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.

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Report to the FOMC on Economic Conditions and Monetary Policy

Book A

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

April 17, 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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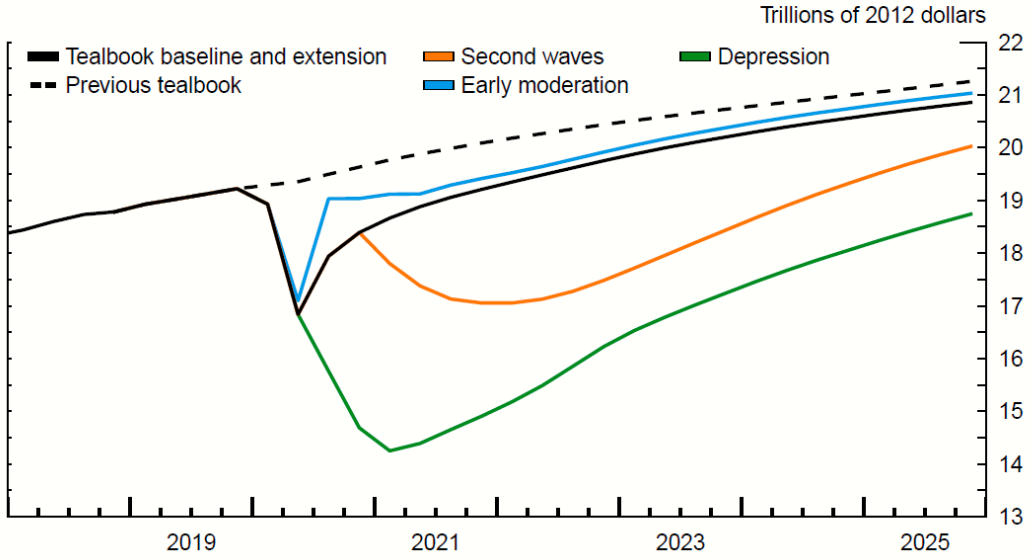
Domestic Economic Developments and Outlook

The social-distancing measures taken to protect people from the spread of the coronavirus (COVID-19) are causing sudden and profound disruptions to economic activity. Based on an astounding increase in unemployment insurance claims, a steep drop in retail sales, and a pronounced weakening in a variety of high-frequency indicators, we now see GDP declining at an annual rate of more than 35 percent in the second quarter, with businesses shedding some 25 million jobs, on net, in April and May and the unemployment rate spiking to 18 percent in May. The substantial fiscal support as well as the prompt and aggressive response from the Federal Reserve will help mitigate the economic losses. Nevertheless, the damage to the economy is severe, and there are likely to be long-lasting effects on demand and supply.

The path ahead is extraordinarily uncertain, and we can see a number of plausible scenarios. Ultimately, the speed of the economic recovery depends on the degree to which the spread of the virus is under control, and our scenarios are guided by assumptions about the duration and intensity of social-distancing restrictions needed to reduce its transmission. The baseline forecast assumes that the current stringent restrictions on social interactions and business operations will last through May and will then ease gradually, but materially, by year-end, though a degree of both voluntary and involuntary social distancing will persist until late 2021. While a faster return to normalcy certainly is possible, we think our baseline assumptions lean toward the optimistic side of expert assessments of the likely path of the disease. Thus, we have also sketched out two more-pessimistic paths, one in which a second wave of the virus hits toward year-end, inducing a new round of strict social distancing, and another in which ineffective containment and delays in developing treatments lead to a prolonged and deep downturn. These alternatives are examined more fully in the Risks and Uncertainty section.

In our baseline projection, despite rapid growth over the second half of the year, output is still 4 percent below its 2019:Q4 peak by year's end, and the unemployment rate is about 8 percent. The restraint on output growth occurs partly because some social distancing remains in place. However, it also occurs because households and businesses react to the negative shock in ways that unleash further contractionary behavior. In addition to the usual amplification of shocks through income and wealth, other channels

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



magnify shocks during recessions. These channels include reduced access to credit, heightened concerns about future prospects—which may be especially prevalent in this episode, given the lingering and pervasive uncertainty about possible recurrences of the disease—and the loss of intangible capital and firm-specific human capital due to bankruptcies and permanent layoffs. As these factors eventually unwind, GDP rises faster than potential in 2021 and 2022, resulting in a decline in the unemployment rate to 4.7 percent at the end of 2022.

We have marked down our inflation projection in response to the greater slack and stronger dollar. We further revised down inflation this year, as we see the reductions in demand from voluntary distancing measures as dominating, on net, the upward pressure on prices from disruptions to production and the supply chain. We now project core PCE inflation to be 1.4 percent this year, with total inflation even lower given the drop in oil prices. Even so, we assume that longer-term inflation expectations remain largely unaffected, as they appear to have been during the previous recession, limiting the decline in inflation. We project both total and core PCE inflation to increase as the economy recovers over the medium term, reaching 1.8 percent and 1.7 percent, respectively, in 2022.

KEY BACKGROUND FACTORS

COVID-19 and Social-Distancing Assumptions

The staff's baseline forecast is built around some key assumptions for how containment measures for the spread of the virus are likely to proceed. We used a framework developed by public health officials to help define three different stages of social-distancing measures and to determine how long each should last.[1]

- Stage 1 is a state of stringent social distancing with stay-at-home orders; under the baseline projection, this stage began in late March and is assumed to last, essentially nationwide, until the end of May. At that point, we assume the spread of COVID-19 will have slowed enough to not overburden the health-care system, and a program of testing and contact tracing will have advanced enough, to enable a gradual easing of social distancing.

- We assume strict stay-at-home orders are lifted gradually and that all have been relaxed by the end of August, at which point all parts of the nation are in stage 2. We assume that other restrictions, such as the permissible size of public gatherings, will continue to ease gradually and businesses will slowly reopen. By the end of this year, businesses are open but under different conditions than before (for example, restaurants may seat fewer customers and keep people spaced farther apart). Thus, a degree of social distancing remains.

- Only in stage 3—which begins in the fourth quarter of 2021, when a vaccine is assumed to be widely available—does daily life return essentially to normal.

Unfortunately, we view the risks around these assumptions as skewed to the downside. In the R&U section, we explore the effects of different assumptions—summarized in the table on the next page—for the course of the disease.

[1] See Scott Gottlieb, Caitlin Rivers, Mark B. McClellan, Lauren Silvis, and Crystal Watson (2020), *National Coronavirus Response: A Road Map to Reopening* (Washington: American Enterprise Institute, March), https://www.aei.org/wp-content/uploads/2020/03/National-Coronavirus-Response-a-Road-Map-to-Recovering-2.pdf.

Alternative Scenarios for the Spread of COVID-19 and Associated Economic Outcomes

Characteristics of the scenarios	Alternative scenarios			
	Early moderation	Staff baseline	Second waves	Depression
Stay-at-home orders	• Lifted in June	• Lifted between June and August	• Lifted in June, but reinstated by 2021:Q1	• Lifted briefly, but reinstated • Not very effective
Voluntary social distancing	• Continues through 2021:Q2	• Continues through 2021:Q3	• Continues through 2021:Q3	• Sporadic
Tracing, therapeutics, and vaccine	• Tracing highly successful • Therapeutics highly successful • Vaccine in 2021:Q2	• Tracing successful • Therapeutics somewhat successful • Vaccine in Sept. 2021	• Tracing not successful enough • Therapeutics unsuccessful • Vaccine in Sept. 2021	• Tracing unsuccessful • Therapeutics unsuccessful • Vaccine in Dec. 2023
Unemployment rate (percent), 2020:Q4 2021:Q4	 5.8 4.9	 7.9 5.4	 7.9 12.8	 22.2 19.4
Core PCE inflation, 2020–22 (percent)	1.6	1.6	1.3	1.0

- Second waves: This scenario—which we view as about equally plausible as the baseline—assumes that the easing of restrictions included in the baseline leads to significant further outbreaks toward year-end, requiring a second round of strict social-distancing measures into next year.

- Early moderation: In this more optimistic scenario, improved testing and tracing along with faster discovery of effective treatments allow social-distancing restrictions to be eased more quickly and significantly than in the

baseline, which leads to less immediate and persistent damage to the economy.

- Depression: In this very severe scenario, the disease continues to spread as neither a vaccine nor effective treatments are found, and a start-and-stop approach to social distancing continues for several years. The pandemic induces prolonged financial, social, and political instability around the globe, generating a protracted and deep downturn.

Fiscal Policy

In addition to the $2.3 trillion Cares Act (the Coronavirus Aid, Relief, and Economic Security Act) and two earlier COVID-related bills, we are also assuming an additional $1 trillion Phase 4 placeholder to account for policies that we expect to be enacted this quarter. As described in detail in appendix A, we estimate that these policies together would, by themselves, boost GDP growth by 4.6 percentage points in 2020, excluding follow-on multipliers and financial offsets. The policies most important for supporting consumption are the increases in unemployment benefits, payments to households this quarter, and additional payments assumed to be enacted and to go out in the following two quarters. On the business side, the Paycheck Protection Program (PPP), which we expect to be enlarged, provides notable support. Finally, the Treasury and Federal Reserve lending programs will bolster the businesses, household, and state and local government sectors.[2]

[2] These lending programs are expected to improve access to credit and reduce borrowing rates, thereby supporting business investment and household spending, and mitigating cuts in state and local government spending. Moreover, and crucially, these programs may help preserve the productive capacity of the economy by preventing large-scale loss of business organizational capital and business bankruptcy. In the absence of these programs, we would have projected more pronounced recessionary dynamics in our baseline projection and a steeper decline in potential output. These effects of the lending programs are not included in the fiscal stimulus table on the next page.

First-Round Direct Effects of COVID-19 Fiscal Stimulus on GDP Growth

(Percentage point contribution to real GDP growth, annual rate)

		2020				2020	2021	2022
		Q1	Q2	Q3	Q4		Q4/Q4	
(1)	**Total**	**0**	**10.1**	**7.2**	**2.1**	**4.6**	**-3.2**	**-.8**
(2)	Government purchases and grants*	0	1.7	1.1	.5	.8	.1	-.3
(3)	Household support	0	6.4	4.9	.9	2.8	-2.5	-.4
(4)	Business support**	0	2.0	1.2	.8	1.0	-.9	-.1
	Memo: Yet to be enacted							
(5)	Phase 4 stimulus placeholder	0	.8	3.9	3.1	1.8	-1.2	-.4

Note: Lines [1] through [5] include policies enacted and yet to be enacted (memo line). Numbers may not sum to totals because of rounding.

* Excludes the effect of school closures.

** Excludes the Main Street Lending Program and other Federal Reserve and Treasury lending programs to facilitate loans to businesses and state and local governments.

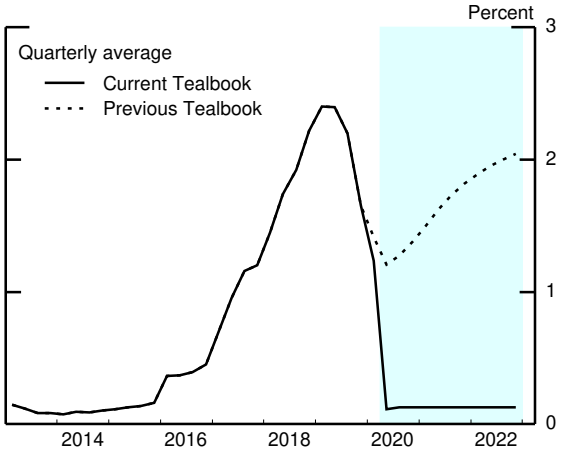
Financial Conditions

As described in the financial sections of this Tealbook, financial markets experienced enormous swings since the March Tealbook, essentially in two phases: An initial period of extreme volatility, illiquidity, and dysfunction, and then, starting about a week after the March FOMC meeting, some degree of improvement. Much of the improvement in market functioning and investor sentiment—which was reflected in rebounding equity and corporate bond prices and a partial retracing of the earlier appreciation of the dollar—was due to the announcement and standing up of several Federal Reserve programs and to the passage of the Cares Act.

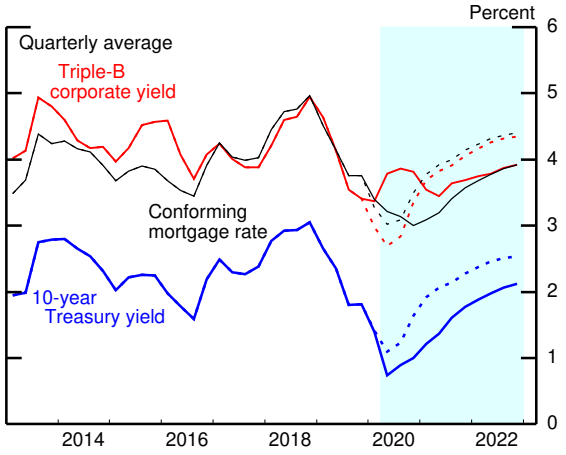
Nonetheless, relative to the assumptions in the March Tealbook, U.S. equity prices are down about 12½ percent, longer-term Treasury yields have decreased around 35 basis points, investment-grade corporate bond spreads have climbed about 120 basis points, and the dollar has appreciated about 5 percent. In addition, although Federal Reserve programs are reportedly providing some support to financial market functioning, incoming information indicates that financing conditions for many businesses and households have tightened significantly in recent weeks. Preliminary indicators point to a significant slowdown of financing flows to lower-rated firms, small businesses, households, and state and local governments. In our current projection, financial conditions are expected to remain adverse through the end of this year and then improve next year in an environment in which the federal funds rate is expected to remain at its effective lower bound.

Key Background Factors Underlying the Baseline Staff Projection

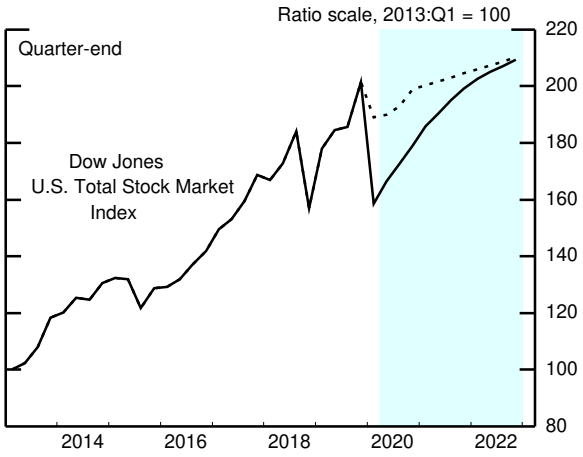
Federal Funds Rate



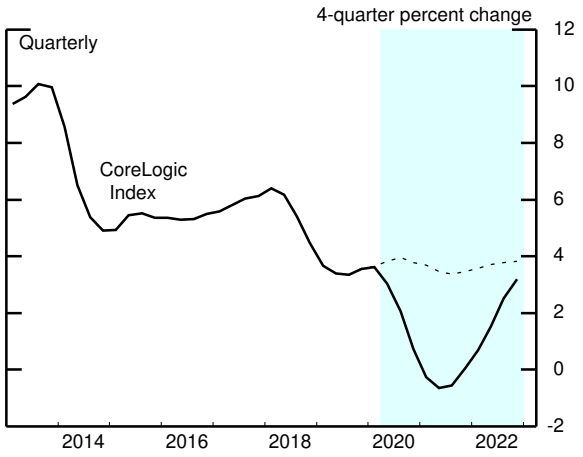
Long-Term Interest Rates



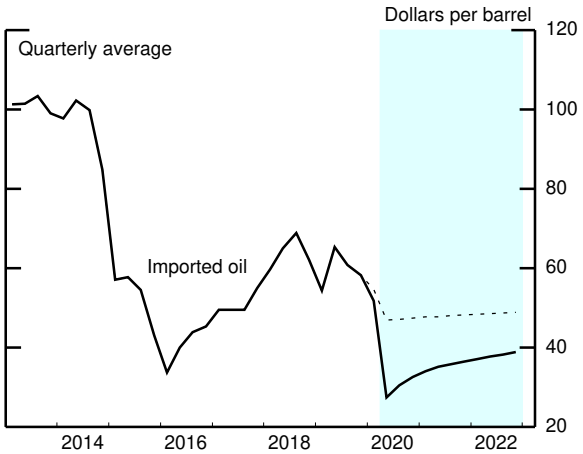
Equity Prices



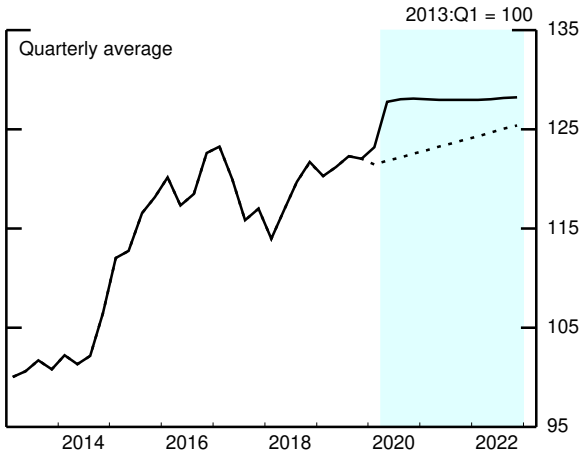
House Prices



Oil Prices



Broad Real Dollar



Summary of the Near-Term Outlook for GDP

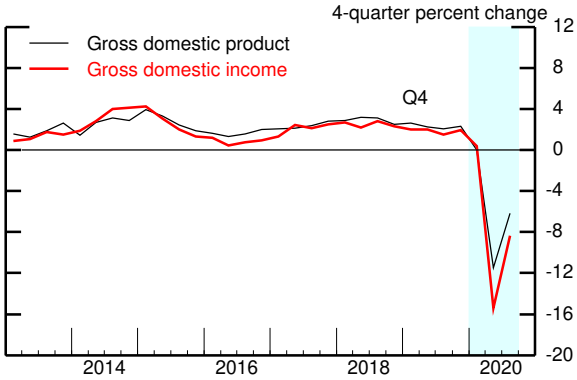
(Percent change at annual rate except as noted)

Measure	2020:Q1		2020:Q2		2020:Q3	
	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook	Previous Tealbook	Current Tealbook
Real GDP	**1.4**	**-5.9**	**1.3**	**-37.4**	**3.0**	**28.9**
Private domestic final purchases	2.1	-4.5	1.6	-44.9	2.7	36.0
Personal consumption expenditures	1.9	-4.9	1.4	-41.5	2.6	47.8
Residential investment	10.3	17.6	7.2	-66.0	11.9	-9.1
Nonres. private fixed investment	.6	-7.8	1.0	-54.2	.8	-5.8
Government purchases	1.4	-1.1	1.7	3.4	1.3	10.9
Contributions to change in real GDP						
Inventory investment[1]	-.6	-2.1	-.5	-3.7	.1	.3
Net exports[1]	.1	.0	.2	5.9	.3	-2.5

1. Percentage points.

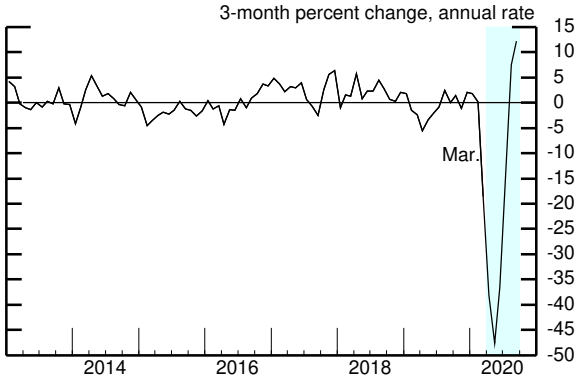
Recent Nonfinancial Developments (1)

Real GDP and GDI



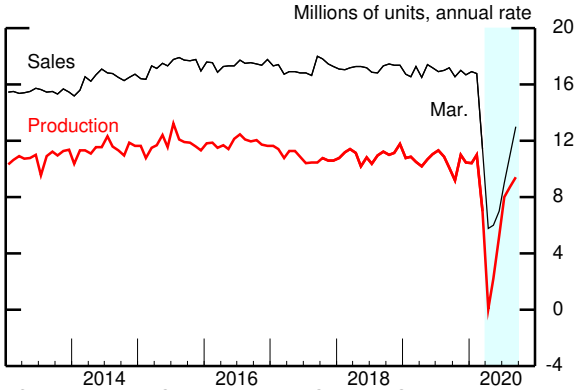
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Manufacturing IP ex. Motor Vehicles and Parts



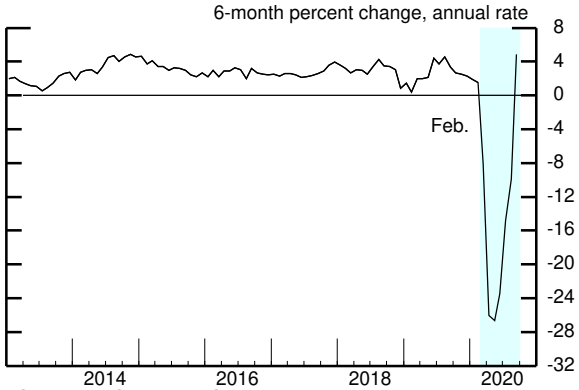
Source: Federal Reserve Board, G.17 Statistical Release, "Industrial Production and Capacity Utilization."

Sales and Production of Light Motor Vehicles



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

Real PCE Growth



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

RECENT DEVELOPMENTS AND NEAR-TERM OUTLOOK FOR REAL ACTIVITY

Because our standard data sources are only just beginning to bear the imprint of the pervasive and strong social-distancing restrictions that are now in place, we have turned to a number of high-frequency measures to inform our assessment of the huge declines in economic activity that are under way.[3] We have added several new charts to show some of these measures.

We project that GDP will decline at an annual rate of more than 35 percent this quarter following an estimated decline of 6 percent in the first quarter.[4]

- **Consumer spending** is expected to fall more than 40 percent at an annual rate in the second quarter as the economic effects of social distancing are felt most acutely. The details in the retail sales report for March show particularly steep drops in spending at restaurants and at department stores that were only somewhat offset by increased e-commerce and grocery purchases.[5] High-frequency indicators show a collapse in April spending at restaurants, at hotels, and for air travel (see the following page for charts of these and other high-frequency measures). Sales of motor vehicles plummeted last month, to 11.4 million units, and we think they will fall to about 6 million units in April, broadly consistent with the preliminary estimates from J.D. Power.
    - The signal from these spending indicators is corroborated by precipitous drops in a variety of consumer sentiment measures.
- **Business and construction activity** are expected to fall dramatically in the second quarter, as most states have ordered a cessation of nonessential

[3] Note that business shutdowns and social distancing make economic measurement especially difficult at present. Government statistical agencies are grappling with operational issues related to data collection, particularly in the mailing-out and processing of paper notices and forms but also in the inability to conduct face-to-face interviews or to collect information at businesses that are closed. And they face methodological issues related to lower response rates (which raise questions about imputations), outlier detection, and seasonal adjustment. The agencies appear to be responding nimbly to these challenges, but we anticipate larger-than-normal revisions and greater-than-usual uncertainty around their estimates. Private producers of statistics are not immune to these challenges.

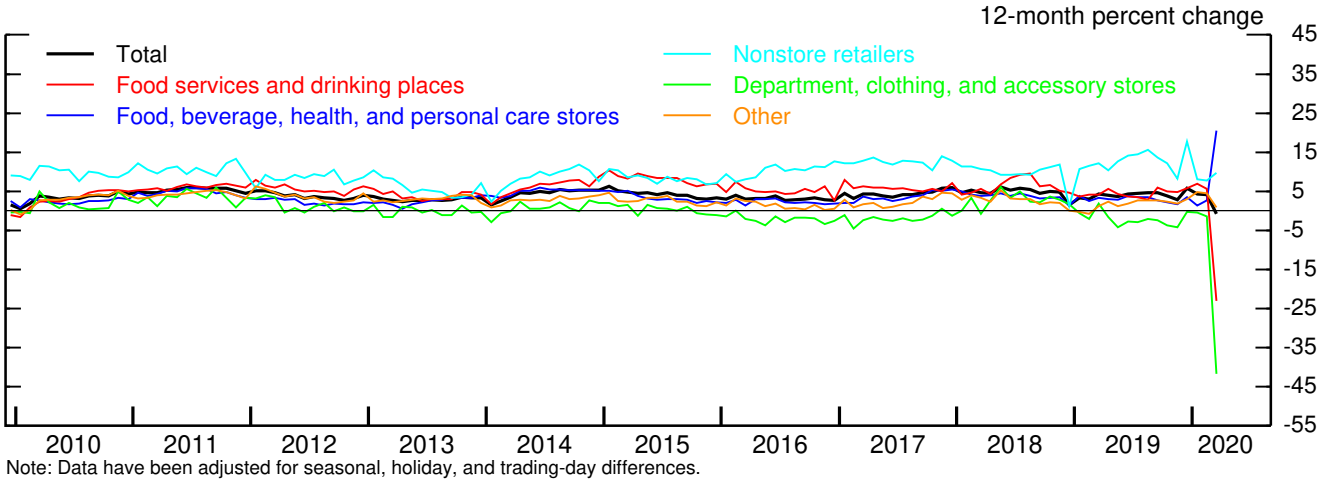
[4] The second-quarter decrease would represent the largest quarterly decline on record; the series on quarterly GDP begins in 1947. The previous record drop was 10 percent in 1958:Q1.

[5] Health spending also appears to be declining, perhaps because the rise in COVID-19-related health care has been more than offset by a reduction in other medical care. Indeed, there are numerous anecdotal reports of sharp revenue declines at hospitals and other health-care facilities.

Domestic Econ Devel & Outlook

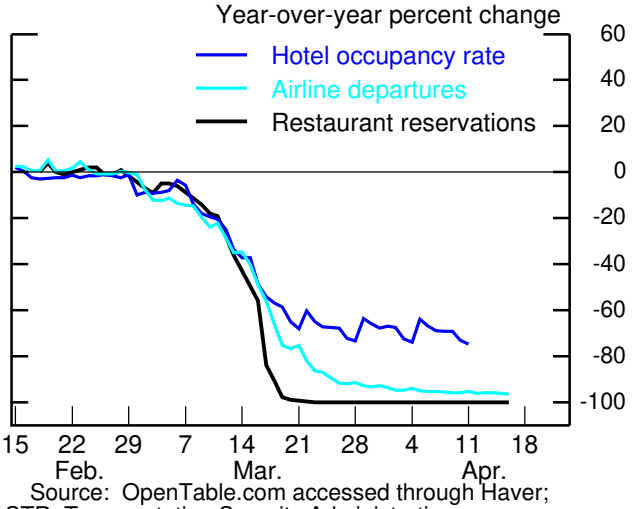
High-Frequency Indicators of Economic Activity: Consumer Spending

Components of Monthly Retail Sales



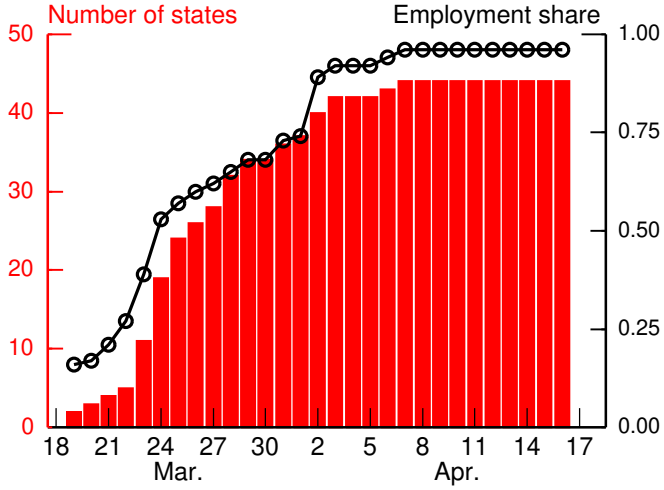
Note: Data have been adjusted for seasonal, holiday, and trading-day differences.
Source: U.S. Census Bureau.

Hotel, Restaurants, and Air Travel



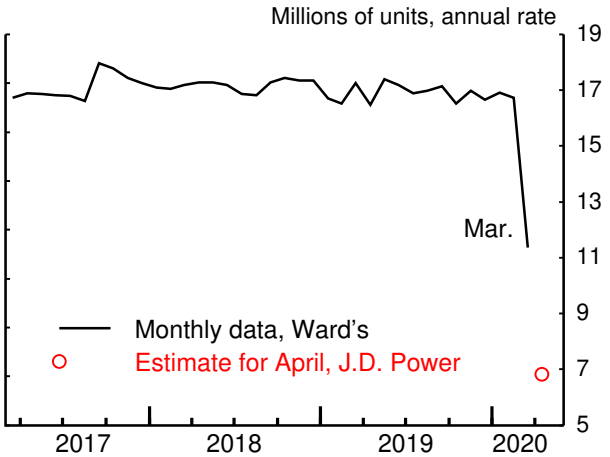
Source: OpenTable.com accessed through Haver; STR; Transportation Security Administration.

States Closing Nonessential Businesses



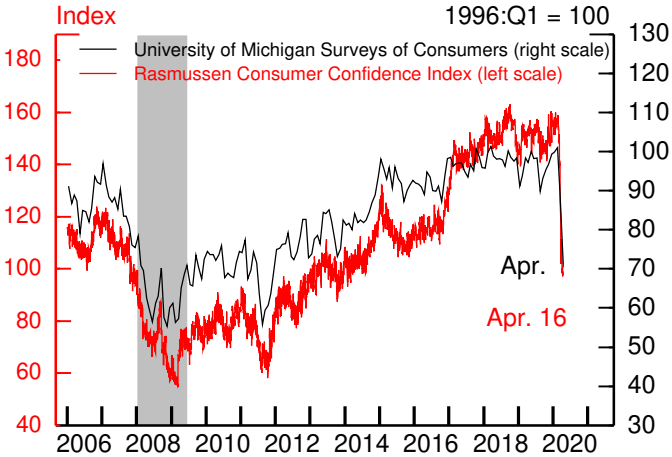
Note: Staff estimates.

U.S. Light Vehicle Sales



Source: Ward's Automotive Group; J.D. Power and Associates estimate as of April 8; adjusted using FRB seasonals.

Indexes of Consumer Confidence



Note: Rasmussen data are reported daily, and Michigan data are reported monthly. The shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research.

operations requiring in-person interactions. Even some activity considered essential has been curtailed, as heightened uncertainty has led many businesses to put investment and hiring plans on hold, while others struggle to ensure safe work environments.

- The enormous uncertainty is likely especially important for **business fixed investment**, which we expect to decline at a 55 percent annual rate this quarter and another 6 percent in the third. The drop in oil prices is also leading to a sharp retrenchment in drilling activity.

- **Manufacturing output** dropped more than 6 percent in March, its largest one-month decline since the transition away from military production at the end of World War II. We anticipate even steeper declines in April, as many factories have temporarily closed, including nearly all motor vehicle and civilian aircraft manufacturers.[6] Anecdotes from the latest Beige Book and recent readings from regional manufacturing surveys suggest that disruptions to supply chains and to downstream demand are widespread, which we think will likely restrain any significant bounceback in manufacturing output this summer.

- In general, the nation's **food sector** is functioning effectively, but some pockets are facing significant challenges. In particular, because demand has shifted away from restaurants toward grocery stores, many companies are struggling to quickly reorient production and distribution for the consumer market. In addition, several food producers—notably, meat processors—have suspended operations because of worker illness and absence. Both the reorientation and production stoppages are likely to cause stress throughout the supply chain, including for farmers. By contrast, some manufacturers of packaged foods—such as snacks and pasta—are operating all-out and extending shifts.

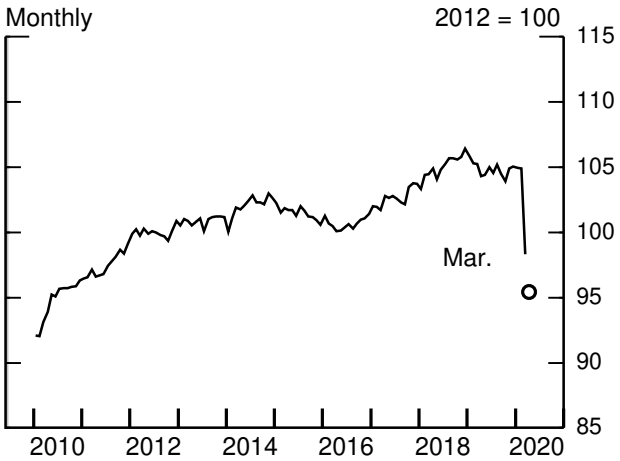
- In the **housing market**, which started the year on solid footing, we expect large drops in both home sales and construction. Pending home sales in early

[6] Boeing recently announced intentions to begin restarting production lines on April 20; motor vehicle manufacturers have announced restart dates between April 27 and mid-May.

Domestic Econ Devel & Outlook

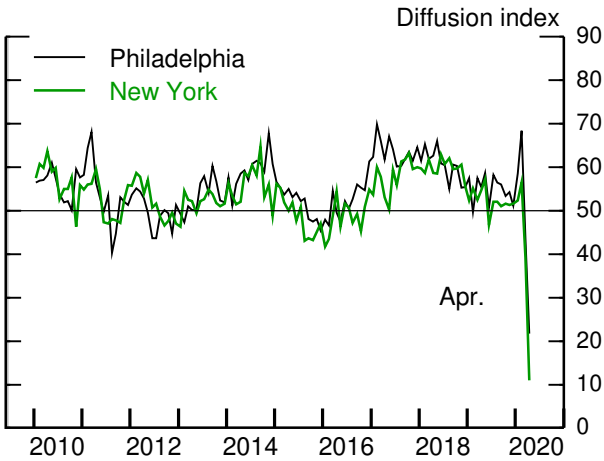
High-Frequency Indicators of Economic Activity: Industrial Sector and Housing

Industrial Production Index: Manufacturing



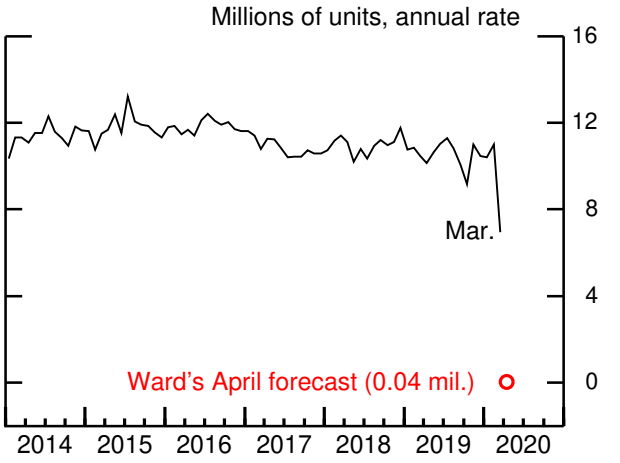
Note: Open circle represents forecast value for April.
Source: Federal Reserve.

Regional Manufacturing Surveys



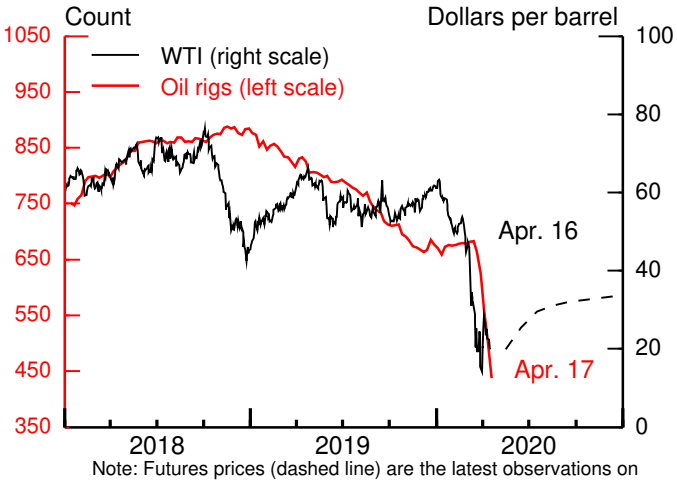
Note: Data represent general activity indexes.
Source: Federal Reserve.

Light Motor Vehicle Production



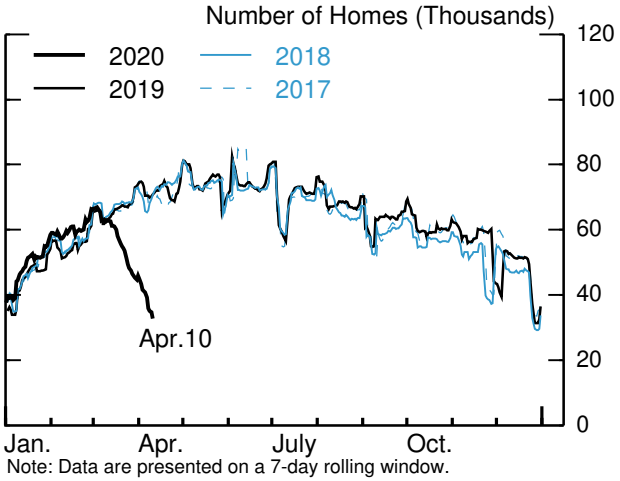
Source: Ward's Automotive Group; General Motors; adjusted using FRB seasonals.

Oil Price and Drilling Rigs



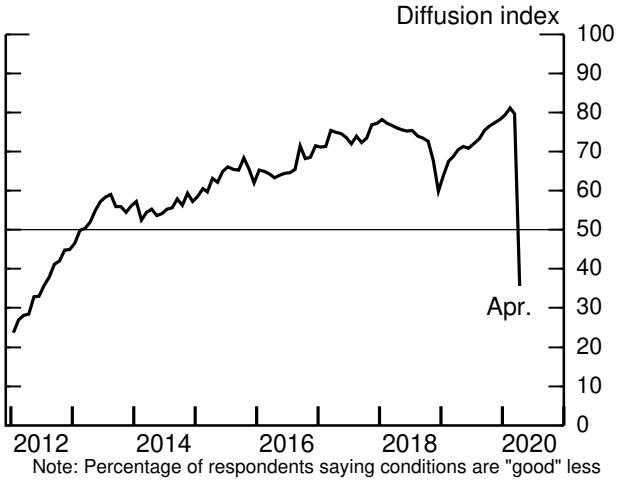
Note: Futures prices (dashed line) are the latest observations on monthly futures contracts.
Source: Baker-Hughes (drilling rigs).

Pending Home Sales



Note: Data are presented on a 7-day rolling window.
Source: Data provided by Redfin, a national real estate brokerage.

Builders' Ratings of Current Sales



Note: Percentage of respondents saying conditions are "good" less percentage responding that conditions are "poor."
Source: National Association of Home Builders.

April may have fallen to about half of typical levels, according to a timely indicator by Redfin based on multiple listing service data. Furthermore, a recent survey from the National Association of Realtors found that nearly half of all realtors are seeing declines of more than 50 percent in buyer interest. In construction, single-family permits fell 12 percent in March, and single-family starts fell 17 percent. Builder sentiment plunged in April, and surveys suggest significant slowdowns owing to supply chain disruptions, increased measures to prevent worker infection, and construction bans in some states.[7]

- **Exports** of goods and services are expected to plunge in the second quarter, declining over 50 percent at an annual rate. As in previous trade collapses, goods trade is likely to be exceptionally responsive to the large decline in foreign GDP. This time, however, we also expect a striking drop in services trade, reflecting the collapse in international travel resulting from social-distancing restrictions.
    - Although exports are expected to subtract 6.6 percentage points from GDP growth in the second quarter, the contribution of net exports is projected to be strongly positive. The anticipated 67 percent decline in imports is even greater than the decline in exports, given very weak domestic demand. Both imports and exports are expected to partially bounce back in the second half of the year.

In the labor market, all indications are that employment is declining at previously unimaginable rates.

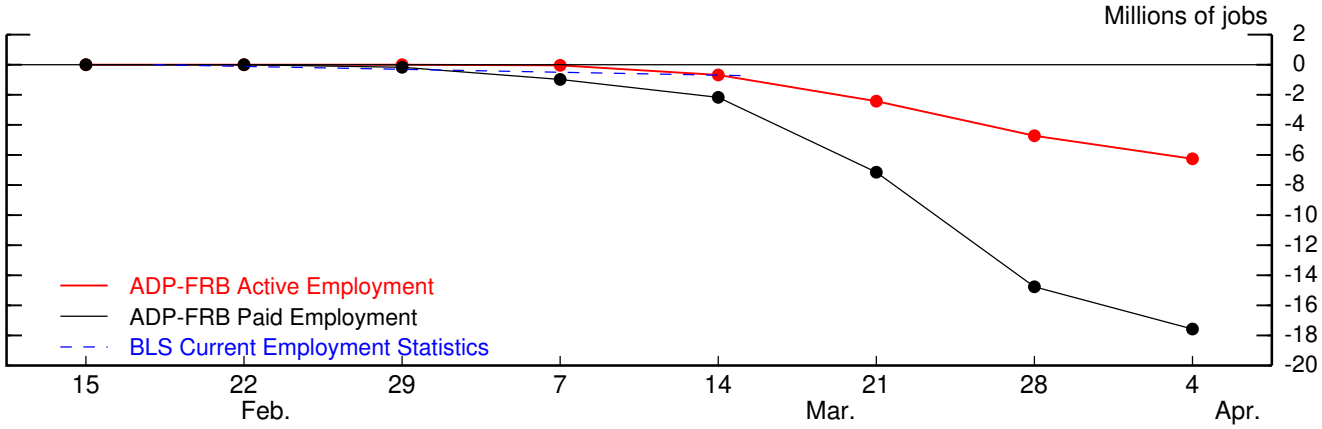
- As reported by the BLS, **private payrolls** tumbled by more than 700,000 in March. However, that drop reflected only changes that occurred through the BLS reference period around mid-month, and the weekly ADP-FRB estimates indicate that the labor market deteriorated dramatically as the month went on. The ADP-FRB estimate through April 4 indicates that firms had removed

[7] See National Association of Realtors, Research Group (2020), 2020 NAR Flash Survey: Economic Pulse, April 5–6, https://www.nar.realtor/sites/default/files/documents/nar-flash-survey-economic-pulse-2020-04-12.pdf; and National Association of Home Builders (2020), "Nearly All Buyers in Recent Survey Say Buyer Traffic Is Down," *NAHBNow* (blog), April 10, http://nahbnow.com/2020/04/nearly-all-builders-in-recent-survey-say-buyer-traffic-is-down.

Domestic Econ Devel & Outlook

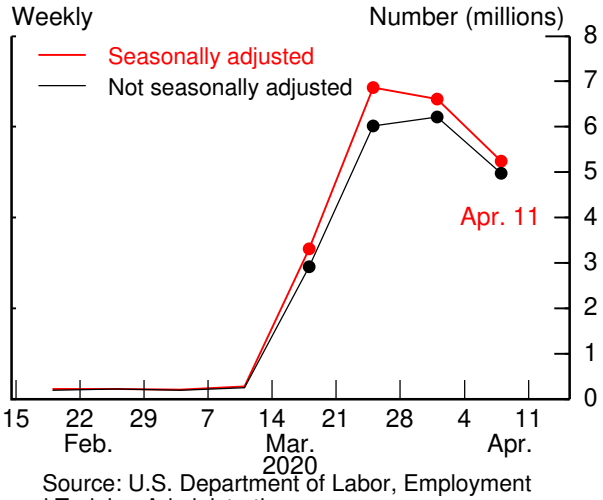
High-Frequency Indicators of Economic Activity: Labor Markets

Cumulative Job Loss since Feb. 15, 2020



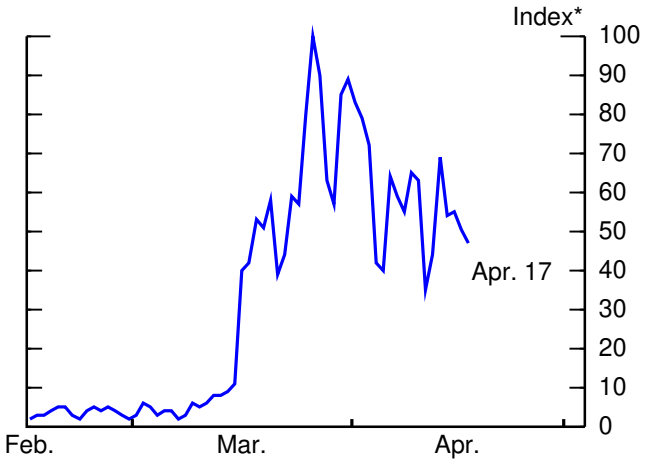
Note: Paid employment includes workers who were issued a paycheck in a given pay period, while active employment also includes unpaid workers who remain active in the payroll system (e.g., are on unpaid furlough).
Source: BLS; FRB estimates of ADP data.

Initial Claims for Unemployment Insurance



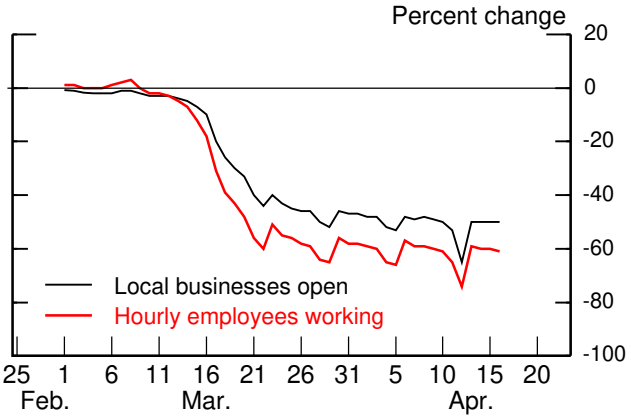
Source: U.S. Department of Labor, Employment and Training Administration.

Google Trends: Unemployment Insurance



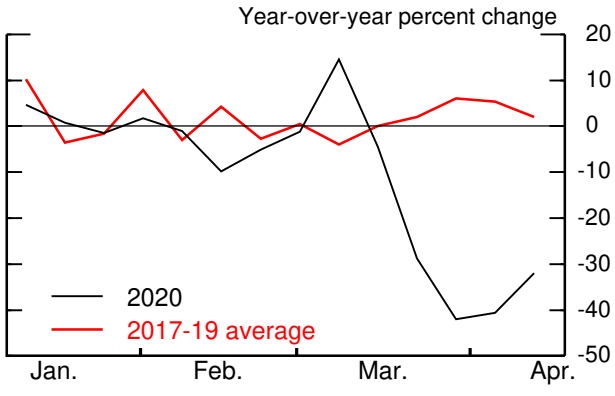
* Index (100 = highest volume of daily searches)
Source: Google Trends.

Small Business Effects



Note: Percent change from the period Jan. 4-31, 2020.
Source: Homebase. Data show their customer base of 60,000 small businesses, which are concentrated in leisure, hospitality, and retail industries.

New Business Applications



Note: Data derived from Employer Identification Number applications. Series include all applications indicating a planned date for paying wages.
Source: U.S. Census Bureau.

more than 6 million workers from payrolls since mid-February and furloughed another 11½ million, thereby reducing paid employment by 17½ million.

- Over the past four weeks (through the week ended April 11), some 22 million people filed initial claims for unemployment insurance benefits.[8]

- Putting this information together, we expect the April employment report to show a staggering decline in payrolls of 21½ million, followed by more than 3 million further losses in May. Our projected losses in May would have been substantially larger if not for the effects of the PPP, which we expect to induce many small businesses to continue paying their workers through at least some period of inactivity.

- With these job losses, we expect the **unemployment rate** to jump to 16 percent in April and 18 percent in May before falling back to 14 percent in June. We also expect the **LFPR** to drop to 62.3 percent in April—more than 1 percentage point below its level at the beginning of the year. However, with many businesses closed, and with unemployment insurance programs having substantially increased weekly benefits and waived job-search requirements, jobless workers may be less likely to report that they are searching for work. Accordingly, the distinction between being unemployed and not in the labor force may have blurred, and we see some risk that both the unemployment rate and LFPR could be lower than we expect.

Near-Term Labor Market Forecast

	2020				2020	
Labor market indicator	Mar.	Apr.	May	June	Q3	Q4
Private payroll employment[1]	-710	-21,670	-3,300	7,430	2,360	1,890
Unemployment rate (percent)	4.4	16.1	18.3	13.8	11.1	7.9
LFPR (percent)	62.7	62.3	62.3	62.3	62.4	62.5
EPOP (percent)	60.0	52.3	50.9	53.7	55.5	57.5

Note: LFPR is labor force participation rate, and EPOP is employment-to-population ratio.
1. Average monthly change, thousands, rounded to nearest 10,000.
Source: Bureau of Labor Statistics; staff calculations.

[8] Claims do not map one-for-one into payroll employment. For example, some of the claims may be multiple filings, and some may come from the self-employed, who are not captured in the BLS payroll figures. On the other side, not all unemployed workers file for benefits, and, with UI systems overburdened, some may not have been able to file their claims yet.

Small businesses appear especially hard hit by social-distancing restrictions because they tend to be concentrated in the industries experiencing the sharpest employment losses. Indeed, reports from Homebase show that about half the small businesses in their customer base have already closed, either temporarily or permanently.[9]

- A recent Chamber of Commerce survey found that just over half of *all* small businesses could close temporarily within the coming weeks.[10] That said, the PPP is likely to mitigate some of these business closures.

- If firms do not reopen, job losses associated with temporary business closures become permanent, which can prolong the effects of a downturn.

- In addition, a new weekly measure from the Census Bureau of applications for Employer Identification Numbers—an important indicator of new business formation—shows year-over-year declines in early April of about 30 percent, rates similar to those seen in the depths of the Great Recession. Should the implied decline in new business formations persist, it would likely hold down future job creation, growth, and productivity.

THE DYNAMICS OF ECONOMIC ACTIVITY GOING FORWARD

The unprecedented depth, speed, and nature of the downturn make it especially hard to judge the trajectory of the recovery. We currently project that after dropping more than 12 percent in the first half of this year (not at an annual rate), GDP will rapidly recover a portion of those losses, but it will still end the year about 4 percent below its level of a year earlier, as the recovery is weighed down by business closures, uncertainty, tight credit, and other factors. As these factors wane, we expect GDP to rise 4.4 percent in 2021 and 2.8 percent in 2022. Accordingly, the unemployment rate is projected to gradually decline, reaching 8 percent at the end of this year and reaching 4.7 percent at the end of 2022. Of course, if the path of the virus and social distancing should look

[9] Homebase is a company that provides software services to small businesses; they had approximately 60,000 clients as of January 2020, and their coverage is best among *very* small employer businesses in the sectors of leisure and hospitality as well as retail trade.

[10] See MetLife and U.S. Chamber of Commerce (2020), *Special Report on Coronavirus and Small Business* (Washington: MetLife and USCC, April), https://www.uschamber.com/sites/default/files/metlife_uscc_coronavirus_and_small_business_report_april_3.pdf.

more like the "Second Waves" or "Depression" scenarios described earlier, the forces described in this section would be more severe.

To help explain these dynamics—though at the risk of false precision—the table below splits our assessment of the COVID-19 effects on GDP growth into five components—the direct effects from social distancing and other disruptions, fiscal stimulus, standard macro dynamics, recessionary dynamics, and potential output.

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

	2020				2020	2021	2022
	Q1	Q2	Q3	Q4	Q4/Q4	Q4/Q4	Q4/Q4
Real GDP	- 5.9	-37.4	28.9	10.4	- 4.3	4.4	2.8
COVID-19 effects	**- 8.1**	**-40.0**	**26.2**	**8.0**	**- 6.8**	**2.4**	**1.1**
1. Social distancing and other disruptions	- 7.4	-47.1	37.9	9.9	- 5.0	5.0	.0
2. Fiscal stimulus (ex. school closures)	.0	10.1	7.2	2.1	4.6	- 3.2	- .8
3. Standard macro dynamics	- .6	- 1.0	- 8.0	- 3.0	- 3.3	2.8	- .2
4. Recessionary dynamics	- .1	- 1.5	-10.4	- .6	- 2.7	- 1.0	2.6
5. Potential output	.0	- .5	- .5	- .5	- .4	- 1.3	- .5

- In the second half of 2020, output bounces back sharply from its second-quarter plunge as **social distancing** diminishes and consumer spending picks back up. Even so, because a degree of distancing is assumed to remain until the fall of 2021, these direct distancing effects do not fully reverse in our projection until the end of that year.

- **Fiscal stimulus** provides significant support this year and helps mitigate the negative dynamics discussed next.

- The second-half rebound in activity is restrained by the effects of standard macro dynamics and, especially, recessionary dynamics. **Standard macro dynamics** are present in all of our forecasts and reflect the usual response of household and business spending ensuing from a change in wages and profits; **recessionary dynamics** are the forces that can have negative reinforcing effects on consumer and business outcomes and that are particularly active during recessions. For example, during recessions, households and businesses often become more pessimistic and uncertain about their prospects and pull back on discretionary purchases, even more than would be expected given their current income and profits; households and businesses also may lose access to affordable credit and become unable to smooth through the period of

low income; and massive firm closures destroy intangible capital, while wide-scale layoffs destroy firm-specific human capital. Furthermore, imbalances such as economic inequality and excessive corporate debt can exacerbate negative economic shocks.

- The strong fiscal policy response, along with the Treasury and Federal Reserve lending programs, led us to temper the magnitude of the recessionary dynamics that we built into the baseline projection.

- In the aggregate, we estimate that the enormous government transfers to households—most of which have not yet occurred, and some of which have not yet even been announced—will more than offset lost income this year, and we have penciled in a notable *upward* revision to disposable personal income relative to the March Tealbook. Nevertheless, income is certainly not fully replaced for everyone, and we think households will remain highly uncertain about when life (and their employment situation) will return to normal. This uncertainty leaves them reluctant to spend, even as social distancing lets up in the second half of 2020.

- We expect these recessionary dynamics to continue to weigh on GDP growth through 2021 even as the standard dynamics turn into tailwinds as income and profits recover from their earlier hits.

- Output is also held down notably in 2021 by even longer-lasting forces that may lead to persistent scarring. We classify these effects as holding down **potential output,** and they can arise from some of the same sources that induce the shorter-lived recessionary dynamics.

  - The surge in the number of permanently laid-off workers, who tend to take longer to match with new employers because they often need to change industry or occupation, suggests that matching workers to firms will be more difficult, thus raising the natural rate of unemployment.

  - Permanent business closures will also lead to the loss of firm-specific expertise, lowering labor productivity persistently. The slow pace of business formations will hold down productivity growth as well. That

said, Treasury and Federal Reserve lending programs will help mitigate these negative dynamics.

- The sharp drop in investment reduces capital deepening, which also has persistent negative effects on production.

- These effects on potential output remain a drag on growth through 2022, limiting the rebound from the unwinding recessionary dynamics. By the end of 2022, potential output is 2.2 percent lower than it would have been in the absence of the pandemic.

- Growth in 2021 and 2022 is also held back by the waning of the boost from fiscal stimulus. The year ends with an output gap of 0.9 percent, about 1¼ percentage points below its level in the March Tealbook.

THE OUTLOOK FOR INFLATION

We expect the economic crisis to push inflation lower this year. The sharp decline in economic activity and the reduction in demand from social distancing, along with the stronger dollar, are expected to outweigh any upward price pressures from disruptions to production and supply chains. Accordingly, we now project core PCE inflation of 1.4 percent this year, with headline inflation lower still given the recent plunge in oil prices. Importantly, however, longer-term inflation expectations are assumed to hold reasonably stable, as they did during the Great Recession, limiting the extent and persistence of this decline in inflation. After this year, we expect both total and core inflation to move back up, reaching 1.8 percent and 1.7 percent, respectively, in 2022.

- We see the voluntary social distancing as exerting downward pressure on inflation over and above the usual effects of economic slack. Such social-distancing effects were evident in the CPI for March, which showed large drops in the price indexes for some heavily affected services like airfares and lodging away from home and more modest declines for a number of goods. Given those data, we estimate that monthly **core PCE** prices declined in March, leaving the 12-month change at 1.7 percent.

- We expect another decline in core prices in April and only small increases in the subsequent couple of months, as these social-distancing effects continue.

While we do see the possibility of upward price pressure from production disruptions, we expect these to be isolated. With this outlook, we expect the 12-month change in core inflation to reach a temporary low of 1.1 percent in the summer. But we expect inflation to move up in the second half as voluntary distancing starts to ease, bringing the 12-month change to 1.4 percent by year-end.

- Given recent and expected large declines in consumer energy prices, the 12-month change in **total PCE prices** is expected to step down from 1.3 percent in March to only 0.4 percent in April and remain close to that level through the summer.

    - The spot price of Brent **crude oil**, at $28 per barrel, is down $22 per barrel since the March Tealbook, less than half of its value in late January. Prices have been under pressure as COVID-19-related reductions in activity have sharply depressed global oil demand without commensurate reductions in oil supply. The box "The Recent Drop in Oil Prices" in the International Economic Developments and Outlook section provides additional background.

- Lower prices of imports are another channel through which the global economic declines are expected to contribute to soft inflation this year. We expect that **effective prices for imported core goods** (that is, including tariffs) will decline 4.4 percent in the second quarter, reflecting the drag from recent dollar appreciation and collapsing commodity prices, even as supply restrictions push up prices of specific imports. Starting next year, import price inflation is expected to pick up to about 1 percent.

- Consumer food prices increased notably in both February and March despite declines in food commodity prices. We attribute part of the strength in March to the increased demand for food at grocery stores. While we expect consumer food price inflation to slow in the coming months, there remains a notable upside risk to our forecast from worsening supply chain disruptions attributable to a lack of farm workers or additional closings of food processing facilities.

- Despite the tumultuous situation, movements in **longer-term inflation expectations** seem so far to have been little changed. The Michigan 5-to-10-year measure moved up to 2.5 percent in early April (although the Michigan 12-month series declined somewhat). Breakeven inflation from TIPS had declined notably in the early part of the intermeeting period but has since recovered; as usual in periods of market stress, these movements likely reflect liquidity and risk premiums more than expected inflation. Combining these and other expectations measures, the staff's common inflation expectations index is also little changed.

Similarly, we expect the economic declines to imply downward pressure on labor compensation.

- Anecdotal reports of downward wage pressures are widespread, and they seem to outweigh reports of premium pay for scarce workers in essential industries.

- We now project the employment cost index to rise about 1 percent 2020, compared with a 2.7 percent increase last year, as the sharp rise in labor market slack depresses wage gains. We expect the year-over-year gains to be between 2 and 3 percent in 2021 and 2022, as slack is reduced.

- Although aggregate wage and salary income is projected to decline this quarter, we expect some of the main hourly wage indicators to show unusual increases in the near term due to large compositional effects. As the huge job losses are concentrated among lower-paid workers, the workers remaining on payrolls will tend to be higher-wage employees, which will mechanically boost the calculation of average wages. For that reason, we expect average hourly earnings from the payroll survey to show a 12-month change of almost 5 percent by May, and we expect compensation per hour in the business sector to increase at an annual rate of more than 6 percent in the second quarter. Those compositional effects would then reverse as payrolls recover.

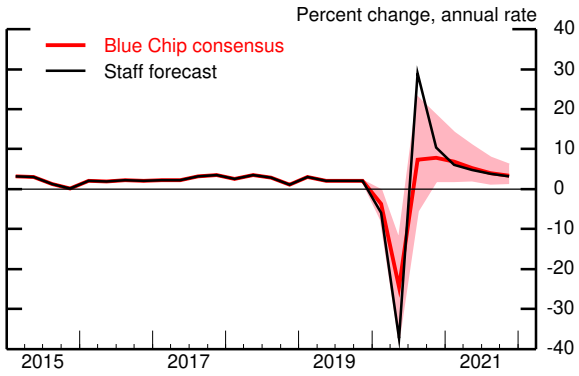
COMPARING THE STAFF PROJECTION WITH OUTSIDE FORECASTS

Outside forecasts embody a wide range of economic outcomes at present. All forecasters agree that economic activity is now contracting sharply, but projections for the length of the downturn and the speed of recovery are disperse.

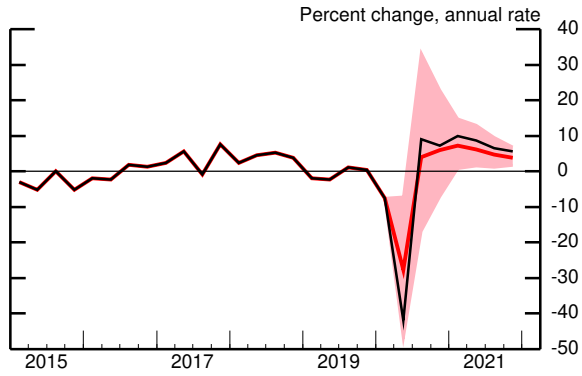
In the near term, the staff's projected drop in GDP and rise in unemployment are relatively large compared with most participants in the Blue Chip; the result for GDP is also evident in the more detailed table and charts following the Blue Chip exhibit, which gives projections from individual forecasters. (Of course, new information becomes available daily, and some of these forecasts are slightly dated.) But our projected rebound is also relatively strong, and by the end of this year, our unemployment projection is in the lower half of Blue Chip respondents. As for inflation, our projection for the CPI is about in line with the Blue Chip.

