. 28, 2020; and Reserve Bank of Australia (RBA): May 8, 2020.
** ECB: July 16, 2020; BOJ: July 15, 2020; BOE: Aug. 6, 2020; BOC: July 15, 2020; and RBA: Aug. 7, 2020.
Source: National central banks.

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[1] Published forecasts typically reflect the views of policymakers. The exceptions are the ECB and RBA, where forecasts reflect the views of their staff.

Table 2: Recent Forward Guidance on Policy Stance

Central bank	Policy rates	Post-COVID-19 crisis asset purchases
ECB	**Outcome based:** ". . . until we have seen the inflation outlook robustly converge to a level sufficiently close to, but below, 2% within our projection horizon."	**Calendar based:** "We will conduct net asset purchases under the PEPP until at least the end of June 2021."
BOJ	**Open ended:** ". . . it expects short- and long-term policy interest rates to remain at their present or lower levels."	**Outcome based:** ". . . until the year-on-year rate of increase in the observed consumer price index (CPI, all items less fresh food) exceeds 2 percent and stays above the target in a stable manner."
BOE	**Outcome based:** ". . . until there is clear evidence that significant progress is being made in eliminating spare capacity and achieving the 2% inflation target sustainably."	**Calendar based:** "The Committee continued to expect the UK government bond asset purchase programme to be completed, and the total stock of purchases to reach £745 billion, around the turn of the year."
BOC	**Outcome based:** ". . . until economic slack is absorbed so that the two percent inflation target is sustainably achieved."	**Outcome based:** "This QE program is making borrowing more affordable for households and businesses and will continue until the recovery is well underway."
RBA	**Outcome based:** ". . . until progress is being made towards full employment and it is confident that inflation will be sustainably within the 2–3 percent target band."	**Outcome based:** ". . . until progress is being made towards the goals for full employment and inflation."

Note: Dates of selected excerpts are European Central Bank (ECB): July 16, 2020; Bank of Japan (BOJ): July 15, 2020; Bank of England (BOE): Aug. 6, 2020; Bank of Canada (BOC): July 15, 2020; and Reserve Bank of Australia (RBA): Sept. 1, 2020. The BOJ was conducting yield curve control before the COVID-19 shock. In response to the COVID-19 shock, the BOJ has stated it would conduct additional purchases of commercial paper and corporate bonds. These purchases will continue until the end of March 2021. PEPP is Pandemic Emergency Purchase Programme. QE is quantitative easing.
Source: National central banks.

By contrast, the BOJ continued to signal that rates would remain at their present or lower levels (open-ended forward guidance). The Reserve Bank of New Zealand (RBNZ) and the Norges Bank indicated that their policy rates would remain low through March 2021 and the end of 2022, respectively (calendar-based forward guidance).

Consistent with central banks' forward guidance, expectations about the future level of policy rates have declined markedly. Market-implied policy rates at the end of 2022 declined sharply at the onset of the recession for the BOE and BOC, as these central banks also cut policy rates and announced other crisis-response measures (see figure). Market-implied policy rates for the BOJ and ECB have been little changed, as these central banks were already at their perceived ELBs.

Several central banks also introduced or expanded asset purchase programs in response to the deterioration of financial market conditions observed in the spring. Since then, communication about asset purchases by some central banks has moved away from emphasizing the goal of restoring market functioning toward explicitly recognizing the need for monetary stimulus in support of the recovery. Accordingly, since June, major central banks have expanded purchases (the ECB, BOE, Riksbank, and RBNZ), extended the duration of purchases (the ECB and Riksbank), or signaled a preference to make further use of the balance sheet if additional policy accommodation is required (the ECB and Riksbank). Reportedly, foreign central banks have not materially changed the maturity compositions or patterns of asset purchases as they moved toward emphasizing stimulus in their communications.

Policy Rate Expectations Based on Overnight Index Swap, December 2022

Source: Bloomberg.
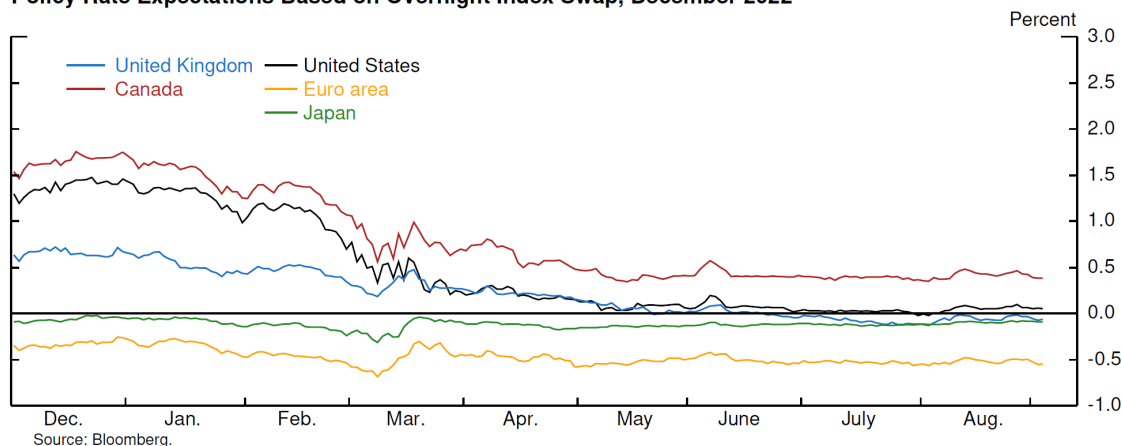
Guidance on asset purchases varies across institutions. The ECB, BOE, and Riksbank have specified amounts of bond purchase programs and timelines for completion (calendar based). The BOC and RBA have provided guidance on asset purchases in terms of progress toward their mandated goals, consistent with the guidance on rates. The BOJ's stance remains outcome based—with an aim to achieve the 2 percent target—but additional purchases of commerical paper and corporate bonds, which account for a small share of the asset purchase program, will last through March 2021. The RBNZ has twice increased the size of its large-scale asset purchase program and has left guidance on future adjustments open ended. Except for the RBNZ, central banks have generally indicated that asset purchases are expected to end before policy rates increase.

Initial announcements of asset purchase programs focused on addressing market functioning, in conjuction with rate cuts and other actions, generally elicited notable market reaction. Immediate declines in euro-area sovereign yields were particularly large, as the timing, size, and composition of announced ECB purchases across euro-area countries surprised market participants (table 3). Italian sovereign bond yields fell a whopping 99 basis points on the March 18 announcement, as the ECB emphasized that purchases would be directed at countries under pressure.

Subsequent expansions of asset purchases have been met by more muted market reaction. For instance, recent announcements of balance sheet expansions by both the ECB and BOE had little effects on 2- and 10-year yields, as market functioning had been largely restored and these stimulus-oriented announcements were, in part, expected.

Recent communication by central banks continues to emphasize their readiness to use the tools at their disposal to meet their mandated goals. Specifically, the BOE and RBNZ have noted the possibility of negative interest rates as a policy option. Other foreign central banks appear reluctant to go down this path, including the BOC, RBA, and Riksbank. The RBA was the second major foreign central bank (after the BOJ) to adopt yield curve control. More generally, a few central banks are reviewing their frameworks. The ECB is reviewing its monetary policy strategy, which could provide further enhancements to its policy framework and communication. Earlier this year, the BOE also announced its intention to evaluate its monetary policy framework. The BOC's scheduled five-year review will conclude in 2021.

Table 3: Initial Market Reaction to Announcements of Asset Purchase Programs

Central bank	Size of asset purchases (billions)	Share of 2019 GDP (percent)	Annoucement date (2020)	Currency^ (percent)	2-year yield^^ (basis points)	10-year yield^^ (basis points)
ECB	€750	6.3	Mar. 18*	-.4	-19	-36
ECB	€600	5.0	June 4	.5	0	-5
BOE	£200	9.0	Mar. 19	.1	-12	-10
BOE	£100	4.5	June 18	-.3	2	4

Note: Market reaction captured changes in asset prices in a 2-hour window, starting 15 minutes before the release to 1.45 hours after the release. GDP is gross domestic product. ECB is European Central Bank. BOE is Bank of England.

^ Positive denotes appreciation of local currency against the dollar.

^^ For the ECB, changes refer to GDP-weighted average changes in sovereign yields for Germany, France, Italy, and Spain.

* Annoucement occurred during local market closures; changes in sovereign yields were estimated using the differences between closing and next days' opening prices.

Source: National central banks; Bloomberg; Federal Reserve Board staff calculations.

Int'l Econ Devel & Outlook

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Int'l Econ Devel & Outlook

Comparing the Staff International Growth Outlook with Other Forecasts

Both outside forecasters and the Board's staff expect the foreign economy to recover in the second half of this year and into next year after a deep recession in the first half. As shown in the first row of the table, the staff sees total foreign gross domestic product in 2020 contracting at a similar pace to the rate estimated by Consensus Economics but noticeably less than projected by the International Monetary Fund (IMF). Some of this difference is due to timing: The IMF released its forecasts in June, while Consensus Economics published its forecasts in August and the staff forecasts are from the current Tealbook. For 2021, the Board forecasts a stronger recovery than projected by both Consensus Economics and the IMF, especially for emerging market economies.

Professional forecasts collected by Consensus Economics continue to have sizable ranges, as uncertainty surrounding the outlook remains elevated. However, the dispersion of forecasts has narrowed somewhat for major economies since the spring. As of August, the forecasts for 2020 growth range from negative 11.0 percent to negative 6.3 percent for the euro area and run from positive 0.5 percent to positive 3.3 percent for China.

Following unparalleled markdowns in the 2020 projections of the staff and outside forecasters over the spring, revisions have been more moderate on net. The staff's forecast for the aggregate foreign economy, like those of Consensus Economics, is little changed on net since the July Tealbook for both 2020 and 2021, as shown in panel A on the next page. Panel B shows that outside forecasters, like the staff, continue to expect a long recovery, with only a partial rebound in growth next year. Return to International text

Comparison of Foreign Real GDP Forecasts

| | Year-over-year percent change | | | | | | Q4-over-Q4 percent change | |
| | 2020 | | | 2021 | | | 2020 | 2021 |
	FRB	IMF	Consensus	FRB	IMF	Consensus	FRB	FRB
1. Total foreign	-6.2	-7.2	-6.1	5.6	4.9	4.9	-4.5	4.9
2. Advanced foreign economies	-6.7	-8.8	-7.0	5.4	5.1	5.1	-4.9	4.7
3. Canada	-5.6	-8.4	-6.4	5.5	4.9	5.3	-3.6	4.2
4. Euro area	-8.0	-10.2	-7.9	6.2	6.0	5.7	-6.0	5.6
5. Japan	-5.9	-5.8	-5.3	3.3	2.4	2.5	-4.3	3.8
6. United Kingdom	-10.4	-10.2	-9.9	5.8	6.3	6.4	-8.3	4.7
7. Emerging market economies	-5.7	-5.5	-5.3	5.9	4.6	4.7	-4.0	5.2
8. China	1.4	1.0	2.1	9.7	8.2	7.8	4.8	6.2
9. Emerging Asia ex. China	-3.3	-2.6	-3.3	5.8	4.5	4.5	-2.8	6.3
10. Mexico	-10.3	-10.5	-9.6	4.8	3.3	3.6	-8.2	4.2
11. Brazil	-6.7	-9.1	-6.2	2.6	3.6	3.2	-7.0	3.6
Memo								
Emerging market economies ex. China	-7.2	-6.9	-6.8	5.1	3.9	4.0	-5.7	5.0
United States	-3.9	-8.0	-5.2	3.8	4.5	4.0	-3.2	4.2

   Note: Gross domestic product (GDP) aggregates are weighted by shares of U.S. nonagricultural exports. India is excluded from all year-over-year forecast aggregates, as Consensus Economics reports Indian growth on a fiscal year basis. Federal Reserve Board (FRB) forecasts are from the current Tealbook. International Monetary Fund (IMF) forecasts are from the June 2020 *World Economic Outlook* update for almost all countries. Consensus Economics' forecasts were published on August 13 for advanced economies and Asian countries, August 19 for Russia, and August 20 for Latin American countries.
   Source: Federal Reserve Board Tealbook forecasts; International Monetary Fund; Consensus Economics.

Int'l Econ Devel & Outlook

Evolution of Foreign Growth Forecasts

A. Forecasts of 2020 Real GDP

Year-over-year percent change

Consensus Economics
International Monetary Fund
Federal Reserve Board

2018   2019   2020
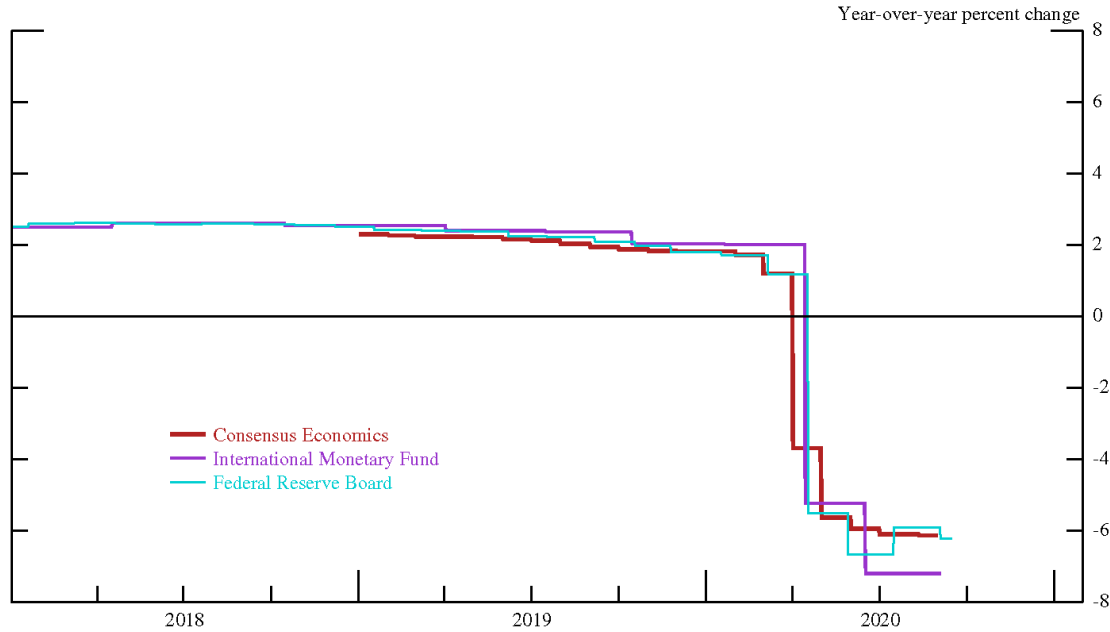
B. Forecasts of 2021 Real GDP
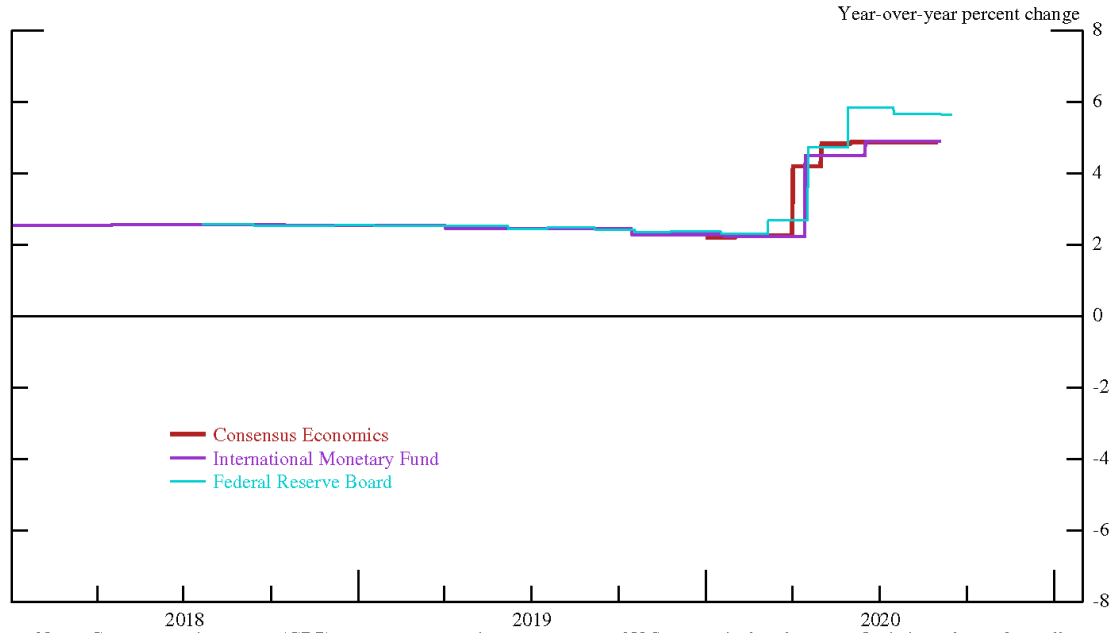
Year-over-year percent change

Consensus Economics
International Monetary Fund
Federal Reserve Board

2018   2019   2020

Note: Gross domestic product (GDP) aggregates are weighted by shares of U.S. nonagricultural exports. India is excluded from all year-over-year forecast aggregates, as Consensus Economics reports Indian growth on a fiscal year basis. Federal Reserve Board (FRB) forecasts are from the current Tealbook. International Monetary Fund (IMF) forecasts for almost all individual countries are from the June 2020 *World Economic Outlook* update. Consensus Economics' forecasts were published on August 13 for advanced economies and Asian countries, August 19 for Russia, and August 20 for Latin American countries. Consensus Economics began forecasting 2020 only in 2019, and 2021 only in 2020. The FRB and IMF began forecasting 2020 and 2021 earlier.
    Source: Federal Reserve Board Tealbook forecasts; International Monetary Fund; Consensus Economics.

Int'l Econ Devel & Outlook

The Foreign GDP Outlook

Real GDP*   Percent change, annual rate**

	2019	2020 Q1	Q2	Q3	Q4	2021	2022	2023
1. Total foreign	1.3	-10.8	-34.7	30.5	9.7	4.9	2.9	2.8
Previous Tealbook	*1.3*	*-10.8*	*-29.3*	*20.3*	*10.1*	*5.4*	*2.8*	*...*
2. Advanced foreign economies	1.1	-9.2	-39.6	39.3	6.9	4.7	2.3	2.2
Previous Tealbook	*1.1*	*-9.2*	*-37.5*	*24.5*	*9.7*	*5.6*	*2.3*	*...*
3. Canada	1.5	-8.2	-38.7	44.5	6.4	4.2	2.6	2.5
4. Euro area	1.0	-13.6	-40.3	40.0	7.8	5.6	2.4	2.2
5. Japan	-.7	-2.5	-27.8	12.0	6.5	3.8	1.2	1.1
6. United Kingdom	1.1	-8.5	-59.8	79.4	7.2	4.7	2.2	2.1
7. Emerging market economies	1.4	-12.5	-29.4	22.2	12.7	5.2	3.4	3.3
Previous Tealbook	*1.4*	*-12.4*	*-20.1*	*16.2*	*10.6*	*5.1*	*3.4*	*...*
8. China	5.9	-36.3	59.1	9.2	9.0	6.2	5.6	5.5
9. Emerging Asia ex. China	1.7	-8.6	-24.7	16.5	11.4	6.3	3.7	3.5
10. Mexico	-.8	-4.6	-52.7	35.6	15.7	4.2	2.2	2.2
11. Brazil	1.6	-9.5	-33.5	21.0	2.8	3.6	2.8	2.6
Memo								
Emerging market economies ex. China	.5	-6.5	-40.4	25.1	13.5	5.0	2.9	2.8

* GDP aggregates weighted by shares of U.S. merchandise exports.
** Annual data are Q4 over Q4.
... Not applicable.

Total Foreign GDP

Percent change, annual rate

Foreign GDP
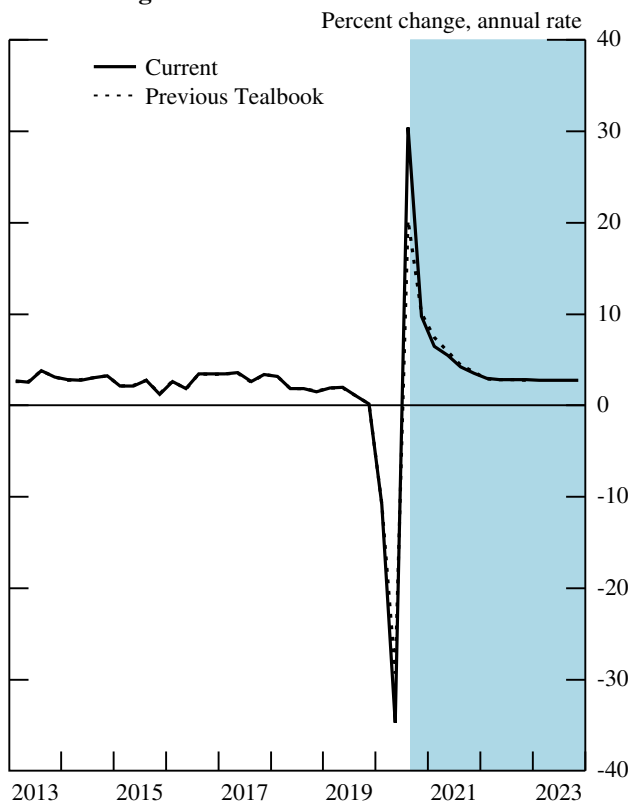
Percent change, annual rate
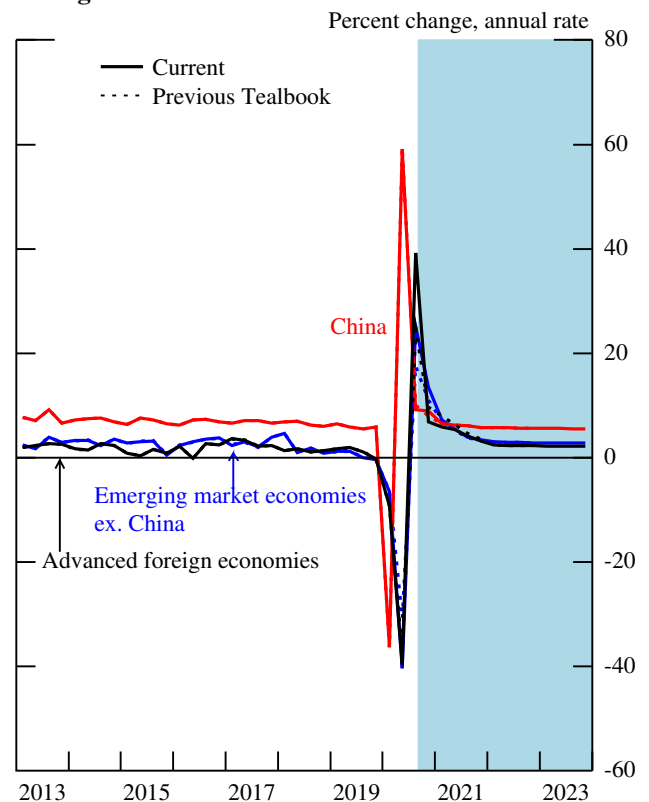
The Foreign Inflation Outlook

Consumer Prices*   Percent change, annual rate**

		2019	2020				2021	2022	2023
			Q1	Q2	Q3	Q4			
1.	Total foreign	2.4	2.4	-2.2	2.7	1.5	2.1	2.2	2.3
	Previous Tealbook	*2.4*	*2.4*	*-1.8*	*1.3*	*1.9*	*2.1*	*2.2*	*...*
2.	Advanced foreign economies	1.2	.6	-2.0	1.3	1.1	1.1	1.3	1.4
	Previous Tealbook	*1.2*	*.6*	*-2.0*	*1.0*	*1.4*	*1.1*	*1.3*	*...*
3.	Canada	2.1	.5	-3.3	1.1	1.3	1.6	1.8	2.0
4.	Euro area	1.0	.7	-1.4	1.5	1.6	1.0	1.1	1.3
5.	Japan	.5	.3	-1.0	1.1	.1	.4	.6	.8
6.	United Kingdom	1.4	2.0	-1.5	1.2	.8	2.0	1.7	1.9
7.	Emerging market economies	3.3	3.6	-2.2	3.7	1.8	2.7	2.8	2.9
	Previous Tealbook	*3.3*	*3.6*	*-1.7*	*1.6*	*2.3*	*2.7*	*2.8*	*...*
8.	China	4.2	4.2	-4.3	2.3	.7	2.5	2.5	2.5
9.	Emerging Asia ex. China	1.9	2.6	-3.6	3.4	1.8	2.4	2.6	3.0
10.	Mexico	2.9	3.3	2.0	6.6	2.9	3.2	3.2	3.2
11.	Brazil	3.4	4.9	-1.6	3.1	3.6	3.7	3.5	3.5
Memo									
	Emerging market economies ex. China	2.6	3.1	-.8	4.8	2.5	2.9	2.9	3.1

* CPI aggregates weighted by shares of U.S. non-oil imports.
** Annual data are Q4 over Q4.
... Not applicable.

Foreign Monetary Policy
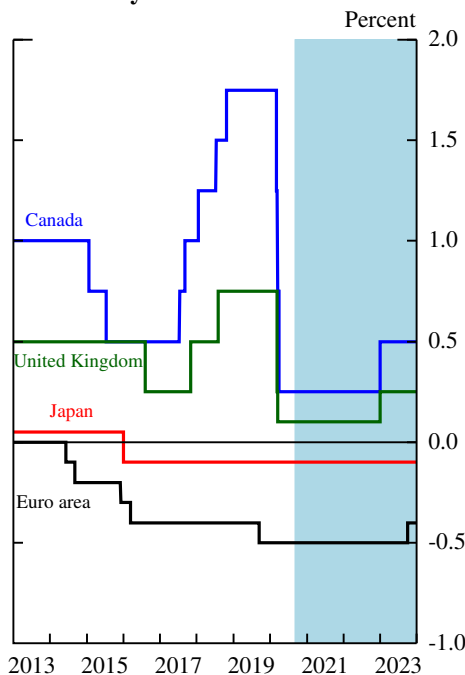
AFE Policy Rates   **AFE Central Bank Balance Sheets**   **EME Policy Rates**

* 1-year benchmark lending rate.
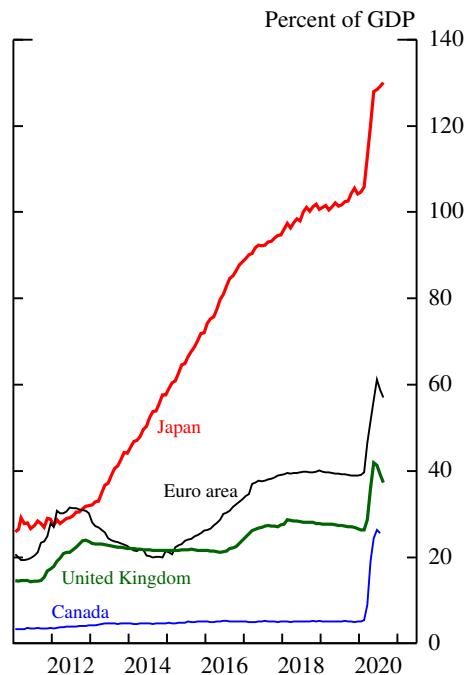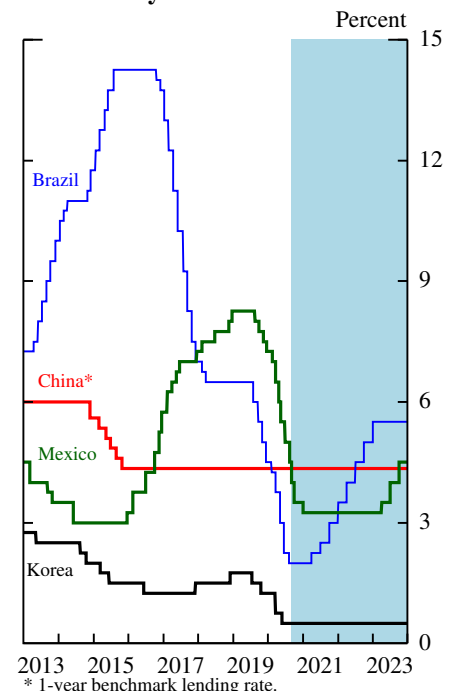
Recent Foreign Indicators

Nominal Exports

Jan. 2011 = 100

- Foreign
- AFE*
- EME**

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

Industrial Production

Jan. 2011 = 100

- Foreign
- AFE*
- EME**

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

Retail Sales

12-month percent change

- Foreign
- AFE*
- EME**

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

Manufacturing PMI

Diffusion index

- Foreign
- AFE*
- EME**

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

Consumer Prices: Advanced Foreign Economies

12-month percent change

- Headline*
- Core**

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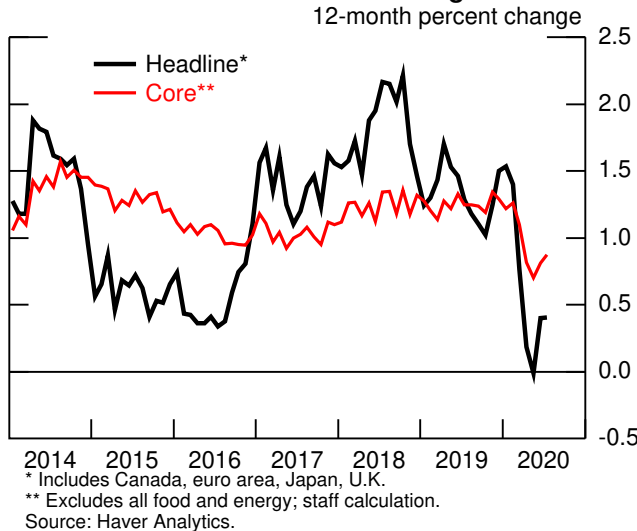
Consumer Prices: Emerging Market Economies

12-month percent change

- Headline*
- Ex. food--emerging Asia**
- Ex. food--Latin America**

* Includes Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Singapore, Taiwan, Thailand.
** Excludes all food; staff calculation. Latin America excludes Argentina and Venezuela.
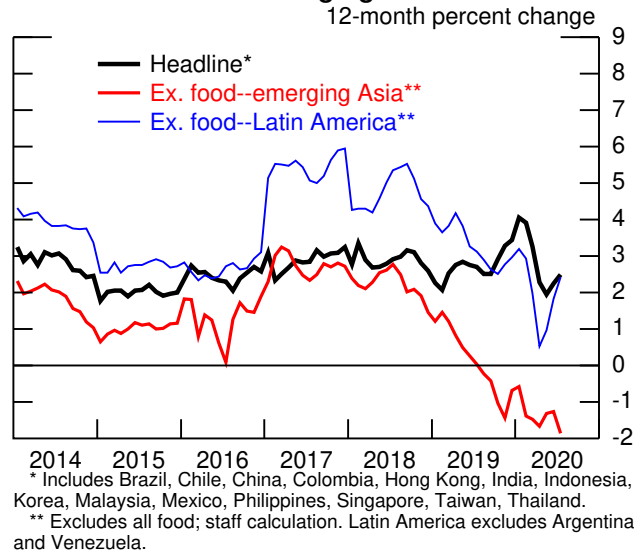
Note: Individual economies' data series may have more recent months than shown here.

Int'l Econ Devel & Outlook

Evolution of Staff's International Forecast

Total Foreign GDP
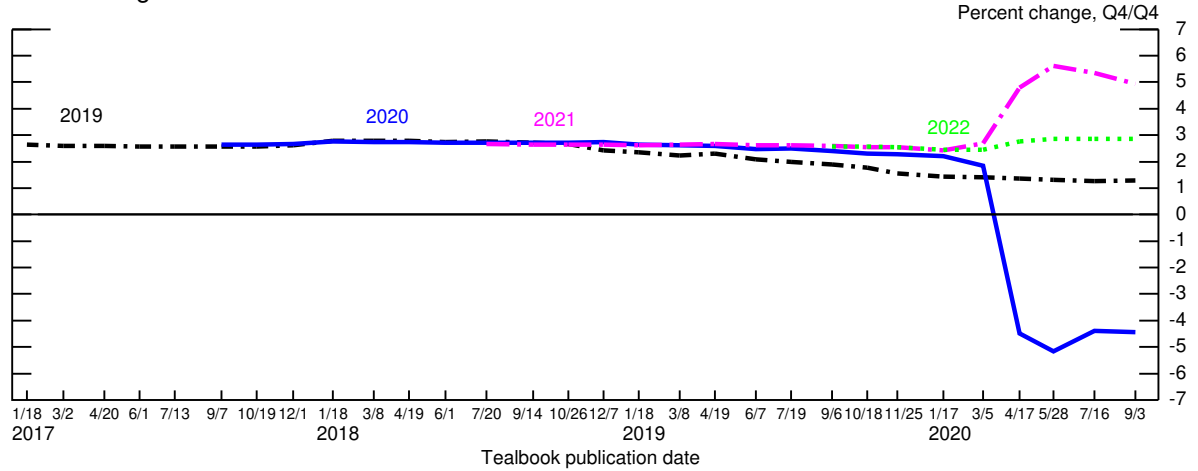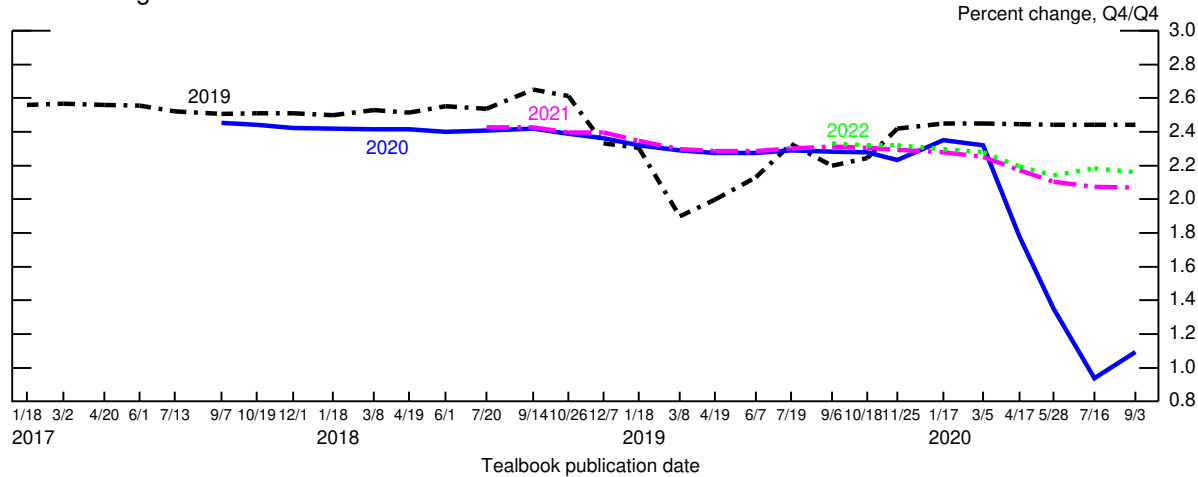
Percent change, Q4/Q4

2019

2020

2021

2022

Tealbook publication date

Total Foreign CPI

Percent change, Q4/Q4

2019

2020

2021

2022

Tealbook publication date

U.S. Current Account Balance

Percent of GDP

2019

2020

2021

2022

Tealbook publication date

Int'l Econ Devel & Outlook

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Int'l Econ Devel & Outlook
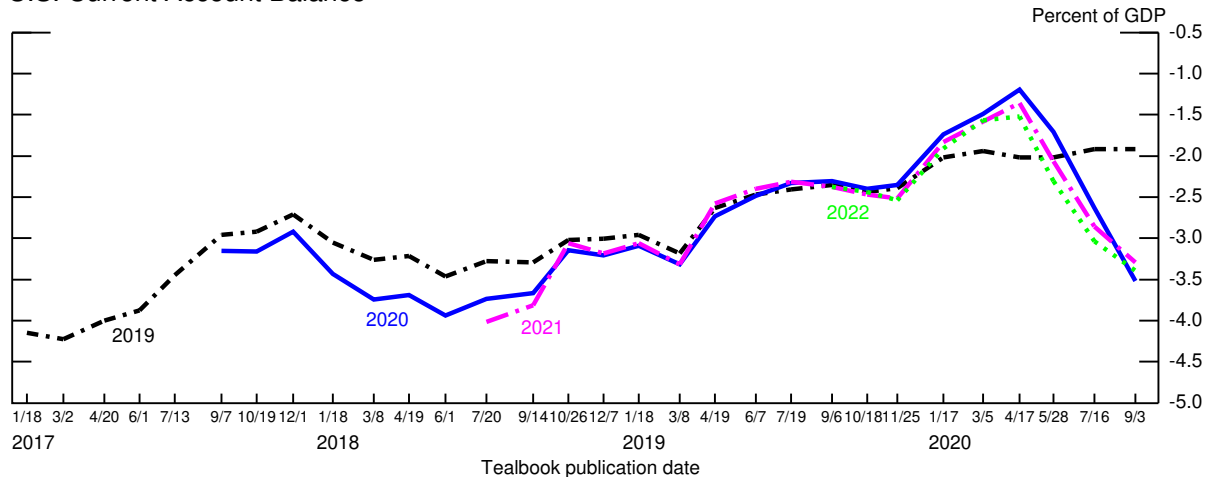
Financial Market Developments

Financial market sentiment improved over the intermeeting period, as the number of new COVID-19 cases in the United States declined and stronger-than-anticipated corporate earnings reports and domestic economic data releases likely boosted expectations about the speed of the recovery. All told, broad stock price indexes rose notably, on net, with technology-focused stocks accounting for roughly half of the increase. Stock price indexes rose even as implied volatility increased sharply and measures of downside risks in equity markets moved up somewhat. Inflation compensation also increased notably and now stands at pre-pandemic levels. Changes in other asset prices were generally more modest but consistent with improved sentiment: The Treasury yield curve steepened a little, spreads on speculative-grade corporate bonds narrowed moderately, and the dollar weakened modestly. Finally, the announcement of the average inflation-targeting framework was seen as broadly consistent with previous Federal Reserve communications.[1]

- Broad equity price indexes increased 7 percent, on net, with gains in most sectors. Spreads on investment- and speculative-grade corporate bonds narrowed 8 basis points and 23 basis points, respectively.

- The one-month implied volatility on the S&P 500 index (the VIX) increased sharply, on net, to 34 percent, with much of the increase occurring very late in the period. The level is its highest since mid-June and comparable to that seen in late December 2018. Additionally, the option-implied cost of insurance against large equity market declines increased somewhat.

- On net, 2-year nominal Treasury yields were little changed, and 10- and 30-year nominal Treasury yields increased 4 basis points and 10 basis points, respectively.

---

[1] This document describes financial market developments through September 3. On the morning of September 4, the August Employment Situation report was released. Although the report indicated, on balance, slightly stronger labor market performance than market participants had expected, limited reaction was evident in asset prices immediately following the release. Later in the morning, the S&P 500 index dropped as much as 3 percent at one point, continuing with the high stock market volatility of the previous trading day, although the drop appears to be unrelated to the report.

