Appendix 1: Materials used by Ms. Logan

Class II FOMC - Restricted (FR)

Material for Briefing on

Financial Developments and Open Market Operations

Lorie Logan
Exhibits by Nathan Dodge and Kathleena Inchoco
November 4, 2020

Three questions

1. How did evolving perceptions of the election, fiscal policy and the virus affect financial markets?

2. How did these developments, and the material changes to the Committee's September statement, affect expectations for Fed policy?

3. How did market functioning evolve and how do market participants assess the tools in place, should challenges emerge?

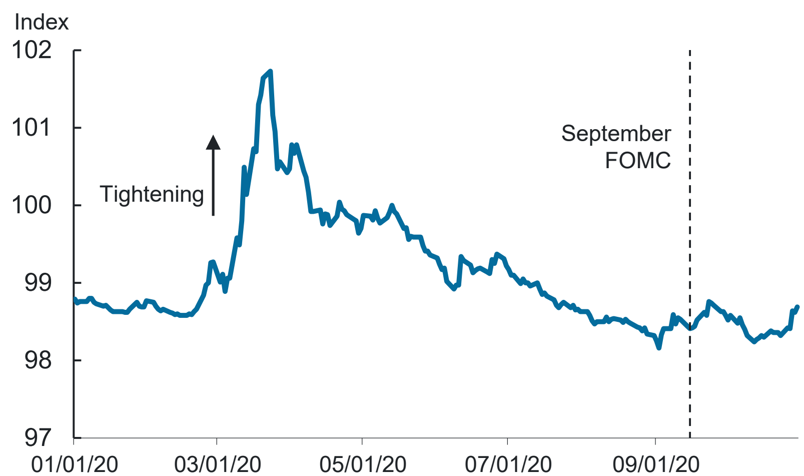
U.S. financial conditions tightened modestly, though remain accommodative

(1) Asset Price Table

	Since Sep FOMC	YTD	Current Level
S&P 500 Index	-3.9%	+1.2%	3,270
NASDAQ 100 Index	-3.4%	+26.6%	11,053
IG Credit Spreads	-4 bps	+32 bps	125 bps
HY Credit Spreads	+19 bps	+173 bps	509 bps
U.S. TW Dollar	+0.5%	+1.6%	117
10Y Treasury Yield	+19 bps	-104 bps	0.87%
10Y TIPS Real Yield	+16 bps	-97 bps	-0.84%
VIX Index	+12 ppts	+24 ppts	38 ppts

Note: Current level pricing as of 10/30/20.
Source: Bloomberg

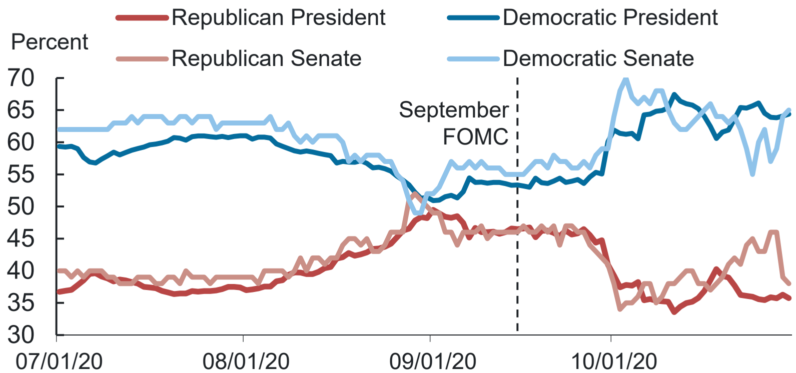
(2) Financial Conditions Index



Source: Bloomberg, Goldman Sachs

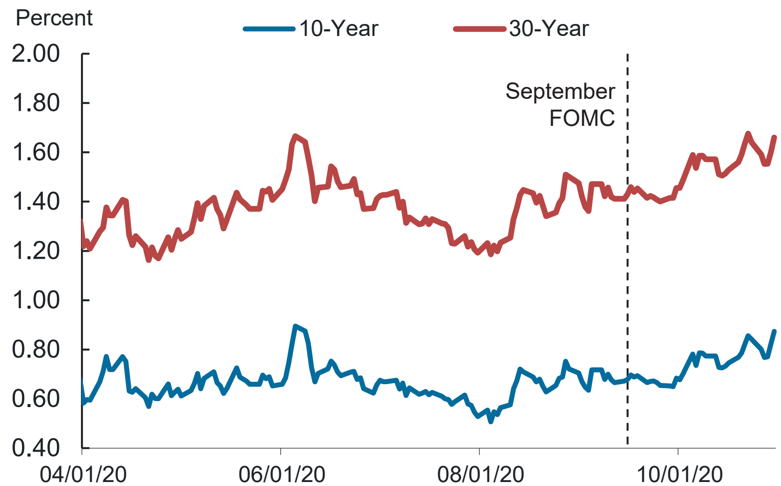
Evolving election and fiscal outlooks lifted Treasury yields and supported equities

(3) Implied Election Outcome Probabilities Based on Prediction Markets



Note: Presidential odds are calculated as a weighted average of prediction odds from the RealClearPolitics aggregate of prediction markets, and PredictIt. Senate odds are from PredictIt alone.
Source: PredictIt, RealClearPolitics, Bloomberg, Staff Calculations

(4) Nominal Treasury Yields

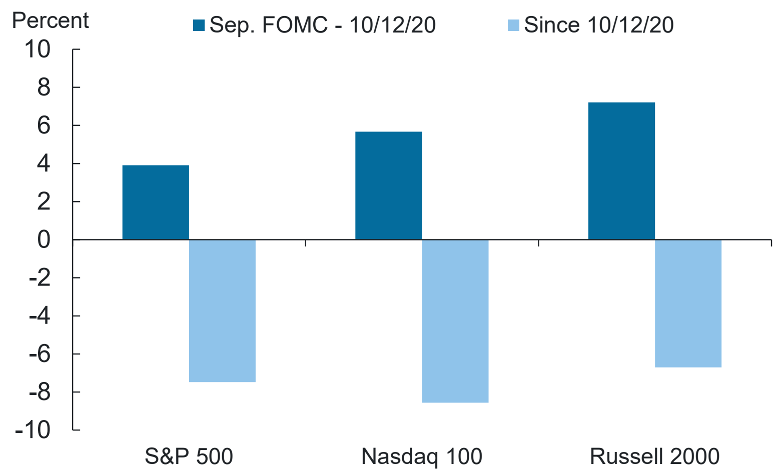


Source: Bloomberg

(5) 10-Year Treasury Term Premium

Source: ACM Model, Bloomberg

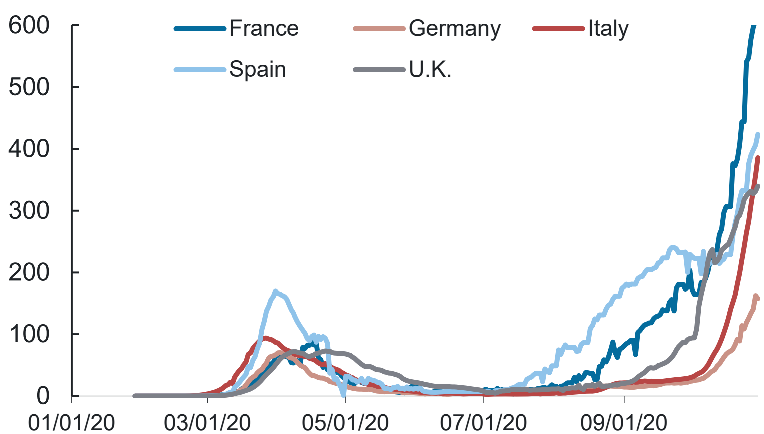
(6) U.S. Equity Index Performance



Source: Bloomberg

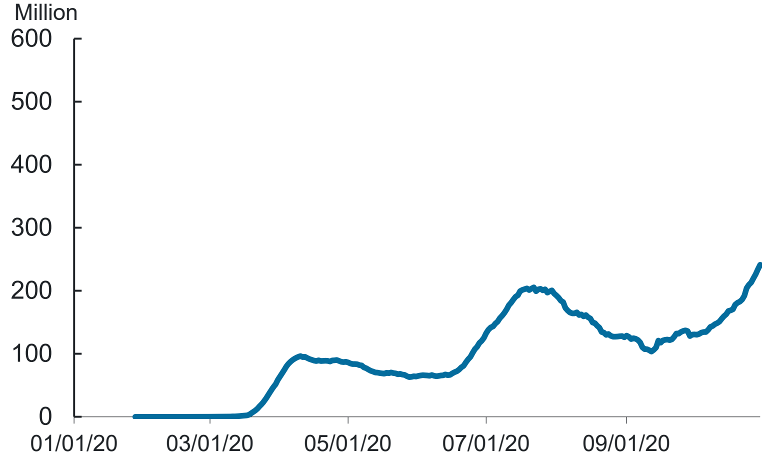
However, rising COVID cases weighed on the outlook late in the period…

(7) Daily Increase in COVID-19 Cases in Europe
(per million of population)



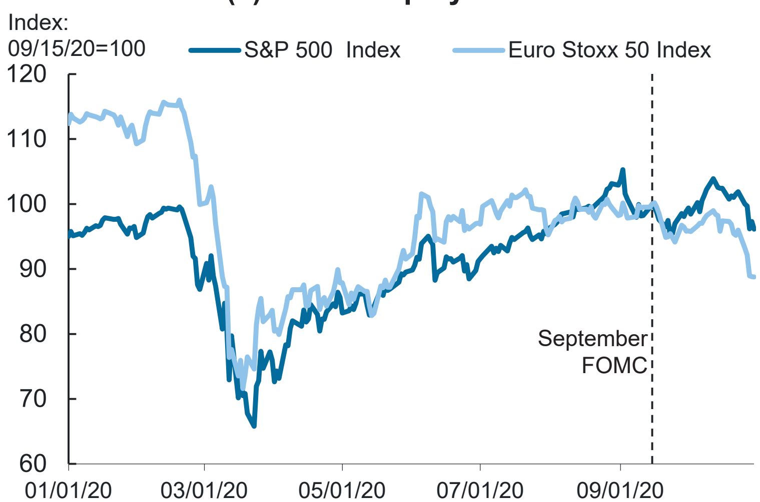
Note: One-week moving average.
Source: Bloomberg, Johns Hopkins University

(8) Daily Increase in COVID-19 Cases in U.S.
(per million of population)



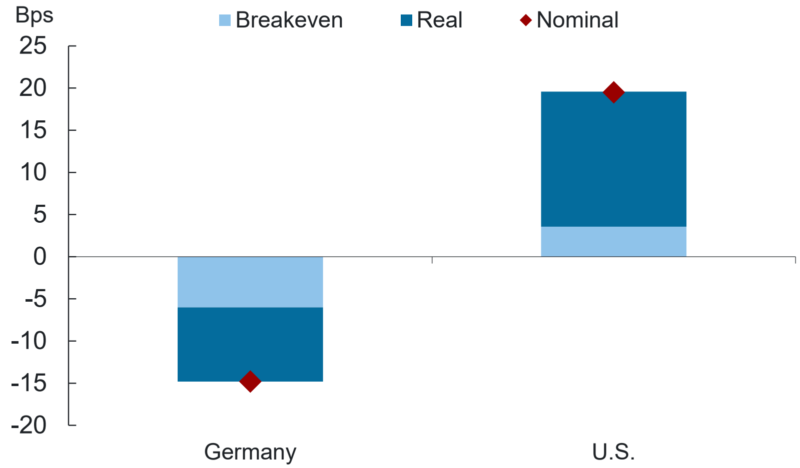
Note: One-week moving average.
Source: Bloomberg, Johns Hopkins University

(9) Global Equity Returns



Source: Bloomberg

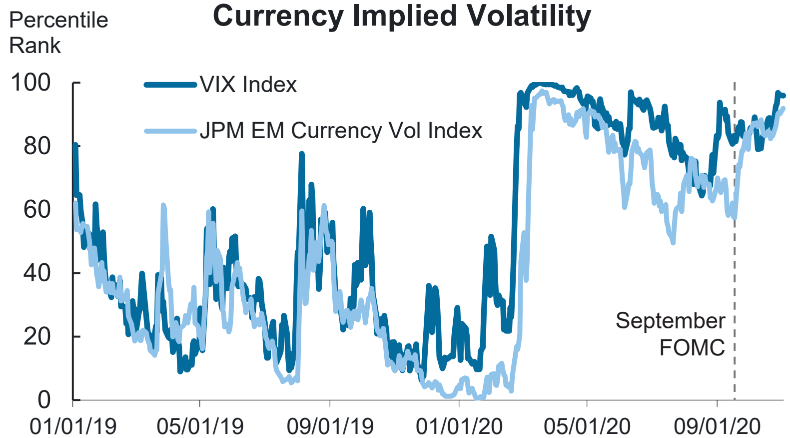
(10) Decomposition of 10-Year Nominal Yield Changes



Source: Bloomberg

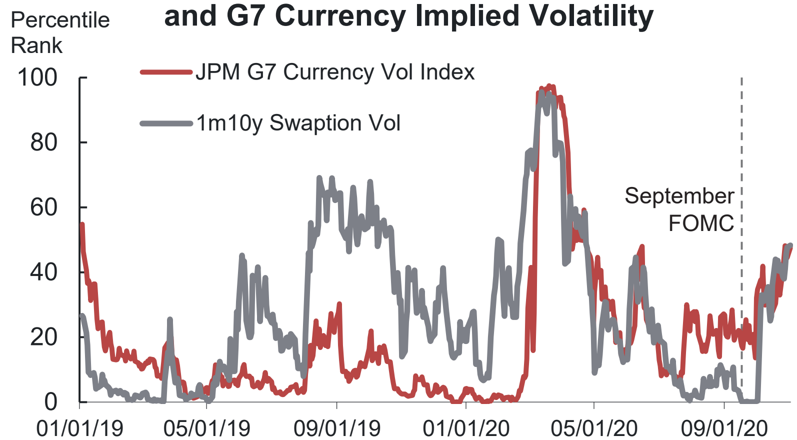
And implied volatility remains elevated reflecting heightened uncertainty

(11) One-Month Equity and Emerging Market Currency Implied Volatility



Note: Percentiles based on 25-year lookback for VIX Index, and 17-year lookback for currency volatility.
Source: Bloomberg

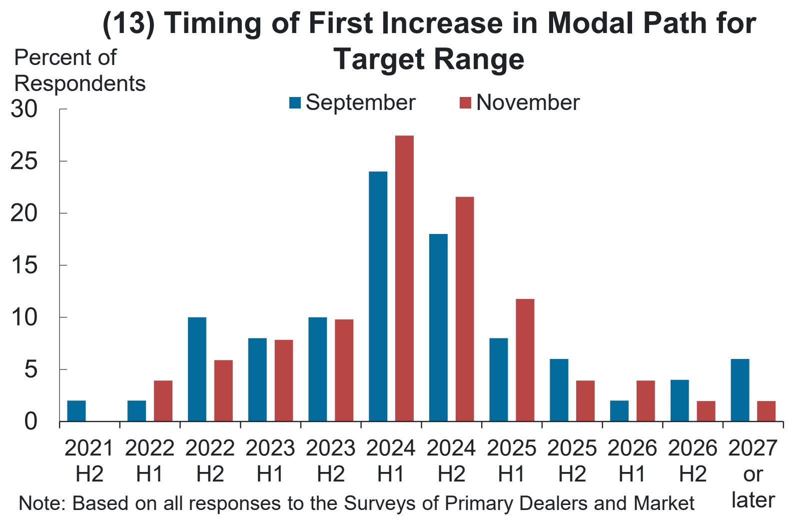
(12) One-Month Longer-dated U.S. Fixed Income and G7 Currency Implied Volatility



Note: Percentiles based on 17-year lookback for currency volatility and 15-year lookback for swaption-implied volatility.
Source: Bloomberg

Expectations for the timing of lift-off were little changed over the intermeeting period…

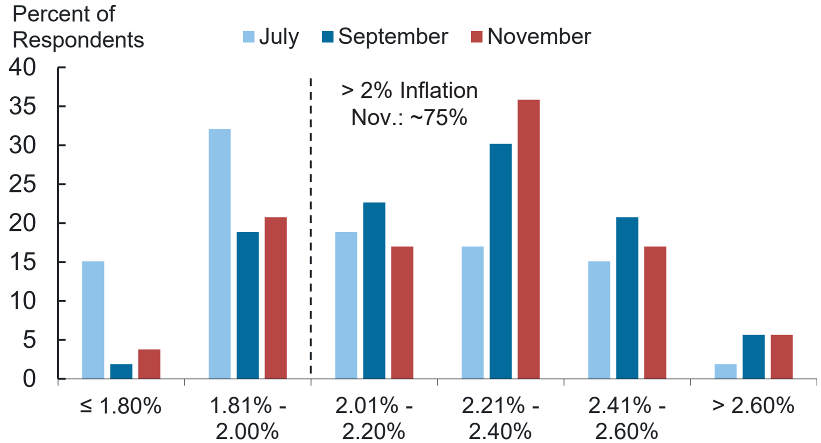
- Revised forward guidance in-line with expectations
- Market-implied path for the federal funds rate shifted up slightly; survey path little changed
- Survey expectations for timing of lift-off coalesced around 2024



Note: Based on all responses to the Surveys of Primary Dealers and Market Participants.
Source: FRBNY

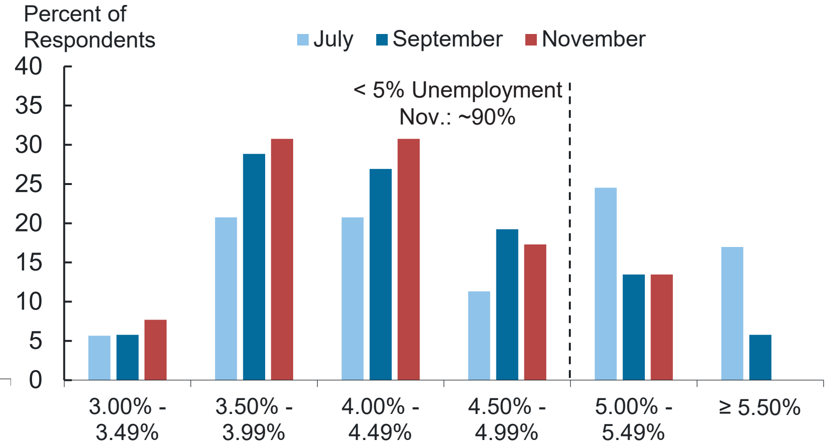
Although perceptions of the FOMC's reaction function are notably changed since July

(14) Expectations for Inflation Rate at Liftoff



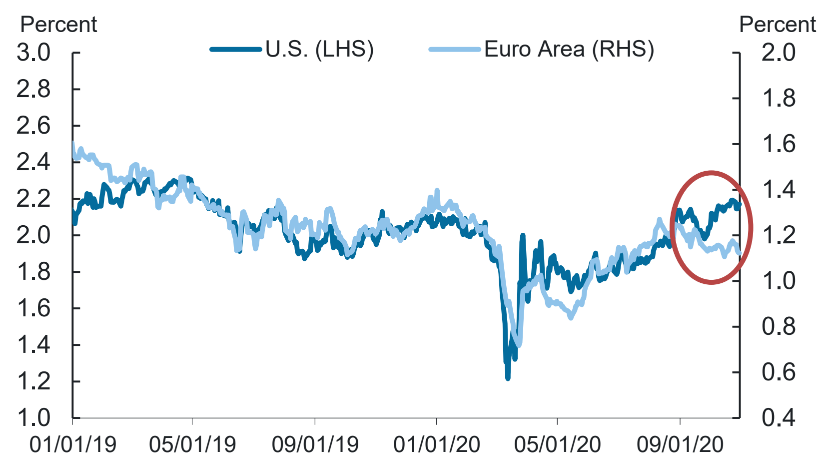
Note: The survey asked for headline 12-month PCE inflation rate estimates. Based on all responses to the Surveys of Primary Dealers and Market Participants.
Source: FRBNY

(15) Expectations for Unemployment Rate at Liftoff



Note: Based on all responses to the Surveys of Primary Dealers and Market Participants.
Source: FRBNY

(16) 5-Year, 5-Year Forward Inflation Compensation

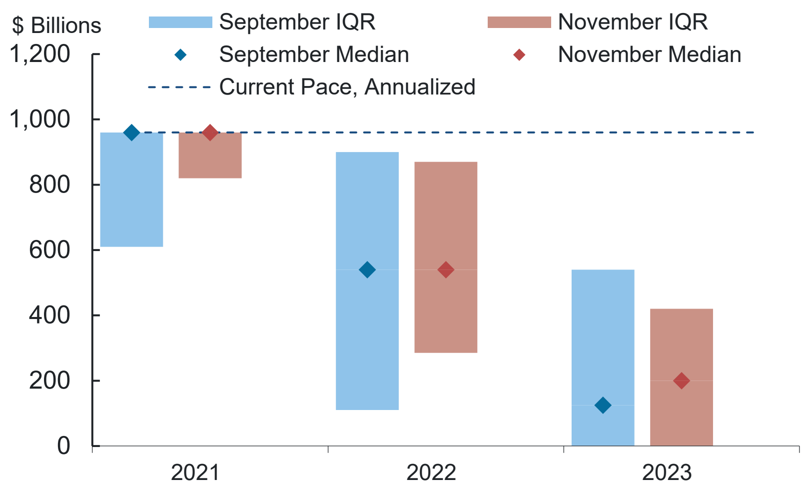


Note: Based on inflation swaps.
Source: Bloomberg

Market participants continued to focus on possible changes to asset purchases

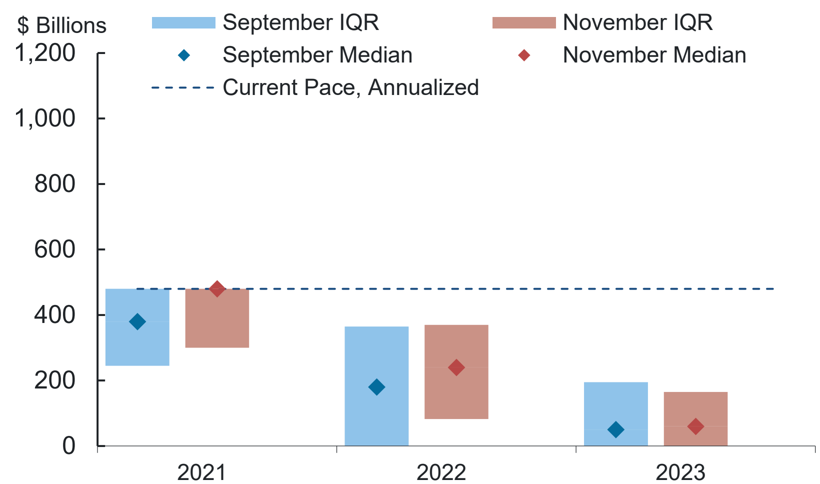
- Market participants generally anticipate the FOMC will at some point evolve its communications
  - Greater emphasis on accommodative financial conditions
  - Outcome-based
- Many anticipate lengthening WAM of Treasury purchases

(17) Expected Net Treasury Purchases



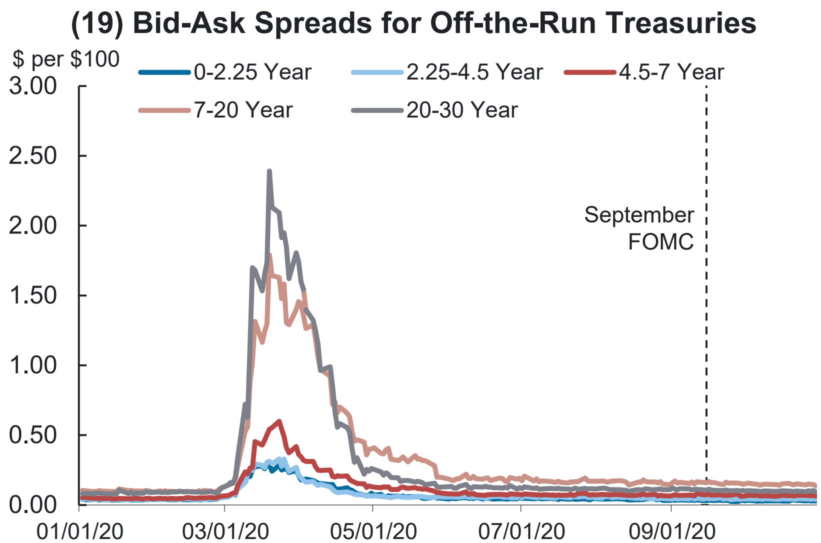
Note: Based on all responses to the Surveys of Primary Dealers and Market Participants.
Source: FRBNY

(18) Expected Net MBS Purchases

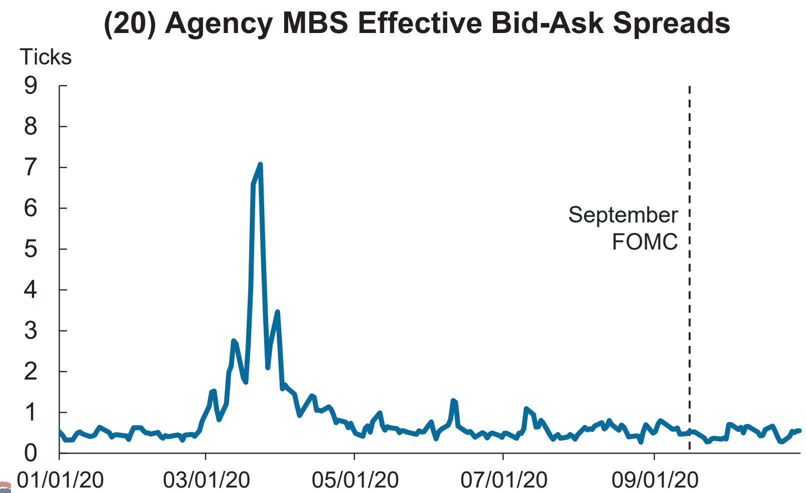


Note: Based on all responses to the Surveys of Primary Dealers and Market Participants.
Source: FRBNY

Markets continued to function smoothly…

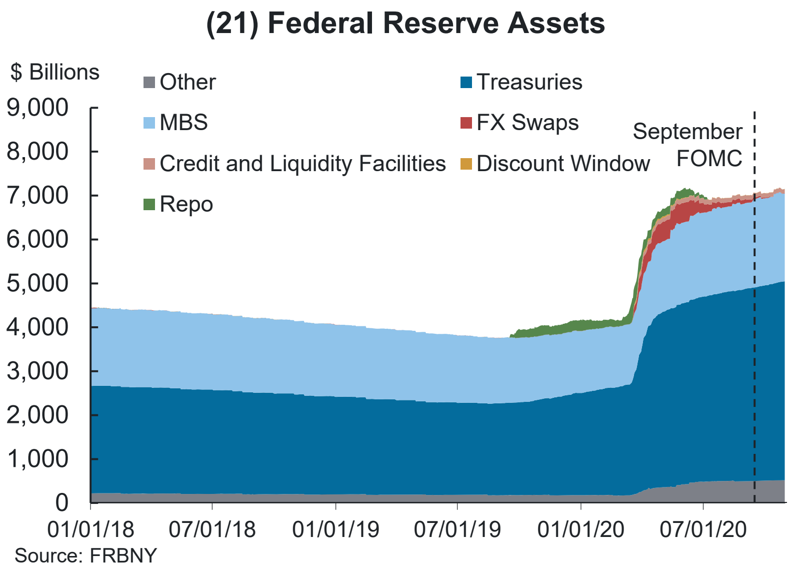


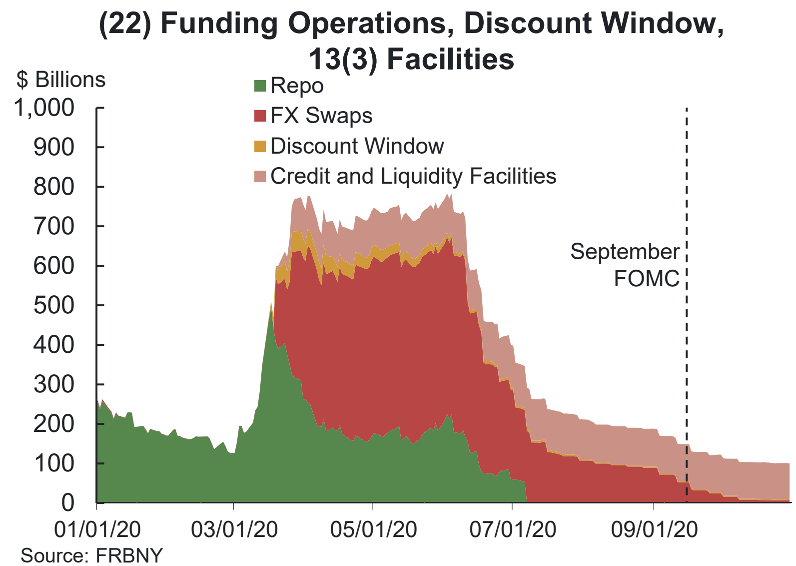
Source: FRBNY



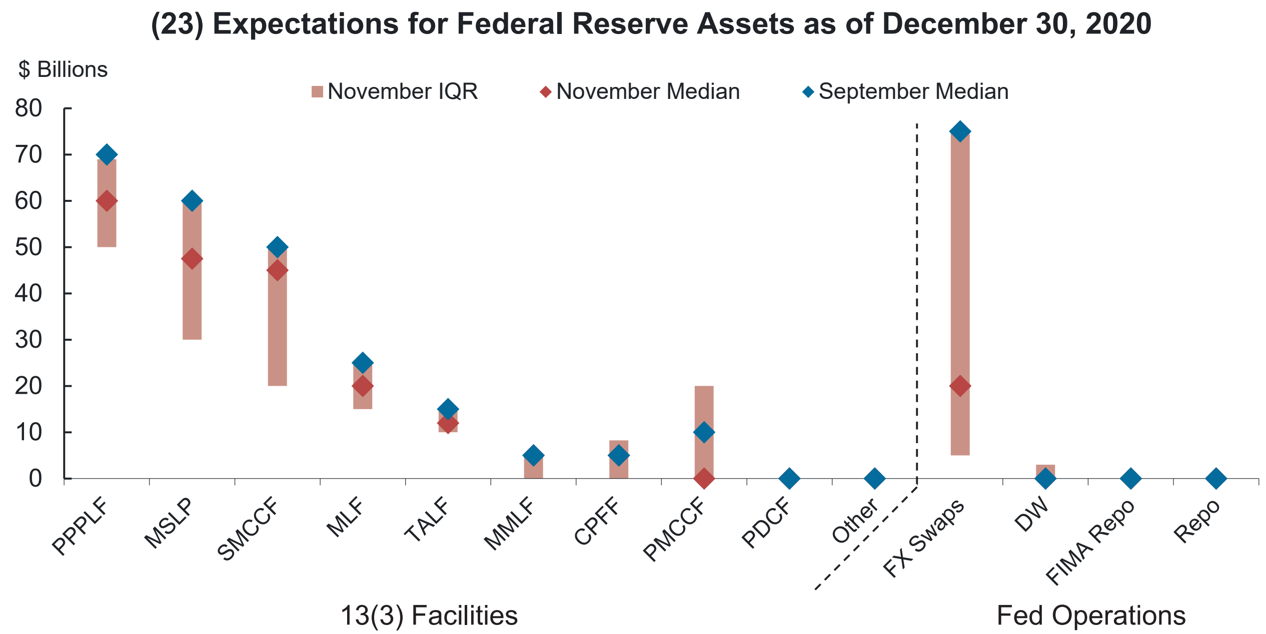
Note: Agency MBS spread is a two-day moving average and includes dealer-to-client transactions for 30-year and 15-year TBA securities across agencies.
Source: Desk Calculations, FINRA, TRACE

