Appendix 1: Materials used by Ms. Zobel, Mr. Schulhofer-Wohl, Ms. Senyuz, and Mr. Doyle

Class I FOMC - Restricted Controlled (FR)

Material for Briefing on

Long-Run Monetary Policy Implementation Frameworks

Patricia Zobel, Sam Schulhofer-Wohl, Zeynep Senyuz, and Brian Doyle
Exhibits by Carolyn Shen and Alex Thorp
November 7, 2018

Exhibit 1

(1) Key Takeaways

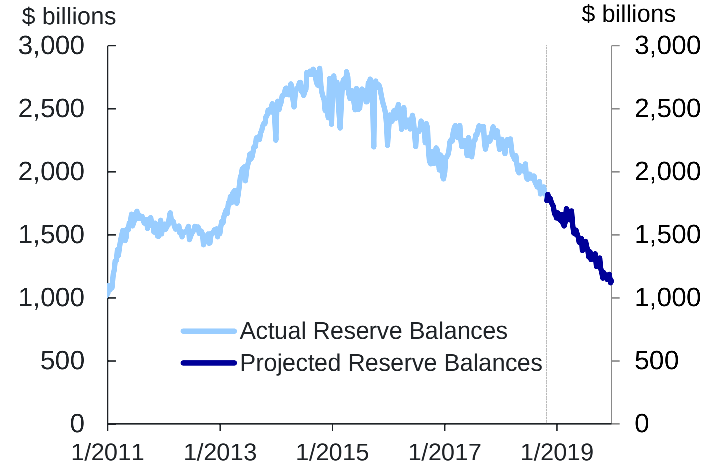
Banks' liquidity management practices have changed markedly since the crisis

At current rates relative to IOER, minimum reserve demand is likely higher than pre-crisis, but much lower than the peak reserve level of $2.8 trillion

- Estimate from the SFOS suggests minimum reserve demand of around $800 billion
- Currently no broad-based signs of unmet reserve need; staff will continue to monitor

In environments with a higher opportunity cost of holding reserves, banks would likely reduce reserve holdings to some degree

(2) Actual and Projected System Reserve Level



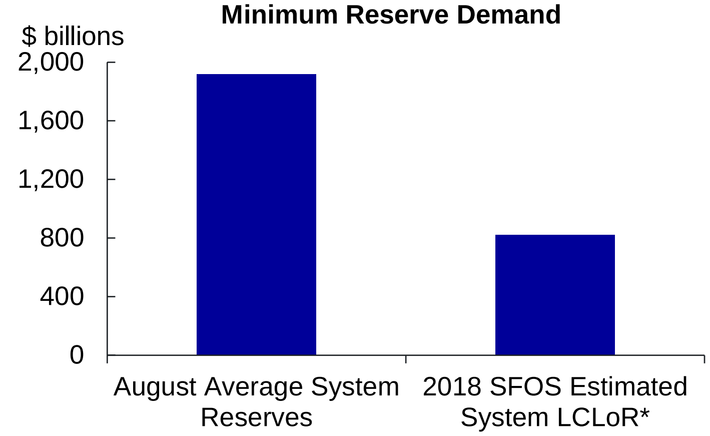
Source: H.4.1 report: 'Other Deposits held by Depository Institutions', staff projections

(3) SFOS Respondents' Motivation for Minimum Reserve Levels

	U.S. GSIB	Large Domestic	Small Domestic	FBO
1) Intraday Payment Needs	63%	44%	83%	62%
2) Potential Deposit Outflows	63%	69%	100%	33%
3) Reserve Requirements	50%	38%	83%	43%
4) Internal Liquidity Stress Tests	75%	63%	50%	71%
5) Attractiveness of IOER	25%	6%	0%	24%
6) HQLA Monetization Concerns	38%	31%	17%	48%

Source: 2018 Senior Financial Officer Survey
Note: Figures shown are the percent of respondents that rated the factor important or very important.

(4) System Reserve Level and SFOS Estimate of Minimum Reserve Demand

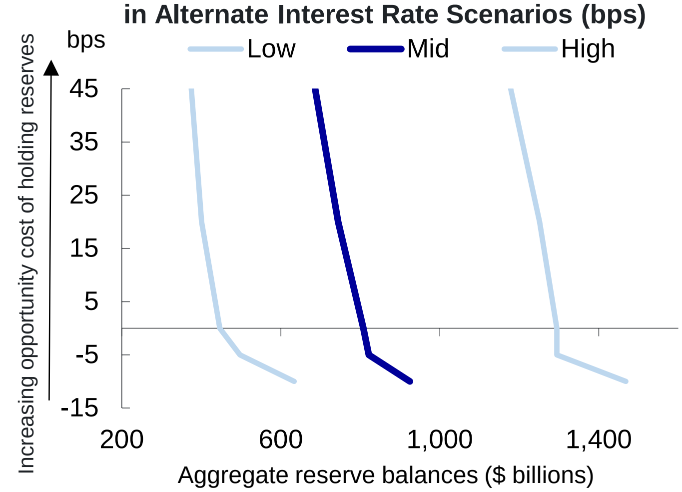


Source: 2018 Senior Financial Officer Survey, staff estimates; H.4.1 report
Note: Lowest Comfortable Level of Reserves. The reserve levels below which respondents would take actions to maintain or increase balances.

(5) Markers of Reserve Need

Marker	Assessment
Fed funds pressure	• About 10% of fed funds volumes above IOER. Reduction in IOER arb activity • Changes in aggregate reserve balances are not correlated with changes in IOER-EFFR spread
Payments pressure	• No material change in timing of payments • Demand for intraday credit is little changed.
Reserve requirement pressure	• Limited number of banks operating with reserve balances close to requirements • Discount window borrowing declined over inter-meeting period
Other funding pressure	• Deposit betas remain low relative to banks' projections for this hiking cycle

(6) Estimated Minimum Reserve Level in Alternate Interest Rate Scenarios (bps)



Source: 2018 Senior Financial Officer Survey, staff estimates

Exhibit 2: Comparison of operating regimes

	Limited excess reserves	Abundant excess reserves
Rate control	- Setting reserve supply to intersect demand at target rate - Worked well pre-crisis - Sources of reserve demand have changed, creating uncertainty about ability to precisely target a rate	- Arbitrage from administered rates to all market rates - Many years of successful experience controlling rates post-crisis - Has worked well internationally
Operations	- High complexity	- Lower complexity
Money market activity	- May help revive overnight interbank market	- Tends to suppress interbank trading, but wholesale deposit markets remain
Target rate	- Natural to target EFFR - Or could shift to OBFR (broader measure of unsecured rates)	- Choice of target rate less straightforward
Liquidity	- Less aggregate liquidity available to banking system - Banks may rely more on Fed facilities - Potential loss of monetary control when providing extra liquidity away from the ELB	- More aggregate liquidity available to the banking system - No loss of monetary control when additional reserves supplied
Total reserves	- Highly uncertain medium-term point estimate: \$700B - Depends on interest rate sensitivity of demand for reserves, might fall in long term	- Highly uncertain point estimate: \$1T - Depends on interest rate sensitivity, buffer for autonomous factors, distributional frictions
Interest expense	- Lower and less concentrated interest payments on reserves	- Higher and more concentrated interest payments on reserves
Policy space	- Returning to an operating regime similar to that used pre-crisis might increase public trust in the Federal Reserve's ability to unwind unconventional policy tools after a crisis and increase willingness to use such tools if another crisis occurred	- Could back reserves with short-term assets in normal times, then exchange for longer-term assets to provide stimulus when needed

Exhibit 3: Target rate options

- **The policy target rate** communicates and transmits the stance of monetary policy.

- In a regime with *limited excess reserves*, policy implementation focuses on the reserves market. Supply adjustments through OMOs influence the rate at which banks are able to borrow reserves.
    - Options: FFR and OBFR

- In a regime with *abundant excess reserves*, transmission relies on arbitrage between money market rates and the administered rates on Federal Reserve's liabilities.
    - Options: FFR, OBFR, Treasury repo rate, and General level of short-term rates (GLOSTR)

Rate Options	Limited excess reserves	Abundant excess reserves
Federal Funds Rate (FFR)	- Communications continuity - Similar framework to pre-crisis - Some risks facing the federal funds market going forward	- Successful rate control so far, but significant risks going forward - Dependent on the behavior of FHLBs - Potential communication challenges due to idiosyncratic market dynamics
Overnight Bank Funding Rate (OBFR)	- Comprehensive measure of banks' funding costs - More robust than EFFR though still susceptible to volume declines - Communications continuity with current practice	- Comprehensive measure of banks' funding costs - Supported by widespread investor participation, but still subject to regulatory disincentives - Operational and communications continuity with current practice
Treasury Repo Rate (SOFR or TGCR)		- Robust transaction volume under a range of market conditions - Affects financing costs of a wide range of financial intermediaries - Consistent with the migration of overnight activity to the secured markets - May require operations correlated in time and size with Treasury issuance
General Level of Short Term Rates (GLOSTR)		- Robust to changes in market structure that affect individual rates - Eliminates the need to react to idiosyncratic rate movements - Transition may raise communication challenges

Questions for Discussion

1. What do you see as the tradeoffs between remaining in a framework like the current one, with abundant excess reserves, versus moving to a framework with limited excess reserves? How does the level of reserves that would ultimately be necessary in each framework affect your views on the appropriate choice of framework?

2. In your preferred framework for policy implementation, what interest rate(s) would you prefer to target? What do you see as the important tradeoffs in choosing among the range of possible target rates discussed in the staff background memos—the effective federal funds rate (EFFR), the overnight bank funding rate (OBFR), a Treasury repo rate, and the general level of short-term rates (GLOSTR)?

Appendix 2: Materials used by Mr. Potter and Ms. Logan

Material for Briefing on

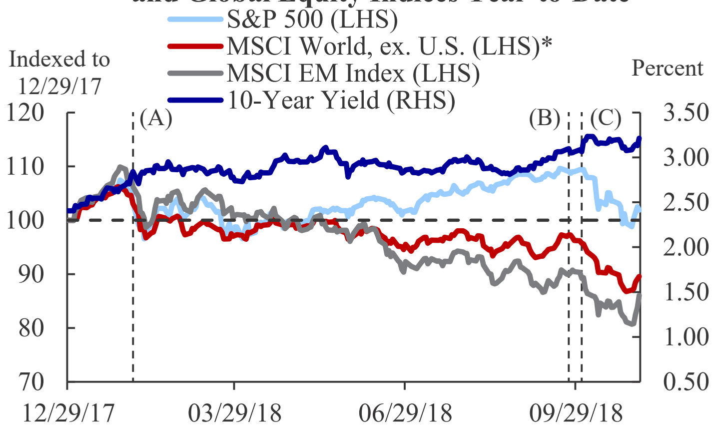
Financial Developments and Open Market Operations

Lorie Logan and Simon Potter
Exhibits by Ashley Rhodes
November 7, 2018

Class II FOMC – Restricted (FR)

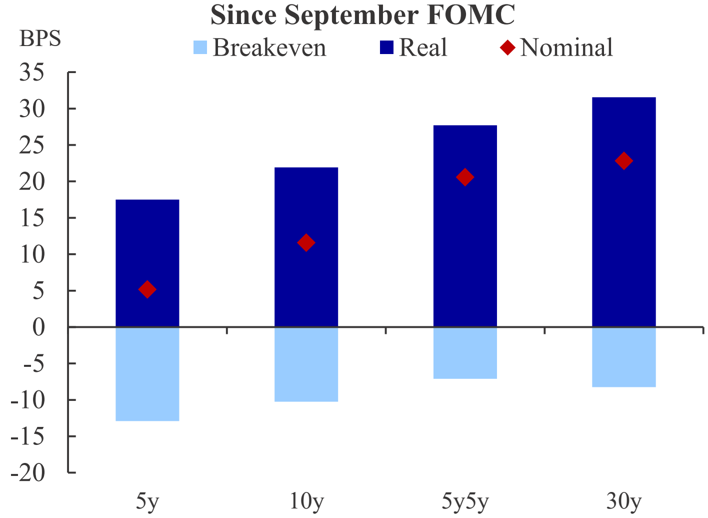
Exhibit 1

(1) Ten-Year U.S. Treasury Yield and Global Equity Indices Year-to-Date



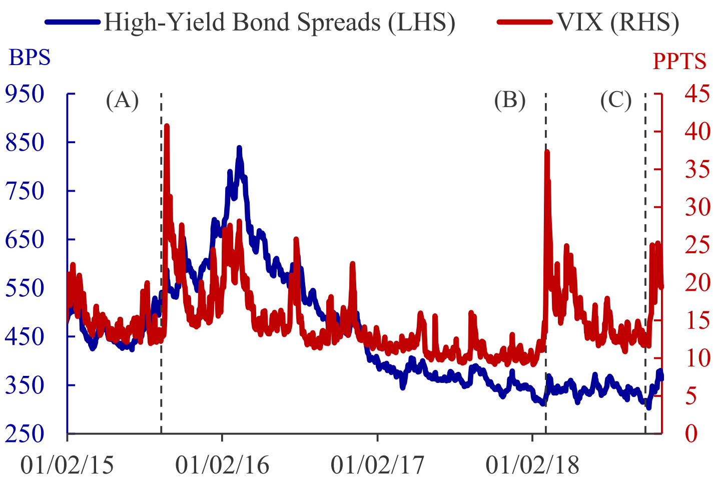
*MSCI World, ex. U.S. captures developed markets ex. U.S.
(A) February 5th, VIX ETP-related market volatility (B) September FOMC
(C) October 3rd, large increase in Treasury yields
Source: Bloomberg, MSCI

(2) Decomposition of Changes in U.S. Treasury Yields Since September FOMC



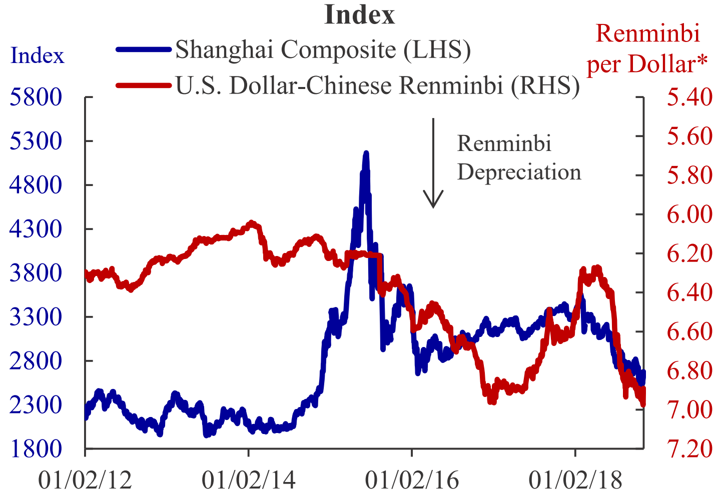
Source: Bloomberg

(3) High-Yield Bond Spreads and VIX Index



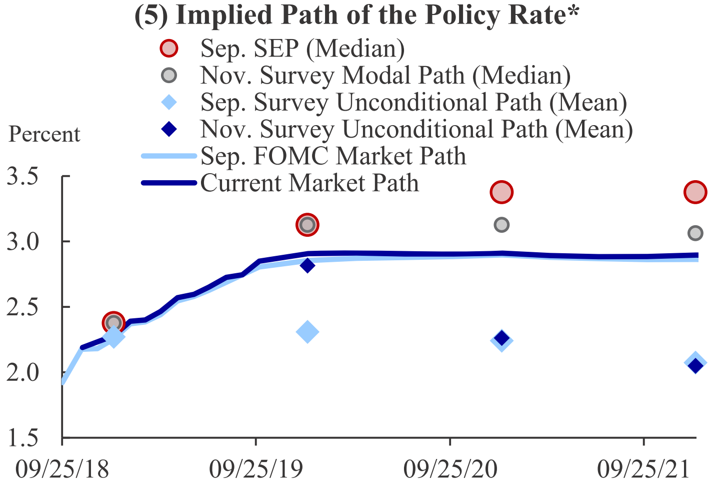
(A) Renminbi Devaluation (B) February 5th, VIX ETP-related market volatility
(C) September FOMC
Source: Barclays, Bloomberg