Financial Markets

Treasury Yields and Policy Expectations

Intraday Treasury Yields

Percent   Percent

July FOMC statement · June employment report · July CPI · July retail sales · July FOMC minutes · Chair's Jackson Hole Speech

10–year (right scale)

2–year (left scale)

Sept. 3

July 28 · July 31 · Aug. 5 · Aug. 10 · Aug. 13 · Aug. 18 · Aug. 21 · Aug. 26 · Aug. 31 · Sept. 3

2020
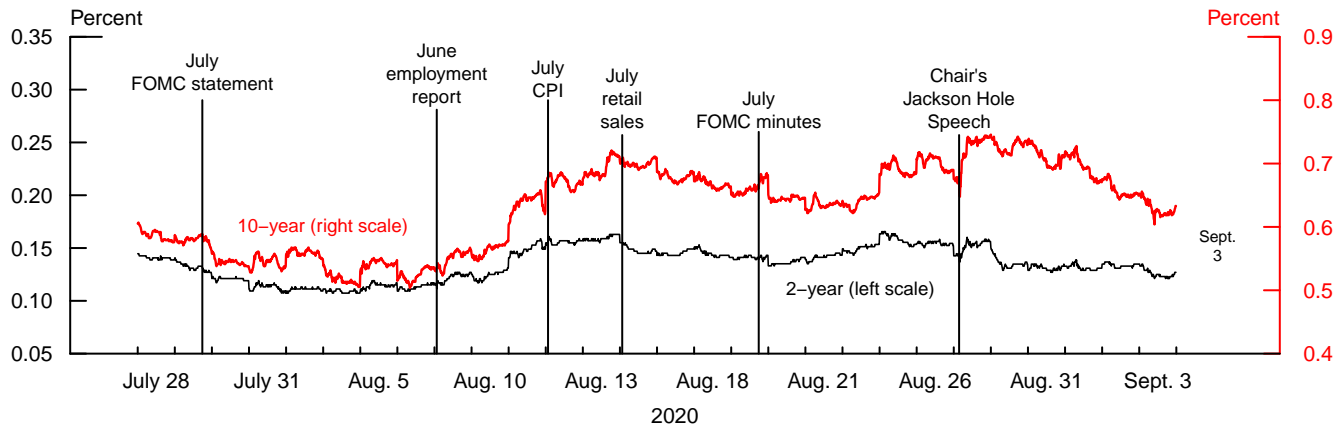
Note: Data are spaced at 5–minute intervals from 8:00 a.m. to 4:00 p.m.
Source: Bloomberg.

Treasury Yield Curve

Percent

—— Most recent: September 3, 2020
- - - Previous FOMC: July 28, 2020

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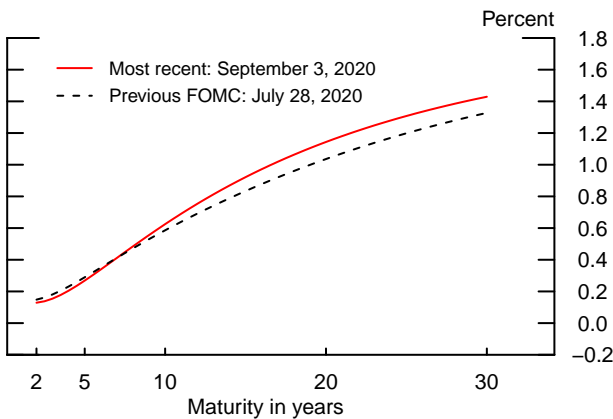
Note: Smoothed yield curve estimated from off–the–run Treasury coupon
securities. Yields shown are those on notional par Treasury securities with
semiannual coupons.
   Source: Federal Reserve Bank of New York; Board staff calculations.

Measure of Implied Volatility of 10–Year Treasury, 1 Month Ahead

Basis points

Daily   July FOMC

Sept. 3

2018 · 2019 · 2020
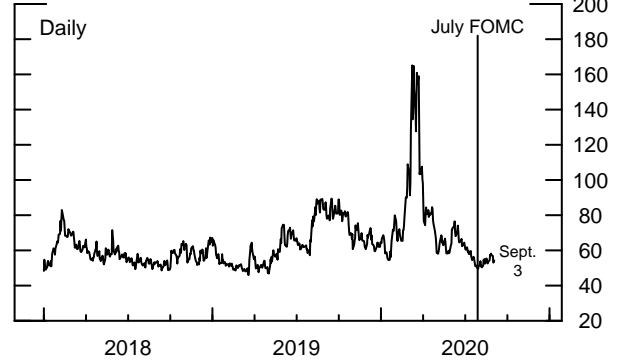
Note: Implied volatility is derived from 10–year, 1–month–ahead
swaptions.
   Source: Barclays.

TIPS–Based Inflation Compensation

Percent

Daily   July FOMC

5 to 10 years ahead

Next 5 years*

Sept. 3

2018 · 2019 · 2020
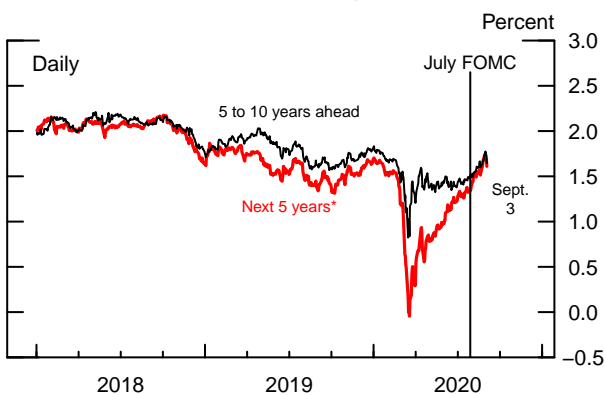
Note: Estimates based on smoothed nominal and inflation–indexed
Treasury yield curves.
   * Adjusted for lagged indexation of Treasury Inflation–Protected Securities
(TIPS) (carry effect).
   Source: Federal Reserve Bank of New York; Board staff calculations.

Implied Federal Funds Rate

Percent

—— Most recent: September 3, 2020
- - - Previous FOMC: July 28, 2020
◆ Blue Chip Financial Forecasts survey

Macro–finance model

With model–based
term premium

With zero
term premium

2020 · 2021 · 2022 · 2023
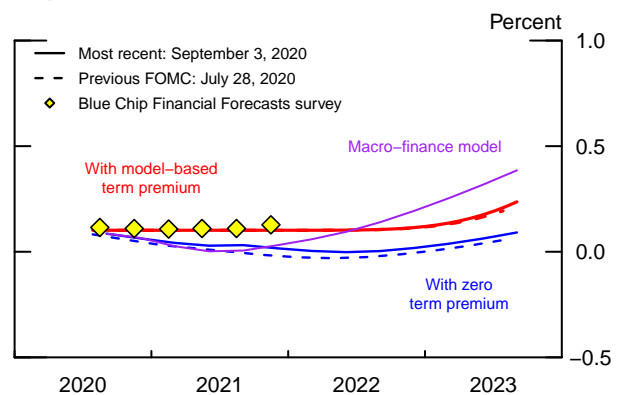
Note: Zero term premium path is estimated using overnight index swap
quotes with a spline approach and a term premium of 0 basis points.
Model–based term premium path is estimated using a term structure model
maintained by Board staff and corrects for term premiums. Macro–finance
model path is estimated using regressions of survey–OIS gaps on the
covariances between real and nominal variables. The Blue Chip path is the
average of respondents' expectations for the federal funds rate in the survey
published on September 1.
   Source: Bloomberg; Board staff calculations.

Financial Markets

- TIPS-based inflation compensation at the 5-year horizon rose 28 basis points, and 5-to-10-year inflation compensation increased 17 basis points. Both measures ended the period at roughly pre-pandemic levels.

- The expected federal funds rate based on a straight read of OIS quotes remains near the effective lower bound (ELB) through at least the first half of 2024. Adjusted for term premiums from staff models, the path is now expected to stay near the ELB at least until the end of 2022, although there is considerable uncertainty around this timing.

- Liquidity conditions continued to normalize and, while they have not returned to their pre-pandemic levels in several markets, functioning has been orderly.

- Most global equity price indexes rose a touch, although less than in the United States. Option-implied volatilities in global equity markets were little changed, on net, and remained above longer-term averages. The staff's broad dollar index declined modestly, consistent with the improvement in risk sentiment.

- Short-term funding markets were stable. Spreads on money market rates were generally little changed across the board, and the amount of Federal Reserve repo outstanding remained at zero.

DOMESTIC DEVELOPMENTS

Yields on 2-year nominal Treasury securities were little changed since the July FOMC meeting, while 10- and 30-year yields rose slightly. On net, 2-year Treasury yields decreased 2 basis points to 0.13 percent, while 10- and 30-year yields increased 4 basis points and 10 basis points, respectively, to 0.62 percent and 1.43 percent. Market commentary attributed the modest increases in longer-term yields to improved investor sentiment, which partly reflected the decline in new COVID-19 cases in the United States and stronger-than-expected economic data, although market reactions to economic data releases were limited. The near-dated implied volatility on 10-year Treasury securities was little changed over the intermeeting period and remained near the bottom of its historical range.

TIPS-based measures of inflation compensation over the next few years continued to increase, likely reflecting the general improvement in investor sentiment, some further

improvements in TIPS market liquidity, and the higher-than-expected July CPI release. The 5-year measure increased 28 basis points to 1.61 percent, while the 5-to-10-year measure increased 17 basis points to 1.65 percent. Both measures are now close to their pre-pandemic levels but are still in the lower end of their historical ranges. A staff model suggests that the majority of the increases were due to changes in risk premiums.

The expected path for the federal funds rate over the next few years, as implied by OIS quotes under the assumption of zero term premiums, was little changed, on net, since the July FOMC meeting and remains below 0.25 percent through at least the first half of 2024. Additionally, the average respondent to the September Blue Chip Financial Forecasts surveys expects a flat path near the ELB until the end of 2021, the extent of the survey's horizon. The staff's model-based measures that adjust for term premiums put the expected policy rate path near the ELB at least until the end of 2022.[2] That said, the staff estimates are surrounded by considerable uncertainty.

Over the intermeeting period, communications about monetary policy seemed to have had little effect on Treasury yields or the path of the federal funds rate. Communications on the day of the July FOMC meeting were reportedly viewed by market participants as in line with expectations. The July FOMC meeting minutes were seen as somewhat less accommodative than expected, with market commentary pointing to the lack of additional insight on the likely timing and content of changes to forward guidance, asset purchases, and the framework review ahead of the September meeting. The minutes also reportedly reinforced the view among market participants that the Committee is not expected to adopt yield curve caps or targets, at least for the time being. Later, the Chair's Jackson Hole speech and the Statement on Longer-Run Goals and Monetary Policy Strategy were seen as broadly in line with expectations, although earlier than expected by most. Following the speech and statement, market participants are reportedly attentive to any new information regarding specific details on any near-term changes to the stance of policy or the Committee's approach to flexible average inflation targeting, including any changes to forward guidance or asset purchases.

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[2] Market-implied forward rates referring to 2021, 2022, and 2023 were at times slightly negative over the intermeeting period, which suggests that investors attached some probability to negative federal funds rate levels. However, financial market quotes likely overstate the likelihood of such a scenario due to risk premiums; market commentary continues to suggest that investors place little probability on the FOMC adopting negative rates.

On net, broad stock price indexes increased notably over the intermeeting period, with the S&P 500 index gaining slightly more than 7 percent. At one point, the S&P 500 index was 11 percent higher than at the time of the July FOMC meeting, reaching all-time highs, before falling more than 3 percent on September 3. In addition to the strong economic news and other factors supporting financial market sentiment over the intermeeting period as a whole, equity prices were boosted by stronger-than-expected second-quarter corporate earnings news, which likely lifted investor expectations about the corporate outlook. Technology-sector stocks, which account for approximately 30 percent of the market capitalization of the S&P 500 index, saw the largest price gains, increasing 13 percent on net. (For a possible explanation for the strong performance of the technology sector, see the box "The Stock Market–Real Economy 'Disconnect': A Closer Look.") Stock prices in the consumer discretionary sector, which beat earnings expectations by a large margin, rose 11 percent on net.

Despite the large increase in equity prices, which historically tends to be accompanied by a decrease in volatility, the VIX increased sharply to 34 percent, its highest level since mid-June, after jumping at the very end of the period. Measures of longer-term downside risks in equity markets, such as the option-implied cost of insuring against a 10 percent decline in the S&P 500 index in three months, increased somewhat and are at levels comparable to those during the 2011 European debt crisis.

Spreads of investment- and speculative-grade corporate bond yields over comparable-maturity Treasury yields narrowed 8 basis points and 23 basis points, respectively. Spreads on corporate bonds rated triple-C and below declined 84 basis points. Overall, both investment- and speculative-grade corporate bond spreads currently stand at about the midpoints of their historical ranges, and spreads on bonds rated triple-C and below stand near their historical median. The Secondary Market Corporate Credit Facility continued purchases at a relatively modest pace, while no issuer has yet sold debt to the Primary Market Corporate Credit Facility.

In the municipal bond market, yield spreads on triple-A-rated bonds increased a bit, while spreads on triple-B-rated bonds declined somewhat. Spreads on both triple-A-rated and triple-B-rated bonds remained elevated relative to their historical ranges despite declining notably since March. During the intermeeting period, the Federal Reserve announced lower spreads for the Municipal Liquidity Facility, and one additional issuer used the facility, bringing the facility's total take-up to two issuers.

Financial Markets

Corporate Markets

Intraday S&P 500 Futures and 10-Year Treasury Yield

July 28, 2020 = 100

Percent

- July FOMC statement
- June employment report
- July CPI
- July retail sales
- July FOMC minutes
- Chair's Jackson Hole Speech
- S&P 500 (left scale)
- U.S. 10-year Treasury yield (right scale)
- Sept. 3
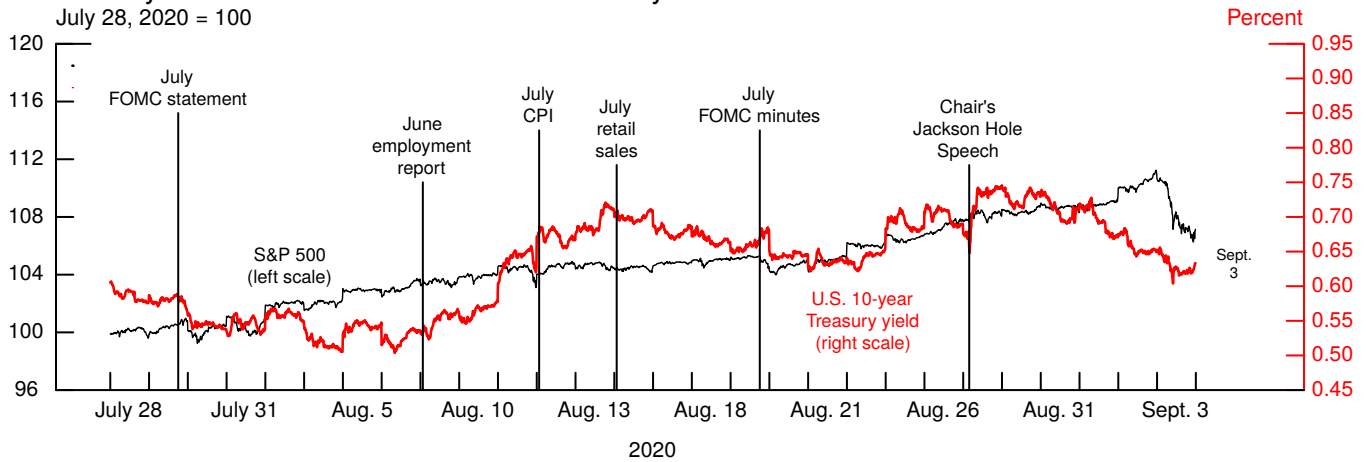
Note: Data are spaced at 5-minute intervals from 8:00 a.m. to 4:00 p.m.
Source: Bloomberg.

Stock Price Indexes

July 28, 2020 = 100

Daily

- July FOMC
- S&P 500
- S&P Consumer Discretionary
- S&P Tech
- Sept. 3

Source: Bloomberg.
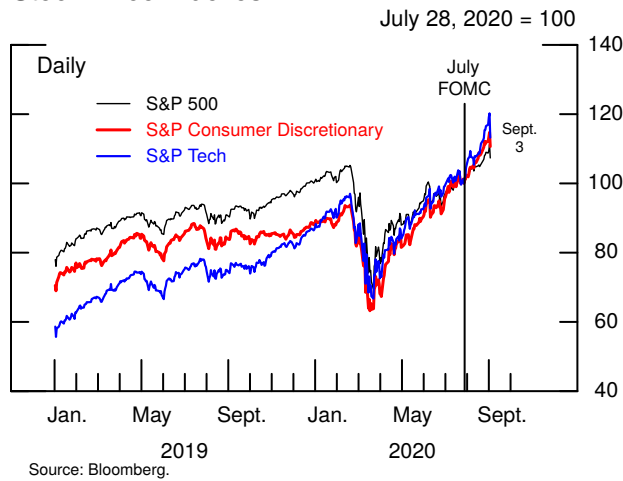
Implied Volatility on S&P 500 (VIX)

Percent

Daily

- July FOMC
- Sept. 3

Source: Chicago Board Options Exchange.
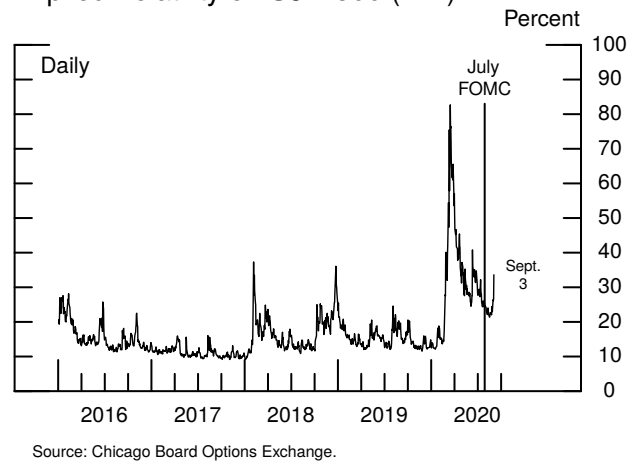
Cost of Insurance against 10% Price Changes over the Next 3 Months

Cents

Monthly Average

- Against a 10% decline*
- Against a 10% rise**
- July FOMC
- Sept. 3
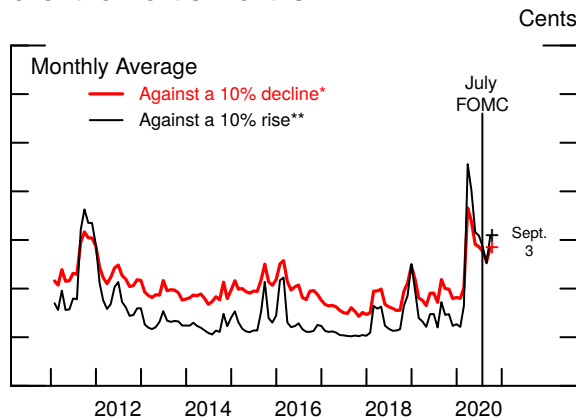
* Price of a binary option that pays $1 if the S&P 500 declines 10% or more over the next 3 months, and zero otherwise.
** Price of a binary option that pays $1 if the S&P 500 rises 10% or more over the next 3 months, and zero otherwise.
Source: Thomson Reuters.

10-Year Corporate Bond Spreads

Basis points   Basis points

Daily

- Triple-B (left scale)
- High-yield (right scale)
- July FOMC
- Sept. 3
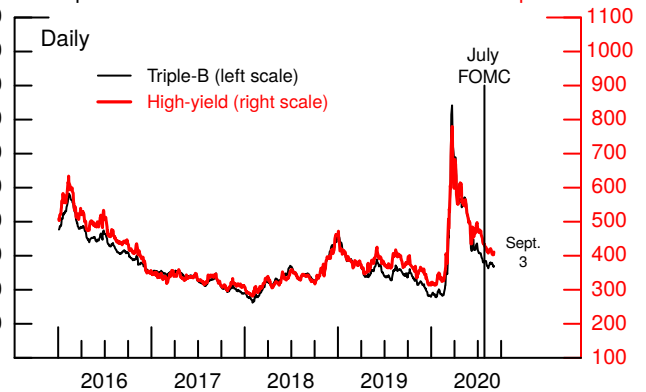
Source: Merrill Lynch; Federal Reserve Bank of New York; Board staff calculations.

Financial Markets

LIQUIDITY CONDITIONS IN DOMESTIC MARKETS

Measures of Treasury market liquidity for on-the-run securities were generally stable over the intermeeting period, and market functioning has remained orderly. Bid-ask spreads were little changed and stand near pre-pandemic levels. Market depth generally remained below pre-pandemic levels for longer tenors, particularly for the 30-year security. On-the-run liquidity premiums for the 10-year Treasury security remained near pre-pandemic levels, while the premium for the 30-year security continues to be somewhat elevated. The slower recovery in liquidity conditions for longer tenors is consistent with past episodes of deterioration in liquidity. Agency MBS market functioning remained in line with pre-pandemic conditions, although liquidity in some portions of the market—notably, for those securities excluded from Federal Reserve open market purchases—stayed below pre-pandemic levels.[3]

Liquidity conditions in equity markets improved slightly according to measures of market depth and the price impact of trades. Conditions are significantly better than those that prevailed earlier this year, although they remain somewhat strained compared with pre-pandemic levels, which is roughly consistent with historical patterns, given that market volatility remains elevated. Liquidity conditions in the corporate bond market also appear to have improved a touch over the intermeeting period. Bid-ask spreads on investment- and speculative-grade have retraced notably from their March peaks and are at the lower end of their historical distribution since 2015 for investment-grade bonds and somewhat above their median for speculative-grade bonds. Liquidity conditions in the municipal bond market were roughly stable over the intermeeting period, as measures of transaction costs for most trade sizes remained close to pre-pandemic levels.

FOREIGN DEVELOPMENTS

Risk sentiment abroad also improved since the July FOMC meeting, although less than in the United States as infection rates rose in several foreign countries. Foreign asset price movements were generally muted; on balance, most foreign equity indexes increased a touch, long-term sovereign yields in major AFEs edged higher, and the dollar weakened modestly.

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[3] Securities that the Federal Reserve is not actively purchasing include higher-coupon TBA securities, specified pools, and collateralized mortgage obligations.

Liquidity Conditions in Domestic Markets

10-Year Indicative Bid-Ask Spreads for Treasury Securities

Cents per $100
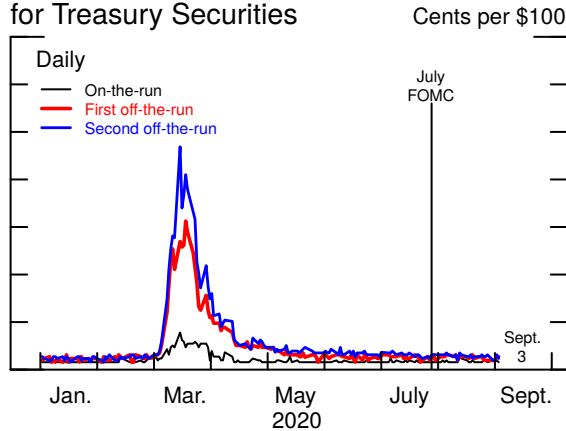
Source: Federal Reserve Bank of New York.

Treasury Market Depth

Millions of dollars   Millions of dollars
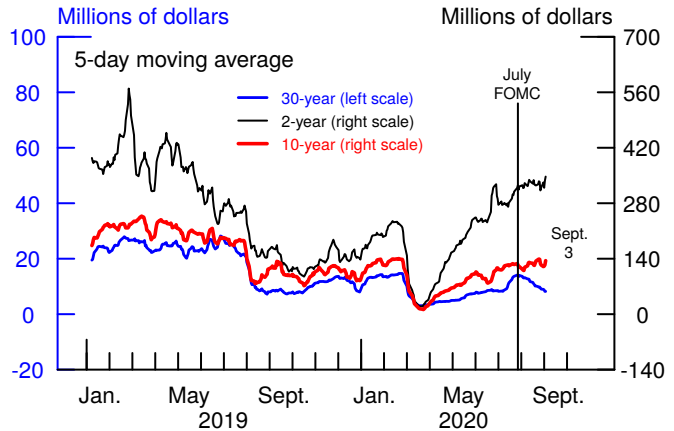
Note: Market depth is defined as the average top 3 bid and ask quote sizes for on-the-run Treasury securities. The tick size of the 2-year is one-fourth of the tick size of the 10-year security.
Source: Repo Inter Dealer Broker community.

On-the-Run Treasury Liquidity Premium

Basis points
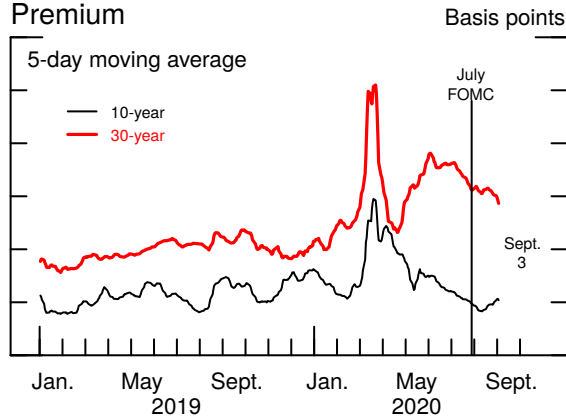
Note: Premium is calculated as spread between regular yields and predicted yields using off-the-run Svensson coefficients.
Source: Federal Reserve Bank of New York; Board staff calculations.

Top-of-the-Book Depth: Equity Index Futures

July 28, 2020 = 100
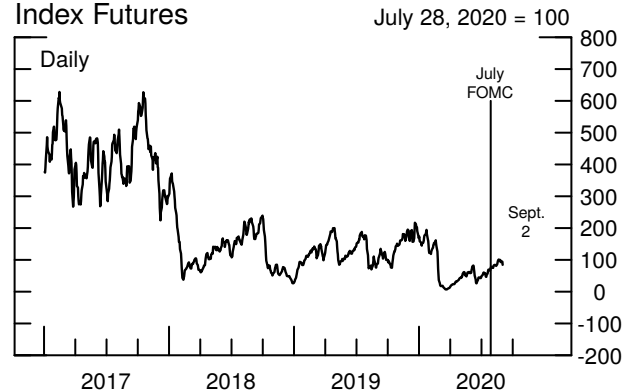
Note: Figure is based on the E-mini S&P 500. Average depth: (Avg. bid size + avg. ask size) / 2.
Source: Tick History.

Bid-Ask Spreads for Corporate Bonds

Percent
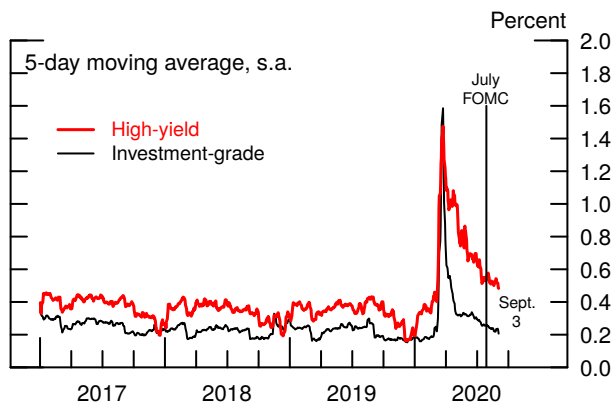
Source: FINRA; Board staff calculations.

Round-Trip Transaction Costs for Large Municipal Bond Trades (Par Value >= 500K)
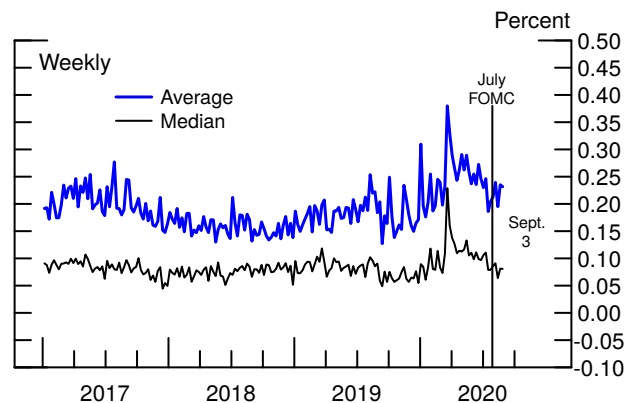
Percent

Note: Round-trip transactions are pairs of trades that start with a dealer-buy from a customer and are immediately followed by a dealer-sell to the customer in trades of the same par value. Round-trip transaction cost is the percentage change from dealer-sell price to dealer-buy price. Only fixed-coupon bonds that are at least 90 days after issuance and traded between the hours of 8:00 a.m. and 6:00 p.m. on weekdays are included.
Source: Municipal Securities Rulemaking Board; Board staff calculations.

Financial Markets

The slight move up in most major equity indexes over the period was accompanied by similarly small moves in option-implied volatility measures, which remain above longer-term averages. Equities in the euro area were little changed amid rising infection rates and second-quarter earnings surprises that were positive but less widespread than positive U.S. earnings surprises. In contrast, U.K. equities declined, as several major U.K. banks reported weak earnings. The Shanghai Composite index increased about 5 percent amid low infection rates, continued recovery in economic activity, and liquidity injections by the People's Bank of China. Moreover, optimism about the U.S.–China Phase One trade deal remaining intact also reportedly contributed to the increase in Chinese equity prices. Broad measures of EME stock prices rose modestly, and inflows to dedicated EME funds were slightly positive on net. In contrast, major equity indexes in Latin America declined amid elevated COVID-19 cases and ongoing macroeconomic concerns.

Longer-term sovereign yields in most AFEs generally tracked the moves in U.S. Treasury yields and increased modestly over the intermeeting period, on net, while foreign economic data had little effect on yields. Central bank communications were generally in line with expectations, and market-based measures indicate that policy rates in AFEs are expected to remain at their ELBs for an extended period. After falling sharply at the onset of the pandemic, inflation compensation measures in the euro area have been recovering since early April and continued to improve modestly over the intermeeting period. Nonetheless, lower-than-expected euro-area August CPI data led to a discrete decline in near-term measures. Inflation expectations implied by staff term structure models remain well below the ECB's target of below, but close to, 2 percent, and survey-based expectations registered a decline.

The dollar continued to fall from the crisis-driven peak in March, although at a slower pace. Notably, earlier in the intermeeting period, the euro continued its upward trend, in part driven by the EU Recovery Fund deal, and reached its highest level against the dollar since 2018. However, it depreciated discretely in response to weak August PMI readings and remarks by ECB chief economist Philip Lane that the ECB is concerned about euro appreciation. Despite little progress on the U.K.–EU trade deal, the British pound appreciated about 2.6 percent against the dollar, supported in part by better-than-expected U.K. economic data. Among EME currencies, the Chinese renminbi was the most notable contributor to the decline in the staff's trade-weighted dollar index, with an appreciation of about 2.1 percent against the dollar. In contrast, the Brazilian

Foreign Developments

Equity Indexes
Daily   Jan. 2, 2020 = 100

Legend:
- S&P 500
- MSCI EME
- DJ Euro Stoxx
- Shanghai

July FOMC

Sept. 3

Note: Indexes denominated in local currency.
Source: Bloomberg.
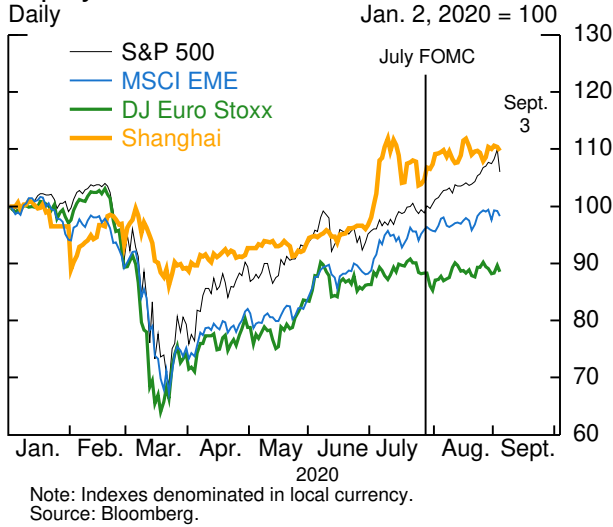
Equity Implied Volatilities
Daily   Percent

Legend:
- VIX
- VDAX

July FOMC

Sept. 3

Source: Bloomberg.

10-Year AFE Sovereign Yields
Daily   Percent

Legend:
- United States
- United Kingdom
- Germany
- Japan

July FOMC

Sept. 3

Source: Bloomberg.
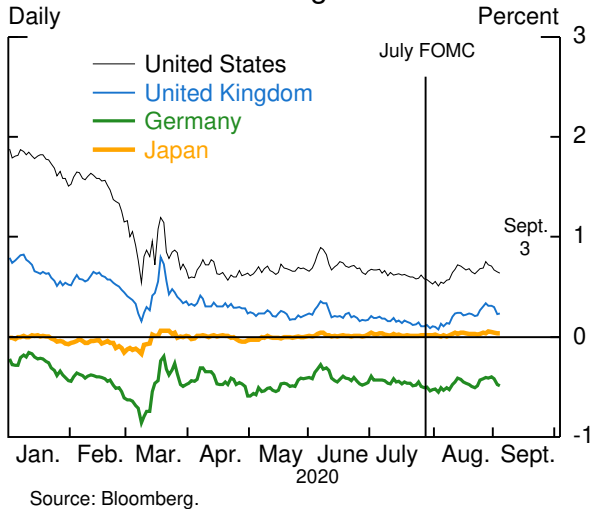
Emerging Market Flows and Spreads
Billions of dollars   Basis points

Legend:
- Weekly bond flows (left scale)*
- Weekly equity flows (left scale)
- EMBI+ (right scale)

July FOMC

Sept. 2

Sept. 3

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

Exchange Rates
Daily   Jan. 2, 2020 = 100

Legend:
- Broad
- EME
- AFE

July FOMC

Sept. 3

Dollar appreciation

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

3-Month OIS Swap Basis Spreads
Billions of dollars   Basis points

Legend:
- Euro (right scale)
- Yen (right scale)
- Total swaps (left scale)

July FOMC

Sept. 3

Note: 3-month measures based on overnight index swap rates.
Source; Bloomberg: Federal Reserve Bank of New York.

Financial Markets
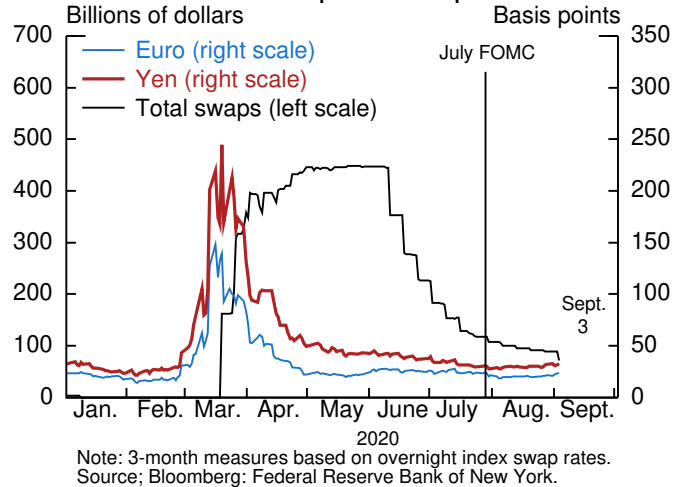
real depreciated about 2.6 percent, as failure to contain the spread of the virus and worries about excessive fiscal spending weighed on the currency.

There was little pressure in global dollar funding markets over the intermeeting period, as market conditions remained orderly and levels of FX swaps basis spreads remained subdued. As a further indication that market conditions have normalized, seven-day U.S. dollar auctions by foreign central banks with access to the Federal Reserve's dollar liquidity swap lines switched from three times a week to once a week as of September 1. On net, the amount of swaps outstanding decreased from $117 billion to $71.6 billion since the July FOMC meeting.

SHORT-TERM FUNDING MARKETS AND FEDERAL RESERVE OPERATIONS

Over the intermeeting period, conditions in short-term funding markets have been stable. Spreads on commercial paper (CP) and negotiable certificates of deposit across different tenors changed little, on net, remaining at levels observed before the pandemic. Total gross CP issuance, as well as the fraction of issuance with overnight maturity, also remained within pre-pandemic normal ranges. Outstanding volumes of nonfinancial CP declined moderately since the previous FOMC meeting, reportedly reflecting the availability of favorable longer-term financing alternatives for issuers.

The assets under management of prime and government money market funds (MMFs) declined modestly on net. Vanguard's announcement that it was converting its $124 billion prime fund to a government fund to provide investors with safer investment choices at reduced fees had little effect on money markets. Partly offsetting changes observed since April, government MMFs, on net, decreased their holdings of Treasury securities and increased their holdings of repurchase agreements, in part driven by a tighter spread between Treasury bill yields and repo rates. Amid stable market conditions, there was no additional take-up in the Money Market Mutual Fund Liquidity Facility or the Commercial Paper Funding Facility over the intermeeting period.

Conditions in short-term municipal bond markets were also stable. The SIFMA seven-day municipal swap index yield on variable rate demand obligations was little changed over the intermeeting period.

The effective federal funds rate was at the interest on excess reserves (IOER) rate of 10 basis points or 1 to 2 basis points below IOER throughout the intermeeting period,

Financial Markets

Short-Term Funding Markets and Federal Reserve Operations

Short-Term Funding Market Spreads

Basis points

Daily
- 1-month AA nonfinancial CP
- 1-month A2/P2 nonfinancial CP
- 1-month NCD
- 3-month NCD

July FOMC

Sept. 1

Jan. Mar. May July Sept.

2020
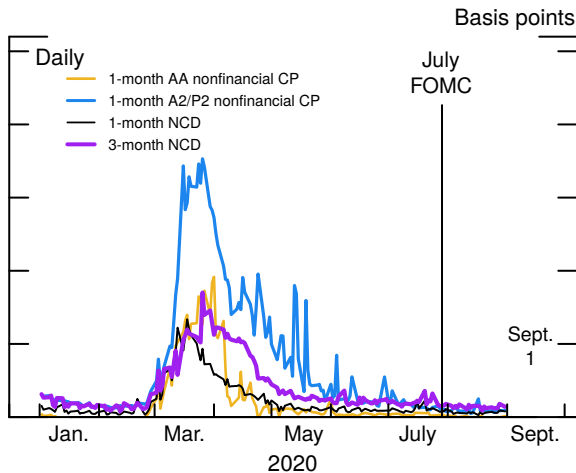
Note: CP is commercial paper; NCD is negotiable certificate of deposit. All spreads are to the overnight index swap rate of the same tenor.
Source: Depository Trust & Clearing Corporation.

MMF Assets under Management

Trillions of dollars   Trillions of dollars

Daily
- Prime (left scale)
- Government (right scale)

July FOMC

Sept. 3

Jan. Mar. May July Sept.

2020
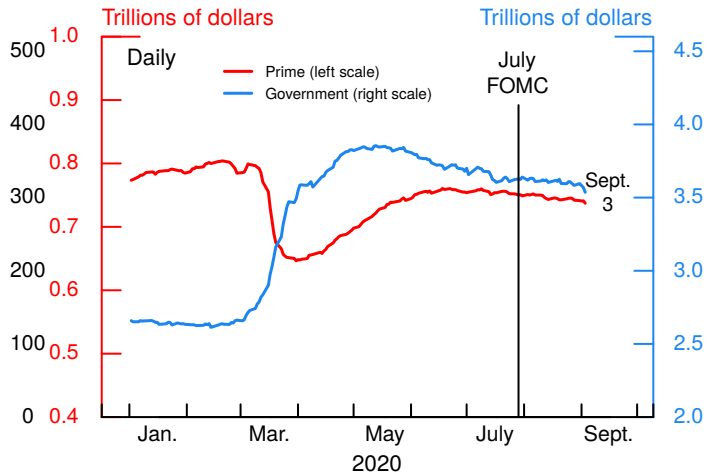
Note: MMF is money market fund
Source: iMoneyNet.

Overnight Funding Rates

Basis points

Daily
- SOFR
- Federal funds rate

July FOMC

Sept. 3

Mar. 16 Apr. 27 June 8 July 20 Aug. 31

2020
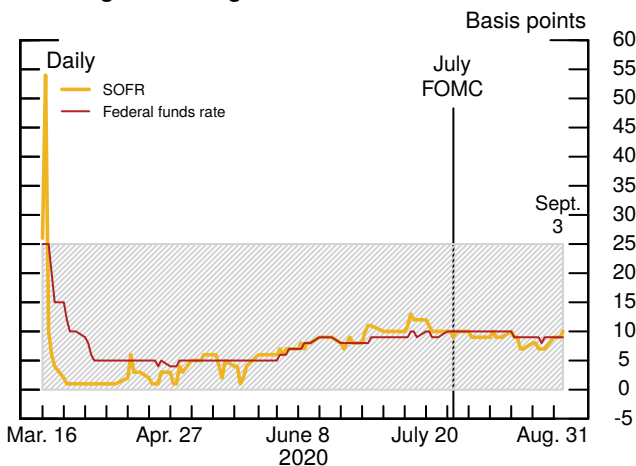
Note: Shaded area is the target range for the federal funds rate. SOFR is Secured Overnight Financing Rate.
Source: Federal Reserve Bank of New York; Federal Reserve Board.