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

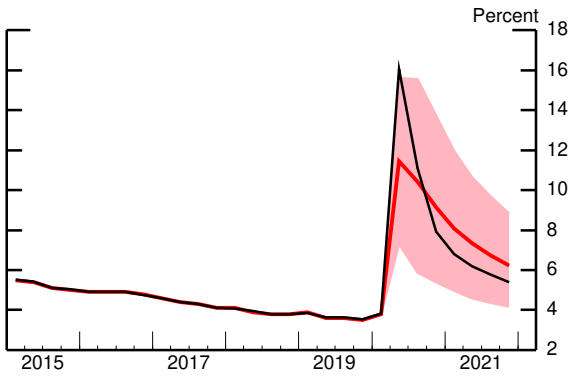
Real GDP



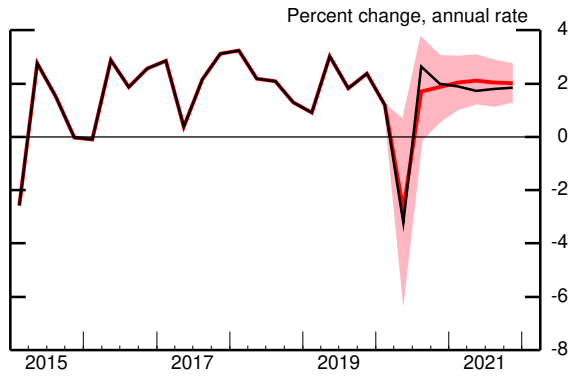
Industrial Production



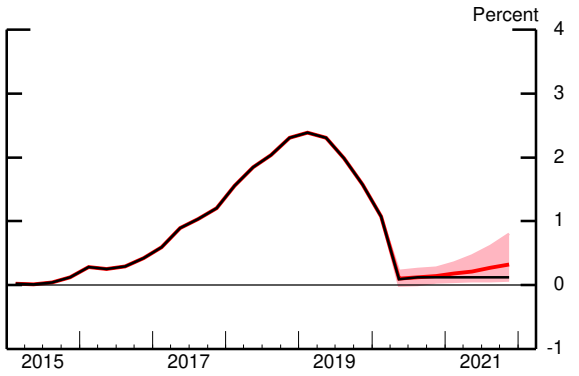
Unemployment Rate



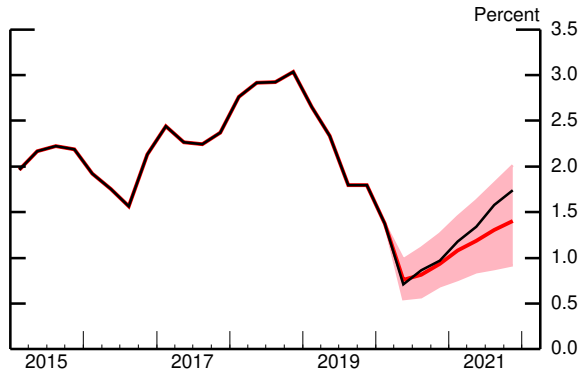
Consumer Price Index



Treasury Bill Rate



10-Year Treasury Yield



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

Comparison of Staff and Outside Forecasts for Real GDP Growth

Source	Date of forecast	2020				2020	2021
		Q1	Q2	Q3	Q4		
Pantheon Macroeconomics	4/17	-6.0	-30.0	20.0	4.0 **	-4.8 **	...
HSBC	4/16	-7.0	-45.0	40.0	20.0	-3.7 **	6.0 *
IHS Markit[1]	4/16	-3.0	-27.4	- .4	6.0	-7.0	10.1
Goldman Sachs	4/15	-7.0	-34.0	19.0	12.0	-4.9 **	5.5 **
Morgan Stanley[2]	4/15	-3.4	-38.0	20.7	15.9	-4.3	4.8
International Monetary Fund	4/14	...	...	...	...	-5.4	4.9
Barclays	4/13	-1.5	-35.0	25.0	3.0	-4.7	2.7
Blue Chip	4/10	-3.8	-24.5	7.4	7.9	-4.2	4.9
JPMorgan	4/9	-10.0	-40.0	23.0	13.0	-6.9	5.7
Wells Fargo	4/8	-1.2	-22.3	7.2	4.8	-3.6 **	1.7 *
Citi	4/7	-2.2 **	-27.6 **	22.9 **	9.5 **	-1.2	...
Jefferies	4/7	2.1	-11.5	-1.9	2.5	-2.4 **	2.4 **
MacroPolicy Perspectives	4/7	-5.5	-24.0	7.4	8.0	-4.5	...
Citadel	4/6	-2.0	-28.0	23.3	-2.5	-2.7	...
Deutsche Bank	4/6	-2.0	-32.9	19.3	12.6	-3.2	2.7
Moody's Analytics	3/31	-2.5	-18.3	...	...	-2.2 *	...
Nomura	3/27	-8.1	-41.7	14.8	3.2	-10.8	...
Amherst Pierpont	3/25	-1.0	-15.0	15.0	5.0	.4 **	...
Median of outside forecasts		*-3.0*	*-28.0*	*19.1*	*7.0*	*-4.3*	*4.9*
April Tealbook	**4/16**	**-5.9**	**-37.4**	**28.9**	**10.4**	**-4.3**	**4.4**

Note: Quarterly rates are annualized percent change from previous quarter. Annual rates are Q4/Q4 growth rates from previous year to current year, except where indicated by *.

* Annual growth rates are on an annual average basis.

** Staff calculations using information in the forecaster's report.

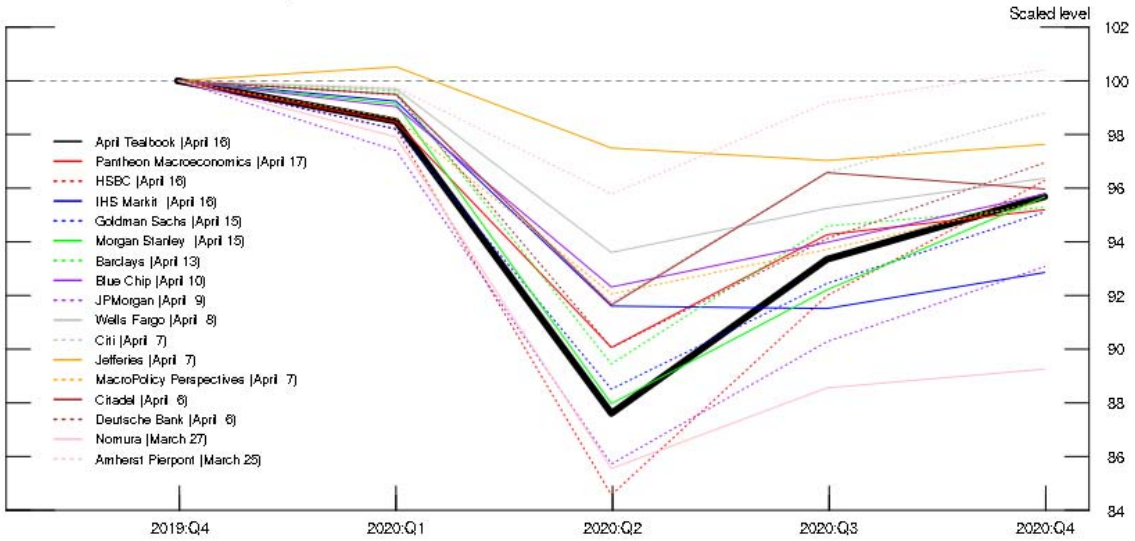
… Not applicable.

1. IHS Markit estimates are as of 4/16 for 2020:Q1 and 2020:Q2 and 4/14 for other periods.

2. The estimates from Morgan Stanley are as of 4/15 for 2020:Q1 and 2020:Q2 and 4/3 for other periods.

Source: For Deutsche Bank, Deutsche Bank Research Department; for Citadel, Citadel Market Update; for International Monetary Fund, World Economic Outlook, April 2020; for MacroPolicy Perspectives, MacroPolicy Perspectives Research Platform; for Morgan Stanley, Morgan Stanley Research; for Nomura, Anchor Report, Global Markets Research; for all others, Federal Reserve Board, Bank & Broker Newsletters.

Level of GDP Relative to 2019:Q4



Note: We show only the most recent forecasts, from March 25, 2020, to April 17, 2020.
Source: For Deutsche Bank, Deutsche Bank Research Department; for Citadel, Citadel Market Update; for IMF, World Economic Outlook, April 2020; for MacroPolicy Perspectives, MacroPolicy Perspectives Research Platform; for Morgan Stanley, Morgan Stanley Research; for Nomura, Anchor Report, Global Markets Research; for all others, Federal Reserve Board, Bank & Broker Newsletters.

THE LONG-TERM OUTLOOK

- The natural rate of unemployment is assumed to gradually edge down from 5 percent in 2022 to its longer-run value of 4.5 percent in the second half of this decade. Potential output growth is 1.6 percent in 2023, reflecting the slow rate of capital stock growth in the wake of the recession, and gradually increases toward its long-run value of 1.7 percent afterward.

- The real long-run equilibrium federal funds rate is still assumed to be 0.5 percent, and the nominal yield on 10-year Treasury securities is 3.0 percent in the longer run. We have revised up our assumption about the long-term federal debt-to-GDP ratio to 125 percent. While the elevated level of federal debt puts upward pressure on longer-term interest rates, we assume that the increase in the size of the SOMA portfolio offsets much of that pressure, and we left the term premium on 10-year Treasury yields in the longer run unchanged.

- Core PCE price inflation increases from 1.7 percent at the end of the medium term to its long-run value of 2.0 percent in 2024. Given this subdued path for core inflation, the nominal federal funds rate increases only slowly from 0.1 percent at the end of 2022 to 2.2 percent in 2025.

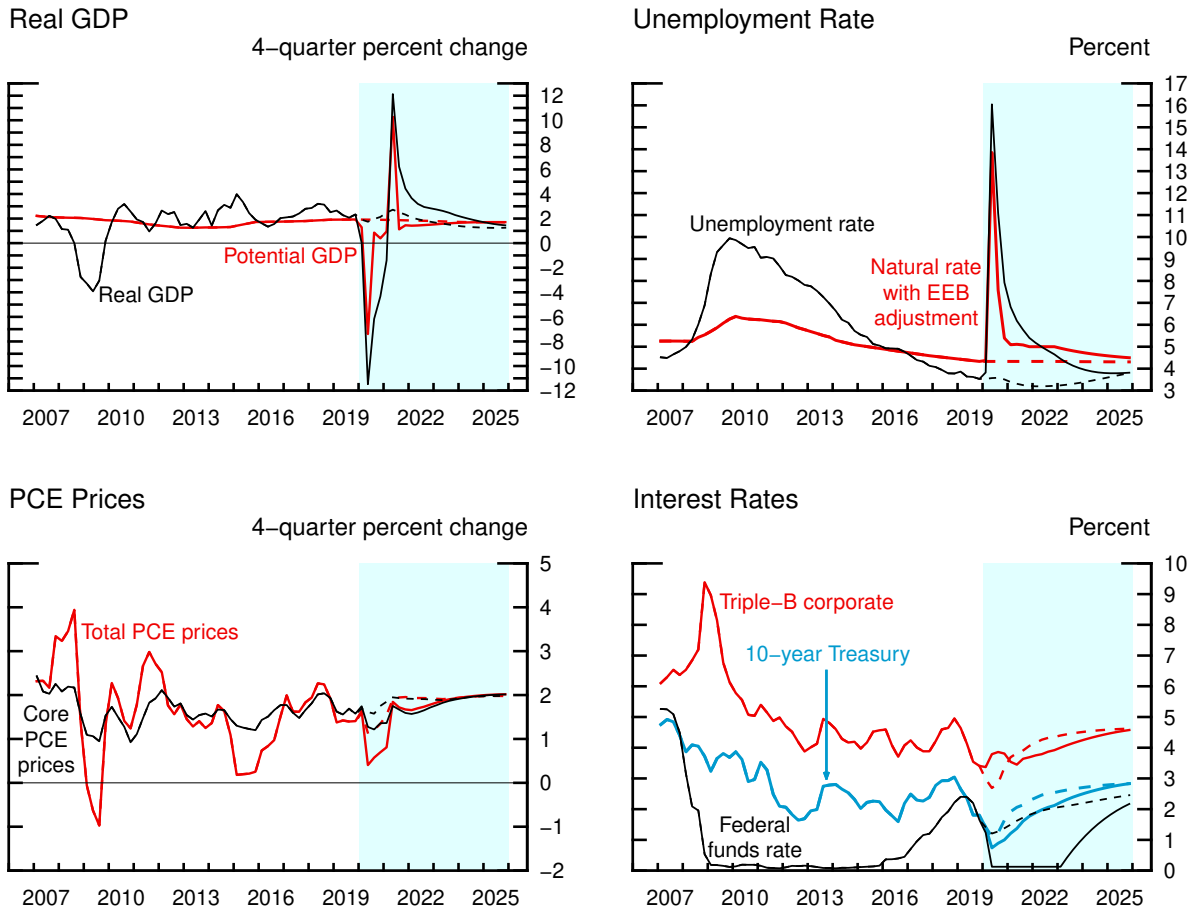
- As monetary policy is assumed to be moderately accommodative beyond the medium term, the unemployment rate continues to fall from 4.7 percent at the end of 2022 to 3.8 percent in 2024 before rising gradually to its long-run value thereafter. GDP growth moves down from 2.8 percent in 2022 to 1.4 percent in 2025 and moves up to its long-run value of 1.7 percent afterward.

The Long–Term Outlook

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

Measure	2020	2021	2022	2023	2024	2025	Longer run
Real GDP	-4.3	4.4	2.8	2.3	1.8	1.4	1.7
Previous Tealbook	*2.1*	*2.3*	*1.7*	*1.4*	*1.3*	*1.3*	*1.7*
Civilian unemployment rate[1]	7.9	5.4	4.7	4.0	3.8	3.8	4.3
Previous Tealbook	*3.5*	*3.2*	*3.2*	*3.4*	*3.6*	*3.8*	*4.3*
PCE prices, total	.7	1.7	1.8	1.9	2.0	2.0	2.0
Previous Tealbook	*1.3*	*2.0*	*1.9*	*1.9*	*2.0*	*2.0*	*2.0*
Core PCE prices	1.4	1.6	1.7	1.9	2.0	2.0	2.0
Previous Tealbook	*1.8*	*1.9*	*1.9*	*1.9*	*2.0*	*2.0*	*2.0*
Federal funds rate[1]	.13	.13	.13	.92	1.68	2.17	2.50
Previous Tealbook	*1.38*	*1.81*	*2.04*	*2.17*	*2.32*	*2.45*	*2.50*
10-year Treasury yield[1]	1.0	1.8	2.1	2.5	2.7	2.8	3.0
Previous Tealbook	*1.6*	*2.3*	*2.5*	*2.7*	*2.8*	*2.8*	*3.0*

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



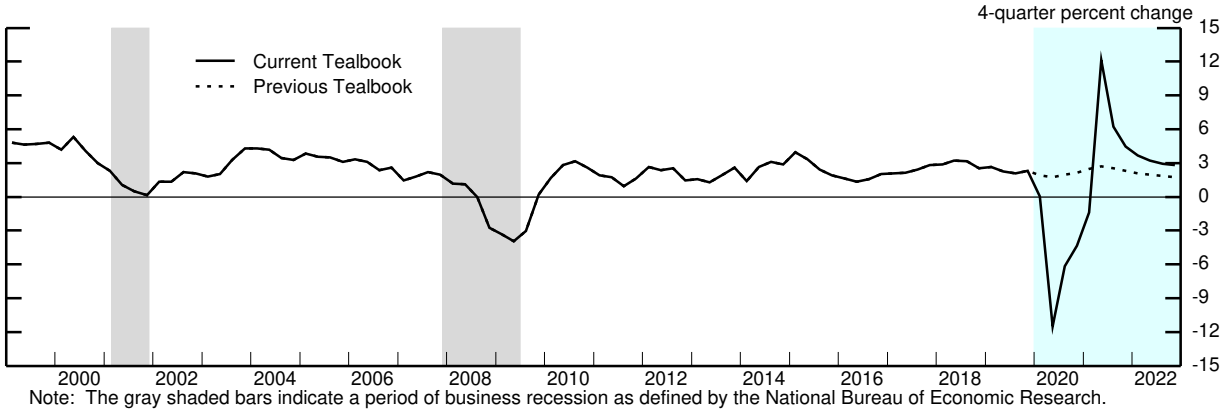
Note: In each panel, shading represents the projection period, and dashed lines are the previous Tealbook.

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
Real GDP	**2.3**	**-23.3**	**19.3**	**-4.3**	**4.4**	**2.8**
Previous Tealbook	*2.3*	*1.4*	*2.9*	*2.1*	*2.3*	*1.7*
Final sales	2.7	-20.8	18.7	-3.0	4.0	1.9
Previous Tealbook	*2.7*	*2.0*	*2.8*	*2.4*	*2.2*	*1.6*
Personal consumption expenditures	2.7	-25.4	27.4	-2.5	3.3	2.8
Previous Tealbook	*2.6*	*1.6*	*2.5*	*2.0*	*2.8*	*2.3*
Residential investment	1.7	-36.8	14.5	-14.9	18.3	1.5
Previous Tealbook	*1.6*	*8.7*	*9.7*	*9.2*	*-2.9*	*-6.4*
Nonresidential structures	-6.2	-51.6	26.8	-21.7	18.1	3.3
Previous Tealbook	*-5.2*	*-3.9*	*-3.4*	*-3.7*	*1.1*	*-.8*
Equipment and intangibles	1.3	-30.1	6.3	-13.8	13.2	4.3
Previous Tealbook	*1.4*	*2.2*	*4.8*	*3.4*	*4.8*	*2.0*
Federal purchases	4.3	11.6	7.3	9.5	-1.8	-2.8
Previous Tealbook	*4.4*	*2.5*	*1.3*	*1.9*	*-.2*	*.4*
State and local purchases	2.2	-5.0	4.4	-.4	-.3	-1.8
Previous Tealbook	*2.2*	*1.0*	*1.0*	*1.0*	*1.0*	*1.0*
Exports	.3	-36.4	39.5	-5.8	6.1	3.8
Previous Tealbook	*.3*	*-.8*	*9.0*	*4.0*	*3.6*	*3.4*
Imports	-2.1	-47.1	54.9	-9.5	8.2	4.8
Previous Tealbook	*-2.2*	*-1.7*	*6.0*	*2.1*	*3.9*	*3.2*
	Contributions to change in real GDP (percentage points)					
Inventory change	-.4	-2.5	.3	-1.3	.4	.9
Previous Tealbook	*-.4*	*-.6*	*.1*	*-.3*	*.1*	*.2*
Net exports	.4	2.9	-1.8	.7	-.4	-.2
Previous Tealbook	*.4*	*.1*	*.2*	*.2*	*-.1*	*-.1*

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.

The Outlook for the Labor Market

Measure	2019	2020 H1	2020 H2	2020	2021	2022
Nonfarm payroll employment[1]	178	-2923	2093	-415	321	186
Previous Tealbook	*178*	*226*	*78*	*152*	*135*	*111*
Private employment[1]	162	-2972	2127	-422	350	200
Previous Tealbook	*162*	*153*	*118*	*135*	*125*	*101*
Labor force participation rate[2]	63.2	62.3	62.5	62.5	62.5	62.5
Previous Tealbook	*63.2*	*63.2*	*63.2*	*63.2*	*63.2*	*63.2*
Civilian unemployment rate[2]	3.5	16.0	7.9	7.9	5.4	4.7
Previous Tealbook	*3.5*	*3.6*	*3.5*	*3.5*	*3.2*	*3.2*
Employment-to-population ratio[2]	61.0	52.3	57.5	57.5	59.1	59.6
Previous Tealbook	*61.0*	*61.0*	*61.0*	*61.0*	*61.2*	*61.2*

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
Percent change at annual rate from final quarter of preceding period						
PCE chain-weighted price index	1.4	-.6	2.0	.7	1.7	1.8
Previous Tealbook	*1.4*	*.9*	*1.8*	*1.3*	*2.0*	*1.9*
Food and beverages	.9	2.9	.7	1.8	1.5	2.0
Previous Tealbook	*.9*	*.4*	*1.7*	*1.1*	*2.5*	*2.3*
Energy	-1.3	-34.9	9.5	-15.6	4.0	2.8
Previous Tealbook	*-1.3*	*-13.4*	*-1.1*	*-7.5*	*1.7*	*1.8*
Excluding food and energy	1.6	.9	1.9	1.4	1.6	1.7
Previous Tealbook	*1.6*	*1.6*	*1.9*	*1.8*	*1.9*	*1.9*
Prices of core goods imports[1]	-1.1	-.9	-1.2	-1.1	1.2	1.0
Previous Tealbook	*-1.1*	*.7*	*.4*	*.6*	*1.0*	*.8*

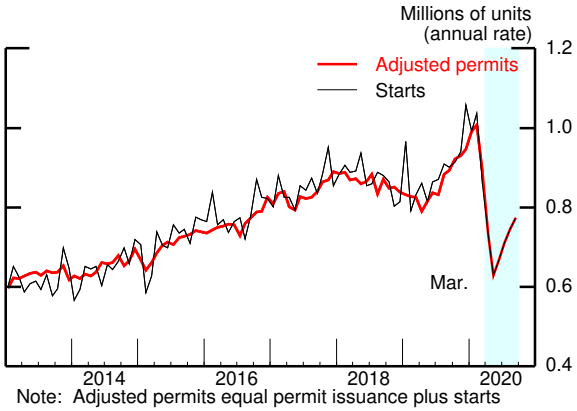
	Mar. 2020[2]	Apr. 2020[2]	May 2020[2]	June 2020[2]	July 2020[2]	Aug. 2020[2]
12-month percent change						
PCE chain-weighted price index	1.3	.4	.4	.4	.4	.5
Previous Tealbook	*1.4*	*1.1*	*1.1*	*1.2*	...	...
Excluding food and energy	1.7	1.3	1.3	1.2	1.1	1.2
Previous Tealbook	*1.7*	*1.6*	*1.7*	*1.6*	...	...

... 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.

Domestic Econ Devel & Outlook

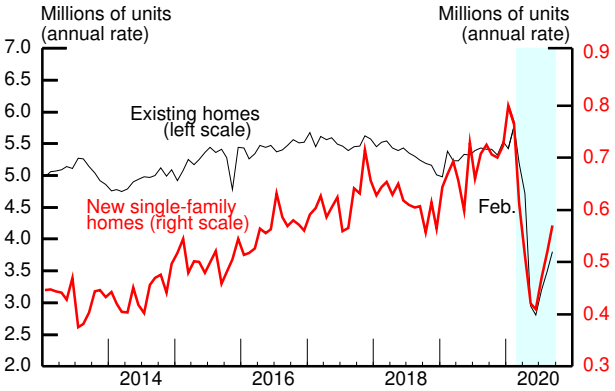
Recent Nonfinancial Developments (2)

Single-Family Housing Starts and Permits



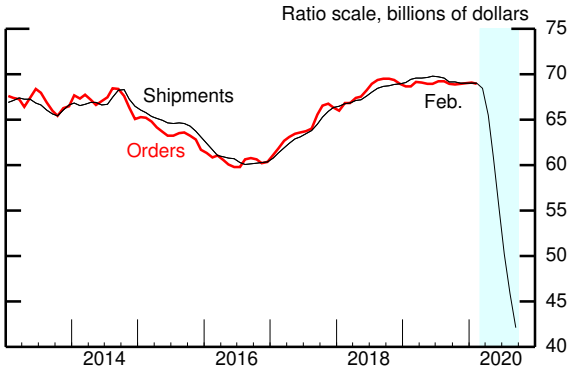
Note: Adjusted permits equal permit issuance plus starts outside of permit-issuing areas.
Source: U.S. Census Bureau.

Home Sales



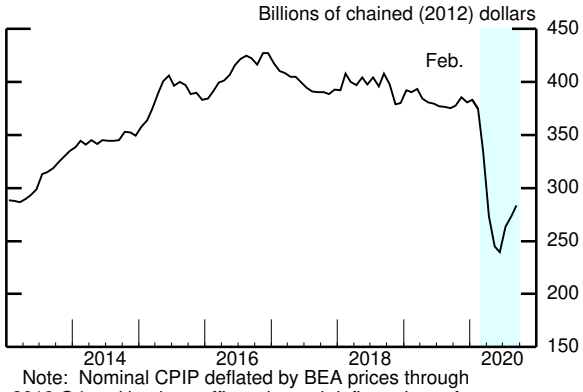
Source: For existing, National Association of Realtors; for new, U.S. Census Bureau.

Nondefense Capital Goods ex. Aircraft



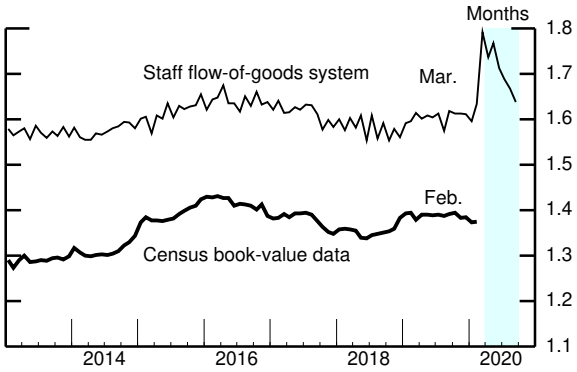
Note: Data are 3-month moving averages.
Source: U.S. Census Bureau.

Nonresidential Construction Put in Place



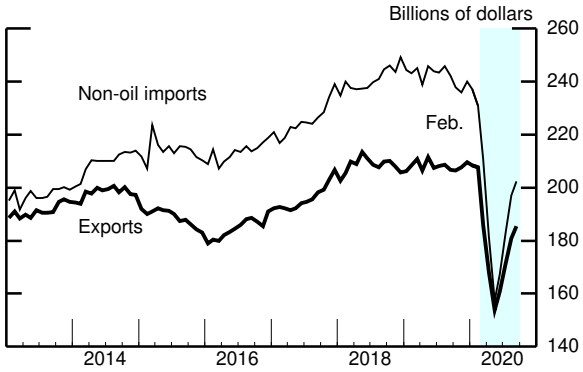
Note: Nominal CPIP deflated by BEA prices through 2019:Q4 and by the staff's estimated deflator thereafter.
Source: U.S. Census Bureau.

Inventory Ratios



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

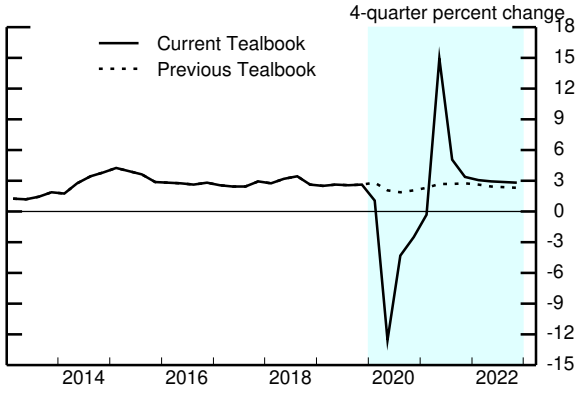
Exports and Non-oil Imports



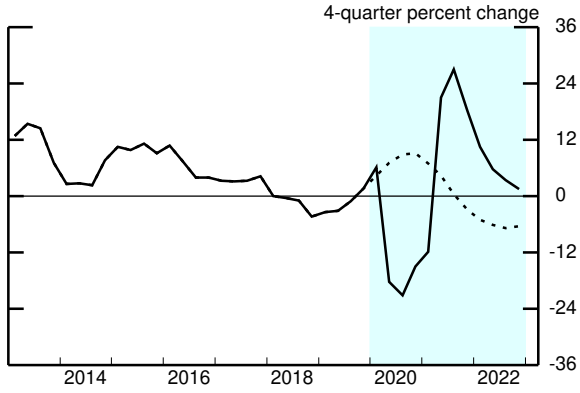
Note: Forecasts are linear interpolations of quarterly values.
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis; U.S. Census Bureau.

Components of Final Demand

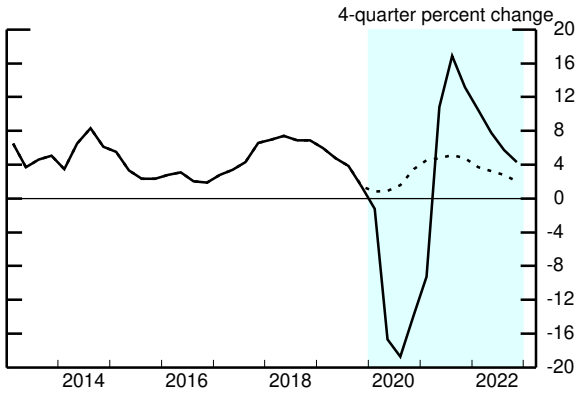
Personal Consumption Expenditures



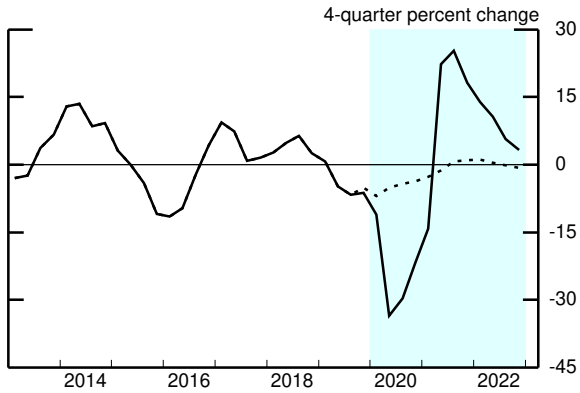
Residential Investment



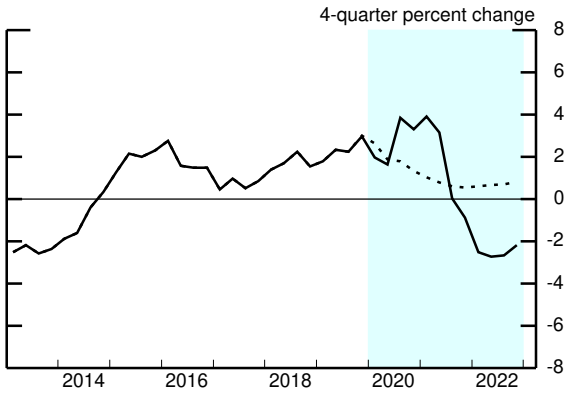
Equipment and Intangibles



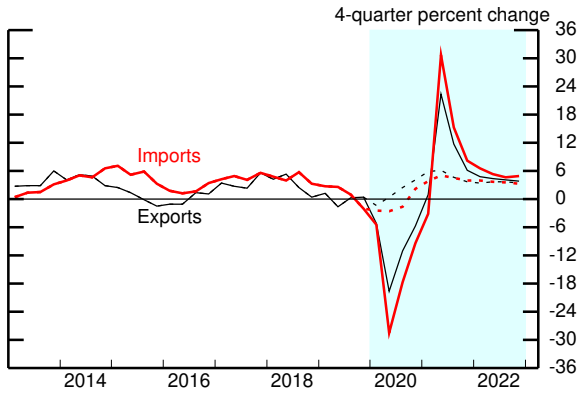
Nonresidential Structures



Government Consumption and Investment



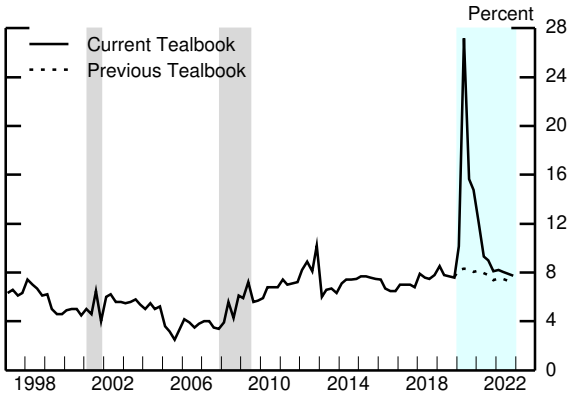
Exports and Imports



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

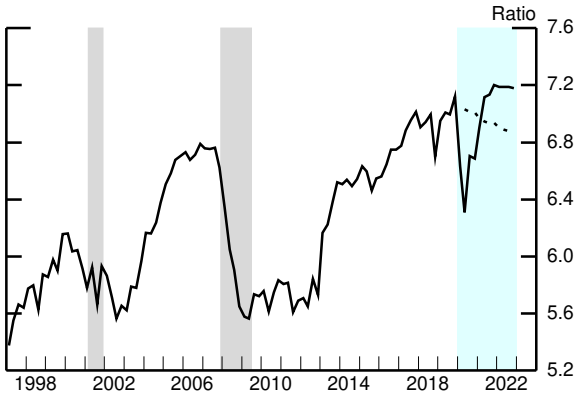
Aspects of the Medium-Term Projection

Personal Saving Rate



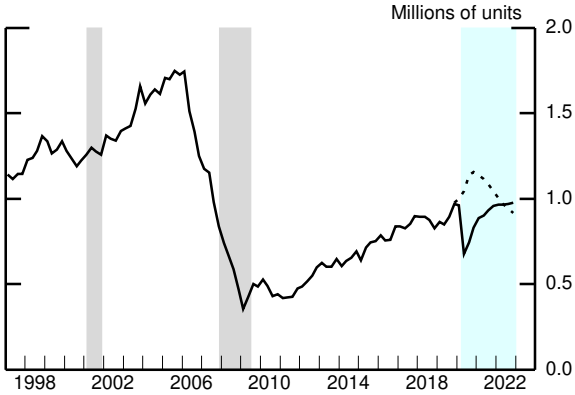
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Wealth-to-Income Ratio



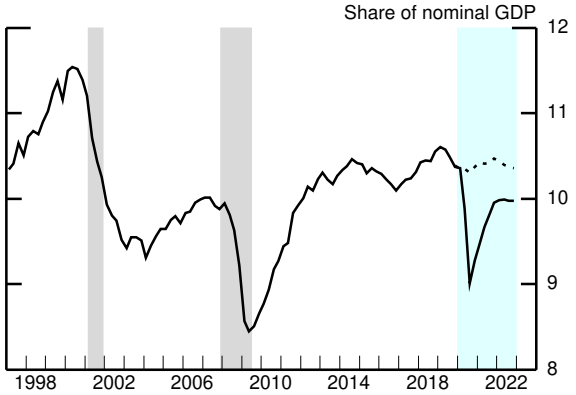
Note: Ratio of household net worth to disposable personal income.
Source: For net worth, Federal Reserve Board, Financial Accounts of the United States; for income, U.S. Dept. of Commerce, Bureau of Economic Analysis.

Single-Family Housing Starts



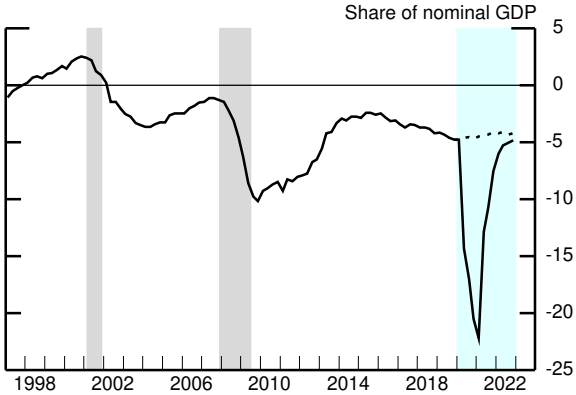
Source: U.S. Census Bureau.

Equipment and Intangibles Spending



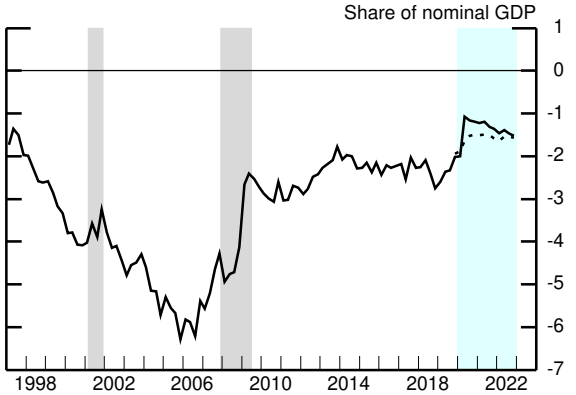
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

Federal Surplus/Deficit



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

Current Account Surplus/Deficit



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

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

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

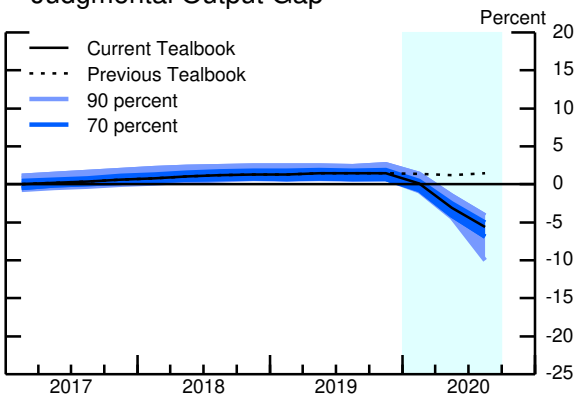
(Percent change at annual rate from final quarter of preceding period except as noted)

Measure	2018	2019	2020	2020 Q1	2020 Q2	2020 Q3
Output gap[1]	**1.3**	**1.5**	**-3.3**	**.1**	**-3.1**	**-5.6**
Previous Tealbook	*1.3*	*1.5*	*1.7*	*1.4*	*1.2*	*1.5*
Real GDP	2.5	2.3	-4.3	-5.9	-37.4	28.9
Previous Tealbook	*2.5*	*2.3*	*2.1*	*1.4*	*1.3*	*3.0*
Measurement error in GDP	-.1	.2	.0	.0	.0	.0
Previous Tealbook	*-.1*	*.2*	*.0*	*.0*	*.0*	*.0*
Potential output	1.9	1.9	.4	-.6	-28.8	43.4
Previous Tealbook	*1.9*	*1.9*	*1.9*	*1.9*	*1.9*	*1.9*

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.

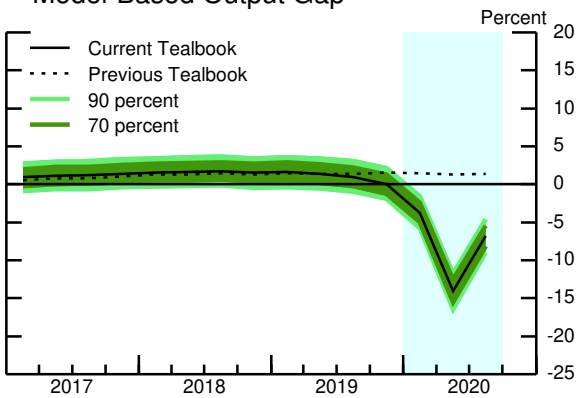
1. Percent, average for the final quarter in the period.

Judgmental Output Gap



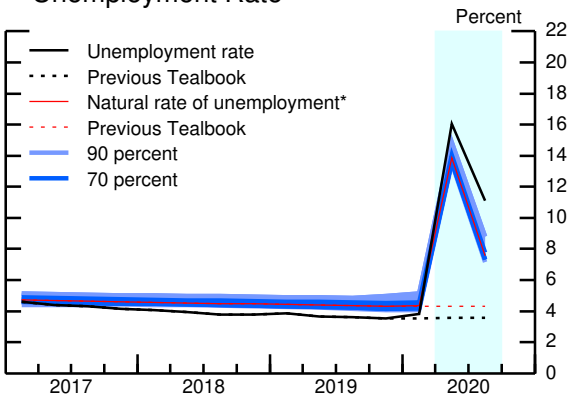
Note: Shaded regions show the distribution of historical revisions to the staff's estimates of the output gap.
Source: Various macroeconomic data; staff assumptions.

Model-Based Output Gap



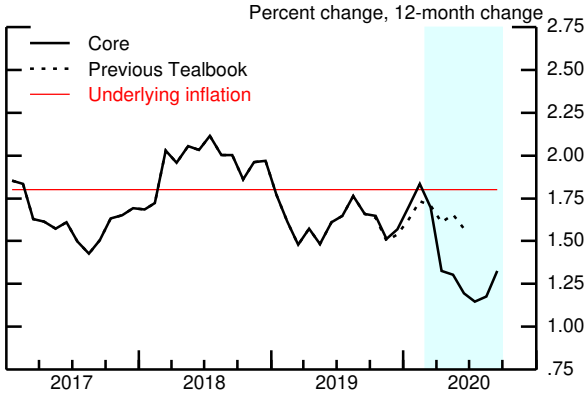
Note: Shaded regions denote model-computed uncertainty bands.
Source: Various macroeconomic data; staff assumptions.

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.

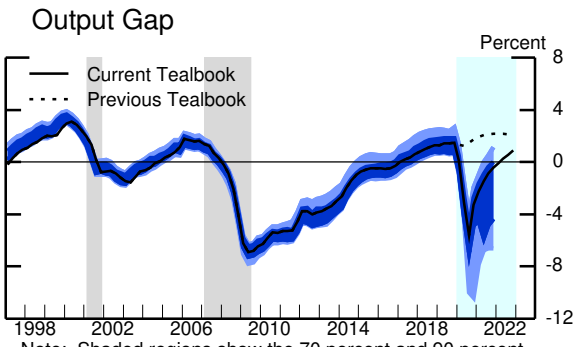
Core PCE Price Inflation



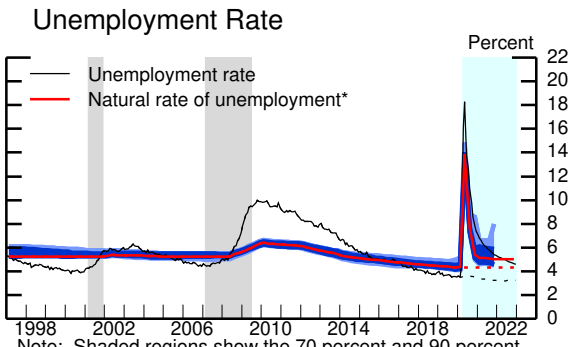
Source: U.S. Department of Commerce, Bureau of Economic Analysis; staff assumptions.

Domestic Econ Devel & Outlook

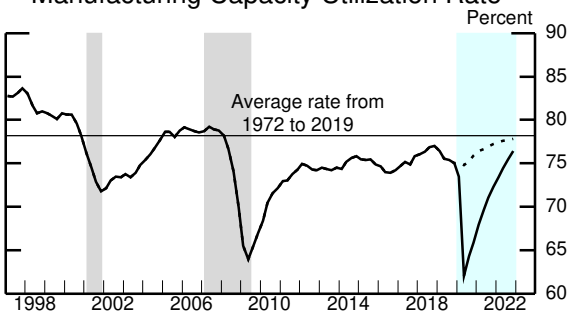
Cyclical Position of the U.S. Economy: Longer-Term Perspective



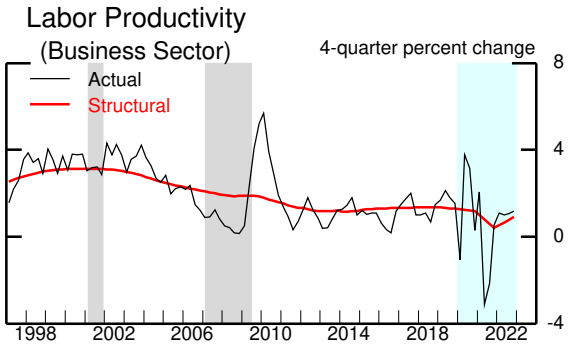
Note: Shaded regions show the 70 percent and 90 percent confidence intervals of the distribution of historical revisions to the staff's estimates of the output gap.
Source: Various macroeconomic data; staff assumptions.



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.



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



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

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

Decomposition of Potential Output

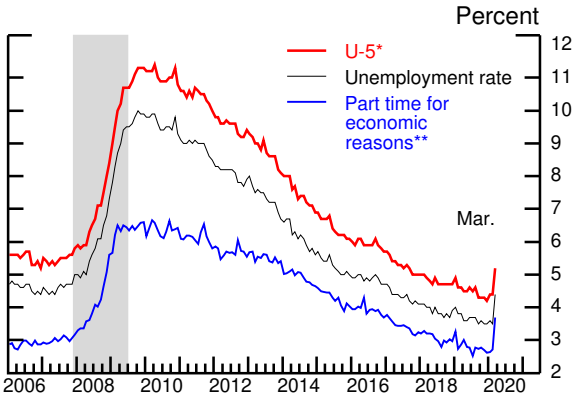
(Percent change, Q4 to Q4, except as noted)

Measure	1974-95	1996-2000	2001-07	2008-10	2011-17	2018	2019	2020	2021	2022
Potential output	3.1	3.6	2.7	1.9	1.5	1.9	1.9	.4	1.5	1.5
Previous Tealbook	*3.1*	*3.6*	*2.7*	*1.9*	*1.5*	*1.9*	*1.9*	*1.9*	*1.9*	*1.8*
Selected contributions:[1]										
Structural labor productivity[2]	1.7	2.9	2.7	1.8	1.3	1.4	1.3	1.2	.4	.9
Previous Tealbook	*1.7*	*2.9*	*2.7*	*1.8*	*1.3*	*1.4*	*1.3*	*1.3*	*1.3*	*1.3*
Capital deepening	.7	1.4	1.0	.5	.8	.7	.7	.6	-.2	.3
Multifactor productivity	.8	1.1	1.4	1.0	.2	.5	.4	.4	.4	.4
Structural hours	1.5	1.3	.8	.5	.4	.9	.5	-1.1	1.2	.6
Previous Tealbook	*1.5*	*1.3*	*.8*	*.5*	*.4*	*.9*	*.5*	*.4*	*.7*	*.5*
Labor force participation	.4	-.1	-.2	-.4	-.4	-.1	.0	-.4	.0	-.1
Previous Tealbook	*.4*	*-.1*	*-.2*	*-.4*	*-.4*	*-.1*	*.0*	*.0*	*-.1*	*-.2*
Memo:										
Output gap[3]	-1.2	2.5	.3	-5.4	.6	1.3	1.5	-3.3	-.4	.9
Previous Tealbook	*-1.2*	*2.5*	*.3*	*-5.4*	*.6*	*1.3*	*1.5*	*1.7*	*2.2*	*2.1*

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

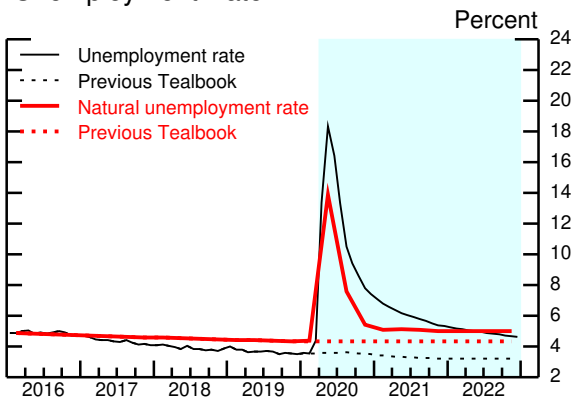
Labor Market Developments and Outlook (1)

Measures of Labor Underutilization



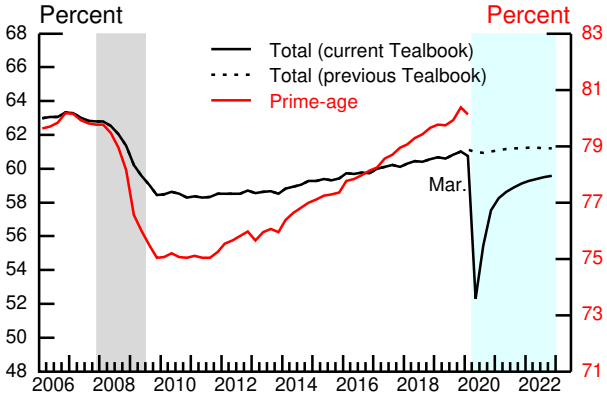
* U-5 measures total unemployed persons plus all marginally attached to the labor force as a percent of the labor force plus persons marginally attached to the labor force.
** Percent of Current Population Survey employment.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Unemployment Rate



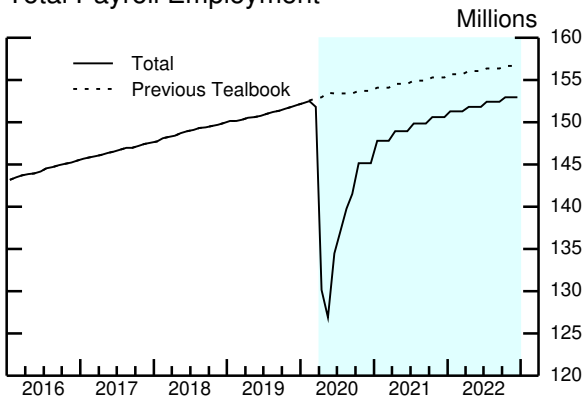
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Employment-to-Population Ratio



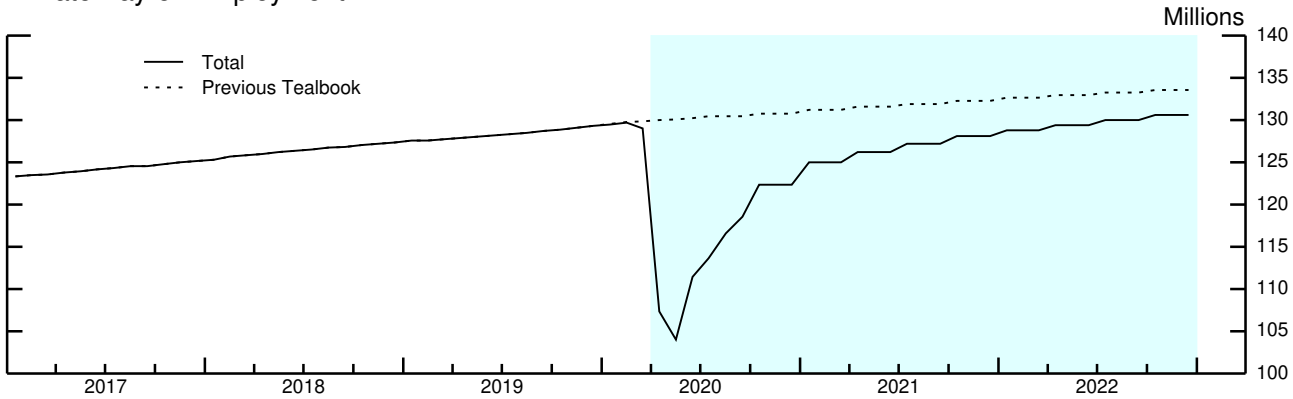
Note: Every curve except the one for the prime-age population corresponds with the left axis.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Total Payroll Employment



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

Private Payroll Employment



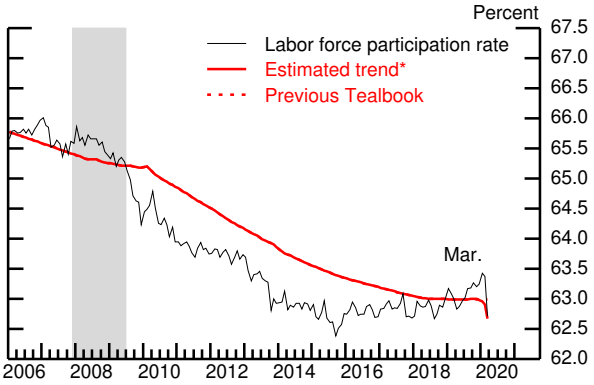
Source: U.S. Department of Labor, Bureau of Labor Statistics.

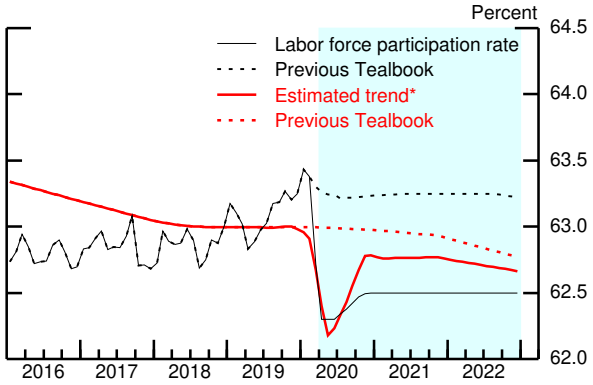
Note: The gray shaded bars indicate a period of business recession as defined by the National Bureau of Economic Research.

Domestic Econ Devel & Outlook

Labor Market Developments and Outlook (2)

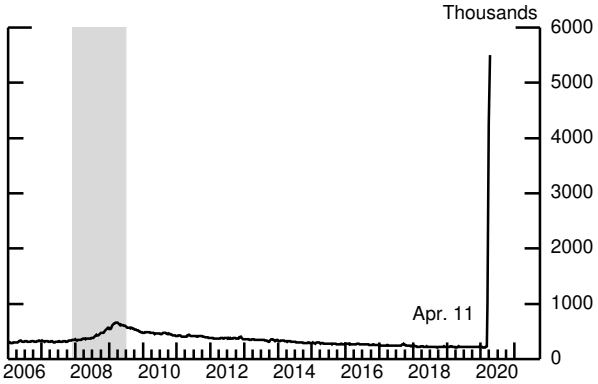
Labor Force Participation Rate





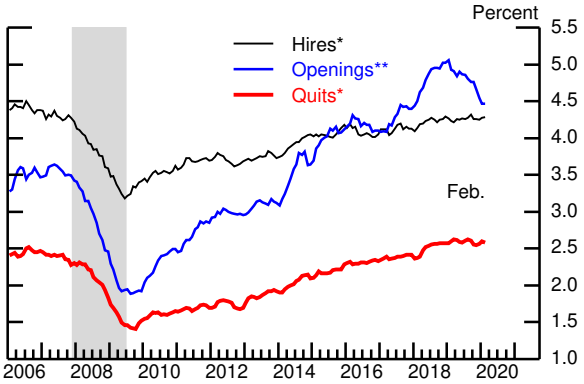
Note: Published data adjusted by staff to account for changes in population weights.
* Includes staff estimate of the effect of extended and emergency unemployment benefits.
Source: U.S. Department of Labor, Bureau of Labor Statistics; staff assumptions.

Initial Unemployment Insurance Claims



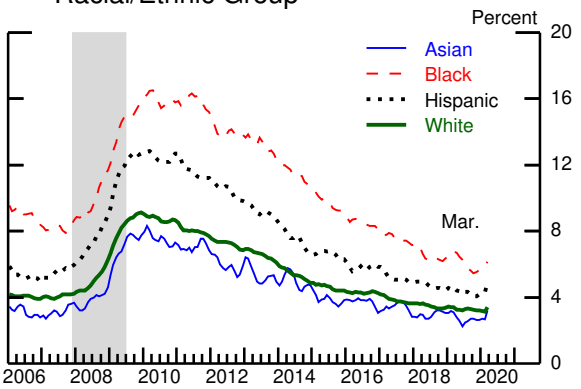
Note: 4-week moving average.
Source: U.S. Department of Labor, Employment and Training Administration.

Hires, Quits, and Job Openings



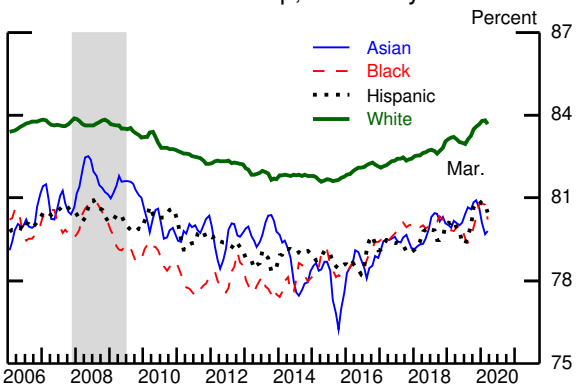
* Percent of private nonfarm payroll employment, 3-month moving average.
** Percent of private nonfarm payroll employment plus unfilled jobs, 3-month moving average.
Source: Job Openings and Labor Turnover Survey.

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.

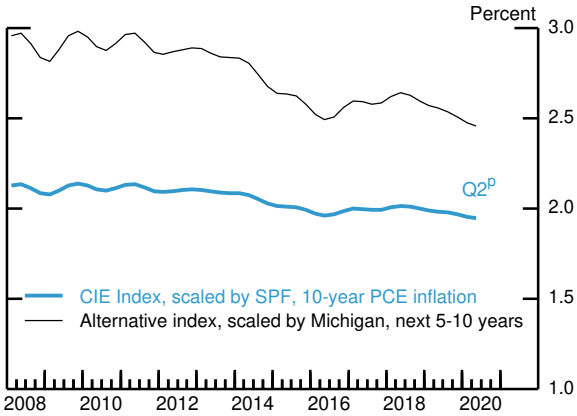
Labor Force Participation Rate by Racial/Ethnic Group, 25 to 54 years old



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.

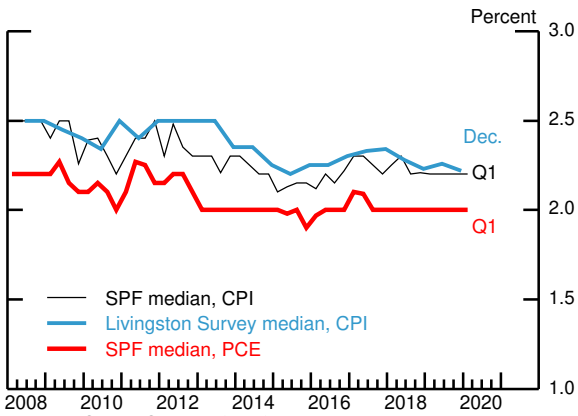
Survey Measures of Longer-Term Inflation Expectations

Index of Common Inflation Expectations



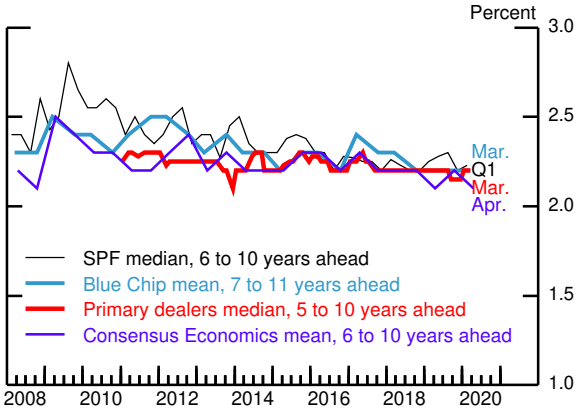
p Preliminary estimate based on data available to date.
Note: Index of 21 inflation expectations indicators.
Source: Staff calculations.

Next 10 Years



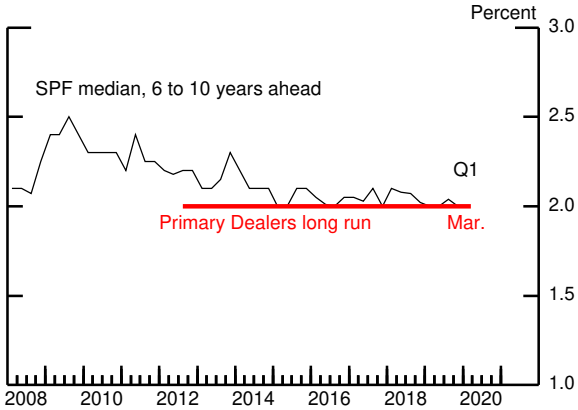
Note: SPF is Survey of Professional Forecasters.
Source: Federal Reserve Bank of Philadelphia.

CPI Forward Expectations



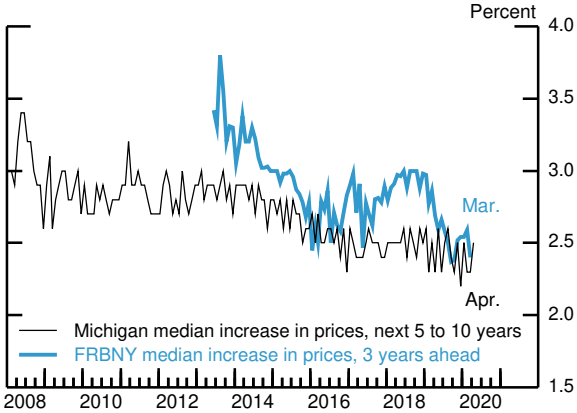
Source: Federal Reserve Bank of Philadelphia; Blue Chip Economic Indicators; Federal Reserve Bank of New York; Consensus Economics.

PCE Forward Expectations



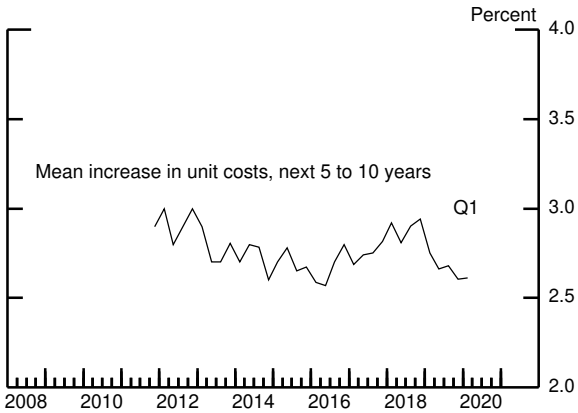
Source: Federal Reserve Bank of Philadelphia; Federal Reserve Bank of New York.

Surveys of Consumers



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

Survey of Business Inflation Expectations

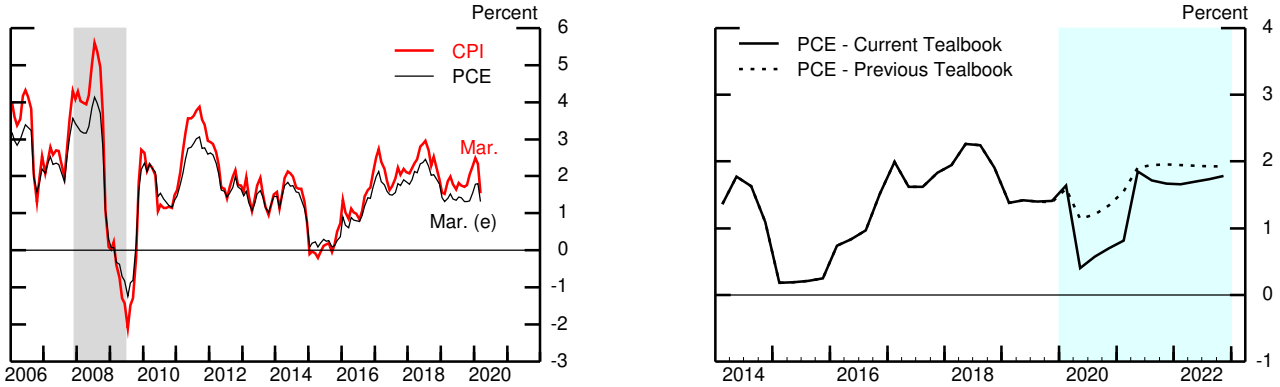


Note: Survey of businesses in the Sixth Federal Reserve District. Data begin in February 2012.
Source: Federal Reserve Bank of Atlanta.

Inflation Developments and Outlook (1)

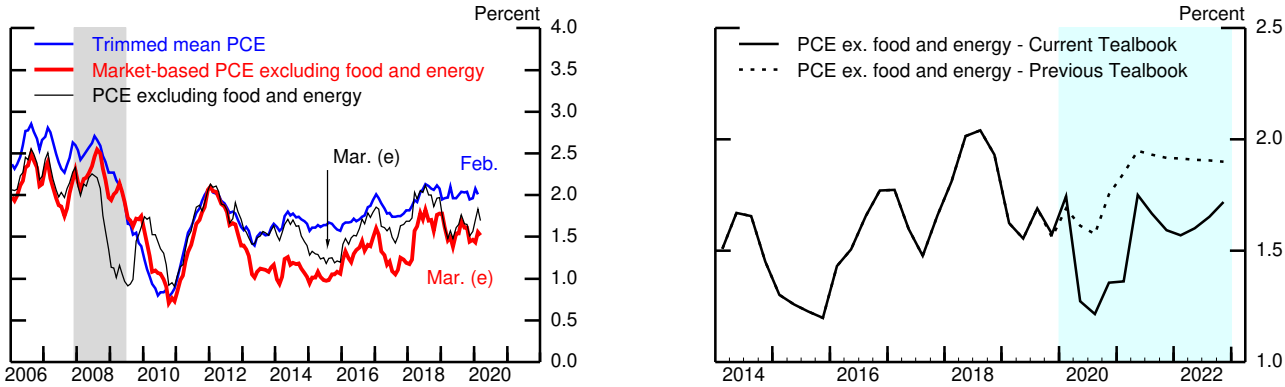
(Percent change from year-earlier period)

Headline Consumer Price Inflation



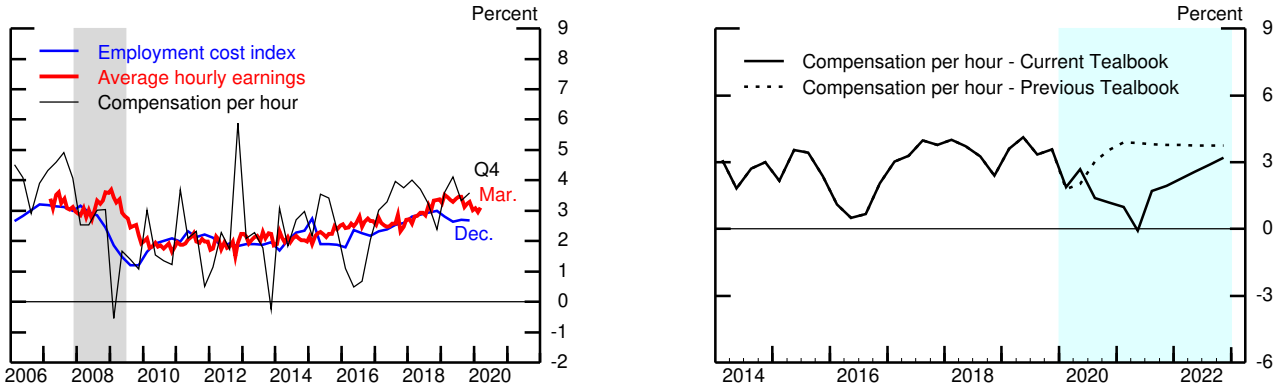
Note: PCE prices from February to March 2020 are staff estimates (e).
Source: For CPI, U.S. Department of Labor, Bureau of Labor Statistics; for PCE, U.S. Department of Commerce, Bureau of Economic Analysis.