(4) Chinese Exchange Rate and Shanghai Composite Index



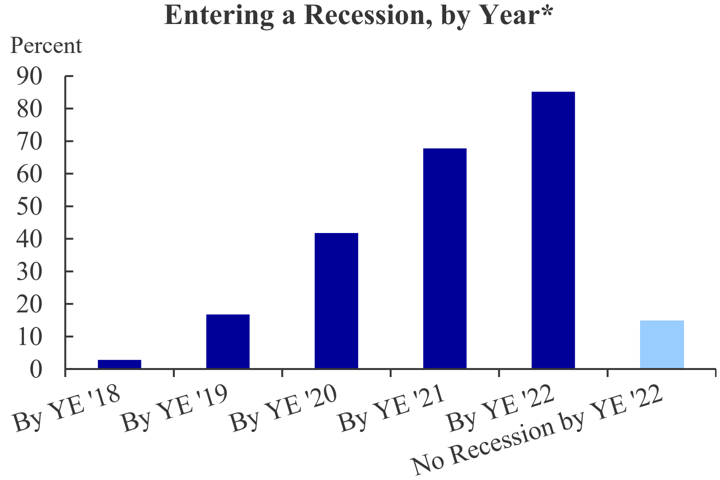
*Scale inverted.
Source: Bloomberg

(5) Implied Path of the Policy Rate*



*Market-implied paths derived from federal funds and Eurodollar futures. Unconditional survey path is the average PDF-implied means from the Surveys of Primary Dealers and Market Participants.
Source: Bloomberg, Desk Calculations, Federal Reserve Board, FRBNY

(6) Average Cumulative Probability of U.S. First Entering a Recession, by Year*

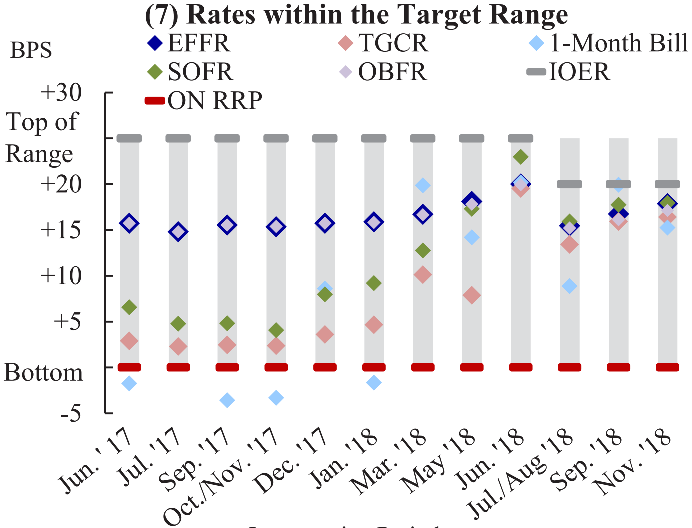


*Based on all responses from the Survey of Primary Dealers. NBER-defined recession.
Source: FRBNY

Class II FOMC – Restricted (FR)

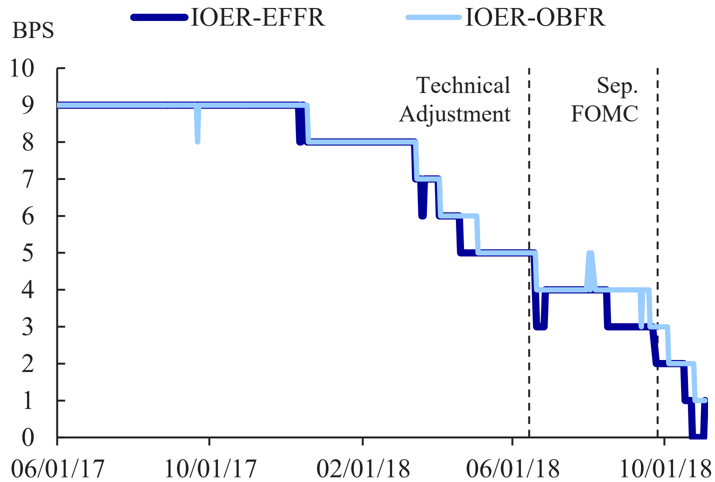
Exhibit 2

(7) Rates within the Target Range



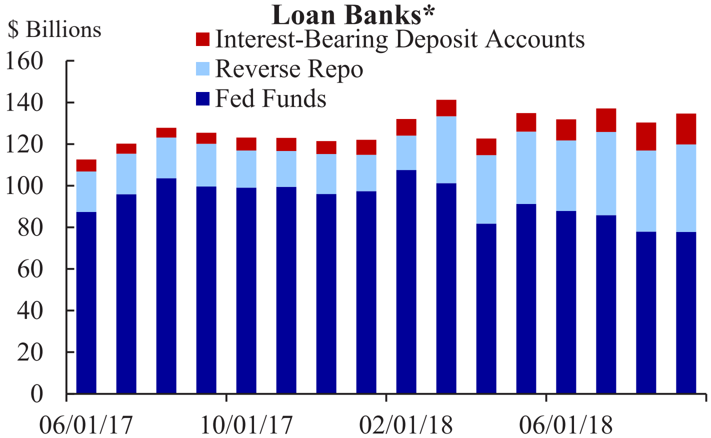
Source: Bloomberg, Board of Governors, FRBNY

(8) Daily Spreads of Rates to Interest on Excess Reserves, Excluding Month-Ends



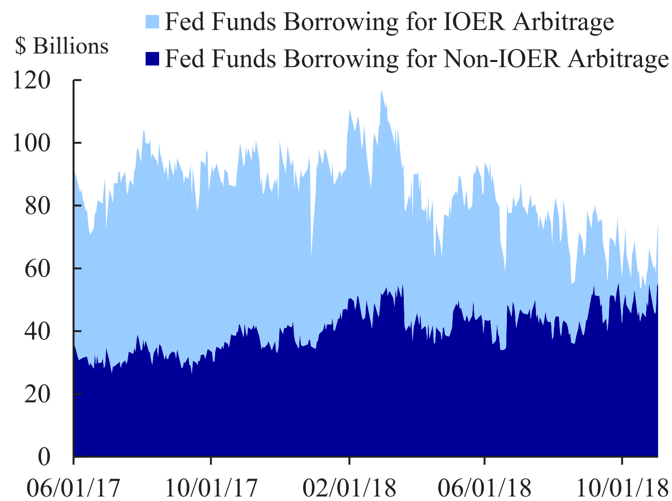
Source: FRBNY

(9) Money Market Investments of Federal Home Loan Banks*



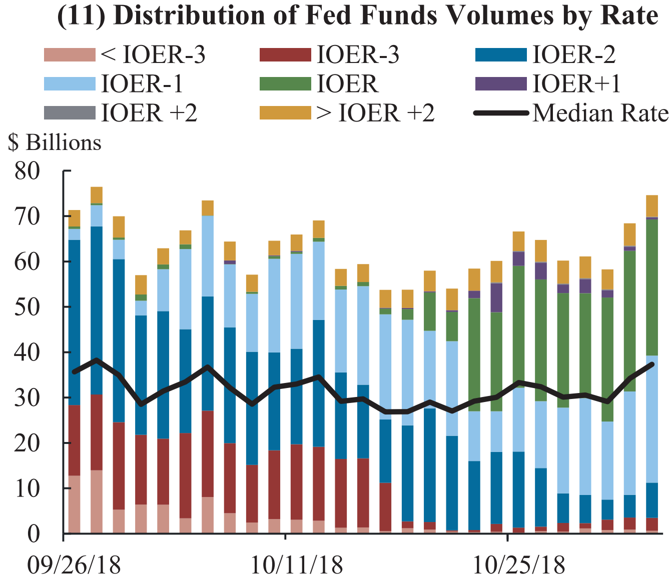
*Daily average outstanding balances for the month. Difference in fed funds volume between FR2420 data and FHFA data likely due to difference in definition of fed funds used by FHFA and FR2420 reporting.
Source: Federal Housing Finance Agency

(10) Fed Funds Borrowing by Motivation*



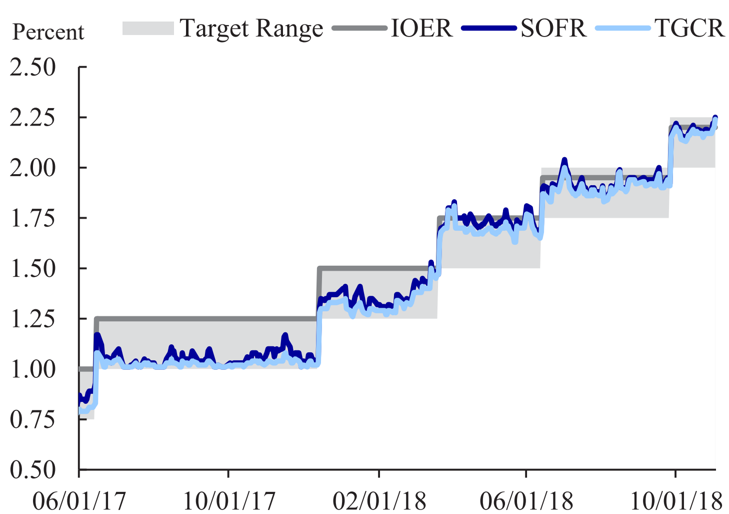
*Borrowing classified based on Desk outreach to bank borrowers.
Source: FRBNY

(11) Distribution of Fed Funds Volumes by Rate



Source: Board of Governors, FRBNY

(12) Select Repo Rates, Excluding Month-Ends



Source: Board of Governors, FRBNY

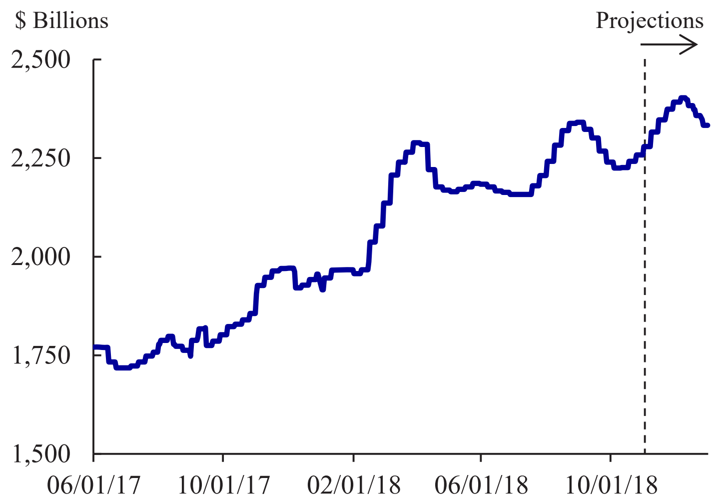
Class II FOMC – Restricted (FR) Exhibit 3

(13) Survey Expectations for Spreads of Key Rates*

	2018 FOMC Meetings		2019 FOMC Meetings			
	Nov.	Dec.	Jan.	Mar.	Jun.**	Dec.**
IOER - EFFR (bps)						
Median	0	0	-1	-1	-3	-4
25th Percentile	0	-1	-2	-4	-5	-7
75th Percentile	1	0	0	1	0	0
IOER - OBFR, Median (bps)	1	0	0	0	-2	-3
Top Target Range - IOER, Median (bps)	5	10	10	10	10	15

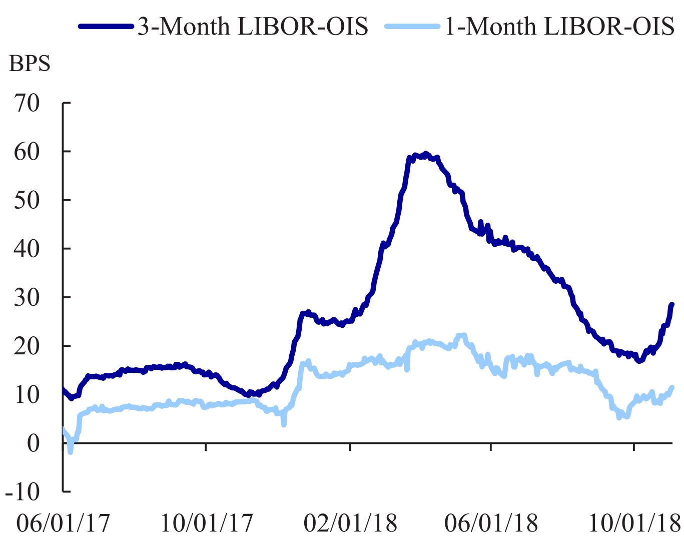
*Based on all responses to the Surveys of Primary Dealers and Market Participants.
**Last non-period end reporting date in month.
Source: FRBNY

(14) Treasury Bills Outstanding



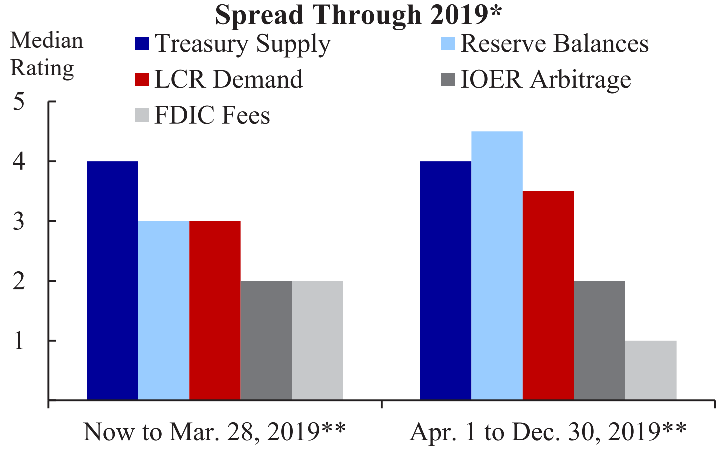
Source: Desk Calculations, U.S. Treasury

(15) LIBOR-OIS Spreads



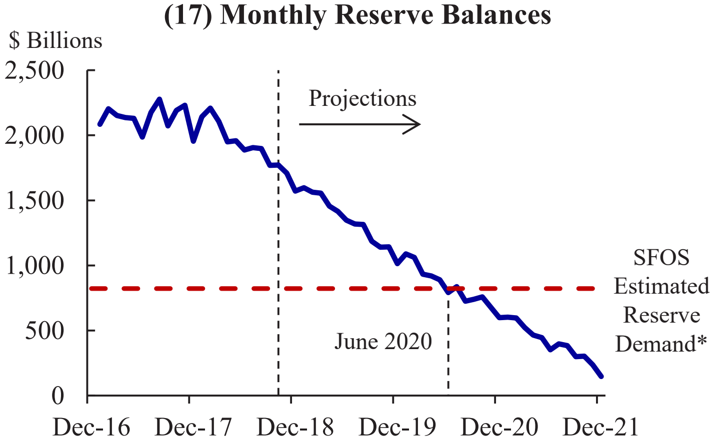
Source: Bloomberg

(16) Importance of Factors Influencing IOER-EFFR Spread Through 2019*



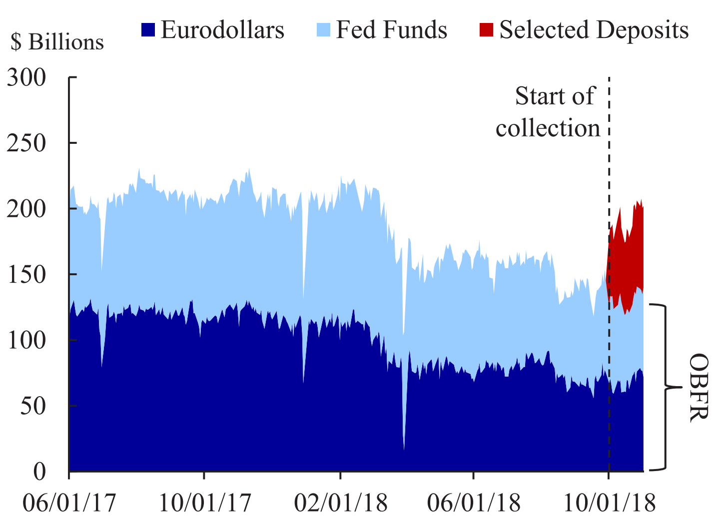
*Based on all responses to the Surveys of Primary Dealers and Market Participants. Ratings for Other category not shown.
**Not period-end reporting dates.
Source: FRBNY