Fed Repo and Reverse Repo Operations

Billions of dollars

Daily
- Repo (overnight and term)
- Reverse repo (overnight)

July FOMC

Sept. 3

Nov.   Jan.   Mar.   May   July   Sept.
2019   2020
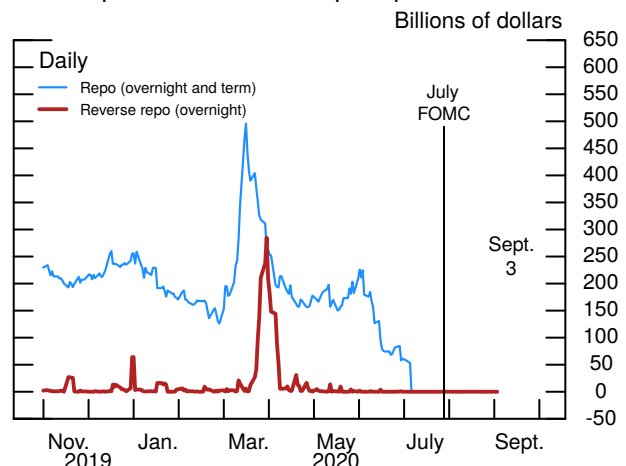
Note: The values shown are outstanding amounts. Repo is repurchase agreement.
Source: Federal Reserve Bank of New York.

Outright Security Purchases

Billions of dollars

Daily
- Treasury purchases (left scale)
- MBS purchases (left scale)
- Cumulative purchases (right scale)

July FOMC   Sept. 3

Mar. 16 Apr. 27 June 8 July 20 Aug. 31

2020
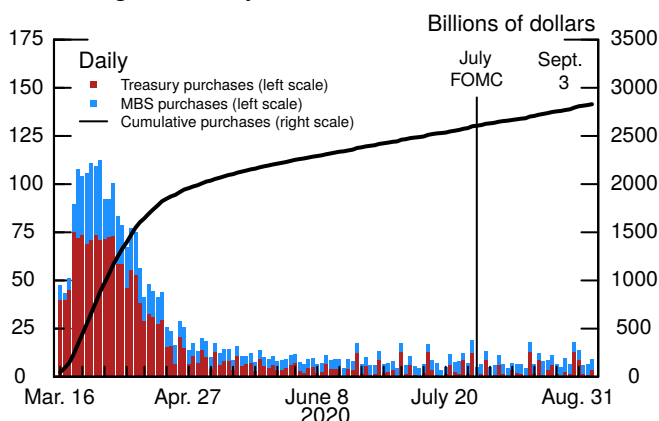
Note: Cumulative purchases are from March 16.
Source: Federal Reserve Bank of New York.

Usage of Liquidity and Credit Facilities

Billions of dollars

Daily
- PPPLF
- MMLF
- Primary credit
- PDCF
- CPFF
- SMCCF
- MLF
- PMCCF

July FOMC   Sept. 3

Mar. 16 Apr. 27 June 8 July 20 Aug. 31

2020
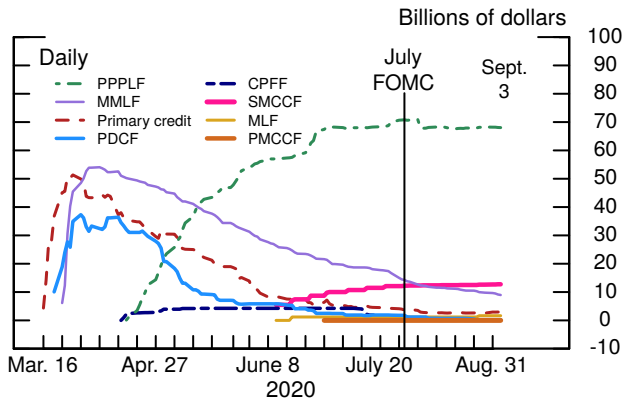
Note: The values shown are outstanding amounts. PPPLF is Paycheck Protection Program Liquidity Facility. MMLF is Money Market Liquidity Facility. PDCF is the Primary Dealer Credit Facility. CPFF is Commercial Paper Funding Facility. SMCCF is Secondary Market Corporate Credit Facility. MLF is Municipal Liquidity Facility. PMCCF is Primary Market Corporate Credit Facility.
Source: Federal Reserve Board.

Financial Markets

similar to levels observed since mid-June. The secured overnight financing rate averaged 9 basis points, 1 basis point lower than over the previous intermeeting period. The slight downward pressure in overnight rates comes amid increased levels of aggregate reserves and small net decreases in Treasury bill issuance.

The amount of Federal Reserve repo outstanding remained at zero over the intermeeting period. Dealers have not participated in repo operations since early July, given more attractive rates in the private market. The monthly pace of Desk purchases of Treasury securities remained at $80 billion. Purchases of agency residential MBS are currently at a pace of $110 billion per month, including $70 billion in reinvestments and $40 billion in additional purchases.

Over the intermeeting period, the Federal Reserve's balance sheet expanded somewhat, as the increase of just over $100 billion in securities held outright was partially offset by declines in central bank liquidity swaps and loans. In aggregate, the total amount outstanding in liquidity and credit facilities edged down slightly; the limited new activity was likely due to improved market conditions, with market pricing more favorable than facility pricing.

Financial Markets

The Stock Market–Real Economy "Disconnect": A Closer Look

The S&P 500 index is trading at all-time highs despite the U.S. economy running far below capacity and an ongoing global pandemic. We contend that this "disconnect" between broad equity prices and economic fundamentals is driven by gains in the market value of very long-term dividends from the S&P 500, which may be related to technological adaptations brought on by the pandemic. In contrast, the value of corporate dividends for the next five years remains far below pre-pandemic levels and likely reflects the ongoing economic challenges many companies face.

Consistent with this assessment, market commentary has highlighted that FAANG firms (Facebook, Amazon, Apple, Netflix, and Google) have experienced very strong stock returns amid the pandemic. FAANG firms are notorious for paying little or no dividends, so arguably their current market values are due to investors' views of the distant future, which includes both the dividends and discount rates that apply many years from now.

This discussion presents evidence that clarifies the nature of the disconnect using data on dividend futures and the cross section of stocks.

EVIDENCE FROM S&P 500 DIVIDEND FUTURES

S&P 500 dividend futures are contracts that require two parties to exchange, on a specific future date, the dividends that the S&P 500 index paid over the year preceding that date and a predetermined cash amount (the futures price). We use these contracts to create portfolios that decompose the S&P 500 index into the value of S&P 500 dividends that will be paid over different time periods. The market prices of these portfolios are shown in figure 1.

In the figure, the "dividends 1 to 2 years in the future" and "dividends 3 to 5 years in the future" portfolios contain dividend-receiving futures for their respective time horizons. The "dividends 6+ years in the future" portfolio combines an S&P 500 index fund and 1- to 5-year dividend-*paying* futures.[1] This portfolio is equivalent to a contract that pays the holder S&P 500 dividends from the sixth year onward. The first five years of dividends typically account for about 10 percent of the S&P 500's value, and the "dividends 6+ years in the future" portfolio accounts for the remaining 90 percent.

---

[1] The portfolios also contain Treasury securities or loans to bring the futures' predetermined cash amounts to the present. We use Treasury yields for the borrowing rate for simplicity.

Figure 1: The S&P 500 Decomposed Using Dividend Futures

Note: Prices are normalized so that Feb. 19, 2020 = 100.
Source: Bloomberg.
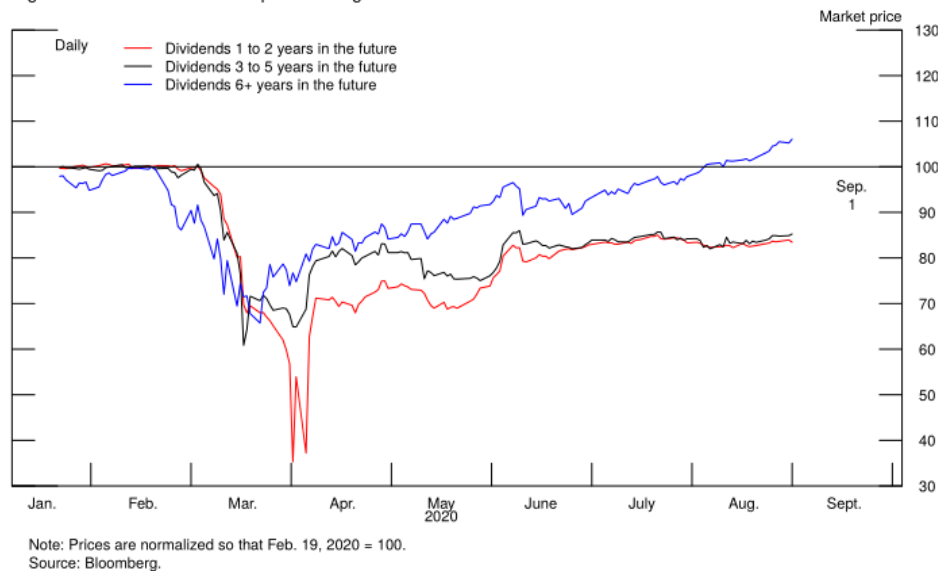
Figure 1 shows that the prices of all three of these portfolios plummeted in March as the COVID pandemic spread around the world. Since then, the values of these portfolios have at least partially rebounded, with the "dividends 1 to 2 years in the future" portfolio recovering from extreme lows, consistent with a sharp improvement in April from a very dire near-term outlook. Even so, as of September 1, the price of the first five years of dividends remains 15 percent below its pre-pandemic levels, while the price of the claim on dividends after the first five years has recovered all of its late February and March losses and more.

EVIDENCE FROM THE CROSS SECTION OF STOCKS

Evidence of the sharper recovery of the price of far-dated dividends is also seen in the cross section of stocks. Figures 2 and 3 show two methods for forming portfolios of stocks that reflect medium-term versus far-term dividends.

Figure 2 divides the S&P 500 into stocks with high price–dividend ratios and stocks with low price–dividend ratios based on data covering the past five years. Intuitively, stocks that have high price–dividend ratios derive more of their value from periods far into the future, as they are expected to pay little in dividends in the medium term. Consistent with figure 1, high price–dividend stocks have recovered all of their COVID-related losses and more. In contrast, low price–dividend ratio stocks remain about 10 percent below their pre-pandemic levels.

Figure 3 divides the S&P 500 into information technology plus FAANG versus ex-info tech and ex-FAANG.[2] The figure mirrors the previous results: Info tech and FAANG firms, which are expected to pay the lion's share of their dividends at

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[2] Among FAANG firms, only Apple is classified as information technology.

Figure 2: High and Low Price-Dividend Stocks

Note: Prices are normalized so that Feb. 19, 2020 = 100.
Price and dividend uses averages over the past five years.
Source: Compustat; Yahoo Finance.

Figure 3: Tech and FAANG Stocks
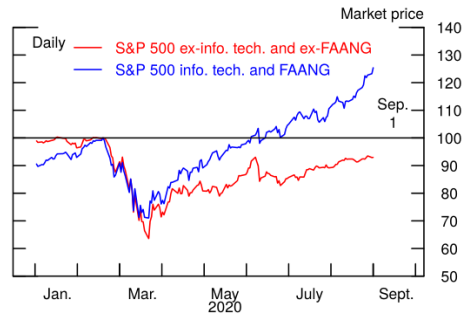
Note: Prices are normalized so that Feb. 19, 2020 = 100.
FAANG is Facebook, Amazon, Apple, Netflix, and Google.
Source: S&P Dow Jones Indices.

distant dates, have recovered all of their losses and more. The portfolio of remaining stocks, which are more closely tied to the medium term, remain well below their pre-pandemic levels.

DISCUSSION

Taken together, this evidence suggests that financial markets remain connected to medium-term economic conditions. Indeed, dividend futures prices remain depressed even at five-year horizons, suggesting a much more pessimistic outlook compared to the quick recovery implied by Wall Street analysts' earnings forecasts for the S&P 500 as a whole. This very different "disconnect" likely reflects two factors: high risk premiums on claims to near- and medium-term dividend futures, and an expected decline in the share of intermediate term earnings paid out as dividends.

At the same time, the pandemic has brought about a more sanguine view of the dividends, discount rates, or both being applied to the very distant future. This shift appears to be related to the dramatic technological adaptations forced by the pandemic.

Financial Markets

Financing Conditions for Businesses and Households

Financing conditions for businesses in capital markets remained broadly accommodative over the intermeeting period. However, bank lending to businesses continued to be relatively tight, with commercial and industrial (C&I) loan growth remaining negative since the July FOMC meeting. The credit quality of large businesses showed tentative signs of stabilization, while small business credit quality appeared to deteriorate further. Broadly, conditions continued to recover in commercial real estate (CRE) markets, but significant stress remained in the hotel and retail sectors. Mortgage and consumer credit markets stayed accommodative for borrowers with relatively strong credit scores, but financing conditions remained tight for borrowers with relatively low credit scores.

- Gross issuance of investment- and speculative-grade corporate bonds was strong over the intermeeting period. Gross equity issuance through seasoned offerings was robust, and gross issuance through initial public offerings (IPOs) was solid.

- C&I loans outstanding continued to decline through August but at a slower pace. Small business financing conditions appeared to remain tight.

- The volume of nonfinancial corporate bond downgrades slowed notably, and market indicators of future default expectations improved somewhat. However, small business loan performance deteriorated further.

- Municipal bond issuance moderated slightly in August after the robust volumes observed in June and July.

- Residential mortgage refinancing remained strong, and home-purchase mortgage activity moved up further to pre-pandemic levels. Even so, mortgage financing conditions remained tight, compared with pre-pandemic conditions, for borrowers with lower credit scores and nonstandard loans.

- Auto loan balances increased solidly in July, and the contraction in credit card balances slowed. Still, financing conditions in consumer credit markets remained tighter for subprime borrowers compared with pre-pandemic levels.

Financing Conditions

Business Finance

Gross Issuance of Nonfinancial Corporate Bonds

Billions of dollars

Monthly rate

- ■ Speculative-grade
- ■ Investment-grade
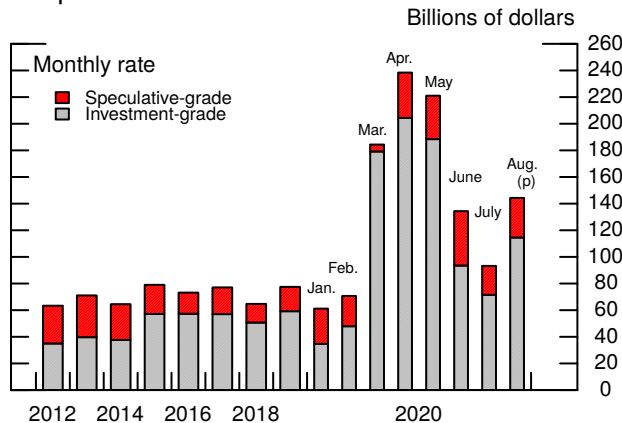
Note: Bonds are categorized by Moody's, Standard & Poor's, and Fitch.
(p) Preliminary.
Source: Mergent Fixed Income Securities Database.

Downgrades of Nonfinancial Corporate Bonds and Leveraged Loans

Percent of outstanding   Percent of outstanding

Annual rate

- — Leveraged loans (left scale)
- ■ Fallen angels (right scale)
- ■ Other IG downgrades (right scale)
- ■ HY downgrades (right scale)
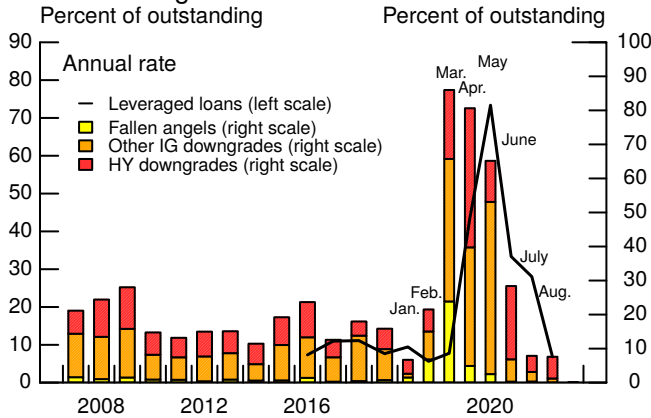
Note: Computed as a percent of nonfinancial bonds outstanding and reported at an annual rate. Fallen angels are bonds downgraded from investment grade (IG) to speculative grade (HY).
Source: For corporate bonds, Federal Reserve Board staff calculations using composite ratings from Mergent Fixed Income Securities Database; for leveraged loans, S&P Leveraged Commentary & Data.

Change in the Number of Local Businesses Open since January

Percent
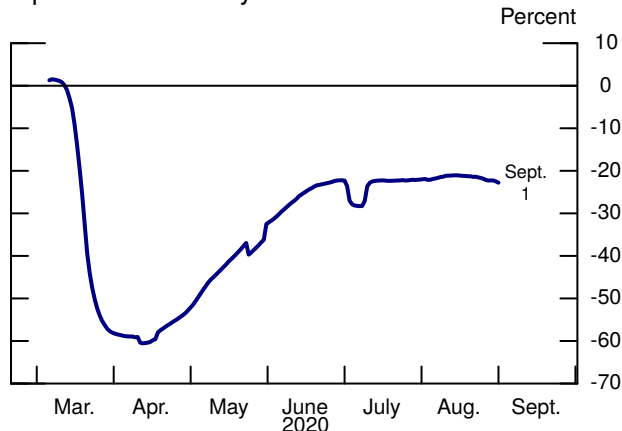
Source: Homebase, a scheduling and time tracking app used by many small restaurants, food and beverage, retail, and other service firms.

Commercial and Industrial Loans

Billions of dollars

Monthly rate, s.a.

- □ Large domestic banks
- ■ Small domestic banks
- ■ Foreign banks

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

Realized and Expected Nonfinancial Bond Default Rates

Percent

Monthly

- — Nonfinancial bond default rate
- — KMV expected default rate, all firms
- — KMV expected default rate, oil firms

Note: For realized default rate, 3-month trailing defaults divided by beginning-of-period outstanding, at an annual rate. For expected default rate, firm-level estimates of default weighted by firm liabilities as a percent of total liabilities, excluding defaulted firms.
Source: For realized default rate, Moody's Investors Service; for expected default rate, calculated using firm-level data from Moody's KMV.

Commercial Real Estate Loans

Billions of dollars

Monthly rate, s.a.
- ■ Construction and land development
- ■ Multifamily
- ■ Nonfarm nonresidential

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

Financing Conditions

BUSINESS FINANCING CONDITIONS

Nonfinancial Business

Financing conditions in capital markets remained accommodative over the intermeeting period, supported by low interest rates and high equity valuations. Amid historically low corporate bond yields, gross issuance of both investment- and speculative-grade corporate bonds was strong in July and August—notably above the volumes observed during the same period last year. Much of this recent issuance is intended to refinance existing debt. Gross institutional leveraged loan issuance picked up slightly in July but remained below the levels observed during the same period last year.

Amid notable equity market gains, gross equity issuance through seasoned offerings strengthened in August to about double its typical pace. Equity raised through IPOs in August was close to its average pace over the past few years, and the reported pipeline of IPOs appears robust.

C&I loans outstanding declined in July and August but at a slower pace than in June. Credit-line repayments drove much of the decline in C&I loans since June. Undrawn commitments are now back to pre-pandemic levels, suggesting that March credit-line drawdowns have, for the most part, been repaid. (The box "U.S. Zombie Firms' Recent Access to Credit" documents recent financing patterns of nonviable firms.)

The credit quality of nonfinancial corporations showed tentative signs of stabilization over the intermeeting period. The volume of nonfinancial corporate bond downgrades exceeded upgrades since the July FOMC meeting, albeit only modestly, representing a sizable reduction in net downgrades since the spring. The pace of nonfinancial corporate bond defaults in July was also notably lower than in April and May but was still elevated relative to pre-pandemic levels, with the energy sector accounting for roughly 60 percent of the default volume in July. The three-month trailing default rate on corporate bonds declined somewhat in July, remaining elevated but well below the levels reached during the early 2000s and the financial crisis. Market indicators of future default expectations improved somewhat, with the KMV expected year-ahead default rate declining modestly and the spread on the speculative-grade CDX index decreasing notably.

On average, corporate earnings reports for the second quarter strongly beat Wall Street analysts' forecasts, which generally called for significant declines in earnings per

share over the previous quarter. In addition, the earnings outlook improved somewhat in August, with substantial upward revisions to an index of earnings per share for S&P 500 firms. However, the outlook is subject to significant uncertainty, and the dispersion in analysts' forecasts remained well above pre-pandemic levels in August despite some recent declines.

Small Businesses

Financing conditions for small businesses remained tight, although some indicators suggest that conditions might have improved a bit recently. The Federal Reserve's Small Business Lending Survey indicates that credit supply continued to tighten in the second quarter. However, the PayNet Small Business Lending Index rebounded strongly in June and increased further in July, now standing just below its pre-pandemic level. While some of this rebound likely reflects the distribution of previously approved PPP loans, it may also indicate some growth in lending outside that program.

Small business credit quality appeared to deteriorate further. While 30-day delinquencies saw a modest improvement between May and July, they remained elevated, and 90-day delinquencies increased further, with the July rate standing 49 percent above the rate in February. Data from Dun & Bradstreet suggest that, as of the second week of August, approximately 20 percent of small businesses were at a high risk for delinquency or failure, with the youngest and smallest firms most vulnerable, and data from Homebase indicate that the share of small businesses that are open began to decline again in August. Similarly, the Census Bureau's Small Business Pulse Survey shows high and growing credit needs among small businesses, with nearly one-third of respondents indicating scarce cash availability and expecting to need financial assistance in the next six months.

Commercial Real Estate

Financing conditions for CRE, particularly financing intermediated through capital markets, recovered further over the intermeeting period. Spreads on triple-B non-agency CMBS continued to decline through August, though they remained somewhat elevated. Triple-A spreads changed little, remaining close to pre-pandemic levels. Issuance of non-agency CMBS was steady but subdued relative to pre-pandemic levels. Spreads on agency CMBS were tight and issuance was very strong, setting a new single-month record in July. In contrast, CRE loan growth at banks was weak in July and August, partly driven by the recovery of CMBS markets in recent months. Delinquency

rates on mortgages in CMBS fell a bit in July but remained quite high in the hotel and retail sectors.

State and Local Government Financing Conditions

Financing conditions in the municipal bond market remained generally accommodative over the intermeeting period. Issuance of state and local government debt moderated slightly in August but remained robust after the very strong pace observed in June and July. Indicators of the credit quality of municipal debt remained roughly stable since the July FOMC meeting, with the volume of rating upgrades somewhat exceeding that of downgrades and state CDS spreads roughly unchanged. That said, market participants are reportedly concerned that municipal market credit quality might decline over the remainder of the year, in which case the municipal bond market could tighten in the coming quarters.

HOUSEHOLD FINANCING CONDITIONS

Residential Real Estate

Financing conditions in the residential mortgage market were little changed over the intermeeting period. Mortgage rates hovered near historical lows. At the same time, the spread between primary mortgage rates and MBS yields remained quite wide (see the box "Reasons for the Wide Spread between Conventional Conforming Mortgage Rates and Mortgage-Backed Security Yields").

Credit continued to flow to higher-score borrowers who meet standard conforming loan criteria while remaining tight for borrowers with lower credit scores and for nonstandard mortgage products such as jumbo loans. Nonetheless, low mortgage rates have supported both home-purchase originations and refinancings. Purchase originations have recovered after a significant decline in April and May, and refinancing originations have reached a monthly pace last seen in 2012 and 2013.

The credit quality of mortgages improved slightly. The rate of transition into delinquency returned to pre-pandemic levels in June and changed little in July, while forbearance rates have continued to slowly decline through mid-August.

Consumer Credit

Financing conditions in consumer credit markets remained accommodative for borrowers with relatively strong credit scores but continued to be tight for subprime

Financing Conditions

Household Finance

Mortgage Rate and MBS Yield

Daily

Rate

July
FOMC

30-year conforming fixed rate mortgage

MBS current coupon yield

10-year Treasury yield

Sept.
2

Apr. May June July Aug. Sept.
2020
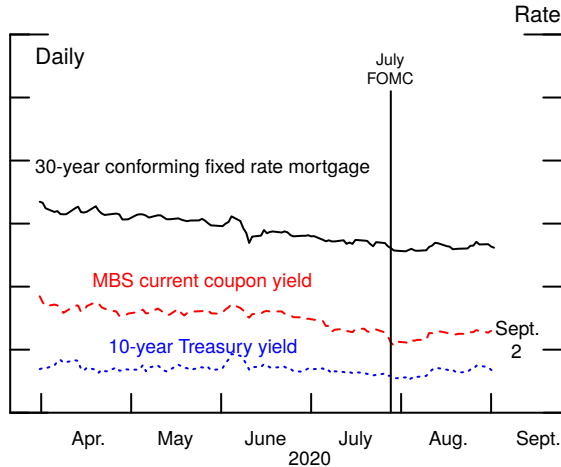
Note: The mortgage-backed securities (MBS) yield is from Fannie Mae through May 31, 2019, and from Uniform Mortgage Backed Securities thereafter.
Source: For mortgage rates before 2010, Freddie Mac; after 2010, Optimal Blue; for MBS yield, J.P. Morgan.

Purchase and Refinance Originations

Thousands

Thousands

Monthly

Home purchase
(left scale)

July

Refinance
(right scale)

2002 2005 2008 2011 2014 2017 2020
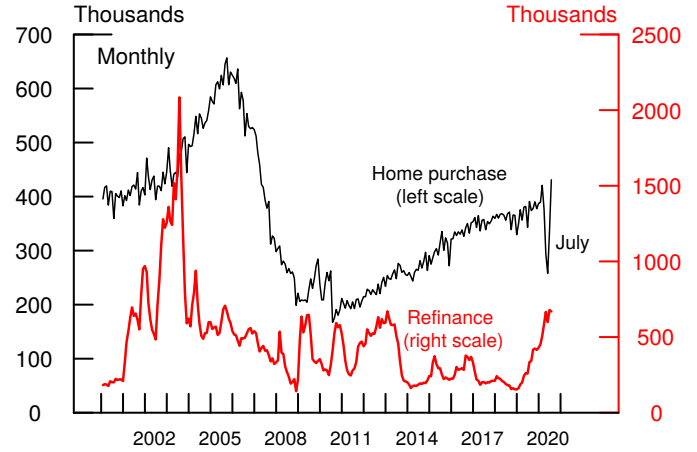
Note: The data are seasonally adjusted by Federal Reserve Board staff.
Source: For values before 2020, data reported under the Home Mortgage Disclosure Act of 1975; for values in 2020, Federal Reserve Board staff estimates.

Percent of Mortgages in Forbearance

Percent

Weekly

July
FOMC

Total
Nonbanks
Banks

Aug.
23

Mar. Apr. May June July Aug.
2020
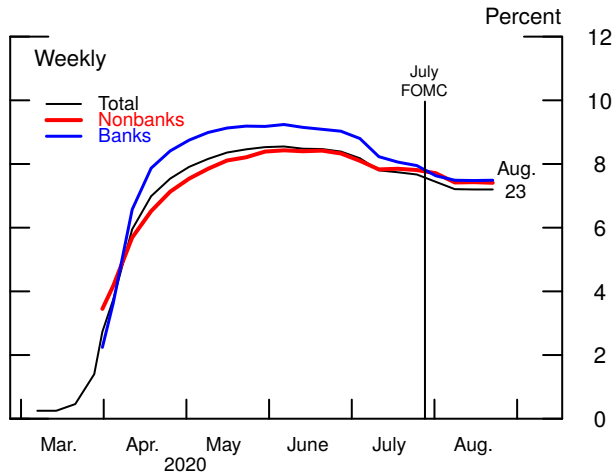
Source: Mortgage Bankers Association.

Consumer Credit Flows

Billions of dollars (real)

Monthly rate

Q1

June

July

Credit cards
Auto loans
Student loans

May

Apr.

2008 2012 2016 2020
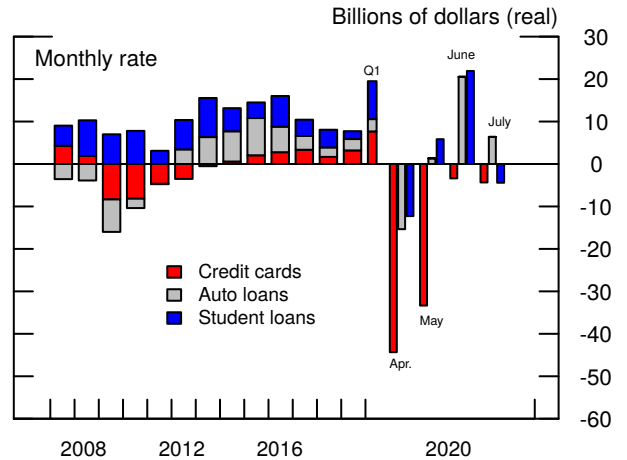
Note: The data are seasonally adjusted by Federal Reserve Board staff.
Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

Auto Loan Balances

Billions of dollars (real)

Quarterly/Monthly

July

Prime

Near prime

July

Subprime

2000 2004 2008 2012 2016 2020
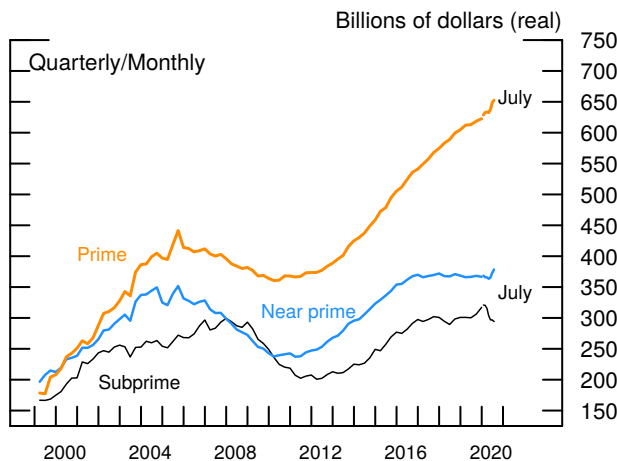
Note: Near prime is between 620 and 719; prime is greater than 719. Scores are measured contemporaneously. Balances before 2020 are plotted quarterly, balances in 2020 are plotted monthly.
Source: Federal Reserve Bank of New York Consumer Credit Panel/Equifax.

Regular Interest Rates for Purchases, by Credit Score

Percent

Quarterly

Prime
Nonprime

Q2

2008 2010 2012 2014 2016 2018 2020
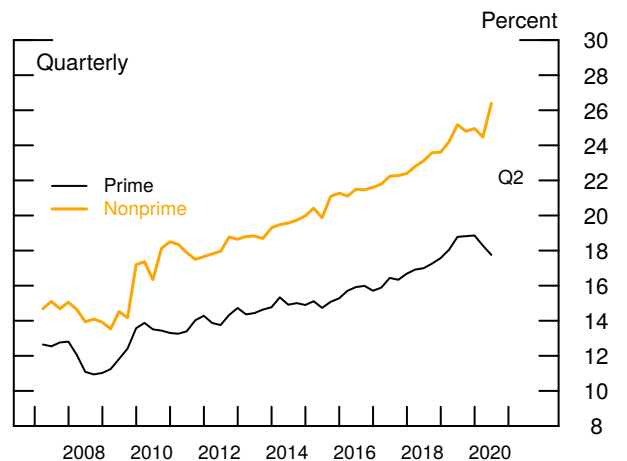
Note: Mail-volume weighted. Dots indicate any monthly data since most recent quarter. Prime is a VantageScore 2.0 credit score of 700 and above. Nonprime is a VantageScore 2.0 credit score below 700.
Source: Mintel.

Financing Conditions

borrowers. Auto loan balances increased solidly, on net, through the end of July, though the growth has been concentrated among prime and near-prime borrowers, whose increased balances more than offset a decline among subprime borrowers. Consumer financing incentives for car purchases have been reportedly targeted at higher-score borrowers.

The contraction of credit card balances that began in March decelerated significantly in June and July (see the box "Consumer Credit Card Markets during the COVID-19 Shutdown"). Credit card financing conditions remained tight for nonprime borrowers. Offered interest rates on credit cards to nonprime borrowers rose in the second quarter, as many lenders stopped offering such borrowers low introductory rates on regular purchases. Credit card limits for nonprime borrowers continued to edge down.

Conditions in the ABS market were stable during the intermeeting period. Consumer ABS spreads edged down a touch across sectors and tranches, while primary market activities continued to rebound, with robust auto and student loan issuance. Credit performance remained stable through mid-August, and the share of auto and credit card balances in forbearance declined.

FINANCING AND FINANCIAL CONDITIONS INDEXES

A staff index that provides a measure of financing conditions for nonfinancial corporations indicates that conditions have eased over the intermeeting period, on net, and are about as accommodative as before the onset of the COVID-19 outbreak in the United States. The average reading of publicly available financial conditions indexes, which are largely based on market prices, also points to easier financial conditions over the intermeeting period; in addition, most of these indexes suggest that conditions have eased to levels that are comparable with those prevailing before the pandemic. In stark contrast, as of July, the SLOOS Bank Lending Standards Index stands at levels last seen in the acute phase of the Global Financial Crisis.

Financing Conditions

U.S. Zombie Firms' Recent Access to Credit

The Federal Reserve's support to credit markets amid the COVID-19 pandemic and its commitment to keeping rates low for a long time have sparked concerns that accommodative credit conditions may keep nonviable U.S. firms alive, with potential adverse effects on longer-run economic growth. The following analysis documents that nonviable U.S. firms—often referred to as "zombie firms"—account for only a minor share of the surge in bond issuance and drawdowns of credit lines recorded in March and April of this year.

While there is no formal definition, zombie firms typically refer to mature companies that are not profitable and benefit from cheap financing to cover debt-servicing costs and survive.[1] Accordingly, we classify as zombies firms that are not young and have negative profits, low sales growth, and low interest coverage ratios.[2] In 2019, zombie firms accounted for roughly 8 percent of the total number of listed U.S firms.[3] The typical U.S. zombie firm appears to hold less cash and is more indebted than other firms. A typical zombie firm is also smaller, older, less profitable, and more dependent on bank credit than its non-zombie counterparts. In our sample, a zombie firm, if rated, has a speculative-grade rating.

Figure 1: Nonfinancial Corporate Bond Gross Issuance

Note: A firm is classified as a zombie if in the previous four quarters it had a negative return on assets, an annual nominal growth rate of sales lower than 4 percent, an interest coverage ratio below 1, and if they were incorporated at least 10 years ago.
Source: Mergent Fixed Income Securities Database, Compustat; staff calculations.

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[1] Zombie firms may be a drag on economic growth, as they may crowd out lending to more profitable firms, possibly distorting the allocation of capital and limiting the entry of new firms.

[2] Specifically, publicly listed firms are zombie firms if they were incorporated at least 10 years ago and in the previous four quarters reported negative operating income, nominal sales growth rates below 4 percent, and an interest coverage ratio less than 1.

[3] Using 2018 accounting data, the share of firms identified as zombies is roughly the same as the share of zombie firms based on 2019 data. Moreover, the majority of firms identified as zombies in 2018 were also classified as such in 2019, suggesting that our definition captures persistent weakness in zombie firms' ability to generate profits and service their debt. Using a similar defintion, Acharya and others (2019) estimate that roughly 10 percent of European firms are zombies. See Viral V. Acharya, Tim Eisert, Christian Eufinger, and Christian Hirsch (2019), "Whatever It Takes: The Real Effects of Unconventional Monetary Policy," *Review of Financial Studies,* vol. 32 (September), pp. 3366–411.

Zombie firms have not relied heavily on bond issuance or bank credit in recent months. Figure 1 shows that zombie firms have not obtained disproportionate volumes of funding through bond markets since the COVID-19 outbreak, either compared to their own reliance on bond issuance in 2019 or relative to non-zombie firms' bond issuance in 2020. One potential explanation for the weak bond issuance by zombie firms is that the corporate bond market may not be the first source of financing for unrated firms—and many zombie firms in our sample fall into this category.

Evidence on credit-line drawdowns also suggests that while many zombie firms increased drawdowns in March 2020, total drawdowns are small compared with those of non-zombie firms (figure 2). One reason for the low usage of credit lines might be that these facilities often carry covenants that tend to discourage credit-line usage, especially if firms do not have strong balance sheets.[4] Quarterly data on firms' cash positions (not shown) suggest that zombie firms relied heavily on their cash holdings to meet liquidity needs in the first quarter of this year.

Taken together, the evidence based on U.S.-listed firms does not indicate that zombie firms have benefited much from the improvement in credit market conditions following the Federal Reserve's actions. As new data on firms' balance sheets and bankruptcy filings become available, it will become more clear whether the current environment of accommodative financing conditions will lead to the breeding of new zombie firms and, if so, whether that will crowd out the activities of more productive firms and weigh on the strength of the U.S. economy going forward. Return to Financing Conditions text

Figure 2: Total Credit−Line Drawdowns

Note: A firm is classified as a zombie if in the previous four quarters it had a negative return on assets, an annual nominal growth rate of sales lower than 4 percent, an interest coverage ratio below 1, and if they were incorporated at least 10 years ago.
Source: FR Y−14Q schedule H.1; Compustat; staff calculations.

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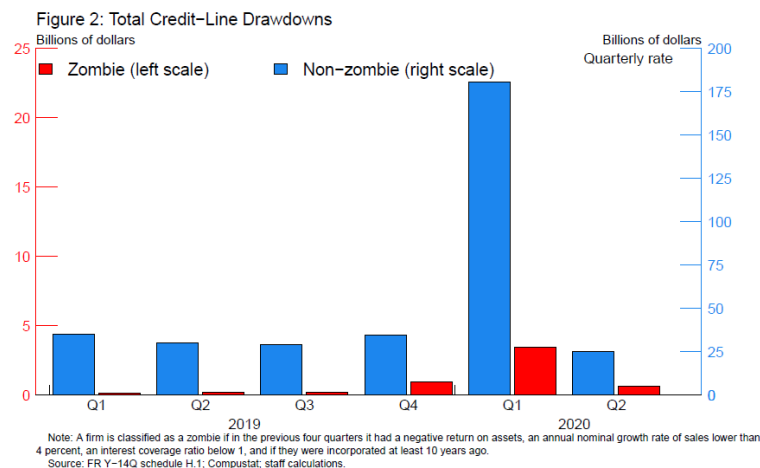
[4] Covenants that limit firm leverage include ceilings on debt-to-asset and debt-to-EBIDTA ratios and floors on the interest coverage ratio.

Financing Conditions

Reasons for the Wide Spread between Conventional Conforming Mortgage Rates and Mortgage-Backed Security Yields

Since the beginning of this year, Treasury and MBS yields have fallen to historic lows. While conventional conforming mortgage rates have also reached record lows—leading to a refinancing boom and supporting a sharp rebound in housing activity—they have not fallen nearly as much as MBS yields. Thus, the primary–secondary spread—the spread of mortgage rates to MBS yields—has widened sharply. Mortgage rates would be about 100 basis points lower today had they moved in line with MBS yields since January.[1] The analysis that follows suggests that we can explain roughly half of the rise in the spread with increased forbearance risk and capacity constraints.

One commonly cited reason for the wide primary–secondary spread is increased risk of mortgage forbearance and borrower default. Although conforming mortgages are guaranteed against default by the housing GSEs, forbearance and expected defaults can lower the value of mortgage servicing rights (MSR), reducing lender profits and leading them to charge a higher mortgage rate.[2] However, industry consultants estimate that MSR valuations for newly originated conforming mortgages have not fallen. Additionally, conforming mortgage rates for borrowers with a high risk of forbearance or default—for whom the value of MSR should have fallen the most—have fallen in line with rates for less risky borrowers. We calculate that even in an extreme scenario where MSR valuations had dropped to zero, lenders would have needed to increase mortgage spreads only about 35 basis points to keep their margins unchanged. Taken together, these facts suggest that forbearance risk has not been a major factor and can explain less than one-third of the increase in conforming mortgage spreads.[3]

A second commonly cited reason for the wide primary–secondary spread is that the recent refinancing wave may have caused many originators to reach their underwriting and origination capacity, generating some temporary market power and resulting in higher mortgage spreads and profit margins. As seen in the figure, the primary–secondary spread tends to be higher when refinancing incentives are larger. Based on this historical relationship, we would have expected the spread to increase about 25 basis points in 2020, about one-fourth of the actual increase.