Measures of Core PCE Price Inflation



Note: Core PCE prices from February to March 2020 are staff estimates (e).
Source: For trimmed mean PCE, Federal Reserve Bank of Dallas; otherwise, U.S. Department of Commerce, Bureau of Economic Analysis.

Labor Cost Growth



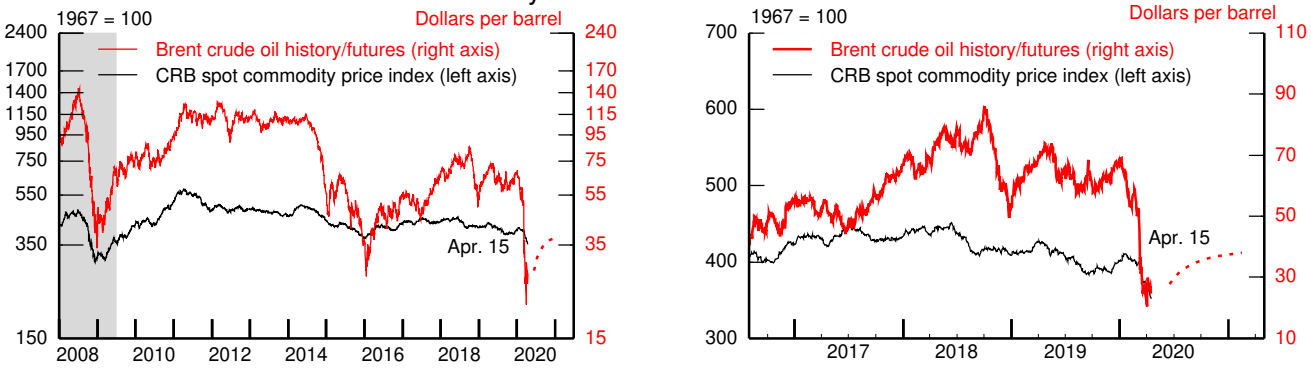
Note: Compensation per hour is for the business sector. Average hourly earnings are for the private nonfarm sector. The employment cost index is for the private sector.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

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

Inflation Developments and Outlook (2)

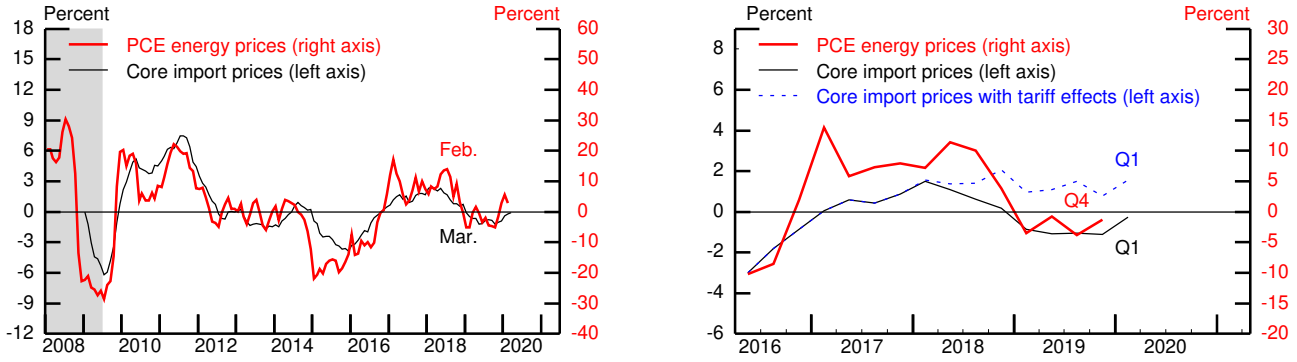
(Percent change from year-earlier period, except as noted)

Commodity and Oil Price Levels



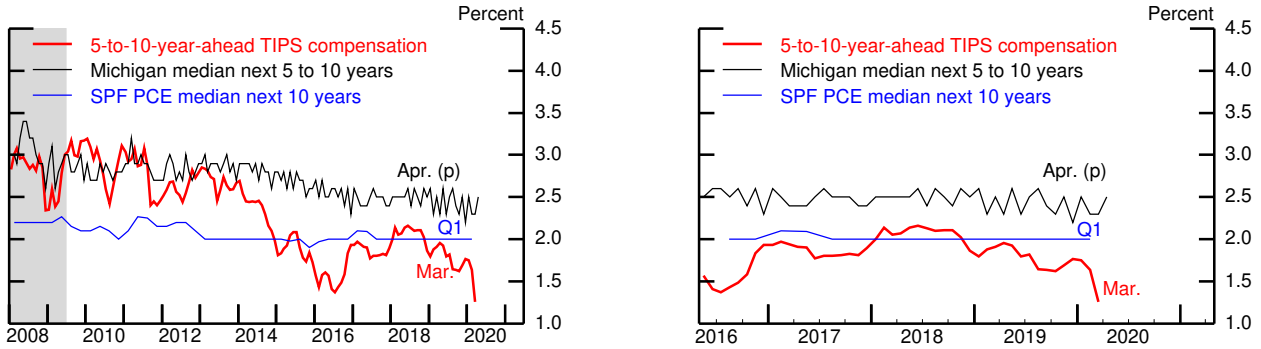
Note: Futures prices (dotted lines) are the latest observations on monthly futures contracts.
Source: For oil prices, U.S. Department of Energy, Energy Information Agency; for commodity prices, Commodity Research Bureau (CRB).

Energy and Import Price Inflation



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

Long-Term Inflation Expectations and Compensation



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

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

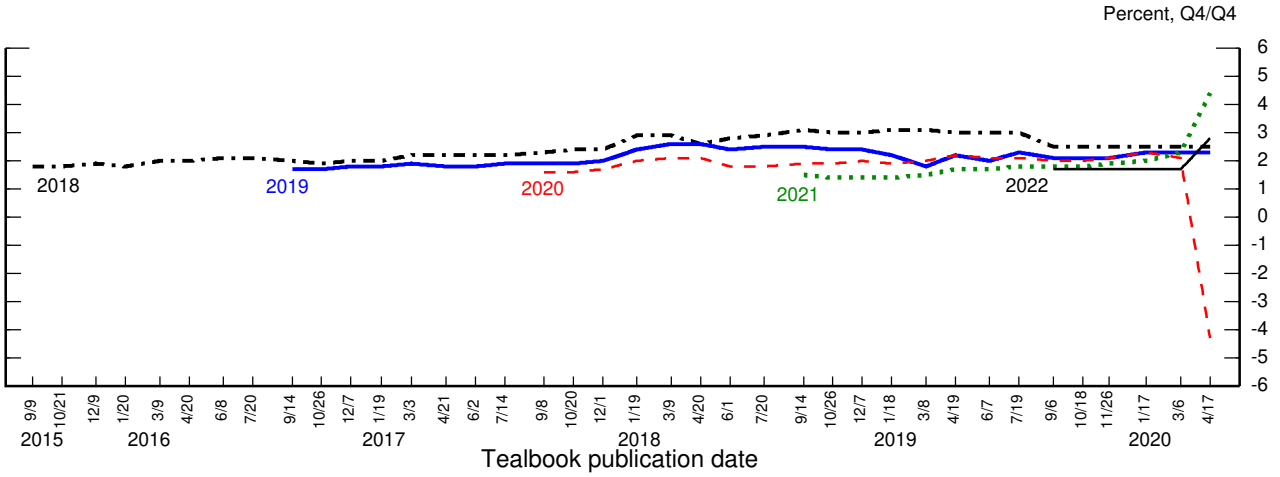
Federal Reserve System Nowcasts of 2020:Q1 Real GDP Growth

(Percent change at annual rate from previous quarter)

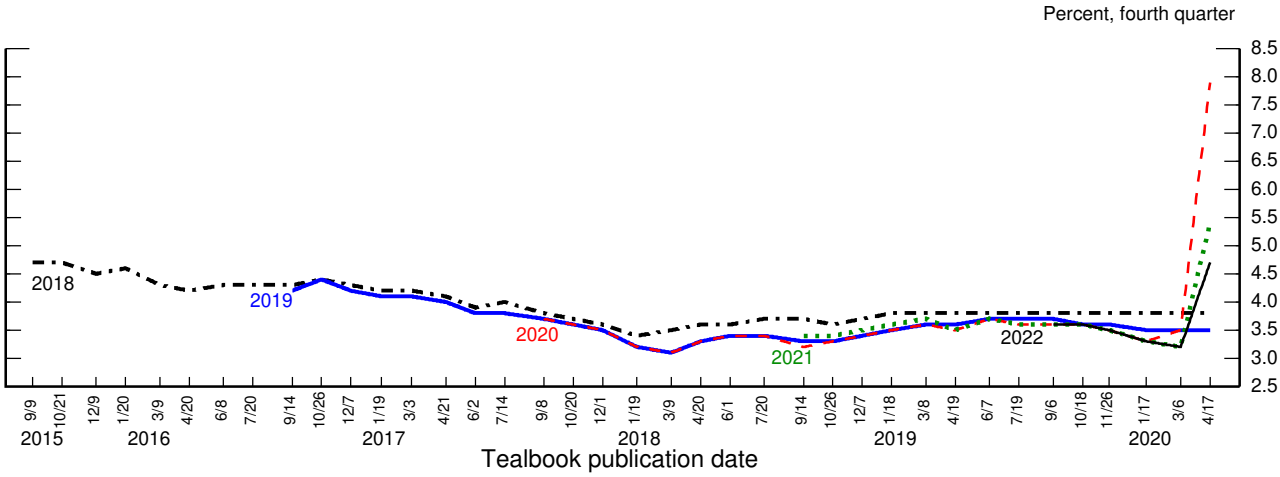
Federal Reserve entity	Type of model	Nowcast as of Apr. 15, 2020
Federal Reserve Bank		
Boston	• Mixed-frequency BVAR	-1.5
New York	• Factor-augmented autoregressive model combination	1.7
	• Factor-augmented autoregressive model combination, financial factors only	1.2
	• Dynamic factor model	-.4
Cleveland	• Bayesian regressions with stochastic volatility	-.5
	• Tracking model	-1.6
Atlanta	• Tracking model combined with Bayesian vector autoregressions (VARs), dynamic factor models, and factor-augmented autoregressions (known as GDPNow)	-.3
Chicago	• Dynamic factor model	1.1
	• Bayesian VARs	.0
St. Louis	• Dynamic factor model	-2.1
	• News index model	-15.5
	• Let-the-data-decide regressions	-2.5
Kansas City	• Accounting-based tracking estimate	-.7
Board of Governors	• Tealbook estimate (judgmental)	-5.1
	• Mixed-frequency dynamic factor model (DFM-SM)	-.7
	• Mixed-frequency dynamic factor model (DFM-BM)	.2
Memo: Median of Federal Reserve System nowcasts		-.6

Evolution of the Staff Forecast

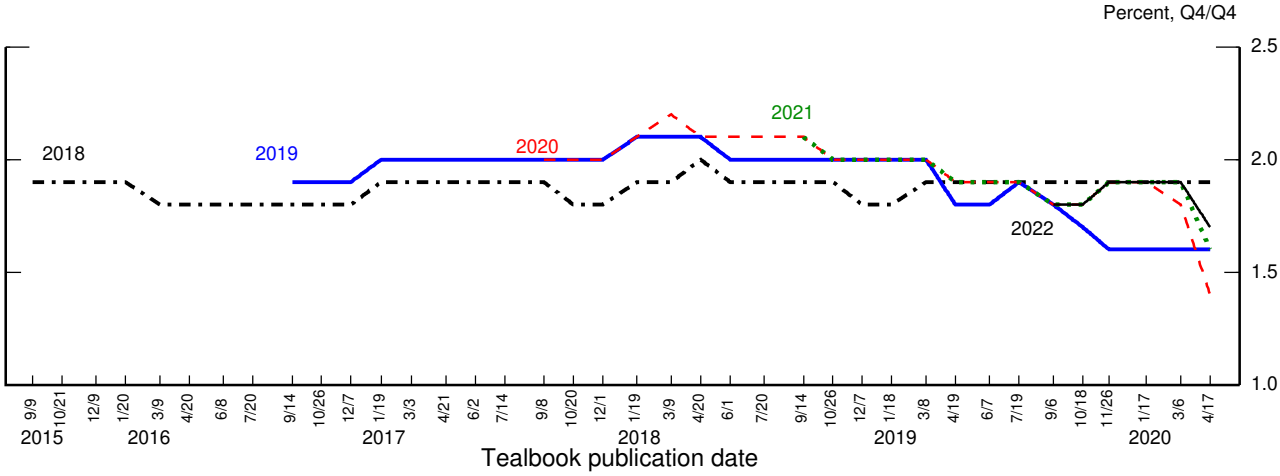
Change in Real GDP



Unemployment Rate



Change in PCE Prices excluding Food and Energy



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Appendix A

Fiscal Policy Stimulus in Response to COVID-19

SUMMARY

This appendix provides additional information on the roughly $3.4 trillion in COVID-19 fiscal policy stimulus measures in the staff projection. It contains three sections: a summary, a discussion of traditional fiscal stimulus measures (for example, tax cuts and spending increases), and a discussion of the Federal Reserve and Treasury lending programs. The appendix is an update of the analysis sent to the Board on April 1, 2020.[1]

Enacted Legislation

In response to the COVID-19 outbreak, lawmakers have enacted a variety of stimulus measures that can be broken into two broad components:

- The first is roughly $1.9 trillion in traditional fiscal stimulus, which includes additional government purchases, income support for households and businesses, and loans and grants to small businesses (table 1, line 5). Together, these traditional stimulus measures are roughly double the size of the stimulus provided by the American Recovery and Reinvestment Act of 2009. We estimate these policies will boost the level of GDP nearly 3 percent over the course of 2020 (table 2, line 5).
- The second main component is roughly $500 billion for the Main Street Lending Program and other Federal Reserve and Treasury lending programs to facilitate loans to businesses and state and local governments. These lending programs are not included in tables 1–4 but are discussed at the end of this appendix.

Table 1: Budget Effects of COVID-19 Fiscal Stimulus, by Legislation

(Billions of nominal dollars)

		2020				Calendar year			Total
		Q1	Q2	Q3	Q4	2020	2021	2022	
(1)	Preparedness & Response Act	0	0	0	0	10	0	0	**10**
(2)	Families First Coronavirus Response Act	0	40	10	10	60	20	0	**90**
(3)	Emergency Disaster Relief	0	10	10	10	30	20	0	**50**
(4)	Cares Act*	0	890	260	100	1,250	280	130	**1,780**
(5)	**Enacted total**	**0**	**940**	**290**	**110**	**1,350**	**320**	**130**	**1,930**
(6)	Phase 4 stimulus placeholder	0	200	200	270	680	150	50	**980**
(7)	**Forecast total**	**0**	**1,140**	**490**	**390**	**2,020**	**480**	**190**	**2,910**

Note: Numbers may not sum to totals because of rounding, and row totals include budget effects after 2022.

*Does not include the Main Street Lending Program and other Federal Reserve and Treasury lending programs to facilitate loans to businesses and state and local governments.

[1] We have updated the analysis along two dimensions. First, we increased the effect of the Small Business Administration's Paycheck Protection Program on GDP growth because early reports indicate that banks have been more effective at quickly disbursing funds than we previously assumed. Second, our forecast now includes a $1 trillion placeholder for "Phase 4" fiscal stimulus.

Additional Legislation

Press reports indicate growing support for additional stimulus, though there is considerable uncertainty over the timing, scope, and size of this additional legislation. We assume that a $1 trillion "Phase 4" stimulus package will be enacted in the near future and include traditional fiscal stimulus in the form of aid to households, small businesses, and state and local governments. We estimate that these policies will boost the level of GDP 1.8 percent in 2020 (table 2, line 6).

Table 2: Direct Effects of COVID-19 Fiscal Stimulus on GDP Growth, by Legislation
(First-round effects, percentage point contribution to real GDP growth, annual rate)

		2020				Q4/Q4		
		Q1	Q2	Q3	Q4	2020	2021	2022
(1)	Preparedness & Response Act	0.0	0.1	0.1	0.0	0.0	0.0	0.0
(2)	Families First Coronavirus Response Act	0.0	0.9	0.4	-0.6	0.2	-0.1	0.0
(3)	Emergency Disaster Relief	0.0	0.9	0.0	-0.5	0.1	-0.1	0.0
(4)	Cares Act*	0.0	7.5	2.8	0.1	2.5	-1.7	-0.4
(5)	**Enacted total**	**0.0**	**9.4**	**3.3**	**-1.0**	**2.8**	**-2.0**	**-0.4**
(6)	Phase 4 stimulus placeholder	0.0	0.8	3.9	3.1	1.8	-1.2	-0.4
(7)	**Forecast total**	**0.0**	**10.1**	**7.2**	**2.1**	**4.6**	**-3.2**	**-0.8**

Note: Numbers may not sum to totals because of rounding. Estimates exclude follow-on multiplier and financial and monetary offsets.
*Does not include the Main Street Lending Program and other Federal Reserve and Treasury lending programs to facilitate loans to businesses and state and local governments.

TRADITIONAL FISCAL STIMULUS: $2.9 TRILLION

We estimate the direct, first-round effect on GDP growth from the stimulus measures—that is, the effect excluding the follow-on multiplier and financial and monetary offsets—in two steps. First, we determine the magnitude of the change in government purchases, taxes, and transfers from the legislation.[2] Second, we calculate the effect on aggregate demand from these changes. Increases in government purchases boost GDP one-for-one. For changes in taxes and transfers, we determine the aggregate demand effects using guidance from staff models and other research about the response of consumers and businesses to fiscal policy.

Notably, although the $2.9 trillion in traditional stimulus in the staff forecast is greater than 10 percent of GDP, its effect on aggregate demand in 2020 is significantly less than what would be implied by a one-for-one boost (table 2, line 7). This difference reflects three sources of slippage between the budgetary cost of stimulus policies and their effects on aggregate demand, because for both households and businesses there is

- a lag in receiving funds or realizing lower tax payments
- a tendency to save a portion of temporary boosts to income
- a tendency to spend out the non-saved portion of the funds over several quarters

[2] For tax provisions, we incorporate estimates from the Joint Committee on Taxation, and for certain outlays analyzed by the Congressional Budget Office, we incorporate their estimates of government outlays.

We estimate that the lag in disbursement of funds will result in $2.0 trillion (out of $2.9 trillion) being distributed by the end of 2020 (table 1, line 7). The ultimate share of stimulus that is spent by households and businesses and the time pattern of that spending depends on the types of households or firms that receive the funds and the type of stimulus. Households or businesses that are liquidity constrained or have been adversely affected by the viral outbreak (for example, businesses or workers in the tourism industry) may have relatively high propensities to spend stimulus funds over the next several quarters. For example, we estimate that unemployment insurance recipients will spend nearly all of their benefits quickly, providing a relatively high bang-for-the-buck boost to growth in 2020. By comparison, we estimate that the boost to aggregate demand from one-time stimulus payments will be lower because the payment is made to nearly all households, many of which are not liquidity constrained.

As a result of the lags in both fund disbursement and the spending responses of households and businesses, the effect of the stimulus on GDP plays out over many quarters. We estimate that the stimulus policies will boost GDP growth 10.1 percentage points (at an annual rate) in the second quarter and 7.2 percentage points in the third quarter. For 2020, we estimate that the stimulus will boost growth 4.6 percentage points (table 2, line 7).

We now turn to analyzing the specific elements of fiscal stimulus legislation, including both enacted legislation and our expectation of the Phase 4 legislation, in three categories: household and business income support, government purchases and grants, and loans and grants to small businesses.

Table 3: Budget Effects of COVID-19 Fiscal Stimulus, by Category
(Billions of nominal dollars)

		2020				Calendar year			**Total**
		Q1	Q2	Q3	Q4	2020	2021	2022	
(1)	Household & business income	0	570	460	340	1,370	260	30	**1,660**
(2)	Government purchases & grants	0	20	40	40	110	220	150	**700**
(3)	Loans/grants to small businesses*	0	550	0	0	550	0	0	**550**
(4)	**Total**	**0**	**1,140**	**490**	**390**	**2,020**	**480**	**190**	**2,910**

Note: Numbers may not sum to totals because of rounding, and row totals include budget effects after 2022.
*Does not include the Main Street Lending Program and other Federal Reserve and Treasury lending programs to facilitate loans to businesses and state and local governments.

Household and Business Income

We estimate that household and firm income will increase $1.4 trillion in 2020 from the stimulus measures (table 3, line 1). As a result, we estimate that the level of GDP will be 2.9 percent higher in 2020 because of stronger aggregate demand (table 4, line 1).

Stimulus Checks

- The Cares Act (enacted March 27) provides stimulus checks of up to $1,200 for adults and $500 for children, with a phase-out for high-income households. We assume that these payments will be disbursed mainly in 2020:Q2 and total $290 billion overall. In addition, we assume that the Phase 4 legislation will include

two additional rounds of stimulus checks that are primarily disbursed in 2020:Q3 and again in 2020:Q4, totaling $580 billion.

- We assume that households will spend 50 percent of these funds over several quarters.[3] Typically, we would assume that the majority of this spending occurs over several quarters following receipt. However, we anticipate that social distancing and heightened uncertainty will reduce spending in the second quarter of this year. Overall, we estimate that these stimulus payments will boost GDP growth in 2020 and will be a drag on growth in 2021 as spending returns to baseline.

Table 4: Direct Effects of COVID-19 Fiscal Stimulus on GDP Growth, by Category
(First-round effect, percentage point contribution to real GDP growth, annual rate)

		2020				Q4/Q4		
		Q1	Q2	Q3	Q4	2020	2021	2022
(1)	Household & business income	0.0	6.6	5.0	0.8	2.9	-2.5	-0.4
(2)	Government purchases & grants	0.0	1.7	1.1	0.5	0.8	0.1	-0.3
(3)	Loans/grants to small businesses*	0.0	1.8	1.0	0.8	0.9	-0.8	-0.1
(4)	**Total**	**0.0**	**10.1**	**7.2**	**2.1**	**4.6**	**-3.2**	**-0.8**

Note: Numbers may not sum to total because of rounding. Estimates exclude follow-on multiplier and financial and monetary offsets.
*Does not include the Main Street Lending Program and other Federal Reserve and Treasury lending programs to facilitate loans to businesses and state and local governments.

Expanded Unemployment Insurance

- The Cares Act expands unemployment insurance (UI) eligibility to gig workers, the self-employed, and those who are unable to work as a result of the COVID-19 outbreak. Moreover, it increases the size of the benefits by $600 per week for all beneficiaries through July and extends the maximum duration of benefits by 13 weeks.[4] Because this policy targets households that are likely to be liquidity constrained, we assume that recipients will spend most of their benefits relatively quickly. We expect these UI changes to boost GDP growth in 2020:Q2 and 2020:Q3.

Student Loan and Mortgage Relief

- The Cares Act provides relief for student loan borrowers and mortgage borrowers, which will boost household income by roughly $145 billion in 2020 (and $160 billion

[3] While the literature finds a broad range of estimates on the marginal propensity to consume in response to the 2001 or the 2008 stimulus checks, most findings suggest that a meaningful share of the stimulus payments are spent over the course of several quarters. See Jonathan A. Parker, Nicholas S. Souleles, David S. Johnson, and Robert McClelland (2013), "Consumer Spending and the Economic Stimulus Payments of 2008," *American Economic Review*, vol. 103 (October), pp. 2530–53; and Claudia R. Sahm, Matthew D. Shapiro, and Joel Slemrod (2012), "Check in the Mail or More in the Paycheck: Does the Effectiveness of Fiscal Stimulus Depend on How It Is Delivered?" *American Economic Journal: Economic Policy*, vol. 4 (August), pp. 216–50.

[4] Staff estimates based on the Survey of Consumer Finances suggest that workers earning the median wage and below will have UI replacement rates of 100 percent or higher.

overall). We project that these policies boost growth in aggregate demand primarily in Q2 and Q3.

Paid Sick Leave

- The Families First Act requires employers with fewer than 500 employees to provide paid leave for both sickness and social-distancing reasons. The staff expects that this program will boost household income and aggregate demand through the rest of this year, though there is substantial uncertainty about the magnitude of take-up.[5]
- The bill requires firms to offer two weeks of paid leave equal to normal earnings for employees who are infected, quarantined, under guidance to social distance, or caring for a child whose school or daycare is closed.
- Firms must offer an additional 10 weeks of paid leave at two-thirds of normal pay for employees caring for a child whose school or daycare is closed.
- Employers' expenses are reimbursed by a refundable payroll tax credit.

Nutrition Programs

- The Cares Act and Families First Act provide about $25 billion in funds for SNAP (that is, food stamps). Given the targeted nature of these programs to low-income households and those in financial distress, we project that these policies will primarily boost GDP growth in Q2.

Tax Cuts

- The Cares Act reduces taxes in several ways, including $145 billion from the modification of limitations on losses for pass-through businesses, $80 billion for modifications to the treatment of net operating losses of corporations, and $13 billion for the modification of the limitation on business interest expenses.[6] Given that these tax cuts largely flow to businesses and high-income individuals, we estimate that these additional tax policies will have a minimal effect on aggregate demand.

[5] The subsequent enactment of the Cares Act will likely reduce take-up of paid sick leave. We expect that the expanded UI benefits and the Paycheck Protection Program will reduce take-up of the separate paid sick-leave policy.

[6] The budget effect of these tax cuts is for 2020 through 2023. The Cares Act also includes a retiming of employer-paid payroll taxes in 2020 and 2021 that are repaid in 2022 and 2023. Because this tax change is a retiming of when payments are made and the Social Security Trust Fund is made whole, we anticipate that the Bureau of Economic Analysis will not include this effect in their estimates of compensation. While the temporary delay in tax payments may improve business balance sheets in the short run, we estimate that this tax provision will not have a material effect on GDP growth. We have not included this policy change in the budgetary effects tables.

Government Purchases and Grants

We estimate that the COVID-19 stimulus will raise government purchases by $110 billion (table 3, line 2). As a result, we estimate the level of GDP will be 0.8 percent higher in 2020 (table 4, line 2).[7]

State and Local Government Support

- The Cares Act provides $230 billion in grants to state and local governments; the Families First Act temporarily expands the percent of Medicaid expenditures that the federal government covers, boosting aid to states by approximately $40 billion; and our projected Phase 4 stimulus contains $200 billion in grants-in-aid. The nearly $500 billion in funds for state and local governments will help stabilize budgets, and we estimate that they will raise state and local government spending over the next two years. In particular, these programs will reduce the severity of cuts to purchases by state and local governments resulting from the combination of a sharp decline in tax revenues this year and the need to adhere to balanced budget rules.

Disaster Relief and Additional Health Spending

- The Cares Act and the national emergency declaration provide around $150 billion for federal purchases such as funds for FEMA, VA hospitals, purchases of protective equipment and ventilators, and vaccine development. We assume that it will take a few years for all of these available funds to be spent.

Loans and Grants to Small Businesses

- The Cares Act provides stimulus through a new Small Business Administration (SBA) loan and grant program referred to as the Paycheck Protection Program (PPP). Given the unprecedented size and features of this program, there is substantial uncertainty about its implications for GDP growth. While some early press reports indicated that banks were unprepared for the large increase in demand for loans through the program, the staff expects that the full amount of loans will be made in the next few weeks. As of April 16, the SBA reported that the program had reached the $350 billion limit enacted under the Cares Act.

The Paycheck Protection Program

- The Cares Act provided roughly $350 billion for PPP loans, and we assume the Phase 4 legislation will add an additional $200 billion.

[7] In this appendix we do not include the effects of temporary school closings, instead focusing on fiscal stimulus. However, in the baseline staff projection, we include a 10-week shutdown of all K–12 schools, which reduces the staff's baseline projection for GDP growth in both Q1 and Q2, with an equal boost in Q3. We assume that the move to online learning will not reduce output at the post-secondary level.

- The maximum loan amount is equal to 250 percent of average monthly payroll costs from last year (with a $10 million cap).[8] The PPP loans have a 1 percent fixed interest rate, do not require payments for the first six months, and are forgiven (that is, turn into grants) if the business meets the following conditions:
    - The average level of employment in the eight weeks after receiving the loan is equal to the average pre-outbreak level. The amount forgiven will be reduced if businesses decrease the number of full-time employees.
    - Salaries are comparable to their pre-outbreak level. The amount of the loan that is forgiven will be reduced if salaries and wages of employees are reduced by more than 25 percent for any employee that made less than $100,000 (annualized) in 2019.
    - At least 75 percent of the loan proceeds must be used for payroll in the eight weeks after loan disbursement. Up to 25 percent may be used for interest on mortgage obligations, rent payments, and utilities.
- The total effect of PPP on GDP growth depends on the total amount of loans and the speed of disbursement.[9] We estimate that PPP will boost GDP by both mitigating payroll losses and strengthening balance sheets of households and businesses. We assume an equal split between the two channels that is broadly consistent with survey evidence from the Federal Reserve Bank of New York of how firms would react to a hypothetical fall in revenues for multiple months.
    - Payroll channel: We assume that $200 billion of the PPP funds will mitigate job losses, boosting average monthly employment by just over 3 million during the remainder of 2020 and 375,000 in 2021. The higher level of employment, relative to a counterfactual without the program, lasts through the rest of the year. Through this channel, GDP growth is expected to increase about ¾ percentage point in 2020.
    - Balance sheet channel: We assume that the remaining $350 billion in PPP funds are used by small business owners to improve household or business balance sheets, purchase intermediate goods, or fund consumption.[10] Because many of these business owners have high wealth and small businesses may be cutting back on spending given the heightened uncertainty, we expect the effect on aggregate demand from these funds to be

[8] Payroll costs are capped at $100,000 per employee, including salary, wages, commissions, tips, employee benefits including sick leave, payments required for the provision of health insurance, payments for retirement benefits, and state and local taxes assessed on compensation.

[9] Loans that take too long to process may not arrive in time to aid many small businesses. The JPMorgan Chase Institute found that 50 percent of small businesses have fewer than 15 days of cash liquidity. See JPMorgan Chase Institute (2019), *Place Matters: Small Business Financial Health in Urban Communities*, report (Washington: JPMorgan Chase Institute, September), https://institute.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/institute/pdf/institute-place-matters.pdf.

[10] Survey evidence from the Federal Reserve Bank of New York reports that roughly one-half of small businesses would buffer a two-month loss in revenue using personal funds.

smaller than that from the employment effects. Overall, the staff estimates that this channel will boost GDP growth by 0.25 percentage point in 2020.

MAIN STREET LENDING AND OTHER FEDERAL RESERVE AND TREASURY LENDING PROGRAMS: $500 BILLION

The Cares Act includes $454 billion in credit support to the business and household sectors and to state and local governments, administered by the Federal Reserve and Treasury, which can support an even a larger amount of loans. In addition, the act includes roughly $50 billion in direct loans to distressed sectors, primarily to airlines. These loans require the firms to maintain payrolls at roughly their pre-crisis levels. However, unlike the small business loans, these loans are not forgivable.

There is considerable uncertainty about the amount of loans that will be disbursed as well as their economic implications. We have little confidence in our ability to quantify these economic effects at this point, and there is little empirical evidence to guide us. As a result, these loan programs are not reflected in tables 1–4. We are continuing to do analysis to better understand the magnitude of the effects of these programs on economic activity. That said, we believe the economic effects of these programs are captured within our baseline projection, which assumes that credit markets remain functional.

Overall, we think that these loans will mitigate payroll losses to a smaller extent than the small business loans because the loans do not offer forgiveness. Nevertheless, some firms will rely on these loans to mitigate layoffs. In addition, these loans may help preserve the productive capacity of the economy by preventing a large-scale loss of business organizational capital and business bankruptcy. The prevention of these dynamics is implicitly embedded within our baseline projection. For example, the staff baseline assumes a functioning airline industry, which, in part, could be attributable to the loan programs.

Appendix B

Tealbook and Model Forecast Errors: An Update through 2019

PART 1: TEALBOOK FORECAST ERRORS

The staff's judgmental Tealbook forecast errors for 2019 were relatively small. Figure 1 reports forecast errors over the past four years for real GDP growth, the unemployment rate, and total and core PCE price inflation. The gray bars show the currently published Q4/Q4 percent changes of each economic variable from 2016 to 2019 (or the Q4 level, in the case of the unemployment rate); the green triangles show, for each year, the forecast from the April Tealbook in the contemporaneous year; and the blue squares indicate the staff forecasts made in the April Tealbook one year earlier than the indicated year. The whisker bands demarcate 70 percent forecast error bands, so that unusually large forecast errors would be represented by the top edge of a gray bar falling outside of the whisker bands. The red dots show the Bureau of Economic Analysis and Bureau of Labor Statistics estimates of the four economic variables from mid-April of the subsequent year, along with 70 percent bands computed from past revisions of those estimates.[1]

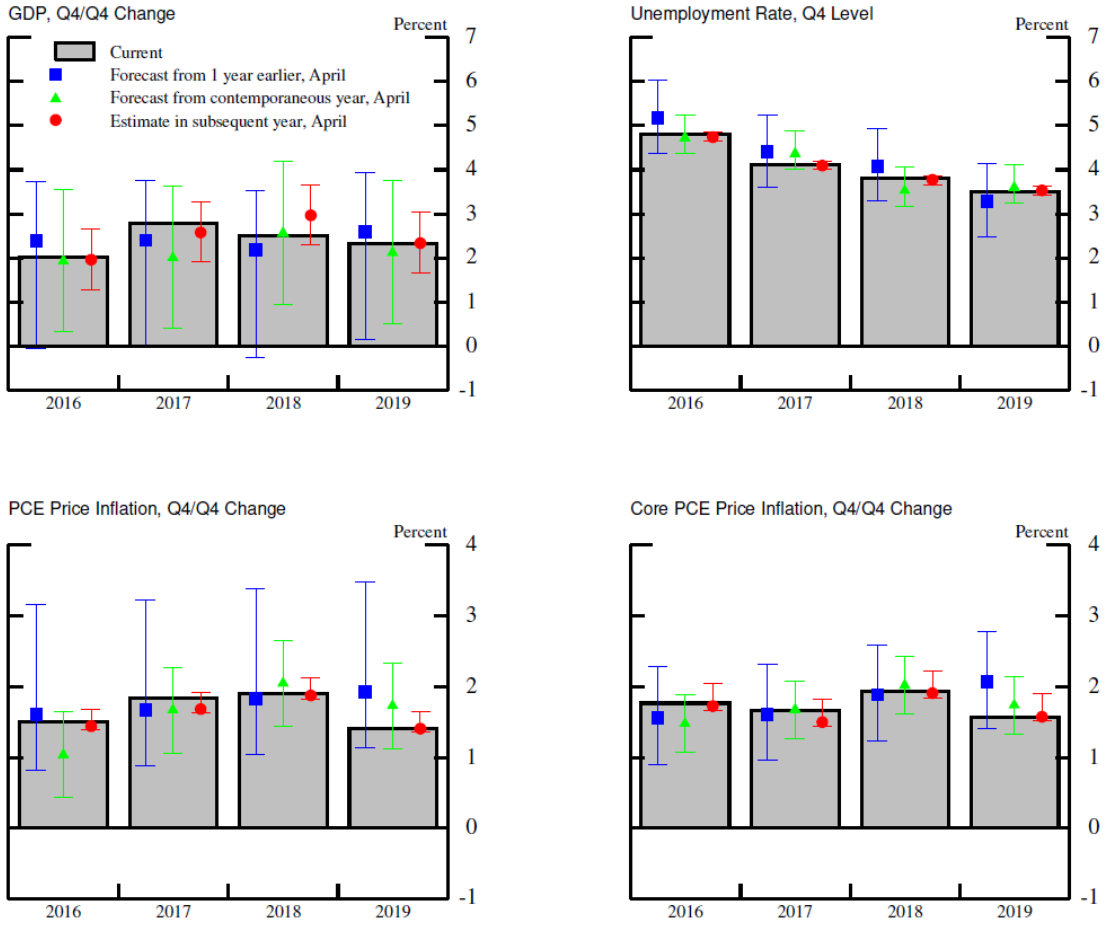
Real GDP growth in 2019 is currently estimated to be 2.3 percent, somewhat lower than the April 2018 Tealbook forecast of 2.6 percent and a touch higher than the April 2019 forecast of 2.2 percent. These forecast errors are well within the 70 percent whisker bands. The forecast error from the April 2018 Tealbook is largely explained by the lower-than-expected contribution of business fixed investment, likely associated with a deterioration in the outlook for profits in 2019 and the heightened concerns about trade policy tensions.

The unemployment rate ended 2019 in line with the staff forecast made in April of that year, as shown by the green triangle in the top-right panel, and just a touch higher than the forecast made in April 2018 (the blue square).

As for inflation, the Q4/Q4 percent changes in both total and core PCE prices in 2019 were lower than the staff's expectations in April 2018 and in April 2019. Lower-than-expected energy prices contributed significantly to the forecast error in total PCE inflation. The forecast miss in core inflation reflected downside surprises in both goods and services prices.

[1] The red dot and gray bar are the same by definition for 2019.

Figure 1: Tealbook Forecasts, 2016-19



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

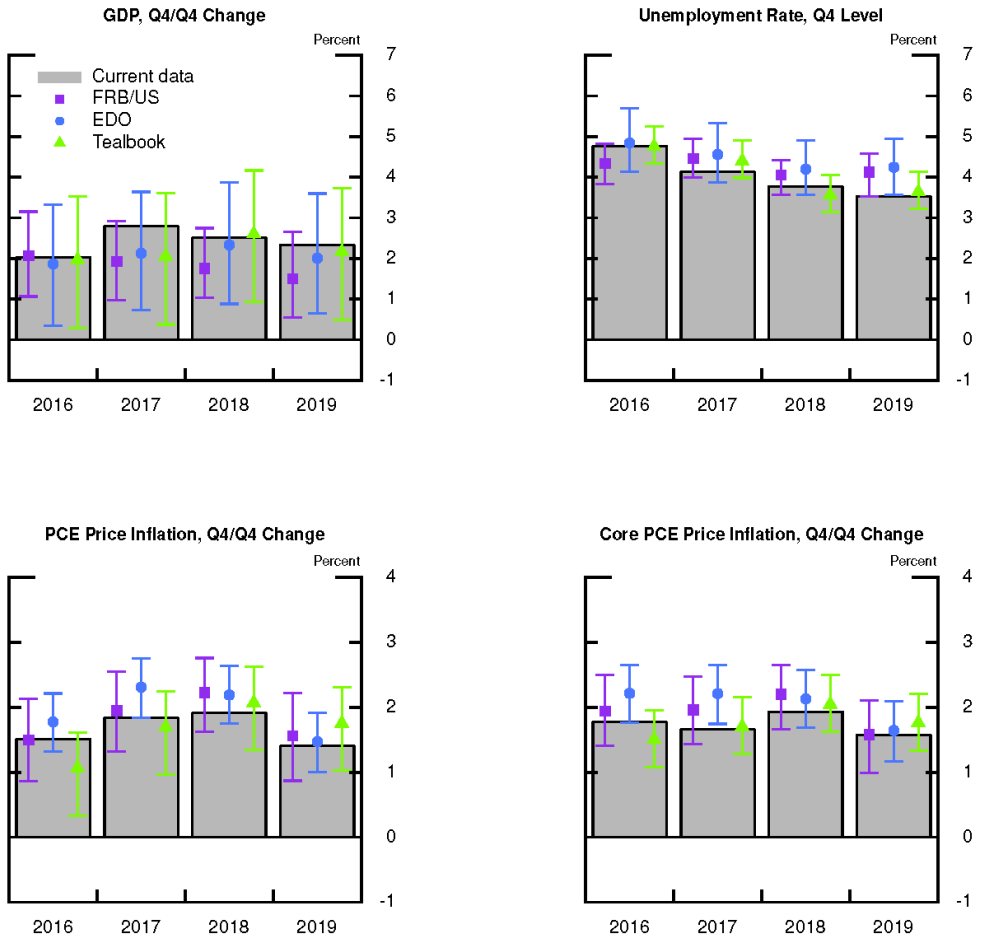
PART 2: FRB/US AND EDO FORECAST ERRORS

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

Figure 2 reports the point forecasts and 70 percent confidence intervals of the Tealbook projection and of the FRB/US and EDO model projections of GDP growth, the unemployment rate, and total and core PCE inflation for 2016 through 2019. Unlike Part 1 of this appendix, this discussion focuses solely on forecasts for the fourth quarter that were made as of the April Tealbook of the same year.

In figure 2, the gray bars represent the currently published data, the purple squares and whisker bands show the respective forecasts and 70 percent confidence intervals of FRB/US, the

Figure 2: Model Forecasts, 2016-19



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

blue circles and whisker bands indicate their counterparts for EDO, and the green triangles and whisker bands show those for the judgmental Tealbook forecasts.[2]

The FRB/US and EDO forecast errors are, on average, somewhat larger than the Tealbook forecast errors over the past four years, and neither model uniformly outperforms the other in forecasting. Both models underpredicted GDP growth and overpredicted the unemployment rate in 2019, with FRB/US having the largest error for GDP growth and EDO having the largest error for the unemployment rate. Like the model forecasts, the judgmental Tealbook forecast underpredicted GDP growth and overpredicted the unemployment rate in 2019, but by narrower margins.

The 2019 unemployment rate errors made by the FRB/US and EDO models were pronounced. At the time of the forecast, the natural rate of unemployment estimated in both models was substantially higher than the actual unemployment rate: The unemployment rate was 3.8 percent in March 2019, while the estimates of the natural unemployment rate in FRB/US and EDO were 4.9 percent and 5.25 percent, respectively. Therefore, the models predicted a faster convergence of the unemployment rate toward its natural rate, induced in part by rising paths of the interest rates resulting from the models' monetary policy rule.

In the case of FRB/US, the large overprediction of the unemployment rate in 2019 was accompanied by a notable underprediction of GDP growth. In addition to the contribution from the more-rapid normalization of monetary policy, FRB/US expected weaker consumer spending growth than occurred. The model assessed that the strength in consumption seen in 2017 and 2018 would not be sustainable in 2019 based on its projection for income and wealth, and it thus projected below-trend growth. In particular, the model viewed equities as overvalued and, as a result, projected that equity valuations would decline in 2019. In addition, weak net exports were expected to be a significant drag on the growth of GDP over 2019.

FRB/US did well in forecasting both core and total PCE inflation from 2016 through 2019. Its root mean squared errors for total and core inflation are 0.12 percentage point and 0.15 percentage point smaller, respectively, than those of the EDO projection and comparable with those of the Tealbook projection. That said, both EDO and FRB/US viewed inflation as having been surprisingly weak in 2017 and 2018 and to a greater extent than the judgmental projection. In 2019, in contrast, the two models made notably smaller forecast errors for total and core PCE inflation than those made in the previous year and those of the Tealbook projection.

Over a longer period (not shown), from 2009 through 2019, the judgmental Tealbook forecast performed better than the FRB/US forecast.[3] The root mean squared forecast errors associated with GDP growth and the unemployment rate are, respectively, 43 percent and 65 percent larger, on average, in the FRB/US projection, while those associated with total and core PCE inflation are, respectively, 31 percent and 70 percent larger.

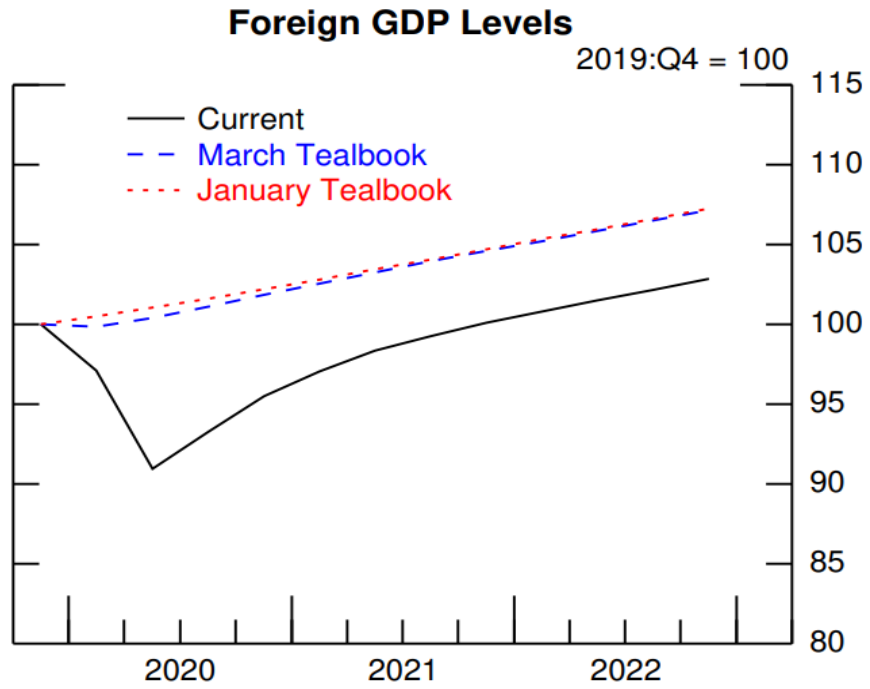
[2] The confidence intervals for FRB/US and EDO are generated via stochastic simulations. For FRB/US, the simulations sample from historical equation residuals. For EDO, they draw from the distributions of shocks, model parameters, and latent state variables.

[3] The EDO forecast errors are not available over this longer period.

International Economic Developments and Outlook

COVID-19 has spread, forcing dramatic restrictions on daily activities worldwide

The spread of the coronavirus (COVID-19) throughout the world and the draconian measures to contain it have produced devastating effects on the global economy, and we are likely in for a sharp and synchronized global contraction greater than in the Global Financial Crisis. Since March, many countries have followed China in closing nonessential businesses and restricting movement. Amid increasingly stringent shutdowns, economic activity has plummeted across the globe and looks to remain depressed for at least the next few months. With many businesses closing and workers staying home, hours worked have fallen and unemployment has soared. Governments and central banks have responded strongly and swiftly to support incomes and to improve market liquidity and the provision of credit.



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

We see a shocking near-term contraction in foreign GDP

We expect foreign GDP to plunge at an annual rate of around 17 percent in the first half of this year. The timing of the collapse varies across countries, in line with the progression of the coronavirus. In China, GDP dropped at a stunning 36 percent annual rate in the first quarter, but data suggest its economy began to revive in March as infection rates fell and restrictions started to be lifted, and we expect a sizable rebound in the second quarter. In other East Asian emerging market economies (EMEs) that adopted early restrictions to limit the coronavirus, we see a less severe decline, spread evenly over the first two quarters. Elsewhere abroad, restrictions were imposed during March and look to be in force for some time, implying a much larger decline (on the order of 30 percent) in the second quarter than in the first (between 5 and 10 percent). Of note, according to the flash estimate, Canada's GDP contracted 10 percent in the first quarter as economic activity fell in March following the introduction of social-distancing measures. (For 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" at the end of the discussion.)

Unlike in past recessions, services activity is dropping more sharply than manufacturing, as restrictions on movement have severely curtailed spending on travel, tourism, restaurants, and recreation. If the relative weakness of services persists, service-oriented economies, such as advanced foreign economies (AFEs) where services are 70 to 80 percent of GDP, may recover more slowly than manufacturing centers, such as East Asia. For further discussion of key foreign economies, see the box "Regional Developments and Outlook" at the end of the discussion.

The policy response has been swift and substantial

Fiscal authorities have tried to fill income gaps resulting from businesses closing and workers staying home. National governments have acted decisively to help firms through tax deferrals, loans, and loan guarantees; to encourage firms to retain workers through wage subsidies; and to support households through enhanced unemployment benefits and cash grants. We estimate that fiscal policy will add almost 3 percentage points to foreign growth this year. We expect spending to wane in later years.

In addition, central banks have cut policy rates, initiated or enhanced credit facilities, relaxed capital requirements for financial institutions, and ramped up asset

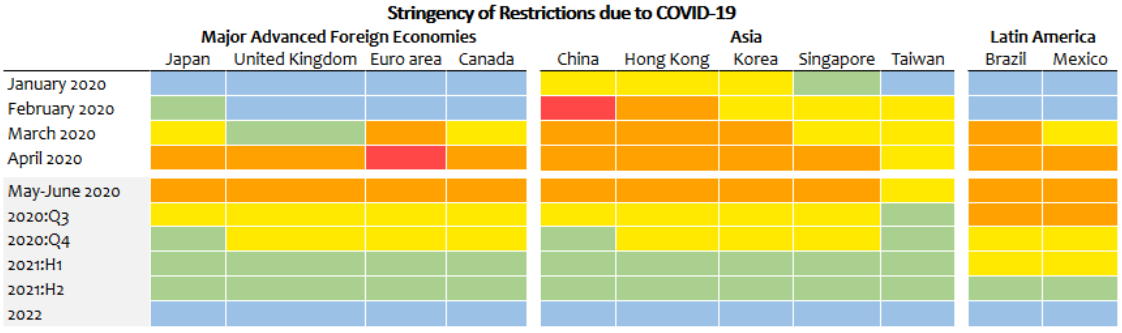
purchase programs to alleviate liquidity concerns in domestic capital markets. These policies should help limit the extent of damage to economies and help set the stage for a robust recovery once governments are able to lift restrictions. (For further details, see the boxes "Fiscal Policy Response to COVID-19 Pandemic in Foreign Economies" and "Foreign Monetary Policy Responses to COVID-19.")

Public health responses to the coronavirus will shape the evolution of recovery

Just as the spread of the coronavirus drove the trajectory of the downturn, so will the recovery depend on success in restraining the virus, thus enabling an eventual lifting of restrictions on activity. Although social distancing has reduced transmission and deaths in several countries, great uncertainty remains about the durability of those successes when people return to work and social activities.

The figure below illustrates how restrictions have evolved across countries and what future restrictions we assume in our baseline outlook. China faced the coronavirus first and, in February, limited the movement of people through draconian measures (coded in red). Reported cases of domestic transmission in China have dissipated, enabling a gradual reopening of the economy. In the euro area, lockdowns in place over the past month appear to have turned the tide on the coronavirus for now, which may allow some easing of restrictions in May. In contrast, we expect a tightening of restrictions in Latin America in coming months as the spread of the coronavirus becomes more apparent.

Stringency of Restrictions due to COVID-19



Source: Staff calculation from University of Oxford's Stringency Index through April 2020 and staff forecasts thereafter.

None	No restrictions
Low	Some restrictions on social interaction and on international travel
Moderate	Some nonessential activity shut down
Notable	Majority of nonessential activity shut down; limited movement; schools closed
Elevated	Shelter in place

Int'l Econ Devel & Outlook

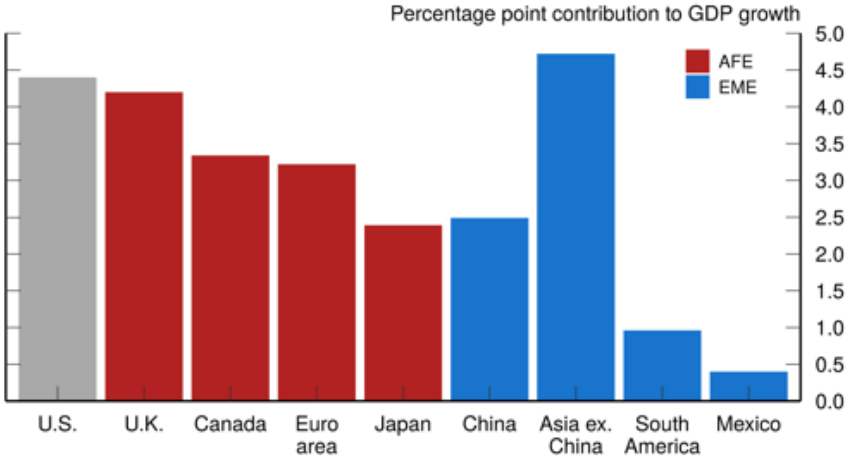
Fiscal Policy Response to COVID-19 Pandemic in Foreign Economies

Authorities in most foreign economies have announced sizable fiscal packages to address the sudden loss of income by firms and households, and more are expected. As shown in figure 1, the estimated fiscal stimulus in 2020 is largest in the United Kingdom and in emerging Asia excluding China, similar to the United States (reaching around 4.5 percent of GDP), but much lower in some emerging market economies (EMEs), such as Latin America, with less fiscal capacity. These fiscal packages will provide some relief to businesses and households and support the eventual recovery. However, despite the fiscal packages' sheer size, economies will still experience sharp near-term contractions given the magnitude of the shock.

The fiscal packages include a wide array of measures for firms and individuals similar to those adopted in the United States (table 1). Measures targeted at firms aim to keep them afloat in the near term with the hope of preserving businesses for the time when demand returns. Such measures include loans at favorable terms and loan guarantees; deferrals of taxes and social security contributions; tax breaks and cash grants, especially for small- and medium-sized enterprises; and targeted sectoral support. For households, measures are aimed at providing income to those in need and alleviating payment difficulties (for example, mortgages). These policies include increased unemployment payments and pensions, mortgage deferrals, and accelerated transfer payments, as well as widespread direct cash payments in some countries. For both firms and individuals, policies are generally targeted at the most vulnerable groups—for instance, low-income or unemployed individuals and affected small- and medium-sized enterprises.

In contrast to the U.S. fiscal measures, several advanced foreign economies and some Asian economies have adopted large direct wage subsidies to keep workers on firms' payrolls.[1] Such measures may help limit the spike in unemployment in these countries. Notably, Germany expanded its short-time work subsidy called "Kurzarbeit"—a scheme regarded by many as having helped stabilize the country's labor market during the Global Financial Crisis (GFC). Under the

Figure 1. Fiscal Impulse in 2020



Note: GDP is gross domestic product; AFE is advanced foreign economy; EME is emerging market economy.
Source: Staff calculations.

[1] While most fiscal support targeted at firms in the United States is through extension of loans, the Paycheck Protection Program does introduce some loan forgiveness for firms that do not lay off their workforce.

Table 1. Some Fiscal Policy Responses to COVID-19 in Selected Foreign Economies

	For Firms		For Households	
	Targeted	Non-Targeted	Targeted	Non-Targeted
France	Postponed payroll taxes. Loan rescheduling. Guaranteed loans for SMEs with cash flow needs		Flexibility in part-time employment; extension of unemployment benefits	
Germany	Effectively unlimited liquidity support for SMEs. Tax holidays to firms affected by virus		Expanded short-time work subsidy—government pays part of social security contributions	
Italy	Tax credits for companies with large losses, hard-hit areas, and health-care sector. Guaranteed loans for SMEs with cash flow needs		€800 cash to self-employed; mortgage deferral for low-income groups	
Japan	Cash payouts, lower taxes, and zero-interest, collateral-free loans to affected SMEs. Subsidies to firms keeping employment. Airline financial support		Cash payouts and more child allowances. Childcare subsidy for those affected	
Spain	Liquidity measures for companies in distress. Easing conditions for temporary collective layoffs		Mortgage payment holiday; additional benefits for laid-off workers	
U.K.	Corporate financing facility for large firms; loan scheme, cash grants and sick pay rebates for SMEs; elimination of tax for some sectors; deferral of VAT payments	Loan guarantees	3-month mortgage payment holiday; sick pay for self-isolators; easier access to sick and disability benefits; government covers 80% of furloughed workers' salaries	
Brazil	Payroll cost loans to SMEs at below-inflation interest rate, additional support to micro businesses	Reduction / delay in necessary payments. New credit from development bank	Earlier transfers to retirees and workers. More people included in social safety net. Three monthly payments to informal workers and unemployed	UI support for reduced work hours; looser conditions on UI withdrawals
China	VAT deduction for prevention-related activities; waive social security contributions for crisis-hit firms	Exemptions of retaliatory tariffs; reduced pension contributions	Electricity fees waived for households in crisis-hit areas	Increased university graduate placements

Note: SME is small- to medium-sized enterprise; VAT is value-added tax; UI is unemployment insurance.
Source: Staff compilation from various sources.

scheme, any company that is forced by economic conditions to reduce employees' work hours below a threshold receives reimbursement for a fraction of its wage bill, up to 12 months, with the thresholds for eligibility loosened during large downturns such as the GFC and the current pandemic. As such, the scheme allows employment adjustments to happen mostly through reduced hours, preventing firms from losing their trained workforce.[2] Of note, the size of the German Kurzarbeit scheme was scaled back quickly after the GFC to not hinder productive reallocation of labor as the economy recovered.[3] The hope of such programs is that in a short-lived recession, workers' continued attachment to their firms will preserve human capital and make it readily available to the firm during the recovery.

While providing needed near-term support, these fiscal measures come at a time when government debt is still elevated in many countries from the GFC (table 2). The fiscal packages,

[2] Subsequent research showed that specific wage negotiations within German firms that allow flexible working hours with proportionate salary adjustments were even more effective in mitigating the rise in unemployment during the GFC. See box 1.6 in Organisation for Economic Cooperation and Development (2010), "Moving beyond the Jobs Crisis," in *OECD Employment Outlook 2010: Moving beyond the Jobs Crisis* (Paris: OECD Publishing), pp. 15–102, http://www.oecd.org/employment/emp/48806664.pdf.

[3] The Kurzarbeit policy is not only seen as a central factor mitigating sharp rises in German unemployment during the GFC, but is also thought to have contributed to a relatively rapid recovery thereafter.

along with plunging revenues, should lead to another sizable step-up in government debt for all countries and heighten concerns about long-run fiscal solvency, especially when the pace of future growth is so uncertain. This concern will be especially true for the most fiscally vulnerable countries, such as Italy, Brazil, and India. Despite the assistance of European Central Bank bond purchases, which limit Italian yields, and aid from the European Union, Italy faces daunting fiscal challenges that could again threaten the continued viability of the euro area. Vulnerable EMEs will likely also suffer from the rise in their public debt, particularly if they continue to experience sharp capital outflows.

Table 2. Public Debt and the Projected Change (% of GDP)

Country	Public debt in 2019	Public debt in 2020	Change
AFEs			
Germany	59.1	66.9	7.8
Canada	91.0	103.6	12.6
Japan	222.4	236.0	13.6
Spain	97.3	112.1	14.8
U.K.	110.3	126.2	15.9
Italy	135.2	162.2	27.0
EMEs			
India	69.0	75.0	6.0
Mexico	53.9	63.0	9.1
China	55.6	65.0	9.4
Brazil	91.6	104.0	12.4

Source: Staff calculations, International Monetary Fund, Organization for Economic Cooperation and Development.

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Foreign Monetary Policy Responses to COVID-19

Foreign central banks have acted swiftly and forcefully as the coronavirus (COVID-19) pandemic has disrupted the global economy and roiled financial markets. A large number of central banks have reduced their policy rates, many to near their effective lower bounds, and have taken substantial actions to start or expand asset purchases and to support the flow of credit in the economy.

Many central banks moved rapidly to ease monetary policy amid the coronavirus pandemic, with around three-fourths of the central banks of economies that we forecast decreasing their policy rates in the intermeeting period. The second and fifth columns of the table show the size of these cuts for selected advanced foreign economies (AFEs) and emerging market economies (EMEs), respectively. As shown in the third column, AFE central banks that had positive policy rates (such as Australia, Canada, and the United Kingdom) have cut these rates to near zero, whereas those AFEs that entered the pandemic with policy rates already at zero (Sweden) or negative (the euro area, Japan, and Switzerland) left their rates unchanged. In the EMEs for which we produce forecasts, almost all central banks have recently cut rates. Although central banks acted quickly to lower rates, policymakers have cited a few reasons to refrain from deeper cuts: In the EMEs, concerns were expressed that lowering rates more risked exacerbating capital outflows, while some AFE central banks commented that further rate cuts could harm banks' financial health or would provide little monetary stimulus.

Foreign central banks have also increasingly turned to asset purchases. In most cases, these purchases have been primarily aimed at restoring market functioning and providing liquidity but have also eased financial conditions by lowering long-term yields. Many AFE central banks have purchased government debt. The Bank of England (BOE) restarted its purchases of gilts. The European Central Bank (ECB) and the Riksbank increased the pace of their existing programs. The Reserve Bank of Australia (RBA) began outright yield curve control, targeting the three-year government bond yield at 0.25 percent, the same as its overnight rate. Some central banks, such as the Bank of Canada (BOC) and the RBA, have started purchases of provincial and state bonds to support liquidity in those markets. The ECB has used its flexibility to weight its purchases more heavily toward bonds of member states, such as Italy, that face higher yields than those in some other euro-area countries.

Policy Interest Rates at Selected Central Banks

Advanced Foreign Economies			Emerging Market Economies		
Economy	Rate Cuts Since March Tealbook (percentage points)	Current Rate (percent)	Economy	Rate Cuts Since March Tealbook (percentage points)	Current Rate (percent)
Canada	-1.00	.25	Chile	-1.25	.50
U.K.	-.65	.10	India	-.75	4.40
Australia	-.25	.25	Hong Kong	-.64	.86
Sweden	.00	.00	Brazil	-.50	3.75
Japan	.00	-.10	Mexico	-.50	6.50
Euro area	.00	-.50	Korea	-.50	.75
Switzerland	.00	-.75	China	-.20	2.95

Monetary authorities have also adopted policies to sustain the provision of credit to businesses and households during the pandemic.[1] Central banks have purchased a variety of private assets, thus directly addressing distresses in funding markets and helping to ease financial conditions for firms. Among these assets are corporate bonds purchased by the BOE, ECB, and the Bank of Japan (BOJ); commercial paper bought by the BOE, BOC, BOJ, and Riksbank; and exchange-traded funds and real estate investment trusts purchased by the BOJ.[2] Even central banks in EMEs have begun purchasing private assets, with the central banks of Chile and Colombia buying bank bonds.