(17) Monthly Reserve Balances



*Senior Financial Officer Survey estimated reserve demand point estimate is $822 billion (red dashed line). Banks were asked to provide "the approximate lowest dollar level of reserve balances that your bank would be comfortable holding before it began taking active steps to maintain or increase its reserve balance position."
Source: Desk Calculations, FRBNY

(18) Volumes Underlying OBFR and Selected Deposits



Source: FRBNY

Appendix 1

(1) Summary of Operational Testing

Summary of Operational Tests in prior period:

- Domestic Authorization
    - October 11: Treasury bill rollover of $26 million
    - October 18: Treasury bill sale of $47 million*
    - October 24: Securities lending (using the back up lending tool) for $71 million
    - October 16 to November 7: Outright MBS TBA purchase for a total of $241 million**
- Foreign Authorization
    - October 11 and 12: U.S. dollar liquidity swap of $51,000 per counterparty (ECB, SNB***, BoC, BoE)
    - October 22 to 24: Japanese yen liquidity swap for JPY51,000
    - November 6 and 7: Sterling liquidity swap for GBP 51,000

Upcoming Operational Tests:

- Seven tests scheduled under the Domestic Authorization
    - November 8: Treasury bill maturity of $53 million
    - November 14 : Outright MBS TBA purchases for up to $45 million****
    - November 15: Overnight repo for no more than $75 million
    - November 19: Overnight reverse repo with MBS collateral for no more than $175 million
    - November 27 and 29: Outright MBS sales (specified pool) for up to $200 million, total
    - November 28: Term reverse repo for no more than $175 million
    - December 4: Term repo for no more than $75 million

- Two tests scheduled under the Foreign Authorization
    - November 20: Yen-denominated repo with 552 U.S.C. (b)(4) for JPY100 million
    - December 11: Yen-denominated sovereign debt sales to private counterparty for JPY100 million

* In the September Briefing, the Desk stated that it would sell exactly $50 million of Treasury bills. However, this figure represented an estimate of the maximum amount to be sold. During the operation the Desk sold a slightly smaller amount, $47 million.

** The total figure assumes the Desk purchases the maximum of $27 million for the outright operation scheduled on November 7th.

*** The SNB conducted an end-to-end test of its dollar repo facility with two of its regular private bank counterparties as part of the U.S. dollar liquidity swap test.

**** For monthly Agency MBS reinvestment periods where principal receipts are below the cap, the Desk will conduct up to $300 million of small value outright purchases. Monthly reinvestment periods run from the 10th business day of the current month to the 9th business day of the following month.

Appendix 2

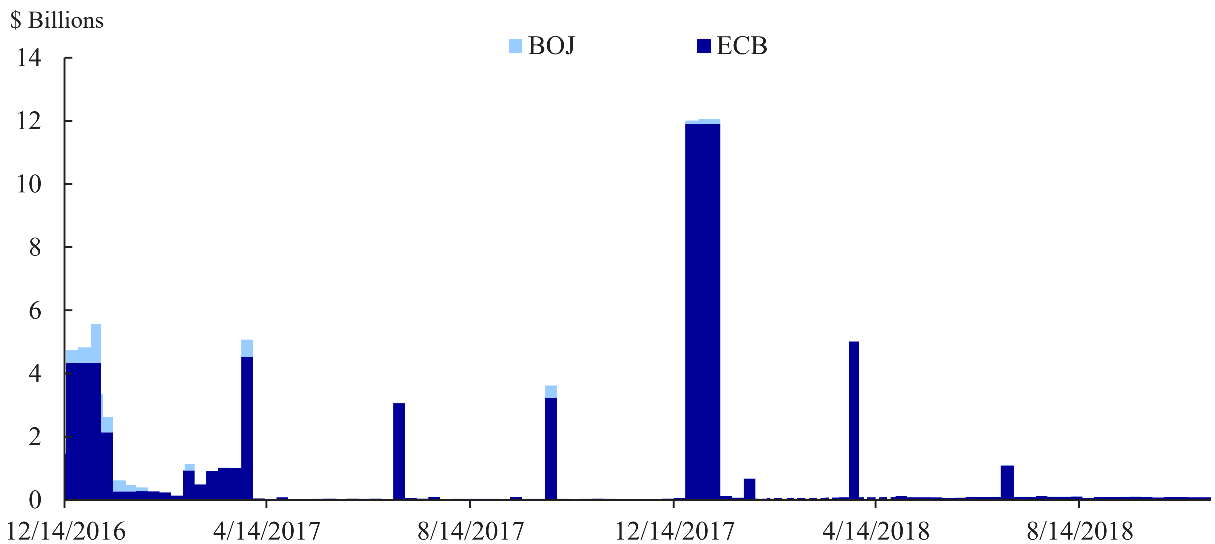
(1) MBS Purchases Summary Since Cap Implementation Through 11/05/18 ($ M)

Purchase Period				Actual Paydowns	Cap	Actual Purchases	Net Deviation	Cumulative Deviation
Oct-17	10/16/17	-	11/13/17	24,353	4,000	20,355	2	2
Nov-17 *	11/14/17	-	12/13/17	28,316	4,000	24,327	11	13
Dec-17	12/14/17	-	01/12/18	24,032	4,000	20,038	6	19
Jan-18	01/16/18	-	02/13/18	22,909	8,000	14,921	12	31
Feb-18	02/14/18	-	03/13/18	20,689	8,000	12,684	(5)	26
Mar-18	03/14/18	-	04/12/18	19,294	8,000	11,308	14	40
Apr-18	04/13/18	-	05/11/18	21,233	12,000	9,234	1	41
May-18	05/14/18	-	06/13/18	20,793	12,000	8,807	14	55
Jun-18	06/14/18	-	07/13/18	24,526	12,000	12,534	8	63
Jul-18	07/16/18	-	08/13/18	22,729	16,000	6,725	(4)	59
Aug-18	08/14/18	-	09/14/18	21,602	16,000	5,607	5	64
Sep-18	09/17/18	-	10/12/18	21,759	16,000	5,755	(4)	60
Oct-18 **	10/15/18	-	11/14/18	17,878	20,000	220	0	60

*Actual paydowns include agency debt maturity. Nov-17: $2,366 million; Jun-18: $1,982 million.

**Actual purchases ongoing, reflect data through 11/07/18. Target amount for October purchase period is $292 million. This is a small value purchase not a reinvestment purchase.

(2) FX Swaps Outstanding



Source: FRBNY

(3) FX Intervention

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

Appendix 3: Materials used by Mr. Engen

Class II FOMC - Restricted (FR)

Material for Briefing on

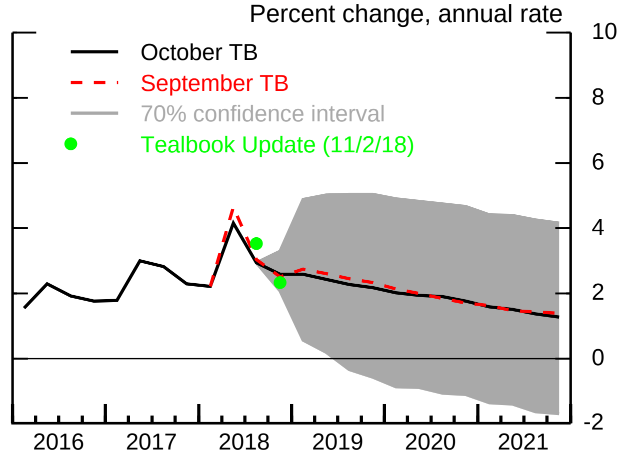
The U.S. Outlook

Eric M. Engen
Exhibits by Bo Yeon Jang and Rosemary Rhodes
November 7, 2018

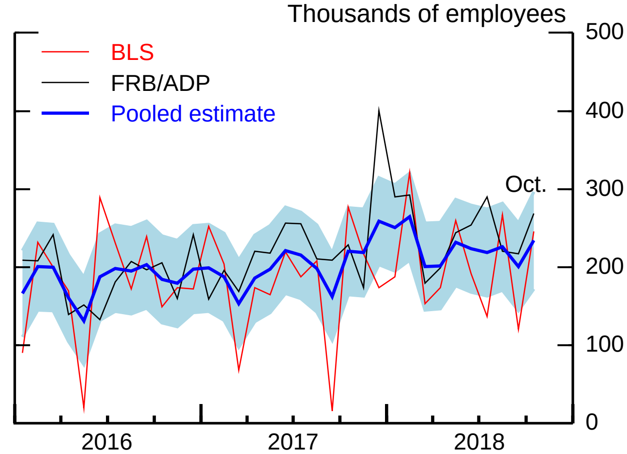
Forecast Summary

Confidence Intervals for Panels 1, 5, 9, and 10 Based on FRB/US Stochastic Simulations

1. Real GDP

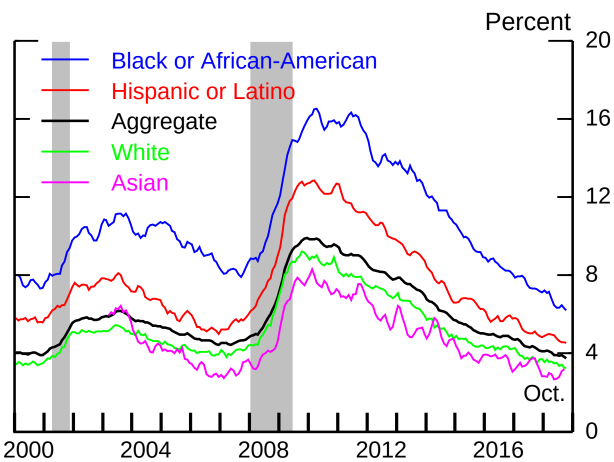


2. Estimates of Private Nonfarm Payroll Gains



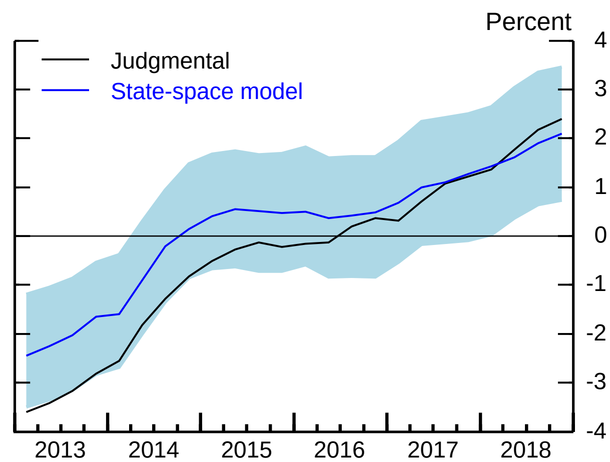
Note: Shaded region denotes 90% confidence interval for pooled estimate. October FRB/ADP value includes data through 10/27.

3. Unemployment Rates by Race or Ethnicity



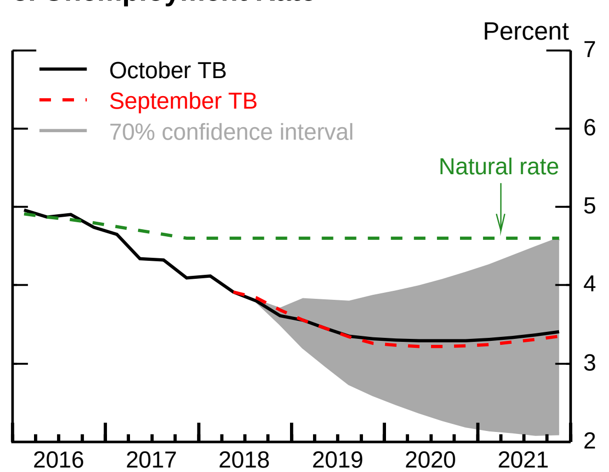
Note: Three-month moving averages. Shaded bars indicate a period of business recession as defined by the NBER.

4. Output Gap Estimates

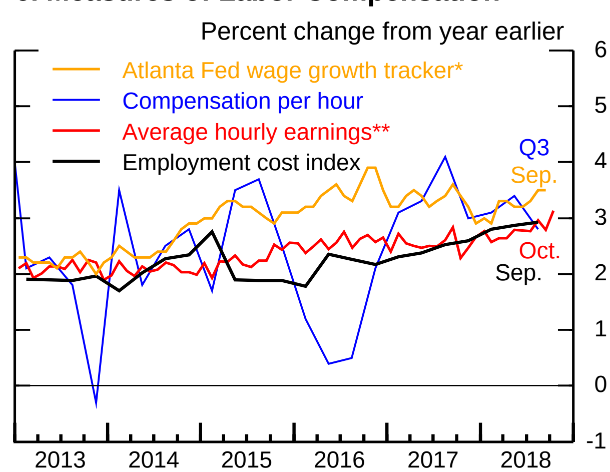


Note: Judgmental estimate is from October TB. Shaded region denotes 70 percent confidence interval around October TB model estimate.

5. Unemployment Rate

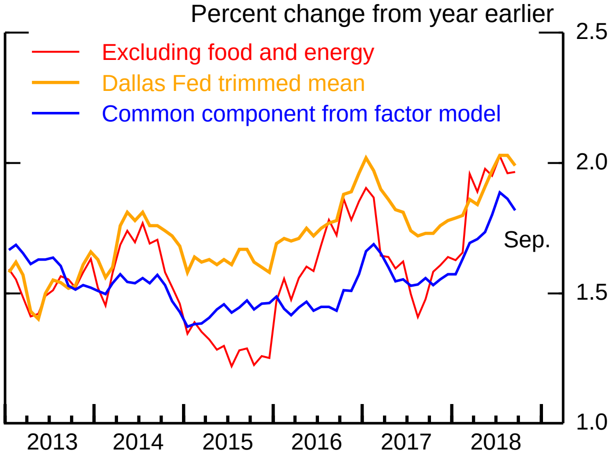


6. Measures of Labor Compensation

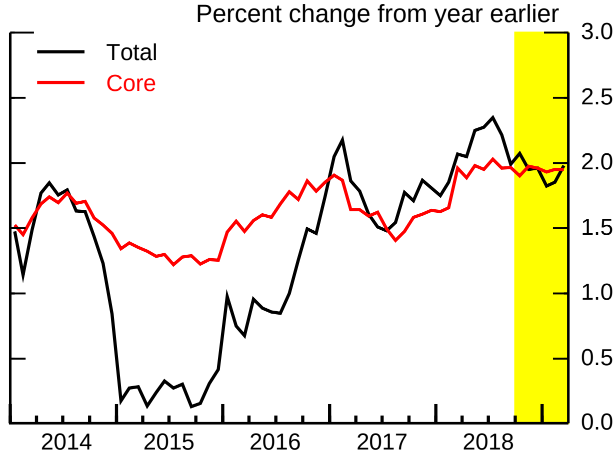


*Three-month moving average. **All employees.