[1] Estimates can vary between 70 and 110 basis points depending on the data sources used.
[2] Originators may also be pricing in the risk of the loan entering forbearance before it is sold, although this scenario has not been common to date.
[3] By contrast, default and forbearance risk have played an important role in pricing and availability of mortgages in the FHA and non-agency market, where originators and servicers are more exposed to forbearance and default risk than in the GSE space.

In summary, no more than one-third of the increase in the primary–secondary spread can be explained by increased forbearance risk, and about one-fourth can be explained by capacity constraints at mortgage lenders. The remaining increase is difficult to rationalize with available data. However, it is possible that capacity constraints have become more binding than usual, as social-distancing measures may have made hiring and training new workers more difficult or as uncertainty about future mortgage demand may have made originators reluctant to increase their workforce to meet current demand. It is also possible that lenders are enjoying additional market power because borrowers tend to shop less for mortgages when rates are low.[4] To the extent that capacity constraints or forbearance risk ease in the future, we would expect the primary–secondary spread to decline, although the timing is quite unclear. Return to Financing Conditions text

Primary–Secondary Spread and Refinance Incentives

Note: Refinance incentive is the weighted average coupon in outstanding mortgage–backed securities (MBS) minus 10–year Treasury yields.
Source: For mortgage rates, Freddie Mac PMMS; for MBS yields, J.P. Morgan.
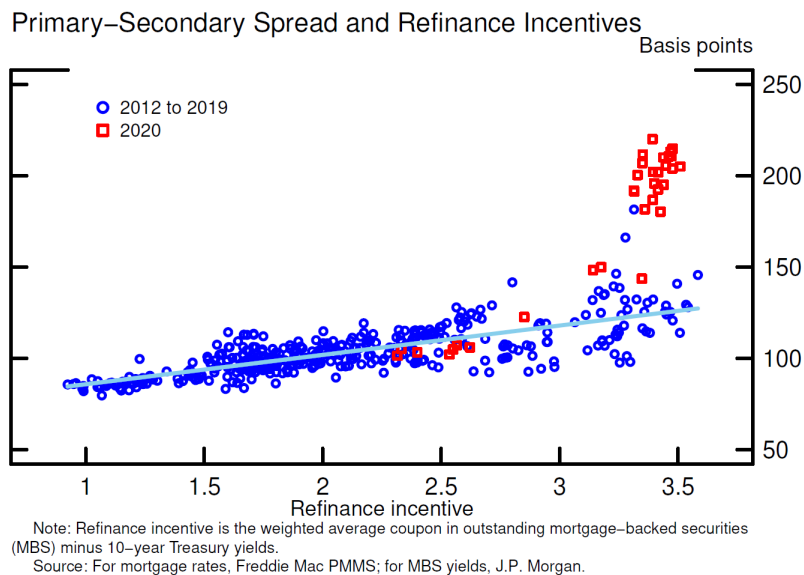
[4] See Neil Bhutta, Andreas Fuster, and Aurel Hizmo (2020), "Paying Too Much? Price Dispersion in the U.S. Mortgage Market," Finance and Economics Discussion Series 2020-062 (Washington: Board of Governors of the Federal Reserve System, August), https://doi.org/10.17016/FEDS.2020.062.

Financing Conditions

Consumer Credit Card Markets during the COVID-19 Shutdown

Revolving consumer credit, which primarily consists of credit card balances, fell at a seasonally adjusted annual rate (s.a.a.r.) of 32 percent in the second quarter, with an unprecedented single-month decrease of 65 percent (s.a.a.r.) in April, according to the G.19 Consumer Credit statistical release. This discussion provides greater detail on these dramatic changes by decomposing the declines into purchase and repayment components using rich account-level information from the Y-14M data set.[1] We show that most of the contraction in credit card balances can be attributed to a decline in purchase volume. The decline was more pronounced among accounts used for transactional purposes, indicating that the contraction was not mainly driven by the tightening of credit card lending standards since the COVID-19 shutdown.

Figure 1 decomposes credit card outstanding balances into three categories: net purchase volume (new consumer purchases using credit cards less any prepayments of these purchases), revolving balances (the previous statement balance not paid off in the current month), and other charges (such as fees and finance charges). As the orange portions of the bars in the figure show, a sizable drop in net purchase volume in April accounted for nearly all of the $36 billion decline in April credit card balances. Net purchase volume decreased $33 billion (25 percent not annualized) in April before recovering $8 billion in May and $11 billion in June. Revolving balances (the blue portions of the bars) stayed essentially flat in April before decreasing $18 billion (4 percent) in both May and June.

The decrease in revolving balances reflects both previous months' lower purchase volumes as well as higher monthly payments. Figure 2 shows payments in excess of the minimum due on the credit card as a fraction of the previous month's balances for borrowers with a revolving balance.

Figure 1: Total Credit Card Balances
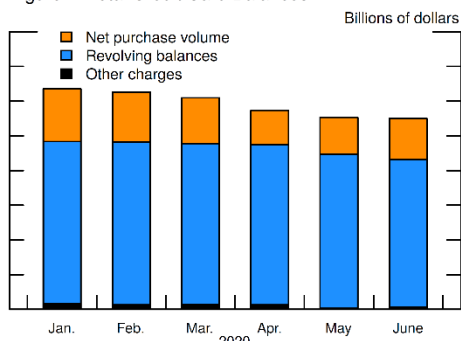
Note: Net purchase volume is new consumer purchases using credit cards less any prepayment of these purchases. Revolving balance is the previous statement balance minus any payments. Other charges are finance charges, fees, and other charges posted to the account.
Source: FR-Y14M.

Figure 2: Payments on Revolver Accounts
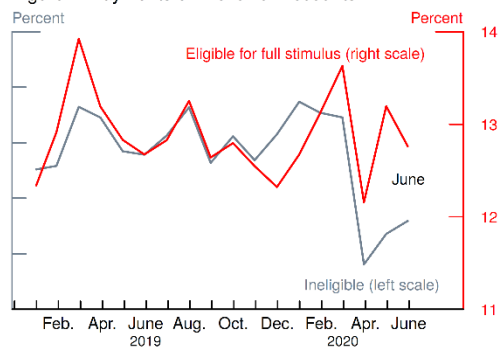
Note: Payments in excess of minimum due are shown as a percent of previous statement balance. Eligible for full stimulus are borrowers with reported individual (household) income of less than $75,000 ($150,000). Ineligible are borrowers with individual (household) income of more than $100,000 ($200,000).
Source: FR-Y14M.

[1] The Y-14M data set contains monthly information on all credit cards issued by the largest banks that are involved in stress testing. Our sample, which excludes private-label and secured cards, covers approximately 73 percent of credit card balances in the Call Reports. In addition, the data set captures information only on individual credit card accounts and, hence, does not provide a complete picture of household expenditures and credit usage.

Figure 3: February to June Purchase Volume Growth, by Income
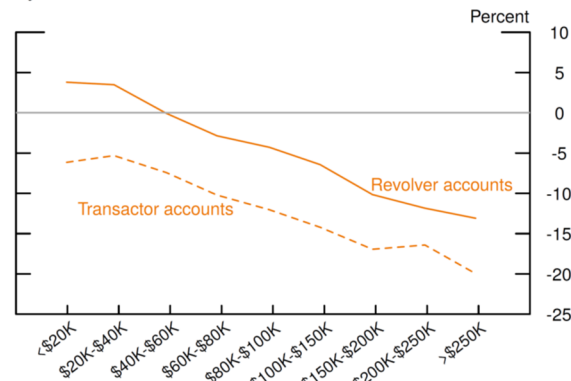
Note: Purchase volume growth from February to June. Income is measured as of January 2020.
Source: FR-Y14M.

At the onset of the shutdown in April, payments for these borrowers declined, though they subsequently increased. The increase in May payments was higher for borrowers estimated to be eligible to receive CARES Act stimulus checks (the red line), and the June level of repayment rates for these borrowers stayed fairly high, consistent with some borrowers using a portion of their checks to pay down existing debt. The combination of lower purchase volume and payments led to a decrease in the overall share of accounts with revolving balances (not plotted), which fell in May and June to below 44 percent, its lowest level since the data were first collected in 2014.

Consumer behavior during the shutdown varies with how individuals typically use their credit cards. We separate credit card accounts into two categories based on how the cards are used: transactor accounts, where the full balance was always paid each month, and revolver accounts, where balances were revolved at least once over the past 12 months.[2] Typically, transactor accounts are less sensitive to changes in lending standards. Figure 3 shows the change in credit card purchase volume from February to June by account holder income (along the horizontal axis). The downward slopes for transactor accounts (dashed line) and revolver accounts (solid line) show that higher-income individuals in both categories reduced purchase volume by more than lower-income individuals. This trend likely reflects the decrease in nonessential spending such as restaurants and travel during the pandemic, which accounts for a larger fraction of high-income individuals' discretionary credit card spending. At the same time, revolver accounts did not reduce their purchase volume as much as transactor accounts at all levels of income (the solid line lies above the dashed line). On average, the difference in the change in purchase volume between revolver and transactor accounts was about 7 percentage points.

The purchase volume decline may be larger for transactor accounts than revolver accounts for two reasons. First, some revolver accounts, particularly those of low-income borrowers, may be used to fund essential purchases, such as food. These borrowers may not have been able to cut their spending much further. Second, the initial decline in spending lowered credit utilization, and some consumers who revolve may have used this extra liquidity to spend more in subsequent months. Return to Financing Conditions text

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[2] More than 60 percent of revolvers had revolving balances in every month over the past year.

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Appendix

Technical Note on Financial Conditions Indexes

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

Overview of Selected FCIs

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

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

Financing Conditions

The first index in the table, the staff FCI for nonfinancial corporations, measures financing conditions for nonfinancial corporations.[1] This index is constructed as the difference in equity returns between two portfolios of firms with credit ratings above and just below investment grade. To the extent that speculative-grade firms are more sensitive to changes in financing conditions than investment-grade firms but have similar exposure to other shocks, movements in this index provide a measure of changes in financing conditions for nonfinancial corporations.

The second index in the table measures the net share of domestic banks reporting tighter lending standards across all core loan categories in the Senior Loan Officer Opinion Survey on Bank Lending Practices. Banks' responses for a given loan category are weighted by banks' holdings of those loans on their balance sheets.[2]

The other FCIs are constructed by aggregating a large set of financial variables into a summary series using various statistical methods. While these indexes provide a useful summary of broad financial market developments, the movements in these indexes may reflect both changes in financing conditions and other shocks to the economy.

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[1] This index was first discussed in the box "Financial Conditions Indexes" in the Financing Conditions for Businesses and Households section of the September 2018 Tealbook A.

[2] This index is an updated version of the index developed in William F. Bassett, Mary Beth Chosak, John C. Driscoll, and Egon Zakrajsek (2014), "Changes in Bank Lending Standards and the Macroeconomy," *Journal of Monetary Economics,* vol. 62 (March), pp. 23–40. The current index uses a new weighting approach for each loan category.

Selected Financial Conditions Indexes

Staff FCI for Nonfinancial Corporations

Standard deviations

Daily

↑Tightening

Sept. 2

Standard deviations

July FOMC
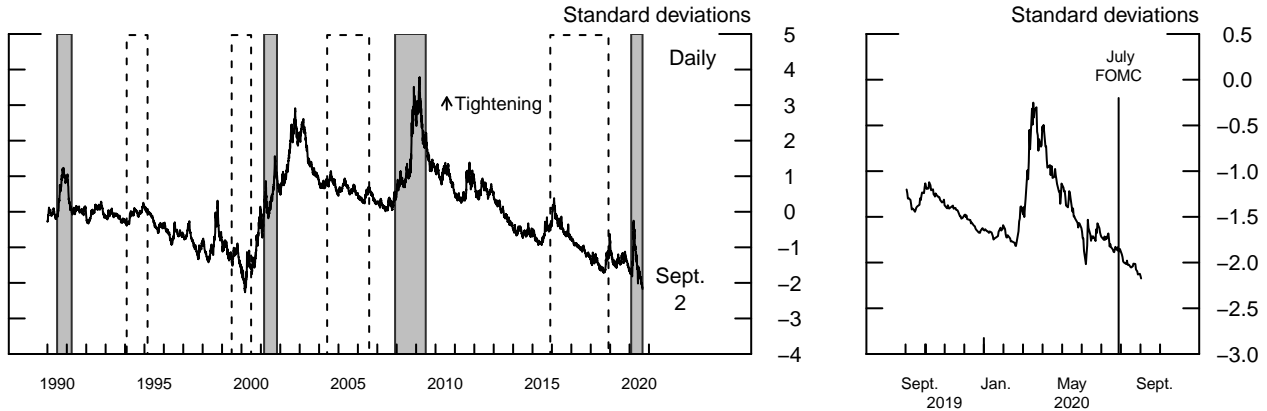
Note: The financial conditions index (FCI) is the deviation from the long–run relation between the systematic components of the cumulative log returns of 2 portfolios of firms with credit ratings above and just below investment grade. The systematic components are derived from the 5–factor Fama–French asset pricing model, augmented with the momentum and quality minus junk factors.
Source: CRSP; Yahoo Finance; Moody's Bond Ratings; Ken French website; AQR Capital Management website.

SLOOS Bank Lending Standards Index
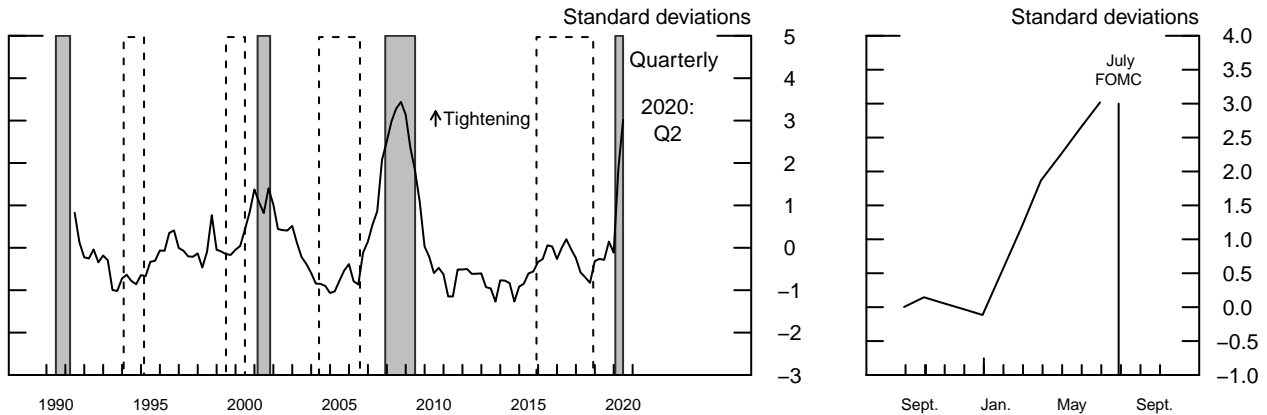
Standard deviations

Quarterly

2020: Q2

↑Tightening

Standard deviations

July FOMC

Note: The index is a weighted average of the net percentage of domestic banks tightening standards for 11 loan categories, with weights given by the size of each loan category on banks' balance sheets.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices.

Mean and Range of External FCIs

Standard deviations

Monthly

↑Tightening

Sept. 2020

Standard deviations

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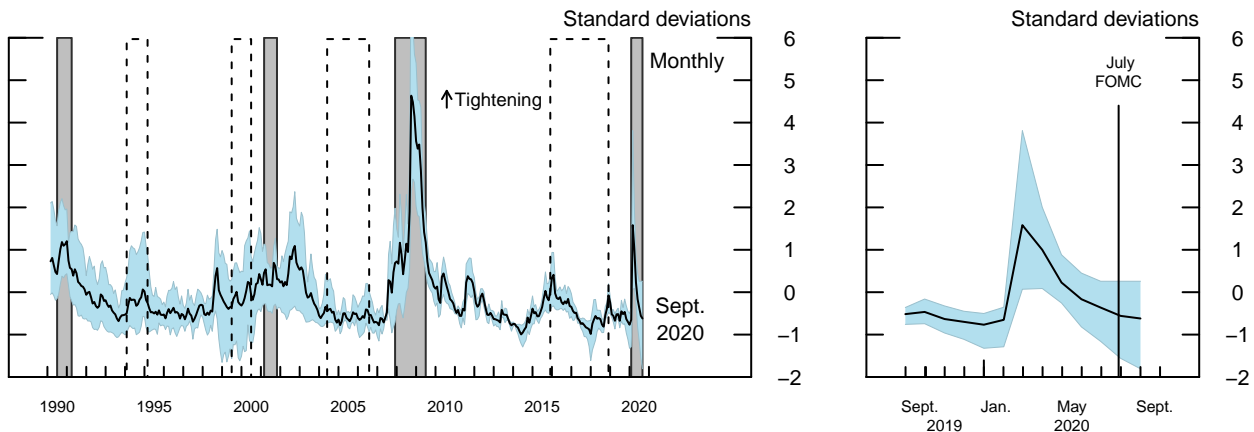
Note: Mean FCI represents the mean of FCIs developed by Goldman Sachs and the Federal Reserve Banks of Chicago, St. Louis, and Kansas City. The blue shaded region represents the range of these 4 standardized FCIs.
Source: Bloomberg; Federal Reserve Banks of Chicago, St. Louis, and Kansas City.

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

Financing Conditions

Selected Financial Conditions Indexes (continued)

Goldman Sachs FCI

Standard deviations — Daily — ↑Tightening — Sept. 1

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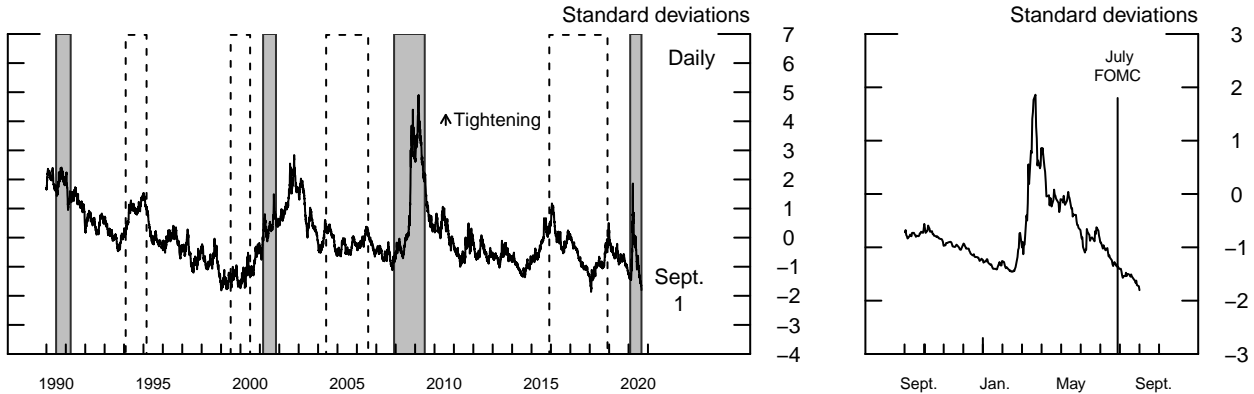
Note: The index is a weighted average of 5 financial variables: the federal funds rate, the 10–year Treasury yield, the triple–B yield spreads to Treasury, the S&P price–to–earnings ratio, and the broad value of the U.S. dollar. Weights are pinned down by the contribution of each financial variable on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

Chicago Fed NFCI

Standard deviations — Weekly — ↑Tightening — Aug. 28

Standard deviations — July FOMC
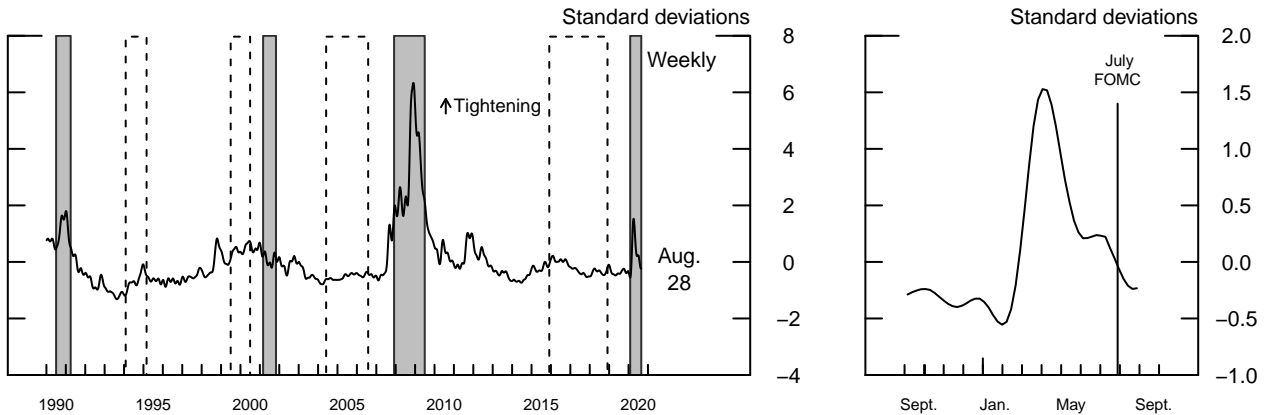
Note: The index is based on 100 financial variables related to money markets (28 indicators), debt and equity markets (27 indicators), and the banking system (45 indicators). The index is weekly and is derived using a dynamic factor model.
  Source: Federal Reserve Bank of Chicago.

St. Louis Fed Financial Stress Index

Standard deviations — Weekly — ↑Tightening — Aug. 28

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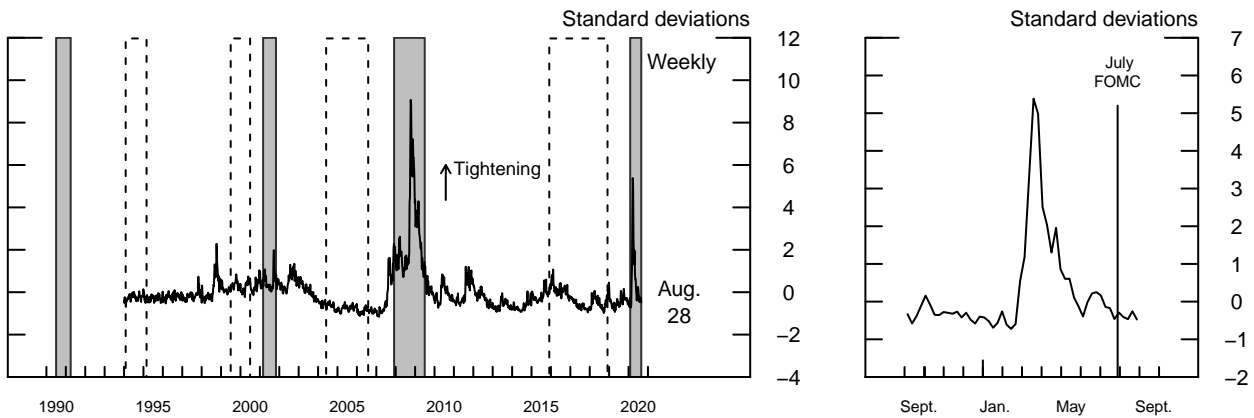
Note: The index is the principal component of 18 variables, including short– and long–term Treasury yields, corporate yields, money market and corporate bond spreads, bond and stock market volatility indicators, breakeven inflation rate, and the S&P 500 index.
  Source: Federal Reserve Bank of St. Louis.

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

Financing Conditions

Selected Financial Conditions Indexes (continued)

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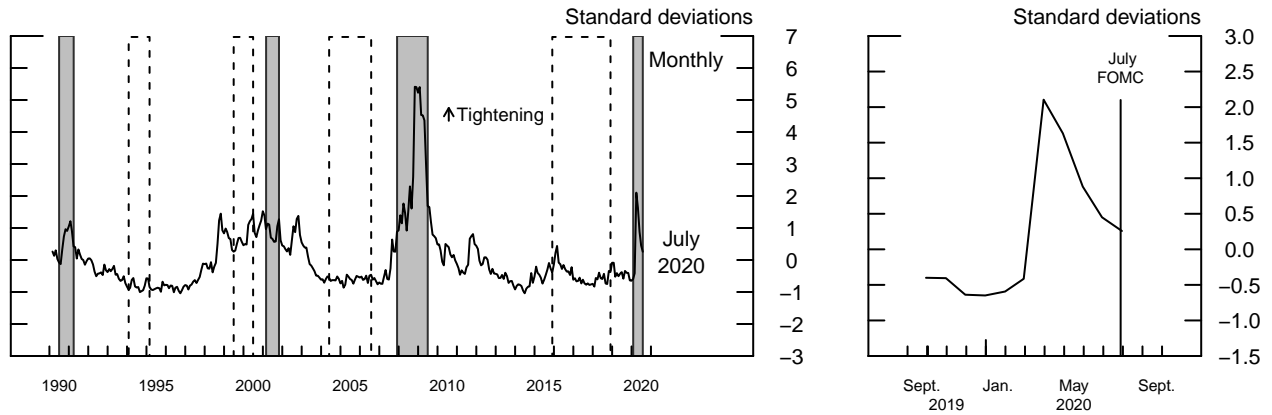
Note: The index is the principal component of 11 financial variables, including short– and long–term interest rates, corporate and consumer yield spreads, the VIX, and the volatility of bank stock prices.
Source: Federal Reserve Bank of Kansas City.

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

Financing Conditions

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Risks & Uncertainty

Risks and Uncertainty

ASSESSMENT OF RISKS

As we noted earlier, the future course of the COVID-19 pandemic and its consequences for the economy remain the key risks for our forecast, and we continue to see uncertainty as highly elevated with risks skewed to the downside. In light of the significant upward revisions we have made to the baseline forecast since the July Tealbook, we see less scope for further upside surprises and thus view the risks to our outlook as more skewed to the downside than in the previous projection. Accordingly, we include a new "Slower Recovery" scenario, where we explore the possibility that the recent better-than-expected data might be obscuring more persistent damage induced by the pandemic. In addition, we view the likelihood of our "Faster Recovery" scenario coming to pass as lower than in recent Tealbooks.

We also again consider a "Second Waves" scenario where the infection rate surges in the fourth quarter both in the United States and abroad, putting pressure on health-care systems and leading to the reinstatement of economically costly lockdowns. However, this scenario, as well as the closely related "Prolonged Slump" scenario, appears less probable than previously, and we now regard a "Second Waves" scenario as less likely than the baseline. In the United States, the explosive growth in infections seen in some states during the summer has ceased without resort to economy-wide lockdowns. Moreover, thus far, the U.S. economy seems to have weathered both virus-related shocks and persistent uncertainty about the progression of the virus better than we had expected. We view both of these developments as favoring the possibility that avoiding the rapid spread of the virus may be consistent with a greater level of economic activity than we had previously thought. At the same time, recent flare-ups of the virus in countries that apparently had the virus well under control a month or two ago are a reminder that the "Second Waves" scenario remains plausible. Indeed, for the foreign economies, we currently assign an increased probability of a second wave compared with July even while we now think it is somewhat less probable domestically.

ALTERNATIVE SCENARIOS

This section describes several alternative scenarios simulated using the FRB/US and SIGMA models as well as a newly developed staff model, US-FLM, that features labor market

Risks & Uncertainty

and financial frictions.[1] In all scenarios, the federal funds rate follows the new policy rule used for the baseline projection. In particular, the federal funds rate rises from the effective lower bound (ELB) in the quarter after the four-quarter-average core inflation rate exceeds the target rate of 2 percent and the output gap is positive. In addition, we assume that policymakers do not adjust the federal funds rate in response to a positive output gap.[2]

Slower Recovery (US-FLM, SIGMA)

In the baseline forecast, the staff assumes that the economy recovers at a steady pace without serious setbacks. Indeed, recent data have largely surprised us to the upside. However, the huge swings in the data over the past two quarters—largely triggered by the imposition and relaxation of mandatory social distancing—may obscure developments, both domestically and abroad, that could cause the recovery to be much slower than assumed in the Tealbook projection. In general, the recessionary dynamics such as heightened pessimism and risk aversion generated by the shock earlier in the year may be more intense and persistent than we have assumed and may be amplified by disruptions in credit markets. Moreover, frictions in the reallocation of resources away from sectors most affected by the pandemic may cause lower productivity growth.

In this scenario, global aggregate demand falls significantly below baseline beginning in 2020:Q4, while frictions in the reallocation process reduce structural productivity and decrease the quality of new job matches, causing greater turnover. Over the longer term, labor supply remains persistently depressed. As a result of these factors, potential output growth is noticeably lower than in the baseline. Limited fiscal and monetary policy space abroad amplifies the effect of these factors on foreign economies. Consequently, foreign demand contracts more than domestic demand, and net exports drop 0.5 percent of GDP below baseline by the end of 2020. The slower pace of economic activity against the background of the high level of indebtedness in the nonfinancial corporate sector causes borrowing spreads to rise 60 basis points above the baseline by mid-2021.

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[1] US-FLM is a new DSGE model that enhances the model developed by Gertler, Sala, and Trigari. See Mark Gertler, Luca Sala, and Antonella Trigari (2008), "An Estimated Monetary DSGE Model with Unemployment and Staggered Nominal Wage Bargaining," *Journal of Money, Credit, and Banking,* vol. 40 (December), pp. 1713–64. In addition to the labor market frictions in that paper, the US-FLM also features financial market frictions, household decisionmaking regarding hours worked and labor force participation, and an expanded range of data employed during estimation, including the unemployment rate and credit spreads.

[2] In addition, all scenarios assume that federal fiscal policy and the Federal Reserve's balance sheet policies are the same as in the baseline.

GDP growth in 2020 is 1.1 percentage points lower than in the baseline forecast, and the unemployment rate is 8.1 percent at the end of the year, 0.7 percentage point above the baseline. Growth in 2021 and 2022 is much weaker than in the baseline, and the level of GDP returns to its pre-pandemic level only in 2023. The unemployment rate moves back toward its long-run natural rate only very gradually and does not reach it until the end of 2025. Inflation falls below 1 percent in 2021.[3] The combination of accommodative monetary policy and weaker potential output causes inflation to rebound quickly, reaching 2 percent by 2024 and almost 2½ percent by the end of 2025. The federal funds rate rises above 0.25 percent—our criterion for "liftoff"—in 2025:Q3 as in the baseline, but it rises more quickly thereafter, in line with the higher path for inflation.

Second Waves (FRB/US, SIGMA)

The baseline projection assumes that social-distancing measures both in the United States and in the foreign economies will have been relaxed somewhat further by early next year. The number of new infections, however, is still elevated in the United States, and new cases have been flaring up in several European and Asian countries that appeared to have the virus under control earlier in the summer. Moreover, the onset of the flu season and a rise in indoor social activities during the fall and winter may increase the risk of a surge in infections in the Northern Hemisphere. An increasing number of deaths per day and rising hospitalization rates could put health-care systems under renewed stress, raising the prospect that extensive and economically costly mitigation measures may become unavoidable. With financial-sector vulnerabilities elevated in the aftermath of the initial pandemic shock, the reinstatement of these measures could be particularly damaging to the economy as firms' and households' access to financing becomes increasingly impaired, while limited policy space for additional fiscal support may cause income to fall more sharply than during the first wave of social distancing. Additionally, the supply side of the economy could suffer more than in the baseline because of greater permanent job loss, a spike in firm exits, and reduced investment.[4]

In this scenario, we illustrate the effects of a resurgent pandemic. Specifically, a rebound in new cases in many U.S. states leads to widespread and persistent resumption of intense social

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[3] The sharp decline in inflation in this scenario reflects a relatively high sensitivity of inflation to aggregate demand in the US-FLM model compared with FRB/US and a number of DSGE models estimated on recent samples.

[4] This scenario assumes that, over much of the medium term, the natural rate of unemployment averages 1.4 percentage points above the baseline, consistent with the staff's estimate of the extent to which mandatory social distancing and associated impairments in labor market functioning temporarily raise the natural rate of unemployment. In addition, the labor force participation rate averages 0.6 percentage point below the baseline over this period. Both the natural rate of unemployment and the participation rate converge to the baseline thereafter.

Alternative Scenarios

Risks & Uncertainty

- Tealbook baseline and extension
- Slower recovery
- Second waves
- Prolonged slump
- Faster recovery

Real GDP

4–quarter percent change

Unemployment Rate

Percent

PCE Prices excluding Food and Energy

4–quarter percent change

Federal Funds Rate

Percent
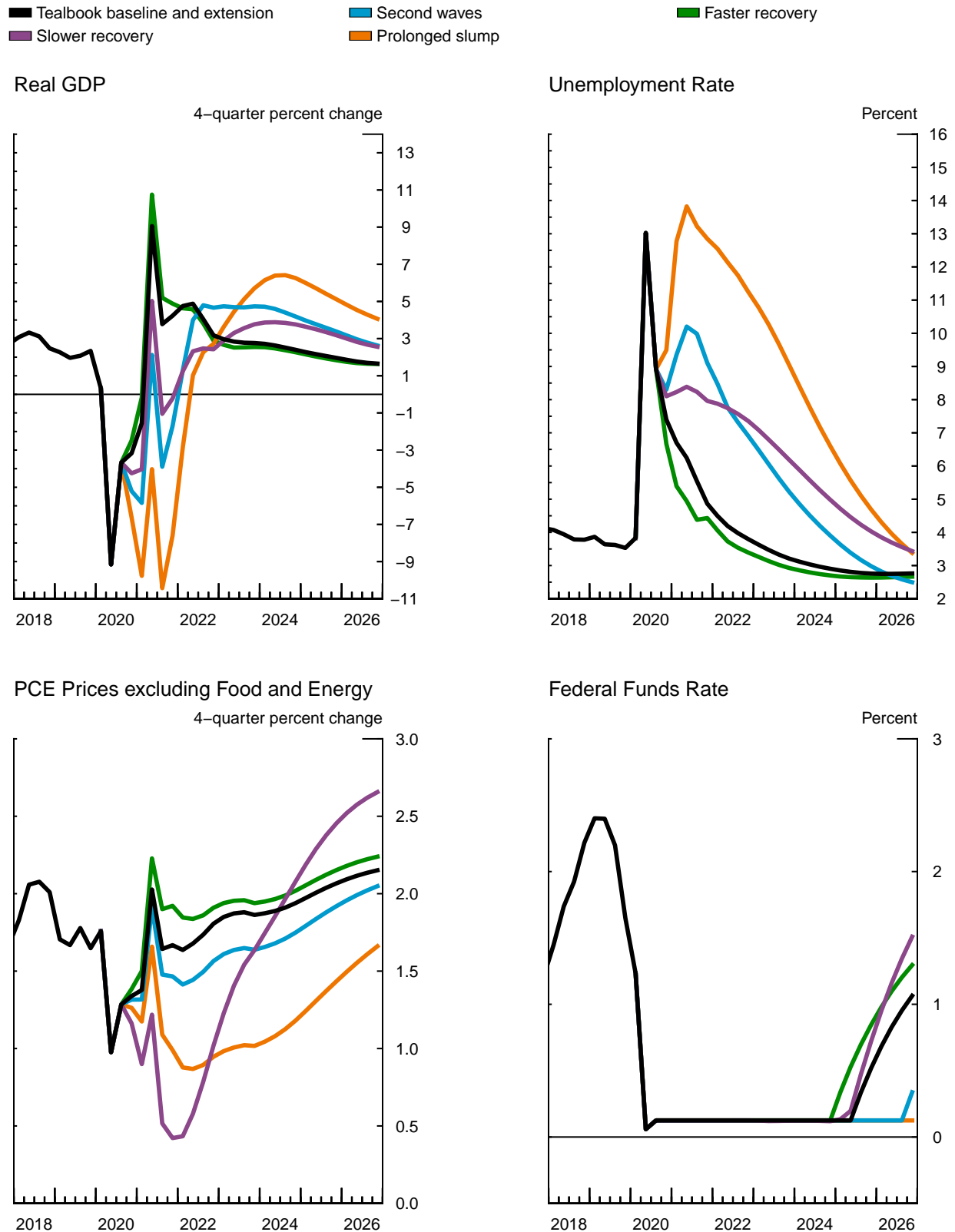
Note: Events such as the COVID–19 pandemic are unprecedented in the data used to construct the confidence intervals usually shown in this exhibit. We judge that our usual methodology is not currently reliable, particularly for the near–term projections, and thus confidence intervals are not presented.

Alternative Scenarios

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

Measure and scenario	2020 H1	2020 H2	2020	2021	2022	2023	2024	2025-26
Real GDP								
Tealbook baseline and extension	-19.5	16.4	-3.2	4.2	3.2	2.8	2.4	1.8
Slower recovery	-19.5	13.8	-4.2	-.2	2.4	3.8	3.8	2.9
Second waves	-19.5	11.6	-5.2	-1.7	4.7	4.7	4.2	3.0
Prolonged slump	-19.5	8.2	-6.6	-7.6	2.7	5.7	6.3	4.6
Faster recovery	-19.5	18.1	-2.5	4.9	2.9	2.5	2.3	1.7
Unemployment rate[1]								
Tealbook baseline and extension	13.0	7.4	7.4	4.9	3.8	3.2	2.9	2.8
Slower recovery	13.0	8.1	8.1	8.0	7.4	6.2	5.0	3.4
Second waves	13.0	8.3	8.3	9.1	6.9	5.2	3.9	2.5
Prolonged slump	13.0	9.5	9.5	12.8	11.2	9.0	6.6	3.4
Faster recovery	13.0	6.7	6.7	4.4	3.4	2.9	2.7	2.7
Total PCE prices								
Tealbook baseline and extension	-.3	2.4	1.1	1.7	1.8	1.9	1.9	2.1
Slower recovery	-.3	2.1	.9	.4	1.0	1.6	2.1	2.6
Second waves	-.3	2.4	1.0	.9	1.6	1.8	1.9	2.1
Prolonged slump	-.3	1.5	.6	.2	.9	1.2	1.6	1.8
Faster recovery	-.3	2.7	1.2	2.0	1.9	1.9	2.0	2.2
Core PCE prices								
Tealbook baseline and extension	.3	2.4	1.3	1.7	1.8	1.9	1.9	2.1
Slower recovery	.3	2.0	1.2	.4	1.0	1.6	2.1	2.6
Second waves	.3	2.3	1.3	1.5	1.6	1.6	1.7	2.0
Prolonged slump	.3	2.2	1.3	1.0	.9	1.0	1.2	1.5
Faster recovery	.3	2.4	1.4	1.9	1.9	1.9	2.0	2.2
Federal funds rate[1]								
Tealbook baseline and extension	.1	.1	.1	.1	.1	.1	.1	1.1
Slower recovery	.1	.1	.1	.1	.1	.1	.1	1.5
Second waves	.1	.1	.1	.1	.1	.1	.1	.3
Prolonged slump	.1	.1	.1	.1	.1	.1	.1	.1
Faster recovery	.1	.1	.1	.1	.1	.1	.1	1.3

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

Risks & Uncertainty

distancing starting in the fourth quarter of 2020. Similarly, renewed outbreaks in many foreign economies necessitate a revival of strict social-distancing measures abroad. Because we believe governments and private agents have learned how to better deal with these disruptions, the social-distancing measures are somewhat less damaging to both the U.S. and foreign economies than in the first wave. Abroad, foreign GDP contracts about 6 percent in 2020 and remains flat in 2021, with growth about 4 percentage points below baseline, on average, in 2020 and 2021. Flight-to-safety flows to the United States lead to a 5 percent appreciation of the dollar.

In the United States, the broad reinstatement of social distancing along with the deterioration in financial conditions cause both consumption and investment to weaken, and the slump in foreign demand—together with the appreciation of the dollar—leads to lower exports. Disruptions associated with renewed social distancing drive up the unemployment rate, which peaks at 10.2 percent in the second quarter of 2021 and remains at an elevated level for the rest of the year. By the end of 2021, the level of U.S. GDP is 8.4 percent below its pre-recession peak and foreign GDP is 7.5 percent lower. The decline in aggregate demand causes core inflation to remain around 1.5 percent in 2021.