Central banks have also begun funding-for-lending-type facilities to provide relatively inexpensive funding to banks as long as they maintain defined lending benchmarks, in some cases with extra incentives to lend to small and medium-sized enterprises. The ECB, BOE, Riksbank, RBA, and Bank of Korea currently have such programs. Finally, financial regulators, which include several central banks, have eased regulations on banks and other financial institutions to support lending. Some financial regulators have lowered countercyclical capital buffers (for example, France, Germany, and the United Kingdom) and signaled some flexibility in the treatment of bad-loan portfolios (for example, the ECB).

As a consequence of these robust actions, central bank balance sheets in AFEs are likely to increase markedly in the near term. For instance, the magnitudes of the purchases cited in the recent announcements of funding-for-lending facilities and asset purchase programs by the ECB, Riksbank, and BOE imply increases in their balance sheets of 10 percentage points of GDP or more in the next year or so. By the same token, we expect that outright purchases of Treasury and agency mortgage-backed securities by the Federal Reserve will reach around 10 percent of U.S. GDP.[3] Measuring the size of these monetary policy responses is difficult. That said, the full range of additional liquidity programs undertaken by many foreign central banks should also boost the size of their balance sheets. While some monetary authorities face constraints to further lowering policy rates, they have been flexible in using many other policy measures.

[1] For more details about these programs, see Nicholas Coleman, Ricardo Correa, Thiago Teixeira Ferreira, Anna Lipinska, Bernardo Morais, Pinar Uysal, and Paul Wood (2020), "Foreign Central Bank Facilities to Support Businesses," Federal Open Market Committee note, Board of Governors of the Federal Reserve System, April 1.

[2] Some facilities to give credit support to businesses, such as the commercial paper facility operated by the BOE, have losses fully indemnified by the government. However, coordination between central banks and finance ministries to this extent seems more the exception (in the United Kingdom and Switzerland) than the rule.

[3] This projection assumes that current purchases aimed at improving market functioning will taper out over the next several weeks. Also, we do not assume the announcement of additional future outright purchases.

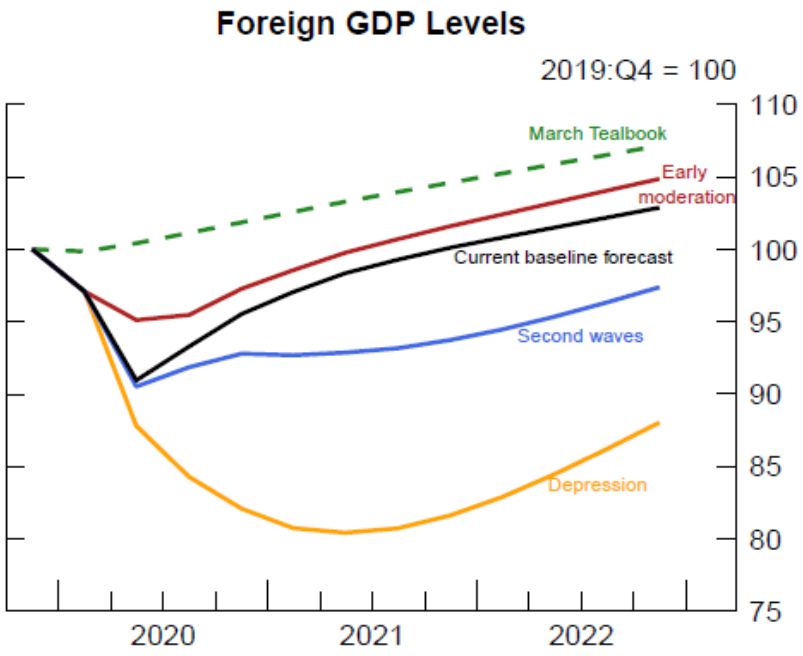
A partial relaxing of restraints in most economies in the second half of the year should allow foreign GDP to begin recovering, boosted by the substantial policy responses of fiscal authorities and central banks. Even so, the level of foreign GDP in the fourth quarter is projected to be 4.5 percent below that at the end of 2019. In addition, given our assumption that a vaccine becomes widely available only by late 2021, some restrictions on social activities and travel will persist, and we expect the pace of recovery to proceed relatively slowly over the remainder of the forecast period.

Recovery could face many headwinds . . .

Although allowing businesses to reopen and people to move more freely should lead to a rebound in activity, many headwinds are likely to restrain the recovery. Consumers and workers may be reluctant to resume activity amid the threat of coronavirus flare-ups. For instance, consumer confidence and retail sales are down sharply even in countries, such as Korea, with more success in containing the coronavirus. Even if the lockdowns succeed in tamping down the virus, they may result in widespread failure of firms or worker detachment from the labor force. Income losses and increased debt could lead firms and households to limit spending for some time. Supply chain disruptions could continue to affect manufacturing, though they should diminish over time. Coronavirus-related protectionism and continued travel restrictions could hamper the rebound from the steep decline in global trade that has occurred in recent months. All of these forces combine to suggest that foreign GDP is likely to remain well below its projected pre-crisis path throughout the forecast period.

. . . leading to a range of possible outcomes

Our conviction about any particular recovery path for the global economy is not strong, as it depends importantly on the trajectory of the coronavirus, which is highly uncertain. Much gloomier outcomes than those in our baseline outlook appear plausible. The scenarios shown in the figure on the next page illustrate a range of possible outcomes explored more fully in the Risks and Uncertainty section.

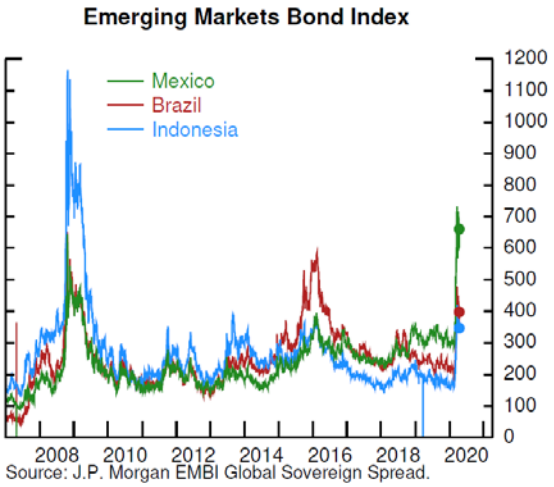


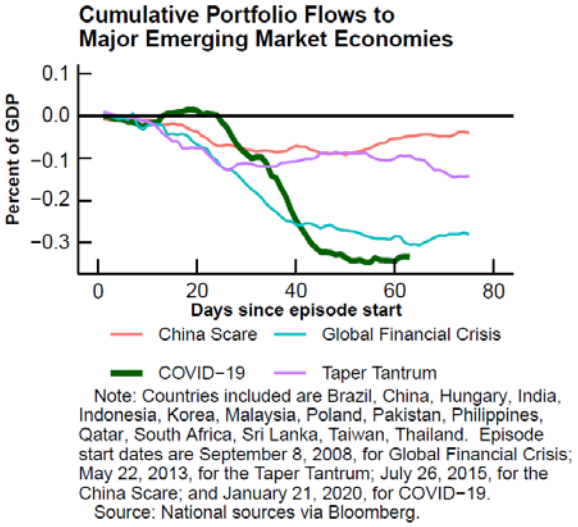
Note: GDP is gross domestic product.
Source: Federal Reserve Board staff calculations.

A particularly plausible alternative to our baseline is a scenario of more protracted weakness and second waves of infections in the foreign economies (blue line in figure). This scenario may reflect a variety of outcomes, including a disease that resurges seasonally or just proves more persistent than currently assumed, the social-distancing measures cause more damage to the economy, and government support proves more limited and less effective. However, we could also see a somewhat earlier recovery than in our baseline, where social distancing diminishes faster because of effective testing and tracking or medical breakthroughs that come earlier than we expect. Finally, a far deeper and more prolonged global depression involving widespread and acute financial and social disruptions, though less likely, is not out of the question.

Emerging market economy stresses could lead to financial crises

Indeed, we are increasingly concerned about full-fledged financial crises in the most vulnerable emerging economies. The current situation is a perfect storm of negative factors for EMEs: falling external demand and commodity prices, increased global risk aversion and capital outflows, and a domestic health crisis as the coronavirus threatens to overrun limited public health resources. Moreover, as debt levels increase across the globe, vulnerable EMEs will face the greatest debt sustainability concerns, which may limit their ability to act forcefully to support the recovery.





Int'l Econ Devel & Outlook

Inflation is down sharply in the near term and lower more persistently

Although the shutdowns across the globe have reduced supply through factory closures and trade disruptions, the depressive effects on demand have predominated, driving down inflation in the foreign economies. The precipitous fall in energy prices, discussed in the box "The Recent Drop in Oil Prices," has begun to show up in headline inflation, and we expect the prolonged period of weak activity and high unemployment to weigh on core inflation as well. Thus, we see inflation remaining well below pre-coronavirus forecasts in most foreign economies, especially in the euro area and Japan. Consequently, we see interest rates in the AFEs remaining at their effective lower bounds for quite some time to come.

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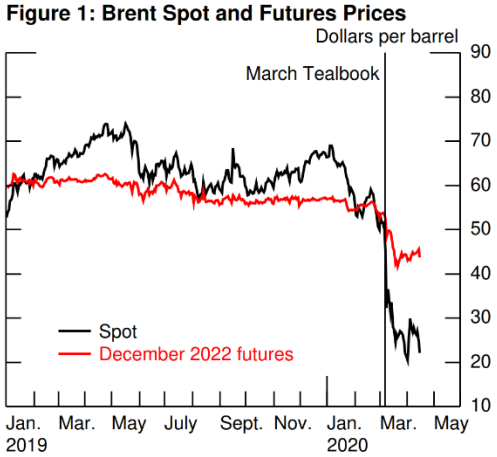
The Recent Drop in Oil Prices

Oil prices have fallen precipitously as the coronavirus (COVID-19) outbreak has worsened, with the spot price of Brent crude oil decreasing from $60 per barrel in late January 2020 to slightly below $28 per barrel on April 15 (figure 1). Futures prices have also fallen by an unusually large amount, with the Brent futures price for delivery in December 2022 dropping from $55 per barrel to $45 per barrel.

Most of the price decline reflects the unprecedented shortfall in oil demand accompanying the coronavirus outbreak, prompted by social-distancing measures across the globe and the associated sharp drop in economic activity. The International Energy Agency (IEA) estimates that oil consumption in the second quarter of 2020 will be 23 percent lower compared with the second quarter of 2019.[1] By comparison, consumption decreased a relatively modest 4 percent during the Global Financial Crisis.

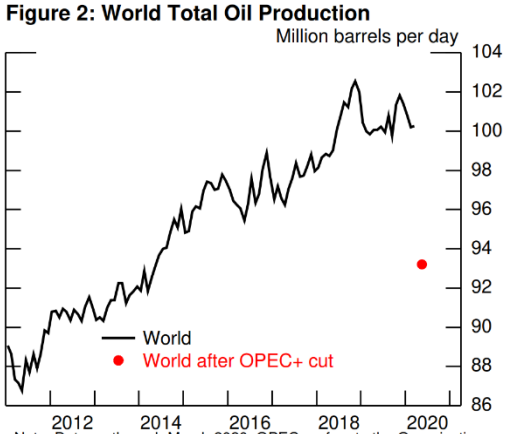
Despite the huge drop in demand, there has not been a commensurate drop in supply. After coordinating on output reductions since 2016, Saudi Arabia and Russia were unable to reach an agreement on a supply cut in an emergency meeting in early March, leading Saudi Arabia to announce that it would flood the global market with oil. On April 12, an agreement was reached in an extraordinary meeting of G-20 oil and energy ministers. The Organization of the Petroleum Exporting Countries (OPEC) and Russia agreed to reduce oil supply by about 10 percent of global output (figure 2). Other G-20 members agreed to purchase additional oil to hold in their strategic reserves. However, some details are still unclear, especially how much the United States and other non-OPEC producers with decentralized production will contribute to the total reduction in supply. Prices rose only slightly as the agreement took shape before falling again.

Figure 1: Brent Spot and Futures Prices



Note: Data go through April 15, 2020.
Source: Bloomberg.

Figure 2: World Total Oil Production



Note: Data go through March 2020. OPEC+ refers to the Organization of Petroleum Exporting Countries and Russia. Total production includes crude oil, natural gas liquids, and nonconventional oils.
Source: International Energy Agency.

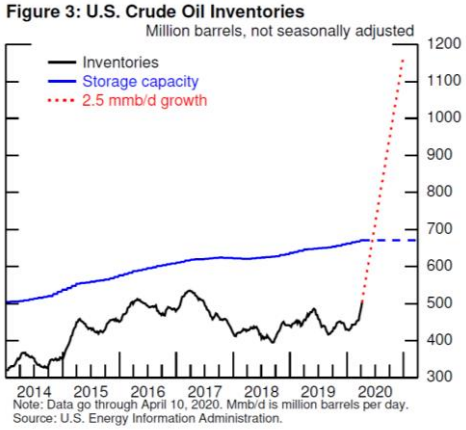
[1] Part of the steep fall stems from particular features of the current downturn. For example, about 6 percentage points of the decline is the result of reduced demand for jet fuel, given the approximately 80 percent drop in global commercial air flights.

Even with the recent agreement, the massive coronavirus-related drop in oil demand means that oil supply still far exceeds demand, leading to substantial inventory increases. As shown in figure 3, U.S. inventories are rapidly catching up with storage capacity. From March 21 to April 10, oil inventories increased nearly 50 million barrels. If we assume no increase in storage capacity and if inventories continue to increase at the current pace of almost 2.5 million barrels per day, the United States would run out of conventional storage capacity by mid-June. Indeed, the IEA currently projects that world inventories will reach their operational limit by mid-2020.

Although falling oil prices could provide some economic boost and partially offset some of the drag from the coronavirus-related collapse in global economic activity, the overall effect is expected to be small. The potential net benefit would arise from the fall in oil prices transfering purchasing power from oil producers to relatively more credit-constrained oil consumers. However, balancing the positive effect for consumers is the immediate negative effect on producers and on investment in the oil sector.

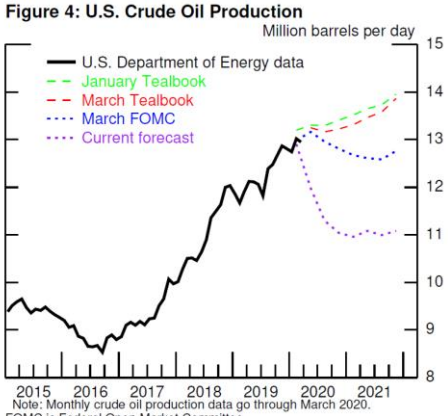
`In particular, the plunge in oil prices has put severe stress on U.S. oil producers. The shale boom of the past decade has made the United States the world's largest producer, accounting for about 15 percent of world crude output last year (table 1). Recently, however, oil companies have reduced their budgets tens of billions of dollars, and the number of oil rigs operating in the United States has fallen 26 percent in just three weeks, the most precipitous decline on record. We expect that these reductions will have a noticeable imprint on U.S. investment spending and oil production in the coming year, with the U.S. Department of Energy forecasting that domestic production will decline 2 million barrels per day over the next few months (purple line in figure 4).

Figure 3: U.S. Crude Oil Inventories



Note: Data go through April 10, 2020. Mmb/d is million barrels per day.
Source: U.S. Energy Information Administration.

Figure 4: U.S. Crude Oil Production



Note: Monthly crude oil production data go through March 2020.
FOMC is Federal Open Market Committee.
Source: U.S. Energy Information Administration.

Table 1: U.S. Share of World Crude Oil Production

Year	Share (percent)
2005	6.95
2010	7.38
2015	11.69
2019	14.92

Source: International Energy Agency.

Regional Developments and Outlook

Timely economic data for March—primarily from purchasing managers indexes (PMIs) and sentiment indicators—showed activity bouncing back in China but collapsing in most other foreign economies, with lockdowns causing extremely sharp contractions in services activity. Manufacturing activity also fell but by less, with longer supplier delivery times pointing to supply chain disruptions. Trade generally contracted, but high-tech exports showed some buoyancy in Asian economies.

Going forward, we expect all foreign economies to rebound from their current contractions, helped by supportive monetary and fiscal policies, but the timing and robustness of those recoveries will vary. Commodity exporters will likely recover more slowly. In addition, countries with preexisting economic weaknesses and vulnerabilities—including low trend growth, high debt, poor public health infrastructure, and low social cohesion—are more likely to see prolonged recessions with a higher chance of financial and political crises.

Emerging Market Economies

- ***China.*** China's preliminary GDP release showed a contraction of 36 percent at an annual rate in the first quarter. Industrial production snapped back substantially in March, as factories reopened and employees returned to work, suggesting a relatively sharp GDP rebound this quarter. Even so, we expect activity to remain well below normal. Relatively weak gains in retail sales and services PMIs in March indicate consumers remain cautious. Moreover, the contraction in the rest of the world is likely to weigh on external demand. All told, we see the Chinese economy growing 4.2 percent on a four-quarter basis this year, down from about 6 percent last year. We assume the authorities, who are mindful of financial stability risks, will remain somewhat restrained in providing stimulus, unlike during the Global Financial Crisis.

- ***Asia ex. China.*** Manufacturing activity has weakened notably in the region, while private consumption and services have registered even sharper declines. We expect that early and effective measures to contain the coronavirus (COVID-19) in some countries (Singapore, Korea, Taiwan), coupled with large stimulus packages, will result in relatively shallow downturns followed by fairly robust recoveries. In other countries, such as India, where extended lockdowns are untenable and policy space is more limited, we expect the crisis will eventually exact a larger economic and human toll, and we see a more protracted downturn and slower recovery.

- ***Mexico.*** Mexico's economy was weak going into the crisis, and the downturn will likely be exacerbated by the fall in oil prices, tighter financial conditions amid global risk aversion, and Mexico's sensitivity to the U.S. manufacturing contraction. In addition, the government has been reluctant to use fiscal stimulus, and its hesitant approach to containing the coronavirus may result in greater long-term economic damage. Although the government has been slow in imposing social-distancing restrictions, a range of indicators—including manufacturing PMIs, movie ticket receipts, traffic congestion, and auto sales—suggest the coronavirus has begun to take a toll on activity.

- ***Brazil.*** Economic activity appeared to fall sharply in March as the coronavirus spread to Brazil. Traffic congestion and energy consumption decreased sharply, retail and auto sales plunged, and confidence indicators took a nosedive. Policymakers responded with lockdown measures and announced a sizable fiscal stimulus package. A "war budget" that would allow for additional extraordinary measures is in train. However, with government debt approaching 90 percent of GDP, we expect that concerns about debt sustainability will ultimately limit the scope for fiscal stimulus.

ADVANCED FOREIGN ECONOMIES

- ***Euro Area.*** Stringent social-distancing measures, including nationwide lockdowns in most euro-area countries, have led to a collapse in economic activity. Unemployment claims spiked in March, although less than in the United States because of relatively generous short-time work compensation schemes and stricter employment protection legislation. Even so, we expect the region's unemployment rate to rise from 7.3 percent in February to more than 11 percent by mid-2020.

  The European Central Bank (ECB) and the region's fiscal authorities have responded swiftly. The ECB announced several measures to support market functioning and economic activity, including the Pandemic Emergency Purchase Programme, a new €750 billion (6.2 percent of euro-area GDP) asset purchase program that allows the ECB to respond flexibly to counter risks to monetary policy transmission and the outlook. In addition to national fiscal measures, European Union (EU) finance ministers, after contentious negotiations, agreed on a €540 billion (3.8 percent of EU GDP) package with an EU unemployment insurance scheme and European Stability Mechanism credit lines for national governments up to 2 percent of each country's GDP.

  The deep recession and plunging commodity prices will weigh on consumer prices, especially in the near term, with headline inflation projected to be barely more than zero in 2020. Thereafter, we see inflation rising only to 1.3 percent, well below the ECB's target.

- ***Japan.*** Despite early success in containing the coronavirus, a surge in new cases led Prime Minister Abe to declare a state of emergency in early April, which empowered local governors to call for restrictions on movement and commerce. This announcement, together with plunging PMIs, consumer confidence, and tourism in March, suggests that both external and domestic demand will decline sharply in the first half of the year. And, on the margin, the recovery in the second half of this year will be less robust given the postponement of the 2020 Tokyo Olympics.

- ***United Kingdom.*** February monthly GDP declined, signaling weak momentum in the economy even before the coronavirus forced strict lockdown measures in late March. Economic indicators for March—including rising unemployment claims as well as deteriorating business and consumer confidence—suggest the U.K. economy contracted sharply in the first quarter.

  The U.K. government and the Bank of England have responded in a coordinated manner with bold fiscal and monetary policy measures. Nonetheless, we project a sluggish

recovery, as the services sector will experience persistent weakness, and uncertainty regarding the future U.K.–EU trade relationship is now more likely to extend beyond 2020.

- ***Canada.*** An unprecedented official flash estimate showed that GDP contracted 10 percent in the first quarter due to a plunge in activity recorded in March amid the introduction of social-distancing measures. More than 1 million jobs were lost in March, and the unemployment rate spiked 2 percentage points to 7.8 percent. The sharp decline in oil prices will further restrain activity, curtailing both investment and exports. Accordingly, we project that the Canadian economy will contract at an even faster pace in the current quarter before a gradual recovery takes hold, supported by accommodative policies and a projected pickup in oil prices.

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Comparing the Staff International Growth Outlook with Other Forecasts

Outside forecasters, like the Board's staff, expect most foreign economies to fall into deep recessions this year. As shown in the first row of the table, both the staff and the International Monetary Fund (IMF) project total foreign GDP to decline around 5 percent in 2020 on a year-over-year basis.[1] That said, the table also reveals a few noticeable differences: For 2020, the staff has a weaker outlook for Canada, China, and emerging Asia excluding China, and the IMF has a weaker outlook for the euro area and Brazil. Consensus Economics appears to be much less pessimistic about 2020 growth than both the staff and the IMF. This difference is likely largely due to the generally more dated forecasts, especially for Latin American countries, collected by Consensus Economics. Even so, it is worth highlighting the unusually large ranges of the professional forecasts represented in Consensus Economics, underscoring the huge uncertainty surrounding the outlook. Notably, the forecasts for 2020 growth for the euro area range from negative 13 percent to negative 2 percent and for China from negative 3 percent to 5 percent.

Both staff and outside forecasters have sharply revised their outlooks. The top panel in the figure on the next page shows the evolution of foreign growth in 2020 on a year-over-year basis and highlights the enormous markdowns in the forecasts for this year for the staff, the IMF, and Consensus Economics. The bottom panel shows that outside forecasters, like the staff, now expect a partial rebound in growth next year.

Comparison of Foreign Real GDP Forecasts

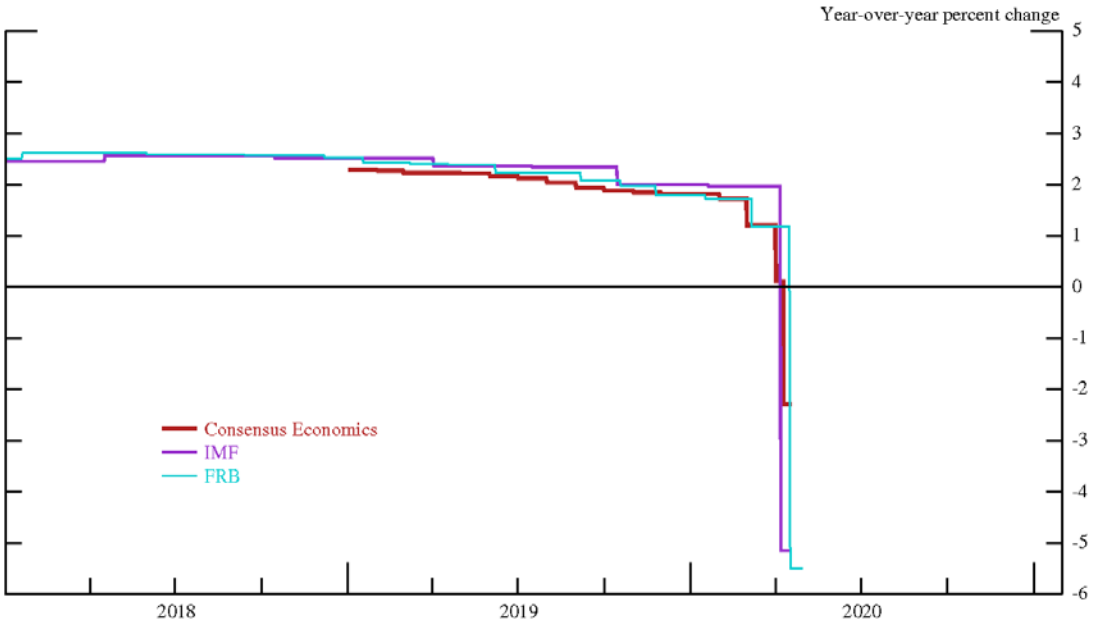
	Year-over-year percent change						Q4/Q4 percent change	
	2020			2021			2020	2021
	FRB	IMF	Consensus	FRB	IMF	Consensus	FRB	FRB
1. Total foreign	-5.5	-5.1	-2.3	4.7	4.4	3.9	-4.5	4.8
2. Advanced foreign economies	-6.6	-6.6	-4.5	4.5	4.3	4.3	-5.8	4.8
3. Canada	-7.5	-6.2	-3.9	5.0	4.2	4.1	-6.9	5.5
4. Euro area	-6.7	-7.5	-5.7	5.1	4.7	5.4	-5.6	4.8
5. Japan	-4.8	-5.2	-3.3	2.2	3.0	2.1	-3.4	2.7
6. United Kingdom	-6.5	-6.5	-5.4	3.5	4.0	4.7	-6.1	3.8
7. Emerging market economies	-4.3	-3.6	.1	4.9	4.6	3.5	-3.1	4.8
8. China	.2	1.2	2.0	10.6	9.2	7.8	4.2	6.5
9. Emerging Asia ex. China	-4.2	-2.2	-1.3	4.3	4.5	4.2	-3.7	5.7
10. Mexico	-7.0	-6.6	.2	3.6	3.0	1.4	-6.0	3.7
11. Brazil	-3.9	-5.3	1.4	2.9	2.9	2.2	-4.2	3.8
Memo								
Emerging market economies ex. China	-5.2	-4.7	-.3	3.7	3.6	2.6	-4.6	4.5
United States	-5.5	-5.9	-4.0	5.1	4.7	3.9	-4.3	4.4

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 April 2020 *World Economic Outlook* update. Consensus Economics' forecasts were published April 9 for advanced economies, April 9 for Asian countries, March 18 for Latin American countries, and March 19 for Russia.
Source: FRB Tealbook forecasts; International Monetary Fund; Consensus Economics.

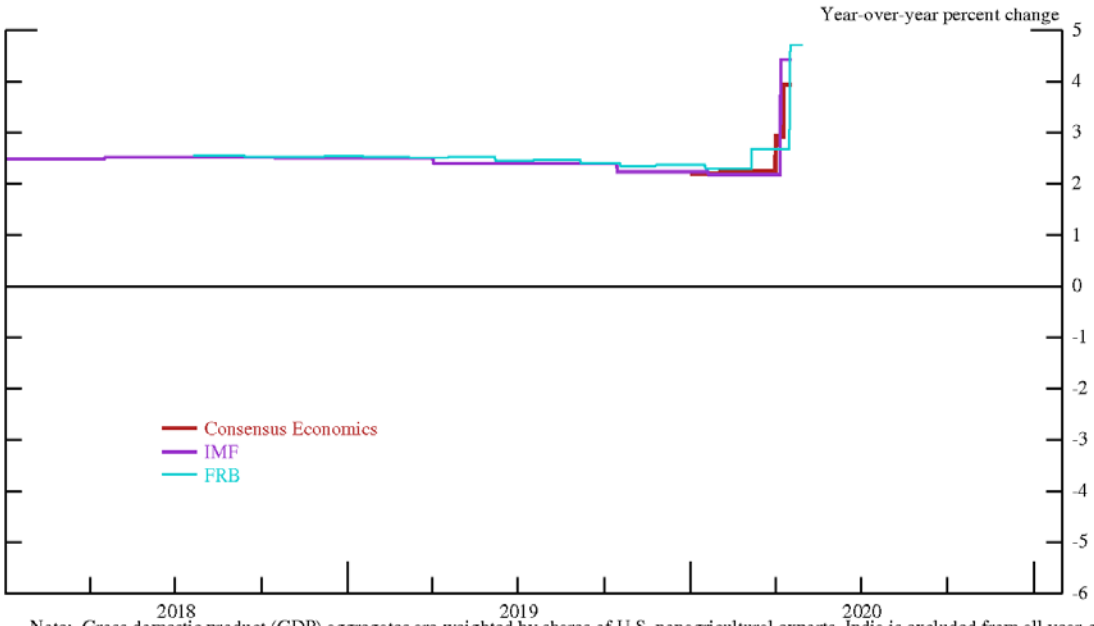
[1] On a Q4/Q4 basis, as shown in the last two columns of the table, the staff forecasts for 2020 are generally a bit less negative than on a year-over-year basis, as the foreign economies are projected to start recovering in the second half of this year.

Evolution of Foreign Growth Forecasts

A. Forecasts of 2020 Real GDP



B. Forecasts of 2021 Real GDP



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 all individual countries are from the April 2020 *World Economic Outlook* update. Consensus Economics' forecasts were published April 10 for advanced foreign economies, April 10 for Asian countries, March 18 for Latin American countries, and March 19 for Russia.
Source: FRB Tealbook forecasts; International Monetary Fund; Consensus Economics.

Int'l Econ Devel & Outlook

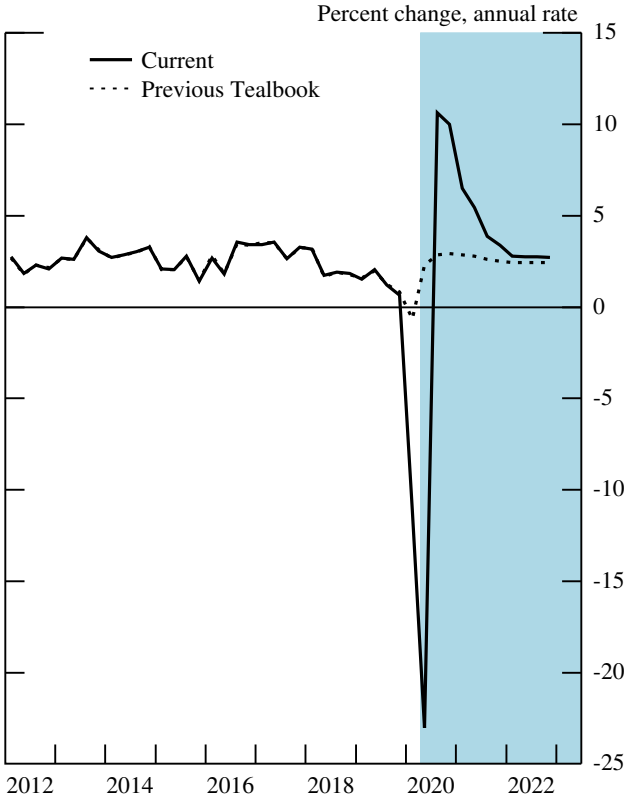
The Foreign GDP Outlook

Real GDP* Percent change, annual rate**

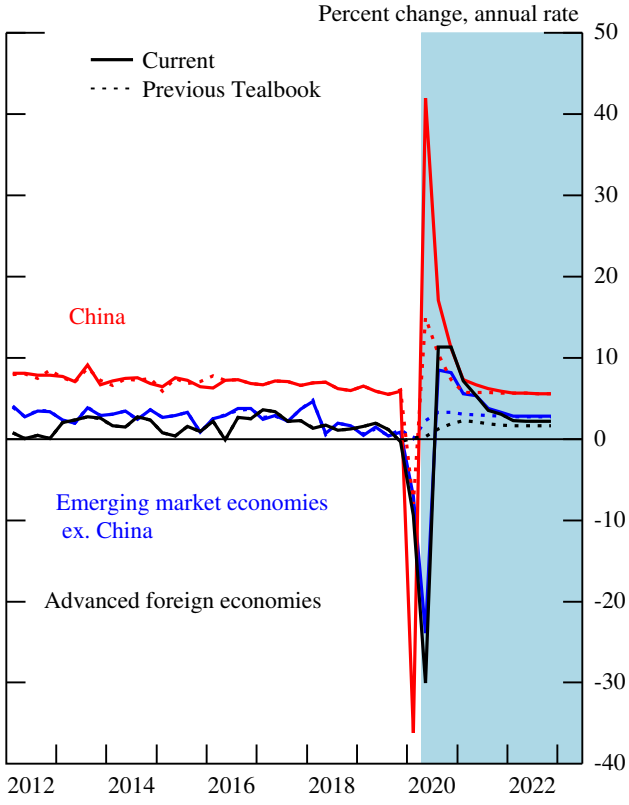
	2019			2020			2020	2021	2022
	H1	Q3	Q4	Q1	Q2	H2			
1. Total foreign	1.8	1.2	.7	-11.1	-23.0	10.3	-4.5	4.8	2.8
Previous Tealbook	*1.8*	*1.2*	*.8*	*-.6*	*2.3*	*2.9*	*1.9*	*2.7*	*2.4*
2. Advanced foreign economies	1.8	1.2	-.3	-9.4	-30.1	11.4	-5.8	4.8	2.2
Previous Tealbook	*1.8*	*1.2*	*-.3*	*.1*	*.3*	*1.6*	*.9*	*2.0*	*1.7*
3. Canada	2.2	1.1	.3	-10.0	-34.0	12.6	-6.9	5.5	2.6
4. Euro area	1.2	1.2	.5	-10.7	-30.5	13.3	-5.6	4.8	2.0
5. Japan	2.2	.1	-7.1	-4.4	-16.5	4.5	-3.4	2.7	1.1
6. United Kingdom	1.0	2.1	.1	-9.0	-29.0	9.6	-6.1	3.8	2.0
7. Emerging market economies	1.8	1.2	1.7	-12.9	-15.3	9.3	-3.1	4.8	3.3
Previous Tealbook	*1.8*	*1.3*	*2.0*	*-1.4*	*4.3*	*4.2*	*2.8*	*3.4*	*3.2*
8. China	6.2	5.5	5.9	-36.2	42.0	14.1	4.2	6.5	5.6
9. Emerging Asia ex. China	2.5	.1	2.8	-10.8	-11.6	4.4	-3.7	5.7	3.5
10. Mexico	-.5	-.3	-.5	-5.0	-35.6	12.9	-6.0	3.7	2.2
11. Brazil	1.0	2.5	2.0	-6.5	-21.0	6.7	-4.2	3.8	2.8
Memo									
Emerging market economies ex. China	1.0	.4	.8	-7.1	-23.9	8.3	-4.6	4.5	2.8

* GDP aggregates weighted by shares of U.S. merchandise exports.
** Annual data are Q4/Q4.

Total Foreign GDP



Foreign GDP



The Foreign Inflation Outlook

Consumer Prices* Percent change, annual rate**

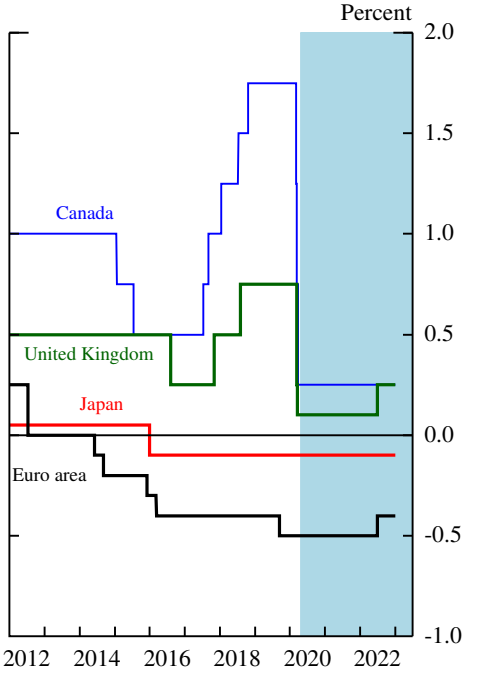
	2019			2020			2020	2021	2022
	H1	Q3	Q4	Q1	Q2	H2			
1. Total foreign	2.1	2.1	3.4	2.4	.6	2.1	1.8	2.2	2.2
Previous Tealbook	*2.0*	*2.2*	*3.5*	*3.0*	*1.8*	*2.2*	*2.3*	*2.3*	*2.3*
2. Advanced foreign economies	1.4	.9	1.1	.7	-.9	.9	.4	1.2	1.3
Previous Tealbook	*1.4*	*.9*	*1.1*	*.9*	*.8*	*1.3*	*1.1*	*1.4*	*1.5*
3. Canada	2.5	1.6	1.7	.8	-.4	1.7	.9	1.8	1.8
4. Euro area	1.1	.7	1.1	.7	-1.5	.8	.2	1.2	1.3
5. Japan	.4	.4	.8	.1	-1.0	.1	-.2	.4	.5
6. United Kingdom	1.8	1.7	.4	2.0	.4	1.3	1.2	1.8	1.6
7. Emerging market economies	2.6	3.0	5.0	3.6	1.5	2.9	2.7	2.8	2.8
Previous Tealbook	*2.4*	*3.1*	*5.2*	*4.5*	*2.5*	*2.8*	*3.2*	*2.8*	*2.8*
8. China	2.8	4.2	7.2	4.2	1.0	2.5	2.6	2.5	2.5
9. Emerging Asia ex. China	1.6	1.2	3.3	3.1	1.7	2.7	2.6	2.7	2.7
10. Mexico	2.8	2.8	3.4	2.9	1.6	3.2	2.7	3.2	3.2
11. Brazil	4.1	2.2	3.2	4.9	2.1	3.7	3.6	3.7	3.5
Memo									
Emerging market economies ex. China	2.4	2.1	3.5	3.1	1.9	3.1	2.8	3.0	2.9

* CPI aggregates weighted by shares of U.S. non-oil imports.
** Annual data are Q4/Q4.

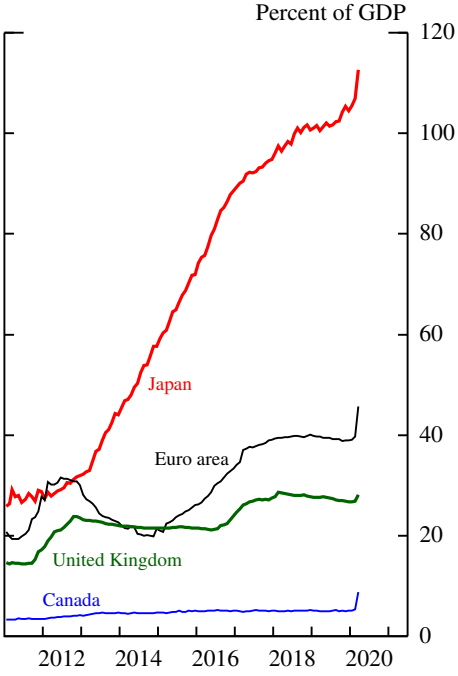
Int'l Econ Devel & Outlook

Foreign Monetary Policy

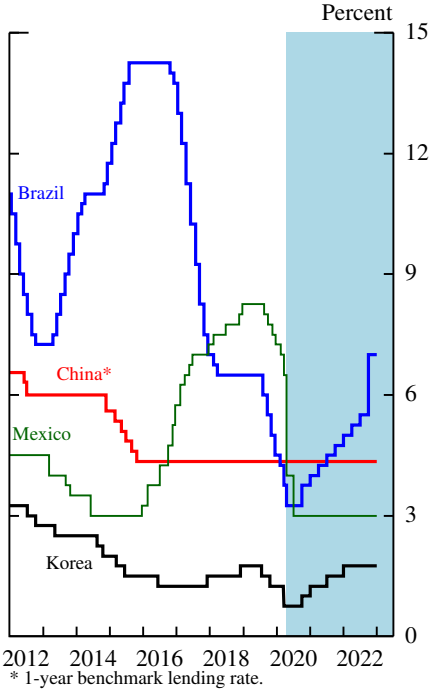
AFE Policy Rates



AFE Central Bank Balance Sheets



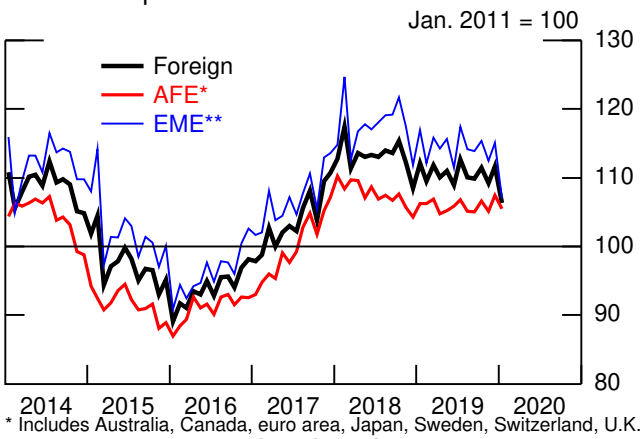
EME Policy Rates



* 1-year benchmark lending rate.

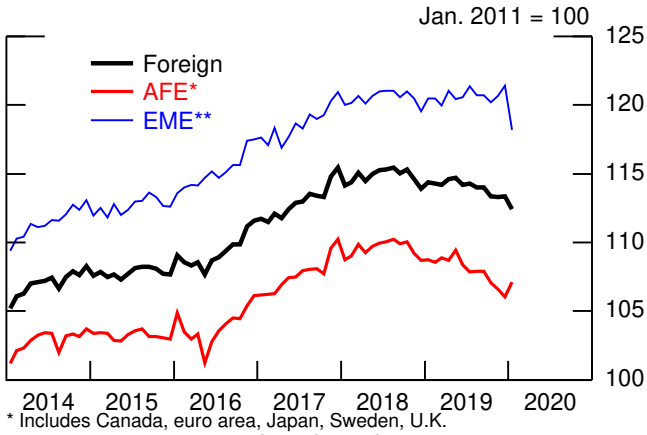
Recent Foreign Indicators

Nominal Exports



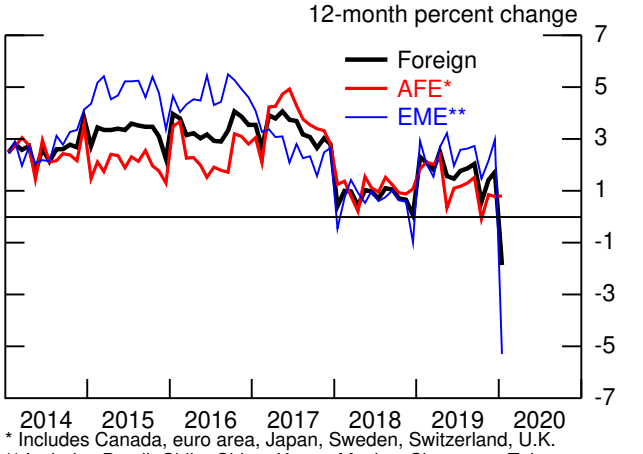
* Includes Australia, Canada, euro area, Japan, Sweden, Switzerland, U.K.
** Includes Argentina, Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Israel, Korea, Malaysia, Mexico, Singapore, Taiwan, Thailand.

Industrial Production



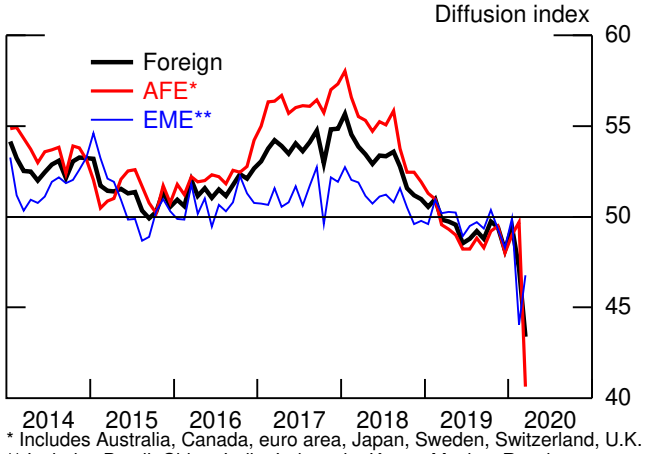
* Includes Canada, euro area, Japan, Sweden, U.K.
** Includes Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Israel, Korea, Malaysia, Mexico, Philippines, Russia, Singapore, Taiwan, Thailand.

Retail Sales



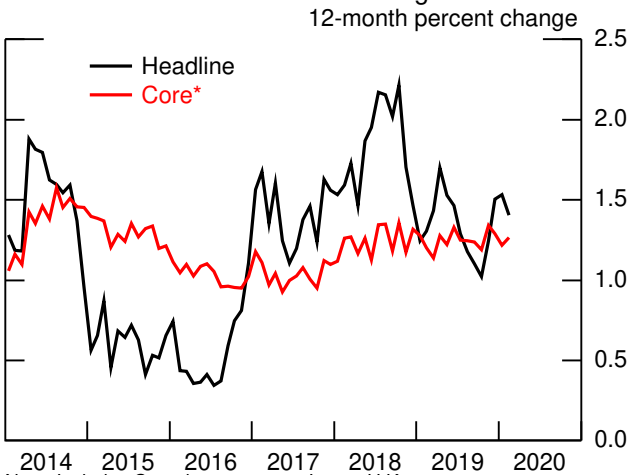
* Includes Canada, euro area, Japan, Sweden, Switzerland, U.K.
** Includes Brazil, Chile, China, Korea, Mexico, Singapore, Taiwan.

Manufacturing PMI



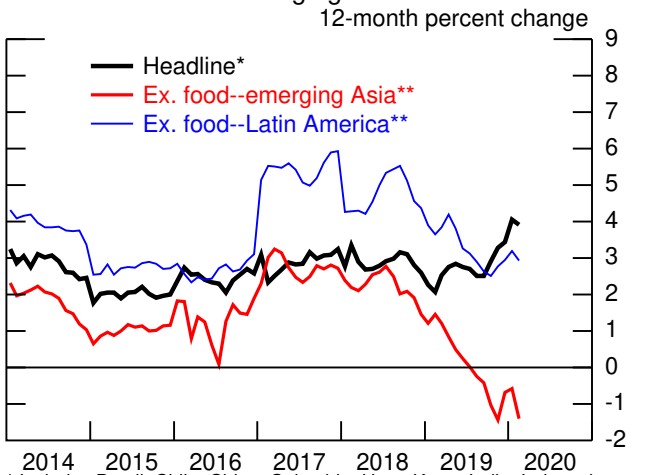
* Includes Australia, Canada, euro area, Japan, Sweden, Switzerland, U.K.
** Includes Brazil, China, India, Indonesia, Korea, Mexico, Russia, Singapore, Taiwan.

Consumer Prices: Advanced Foreign Economies



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

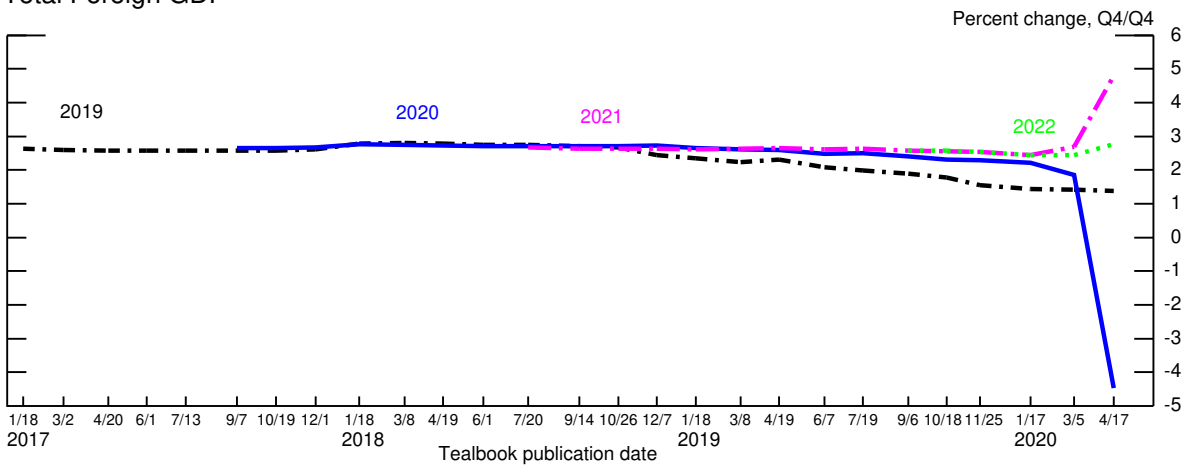
Consumer Prices: Emerging Market Economies



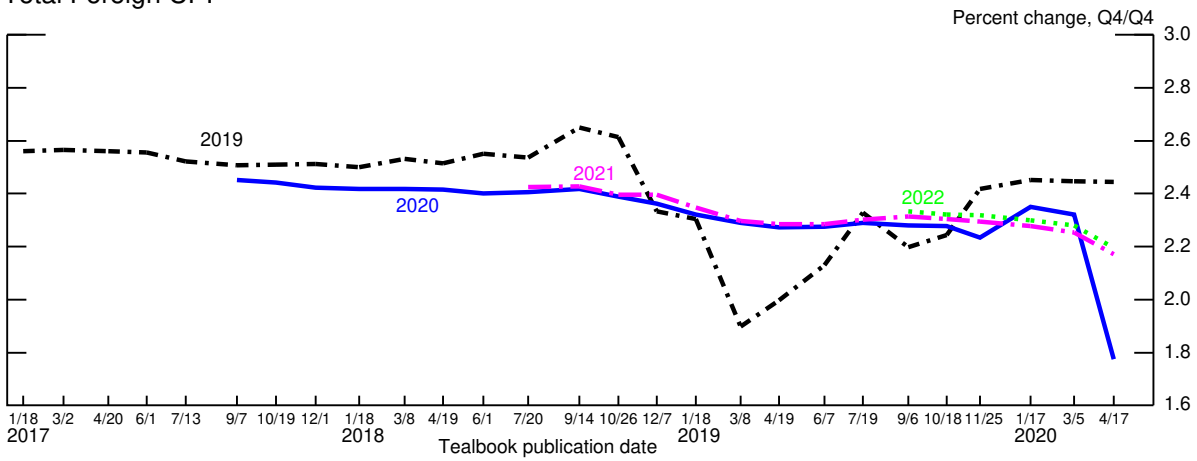
* Includes Brazil, Chile, China, Colombia, Hong Kong, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Singapore, Taiwan, Thailand.
** Excludes all food; staff calculation. Latin America excludes Argentina and Venezuela.

Evolution of Staff's International Forecast

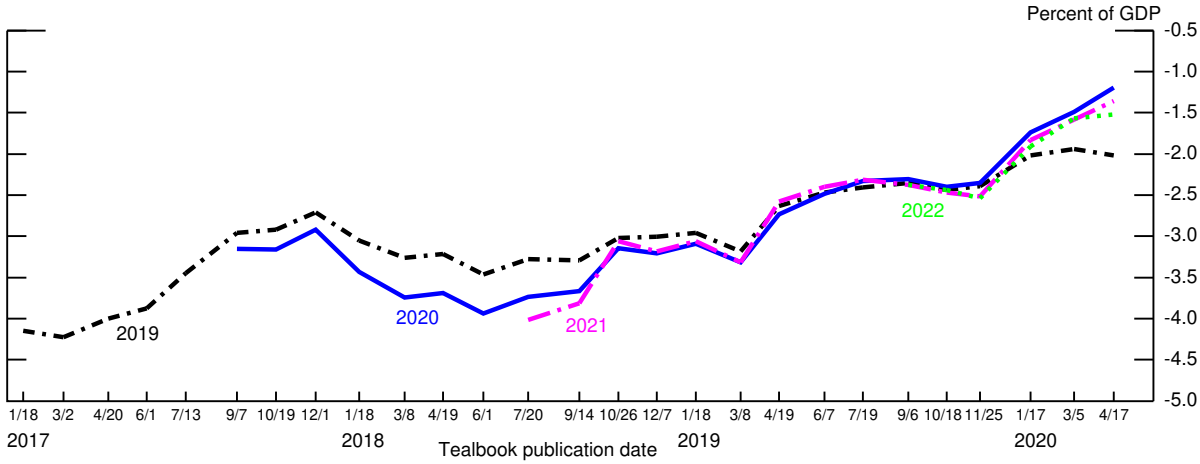
Total Foreign GDP



Total Foreign CPI



U.S. Current Account Balance



Int'l Econ Devel & Outlook

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Financial Market Developments

At the start of the intermeeting period on March 15, financial markets were in the throes of record declines in the prices of risky assets, widespread illiquidity, and soaring volatility as uncertainty skyrocketed regarding the effects of COVID-19 on the global economy. However, beginning in the second week of the intermeeting period, the extreme volatility and illiquidity began to subside and most prices for risky assets increased sharply, even as the dire consequences of the COVID-19 pandemic for economic activity came into sharper focus and weighed on risky asset prices. Much of the improvement in market sentiment and functioning is a result of the launch of Federal Reserve programs, the announcement of the Cares Act, and early signs of a decline in outbreak intensity in the United States and major foreign economies. In addition, market sentiment seemed to be further bolstered toward the end of the period by a perception of somewhat reduced uncertainty regarding the likely evolution of the pandemic in the near term.

- While broad equity prices are up 3 percent over the period, current levels are about 15 percent lower than peak levels from earlier in the year. The VIX index is now at about 40 percent, still elevated by historical standards but less than half its record peak level in March.

- Spreads on 10-year investment- and speculative-grade corporate bonds have fallen recently to levels slightly below the highs registered in early 2016.

- Treasury market functioning has improved recently, though liquidity remains strained according to some measures. Yields for securities with maturities of up to two years are under 25 basis points. The 10-year Treasury yield now stands at around 70 basis points.

- A straight read of market quotes suggests that the expected federal funds rate will remain under 25 basis points through 2022.

- In short-term funding markets, spreads have narrowed across the board. For the highest-rated overnight commercial paper (CP), spreads have reverted to pre-March levels, while spreads for paper with either lower ratings or longer tenors are still very elevated. Overall issuance of unsecured instruments has

moved back to normal ranges, and redemptions at prime money market funds (MMFs) have subsided. Offshore dollar funding markets have stabilized.

- In advanced foreign economies (AFEs), major equity market indexes rebounded over the intermeeting period but remain as much as 30 percent lower than earlier in the year, while corporate debt markets and more vulnerable sovereign markets have continued to reflect heightened concerns about higher default risk. Long-term AFE sovereign yields were little changed, on net, and the dollar strengthened against most currencies. Conditions improved more modestly in emerging markets, which have experienced severe strains, including sharply rising spreads and dramatic capital outflows.

MARKET DYNAMICS OVER THE PERIOD

Illiquidity and Dislocation

At the start of the intermeeting period, financial markets were gripped by widespread illiquidity, soaring volatility, and other forms of dysfunction as uncertainty skyrocketed regarding the effects of COVID-19 on the global economy. On the first day of the intermeeting period, equity markets fell 12 percent and one-month implied volatility on the S&P 500 index (the VIX) closed at a record high of 83 percent.[1] Treasury markets also experienced extreme volatility during the first week of the intermeeting period, and market liquidity became substantially impaired as investors, in a stampede to acquire cash and short-term government securities, sold large volumes of medium- and long-term Treasury securities, straining dealers' capacity to intermediate and boosting long-term yields. At the same time, yields on Treasury bills declined, dipping below zero on some days. TIPS-based measures of inflation compensation cratered, with some measures reaching record-low levels. Staff models attribute much of these declines to a sharp rise in the illiquidity of TIPS compared with nominal Treasury securities. Similar stresses afflicted foreign financial markets, and the exchange value of the dollar appreciated amid flight-to-safety demands.

During this period, corporate and municipal bond spreads soared amid extreme volatility and poor liquidity. Credit risk spreads for investment- and speculative-grade bonds shot up, although they rose to only about half of their peak levels during the Global

[1] The only larger single-day percentage decline in the S&P 500 occurred on "Black Monday," October 19, 1987.

Financial Crisis. Issuance in the speculative-grade corporate bond market stopped. The leveraged loan market also shuttered, with secondary-market prices plunging and average bid-ask spreads spiking to levels not seen since the Global Financial Crisis. The municipal bond market experienced significant stresses and liquidity strains as well amid growing concerns about the outlook of the state and local government sector, with a sharp slowdown in primary-market issuance and a surge in secondary-market yields.

The market for agency and non-agency securitized products also experienced substantial stresses over this period. MBS spreads to Treasury yields widened and were volatile, while functioning in the market for TBA-ineligible specified MBS pools was significantly impaired.[2] In ABS and CMBS markets, spreads widened sharply, although they remained well below the peaks seen during the Global Financial Crisis. Spreads for AAA-rated tranches of CLOs also reached post-crisis highs.

Strains in short-term funding markets, including overnight money markets, intensified. As spreads soared, issuance of unsecured CP and negotiable certificates of deposit (NCDs) declined substantially and shifted to very short tenors, with issuance at maturities beyond 30 days essentially frozen. Institutional prime MMFs experienced heavy redemptions and the funds reportedly faced difficulties selling assets to raise cash amid impaired secondary-market liquidity. Declining weekly liquid assets (WLAs) in these MMFs raised concerns that investors might run and force funds to impose fees or gates on redemptions.[3] Tax-exempt MMFs also faced sizable redemptions, while government MMFs received large inflows. These funding strains severely impaired the market for offshore dollar funding, and obtaining dollar funding abroad beyond very short maturities became very difficult.

Some Normalization amid a Darkening Economic Outlook

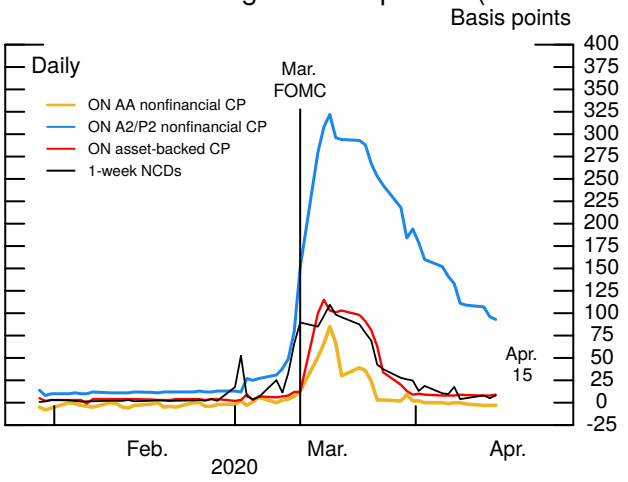
Beginning in the second week of the intermeeting period, the extreme volatility and illiquidity began to subside, even as the dire consequences of the COVID-19 pandemic for economic activity came into sharper focus, putting downward pressure on the prices of risky assets. Much of the improvement in market sentiment and functioning

[2] "Specified pools" are pools of agency-backed mortgages in which the characteristics of the loans in the pool conform to different standards than to-be-announced (TBA) "good delivery" guidelines. Certain specified pools are ineligible for delivery into the TBA market and are therefore excluded from the Federal Reserve's purchase program.

[3] WLAs are MMF portfolio assets that mature or can be put back within five business days as well as certain government securities. SEC rules allow MMFs to impose redemption fees and gates when their WLAs fall below 30 percent of total assets.

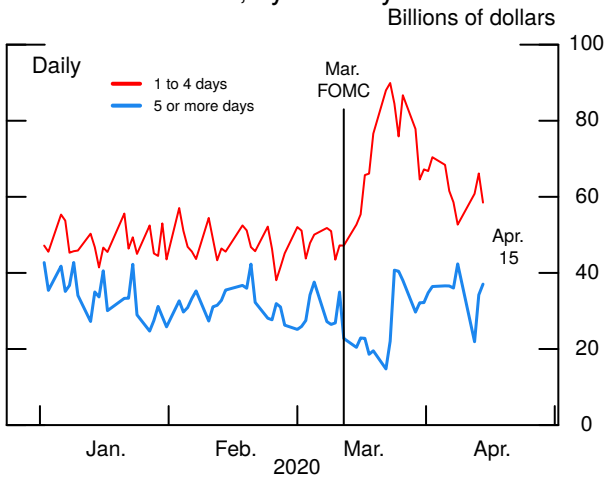
Short-Term Funding Markets

Short-Term Funding Market Spreads (Short Tenor)



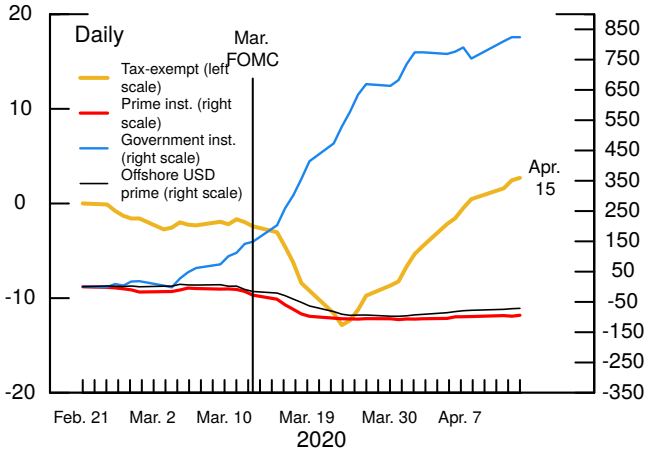
Note: CP is commercial paper; NCD is negotiable certificate of deposit. Overnight (ON) spreads are the effective federal funds rate; all other spreads are to the overnight index swap rate of the same tenor.
Source: Depository Trust & Clearing Corporation.

Total CP Issuance, by Maturity



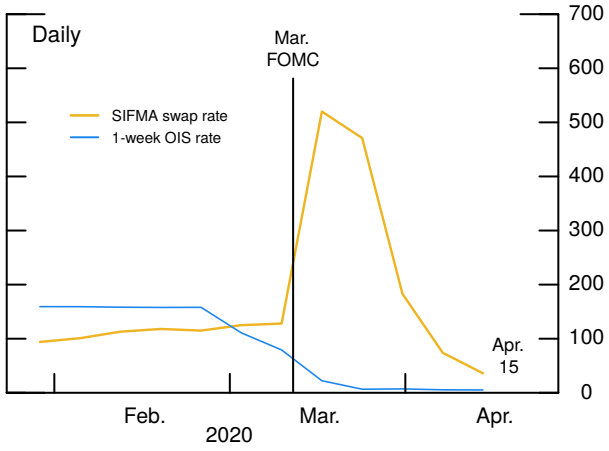
Note: CP is commercial paper.
Source: Depository Trust & Clearing Corporation.

MMF Cumulative Flows since Mid-February 2020



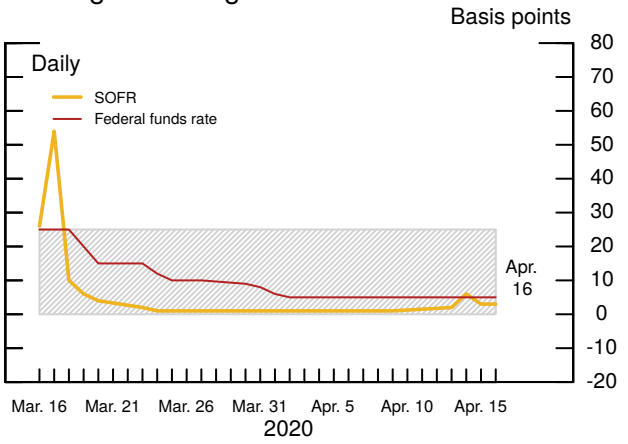
Note: MMF is money market fund.
Source: iMoneyNet.