And the Federal Reserve balance sheet grew modestly



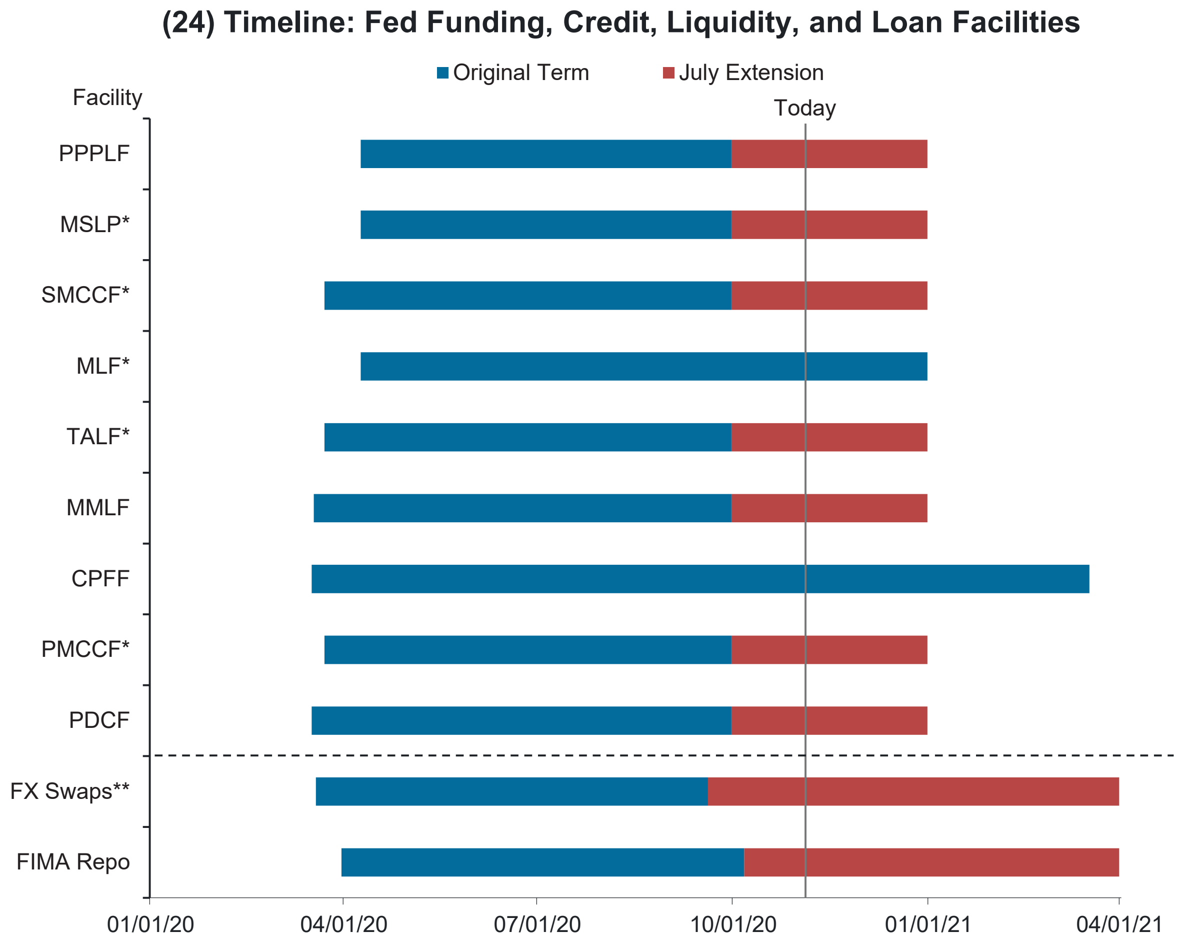


Expectations for outstanding assets fell further across facilities…



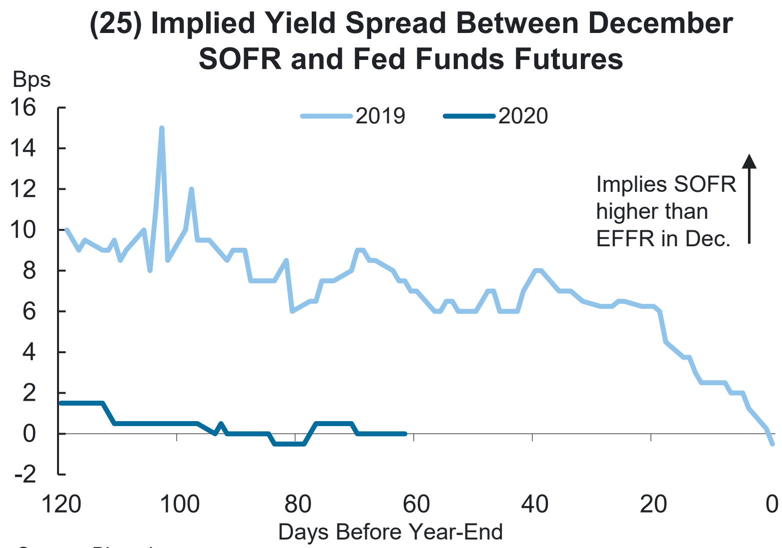
Note: MSLP aggregated by summing the three individual Main Street programs. Based on all responses to the Surveys of Primary Dealers and Market Participants.
Source: FRBNY

Although risks remain and most expect facilities to be extended beyond year end

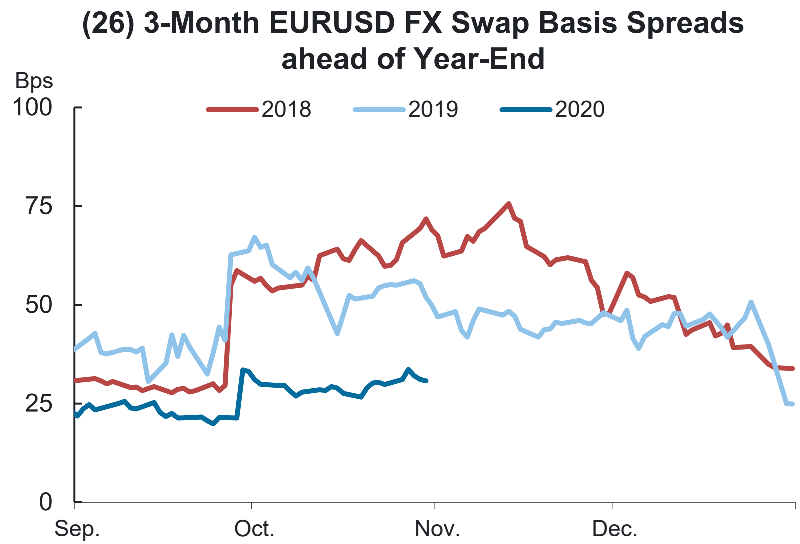


Note: * Uses CARES Act equity. ** Refers only to temporary swap lines with 9 additional jurisdictions.
Source: FRBNY, Staff Calculations

Expectations are for calm year-end conditions



Source: Bloomberg



Source: Bloomberg, Desk Calculations

Appendix

Appendix I

(1) Summary of Operational Tests in prior period:

- Domestic Authorization
  - October 7: Outright UMBS purchase for early settlement for $13 million
  - October 7: Overnight repo (using the back-up tool) for $59 million
  - October 15: Securities lending (using the back-up tool) for $82 million
- Foreign Authorization
  - September 29: US dollar liquidity swap for USD 51,000 with the BoC and SNB
  - September 29: US dollar liquidity rollover swap for USD 60,000 with the ECB and BoE
  - October 22: Canadian dollar liquidity swap for CAD 51,000 with the BoC

(2) Upcoming Operational Tests:

- 4 tests scheduled under the Domestic Authorization
  - November 18: Treasury outright sale for up to $25 million
  - November 18: Overnight reverse repo (using back-up tool) for up to $175 million
  - December 1 and 3: Coupon swap with unsettled MBS holdings for $20 million, total
  - December 10: MBS specified pool sale for up to $90 million
- 5 tests scheduled under the Foreign Authorization
  - November 6: Japanese yen liquidity swap for JPY 51,000 with the BoJ
  - November 17: Yen-denominated sovereign debt purchase with private counterparties for ¥300 million
  - November 17: Yen-denominated sovereign debt sales with private counterparties for ¥300 million
  - November 19: British pound liquidity swap for GBP 51,000 with the BoE
  - December 2: Euro-denominated repo with private counterparties for up to €4.0 million

(3) FX Intervention:

- There were no intervention operations in foreign currencies for the System's account during the intermeeting period

Appendix II

(4) Treasury Purchase Summary since June 12, 2020 ($ Millions)

Purchase Period	New Purchase Target	Actual Purchases	Net Deviation	Cumulative Deviation Since 6/20
Jun-20	80,000	80,013	13	13
Jul-20	80,000	80,006	6	19
Aug-20	80,000	80,004	4	23
Sep-20	80,000	80,004	4	27

Note: The Desk purchased $1,590.28 billion between 3/16/20 and 6/11/20.

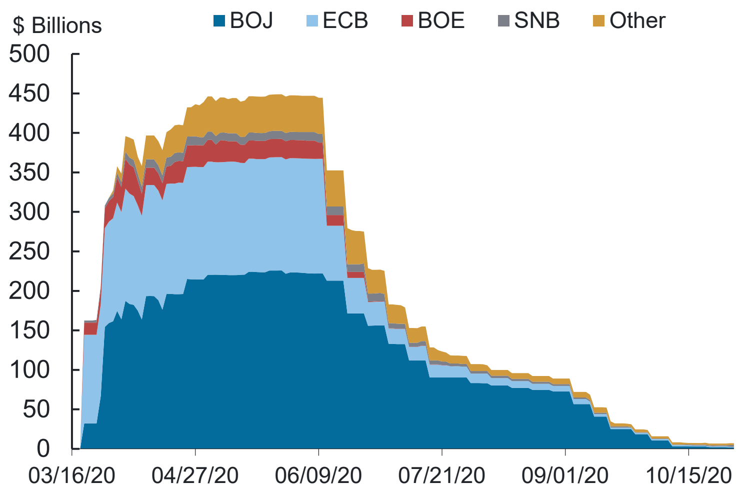
(5) MBS Purchase Summary since June 12, 2020 ($ Millions)

Purchase Period	New Purchase Target	Paydowns	Actual Purchases	Net Deviation	Cumulative Deviation Since 6/20
Jun-20	40,000	55,976	95,895	-81	-81
Jul-20	40,000	69,382	109,407	25	-56
Aug-20	40,000	70,319	110,343	24	-32
Sep-20	40,000	71,119	111,139	20	-12

Note: The Desk purchased $728 billion between 3/16/20 and 6/11/20 of which $108 billion were reinvestments.

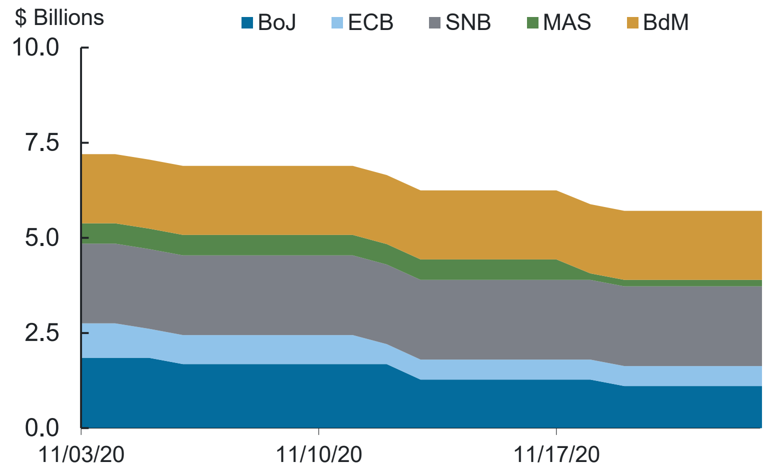
Appendix III

(6) FX Swaps Outstanding by Counterparty



Source: FRBNY

(7) FX Swaps Upcoming Maturity Schedule



Source: FRBNY

(8) Total Amount Outstanding by Central Bank ($ Billions)

	Current Amount Outstanding	Coronavirus Peak Outstanding	GFC Peak Outstanding
Bank of Japan	1.85	225.84	127.57
European Central Bank	0.91	144.98	313.81
Bank of England	0.00	37.70	95.00
Swiss National Bank	2.09	11.40	31.06
Reserve Bank of Australia	0.00	1.17	26.67
Denmark Nationalbank	0.00	5.29	15.00
Norges Bank	0.00	5.40	8.95
Monetary Authority of Singapore	0.54	10.03	0.00
Bank of Korea	0.00	18.79	16.35
Banco de Mexico	1.82	6.59	3.22
Riksbank	0.00	0.00	25.00
Total	**7.20**	**448.95**	**586.12**

Source: FRBNY

Appendix 1a: Materials used by Ms. Logan

Class II FOMC - Restricted (FR)

Material for Briefing on

Financial Developments Update

Lorie Logan

Exhibits by Nathan Dodge and Kathleena Inchoco

November 4, 2020

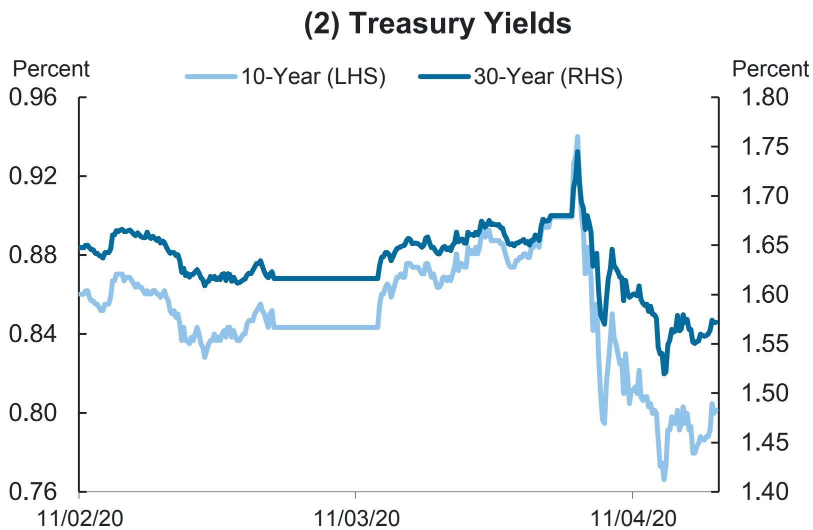
Recent changes

(1) Asset Price Table

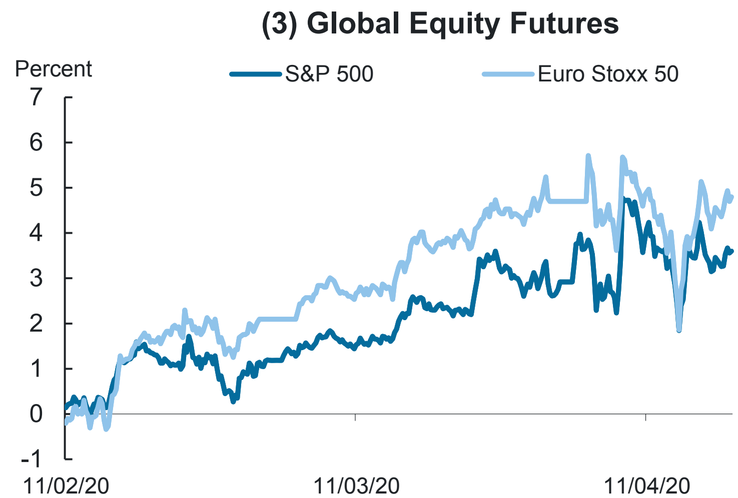
	1-Day Change	Since Sep. FOMC	Since Friday (10/30)	IMP to Friday (10/30/20)	Current Level
S&P 500 Futures	+1.2%	0.2%	4.2%	-3.8%	3,402
NASDAQ 100 Futures	+2.8%	1.1%	4.8%	-3.5%	11,580
Russell 2000 Futures	-0.3%	4.5%	4.5%	0.0%	1606
IG Credit Spreads	N/A	-5 bps	-1 bps	-4 bps	124 bps
HY Credit Spreads	N/A	-6 bps	-25 bps	+19 bps	484 bps
Bloomberg Dollar Index	-0.30%	-0.2%	-0.8%	+0.6%	1163
2Y Treasury Yield	-1 bps	+2 bps	+1 bps	+1 bps	0.16%
5Y Treasury Yield	-3 bps	+9 bps	-2 bps	+11 bps	0.36%
10Y Treasury Yield	-8 bps	+14 bps	-6 bps	+19 bps	0.82%
30Y Treasury Yield	-9 bps	+16 bps	-7 bps	+23 bps	1.59%
VIX Index	-4 ppts	+6 ppts	-6 ppts	+12 ppts	32 ppts

Note: Current level pricing as of 11/04/20 7:30 AM.
Source: Bloomberg

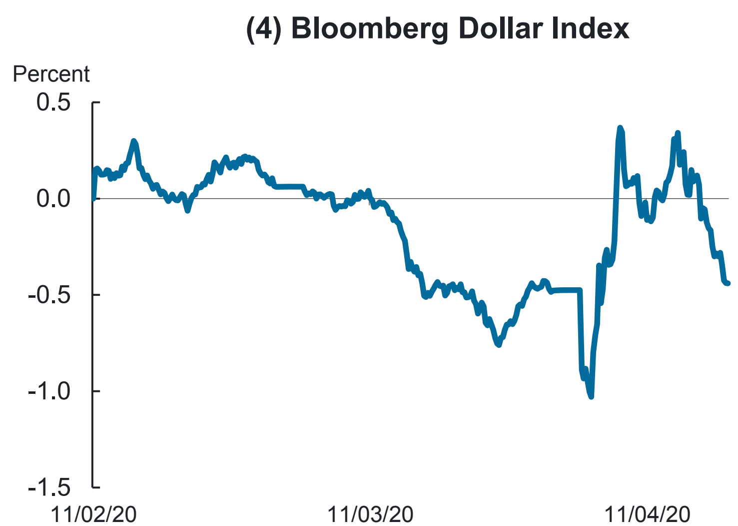
Changes since Friday (10/30)



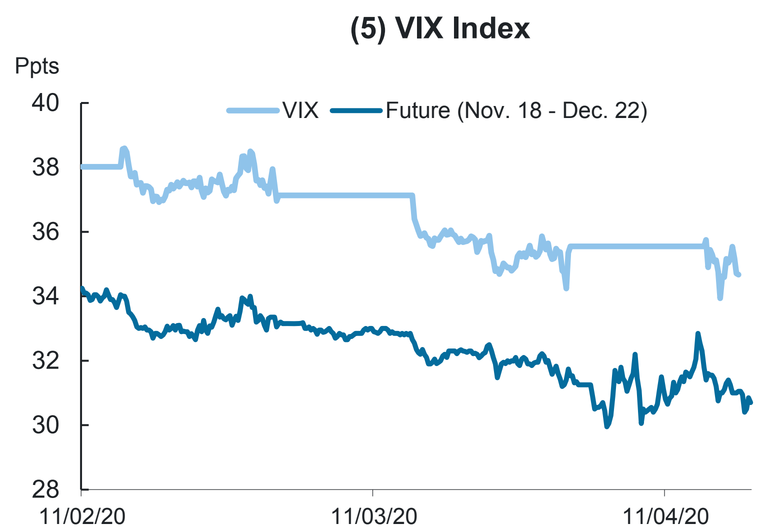
Source: Bloomberg



Source: Bloomberg



Source: Bloomberg



Source: Bloomberg

Appendix 2: Materials used by Ms. Zobel, Ms. Senyuz, Mr. Wood, and Ms. Zarutskie

Class II FOMC - Restricted (FR)

Material for Briefing on

Asset Purchases

Zeynep Senyuz, Paul Wood, and Rebecca Zarutskie
Exhibits by Zina Saijid
November 4, 2020

Supporting memos and contributors listed on final page of packet.

Discussion of Memo:

Considerations for Asset Purchases

Longer-term yields are already low

- With yields near the lower bound, rate volatility is lower.
  - Effectiveness of duration-risk channel might be diminished.
  - Asset purchases may still be effective through other channels.

- Longer-term Treasury yields may be subject to the same lower bound as the policy rate.

- Nonetheless, asset purchases can be effective at sustaining the current level of yields and in offsetting upward pressure on longer-term rates.

High Treasury debt issuance presents risks of higher yields

- Higher level of Treasury debt issuance and higher weighted average maturity of coupon issuance have already put upward pressure on yields.

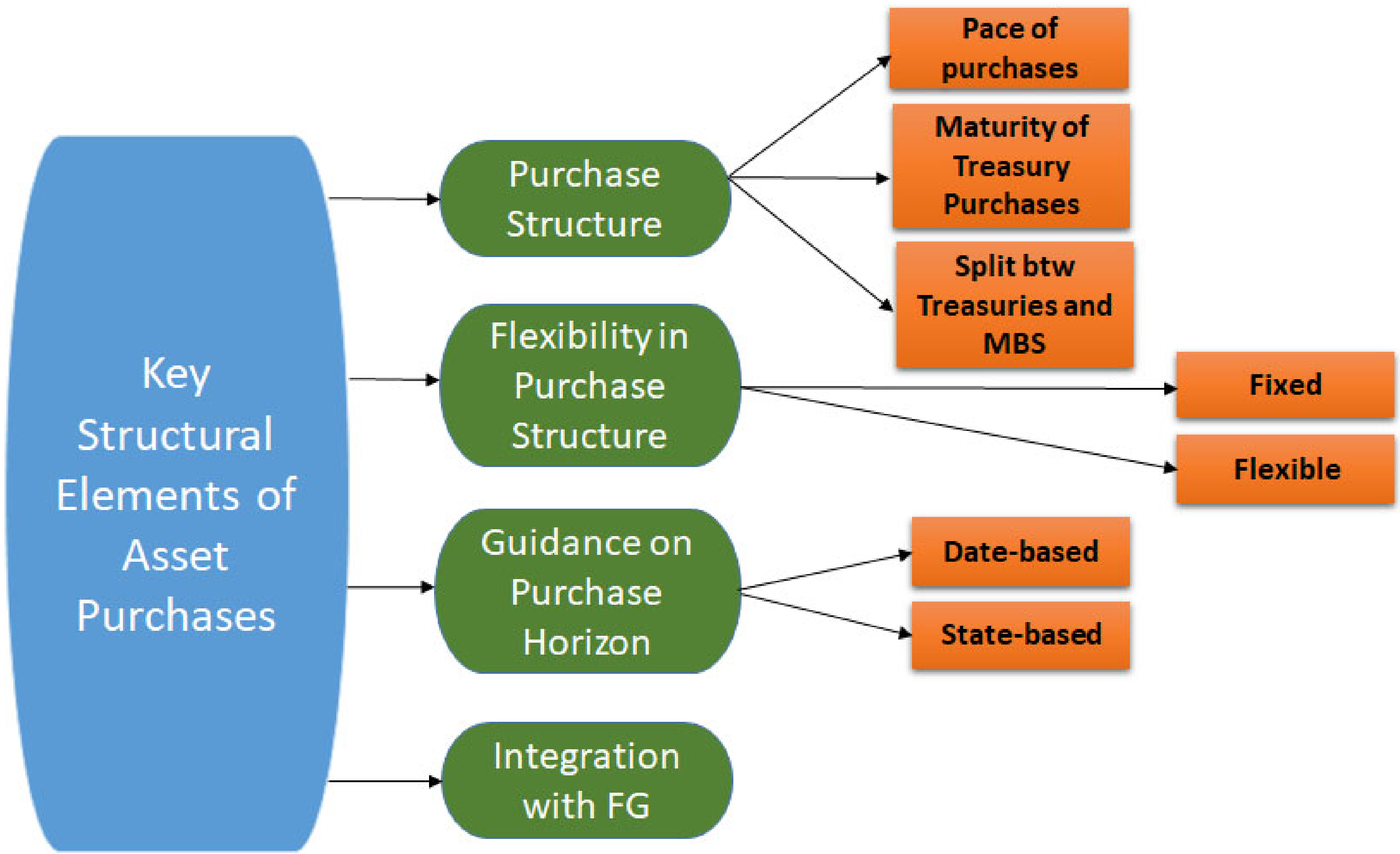
- Considerable uncertainty about the fiscal outlook.

- Higher than expected debt issuance with longer maturities could put further upward pressure on longer-term rates.

Further asset purchases are expected

- Current low yields reflect the effects of ongoing purchases, forward guidance (FG) for the federal funds rate, and market expectations for further purchases.
- The current pace of purchases is expected through 2021, and some purchases are expected through 2023.
- Reducing purchases significantly could put upward pressure on rates.

Design features of asset purchases



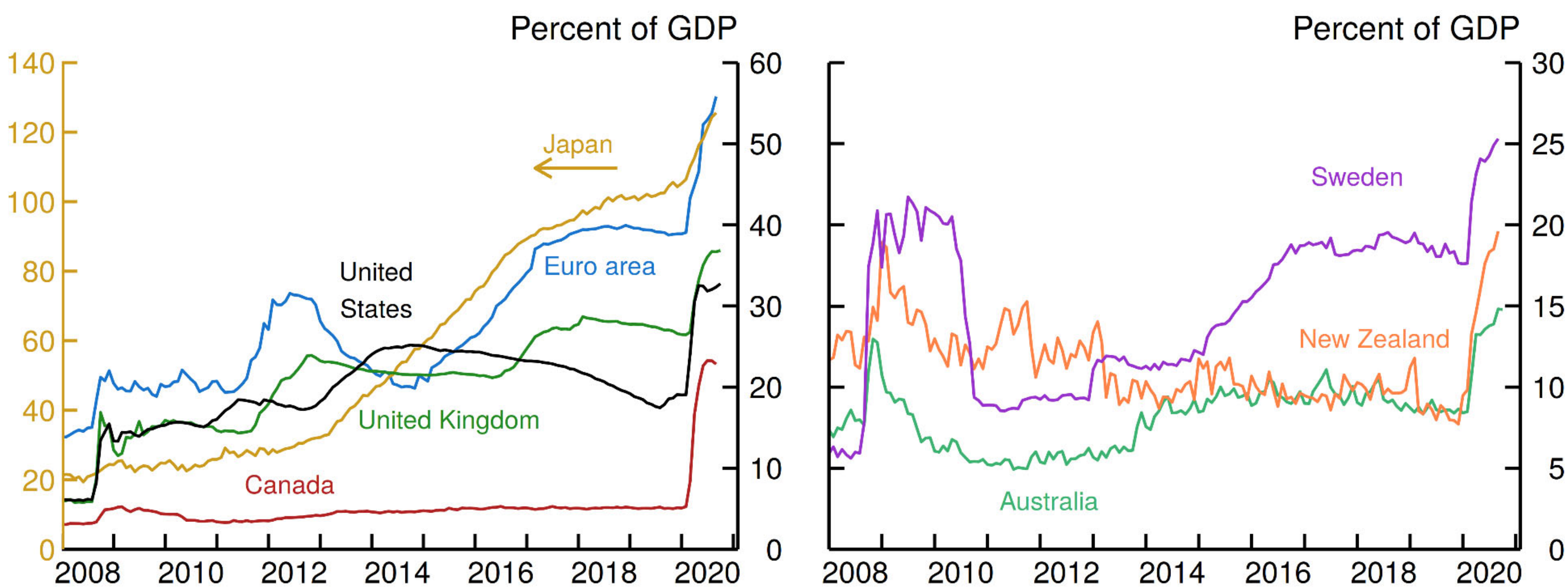
Discussion of Memo:

Ongoing Asset Purchases at Foreign Central Banks

Rapid balance sheet expansion this year

- Foreign central banks introduced or expanded asset purchase programs last spring in response to market functioning strains.

Central Bank Assets in Advanced Economies



* For this year, we are scaling the size of the balance sheet by end-2019 gross domestic product (GDP).
Source: Haver Analytics; Federal Reserve Board staff calculations.

Structure of asset purchase programs

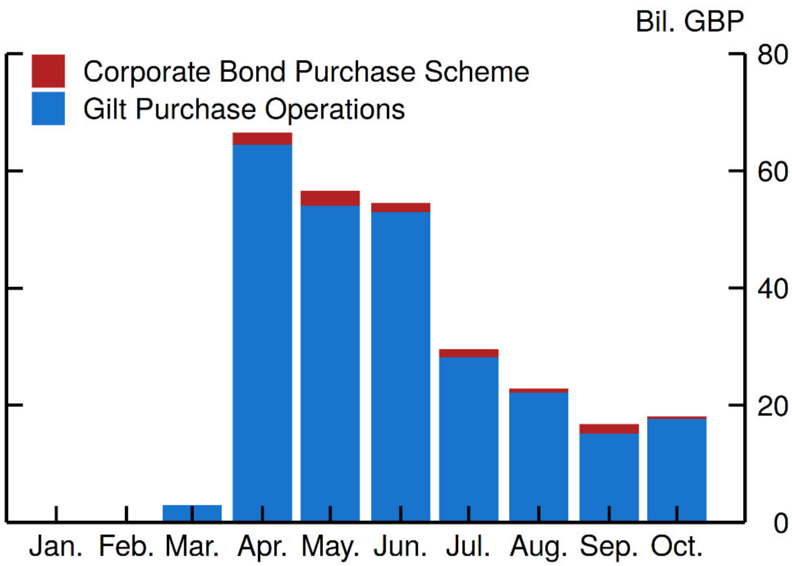
Asset Purchase Programs of Foreign Central Banks

Central Bank	End date	Purchase cap	Targeted pace	Purchases To-date	Percent-of-GDP
ECB					
PEPP	June 2021	€1,350bn	Not specified	€629bn	5.2
APP	Open-ended	Open-ended; Additional envelope of €120bn through end-2020	€20bn per month	€267bn	2.2
BOJ	Open-ended	Open-ended (YCC)	Not specified	¥47tn	8.6
BOE	End 2020	£300bn	Not specified	£268bn	11.5
BOC	Open-ended	Open-ended	C$4bn per week	C$182bn	7.8
RBA	Open-ended	Open-ended (YCC)	Not specified	A$65bn	3.2
Riksbank	June 2021	SEK 500bn	Not specified	SEK 254bn	5.0
RBNZ	June 2022	NZ$100bn	Not specified	NZ$38bn	12.1

Evolution of asset purchase programs

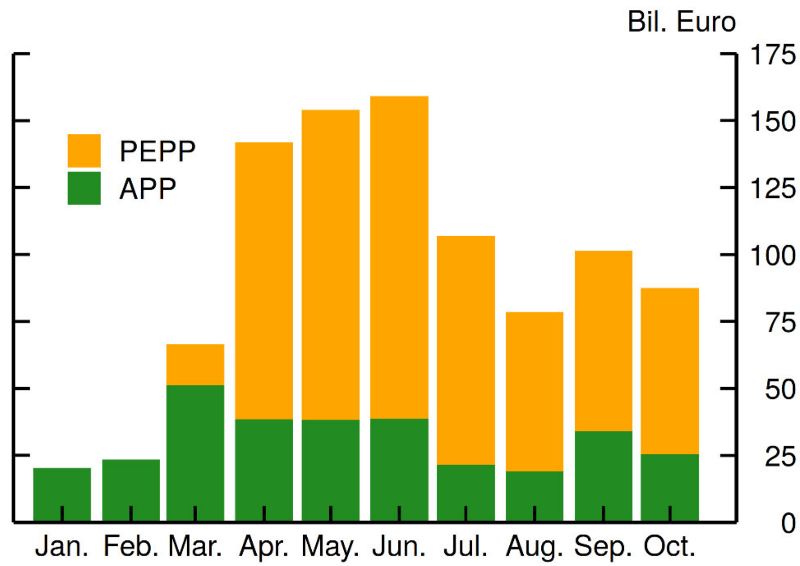
- Central banks shifted away from restoring market functioning and toward providing monetary accommodation.
- Bank of England extended purchases in June at reduced pace.