Compared with the baseline, the disruption to economic activity is more protracted, in part because of persistent damage to the functioning of labor and financial markets. Indeed, at the end of 2023, the unemployment rate is 5.2 percent, 0.9 percentage point above its assumed natural rate at that time. The persistent weakness of aggregate demand depresses inflation, which averages around 15 basis points below the baseline through 2025. The stubbornly low inflation causes the federal funds rate to remain at the ELB until 2026.

Prolonged Slump (FRB/US, SIGMA)

While the baseline projection assumes a vaccine will become available over the course of next year, the search for a vaccine and other effective therapies may drag on. Consequently, it may remain difficult to engage safely in many kinds of economic activity, and the start-and-stop approach to controlling the virus described earlier in the "Second Waves" scenario may become the only option for several years in many countries, causing a series of disruptions to businesses and households. In the face of these repeated episodes of transient, but intense, contractions, the fiscal and financial measures that supported households and firms through the first contraction may be unsustainable. In particular, high levels of debt and divergent views about the desirability and size of additional stimulus packages may cause fiscal support to be weaker than

during the first wave, contributing to a rise in pessimism and uncertainty associated with the recession.

In addition, factors such as high levels of nonfinancial corporate debt and resultant solvency risk, income losses faced by nonbank mortgage lenders and servicers, and unusually large, unsustainable budget deficits of state and local governments could pose a serious threat to financial stability. Moreover, while banks seem to have adequate levels of capital and bank lending has been supportive to economic activity thus far, capital ratios at a significant number of banks would likely fall near or below the required minimum in a scenario like the one considered here, creating a widespread curtailment of credit. Abroad, as breakouts become recurrent and additional fiscal support becomes increasingly limited, collapsing household and business confidence could push several vulnerable economies into financial crisis, possibly leading to significant social unrest as well as adverse spillovers to the United States.

In this scenario, the risk factors described above lead to a broad economic slump. The U.S. unemployment rate turns up again and peaks in the second quarter of 2021, when it averages 13.8 percent. Corporate borrowing spreads jump 260 basis points in the United States, 350 basis points in the advanced foreign economies (AFEs), and 600 basis points in the emerging market economies (EMEs), relative to the baseline. Flight-to-safety flows lead the dollar to appreciate 10 percent, and household and business sentiment drops around the world. At the trough of the contraction, the level of GDP in the United States is 14 percent below its peak; the drop is about 18 percent in both the AFEs and the EMEs.

With a sluggish recovery, the unemployment rate remains above 10 percent until mid-2023 and above the assumed longer-run natural rate of unemployment until 2025.[5] Correspondingly, core inflation drops to 1 percent in 2021 and remains in the range of 1 to 1.5 percent during the first half of the decade, held down by persistently weak demand, lower import prices, and a downward drift of long-term inflation expectations. The federal funds rate does not rise from the ELB until 2028.

Faster Recovery (FRB/US, SIGMA)

In the United States, the economic effects of social distancing on consumer spending and production appear to have been fading more rapidly than we had assumed. In the labor market,

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[5] This scenario also incorporates greater supply-side damage than in the baseline. The natural rate of unemployment rises 1.8 percentage points above the baseline, on average, over much of the medium term, and the labor force participation rate is lower by 0.5 percentage point.

after an initial surge in the unemployment rate, recovery has proceeded at a comparatively mild but steady pace. In the foreign economies, despite GDP surprising somewhat on the downside in the second quarter, more recent data on economic activity have been better than expected. This scenario considers the consequences of even faster economic normalization than projected in the current Tealbook both at home and abroad. In foreign economies, the level of GDP increases to almost 2 percent above baseline by the first quarter of next year, while a reversal of flight-to-safety flows contributes to a 3 percent depreciation of the dollar.

A quicker recovery might come from a number of sources. For example, households and businesses may be better able to sustain economic activity while containing the spread of the virus as in-person service providers work out ways to continue to operate their businesses safely, a greater share of the workforce adapts to the remote-work environment, and individuals find ways to participate in the economy while avoiding high-risk behavior. Greater confidence that a broad spectrum of economic activities is safe—perhaps facilitated by the widespread availability of instant testing—and that the virus is under control could help the economy normalize faster than assumed in the baseline forecast. In addition, the course of the pandemic itself may be less severe than we expect, perhaps because treatments that are more effective become available or because targeted social-distancing and isolation strategies are adopted in a timely manner.

In this scenario, as these positive developments unfold, social-distancing effects on spending and employment wind down faster and are eliminated almost completely by the end of this year both in the United States and abroad. Because of stronger economic activity, stock markets surge. The supply side of the economy requires several quarters to adjust to the rapid improvement in aggregate demand, leading to more upward pressure on inflation than in the baseline.

Stronger foreign demand, a weaker dollar, and the faster moderation of social distancing by the end of the year do not fully make up for the massive decline in U.S. economic activity in the first half; U.S. GDP is still down 2.5 percent over this year as a whole. The unemployment rate averages 6.7 percent in the fourth quarter, 0.7 percentage point lower than in the baseline, reflecting both the direct effect on activity of more moderate social-distancing measures and a reduction of some of the recessionary dynamics in the baseline. The unemployment rate declines rapidly toward its natural rate, falling to 5.4 percent by the first quarter of 2021. With stronger demand running ahead of supply, core inflation reaches 1.9 percent in 2021, 0.3 percentage point above the baseline. After 2021, the outcomes in this scenario are slightly better than in the baseline, and, as a result, the federal funds rate exits from the ELB in the first quarter of 2025, two quarters earlier than in the baseline.

MODEL-BASED ASSESSMENT OF RISK

The dominant source of current uncertainty—the COVID-19 pandemic—is without parallel in the data used to estimate our quantitative risk models, and the validity of these models relies on the strong assumption that forecast uncertainty remains related to the data in a way that is similar to what has occurred in the past. With that important caveat in mind, we show our usual exhibit that provides some perspective on the distribution of forecast errors one year ahead, conditional on measures of real economic activity, inflation, financial market conditions, and an index of overall macroeconomic uncertainty.[6] Considering the unprecedented declines in spending, production, and employment, it is not surprising that the model infers unusually wide and adversely skewed distributions for staff forecast errors over the next year. The distribution has narrowed since its peak in the spring but remains broader than at any time during the Great Recession, consistent with our judgmental assessment that uncertainty, while still very high, has diminished.

ALTERNATIVE MODEL FORECASTS

Given the unusual current circumstances of the pandemic, the FRB/US and EDO forecasts condition on the staff judgmental projection through the end of 2020. As shown in the "Alternative Model Forecasts" exhibit, the FRB/US model projects that GDP will grow 5.5 percent in 2021 and 4.3 percent, on average, in 2022 and 2023, about 1.3 percentage points faster than in the Tealbook baseline outlook.[7] The FRB/US model projects that private consumption growth and investment will rebound strongly in 2021 as low interest rates provide favorable financing conditions and the effects of temporary shocks fade.

With GDP growth in the FRB/US model's projection for 2021 and 2022 stronger than its potential pace of 2.0 percent, the output gap turns positive at the end of 2021 and rises over the projection period until it reaches 5.7 percent at the end of 2023, an unprecedentedly high level. The unemployment rate moves down gradually and reaches 3.6 percent by the end of 2023, somewhat higher than the staff projection of 3.2 percent. One key reason for FRB/US's higher unemployment rate projection is the model's higher estimate of the natural rate of unemployment

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[6] This analysis uses a framework similar in spirit to quantile regressions using past forecast errors as the dependent variable. The variables that serve as inputs into the model are shown in the exhibit "Macroeconomic Indexes Underlying the Conditional Distributions of Staff Forecast Errors 1 Year Ahead."

[7] We condition the FRB/US forecast on staff projections for federal government spending and tax policies, foreign GDP growth, foreign inflation, and the paths of the U.S. dollar and oil prices. The federal funds rate is governed by the same policy rule as in the baseline.

Conditional Distributions of Staff Forecast Errors 1 Year Ahead

Unemployment Rate

GDP Growth

CPI Inflation

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

Macroeconomic Indexes Underlying the Conditional Distributions
of Staff Forecast Errors 1 Year Ahead

Risks & Uncertainty

Financial Market Conditions

Standard deviations

Source: Staff estimates.

Macroeconomic Uncertainty

Standard deviations

Source: Staff estimates.

Real Activity

Standard deviations

Source: Staff estimates.

Inflation

Standard deviations

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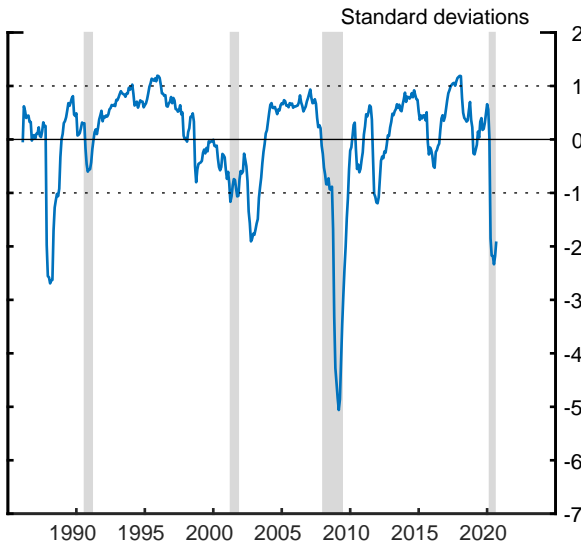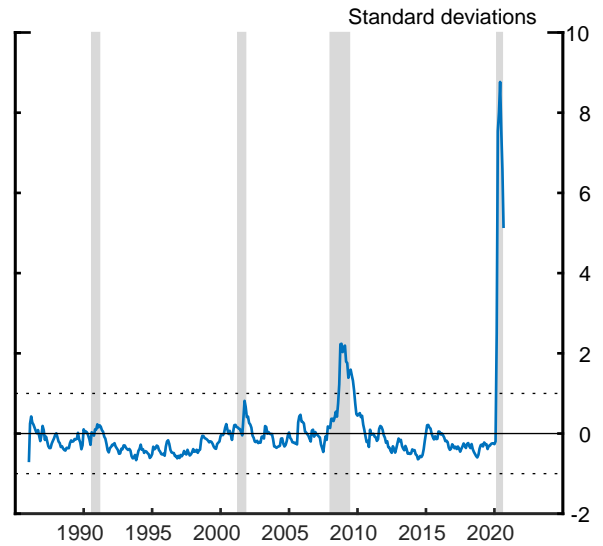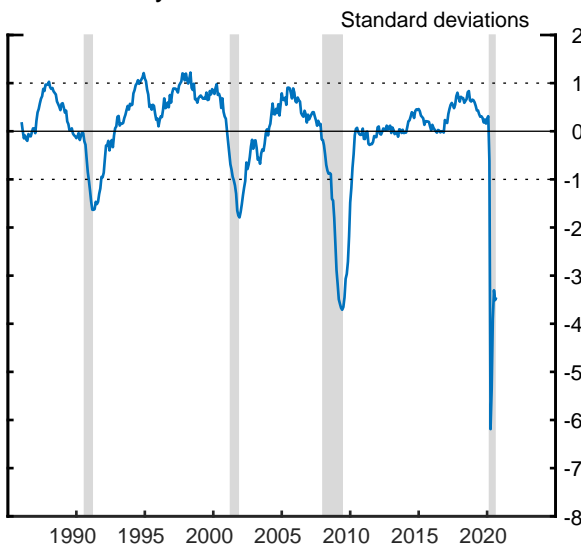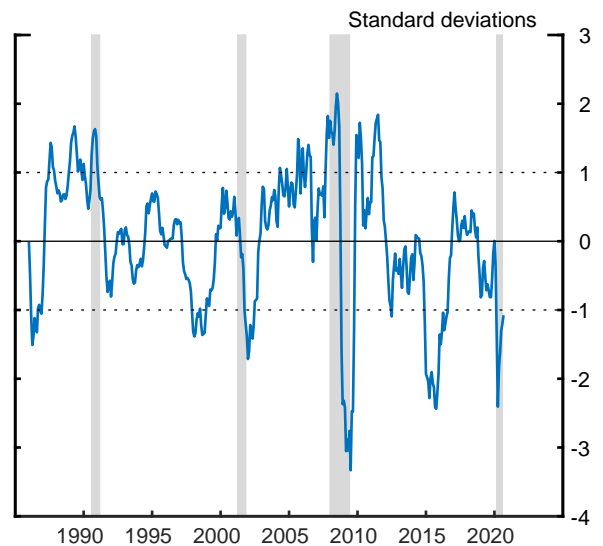
Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

of 5.6 percent in 2020:Q4 based on the results of a statistical filtering exercise. Importantly, unlike the staff assumption, which has the natural rate falling to 4.3 percent at the end of the medium term, the FRB/US model mechanically assumes a constant natural rate over the forecast period. Core inflation gradually moves up from 1.3 percent in 2020 to 1.7 percent in 2023, held below 2 percent by persistently low wages and long-term inflation expectations in the model forecast.

The EDO model projects GDP growth of 4.9 percent in 2021 and 3.4 percent, on average, in 2022 and 2023, well above the model's estimate of the average growth rate of potential output over those years of 2.4 percent.[8] Core inflation increases gradually over the projection period from 1.5 percent at the end of 2021 to 1.9 percent in 2023, still below its longer-run level of 2 percent. The model predicts unemployment will decline to 4.6 percent by the end of 2023 as economic activity recovers. The federal funds rate rises to 3.8 percent over the forecasting horizon.[9]

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[8] In the case of the EDO model forecast, the federal funds rate is governed by the model's estimated rule.

[9] This high value for the federal funds rate has two sources. First, the EDO model assumes that, in the absence of shocks, the federal funds rate would converge to a value around 3 percent. Second, the natural rate of unemployment in EDO is 5.2 percent, so a 4.3 percent unemployment rate is associated with a sizable positive output gap, which puts the federal funds rate above its long-run value.

Alternative Model Forecasts

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

Measure and projection	2020		2021		2022		2023	
	Previous Tealbook	Current Tealbook	*Previous Tealbook*	Current Tealbook	*Previous Tealbook*	Current Tealbook	*Previous Tealbook*	Current Tealbook
Real GDP								
Staff	*-5.6*	-3.2	*5.1*	4.2	*2.9*	3.2	*2.2*	2.8
FRB/US[1]	*-5.6*	-3.2	*5.1*	5.5	*3.1*	4.5	*n.a.*	4.1
EDO[1]	*-5.6*	-3.2	*6.3*	4.9	*4.2*	3.6	*3.6*	3.2
Unemployment rate[2]								
Staff	*8.9*	7.4	*5.4*	4.9	*4.7*	3.8	*4.2*	3.2
FRB/US[1]	*8.9*	7.4	*7.8*	6.6	*7.2*	5.1	*n.a.*	3.6
EDO[1]	*10.7*	7.9	*5.9*	5.3	*4.9*	4.7	*4.7*	4.6
Total PCE prices								
Staff	*1.0*	1.1	*1.7*	1.7	*1.7*	1.8	*1.9*	1.9
FRB/US[1]	*1.0*	1.1	*1.5*	1.6	*1.4*	1.7	*n.a.*	1.7
EDO[1]	*1.0*	1.0	*1.3*	1.5	*1.5*	1.7	*1.8*	1.9
Core PCE prices								
Staff	*1.1*	1.3	*1.7*	1.7	*1.7*	1.8	*1.9*	1.9
FRB/US[1]	*1.1*	1.3	*1.6*	1.7	*1.4*	1.7	*n.a.*	1.7
EDO[1]	*1.1*	1.3	*1.3*	1.5	*1.5*	1.7	*1.8*	1.9
Federal funds rate[2]								
Staff	*.1*	.1	*.1*	.1	*.1*	.1	*.4*	.1
FRB/US[1]	*.1*	.1	*.1*	.1	*.1*	.1	*n.a.*	.1
EDO[1]	*.1*	.1	*2.1*	2.4	*3.1*	3.3	*3.7*	3.8

1. The FRB/US and EDO forecasts condition on the staff forecast for 2020. The EDO projections integrate over the posterior distribution of model parameters. Projections labeled "*Previous Tealbook*" are forecasts conditional on information available at the close of the July Tealbook.

2. Percent, average for Q4.

n.a. Not available.

Decomposition of FRB/US Real GDP Growth Forecast
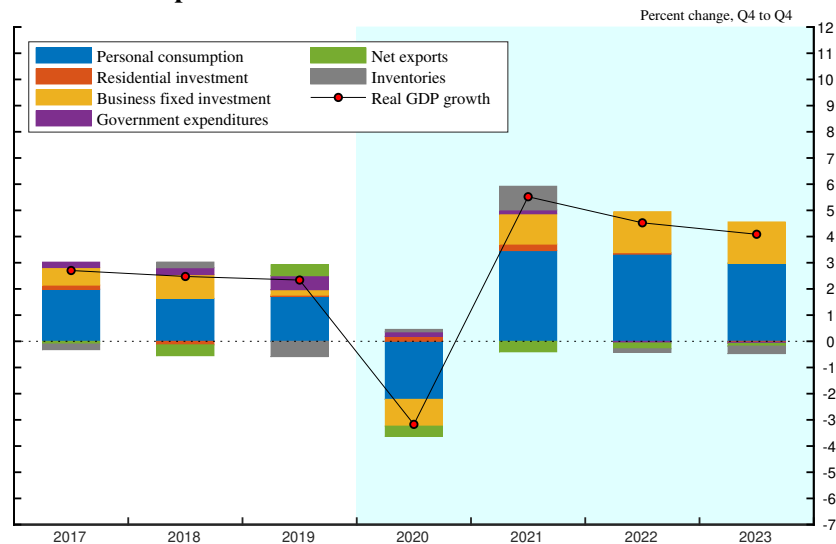
Note: Shading represents the projection period.
Source: Staff calculations.

Risks & Uncertainty

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Monetary Policy Strategies

On August 27, the Committee released an updated Statement on Longer-Run Goals and Monetary Policy Strategy (henceforth, the consensus statement), which broadly outlines its new strategy for achieving its Congressionally mandated goals of maximum employment and price stability. Notably, the new statement acknowledges the challenges posed by the proximity of the federal funds rate to the effective lower bound (ELB). Under its new strategy, the Committee seeks to mitigate "shortfalls" rather than "deviations" of employment from its maximum level. The Committee also "seeks to achieve inflation that averages 2 percent over time," with the indication that, "following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time."

In response to the revisions to the consensus statement, the staff has introduced new baseline assumptions for the path of the federal funds rate (see the Domestic Economic Developments and Outlook section of this Tealbook). Here we discuss a range of alternative policy strategies for setting the federal funds rate and their associated interest rate paths and macroeconomic outcomes, including new strategies that incorporate elements of the new consensus statement. In particular, we consider an expanded set of policy strategies that only react to shortfalls of employment from an estimate of its maximum level and that contain "makeup" elements by which policymakers seek to achieve inflation outcomes above 2 percent when inflation has been running below 2 percent for some time. This temporary overshooting of the longer-run inflation target will likely be desirable to keep longer-term inflation expectations centered on 2 percent. We continue to include several policy strategies that, while arguably inconsistent with aspects of the revised consensus statement, nonetheless provide well-known benchmarks for comparison.

We begin with a description of the changes made to the strategies discussed within this section. While these changes are intended to reflect elements of the new consensus statement, they should not be viewed as an attempt to summarize the Committee's monetary policy strategy. Moreover, the staff may make additional changes to the strategies in this section as a result of further analysis and model development. As in past Tealbooks, we explore the prescriptions of a range of simple rules and optimal

control simulations. We conclude by providing updated estimates of the equilibrium real federal funds rate in the longer run.

CHANGES IN RESPONSE TO THE NEW CONSENSUS STATEMENT

Here we briefly describe the changes implemented within this section.

New Gap Measures

- To reflect the consensus statement's focus on labor developments beyond movements in the projected unemployment rate gap, we introduce simulations that use the gap between the level of the employment-to-population (EPOP) ratio and the staff's estimate of its trend level (henceforth, the EPOP gap) as a measure of resource slack. This measure reflects variations in both the unemployment rate gap and the gap in labor force participation from its estimated trend.

- The top panel in the first exhibit shows this EPOP gap alongside the output gap and the unemployment rate gap. Overall, the three measures of resource slack co-move fairly strongly in the past and in the staff projection, with the EPOP gap being a bit less volatile than the unemployment rate gap.[1]

- The revised consensus statement emphasizes that it will likely be appropriate to aim for inflation moderately above 2 percent following periods during which inflation has run persistently below 2 percent. Accordingly, we introduce a new inflation makeup measure, called the "discounted average inflation gap," that accumulates historical deviations of inflation from 2 percent but flexibly allows them to become "bygones" gradually over time. Our calibration of this measure assigns a reasonably large weight to inflation misses over roughly the past five years. (See the box "A Discounted Average Inflation Gap" for technical details on the construction of this measure.) We use this new measure in optimal control simulations and in a new simple rule, described later.

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[1] At least a part of the smaller volatility of the EPOP gap relative to the unemployment rate gap is that both measures depend on the volatility of the employed population, but the EPOP gap is scaled by the working-age population, whereas the unemployment rate gap is scaled by the labor force.

- As discussed in the box, the discounted average inflation gap is a flexible measure that can be initialized to begin accumulating inflation misses at different dates. The bottom panel of the first exhibit shows the paths of this discounted average inflation gap using two illustrative initialization periods along with the path of the contemporaneous gap between four-quarter PCE inflation and 2 percent, all under the Tealbook baseline projection. Accumulating inflation misses starting in 2012 could reflect a desire to offset, at least in part, inflation misses since the release of the first consensus statement. Accumulating inflation misses starting in 2019 could reflect a desire to offset inflation misses since the FOMC undertook its strategic framework review. By late 2021, the discounted average inflation gap under either initialization period is either flat or has an upward trajectory despite the fact that inflation does not move above 2 percent until mid-2025 in the staff's projection. The 2021–25 trajectory reflects the discounting of larger previous inflation shortfalls that exceed the new smaller undershoots that are still occurring during that period. Overall, the gap shrinks fairly slowly, reflecting a backward-looking assessment of inflation in which past inflation undershoots become bygones only gradually. By contrast, the gap between contemporaneous four-quarter PCE inflation and the 2 percent target closes more quickly as inflation in the baseline projection moves close to 2 percent.

New Strategies

- We introduce a new simple rule, the asymmetric discounted average inflation targeting (ADAIT) rule, which responds to the EPOP gap and the discounted average inflation gap described above. This rule is "asymmetric" in that it responds only to shortfalls of EPOP from its trend level, consistent with policymakers seeking to mitigate shortfalls from maximum employment. In particular, the rule takes the following form:

$$R_t = 0.85R_{t-1} + 0.15(r^{LR} + 2 + 1.5\,D\,\bar{\pi}gap_t + 1.5\,\min(EPOPgap_t, 0)).$$

<div style="text-align: right">**Monetary Policy Strategies**</div>

The EPOP and Discounted Average Inflation Gaps

Monetary Policy Strategies

Measures of Resource Slack

Percent/percentage points

- Output gap
- EPOP gap
- Unemployment rate gap (inverted sign)

Tealbook projection ⟶
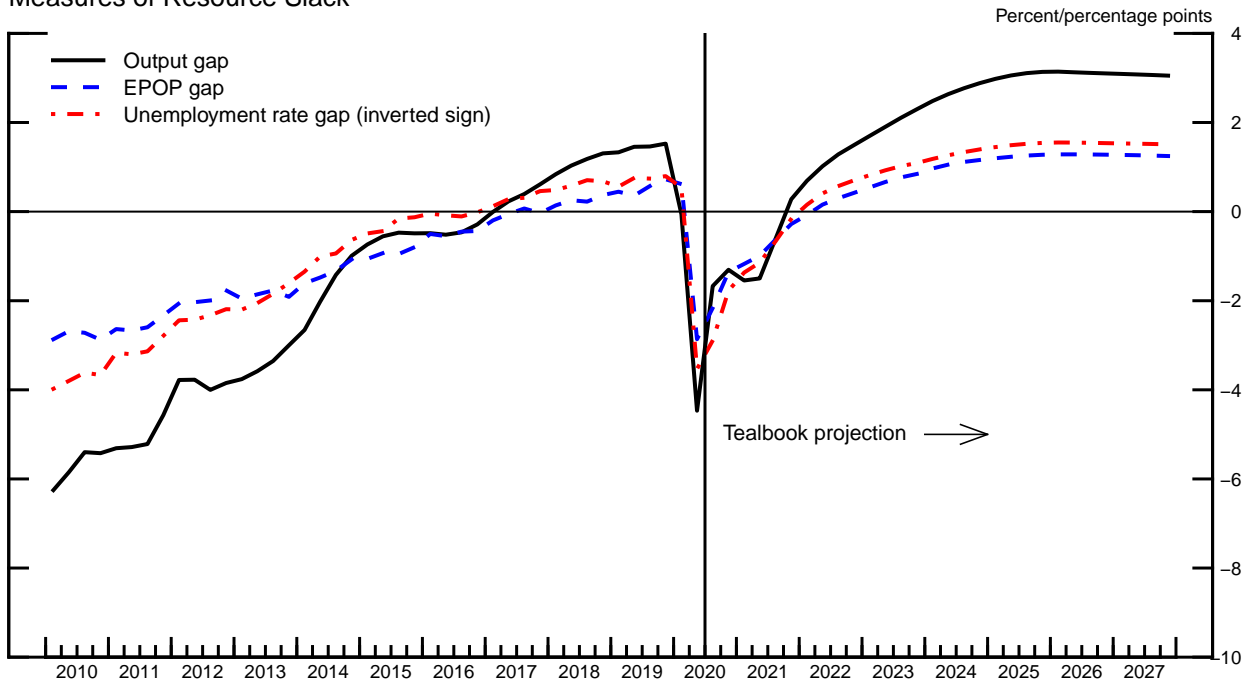
Note: Based on the Tealbook baseline projection. The unemployment rate gap is shown as the staff's estimate of the natural rate of unemployment less the actual unemployment rate to orient it similarly with the output and employment–to–population (EPOP) gaps.

Measures of Inflation Gaps

Percentage points

- Contemporaneous inflation gap
- Discounted average inflation gap (2019)
- Discounted average inflation gap (2012)
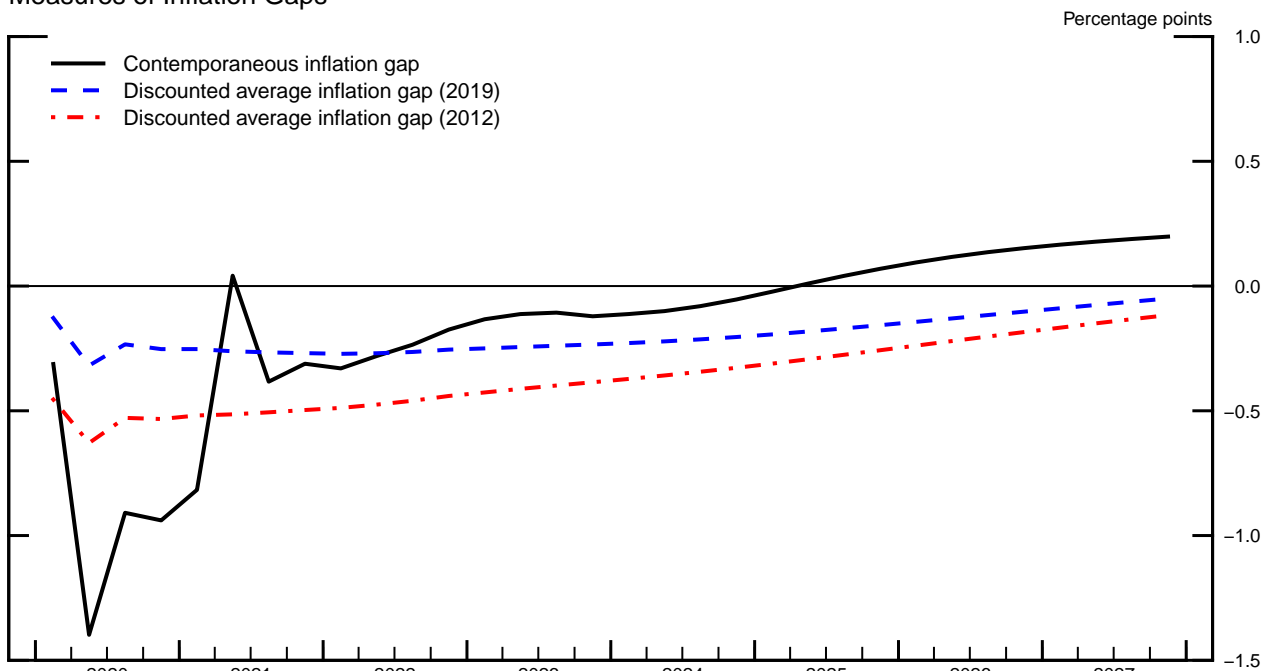
Note: The measures of inflation gaps are based on the Tealbook baseline projection of PCE inflation. The contemporaneous inflation gap is constructed as the difference between four–quarter PCE inflation and 2 percent.

Constructed in the form of the inertial Taylor (1999) rule, the ADAIT rule responds with inertia to movements in the new gap measures.[2]

- Beginning with this Tealbook, the optimal control simulations are conducted under a new specification of the loss function that uses the EPOP gap and the discounted average inflation gap described earlier, as opposed to the unemployment rate gap and the (contemporaneous) inflation gap under the previous specification. As a result, the optimal control exercises with an asymmetric weight on labor market slack feature both a makeup strategy regarding persistent inflation deviations and an approach that focuses on eliminating shortfalls from maximum employment.

NEAR-TERM PRESCRIPTIONS OF SELECTED SIMPLE POLICY RULES

The top panel of the second exhibit shows the near-term prescriptions for the federal funds rate from four simple policy rules: the inertial version of the Taylor (1999) rule, the Taylor (1993) rule, and the ADAIT rule described earlier under two different initializations of the discounted average inflation gap.[3] These simple rule prescriptions are not subject to the ELB on the policy rate and take as given the Tealbook baseline projections for the output gap, the EPOP gap, and core inflation, which are shown in the middle panels.[4] The top-right panel provides the staff's baseline path for the federal

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[2] The ADAIT rule places a modestly larger weight on the EPOP gap than the inertial Taylor (1999) rule places on the unemployment rate gap, reflecting the lower volatility of the EPOP gap relative to the unemployment rate gap noted earlier. The coefficient on the average inflation gap is such that, all else being equal, a one-time inflation deviation generates an initial response that is nearly equal to that of the inertial Taylor (1999) rule followed by a larger response as the ADAIT rule seeks to eliminate the discounted average inflation gap. Further details on this rule are found in the appendix to this section. The scaling factor D that multiplies the $\bar{\pi}gap_t$ is described in the box "A Discounted Average Inflation Gap" and is used in this rule to make the rule comparable to those studied during the framework review. See Arias and others (2019).

[3] The simple rules examined herein use intercept terms that are consistent with a real federal funds rate of 50 basis points in the longer run. The appendix in this Tealbook section provides technical details on these simple policy rules.

[4] For the purposes of the near-term prescriptions and dynamic policy simulations, the discounted average inflation gap is defined in terms of core PCE inflation. The Tealbook baseline and dynamic simulations presented later in this section of the Tealbook embed the assumption that the federal funds rate is subject to an ELB of 12½ basis points, a value that corresponds to the midpoint of the current target range. In addition, all dynamic simulations incorporate the staff's baseline estimates of the macroeconomic effects of the Federal Reserve's balance sheet policies and federal fiscal policies.

Policy Rules and the Staff Projection

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

	2020:Q4	2021:Q1
Inertial Taylor (1999) rule	**.13**	**.12**
Previous Tealbook projection	*−.22*	*−.34*
Taylor (1993) rule	**.84**	**.78**
Previous Tealbook projection	*−.51*	*.14*
ADAIT 2012 rule	**−.22**	**−.47**
Previous Tealbook projection	*−.39*	*−.70*
ADAIT 2019 rule	**−.03**	**−.12**
Previous Tealbook projection	*−.18*	*−.33*
Addendum:		
Tealbook baseline	**.13**	**.13**
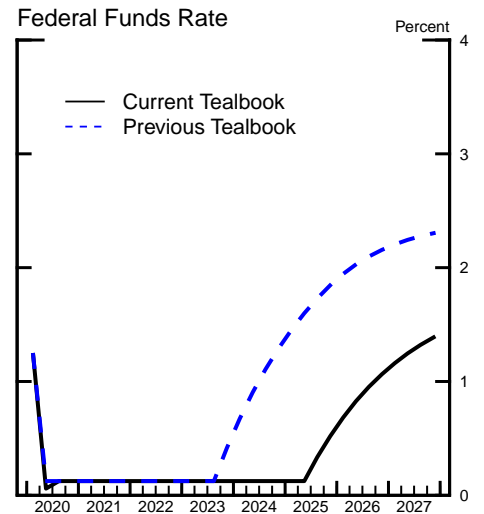
Federal Funds Rate

Percent

- Current Tealbook
- - - Previous Tealbook

Output Gap

Percent

- Current Tealbook
- - - Previous Tealbook

EPOP Gap

Percentage points

PCE Prices ex. Food and Energy

4–quarter change   Percent
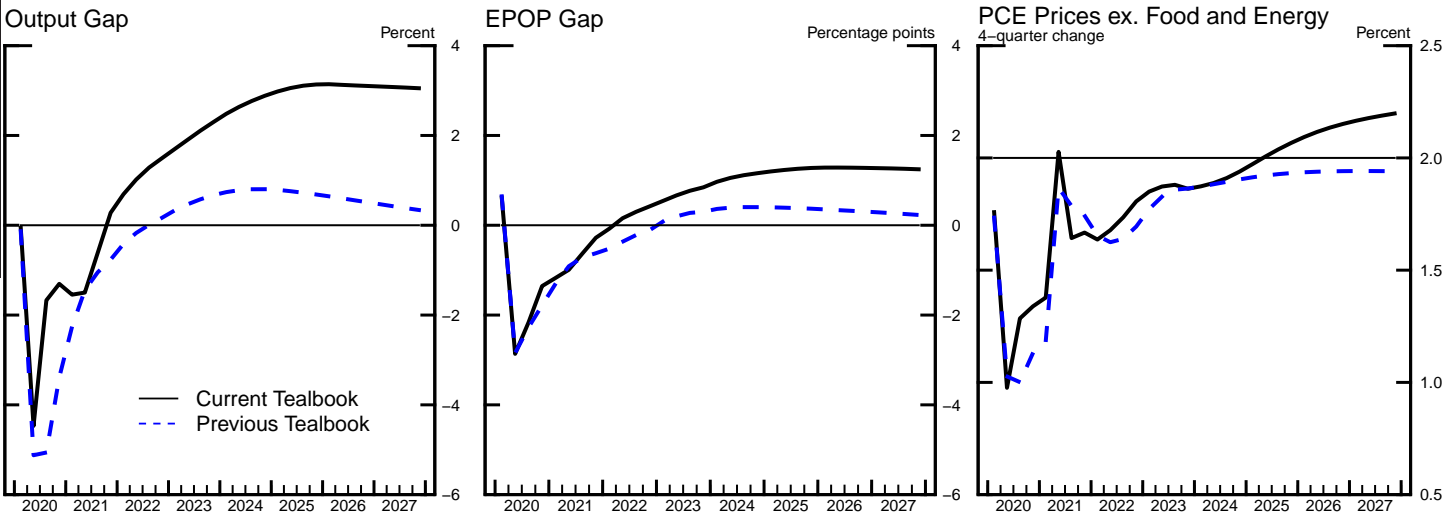
A Medium–Term Notion of the Equilibrium Real Federal Funds Rate[2]
(Percent)

	Current Value	*Previous Tealbook*
Tealbook baseline		
FRB/US *r**	−.45	*−1.12*
Average projected real federal funds rate	−1.52	*−1.44*
SEP–consistent baseline		
FRB/US *r**	−2.65	
Average projected real federal funds rate	−1.28	

1. The lines denoted "Previous Tealbook projection" report prescriptions based on the previous Tealbook's staff outlook for inflation and resource slack.

2. The "FRB/US *r**" is the level of the real federal funds rate that, if maintained over a 12–quarter period (beginning in the current quarter) in the FRB/US model, sets the output gap equal to zero in the final quarter of that period given a baseline Tealbook or SEP–consistent projection. The SEP–consistent baseline corresponds to the June 2020 median SEP responses. The "Average projected real federal funds rate" is calculated under the Tealbook and SEP–consistent baseline projection over the same 12–quarter period as FRB/US *r**.

Monetary Policy Strategies

funds rate, which, reflecting the staff's new policy rate assumptions, remains at the ELB until 2025.

- The new ADAIT rule prescribes holding rates slightly below zero over the near term for both initializations of the inflation gap, and the rates have revised up relatively little compared with the values they would have had under the July Tealbook projection. Their current low level and modest upward revision since July reflect both the existing shortfall in employment from its trend level and the persistent undershooting of the 2 percent inflation goal.

- Reflecting the upgrade to the staff's near-term economic projection, the Taylor rules prescribe higher values for the federal funds rate in the fourth quarter of 2020 and the first quarter of 2021 relative to prescriptions based on the July Tealbook projection. While the inertial Taylor (1999) rule holds the policy rate near the ELB, the Taylor (1993) rule calls for the federal funds rate to be just above ¾ percent in the next couple of quarters.[5]

A MEDIUM-TERM NOTION OF THE EQUILIBRIUM REAL FEDERAL FUNDS RATE

The bottom panel of the second exhibit reports estimates of a medium-term concept of the equilibrium real federal funds rate (r^*) generated under two baselines: the Tealbook baseline and a projection consistent with the medians in the June 2020 SEP. This concept of r^*, labeled "FRB/US r^*," corresponds to the level of the real federal funds rate that, if maintained over a 12-quarter period starting in the current quarter, would bring the output gap to zero in the final quarter of that period, according to the FRB/US model. This measure is a summary of the projected underlying strength of the real economy but does not take into account considerations such as achieving the inflation objective, mitigating shortfalls from maximum employment, or avoiding sharp changes in the federal funds rate.

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[5] As a result of the changes introduced in this Tealbook, the first-difference rule is not included among the strategies shown in this section for space considerations. In the near term, the first-difference rule prescribes a federal funds rate of about ½ percent in the fourth quarter and about 1¼ percent in the first quarter of 2021, reflecting the upward trajectory of the output gap in the staff projection. In future Tealbooks, the collection of rules shown in this section may be revised.

- At negative 45 basis points, the current value of the Tealbook-consistent FRB/US *r** is higher than its value in the July Tealbook, reflecting a significantly higher projection for output in the medium term relative to the previous projection. This estimated equilibrium real rate is over a percentage point above the average projected real federal funds rate in the Tealbook baseline, in which output returns to potential by the fourth quarter of 2021.

- At negative 2.65 percent, the June 2020 SEP-consistent FRB/US *r** is lower than the Tealbook-consistent FRB/US *r** because the level of resource utilization over the coming years consistent with median SEP responses is lower than the staff's outlook for resource utilization under the current Tealbook projection.

SIMPLE POLICY RULE SIMULATIONS

The third exhibit reports the Tealbook baseline projection and results obtained from dynamic simulations of the FRB/US model under the new ADAIT rule, the inertial Taylor (1999) rule, and the Taylor (1993) rule. These simulations reflect the endogenous responses of resource utilization and inflation to the different federal funds rate paths implied by the policy rules, subject to the ELB constraint. The simulations for each rule are carried out under the assumptions that policymakers commit to following that rule in the future and that financial market participants, price setters, and wage setters correctly anticipate that monetary policy will follow through on this commitment and are aware of the implications for interest rates and the economy.

- As noted above, the staff baseline projection includes new assumptions for the path of the federal funds rate. The federal funds rate now remains at the ELB until the quarter after the unemployment rate is below 4.1 percent and the inflation rate is above 2.0 percent. Thereafter, the federal funds rate follows an inertial version of the Taylor (1999) rule, but with no response to the output gap when that gap is positive. As a result of the new specification, the federal funds rate remains at the ELB until mid-2025, then rises to about 1½ percent by the end of 2027 in the baseline projection.