7. Measures of Underlying PCE Price Inflation

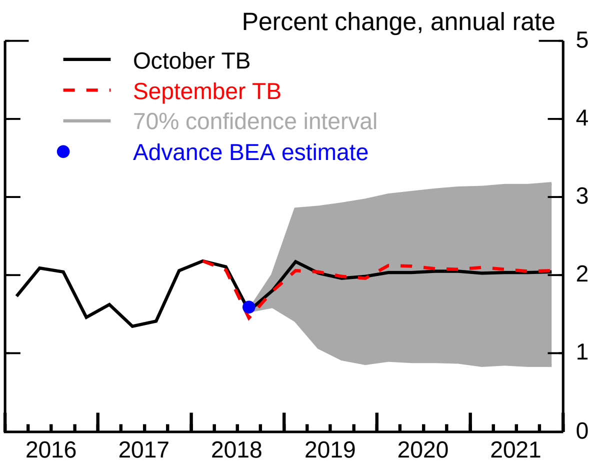


8. Monthly PCE Price Inflation

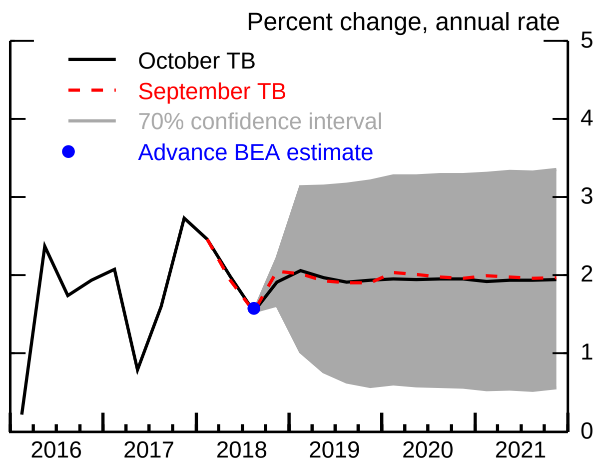


Note: Shaded yellow region indicates forecast period.

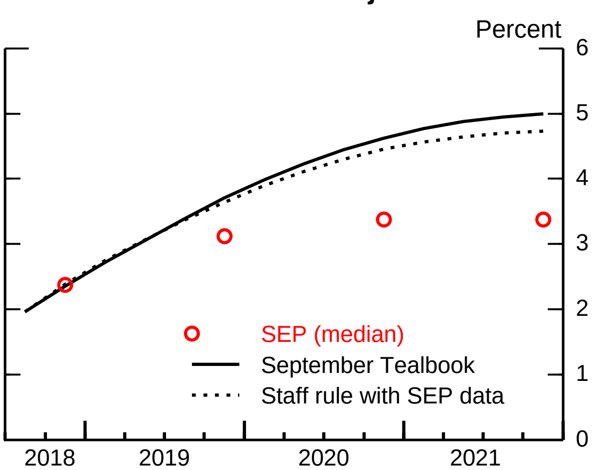
9. PCE Prices Excluding Food and Energy



10. Total PCE Prices



11. Federal Funds Rate Projections

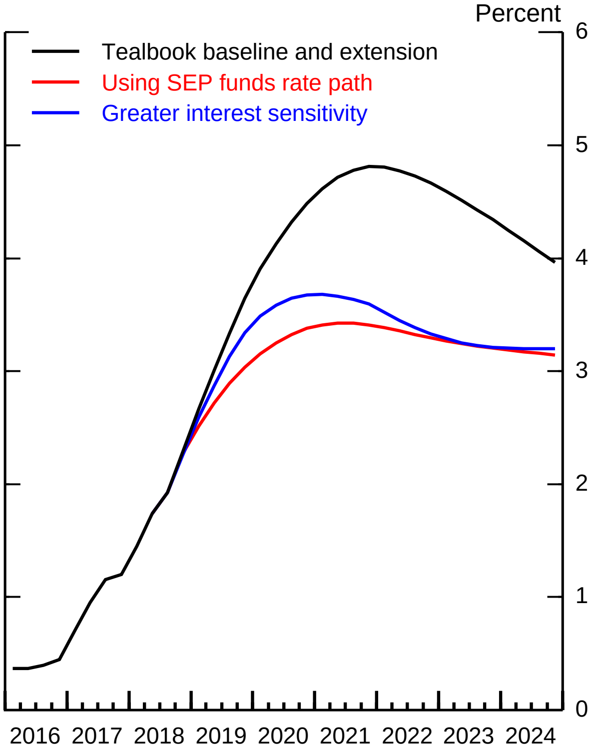


12. Possible Explanations for the Different Funds Rate Paths

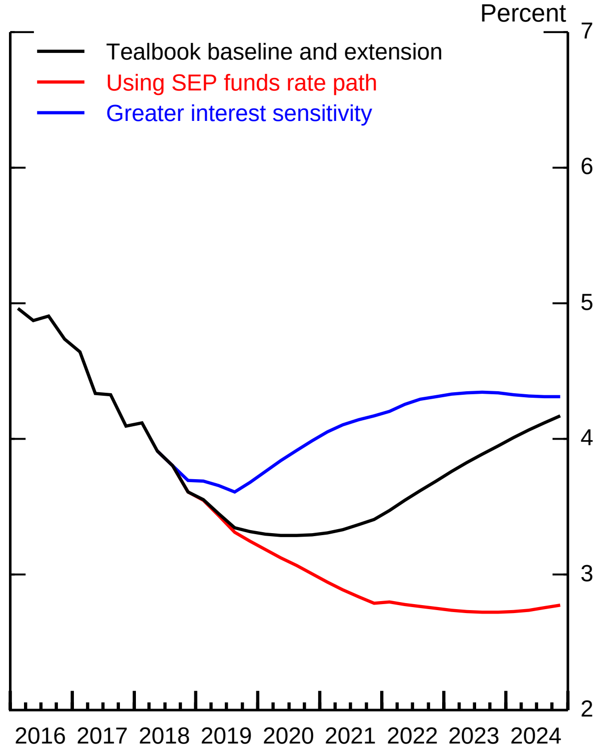
- Different assumed policy rules.
- Tealbook baseline assumes greater underlying strength ("momentum") in aggregate demand.
- Real activity is more interest sensitive than what the Tealbook baseline assumes.

13. Simulated Outcomes Under Different Policy Path or Interest Sensitivity Assumptions

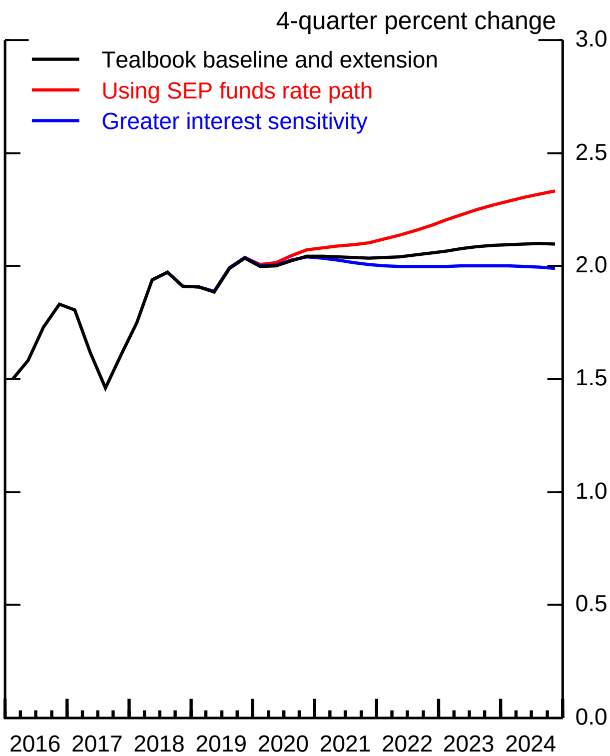
A. Federal Funds Rate



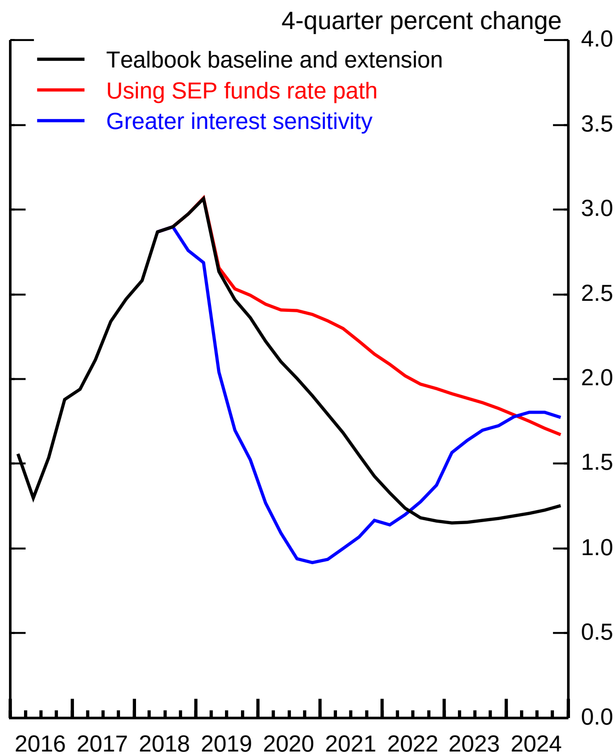
B. Unemployment Rate



C. PCE Prices Excluding Food and Energy



D. Real GDP



Appendix 4: Materials used by Ms. Wilson

Class II FOMC – Restricted (FR)

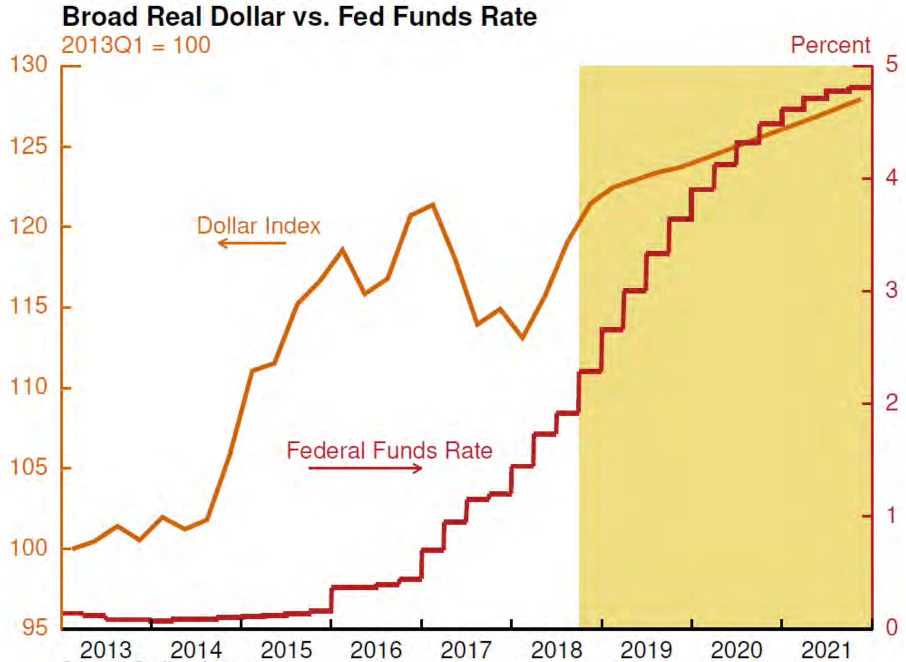
Material for Briefing on

The International Outlook

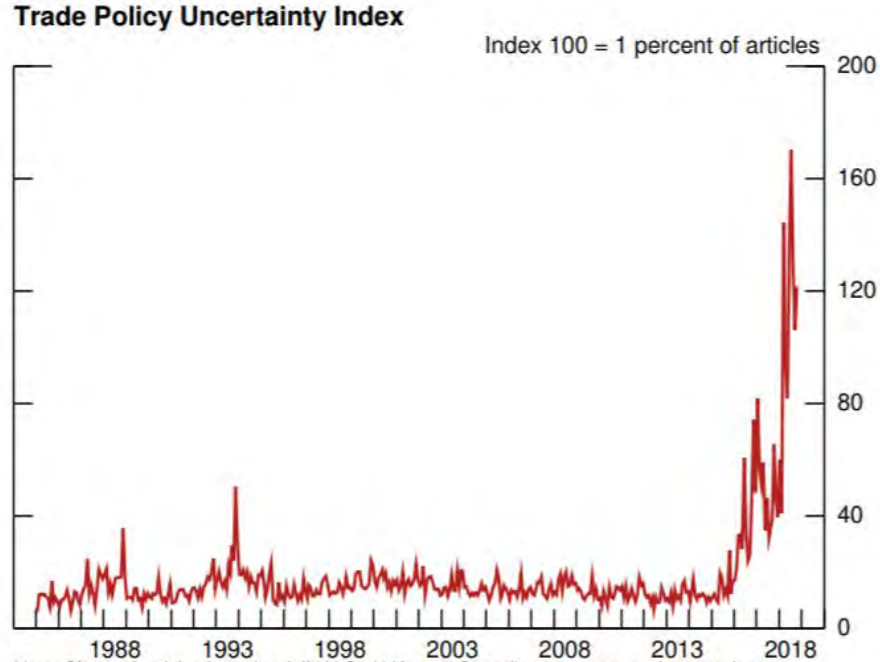
Beth Anne Wilson
Exhibits by Mandy Bowers
November 7, 2018

United States: These Might Rock You

- Interest rates are projected to rise materially.
- The dollar strengthens commensurately.
- U.S. trade policy remains highly uncertain.



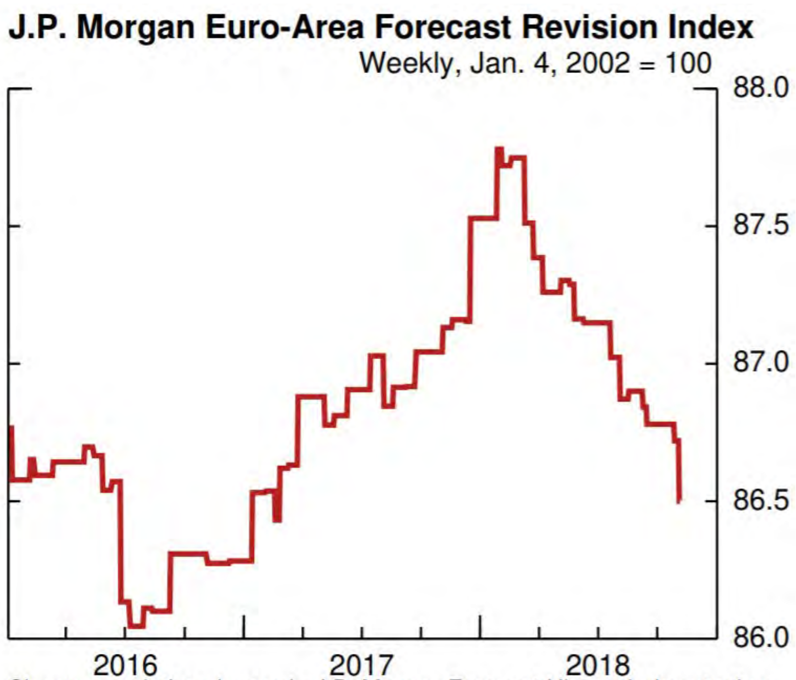
Source: Staff estimates.