BOE Asset Purchases



Source: Bank of England.

ECB Asset Purchases



Source: European Central Bank.

Bank of Canada recalibrated purchases

- Will gradually reduce weekly pace from at least C$5 billion to at least C$4 billion while increasing the maturity of purchases.
- Will "shift purchases towards longer-term bonds, which have more direct influence on the borrowing rates that are most important for households and businesses."
- Adjusted purchase program "is providing at least as much monetary stimulus as before."

Guidance on Policy

Central Bank	Policy Rates	Asset purchases
ECB	...to remain at their present or lower levels until it has seen the inflation outlook robustly converge to a level sufficiently close to, but below, 2% within its projection horizon, and such convergence has been consistently reflected in underlying inflation dynamics.	**PEPP:** ...until at least the end of June 2021 and, in any case, until it judges that the coronavirus crisis phase is over. **APP:** ...run for as long as necessary to reinforce the accommodative impact of its policy rates, and to end shortly before it starts raising the key ECB interest rates.
Bank of England	…The Committee does not intend to tighten monetary policy until there is clear evidence that significant progress is being made in eliminating spare capacity and achieving the 2% inflation target sustainably.	...The Committee expects that programme to be completed, and the total stock of asset purchases to reach £745 billion, around the turn of the year.
Bank of Canada	…The Governing Council will hold the policy interest rate at the effective lower bound until economic slack is absorbed so that the 2 percent inflation target is sustainably achieved. In our current projection, this does not happen until into 2023.	… The program will continue until the recovery is well underway.

Discussion of Memo:

Assessing Risks Related to Adding High Levels of Reserves to the Banking System

Two reserves growth scenarios

- $2.5 trillion in additional reserves:
  - Broadly in line with current pace of asset purchases over next six quarters and Treasury General Account declining.
- $5 trillion in additional reserves:
  - “Severely adverse scenario” arising in response to a severe economic downturn.
- As aggregate reserves rise:
  - Banks may take actions to shed liabilities or shed reserves for higher yielding liquid assets.
  - Such actions would place downward pressure on short-term interest rates.

$2.5 trillion scenario

- Banks would likely have sufficient capacity to absorb the increase in reserves.

- Downward pressure on short-term interest rates would likely emerge.

- Existing tools should be sufficient to manage short-term rates.
  - Widen spread of IOER rate to ON RRP rate.
  - ON RRP facility a key safety valve to drain reserves from banking system.

$5 trillion scenario

- Banks might take more aggressive action to limit reserves growth and improve profits.
  - Outcomes in this scenario are especially uncertain.

- Money market rates more likely to fall the bottom of the target range.

- Demand for ON RRP could increase substantially.

Possible policy responses

- Enhance ON RRP’s safety valve effect.
  - Increase current limit for counterparties.
  - Expand set of eligible counterparties.

- Make asset purchases more reserves-neutral.
  - Tilt purchases toward longer-dated securities.
  - Maturity Extension Program

- Expand the role of other non-reserve liabilities.

- Extend temporary regulatory exemption of reserves for banks.
  - Offer supervisory guidance.

Questions for Discussion on Asset Purchases

1. In considering how the Committee's asset purchases should evolve over coming meetings, what do you see as the most important objectives of these purchases—maintaining policy accommodation, providing additional policy accommodation, or guarding against a potential tightening in financial conditions? What are your views on whether sustaining smooth market functioning should remain as an explicit objectives of purchases?

2. What economic of financial factors do you see as important in assessing the appropriate pace and composition of asset purchases over time? Under what circumstances should the Committee alter the pace and/or composition of asset purchases?

3. In terms of the Committee's communications regarding the future path of asset purchases, what do you see as the appropriate role of date-based or state-based guidance? What are your views about the most appropriate way to integrate guidance for asset purchases with forward guidance for the federal funds rate?

4. Are you comfortable with the tools that the Federal Reserve has to manage pressures on bank balance sheets and money market rates that could arise with sizable further increases in aggregate bank reserves?

Supporting Memos and Contributors

Gust, Christopher, Antoine Martin, Zeynep Senyuz, and Patricia Zobel (2020). "Considerations for Asset Purchases," memorandum to the Federal Open Market Committee, Board of Governors of the Federal Reserve System, October 16.

Sagnanert, Pon, Zina Saijid, and Paul Wood (2020). "Ongoing Asset Purchases at Foreign Central Banks," memorandum to the Federal Open Market Committee, Board of Governors of the Federal Reserve System, October 16.

Chow, Yan, Brian Hefferle, Haitham Jendoubi, Hillel Kipnis, Adam Kirk, Holly Kirkpatrick, Michael Koslow, Roseanna Levy, Paul Licari, Dina Marchioni, Antoine Martin, Chris Mayerfield, John McGowan, Judit Temesvary, Katherine Tilghman-Hill, Phil Weed, Emily Yang, and Rebecca Zarutskie (2020). "Assessing Risks Related to Adding High Levels of Reserves to the Banking System," memorandum to the Federal Open Market Committee, Board of Governors of the Federal Reserve System, October 21.

Appendix 3: Materials used by Mr. Lengermann

Class II FOMC - Restricted (FR)

Material for Briefing on

The U.S. Outlook

Paul Lengermann
Exhibits by Rosemary Rhodes and Ashley Sexton
November 4, 2020

Class II FOMC - Restricted (FR)

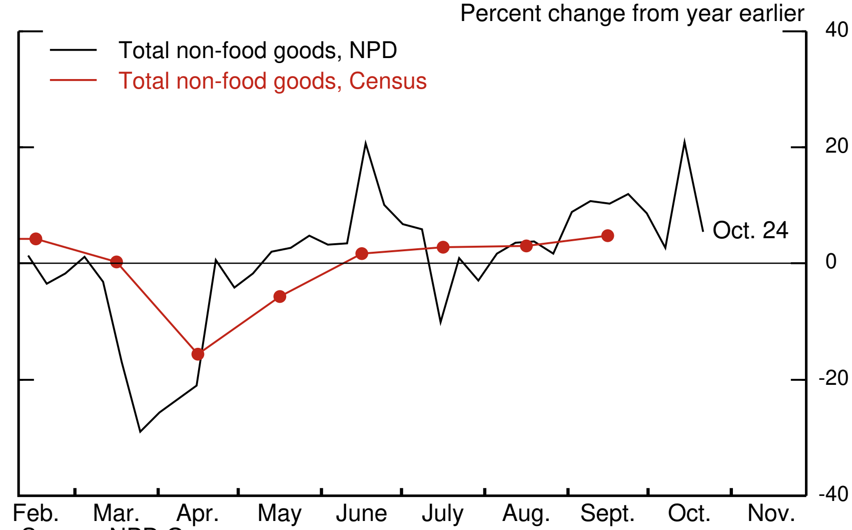
Recent Data and Near-term Outlook

1. Q3 GDP rebounds, slower growth thereafter

	Q3	Q4	21:H1
1. GDP (% change)	33.3	3.4	0.8
2. October TB	*31.9*	*3.9*	*1.2*
3. September TB	*29.7*	*4.5*	*2.2*
Contribution from:			
4. PCE (p.p.)	25.4	1.9	-0.9
5. September TB	*24.1*	*2.8*	*0.4*
6. RES + BFI (p.p.)	5.3	1.5	0.7
7. September TB	*2.6*	*1.0*	*1.2*
Memo:			
8. Unemployment rate*	8.8	7.2	6.2
9. September TB	*8.9*	*7.4*	*6.2*

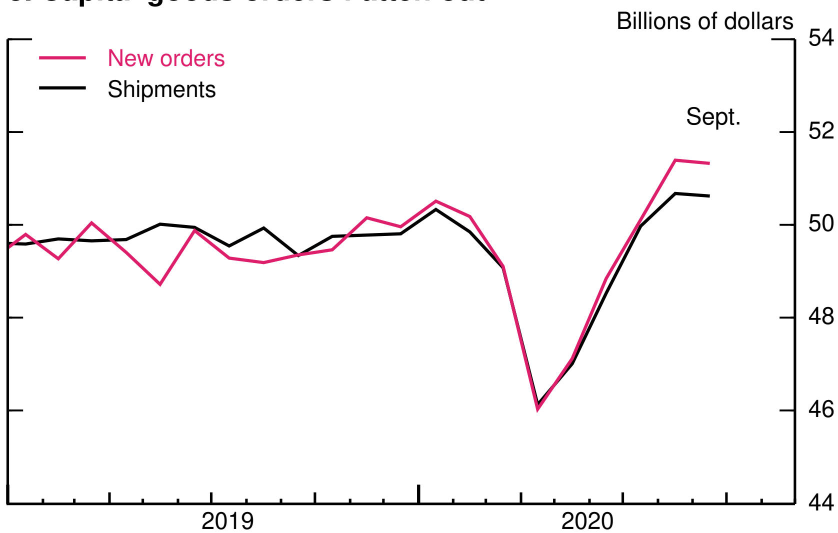
*Level in final quarter of period indicated.

2. Retail goods spending maintained in October



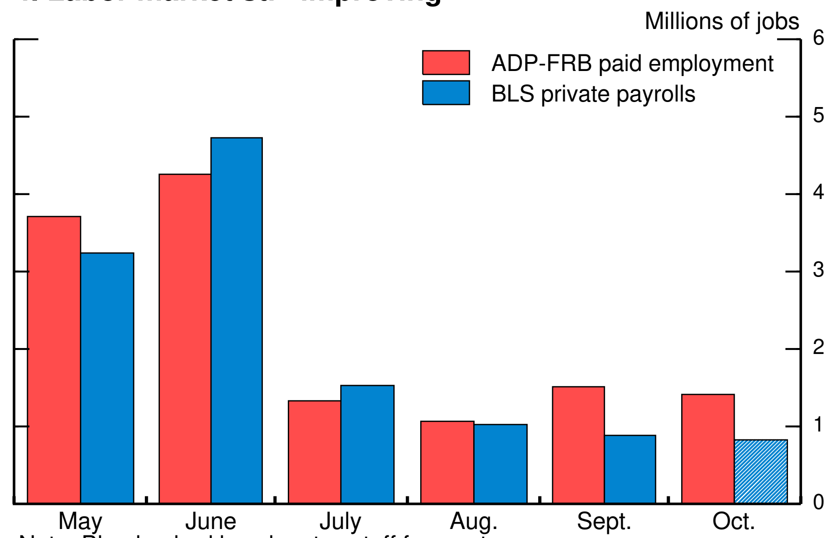
Source: NPD Group.

3. Capital goods orders flatten out



Note: Series are weighted by the share of nondefense shipments (excl. aircraft) that are purchased for private business investment.

4. Labor market still improving

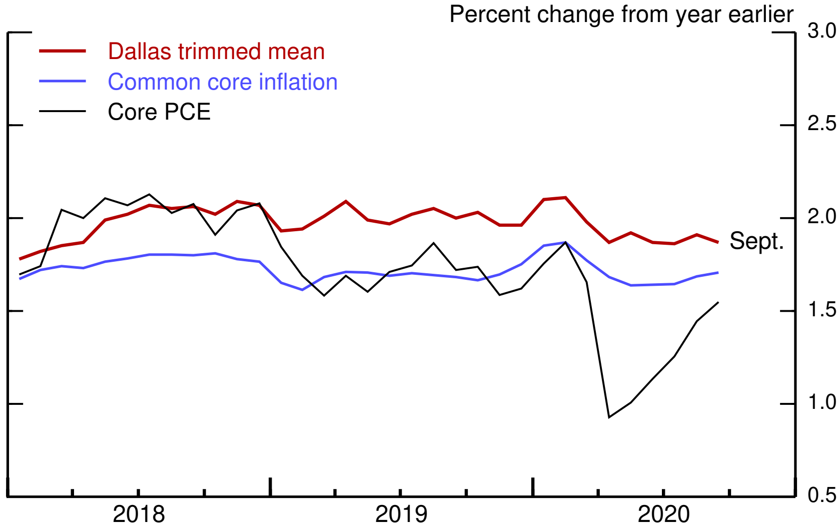


Note: Blue hashed bar denotes staff forecast.

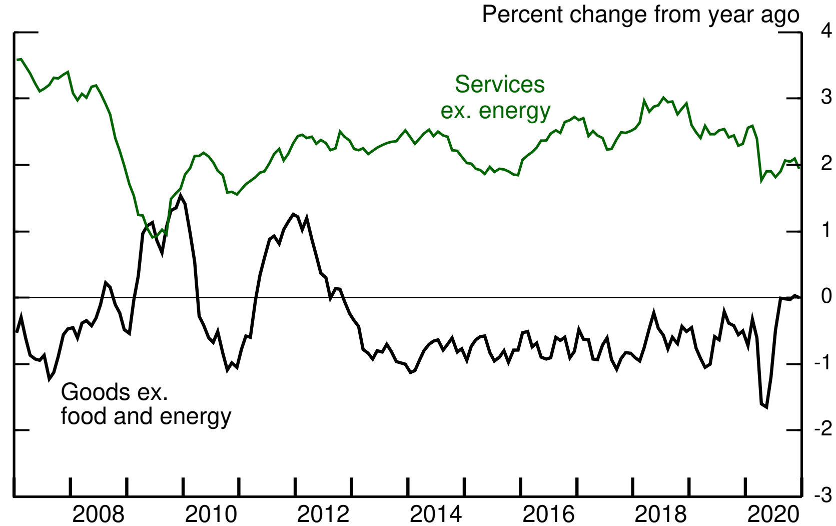
Class II FOMC - Restricted (FR)

Near-term Inflation Developments

5. Core inflation moves closer to pre-COVID rate

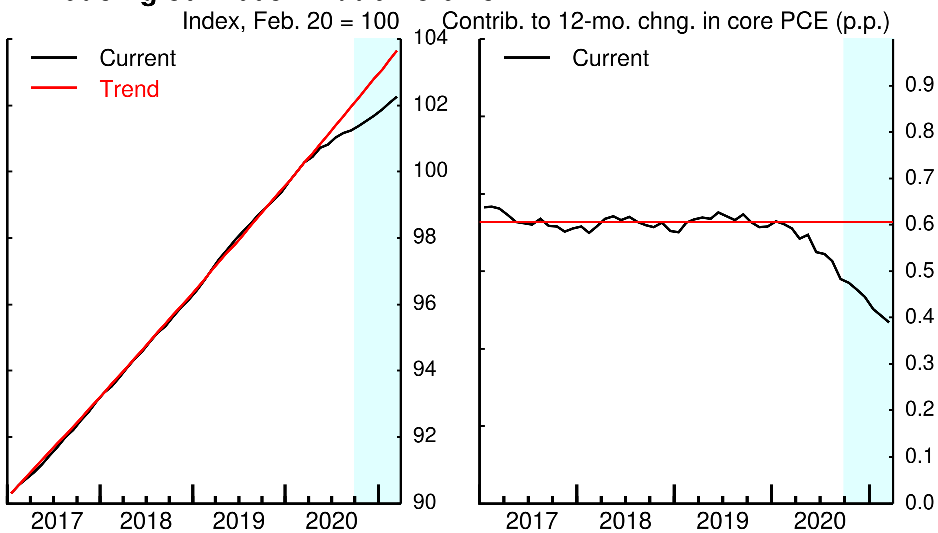


6. Goods inflation has been stronger than usual, which may prove transitory

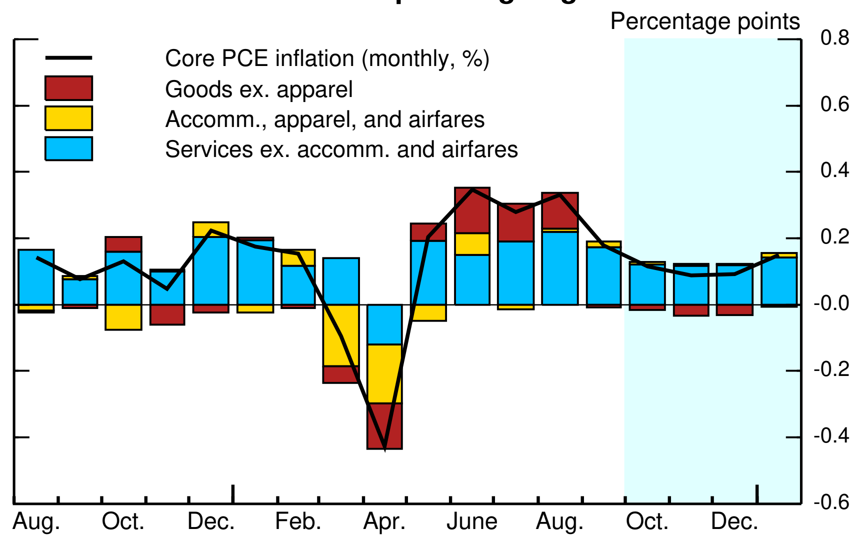


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

7. Housing services inflation slows



8. More modest inflation expected going forward

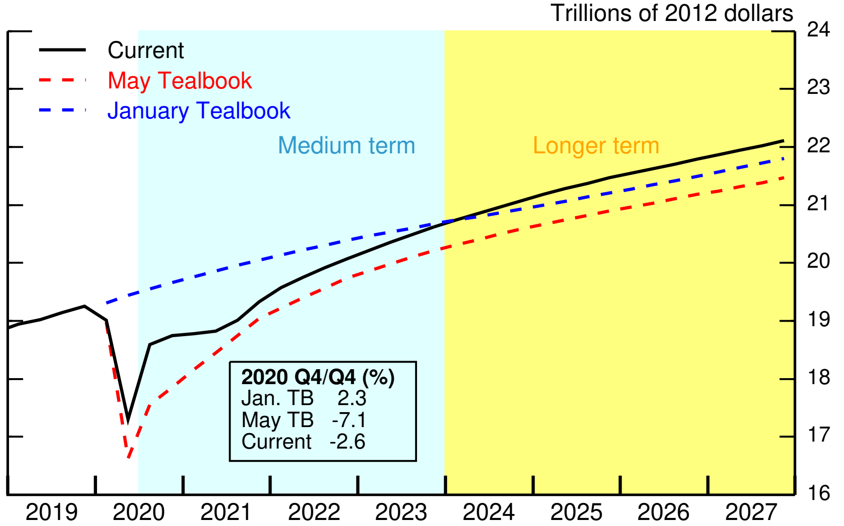


Note: Bars show contributions of specified categories to overall core PCE price inflation.

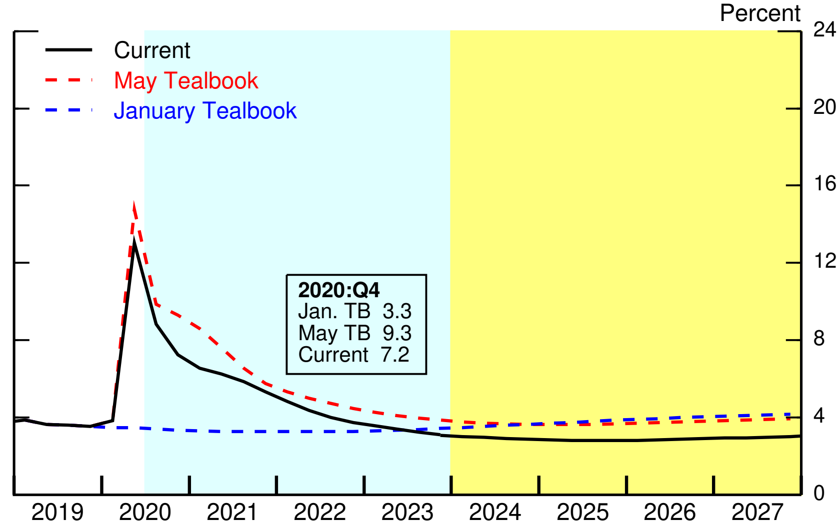
Class II FOMC - Restricted (FR)

Forecast Evolution Since the Onset of COVID-19

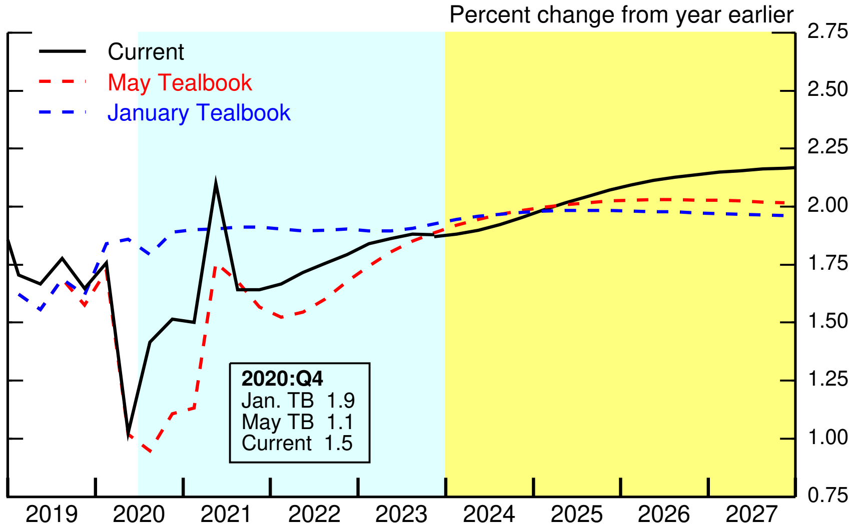
9. GDP



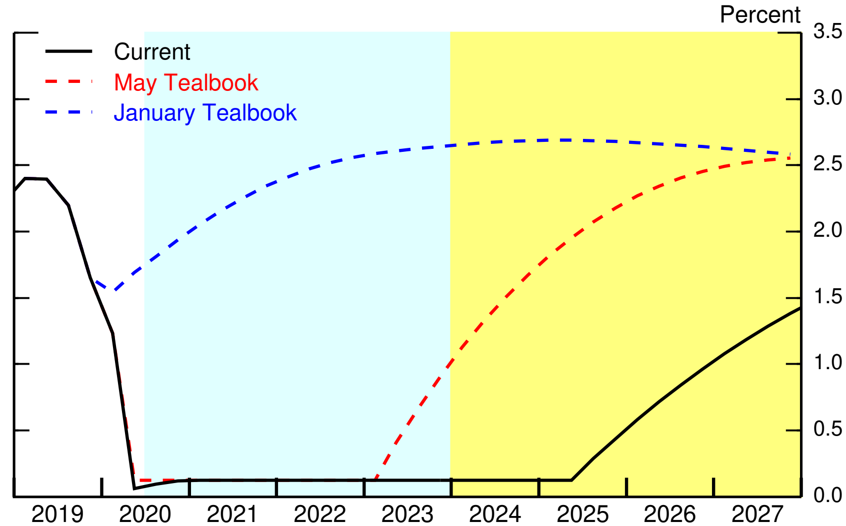
10. Unemployment Rate



11. Core PCE Inflation



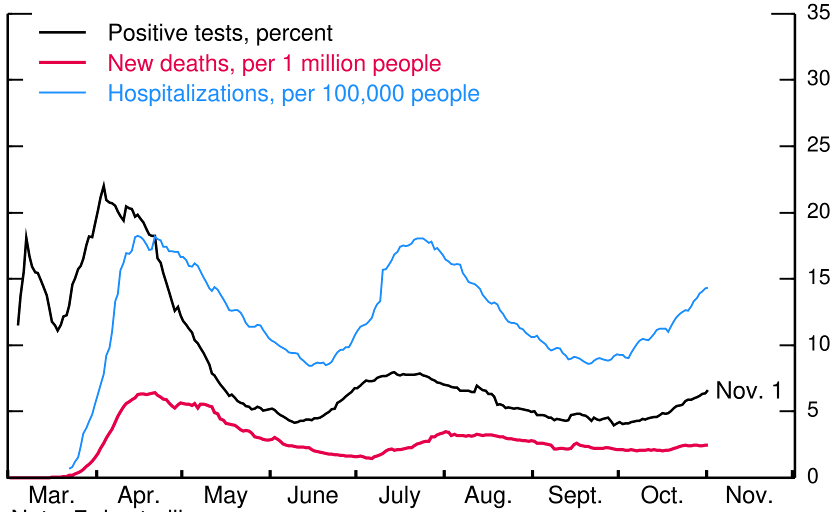
12. Federal Funds Rate



Class II FOMC - Restricted (FR)

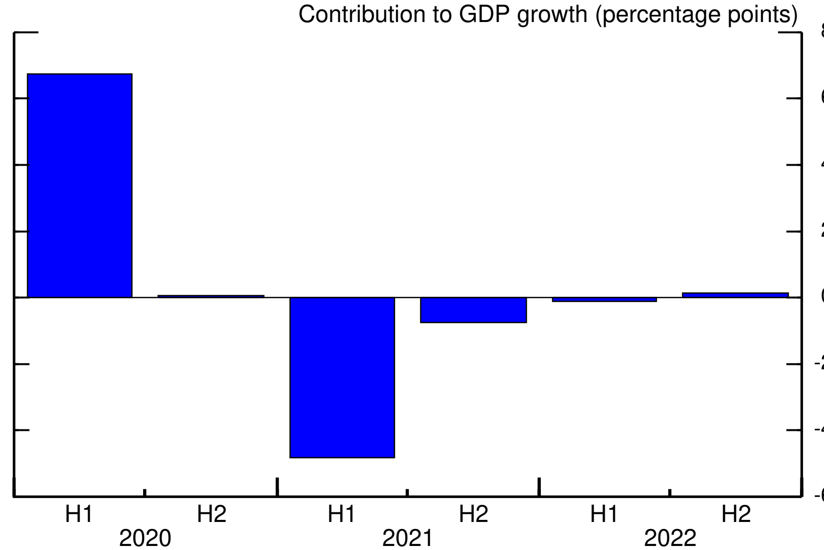
Risks to the Outlook

13. COVID-19 hospitalizations & positivity rates rising

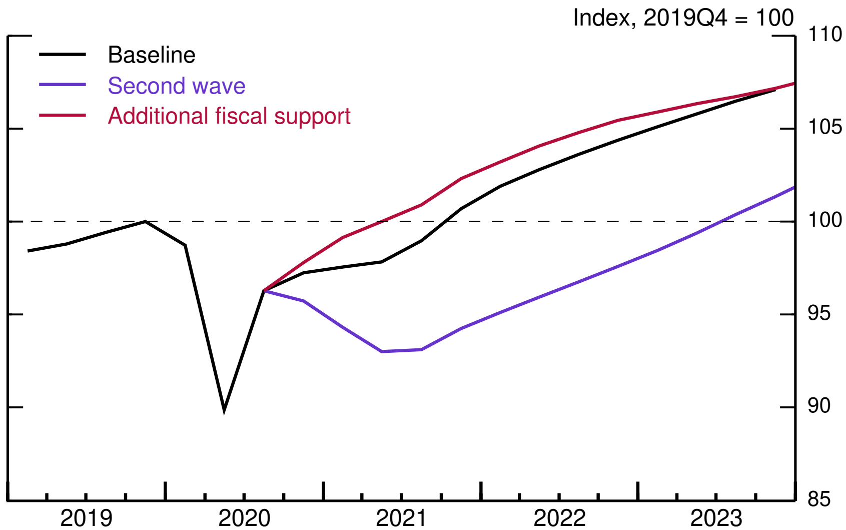


Note: 7-day trailing averages.
Source: Covid Tracking Project.