SIFMA Swap Rate and 1-Week OIS



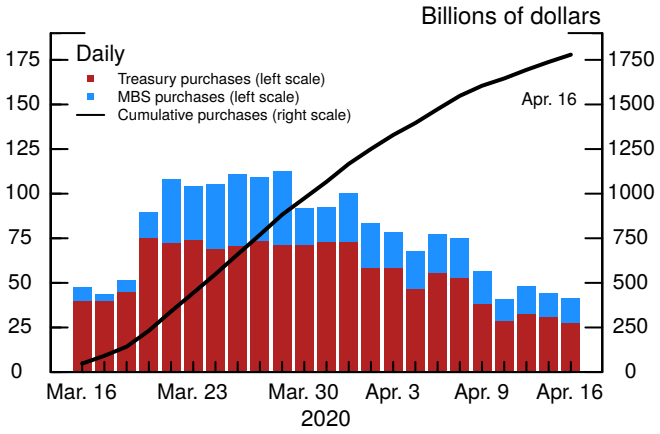
Note: "Online" Securities Industry and Financial Markets Association rate is calculated and released every Wednesday at 4 p.m. EDT; however, the weekly update will only be reflected in this chart every Friday at 8:30 a.m.
Source: Bloomberg.

Overnight Funding Rates



Note: Shaded area is the target range for the federal funds rate. SOFR is Secured Overnight Financing Rate.
Source: FRBNY; FRB.

Pace of Daily Security Purchases



Note: Cumulative purchases show the cumulative over this intermeeting period.
Source: FRBNY public release.

Financial Markets

is a result of the passage of the fiscal relief package (Cares Act) and the launch of key Federal Reserve programs such as expanded SOMA purchases and discount window lending, the Primary Dealer Credit Facility (PDCF) and the Money Market Liquidity Facility (MMLF) established under section 13(3) of the Federal Reserve Act, and successful auctions at foreign central banks under the new terms of dollar swap lines. Even though the uptake of some of the Federal Reserve facilities is fairly light, the presence of the programs as a backstop appears to have boosted confidence among market participants that the worst possible outcomes regarding financial market dysfunction will be avoided. That confidence appears to have lowered flight-to-safety and liquidity demands as well as reduced risk premiums across a range of assets. In addition, the perception among market participants of somewhat reduced uncertainty regarding the likely evolution of the pandemic in the near term appeared to bolster sentiment. While current expectations are more severe than generally anticipated in the early days of the outbreak, the reduction in uncertainty nevertheless may have been an important contributor to the easing of panic in financial markets.

Domestic equity prices more than retraced their declines earlier in the period. Similarly, equity market volatility subsided substantially in the latter portion of the period. Foreign equity indexes followed a similar pattern.

The improvement in market sentiment and functioning extended to debt markets as well, albeit to varying degrees. Treasury market liquidity gradually improved and Treasury yields became less volatile. Long-term Treasury yields declined as selling pressures eased. Corporate and municipal bond yields retraced the spikes seen earlier in the period and are slightly lower on net. Similar improvements occurred in markets for agency and non-agency securitized products, with prices of agency MBS supported by Federal Reserve purchases. Prices for secondary-market leveraged loans retraced some of their declines. Redemption pressures at institutional prime MMFs eased, and the functioning of short-term funding markets—including those for term CP, NCDs, short-term municipal debt, and dollar funding abroad—improved somewhat.

THE CURRENT STATE OF U.S. FINANCIAL MARKETS

Short-Term Funding Markets

In the markets for CP, NCDs, and short-term municipal debt, challenges in some segments persist but conditions have stabilized, in large part because of the announcement or commencement of several liquidity facilities, including the PDCF, the

MMLF, and the CPFF. (For details on the PDCF and the MMLF, and on changes to Federal Reserve open market operations, see the boxes "The Effect of Increased Repo Operations, Expanded System Open Market Account Purchases, and the Primary Dealer Credit Facility on Dealer Balance Sheets and Funding Costs" and "The Money Market Mutual Fund Liquidity Facility.") Spreads at overnight tenors for the highest-rated instruments are at pre-March levels. Meanwhile, overall issuance of unsecured CP and NCDs in recent days has been comparable to levels seen in January and February. Spreads for overnight A2/P2 nonfinancial CP and for instruments with maturities exceeding one month remain highly elevated. Redemption pressures for prime MMFs have eased, although funds reportedly remain reluctant to invest in longer-tenor CP and NCDs given concerns that outflows might resume.

Conditions in the market for short-term municipal securities remain somewhat strained. The SIFMA seven-day municipal swap index—a benchmark rate for high-grade tax-exempt variable-rate demand obligations—declined sharply after hitting a pre-crisis high of 520 basis points. It currently stands at 36 basis points, which is still somewhat elevated relative to OIS. Although only about $1.5 billion in municipal securities has been pledged to the MMLF, market participants have noted that inclusion of these securities in the facility is playing an important backstop role. Municipal MMFs have attracted modest inflows in early April.

Funding conditions in other overnight money markets also appear stable. After printing at or above the top of the target range for a few days following the FOMC meeting, both the effective federal funds rate (EFFR) and the Secured Overnight Financing Rate softened considerably to 5 basis points and about 3 basis points, respectively, later in the period.

Treasury and Related Markets

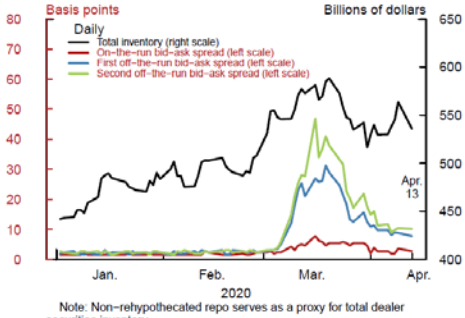
Despite the consistent improvement in Treasury market liquidity in recent weeks and a decline in realized Treasury yield volatility close to levels seen early in the year, trading conditions remain strained, according to some measures. (See also the box "The Effect of Increased Repo Operations, Expanded System Open Market Account Purchases, and the Primary Dealer Credit Facility on Dealer Balance Sheets and Funding Costs.") While market depth remains exceptionally low in on-the-run cash and related futures markets, other measures of the cost of trading, such as bid-ask spreads, have nevertheless

The Effect of Increased Repo Operations, Expanded System Open Market Account Purchases, and the Primary Dealer Credit Facility on Dealer Balance Sheets and Funding Costs

Liquidity conditions in dealer-intermediated markets—including the Treasury, agency MBS, corporate, and municipal bond markets—became severely strained in early March (see "Treasury and Related Markets" and "Corporate and Municipal Markets" in this section). A number of actions taken by the Federal Reserve—including the expansion of repo operations, the increase in the Federal Reserve's purchases of Treasury securities and agency MBS, and the creation of the Primary Dealer Credit Facility (PDCF)—were designed to improve market functioning, primarily by alleviating balance sheet capacity and funding constraints at dealers. This discussion provides an early view into the role of these actions in mitigating dealer balance sheet and funding constraints.

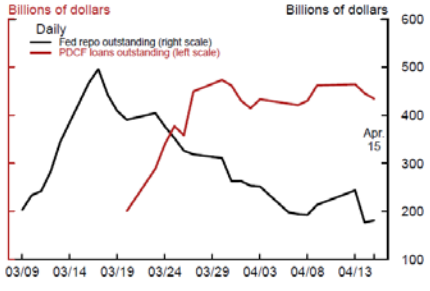
Beginning in late February, as a wide range of investors rushed to raise cash or rebalance their portfolios by selling assets, dealers absorbed large amounts of less-liquid securities, including off-the-run Treasury securities, onto their balance sheets—which had already been elevated, reflecting in part strong Treasury issuance over the past two years (figure 1).[1] By early March, some dealers had reportedly reached their capacity to absorb these sales, leading to a deterioration in the functioning of a number of dealer-intermediated markets. At the same time, investor demand for repo financing rose sharply, in particular against Treasury collateral, putting further strain on dealers' balance sheets and pushing up dealers' funding costs.

Figure 1: Total Dealer Inventory and Indicative U.S. Treasury Bid-Ask Spreads



Note: Non-rehypothecated repo serves as a proxy for total dealer securities inventory.
Source: Federal Reserve Bank of New York (NPQS); Federal Reserve Board, Form FR 2052a, Complex Institution Liquidity Monitoring Report.

Figure 2: Fed Repo Operations and PDCF Loans Outstanding



Source: Federal Reserve Bank of New York.

[1] Investors that sold large volumes of securities included, among others, foreign central bank reserve managers that sold shorter-dated off-the-run Treasury securities to raise dollars, pension funds that sold longer-dated off-the-run Treasury securities to rebalance their portfolios and realize capital gains, hedge fund investors that sold Treasury securities because of reduced hedging benefits, and mortgage REITs that sold agency MBS to de-lever their portfolios.

Federal Reserve Actions to Support Dealer Intermediation

Between March 9 and March 17, the Desk repeatedly expanded the ongoing overnight and term repo operations to address disruptions in Treasury financing markets. The Desk started to offer two daily overnight repo operations of up to $500 billion each as well as regular term operations of at least $45 billion or more at various maturities. Usage of repo operations increased significantly in mid-March, peaking at $496 billion on March 17; since then, usage has declined as private repo rates have come down to near-zero levels (black line in figure 2).

To support the smooth functioning of Treasury and agency MBS markets, on March 15, the FOMC directed the Desk to increase SOMA holdings of Treasury securities by at least $500 billion and of agency MBS by at least $200 billion. In response to extraordinary private market sales of Treasury securities and agency MBS, the Desk accelerated its purchases on March 19 and 20 and, following a further directive by the FOMC on March 23, has continued purchasing these securities in the amounts needed to support smooth market functioning while including agency CMBS in its MBS purchases. In addition, to ease the regulatory restrictions associated with dealer balance sheet growth, the Federal Reserve announced on April 1 that it would temporarily change its supplementary leverage ratio rule to exclude U.S. Treasury securities and reserves from the calculation of the rule for bank holding companies.

To support market functioning by expanding the ability of primary dealers to access term funding for a wide range of collateral, the Federal Reserve announced on March 17 the establishment of the PDCF.[2] The PDCF offers dealers funding at the primary credit rate with maturities of up to 90 days against a broad range of collateral classes, including Treasury securities, agency MBS, investment-grade corporate debt securities, and equities. The amount of PDCF loans outstanding increased steeply in the initial days of the facility and has since remained around $35 billion (red line in figure 2). More than one-third of the collateral pledged by primary dealers has been investment-grade corporate debt securities. Dealers have also used the facility to finance their holdings of commercial paper and municipal and asset-backed securities.

Effect of Fed Actions on Dealer Balance Sheets and Funding Costs

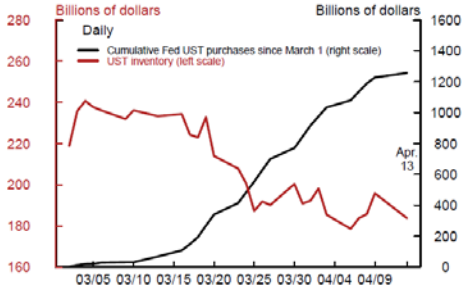
Since the announcement of increased SOMA purchases, the net cumulative inflow of Treasury securities onto dealer balance sheets is estimated to have flattened out, and Treasury and agency MBS market functioning has improved. An indicator of the effect of Fed asset purchases on dealers' balance sheet constraints can be seen in figure 3. Dealers' inventory holdings of U.S. Treasury securities (red line) has declined steadily since mid-March as the Federal Reserve's Treasury purchases (black line) picked up, suggesting that the Desk's purchases have absorbed some of the Treasury securities that might have otherwise been held on dealers' balance sheets. The increased

[2] The PDCF was established under Section 13(3) of the Federal Reserve Act, which requires, among other things, that the facility have broad-based eligibility and that the Board receive previous approval to establish the facility from the Secretary of the Treasury.

Federal Reserve Treasury purchases have also been associated with a gradual, but substantial, improvement in Treasury market trading conditions. For example, measures of the cost of trading in the Treasury market, such as bid-ask spreads, shown in figure 4, have declined notably over the same period despite still remaining elevated.

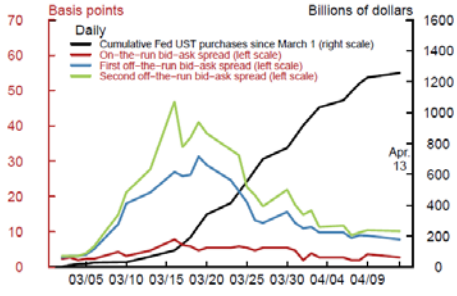
Funding conditions for dealers have also gradually improved since the expansion of repo operations on March 9 and the announcement of the PDCF on March 17. Borrowing rates for large dealers with access to triparty financing for Treasury securities (black line in figure 5) as well as borrowing rates for smaller dealers in the interdealer GCF repo market (not shown) declined notably. Aided by the ample liquidity provided by Federal Reserve actions and the large inflows into government MMFs, triparty repo rates for Treasury collateral relative to the IOER (black line) continued to fall to even lower levels than they had traded at before the initial volatility, and the cross-sectional dispersion in rates across borrowers (red line) dropped and has remained low. Similarly, investment-grade corporate bond repo rates in triparty markets (black line in figure 6) have come back down relative to the IOER, while the dispersion in rates (red line) has reversed more than half of its earlier increase.

Figure 3: Fed UST Purchases and Dealer UST Inventory



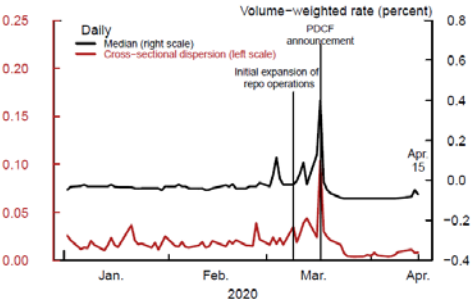
Note: UST stands for U.S. Treasury. UST non-rehypothecated repo serves as a proxy for dealer UST inventory.
Source: Federal Reserve Bank of New York; Federal Reserve Board, Form FR 2052a, Complex Institution Liquidity Monitoring Report.

Figure 4: Fed UST Purchases and Indicative UST Bid-Ask Spreads



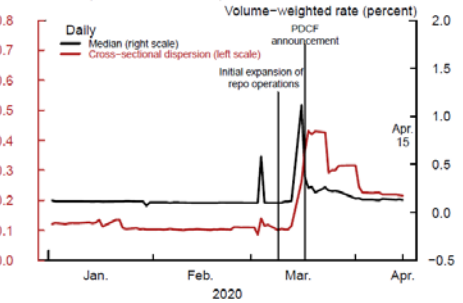
Note: UST stands for U.S. Treasury. Bid-ask spreads are from figure 1.
Source: Federal Reserve Bank of New York.

Figure 5: Treasury Triparty Rates (Relative to IOER) Across Borrowers



Note: Borrower rates are volume weighted. Cross-sectional dispersion is the standard deviation in rates across borrowers for a given day. IOER is interest on excess reserves.
Source: Federal Reserve Bank of New York.

Figure 6: Investment-Grade Corporate Bond Triparty Rates (Relative to IOER) Across Borrowers



Note: Borrower rates are volume weighted. Cross-sectional dispersion is the standard deviation in rates across borrowers for a given day. IOER is interest on excess reserves.
Source: Federal Reserve Bank of New York.

Financial Markets

The Money Market Mutual Fund Liquidity Facility

Conditions in short-term funding markets began to deteriorate rapidly in the second week of March. Redemptions from prime money market funds (MMFs) accelerated quickly, and the funds reportedly faced difficulty selling assets to meet redemptions. Weekly liquid assets for some funds dropped close to the SEC's 30 percent minimum requirement, raising concerns that investors might run before funds could impose gates to limit withdrawals. As MMFs responded by pulling back from investing in commercial paper (CP) and other assets, spreads for these instruments shot up, in some cases to historic highs, and the availability of short-term funding beyond overnight loans plummeted.

On March 18, the Federal Reserve announced the establishment of the Money Market Mutual Fund Liquidity Facility (MMLF) to improve liquidity and functioning in short-term funding markets by assisting MMFs in selling assets.[1] Under the MMLF, the Federal Reserve Bank of Boston (FRBB) provides nonrecourse loans to eligible financial institutions—essentially banks—to purchase certain types of highly rated assets from MMFs. The banks pledge the assets to the FRBB as collateral for the loans.[2] The MMLF could be rapidly deployed and was suitable for countering run pressures on MMFs. Within days of the initial MMLF announcement—and the announcement of the Commercial Paper Funding Facility (CPFF) on March 17— severe stress in the short-term funding markets began to ease as redemptions from MMFs diminished.[3]

When the MMLF was first announced, eligible assets included CP as well as Treasury, agency, and government-sponsored enterprise securities. An expansion to include short-term municipal securities was announced on March 20, and negotiable certificates of deposit (NCDs) and variable-rate demand notes (VRDNs) were added on March 23, the day operations began.

In the first week of operations (March 23 to 27), the FRBB extended 568 loans totaling $45 billion, which were mostly backed by asset-backed CP, unsecured CP, and NCDs (figure 1). Take-up for the MMLF slowed considerably after the first week amid improving market conditions. As of April 15, the FRBB had originated 734 loans to nine financial institutions that purchased assets from 112 different MMFs.

[1] The PDCF was established under Section 13(3) of the Federal Reserve Act, which requires, among other things, that the facility have broad-based eligibility and that the Board receive previous approval to establish the facility from the Secretary of the Treasury. More details about the MMLF are available on the Board's website at https://www.federalreserve.gov/publications/files/money-market-mutual-fund-liquidity-facility-3-25-20.pdf.

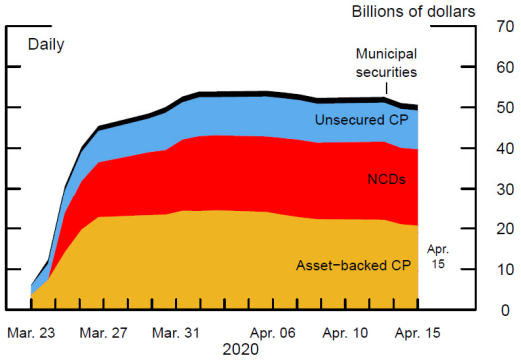
[2] On March 19, 2020, the Federal Reserve Board, the Office of the Comptroller of the Currency, and the Federal Deposit Insurance Corporation issued an interim final rule that effectively neutralizes the effect of asset purchases under the MMLF on banks' capital ratios.

[3] The CPFF supports liquidity in the CP market by purchasing paper directly from issuers and by giving investors confidence that issuers will be able to roll maturing CP. The CPFF made $950 million in purchases in its first two days of operations, which began on April 14. Several other Federal Reserve actions announced in mid-March have also contributed to improvements in market conditions. These actions include a large increase in open market purchases of Treasury securities and agency mortgage-backed securities announced on March 15 and the establishment of the Primary Dealer Credit Facility (PDCF) announced on March 17, discussed in the box "The Effect of Increased Repo Operations, Expanded System Open Market Account Purchases, and the Primary Dealer Credit Facility on Dealer Balance Sheets and Funding Costs." They also include the establishment of temporary swap lines with other central banks on March 19, discussed in the box "Central Bank Liquidity Swaps and FIMA Repo Facility."

Redemptions from prime MMFs began to slow on the MMLF announcement day and continued to decline as operations began on March 23 (figure 2). Spreads for one-month CP and NCDs also started to decline after MMLF operations began (figure 3). On net, spreads for these instruments have narrowed 90 to 200 basis points from their peaks in March, but they remain above the 95th percentile of their distributions since 2002, reflecting ongoing concerns about the effects of the pandemic. Spreads for A2/P2-rated CP, which is ineligible for the MMLF, remain particularly wide. Market participants have noted that the backstop provided by the MMLF has encouraged prime MMFs to purchase securities with longer tenors, and issuance of unsecured CP with tenors beyond overnight and NCDs with maturities up to a year has moved up to near pre-pandemic levels.

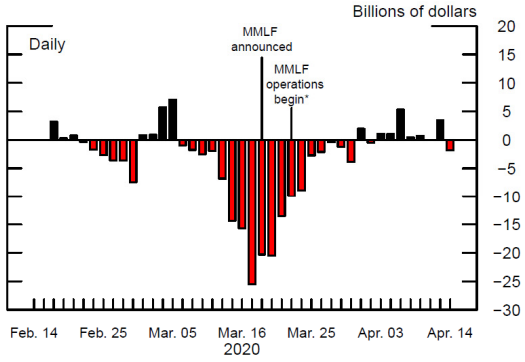
Stress in the short-term municipal debt market, which rapidly escalated in the third week of March, eased substantially after the MMLF was expanded to include short-term municipal securities on March 20 and VRDNs on March 23, even though total take-up of these securities under the MMLF has been small. Redemptions from tax-exempt MMFs, which had picked up quickly in the preceding days, came to a halt on March 25. The benchmark seven-day SIFMA (Securities Industry and Financial Markets Association) municipal swap index yield, which jumped to 520 basis points on March 18, has since declined and was 36 basis points on April 15 (figure 4). Even so, the spread of the SIFMA rate to OIS remains at the 95th percentile of its distribution since 2002.

Figure 1: MMLF Outstanding Loans by Collateral Type



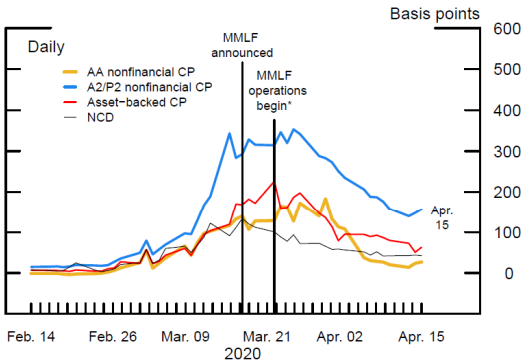
Source: Federal Reserve Bank of Boston.

Figure 2: Prime MMF Net Flows



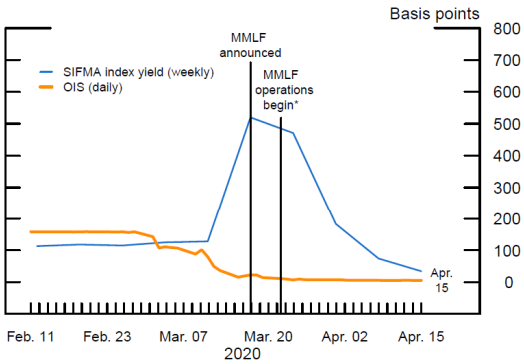
* MMLF operations began on March 23. On the same day, the Federal Reserve announced that the MMLF would be expanded to include NCDs and variable-rate demand notes.
Source: iMoneyNet.

Figure 3: 1-Month Funding Market Spreads



Note: All spreads are to OIS of the same tenor.
* MMLF operations began on March 23. On the same day, the Federal Reserve announced that the MMLF would be expanded to include NCDs and variable-rate demand notes.
Source: Depository Trust & Clearing Corporation.

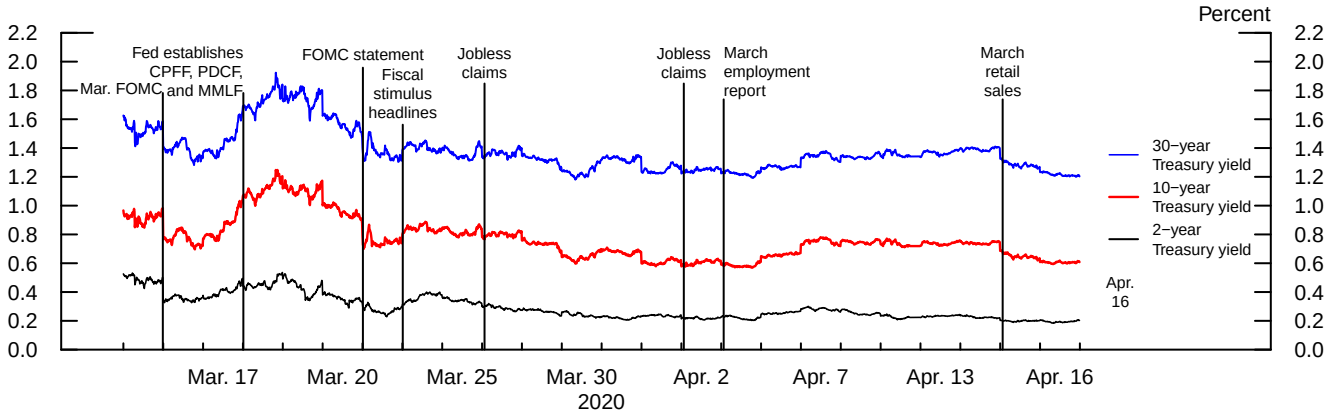
Figure 4: 7-Day SIFMA Municipal Swap Index Yield and OIS Rate



* MMLF operations began on March 23. On the same day, the Federal Reserve announced that the MMLF would be expanded to include NCDs and variable-rate demand notes.
Source: Bloomberg.

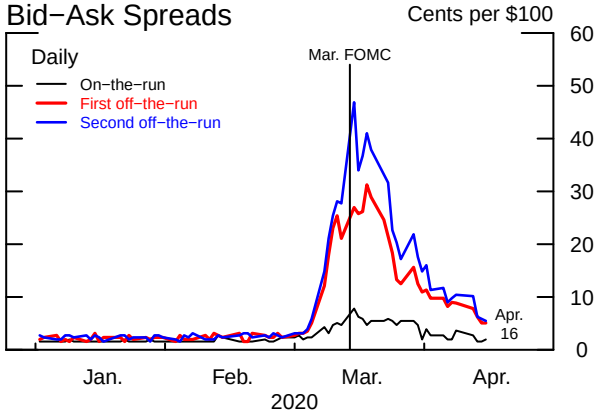
Treasury and Related Markets

Intraday Treasury Yields



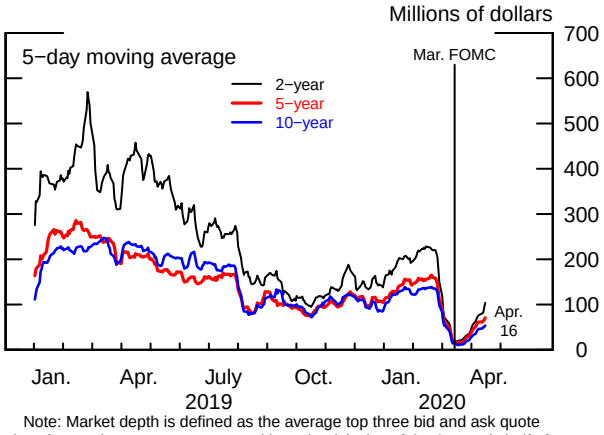
Note: Data are spaced at 5−minute intervals from 8:00 a.m. to 4:00 p.m. CPFF is Commercial Paper Funding Facility; PDCF is Primary Dealer Credit Facility; MMLF is Money Market Mutual Fund Liquidity Facility.
Source: Bloomberg.

10−Year Off−the−Run Indicative Bid−Ask Spreads



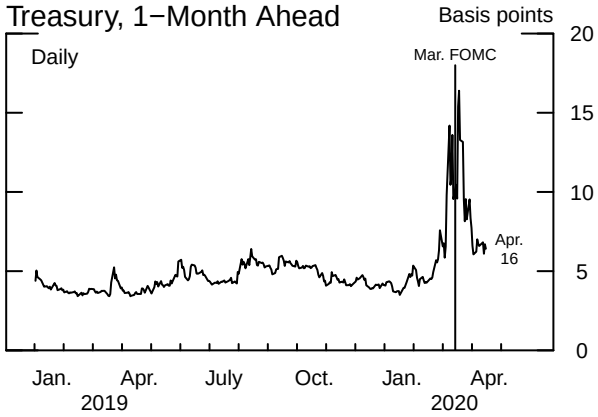
Source: New Price Quote System.

Treasury Market Depth



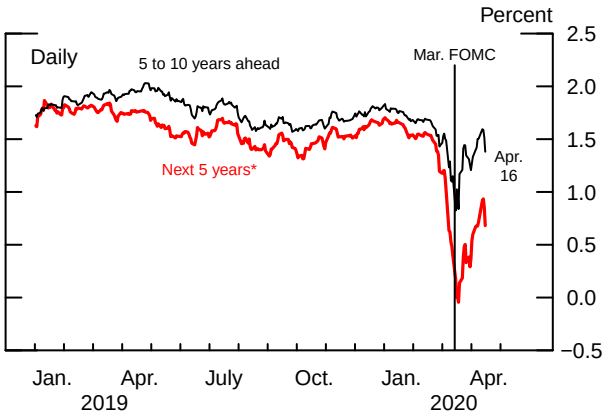
Note: Market depth is defined as the average top three bid and ask quote sizes for on−the−run Treasury securities. The tick size of the 2−year is half of the tick size of the 5−year security.
Source: Repo Inter Dealer Broker community.

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



Note: Implied volatility comes from the Treasury yield VIX (TYVIX) series.
Source: Bloomberg; CBOE.

TIPS−Based Inflation Compensation



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

Financial Markets

fallen close to levels seen early in the year, with the exception of the longest tenors.[4] However, in the off-the-run Treasury market, bid-ask spreads remain substantially wider and liquidity conditions remain strained, according to market commentary.

Regarding the levels of Treasury yields, 2- and 10-year yields ended the period at 0.22 percent and 0.67 percent, respectively, the latter being just a bit above its all-time end-of-day low reached earlier in early March. These low yields largely reflect expectations that short-term interest rates will remain near zero for an extended period. A straight read of financial market quotes suggests that the expected federal funds rate will remain near the effective lower bound through the end of 2020, as do model-based measures of policy expectations that adjust OIS quotes for risk premiums. However, by the end of 2021, the model-based measures suggest gradual increases in the federal funds rate, whereas the raw OIS quotes—not adjusted for term premiums—remain close to the effective lower bound.[5] Amid somewhat improved liquidity conditions for TIPS, 5-year and 5-to-10-year measures of inflation compensation have risen notably to 0.68 percent and 1.38 percent, respectively—still very low by historical standards.

Corporate and Municipal Markets

The extreme uncertainty and fear that gripped equity markets early in the intermeeting period have diminished greatly. Broad equity price indexes stand about 15 percent below peaks registered earlier this year. The VIX index has fallen to less than half of its record peak level in March but is still substantially elevated relative to historical standards. Despite the apparent improvement in sentiment, liquidity in equity futures markets remains relatively poor. For example, market depth in S&P 500 index futures, which are usually exceptionally liquid, is still extremely low.

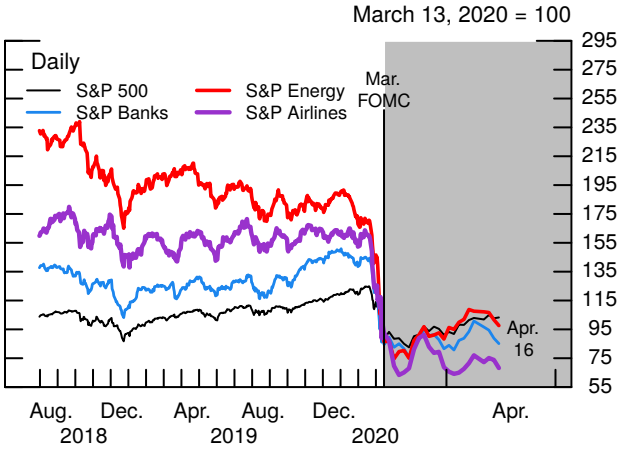
Spreads of both triple-B and speculative-grade 10-year corporate bonds are at elevated levels, though slightly below those seen in 2016 and well below the peaks observed during the Global Financial Crisis. Secondary-market liquidity conditions as measured by bid-ask spreads are at the upper end of typical ranges for speculative-grade bonds but have declined to near the historical median for investment-grade bonds. The

[4] See Dobrislav Dobrev and Andrew Meldrum (2020), "Understanding the Recent Deterioration in the Functioning of the On-the-Run Treasury Cash and Treasury Futures Markets," memorandum, Board of Governors of the Federal Reserve System, Division of Monetary Affairs, April 8.

[5] The staff's macro-finance model suggests an expected increase of about 25 basis points in the EFFR by the end of 2021, whereas the OIS-ZLB model implies an expected funds rate roughly 40 basis points above its current level at the same horizon.

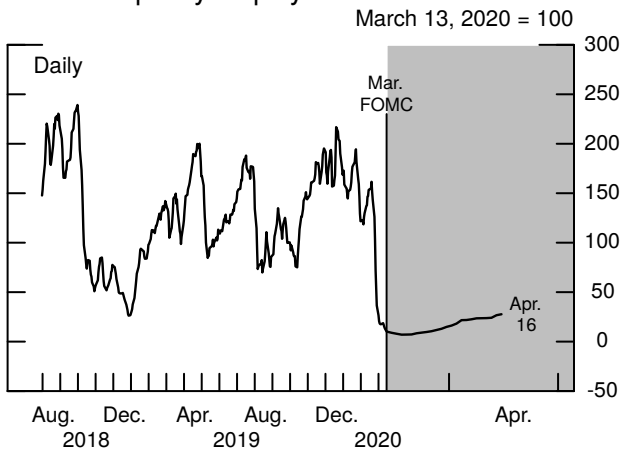
Corporate and Municipal Markets

Selected S&P 500 Stock Price Indexes



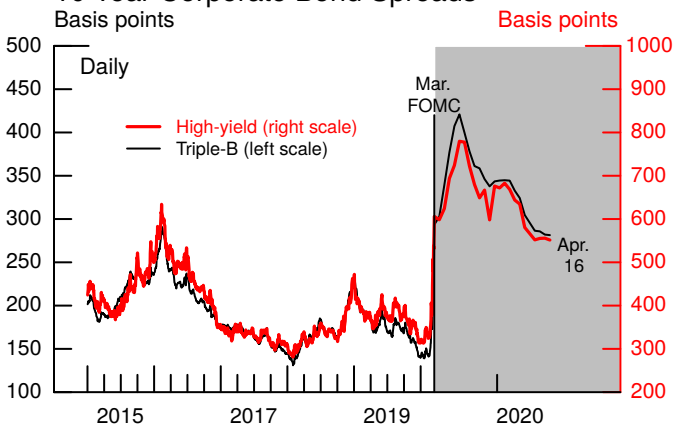
Note: The shaded gray area represents an expanded window focusing on the period following the previous FOMC meeting.
Source: Bloomberg.

Market Liquidity: Equity Index Futures



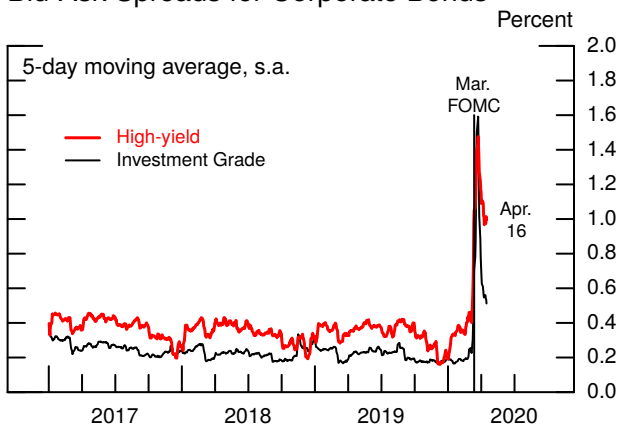
Note: The shaded gray area represents an expanded window focusing on the period following the previous FOMC meeting. Average depth: (Avg. bid size + avg. ask size) / 2.
Source: Tick History.

10-Year Corporate Bond Spreads



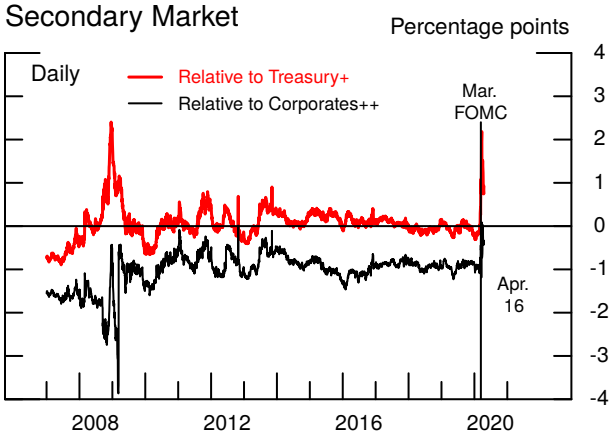
Note: The shaded gray area represents an expanded window focusing on the period following the previous FOMC meeting. Spreads over 10-year Treasury yield.
Source: Merrill Lynch; FRBNY; Board staff calculations.

Bid-Ask Spreads for Corporate Bonds



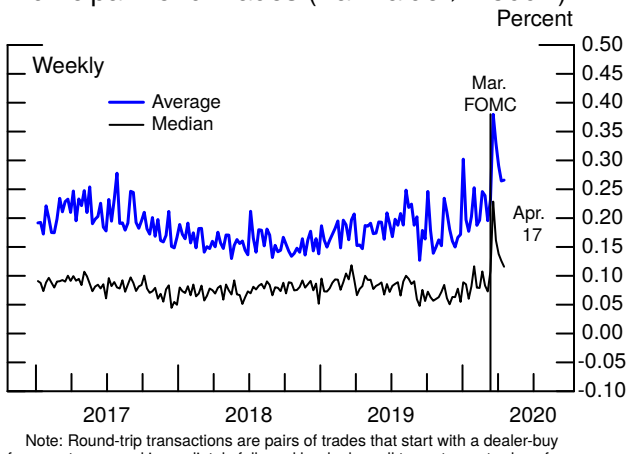
Source: FINRA.

Municipal Bond 20-year Yield Spreads, Secondary Market



+ Municipal Market Advisors 20-year index relative to 20-year Treasury.
++ Municipal Market Advisors 20-year index relative to estimated triple-A 20-year yield.
Source: Municipal Market Advisors; Merrill Lynch.

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



Note: Round-trip transactions are pairs of trades that start with a dealer-buy from customer, and immediately followed by dealer-sell to customer 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

primary leveraged loan market has shown signs of life, but spreads remain historically high. Liquidity conditions in the secondary market for leveraged loans remain strained, albeit improved.

Even though the announcements of the Cares Act and the Municipal Liquidity Facility helped stabilize municipal bond markets, spreads of municipal bond yields over comparable-maturity Treasury securities remain somewhat elevated. The primary market remains functional and open, with issuance observed across several states, sectors, and rating categories. That said, the volume of new issuance is still subdued relative to pre-March levels.

Securitized Product Markets

Market conditions have improved significantly for agency MBS eligible for Desk purchase and modestly for other securitizations. Spreads on agency RMBS are a bit narrower than their levels in late February, as the Desk purchases appear to have stabilized this market. However, liquidity conditions remain strained, especially for securities not in the Federal Reserve's purchase program such as TBA-ineligible specified MBS pools. Since the March 23 FOMC directive to the Desk to begin purchasing agency CMBS for the first time, indicators of agency CMBS market functioning have improved significantly. Measures of liquidity, such as agency CMBS bid-ask spreads, have improved notably, and market intelligence indicates that dealers are again willing to make two-way markets.

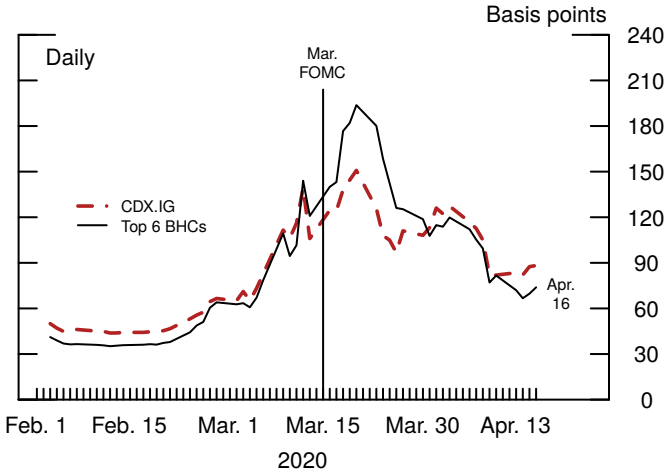
Regarding private-label securitized products, secondary-market spreads remain elevated but have tightened significantly in sectors eligible for TALF support, including consumer ABS, CLOs, and CMBS. New issuance of these securities remains stalled, although a few issuers are reportedly beginning to take some initial steps to bring deals to the market.

Bank Funding Markets

Equity and credit investors are wary of banks' earnings prospects, driven by concerns about potential credit losses associated with the pandemic's economic fallout and the effect of low long-term interest rates on banks' profit margins. Credit default swaps for large banking institutions are somewhat elevated by historical standards. Bank earnings dropped in the first quarter, mainly as a result of higher loan loss provisions.

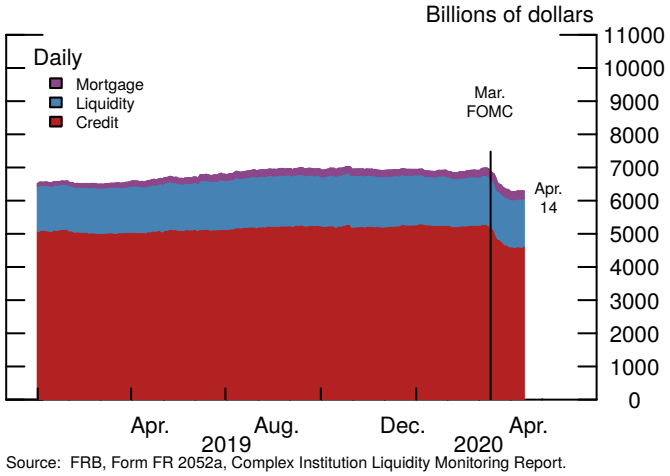
Banking Developments, Leveraged Loans, and Asset-Backed Securities

CDS Spreads



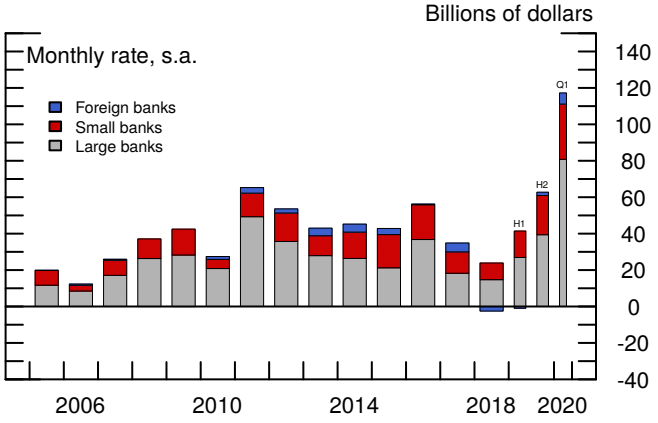
Note: Top 6 bank holding companies (BHCs) are Bank of America, Citigroup, Goldman Sachs, Morgan Stanley, JPMorgan Chase, and Wells Fargo. CDX.IG is the on-the-run investment-grade credit default swap (CDS) index.
Source: Markit.

Undrawn Credit Commitments at the 12 Largest Banks



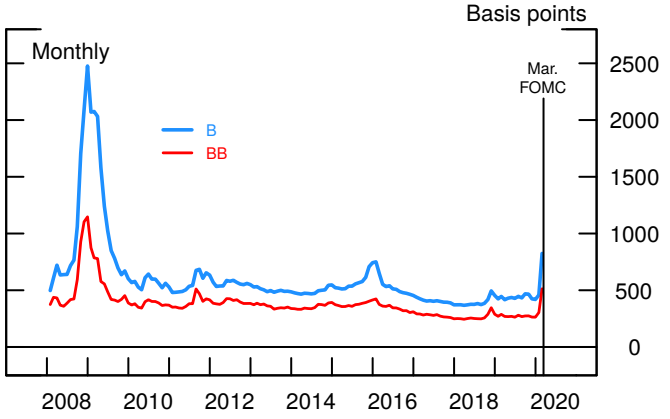
Source: FRB, Form FR 2052a, Complex Institution Liquidity Monitoring Report.

Change in Bank Deposits Other Than Large Time



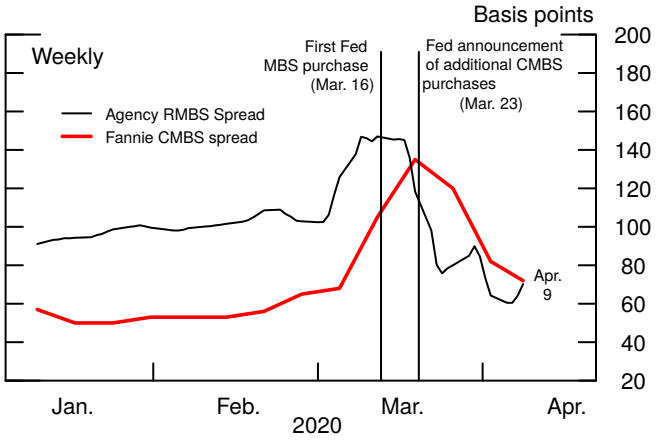
Source: FR 2644.

Secondary Market Leveraged Loan Spreads



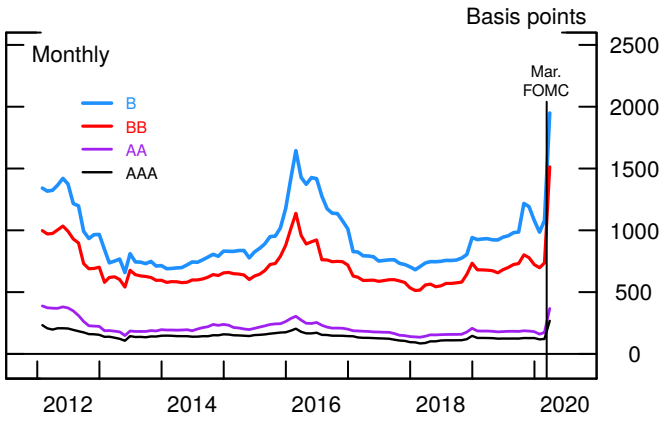
Note: Based on month-end data. Last data point is for March 31.
Source: S&P Leveraged Commentary and Data.

Agency MBS Spreads



Note: Fannie CMBS Spread is Fannie's Delegated Underwriting and Servicing (DUS) program multiborrower MBS pools with a 10 year loan term and a yield maintenance term of 9.5 years (10/9.5 TBA). Agency RMBS spread is UMBS 2½ current coupon minus the duration-matched Treasury yield. UMBS is Uniform Mortgage Backed Securities. TBA is to-be-announced.
Source: For Agency RMBS, Barclays; For Fannie CMBS, J.P. Morgan.

Secondary Market CLO Spreads



Note: Based on month-end data. Last data point is for March 31.
Source: JP Morgan Markets.

Financial Markets

Even so, bank funding conditions remain favorable, in part because banks have received large inflows of deposits.

Primary credit borrowing by depository institutions rose sharply after changes to the program—including more favorable loan terms—were announced on March 15 (see the box "Primary Credit Borrowing in Response to Program Changes"). The use of Federal Reserve intraday credit by depository institutions since the FOMC meeting has been stable and comparable—both in terms of dollar amounts and number of institutions overdrafting—to usage levels earlier in the year.

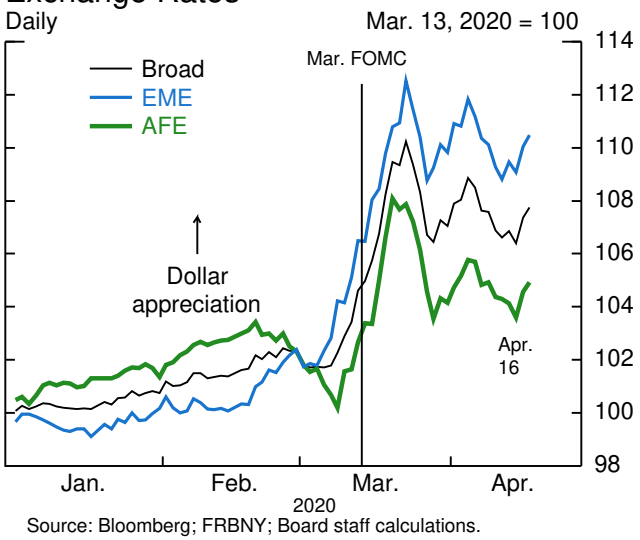
Foreign Markets

Cascading shutdowns in many countries aimed at containing the spread of COVID-19 weighed heavily on risk sentiment abroad, and many foreign markets experienced severe illiquidity early in the period. Aggressive central bank and fiscal actions in many countries helped boost sentiment and improve market functioning. As a result, over the intermeeting period foreign equity indexes are higher and long-term sovereign yields are little changed or somewhat lower. Relative to early in the year, however, asset prices abroad reflect a substantial deterioration in expectations for growth and in risk sentiment. Exchange rates depreciated moderately, on net, against the dollar for all but the most vulnerable EMEs.

Strong demand for dollars amid flight to safety globally and disruptions in U.S. short-term funding markets together caused severe strains in funding markets for dollars abroad, especially early in the intermeeting period. Basis spreads in the foreign exchange (FX) swap market widened sharply and liquidity conditions deteriorated as the end of the first quarter approached. Strains were particularly severe in the dollar–yen market, as this was also the end of the Japanese fiscal year. Following several changes to the standing central bank liquidity swap lines and a temporary expansion in the number of central bank counterparties, conditions in the FX swap market improved notably (see the box "Central Bank Liquidity Swaps and FIMA Repo Facility"). Actions by the FOMC to support the functioning of short-term funding markets in the United States also improved the functioning of dollar funding markets abroad. In addition, the announcement of the FIMA repo facility, which creates another channel for foreign monetary authorities to raise dollars, reportedly contributed to the improvement in dollar funding conditions. Nonetheless, FX swap market conditions remain strained, with high bid-ask spreads and low market depth. This trend is particularly true for longer-maturity FX swaps (that is,

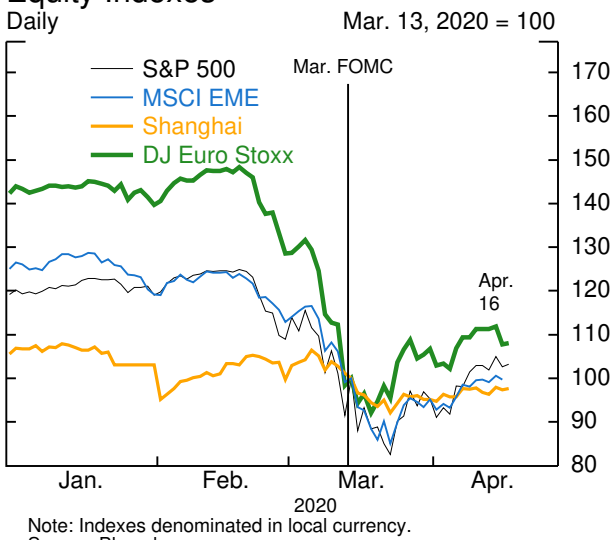
Foreign Developments

Exchange Rates



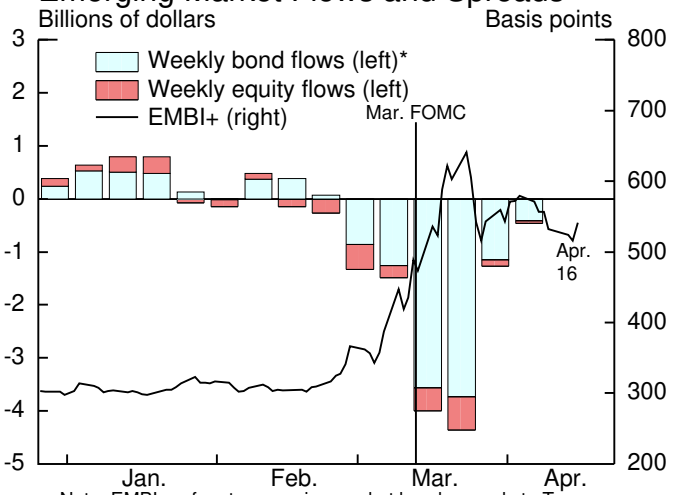
Source: Bloomberg; FRBNY; Board staff calculations.

Equity Indexes



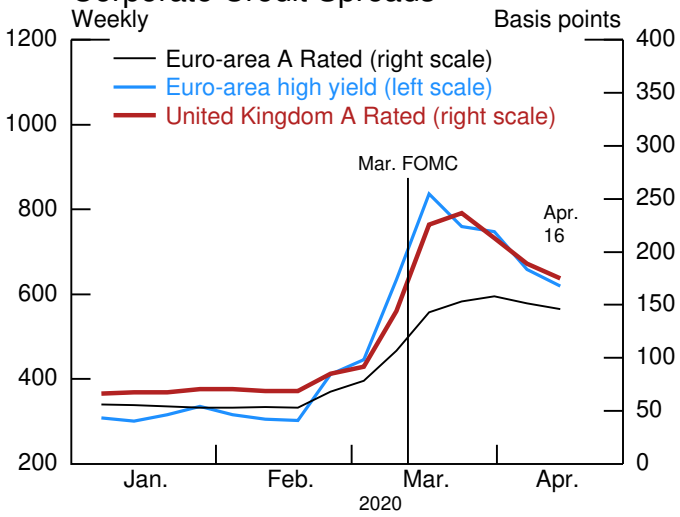
Note: Indexes denominated in local currency.
Source: Bloomberg.

Emerging Market Flows and Spreads



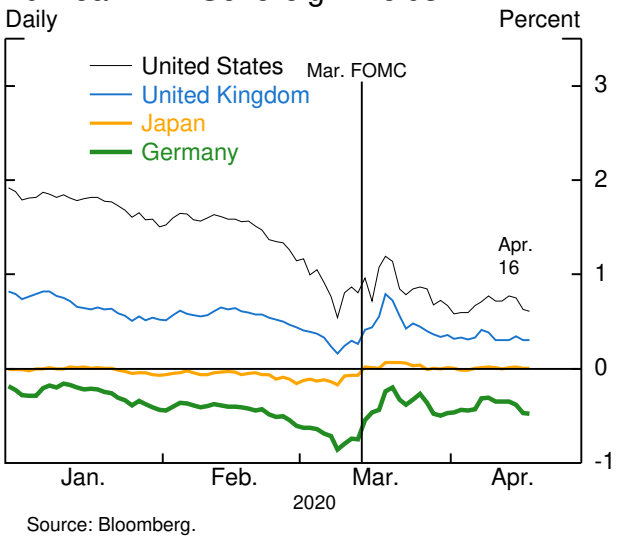
Note: EMBI+ refers to emerging market bond spreads to Treasury securities. Excludes intra-China flows.
* Average weekly flow by month.
Source: Emerging Portfolio Fund Research, J.P. Morgan EMBI+.

Corporate Credit Spreads



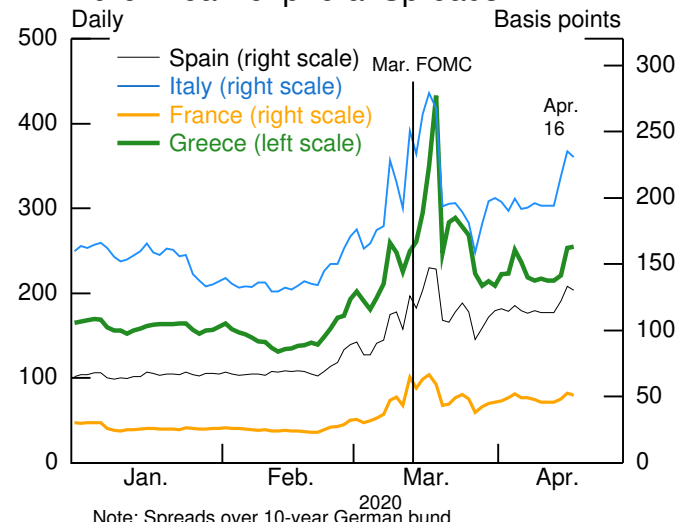
Source: Bloomberg; Bank of America Merrill Lynch.

10-Year AFE Sovereign Yields



Source: Bloomberg.

Euro-Area Peripheral Spreads



Note: Spreads over 10-year German bund.
Source: Bloomberg.

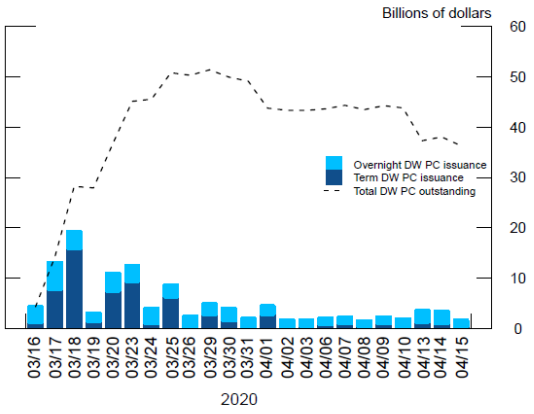
Primary Credit Borrowing in Response to Program Changes

Discount window borrowing under the primary credit program increased dramatically following changes to the program effective March 16, as seen in figure 1, which included more favorable loan terms and policymaker communications encouraging usage.[1] The primary credit rate was set to the top of the federal funds rate target range, narrowing its spread to the interest rate on excess reserves by 50 basis points. The program's changes allow depository institutions to borrow primary credit for as long as 90 days, with features allowing for favorable treatment under the Liquidity Coverage Ratio. Additionally, large regional banks may have been more comfortable borrowing primary credit following changes to the H.4.1 statistical release that made it much more difficult for the public to identify large discount window borrowings by District, thus potentially reducing stigma.[2]

Primary credit outstanding reached $50 billion in late March—its highest level since the financial crisis—with the volume of term loan issuance outpacing that of overnight loans. Since the program changes, there have been nearly 1,450 primary credit loan originations, totaling about $115 billion. While initial borrowing from the program was dominated by U.S. global systemically important banks (G-SIBs), usage overall has been widespread, with 581 unique borrowers. Smaller institutions (with assets less than $10 billion) have been the most frequent borrowers, and midsized institutions (with assets ranging from $50 to $250 billion) have borrowed the most in aggregate.

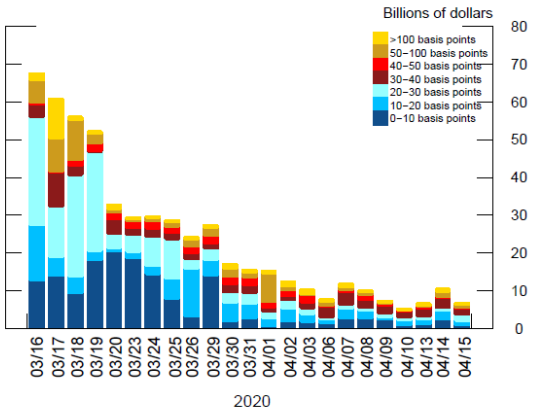
Amid rate pressures in money markets early in the intermeeting period and a lower primary credit rate, borrowing in unsecured markets (fed funds, Eurodollar, and selected deposits) above the primary credit rate was elevated, as seen in figure 2, suggesting that some discount window stigma likely still persisted. As broader market conditions have eased, unsecured borrowing above the primary credit rate has come down notably, from $67 billion on March 16 to about $7 billion on April 15, and so too have the typical spreads to the primary credit rate on these transactions.

Figure 1: Discount Window Primary Credit Origination and Outstanding Volumes



Note: DW is discount window, and PC is primary credit.
Source: Federal Reserve Banks.

Figure 2: Volumes and Spreads of Unsecured Borrowing above the Discount Window Primary Credit Rate



Source: Federal Reserve Board, Form FR 2420, "Report of Selected Money Market Rates."

[1] These communications include the Board's statement on March 15 amplified by the Chair's press conference remarks, a joint statement by regulatory agencies on March 16, and targeted outreach to banks. In addition, several U.S. G-SIBs publicly stated their intentions to borrow from the discount window.

[2] See Board of Governors of the Federal Reserve System (2020), "Federal Reserve Board Encouraged by Increase in Discount Window Borrowing to Support the Flow of Credit to Households and Businesses," press release, March 19, https://www.federalreserve.gov/newsevents/pressreleases/monetary20200319c.htm.

Central Bank Liquidity Swaps and FIMA Repo Facility

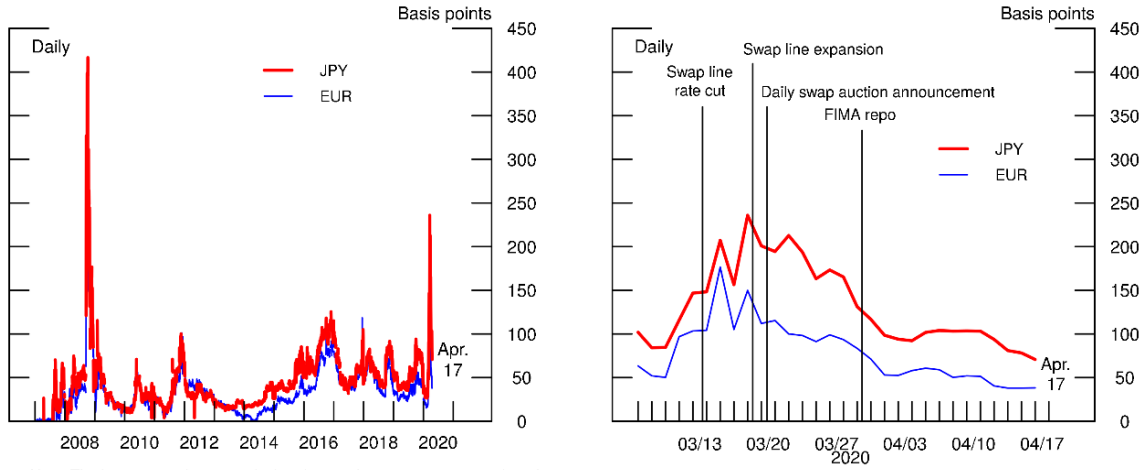
As the COVID-19 pandemic has roiled global financial markets, global dollar funding activity has also become strained, making it more difficult and costly to borrow U.S. dollars. The U.S. dollar is used extensively as a funding and investment currency, playing a critical role in the global financial system. Foreign corporations borrow in dollars to fund dollar business activities or to widen their potential investor base, thereby lowering their borrowing costs. Many foreign governments and firms also borrow in dollars, as their domestic currencies can be considered more volatile and risky by global investors. Foreign financial institutions borrow dollars to lend (either through bank loans or investments in debt securities) both to a broad array of foreign borrowers and to U.S. households and firms.

In general, foreign financial institutions do not have ready access to U.S. retail deposits or other stable sources of dollar funding, and they thus rely more heavily on wholesale funding markets than do U.S. borrowers. As a result, when these wholesale funding markets seize up, as occurred during the Global Financial Crisis (GFC) and recently as COVID-19 emerged, foreign financial institutions may be disproportionately affected. They not only may cut back on lending to foreign borrowers, thereby exacerbating disruptions in global markets, but also may reduce lending to U.S. residents and liquidate holdings of U.S. assets in order to obtain dollars, creating negative spillovers to U.S. borrowers and markets.