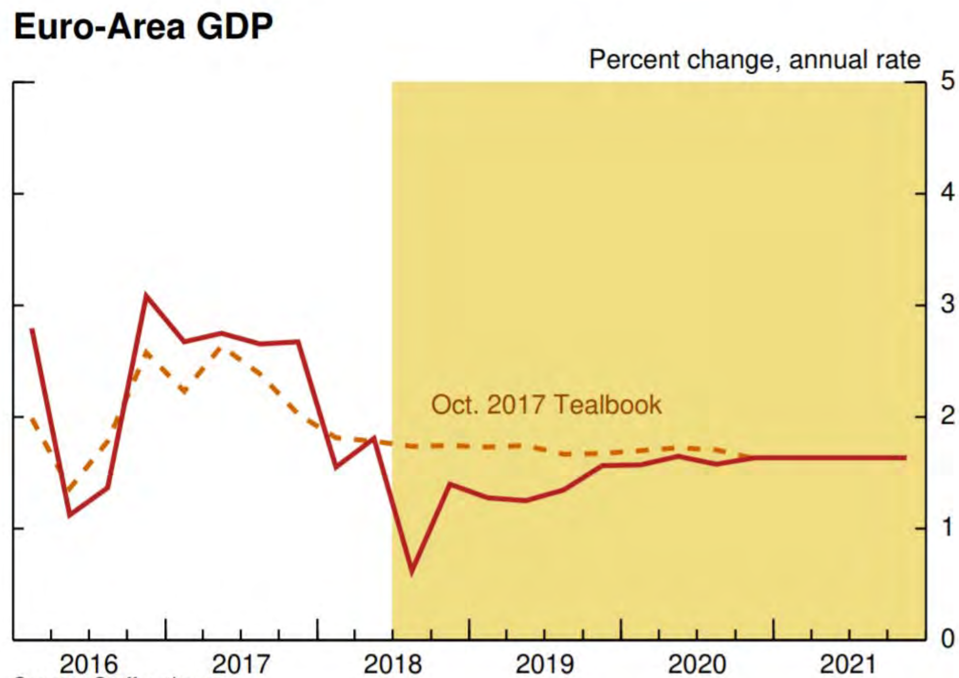
Note: Share of articles in major daily U.S., U.K., and Canadian newspapers that mention uncertainty and an additional trade-policy-related word. Source: Staff calculations.

Europe: Lost that lovin' feeling?

- Euro-area data have persistently disappointed.
- Leading to downward revisions in the outlook.



Shows cumulative change in J.P. Morgan Forecast History Index starting at 100 on Jan 4, 2002. Changes in index reflect revisions to forecast of average real GDP growth over the quarters t-1, t, t+1, and t+2.
Source: Bloomberg.

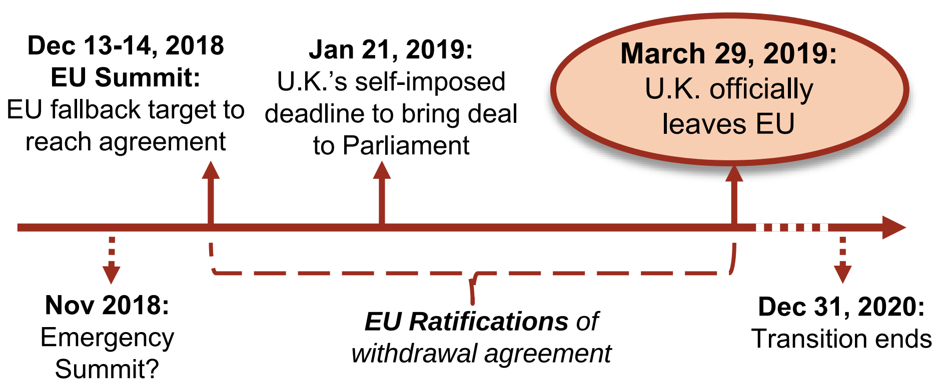


Source: Staff estimates.

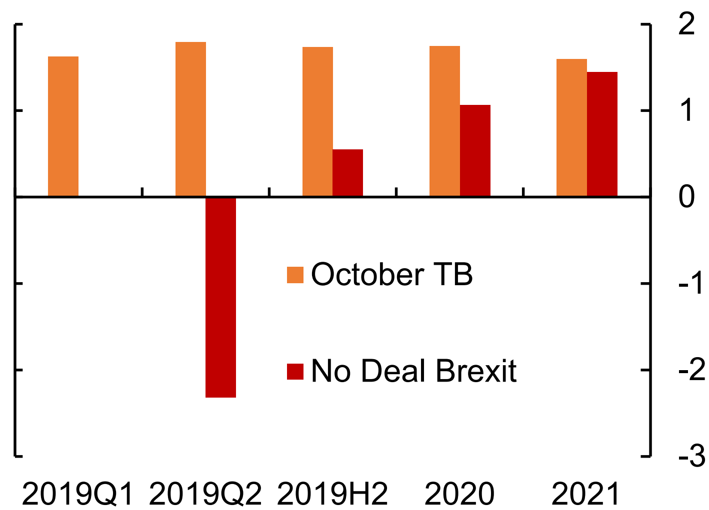
Brexit: Breakin’ Up is Hard to Do

- The U.K. and EU still seem far apart, and avoiding a “no deal” Brexit is far from a foregone conclusion.
- Hard and sudden “no deal” Brexit could ….
  - Weigh on UK growth
  - Increase financial stability risks, with potential transmission to the U.S.

Key Future Dates



UK Real GDP

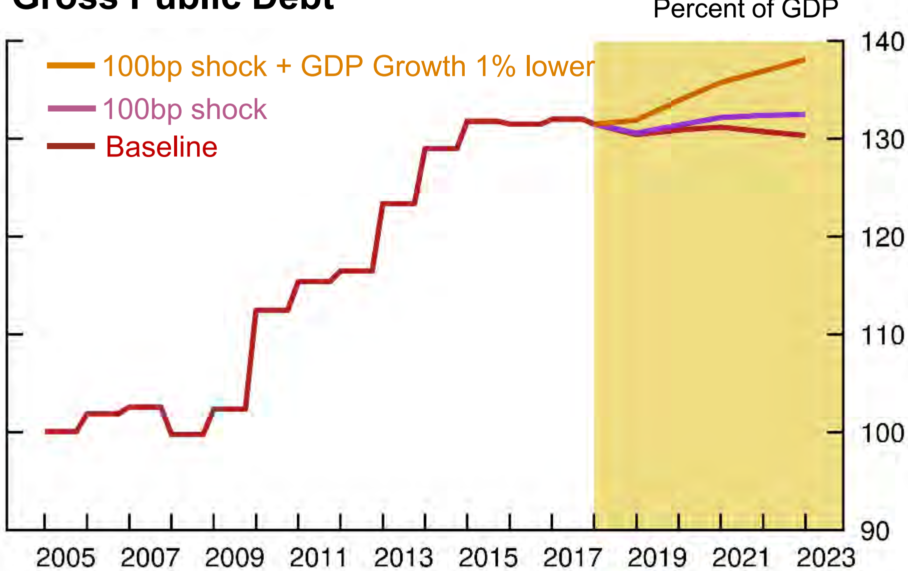


Source: Staff estimates.

Italy: Mambo Italiano

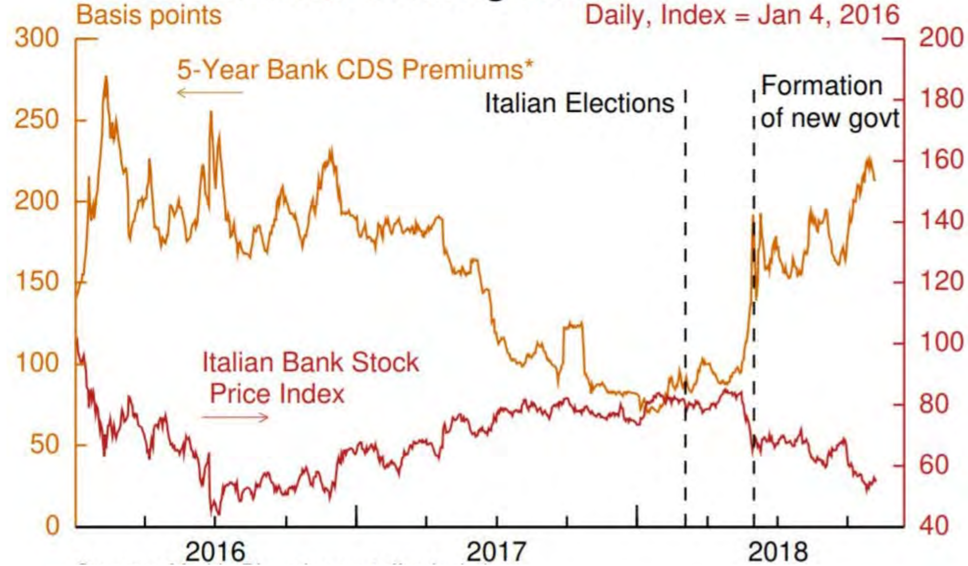
- Incoming government is not adhering to EU fiscal rules.
  - Potentially leading to sanctions.
- Suffers from low growth, high debt, and unprofitable banks.
- Struggles could reverberate across global markets.

Gross Public Debt



Source: Staff simulation. 100bp shock shows impact when marginal rate receives 100bp shock that remains level over forecast horizon. GDP growth 1 percentage point slower than baseline simulation.

Italian Financial Banking Indicators

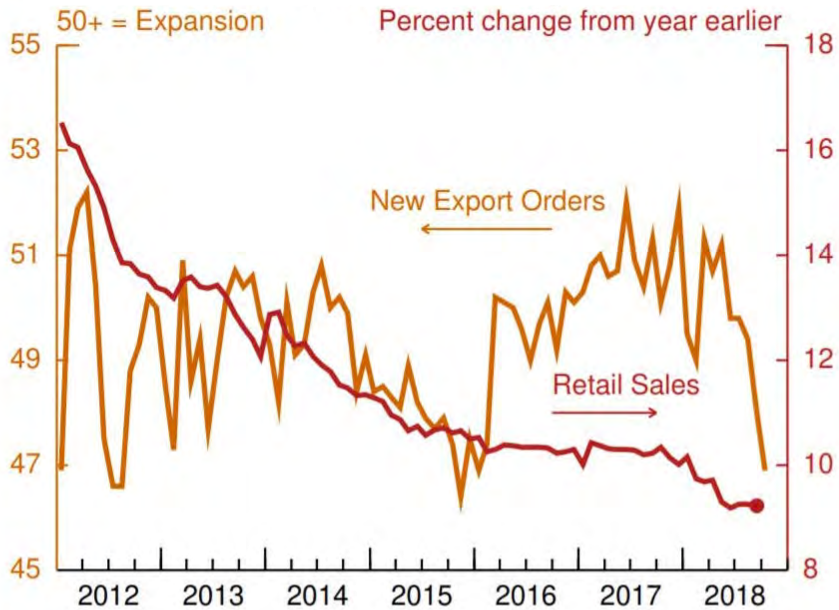


Source: Markit, Bloomberg, staff calculations.
*Credit Default Swap indexes weighted by bank total assets.

China: Slow Ride

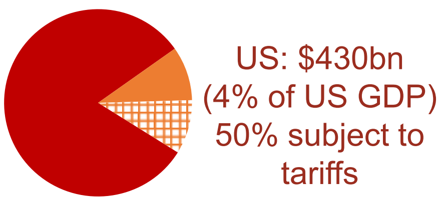
- Deleveraging has led to a deceleration of growth.
- Trade tensions with the U.S. limited to date.
- Potential effect could be much more.

Chinese Retail Sales and New Export Orders

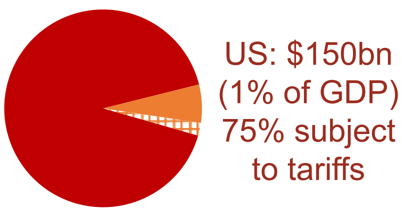


Source: Staff estimates.

Chinese Exports:
$2.3 Trillion
(18% of GDP)



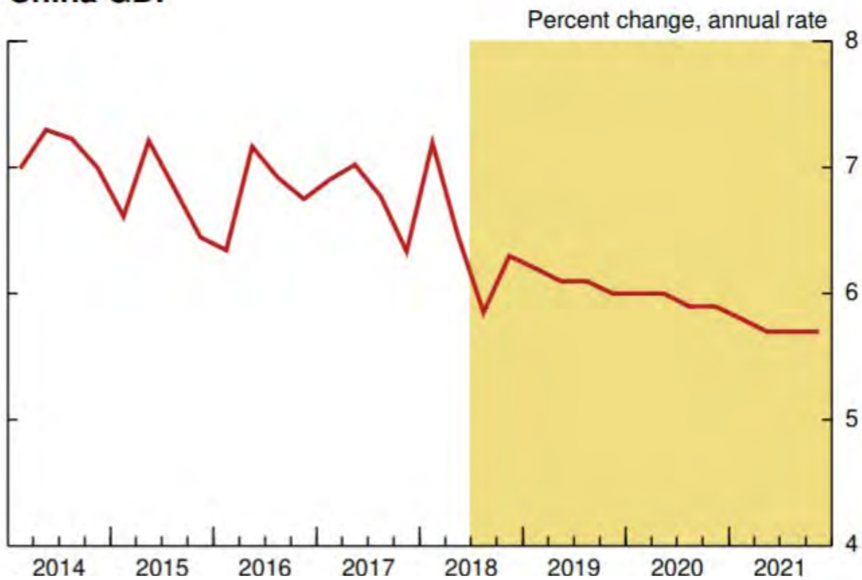
Chinese Imports:
$1.8 Trillion
(15% of GDP)



China: Don't Bring me Down

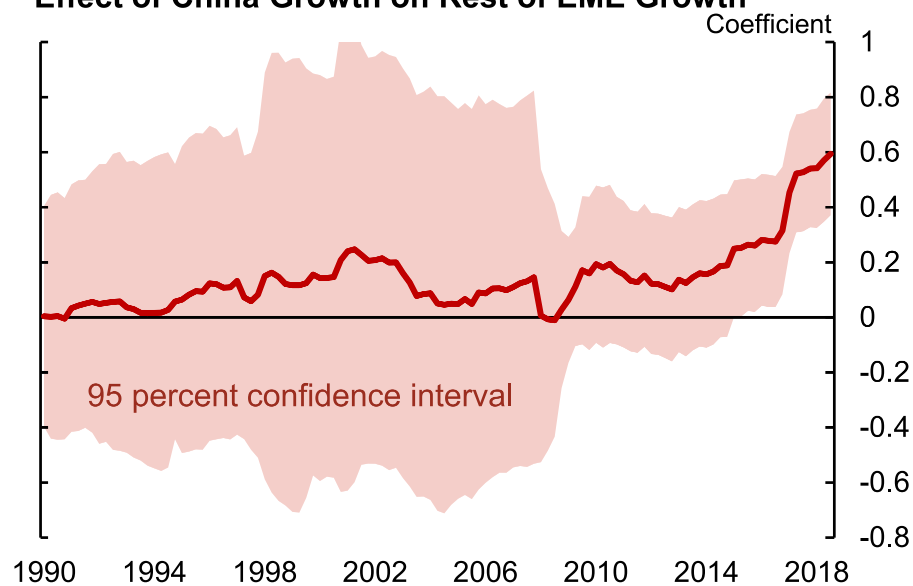
- Already, we expect China's growth to slow noticeably.
- Even weaker growth would be expected to slow broader EME performance as well.

China GDP



Source: Staff estimates.

Effect of China Growth on Rest of EME Growth*



*Coefficient on Chinese growth from 10-year rolling regressions of aggregate EME ex-China growth on Chinese growth and advanced-economy growth.
Source: staff estimates.