- The exhibit shows two versions of the ADAIT rule: one using the discounted average inflation gap initialized in 2012 and another where that gap is initialized in 2019.

- Using the gap that is initialized in 2019 (the green dashed line), the ADAIT rule prescribes a path of the federal funds rate that departs from the ELB in 2022 but remains at about ½ percent through 2025. Because this rule responds to shortfalls from the EPOP trend, rather than deviations, the path remains low even after the EPOP gap closes in 2022. The low path also reflects the rule's response to the slow evolution of the discounted average inflation gap.

- The ADAIT rule implemented using the discounted average inflation gap initialized in 2012 (the light blue dashed line) departs from the ELB in 2025. Thereafter, the rule prescriptions are similar to those of the version in which that gap is initialized in 2019, reflecting the fading importance of the initialization date as time progresses. The gradually increasing policy rate path of this rule reflects the slow evolution of the discounted average inflation gap, the fact that the rule only responds to EPOP gap shortfalls, and the inertial term.

- The lower paths of the policy rate under the ADAIT rules, relative to the paths prescribed by the Taylor rules, result in inflation reaching 2 percent in late 2025 and 2026 for the 2012 and 2019 initializations of the inflation gap, respectively.

- The Taylor (1993) rule calls for an increase in the policy rate to roughly ¾ percent by the end of 2020, whereas the inertial Taylor (1999) rule responds more gradually to the projected improvement in the output gap, resulting in a federal funds rate of about ½ percent at the end of 2023 Neither Taylor rule generates inflation that returns to the 2 percent objective over the period shown.

- Most simple policy rules featured in this section prescribe raising the federal funds rate sooner than in the Tealbook baseline projection. The Tealbook baseline path departs from the ELB later than the prescriptions of most of the simple policy rules because the staff assumed that the federal funds rate leaves the ELB only after the inflation rate is above 2 percent.

Monetary Policy Strategies

Simple Policy Rule Simulations

Monetary Policy Strategies
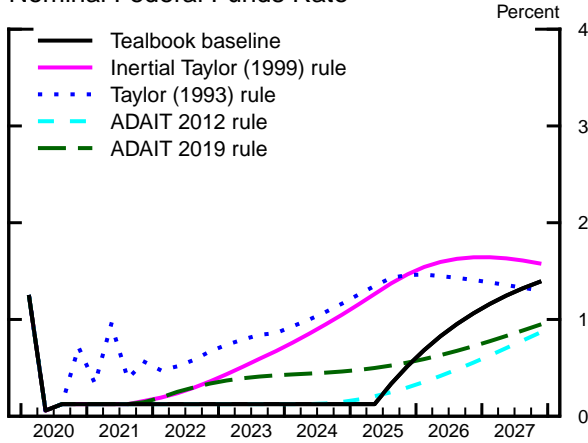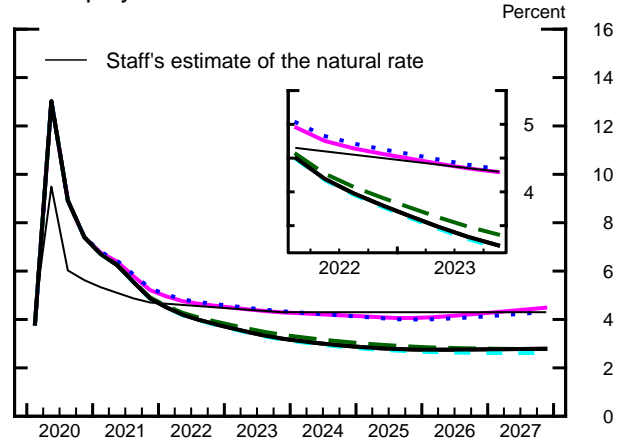
Nominal Federal Funds Rate

Percent

- Tealbook baseline
- Inertial Taylor (1999) rule
- Taylor (1993) rule
- ADAIT 2012 rule
- ADAIT 2019 rule

Unemployment Rate

Percent

—— Staff's estimate of the natural rate

Real Federal Funds Rate

Percent

EPOP Gap

Percentage points

Real 10–Year Treasury Yield

Percent

PCE Inflation

4–quarter percent change
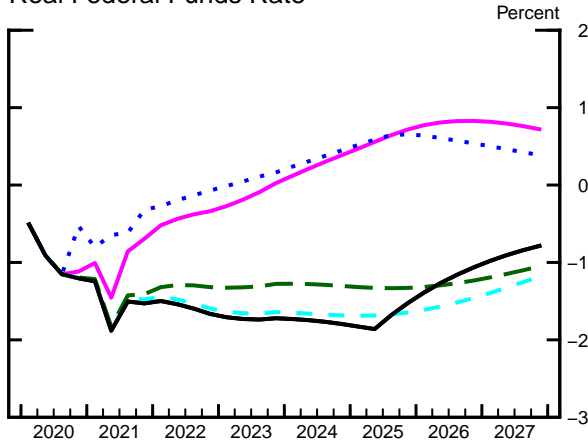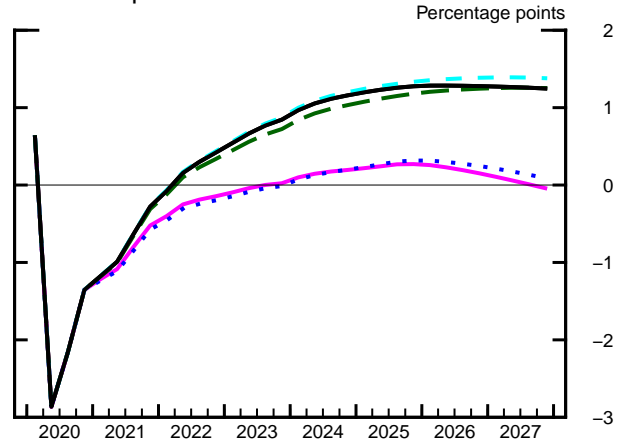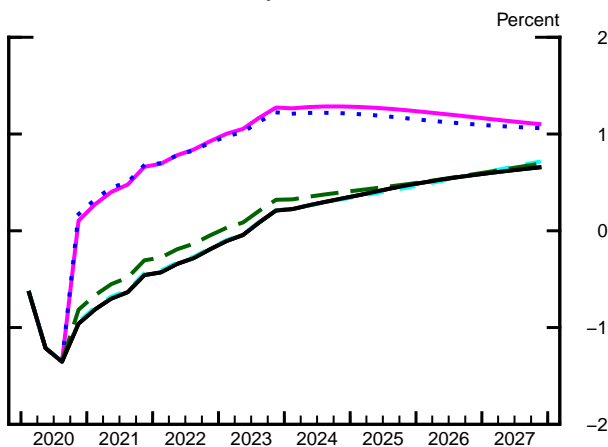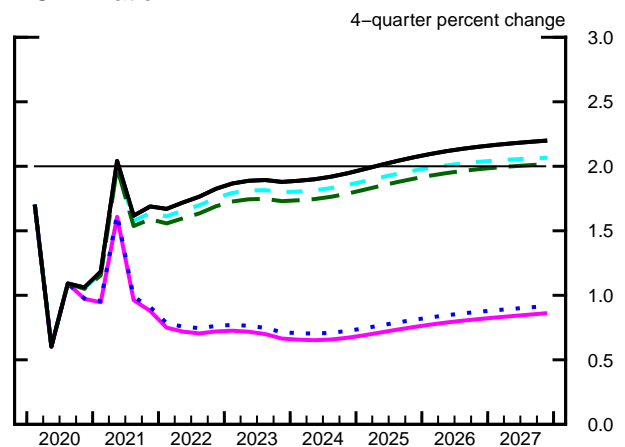
Note: The simulations in this exhibit are based on policy rules that respond to core PCE inflation.

OPTIMAL CONTROL SIMULATIONS UNDER COMMITMENT

In the fourth exhibit, we display optimal control simulations conditional on the Tealbook baseline under different assumptions about policymakers' preferences, as captured by a loss function over macroeconomic outcomes. The concept of optimal control we employ here is one in which we assume current policymakers are able to commit future policymakers to their plans. Such a commitment, when feasible, may lead to improved economic outcomes.[6] In a subsequent exhibit, we will examine the effects of relaxing this assumption.

Starting with this Tealbook, we assume that policymakers choose a path of the federal funds rate to minimize the present value of the weighted sum of the squared discounted average inflation gap, the squared EPOP gap, and squared changes in the federal funds rate:

$$L_t = \sum_{\tau=0}^{T} \beta^\tau \left\{ \lambda_\pi \left(\bar{\pi} gap_{t+\tau} \right)^2 + \lambda_{e,t+\tau} (EPOPgap_{t+\tau})^2 + \lambda_R (R_{t+\tau} - R_{t+\tau-1})^2 \right\}.$$

In the exhibit and the discussion that follows, we refer to this loss function as the "new specification." For comparison, we also report results under the "previous specification" of the loss function, which uses the unemployment rate gap instead of the EPOP gap and the difference between four-quarter headline inflation and 2 percent instead of the discounted average inflation gap.[7] For each specification, we consider two sets of weights on the components of the loss function. In this section, we show the optimal control simulations using the discounted average inflation gap initialized in 2019. Using the inflation gap initialized in 2012 results in very similar paths for all the variables.

Asymmetric Weights

- Under asymmetric weights, policymakers assign no cost to positive EPOP gaps but penalize negative EPOP gaps using the same unit weight that they assign to the other two components of the loss function (and similarly for the

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[6] Under the optimal control policies, policymakers achieve the displayed economic outcomes by making promises that bind future policymakers to take actions that may not be optimal from the perspective of those future policymakers (that is, the promises are time inconsistent). It is assumed that these promises are taken as credible by wage and price setters and by financial market participants.

[7] For the purposes of the optimal control simulations, the discounted average inflation gap is defined in terms of PCE inflation.

Monetary Policy Strategies

Optimal Control Simulations under Commitment

Nominal Federal Funds Rate
Percent

- —— Tealbook baseline
- ---- Equal weights (previous specification)
- —— Asymmetric weight on *ugap* (previous)
- ---- Equal weights (new specification)
- —— Asymmetric weight on *EPOPgap* (new)

Unemployment Rate
Percent

—— Staff's estimate of the natural rate

Real Federal Funds Rate
Percent

EPOP Gap
Percentage points

Real 10–Year Treasury Yield
Percent

PCE Inflation
4–quarter percent change

Monetary Policy Strategies
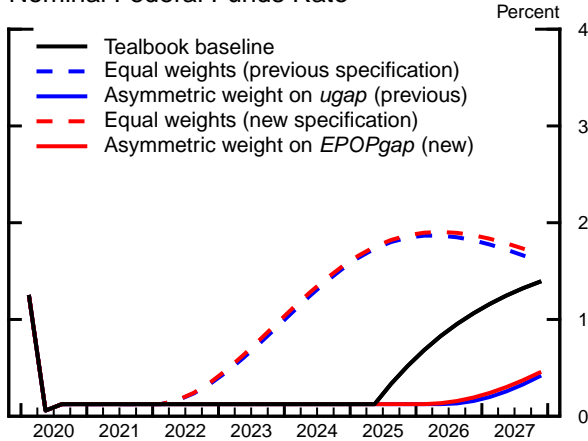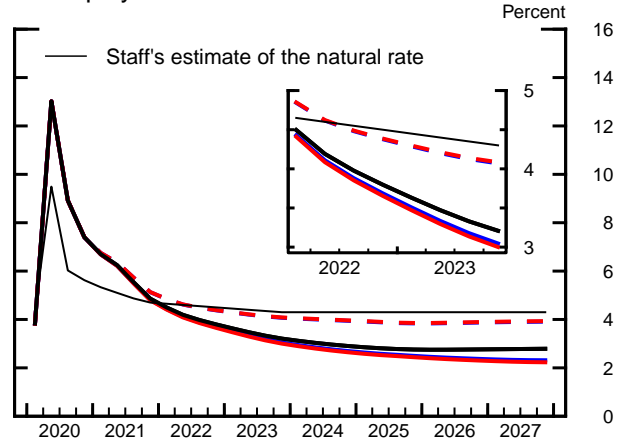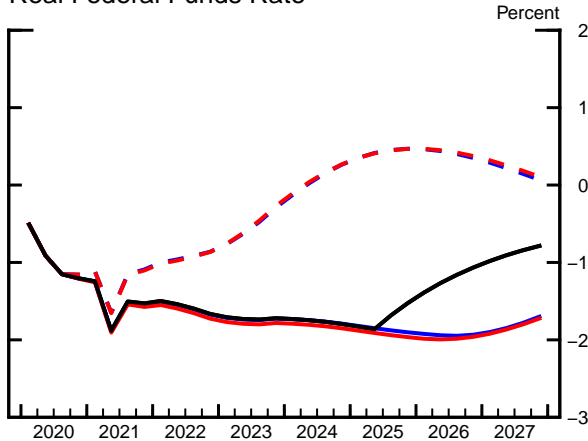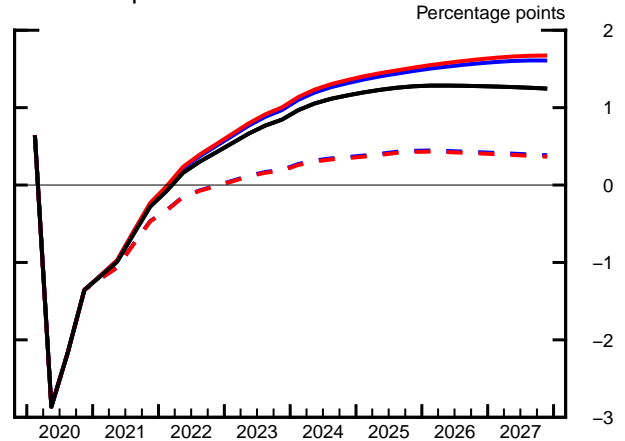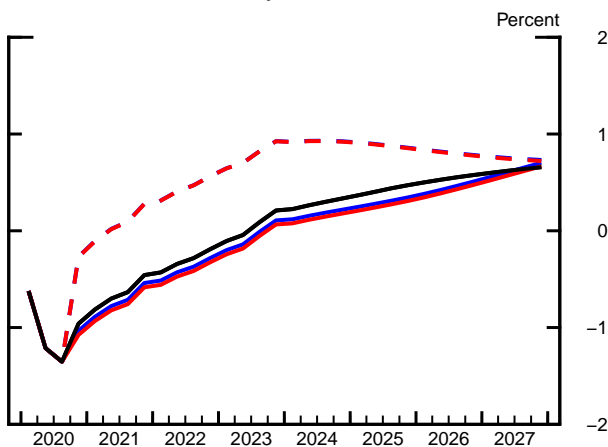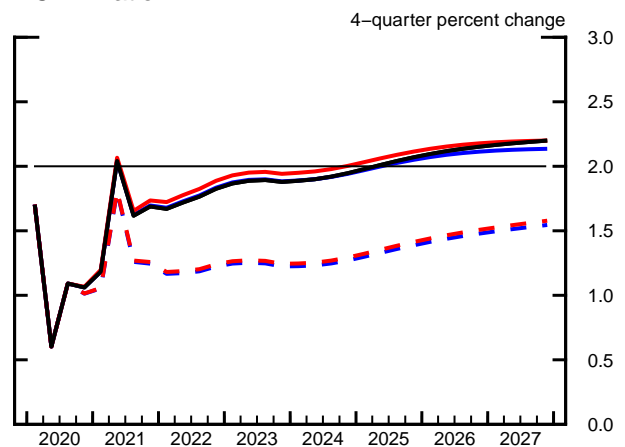
Note: The blue and red sets of lines correspond to an optimal control policy under commitment using the previous and new specifications, respectively, as described in the appendix.

negative and positive unemployment rate gap under the previous specification). The asymmetric weights implement a "shortfalls"-based strategy regarding the labor market: Under these preferences, policymakers' desire to hasten the recovery and achieve inflation that averages 2 percent over time does not have to be balanced against a desire to prevent employment from running above its estimated maximum rate.

- As is evident from the exhibit, the results under the new specification (labeled "Asymmetric weight on *EPOPgap* (new)") are similar to the results under the previous specification (labeled "Asymmetric weight on *ugap* (previous)").

- The choice of labor gap measures turns out to have little effect on optimal control in this instance because the new and previous measures of slack are projected to be fairly similar in periods when the ELB is not binding.

- In addition, when the loss function penalizes contemporaneous inflation deviations—as under the previous specification—it is still trying to minimize the discounted sum of these deviations over time into the future, which is similar to minimizing an average inflation gap.[8] The introduction of the discounted average inflation gap under the new specification brings historical inflation misses into the loss function as well. Given that past inflation deviations gradually become bygones, the effects of the inflation misses before 2020 fade significantly over the period during which policy is constrained at the ELB. As a result, the sum of discounted losses that policymakers seek to eliminate are similar, on balance, under the previous and new specifications, leading to similar policy prescriptions and outcomes.

- The path of the policy rate under both specifications of asymmetric preferences departs the ELB in 2027, over a year after the Tealbook baseline. The anticipation of this more accommodative path for the policy rate leads to slightly lower nominal and real 10-year Treasury yields. These lower yields,

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[8] The similarities here are likely sensitive to the current environment in which outcomes are strongly affected by the ELB, and this similarity may not hold for other specifications of the inflation gap, different weights within the loss function, or the speed of discounting future losses to determine the present value of the total loss.

in turn, stimulate aggregate demand and drive PCE inflation modestly above
2 percent in 2025.

Equal Weights

- The simulations labeled "Equal weights (new specification)" and "Equal
  weights (previous specification)" present cases in which policymakers are
  assumed to place equal weights on the three components of the new and
  previous loss functions, respectively. These equal-weights strategies seek to
  counter both the high level of resource slack in the near term and the
  persistently tight labor market in the medium term in the Tealbook baseline.
  In this way, the equal-weights loss function provides a symmetric response to
  the staff's measure of labor market slack, seeking to eliminate both positive
  and negative deviations from the staff's estimate of maximum employment
  rather than responding only to shortfalls.

- For the same reasons as under asymmetric weights, the policy prescriptions
  are similar under both the previous specifications and the new specification of
  the gaps in the loss function. Because the policymaker attempts, under equal
  weights, to eliminate all labor market deviations rather than only shortfalls,
  the federal funds rate prescriptions are markedly less accommodative than
  those in the Tealbook baseline, with the policy rate departing from the ELB in
  late 2022 (the dashed-blue and dashed-red lines). Notably, inflation does not
  return to 2 percent until 2035.

OPTIMAL CONTROL SIMULATIONS—COMMITMENT VERSUS DISCRETION

Analyses such as the optimal control simulations under commitment, discussed
earlier, are based on the assumption that current policymakers can commit future
policymakers to take such actions. However, the need to be pragmatic and flexible in a
highly uncertain economic environment raises questions about the validity of this
assumption. In the fifth exhibit, we compare the path for the policy rate and associated
macroeconomic outcomes under commitment to the policy rate and macroeconomic
outcomes when we assume that policymakers are unable to credibly commit to future

policy actions.[9] We refer to simulations that do not enforce the assumption of commitment as being run under discretion. Importantly, the macroeconomic outcomes generated in simulations under commitment depend heavily on the assumption that the public believes that current policymakers' pledges will be honored by future policymakers, while outcomes under discretion do not rely on policymakers being able to influence expectations in this way.

- Under discretion, the federal funds rate departs from the ELB in 2025, while it rises from the ELB in 2027 under commitment. Both paths lie below the path of the federal funds rate under the Tealbook baseline, reaching ½ percent under commitment and 1 percent under discretion by the end of 2027.

- The somewhat lower path for the federal funds rate under commitment generates slightly higher inflation and a slightly lower path of both the nominal and real 10-year Treasury rate relative to the discretion solution, pushing inflation modestly above 2 percent starting in late 2024. Importantly, however, optimal control policy under discretion also generates a slight inflation overshoot because of the backward-looking nature of the discounted average inflation gap in the loss function.

- Overall, the differences in policy rate paths and macroeconomic outcomes between the discretion and commitment cases are perhaps smaller than one might have assumed given the sizable difference in behavioral assumptions that underlie the two cases. A primary reason for this similarity is the use of the discounted average inflation gap in the loss function. Including the backward-looking discounted average inflation gap in the loss function has important implications for the prescriptions of optimal control policy conducted under discretion because past inflation misses continue to have an effect on current-period losses.[10] In this way, including the discounted average inflation gap in the loss function of an optimal control exercise under discretion can be thought of as embedding an institutional commitment "to

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[9] As above, here we show the optimal control simulations under asymmetric weights using the discounted average inflation gap initialized in 2019. Using the discounted average inflation gap initialized in 2012 results in very similar paths for the policy rate and associated economic outcomes, regardless of whether the optimal control exercise is done under commitment or discretion.

[10] The quantitative differences here depend on specifications for the discounted average inflation gap and alternative specifications may lead to quantitative differences of different sizes.

Optimal Control Simulations – Commitment versus Discretion

Monetary Policy Strategies
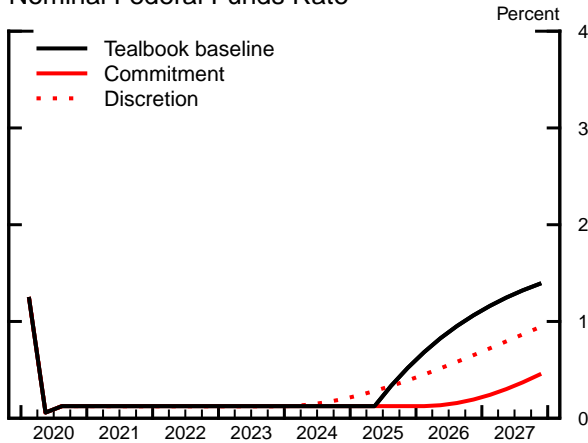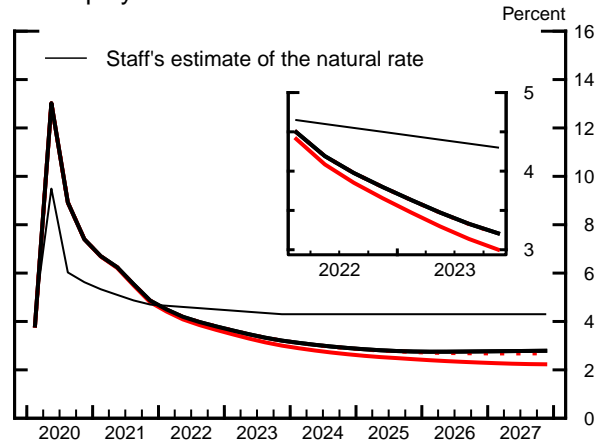
Nominal Federal Funds Rate
Percent

- —— Tealbook baseline
- —— Commitment
- ···· Discretion

Unemployment Rate
Percent

—— Staff's estimate of the natural rate

Real Federal Funds Rate
Percent

EPOP Gap
Percentage points

Real 10–Year Treasury Yield
Percent
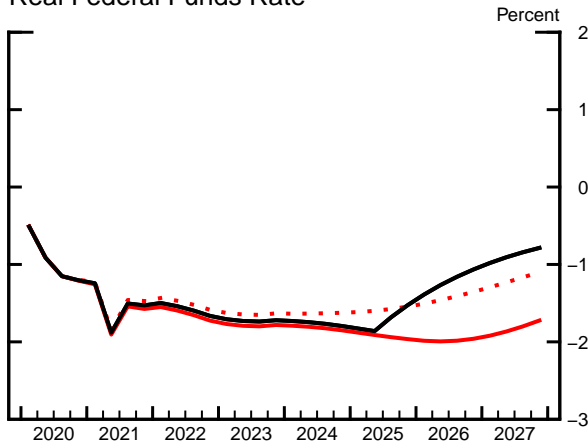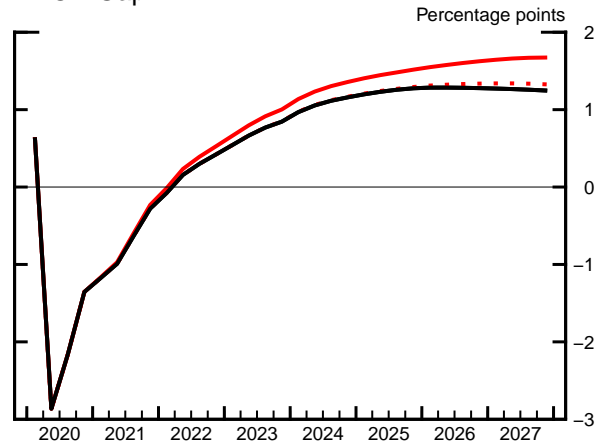
PCE Inflation
4–quarter percent change
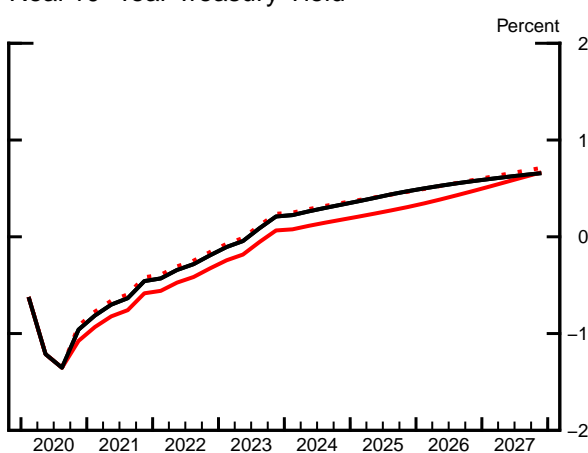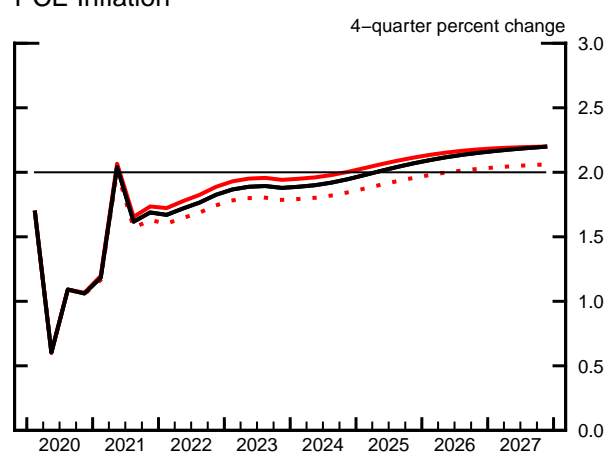
Note: Under commitment, current policymakers achieve the displayed economic outcomes by making promises that bind future policymakers to take actions that may not be optimal from the perspective of those future policymakers. Under discretion, the policymakers cannot credibly commit to carrying out a plan that requires future policymakers to make choices that would be suboptimal at the future time, as future policymakers will reoptimize without regard for past policymakers' promises.

achieve inflation that averages 2 percent over time" without assuming the ability of current policymakers to commit future policymakers to specific actions.

ESTIMATES OF THE EQUILIBRIUM REAL FEDERAL FUNDS RATE IN THE LONGER RUN

The next exhibit updates selected estimates of the equilibrium real federal funds rate in the longer run, denoted r^{LR}. This concept is the rate consistent with the economy operating at its potential once the transitory effects of economic shocks have abated. This rate, along with the Committee's inflation objective, determines the longer-run level of the nominal federal funds rate and other interest rates in the staff's projection and economic models. In addition, r^{LR} serves as a parameter in the formulas for many of the simple policy rules considered in this section of Tealbook A.

- The top panel of the exhibit shows the range of historical values through 2020:Q2 from eight model-based time-series estimates of r^{LR}.[11] The values for 2020:Q2 range from negative 2¾ percent to positive 1½ percent, with a mean of just below negative ¼ percent.

- All but one of the eight models translate the severe deterioration in the economic data in the second quarter as an indication that r^{LR} has declined, with some downward revisions being larger than 2 percentage points.[12] However, these downward revisions are anticipated to reverse, at least to some degree, as the economic recovery begins in the third quarter. If the staff's view of a relatively strong bounceback in economic activity in the second half of the year comes to fruition, then several of the models' estimates of r^{LR} will move up.

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[11] The top panel reports the range of "one sided" estimates—that is, the estimates for a particular date are conditioned only on data up to that date. Although the modeling approaches and econometric techniques differ across models, the studies have the common feature that they use time-series methods to infer r^{LR} on the basis of the co-movement of either macroeconomic series (like inflation, interest rates, and real GDP) or both macroeconomic and financial data (like TIPS yields). See the appendix to this section for sources and methodology regarding these estimates.

[12] In addition to the updated data, two of the models used in the exhibit, Laubach and Williams (2003) and Holston, Laubach, and Williams (2017), have been modified by their authors to be conducive to continued estimation during and after the COVID-19 pandemic. A reference providing details on these modifications is included in the appendix to this section.

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

Selected Time–Series Estimates

Quarterly   Percent
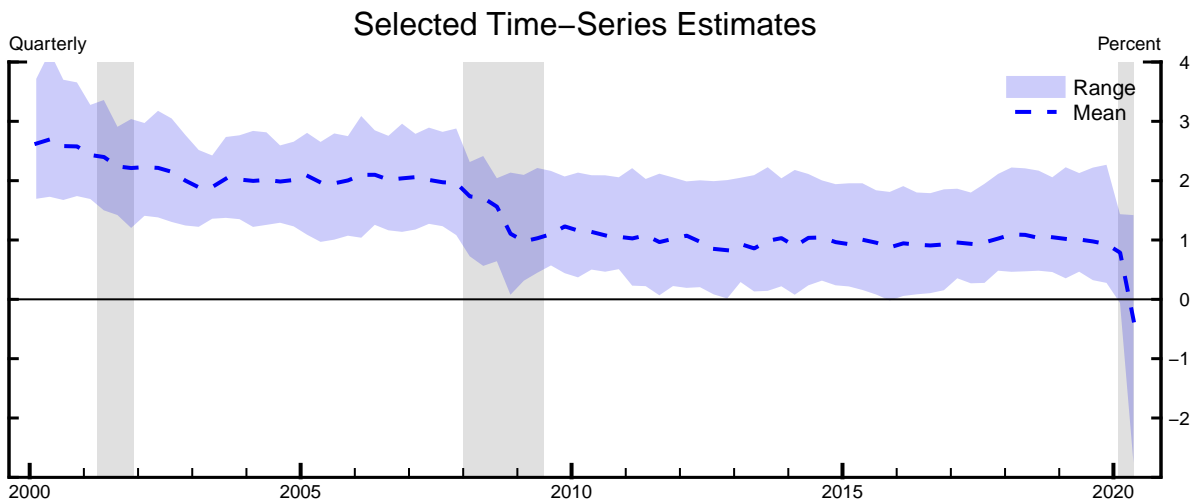
68 Percent Uncertainty Bands around Latest Point Estimates
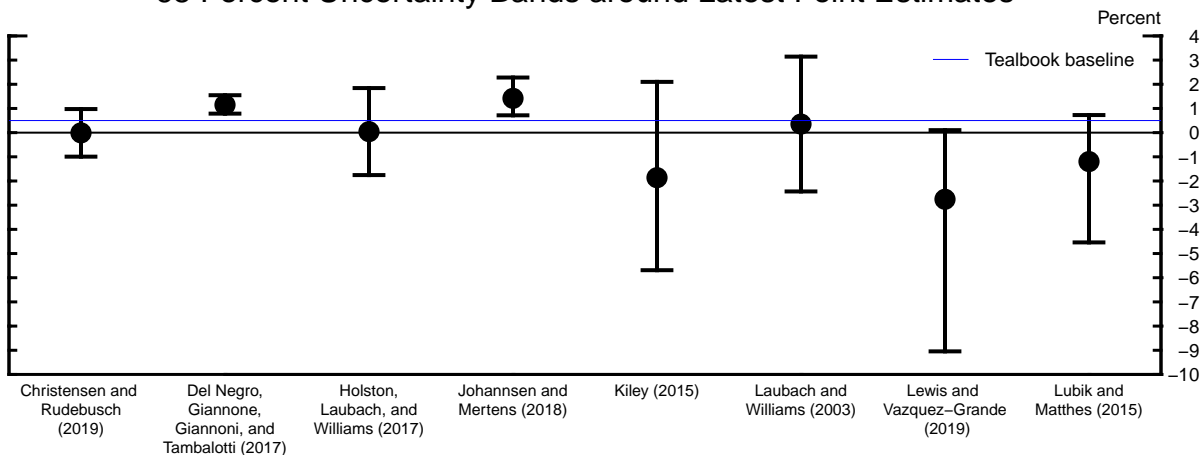
Percent

Longer–Run Values from Selected Forecasters

	Release date	Percent
Tealbook baseline	Sept. 2020	.50
Median SEP	June 2020	.50
Median Survey of Primary Dealers	July 2020	.25
Blue Chip consensus	Mar. 2020	.10
Congressional Budget Office	July 2020	.44

Note: The latest time–series estimates in the top panel are for 2020:Q2. The shaded vertical areas in the top panel are NBER recessions. See the appendix for the sources of the values reported in the bottom panel. The models of Laubach and Williams (2003) and Holston, Laubach, and Williams (2017) have been modified by their authors to allow continued estimation during and after the COVID–19 pandemic.

- The middle panel shows estimates of r^{LR} and their associated uncertainty bands for the second quarter. These objects should be interpreted with particular caution because the magnitude, speed, and nature of the recent fall in economic activity is well outside the U.S. historical experience that informed the construction and estimation of these models. The uncertainty bands around the point estimates for these models have always been wide, but, with unprecedented changes in the second quarter, the intervals shown in the middle panel generally portray even greater uncertainty than in previous Tealbooks. As well as the uncertainty that exists within each model about the prevailing state of the economy and the model's parameter estimates, many sources of uncertainty, such as the choice of econometric approach and the possibility that historical economic relationships are not applicable to the current context, are not captured by the width of each models' uncertainty bands.

- The lower panel of the exhibit reports longer-term estimates of the real federal funds rate from selected sources. The baseline assumption for the longer-term estimate of the real federal funds rate in the Tealbook baseline is 50 basis points. The median in the July Survey of Primary Dealers stands at 25 basis points, about 5 basis points higher than in April, but 25 basis points below its level at the end of 2019. The Congressional Budget Office estimate, at 44 basis points, and the Blue Chip consensus estimate, at 10 basis points, are about 15 basis points higher and lower, respectively, than this median.

The final four exhibits tabulate the simulation results under the Tealbook baseline for key variables under the policy rules shown in the exhibit "Simple Policy Rule Simulations" and the optimal control simulations shown in the exhibit "Optimal Control Simulations under Commitment."