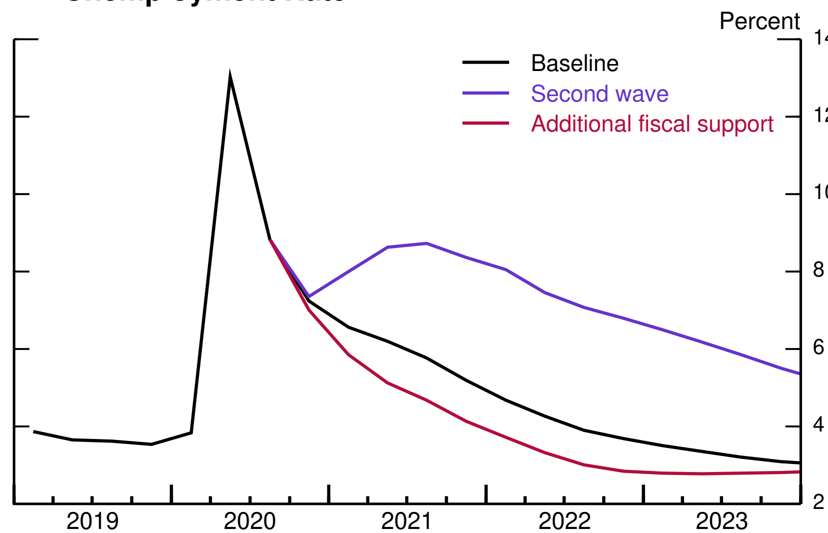
14. Fiscal Impetus



15. Alternative Scenarios for GDP

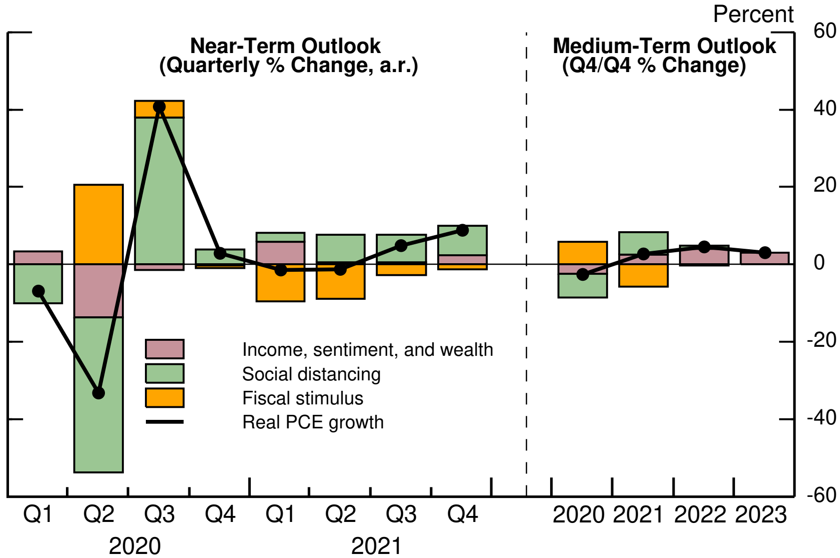


16. Alternative Scenarios for the Unemployment Rate

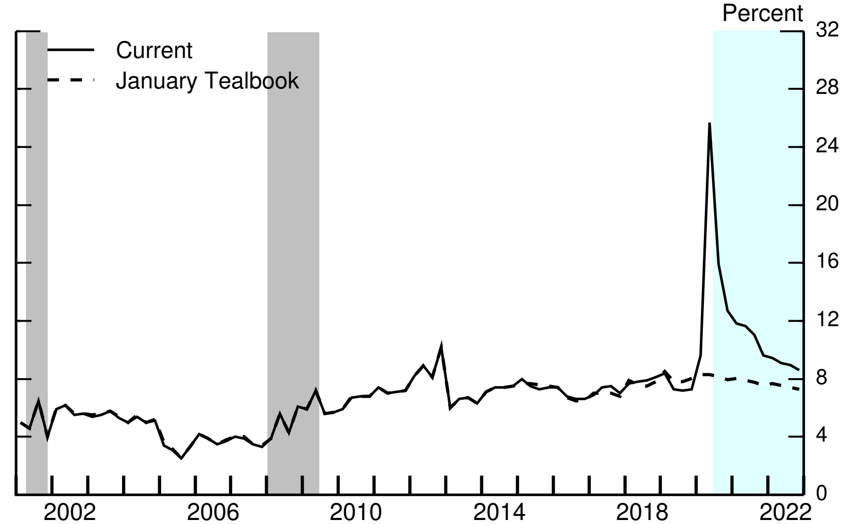


Consumer Spending Expected to Moderate

17. PCE steps down in 2021:H1 before accelerating

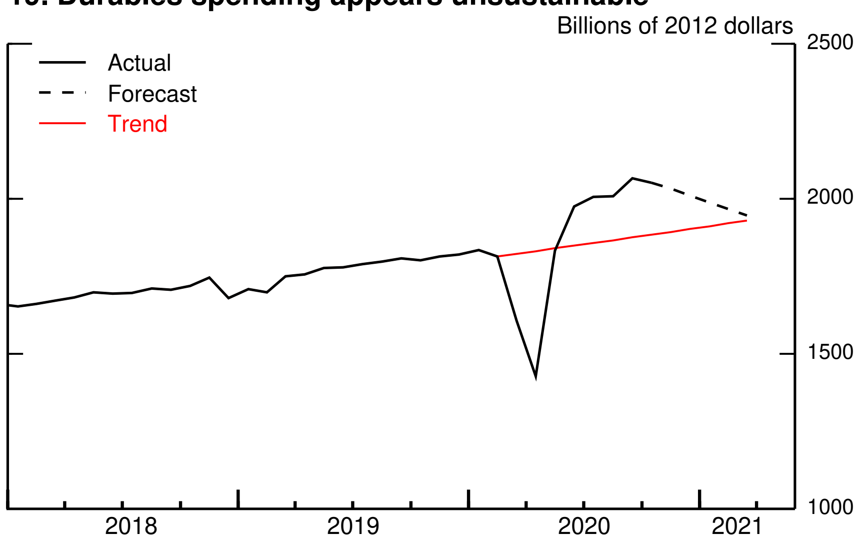


18. Saving rate slowly returns to pre-COVID trend



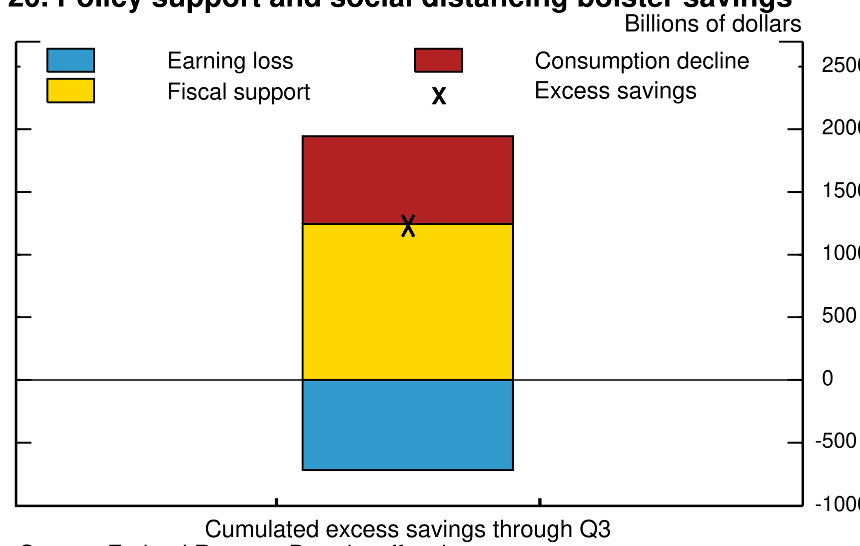
Source: U.S. Dept. of Commerce, Bureau of Economic Analysis.

19. Durables spending appears unsustainable



Note: Counterfactual assumes average growth from 2015 to 2019 continues from the Febuary 2020 jumpoff point.

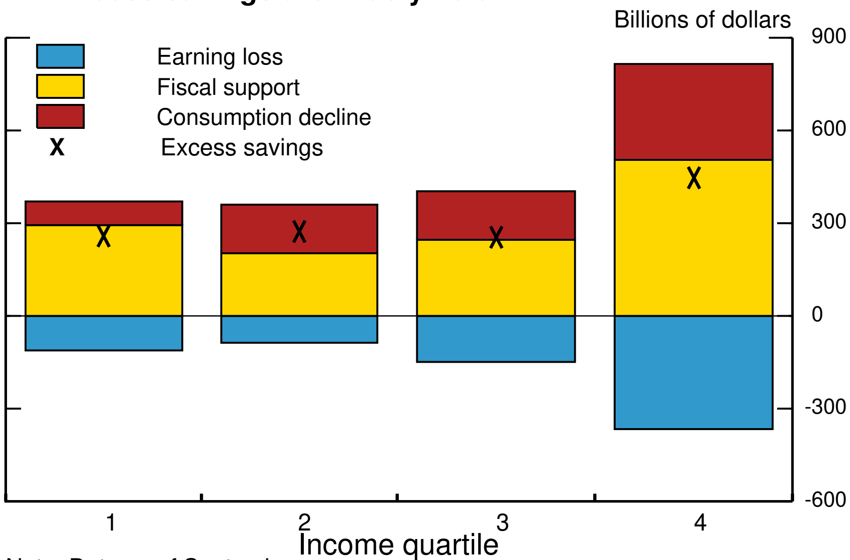
20. Policy support and social distancing bolster savings



Source: Federal Reserve Board staff estimates.

Savings Distribution and Aggregate Consumption

21. Excess savings are widely held



Note: Data as of September.
Source: Federal Reserve Board staff estimates.

22. Aggregate spending depends on savings distribution

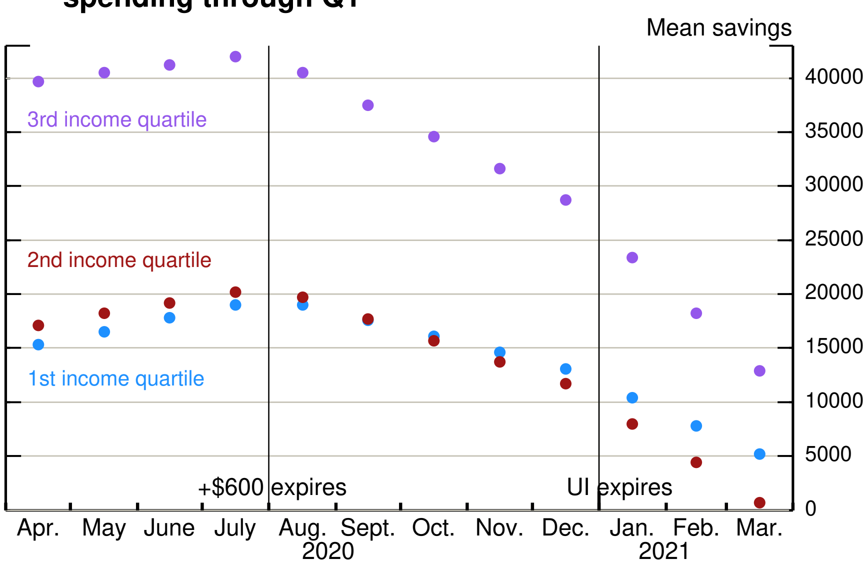
Low-income households:

- Savings exhausted by early 2021 for some, spending declines
- Risk (-): Expiration of forbearance and eviction moratoriums

High-income households:

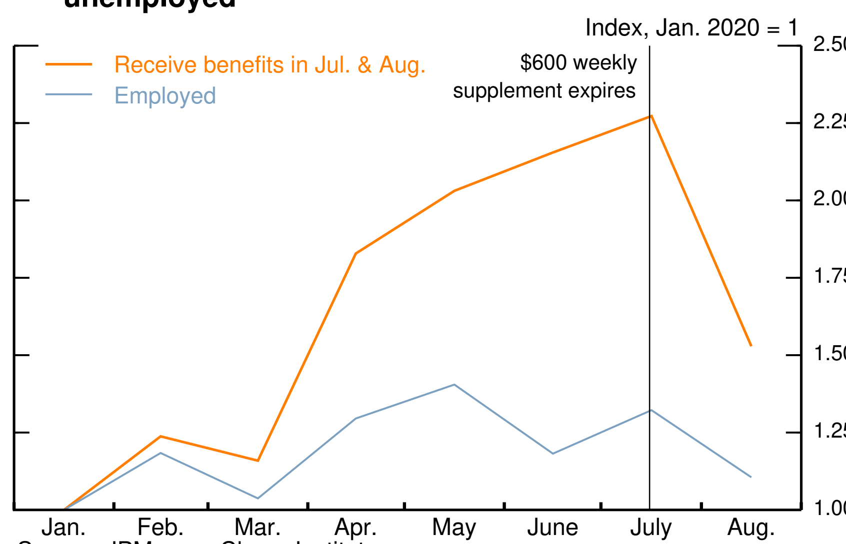
- Spending recovers once restrictions end; precautionary motives persist
- Risk (+): Make-up spending once vaccine available

23. SCF analysis: household savings can support spending through Q1



Note: Top income quartile is not shown.
Source: Bhutta, Blair, Dettling, Moore (2020).

24. Checking account balance of employed vs. unemployed

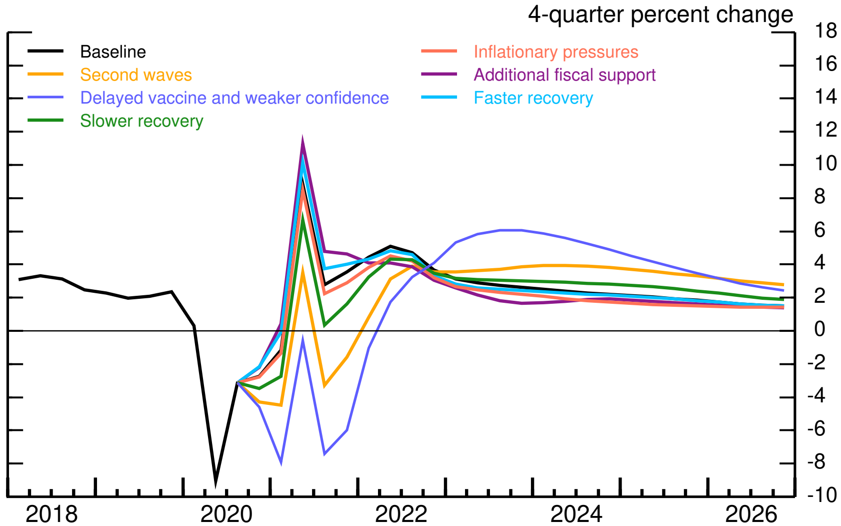


Source: JPMorgan Chase Institute.

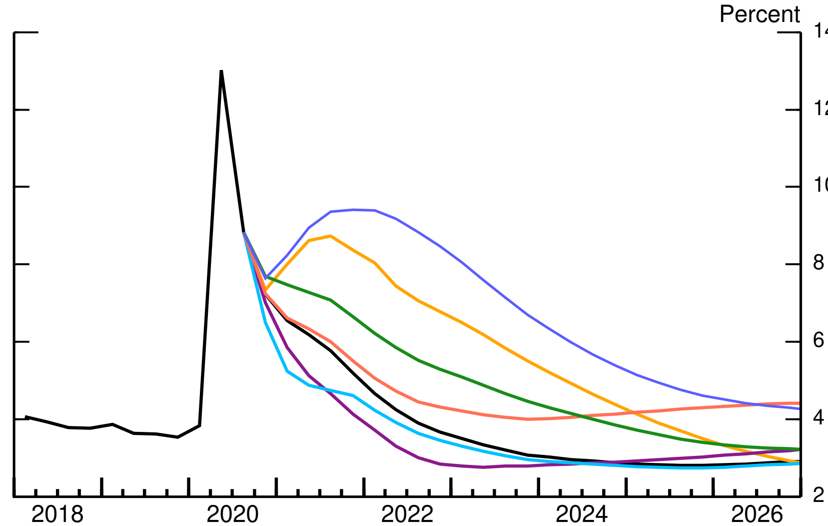
Class II FOMC - Restricted (FR)

Appendix: Alternative Scenarios

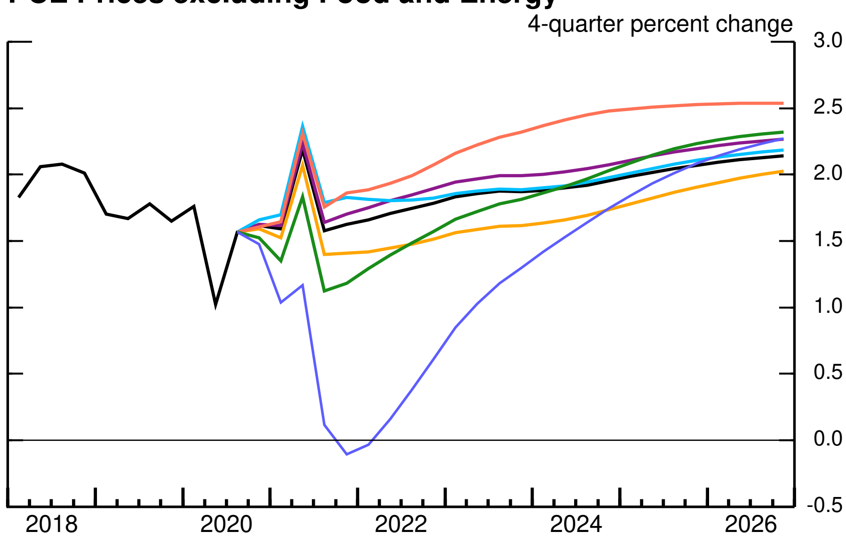
Real GDP



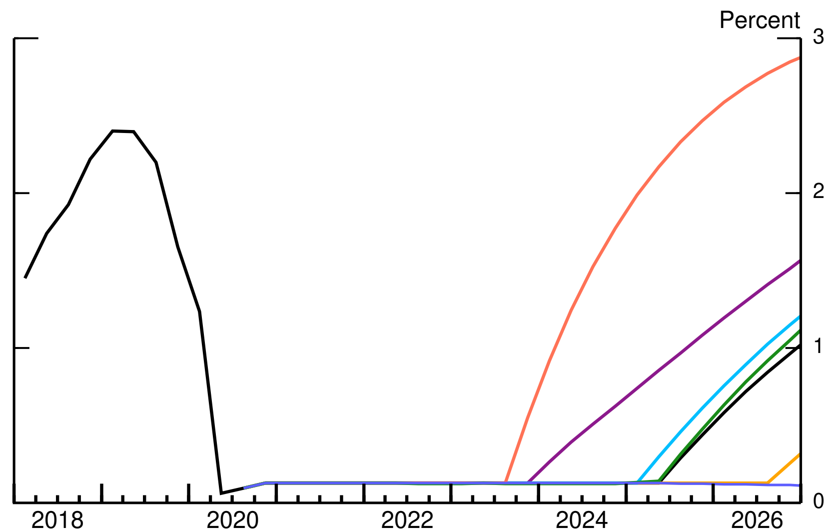
Unemployment Rate



PCE Prices excluding Food and Energy



Federal Funds Rate

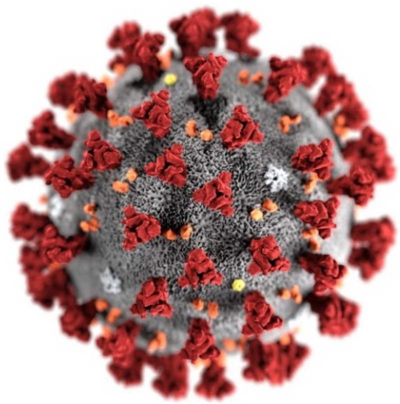


Appendix 4: Materials used by Mr. Wood

Class II FOMC - Restricted (FR)

Material for Briefing on

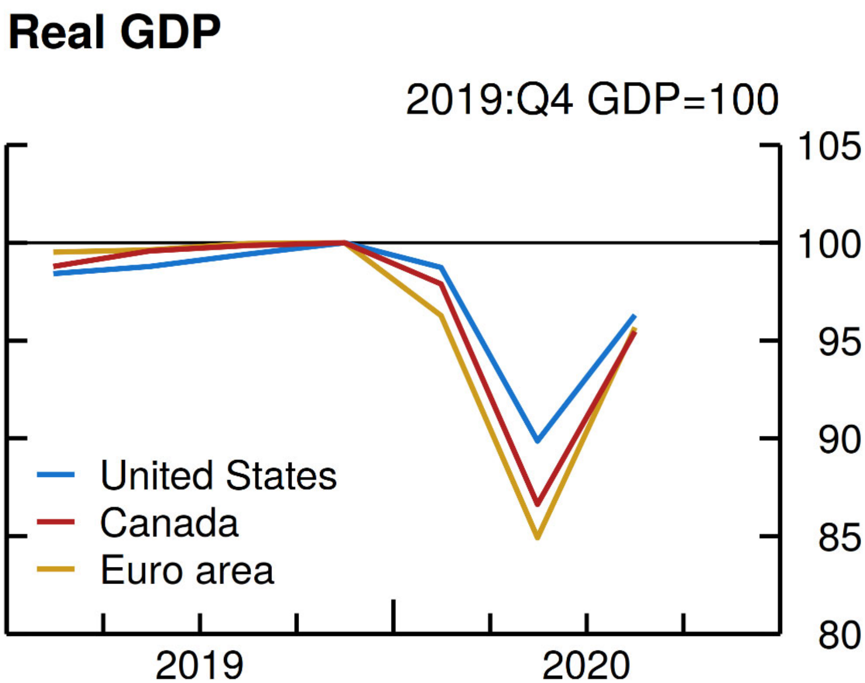
The International Outlook



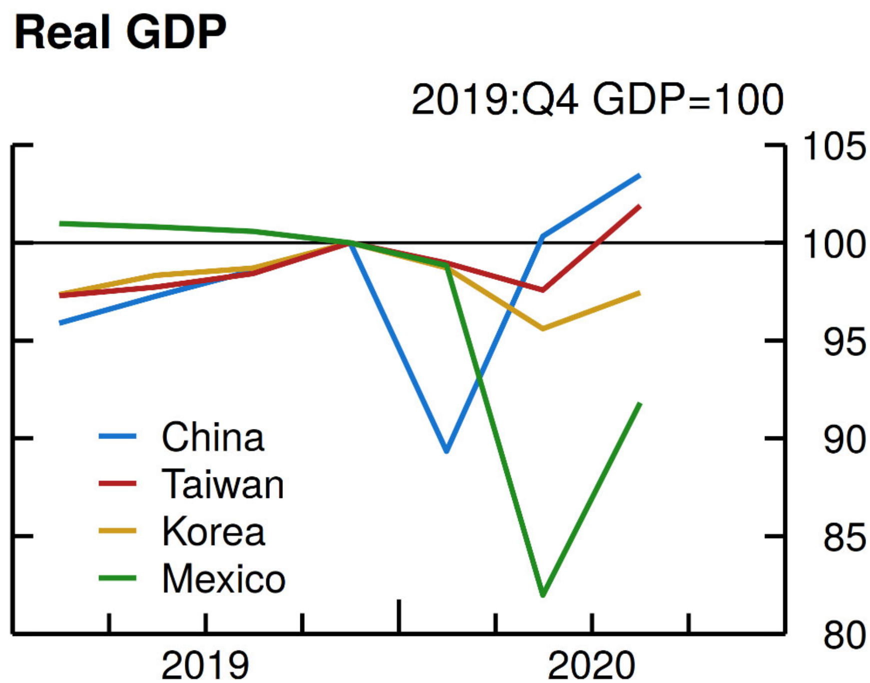
Paul Wood
Exhibits by Chazz Edington
November 4, 2020

Foreign recoveries to date

- Canada and euro area fell sharply on severe lockdowns but had strong third-quarter rebounds.
- China has recovered entire decline, but Mexico remains depressed.



Source: Haver Analytics.

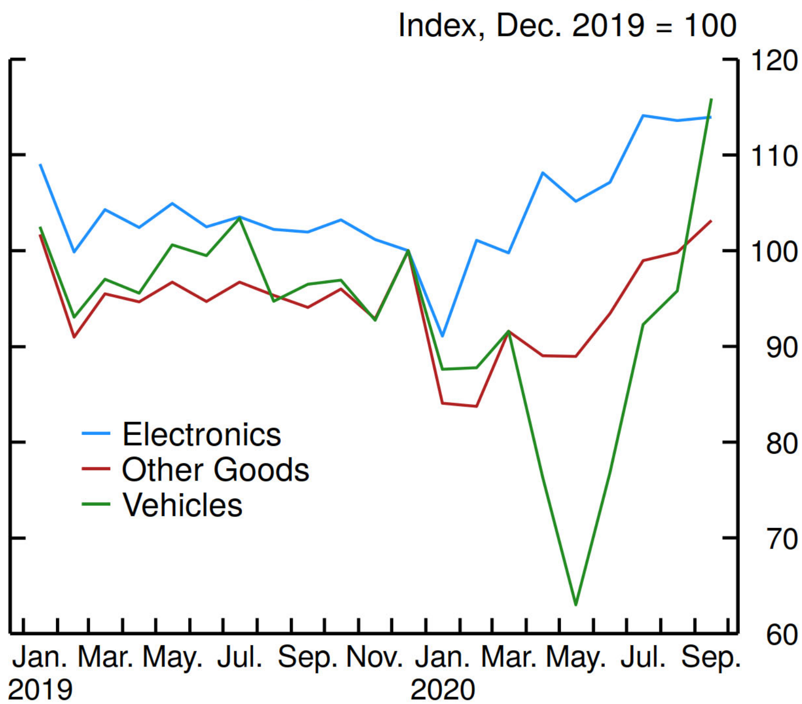


Source: Haver Analytics.

Rebound in exports and manufacturing

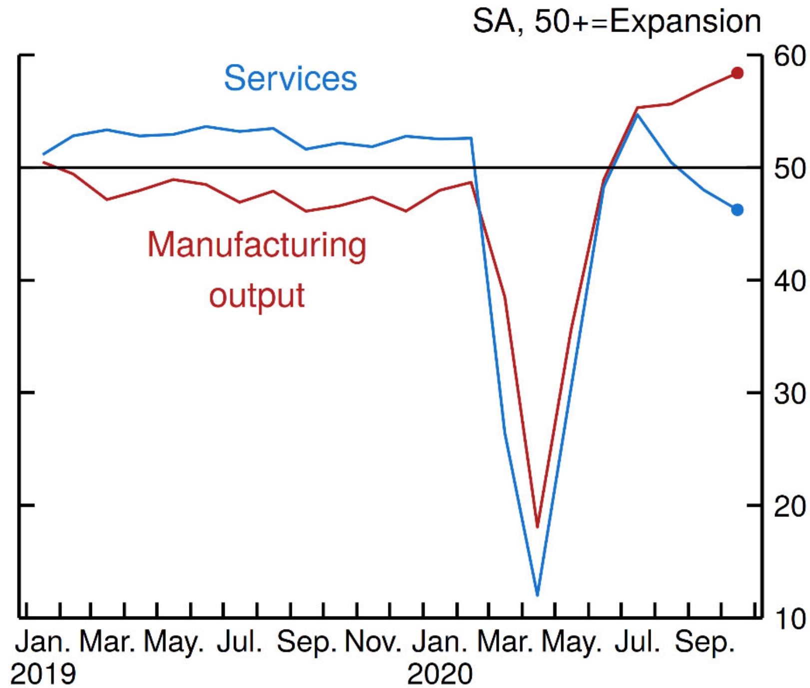
- Recovery in manufactured exports has been strong for Asian EMEs.
- In euro-area, solid recovery in manufacturing, but services activity slowing amid virus resurgence.

Asian Nominal Exports by Product-Type



The Asian aggregate comprises of China, South Korea, Taiwan, Singapore, and Vietnam. All lines are seasonally adjusted.
Source: Haver Analytics.

Euro-area PMI



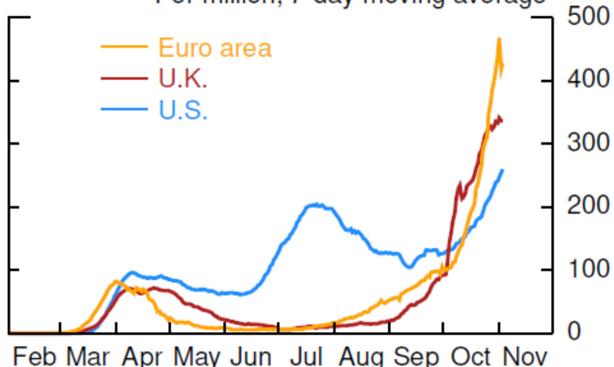
Source: IHS Markit.

COVID-19 resurgence

- Coronavirus cases have resurged in Europe.
  - Deaths and hospitalization low relative to spring, but rising.

New Coronavirus Cases*

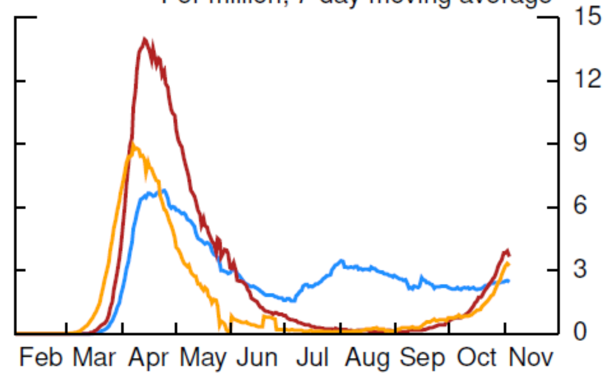
Per million; 7-day moving average



*Source: Johns Hopkins Center for Systems Science and Engineering.

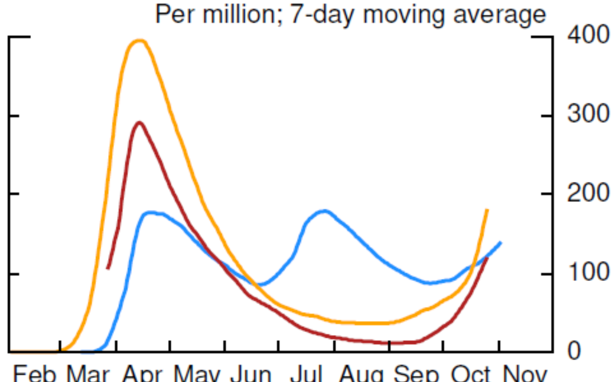
New Coronavirus Deaths*

Per million; 7-day moving average



Daily Covid-19 Hospital Occupancy**

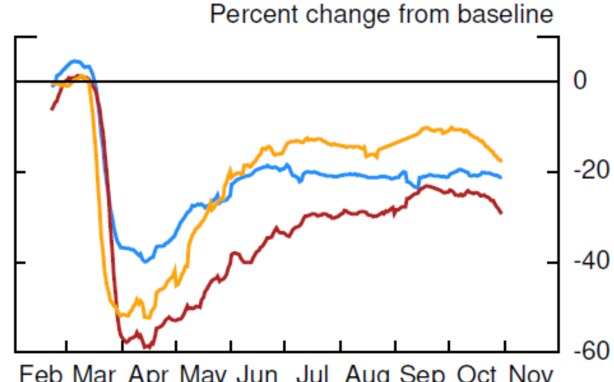
Per million; 7-day moving average



**Source: European Centre for Disease Prevention & Control

Mobility

Percent change from baseline

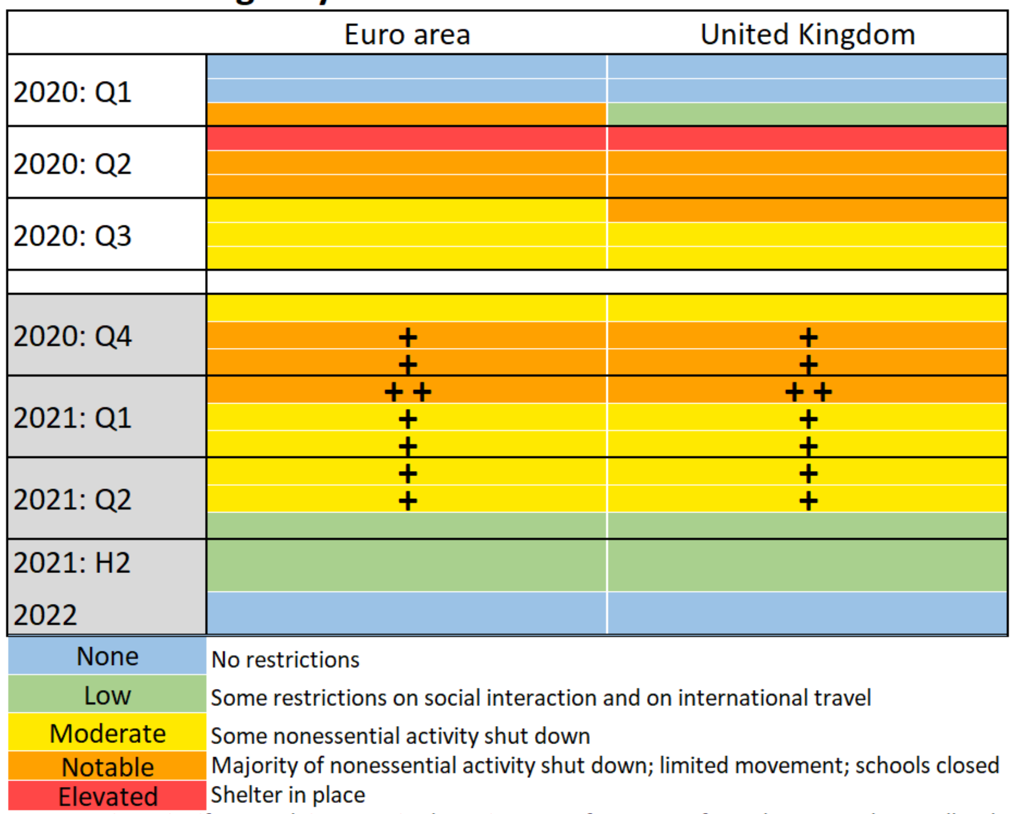


Source: Google Community Mobility Reports
Average of retail&recreation, grocery&pharmacy, transit station, workplace mobility.

Governments imposing new restrictions

- France, Germany, and England imposed widespread restrictions.
- Less severe than in the spring (factories and schools generally open).