In response to disruptions in wholesale dollar funding markets, foreign institutions typically increase their reliance on the foreign exchange (FX) swap market for dollar funding. Using swaps entails using foreign currency to purchase dollars, with an agreement to reverse the transaction (using dollars to repurchase foreign currency) at a later date. In March, stresses in U.S. commercial paper and other wholesale dollar funding markets pushed foreign borrowers to make greater use of the FX swap market to borrow dollars. This heightened demand pushed up the cost of borrowing dollars through the FX swap market compared to the cost of directly borrowing dollars. In principle, arbitrage should keep these two costs very close to one another, but market participants' balance sheet constraints and liquidity preferences can impede arbitrage, especially when markets are stressed. The difference between these two borrowing costs, known as the FX swap basis spread, is a key measure of stress in global dollar funding markets.[1] As shown in the left panel of figure 1, these spreads widened to levels not seen since the GFC. The increases may have been exacerbated by shifts to remote working arrangements in many financial centers, which likely affected the intermediation capacity and willingness of a number of institutions to supply dollars via FX swaps.

[1] More precisely, in an FX swap transaction, one exchanges foreign currency for dollars at the "spot" exchange rate while contracting at the same time to reverse that transaction at a future date at an agreed-upon "forward" exchange rate. The total cost of borrowing dollars via an FX swap consists of the interest rate on borrowing the foreign currency plus the additional interest rate implied by the difference between the spot and forward exchange rates. The difference in dollar funding costs between the FX swap and direct borrowing markets, the "FX swap basis spread," can widen when there is stress in dollar funding markets.

Figure 1. Three-Month FX Swap Basis Spreads



Note: The basis spreads were calculated using the respective overnight index swap rates.
Source: Federal Reserve Bank of New York calculations based on data from Bloomberg Finance LP.

The Federal Reserve responded to these strains by announcing the expansion and enhancement of dollar liquidity swap lines and by introducing the FIMA Repo Facility, a new temporary repurchase agreement (repo) facility for foreign and international monetary authorities. The Federal Reserve's dollar liquidity programs aim to mitigate these strains, limiting any adverse effects on U.S. households and businesses.

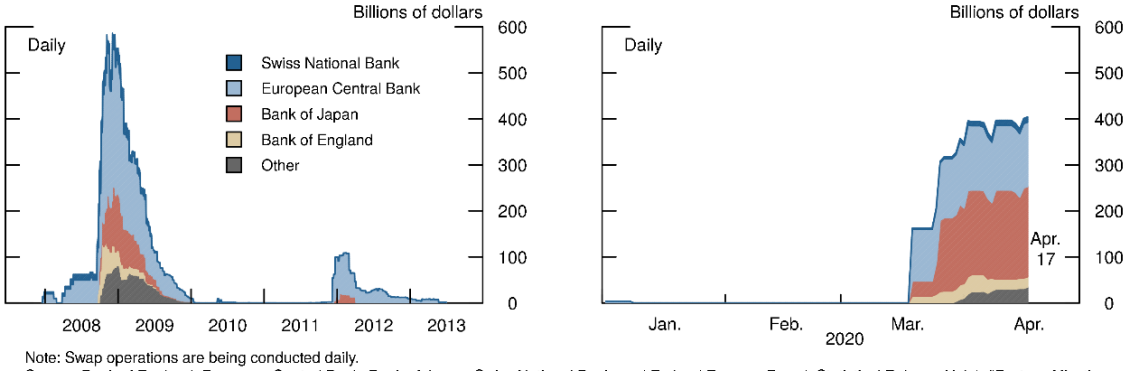
THE FEDERAL RESERVE'S DOLLAR LIQUIDITY SWAP LINES AND THEIR PAST USAGE

Under the Federal Reserve's dollar liquidity swap arrangements, the Federal Reserve provides U.S. dollars to a foreign central bank in exchange for the equivalent amount of funds in the foreign central bank's currency based on the market exchange rate at the time of the transaction. This "swap" provides the foreign central bank with dollars that it can supply to financial institutions in its jurisdiction. The Federal Reserve and the foreign central bank agree to swap back the same quantities of their two currencies at a specified date in the future, removing FX risk and other market risks. Because the swap agreements are with central banks, there is no credit risk exposure of the Federal Reserve to private counterparties such as foreign commercial banks. The foreign central bank requesting the transaction pays a fee equal to the U.S. dollar overnight index swap (OIS) rate for the maturity equal to the maturity of the drawing plus a spread that over time has ranged between 25 and 100 basis points.

Swap lines were established in late 2007 with four central banks—the European Central Bank (ECB), the Bank of England (BOE), the Bank of Japan (BOJ), and the Swiss National Bank (SNB)—and were later extended to a larger group of central banks in jurisdictions with significant involvement in dollar funding markets as the GFC deepened.[2] As shown in the left panel of

[2] The additional swap line agreements were with the central banks of six advanced foreign economies—Australia, Canada, Denmark, New Zealand, Norway, and Sweden—and four emerging market economies—Brazil, Korea, Mexico, and Singapore.

Figure 2. Central Bank Dollar Liquidity Swaps Outstanding



Note: Swap operations are being conducted daily.
Source: Bank of England; European Central Bank; Bank of Japan; Swiss National Bank; and Federal Reserve Board, Statistical Release H.4.1, "Factors Affecting Reserve Balances."

figure 2, usage of these swap lines reached a peak of $586 billion in December 2008 and proved effective in narrowing FX swap basis spreads and, more generally, helping to reduce pressure in dollar funding markets. Swap lines with major central banks also helped relieve stresses in these markets that re-emerged during the 2010–12 European sovereign debt crisis.[3]

USAGE OF THE FEDERAL RESERVE'S DOLLAR SWAP LINES

In response to the COVID-19 pandemic and accompanying stresses in dollar funding markets, the swap lines were expanded and enhanced in three ways during the week of March 15, 2020. On March 15, the swap fee spread above the OIS rate was reduced from 50 basis points to 25 basis points, and four central banks began offering swaps with a maturity of 84 days in addition to their usual 7-day operations. On March 19, temporary swap lines were reopened with the nine central banks that had had temporary agreements during the GFC. On March 20, the five foreign central banks with standing swap agreements announced that they would begin daily auctions for their 7-day maturity operations.[4]

As shown in the right panel of figure 2, the auctions initially conducted by the ECB, BOE, BOJ, and SNB met with extremely strong demand, especially for the 84-day operations. Other central banks started auctions once they had the operational infrastructure in place. As of April 17, swaps outstanding stood at $404 billion, of which $385 billion was in the 84-day maturity. Demand has been strongest from the BOJ, at $196 billion, and the ECB, at $140 billion. The strong demand from Japan is likely a result of the country's large stock of dollar assets typically financed by short-term borrowing. Participation by central banks with temporary arrangements has been lower but still sizable, at $35 billion.

[3] The swap lines were allowed to lapse in February 2010 but when funding strains re-emerged in May 2010, the swap lines were re-established with five central banks: the Bank of Canada, the ECB, the BOE, the SNB, and the BOJ. These temporary swap lines were converted in October 2013 to standing lines with no pre-set expiration date. The Federal Reserve also has foreign currency liquidity swap lines that allow it to obtain foreign currencies from these central banks. The foreign liquidity swap lines have not been used except for small-value testing.

[4] See Board of Governors of the Federal Reserve System (2020), "Federal Reserve Announces the Establishment of Temporary U.S. Dollar Liquidity Arrangements with Other Central Banks," press release, March 19, https://www.federalreserve.gov/newsevents/pressreleases/monetary20200319b.htm.

In this most recent episode, the swap lines again appeared effective at diminishing strains in dollar funding markets. The announcements had an immediate positive effect on markets and were viewed as lessening strains in dollar funding markets. Though still elevated from pre-COVID-19 levels, three-month swap basis spreads fell back to levels seen in early March (right panel of figure 1).

THE FEDERAL RESERVE'S TEMPORARY FIMA REPO FACILITY

In addition to the swap line enhancements, on March 31, the Federal Reserve announced a new program to support dollar funding markets, the FIMA Repo Facility. This facility is designed to provide a reliable source of dollar liquidity to a broad range of countries, many of which do not have swap line arrangements with the Federal Reserve. Under this facility, FIMA account holders (which include foreign central banks and other monetary authorities) can enter into overnight repos with the Federal Reserve, temporarily exchanging U.S. Treasury securities they hold with the Federal Reserve for U.S. dollars, which can then be made available to institutions in their jurisdictions. This facility is intended as a backstop, with the rate set at the discount rate plus 25 basis points.

The FIMA Repo Facility allows central banks to obtain dollars without selling their Treasury securities outright and allows a smoothing of planned sales, which should help to prevent Treasury market disruptions and upward pressures on yields. Though usage of this facility so far has been minimal, with the first accounts in the process of being set up and tested, market participants have indicated that the announcement of the FIMA facility contributed to easing strains in offshore dollar funding markets.

three-month swaps), where some participants still appear reluctant to provide dollar liquidity to the market despite the large dollar operations of foreign central banks.

Demand for dollar-denominated assets continued to be strong and supported the exchange value of the dollar. Over the intermeeting period, the staff's broad dollar index increased close to 2.5 percent, with the dollar appreciating about 1.5 percent against AFE currencies and about 3.5 percent against EME currencies. The broad dollar index is now close to 8 percent higher since the beginning of the year. Currencies of commodity exporters with existing macroeconomic vulnerabilities, such as the Mexican peso and Brazilian *real,* depreciated sharply during the intermeeting period. Pressure on the peso intensified further following the downgrade of Mexico's long-term sovereign debt in mid-April. Liquidity in spot FX markets deteriorated early in the period as measures of implied volatility spiked and trading volumes moved sharply higher. In recent weeks, conditions have improved along with sentiment, but these markets remain relatively illiquid, particularly for EME currencies. The illiquidity is likely due in part to the high number of traders working from home in London and New York, where a large share of the global FX trading volume is conducted.

Foreign equity prices were volatile over the intermeeting period, with indexes declining up to 20 percent the week following the March FOMC meeting and as much as 30 percent since the start of the pandemic. Advanced-economy equity indexes subsequently posted notable rebounds following extraordinary monetary and fiscal policy action in the United States and abroad, but a significant amount of uncertainty remains and measures of equity-implied volatility abroad are still elevated. Most AFE equity indexes are between 3 and 15 percent higher, but the rebound was more modest in many EME countries and indexes remain slightly lower on net. U.K. and euro-area bank equities significantly underperformed, falling 16 percent and 13 percent, respectively, as regulators in these jurisdictions urged banks to refrain from paying dividends and buying back shares in order to boost banks' capacity to absorb losses and support lending. Mexican and Brazilian equity indexes underperformed other emerging market equities, falling about 11 percent and 6 percent, respectively. Exceptionally strong outflows from emerging market mutual funds suggest sales by foreign investors contributed to the price declines.

The improvements in foreign corporate debt markets were more modest. Some measures of European nonfinancial corporate bond spreads retraced some of the earlier

widening and ended the intermeeting period about unchanged, while high-yield corporate bond spreads in emerging Asia and Latin America widened more than 150 basis points; corporate bond spreads abroad are currently near the levels observed in previous episodes of severe stress. Foreign corporate bond markets suffered from the same lack of liquidity observed in U.S. markets, although new asset purchase programs announced in the United States and several other countries helped improve liquidity conditions. Total nonfinancial corporate debt issuance abroad was subdued over the intermeeting period despite acceleration of activity late in the period by high-rated firms as conditions improved, though very little high-yield debt has been issued. In emerging markets, EMBI spreads widened sharply and capital outflows reached record levels as investors withdrew from emerging market bond funds in mid-March. As global sentiment improved somewhat, EME capital outflows slowed and the EMBI spread partially retraced earlier declines.

Advanced-economy sovereign yields were also volatile over the intermeeting period and were unchanged or modestly higher on net. Policy rates in most major AFEs are now at or near their effective lower bounds, and market-based policy expectations suggest that policy rates will remain at these levels at least through 2021. In Germany, yields were modestly higher, reflecting the country's announced sizable fiscal package, which increased expectations for debt issuance, and expectations that the ECB will direct asset purchases toward peripheral sovereign bonds and away from German bonds. Early in the period, peripheral euro-area sovereign spreads narrowed significantly amid reported increases in ECB purchases, but these moves were retraced as the announced euro-zone fiscal support fell short of hopes for a common-liability euro-zone debt instrument to fund COVID-19 measures. Market-based long-term inflation expectations in the euro area declined sharply to a historically low level earlier in the period but have since partially retraced and now stand at close to 1 percent.

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Financing Conditions for Businesses and Households

Financing conditions for businesses and households have been strained over the intermeeting period, with preliminary indicators pointing to a slowdown of financing flows to lower-rated firms, small businesses, and households since the coronavirus (COVID-19) outbreak. Federal Reserve announcements of facilities to support the flow of credit to businesses, households, and state and local governments appeared to improve financing conditions in many markets, although conditions have yet to normalize. Other Federal Reserve actions, including asset purchases and new guidance on bank activities, also helped support financing conditions for businesses and households.

- Gross issuance of investment-grade corporate bonds has been strong since the Federal Reserve's announcement of corporate credit facilities. In contrast, the markets for speculative-grade corporate bonds and leveraged loans have only recently begun to thaw. C&I lending has been strong, but conditions are currently somewhat tight and poised to tighten further.

- Credit quality and the earnings outlook of nonfinancial corporations deteriorated substantially. Market analysts currently forecast a record volume of downgrades of nonfinancial corporate bonds, including a substantial volume from triple-B to speculative grade.

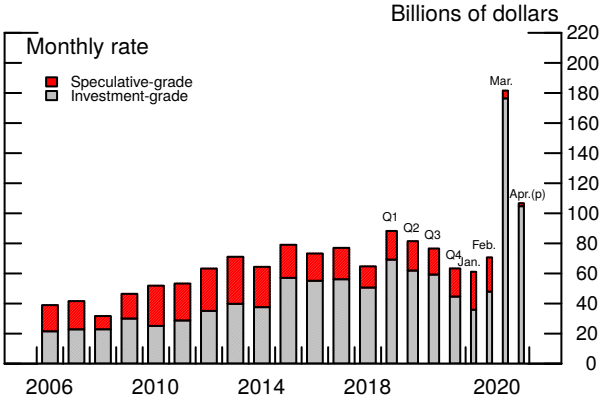
- While the Small Business Administration has approved, as of April 15, approximately $330 billion in loan applications under the new Paycheck Protection Program (PPP), only about 20 percent of funds have been disbursed to small businesses so far. The April 2020 SLOOS pointed to a significant tightening of bank lending standards for new loans and credit lines to small businesses.

- Conditions in residential mortgage markets appear tight for low-rated borrowers and other borrowers who rely on nonconforming mortgages. Nonetheless, mortgage rates remain low relative to historical standards, and indicators of refinancing activity suggest ongoing strength.

- Current financing conditions for consumer credit have tightened somewhat but do not appear to be acting as a drag on consumer spending. While banks

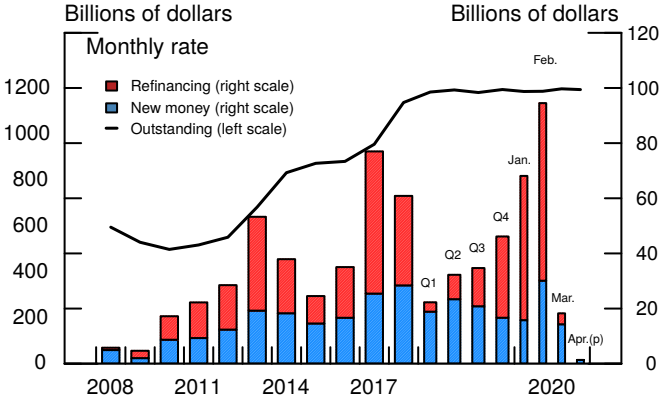
Business Finance

Gross Issuance of Nonfinancial Corporate Bonds



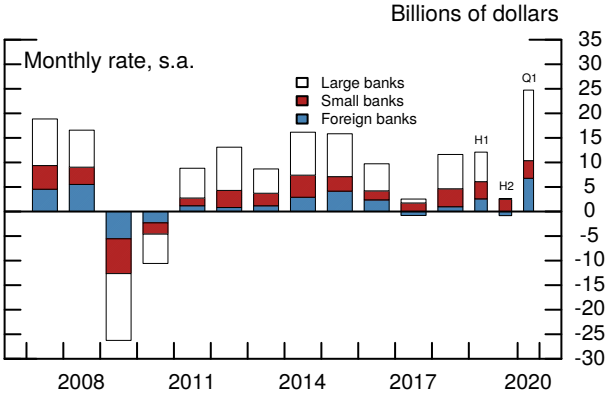
Note: Bonds are categorized by Moody's, Standard & Poor's, and Fitch.
p Preliminary.
Source: Mergent Fixed Income Securities Database.

Institutional Leveraged Loan Issuance, by Purpose



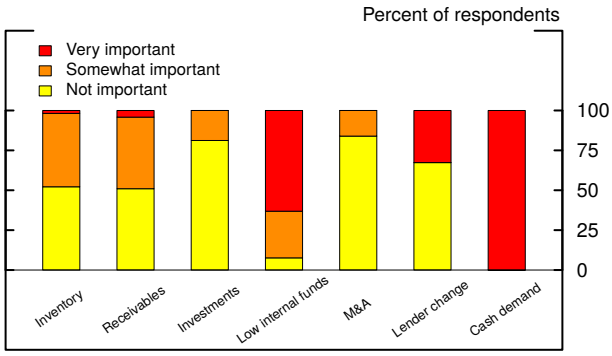
p Preliminary.
Source: Thomson Reuters LPC LoanConnector.

Commercial and Industrial Loans



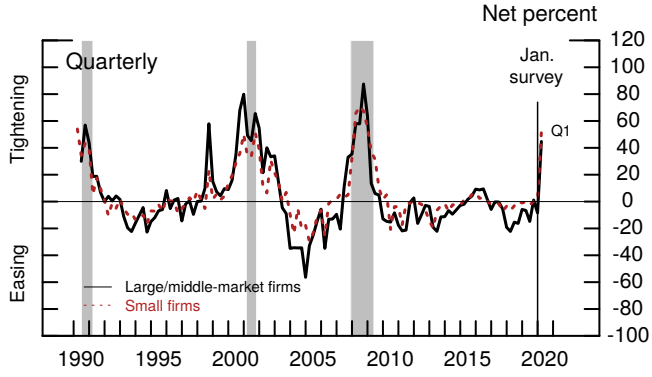
Source: Federal Reserve Board staff calculations; Federal Reserve Board, Form FR 2644, Weekly Report of Selected Assets and Liabilities of Domestically Chartered Commercial Banks and U.S. Branches and Agencies of Foreign Banks.

Reasons for Stronger C&I Loan Demand



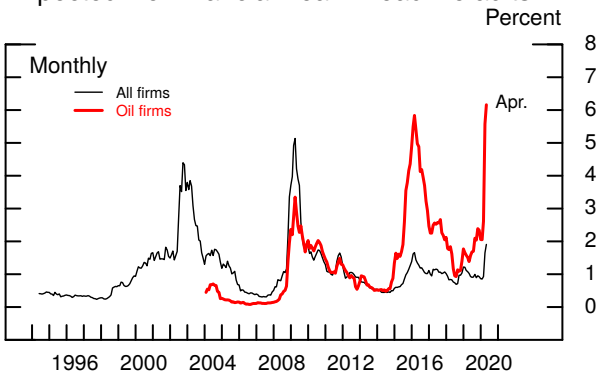
Note: In the April 2020 SLOOS, banks reported the following reasons for stronger commercial and industrial (C&I) loan demand: customer inventory financing needs increased, customer accounts receivable financing needs increased, customer investment increased, customer internally generated funds decreased, customer mergers and acquisitions (M&A) financing needs increased, customer borrowing shifted from other lenders, customer demand for cash increased.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS).

Standards for C&I Loans



Note: The most recent data are from the April 2020 SLOOS. Banks' responses are weighted by the outstanding amount of commercial and industrial (C&I) loans on their balance sheets at the end of the previous quarter. The shaded regions indicate periods of business recession as defined by the National Bureau of Economic Research.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS).

Expected Nonfinancial Year-Ahead Defaults



Note: Firm-level estimates of default weighted by firm liabilities as a percent of total liabilities, excluding defaulted firms.
Source: Calculated using firm-level data from Moody's KMV.

Financing Conditions

in the April SLOOS reported tightening underwriting standards on new consumer loans, respondents indicated that they also experienced weaker demand across all consumer loan types.

- Concerns about the finances of state and local governments contributed to a marked deterioration in credit conditions in the municipal bond market in March. Strains appear to have lesssened somewhat amid the Federal Reserve's announcement of facilities to support the flow of credit and liquidity to state and local governments.

BUSINESS FINANCING CONDITIONS

Nonfinancial Businesses

Financing conditions for nonfinancial firms are currently somewhat tight, as conditions have improved notably over the past few weeks. The primary market for speculative-grade bonds and leveraged loans was shuttered for nearly all of March, but gross issuance in these markets has resumed, albeit at a slow pace, in April. Investment-grade issuance has been robust since the Federal Reserve's announcements, in mid and late March, of new corporate credit and funding facilities—specifically, the Commercial Paper Funding Facility (CPFF), the Primary Market Corporate Credit Facility, the Secondary Market Corporate Credit Facility, and the Term Asset-Backed Securities Loan Facility (TALF). Conditions in the market for corporate bonds and loans improved further in response to the Federal Reserve's announcement in April to expand corporate credit facilities to include firms that have been recently downgraded to just below investment grade.

C&I lending conditions are currently somewhat tight and poised to tighten further. C&I loans on banks' books soared in March, largely driven by credit-line drawdowns in the second half of the month, as firms reportedly rushed to shore up liquidity for precautionary motives and to meet funding needs. Banks commented that while drawdowns were widespread across sectors, large firms in the transportation, travel, and manufacturing industries accounted for a large share of the volume. Meanwhile, banks reported in the April SLOOS having tightened their C&I lending standards and terms significantly for firms of all sizes. Almost all banks cited a less favorable or more uncertain economic outlook as important reasons for tightening. To support bank lending

to midsize businesses, the Federal Reserve announced in April the establishment of the Main Street Lending Program (MSLP).

Credit quality of nonfinancial corporations has deteriorated sharply. The volume of nonfinancial corporate bond downgrades vastly outpaced the volume of upgrades, and downgrades were broad based across sectors and credit ratings. Market analysts currently forecast a record volume of downgrades from triple-B to speculative grade. The KMV expected year-ahead default rate increased sharply in March, driven by speculative-grade and oil firms. The corporate earnings outlook deteriorated substantially and remains highly uncertain, as analysts and investors expect delayed reports and withdrawn forecasts from many companies. Private-sector equity analysts estimates suggest that earnings per share for S&P 500 companies fell 12 percent in the first quarter relative to the previous quarter, a significant decline since the March FOMC meeting. Twelve-month-ahead earnings expectations were revised down noticeably in March, and further downward revisions are expected in coming months after companies provide additional information about their operations.

Equity markets for new and seasoned issues appear generally open. Gross equity issuance through both initial and seasoned offerings has been muted over the intermeeting period. However, market commentary remains cautiously optimistic, suggesting that issuers are awaiting a less volatile market.

Small Businesses

Credit conditions for small businesses are tight. Prominent small-business fintech lenders have reportedly ceased originating new loans, in particular to firms in industries most directly affected by the COVID-19 pandemic. In addition, data from the April SLOOS show a large increase in the share of banks reporting that they have tightened standards for new credit to small businesses. In response to the significant decline in small business operational performance, anecdotal evidence suggests that many lenders are providing some relief plans that allow existing customers to defer interest and principal payments for 90 days.

Demand by small businesses for PPP loans, created under the Coronavirus Aid, Relief, and Economic Security Act (Cares Act), has been extremely high, with approximately $330 billion in loan approvals since the launch of the program. However, banks have raised concerns about their limited ability to meet demand, citing various

implementation challenges. To bolster the effectiveness of the PPP, the Federal Reserve announced it would establish the Paycheck Protection Program Liquidity Facility to provide term financing, backed by PPP loans, to eligible banks.[1] The Federal Reserve's announcement of the MSLP may further support bank lending to small firms, as firms that obtain loans through the PPP can also participate in the MSLP.

Commercial Real Estate

Financing conditions for commercial real estate (CRE) are strained. Non-agency CMBS issuance shut down as a result of volatility in structured credit markets and an increase in default risk for CRE borrowers. The extension of TALF to include non-agency CMBS as eligible collateral reportedly helped narrow secondary market spreads of non-agency CMBS yields to Treasury yields. However non-agency CMBS issuance has not resumed yet, and no new deals are expected to be priced in the coming weeks. Meanwhile, agency CMBS issuance continued, supported by the Federal Reserve's purchases of these securities.[2]

Most SLOOS respondents reported having tightened lending standards for CRE loans, and industry surveys indicate that banks and insurance companies have pulled back on new CRE loan originations in recent weeks. CRE loans on banks' books increased in the second half of March, as banks were unable to securitize some nonresidential loans. In addition, some borrowers drew down existing credit lines on construction and land development loans, as social-distancing measures, prompted by the COVID-19 outbreak, are extending construction completion times and reducing borrowers' ability to raise longer-term funding.

State and Local Government Financing Conditions

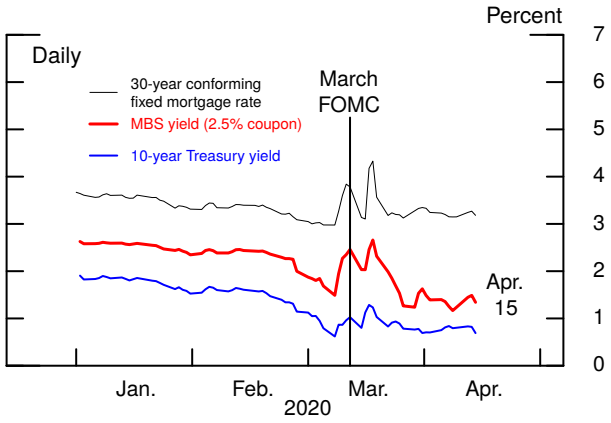
Credit conditions in municipal bond markets have improved but have not yet normalized. The spread between municipal bond yields to Treasury yields increased in March to near the top of its historical distribution, and issuance declined markedly amid concerns about the fiscal prospects of state and municipal governments due to increased pandemic-associated expenses and a delay in tax revenues. The inclusion of variable-rate

[1] To further increase the program's effectiveness, U.S. federal bank regulators issued an interim final rule clarifying that loans covered by the PPP would have a 0 percent risk weight for bank capital requirements.

[2] Agency CMBS typically funds mortgages backed by multifamily properties, especially affordable housing. Non-agency CMBS funds mortgages collateralized by a much broader array of commercial properties.

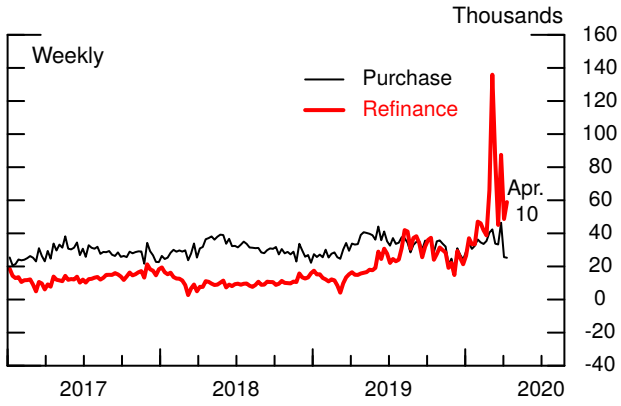
Household Finance

Mortgage Rate and MBS Yield



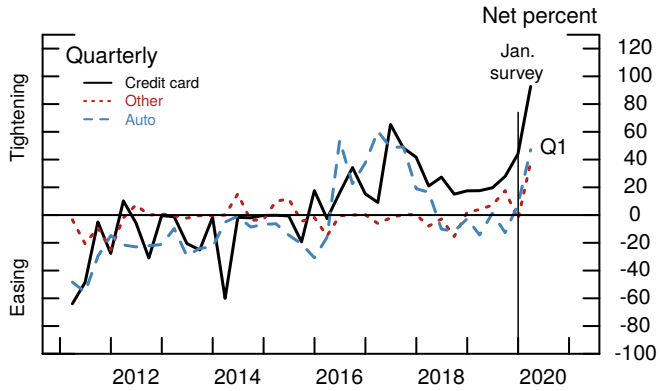
Note: The mortgage-backed securities (MBS) yield is from Fannie Mae through May 31, 2019, and from uniform MBS thereafter.
Source: For mortgage rate, Optimal Blue; for MBS yield, Barclays.

Number of Rate Locks



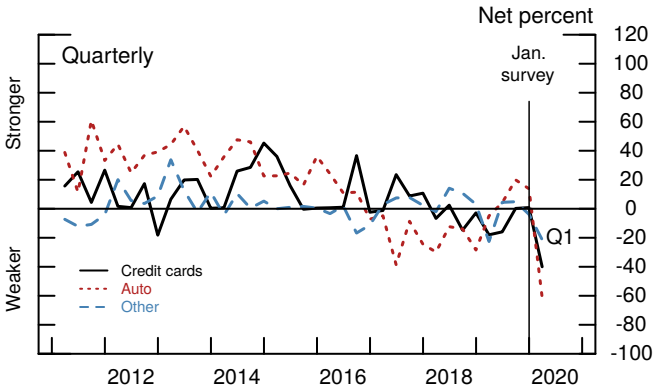
Note: Data are seasonally adjusted by Board staff.
Source: Optimal Blue.

Standards for Consumer Loans



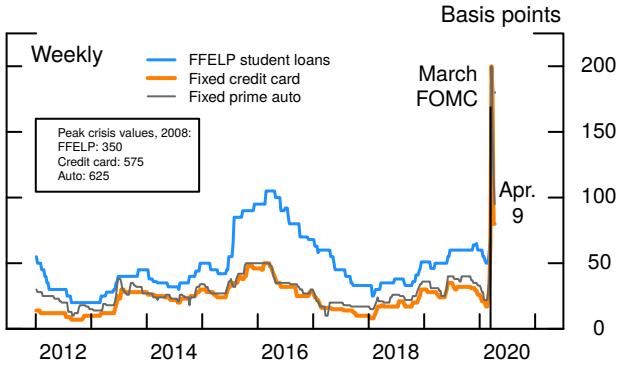
Note: Banks' responses are weighted by the outstanding amounts of the relevant loan categories on their balance sheets at the end of the previous quarter.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS).

Demand for Consumer Loans



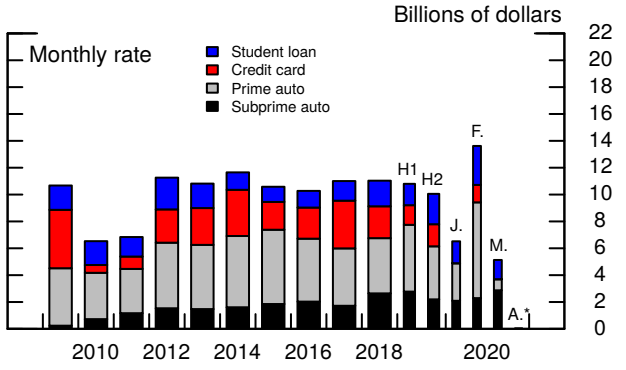
Note: Banks' responses are weighted by the outstanding amounts of the relevant loan categories on their balance sheets at the end of the previous quarter.
Source: Federal Reserve Board, Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS).

Selected ABS Spreads (3-Year Triple-A)



Note: Spreads are to swap rate for credit card and auto asset-backed securities (ABS) and to 3-month LIBOR for student loans. FFELP is Federal Family Education Loan Program.
Source: J.P. Morgan.

Consumer ABS Issuance



* Month to date.
Note: ABS is asset-backed securities.
Source: Merrill Lynch; Bloomberg.

Financing Conditions

demand obligation notes in the Federal Reserve's Money Market Mutual Fund Liquidity Facility, along with the inclusion of municipal commercial paper in the CPFF, while only directly affecting the market for short-term municipal securities, reportedly improved risk sentiment in the broader municipal bond market. The subsequent announcement of the Federal Reserve's Municipal Liquidity Facility appeared to further improve conditions in the municipal bond market. In April, spreads tightened, and primary-market bond issuance picked up for states and municipalities across ratings categories from the very low levels seen in late March.

Despite these recent positive developments, state-specific CDS spreads are still elevated for many states, with those for Illinois, Connecticut, New Jersey, and California at or above the 75th percentile of their historical distribution. Of note, S&P and Moody's placed Illinois—currently rated triple-B-minus—on negative credit watch because of the economic, pension, and budgetary threats posed by the COVID-19 pandemic.

HOUSEHOLD FINANCING CONDITIONS

Residential Real Estate

Financing conditions in the residential mortgage market are quite tight for lower-rated borrowers and other borrowers who rely on nonconforming segments of the market, but credit is still flowing to higher-score borrowers who can fit into standard conforming loan criteria. Faced with uncertainty about exposure to the costs and liquidity strains associated with potentially widespread forbearance (see the box "Forbearance and Liquidity Stress of Nonbank Mortgage Servicers: Implications for Credit Supply"), many mortgage originators and warehouse lenders have announced tighter underwriting standards on new originations in order to reduce their exposure to borrowers who are more likely to enter forbearance or have difficulty resuming their payments when the forbearance period ends. Tighter standards include imposing credit score floors in a range of 680 to 700 and increasing requirements for employment documentation. In the April SLOOS, banks reported having tightened standards on jumbo loans, and the markets for new-issue securitized jumbo and nonqualified mortgage are frozen.

The pressures facing originators and servicers have led to a considerable widening of the spread between the primary mortgage rate and MBS yields. Nevertheless, primary mortgage interest rates are low relative to historical standards, and available indicators suggest that refinance activity remained elevated through early April. The volume of mortgage rate locks for home-purchase loans dropped materially in early April, reflecting

Forbearance and Liquidity Stress of Nonbank Mortgage Servicers: Implications for Credit Supply

The Cares Act provides a right to forbearance for up to 12 months to homeowners experiencing hardships associated with coronavirus (COVID-19) who have mortgages in pools guaranteed by Fannie Mae, Freddie Mac, and Ginnie Mae.[1] Large-scale take-up of forbearance would put nonbank mortgage servicers under significant liquidity strains because their servicing contracts require them to advance payments (principal, interest, taxes, and insurance) to investors and other authorities even if servicers do not receive payments from borrowers.[2] The liquidity strains faced by nonbank servicers could result in a material decrease in credit supply because many nonbank servicers also originate new loans.

Advance payment requirements are particularly challenging for nonbank servicers for two main reasons. First, their servicing portfolios have higher concentrations of mortgages in Ginnie Mae pools, and these loans are more likely to enter forbearance because the borrowers have lower credit scores. Second, nonbanks do not hold enough liquid assets to cover advances on their own. In the fourth quarter of 2019, the cash holdings of the top 30 nonbank servicers amounted to $4.2 billion.[3] Even if only 10 percent of borrowers were to take up forbearance, these nonbank servicers' cash holdings would cover advances for only a few months (top row of table 1). Their monthly income from servicing fees and mortgage origination, at less than $1 billion in the fourth quarter, is not enough to make up the difference. Moreover, nonbanks have fewer external sources of liquidity. They do not have access to Federal Home Loan Banks or the

Table 1. Monthly Advance Requirement for Top 30 Nonbank Servicers
(Billions of dollars)

Forbearance take-up rate	Ginnie advance	GSE advance	Total
10 percent	.8	1.3	2.1
20 percent	1.7	2.6	4.3
30 percent	2.5	4.0	6.5

Source: eMBS as of March 2020.

[1] Most of the loans in Ginnie Mae pools are FHA and VA loans. FHA and VA provide credit guarantees on the mortgages, while Ginnie Mae guarantees timely payments to holders of bonds backed by FHA and VA loans.

[2] Servicers eventually get reimbursed for these payments after the forbearance period, which can last up to 12 months.

Servicers have reportedly been offering forbearance even for loans that are not covered by the Cares Act, creating additional liquidity pressure because servicers are also required to advance payments for loans in private-label securities.

[3] The top 30 nonbanks' shares of servicing were 40 percent for the GSEs and 59 percent for Ginnie Mae as of March 2020.

discount window. Although servicers can borrow against advances from private lenders to some extent, many servicers do not have existing borrowing facilities for these advances, and the process of setting up new facilities is slow and cumbersome.

In response to likely liquidity shortages, Ginnie Mae established a liquidity facility on April 10 to cover principal and interest advances for its loans. This facility alone is unlikely to address liquidity shortages fully because it does not cover advances for taxes and insurance, which amount to about 25 percent of total required payments. Moreover, servicers will need to finance GSE advances in other ways because the GSEs do not plan to establish a liquidity facility.

In the short term, nonbank servicers, faced with liquidity pressures, may stop extending credit to riskier borrowers because they are more likely to need to fund servicing advances for these loans.[4] Additionally, warehouse lenders that provide liquidity for nonbanks to finance loan originations may refuse to lend against loans to high-risk borrowers, because loans could enter forbearance before securitization. Such loans would be ineligible for sale to the GSEs or Ginnie Mae and would fall in value.

In the longer term, a large-scale forbearance take-up could cause some nonbanks to fail. Their failure would have a substantial effect on the aggregate mortgage market, as nonbanks originated 40 percent of all mortgages in 2019. The contraction in credit would be more pronounced for borrowers who depend on FHA and VA financing, as nonbanks originated more than 80 percent of these loans. These borrowers tend to be those with low credit scores or high loan-to-value (LTV) ratios, and, consequently, many first-time homebuyers rely on this source of financing (table 2).

The implications for aggregate credit availability depend on the extent to which borrowers would be able to find an alternative source of credit. It is unclear whether banks would be willing to lend on a large scale to low-score borrowers. In the early 2010s, many banks pulled back from originating loans to low-score borrowers—primarily FHA and VA loans—because of potential legal and reputational risks and higher servicing costs associated with foreclosures in the event these borrowers defaulted. Banks might be willing to originate GSE mortgages to these borrowers because the default servicing costs are lower for these loans. However, lower-score borrowers would face a higher cost of credit than they currently obtain from the FHA or VA because of the risk-based pricing parameters of the GSEs.

[4] By originating a loan, lenders create an obligation to service the loan. Originators that do not want to service the loan themselves could sell the servicing. But it is not always easy to find buyers for this servicing, and it is especially difficult now because of the forbearance risk.

The effect on credit availability for borrowers with a low down payment would likely not be as severe if banks remain willing to originate high LTV loans. The GSEs have special loan programs for borrowers with low down payments. Thus, many first-time homebuyers—who tend to have low down payments—might still be able to access credit, even in the extreme scenario of a collapse of nonbank lending, because a large fraction have reasonably high credit scores. However, if banks tighten the down payment requirement because of the economic uncertainty due to the pandemic, even higher-score first-time homebuyers might not be able to access credit.

Table 2. Ginnie Mae's Share in Origination of Federally Backed Mortgages within Borrower Groups in 2019
(Percent)

	Overall	Credit score ≤ 680	LTV ≥ 95	Credit score ≤ 680 and LTV ≥ 95
Among all borrowers	33	76	66	94
Among first-time homebuyers	46	85	63	93

Note: Federally backed mortgages are loans held in pools guaranteed by Fannie Mae, Freddie Mac, or Ginnie Mae.
Source: eMBS.

in part declines in homebuyer demand and disruptions in the home search and purchase process.

Consumer Credit

Current conditions for consumer credit have tightened somewhat, on balance, but do not appear to be acting as a drag on consumer spending amid the plunge in consumer expenditures from social-distancing measures. As financial market volatility surged, yield spreads of consumer asset-backed securities spiked in mid-March, and primary-market issuance came to a halt. In response to the TALF announcements and diminished financial market uncertainty, spreads narrowed notably, and market participants are reportedly in the process of putting together several deals.

Banks reported in the April SLOOS that they tightened standards and experienced weaker demand across all consumer loan types. Of note, the fractions of banks that tightened credit card standards and reported weaker demand for credit card and auto loans in the first quarter were near the highest ever recorded in the survey. However, many large captive finance companies introduced attractive financing programs in order to boost auto sales. Indeed, auto loan interest rates plunged sharply in early April.

Banking regulators announced a number of supervisory and regulatory policies aimed also at encouraging lending to households.[3] In addition, lenders announced a willingness to work with their borrowers to mitigate the incidence of delinquency and defaults. The Cares Act implemented two measures to help federal student loan borrowers: an interest waiver and the suspension of loan payments without penalty.[4]

FINANCING AND FINANCIAL CONDITIONS INDEXES

A staff index that tracks financing conditions for nonfinancial corporations indicates that conditions have remained tight despite having eased somewhat since March 23, the day the Federal Reserve announced a broad range of new measures to support the flow of credit to businesses and households. As shown in the appendix to this section, other publicly available financial conditions indexes, which aggregate a large set of

[3] On the supervisory front, one such policy is a statement of supervisory support for banking organizations that choose to use their capital and liquidity buffers to continue lending to households and businesses. On the regulatory front, policies include changes relating to capital distribution limitations as well as an enhanced regulatory capital transition option for Current Expected Credit Losses.

[4] Staff estimates based on credit bureau data indicate that the median and mean student loan monthly payments are about $170 and $260, respectively.

financial variables into a summary series, also point to tight financial conditions. In addition, the staff's SLOOS Bank Lending Standards Index, which measures the net share of banks reporting tighter lending standards across all core loan categories to businesses and households, increased significantly in the first quarter. According to some of these indexes, the change in financial conditions since the COVID-19 outbreak is comparable with the one that occurred at the onset of the Great Recession.

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.

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]

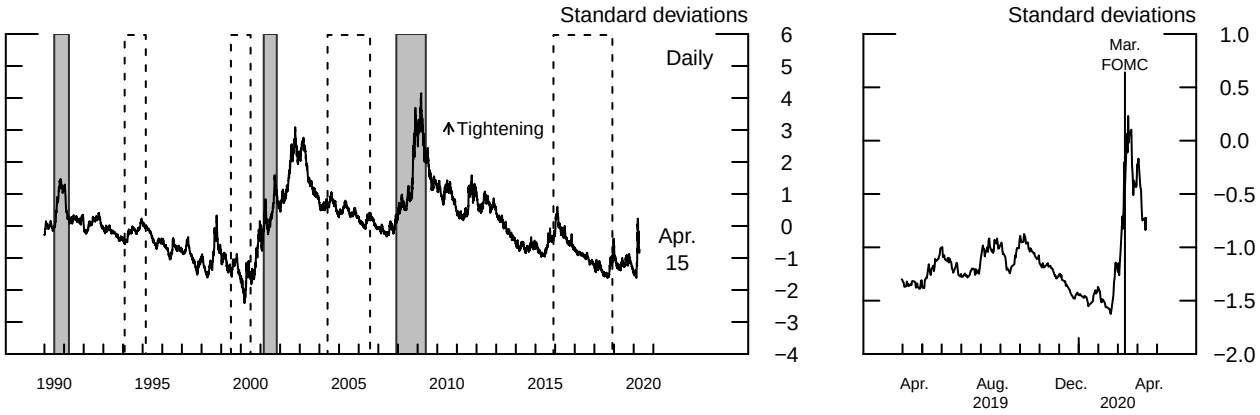
The other FCIs are constructed by aggregating a large set of financial variables into a summary series using various statistical methods. While these indexes provide a useful summary of broad financial market developments, the movements in these indexes may reflect both changes in financing conditions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

[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.

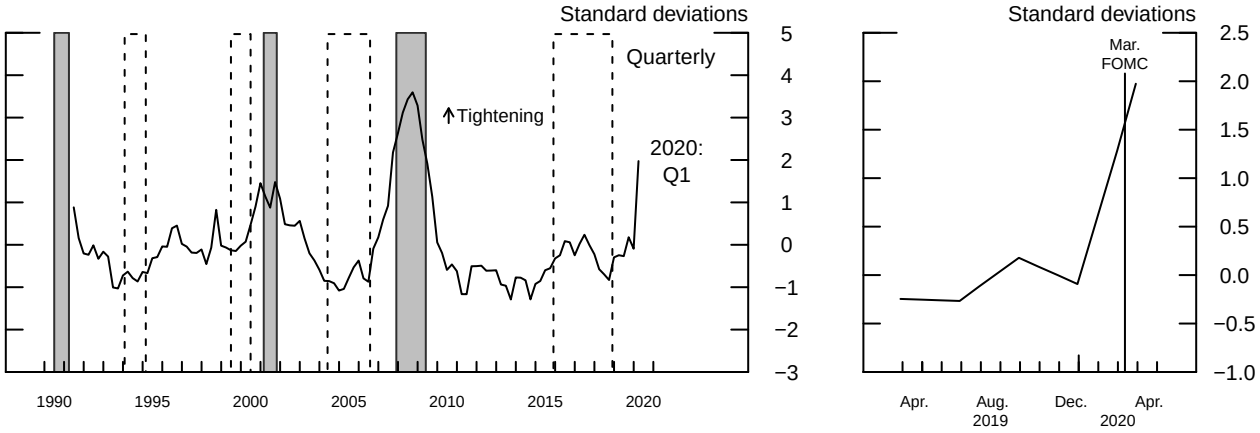
Selected Financial Conditions Indexes

Staff FCI for Nonfinancial Corporations



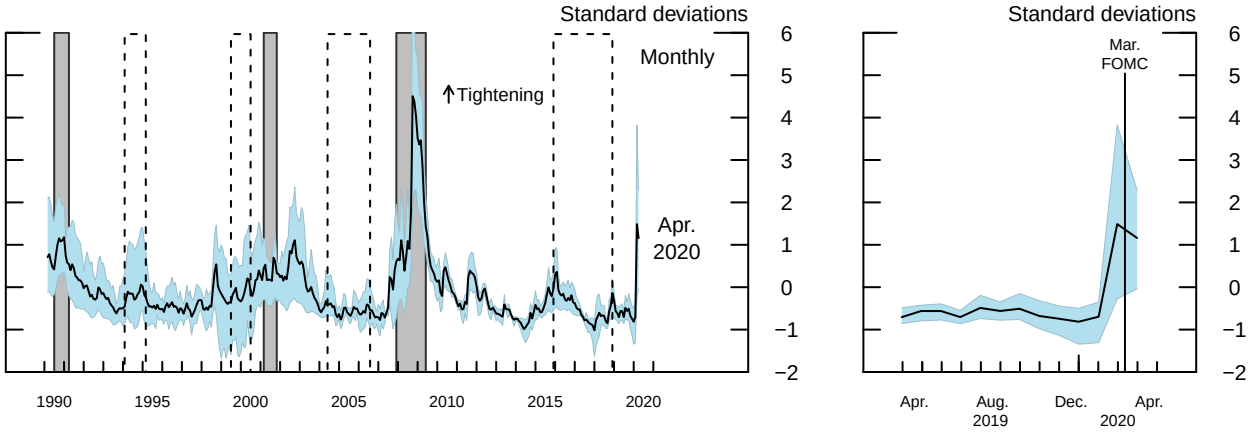
Note: The financial conditions index (FCI) is the deviation from the long−run relation between the systematic components of the cumulative log returns of 2 portfolios of firms with credit ratings above and just below investment grade. The systematic components are derived from the 5−factor Fama−French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

SLOOS Bank Lending Standards Index



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

Mean and Range of External FCIs

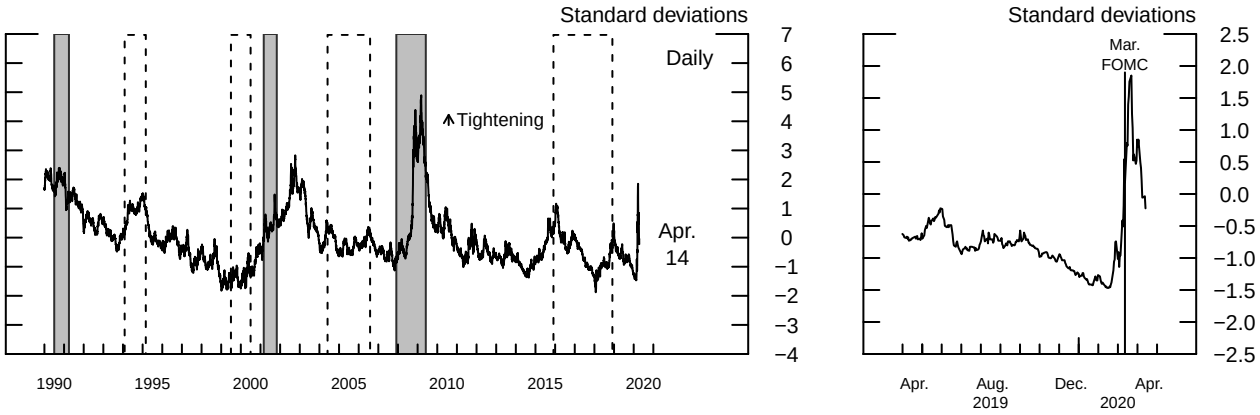


Note: Mean FCI represents the mean of FCIs developed by Goldman Sachs and the Federal Reserve Banks of Chicago, St. Louis, and Kansas City. The blue shaded region represents the range of these 4 standardized FCIs.
Source: Bloomberg; Federal Reserve Banks of Chicago, St. Louis, and Kansas City.

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

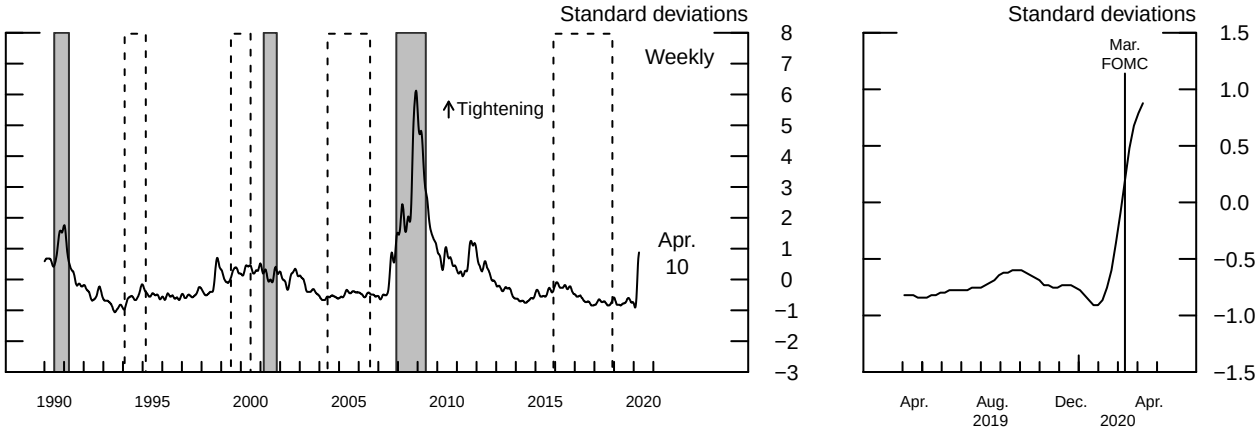
Selected Financial Conditions Indexes (continued)

Goldman Sachs FCI



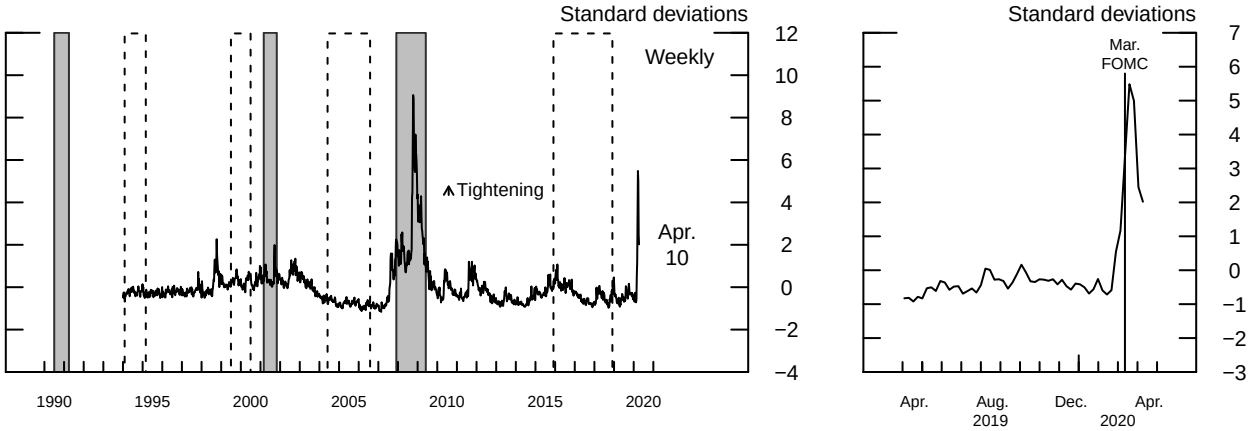
Note: The index is a weighted average of 5 financial variables: the federal funds rate, the 10−year Treasury yield, the triple−B yield spreads to Treasury, the S&P price−to−earnings ratio, and the broad value of the U.S. dollar. Weights are pinned down by the contribution of each financial variable on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

Chicago Fed NFCI



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

St. Louis Fed Financial Stress Index

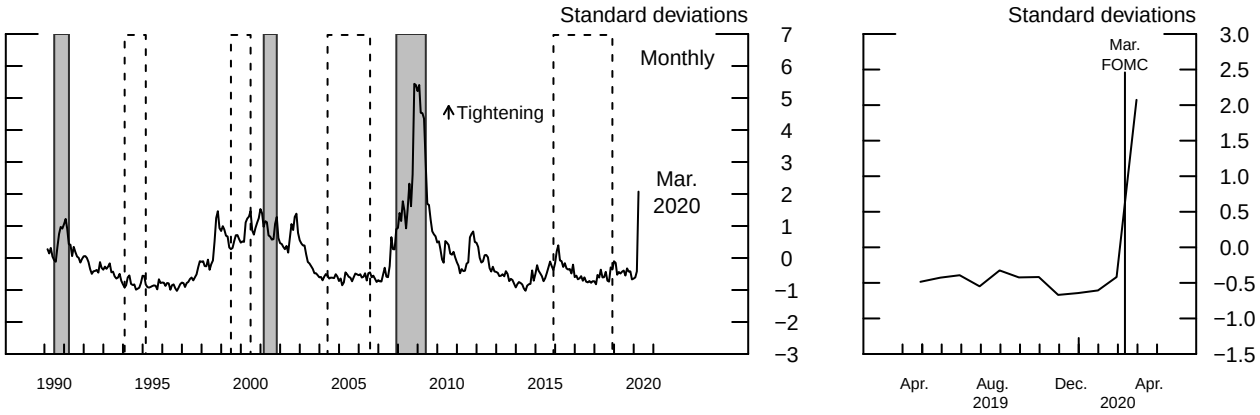


Note: The index is the principal component of 18 variables, including short− and long−term Treasury yields, corporate yields, money market and corporate bond spreads, bond and stock market volatility indicators, breakeven inflation rate, and the S&P 500 index.
Source: Federal Reserve Bank of St. Louis.

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

Selected Financial Conditions Indexes (continued)

Kansas City Fed Financial Stress Index



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

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

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Risks and Uncertainty

Assessment of Risks

The staff continues to judge that the uncertainty around the economic projection is extremely elevated and that the risks are skewed to the downside for output and inflation and, correspondingly, to the upside for the unemployment rate. Importantly, how much the economy will weaken and how long it will take to recover will depend on the evolution of the coronavirus (COVID-19) outbreak and the measures undertaken to contain it.

At the time of this writing, COVID-19 has spread widely across the globe, with more than 2.1 million people infected and almost 150,000 deaths.[1] In the United States, there have been 670,000 confirmed cases and more than 30,000 reported deaths, with the virus spreading across both urban and rural areas.[2] Early breakdowns of the aggregate data suggest that the fatality rate is higher among older individuals, men, and African Americans.[3]

How long this pandemic will last is highly uncertain. Pandemics end because a vaccine becomes available or because the virus spreads so widely that the population develops "herd immunity." Herd immunity, even if it were to develop at an extremely slow pace, would involve a tremendous death toll.[4] However, some health-care experts suggest that a vaccine is likely to take 12 to 18 months to become available. A key factor for the global economy therefore hinges on how the virus outbreak is managed by social-distancing requirements and other measures in the meantime. In response to the outbreak, most foreign economies have implemented some

[1] See Johns Hopkins University (2020), "Coronavirus Resource Center," webpage, https://coronavirus.jhu.edu.

[2] See COVID Tracking Project (2020), "Most Recent Data," webpage, https://covidtracking.com/data. See also Jack Healy, Sabrina Tavernise, Robert Gebeloff, and Weiyi Cai (2020), "Coronavirus Was Slow to Spread to Rural America. Not Anymore," *New York Times*, April 8, https://www.nytimes.com/interactive/2020/04/08/us/coronavirus-rural-america-cases.html.

[3] See Allison Aubrey and Joe Neel (2020), "CDC Hospital Data Point to Racial Disparity in COVID-19 Cases," *National Public Radio*, April 8, https://www.npr.org/sections/coronavirus-live-updates/2020/04/08/830030932/cdc-hospital-data-point-to-racial-disparity-in-covid-19-cases.

[4] See Ezekiel J. Emanuel and others (2020), "Fair Allocation of Scarce Medical Resources in the Time of Covid-19," *New England Journal of Medicine*, March 30, https://www.doi.org/10.1056/NEJMsb2005114. The study by Imperial College indicates that the death toll could reach 2.2 million in the United States in the case of "herd immunity." See Neil M. Ferguson and others (2020), "Impact of Non-pharmaceutical Interventions (NPIs) to Reduce COVID-19 Mortality and Healthcare Demand," Imperial College London, School of Public Health, March 16, https://www.doi.org/10.25561/77482.

form of social distancing, and 96 percent of U.S. employment is covered by highly restrictive social-distancing orders; these restrictions appear to have been successful in slowing the virus spread. However, it is still too early to know if that slowing can be maintained after the restrictions are eased or lifted.[5]

The staff baseline assumes that the United States can flatten the pandemic curve through a tight implementation of social distancing lasting through the end of May. Thereafter, social-distancing restrictions are assumed to be relaxed gradually, and tight restrictions are essentially no longer present by the end of the third quarter. However, limited forms of social distancing—for example, limits on very large gatherings or distance restrictions in sit-down restaurants—are assumed to be in place until the fall of next year when a vaccine may be available. The staff baseline also assumes that, for the period from the middle of this year to the fall of next year, effective therapeutics are developed and a successful system of testing and contact tracing is put in place that helps prevent major new widespread COVID-19 outbreaks. Similar considerations apply to our baseline for foreign economies, where we assume that a partial relaxing of restraints should allow activity to recover in the second half of the year.

There are both upside and downside risks to the baseline assumptions about the containment of the virus, both domestically and abroad. On the upside, it is possible that some forms of social distancing are safely eased faster than assumed in the baseline. These circumstances would be the case if contact tracing and tracking ends up being successful, a vaccine is developed earlier than the fall of next year, or effective therapeutic medications that greatly limit the death toll become available more quickly. Overall, however, it currently appears that the balance of risks is skewed to the downside.

On the downside, strict social distancing may need to be maintained for longer. For instance, the strategies for gradually reopening the United States and most foreign economies over the summer may prove misguided, and the virus spread and death count could rise again sometime after restrictions are relaxed.[6] In addition, a substantial risk lies in the possible

[5] Some European countries have just started to loosen social distancing restrictions, which should provide more evidence on whether such a strategy ends up successful or leads to a second wave of outbreaks.

[6] See Gottlieb and others (2020), *National Coronavirus Response: A Road Map to Reopening*, report (Washington: American Enterprise Institute, March 29), https://www.aei.org/research-products/report/national-coronavirus-response-a-road-map-to-reopening. They outline a strategy for gradual reopening of sectors of the economy, beginning with schools and other important sectors—coupled with containing the spread of the virus by contact tracing and strict isolation of infected individuals, along with more widespread testing of the population. A widespread requirement to wear masks in public could also be part of a reopening strategy.

resurgence of the outbreak in the coming winter. A second wave is typical of influenza pandemics, often about six months after the first wave. In fact, a second wave occurred in each of the 10 influenza pandemics over the past 250-plus years and, in the case of COVID-19, could result from a seasonal increase in virus spread together with a lack of adequate measures for testing and contact tracing.[7] In this case, government authorities will be forced to reintroduce strict social-distancing measures and the economy could experience another substantial contraction in activity in the first half of next year—a scenario often described as having a "W" shape. Lastly, tracking and tracing strategies could fail from the start, perhaps because they are too invasive or because they are just too difficult in a large, mobile economy, and severe social distancing might be needed until a vaccine emerges.[8]

Beyond the uncertainty surrounding the progression of the pandemic, there are also uncertainties about the evolution of the economy in these circumstances. Even assuming the outbreak is managed roughly as envisioned in the baseline, it is very uncertain to what degree a temporary—but extremely acute—economic contraction may trigger protracted recessionary dynamics. For example, some small businesses and highly levered firms will likely enter bankruptcy, which will destroy jobs, and the start-up of some new firms will likely be delayed. Whether such developments have larger and longer-lasting effects on potential output than assumed in the baseline projection remains to be seen. It is also conceivable that behavioral changes of consumers and businesses due to heightened uncertainty could provide a greater drag on economic growth throughout the medium term than assumed in the baseline. Indeed, it is possible that a severely adverse outcome associated with the course of the pandemic could resemble the worst economic outcomes of the 20th century. Broad public support for continued social distancing could collapse as the economy falls apart both domestically and abroad.

The dominant source of current uncertainty—the COVID-19 pandemic—is without parallel in the data used to estimate our quantitative risk models. The validity of these models relies on an assumption that forecast uncertainty remains related to the data in a way that is

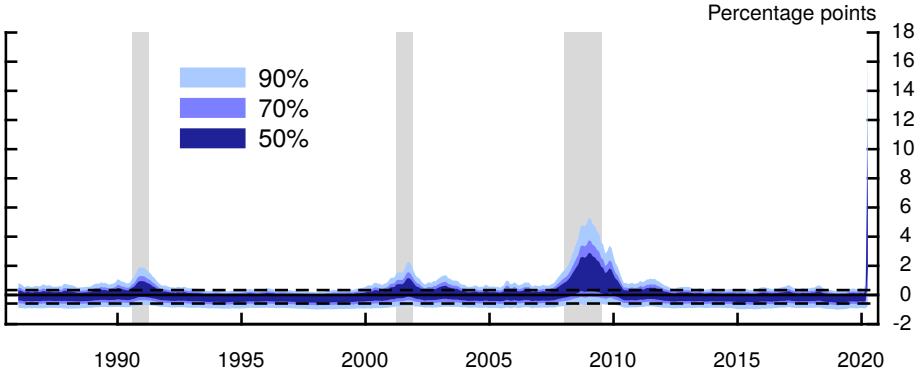
[7] National Academies of Sciences, Engineering, and Medicine (2020), "Rapid Expert Consultation on SARS-CoV-2 Survival in Relation to Temperature and Humidity and Potential for Seasonality for the COVID-19 Pandemic," letter to the Office of Science and Technology Policy (Washington: The National Academies Press, April 7), https://www.doi.org/10.17226/25771.