Monetary Policy Strategies

Outcomes of Simple Policy Rule Simulations
(Percent change, annual rate, from end of preceding period, except as noted)

Outcome and strategy	2020	2021	2022	2023	2024	2025	2026	2027
Nominal federal funds rate[1]								
Inertial Taylor (1999)	.1	.2	.4	.7	1.0	1.5	1.6	1.6
Taylor (1993)	.7	.6	.7	.9	1.2	1.5	1.4	1.3
ADAIT 2012	.1	.1	.1	.1	.1	.3	.6	.9
ADAIT 2019	.1	.1	.3	.4	.5	.6	.7	.9
Extended Tealbook baseline	.1	.1	.1	.1	.1	.5	1.1	1.4
Real GDP								
Inertial Taylor (1999)	-3.2	3.5	2.5	2.3	2.1	1.8	1.1	1.1
Taylor (1993)	-3.2	3.4	2.5	2.3	2.2	1.8	1.2	1.2
ADAIT 2012	-3.2	4.2	3.2	2.8	2.4	2.0	1.7	1.7
ADAIT 2019	-3.2	4.1	3.1	2.7	2.4	2.0	1.7	1.7
Extended Tealbook baseline	-3.2	4.2	3.2	2.8	2.4	2.0	1.7	1.6
Unemployment rate[1]								
Inertial Taylor (1999)	7.4	5.2	4.6	4.3	4.2	4.1	4.2	4.5
Taylor (1993)	7.4	5.3	4.6	4.3	4.2	4.0	4.1	4.3
ADAIT 2012	7.4	4.9	3.8	3.2	2.8	2.7	2.6	2.6
ADAIT 2019	7.4	4.9	3.9	3.4	3.1	2.9	2.8	2.8
Extended Tealbook baseline	7.4	4.9	3.8	3.2	2.9	2.8	2.8	2.8
Total PCE prices								
Inertial Taylor (1999)	1.0	.9	.7	.7	.7	.8	.8	.9
Taylor (1993)	1.0	.9	.8	.7	.7	.8	.9	.9
ADAIT 2012	1.1	1.6	1.8	1.8	1.9	2.0	2.0	2.1
ADAIT 2019	1.0	1.6	1.7	1.7	1.8	1.9	2.0	2.0
Extended Tealbook baseline	1.1	1.7	1.8	1.9	1.9	2.1	2.2	2.2
Core PCE prices								
Inertial Taylor (1999)	1.2	.9	.7	.6	.7	.8	.8	.9
Taylor (1993)	1.3	.9	.7	.7	.7	.8	.9	.9
ADAIT 2012	1.3	1.6	1.7	1.8	1.8	2.0	2.0	2.1
ADAIT 2019	1.3	1.6	1.7	1.7	1.8	1.9	2.0	2.0
Extended Tealbook baseline	1.3	1.7	1.8	1.9	1.9	2.1	2.2	2.2

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

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

Outcome and strategy	2020		2021				2022	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Nominal federal funds rate[1]								
Inertial Taylor (1999)	.1	.1	.1	.1	.1	.2	.2	.2
Taylor (1993)	.1	.7	.3	1.0	.4	.6	.5	.5
ADAIT 2012	.1	.1	.1	.1	.1	.1	.1	.1
ADAIT 2019	.1	.1	.1	.1	.1	.1	.2	.3
Extended Tealbook baseline	.1	.1	.1	.1	.1	.1	.1	.1
Real GDP								
Inertial Taylor (1999)	-3.7	-3.2	-1.7	8.7	3.2	3.5	3.9	4.1
Taylor (1993)	-3.7	-3.2	-1.8	8.6	3.1	3.4	3.9	4.0
ADAIT 2012	-3.7	-3.2	-1.5	9.1	3.8	4.2	4.8	4.9
ADAIT 2019	-3.7	-3.2	-1.6	9.0	3.7	4.1	4.6	4.8
Extended Tealbook baseline	-3.7	-3.2	-1.6	9.1	3.8	4.2	4.8	4.9
Unemployment rate[1]								
Inertial Taylor (1999)	8.9	7.4	6.8	6.4	5.8	5.2	5.0	4.8
Taylor (1993)	8.9	7.4	6.8	6.4	5.9	5.3	5.0	4.8
ADAIT 2012	8.9	7.4	6.7	6.2	5.5	4.9	4.5	4.2
ADAIT 2019	8.9	7.4	6.7	6.3	5.6	4.9	4.6	4.3
Extended Tealbook baseline	8.9	7.4	6.7	6.2	5.5	4.9	4.5	4.2
Total PCE prices								
Inertial Taylor (1999)	1.1	1.0	.9	1.6	1.0	.9	.7	.7
Taylor (1993)	1.1	1.0	1.0	1.6	1.0	.9	.8	.8
ADAIT 2012	1.1	1.1	1.2	2.0	1.6	1.6	1.6	1.7
ADAIT 2019	1.1	1.0	1.2	2.0	1.5	1.6	1.6	1.6
Extended Tealbook baseline	1.1	1.1	1.2	2.0	1.6	1.7	1.7	1.7
Core PCE prices								
Inertial Taylor (1999)	1.3	1.2	1.1	1.6	1.0	.9	.7	.7
Taylor (1993)	1.3	1.3	1.1	1.6	1.0	.9	.8	.7
ADAIT 2012	1.3	1.3	1.4	2.0	1.6	1.6	1.6	1.6
ADAIT 2019	1.3	1.3	1.3	2.0	1.6	1.6	1.5	1.6
Extended Tealbook baseline	1.3	1.3	1.4	2.0	1.6	1.7	1.6	1.7

1. Percent, average for the quarter.

Monetary Policy Strategies

Outcomes of Optimal Control Simulations under Commitment
(Percent change, annual rate, from end of preceding period, except as noted)

Outcome and strategy	2020	2021	2022	2023	2024	2025	2026	2027
Nominal federal funds rate[1]								
Equal weights (previous specification)	.1	.1	.3	.9	1.5	1.8	1.8	1.6
Asymmetric weight on *ugap* (previous)	.1	.1	.1	.1	.1	.1	.2	.4
Equal weights (new specification)	.1	.1	.3	1.0	1.5	1.9	1.9	1.7
Asymmetric weight on *EPOPgap* (new)	.1	.1	.1	.1	.1	.1	.2	.5
Extended Tealbook baseline	.1	.1	.1	.1	.1	.5	1.1	1.4
Real GDP								
Equal weights (previous specification)	-3.2	3.6	2.6	2.3	2.1	1.9	1.5	1.5
Asymmetric weight on *ugap* (previous)	-3.2	4.3	3.3	2.8	2.5	2.0	1.8	1.7
Equal weights (new specification)	-3.2	3.6	2.6	2.3	2.1	1.9	1.4	1.5
Asymmetric weight on *EPOPgap* (new)	-3.2	4.4	3.3	2.9	2.5	2.1	1.9	1.8
Extended Tealbook baseline	-3.2	4.2	3.2	2.8	2.4	2.0	1.7	1.6
Unemployment rate[1]								
Equal weights (previous specification)	7.4	5.1	4.4	4.1	3.9	3.8	3.9	3.9
Asymmetric weight on *ugap* (previous)	7.4	4.8	3.7	3.0	2.7	2.5	2.4	2.3
Equal weights (new specification)	7.4	5.1	4.4	4.1	4.0	3.9	3.9	3.9
Asymmetric weight on *EPOPgap* (new)	7.4	4.8	3.7	3.0	2.6	2.4	2.3	2.2
Extended Tealbook baseline	7.4	4.9	3.8	3.2	2.9	2.8	2.8	2.8
Total PCE prices								
Equal weights (previous specification)	1.0	1.2	1.2	1.2	1.3	1.4	1.5	1.5
Asymmetric weight on *ugap* (previous)	1.1	1.7	1.8	1.9	1.9	2.1	2.1	2.1
Equal weights (new specification)	1.0	1.3	1.2	1.2	1.3	1.4	1.5	1.6
Asymmetric weight on *EPOPgap* (new)	1.1	1.7	1.9	1.9	2.0	2.1	2.2	2.2
Extended Tealbook baseline	1.1	1.7	1.8	1.9	1.9	2.1	2.2	2.2
Core PCE prices								
Equal weights (previous specification)	1.3	1.2	1.2	1.2	1.3	1.4	1.5	1.5
Asymmetric weight on *ugap* (previous)	1.3	1.7	1.8	1.9	1.9	2.0	2.1	2.1
Equal weights (new specification)	1.3	1.2	1.2	1.2	1.3	1.4	1.5	1.6
Asymmetric weight on *EPOPgap* (new)	1.3	1.7	1.9	1.9	2.0	2.1	2.2	2.2
Extended Tealbook baseline	1.3	1.7	1.8	1.9	1.9	2.1	2.2	2.2

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

Outcomes of Optimal Control Simulations under Commitment, Quarterly

(4-quarter percent change, except as noted)

Outcome and strategy	2020		2021				2022	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Nominal federal funds rate[1]								
Equal weights (previous specification)	.1	.1	.1	.1	.1	.1	.1	.2
Asymmetric weight on *ugap* (previous)	.1	.1	.1	.1	.1	.1	.1	.1
Equal weights (new specification)	.1	.1	.1	.1	.1	.1	.1	.2
Asymmetric weight on *EPOPgap* (new)	.1	.1	.1	.1	.1	.1	.1	.1
Extended Tealbook baseline	.1	.1	.1	.1	.1	.1	.1	.1
Real GDP								
Equal weights (previous specification)	-3.7	-3.2	-1.7	8.8	3.3	3.6	4.2	4.3
Asymmetric weight on *ugap* (previous)	-3.7	-3.2	-1.5	9.1	3.9	4.3	4.9	5.0
Equal weights (new specification)	-3.7	-3.2	-1.7	8.8	3.3	3.6	4.2	4.3
Asymmetric weight on *EPOPgap* (new)	-3.7	-3.2	-1.5	9.1	3.9	4.4	4.9	5.0
Extended Tealbook baseline	-3.7	-3.2	-1.6	9.1	3.8	4.2	4.8	4.9
Unemployment rate[1]								
Equal weights (previous specification)	8.9	7.4	6.8	6.4	5.7	5.1	4.8	4.6
Asymmetric weight on *ugap* (previous)	8.9	7.4	6.7	6.2	5.5	4.8	4.4	4.1
Equal weights (new specification)	8.9	7.4	6.8	6.4	5.7	5.1	4.8	4.6
Asymmetric weight on *EPOPgap* (new)	8.9	7.4	6.7	6.2	5.5	4.8	4.4	4.1
Extended Tealbook baseline	8.9	7.4	6.7	6.2	5.5	4.9	4.5	4.2
Total PCE prices								
Equal weights (previous specification)	1.1	1.0	1.1	1.8	1.3	1.2	1.2	1.2
Asymmetric weight on *ugap* (previous)	1.1	1.1	1.2	2.0	1.6	1.7	1.7	1.7
Equal weights (new specification)	1.1	1.0	1.1	1.8	1.3	1.3	1.2	1.2
Asymmetric weight on *EPOPgap* (new)	1.1	1.1	1.2	2.1	1.7	1.7	1.7	1.8
Extended Tealbook baseline	1.1	1.1	1.2	2.0	1.6	1.7	1.7	1.7
Core PCE prices								
Equal weights (previous specification)	1.3	1.3	1.2	1.8	1.3	1.2	1.1	1.1
Asymmetric weight on *ugap* (previous)	1.3	1.3	1.4	2.0	1.6	1.7	1.6	1.7
Equal weights (new specification)	1.3	1.3	1.3	1.8	1.3	1.2	1.1	1.1
Asymmetric weight on *EPOPgap* (new)	1.3	1.3	1.4	2.1	1.7	1.7	1.7	1.7
Extended Tealbook baseline	1.3	1.3	1.4	2.0	1.6	1.7	1.6	1.7

1. Percent, average for the quarter.

Monetary Policy Strategies

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Monetary Policy Strategies

A Discounted Average Inflation Gap

No particular mathematical formula can fully capture the Committee's assessment of the implications of past, current, and projected inflation deviations for monetary policy settings. Nonetheless, simulations of simple policy strategies that incorporate explicit makeup elements may offer useful benchmarks for policy. Starting with this Tealbook, the Monetary Policy Strategies section will feature a number of strategies that seek to eliminate current and past inflation deviations from 2 percent in a manner that allows those deviations to become bygones gradually over time.

Specifically, the new discounted average inflation gap in period t (labeled $\bar{\pi}gap_t$) is defined by a recursive formula,

$$\bar{\pi}gap_t = \left(\frac{1}{D}\right)\left(\frac{1}{1+3\gamma}\right)(\pi_t - 2) + \gamma\,\bar{\pi}gap_{t-1},$$

where π_t is the quarterly inflation rate expressed at an annual rate and γ is a parameter controlling the speed at which past inflation deviations from 2 percent are gradually discounted.[1] The fraction $1/(1 + 3\gamma)$ is a technical adjustment to account for annualized inflation rates. The fraction $1/D$ converts the recursive object into a weighted average by dividing the gap by the annualized duration of the process. $D = 1/(4(1 - \gamma))$ is also a function of γ, the speed at which past inflation deviations are discounted. The formula provides flexibility with regard to the importance of past inflation deviations that policymakers seek to eliminate, as it allows for the possibility of changing the value of γ and of initializing the gap at some specific date. In the remainder of this discussion, we briefly examine both of these dimensions.

In our benchmark implementation, we set $\gamma = 0.95$. Different choices of γ imply different durations and different speeds at which inflation deviations are discounted. In figure 1, we compare our benchmark choice of $\gamma = 0.95$ with alternative specifications that yield average durations of 1 year and 10 years, respectively.[2] Our benchmark value of $\gamma = 0.95$ implies an annualized duration of five years, which places the majority of the weight on inflation misses over roughly a business cycle frequency.

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Monetary Policy Strategies

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[1] The discounted average inflation gap can be expressed in terms of either headline or core inflation. Figures 1 and 2 show the gap constructed using headline PCE inflation.

[2] In figure 1, the discounted average inflation gap is initialized in 2012. An alternative choice of initialization period does not considerably change the relative trajectories of the paths shown in the figure.

Figure 1: Discounted Average Inflation Gap, Alternative Durations

Percentage points

- - - - 10 years (γ=0.975)
- - · - 5 years (γ=0.95)
- · · · · 1 year (γ=0.75)
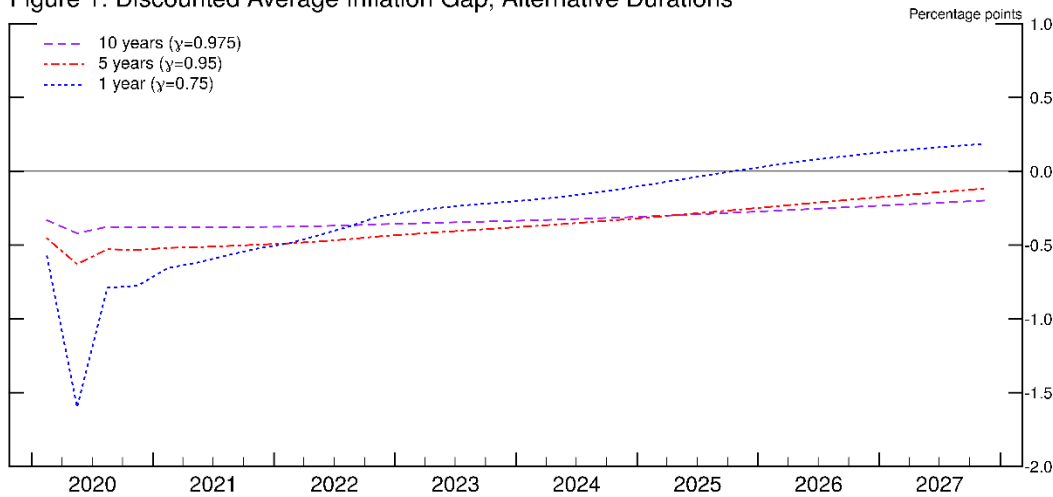
The second determination to be made in calculating the discounted average inflation gap is the initialization date. Figure 2 shows the result of two different initialization settings: one in which the lagged value of the discounted average inflation gap is set to zero at the beginning of 2019 and one in which the lagged value is set to zero at the beginning of 2012. These chosen initialization dates roughly coincide with the timing of the FOMC's public announcement in November 2018 that it would review its policy framework and the selection of the 2 percent inflation objective as a definition of price stability, respectively. Initializing the lagged gap to zero in 2012 could reflect a desire to take into account, at least in part, inflation misses since that year.[3] Initializing the lagged gap to be zero in 2019 could reflect a desire to respond to recent and future inflation deviations without committing to responding to deviations that occurred before the announcement of the framework review. Return to Monetary Policy Strategies text | Return to Monetary Policy Strategies appendix

Figure 2: Discounted Average Inflation Gap, Alternative Initializations

Percentage points

- - - - 2019 initialization
- - · - 2012 initialization

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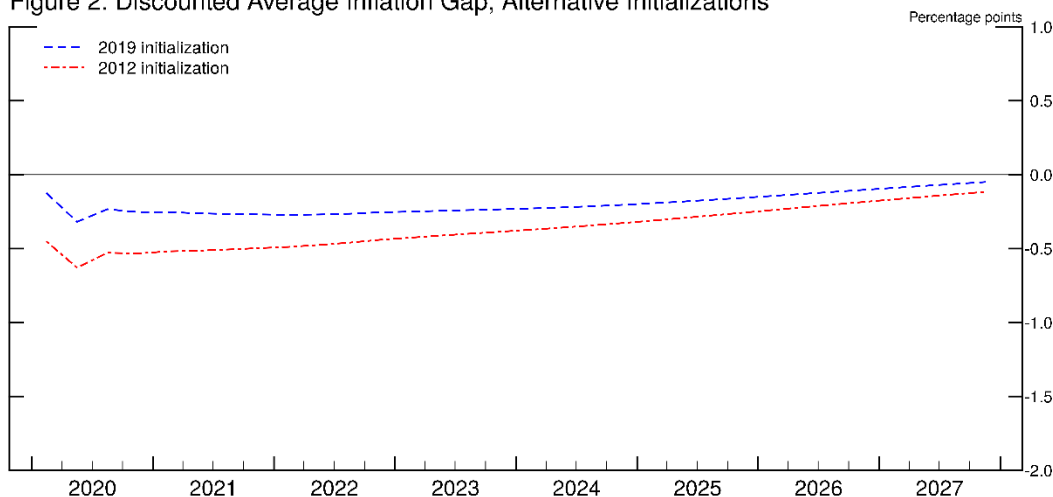
[3] Given the selection of $\gamma = 0.95$, initializing the gap to be zero at an earlier date than 2012 would have little effect on the current level of the discounted average inflation gap, because the effective weight on inflation deviations more than eight years hence is small.

Appendix

Implementation of the Simple Rules and Optimal Control Simulations

       The monetary policy strategies considered in this section of Tealbook A typically fall into one of two categories. Under simple policy rules, policymakers set the federal funds rate according to a reaction function that includes a small number of macroeconomic factors. Under optimal control policies, policymakers compute a path for the federal funds rate that minimizes a loss function meant to capture policymakers' preferences over macroeconomic outcomes. Unless otherwise noted, the simulations embed the assumption that policymakers will adhere to the policy strategy in the future and that financial market participants, price setters, and wage setters not only believe that policymakers will follow through with their strategy, but also fully understand the macroeconomic implications of policymakers doing so. Such policy strategies are described as commitment strategies.

       The two approaches have different merits and limitations. The parsimony of simple rules makes them relatively easy to communicate to the public, and, because they respond only to variables that are central to a range of models, proponents argue that they may be more robust to uncertainty about the structure of the economy. However, simple rules omit, by construction, other potential influences on policy decisions; thus, strict adherence to such rules may, at times, lead to unsatisfactory outcomes. By comparison, optimal control policies respond to a broader set of economic factors; their prescriptions optimally balance various policy objectives. And, although this section focuses on policies under commitment, optimal control policies can more generally be derived under various assumptions about the degree to which policymakers can commit. That said, optimal control policies assume substantial knowledge on the part of policymakers and are sensitive to the assumed loss function and the specifics of the particular model.

       Given the different strengths and weaknesses of the two approaches, they are probably best considered together as a means to assess the various tradeoffs policymakers may face when pursuing their mandated objectives.

POLICY RULES USED IN THE MONETARY POLICY STRATEGIES SECTION

       The table "Simple Rules" that follows gives expressions for three simple policy rules reported in the exhibits of the Monetary Policy Strategies section.[1] R_t denotes the nominal federal funds rate prescribed by a strategy for quarter t. The right-hand-side variables of the first

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[1] In the staff's construction of the baseline projection, not shown in this table, the federal funds rate remains at the ELB until the quarter after the unemployment rate is below 4.1 percent and the inflation rate is above 2.0 percent. Thereafter, the federal funds rate follows an inertial version of the Taylor (1999) rule, but with no response to the output gap when that gap is positive and with a time-varying intercept that is 1 percentage point below its long-run level through 2030 and then gradually rises to its long-run level thereafter.

two rules include the staff's projection of trailing four-quarter core PCE price inflation for the current quarter (π_t^4) and the output gap estimate for the current period ($ygap_t$). The value of policymakers' longer-run inflation objective, denoted π^{LR}, is 2 percent. The additional right-hand-side variables of the asymmetric discounted average inflation targeting (ADAIT) rule are described in the Monetary Policy Strategies section and include the discounted average inflation gap, denoted $\bar{\pi}gap_t$, which is an inflation makeup measure that accumulates historical inflation deviations from 2 percent but allows them to become "bygones" gradually over time.[2] The ADAIT rule also responds to shortfalls of employment from its maximum level, as determined by the gap between the level of the employment-to-population (EPOP) ratio and the staff's estimate of its trend (henceforth, the EPOP gap), with the response being limited to shortfalls via the minimum operator that replaces positive values of the EPOP gap with zero.

<div style="writing-mode: vertical">**Monetary Policy Strategies**</div>

Simple Rules

Taylor (1993) rule	$R_t = r^{LR} + \pi_t^4 + 0.5(\pi_t^4 - \pi^{LR}) + 0.5 ygap_t$
Inertial Taylor (1999) rule	$R_t = 0.85 R_{t-1} + 0.15(r^{LR} + \pi_t^4 + 0.5(\pi_t^4 - \pi^{LR}) + ygap_t)$
ADAIT rule	$R_t = 0.85 R_{t-1} + 0.15(r^{LR} + 2 + 1.5\,\bar{\pi}gap_t + 1.5\min(EPOPgap_t, 0))$

The first rule in the table was studied by Taylor (1993). The inertial Taylor (1999) rule features more inertia and a stronger response to resource slack over time compared with the Taylor (1993) rule. The inertial Taylor (1999) rule has been featured prominently in analysis by Board staff. The intercepts of the three rules, denoted r^{LR}, are constant and chosen so that they are consistent with a 2 percent longer-run inflation objective and an equilibrium real federal funds rate in the longer run of 0.5 percent.

NEAR-TERM PRESCRIPTIONS OF SELECTED POLICY RULES

The "Near-Term Prescriptions of Selected Policy Rules" reported in the first exhibit are calculated taking as given the Tealbook projections for inflation and measures of resource slack. When the Tealbook is published early in a quarter, the prescriptions are shown for the current and next quarters. When the Tealbook is published late in a quarter, the prescriptions are shown for the next two quarters. In both cases, rules that include a lagged policy rate as a right-hand-side variable use the midpoint of the current target range of the federal funds rate as that value in the first quarter shown and then condition on their simulated lagged federal funds rate for the second quarter shown.

A MEDIUM-TERM NOTION OF THE EQUILIBRIUM REAL FEDERAL FUNDS RATE

The bottom panel of the exhibit "Policy Rules and the Staff Projection" provides estimates of one notion of the equilibrium real federal funds rate that uses alternative baselines: the Tealbook baseline and another one consistent with median responses to the latest Summary of Economic Projections (SEP). The simulations are conducted using the FRB/US model, the staff's large-scale econometric model of the U.S. economy. "FRB/US r^*" is the real federal funds rate

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[2] See the box "A Discounted Average Inflation Gap" in the Monetary Policy Strategies section.

that, if maintained over a 12-quarter period (beginning in the current quarter), makes the output gap equal to zero in the final quarter of that period, given either the Tealbook or the SEP-consistent economic projection. This measure depends on a broad array of economic factors, some of which take the form of projected values of the model's exogenous variables.[3] The measure is derived under the assumption that agents in the model form VAR-based expectations—that is, agents use small-scale statistical models so that their expectations of future variables are determined solely by historical relationships.

The "Average projected real federal funds rate" for the Tealbook baseline and the SEP-consistent baseline reported in the panel are the corresponding averages of the real federal funds rate under the Tealbook baseline projection and SEP-consistent projection, respectively, calculated over the same 12-quarter period as the Tealbook-consistent and SEP-consistent FRB/US r^*. For a given economic projection, the average projected real federal funds rates and the FRB/US r^* may be associated with somewhat different macroeconomic outcomes even when their values are identical. The reason is that, in the FRB/US r^* simulation, the real federal funds rate is held constant over the entire 12-quarter period, whereas, in the economic projection, the real federal funds rate can vary over time.

FRB/US MODEL SIMULATIONS

The results presented in the exhibits "Simple Policy Rule Simulations" and "Optimal Control Simulations under Commitment" are derived from dynamic simulations of the FRB/US model. Each simulated policy strategy is assumed to be in force over the whole period covered by the simulation; this period extends several decades beyond the time horizon shown in the exhibits. The simulations are conducted under the assumption that market participants as well as price and wage setters form model-consistent expectations and are predicated on the staff's extended Tealbook projection, which includes the macroeconomic effects of the Committee's large-scale asset purchase programs. When the Tealbook is published early in a quarter, all of the simulations begin in that quarter; when the Tealbook is published late in a quarter, all of the simulations begin in the subsequent quarter.

COMPUTATION OF OPTIMAL CONTROL POLICIES UNDER COMMITMENT

The current Tealbook represents a transition between two specifications of the gaps in the loss functions for the optimal control simulations. To demonstrate the differences generated by the use of different gap measures, results from both specifications are provided in the main text and both specifications are described in this appendix.

In previous Tealbooks, the optimal control simulations posited that policymakers choose a path for the federal funds rate to minimize a discounted weighted sum of squared inflation gaps (measured as the difference between four-quarter headline PCE price inflation, π_t^{PCE}, and the Committee's 2 percent objective), squared unemployment gaps ($ugap_t$, measured as the difference between the unemployment rate and the staff's estimate of the natural rate), and squared changes in the federal funds rate R_t. In the specification of the gaps that begins with this

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[3] For a discussion of the equilibrium real federal funds rates in the longer run and other concepts of equilibrium interest rates, see Gust and others (2016).

Tealbook, the optimal control simulations posit that policymakers choose a path for the federal funds rate to minimize a discounted weighted sum of squared discounted average inflation gaps, squared EPOP gaps (measured as the gap between the level of the EPOP ratio and the staff's estimate of its trend), and, as before, squared changes in the federal funds rate. In the following equations, the resulting loss functions embed the assumption that policymakers discount the future using a quarterly discount factor, $\beta = 0.9963$:

Previous specification

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

New specification

$$L_t = \sum_{\tau=0}^{T} \beta^\tau \left\{ \lambda_\pi \left(\bar{\pi}gap_{t+\tau} \right)^2 + \lambda_{e,t+\tau}(EPOPgap_{t+\tau})^2 + \lambda_R(R_{t+\tau} - R_{t+\tau-1})^2 \right\}.$$

The exhibit "Optimal Control Simulations under Commitment" considers weighting structures on the inflation gap, the labor market gap, and the policy rate change components of the loss function. The tables "Loss Functions (Previous Specification)" and "Loss Functions (New Specification)" show the weights used in the previous and new specifications, respectively.

Loss Functions (Previous Specification)

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

Loss Functions (New Specification)

	λ_π	$\lambda_{e,t+\tau}$		λ_R
		$EPOPgap_{t+\tau} < 0$	$EPOPgap_{t+\tau} \geq 0$	
Equal weights	1	1	1	1
Asymmetric weight on *EPOPgap*	1	1	0	1

The first weighting structure, labeled "Equal weights," assigns equal weights to all three components at all times. The second weighting structure in either table, labeled "Asymmetric weight on *ugap*" or "Asymmetric weight on *EPOPgap*," uses the same weights as the equal-weights structure whenever either the unemployment rate is above the staff's estimate of the natural rate (under the previous specification of the gaps) or the EPOP gap is below the staff's

estimate of its trend (under the new specification of the gaps). However, this second weighting structure assigns no penalty to the unemployment rate falling below the natural rate (under the previous specification) or the EPOP gap moving above the staff's estimate of its trend. The optimal control policy and associated outcomes depend on the relative (rather than the absolute) values of the weights.

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

ESTIMATES OF THE EQUILIBRIUM REAL FEDERAL FUNDS RATE IN THE LONGER RUN

The top panel of the exhibit "Estimates of the Equilibrium Real Federal Funds Rate in the Longer Run" shows a range of estimates of r^{LR} from eight time-series models based on the following studies: Christensen and Rudebusch (2019); Del Negro, Giannone, Giannoni, and Tambalotti (2017); Holston, Laubach, and Williams (2017); Johannsen and Mertens (2018); Kiley (2015); Laubach and Williams (2003); Lewis and Vazquez-Grande (2019); and Lubik and Matthes (2015).[4] For comparability, all computations use the latest vintage of historical data through the quarter preceding this Tealbook. Moreover, the estimates are one sided in the sense that, at each point, they make use of historical data only up to that point in time. As a result, their historical movements can differ from the two-sided estimates reported in some of those studies.

The middle panel reports, for a selection of models, the point estimates and associated 68 percent uncertainty bands for 2020:Q2. The computation and interpretation of these bands are specific to each study.[5]

The bottom panel shows r^{LR} values from selected forecasters. These values were obtained as follows:

- "Tealbook baseline" is the staff's assumption about the level of the equilibrium real federal funds rate in the longer run.
- "Median SEP" is the median of FOMC participants' projections of the federal funds rate in the longer run minus the corresponding projection of PCE inflation.
- "Median Survey of Primary Dealers" equals the long-run median dealer forecast for the target rate minus the longer-run median dealer forecast of PCE inflation.

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[4] Two of the models featured in the exhibit, Laubach and Williams (2003) and Holston, Laubach, and Williams (2017), have been updated to incorporate a modification (one consistent with their basic structures) to make them more conducive to continued estimation during and after the COVID-19 pandemic. Details on this adjustment are available in Holston, Laubach, and Williams (2020).

[5] The ranges in the table represent both parameter and state uncertainty.

- "Blue Chip consensus" equals the five-year-forward, five-year average consensus forecast for the three-month Treasury bill rate minus the corresponding average forecast for the annual change in the GDP chained price index. The horizon covers the five-year period that begins with the first quarter of the seventh year after the survey year.
- "Congressional Budget Office" equals the projected federal funds rate minus the projected annualized quarterly change in the core PCE index, for the last quarter of the tenth year after the release year.

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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]	
	07/17/20	09/04/20	07/17/20	09/04/20	07/17/20	09/04/20	07/17/20	09/04/20	07/17/20	09/04/20
Quarterly										
2020:Q1	-3.4	-3.4	-5.0	-5.0	1.3	1.3	1.7	1.6	3.8	3.8
Q2	-34.1	-33.3	-33.2	-31.8	-1.6	-1.8	-.9	-1.0	13.0	13.0
Q3	17.4	32.8	15.2	29.7	2.8	3.4	2.0	3.2	10.3	8.9
Q4	10.4	5.9	8.7	4.5	1.7	1.4	1.8	1.6	8.9	7.4
2021:Q1	9.1	3.5	7.2	1.6	1.8	1.8	1.9	1.8	7.8	6.7
Q2	7.7	4.7	5.8	2.8	1.7	1.6	1.8	1.6	6.7	6.2
Q3	5.9	8.2	4.0	6.3	1.7	1.7	1.7	1.6	5.9	5.5
Q4	5.3	8.2	3.5	6.3	1.7	1.7	1.6	1.7	5.4	4.9
2022:Q1	5.0	5.4	3.4	3.6	1.6	1.7	1.5	1.7	5.2	4.5
Q2	4.8	5.3	2.9	3.3	1.7	1.8	1.6	1.8	5.0	4.2
Q3	4.5	5.0	2.7	3.0	1.8	1.9	1.7	1.8	4.8	4.0
Q4	4.5	4.7	2.6	2.8	1.9	1.9	1.9	1.9	4.7	3.8
Two-quarter[2]										
2020:Q2	-20.2	-19.7	-20.3	-19.5	-.2	-.3	.4	.3	9.5	9.5
Q4	13.9	18.6	11.9	16.4	2.2	2.4	1.9	2.4	-4.1	-5.6
2021:Q2	8.4	4.1	6.5	2.2	1.8	1.7	1.8	1.7	-2.2	-1.2
Q4	5.6	8.2	3.8	6.3	1.7	1.7	1.7	1.6	-1.3	-1.3
2022:Q2	4.9	5.3	3.1	3.4	1.6	1.7	1.6	1.7	-.4	-.7
Q4	4.5	4.8	2.6	2.9	1.8	1.9	1.8	1.9	-.3	-.4
Four-quarter[3]										
2019:Q4	4.0	4.0	2.3	2.3	1.4	1.5	1.6	1.6	-.3	-.3
2020:Q4	-4.7	-2.5	-5.6	-3.2	1.0	1.1	1.1	1.3	5.4	3.9
2021:Q4	7.0	6.1	5.1	4.2	1.7	1.7	1.7	1.7	-3.5	-2.5
2022:Q4	4.7	5.1	2.9	3.2	1.7	1.8	1.7	1.8	-.7	-1.1
2023:Q4	...	4.7	2.2	2.8	1.9	1.9	1.9	1.9	-.5	-.6
Annual										
2019	4.1	4.0	2.3	2.2	1.4	1.5	1.6	1.7	3.7	3.7
2020	-4.5	-3.0	-5.5	-3.9	1.1	1.1	1.2	1.3	9.0	8.3
2021	6.0	5.4	4.4	3.8	1.7	1.6	1.6	1.7	6.5	5.8
2022	5.2	6.1	3.4	4.2	1.7	1.7	1.7	1.7	4.9	4.1
2023	...	4.8	2.4	2.8	1.9	1.9	1.8	1.9	4.4	3.4

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.
... Not applicable.

Greensheets

Greensheets

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

Item	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2020[1]	2021[1]	2022[1]	2023[1]
Real GDP	-31.8	29.7	4.5	1.6	2.8	6.3	6.3	3.6	3.3	3.0	2.8	-3.2	4.2	3.2	2.8
Previous Tealbook	*-33.2*	*15.2*	*8.7*	*7.2*	*5.8*	*4.0*	*3.5*	*3.4*	*2.9*	*2.7*	*2.6*	*-5.6*	*5.1*	*2.9*	*2.2*
Final sales	-28.5	22.6	3.7	2.0	2.4	6.1	5.9	3.4	3.4	2.8	2.6	-3.3	4.1	3.1	2.7
Previous Tealbook	*-30.7*	*13.8*	*5.6*	*6.3*	*5.0*	*3.6*	*3.2*	*2.7*	*2.7*	*2.3*	*2.2*	*-5.3*	*4.5*	*2.5*	*…*
Priv. dom. final purch.	-32.9	32.0	4.4	1.6	2.3	8.0	7.8	4.5	4.1	3.8	3.5	-3.4	4.9	4.0	3.4
Previous Tealbook	*-34.6*	*15.1*	*8.3*	*7.9*	*6.4*	*4.9*	*4.5*	*3.7*	*3.3*	*3.4*	*3.4*	*-6.4*	*5.9*	*3.5*	*…*
Personal cons. expend.	-34.1	37.4	4.1	.0	1.2	8.0	7.9	3.9	3.6	3.3	3.0	-3.2	4.2	3.4	3.0
Previous Tealbook	*-35.2*	*21.4*	*8.4*	*7.1*	*5.3*	*4.4*	*4.3*	*3.3*	*3.0*	*3.0*	*3.0*	*-5.6*	*5.3*	*3.1*	*…*
Durables	-1.3	82.3	.7	-7.4	-6.3	-1.9	-2.0	2.6	2.5	2.2	1.9	12.2	-4.4	2.3	1.8
Nondurables	-14.9	33.6	.1	-5.5	-4.3	.2	.6	3.2	3.6	3.3	3.0	5.1	-2.3	3.2	3.0
Services	-43.1	31.9	6.1	3.3	4.4	12.3	11.9	4.3	3.8	3.5	3.2	-7.9	7.9	3.7	3.2
Residential investment	-36.3	45.9	13.7	11.4	8.5	10.1	8.4	6.8	6.3	5.1	4.4	5.9	9.6	5.6	3.0
Previous Tealbook	*-39.6*	*8.5*	*14.3*	*13.0*	*6.4*	*1.9*	*.8*	*2.3*	*3.0*	*3.9*	*5.4*	*-3.0*	*5.4*	*3.6*	*…*
Nonres. priv. fixed invest.	-25.7	4.2	3.2	6.8	5.8	7.3	6.9	7.2	5.9	6.1	5.6	-7.1	6.7	6.2	5.6
Previous Tealbook	*-30.0*	*-11.5*	*6.0*	*11.0*	*12.5*	*9.0*	*7.2*	*6.1*	*4.8*	*4.9*	*5.0*	*-11.5*	*9.9*	*5.2*	*…*
Equipment & intangibles	-23.7	11.6	8.2	8.1	7.3	6.9	6.9	7.6	7.0	6.3	5.8	-3.9	7.3	6.7	5.1
Previous Tealbook	*-28.5*	*-7.6*	*9.3*	*11.4*	*12.4*	*8.7*	*7.2*	*6.4*	*5.2*	*5.3*	*5.7*	*-9.9*	*9.9*	*5.6*	*…*
Nonres. structures	-32.1	-19.0	-14.4	1.6	.0	9.1	7.0	5.5	1.8	5.3	4.6	-17.9	4.4	4.3	7.3
Previous Tealbook	*-35.1*	*-25.0*	*-6.3*	*9.3*	*12.9*	*10.5*	*6.9*	*5.0*	*3.5*	*3.4*	*2.4*	*-17.3*	*9.8*	*3.6*	*…*
Net exports[2]	-770	-972	-956	-929	-920	-971	-1025	-1053	-1057	-1084	-1107	-872	-961	-1075	-1138
Previous Tealbook[2]	*-836*	*-819*	*-894*	*-924*	*-953*	*-985*	*-1000*	*-1022*	*-1024*	*-1044*	*-1064*	*-841*	*-966*	*-1038*	*…*
Exports	-64.0	58.5	21.3	10.9	8.6	12.3	13.3	4.7	4.6	4.5	4.5	-11.1	11.3	4.5	4.4
Imports	-54.1	82.4	12.0	4.2	4.9	15.6	16.3	6.6	3.6	6.2	5.6	-5.5	10.1	5.5	4.8
Gov't. cons. & invest.	2.9	1.1	-2.7	1.0	1.2	.8	.4	-.3	-.3	-.3	-.2	.6	.8	-.3	-.2
Previous Tealbook	*1.8*	*3.3*	*-.6*	*.5*	*.1*	*-.7*	*-3.0*	*-.9*	*-.9*	*-1.7*	*-2.3*	*1.4*	*-.8*	*-1.5*	*…*
Federal	17.6	11.7	2.9	1.3	1.5	.4	-.6	-2.0	-2.1	-2.2	-1.9	8.2	.6	-2.0	-2.0
Defense	4.2	2.1	2.1	.8	.8	.8	.1	.6	.6	.6	1.1	2.0	.6	.7	1.0
Nondefense	40.1	26.1	3.9	1.9	2.5	-.1	-1.5	-5.3	-5.5	-5.9	-5.8	17.6	.7	-5.6	-6.2
State & local	-5.4	-5.3	-6.4	.8	1.0	1.0	1.0	.9	1.0	1.0	.9	-4.1	1.0	.9	1.0
Change in priv. inventories[2]	-289	-13	29	5	26	37	62	74	65	76	86	-89	33	75	91
Previous Tealbook[2]	*-248*	*-196*	*-49*	*-6*	*34*	*55*	*74*	*111*	*126*	*148*	*166*	*-142*	*39*	*138*	*…*

1. Change from fourth quarter of previous year to fourth quarter of year indicated.
2. Billions of chained (2012) dollars; annual values show annual averages.
… Not applicable.