Stringency of Restrictions due to Covid-19

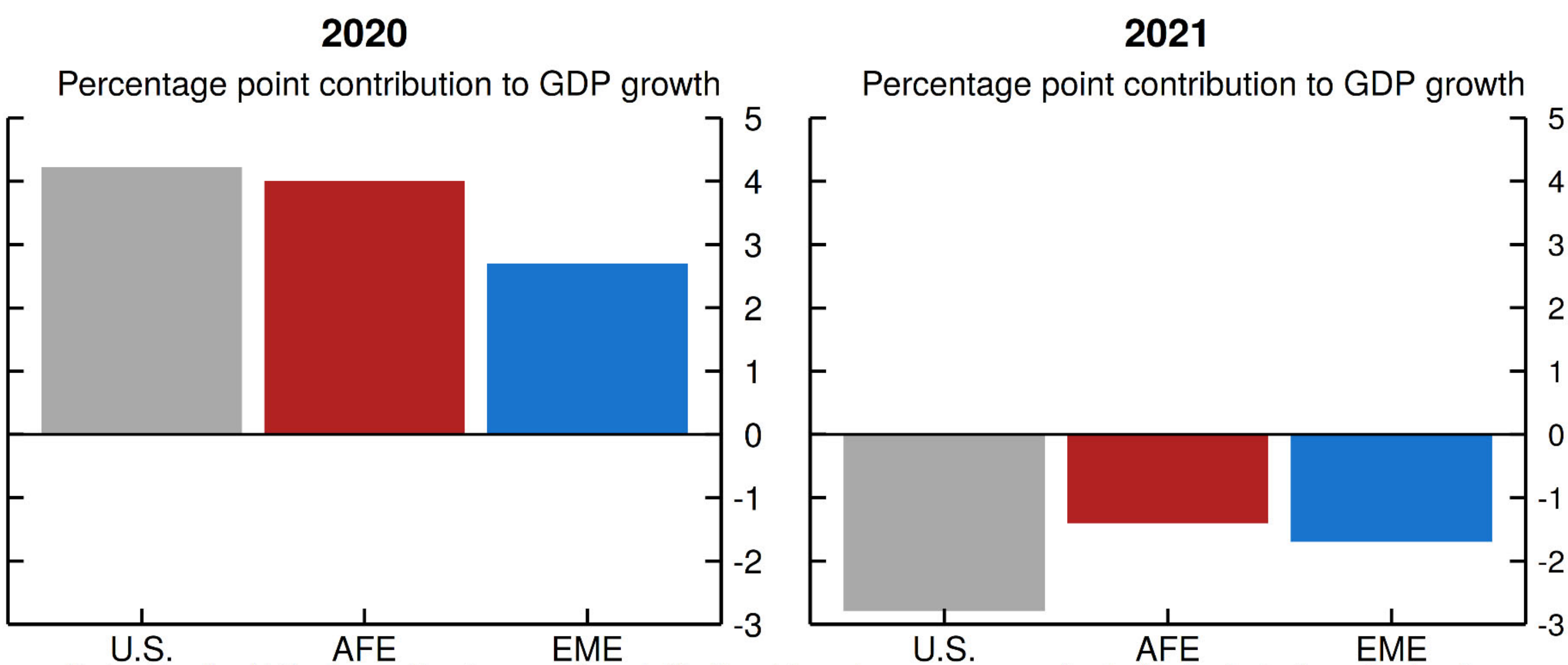


Note: + signs signify a notch increase in the stringency of measures from the September Tealbook.
Source: Federal Reserve Board staff calculations from University of Oxford's Stringency Index through September and staff forecasts thereafter.

Fiscal support

- AFE governments extended their support for incomes. No fiscal cliff, but fiscal policy will be a small drag on growth next year.
- EME governments provided less support amid limited fiscal space.

Effects of Fiscal Policies on GDP Growth

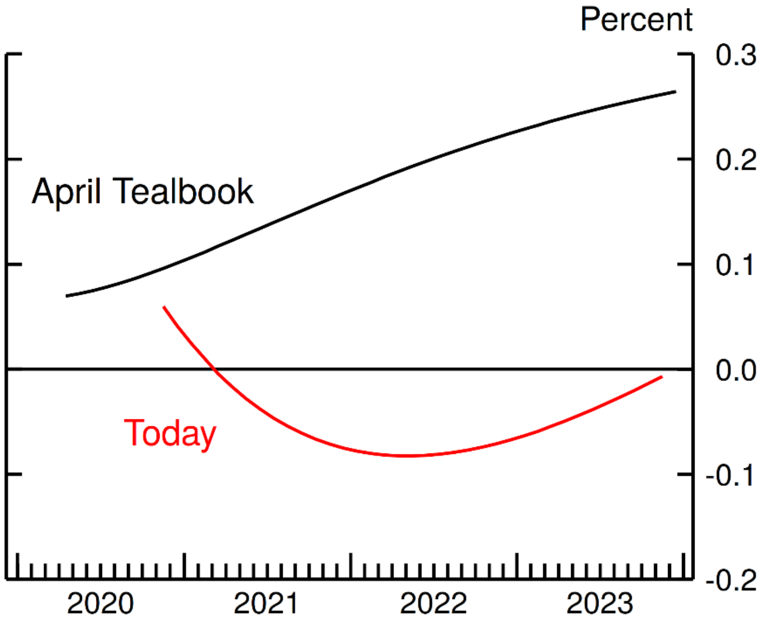


Note: For the U.S., the estimate uses the staff's fiscal impetus measure adjusted to include the effects of follow-on multipliers.
Source: Federal Reserve Board staff estimates.

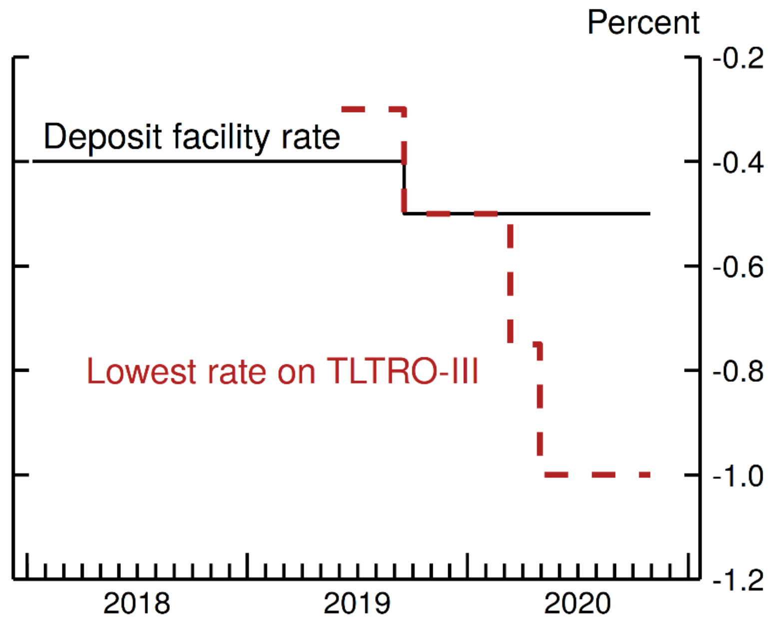
Central banks explore easing options

- We expect Bank of England to increase asset purchases and to consider possible tools for the future.
- ECB signaled it would ease in December.
  - We expect further PEPP purchases and easing of TLTRO terms.

BOE Policy Expectations Based on OIS Rates



ECB Rates



Source: European Central Bank.

Assessing the near-term forecast for Europe

- Several major European countries are shutting down large parts of the services economy for at least one month.

- With factories still open, solid manufacturing growth may continue.
  - But uncertainty and loss of income threaten demand.

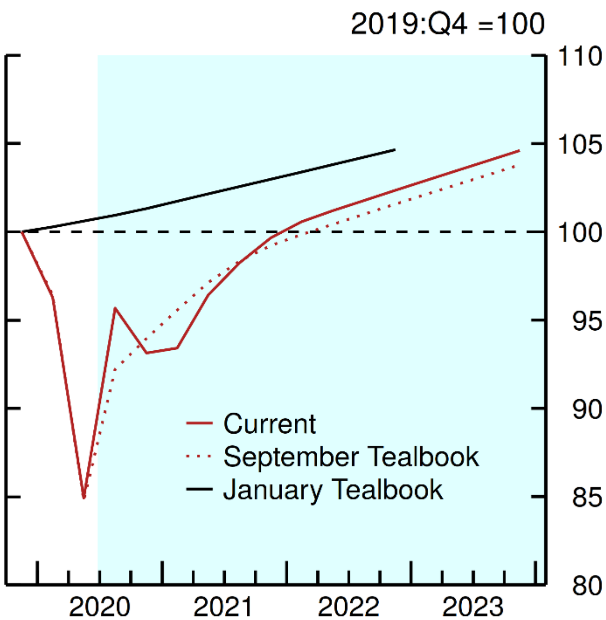
- We expect UK and euro-area GDP to contract significantly in the fourth quarter.

- European contraction should be a drag on the global economic recovery, with possible increase in financial stresses.

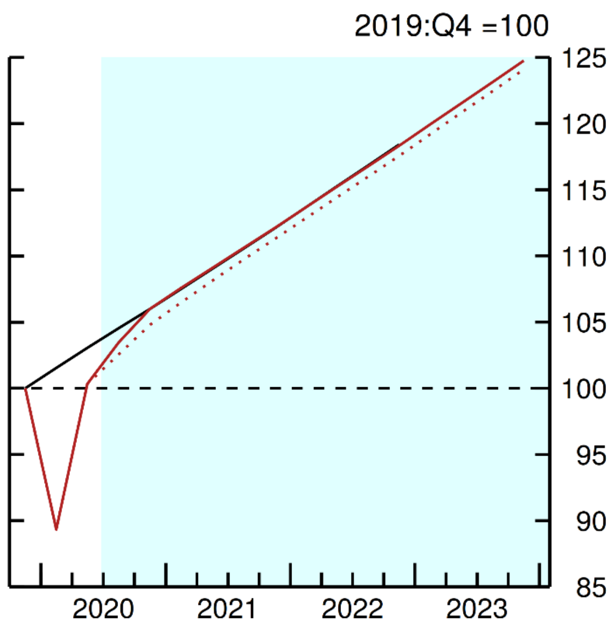
Diverging recoveries across economies

- Euro-area GDP to turn down on new restrictions.
- China GDP should resume pre-COVID path.
- Latin America to suffer a long-lasting loss of GDP.

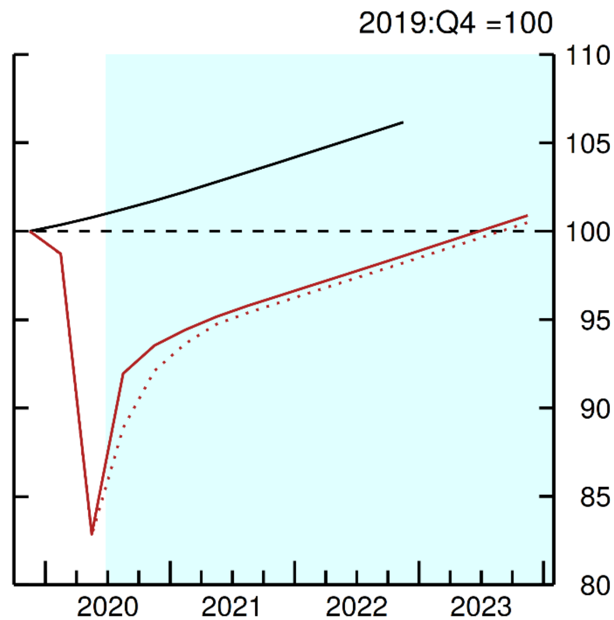
Euro area Real GDP Level



China Real GDP Level



Latin America Real GDP Level



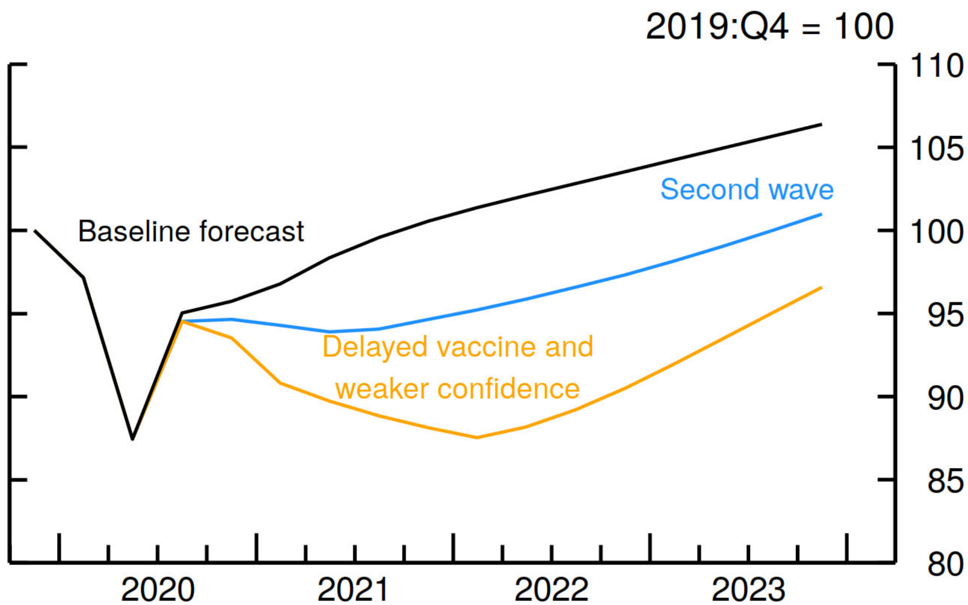
Source: Federal Reserve Board staff forecasts.

Note: Weighted by bilateral shares in U.S. merchandise exports.

Risks are to the downside

- Baseline moving closer to second-wave scenario, which has more widespread lockdowns, with tightening financial conditions.
- Under more adverse scenario, confidence deteriorates amid doubts about global recovery, with particular fallout for vulnerable EMEs.

Foreign GDP: Baseline and Scenarios



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

Appendix 5: Materials used by Mr. Kiley

Class II FOMC - Restricted (FR)

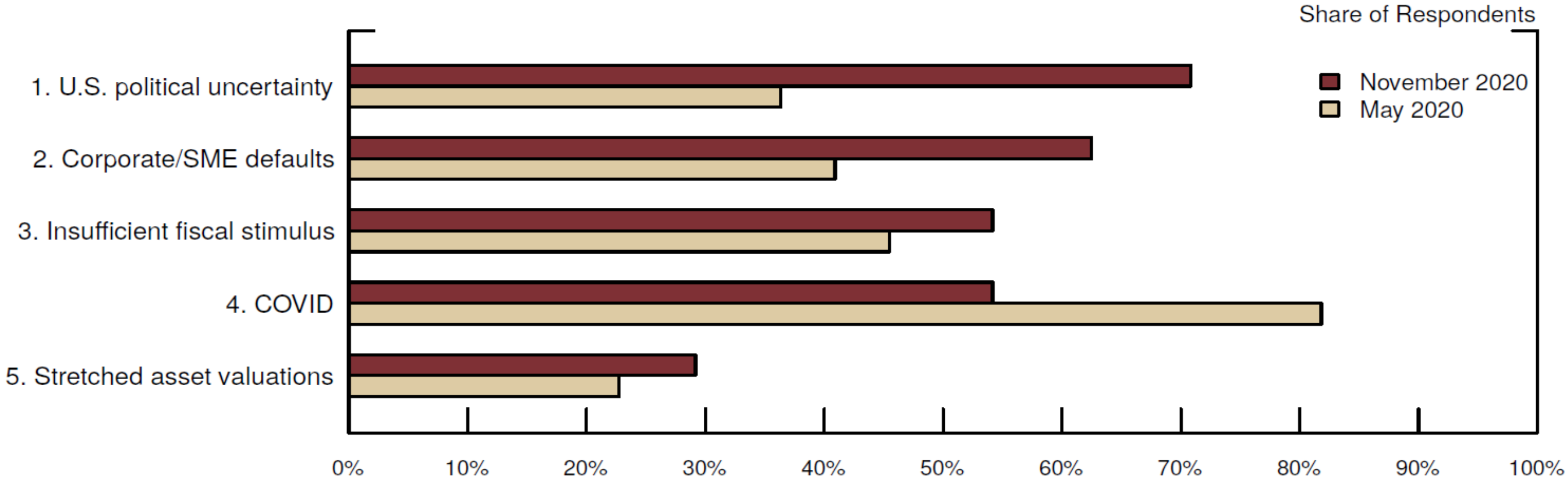
Material for Briefing on

Financial Stability

Michael Kiley
Exhibits by Morgan Elliott and Cole Langlois
November 4, 2020

Near term risks

Most Cited Potential Shocks



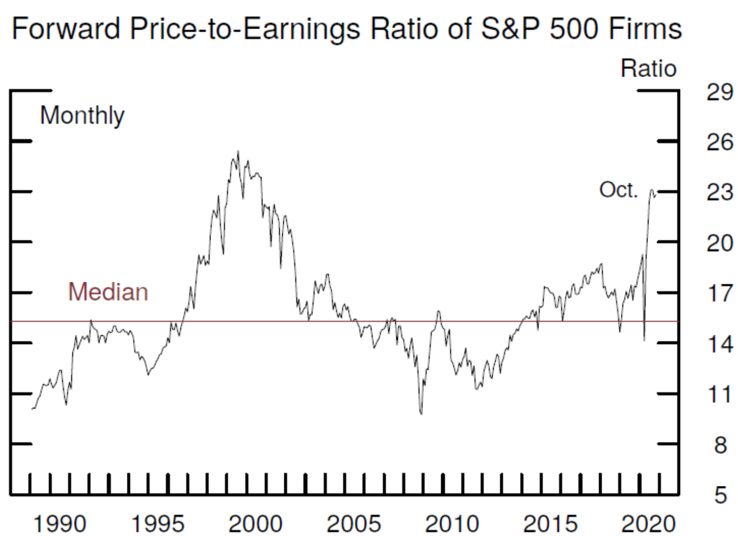
Note: Responses are to the following question: "Over the next 12-18 months, which shocks, if realized, do you think would have the greatest negative effect on the functioning of the U.S. financial system?"

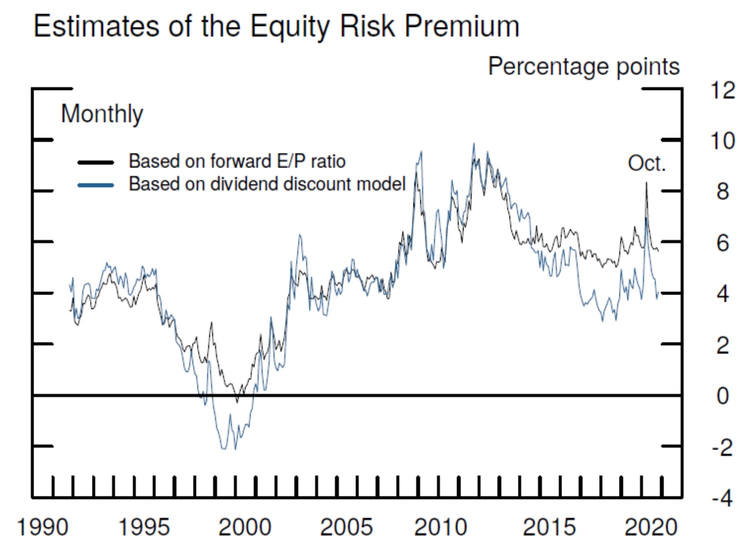
Asset valuations

Accounting for low interest rates, valuations appear moderate, but prices remain vulnerable to significant declines

Equity valuations

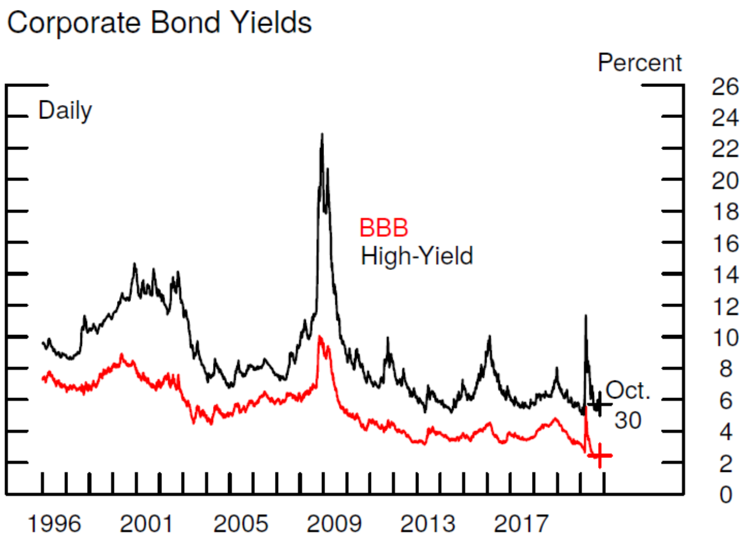
- Despite volatility, equity prices relative to earnings are near historic highs
- Measures of the compensation for risk lie in the broad middle of their typical range

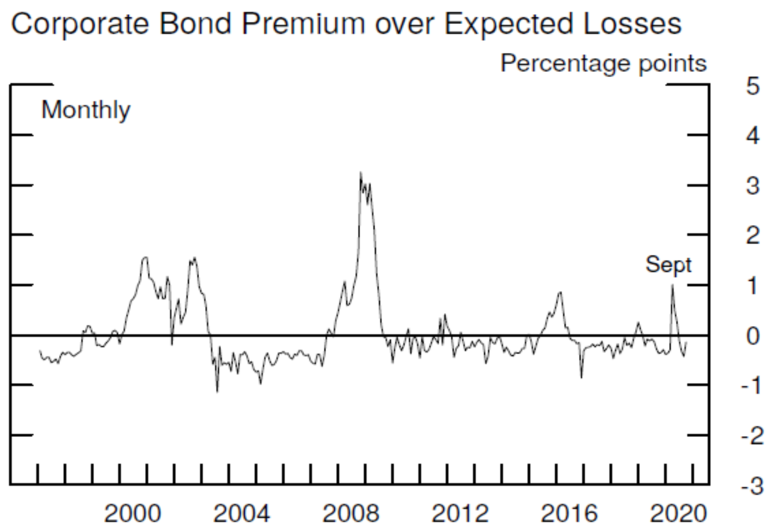




Corporate debt markets

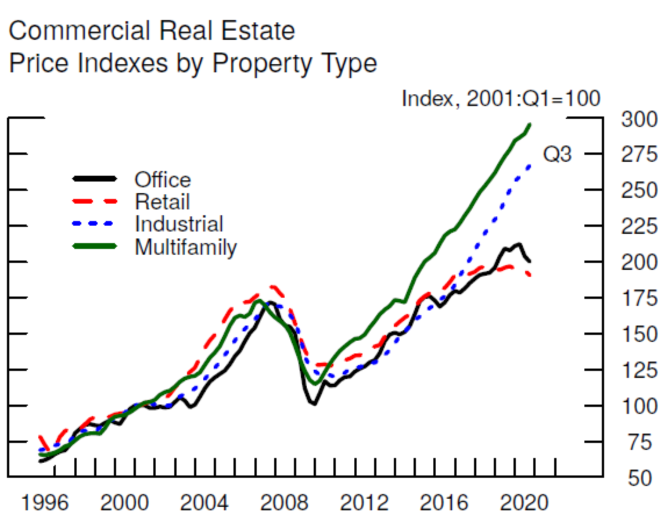
- As with equities
  - Bond prices are high and yields are low, reflecting the low level of Treasury yields
  - Compensation for risk is within typical ranges

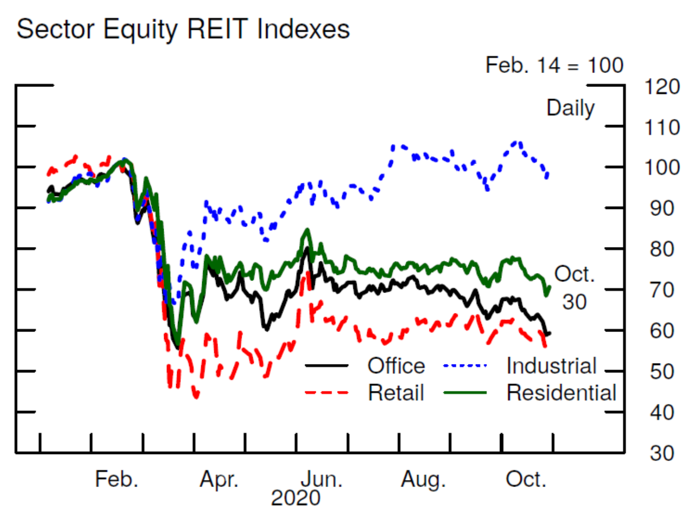




Commercial real estate

- To date, commercial real estate price indexes have started to decline in some sectors
- Market conditions point to risk of declines, especially in severely impacted sectors
- Some financial institutions may have sizable exposures to CRE





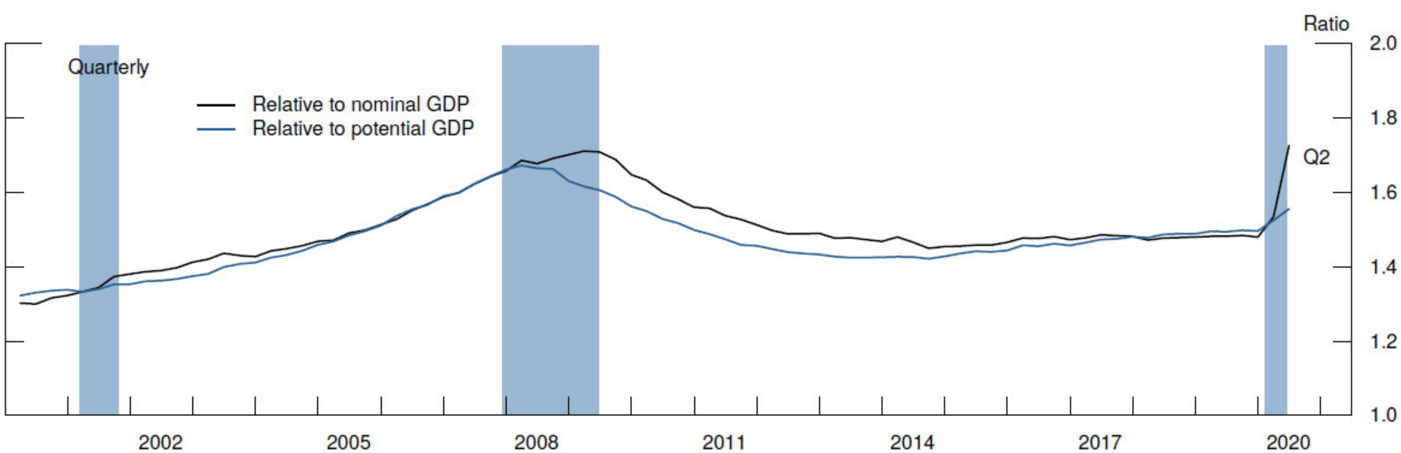
Household and business borrowing

Historically high levels of business debt and the weakening in household finances could pose a significant medium-run vulnerability for the financial system

Total nonfinancial credit

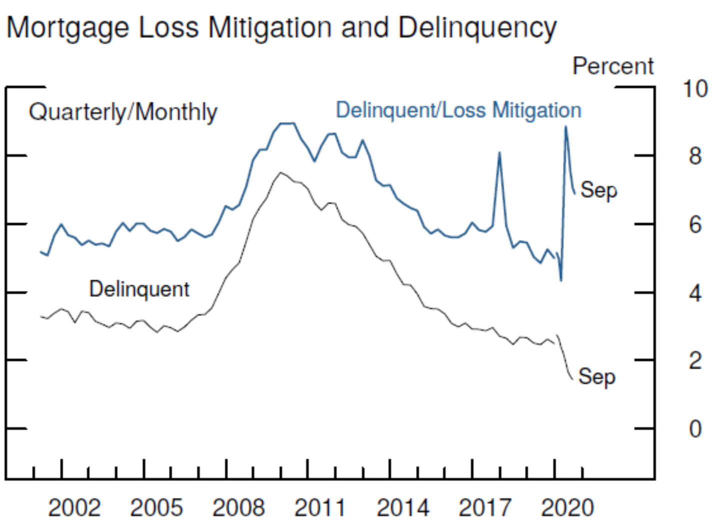
- Total nonfinancial credit relative to GDP jumped during the first half of the year, reflecting increased borrowing and, to a larger extent, the drop in nominal GDP
- Policies that support the rapid return of income to potential are among the most important steps that can be taken to ameliorate vulnerabilities associated with private-sector debt

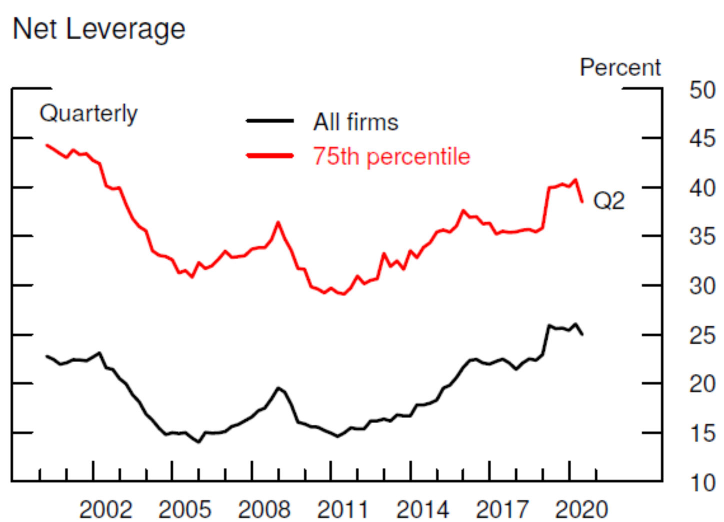
Nonfinancial Credit-to-GDP Ratios



Debt may weigh on households and businesses

- Household finances may become increasingly strained
- Business debt levels were high prior to the COVID



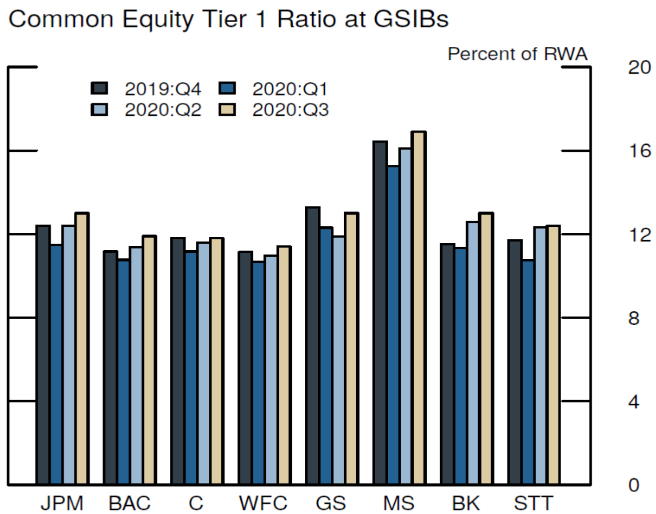


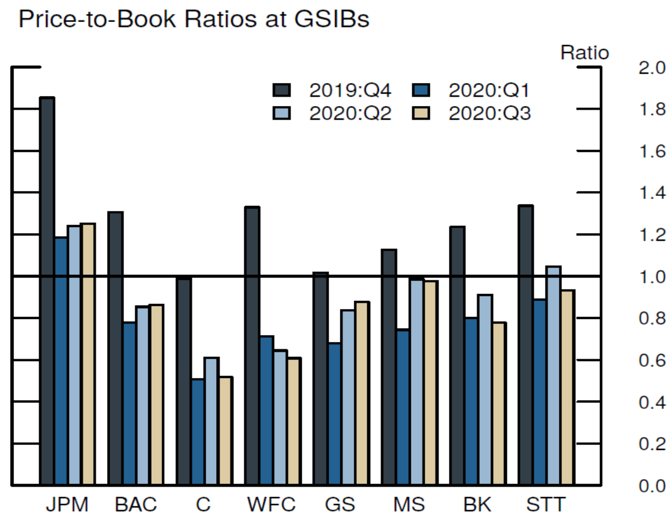
Financial leverage

Solvency concerns have not emerged for key financial institutions, but the pandemic will likely weaken balance sheets