[8] For example, the Chinese government used about 9,000 contact trace workers to identify and isolate infected individuals in Wuhan. A proposal from the Johns Hopkins School of Public Health suggests that same approach would require about 100,000 contact trace workers in the United States. See Crystal Watson and others (2020), *A National Plan to Enable Comprehensive Covid-19 Case Finding and Contact Tracing in the United States*, report (Baltimore, MD: Johns Hopkins Center for Health Security, April 10), https://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2020/a-national-plan-to-enable-comprehensive-COVID-19-case-finding-and-contact-tracing-in-the-US.pdf.

Risks & Uncertainty

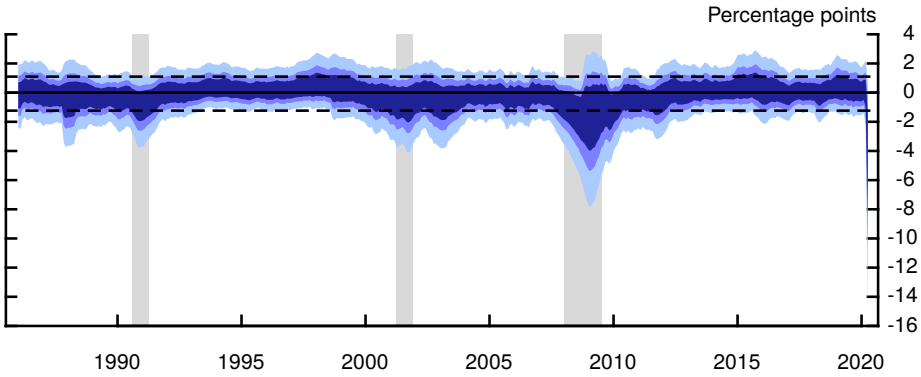
Conditional Distributions of Staff Forecast Errors 1 Year Ahead

Unemployment Rate



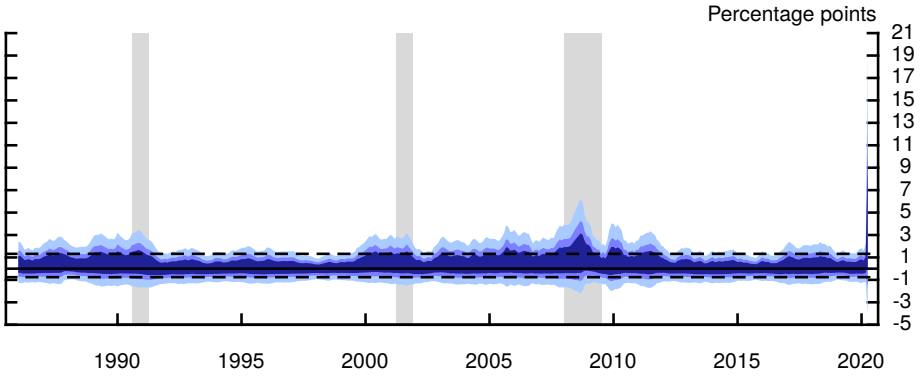
	April 2020
95th	16.8
85th	12.1
50th	5.1
15th	.5
5th	- .8

GDP Growth



	April 2020
95th	.9
85th	- .3
50th	-4.5
15th	-10.8
5th	-15.0

CPI Inflation

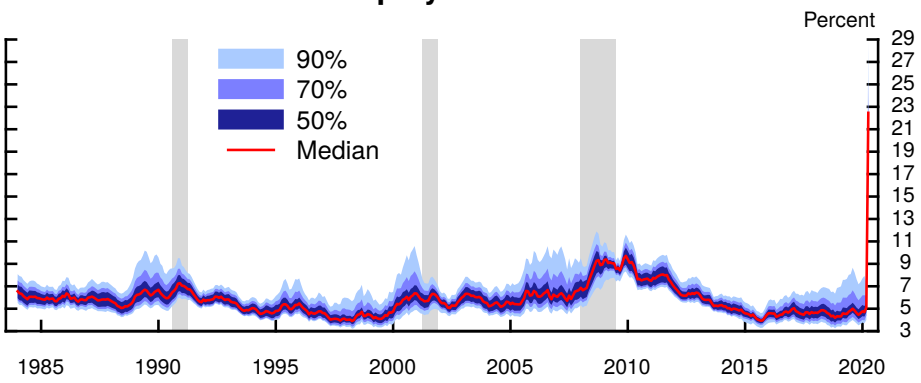


	April 2020
95th	18.9
85th	13.2
50th	4.5
15th	-1.6
5th	-4.1

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 strain, and the volatility of high-frequency macroeconomic indicators. The tables show selected quantiles of the predictive distributions for the respective variables as of the current Tealbook. Dashed lines denote the median 15th and 85th percentiles. Gray shaded bars indicate recession periods as defined by the National Bureau of Economic Research.

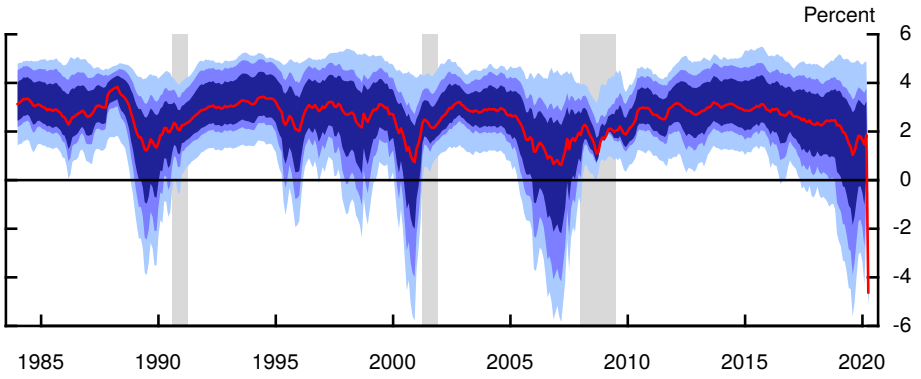
Conditional Distributions of Macroeconomic Variables 2 Years Ahead

Unemployment Rate



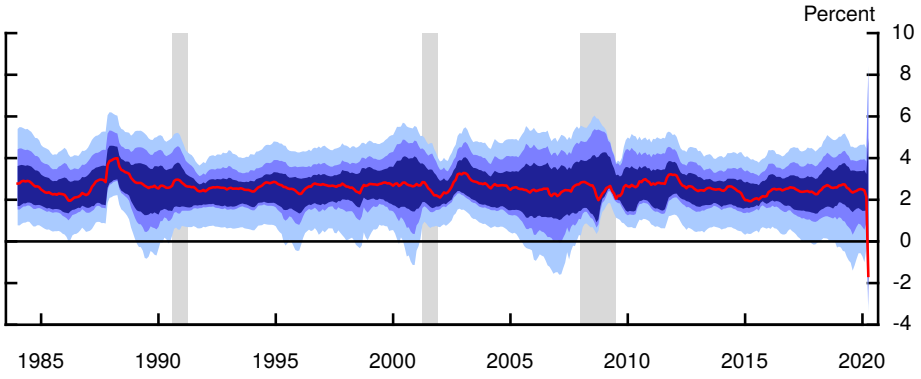
April 2020	
95th	28.8
85th	25.3
50th	22.5
15th	19.2
5th	16.0

GDP Growth



April 2020	
95th	.9
85th	-2.6
50th	-4.6
15th	-5.1
5th	-5.2

CPI Inflation



April 2020	
95th	8.4
85th	8.2
50th	-1.7
15th	-3.1
5th	-3.4

Note: The exhibit shows estimates of quantiles of the conditional distribution of the respective macro variables 2 years ahead. The estimates are conditioned on indicators of real activity, inflation, financial market strain, the volatility of high-frequency macroeconomic indicators, and a term-spread-based recession probability. The tables show selected quantiles of the predictive distributions for the respective variables as of the current Tealbook. Gray shaded bars indicate recession periods as defined by the National Bureau of Economic Research.

similar to what has occurred in the past. With that caveat in mind, we show our usual two exhibits that provide some perspective on the distribution of outcomes one year and two years ahead. Both the projected distribution of forecast errors over the next year and the distribution of outcomes two years ahead have widened by an unprecedented amount. The distribution for forecast errors one year ahead is adversely skewed for GDP growth and the unemployment rate, and the two-year-ahead exhibit suggests that there is substantial risk of unusually elevated unemployment and low growth even further out. With regard to inflation, we view the risks to the projection as tilted to the downside, on balance, in large part because of the substantial downside risks to economic activity, which could lead to very subdued actual inflation and even some erosion in longer-run inflation expectations.

ALTERNATIVE SCENARIOS

This section describes several alternative scenarios focusing on uncertainty about the course of the COVID-19 epidemic globally and the associated macroeconomic disruptions both at home and abroad, including several of the risks highlighted previously. These scenarios are simulated using the FRB/US and SIGMA models. In all scenarios, the federal funds rate follows a policy rule meant to be roughly consistent with the forward guidance provided in the March FOMC statement and departs from the effective lower bound in the quarter after the unemployment rate falls below its assumed long-run natural rate of 4.3 percent.[9]

We think a more pessimistic scenario in which a second wave of the virus hits toward year-end, inducing a second round of strict social distancing, is equally as plausible as our baseline assumptions. Although a faster return to normalcy certainly is possible, it seems just as conceivable that ineffective containment of the virus and delays in developing treatments could lead to an economic depression.

Second Waves (FRB/US, SIGMA)

By the end of this year, the staff forecasts that social-distancing measures both in the United States and abroad will have been materially relaxed. However, it is likely that coronavirus immunity in many countries, including the United States, will be sufficiently rare that epidemic propagation remains possible. In the absence of less disruptive, but still effective,

[9] In addition, all scenarios assume that the Federal Reserve's balance sheet policies and federal fiscal policies are the same as in the baseline. The Monetary Policy Strategies section of this Tealbook considers the effects of alternative interest rate policies in the first two of the following scenarios.

methods for responding to new outbreaks, a second wave of infections may emerge and necessitate reinstatement of widespread strict social distancing. The reinstatement of these measures could be particularly damaging to the economy if the financial system is already strained by the effects of the first round of measures, thus impairing firms' and households' access to financing.[10] In that event, the resulting destruction of employment relationships and spike in firm exits may presage a more persistently sluggish recovery than shown in the Tealbook projection, perhaps similar to what was experienced following the Great Recession.

In this scenario, we illustrate the effects of a resurgent pandemic. Domestically, the residual social distancing assumed in the baseline, along with warm weather during the summer, delays the resurgence of the virus until late 2020 and the resumption of intense social distancing until the first quarter of 2021. Similar renewed outbreaks, albeit not necessarily synchronized with the United States, emerge in many foreign economies over the course of this year and the next, also necessitating a revival of strict social-distancing measures. In other foreign countries, it proves impossible to convincingly contain the virus in the first place, and social-distancing measures remain largely in place. Foreign GDP contracts around 6½ percent in 2020 and expands only 1¼ percent in 2021, about 3 percentage points below baseline in both years, while flight-to-safety flows to the United States lead to a 7 percent appreciation of the dollar.

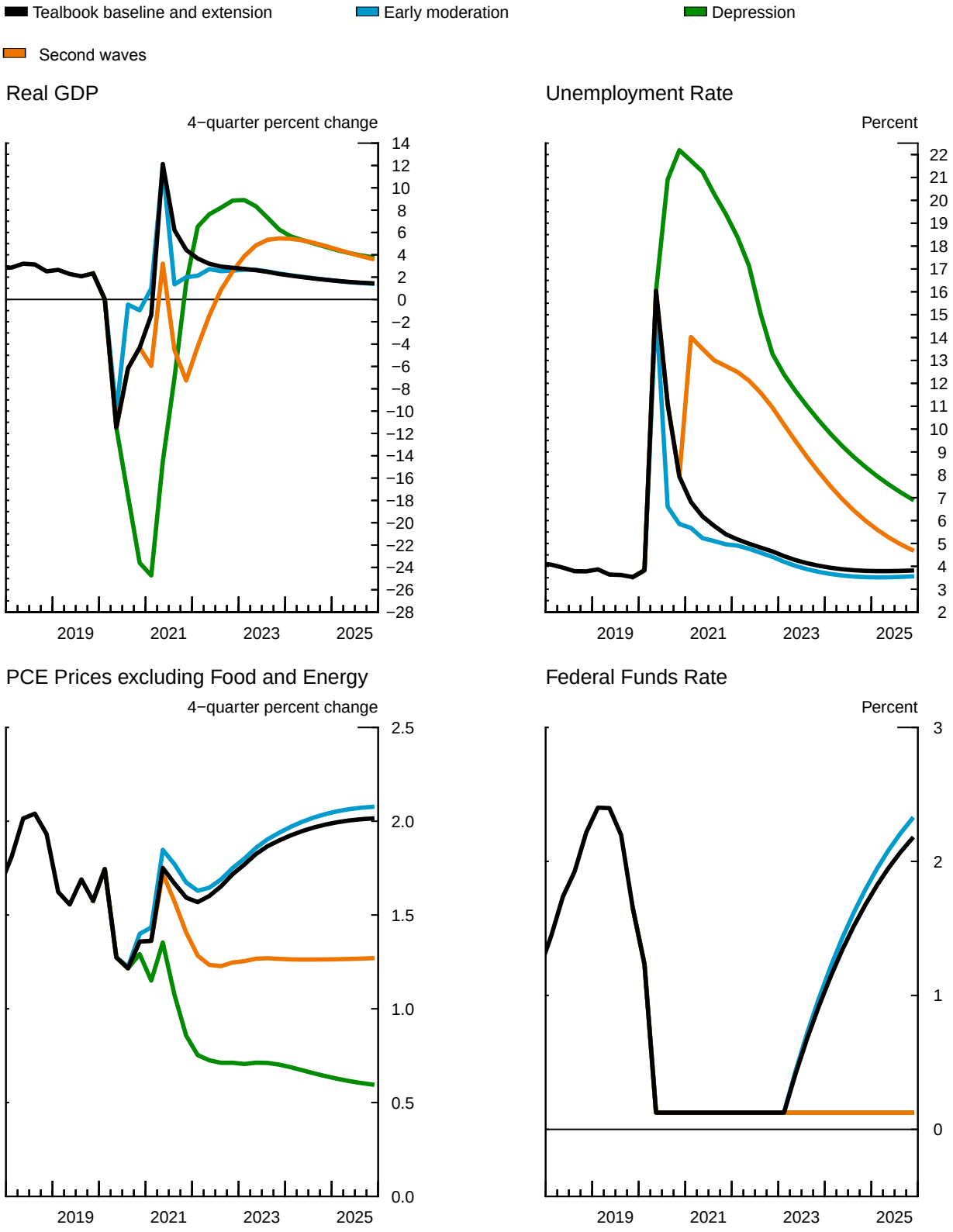
In the United States, the unemployment rate in 2021:Q1 jumps to 14 percent—less than the previous spike in 2020:Q2, reflecting better preparations and more efficient distancing strategies. By the end of 2021, the level of U.S. GDP is 11 percent below its previous peak, while foreign GDP is 5 percent lower. The decline in aggregate demand and core import prices causes inflation to drop precipitously over the course of 2021, remaining around 1¼ percent for several years.

Compared with the baseline, the disruption to economic activity is more protracted. Indeed, after nearly three years, at the end of 2023, the unemployment rate remains at 8 percent, 3¼ percentage points above the natural rate at that time. The persistent weakness of aggregate demand and a gradual downward drift of long-term inflation expectations depress inflation, which averages 1¼ percent between 2021 and 2025. The stubbornly high unemployment rate is also responsible for holding the federal funds rate at the effective lower bound until 2026:Q4.

[10] A growing recognition that recurring cycles of relatively intense social distancing may be necessary for some indefinite time—and that a rapid return to normal levels of economic activity is not assured—may itself limit the willingness of financial intermediaries to provide financing as liberally as during the first episode of social distancing.

Risks & Uncertainty

Alternative Scenarios



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		2021	2022	2023	2024-25
	H1	H2				
Real GDP						
Tealbook baseline and extension	-23.3	19.3	4.4	2.8	2.3	1.6
Second waves	-23.3	19.3	-7.3	2.5	5.5	4.2
Early moderation	-20.9	23.9	2.0	2.6	2.3	1.6
Depression	-23.3	-23.9	1.5	8.9	6.3	4.2
Unemployment rate[1]						
Tealbook baseline and extension	16.0	7.9	5.4	4.7	4.0	3.8
Second waves	16.0	7.9	12.8	10.9	8.1	4.7
Early moderation	15.3	5.8	5.0	4.4	3.8	3.6
Depression	16.0	22.2	19.4	13.3	10.4	6.9
Total PCE prices						
Tealbook baseline and extension	-.6	2.0	1.7	1.8	1.9	2.0
Second waves	-.6	2.0	.9	1.4	1.4	1.4
Early moderation	.0	1.8	1.7	1.8	2.0	2.1
Depression	-.6	-.4	.7	1.1	1.1	.8
Core PCE prices						
Tealbook baseline and extension	.9	1.9	1.6	1.7	1.9	2.0
Second waves	.9	1.9	1.4	1.2	1.3	1.3
Early moderation	.9	1.9	1.7	1.8	1.9	2.1
Depression	.9	1.7	.9	.7	.7	.6
Federal funds rate[1]						
Tealbook baseline and extension	.1	.1	.1	.1	.9	2.2
Second waves	.1	.1	.1	.1	.1	.1
Early moderation	.1	.1	.1	.1	1.0	2.3
Depression	.1	.1	.1	.1	.1	.1

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

Early Moderation (FRB/US, SIGMA)

The staff baseline assumes that, globally, the share of economic activity directly disrupted by social distancing will begin falling over the summer and will be materially lower by the end of the year. Moreover, the moderation of social distancing is contingent on the availability of other, more efficient ways of containing the spread of the virus or mitigating its most severe effects. In this scenario, we assume that such alternatives become available more quickly than in the baseline, allowing social distancing to wind down faster near the end of the third quarter and to be eliminated almost completely by the end of the year both in the United States and abroad. Foreign GDP growth runs at negative 2½ percent this year, 1½ percentage points above baseline, while a reversal of flight-to-safety flows contributes to a 5 percent depreciation of the dollar.

Stronger foreign demand, a weaker dollar, and the faster moderation of social distancing in the second half of the year do not fully make up for the massive decline in U.S. economic activity through May: GDP in the United States still drops 1 percent this year. The unemployment rate averages 6½ percent in the third quarter, about 4½ percentage points below the average for that quarter in the baseline, reflecting both the direct effect of more moderate social-distancing measures and a reduction of some of the recessionary headwinds in the baseline. The unemployment rate rapidly declines back toward the natural rate of unemployment, falling to 5¾ percent by the end of this year. The less severe deterioration in resource utilization boosts inflation somewhat, and inflation averages around 1 percent in 2020, about 20 basis points higher than in the baseline. After 2020, however, the outcomes in this scenario are similar to those in the baseline, and, as a result, the federal funds rate tracks the baseline path closely, exiting from the effective lower bound in the middle of 2023.

Depression (FRB/US, SIGMA)

One severely adverse outcome associated with the course of the pandemic could resemble the worst economic outcomes of the 20th century. Testing and contact tracing techniques may never scale up well enough to be applicable to large economies or within the reach of developing economies, while the search for a vaccine may drag on for a long time and therapies to alleviate the effects of the virus may not be developed. At the same time, both in the United States and abroad, public support for prolonged economy-wide social distancing may collapse as the economy falls apart amid social and political unrest.

Under these circumstances, the start-and-stop approach to controlling the virus described in the first alternative scenario may become the only option for several years, with policymakers

repeatedly resorting to sporadic and uncoordinated bouts of intense, but brief, social distancing when local epidemics threaten to overwhelm health-care systems. With most people still susceptible to the virus, many will continue to shun activities that carry an appreciable risk of infection, even in periods without formal restrictions in place, exerting continuous downward pressure on aggregate demand. Moreover, given expectations of chronically depressed economic activity and huge risks to the downside, firms will defer investment and hiring, and both firms and households may find it extremely difficult to access financial resources that would permit them to ride out the resulting turbulence, amplifying and prolonging the downturn.

In the foreign economies, underlying financial and fiscal vulnerabilities may magnify the economic disruptions. In China, vulnerabilities in the banking and corporate sectors may come to the fore, triggering much more significant financial distress than seen so far. Many of the emerging market economies (EMEs) could plunge into a severe financial crisis amid renewed capital outflow pressures. With significant strains on their fiscal capacity, countries in the euro-area periphery could default, raising serious questions about the viability of the euro. The spread of the disease, financial stresses, and the economic downturn could interact to generate social and political instability in a number of these regions.

In this scenario, by the third quarter of the year, the continued threat of infection and escalating pessimism about efforts to contain the pandemic at acceptable levels of social cost entail that, rather than declining as in the baseline, the U.S. unemployment rate remains highly elevated and averages 21 percent in that quarter, touching off a broad economic collapse. Corporate borrowing spreads skyrocket by an additional 500 basis points in the United States and in the advanced foreign economies (AFEs) and by 600 basis points in the EMEs. Flight-to-safety flows lead the dollar to appreciate about 15 percent, and household and business sentiment drop around the world. At the trough of the depression, the level of GDP in the United States is more than 25 percent below its peak; the drop is about 15 percent in the AFEs and 20 percent in the EMEs—magnitudes not seen since the Great Depression.

A sluggish recovery from an extremely high unemployment rate leads to the unemployment rate remaining above 10 percent until the beginning of 2024 and above the natural rate of unemployment until the middle of 2029. Correspondingly, core inflation drops to 1¼ percent in 2020 and remains roughly between ½ and ¾ percent over the next decade, held down by persistently weak demand and a downward drift of long-term inflation expectations.[11] The federal funds rate exits the effective lower bound at the beginning of 2030.

[11] Long-term inflation expectations end the decade around 1¼ percent—a sizable movement in what appears to have been a relatively stable series since the late 1990s.

Risks & Uncertainty

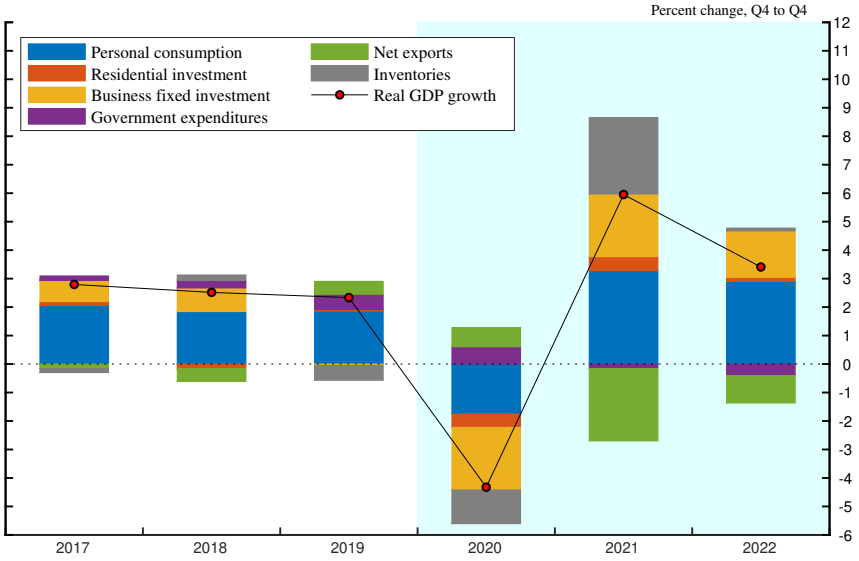
Alternative Model Forecasts

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

Measure and projection	2020		2021		2022	
	Previous Tealbook	Current Tealbook	*Previous Tealbook*	Current Tealbook	*Previous Tealbook*	Current Tealbook
Real GDP						
Staff	*2.1*	-4.3	*2.3*	4.4	*1.7*	2.8
FRB/US[1]	*2.3*	-4.3	*2.5*	6.0	*2.1*	3.4
EDO[1]	*1.7*	-5.3	*1.7*	6.6	*2.2*	3.3
Unemployment rate[2]						
Staff	*3.5*	7.9	*3.2*	5.4	*3.2*	4.7
FRB/US[1]	*3.3*	7.9	*3.3*	4.2	*3.4*	3.4
EDO[1]	*4.0*	8.9	*4.5*	4.8	*4.8*	4.4
Total PCE prices						
Staff	*1.3*	.7	*2.0*	1.7	*1.9*	1.8
FRB/US[1]	*1.3*	.7	*2.0*	1.9	*2.0*	1.7
EDO[1]	*1.8*	.7	*2.3*	1.7	*2.3*	1.9
Core PCE prices						
Staff	*1.8*	1.4	*1.9*	1.6	*1.9*	1.7
FRB/US[1]	*1.8*	1.4	*2.0*	1.8	*2.0*	1.6
EDO[1]	*1.9*	1.4	*2.3*	1.7	*2.3*	1.9
Federal funds rate[2]						
Staff	*1.4*	.1	*1.8*	.1	*2.0*	.1
FRB/US[1]	*1.7*	.1	*2.0*	.4	*2.2*	1.0
EDO[1]	*2.5*	.1	*3.3*	3.6	*3.8*	4.2

1. The FRB/US and EDO forecasts condition on the staff forecast for 2020. The EDO projections labeled "*Previous Tealbook*" and "Current Tealbook" integrate over the posterior distribution of model parameters.
2. Percent, average for Q4.

Decomposition of FRB/US Real GDP Growth Forecast



Note: Shading represents the projection period.
Source: Staff calculations.

Monetary Policy Strategies

This section discusses a range of strategies for setting the federal funds rate and compares the associated interest rate paths and macroeconomic outcomes with those in the Tealbook baseline projection. In general, the policy rate prescriptions described in this section are substantially lower than in the March Tealbook because of the sudden and profound disruptions to economic activity arising from the COVID-19 outbreak and the lockdown and social distancing measures taken in response. As emphasized elsewhere in this Tealbook, the path forward is extraordinarily uncertain. To explore the sensitivity of policy prescriptions and macroeconomic outcomes associated with various policy strategies to alternative assumptions about the magnitude and duration of the disruptions, an additional exhibit discusses optimal control simulations under two alternative scenarios, "Early Moderation" and "Second Waves," featured in the Risks and Uncertainty section of this Tealbook.

Near-Term Prescriptions of Selected Simple Policy Rules

The top panel of the first 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, a first-difference rule, and a flexible price-level targeting (FPLT) rule.[1] These near-term prescriptions take as given the Tealbook baseline projections for the output gap and core inflation, which are shown in the middle panels.[2] These near-term prescriptions do not impose the effective lower bound (ELB) on the policy rate.[3] To ensure that the rules that feature a lagged policy rate term reflect the present policy environment, their prescriptions for the second quarter of this year use the midpoint of the current target range for the federal funds rate as the lagged policy rate term. The top and middle panels also provide the staff's baseline path for the federal funds rate. In the

[1] Except for the first-difference rule, which has no intercept term, 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.

[2] Because the FPLT rule responds to the gap between the unemployment rate and the natural rate of unemployment, this rule takes as given the Tealbook baseline projections for these variables instead of the projection for the output gap.

[3] 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 estimate of the macroeconomic effects of the Federal Reserve's balance sheet policies and federal fiscal policies.

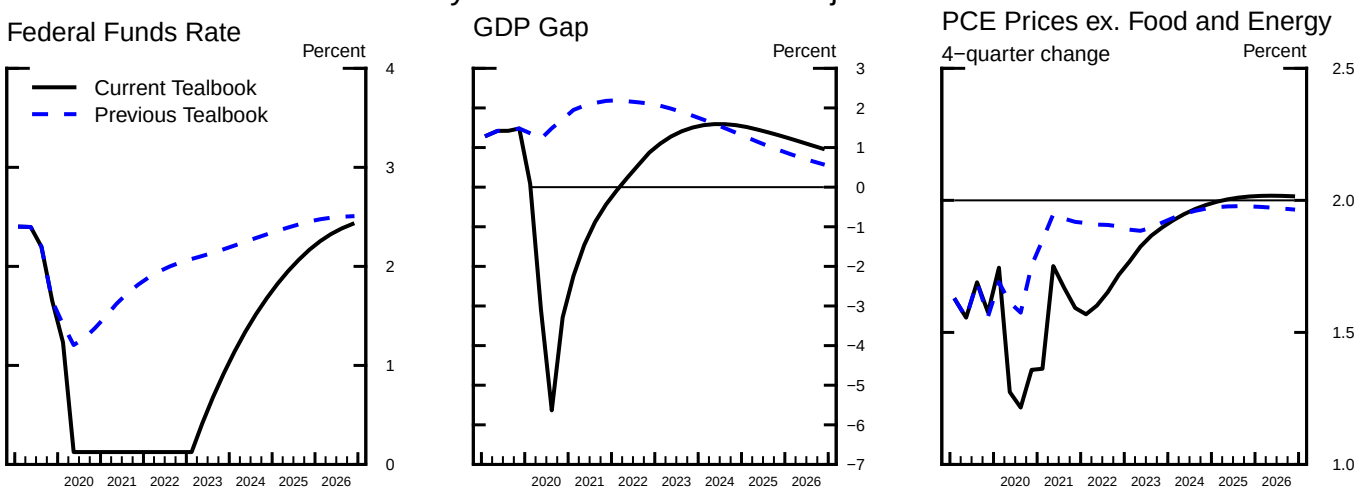
Policy Rules and the Staff Projection

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

(Percent)

	2020:Q2	2020:Q3
Inertial Taylor (1999) rule	**−.15**	**−.77**
Previous Tealbook projection	*.57*	*.99*
Taylor (1993) rule	**−.14**	**−1.50**
Previous Tealbook projection	*2.51*	*2.59*
First−difference rule	**−1.36**	**−.67**
Previous Tealbook projection	*.34*	*.74*
Flexible price−level targeting rule	**−.49**	**−1.22**
Previous Tealbook projection	*.05*	*−.02*
Addendum:		
Tealbook baseline	**.13**	**.13**

Key Elements of the Staff Projection



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

(Percent)

	Current Value	*Current−Quarter Estimate Based on Previous Tealbook*	*Previous Tealbook*
Tealbook baseline			
FRB/US *r**	−.78	*.99*	*.98*
Average projected real federal funds rate	−1.41	*−.12*	*−.16*
SEP−consistent baseline			
FRB/US *r**	n.a.		
Average projected real federal funds rate	n.a.		

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 either the Tealbook or SEP−consistent projection. The SEP−consistent baseline for a given period corresponds to the median SEP responses. The Committee did not provide SEP responses at their March 2020 FOMC meeting. The "Average projected real federal funds rate" is calculated under the Tealbook and SEP−consistent baseline projections over the same 12−quarter period as FRB/US *r**. "n.a." is not applicable.

current Tealbook projection, the staff assumes that the federal funds rate remains at its ELB as long as the unemployment rate is higher than 4.3 percent and follows the conditional attenuated policy rule thereafter.

- All the simple policy rules considered in this section prescribe negative values for the federal funds rate. These prescriptions are substantially lower than those made using the March Tealbook projections because the staff outlook now features a much larger amount of resource slack and a lower path for inflation in the near term.

- The inertial Taylor (1999) rule prescribes policy rates that are higher, on average, than the other rules, largely reflecting the effects of the lagged policy rate operating through the interest rate smoothing term.

- The Taylor (1993) rule calls for the federal funds rate to be about negative 1½ percent by the third quarter of this year, 4 percentage points below the value prescribed using the March Tealbook projections.

- The first-difference rule, which reacts to the expected change in the output gap, prescribes policy rates of about negative 1 percent in the near term, on average, because resource utilization is projected to fall sharply from its level earlier this year.

- The FPLT rule calls for negative values of the federal funds rate over the second and third quarter of this year. These prescriptions reflect the high level of unemployment, relative to its natural rate, as well as the rule's effort to eliminate a cumulative shortfall in the core PCE price index of almost 3½ percent from its target path since the end of 2011.

A Medium-Term Notion of the Equilibrium Real Federal Funds Rate

The bottom panel of the first exhibit reports estimates of a medium-term concept of the equilibrium real federal funds rate (r^*) generated under the Tealbook baseline.[4]

[4] In previous Tealbooks, this exhibit included statistics under a projection consistent with the median responses to the Summary of Economic Projections (SEP). Because the FOMC participants did not make SEP submissions for their March 15 meeting, it is not possible to generate comparable statistics for the current Tealbook.

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 or avoiding sharp changes in the federal funds rate.

- At negative 0.78 percent, the current value of the Tealbook-consistent FRB/US *r** is about 1¾ percentage points lower than the value consistent with the March Tealbook projection. This reduction seems modest in relation to the substantial downward revision to the staff's aggregate demand projection in the current and the next few quarters but is consistent with the fact that the output gap in the staff projection is only moderately below its value in the March Tealbook by the end of the 12-quarter period used to determine *r**.

SIMPLE POLICY RULE SIMULATIONS

The second exhibit reports the Tealbook baseline projection and results from dynamic simulations of the FRB/US model under the inertial Taylor (1999) rule, the Taylor (1993) rule, the first-difference rule, and the FPLT 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. 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.

- Under the Tealbook baseline, the federal funds rate remains at the ELB until 2023:Q2, when the unemployment rate falls below 4.3 percent. Thereafter, the policy rate follows the prescriptions of the conditional attenuated policy rule, reaching 2.4 percent by the end of 2026.

- The inertial Taylor (1999) rule calls for the federal funds rate to increase sooner than under the Tealbook baseline, leaving the ELB in the second half

of 2021.[5] This higher path for the federal funds rate results in a higher unemployment rate, a more negative output gap, lower inflation, and a higher real 10-year Treasury yield than in the Tealbook baseline projection.

- The Taylor (1993) rule calls for departure from the ELB by the second quarter of 2021, two years earlier than under the Tealbook baseline. The initial rise in the federal funds rate is more rapid than under the inertial Taylor (1999) rule because the Taylor (1993) rule does not feature inertia. The unemployment rate path is higher, and the path for inflation is lower, than the corresponding paths in the Tealbook baseline projection.

- The first-difference rule calls for a substantial increase in the federal funds rate in the near term because it reacts to the expected narrowing of the output gap once social distancing measures have eased. The federal funds rate continues to rise as the economy recovers, peaking at about 4 percent in 2024.

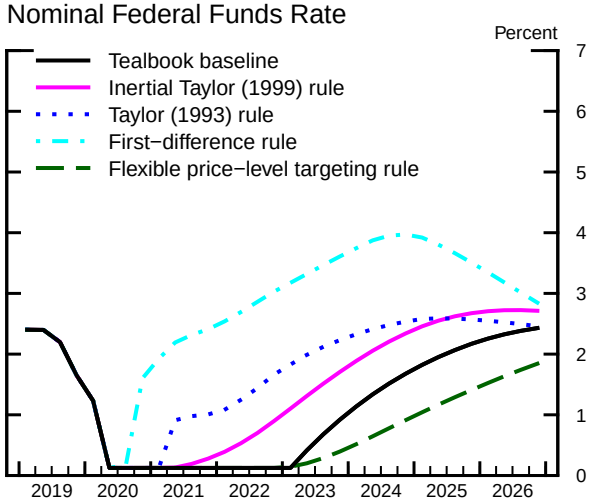
- The FPLT rule responds to, and seeks to eliminate, the cumulative shortfall of the level of core PCE prices from a target path that is defined by the growth of that price level at an annual rate of 2 percent from the end of 2011 onward. Eliminating the current shortfall of 3½ percent requires inflation to run above 2 percent over the coming decade. The simulation embeds the assumptions that policymakers can credibly commit to closing this gap over time and that financial market participants, price setters, and wage setters correctly anticipate the ensuing long period of a low federal funds rate. Consequently, the path of the real 10-year Treasury rate immediately drops to negative 1½ percent and remains below the corresponding Tealbook baseline path throughout the period shown.[6] The unemployment rate is lower under the FPLT rule than in the Tealbook baseline and all other simulations, dropping to 3.1 percent by 2025. Inflation exceeds 2 percent by about ¼ percentage point, on average, from 2021 through the end of 2026.

[5] In the first period of the simulations, the lagged value of the federal funds rate that enters some of the simple policy rules is set to be the midpoint of the current target range to reflect the present policy environment. See the appendix for details.

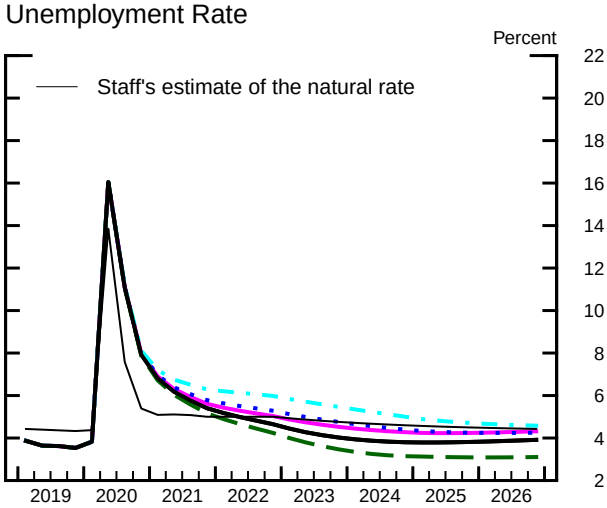
[6] Even though real 10-year Treasury rates are negative throughout the period shown, the nominal 10-year Treasury rates remain positive and higher than the ELB imposed on short-term interest rates.

Simple Policy Rule Simulations

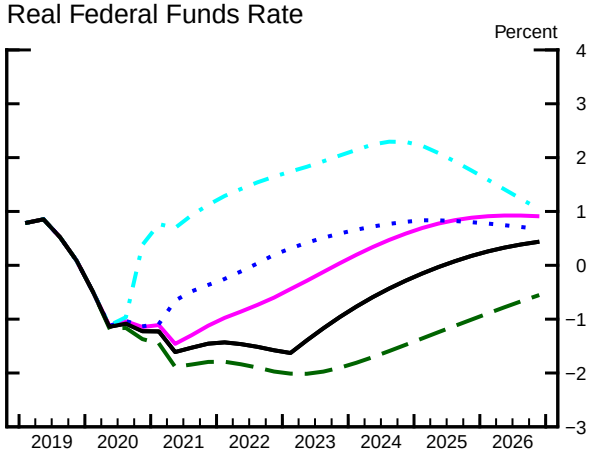
Nominal Federal Funds Rate



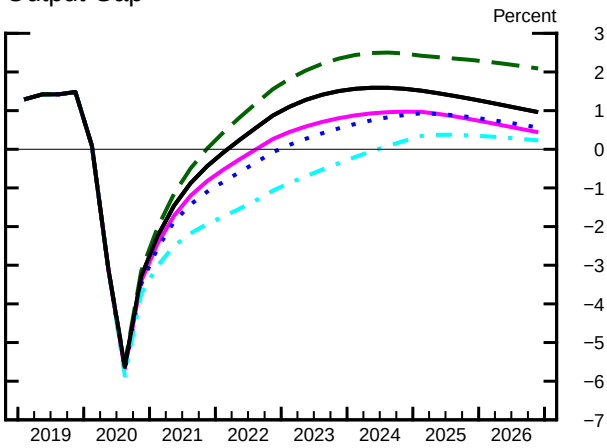
Unemployment Rate



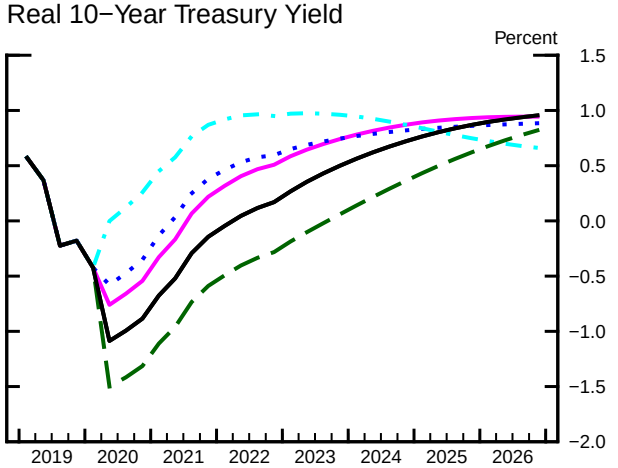
Real Federal Funds Rate



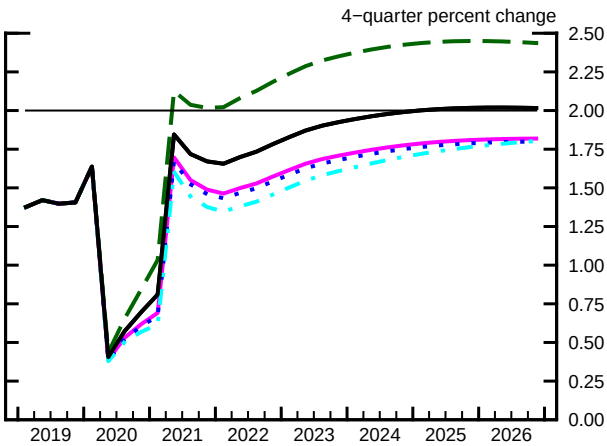
Output Gap



Real 10−Year Treasury Yield



PCE Inflation



Note: The policy rule simulations in this exhibit are based on rules that respond to core inflation rather than to headline inflation. This choice of rule specification was made in light of a tendency for current and near−term core inflation rates to outperform headline inflation rates as predictors of the medium−term behavior of headline inflation. All the rules with the exception of FPLT rule also responds to the output gap presented in the middle−right panel.

- With the exception of the first-difference rule, the prescriptions of the simple policy rules are substantially lower than the corresponding prescriptions in the March Tealbook. Through 2026, the average downward revision in the interest rates prescribed by the inertial Taylor (1999) rule, the Taylor (1993) rule, and the FPLT rule are 131, 101, and 73 basis points, respectively. The corresponding average revision for the Tealbook baseline is 104 basis points.

OPTIMAL CONTROL SIMULATIONS UNDER COMMITMENT

The third exhibit displays optimal control simulations conditional on the Tealbook baseline under two different assumptions about policymakers' preferences, as captured by alternative specifications of the loss function.[7] The concept of optimal control employed here is one in which current policymakers are able to commit future policymakers to their plans; such a commitment, when feasible, may lead to improved economic outcomes.[8]

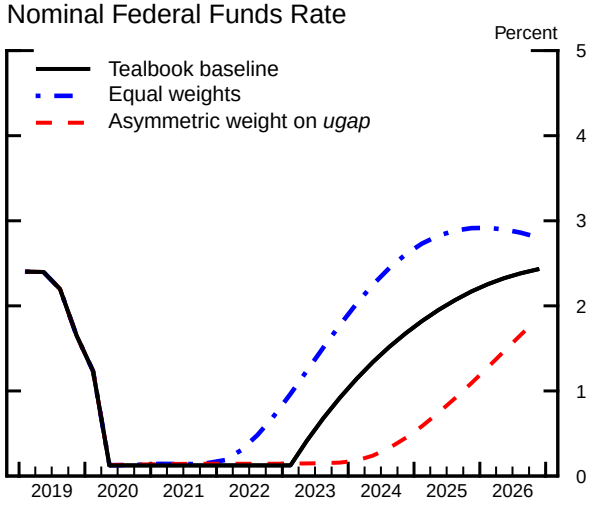
- The simulation labeled "Equal weights" presents the case in which policymakers are assumed to place equal weights on keeping headline PCE inflation close to the Committee's objective of 2 percent, on keeping the unemployment rate close to the staff's estimate of the natural rate of unemployment, and on keeping the federal funds rate close to its previous value. Under this strategy, the federal funds rate prescriptions are less accommodative than those in the baseline, with the federal funds rate departing from the ELB in the first half of 2022, about one year earlier than in the baseline path. The equal-weights strategy seeks to counter both the high level of unemployment relative to its natural rate in the near term and the modest, but persistent, undershooting of the natural rate from the end of 2022 onward in the Tealbook baseline. In the simulation, containing this undershooting is the dominant consideration for policymakers because their ability to reduce unemployment over the next couple of years is limited by the ELB constraint on the policy rate and by the sluggish response of economic

[7] The box "Optimal Control and the Loss Function" in the Monetary Policy Strategies section of Tealbook B for June 2016 offers motivations for these specifications.

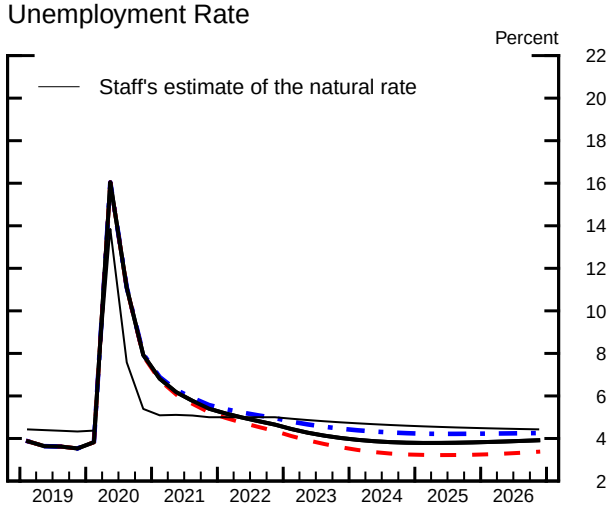
[8] Under the optimal control policies, policymakers achieve the displayed economic outcomes by making promises that bind future policymakers to take actions that may not be optimal from the perspective of those future policymakers (that is, the promises are time inconsistent). It is assumed that these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

Optimal Control Simulations under Commitment

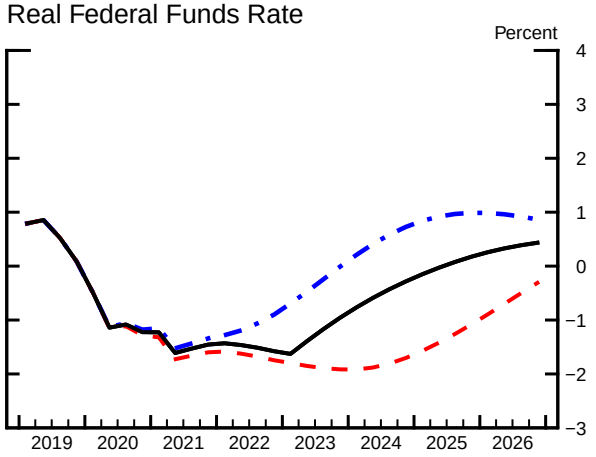
Nominal Federal Funds Rate



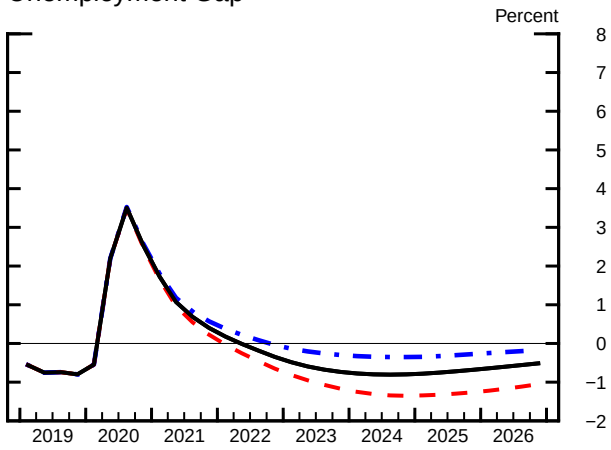
Unemployment Rate



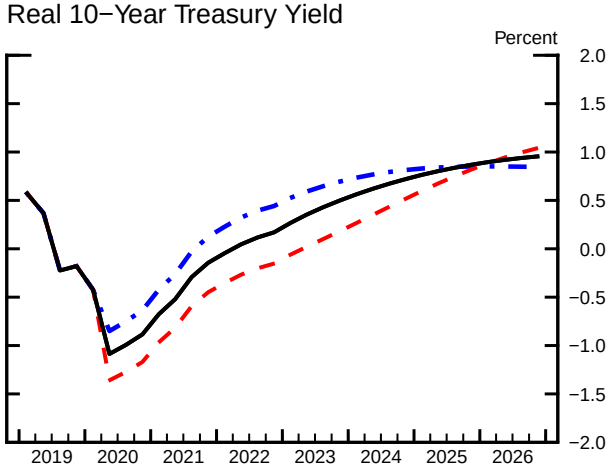
Real Federal Funds Rate



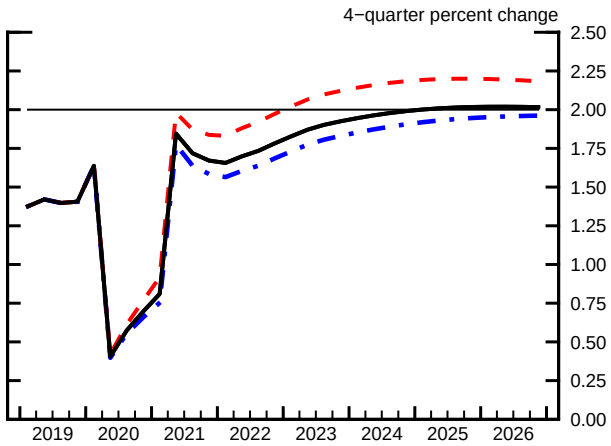
Unemployment Gap



Real 10−Year Treasury Yield



PCE Inflation



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

activity to monetary policy in the FRB/US model. Overall, this optimal control path for the federal funds rate leads to a slightly higher unemployment rate and lower inflation than in the baseline. The federal funds rate prescriptions arising from the equal-weights loss specification in this Tealbook are, on average, about 2¼ percentage points lower than those in the March Tealbook through 2026, reflecting the substantially larger projection for the unemployment gap and somewhat greater shortfalls of inflation from 2 percent over the next few years than in March.

- The simulation labeled "Asymmetric weight on *ugap*" uses a loss function that assigns no cost to deviations of the unemployment rate from the natural rate when the unemployment rate is below the natural rate, but it is otherwise identical to the specification with equal weights. Under this strategy, policymakers' desire to hasten the labor market recovery and raise inflation to 2 percent does not have to be balanced against a preference to prevent the unemployment rate from eventually running below its natural rate. The federal funds rate remains at the ELB until the second half of 2024, more than a year longer than in the Tealbook baseline projection. This relatively accommodative stance leads to a higher path for inflation and, eventually, a somewhat stronger labor market, with the unemployment rate reaching about 3¼ percent by the end of 2024. The federal funds rate prescriptions arising from the asymmetric specification of the loss function in this Tealbook are, on average, about 1½ percentage points lower than those in the March Tealbook through 2026, reflecting primarily the significant increase in the unemployment gap.

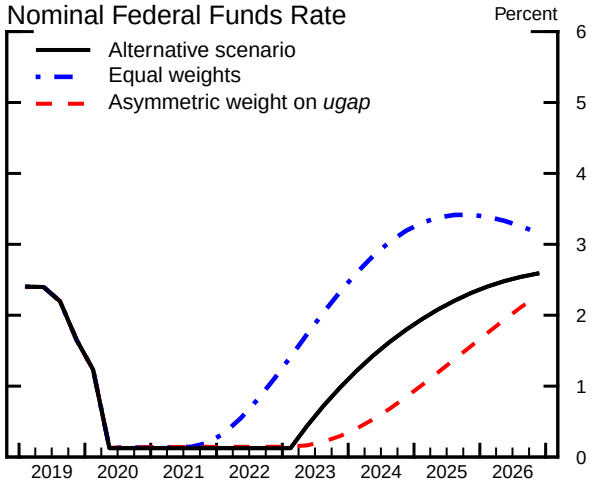
Optimal Control Simulations in Two Alternative Scenarios

As emphasized elsewhere in this Tealbook, the uncertainty surrounding the economic outlook is extremely elevated. In particular, how much the economy will weaken and how long it will take to recover will depend on the evolution of the COVID-19 outbreak and the measures undertaken to contain it. Beyond the uncertainty surrounding the progression of the pandemic, there is much uncertainty about the evolution of the macroeconomy in these circumstances. The next exhibit discusses optimal control simulations in two alternative sets of circumstances presented in the Risks and Uncertainty section of this Tealbook. Under "Early Moderation," the

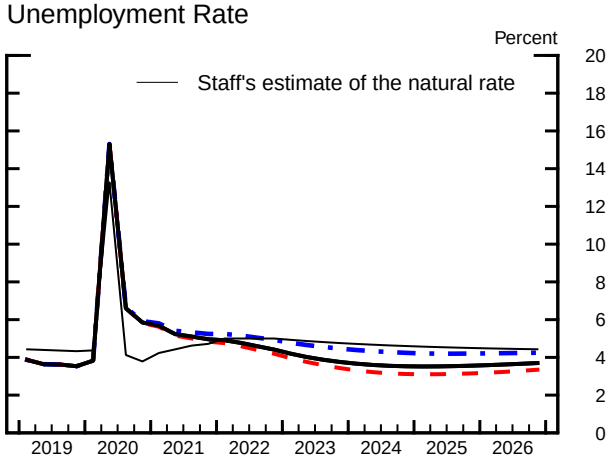
Optimal Control Simulations in Two Alternative Scenarios

Early Moderation Scenario

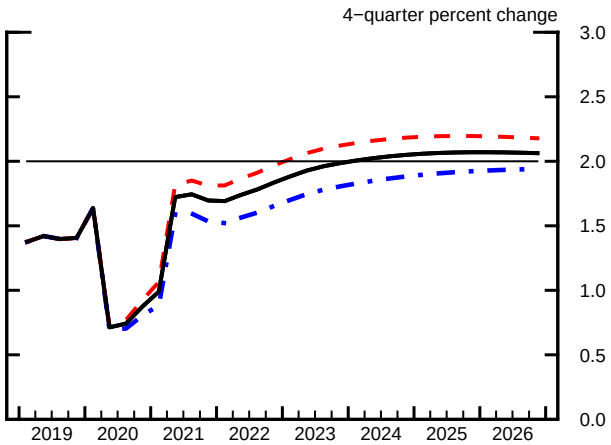
Nominal Federal Funds Rate



Unemployment Rate

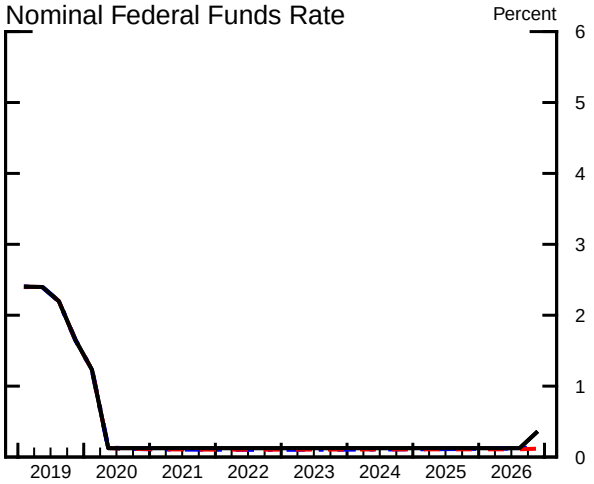


PCE Inflation

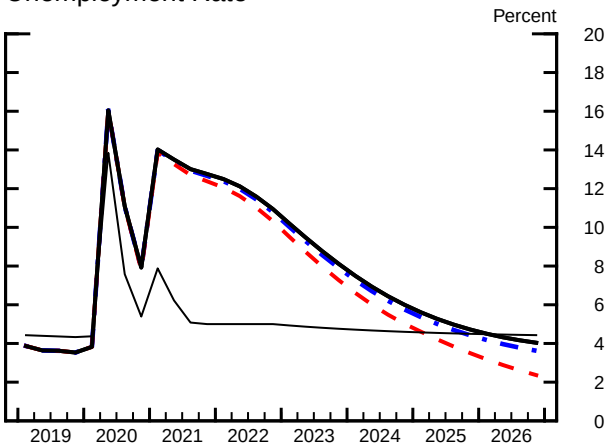


Second Waves Scenario

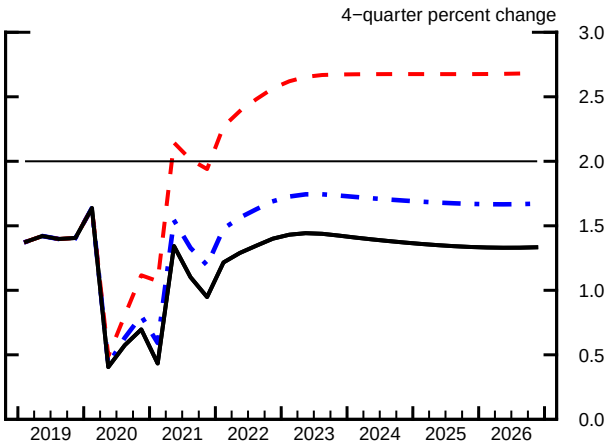
Nominal Federal Funds Rate



Unemployment Rate



PCE Inflation



economic downturn is shorter than under the staff projection, whereas, under "Second Waves," aggregate demand is depressed for a few more years.[9]

- In the "Early Moderation" scenario, the policy rate path resulting from the equal-weights loss function is less accommodative than that in the scenario baseline, whereas, under the asymmetric-weights loss function, the policy rate path remains at the ELB longer, and then rises more gradually, than in the scenario baseline.
    - Under the equal-weights loss function, the federal funds rate remains at the ELB until the beginning of 2022, about five quarters earlier than in the scenario baseline. As was the case for this loss function under the Tealbook baseline, the strategy aims to contain the persistent projected undershooting of the natural rate of unemployment from 2022 onward in this scenario baseline. Accordingly, this optimal control path for the federal funds rate leads to a slightly higher unemployment rate and lower inflation than in the scenario baseline.
    - Under the asymmetric-weight-on-*ugap* loss function, the federal funds rate remains at the ELB until the end of 2023. The unemployment rate falls to a low of 3 percent by the end of 2024 and then stays near that value for a prolonged period. Reflecting this period of tight resource utilization, the path for inflation is slightly higher than under the scenario baseline, with inflation overshooting 2 percent by the beginning of 2023.

- In the "Second Waves" scenario, the paths for the federal funds rate under both the equal-weights and asymmetric-weights loss functions are distinctly more accommodative than the scenario baseline path.

    - Under the equal-weights loss function, the federal funds rate remains at the ELB through the middle of 2028 (not shown), about two years later than under the scenario baseline policy assumptions. The unemployment rate falls below the natural rate in 2025. However, the

[9] See the Risks and Uncertainty section of this Tealbook for details concerning the construction of these scenarios. As with the Tealbook baseline, the alternative simulations in the Risks and Uncertainty section of this Tealbook embed the assumptions that the federal funds rate remains at the ELB until the unemployment rate falls below 4.3 percent and that it follows the conditional attenuated rule thereafter.

ensuing period of tight resource utilization is insufficient to raise inflation back to 2 percent on a sustained basis.

- Under the asymmetric-weights-on-*ugap* loss function, the federal funds rate remains at the ELB until the end of 2030 (not shown), hastening somewhat the economic recovery. The unemployment rate averages about ¾ percentage point less than in the scenario baseline over the next five years. Fueled by the long period of policy accommodation, the unemployment rate then falls to unprecedented lows. Due to the forward-looking nature of inflation in the FRB/US model, the period of very high resource utilization in the decade ahead is associated with a higher rate of inflation even in the near term: Inflation runs near 2½ percent for much of the next decade. The strong linkage in the FRB/US model between future resource utilization and current inflation is common to many economic models in which price and wage setters have model-consistent expectations that take into account developments that occur in the far future. However, price and wage setters may not factor developments that occur far in the future heavily in their current decisions, particularly in the current, and highly unusual, circumstances. Accordingly, the model's strong linkage between future resource utilization and current inflation may not hold in practice.

The final four exhibits tabulate the dynamic simulation results shown in the exhibits "Simple Policy Rule Simulations" and "Optimal Control Simulations under Commitment."