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Real GDP	2.9	2.2	2.1	2.7	2.5	2.3	-3.2	4.2	3.2	2.8
Previous Tealbook	*2.9*	*1.9*	*2.0*	*2.8*	*2.5*	*2.3*	*-5.6*	*5.1*	*2.9*	*2.2*
Final sales	3.2	2.1	2.3	2.8	2.2	2.8	-3.3	4.1	3.1	2.7
Previous Tealbook	*3.2*	*1.8*	*2.2*	*2.9*	*2.2*	*2.7*	*-5.3*	*4.5*	*2.5*	*…*
Priv. dom. final purch.	4.5	2.8	2.6	3.2	2.7	2.3	-3.4	4.9	4.0	3.4
Previous Tealbook	*4.5*	*2.5*	*2.8*	*3.4*	*2.8*	*2.1*	*-6.4*	*5.9*	*3.5*	*…*
Personal cons. expend.	3.8	3.1	2.7	2.9	2.4	2.5	-3.2	4.2	3.4	3.0
Previous Tealbook	*3.8*	*2.9*	*2.8*	*2.9*	*2.6*	*2.7*	*-5.6*	*5.3*	*3.1*	*…*
Durables	9.2	6.0	7.0	8.1	4.2	5.7	12.2	-4.4	2.3	1.8
Nondurables	3.2	2.8	2.0	3.7	2.3	2.7	5.1	-2.3	3.2	3.0
Services	3.2	2.7	2.3	1.8	2.1	1.9	-7.9	7.9	3.7	3.2
Residential investment	7.7	9.2	4.2	4.7	-3.9	1.6	5.9	9.6	5.6	3.0
Previous Tealbook	*7.7*	*9.1*	*3.9*	*4.2*	*-4.4*	*1.7*	*-3.0*	*5.4*	*3.6*	*…*
Nonres. priv. fixed invest.	6.9	-.1	1.8	4.8	6.5	1.4	-7.1	6.7	6.2	5.6
Previous Tealbook	*6.9*	*-.9*	*2.4*	*5.4*	*5.9*	*-.4*	*-11.5*	*9.9*	*5.2*	*…*
Equipment & intangibles	6.1	2.2	1.3	6.3	8.0	1.3	-3.9	7.3	6.7	5.1
Previous Tealbook	*6.1*	*2.3*	*1.9*	*6.6*	*6.8*	*1.3*	*-9.9*	*9.9*	*5.6*	*…*
Nonres. structures	9.3	-7.3	3.5	.0	1.2	1.9	-17.9	4.4	4.3	7.3
Previous Tealbook	*9.3*	*-10.9*	*4.3*	*1.5*	*2.6*	*-6.2*	*-17.3*	*9.8*	*3.6*	*…*
Net exports[1]	-577	-720	-764	-817	-878	-918	-872	-961	-1075	-1138
Previous Tealbook[1]	*-577*	*-722*	*-784*	*-850*	*-920*	*-954*	*-841*	*-966*	*-1038*	*…*
Exports	2.9	-1.5	1.5	5.8	.5	.4	-11.1	11.3	4.5	4.4
Imports	6.5	3.3	2.8	5.6	3.0	-1.9	-5.5	10.1	5.5	4.8
Gov't. cons. & invest.	.3	2.2	1.5	1.1	1.5	3.0	.6	.8	-.3	-.2
Previous Tealbook	*.3*	*2.3*	*1.5*	*.8*	*1.5*	*3.0*	*1.4*	*-.8*	*-1.5*	*…*
Federal	-1.1	1.3	.1	1.2	3.0	4.8	8.2	.6	-2.0	-2.0
Defense	-3.4	-.4	-.7	2.2	4.2	5.6	2.0	.6	.7	1.0
Nondefense	2.7	3.8	1.2	-.1	1.1	3.7	17.6	.7	-5.6	-6.2
State & local	1.2	2.8	2.4	1.1	.6	1.9	-4.1	1.0	.9	1.0
Change in priv. inventories[1]	86	138	25	16	53	49	-89	33	75	91
Previous Tealbook[1]	*86*	*132*	*23*	*32*	*48*	*67*	*-142*	*39*	*138*	*…*

1. Billions of chained (2012) dollars; annual values show annual averages.
… Not applicable.

Greensheets

Greensheets

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

Item	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2020[1]	2021[1]	2022[1]	2023[1]
Real GDP	-31.8	29.7	4.5	1.6	2.8	6.3	6.3	3.6	3.3	3.0	2.8	-3.2	4.2	3.2	2.8
Previous Tealbook	*-33.2*	*15.2*	*8.7*	*7.2*	*5.8*	*4.0*	*3.5*	*3.4*	*2.9*	*2.7*	*2.6*	*-5.6*	*5.1*	*2.9*	*2.2*
Final sales	-27.5	24.1	3.7	2.0	2.4	6.1	5.9	3.4	3.4	2.8	2.6	-3.3	4.1	3.1	2.7
Previous Tealbook	*-29.8*	*14.2*	*5.8*	*6.4*	*5.0*	*3.6*	*3.2*	*2.7*	*2.6*	*2.3*	*2.2*	*-5.3*	*4.5*	*2.5*	*…*
Priv. dom. final purch.	-28.3	26.7	3.8	1.3	1.9	6.7	6.6	3.9	3.5	3.3	3.0	-2.9	4.1	3.4	2.9
Previous Tealbook	*-29.8*	*12.8*	*7.0*	*6.7*	*5.4*	*4.2*	*3.8*	*3.1*	*2.8*	*2.8*	*2.9*	*-5.4*	*5.0*	*2.9*	*…*
Personal cons. expend.	-25.0	24.1	2.8	.0	.8	5.3	5.3	2.6	2.4	2.2	2.0	-2.2	2.9	2.3	2.0
Previous Tealbook	*-24.3*	*13.9*	*5.7*	*4.8*	*3.6*	*3.0*	*2.9*	*2.3*	*2.1*	*2.1*	*2.1*	*-3.8*	*3.6*	*2.1*	*…*
Durables	.3	5.2	.1	-.6	-.5	-.1	-.1	.2	.2	.2	.1	.9	-.4	.2	.1
Nondurables	-1.5	4.9	.0	-.8	-.6	.0	.1	.4	.5	.5	.4	.7	-.3	.4	.4
Services	-23.7	14.0	2.7	1.5	2.0	5.4	5.3	2.0	1.8	1.6	1.5	-3.7	3.6	1.7	1.5
Residential investment	-1.5	1.7	.5	.5	.4	.4	.4	.3	.3	.2	.2	.2	.4	.3	.1
Previous Tealbook	*-1.7*	*.4*	*.5*	*.5*	*.3*	*.1*	*.0*	*.1*	*.1*	*.2*	*.2*	*-.1*	*.2*	*.1*	*…*
Nonres. priv. fixed invest.	-3.2	.9	.4	.8	.7	.9	.9	.9	.8	.8	.7	-.9	.9	.8	.7
Previous Tealbook	*-3.8*	*-1.5*	*.8*	*1.3*	*1.5*	*1.1*	*.9*	*.8*	*.6*	*.6*	*.6*	*-1.5*	*1.2*	*.7*	*…*
Equipment & intangibles	-2.2	1.5	.8	.8	.7	.7	.7	.8	.7	.7	.6	-.4	.7	.7	.5
Previous Tealbook	*-2.8*	*-.7*	*.9*	*1.1*	*1.2*	*.8*	*.7*	*.6*	*.5*	*.5*	*.6*	*-1.0*	*1.0*	*.6*	*…*
Nonres. structures	-1.0	-.5	-.4	.0	.0	.2	.2	.1	.0	.1	.1	-.5	.1	.1	.2
Previous Tealbook	*-1.0*	*-.8*	*-.2*	*.2*	*.3*	*.3*	*.2*	*.1*	*.1*	*.1*	*.1*	*-.5*	*.2*	*.1*	*…*
Net exports	.7	-3.4	.4	.5	.2	-.8	-.8	-.4	.0	-.4	-.3	-.5	-.2	-.3	-.2
Previous Tealbook	*-1.3*	*.6*	*-1.2*	*-.4*	*-.4*	*-.4*	*-.1*	*-.3*	*.0*	*-.3*	*-.3*	*-.1*	*-.3*	*-.2*	*…*
Exports	-9.4	4.8	1.9	1.1	.9	1.3	1.4	.5	.5	.5	.5	-1.3	1.1	.5	.5
Imports	10.1	-8.1	-1.5	-.6	-.7	-2.0	-2.2	-.9	-.5	-.9	-.8	.8	-1.4	-.8	-.7
Gov't. cons. & invest.	1.4	.7	-.5	.2	.2	.2	.1	.0	.0	-.1	.0	.1	.2	.0	.0
Previous Tealbook	*1.4*	*.8*	*-.1*	*.1*	*.0*	*-.1*	*-.5*	*-.2*	*-.2*	*-.3*	*-.4*	*.2*	*-.1*	*-.3*	*…*
Federal	1.5	1.1	.2	.1	.1	.0	.0	-.1	-.1	-.2	-.1	.5	.0	-.1	-.1
Defense	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0
Nondefense	1.1	.9	.1	.1	.1	.0	.0	-.2	-.2	-.2	-.2	.5	.0	-.2	-.2
State & local	-.1	-.3	-.7	.1	.1	.1	.1	.1	.1	.1	.1	-.4	.1	.1	.1
Change in priv. inventories	-4.2	5.6	.8	-.5	.4	.2	.5	.2	-.2	.2	.2	.1	.2	.1	.1
Previous Tealbook	*-3.3*	*1.1*	*2.9*	*.9*	*.8*	*.4*	*.4*	*.7*	*.3*	*.4*	*.3*	*-.3*	*.6*	*.4*	*…*

1. Change from fourth quarter of previous year to fourth quarter of year indicated.
… Not applicable.

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

Item	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2020[1]	2021[1]	2022[1]	2023[1]
GDP chain-wt. price index	-2.0	2.4	1.3	1.9	1.9	1.8	1.7	1.7	1.9	1.9	1.9	.8	1.8	1.9	1.9
Previous Tealbook	*-.9*	*1.9*	*1.6*	*1.7*	*1.8*	*1.8*	*1.7*	*1.6*	*1.9*	*1.8*	*1.9*	*1.0*	*1.8*	*1.8*	*...*
PCE chain-wt. price index	-1.8	3.4	1.4	1.8	1.6	1.7	1.7	1.7	1.8	1.9	1.9	1.1	1.7	1.8	1.9
Previous Tealbook	*-1.6*	*2.8*	*1.7*	*1.8*	*1.7*	*1.7*	*1.7*	*1.6*	*1.7*	*1.8*	*1.9*	*1.0*	*1.7*	*1.7*	*1.9*
Energy	-45.0	25.5	1.6	4.2	3.7	2.9	2.1	1.7	2.0	1.9	1.8	-10.8	3.2	1.8	1.9
Previous Tealbook	*-43.3*	*21.2*	*1.7*	*3.5*	*3.0*	*2.8*	*2.4*	*2.0*	*2.3*	*2.2*	*2.2*	*-10.9*	*2.9*	*2.2*	*...*
Food	15.4	-2.3	-.2	.5	.7	1.9	2.0	2.0	2.1	2.1	2.0	3.8	1.3	2.0	2.0
Previous Tealbook	*15.8*	*4.0*	*.6*	*.5*	*.7*	*1.9*	*2.0*	*2.0*	*2.1*	*2.1*	*2.0*	*5.7*	*1.3*	*2.0*	*...*
Ex. food & energy	-1.0	3.2	1.6	1.8	1.6	1.6	1.7	1.7	1.8	1.8	1.9	1.3	1.7	1.8	1.9
Previous Tealbook	*-.9*	*2.0*	*1.8*	*1.9*	*1.8*	*1.7*	*1.6*	*1.5*	*1.6*	*1.7*	*1.9*	*1.1*	*1.7*	*1.7*	*1.9*
Ex. food & energy, market based	.1	2.4	1.8	1.7	1.5	1.5	1.5	1.5	1.6	1.7	1.8	1.5	1.5	1.7	1.7
Previous Tealbook	*.1*	*1.7*	*1.6*	*1.8*	*1.6*	*1.5*	*1.5*	*1.4*	*1.5*	*1.6*	*1.7*	*1.3*	*1.6*	*1.6*	*...*
CPI	-3.5	4.8	2.2	2.0	1.9	2.0	2.0	2.0	2.1	2.1	2.1	1.1	2.0	2.1	2.1
Previous Tealbook	*-3.5*	*3.5*	*1.9*	*2.0*	*1.9*	*2.0*	*2.0*	*1.9*	*2.0*	*2.1*	*2.1*	*.7*	*2.0*	*2.0*	*...*
Ex. food & energy	-1.6	4.1	2.5	1.9	1.8	1.8	1.9	2.0	2.0	2.1	2.1	1.7	1.9	2.0	2.1
Previous Tealbook	*-1.6*	*2.1*	*2.0*	*2.0*	*1.9*	*1.9*	*1.9*	*1.9*	*1.9*	*2.0*	*2.1*	*1.1*	*1.9*	*2.0*	*...*
ECI, hourly compensation[2]	1.7	1.2	1.3	1.8	2.2	2.2	2.2	2.5	2.5	2.5	2.5	1.9	2.1	2.5	2.6
Previous Tealbook[2]	*1.0*	*1.2*	*1.3*	*1.7*	*2.0*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*1.7*	*2.0*	*2.1*	*...*
Business sector															
Output per hour	8.9	3.7	-3.0	-5.2	-2.2	2.8	4.0	1.1	1.0	.9	.8	2.3	-.2	.9	1.0
Previous Tealbook	*8.7*	*-4.4*	*.6*	*1.3*	*1.4*	*-.6*	*.1*	*.2*	*1.0*	*.9*	*.8*	*1.0*	*.5*	*.7*	*...*
Compensation per hour	19.6	-11.0	-.8	-.8	-.6	1.4	2.6	3.6	3.6	3.6	3.6	3.6	.6	3.6	3.7
Previous Tealbook	*17.0*	*-14.0*	*.2*	*.9*	*1.9*	*2.3*	*2.4*	*2.9*	*2.9*	*2.9*	*2.9*	*1.4*	*1.9*	*2.9*	*...*
Unit labor costs	9.8	-14.2	2.3	4.7	1.6	-1.4	-1.3	2.5	2.6	2.7	2.8	1.3	.9	2.7	2.7
Previous Tealbook	*7.7*	*-10.0*	*-.4*	*-.4*	*.5*	*2.9*	*2.3*	*2.7*	*1.9*	*2.0*	*2.1*	*.5*	*1.3*	*2.2*	*...*
Core goods imports chain-wt. price index[3]	-2.0	1.2	4.3	2.0	1.6	1.0	1.0	1.1	1.0	.9	1.0	1.0	1.4	1.0	1.0
Previous Tealbook[3]	*-2.1*	*-1.6*	*1.7*	*1.3*	*1.3*	*1.0*	*1.0*	*1.0*	*1.0*	*.9*	*.9*	*.0*	*1.2*	*1.0*	*...*

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.
... Not applicable.

Greensheets

Greensheets

Changes in Prices and Costs

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

Item	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
GDP chain-wt. price index	1.5	.8	1.5	2.0	2.3	1.6	.8	1.8	1.9	1.9
Previous Tealbook	*1.5*	*.9*	*1.5*	*2.0*	*2.3*	*1.6*	*1.0*	*1.8*	*1.8*	*...*
PCE chain-wt. price index	1.1	.2	1.6	1.8	2.0	1.5	1.1	1.7	1.8	1.9
Previous Tealbook	*1.1*	*.3*	*1.5*	*1.8*	*1.9*	*1.4*	*1.0*	*1.7*	*1.7*	*1.9*
Energy	-7.1	-16.4	1.9	8.0	3.8	-.6	-10.8	3.2	1.8	1.9
Previous Tealbook	*-7.1*	*-16.4*	*2.0*	*8.0*	*3.9*	*-1.3*	*-10.9*	*2.9*	*2.2*	*...*
Food	2.8	.3	-1.8	.7	.5	.9	3.8	1.3	2.0	2.0
Previous Tealbook	*2.8*	*.3*	*-1.8*	*.7*	*.5*	*.9*	*5.7*	*1.3*	*2.0*	*...*
Ex. food & energy	1.5	1.2	1.8	1.7	2.0	1.6	1.3	1.7	1.8	1.9
Previous Tealbook	*1.5*	*1.2*	*1.8*	*1.7*	*1.9*	*1.6*	*1.1*	*1.7*	*1.7*	*1.9*
Ex. food & energy, market based	1.1	1.1	1.4	1.2	1.7	1.5	1.5	1.5	1.7	1.7
Previous Tealbook	*1.1*	*1.1*	*1.4*	*1.2*	*1.7*	*1.5*	*1.3*	*1.6*	*1.6*	*...*
CPI	1.2	.4	1.8	2.1	2.2	2.0	1.1	2.0	2.1	2.1
Previous Tealbook	*1.2*	*.4*	*1.8*	*2.1*	*2.2*	*2.0*	*.7*	*2.0*	*2.0*	*...*
Ex. food & energy	1.7	2.0	2.2	1.8	2.2	2.3	1.7	1.9	2.0	2.1
Previous Tealbook	*1.7*	*2.0*	*2.2*	*1.8*	*2.2*	*2.3*	*1.1*	*1.9*	*2.0*	*...*
ECI, hourly compensation[1]	2.3	1.9	2.2	2.6	3.0	2.7	1.9	2.1	2.5	2.6
Previous Tealbook[1]	*2.3*	*1.9*	*2.2*	*2.6*	*3.0*	*2.7*	*1.7*	*2.0*	*2.1*	*...*
Business sector										
Output per hour	.3	1.0	1.3	1.0	1.3	1.8	2.3	-.2	.9	1.0
Previous Tealbook	*.3*	*.7*	*1.3*	*1.1*	*1.4*	*1.9*	*1.0*	*.5*	*.7*	*...*
Compensation per hour	3.0	2.4	2.0	4.0	2.6	3.3	3.6	.6	3.6	3.7
Previous Tealbook	*3.0*	*2.4*	*2.0*	*3.8*	*2.4*	*4.0*	*1.4*	*1.9*	*2.9*	*...*
Unit labor costs	2.7	1.4	.7	3.0	1.3	1.4	1.3	.9	2.7	2.7
Previous Tealbook	*2.7*	*1.7*	*.8*	*2.6*	*1.0*	*2.0*	*.5*	*1.3*	*2.2*	*...*
Core goods imports chain-wt. price index[2]	-.4	-4.2	-.8	.9	.1	-1.4	1.0	1.4	1.0	1.0
Previous Tealbook[2]	*-.4*	*-4.3*	*-.9*	*.9*	*.2*	*-1.1*	*.0*	*1.2*	*1.0*	*...*

1. Private-industry workers.
2. Core goods imports exclude computers, semiconductors, oil, and natural gas.
... Not applicable.

Class II FOMC – Restricted (FR)   September 4, 2020

Other Macroeconomic Indicators

Item	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2020[1]	2021[1]	2022[1]	2023[1]
Employment and production															
Nonfarm payroll employment[2]	-4,427	1,292	763	596	533	517	374	339	314	303	286	-669	505	311	266
Unemployment rate[3]	13.0	8.9	7.4	6.7	6.2	5.5	4.9	4.5	4.2	4.0	3.8	7.4	4.9	3.8	3.2
Previous Tealbook[3]	13.0	10.3	8.9	7.8	6.7	5.9	5.4	5.2	5.0	4.8	4.7	8.9	5.4	4.7	4.2
Natural rate of unemployment[3]	9.5	6.0	5.6	5.3	5.1	4.9	4.7	4.7	4.6	4.6	4.5	5.6	4.7	4.5	4.3
Previous Tealbook[3]	9.4	7.0	6.3	5.9	5.6	5.2	4.9	4.9	4.8	4.7	4.7	6.3	4.9	4.7	...
Employment-to-Population Ratio[3]	52.9	56.1	57.3	57.8	58.2	58.9	59.4	59.7	59.9	60.1	60.3	57.3	59.4	60.3	60.8
Employment-to-Population Trend[3]	55.8	58.3	58.6	59.0	59.2	59.5	59.7	59.7	59.7	59.8	59.8	58.6	59.7	59.8	59.9
Output gap[4]	-4.5	-1.7	-1.3	-1.5	-1.5	-.6	.3	.7	1.0	1.3	1.5	-1.3	.3	1.5	2.3
Previous Tealbook[4]	-5.1	-5.1	-3.4	-2.3	-1.4	-1.0	-.8	-.4	-.2	.0	.2	-3.4	-.8	.2	...
Industrial production[5]	-43.2	34.6	7.4	2.6	2.6	6.2	6.0	3.8	2.3	2.4	2.1	-6.4	4.3	2.6	1.8
Previous Tealbook[5]	-42.6	29.7	6.9	4.8	4.5	4.2	3.5	3.3	2.6	2.6	2.5	-7.2	4.2	2.7	...
Manufacturing industr. prod.[5]	-47.1	48.8	9.2	2.9	2.6	6.8	7.1	4.0	2.6	2.8	2.5	-5.0	4.8	3.0	2.1
Previous Tealbook[5]	-47.0	43.3	10.8	6.0	5.3	4.6	4.1	3.5	3.0	3.1	2.9	-5.6	5.0	3.1	...
Capacity utilization rate - mfg.[3]	63.1	69.7	71.4	71.9	72.4	73.7	74.9	75.6	76.1	76.6	77.0	71.4	74.9	77.0	78.3
Previous Tealbook[3]	63.1	69.1	71.0	72.0	72.9	73.7	74.4	75.0	75.5	76.0	76.5	71.0	74.4	76.5	...
Housing starts[6]	1.1	1.5	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.4	1.5	1.6	1.7
Light motor vehicle sales[6]	11.3	15.1	16.0	15.7	15.8	16.4	16.7	16.8	16.9	17.0	17.1	14.4	16.2	17.0	17.1
Income and saving															
Nominal GDP[5]	-33.3	32.8	5.9	3.5	4.7	8.2	8.2	5.4	5.3	5.0	4.7	-2.5	6.1	5.1	4.7
Real disposable pers. income[5]	47.1	-20.1	11.7	-16.9	-7.8	3.2	1.5	4.4	2.7	2.9	2.4	7.7	-5.3	3.1	2.8
Previous Tealbook[5]	79.3	-29.3	-15.7	-10.2	-1.4	3.2	.1	5.0	2.4	2.0	2.0	1.9	-2.2	2.8	...
Personal saving rate[3]	26.0	15.5	17.0	13.1	11.1	10.1	8.8	9.0	8.8	8.8	8.7	17.0	8.8	8.7	8.6
Previous Tealbook[3]	29.6	19.5	14.4	10.6	9.1	8.9	8.0	8.4	8.3	8.1	7.9	14.4	8.0	7.9	...
Corporate profits[7]	-37.7	63.7	2.8	2.5	-11.7	27.6	23.1	7.2	7.1	3.0	3.0	-10.9	9.2	5.0	5.2
Profit share of GNP[3]	9.2	9.7	9.6	9.6	9.2	9.6	9.9	9.9	10.0	9.9	9.9	9.6	9.9	9.9	9.9
Gross national saving rate[3]	17.0	17.9	18.4	18.7	19.0	18.7	18.5	18.5	18.6	18.6	18.7	18.4	18.5	18.7	19.0
Net national saving rate[3]	-.6	1.6	2.2	2.5	3.0	2.8	2.6	2.8	3.0	3.1	3.1	2.2	2.6	3.1	3.5

1. Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise indicated.
2. Average monthly change, thousands.
3. Percent; annual values are for the fourth quarter of the year indicated.
4. Percent difference between actual and potential output; a negative number indicates that the economy is operating below potential. Annual values are for the fourth quarter of the year indicated.
5. Percent change, annual rate.
6. Level, millions; annual values are annual averages.
7. Percent change, annual rate, with inventory valuation and capital consumption adjustments.
... Not applicable.

Greensheets

Greensheets
Other Macroeconomic Indicators
(Change from fourth quarter of previous year to fourth quarter of year indicated, unless otherwise noted)

Item	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Employment and production										
Nonfarm payroll employment[1]	250	227	195	176	193	178	-669	505	311	266
Unemployment rate[2]	5.7	5.0	4.8	4.1	3.8	3.5	7.4	4.9	3.8	3.2
Previous Tealbook[2]	*5.7*	*5.0*	*4.8*	*4.1*	*3.8*	*3.5*	*8.9*	*5.4*	*4.7*	*4.2*
Natural rate of unemployment[2]	5.1	4.9	4.8	4.6	4.5	4.3	5.6	4.7	4.5	4.3
Previous Tealbook[2]	*5.1*	*4.9*	*4.8*	*4.6*	*4.5*	*4.3*	*6.3*	*4.9*	*4.7*	*…*
Employment-to-Population Ratio[2]	59.3	59.4	59.7	60.1	60.6	61.0	57.3	59.4	60.3	60.8
Employment-to-Population Trend[2]	60.3	60.2	60.2	60.2	60.2	60.3	58.6	59.7	59.8	59.9
Output gap[3]	-1.0	-.5	-.3	.6	1.3	1.5	-1.3	.3	1.5	2.3
Previous Tealbook[3]	*-1.0*	*-.5*	*-.3*	*.6*	*1.3*	*1.5*	*-3.4*	*-.8*	*.2*	*…*
Industrial production	3.4	-3.4	-.3	3.6	4.0	-.7	-6.4	4.3	2.6	1.8
Previous Tealbook	*3.4*	*-3.4*	*-.3*	*3.6*	*4.0*	*-.7*	*-7.2*	*4.2*	*2.7*	*…*
Manufacturing industr. prod.	1.4	-1.7	.3	2.5	2.2	-1.2	-5.0	4.8	3.0	2.1
Previous Tealbook	*1.4*	*-1.7*	*.3*	*2.5*	*2.2*	*-1.2*	*-5.6*	*5.0*	*3.1*	*…*
Capacity utilization rate - mfg.[2]	75.8	74.9	74.2	75.8	77.0	75.0	71.4	74.9	77.0	78.3
Previous Tealbook[2]	*75.8*	*74.9*	*74.2*	*75.8*	*77.0*	*75.0*	*71.0*	*74.4*	*76.5*	*…*
Housing starts[4]	1.0	1.1	1.2	1.2	1.2	1.3	1.4	1.5	1.6	1.7
Light motor vehicle sales[4]	16.5	17.4	17.5	17.1	17.2	17.0	14.4	16.2	17.0	17.1
Income and saving										
Nominal GDP	4.5	3.0	3.6	4.8	4.9	4.0	-2.5	6.1	5.1	4.7
Real disposable pers. income	5.3	3.1	1.8	3.4	3.7	1.6	7.7	-5.3	3.1	2.8
Previous Tealbook	*5.3*	*3.0*	*1.6*	*3.4*	*3.9*	*2.6*	*1.9*	*-2.2*	*2.8*	*…*
Personal saving rate[2]	7.5	7.4	6.6	7.0	8.1	7.3	17.0	8.8	8.7	8.6
Previous Tealbook[2]	*7.5*	*7.5*	*6.5*	*6.8*	*7.8*	*7.7*	*14.4*	*8.0*	*7.9*	*…*
Corporate profits[5]	6.7	-10.9	5.4	5.1	5.9	1.3	-10.9	9.2	5.0	5.2
Profit share of GNP[2]	12.1	10.5	10.6	10.6	10.8	10.5	9.6	9.9	9.9	9.9
Gross national saving rate[2]	20.3	19.4	18.4	18.8	18.7	18.4	18.4	18.5	18.7	19.0
Net national saving rate[2]	5.4	4.4	3.2	3.8	3.6	3.1	2.2	2.6	3.1	3.5

1. Average monthly change, thousands.
2. Percent; values are for the fourth quarter of the year indicated.
3. Percent difference between actual and potential output; a negative number indicates that the economy is operating below potential. Values are for the fourth quarter of the year indicated.
4. Level, millions; values are annual averages.
5. Percent change, with inventory valuation and capital consumption adjustments.
… Not applicable.

Staff Projections of Government-Sector Accounts and Related Items

Item	2018	2019	2020	2021	2022	2023	2020 Q2	Q3	Q4	2021 Q1
Unified federal budget[1]					Nominal dollars, billions					
Receipts	3,330	3,462	3,237	3,337	3,594	3,808	657	977	695	718
Outlays	4,109	4,447	6,683	5,486	5,012	5,127	2,657	1,678	1,756	1,341
Surplus/deficit	-779	-984	-3,446	-2,149	-1,419	-1,319	-2,001	-702	-1,061	-623
					Percent of GDP					
Surplus/deficit	-3.8	-4.6	-16.5	-10.0	-6.2	-5.5	-38.0	-13.4	-20.4	-12.0
Previous Tealbook	*-3.8*	*-4.6*	*-18.2*	*-10.3*	*-6.2*	*-5.5*	*-38.0*	*-19.5*	*-19.5*	*-11.8*
Primary surplus/deficit	-2.2	-2.9	-14.8	-8.5	-4.9	-4.1	-36.4	-12.3	-18.7	-10.5
Net interest	1.6	1.8	1.6	1.4	1.3	1.4	1.5	1.1	1.8	1.5
Cyclically adjusted surplus/deficit	-4.2	-5.3	-15.5	-9.1	-6.4	-6.3	-35.0	-11.4	-19.9	-10.8
Federal debt held by public	77.3	79.2	96.2	103.9	104.4	105.4	97.4	96.2	102.0	105.3
Government in the NIPA[2]					Real percent change, annual rate					
Purchases	1.5	3.0	.6	.8	-.3	-.2	2.9	1.1	-2.7	1.0
Consumption	1.5	2.1	.2	1.3	-.1	-.1	3.3	1.1	-3.3	1.5
Investment	1.6	6.8	2.3	-.7	-.7	-.4	1.6	1.1	.0	-.7
State and local construction	-3.0	7.5	3.6	-5.0	-5.0	-5.0	.4	.0	-2.0	-5.0
Real disposable personal income	3.7	1.6	7.8	-5.4	3.1	2.8	47.0	-20.1	11.7	-17.0
Contribution from transfers[3]	.4	.7	8.7	-6.7	.6	.6	59.4	-32.6	8.9	-16.2
Contribution from taxes[3]	.3	-.8	.7	-.9	-1.0	-.9	5.1	-1.5	.3	-.1
Government employment					Average net change in monthly payrolls, thousands					
Federal	1	3	3	1	1	1	-1	181	-182	1
State and local	8	12	-116	28	28	26	-469	-19	20	-5
Fiscal indicators[2]					Percentage point contribution to change in real GDP, annual rate					
Fiscal effect (FE)[4]	.4	.9	5.9	-3.9	-.4	.1	17.9	2.8	2.2	-6.0
Discretionary policy actions (FI)	.6	.8	4.7	-3.6	-.4	.1	13.7	.9	3.8	-5.1
Previous Tealbook	*.6*	*.8*	*5.0*	*-4.0*	*-.5*	*-.2*	*13.6*	*5.6*	*.1*	*-4.6*
Federal purchases	.2	.3	.5	.0	-.1	-.1	1.4	1.1	.2	.1
State and local purchases	.1	.2	-.4	.1	.1	.1	-.1	-.3	-.7	.1
Taxes and transfers	.3	.3	4.5	-3.7	-.4	.1	13.0	.7	4.3	-5.2
Cyclical	-.1	-.1	1.1	-.6	-.4	-.2	3.0	1.6	-.3	-1.2
Other	-.1	.2	.1	.3	.4	.3	1.2	.3	-1.3	.3

1. Annual values stated on a fiscal year basis. Quarterly values not seasonally adjusted.
2. Annual values refer to the change from fourth quarter of previous year to fourth quarter of year indicated.
3. Percentage point contribution to change in real disposable personal income, annual basis.
4. The FE measure captures the total contribution of the government sector to the growth of aggregate demand (excluding any multiplier effects and financial offsets). It equals the sum of the direct contributions to aggregate demand growth from all changes in federal purchases and state and local purchases, plus the estimated contribution to real household consumption and business investment that is induced by changes in transfer and tax policies. FI (fiscal impetus) is the portion of FE attributable to discretionary fiscal policy actions (for example, a legislated change in tax revenues).

Greensheets

Greensheets

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

Measure and country	2020				2021				2022			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Real GDP[1]												
Total foreign	-10.8	-34.7	30.5	9.7	6.5	5.5	4.2	3.5	3.0	2.9	2.8	2.8
Previous Tealbook	-10.8	-29.3	20.3	10.1	7.4	5.9	4.4	3.7	2.9	2.8	2.8	2.8
Advanced foreign economies	-9.2	-39.6	39.3	6.9	5.9	5.4	4.2	3.2	2.5	2.3	2.3	2.3
Canada	-8.2	-38.7	44.5	6.4	5.2	4.5	3.9	3.2	2.7	2.6	2.5	2.5
Japan	-2.5	-27.8	12.0	6.5	6.0	4.6	2.4	2.1	1.3	1.1	1.1	1.1
United Kingdom	-8.5	-59.8	79.4	7.2	4.9	5.9	5.0	3.0	2.2	2.2	2.2	2.2
Euro area	-13.6	-40.3	40.0	7.8	7.0	6.7	5.1	3.6	2.5	2.3	2.3	2.3
Germany	-7.8	-33.5	31.0	8.0	7.3	4.3	3.6	3.2	2.4	2.2	2.2	2.2
Emerging market economies	-12.5	-29.4	22.2	12.7	7.1	5.6	4.3	3.8	3.5	3.4	3.3	3.3
Asia	-19.3	-2.5	13.9	10.6	7.6	6.5	5.7	5.2	4.6	4.3	4.3	4.2
Korea	-5.0	-12.0	5.0	8.0	6.5	5.5	4.0	3.0	2.3	2.3	2.3	2.3
China	-36.3	59.1	9.2	9.0	6.5	6.3	6.1	5.8	5.7	5.7	5.6	5.6
Latin America	-5.1	-50.5	32.8	15.4	6.8	4.8	2.8	2.4	2.4	2.4	2.4	2.4
Mexico	-4.6	-52.7	35.6	15.7	7.1	4.9	2.5	2.2	2.2	2.2	2.2	2.2
Brazil	-9.5	-33.5	21.0	2.8	3.5	4.0	3.8	3.2	2.8	2.8	2.8	2.8
Addendum												
Emerging market economies ex. China	-6.5	-40.4	25.1	13.5	7.3	5.5	3.9	3.4	3.1	2.9	2.9	2.9
Consumer prices[2]												
Total foreign	2.4	-2.2	2.7	1.5	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2
Previous Tealbook	2.4	-1.8	1.3	1.9	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2
Advanced foreign economies	.6	-2.0	1.3	1.1	1.1	1.0	1.1	1.2	1.2	1.2	1.3	1.3
Canada	.5	-3.3	1.1	1.3	1.4	1.5	1.6	1.8	1.8	1.8	1.9	1.9
Japan	.3	-1.0	1.1	.1	.2	.3	.4	.5	.5	.6	.6	.7
United Kingdom	2.0	-1.5	1.2	.8	3.4	1.8	1.2	1.4	1.7	1.8	1.8	1.8
Euro area	.7	-1.4	1.5	1.6	1.0	.9	1.0	1.1	1.1	1.1	1.1	1.1
Germany	1.8	-1.2	1.4	1.6	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5
Emerging market economies	3.6	-2.2	3.7	1.8	2.6	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Asia	3.6	-4.0	2.7	1.1	2.4	2.5	2.6	2.6	2.6	2.6	2.6	2.6
Korea	1.6	-3.2	2.0	1.4	1.8	2.1	2.1	2.1	2.1	2.1	2.1	2.1
China	4.2	-4.3	2.3	.7	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Latin America	3.8	1.9	6.3	3.2	3.3	3.3	3.3	3.3	3.2	3.2	3.2	3.2
Mexico	3.3	2.0	6.6	2.9	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Brazil	4.9	-1.6	3.1	3.6	3.7	3.7	3.7	3.7	3.6	3.5	3.5	3.5
Addendum												
Emerging market economies ex. China	3.1	-.8	4.8	2.5	2.7	2.9	2.9	2.9	2.9	2.9	2.9	2.9

Note: Columns for 2021 and 2022 are under the heading ----Projected----.

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	2014	2015	2016	2017	2018	2019	2020	Projected 2021	2022	2023
Real GDP¹										
Total foreign	3.0	2.1	2.8	3.3	2.1	1.3	-4.5	4.9	2.9	2.8
Previous Tealbook	*3.0*	*2.1*	*2.8*	*3.2*	*2.1*	*1.3*	*-4.4*	*5.4*		
Advanced foreign economies	2.0	.9	1.8	2.9	1.4	1.1	-4.9	4.7	2.3	2.2
Canada	2.8	-.4	1.7	3.2	1.8	1.5	-3.6	4.2	2.6	2.5
Japan	-.4	1.0	1.2	2.6	-.3	-.7	-4.3	3.8	1.2	1.1
United Kingdom	2.5	2.4	1.8	1.6	1.4	1.1	-8.3	4.7	2.2	2.1
Euro area	1.5	2.0	2.1	3.0	1.2	1.0	-6.0	5.6	2.4	2.2
Germany	2.3	1.1	1.9	3.6	.3	.4	-3.5	4.6	2.2	2.2
Emerging market economies	3.9	3.2	3.9	3.6	2.8	1.4	-4.0	5.2	3.4	3.3
Asia	5.2	4.7	5.3	5.4	4.4	3.1	-.2	6.2	4.4	4.2
Korea	2.6	3.5	2.6	2.9	3.2	2.4	-1.3	4.7	2.3	2.3
China	7.3	6.9	6.9	6.9	6.5	5.9	4.8	6.2	5.6	5.5
Latin America	2.7	1.8	2.4	1.9	1.1	-.4	-7.9	4.2	2.4	2.3
Mexico	3.4	2.7	3.1	1.8	1.2	-.8	-8.2	4.2	2.2	2.2
Brazil	-.2	-5.5	-1.8	2.4	.8	1.6	-7.0	3.6	2.8	2.6
Addendum										
Emerging market economies ex. China	3.1	2.4	3.2	2.8	2.1	.5	-5.7	5.0	2.9	2.8
Consumer prices²										
Total foreign	2.0	1.4	1.9	2.5	2.4	2.4	1.1	2.1	2.2	2.3
Previous Tealbook	*2.0*	*1.4*	*1.9*	*2.5*	*2.4*	*2.4*	*.9*	*2.1*		
Advanced foreign economies	1.2	.5	.9	1.5	1.8	1.2	.2	1.1	1.3	1.4
Canada	2.0	1.3	1.4	1.8	2.1	2.1	-.1	1.6	1.8	2.0
Japan	2.5	.1	.3	.6	.8	.5	.1	.4	.6	.8
United Kingdom	.9	.1	1.2	3.0	2.3	1.4	.6	2.0	1.7	1.9
Euro area	.2	.3	.7	1.4	1.9	1.0	.6	1.0	1.1	1.3
Germany	.4	.5	1.0	1.6	2.1	1.2	.9	1.4	1.5	1.5
Emerging market economies	2.6	2.0	2.6	3.2	2.9	3.3	1.7	2.7	2.8	2.9
Asia	1.8	1.5	2.1	2.0	2.0	3.3	.8	2.5	2.6	2.7
Korea	1.0	.9	1.4	1.4	1.7	.3	.5	2.0	2.1	2.1
China	1.5	1.4	2.1	1.7	2.1	4.2	.7	2.5	2.5	2.5
Latin America	4.7	3.2	4.0	6.3	5.0	3.3	3.8	3.3	3.2	3.2
Mexico	4.2	2.3	3.2	6.6	4.8	2.9	3.7	3.2	3.2	3.2
Brazil	6.5	10.4	7.1	2.8	4.1	3.4	2.5	3.7	3.5	3.5
Addendum										
Emerging market economies ex. China	3.5	2.3	3.0	4.2	3.4	2.6	2.4	2.9	2.9	3.1

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

Greensheets

U.S. Current Account

Quarterly Data

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

	2020				2021 (Projected)				2022 (Projected)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
U.S. current account balance	**-446.5**	**-694.8**	**-837.5**	**-745.6**	**-670.2**	**-624.7**	**-674.2**	**-741.5**	**-773.9**	**-765.4**	**-788.8**	**-803.0**
Previous Tealbook	*-416.8*	*-639.7*	*-541.0*	*-545.4*	*-584.8*	*-577.1*	*-608.4*	*-633.8*	*-666.1*	*-653.6*	*-680.5*	*-704.6*
Current account as percent of GDP	-2.1	-3.6	-4.0	-3.5	-3.1	-2.9	-3.1	-3.3	-3.4	-3.3	-3.4	-3.4
Previous Tealbook	*-1.9*	*-3.3*	*-2.7*	*-2.6*	*-2.8*	*-2.7*	*-2.8*	*-2.9*	*-3.0*	*-2.9*	*-3.0*	*-3.0*
Net goods & services	-505.9	-659.6	-782.8	-689.3	-665.3	-651.4	-695.3	-743.5	-772.2	-769.4	-793.6	-816.6
Investment income, net	221.8	128.8	111.7	111.9	165.5	190.8	187.4	170.2	168.6	168.0	171.2	181.8
Direct, net	297.4	210.2	163.9	161.8	216.7	243.4	243.2	231.4	234.5	239.6	249.2	266.8
Portfolio, net	-75.6	-81.4	-52.2	-49.9	-51.2	-52.6	-55.8	-61.2	-65.9	-71.5	-77.9	-85.1
Other income and transfers, net	-162.4	-164.0	-166.4	-168.2	-170.4	-164.0	-166.4	-168.2	-170.4	-164.0	-166.4	-168.2

Annual Data

Billions of dollars

	2014	2015	2016	2017	2018	2019	2020	2021 (Projected)	2022	2023
U.S. current account balance	**-367.8**	**-407.4**	**-394.9**	**-365.3**	**-449.7**	**-480.2**	**-681.1**	**-677.6**	**-782.8**	**-806.2**
Previous Tealbook	*-367.8*	*-407.4*	*-394.9*	*-365.3*	*-449.7*	*-480.2*	*-535.7*	*-601.0*	*-676.2*	
Current account as percent of GDP	-2.1	-2.2	-2.1	-1.9	-2.2	-2.2	-3.3	-3.1	-3.4	-3.3
Previous Tealbook	*-2.1*	*-2.2*	*-2.1*	*-1.9*	*-2.2*	*-2.2*	*-2.6*	*-2.8*	*-3.0*	
Net goods & services	-484.1	-491.3	-481.2	-513.8	-579.9	-576.9	-659.4	-688.9	-788.0	-843.1
Investment income, net	209.7	195.5	208.0	268.3	261.6	248.4	143.6	178.5	172.4	204.2
Direct, net	284.2	277.3	289.7	350.3	342.5	329.3	208.3	233.7	247.5	308.4
Portfolio, net	-74.5	-81.8	-81.7	-82.0	-80.8	-80.9	-64.8	-55.2	-75.1	-104.2
Other income and transfers, net	-93.4	-111.6	-121.7	-119.8	-131.4	-151.8	-165.3	-167.2	-167.2	-167.2

Abbreviations

ABS	asset-backed securities
ADAIT	asymmetric discounted average inflation targeting
AFE	advanced foreign economy
a.r.	annual rate
BLS	Bureau of Labor Statistics
BOC	Bank of Canada
BOE	Bank of England
BOJ	Bank of Japan
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CBRT	Central Bank of the Republic of Turkey
CDS	credit default swaps
C&I	commercial and industrial
CMBS	commercial mortgage-backed securities
COVID-19	coronavirus disease 2019
CP	commercial paper
CPI	consumer price index
CPS	Current Population Survey
CRE	commercial real estate
DSGE	dynamic stochastic general equilibrium
EBITDA	earnings before interest, taxes, depreciation, and amortization
ECB	European Central Bank
ECI	employment cost index
E&I	equipment and intellectual property products
ELB	effective lower bound
EME	emerging market economy

EPOP	employment-to-population ratio
EU	European Union
FAANG	Facebook, Amazon, Apple, Netflix, and Google
FCI	financial conditions index
FHA	Federal Housing Administration
FOMC	Federal Open Market Committee; also, the Committee
FPLT	flexible price-level targeting
FRB/US	A large-scale macroeconometric model of the U.S. economy
FX	foreign exchange
GDP	gross domestic product
GFC	Global Financial Crisis
GSE	government-sponsored enterprise
IMF	International Monetary Fund
IOER	interest on excess reserves
IPO	initial public offering
LFPR	labor force participation rate
MBS	mortgage-backed securities
MLF	Municipal Liquidity Facility
MMF	money market fund
MSR	mortgage servicing rights
OIS	overnight index swap
OPEC	Organization of the Petroleum Exporting Countries
PCE	personal consumption expenditures
PPP	Paycheck Protection Program
RBA	Reserve Bank of Australia
RBNZ	Reserve Bank of New Zealand
R&D	research and development

s.a.a.r.	seasonally adjusted annual rate
SEP	Summary of Economic Projections
SHED	Survey of Household Economics and Decisionmaking
SIFMA	Securities Industry and Financial Markets Association
SIGMA	A calibrated multicountry DSGE model
S&L	state and local
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SOMA	System Open Market Account
S&P	Standard & Poor's
STW	short-time work
TBA	to be announced
TIPS	Treasury Inflation-Protected Securities
UI	unemployment insurance
US-FLM	a new DSGE model that enhances the model developed by Gertler, Sala, and Trigari (2008)
VAR	vector autoregression
VIX	one-month-ahead option-implied volatility on the S&P 500 index

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