EME: Won't Get Fooled Again

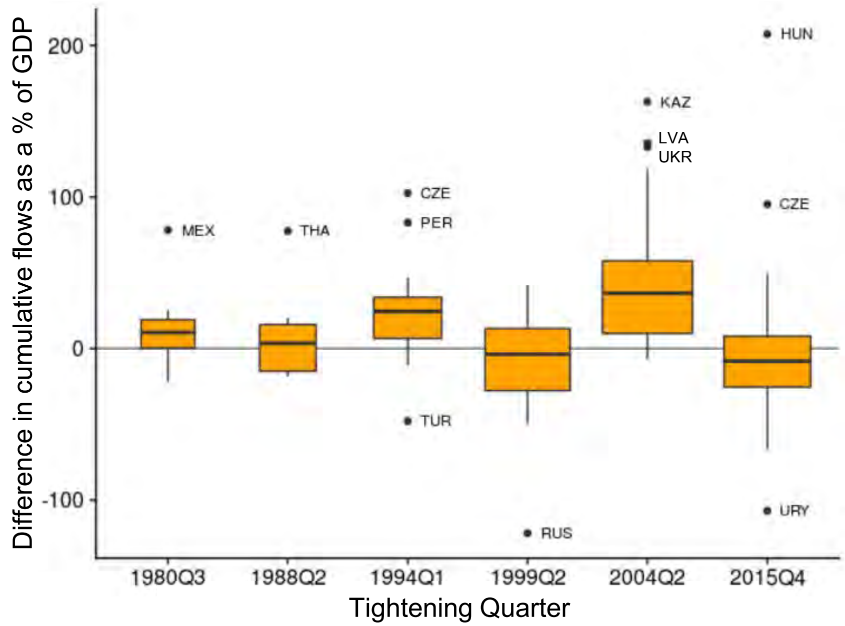
- Common view is that U.S. monetary policy tightening hurts EMEs.
- But not every tightening cycle slows EME growth or leads to capital outflows.

Average Real GDP Growth around U.S. Tightenings

Start of U.S. Tightening Episode	*Emerging Asia*		*Latin America*	
	2 Years Before	2 Years After	2 Years Before	2 Years After
1980Q3	5.8	6.4	6.9	3.0
1988Q2	11.9	7.1	2.1	2.9
1994Q1	8.1	9.1	3.3	1.0
1999Q2	2.5	7.3	4.0	3.0
2004Q2	7.4	7.6	2.7	4.1
2015Q4	5.7	5.7	2.6	1.6

Source: Staff estimates.

Change in capital inflows to EMEs
2 years before and after initial Fed tightening



Black lines are median value, box edges are 25th and 75th percentile. Lines are range of values excluding outliers (greater than 1.5*interquartile range). Difference is cumulative gross inflows two years after tightening minus those 2 years after. Scaled to GDP in quarter of tightening. Source: Haver, IMF BoPS, WDI.

EME: Take the money and run?

- What is the impact on EMEs if our Tealbook baseline is realized?

Model Description

- 4 regions – U.S., AFE, Emerging Asia (less vulnerable), Latin America (more vulnerable)
- Allow currency depreciation to:
  - Boost inflation expectations.
  - Raise borrowing costs of vulnerable EMEs.

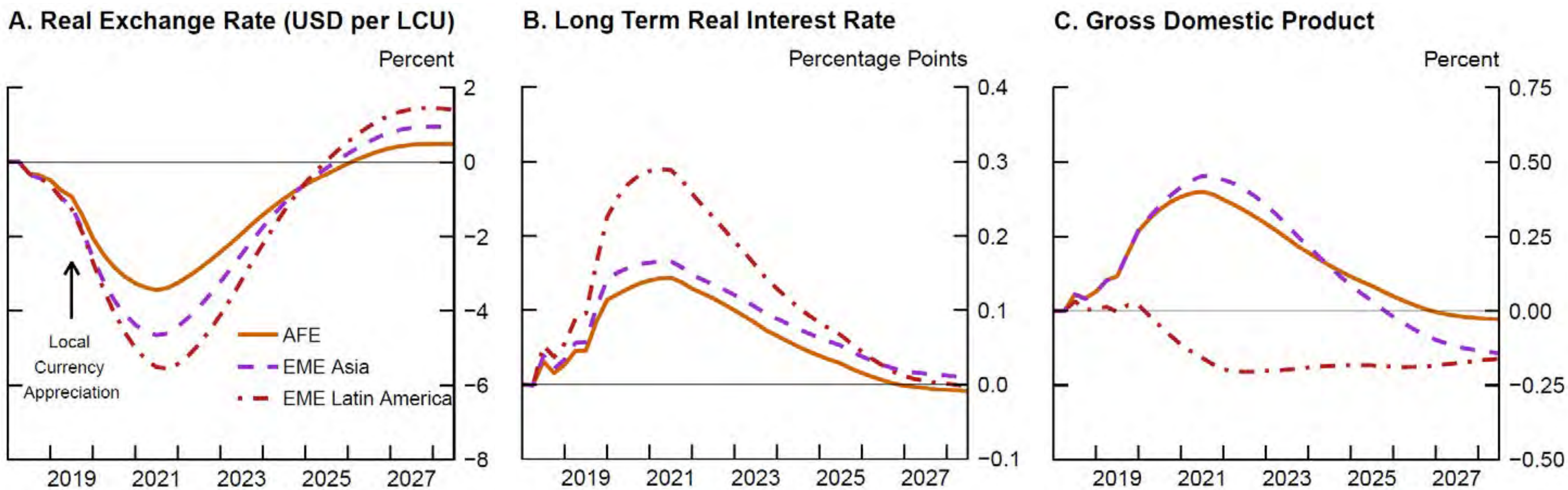
Calibrate

- Use Blue Chip consensus as starting point to capture market expectations.
- Then add shocks to U.S. aggregate demand to generate TB unemployment forecast → higher U.S. policy rates than markets.

Examine impact on foreign economies

EME: Good times, Bad times

- Higher path of U.S. interest rates pushes down currencies abroad.
- Foreign long-term rates also rise, especially in Latin America.
- For AFEs and less vulnerable EMEs the boost to trade from the exchange rate outweighs the cost of higher interest rate.
- For vulnerable EMEs, the reverse is true but the drag on GDP is slight.



Source: Staff estimates.

Vulnerabilities: All Along the Watchtower

- EME vulnerability index is rising.
- Matrix points to some notable vulnerabilities and prominent risks.

EME Vulnerability Index*

Source: Staff calculations. Based on 6 indicators: CA/GDP, gross govt debt/GDP, avg inflation, increase in bank credit to private sector/GDP, reserves/GDP, total external debt/exports. Score ranges from 1 (all variables for all countries falling in bottom 5th percentile of historical experience) to 5 (all variables for all countries falling in top 5th percentile). Countries: Brazil, Chile, China, Colombia, India, Indonesia, Korea, Malaysia, Mexico, Philippines, South Africa, Thailand, Turkey.

Country	IFSM Assessment October	Prominence of Risks
Canada	Moderate	Low
France	Moderate	Medium
Germany	Low	Medium
Italy	Notable	High
Japan	Moderate	Medium
Switzerland	Moderate	Low
United Kingdom	Moderate	High
Brazil	Notable	High
China	Notable	High
Hong Kong	Moderate	Medium
Mexico	Notable	Medium
South Korea	Low	Medium
Turkey	Elevated	High
Overall	**Moderate**	

IFSM Assessment Key:

Extremely Subdued	Low	Moderate	Notable	Elevated

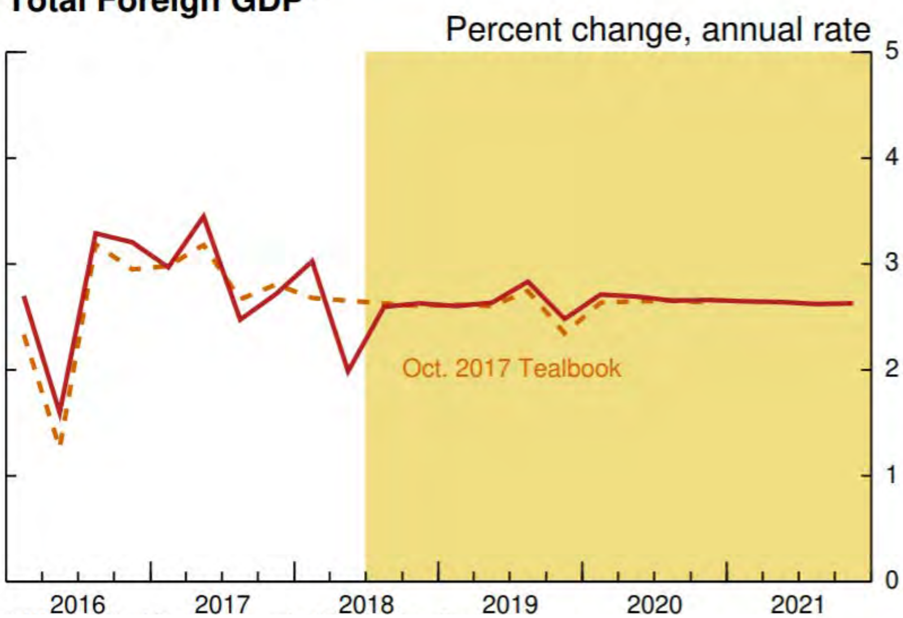
Prominence of Risks Key:

Low	Medium	High

Bottom Line: Peaceful (Qu)Easy Feeling

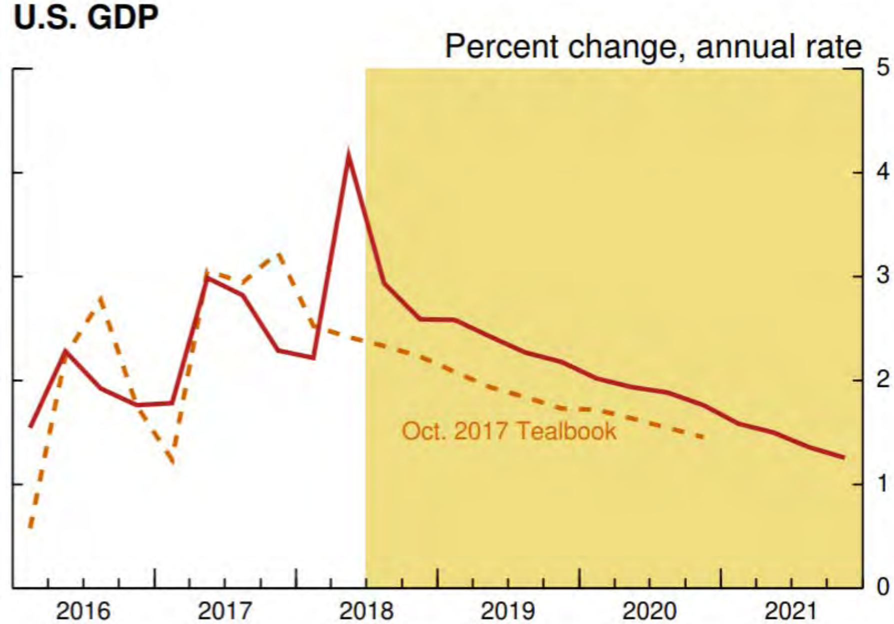
- Baseline of relatively stable foreign growth near potential.
- Does incorporate drag from Britaly and EMEs.
- Leaving it little changed from last year despite sizable U.S. revision.

Total Foreign GDP*



*Weighted by bilateral shares in U.S. merchandise exports.
Source: Staff estimates.

U.S. GDP



Source: Staff estimates.

Appendix 5: Materials used by Mr. Bassett

Material for Briefing on

Financial Stability Developments

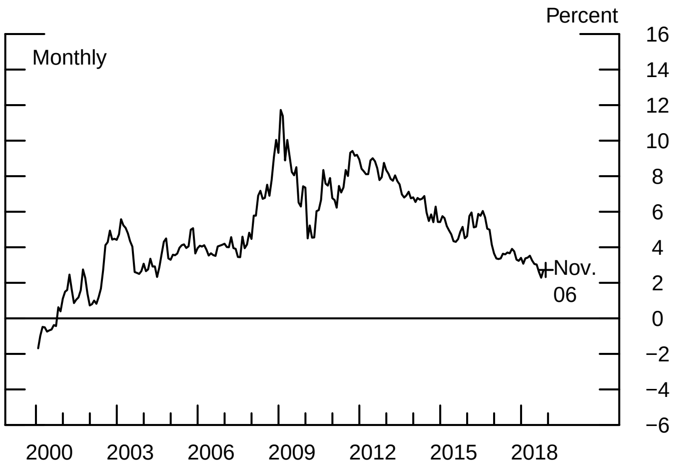
William F. Bassett
Exhibits by Candy Martinez
November 7, 2018

Class II FOMC - Restricted (FR)

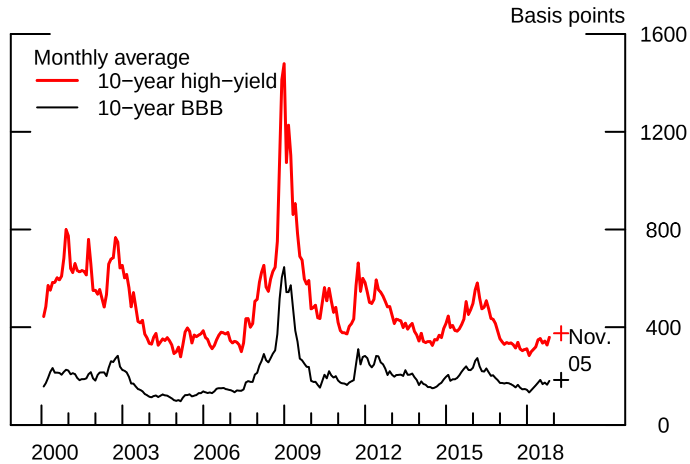
Exhibit 1: Valuations and Business Leverage

November 7, 2018

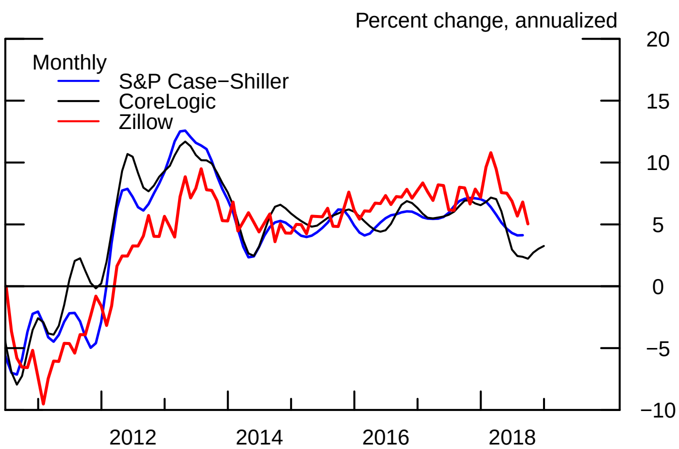
1−1
Equity Risk Premium



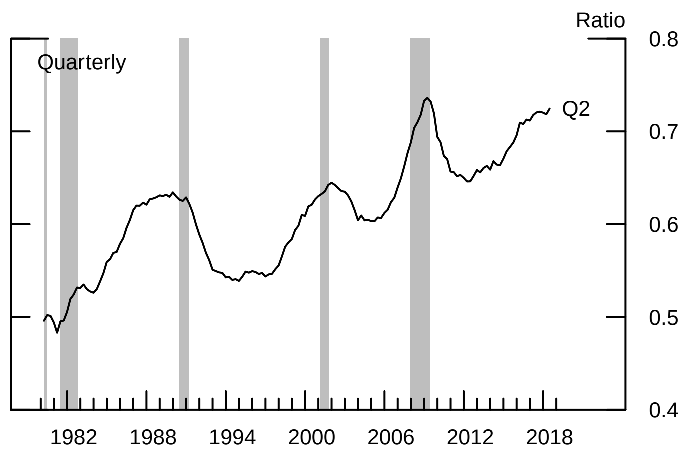
1−2
Corporate Bond Spreads



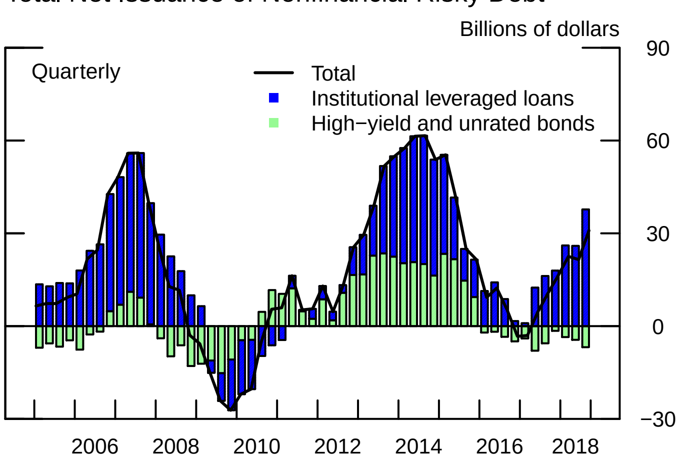
1−3
Growth of Nominal Prices of Existing Homes