Banks

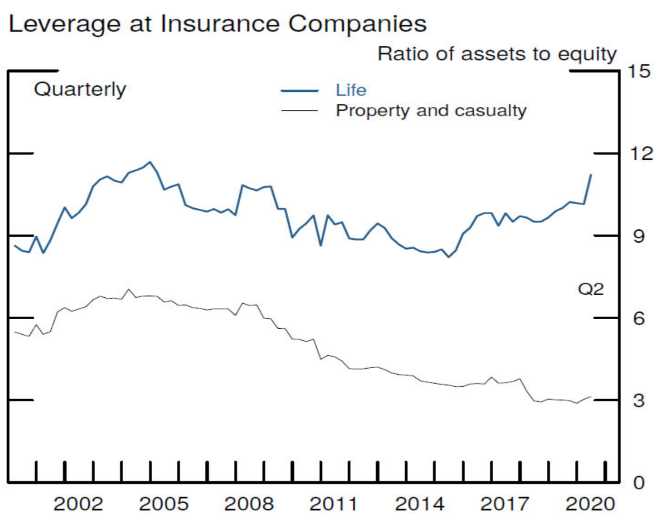
- Banks had substantial loss absorbing capacity prior to COVID, and generally remain resilient
- Price-to-book ratios point to investor concerns about a worsening in banks' medium-term prospects since COVID

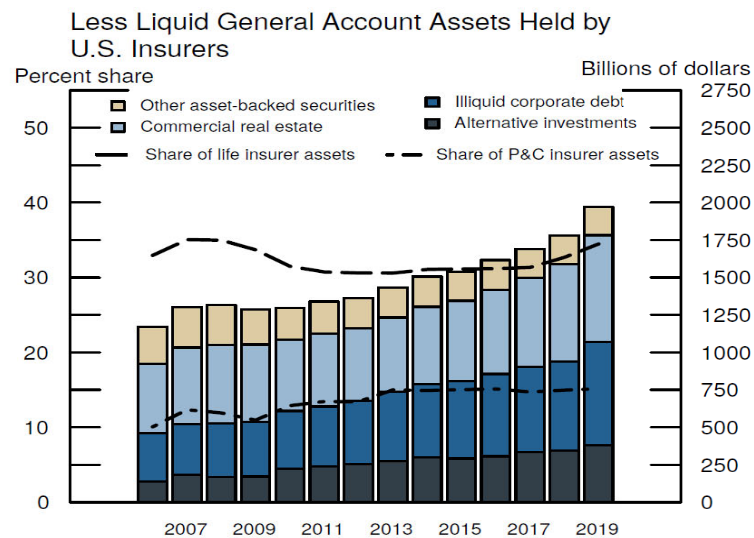




Nonbanks

- Nonbank financial intermediaries amplified the turmoil earlier this year; much of this reflected funding and liquidity pressures
- Life insurers are relatively highly levered, and hold a substantial quantity of illiquid and risky corporate and CRE debt



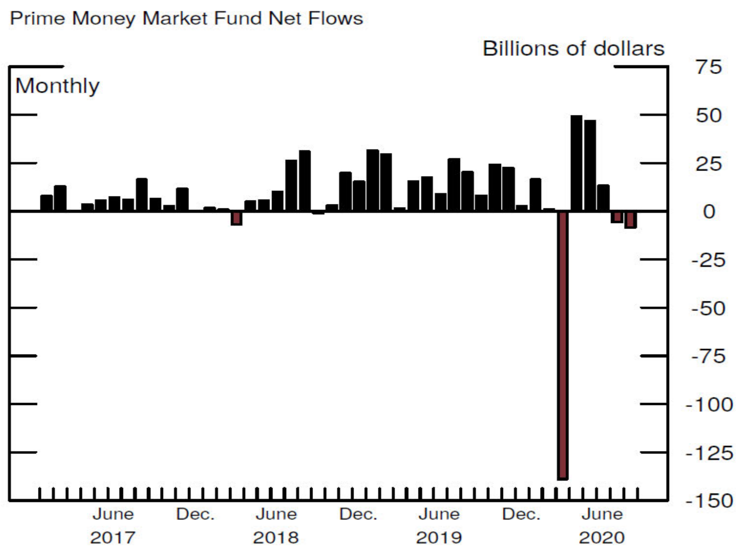


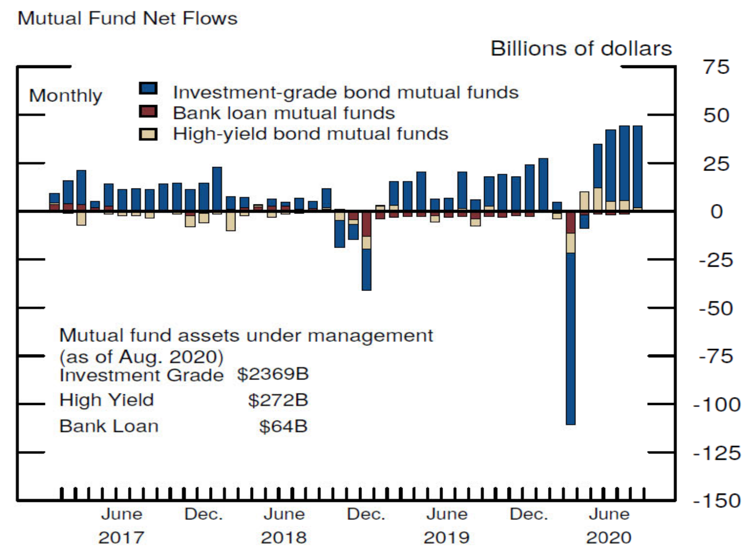
Funding risk

Structural vulnerabilities in markets for short-term funding and corporate bonds remain

Money-market and mutual fund flows

- Emergency facilities were critical in restoring functioning and remain as backstops
- The susceptibility of MMMFs to runs and liquidity mismatch at investment funds may require structural reforms





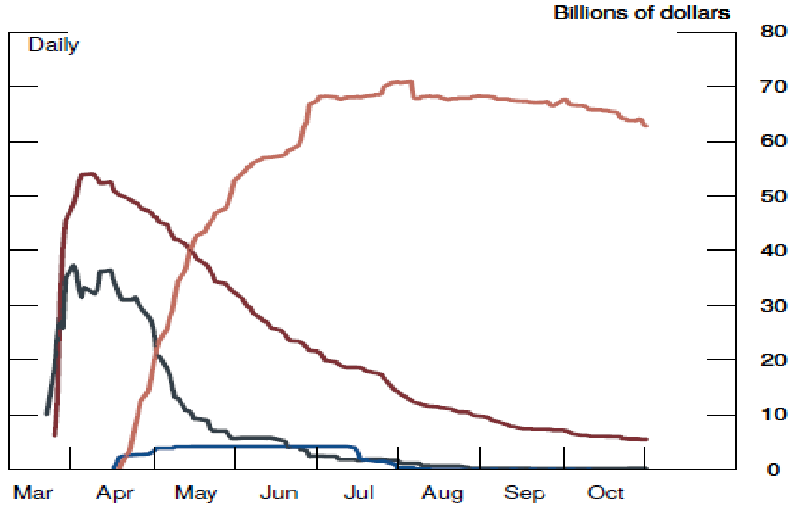
Takeaways

- High asset prices could fall sharply if adverse shocks are realized
- Vulnerabilities in CRE and business debt are high
- The resilience of the financial sector—including the banks—has arguably taken a hit and will be watched carefully
- And structural vulnerabilities related to short-term funding and liquidity transformation remain, although emergency facilities likely limit near-term risks

Appendix

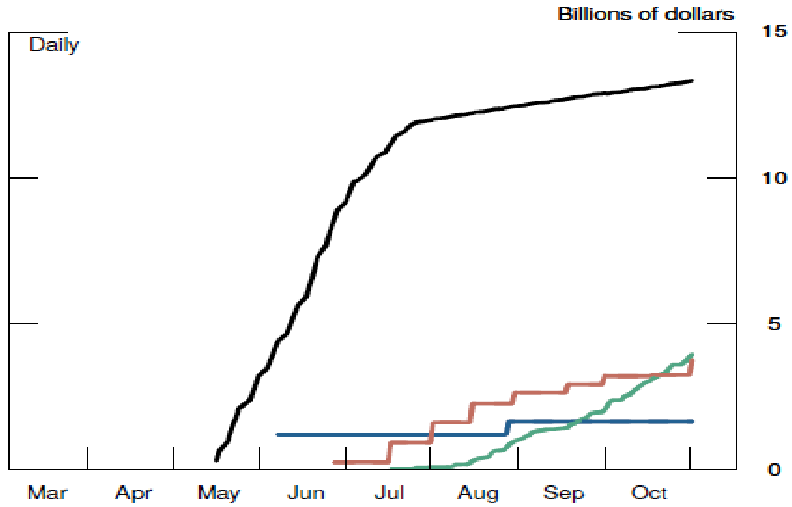
Appendix

13(3) facilities that commenced before May



- Money Market Mutual Fund Liquidity Facility
- Primary Dealer Credit Facility
- Commercial Paper Funding Facility
- Paycheck Protection Program Liquidity Facility

13(3) facilities that commenced in May or later



- Municipal Liquidity Facility
- Main Street Lending Program
- Secondary Market Corporate Credit Facility
- Term Asset-Backed Securities Loan Facility

Appendix

Panels from Slide 4

- *Forward Price-to-Earnings Ratio of S&P 500 Firms: Note: Aggregate forward price-to-earnings ratio of S&P 500 firms. Based on expected earnings for 12 months ahead* (Source: Federal Reserve Board staff calculations using Refinitiv (formerly Thomson Reuters), Institutional Brokers Estimate System Estimates).

- *Estimates of the Equity Risk Premium: Aggregate forward earnings-to-price ratio of S&P 500 firms. Based on expected earnings for 12 months ahead. Real Treasury yields are calculated from the 10-year consumer price index inflation forecast and the smoothed nominal yield curve estimated from off-the-run securities. Based on a dividend model and staff projections.* (Source: Federal Reserve Board staff calculations using Refinitiv (formerly Thomson Reuters), Institutional Brokers Estimate System Estimates; Department of the Treasury; Federal Reserve Bank of Philadelphia, Survey of Professional Forecasters).

Panels from Slide 5

- *Corporate Bond Yields: The triple-B series reflects the effective yield of the ICE BofAML triple-B U.S. Corporate Index (C0A4), and the high-yield series reflects the effective yield of the ICE BofAML U.S. High Yield Index (H0A0)* (Source: ICE Data Indices, LLC).

Appendix

- *Corporate Bond Premium over Expected Losses:* (Source: Federal Reserve Board staff calculations based on Lehman Brothers Fixed Income Database (Warga); Intercontinental Exchange, Inc., ICE Data Services; Center for Research in Security Prices, CRSP/Compustat Merged Database, Wharton Research Data Services; S&P Global Market Intelligence, Compustat).

Panels from Slide 6

- *Commercial Real Estate Price Indexes by Property Type:* (Source: Costar).
- *Sector Equity REIT Indexes:* (Source: Bloomberg).

Panels from Slide 8

- *Nonfinancial Credit-to-GDP Ratios: (*Source: Federal Reserve Board staff calculations based on Bureau of Economic Analysis, national income and product accounts, and Federal Reserve Board, Statistical Release Z.1, "Financial Accounts of the United States", Congressional Budget Office.)

Appendix

Panels from Slide 9

- *Mortgage Loss Mitigation and Delinquency: Loss mitigation includes tradelines that have a narrative code of forbearance, or natural disaster, payment deferral (including partial), and loan modification (including federal government plans), as well as loans with zero scheduled payment and a non-zero balance. Delinquent includes loans reported to the credit bureau as 30 or more days delinquent* (Source: FRBNY CCP/Equifax).

  Net Leverage: Net leverage is the ratio of the book value of total debt minus cash and cash equivalents to the book value of total assets. 75th percentile is calculated from subset of 2500 largest firms, by assets (Source: Compustat).

Panels from Slide 11

- *Common Equity Tier 1 Ratio at GSIBs:* (Source: FR-Y9C, Bank Earnings Call Transcripts).
- *Price-to-Book Ratios at GSIBs:* (Source: S&P Global Market Intelligence).

Appendix

Panels from Slide 12

- *Leverage at Insurance Companies: Ratio is calculated as (total assets - separate account assets)/(total capital - accumulated other comprehensive income) using generally accepted accounting principles. The largest 10 publicly traded life and property and casualty insurers are represented* (Source: S&P Global Market Intelligence, regulatory filing of large insurance groups).

- *Less Liquid General Account Assets Held by U.S. Insurers: Securitized products include collateralized loan obligations for corporate debt, private label commercial mortgage-backed securities for commercial real estate, and private label residential mortgage-backed securities and asset-backed securities backed by autos, credit cards, consumer loans, and student loans for other asset-backed securities. Illiquid corporate debt includes private placements, bank/syndicated loans, and high yield bonds. Alternative investments include assets filed under Schedule BA. P&C is property and casualty* (Source: Staff estimates based on data from Bloomberg Finance LP and NAIC Annual Statutory Filings).

Panels from Slide 14

- *Prime Money Market Fund Net Flows:* (Source: Investment Company Institute).

- *Mutual Fund Net Flows:* (Source: Investment Company Institute).

Appendix

Panels from Slide 17

- *13(3) facilities that commenced before May:* (Source: Federal Reserve Board).
- *13(3) facilities that commenced in May or later:* (Source: Federal Reserve Board).

Appendix 6: Materials used by Ms. Meade

Class I FOMC – Restricted Controlled (FR)

Material for Briefing on

Recommended Changes to the Summary of Economic Projections

Ellen E. Meade
Exhibits by Erik Larsson and Isaiah Ahn
November 4, 2020

Summary of Economic Projections

In conjunction with the Federal Open Market Committee (FOMC) meeting held on December 15–16, 2020, meeting participants submitted their projections of the most likely outcomes for real gross domestic product (GDP) growth, the unemployment rate, and inflation for each year from 2020 to 2023 and over the longer run. Each participant's projections were based on information available at the time of the meeting, together with her or his assessment of appropriate monetary policy—including a path for the federal funds rate and its longer-run value—and assumptions about other factors likely to affect economic outcomes. The longer-run projections represent each participant's assessment of the value to which each variable would be expected to converge, over time, under appropriate monetary policy and in the absence of further shocks to the economy. "Appropriate monetary policy" is defined as the future path of policy that each participant deems most likely to foster outcomes for economic activity and inflation that best satisfy his or her individual interpretation of the statutory mandate to promote maximum employment and price stability.

Beginning with the December 2020 FOMC meeting, all Summary of Economic Projections charts and tables previously released with the minutes of a meeting will be released following the conclusion of an FOMC meeting. That is, the release of the distribution of participants' projections (Figures 3.A. through 3.E.), participants' assessments of uncertainty and risks associated with the projections (Figures 4.A. though 4.C. and Figure 5), and Table 2 and associated box, which describe projection error ranges, have been accelerated by three weeks. Two new exhibits, Figures 4.D. and 4.E., have been added to further enhance the information provided on uncertainty and risks by showing how FOMC participants' assessments of uncertainties and risks have evolved over time.

Table 1. Economic projections of Federal Reserve Board members and Federal Reserve Bank presidents, under their individual assumptions of projected appropriate monetary policy, September 2020

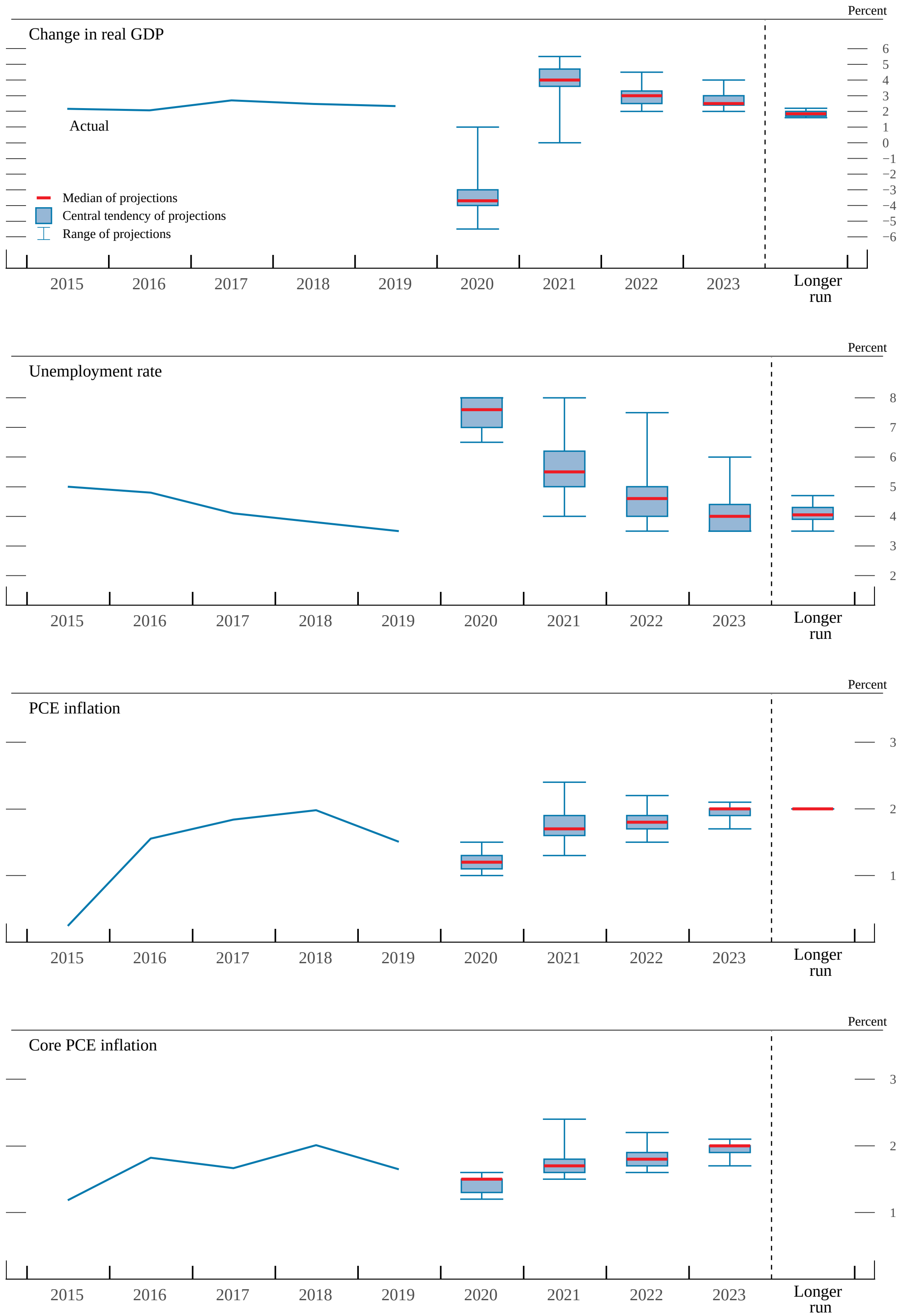
Percent

Variable	Median[1]					Central Tendency[2]					Range[3]				
	2020	2021	2022	2023	Longer run	2020	2021	2022	2023	Longer run	2020	2021	2022	2023	Longer run
Change in real GDP	-3.7	4.0	3.0	2.5	1.9	-4.0–-3.0	3.6–4.7	2.5–3.3	2.4–3.0	1.7–2.0	-5.5–1.0	0.0–5.5	2.0–4.5	2.0–4.0	1.6–2.2
June projection	-6.5	5.0	3.5		1.8	-7.6–-5.5	4.5–6.0	3.0–4.5		1.7–2.0	-10.0–-4.2	-1.0–7.0	2.0–6.0		1.6–2.2
Unemployment rate	7.6	5.5	4.6	4.0	4.1	7.0–8.0	5.0–6.2	4.0–5.0	3.5–4.4	3.9–4.3	6.5–8.0	4.0–8.0	3.5–7.5	3.5–6.0	3.5–4.7
June projection	9.3	6.5	5.5		4.1	9.0–10.0	5.9–7.5	4.8–6.1		4.0–4.3	7.0–14.0	4.5–12.0	4.0–8.0		3.5–4.7
PCE inflation	1.2	1.7	1.8	2.0	2.0	1.1–1.3	1.6–1.9	1.7–1.9	1.9–2.0	2.0	1.0–1.5	1.3–2.4	1.5–2.2	1.7–2.1	2.0
June projection	0.8	1.6	1.7		2.0	0.6–1.0	1.4–1.7	1.6–1.8		2.0	0.5–1.2	1.1–2.0	1.4–2.2		2.0
Core PCE inflation[4]	1.5	1.7	1.8	2.0		1.3–1.5	1.6–1.8	1.7–1.9	1.9–2.0		1.2–1.6	1.5–2.4	1.6–2.2	1.7–2.1	
June projection	1.0	1.5	1.7			0.9–1.1	1.4–1.7	1.6–1.8			0.7–1.3	1.2–2.0	1.2–2.2		
Memo: Projected appropriate policy path															
Federal funds rate	0.1	0.1	0.1	0.1	2.5	0.1	0.1	0.1	0.1–0.4	2.3–2.5	0.1	0.1	0.1–0.6	0.1–1.4	2.0–3.0
June projection	0.1	0.1	0.1		2.5	0.1	0.1	0.1		2.3–2.5	0.1	0.1	0.1–1.1		2.0–3.0

NOTE: Projections of change in real gross domestic product (GDP) and projections for both measures of inflation are percent changes from the fourth quarter of the previous year to the fourth quarter of the year indicated. PCE inflation and core PCE inflation are the percentage rates of change in, respectively, the price index for personal consumption expenditures (PCE) and the price index for PCE excluding food and energy. Projections for the unemployment rate are for the average civilian unemployment rate in the fourth quarter of the year indicated. Each participant's projections are based on his or her assessment of appropriate monetary policy. Longer-run projections represent each participant's assessment of the rate to which each variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy. The projections for the federal funds rate are the value of the midpoint of the projected appropriate target range for the federal funds rate or the projected appropriate target level for the federal funds rate at the end of the specified calendar year or over the longer run. The June projections were made in conjunction with the meeting of the Federal Open Market Committee on June 9–10, 2020. One participant did not submit longer-run projections for the change in real GDP, the unemployment rate, or the federal funds rate in conjunction with the June 9–10, 2020, meeting, and one participant did not submit such projections in conjunction with the September 15–16, 2020, meeting.

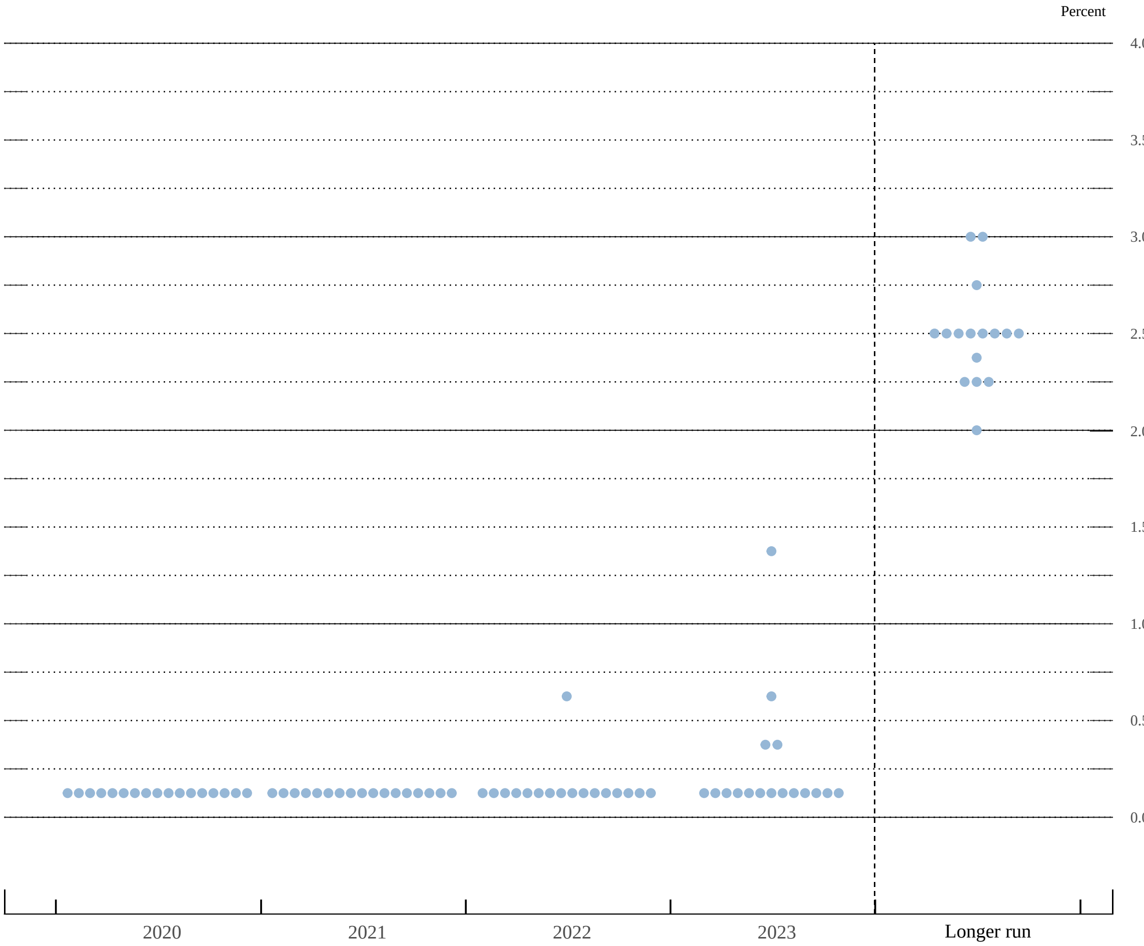
1. For each period, the median is the middle projection when the projections are arranged from lowest to highest. When the number of projections is even, the median is the average of the two middle projections.
2. The central tendency excludes the three highest and three lowest projections for each variable in each year.
3. The range for a variable in a given year includes all participants' projections, from lowest to highest, for that variable in that year.
4. Longer-run projections for core PCE inflation are not collected.

Figure 1. Medians, central tendencies, and ranges of economic projections, 2020–23 and over the longer run



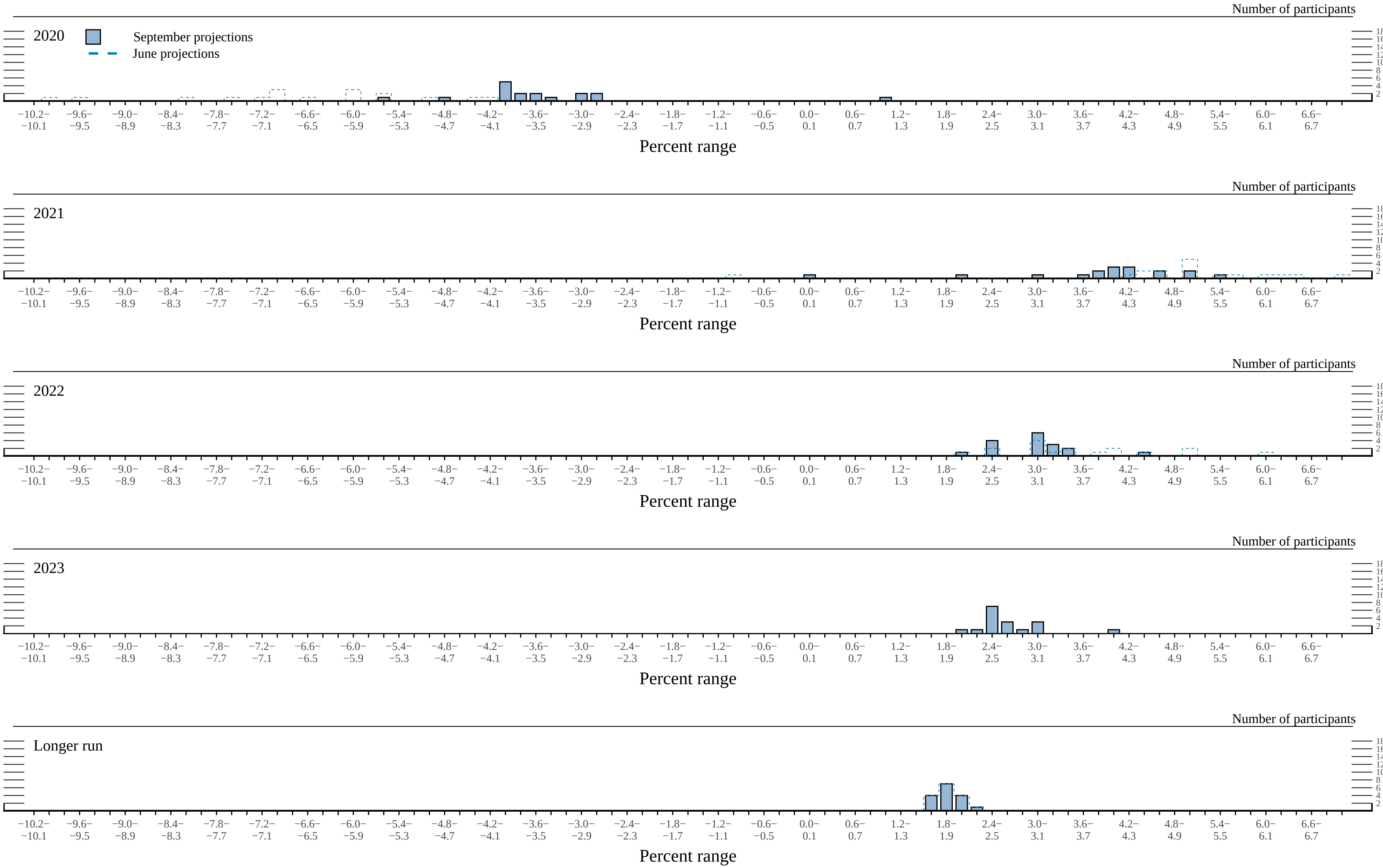
Note: Definitions of variables and other explanations are in the notes to table 1. The data for the actual values of the variables are annual.