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
Nominal federal funds rate[1]							
Inertial Taylor (1999)	.1	.3	.9	1.7	2.3	2.7	2.7
Taylor (1993)	.1	1.0	1.7	2.2	2.5	2.6	2.5
First-difference	1.6	2.4	3.0	3.6	4.0	3.5	2.8
Flexible price-level targeting	.1	.1	.1	.4	.9	1.4	1.8
Extended Tealbook baseline	.1	.1	.1	.9	1.7	2.2	2.4
Real GDP							
Inertial Taylor (1999)	-4.4	4.1	2.6	2.1	1.8	1.5	1.3
Taylor (1993)	-4.5	3.9	2.5	2.2	2.0	1.6	1.4
First-difference	-4.8	3.3	2.2	2.2	2.1	1.7	1.5
Flexible price-level targeting	-4.2	4.8	3.1	2.5	1.9	1.6	1.6
Extended Tealbook baseline	-4.3	4.4	2.8	2.3	1.8	1.4	1.4
Unemployment rate[1]							
Inertial Taylor (1999)	8.0	5.6	5.0	4.5	4.3	4.2	4.3
Taylor (1993)	8.0	5.8	5.3	4.8	4.4	4.2	4.3
First-difference	8.1	6.3	6.0	5.5	5.0	4.7	4.6
Flexible price-level targeting	7.9	5.2	4.2	3.5	3.1	3.1	3.1
Extended Tealbook baseline	7.9	5.4	4.7	4.0	3.8	3.8	3.9
Total PCE prices							
Inertial Taylor (1999)	.6	1.5	1.6	1.7	1.8	1.8	1.8
Taylor (1993)	.6	1.5	1.5	1.7	1.8	1.8	1.8
First-difference	.6	1.4	1.5	1.6	1.7	1.8	1.8
Flexible price-level targeting	.8	2.0	2.2	2.4	2.4	2.4	2.4
Extended Tealbook baseline	.7	1.7	1.8	1.9	2.0	2.0	2.0
Core PCE prices							
Inertial Taylor (1999)	1.3	1.4	1.5	1.7	1.8	1.8	1.8
Taylor (1993)	1.3	1.4	1.5	1.7	1.7	1.8	1.8
First-difference	1.2	1.3	1.4	1.6	1.7	1.8	1.8
Flexible price-level targeting	1.5	1.9	2.1	2.3	2.4	2.4	2.4
Extended Tealbook baseline	1.4	1.6	1.7	1.9	2.0	2.0	2.0

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			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nominal federal funds rate[1]								
Inertial Taylor (1999)	1.2	.1	.1	.1	.1	.1	.2	.3
Taylor (1993)	1.2	.1	.1	.1	.1	.9	1.0	1.0
First-difference	1.2	.1	.2	1.6	1.9	2.2	2.3	2.4
Flexible price-level targeting	1.2	.1	.1	.1	.1	.1	.1	.1
Extended Tealbook baseline	1.2	.1	.1	.1	.1	.1	.1	.1
Real GDP								
Inertial Taylor (1999)	.0	-11.5	-6.2	-4.4	-1.6	11.8	5.9	4.1
Taylor (1993)	.0	-11.5	-6.3	-4.5	-1.7	11.6	5.7	3.9
First-difference	.0	-11.5	-6.4	-4.8	-2.2	10.9	5.0	3.3
Flexible price-level targeting	.0	-11.5	-6.1	-4.2	-1.2	12.5	6.6	4.8
Extended Tealbook baseline	.0	-11.5	-6.2	-4.3	-1.4	12.1	6.2	4.4
Unemployment rate[1]								
Inertial Taylor (1999)	3.8	16.0	11.1	8.0	6.9	6.3	5.9	5.6
Taylor (1993)	3.8	16.0	11.1	8.0	7.0	6.4	6.1	5.8
First-difference	3.8	16.0	11.2	8.1	7.2	6.7	6.5	6.3
Flexible price-level targeting	3.8	16.0	11.1	7.9	6.7	6.0	5.6	5.2
Extended Tealbook baseline	3.8	16.0	11.1	7.9	6.8	6.2	5.8	5.4
Total PCE prices								
Inertial Taylor (1999)	1.6	.4	.5	.6	.7	1.7	1.6	1.5
Taylor (1993)	1.6	.4	.5	.6	.7	1.7	1.5	1.5
First-difference	1.6	.4	.5	.6	.6	1.6	1.4	1.4
Flexible price-level targeting	1.6	.4	.7	.8	1.0	2.1	2.0	2.0
Extended Tealbook baseline	1.6	.4	.6	.7	.8	1.8	1.7	1.7
Core PCE prices								
Inertial Taylor (1999)	1.7	1.3	1.2	1.3	1.2	1.6	1.5	1.4
Taylor (1993)	1.7	1.3	1.2	1.3	1.2	1.6	1.5	1.4
First-difference	1.7	1.2	1.1	1.2	1.2	1.5	1.4	1.3
Flexible price-level targeting	1.7	1.3	1.3	1.5	1.6	2.0	2.0	1.9
Extended Tealbook baseline	1.7	1.3	1.2	1.4	1.4	1.8	1.7	1.6

1. Percent, average for the quarter.

Outcomes of Optimal Control Simulations under Commitment

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

Outcome and strategy	2020	2021	2022	2023	2024	2025	2026
Nominal federal funds rate[1]							
Equal weights	.1	.2	.7	1.8	2.6	2.9	2.8
Asymmetric weight on *ugap*	.1	.1	.1	.2	.4	1.1	1.8
Extended Tealbook baseline	.1	.1	.1	.9	1.7	2.2	2.4
Real GDP							
Equal weights	-4.4	4.2	2.6	2.1	1.8	1.5	1.4
Asymmetric weight on *ugap*	-4.2	4.7	3.1	2.5	1.9	1.5	1.3
Extended Tealbook baseline	-4.3	4.4	2.8	2.3	1.8	1.4	1.4
Unemployment rate[1]							
Equal weights	8.0	5.6	5.0	4.5	4.3	4.2	4.3
Asymmetric weight on *ugap*	7.9	5.2	4.3	3.6	3.2	3.2	3.4
Extended Tealbook baseline	7.9	5.4	4.7	4.0	3.8	3.8	3.9
Total PCE prices							
Equal weights	.7	1.6	1.7	1.8	1.9	1.9	2.0
Asymmetric weight on *ugap*	.8	1.8	2.0	2.1	2.2	2.2	2.2
Extended Tealbook baseline	.7	1.7	1.8	1.9	2.0	2.0	2.0
Core PCE prices							
Equal weights	1.3	1.5	1.6	1.8	1.9	1.9	2.0
Asymmetric weight on *ugap*	1.4	1.8	1.9	2.1	2.2	2.2	2.2
Extended Tealbook baseline	1.4	1.6	1.7	1.9	2.0	2.0	2.0

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

Outcomes of Optimal Control Simulations under Commitment, Quarterly

(4-quarter percent change, except as noted)

Outcome and strategy	2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Nominal federal funds rate[1]								
Equal weights	1.2	.1	.1	.1	.1	.1	.1	.2
Asymmetric weight on *ugap*	1.2	.1	.1	.1	.1	.1	.1	.1
Extended Tealbook baseline	1.2	.1	.1	.1	.1	.1	.1	.1
Real GDP								
Equal weights	.0	-11.5	-6.2	-4.4	-1.6	11.9	6.0	4.2
Asymmetric weight on *ugap*	.0	-11.5	-6.1	-4.2	-1.2	12.4	6.5	4.7
Extended Tealbook baseline	.0	-11.5	-6.2	-4.3	-1.4	12.1	6.2	4.4
Unemployment rate[1]								
Equal weights	3.8	16.0	11.1	8.0	6.9	6.3	5.9	5.6
Asymmetric weight on *ugap*	3.8	16.0	11.1	7.9	6.7	6.1	5.6	5.2
Extended Tealbook baseline	3.8	16.0	11.1	7.9	6.8	6.2	5.8	5.4
Total PCE prices								
Equal weights	1.6	.4	.6	.7	.8	1.8	1.6	1.6
Asymmetric weight on *ugap*	1.6	.4	.6	.8	.9	2.0	1.9	1.8
Extended Tealbook baseline	1.6	.4	.6	.7	.8	1.8	1.7	1.7
Core PCE prices								
Equal weights	1.7	1.3	1.2	1.3	1.3	1.7	1.6	1.5
Asymmetric weight on *ugap*	1.7	1.3	1.3	1.4	1.5	1.9	1.8	1.8
Extended Tealbook baseline	1.7	1.3	1.2	1.4	1.4	1.8	1.7	1.6

1. Percent, average for the quarter.

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. Both approaches recognize the Federal Reserve's dual mandate. 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 four simple policy rules reported in the first two exhibits of the Monetary Policy Strategies section. It also reports the expression for the conditional attenuated rule that the staff uses in the construction of the Tealbook baseline projection.[1] R_t denotes the nominal federal funds rate prescribed by a strategy for quarter *t*. For the current quarter, the lagged value R_{t-1} corresponds to the midpoint of the current target range of the federal funds rate to ensure the prescriptions reflect the present policy

[1] In the staff's construction of the baseline projection, the federal funds rate remains at the effective lower bound until the unemployment rate falls below 4.3 percent. Thereafter, the policy rate follows the prescriptions of the conditional attenuated policy rule.

environment. The right-hand-side variables of the first four rules include the staff's projection of trailing four-quarter core PCE price inflation for the current quarter and three quarters ahead (π_t and $\pi_{t+3|t}$), the output gap estimate for the current period ($ygap_t$), and the forecast of the three-quarter-ahead annual change in the output gap ($ygap_{t+3|t} - ygap_{t-1}$). The value of policymakers' longer-run inflation objective, denoted π^{LR}, is 2 percent. In the case of the flexible price-level targeting rule, the right-hand-side variables include an unemployment rate gap and a price-level gap. The unemployment gap is defined as the difference between the unemployment rate, u_t, and the staff's estimate of its natural rate, u_t^*, which currently stands at 4.3 percent. The price gap is defined as 100 times the difference between the log of the core PCE price level, p_t, and the log of the target price-level path, p_t^*. The 2011:Q4 value of p_t^* is set to the 2011:Q4 value of the core PCE price index, and, subsequently, p_t^* is assumed to grow at a 2 percent annual rate.

Simple Rules

Taylor (1993) rule	$R_t = r^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 0.5ygap_t$
Inertial Taylor (1999) rule	$R_t = 0.85R_{t-1} + 0.15(r^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + ygap_t)$
Conditional attenuated rule	$R_t = 0.85R_{t-1} + 0.15(r_t^* + \pi_t + 0.5(\pi_t - \pi^{LR}) + 0.2ygap_t)$
First-difference rule	$R_t = R_{t-1} + 0.5(\pi_{t+3\|t} - \pi^{LR}) + 0.5\Delta^4 ygap_{t+3\|t}$
Flexible price-level targeting rule	$R_t = 0.85R_{t-1} + 0.15(r^{LR} + \pi_t + (p_t - p_t^*) - (u_t - u_t^*))$

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 and rules that depend on a price gap, like the FPLT rule, have been featured prominently in analysis by Board staff.[2] The conditional attenuated rule has the same form as the inertial Taylor (1999) rule but responds less strongly to the output gap. The intercepts of the Taylor (1993), inertial Taylor (1999) and FPLT 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. The intercept of the conditional attenuated rule, denoted r_t^*, is zero over the next few years and then rises to 0.5 percent over time. The prescriptions of the first-difference rule do not depend on the level of the output gap or the longer-run real interest rate; see Orphanides (2003).

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 the output gap. 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

[2] For applications, see, for example, Erceg and others (2012). An FPLT rule similar to the one above is also analyzed by Chung and others (2015).

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).[3] 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 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.[4] 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.

[3] The statistics associated with the SEP are unavailable in the current Tealbook because the FOMC did not submit SEP projections in March.

[4] 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).

COMPUTATION OF OPTIMAL CONTROL POLICIES UNDER COMMITMENT

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

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

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

Loss Functions

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

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

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

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

	Nominal GDP		Real GDP		PCE price index		Core PCE price index		Unemployment rate[1]	
Interval	03/06/20	04/16/20	03/06/20	04/16/20	03/06/20	04/16/20	03/06/20	04/16/20	03/06/20	04/16/20
Quarterly										
2019:Q1	3.9	3.9	3.1	3.1	.4	.4	1.1	1.1	3.9	3.9
Q2	4.7	4.7	2.0	2.0	2.4	2.4	1.9	1.9	3.6	3.6
Q3	3.8	3.8	2.1	2.1	1.5	1.5	2.1	2.1	3.6	3.6
Q4	3.4	3.5	2.1	2.1	1.3	1.4	1.2	1.3	3.5	3.5
2020:Q1	2.7	-4.6	1.4	-5.9	1.2	1.3	1.6	1.7	3.5	3.8
Q2	2.5	-37.2	1.3	-37.4	.6	-2.5	1.6	.0	3.6	16.0
Q3	5.0	31.1	3.0	28.9	1.8	2.2	2.0	1.9	3.6	11.1
Q4	4.8	12.2	2.8	10.4	1.9	1.9	1.9	1.9	3.5	7.9
2021:Q1	4.8	7.7	2.8	6.1	2.0	1.8	2.0	1.7	3.4	6.8
Q2	4.5	6.5	2.3	4.7	2.0	1.6	1.9	1.5	3.3	6.2
Q3	4.2	5.6	2.1	3.8	1.9	1.7	1.9	1.5	3.2	5.8
Q4	4.0	4.9	2.1	3.2	1.9	1.7	1.9	1.6	3.2	5.4
Two-quarter[2]										
2019:Q2	4.3	4.3	2.6	2.6	1.4	1.4	1.5	1.5	-.2	-.2
Q4	3.6	3.7	2.1	2.1	1.4	1.4	1.7	1.7	-.1	-.1
2020:Q2	2.6	-22.6	1.4	-23.3	.9	-.6	1.6	.9	.1	12.5
Q4	4.9	21.2	2.9	19.3	1.8	2.0	1.9	1.9	-.1	-8.1
2021:Q2	4.7	7.1	2.5	5.4	2.0	1.7	2.0	1.6	-.2	-1.7
Q4	4.1	5.2	2.1	3.5	1.9	1.7	1.9	1.5	-.1	-.8
Four-quarter[3]										
2018:Q4	4.9	4.9	2.5	2.5	1.9	1.9	1.9	1.9	-.3	-.3
2019:Q4	3.9	4.0	2.3	2.3	1.4	1.4	1.6	1.6	-.3	-.3
2020:Q4	3.8	-3.2	2.1	-4.3	1.3	.7	1.8	1.4	.0	4.4
2021:Q4	4.4	6.2	2.3	4.4	2.0	1.7	1.9	1.6	-.3	-2.5
2022:Q4	3.8	4.7	1.7	2.8	1.9	1.8	1.9	1.7	.0	-.7
Annual										
2018	5.4	5.4	2.9	2.9	2.1	2.1	1.9	1.9	3.9	3.9
2019	4.1	4.1	2.3	2.3	1.4	1.4	1.6	1.6	3.7	3.7
2020	3.5	-4.2	1.9	-5.5	1.3	.8	1.7	1.4	3.6	9.7
2021	4.5	6.8	2.5	5.1	1.8	1.5	1.9	1.6	3.3	6.0
2022	4.0	5.0	1.9	3.2	1.9	1.7	1.9	1.6	3.2	4.9

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

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

Item	2019			2020				2021				2019[1]	2020[1]	2021[1]	2022[1]
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP	2.0	2.1	2.1	-5.9	-37.4	28.9	10.4	6.1	4.7	3.8	3.2	2.3	-4.3	4.4	2.8
Previous Tealbook	*2.0*	*2.1*	*2.1*	*1.4*	*1.3*	*3.0*	*2.8*	*2.8*	*2.3*	*2.1*	*2.1*	*2.3*	*2.1*	*2.3*	*1.7*
Final sales	3.0	2.1	3.1	-3.9	-34.7	28.0	10.0	5.4	4.4	3.2	2.9	2.7	-3.0	4.0	1.9
Previous Tealbook	*3.0*	*2.1*	*3.3*	*2.1*	*1.9*	*2.8*	*2.8*	*2.7*	*2.1*	*2.1*	*2.1*	*2.7*	*2.4*	*2.2*	*1.6*
Priv. dom. final purch.	3.3	2.3	1.3	-4.5	-44.9	36.0	13.4	6.8	5.8	4.9	4.2	2.1	-5.1	5.4	3.0
Previous Tealbook	*3.3*	*2.3*	*1.5*	*2.1*	*1.6*	*2.7*	*3.0*	*3.2*	*2.6*	*2.4*	*2.5*	*2.2*	*2.3*	*2.7*	*1.8*
Personal cons. expend.	4.6	3.1	1.8	-4.9	-41.5	47.8	9.8	3.9	3.5	3.1	2.9	2.7	-2.5	3.3	2.8
Previous Tealbook	*4.6*	*3.1*	*1.7*	*1.9*	*1.4*	*2.6*	*2.3*	*2.9*	*2.9*	*2.6*	*2.6*	*2.6*	*2.0*	*2.8*	*2.3*
Durables	13.0	8.1	2.8	-13.0	-65.0	74.1	12.6	6.6	6.2	5.8	5.6	5.9	-12.1	6.0	5.6
Nondurables	6.5	3.9	-.6	7.0	1.0	2.0	10.1	4.0	3.5	3.3	3.0	3.0	4.9	3.5	3.0
Services	2.8	2.2	2.4	-7.0	-47.3	63.1	9.4	3.6	3.1	2.6	2.5	2.1	-3.3	3.0	2.4
Residential investment	-3.0	4.6	6.5	17.6	-66.0	-9.1	44.1	35.7	20.8	10.0	8.5	1.7	-14.9	18.3	1.5
Previous Tealbook	*-3.0*	*4.6*	*6.1*	*10.3*	*7.2*	*11.9*	*7.5*	*1.6*	*-3.1*	*-3.9*	*-6.0*	*1.6*	*9.2*	*-2.9*	*-6.4*
Nonres. priv. fixed invest.	-1.0	-2.3	-2.4	-7.8	-54.2	-5.8	28.3	16.9	15.2	14.2	10.5	-.4	-15.5	14.2	4.1
Previous Tealbook	*-1.0*	*-2.3*	*-1.2*	*.6*	*1.0*	*.8*	*5.3*	*5.0*	*3.0*	*3.5*	*4.6*	*.0*	*1.9*	*4.0*	*1.5*
Equipment & intangibles	2.1	-.1	-1.1	-5.6	-48.3	-9.7	25.1	15.8	15.3	11.7	10.0	1.3	-13.8	13.2	4.3
Previous Tealbook	*2.1*	*-.1*	*-.7*	*1.9*	*2.4*	*2.7*	*6.9*	*6.4*	*3.2*	*4.1*	*5.5*	*1.4*	*3.4*	*4.8*	*2.0*
Nonres. structures	-11.1	-9.9	-7.2	-15.7	-72.2	12.8	42.4	21.0	15.2	24.2	12.5	-6.2	-21.7	18.1	3.3
Previous Tealbook	*-11.1*	*-9.9*	*-2.9*	*-4.0*	*-3.8*	*-6.2*	*-.6*	*.0*	*2.1*	*1.3*	*.9*	*-5.2*	*-3.7*	*1.1*	*-.8*
Net exports[2]	-981	-990	-901	-886	-476	-647	-721	-758	-790	-824	-830	-954	-683	-801	-869
Previous Tealbook[2]	*-981*	*-990*	*-900*	*-895*	*-880*	*-868*	*-870*	*-877*	*-895*	*-903*	*-914*	*-954*	*-878*	*-897*	*-931*
Exports	-5.7	1.0	2.1	-17.1	-51.2	51.1	28.9	8.8	5.5	5.0	4.9	.3	-5.8	6.1	3.8
Imports	.0	1.8	-8.4	-14.3	-67.4	78.9	34.2	11.9	8.3	8.2	4.4	-2.1	-9.5	8.2	4.8
Gov't. cons. & invest.	4.8	1.7	2.5	-1.1	3.4	10.9	.4	1.3	.4	-1.9	-3.3	3.0	3.3	-.9	-2.2
Previous Tealbook	*4.8*	*1.7*	*2.6*	*1.4*	*1.7*	*1.3*	*.8*	*.3*	*.7*	*.6*	*.6*	*3.0*	*1.3*	*.5*	*.8*
Federal	8.3	3.3	3.4	.8	23.7	13.9	1.2	1.6	.2	-2.5	-6.2	4.3	9.5	-1.8	-2.8
Defense	3.3	2.2	4.4	.0	2.4	2.1	2.1	.8	.8	.8	.1	4.4	1.6	.6	.7
Nondefense	16.1	5.0	1.9	1.9	60.3	30.5	.0	2.5	-.5	-6.4	-13.4	4.1	20.8	-4.6	-7.2
State & local	2.7	.7	2.0	-2.2	-7.7	9.0	-.1	1.0	.6	-1.5	-1.4	2.2	-.4	-.3	-1.8
Change in priv. inventories[2]	69	69	13	-100	-292	-276	-265	-232	-221	-193	-179	67	-233	-206	-42
Previous Tealbook[2]	*69*	*69*	*5*	*-29*	*-59*	*-52*	*-50*	*-43*	*-32*	*-30*	*-32*	*65*	*-48*	*-34*	*0*

1. Change from fourth quarter of previous year to fourth quarter of year indicated.
2. Billions of chained (2012) dollars; annual values show annual averages.

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

Item	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Real GDP	2.6	2.9	1.9	2.0	2.8	2.5	2.3	-4.3	4.4	2.8
Previous Tealbook	*2.6*	*2.9*	*1.9*	*2.0*	*2.8*	*2.5*	*2.3*	*2.1*	*2.3*	*1.7*
Final sales	2.0	3.2	1.8	2.2	2.9	2.2	2.7	-3.0	4.0	1.9
Previous Tealbook	*2.0*	*3.2*	*1.8*	*2.2*	*2.9*	*2.2*	*2.7*	*2.4*	*2.2*	*1.6*
Priv. dom. final purch.	2.6	4.5	2.5	2.8	3.4	2.8	2.1	-5.1	5.4	3.0
Previous Tealbook	*2.6*	*4.5*	*2.5*	*2.8*	*3.4*	*2.8*	*2.2*	*2.3*	*2.7*	*1.8*
Personal cons. expend.	1.9	3.8	2.9	2.8	2.9	2.6	2.7	-2.5	3.3	2.8
Previous Tealbook	*1.9*	*3.8*	*2.9*	*2.8*	*2.9*	*2.6*	*2.6*	*2.0*	*2.8*	*2.3*
Durables	5.0	9.2	5.8	7.3	7.7	3.8	5.9	-12.1	6.0	5.6
Nondurables	2.8	3.2	2.8	1.8	3.7	2.5	3.0	4.9	3.5	3.0
Services	1.1	3.2	2.5	2.4	2.0	2.5	2.1	-3.3	3.0	2.4
Residential investment	7.1	7.7	9.1	3.9	4.2	-4.4	1.7	-14.9	18.3	1.5
Previous Tealbook	*7.1*	*7.7*	*9.1*	*3.9*	*4.2*	*-4.4*	*1.6*	*9.2*	*-2.9*	*-6.4*
Nonres. priv. fixed invest.	5.4	6.9	-.9	2.4	5.4	5.9	-.4	-15.5	14.2	4.1
Previous Tealbook	*5.4*	*6.9*	*-.9*	*2.4*	*5.4*	*5.9*	*.0*	*1.9*	*4.0*	*1.5*
Equipment & intangibles	5.1	6.1	2.3	1.9	6.6	6.8	1.3	-13.8	13.2	4.3
Previous Tealbook	5.1	6.1	2.3	1.9	6.6	6.8	1.4	3.4	4.8	2.0
Nonres. structures	6.7	9.3	-10.9	4.3	1.5	2.6	-6.2	-21.7	18.1	3.3
Previous Tealbook	*6.7*	*9.3*	*-10.9*	*4.3*	*1.5*	*2.6*	*-5.2*	*-3.7*	*1.1*	*-.8*
Net exports[1]	-533	-577	-722	-784	-850	-920	-954	-683	-801	-869
Previous Tealbook[1]	*-533*	*-577*	*-722*	*-784*	*-850*	*-920*	*-954*	*-878*	*-897*	*-931*
Exports	6.0	2.9	-1.5	1.1	5.5	.4	.3	-5.8	6.1	3.8
Imports	3.0	6.5	3.2	3.4	5.6	3.2	-2.1	-9.5	8.2	4.8
Gov't. cons. & invest.	-2.4	.3	2.3	1.5	.8	1.5	3.0	3.3	-.9	-2.2
Previous Tealbook	*-2.4*	*.3*	*2.3*	*1.5*	*.8*	*1.5*	*3.0*	*1.3*	*.5*	*.8*
Federal	-6.1	-1.1	1.1	.1	1.7	2.7	4.3	9.5	-1.8	-2.8
Defense	-6.5	-3.4	-.4	-.8	1.9	4.0	4.4	1.6	.6	.7
Nondefense	-5.5	2.7	3.4	1.5	1.4	.7	4.1	20.8	-4.6	-7.2
State & local	.2	1.2	3.0	2.3	.4	.9	2.2	-.4	-.3	-1.8
Change in priv. inventories[1]	109	86	132	23	32	48	67	-233	-206	-42
Previous Tealbook[1]	*109*	*86*	*132*	*23*	*32*	*48*	*65*	*-48*	*-34*	*-0*

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

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

Item	2019			2020				2021				2019[1]	2020[1]	2021[1]	2022[1]
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
Real GDP	2.0	2.1	2.1	-5.9	-37.4	28.9	10.4	6.1	4.7	3.8	3.2	2.3	-4.3	4.4	2.8
Previous Tealbook	*2.0*	*2.1*	*2.1*	*1.4*	*1.3*	*3.0*	*2.8*	*2.8*	*2.3*	*2.1*	*2.1*	*2.3*	*2.1*	*2.3*	*1.7*
Final sales	2.9	2.1	3.1	-3.9	-33.7	28.6	10.2	5.5	4.5	3.3	2.9	2.7	-3.0	4.0	1.9
Previous Tealbook	*2.9*	*2.1*	*3.2*	*2.1*	*1.9*	*2.8*	*2.8*	*2.7*	*2.1*	*2.1*	*2.1*	*2.7*	*2.4*	*2.2*	*1.6*
Priv. dom. final purch.	2.8	2.0	1.2	-3.7	-41.7	28.6	11.0	5.7	4.8	4.1	3.6	1.8	-4.3	4.6	2.5
Previous Tealbook	*2.8*	*2.0*	*1.2*	*1.8*	*1.3*	*2.3*	*2.6*	*2.7*	*2.2*	*2.1*	*2.1*	*1.8*	*2.0*	*2.3*	*1.5*
Personal cons. expend.	3.0	2.1	1.2	-3.3	-29.7	29.2	6.8	2.8	2.4	2.1	2.0	1.8	-1.7	2.3	1.9
Previous Tealbook	*3.0*	*2.1*	*1.2*	*1.3*	*.9*	*1.8*	*1.6*	*2.0*	*2.0*	*1.8*	*1.8*	*1.8*	*1.4*	*1.9*	*1.6*
Durables	.9	.6	.2	-1.0	-6.0	3.7	.8	.4	.4	.4	.4	.4	-.9	.4	.3
Nondurables	.9	.5	-.1	1.0	1.2	.7	1.5	.6	.5	.5	.4	.4	.7	.5	.4
Services	1.3	1.0	1.1	-3.3	-24.8	24.8	4.5	1.7	1.5	1.3	1.2	1.0	-1.6	1.4	1.2
Residential investment	-.1	.2	.2	.6	-3.5	-.2	1.2	1.1	.7	.4	.3	.1	-.6	.6	.1
Previous Tealbook	*-.1*	*.2*	*.2*	*.4*	*.3*	*.4*	*.3*	*.1*	*-.1*	*-.2*	*-.2*	*.1*	*.3*	*-.1*	*-.3*
Nonres. priv. fixed invest.	-.1	-.3	-.3	-1.0	-8.5	-.4	2.9	1.9	1.7	1.6	1.3	.0	-2.0	1.6	.5
Previous Tealbook	*-.1*	*-.3*	*-.2*	*.1*	*.1*	*.1*	*.7*	*.6*	*.4*	*.5*	*.6*	*.0*	*.3*	*.5*	*.2*
Equipment & intangibles	.2	.0	-.1	-.6	-5.6	-.8	2.1	1.4	1.4	1.1	.9	.1	-1.4	1.2	.4
Previous Tealbook	*.2*	*.0*	*-.1*	*.2*	*.2*	*.3*	*.7*	*.6*	*.3*	*.4*	*.6*	*.2*	*.4*	*.5*	*.2*
Nonres. structures	-.4	-.3	-.2	-.5	-2.8	.3	.8	.5	.3	.5	.3	-.2	-.6	.4	.1
Previous Tealbook	*-.4*	*-.3*	*-.1*	*-.1*	*-.1*	*-.2*	*.0*	*.0*	*.1*	*.0*	*.0*	*-.2*	*-.1*	*.0*	*.0*
Net exports	-.7	-.1	1.5	.0	5.9	-2.5	-.9	-.5	-.4	-.5	.0	.4	.7	-.4	-.2
Previous Tealbook	*-.7*	*-.1*	*1.5*	*.1*	*.2*	*.3*	*.1*	*-.1*	*-.3*	*-.1*	*-.1*	*.4*	*.2*	*-.1*	*-.1*
Exports	-.7	.1	.2	-2.1	-6.6	4.7	2.8	1.0	.6	.5	.5	.0	-.7	.7	.4
Imports	.0	-.3	1.3	2.1	12.5	-7.2	-3.7	-1.5	-1.0	-1.0	-.6	.3	1.3	-1.0	-.6
Gov't. cons. & invest.	.8	.3	.4	-.2	2.0	2.7	.1	.3	.1	-.3	-.6	.5	.6	-.2	-.4
Previous Tealbook	*.8*	*.3*	*.5*	*.2*	*.3*	*.2*	*.1*	*.1*	*.1*	*.1*	*.1*	*.5*	*.2*	*.1*	*.1*
Federal	.5	.2	.2	.1	2.0	1.3	.1	.1	.0	-.2	-.5	.3	.6	-.1	-.2
Defense	.1	.1	.2	.0	.4	.2	.1	.0	.0	.0	.0	.2	.1	.0	.0
Nondefense	.4	.1	.1	.1	1.6	1.1	.0	.1	.0	-.2	-.5	.1	.6	-.2	-.2
State & local	.3	.1	.2	-.2	.0	1.4	.0	.1	.1	-.2	-.1	.2	.0	.0	-.2
Change in priv. inventories	-.9	.0	-1.0	-2.1	-3.7	.3	.2	.6	.2	.5	.3	-.4	-1.3	.4	.9
Previous Tealbook	*-.9*	*.0*	*-1.1*	*-.6*	*-.5*	*.1*	*.0*	*.1*	*.2*	*.0*	*.0*	*-.4*	*-.3*	*.1*	*.2*

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

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

Item	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2019[1]	2020[1]	2021[1]	2022[1]
GDP chain-wt. price index	2.4	1.8	1.3	1.5	.2	1.6	1.6	1.5	1.7	1.7	1.7	1.6	1.2	1.6	1.8
Previous Tealbook	*2.4*	*1.8*	*1.3*	*1.3*	*1.1*	*2.0*	*2.0*	*2.0*	*2.2*	*2.0*	*1.9*	*1.6*	*1.6*	*2.0*	*2.0*
PCE chain-wt. price index	2.4	1.5	1.4	1.3	-2.5	2.2	1.9	1.8	1.6	1.7	1.7	1.4	.7	1.7	1.8
Previous Tealbook	*2.4*	*1.5*	*1.3*	*1.2*	*.6*	*1.8*	*1.9*	*2.0*	*2.0*	*1.9*	*1.9*	*1.4*	*1.3*	*2.0*	*1.9*
Energy	18.4	-8.2	4.9	-10.9	-52.4	13.7	5.4	5.3	4.2	3.4	3.0	-1.3	-15.6	4.0	2.8
Previous Tealbook	*18.4*	*-8.2*	*4.9*	*-6.6*	*-19.7*	*-2.1*	*.0*	*1.7*	*1.8*	*1.7*	*1.6*	*-1.3*	*-7.5*	*1.7*	*1.8*
Food	.6	-.5	.5	3.0	2.8	1.0	.3	.5	.9	2.4	2.4	.9	1.8	1.5	2.0
Previous Tealbook	*.6*	*-.5*	*.5*	*.9*	*-.1*	*1.5*	*2.0*	*2.9*	*2.6*	*2.4*	*2.3*	*.9*	*1.1*	*2.5*	*2.3*
Ex. food & energy	1.9	2.1	1.3	1.7	.0	1.9	1.9	1.7	1.5	1.5	1.6	1.6	1.4	1.6	1.7
Previous Tealbook	*1.9*	*2.1*	*1.2*	*1.6*	*1.6*	*2.0*	*1.9*	*2.0*	*1.9*	*1.9*	*1.9*	*1.6*	*1.8*	*1.9*	*1.9*
Ex. food & energy, market based	1.4	1.8	1.1	1.7	.0	1.9	1.7	1.6	1.4	1.4	1.4	1.5	1.3	1.5	1.6
Previous Tealbook	*1.4*	*1.8*	*1.0*	*1.7*	*1.5*	*1.8*	*1.8*	*1.8*	*1.8*	*1.7*	*1.7*	*1.5*	*1.7*	*1.8*	*1.8*
CPI	3.0	1.8	2.4	1.2	-3.2	2.6	2.0	1.9	1.7	1.8	1.8	2.0	.6	1.8	2.1
Previous Tealbook	*3.0*	*1.8*	*2.4*	*1.5*	*.4*	*2.0*	*2.2*	*2.3*	*2.3*	*2.2*	*2.2*	*2.0*	*1.5*	*2.3*	*2.3*
Ex. food & energy	2.2	2.8	2.0	2.0	.6	2.3	1.9	1.8	1.6	1.6	1.6	2.3	1.7	1.6	2.0
Previous Tealbook	*2.2*	*2.8*	*2.0*	*2.2*	*2.0*	*2.3*	*2.3*	*2.3*	*2.3*	*2.2*	*2.2*	*2.3*	*2.2*	*2.3*	*2.3*
ECI, hourly compensation[2]	2.1	3.3	2.6	2.6	-2.8	2.9	1.0	3.6	1.9	1.9	3.5	2.7	.9	2.7	2.2
Previous Tealbook[2]	*2.1*	*3.3*	*2.6*	*2.7*	*2.7*	*2.7*	*2.7*	*2.8*	*2.8*	*2.7*	*2.7*	*2.7*	*2.7*	*2.8*	*2.7*
Business sector															
Output per hour	2.9	-.4	.9	-7.7	24.9	-2.8	-9.7	-1.0	1.6	1.0	.6	1.8	.3	.5	1.2
Previous Tealbook	*2.9*	*-.4*	*.6*	*-1.1*	*.2*	*2.7*	*2.2*	*1.7*	*1.2*	*1.1*	*1.0*	*1.7*	*1.0*	*1.2*	*1.2*
Compensation per hour	2.9	-.1	1.9	2.7	6.3	-5.0	1.0	1.9	1.9	1.9	1.9	3.6	1.2	1.9	3.2
Previous Tealbook	*2.9*	*-.1*	*1.9*	*2.4*	*3.9*	*3.9*	*3.9*	*3.8*	*3.8*	*3.8*	*3.8*	*3.6*	*3.5*	*3.8*	*3.7*
Unit labor costs	.1	.3	.9	11.3	-14.9	-2.2	11.9	3.0	.4	.9	1.3	1.7	.9	1.4	2.0
Previous Tealbook	*.1*	*.3*	*.9*	*3.5*	*3.7*	*1.1*	*1.7*	*2.0*	*2.6*	*2.6*	*2.8*	*1.7*	*2.5*	*2.5*	*2.5*
Core goods imports chain-wt. price index[3]	-.6	-1.0	-1.2	1.7	-3.5	-2.9	.5	1.2	1.4	1.2	1.2	-1.1	-1.1	1.2	1.0
Previous Tealbook[3]	*-.6*	*-1.0*	*-1.2*	*.8*	*.6*	*.2*	*.7*	*1.0*	*1.0*	*.9*	*.9*	*-1.1*	*.6*	*1.0*	*.8*

1. Change from fourth quarter of previous year to fourth quarter of year indicated.
2. Private-industry workers.
3. Core goods imports exclude computers, semiconductors, oil, and natural gas.

Changes in Prices and Costs

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

Item	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
GDP chain-wt. price index	1.8	1.5	.9	1.5	2.0	2.3	1.6	1.2	1.6	1.8
Previous Tealbook	*1.8*	*1.5*	*.9*	*1.5*	*2.0*	*2.3*	*1.6*	*1.6*	*2.0*	*2.0*
PCE chain-wt. price index	1.2	1.1	.3	1.5	1.8	1.9	1.4	.7	1.7	1.8
Previous Tealbook	*1.2*	*1.1*	*.3*	*1.5*	*1.8*	*1.9*	*1.4*	*1.3*	*2.0*	*1.9*
Energy	-2.9	-7.1	-16.4	2.0	8.0	3.9	-1.3	-15.6	4.0	2.8
Previous Tealbook	*-2.9*	*-7.1*	*-16.4*	*2.0*	*8.0*	*3.9*	*-1.3*	*-7.5*	*1.7*	*1.8*
Food	.7	2.8	.3	-1.8	.7	.5	.9	1.8	1.5	2.0
Previous Tealbook	*.7*	*2.8*	*.3*	*-1.8*	*.7*	*.5*	*.9*	*1.1*	*2.5*	*2.3*
Ex. food & energy	1.6	1.5	1.2	1.8	1.7	1.9	1.6	1.4	1.6	1.7
Previous Tealbook	*1.6*	*1.5*	*1.2*	*1.8*	*1.7*	*1.9*	*1.6*	*1.8*	*1.9*	*1.9*
Ex. food & energy, market based	1.1	1.1	1.1	1.4	1.2	1.7	1.5	1.3	1.5	1.6
Previous Tealbook	*1.1*	*1.1*	*1.1*	*1.4*	*1.2*	*1.7*	*1.5*	*1.7*	*1.8*	*1.8*
CPI	1.2	1.2	.4	1.8	2.1	2.2	2.0	.6	1.8	2.1
Previous Tealbook	*1.2*	*1.2*	*.4*	*1.8*	*2.1*	*2.2*	*2.0*	*1.5*	*2.3*	*2.3*
Ex. food & energy	1.7	1.7	2.0	2.2	1.8	2.2	2.3	1.7	1.6	2.0
Previous Tealbook	*1.7*	*1.7*	*2.0*	*2.2*	*1.8*	*2.2*	*2.3*	*2.2*	*2.3*	*2.3*
ECI, hourly compensation[1]	2.0	2.3	1.9	2.2	2.6	3.0	2.7	.9	2.7	2.2
Previous Tealbook[1]	*2.0*	*2.3*	*1.9*	*2.2*	*2.6*	*3.0*	*2.7*	*2.7*	*2.8*	*2.7*
Business sector										
Output per hour	1.8	.3	.7	1.3	1.1	1.4	1.8	.3	.5	1.2
Previous Tealbook	*1.8*	*.3*	*.7*	*1.3*	*1.1*	*1.4*	*1.7*	*1.0*	*1.2*	*1.2*
Compensation per hour	-.3	3.0	2.4	2.0	3.8	2.4	3.6	1.2	1.9	3.2
Previous Tealbook	*-.3*	*3.0*	*2.4*	*2.0*	*3.8*	*2.4*	*3.6*	*3.5*	*3.8*	*3.7*
Unit labor costs	-2.0	2.7	1.7	.8	2.6	1.0	1.7	.9	1.4	2.0
Previous Tealbook	*-2.0*	*2.7*	*1.7*	*.8*	*2.6*	*1.0*	*1.7*	*2.5*	*2.5*	*2.5*
Core goods imports chain-wt. price index[2]	-2.2	-.4	-4.3	-.9	.9	.2	-1.1	-1.1	1.2	1.0
Previous Tealbook[2]	*-2.2*	*-.4*	*-4.3*	*-.9*	*.9*	*.2*	*-1.1*	*.6*	*1.0*	*.8*

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

Other Macroeconomic Indicators

Item	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2019[1]	2020[1]	2021[1]	2022[1]
Employment and production															
Nonfarm payroll employment[2]	159	203	210	-71	-5,774	2,350	1,836	371	371	271	271	178	-415	321	186
Unemployment rate[3]	3.6	3.6	3.5	3.8	16.0	11.1	7.9	6.8	6.2	5.8	5.4	3.5	7.9	5.4	4.7
Previous Tealbook[3]	*3.6*	*3.6*	*3.5*	*3.5*	*3.6*	*3.6*	*3.5*	*3.4*	*3.3*	*3.2*	*3.2*	*3.5*	*3.5*	*3.2*	*3.2*
Natural rate of unemployment[3]	4.4	4.4	4.3	4.4	13.8	7.6	5.4	5.1	5.1	5.1	5.0	4.3	5.4	5.0	5.0
Previous Tealbook[3]	*4.4*	*4.4*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
Employment-to-Population Ratio[3]	60.6	60.8	61.0	60.8	52.3	55.5	57.5	58.2	58.6	58.9	59.1	61.0	57.5	59.1	59.6
Employment-to-Population Trend[3]	60.2	60.3	60.3	60.1	53.6	57.7	59.4	59.6	59.6	59.6	59.6	60.3	59.4	59.6	59.5
Output gap[4]	1.4	1.4	1.5	.1	-3.1	-5.6	-3.3	-2.2	-1.5	-.9	-.4	1.5	-3.3	-.4	.9
Previous Tealbook[4]	*1.4*	*1.4*	*1.5*	*1.4*	*1.2*	*1.5*	*1.7*	*1.9*	*2.1*	*2.1*	*2.2*	*1.5*	*1.7*	*2.2*	*2.1*
Industrial production[5]	-2.3	1.1	.3	-7.5	-41.9	9.1	7.3	9.9	8.7	6.6	5.6	-.7	-11.0	7.7	4.7
Previous Tealbook[5]	*-2.3*	*1.1*	*.1*	*.2*	*.9*	*2.1*	*2.9*	*2.8*	*1.9*	*2.0*	*1.7*	*-.7*	*1.5*	*2.1*	*1.0*
Manufacturing industr. prod.[5]	-3.3	.7	-.5	-7.1	-48.7	16.1	10.9	13.1	10.0	8.1	7.1	-1.2	-11.5	9.5	5.7
Previous Tealbook[5]	*-3.3*	*.7*	*-.5*	*1.6*	*-.8*	*2.8*	*4.2*	*3.2*	*1.5*	*1.8*	*1.7*	*-1.2*	*1.9*	*2.0*	*.9*
Capacity utilization rate - mfg.[3]	75.5	75.4	75.0	73.5	62.1	64.3	65.9	68.0	69.6	71.0	72.3	75.0	65.9	72.3	76.4
Previous Tealbook[3]	*75.5*	*75.4*	*75.0*	*75.1*	*74.8*	*75.2*	*75.9*	*76.4*	*76.7*	*77.0*	*77.2*	*75.0*	*75.9*	*77.2*	*77.8*
Housing starts[6]	1.3	1.3	1.4	1.5	.9	1.0	1.1	1.2	1.3	1.3	1.3	1.3	1.1	1.3	1.3
Light motor vehicle sales[6]	17.0	17.0	16.7	15.0	6.3	11.0	13.0	13.4	13.7	14.0	14.3	17.0	11.3	13.9	14.9
Income and saving															
Nominal GDP[5]	4.7	3.8	3.5	-4.6	-37.2	31.1	12.2	7.7	6.5	5.6	4.9	4.0	-3.2	6.2	4.7
Real disposable pers. income[5]	1.5	2.1	1.6	6.3	39.0	-19.2	5.1	-8.2	-8.6	1.7	-1.0	2.4	5.8	-4.1	2.5
Previous Tealbook[5]	*1.5*	*2.1*	*1.7*	*4.5*	*1.8*	*2.2*	*1.5*	*3.4*	*2.0*	*1.8*	*.8*	*2.4*	*2.5*	*2.0*	*2.2*
Personal saving rate[3]	7.8	7.7	7.6	10.1	27.2	15.6	14.8	12.1	9.3	9.0	8.1	7.6	14.8	8.1	7.7
Previous Tealbook[3]	*7.8*	*7.7*	*7.7*	*8.2*	*8.3*	*8.2*	*8.1*	*8.2*	*8.0*	*7.8*	*7.4*	*7.7*	*8.1*	*7.4*	*7.2*
Corporate profits[7]	16.0	-.9	10.6	-31.0	4.8	-42.0	14.9	18.0	17.6	16.6	5.8	2.2	-16.7	14.4	7.1
Profit share of GNP[3]	9.6	9.5	9.7	8.9	10.2	8.3	8.3	8.5	8.7	8.9	9.0	9.7	8.3	9.0	9.2
Gross national saving rate[3]	17.9	17.5	17.6	18.0	11.8	12.3	14.3	15.6	16.1	16.5	16.7	17.6	14.3	16.7	17.5
Net national saving rate[3]	2.3	1.9	2.0	2.5	-7.7	-5.6	-2.8	-1.0	.0	.5	.7	2.0	-2.8	.7	1.9

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

Other Macroeconomic Indicators

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

Item	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Employment and production										
Nonfarm payroll employment[1]	192	250	227	195	176	193	178	-415	321	186
Unemployment rate[2]	7.0	5.7	5.0	4.8	4.1	3.8	3.5	7.9	5.4	4.7
Previous Tealbook[2]	*7.0*	*5.7*	*5.0*	*4.8*	*4.1*	*3.8*	*3.5*	*3.5*	*3.2*	*3.2*
Natural rate of unemployment[2]	5.4	5.1	4.9	4.8	4.6	4.5	4.3	5.4	5.0	5.0
Previous Tealbook[2]	*5.4*	*5.1*	*4.9*	*4.8*	*4.6*	*4.5*	*4.3*	*4.3*	*4.3*	*4.3*
Employment-to-Population Ratio[2]	58.5	59.3	59.4	59.7	60.1	60.6	61.0	57.5	59.1	59.6
Employment-to-Population Trend[2]	60.4	60.3	60.2	60.2	60.2	60.2	60.3	59.4	59.6	59.5
Output gap[3]	-3.0	-1.0	-.5	-.3	.6	1.3	1.5	-3.3	-.4	.9
Previous Tealbook[3]	*-3.0*	*-1.0*	*-.5*	*-.3*	*.6*	*1.3*	*1.5*	*1.7*	*2.2*	*2.1*
Industrial production	2.3	3.4	-3.4	-.3	3.6	4.0	-.7	-11.0	7.7	4.7
Previous Tealbook	*2.3*	*3.4*	*-3.4*	*-.3*	*3.6*	*4.0*	*-.7*	*1.5*	*2.1*	*1.0*
Manufacturing industr. prod.	1.1	1.4	-1.7	.3	2.5	2.2	-1.2	-11.5	9.5	5.7
Previous Tealbook	*1.1*	*1.4*	*-1.7*	*.3*	*2.5*	*2.2*	*-1.2*	*1.9*	*2.0*	*.9*
Capacity utilization rate - mfg.[2]	74.5	75.8	74.9	74.2	75.8	77.0	75.0	65.9	72.3	76.4
Previous Tealbook[2]	*74.5*	*75.8*	*74.9*	*74.2*	*75.8*	*77.0*	*75.0*	*75.9*	*77.2*	*77.8*
Housing starts[4]	.9	1.0	1.1	1.2	1.2	1.2	1.3	1.1	1.3	1.3
Light motor vehicle sales[4]	15.5	16.5	17.4	17.5	17.1	17.2	17.0	11.3	13.9	14.9
Income and saving										
Nominal GDP	4.4	4.5	2.8	3.5	4.9	4.9	4.0	-3.2	6.2	4.7
Real disposable pers. income	-2.5	5.3	3.0	1.6	3.4	3.9	2.4	5.8	-4.1	2.5
Previous Tealbook	*-2.5*	*5.3*	*3.0*	*1.6*	*3.4*	*3.9*	*2.4*	*2.5*	*2.0*	*2.2*
Personal saving rate[2]	6.3	7.5	7.5	6.5	6.8	7.8	7.6	14.8	8.1	7.7
Previous Tealbook[2]	*6.3*	*7.5*	*7.5*	*6.5*	*6.8*	*7.8*	*7.7*	*8.1*	*7.4*	*7.2*
Corporate profits[5]	3.9	6.7	-10.8	3.3	-.6	4.2	2.2	-16.7	14.4	7.1
Profit share of GNP[2]	11.8	12.1	10.5	10.5	9.9	9.9	9.7	8.3	9.0	9.2
Gross national saving rate[2]	19.2	20.3	19.6	18.1	18.0	17.9	17.6	14.3	16.7	17.5
Net national saving rate[2]	4.0	5.3	4.5	2.7	2.7	2.4	2.0	-2.8	.7	1.9

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

Staff Projections of Government-Sector Accounts and Related Items

Item	2017	2018	2019	2020	2021	2022	2019 Q4	2020 Q1	2020 Q2	2020 Q3
Unified federal budget[1]				Nominal dollars, billions						
Receipts	3,316	3,330	3,462	2,088	3,190	3,908	807	797	-357	842
Outlays	3,982	4,109	4,447	5,614	5,514	5,065	1,163	1,184	1,669	1,598
Surplus/deficit	-665	-779	-984	-3,526	-2,323	-1,158	-357	-387	-2,026	-756
				Percent of GDP						
Surplus/deficit	-3.5	-3.8	-4.6	-17.0	-10.8	-5.1	-6.7	-7.2	-38.7	-14.6
Previous Tealbook	*-3.5*	*-3.8*	*-4.6*	*-4.6*	*-4.3*	*-4.4*	*-6.7*	*-7.3*	*-.4*	*-4.7*
Primary surplus/deficit	-2.1	-2.2	-2.9	-15.4	-9.2	-3.6	-4.8	-5.3	-37.0	-13.6
Net interest	1.4	1.6	1.8	1.6	1.5	1.5	1.9	1.9	1.7	1.0
Cyclically adjusted surplus/deficit	-3.5	-4.2	-5.2	-16.8	-9.7	-4.9	-7.3	-7.5	-38.0	-13.0
Federal debt held by public	76.0	77.5	79.2	98.6	105.8	106.0	80.1	82.1	93.3	98.6
Government in the NIPA[2]				Real percent change, annual rate						
Purchases	.8	1.5	3.0	3.3	-.9	-2.2	2.5	-1.1	3.4	10.9
Consumption	.6	1.6	2.3	5.1	-1.0	-3.2	1.8	-1.4	6.1	14.8
Investment	2.0	1.5	6.0	-4.1	-.2	2.7	5.8	.3	-6.9	-4.9
State and local construction	-1.8	-1.5	7.2	-10.1	-3.8	2.1	5.1	1.0	-14.1	-13.4
Real disposable personal income	3.5	3.9	2.4	5.8	-4.2	2.4	1.6	6.3	39.1	-19.3
Contribution from transfers[3]	.2	.4	1.1	8.0	-6.3	.7	.3	1.8	41.4	-9.6
Contribution from taxes[3]	-.9	.4	-.8	1.8	-1.8	-.8	-.5	1.4	12.1	.4
Government employment				Average net change in monthly payrolls, thousands						
Federal	-2	1	3	0	1	1	-3	11	64	-17
State and local	8	8	12	7	-30	-15	13	15	8	6
Fiscal indicators[2]				Percentage point contribution to change in real GDP, annual rate						
Fiscal effect (FE)[4]	.2	.4	1.0	5.5	-2.9	-.9	.7	.7	11.1	9.6
Discretionary policy actions (FI)	.3	.6	.8	4.2	-2.6	-.9	.6	.2	7.6	7.5
Previous Tealbook	*.3*	*.6*	*.8*	*.5*	*.1*	*.1*	*.7*	*.5*	*.5*	*.5*
Federal purchases	.1	.2	.3	.6	-.1	-.2	.2	.1	2.0	1.2
State and local purchases	.0	.1	.2	.0	.0	-.2	.2	-.2	.0	1.4
Taxes and transfers	.1	.3	.3	3.5	-2.5	-.5	.2	.3	6.9	5.4
Cyclical	-.1	-.1	-.1	1.1	-.5	-.3	-.1	.2	1.7	2.0
Other	.0	-.1	.3	.2	.2	.3	.2	.4	1.9	.1

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

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

Measure and country	2019 Q1	2019 Q2	2019 Q3	2019 Q4	Projected 2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4
***Real GDP*[1]**												
Total foreign	1.5	2.1	1.2	.7	-11.1	-23.0	10.6	10.0	6.5	5.5	3.9	3.4
Previous Tealbook	*1.6*	*2.0*	*1.2*	*.8*	*-.6*	*2.3*	*2.9*	*2.9*	*2.9*	*2.8*	*2.6*	*2.5*
Advanced foreign economies	1.6	1.9	1.2	-.3	-9.4	-30.1	11.4	11.4	7.1	5.4	3.5	3.1
Canada	1.0	3.4	1.1	.3	-10.0	-34.0	11.5	13.7	7.5	6.2	4.6	3.9
Japan	2.2	2.3	.1	-7.1	-4.4	-16.5	4.5	4.4	4.3	3.1	1.8	1.7
United Kingdom	2.7	-.6	2.1	.1	-9.0	-29.0	11.0	8.2	6.7	4.3	2.2	2.2
Euro area	1.8	.6	1.2	.5	-10.7	-30.5	14.2	12.4	7.9	5.5	3.2	2.6
Germany	1.9	-1.0	.8	.1	-4.5	-27.0	13.2	10.9	6.6	3.5	2.8	2.4
Emerging market economies	1.5	2.2	1.2	1.7	-12.9	-15.3	9.9	8.7	5.9	5.6	4.2	3.7
Asia	3.3	4.2	2.0	3.8	-20.6	4.1	7.8	7.4	6.9	6.5	5.5	4.9
Korea	-1.5	4.2	1.7	5.1	-10.0	-15.0	4.0	6.0	5.0	5.0	3.5	3.0
China	6.5	5.9	5.5	5.9	-36.2	42.0	17.1	11.2	7.3	6.7	6.2	5.9
Latin America	-.2	.2	.3	-.8	-4.7	-32.5	12.7	10.4	4.9	4.7	2.8	2.4
Mexico	-.5	-.4	-.3	-.5	-5.0	-35.6	14.2	11.7	5.1	4.9	2.5	2.2
Brazil	.0	2.1	2.5	2.0	-6.5	-21.0	8.0	5.4	4.1	4.0	3.8	3.2
Addendum												
Emerging market economies ex. China	.5	1.5	.4	.8	-7.1	-23.9	8.5	8.2	5.6	5.3	3.8	3.3
***Consumer prices*[2]**												
Total foreign	1.0	3.2	2.1	3.4	2.4	.6	2.0	2.2	2.2	2.2	2.2	2.2
Previous Tealbook	*.8*	*3.2*	*2.2*	*3.5*	*3.0*	*1.8*	*2.2*	*2.2*	*2.3*	*2.2*	*2.3*	*2.3*
Advanced foreign economies	.7	2.1	.9	1.1	.7	-.9	.6	1.2	1.2	1.2	1.2	1.3
Canada	1.7	3.3	1.6	1.7	.8	-.4	1.1	2.3	1.9	1.9	1.8	1.8
Japan	.3	.5	.4	.8	.1	-1.0	.0	.2	.3	.3	.4	.4
United Kingdom	1.1	2.5	1.7	.4	2.0	.4	1.3	1.2	1.8	1.8	1.7	1.7
Euro area	.3	1.9	.7	1.1	.7	-1.5	.6	1.0	1.2	1.2	1.2	1.2
Germany	.1	2.5	.3	1.9	.2	-1.4	.6	1.2	1.5	1.6	1.6	1.6
Emerging market economies	1.2	4.0	3.0	5.0	3.6	1.5	2.9	2.9	2.8	2.8	2.8	2.8
Asia	1.0	3.7	3.0	5.6	3.8	1.3	2.6	2.6	2.6	2.6	2.6	2.6
Korea	-2.0	1.9	-.5	1.7	1.6	.4	2.1	2.1	2.1	2.1	2.1	2.1
China	1.3	4.3	4.2	7.2	4.2	1.0	2.5	2.5	2.5	2.5	2.5	2.5
Latin America	1.6	4.8	3.1	3.9	3.4	2.0	3.5	3.5	3.4	3.3	3.3	3.3
Mexico	1.1	4.5	2.8	3.4	2.9	1.6	3.2	3.2	3.2	3.2	3.2	3.2
Brazil	2.9	5.2	2.2	3.2	4.9	2.1	3.6	3.8	3.7	3.7	3.7	3.7
Addendum												
Emerging market economies ex. China	1.1	3.8	2.1	3.5	3.1	1.9	3.1	3.1	3.0	3.0	3.0	3.0

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

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

Measure and country	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
								----------Projected----------		
Real GDP[1]										
Total foreign	3.0	3.0	2.1	2.9	3.2	2.2	1.4	-4.5	4.8	2.8
Previous Tealbook	*3.0*	*3.0*	*2.1*	*2.9*	*3.2*	*2.2*	*1.4*	*1.9*	*2.7*	*2.4*
Advanced foreign economies	2.4	2.0	.9	1.8	2.9	1.4	1.1	-5.8	4.8	2.2
Canada	3.4	2.8	-.4	1.7	3.2	1.8	1.5	-6.9	5.5	2.6
Japan	2.8	-.4	1.0	1.2	2.6	-.2	-.7	-3.4	2.7	1.1
United Kingdom	2.7	2.5	2.4	1.8	1.6	1.4	1.1	-6.1	3.8	2.0
Euro area	.7	1.6	2.1	2.1	3.0	1.2	1.0	-5.6	4.8	2.0
Germany	1.5	2.3	1.3	1.9	3.4	.6	.5	-3.3	3.8	1.9
Emerging market economies	3.7	3.9	3.3	3.9	3.6	3.0	1.7	-3.1	4.8	3.3
Asia	5.5	5.2	4.7	5.3	5.4	4.4	3.3	-1.1	6.0	4.2
Korea	3.7	2.6	3.4	2.7	2.8	3.0	2.3	-4.2	4.1	2.3
China	7.6	7.3	6.9	6.9	6.9	6.5	5.9	4.2	6.5	5.6
Latin America	1.7	2.8	1.9	2.5	1.9	1.3	-.1	-5.4	3.7	2.3
Mexico	1.2	3.4	2.8	3.3	1.7	1.5	-.4	-6.0	3.7	2.2
Brazil	2.6	-.1	-5.5	-2.2	2.4	1.3	1.7	-4.2	3.8	2.8
Addendum										
Emerging market economies ex. China	2.8	3.1	2.4	3.2	2.8	2.2	.8	-4.6	4.5	2.8
Consumer prices[2]										
Total foreign	2.4	2.0	1.4	1.9	2.5	2.4	2.4	1.8	2.2	2.2
Previous Tealbook	*2.4*	*2.0*	*1.4*	*1.9*	*2.5*	*2.4*	*2.4*	*2.3*	*2.3*	*2.3*
Advanced foreign economies	1.0	1.2	.5	.9	1.5	1.8	1.2	.4	1.2	1.3
Canada	1.0	2.0	1.3	1.4	1.8	2.1	2.1	.9	1.8	1.8
Japan	1.4	2.5	.1	.3	.6	.8	.5	-.2	.4	.5
United Kingdom	2.1	.9	.1	1.2	3.0	2.3	1.4	1.2	1.8	1.6
Euro area	.8	.2	.3	.7	1.4	1.9	1.0	.2	1.2	1.3
Germany	1.4	.4	.5	1.0	1.6	2.1	1.2	.1	1.6	1.6
Emerging market economies	3.4	2.6	2.0	2.6	3.2	2.9	3.3	2.7	2.8	2.8
Asia	3.2	1.8	1.4	2.1	2.0	2.0	3.3	2.6	2.6	2.6
Korea	1.1	1.0	.9	1.4	1.4	1.7	.3	1.5	2.1	2.1
China	2.9	1.5	1.4	2.1	1.7	2.1	4.2	2.6	2.5	2.5
Latin America	4.0	4.7	3.2	4.0	6.4	5.0	3.4	3.1	3.3	3.2
Mexico	3.6	4.2	2.3	3.3	6.6	4.8	2.9	2.7	3.2	3.2
Brazil	5.8	6.5	10.4	7.1	2.8	4.1	3.4	3.6	3.7	3.5
Addendum										
Emerging market economies ex. China	3.8	3.5	2.4	3.0	4.2	3.4	2.6	2.8	3.0	2.9

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

U.S. Current Account

Quarterly Data

	2019				Projected 2020				Projected 2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Billions of dollars, s.a.a.r.											
U.S. current account balance	**-547.6**	**-505.0**	**-501.5**	**-439.3**	**-429.3**	**-204.7**	**-238.0**	**-251.7**	**-260.9**	**-259.7**	**-290.5**	**-303.7**
Previous Tealbook	*-549.9*	*-506.0*	*-501.5*	*-421.8*	*-411.8*	*-360.2*	*-338.2*	*-336.6*	*-344.6*	*-343.1*	*-349.8*	*-372.4*
Current account as percent of GDP	-2.6	-2.4	-2.3	-2.0	-2.0	-1.1	-1.2	-1.2	-1.2	-1.2	-1.3	-1.4
Previous Tealbook	*-2.6*	*-2.4*	*-2.3*	*-1.9*	*-1.9*	*-1.6*	*-1.5*	*-1.5*	*-1.5*	*-1.5*	*-1.5*	*-1.6*
Net goods & services	-631.0	-641.6	-633.7	-559.4	-556.8	-176.5	-287.6	-333.9	-366.0	-386.0	-412.8	-419.5
Investment income, net	241.2	280.3	277.3	283.1	291.0	123.1	205.5	245.2	268.7	277.4	278.2	278.8
Direct, net	313.7	344.2	337.1	341.9	338.1	134.8	212.2	242.7	263.9	272.8	276.5	281.3
Portfolio, net	-72.4	-63.9	-59.8	-58.8	-47.1	-11.8	-6.7	2.5	4.7	4.7	1.7	-2.5
Other income and transfers, net	-157.8	-143.7	-145.2	-162.9	-163.6	-151.2	-155.9	-162.9	-163.6	-151.2	-155.9	-162.9

Annual Data

								Projected		
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	Billions of dollars									
U.S. current account balance	**-348.8**	**-365.2**	**-407.8**	**-428.3**	**-439.6**	**-491.0**	**-498.3**	**-280.9**	**-278.7**	**-335.5**
Previous Tealbook	*-348.8*	*-365.2*	*-407.8*	*-428.3*	*-439.6*	*-491.0*	*-494.8*	*-361.7*	*-352.5*	*-378.1*
Current account as percent of GDP	-2.1	-2.1	-2.2	-2.3	-2.3	-2.4	-2.3	-1.4	-1.3	-1.5
Previous Tealbook	*-2.1*	*-2.1*	*-2.2*	*-2.3*	*-2.3*	*-2.4*	*-2.3*	*-1.6*	*-1.5*	*-1.6*
Net goods & services	-461.1	-489.6	-498.5	-503.0	-550.1	-627.7	-616.4	-338.7	-396.1	-450.3
Investment income, net	215.4	228.9	214.7	211.1	238.7	266.9	270.5	216.2	275.8	273.1
Direct, net	283.3	284.2	284.6	278.0	304.0	330.3	334.2	232.0	273.6	288.0
Portfolio, net	-67.9	-55.3	-70.0	-66.9	-65.3	-63.4	-63.7	-15.8	2.1	-14.8
Other income and transfers, net	-103.1	-104.6	-123.9	-136.4	-128.2	-130.2	-152.4	-158.4	-158.4	-158.4

Abbreviations

ABS	asset-backed securities
AFE	advanced foreign economy
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
CDS	credit default swaps
C&I	commercial and industrial
CLO	collateralized loan obligation
CMBS	commercial mortgage-backed securities
COVID-19	coronavirus disease 2019
CP	commercial paper
CPFF	Commercial Paper Funding Facility
CPI	consumer price index
CRE	commercial real estate
ECB	European Central Bank
EFFR	effective federal funds rate
ELB	effective lower bound
EMBI	emerging markets bond index
EME	emerging market economy
EU	European Union
FCI	financial conditions index
FEMA	Federal Emergency Management Agency
FHA	Federal Housing Administration

FIMA	foreign and international monetary authorities
FOMC	Federal Open Market Committee; also, the Committee
FPLT	flexible price-level targeting
FRB	Federal Reserve Board
FRBB	Federal Reserve Bank of Boston
FRB/US	A large-scale macroeconometric model of the U.S. economy
FX	foreign exchange
GCF	general collateral finance
GDP	gross domestic product
GFC	Global Financial Crisis
G-SIBs	global systemically important banks
GSE	government-sponsored enterprise
IEA	International Energy Agency
IMF	International Monetary Fund
IOER	interest on excess reserves
LFPR	labor force participation rate
LTV	loan-to-value
MBS	mortgage-backed securities
MMF	money market fund
MMLF	Money Market Liquidity Facility
MSLP	Main Street Lending Program
NAR	National Association of Realtors
NCD	negotiable certificate of deposit
OIS	overnight index swap
OPEC	Organization of the Petroleum Exporting Countries
PCE	personal consumption expenditures
PDCF	Primary Dealer Credit Facility

PMI	private mortgage insurance
PPP	Paycheck Protection Program
RBA	Reserve Bank of Australia
RMBS	residential mortgage-backed securities
repo	repurchase agreement
SARS	severe acute respiratory syndrome
SBA	Small Business Administration
SEC	Securities Exchange Commission
SEP	Summary of Economic Projections
SIFMA	Securities Industry and Financial Markets Association
SIGMA	A calibrated multicountry DSGE model
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices
SNAP	Supplemental Nutrition Assistance Program
SNB	Swiss National Bank
SOMA	System Open Market Account
S&P	Standard & Poor's
TALF	Term Asset-Backed Securities Loan Facility
TBA	to be announced
TIPS	Treasury Inflation-Protected Securities
UI	unemployment insurance
VA	Department of Veterans Affairs
VAR	vector autoregression
VIX	one-month-ahead option-implied volatility on the S&P 500 index
WLA	weekly liquid assets

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