1−4
Business Sector Credit−to−GDP Ratio



1−5
Total Net Issuance of Nonfinancial Risky Debt



1−6
Holders of Leveraged Loans

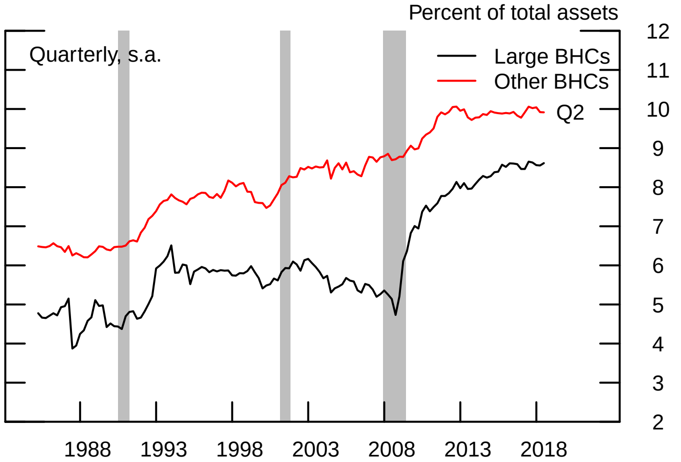
Institution Type	2015	2018Q1
1. CLOs	53%	59%
2. Banks	12%	9%
3. Mutual Funds	18%	21%
4. Insurance Companies	5%	6%
5. Other	12%	6%

Class II FOMC - Restricted (FR)

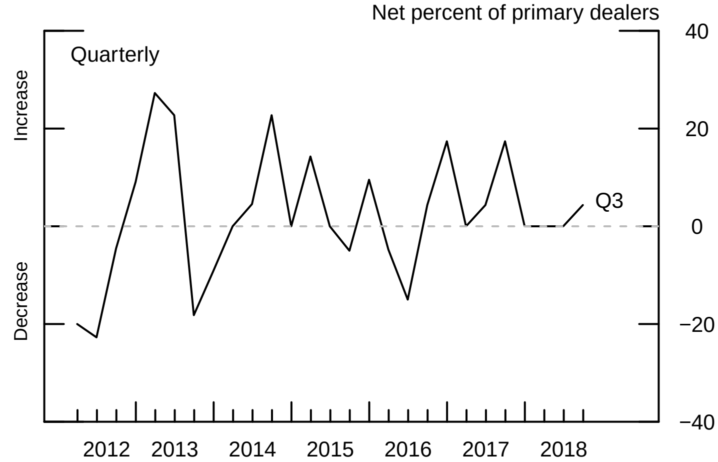
Exhibit 2: Financial Leverage and Funding Markets

November 7, 2018

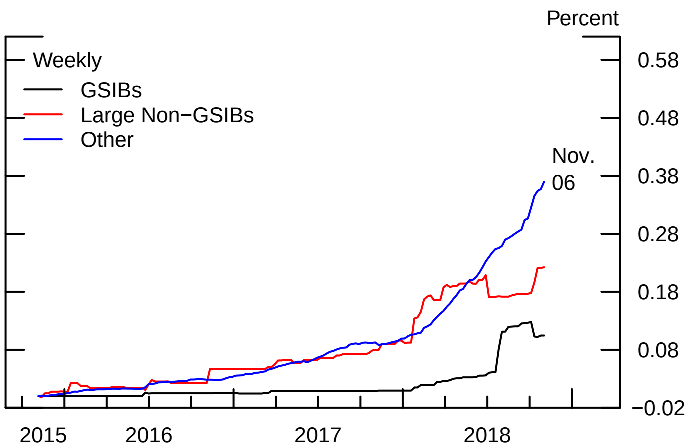
2−1
Common−Equity−to−Assets Ratio for Commercial Banks



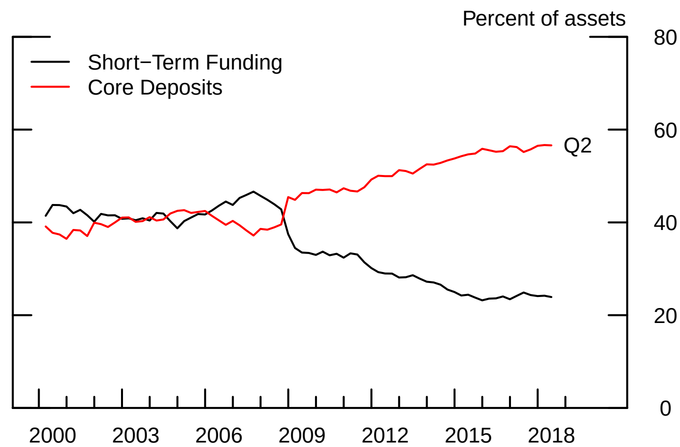
2−2
Changes in the Use of Financial Leverage by Hedge Funds



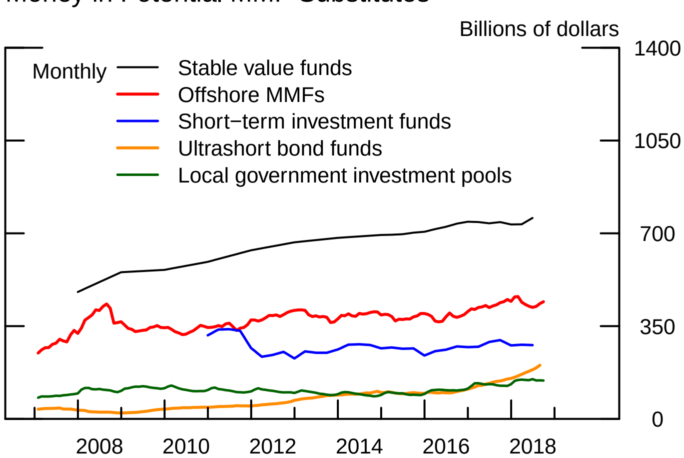
2−3
Cumulative Changes in Rates on Deposits



2−4
Liability Categories at Large Banks



2−5
Money in Potential MMF Substitutes



2−6
Libor Transition

- LIBOR panel banks have only agreed to continue submissions through the end of 2021
- The Federal Reserve System is leading the effort to promote SOFR, and exploring solutions for legacy LIBOR contracts

 Exhibit 3: Staff Judgement on Levels of Vulnerabilities

Key: Extremely subdued | Low | Moderate | Notable | Elevated

	October 2017	July 2018	October 2018
Valuation Pressures	• The equity price-to-earnings ratio is near its highest value outside the dot-com era and has edged up further. • Corporate bond spreads to Treasury yields have compressed a little further, while standards and terms on leveraged loans have deteriorated over the last year. • CRE prices have continued to rise, although bank lending standards for CRE loans have tightened somewhat. • Asset valuations appear less excessive, but still stretched, when compared to current low Treasury yields.	• Valuation pressures remain elevated across most markets. • House prices have accelerated over the past year, pushing their ratio to rents further above their estimated historical trend. • Valuation pressures in CRE markets continued to increase from already stretched conditions.	• Valuation pressures remain elevated across most markets. • Leveraged lending markets show continued evidence of elevated risk appetite. • CRE capitalization rates are at historical lows. • The ratio of house prices to rents remains above its historical trend although house prices have decelerated recently.
Private Nonfinancial Sector Leverage	• Leverage in the nonfinancial corporate sector remains elevated, but risky debt outstanding has edged down. • Household borrowing has moved up mainly for prime borrowers. • Overall nonfinancial sector leverage continues to be below trend by most estimates.	• In the nonfinancial corporate sector, debt owed by highly-levered and lower-rated firms remains elevated. • The household sector appears resilient. The amount of debt owed by borrowers with near-prime and subprime credit scores is flat and well below pre-crisis levels.	• Corporate debt remains elevated, amid signs of deteriorating credit underwriting standards. • The household sector appears resilient, with moderate borrowing concentrated among prime-rated borrowers.
Financial Sector Leverage	• Capital positions at banks and insurance companies remain at high levels. • Available indicators of leverage at other nonbank financial institutions are mostly little changed, though there are some signs of leverage increasing.	• Capital positions at banks and insurance companies remain at high levels. • Some measures of hedge fund leverage remain high.	• Capital positions at banks and insurance companies remain at high levels. • Available indicators of hedge fund leverage remain high.
Maturity and Liquidity Trans-formation	• Large BHCs' holdings of liquid assets remain at high levels. • There has been little growth outside of government funds in potential substitutes for prime money market funds. • Insurance companies continue to grow their nontraditional liabilities, albeit at a slower pace in most categories.	• Large BHCs' holdings of liquid assets remain at high levels. • Banks' core deposit funding remains high, while short-term funding remains near historical lows. • The growth in potential substitutes for prime MMFs remains limited.	• Large BHCs' holdings of liquid assets remain at high levels. • Banks' core deposit funding remains high, while short-term funding remains near historical lows. • Aggregate measures of runnable liabilities, including those issued by nonbanks, remain relatively low.
Overall Assessment			

Exhibit 1:
1: Note: Equity risk premium is estimated using a dividend discount model developed by staff.
Source: Staff estimates.
2: Note: Spreads over 10−year Treasury yield. Plot includes data up to Nov 5.
Source: Staff estimates of smoothed corporate yield curves based on Merrill Lynch data and smoothed Treasury yield curve.
3: Note: The date of the last observation varies by series. S&P Case-Shiller ends in August, CoreLogic ends in September, and Zillow ends in September.
Source: Standard and Poor's, CoreLogic, and Zillow.
4: Source: Financial Accounts of the United States and NIPA.
5: Note: Data are a four-quarter moving average. Total net issuance of risky debt is the sum of the net issuance of speculative-grade and unrated bonds and leveraged loans.
Source: Mergent Fixed Investment Securities Database, S&P.
6: Source: S&P LCD.

Exhibit 2:
1: Note: Common equity is defined as total equity capital net of preferred equity and intangible assets, and is divided by total assets. Large BHCs are those with greater than $50 billion in total assets. The shaded bars indicate periods of business recession as defined by the National Bureau of Economic Research.
Source: Call Report.
2: Note: Data are collected in the middle of each quarter.
Source: Senior Credit Officer Opinion Survey (SCOOS).
3: Note: Jumbo CD - $100k: up to 1 year maturity. Rate hikes occurred on 12/13/2017, 03/21/2018, 6/13/2018 and 09/26/2018. Large Non-GSIB banks include BHCs and IHCs that have $50 billion or more in average total consolidated assets, and are not designated as US Global Systemically Important Banks. The IHCs of Credit Suisse, Barclays, and UBS are excluded due to lack of data history for comparison.
Source: SNL.
4: Note: Data as of 2018:Q2. Large banks include BHCs and IHCs that have $50 billion or more in average total consolidated assets. The IHCs of Credit Suisse, Barclays, and UBS are excluded due to lack of data history for comparison.
Source: FR Y-9C.
5. Note: MMFs are money market funds. Local government investment pools are rated "AAAm" or "AAm." The date of the last observation varies by series. Stable value funds ends in June, offshore MMFs ends in September, short-term investment funds ends in June, ultrashort bonds funds ends in August, and local government investing pools ends in September.
Source: S&P.

Exhibit 3:
Note: Heat map color assignments were made by staff judgment. In the absence of significant structural changes, we would expect vulnerabilities to spend roughly equal proportions of time in each of the colored risk buckets.
Source: October 2018 QS report.

Appendix 6: Materials used by Mr. Reeve

Class I FOMC – Restricted Controlled (FR)

Material for the Briefing on

Monetary Policy Alternatives

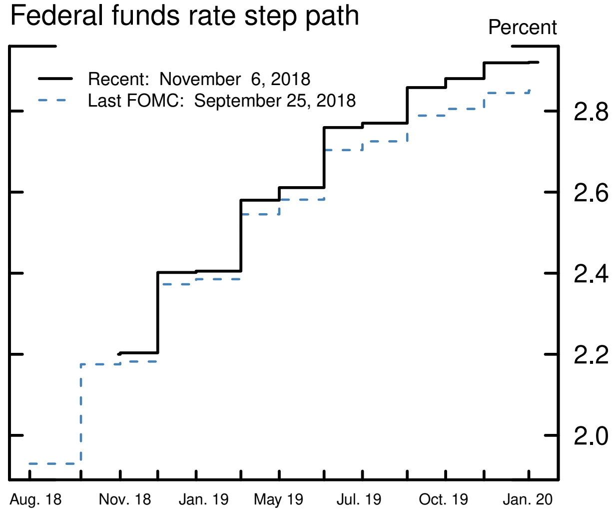
Trevor Reeve
Exhibits by Gurubala Kotta
November 7-8, 2018

Monetary Policy Considerations

Alternative B

- Economy evolving broadly in line with expectations.
- Maintain the target range at this meeting.
- Reiterate "further gradual increases."

Federal funds rate step path

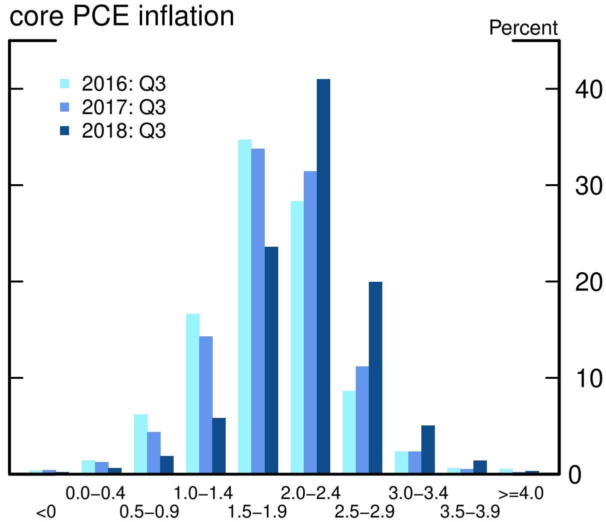


Note: Derived from settlement quotes on federal funds futures contracts from the CME.

Alternative C

- Increasingly high levels of resource utilization, buildup of inflation risks.
- Raise the target range.
- "Further gradual increases are likely to continue for some time."

Subjective probabilities of year–ahead core PCE inflation

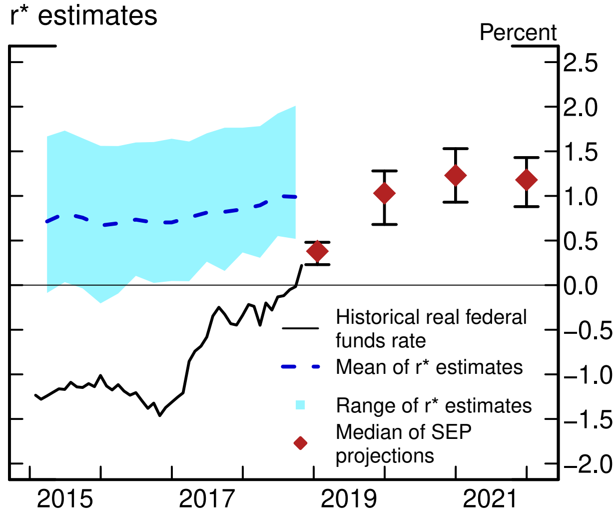


Source: Survey of Professional Forecasters.

Alternative A

- Monetary policy is appropriately neutral.
- Maintain the target range.
- Remove reference to "further gradual increases."