Figure 2. FOMC participants' assessments of appropriate monetary policy: Midpoint of target range or target level for the federal funds rate



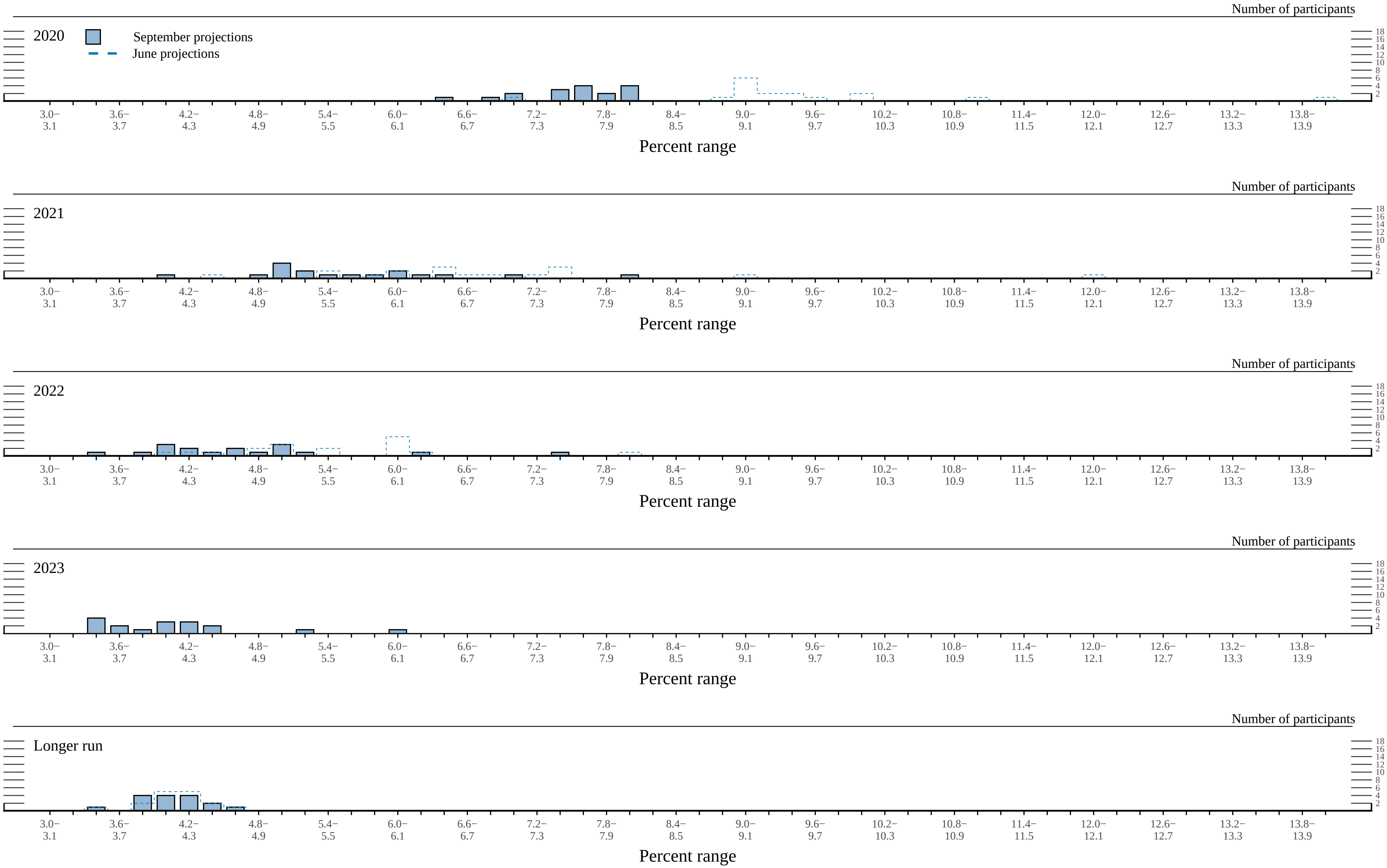
NOTE: Each shaded circle indicates the value (rounded to the nearest 1/8 percentage point) of an individual participant's judgment of the midpoint of the appropriate target range for the federal funds rate or the appropriate target level for the federal funds rate at the end of the specified calendar year or over the longer run. One participant did not submit longer-run projections for the federal funds rate.

Figure 3.A. Distribution of participants' projections for the change in real GDP, 2020–23 and over the longer run



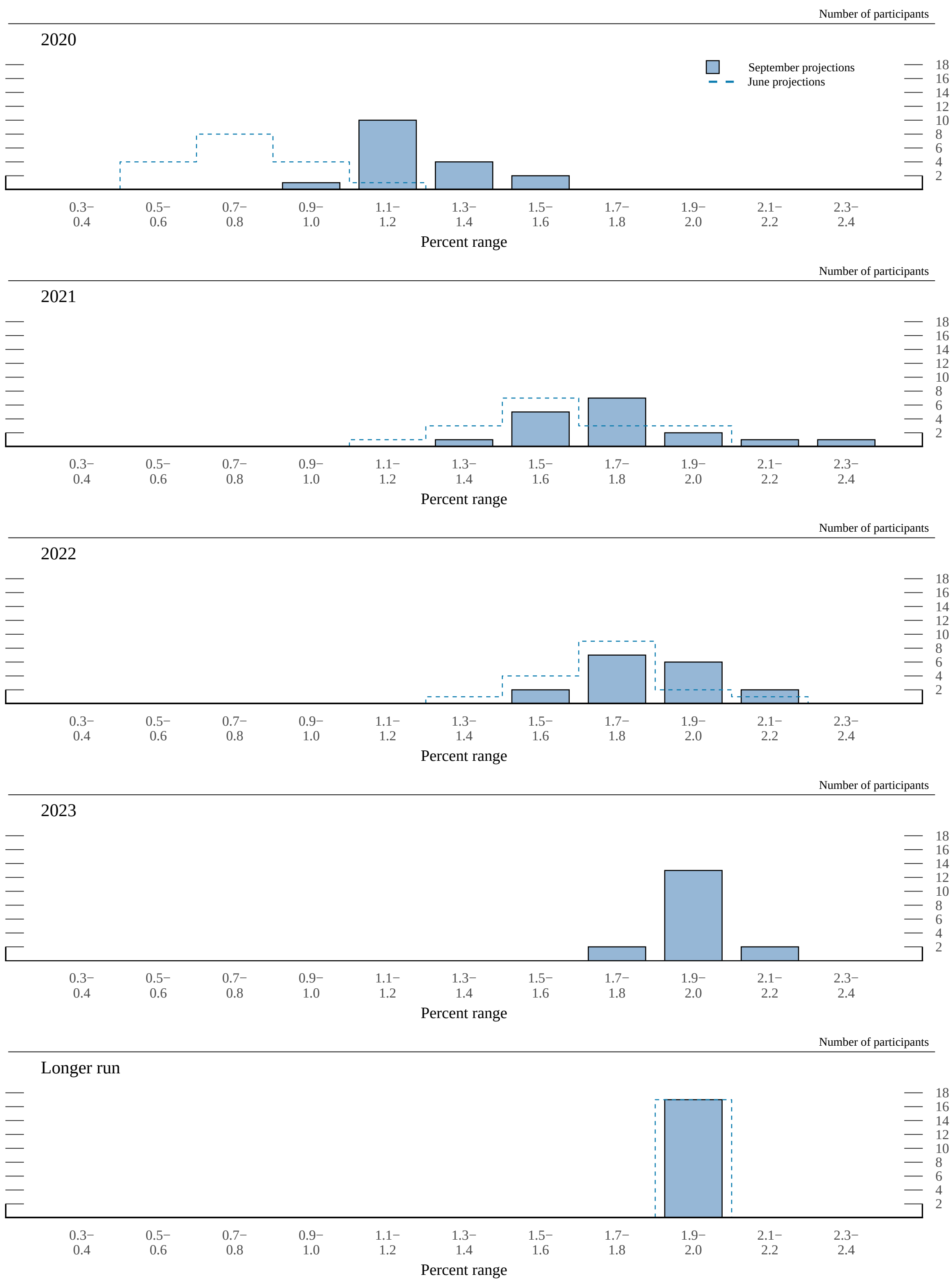
Note: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.B. Distribution of participants' projections for the unemployment rate, 2020–23 and over the longer run



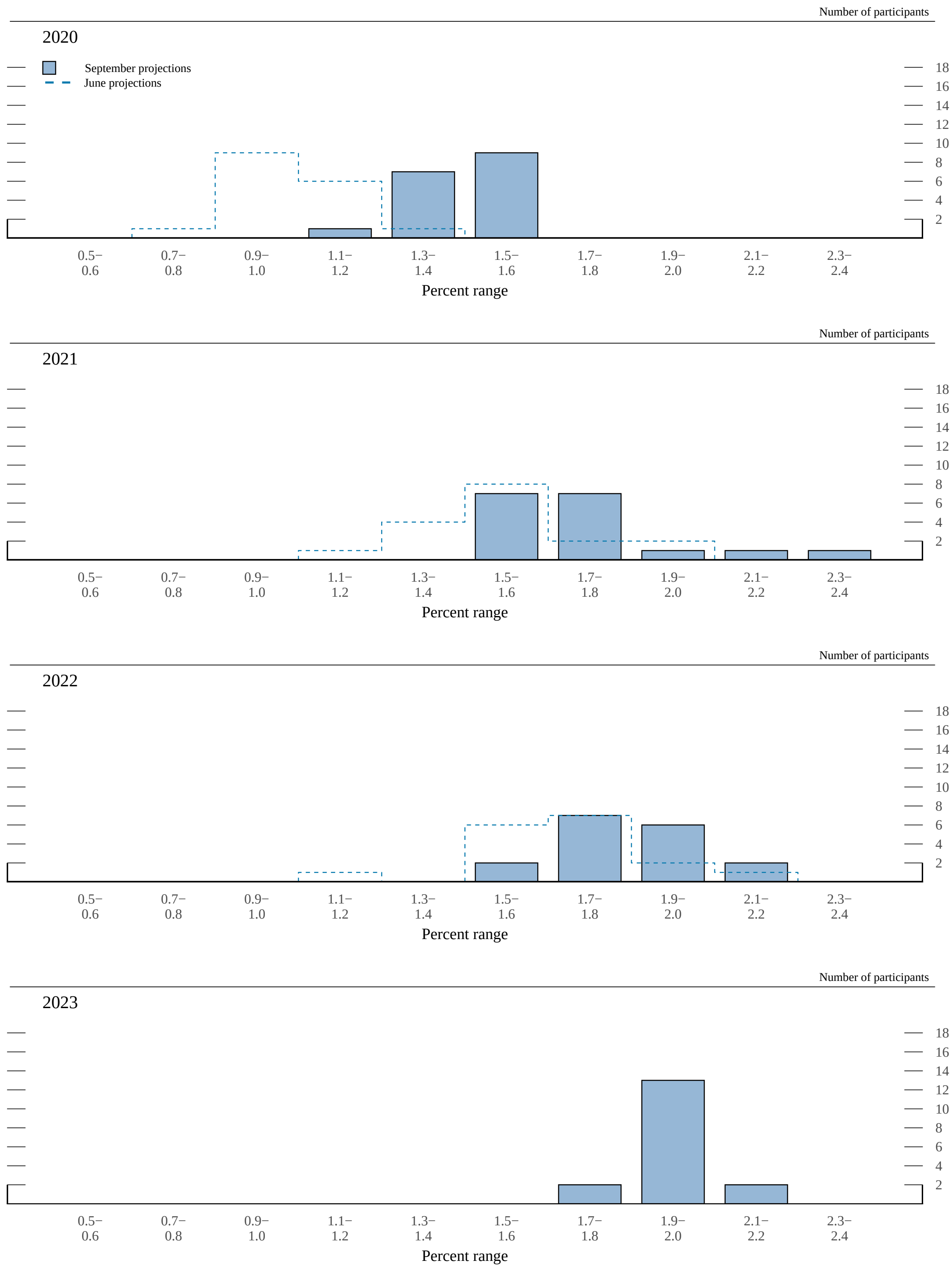
Note: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.C. Distribution of participants' projections for PCE inflation, 2020–23 and over the longer run



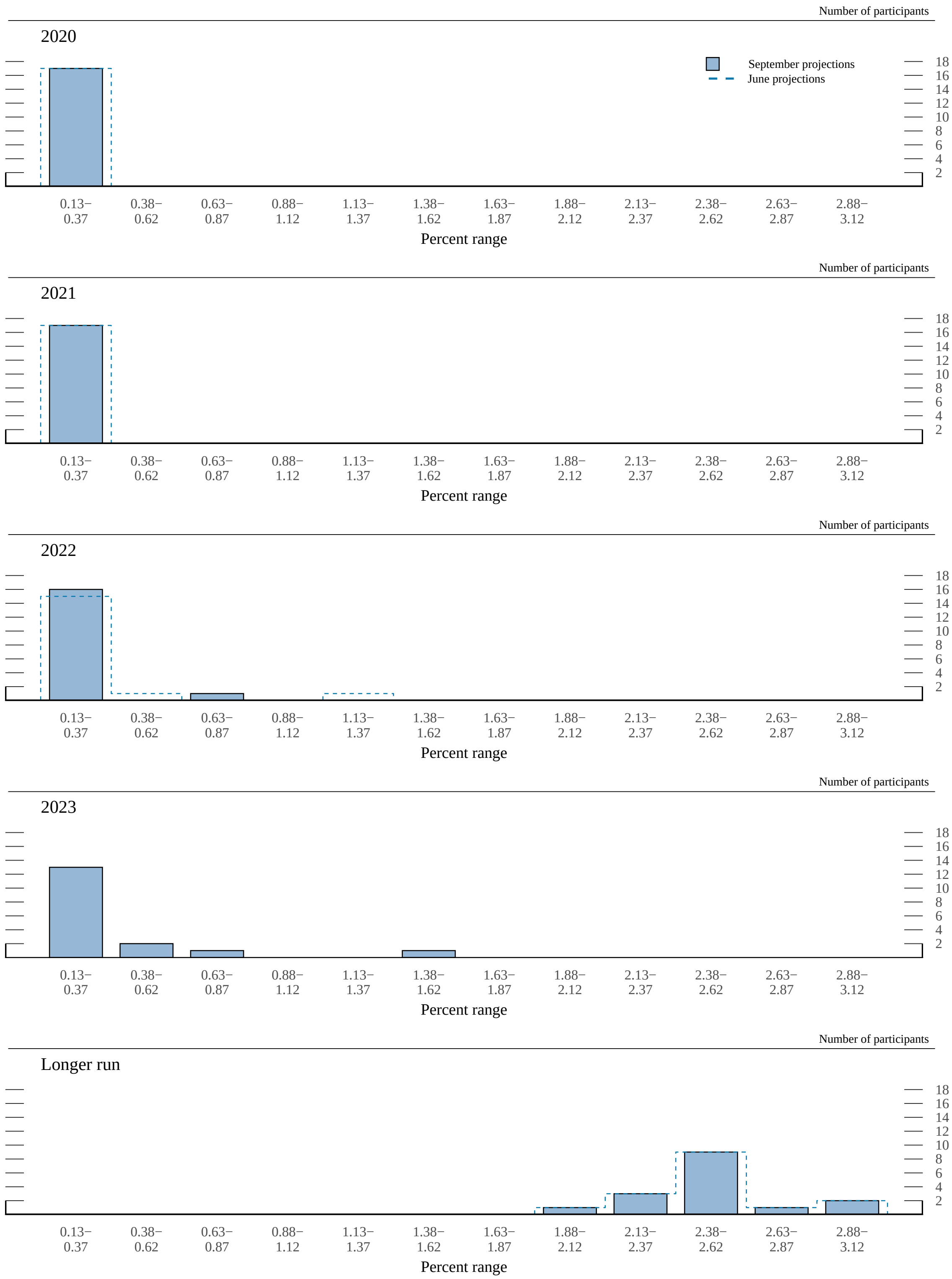
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 3.D. Distribution of participants' projections for core PCE inflation, 2020–23



NOTE: Definitions of variables and other explanations are in the notes to table 1.

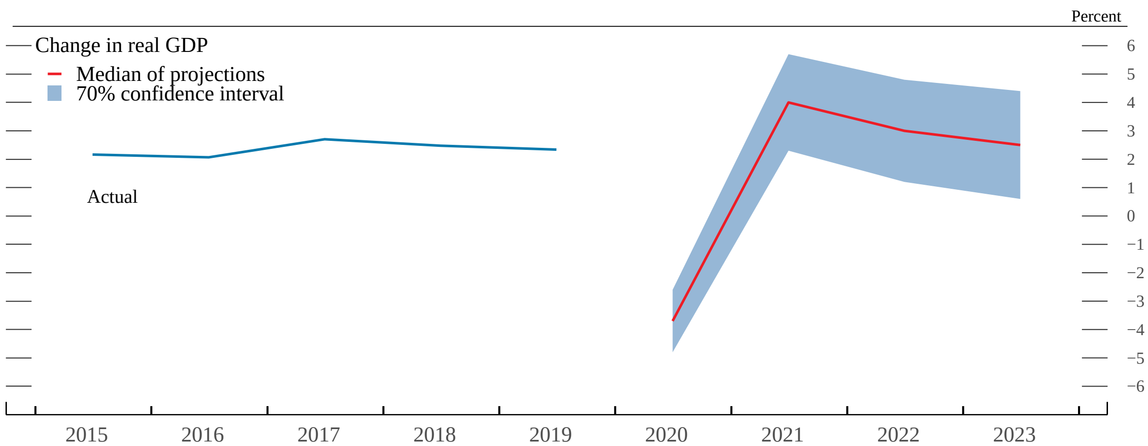
Figure 3.E. Distribution of participants' judgments of the midpoint of the appropriate target range for the federal funds rate or the appropriate target level for the federal funds rate, 2020–23 and over the longer run



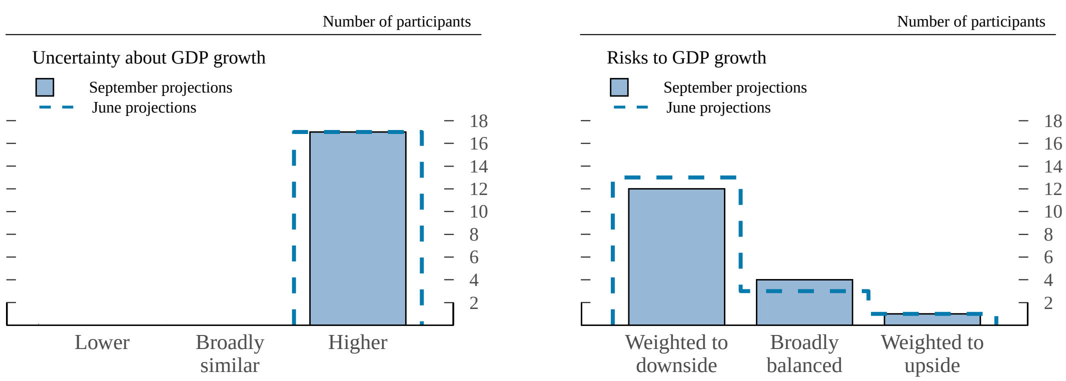
NOTE: Definitions of variables and other explanations are in the notes to table 1.

Figure 4.A. Uncertainty and risks in projections of GDP growth

Median projection and confidence interval based on historical forecast errors

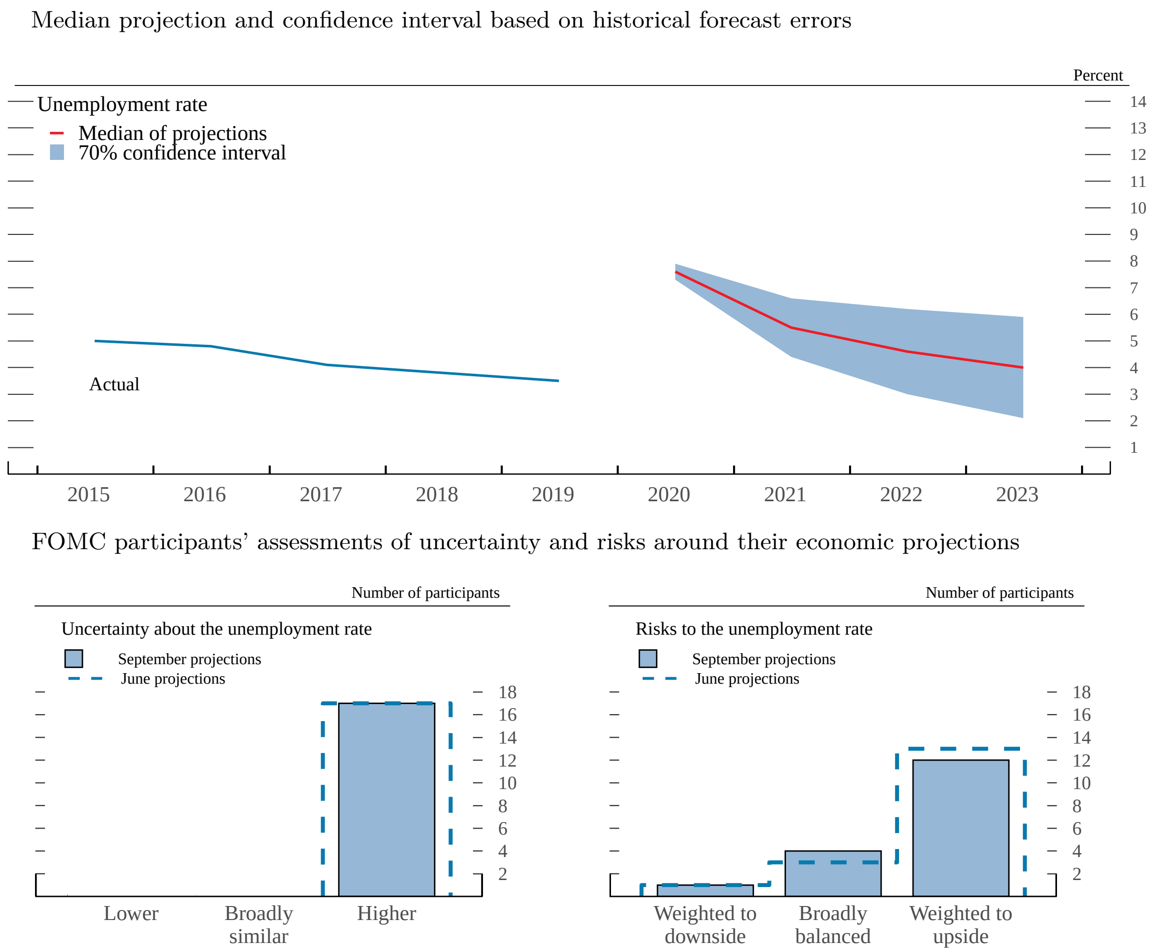


FOMC participants' assessments of uncertainty and risks around their economic projections



Note: The blue and red lines in the top panel show actual values and median projected values, respectively, of the percent change in real gross domestic product (GDP) from the fourth quarter of the previous year to the fourth quarter of the year indicated. The confidence interval around the median projected values is assumed to be symmetric and is based on root mean squared errors of various private and government forecasts made over the previous 20 years; more information about these data is available in table 2. Because current conditions may differ from those that prevailed, on average, over the previous 20 years, the width and shape of the confidence interval estimated on the basis of the historical forecast errors may not reflect FOMC participants' current assessments of the uncertainty and risks around their projections; these current assessments are summarized in the lower panels. Generally speaking, participants who judge the uncertainty about their projections as "broadly similar" to the average levels of the past 20 years would view the width of the confidence interval shown in the historical fan chart as largely consistent with their assessments of the uncertainty about their projections. Likewise, participants who judge the risks to their projections as "broadly balanced" would view the confidence interval around their projections as approximately symmetric. For definitions of uncertainty and risks in economic projections, see the box "Forecast Uncertainty."

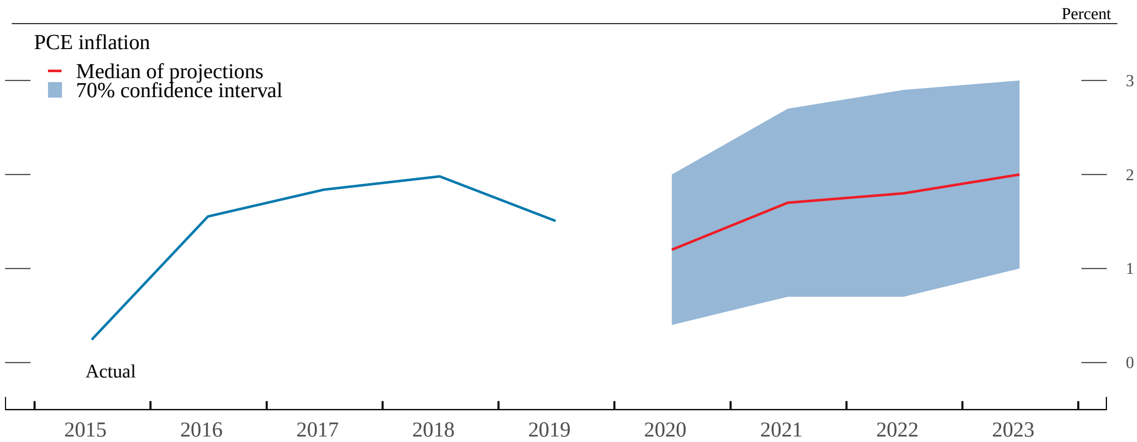
Figure 4.B. Uncertainty and risks in projections of the unemployment rate



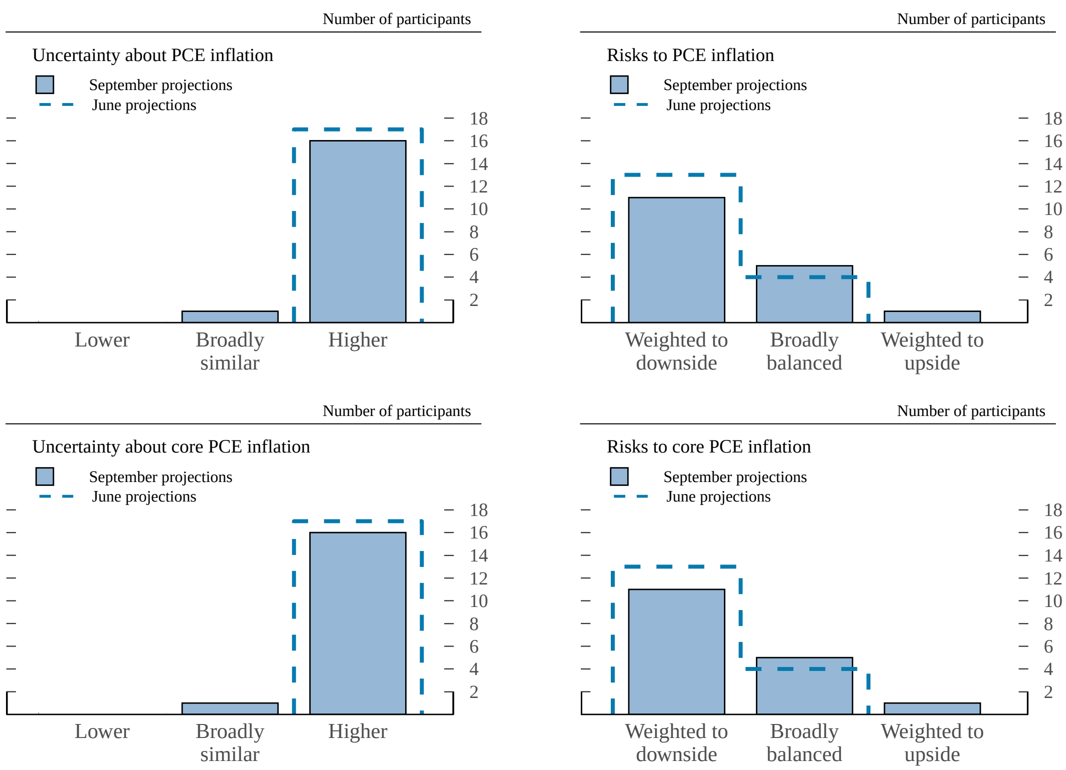
Note: The blue and red lines in the top panel show actual values and median projected values, respectively, of the average civilian unemployment rate in the fourth quarter of the year indicated. The confidence interval around the median projected values is assumed to be symmetric and is based on root mean squared errors of various private and government forecasts made over the previous 20 years; more information about these data is available in table 2. Because current conditions may differ from those that prevailed, on average, over the previous 20 years, the width and shape of the confidence interval estimated on the basis of the historical forecast errors may not reflect FOMC participants' current assessments of the uncertainty and risks around their projections; these current assessments are summarized in the lower panels. Generally speaking, participants who judge the uncertainty about their projections as "broadly similar" to the average levels of the past 20 years would view the width of the confidence interval shown in the historical fan chart as largely consistent with their assessments of the uncertainty about their projections. Likewise, participants who judge the risks to their projections as "broadly balanced" would view the confidence interval around their projections as approximately symmetric. For definitions of uncertainty and risks in economic projections, see the box "Forecast Uncertainty."