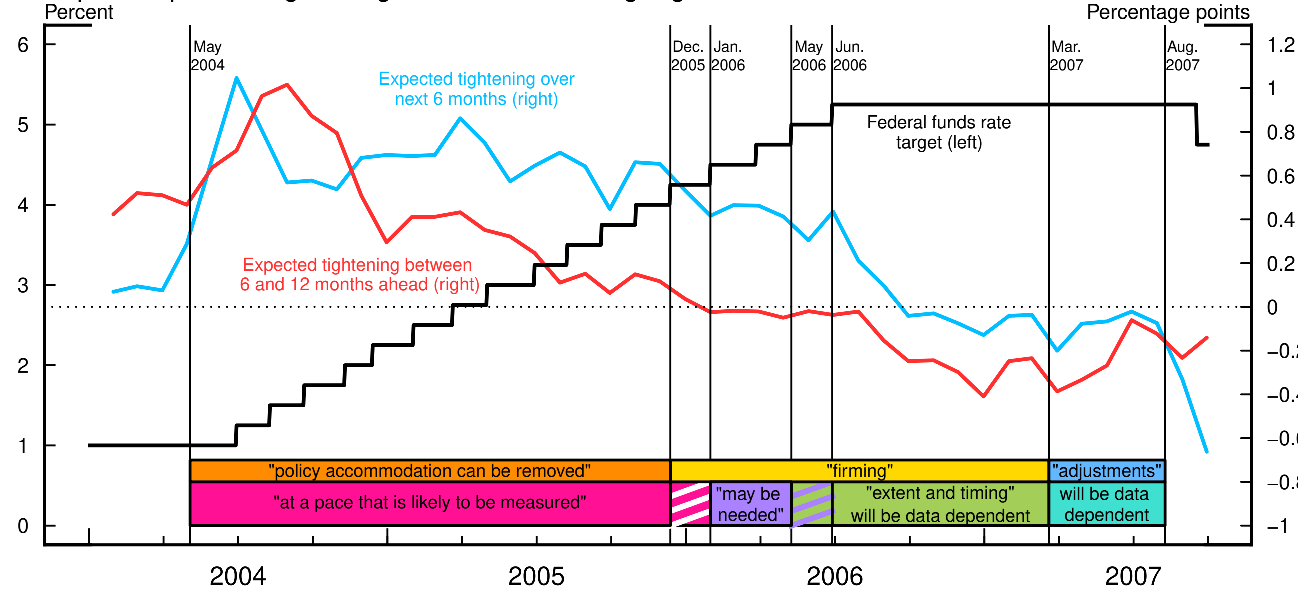
Real federal funds rate: Projections and r* estimates



Note: 2018:Q3 is based on seven of eight models. See the September 2018 Monetary Policy Strategies section of Tealbook A for details. Whiskers denote central tendency of SEP projections.

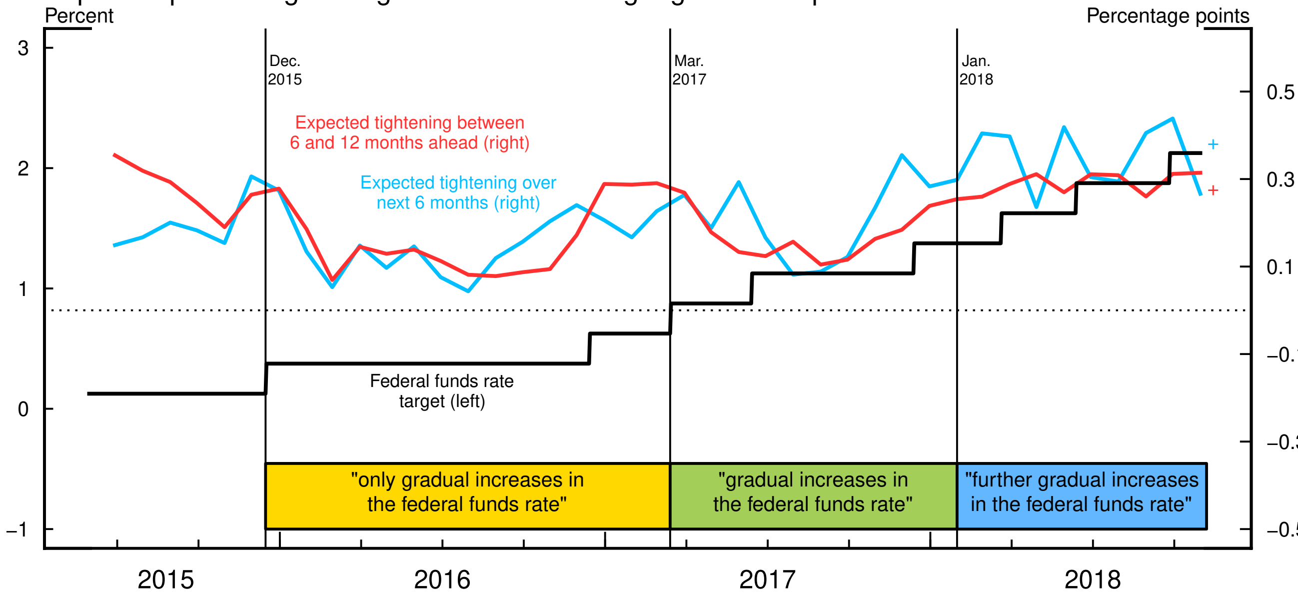
Monetary Policy Considerations

Expected pace of tightening and statement language: 2004–2007



Note: Monthly averages were used for the expected tightening series. The hatched region between the Dec. 2005 and Jan. 2006 FOMC meeting dates indicates the period in which the postmeeting statement included the word "measured", but in different usage than in the earlier period. The hatched region between the May 2006 and Jun. 2006 FOMC meeting dates indicates the period in which the post−meeting statement said that additional policy firming "may yet be needed", but that its "extent and timing" would be data dependent.
Source: Federal Reserve Board, Board staff calculations.

Expected pace of tightening and statement language: 2015 – present



Note: Monthly averages were used for the expected tightening series. Expected tightening data as of November 6 is denoted with "+".
Source: Federal Reserve Board, Board staff calculations.

Possible language for future transition

- Alternative A drops reference to future rate increases.
- Other possibilities
  - "The Committee expects that some further gradual increases in the target range..."
  - "The Committee judges that some further gradual increases...may be warranted to..."
  - "In determining the timing and size of any additional increases in the federal funds rate, the Committee will assess..."

SEPTEMBER 2018 FOMC STATEMENT

1. Information received since the Federal Open Market Committee met in August indicates that the labor market has continued to strengthen and that economic activity has been rising at a strong rate. Job gains have been strong, on average, in recent months, and the unemployment rate has stayed low. Household spending and business fixed investment have grown strongly. On a 12-month basis, both overall inflation and inflation for items other than food and energy remain near 2 percent. Indicators of longer-term inflation expectations are little changed, on balance.

2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee expects that further gradual increases in the target range for the federal funds rate will be consistent with sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective over the medium term. Risks to the economic outlook appear roughly balanced.

3. In view of realized and expected labor market conditions and inflation, the Committee decided to raise the target range for the federal funds rate to 2 to 2-1/4 percent.

4. In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its maximum employment objective and its symmetric 2 percent inflation objective. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments.

ALTERNATIVE A FOR NOVEMBER 2018

1. Information received since the Federal Open Market Committee met in ~~August~~ **September** indicates that the labor market has continued to strengthen and that economic activity has been rising at a strong rate. Job gains have been strong, on average, in recent months, and the unemployment rate has ~~stayed low~~ **declined**. Household spending ~~and~~ **has continued to grow strongly, while growth of** business fixed investment ~~have grown strongly~~ **has moderated from its rapid pace earlier in the year**. On a 12-month basis, both overall inflation and inflation for items other than food and energy remain near 2 percent. Indicators of longer-term inflation expectations are little changed, on balance.

2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee expects that ~~further gradual increases in~~ the **current** target range for the federal funds rate will**, for a time,** be consistent with sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective over the medium term. Risks to the economic outlook appear roughly balanced.

3. In view of realized and expected labor market conditions and inflation, the Committee decided to ~~raise~~ **maintain** the target range for the federal funds rate ~~to~~ **at** 2 to 2-1/4 percent.

4. In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its maximum employment objective and its symmetric 2 percent inflation objective. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments.

ALTERNATIVE B FOR NOVEMBER 2018

1. Information received since the Federal Open Market Committee met in ~~August~~ **September** indicates that the labor market has continued to strengthen and that economic activity has been rising at a strong rate. Job gains have been strong, on average, in recent months, and the unemployment rate has ~~stayed low~~ **declined**. Household spending ~~and~~ **has continued to grow strongly, while growth of** business fixed investment ~~have grown strongly~~ **has moderated from its rapid pace earlier in the year**. On a 12-month basis, both overall inflation and inflation for items other than food and energy remain near 2 percent. Indicators of longer-term inflation expectations are little changed, on balance.

2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee expects that further gradual increases in the target range for the federal funds rate will be consistent with sustained expansion of economic activity, strong labor market conditions, and inflation near the Committee's symmetric 2 percent objective over the medium term. Risks to the economic outlook appear roughly balanced.

3. In view of realized and expected labor market conditions and inflation, the Committee decided to ~~raise~~ **maintain** the target range for the federal funds rate ~~to~~ **at** 2 to 2-1/4 percent.

4. In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its maximum employment objective and its symmetric 2 percent inflation objective. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments.

ALTERNATIVE C FOR NOVEMBER 2018

1. Information received since the Federal Open Market Committee met in ~~August~~ **September** indicates that the labor market has continued to ~~strengthen~~ **tighten** and that economic activity has been rising at a strong rate. Job gains have been ~~strong, on average,~~ **robust** in recent months, and the unemployment rate has ~~stayed low~~ **reached multi-decade lows**. Household spending ~~and~~ **has continued to grow strongly, while growth of** business fixed investment ~~have grown strongly~~ **has moderated from its rapid pace earlier in the year**. On a 12-month basis, both overall inflation and inflation for items other than food and energy remain near 2 percent. Indicators of longer-term inflation expectations are little changed, on balance.

2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee expects that further gradual increases in the target range for the federal funds rate will be ~~consistent with sustained expansion of economic activity, strong labor market conditions, and~~ **warranted for some time to keep** inflation near the Committee's symmetric 2 percent objective **and to sustain the economic expansion and maximum employment** over the medium term. Risks to the ~~economic~~ outlook **for economic activity** appear roughly balanced. **The Committee is monitoring inflation developments closely.**

3. In view of realized and expected labor market conditions and inflation, the Committee decided to raise the target range for the federal funds rate to ~~2 to~~ 2-1/4 **to 2-1/2** percent. **This decision should help guard against the risk that excessive inflation pressures will emerge amid increasingly high levels of resource utilization.**

4. In determining the timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess realized and expected economic conditions relative to its maximum employment objective and its symmetric 2 percent inflation objective. This assessment will take into account a wide range of information, including measures of labor market conditions, indicators of inflation pressures and inflation expectations, and readings on financial and international developments.

Implementation Note for November 2018 Alternatives A and B

Release Date: November 8, 2018

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 26~~ **November 8**, 2018:

- The Board of Governors of the Federal Reserve System voted **[** unanimously **]** to ~~raise~~ **maintain** the interest rate paid on required and excess reserve balances ~~to~~ **at** 2.20 percent, effective ~~September 27~~ **November 9**, 2018.
- 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 27~~ **November 9**, 2018, 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 2 to 2-1/4 percent, including overnight reverse repurchase operations (and reverse repurchase operations with maturities of more than one day when necessary to accommodate weekend, holiday, or similar trading conventions) at an offering rate of 2.00 percent, in amounts limited only by the value of Treasury securities held outright in the System Open Market Account that are available for such operations and by a per-counterparty limit of $30 billion per day.

  The Committee directs the Desk to continue rolling over at auction ~~the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during September that exceeds $24 billion, and to continue reinvesting in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during September that exceeds $16 billion. Effective in October, the Committee directs the Desk to roll over at auction~~ the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during each calendar month that exceeds $30 billion, and to **continue** reinvest**ing** in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during each calendar month that exceeds $20 billion. Small deviations from these amounts for operational reasons are acceptable.

The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions."

- In a related action, the Board of Governors of the Federal Reserve System voted [unanimously] to approve ~~a 1/4 percentage point increase in~~ **the establishment of** the primary credit rate ~~to~~ **at the existing level of** 2.75 percent.~~, effective September 27, 2018. In taking this action, the Board approved requests to establish that rate submitted by the Boards of Directors of the Federal Reserve Banks of …~~

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.

Implementation Note for November 2018 Alternative C

Release Date: November 8, 2018

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 26~~ **November 8**, 2018:

- The Board of Governors of the Federal Reserve System voted **[** unanimously **]** to raise the interest rate paid on required and excess reserve balances to ~~2.20~~ **2.40** percent, effective ~~September 27~~ **November 9**, 2018. **Setting the interest rate paid on required and excess reserve balances 10 basis points below the top of the target range for the federal funds rate is intended to foster trading in the federal funds market at rates well within the FOMC's target range.**

- 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 27~~ **November 9**, 2018, 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 ~~2 to~~ 2-1/4 **to 2-1/2** percent, including overnight reverse repurchase operations (and reverse repurchase operations with maturities of more than one day when necessary to accommodate weekend, holiday, or similar trading conventions) at an offering rate of ~~2.00~~ **2.25** percent, in amounts limited only by the value of Treasury securities held outright in the System Open Market Account that are available for such operations and by a per-counterparty limit of $30 billion per day.

  The Committee directs the Desk to continue rolling over at auction ~~the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during September that exceeds $24 billion, and to continue reinvesting in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during September that exceeds $16 billion. Effective in October, the Committee directs the Desk to roll over at auction~~ the amount of principal payments from the Federal Reserve's holdings of Treasury securities maturing during each calendar month that exceeds $30 billion, and to **continue** reinvest**ing** in agency mortgage-backed securities the amount of principal payments from the Federal Reserve's holdings of agency debt and agency mortgage-backed securities received during each calendar month that exceeds $20 billion. Small deviations from these amounts for operational reasons are acceptable.

The Committee also directs the Desk to engage in dollar roll and coupon swap transactions as necessary to facilitate settlement of the Federal Reserve's agency mortgage-backed securities transactions."

- In a related action, the Board of Governors of the Federal Reserve System voted **[** unanimously **]** to approve a 1/4 percentage point increase in the primary credit rate to ~~2.75~~ **3.00** percent, effective ~~September 27~~ **November 9**, 2018. In taking this action, the Board approved requests to establish that rate submitted by the Boards of Directors of the Federal Reserve Banks of . . .

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

Potential Board actions associated with FOMC Alternatives A or B

Interest on required and excess reserve balances

Leave the interest rates paid on required and excess reserve balances unchanged at 2.20 percent.

Establishment of the primary, secondary, and seasonal credit rates

Approve establishment of the primary credit rate at the existing rate of 2.75 percent and establishment of the rates for secondary and seasonal credit under the existing formulas specified in the staff's November 2, 2018, memo to the Board.

Potential Board actions associated with FOMC Alternative C

Interest on required and excess reserve balances

Raise the interest rate paid on required and excess reserve balances to 2.40 percent, effective November 9, 2018.

Establishment of the primary, secondary, and seasonal credit rates

Approve establishment of the primary credit rate by the Federal Reserve Banks of [...] at 3.00 percent, effective November 9, 2018. This action will encompass approval of the establishment of a 3.00 percent primary credit rate by each of the remaining Federal Reserve Banks, effective on the later of November 9, 2018, or the date such Reserve Banks inform the Secretary of the Board of such a request; the Secretary of the Board would be authorized to inform each such Reserve Bank of the approval of the Board of Governors upon such notification by the Reserve Bank. Lastly, this vote will also encompass the establishment of the rates for secondary and seasonal credit under the existing formulas specified in staff's November 2, 2018, memorandum to the Board.