Figure 4.C. Uncertainty and risks in projections of PCE inflation

Median projection and confidence interval based on historical forecast errors

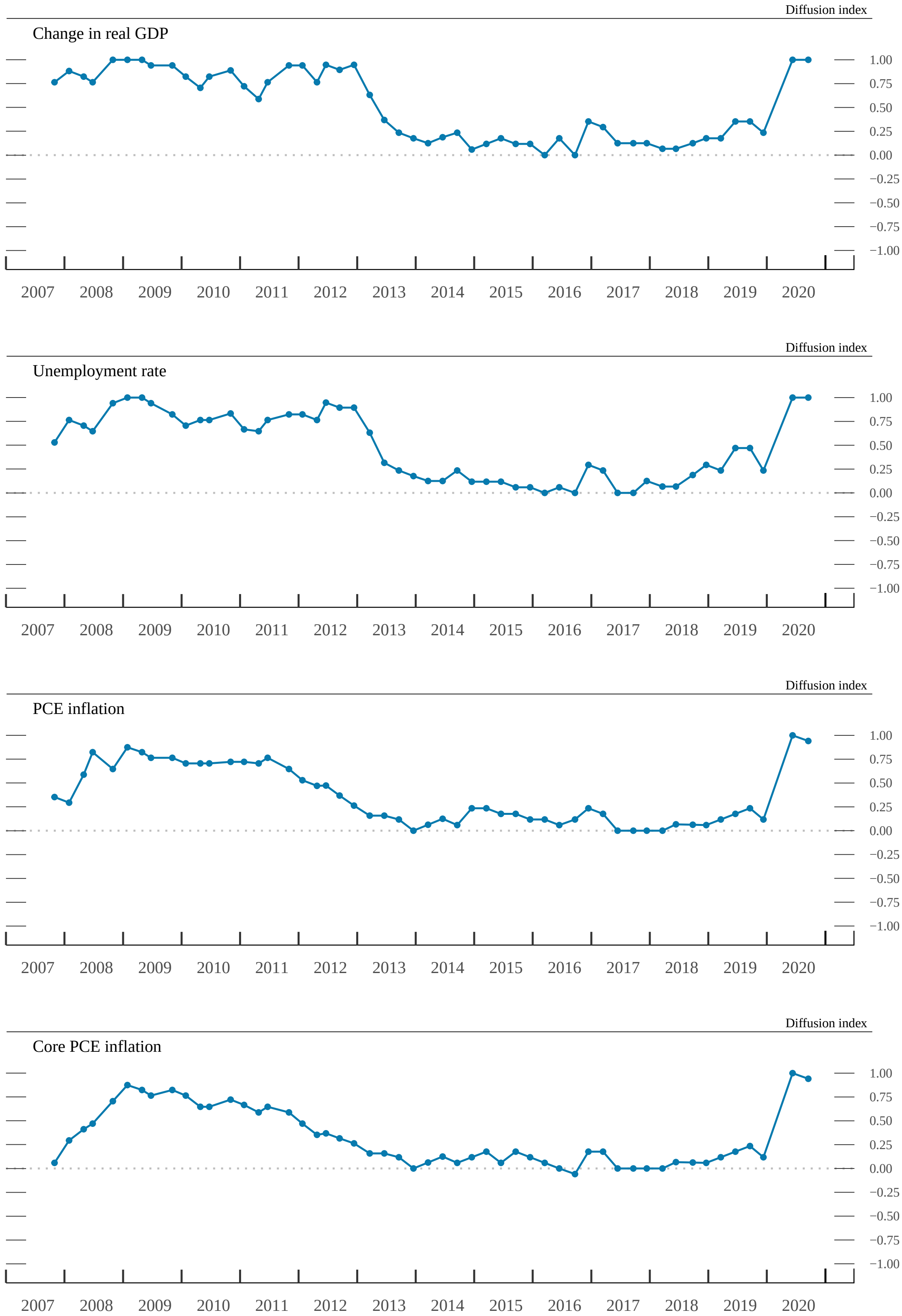


FOMC participants' assessments of uncertainty and risks around their economic projections



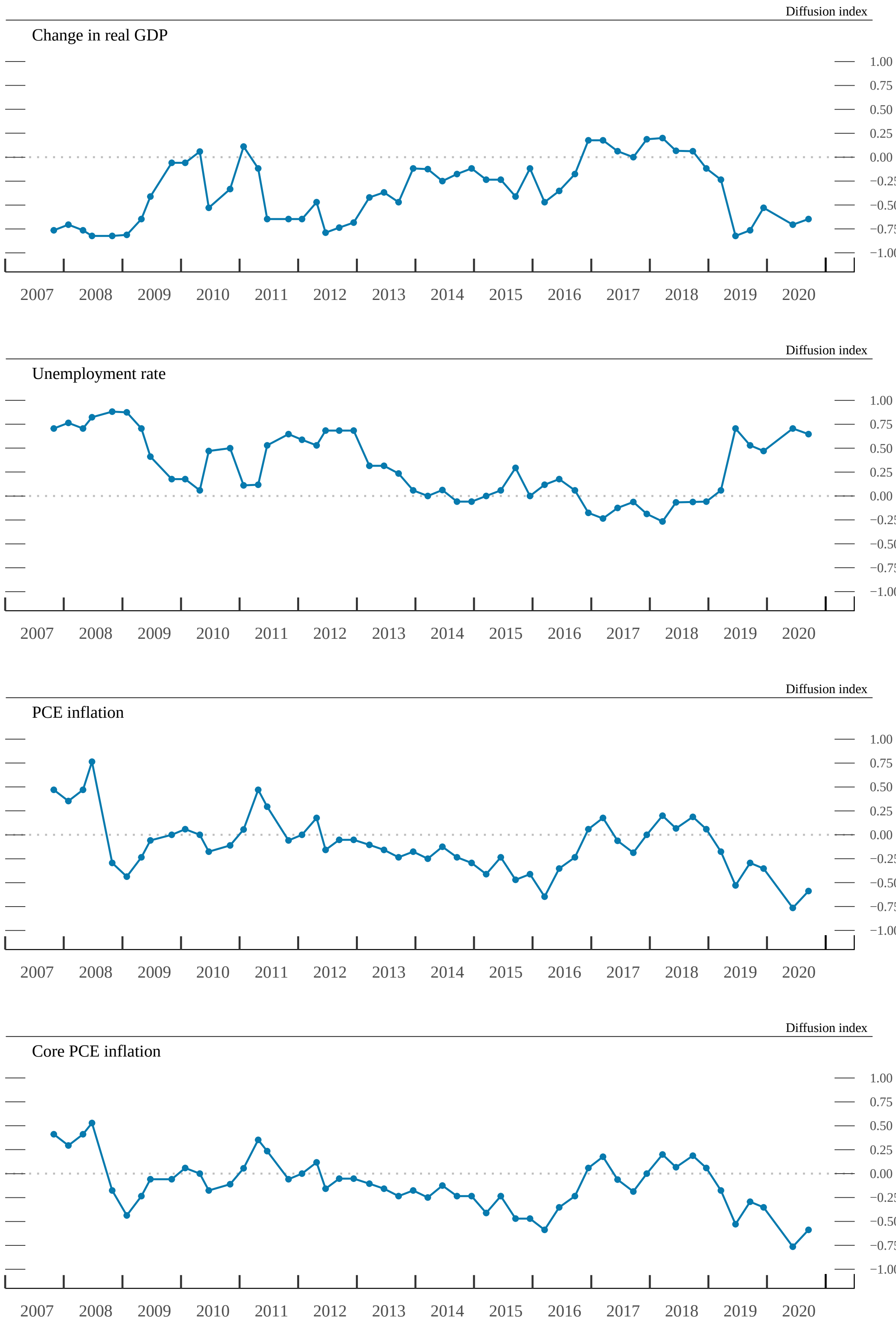
NOTE: The blue and red lines in the top panel show actual values and median projected values, respectively, of the percent change in the price index for personal consumption expenditures (PCE) from the fourth quarter of the previous year to the fourth quarter of the year indicated. The confidence interval around the median projected values is assumed to be symmetric and is based on root mean squared errors of various private and government forecasts made over the previous 20 years; more information about these data is available in table 2. Because current conditions may differ from those that prevailed, on average, over the previous 20 years, the width and shape of the confidence interval estimated on the basis of the historical forecast errors may not reflect FOMC participants' current assessments of the uncertainty and risks around their projections; these current assessments are summarized in the lower panels. Generally speaking, participants who judge the uncertainty about their projections as "broadly similar" to the average levels of the past 20 years would view the width of the confidence interval shown in the historical fan chart as largely consistent with their assessments of the uncertainty about their projections. Likewise, participants who judge the risks to their projections as "broadly balanced" would view the confidence interval around their projections as approximately symmetric. For definitions of uncertainty and risks in economic projections, see the box "Forecast Uncertainty."

Figure 4.D. Diffusion indexes of participants' uncertainty assessments



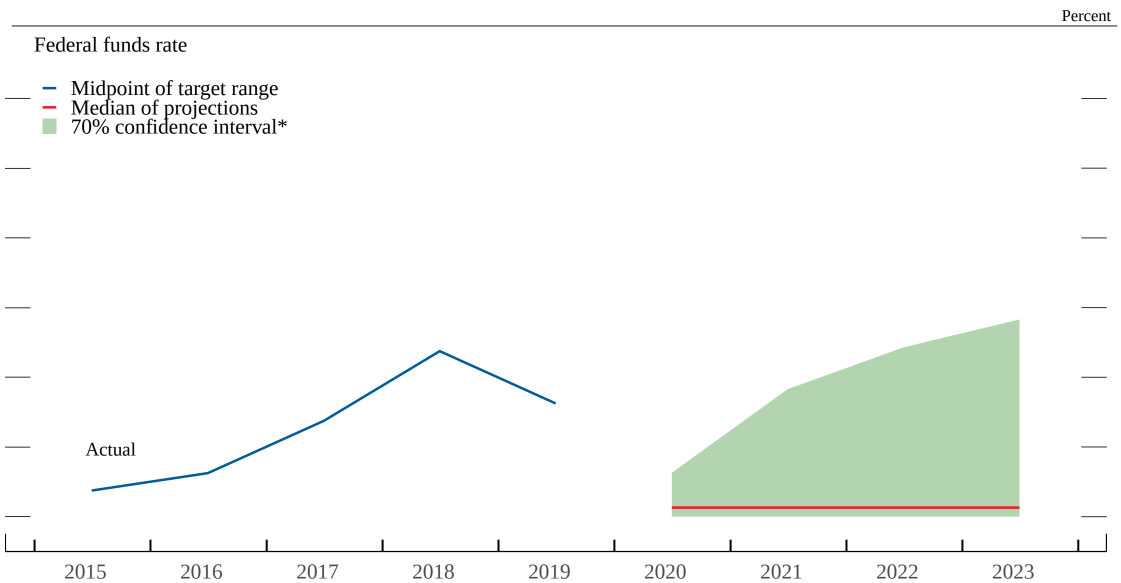
Note: Number of participants who responded "Higher" less those who responded "Lower" for the question, "Please indicate your judgment of the uncertainty attached to your projections relative to levels of uncertainty over the past 20 years," divided by the total number of participants. Figure excludes March 2020 when no projections were submitted.

Figure 4.E. Diffusion indexes of participants' risk weightings



NOTE: Each point represents the number of participants who responded "Weighted to the Upside" less those who responded "Weighted to the Downside" for the question, "Please indicate your judgment of the risk weighting around your projections," divided by the total number of participants. Figure excludes March 2020 when no projections were submitted.

Figure 5. Uncertainty and risks in projections of the federal funds rate



Note: The blue and red lines are based on actual values and median projected values, respectively, of the Committee's target for the federal funds rate at the end of the year indicated. The actual values are the midpoint of the target range; the median projected values are based on either the midpoint of the target range or the target level. The confidence interval around the median projected values is based on root mean squared errors of various private and government forecasts made over the previous 20 years. The confidence interval is not strictly consistent with the projections for the federal funds rate, primarily because these projections are not forecasts of the likeliest outcomes for the federal funds rate, but rather projections of participants' individual assessments of appropriate monetary policy. Still, historical forecast errors provide a broad sense of the uncertainty around the future path of the federal funds rate generated by the uncertainty about the macroeconomic variables as well as additional adjustments to monetary policy that may be appropriate to offset the effects of shocks to the economy.

The confidence interval is assumed to be symmetric except when it is truncated at zero - the bottom of the lowest target range for the federal funds rate that has been adopted in the past by the Committee. This truncation would not be intended to indicate the likelihood of the use of negative interest rates to provide additional monetary policy accommodation if doing so was judged appropriate. In such situations, the Committee could also employ other tools, including forward guidance and large-scale asset purchases, to provide additional accommodation. Because current conditions may differ from those that prevailed, on average, over the previous 20 years, the width and shape of the confidence interval estimated on the basis of the historical forecast errors may not reflect FOMC participants' current assessments of the uncertainty and risks around their projections.

* The confidence interval is derived from forecasts of the average level of short-term interest rates in the fourth quarter of the year indicated; more information about these data is available in table 2. The shaded area encompasses less than a 70 percent confidence interval if the confidence interval has been truncated at zero.

Table 2. Average historical projection error ranges
Percentage points

Variable	2020	2021	2022	2023
Change in real GDP[1]	±1.1	±1.7	±1.8	±1.9
Unemployment rate[1]	±0.3	±1.1	±1.6	±1.9
Total consumer prices[2]	±0.8	±1.0	±1.1	±1.0
Short-term interest rates[3] . . .	±0.5	±1.7	±2.3	±2.7

NOTE: Error ranges shown are measured as plus or minus the root mean squared error of projections for 2000 through 2019 that were released in the fall by various private and government forecasters. As described in the box "Forecast Uncertainty," under certain assumptions, there is about a 70 percent probability that actual outcomes for real GDP, unemployment, consumer prices, and the federal funds rate will be in ranges implied by the average size of projection errors made in the past. For more information, see David Reifschneider and Peter Tulip (2017), "Gauging the Uncertainty of the Economic Outlook Using Historical Forecasting Errors: The Federal Reserve's Approach," Finance and Economics Discussion Series 2017-020 (Washington: Board of Governors of the Federal Reserve System, February), https://dx. doi.org/10.17016/FEDS.2017.020.

1. Definitions of variables are in the general note to table 1.

2. Measure is the overall consumer price index, the price measure that has been most widely used in government and private economic forecasts. Projections are percent changes on a fourth quarter to fourth quarter basis.

3. For Federal Reserve staff forecasts, measure is the federal funds rate. For other forecasts, measure is the rate on 3-month Treasury bills. Projection errors are calculated using average levels, in percent, in the fourth quarter.

Forecast Uncertainty

The economic projections provided by the members of the Board of Governors and the presidents of the Federal Reserve Banks inform discussions of monetary policy among policymakers and can aid public understanding of the basis for policy actions. Considerable uncertainty attends these projections, however. The economic and statistical models and relationships used to help produce economic forecasts are necessarily imperfect descriptions of the real world, and the future path of the economy can be affected by myriad unforeseen developments and events. Thus, in setting the stance of monetary policy, participants consider not only what appears to be the most likely economic outcome as embodied in their projections, but also the range of alternative possibilities, the likelihood of their occurring, and the potential costs to the economy should they occur.

Table 2 summarizes the average historical accuracy of a range of forecasts, including those reported in past *Monetary Policy Report*s and those prepared by the Federal Reserve Board's staff in advance of meetings of the Federal Open Market Committee. The projection error ranges shown in the table illustrate the considerable uncertainty associated with economic forecasts. For example, suppose a participant projects that real gross domestic product (GDP) and total consumer prices will rise steadily at annual rates of, respectively, 3 percent and 2 percent. If the uncertainty attending those projections is similar to that experienced in the past and the risks around the projections are broadly balanced, the numbers reported in table 2 would imply a probability of about 70 percent that actual GDP would expand within a range of 1.9 to 4.1 percent in the current year, 1.3 to 4.7 percent in the second year, 1.2 to 4.8 percent in the third year, and 1.1 to 4.9 percent in the fourth year. The corresponding 70 percent confidence intervals for overall inflation would be 1.2 to 2.8 percent in the current year, 1.0 to 3.0 percent in the second year, 0.9 to 3.1 percent in the third year, and 1.0 to 3.0 percent in the fourth year.

Because current conditions may differ from those that prevailed, on average, over history, participants provide judgments as to whether the uncertainty attached to their projections of each economic variable is greater than, smaller than, or broadly similar to typical levels of forecast uncertainty seen in the past 20 years, as presented in table 2.

That is, participants judge whether each economic variable is more likely to be above or below their projections of the most likely outcome. These judgments about the uncertainty and the risks attending each participant's projections are distinct from the diversity of participants' views about the most likely outcomes. Forecast uncertainty is concerned with the risks associated with a particular projection rather than with divergences across a number of different projections. As with real activity and inflation, the outlook for the future path of the federal funds rate is subject to considerable uncertainty. This uncertainty arises primarily because each participant's assessment of the appropriate stance of monetary policy depends importantly on the evolution of real activity and inflation over time. If economic conditions evolve in an unexpected manner, then assessments of the appropriate setting of the federal funds rate would change from that point forward. The final line in table 2 shows the error ranges for forecasts of short-term interest rates. They suggest that the historical confidence intervals associated with projections of the federal funds rate are quite wide. It should be noted, however, that these confidence intervals are not strictly consistent with the projections for the federal funds rate, as these projections are not forecasts of the most likely quarterly outcomes but rather are projections of participants' individual assessments of appropriate monetary policy and are on an end-of-year basis. However, the forecast errors should provide a sense of the uncertainty around the future path of the federal funds rate generated by the uncertainty about the macroeconomic variables as well as additional adjustments to monetary policy that would be appropriate to offset the effects of shocks to the economy.

Appendix 7: Materials used by Mr. Reeve

Class I FOMC – Restricted Controlled (FR)

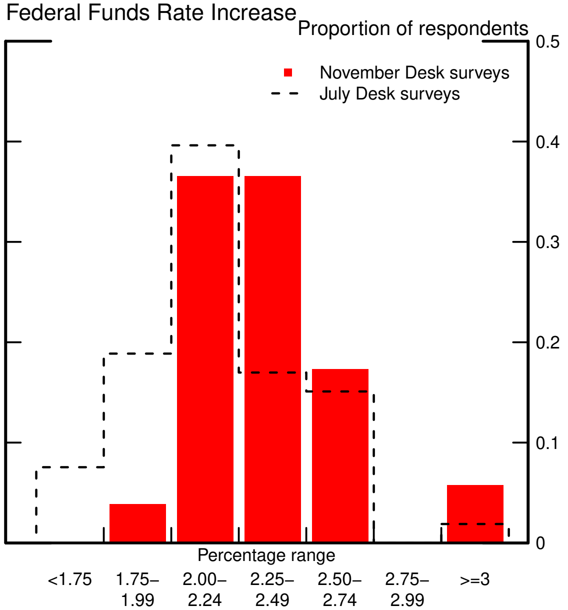
Material for the Briefing on

Monetary Policy Alternatives

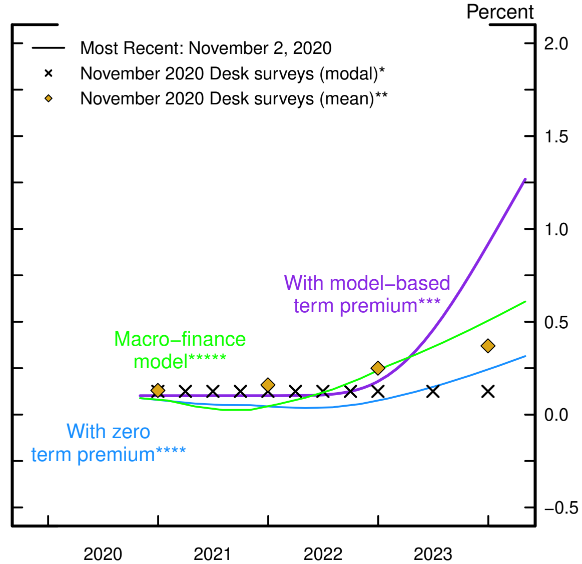
Trevor A. Reeve
Exhibits by Luke Morgan
November 4-5, 2020

Monetary Policy Considerations

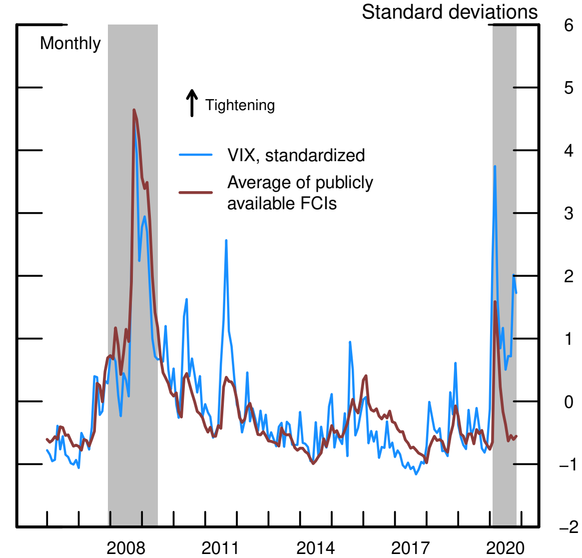
Respondents' Estimates of Inflation at First Federal Funds Rate Increase



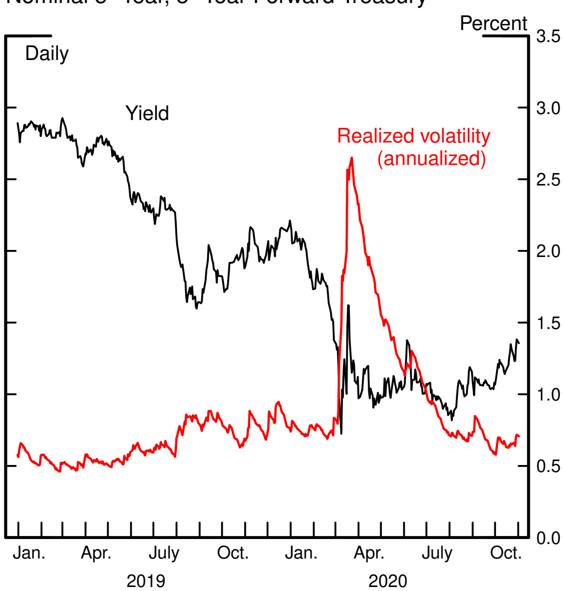
Federal Funds Rate Projections



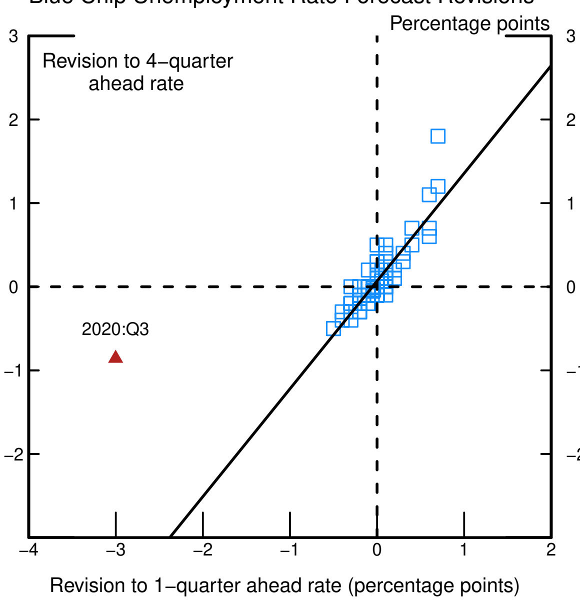
Financial Conditions Indexes and the VIX



Nominal 5–Year, 5–Year Forward Treasury



Blue Chip Unemployment Rate Forecast Revisions



Desk Surveys Probability Distribution of the 10–Year Treasury Yield, Year–End 2021

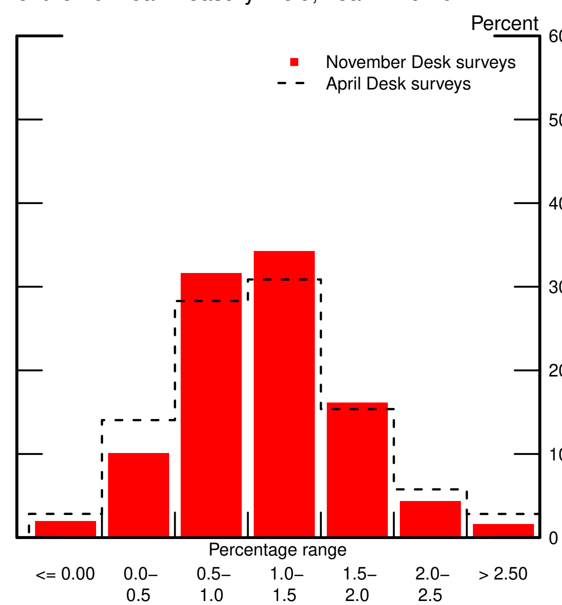


Exhibit Notes

Exhibit 1:

Top-left panel:

Based on responses to the Desk surveys. Respondents were asked for their estimates of the 12-month headline PCE inflation rate at the time of the first federal funds rate increase. Source: FRBNY; Board staff calculations.

Top-middle panel:

*Median of respondents' modal paths for the federal funds rate. **Estimated from respondents' unconditional year-end probability distributions. ***Adjusted for premiums using a term structure model based on Priebsch (2019). ****Estimated using overnight index swap quotes with a spline approach and a term premium of 0 basis points. *****Macro-finance model path is estimated by averaging over regressions of survey-OIS gaps on the covariances between real and nominal variables based on Diercks and Carl (2019). Source: Bloomberg; Board staff calculations; FRBNY.

Top-right panel:

Shaded areas indicate NBER recessions. Source: Bloomberg; Federal Reserve Banks of Chicago, St. Louis, and Kansas City.

Bottom-left panel:

Realized volatility is measured using an exponentially weighted moving average of squared daily changes in yields, with approximately 2/3 weight on the most recent month. Source: Board staff calculations.

Bottom-middle panel:

Plotted data indicate the revision, at quarter end, to the one-quarter ahead unemployment rate (horizontal axis) against the contemporaneous revision to the four-quarter ahead unemployment rate. The blue squares depict revisions from 1990:Q1-2020:Q1. The red triangle shows data for 2020:Q3. Data for 2020:Q2 data is not shown to maintain visibility. The data for 2020:Q2 are 11.7 percentage points for the revision to the one-quarter ahead rate and 5.6 percentage points for the revision to the four-quarter ahead rate.

Bottom-right panel:

Probabilities are the averages of the probabilities assigned by respondents to the Survey of Market Participants and Survey of Primary Dealers to different ranges of the 10-year Treasury yield at the end of 2021. Source: FRBNY.

SEPTEMBER 2020 FOMC STATEMENT

1. The Federal Reserve is committed to using its full range of tools to support the U.S. economy in this challenging time, thereby promoting its maximum employment and price stability goals.

2. The COVID-19 pandemic is causing tremendous human and economic hardship across the United States and around the world. Economic activity and employment have picked up in recent months but remain well below their levels at the beginning of the year. Weaker demand and significantly lower oil prices are holding down consumer price inflation. Overall financial conditions have improved in recent months, in part reflecting policy measures to support the economy and the flow of credit to U.S. households and businesses.

3. The path of the economy will depend significantly on the course of the virus. The ongoing public health crisis will continue to weigh on economic activity, employment, and inflation in the near term, and poses considerable risks to the economic outlook over the medium term.

4. The Committee seeks to achieve maximum employment and inflation at the rate of 2 percent over the longer run. With inflation running persistently below this longer-run goal, the Committee will aim to achieve inflation moderately above 2 percent for some time so that inflation averages 2 percent over time and longer-term inflation expectations remain well anchored at 2 percent. The Committee expects to maintain an accommodative stance of monetary policy until these outcomes are achieved. The Committee decided to keep the target range for the federal funds rate at 0 to 1/4 percent and expects it will be appropriate to maintain this target range until labor market conditions have reached levels consistent with the Committee's assessments of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time. In addition, over coming months the Federal Reserve will increase its holdings of Treasury securities and agency mortgage-backed securities at least at the current pace to sustain smooth market functioning and help foster accommodative financial conditions, thereby supporting the flow of credit to households and businesses.

5. In assessing the appropriate stance of monetary policy, the Committee will continue to monitor the implications of incoming information for the economic outlook. The Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals. The Committee's assessments will take into account a wide range of information, including readings on public health, labor market conditions, inflation pressures and inflation expectations, and financial and international developments.

ALTERNATIVE A FOR NOVEMBER 2020

1. The Federal Reserve is committed to using its full range of tools to support the U.S. economy in this challenging time, thereby promoting its maximum employment and price stability goals.

2. The COVID-19 pandemic is causing tremendous human and economic hardship across the United States and around the world. Economic activity and employment have ~~picked up~~ **continued to increase** in recent months but **at a slowing pace, and both** remain well below their levels at the beginning of the year. Weaker demand and significantly lower oil prices are holding down consumer price inflation. Overall financial conditions ~~have improved in recent months~~ **remain accommodative**, in part reflecting policy measures to support the economy and the flow of credit to U.S. households and businesses.

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ALTERNATIVE B FOR NOVEMBER 2020

1. The Federal Reserve is committed to using its full range of tools to support the U.S. economy in this challenging time, thereby promoting its maximum employment and price stability goals.

2. The COVID-19 pandemic is causing tremendous human and economic hardship across the United States and around the world. Economic activity and employment have ~~picked up in recent months~~ **continued to recover** but remain well below their levels at the beginning of the year. Weaker demand and ~~significantly lower~~ **earlier declines in** oil prices ~~are~~ **have been** holding down consumer price inflation. Overall financial conditions ~~have improved in recent months~~ **remain accommodative**, in part reflecting policy measures to support the economy and the flow of credit to U.S. households and businesses.

3. The path of the economy will depend significantly on the course of the virus. The ongoing public health crisis will continue to weigh on economic activity, employment, and inflation in the near term, and poses considerable risks to the economic outlook over the medium term.

4. The Committee seeks to achieve maximum employment and inflation at the rate of 2 percent over the longer run. With inflation running persistently below this longer-run goal, the Committee will aim to achieve inflation moderately above 2 percent for some time so that inflation averages 2 percent over time and longer-term inflation expectations remain well anchored at 2 percent. The Committee expects to maintain an accommodative stance of monetary policy until these outcomes are achieved. The Committee decided to keep the target range for the federal funds rate at 0 to 1/4 percent and expects it will be appropriate to maintain this target range until labor market conditions have reached levels consistent with the Committee's assessments of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time. In addition, over coming months the Federal Reserve will increase its holdings of Treasury securities and agency mortgage-backed securities at least at the current pace to sustain smooth market functioning and help foster accommodative financial conditions, thereby supporting the flow of credit to households and businesses.

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1. The Federal Reserve is committed to using its full range of tools to support the U.S. economy in this challenging time, thereby promoting its maximum employment and price stability goals.

2. The COVID-19 pandemic is causing tremendous human and economic hardship across the United States and around the world. Economic activity and employment have picked up in recent months but remain well below their levels at the beginning of the year. ~~Weaker demand and significantly lower oil prices are holding down consumer price inflation.~~ **After slowing sharply earlier in the year, inflation has moved up recently.** Overall financial conditions ~~have improved in recent months~~ **remain accommodative**, in part reflecting policy measures to support the economy and the flow of credit to U.S. households and businesses.

3. The path of the economy will depend significantly on the course of the virus. The ongoing public health crisis will continue to weigh on economic activity, employment, and inflation in the near term, and poses considerable risks to the economic outlook over the medium term.

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Implementation Note for November 2020, All Alternatives

Release Date: November 5, 2020

Decisions Regarding Monetary Policy Implementation

The Federal Reserve has made the following decisions to implement the monetary policy stance announced by the Federal Open Market Committee in its statement on ~~September 16~~ **November 5**, 2020:

- The Board of Governors of the Federal Reserve System voted [unanimously] to maintain the interest rate paid on required and excess reserve balances at 0.10 percent, effective ~~September 17~~ **November 6**, 2020.
- As part of its policy decision, the Federal Open Market Committee voted to authorize and direct the Open Market Desk at the Federal Reserve Bank of New York, until instructed otherwise, to execute transactions in the System Open Market Account in accordance with the following domestic policy directive:

  "Effective ~~September 17~~ **November 6**, 2020, the Federal Open Market Committee directs the Desk to:
  - Undertake open market operations as necessary to maintain the federal funds rate in a target range of 0 to 1/4 percent.
  - Increase the System Open Market Account holdings of Treasury securities and agency mortgage-backed securities (MBS) at the current pace. Increase holdings of Treasury securities and agency MBS by additional amounts and purchase agency commercial mortgage-backed securities (CMBS) as needed to sustain smooth functioning of markets for these securities.
  - Conduct term and overnight repurchase agreement operations to support effective policy implementation and the smooth functioning of short-term U.S. dollar funding markets.
  - Conduct overnight reverse repurchase agreement operations at an offering rate of 0.00 percent and with a per-counterparty limit of $30 billion per day; the per-counterparty limit can be temporarily increased at the discretion of the Chair.
  - Roll over at auction all principal payments from the Federal Reserve's holdings of Treasury securities and reinvest all principal payments from the Federal Reserve's holdings of agency debt and agency MBS in agency MBS.
  - Allow modest deviations from stated amounts for purchases and reinvestments, if needed for operational reasons.
  - Engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency MBS transactions."

- In a related action, the Board of Governors of the Federal Reserve System voted [unanimously] to approve the establishment of the primary credit rate at the existing level of 0.25 percent.

This information will be updated as appropriate to reflect decisions of the Federal Open Market Committee or the Board of Governors regarding details of the Federal Reserve's operational tools and approach used to implement monetary policy.

More information regarding open market operations and reinvestments may be found on the Federal Reserve Bank of New York's website.

Potential actions of the Board of Governors of the Federal Reserve System

Interest on required and excess reserve balances

Leave the interest rate paid on required and excess reserve balances unchanged at 0.10 percent.

Establishment of the primary, secondary, and seasonal credit rates

Approve establishment of the primary credit rate at the existing rate of 0.25 percent and establishment of the rates for secondary and seasonal credit under the existing formulas specified in the staff’s October 30, 2020, memo to the Board.