

Appendix 1: Materials used by Messrs. Fuhrer, Adrian, and Sim

Class II FOMC – Restricted (FR)

Material for the Briefings on

The Relationship between Monetary Policy and Financial Stability

Jeff Fuhrer, Tobias Adrian, and Jae Sim
April 26, 2016

Material for Briefing on
The Linkages Among Monetary Policy,
Macroprudential Policy and Financial
Stability

Jeff Fuhrer, Joe Haubrich and Joe Peek

April 26, 2016

Key features of financial instability

1. Rapid growth of debt
 2. Rapid asset price appreciation
- Future bouts of instability will occur, even with improved regulations
 - Strong capital buffers and other structural tools will make the system more resilient
 - But will not eliminate instability

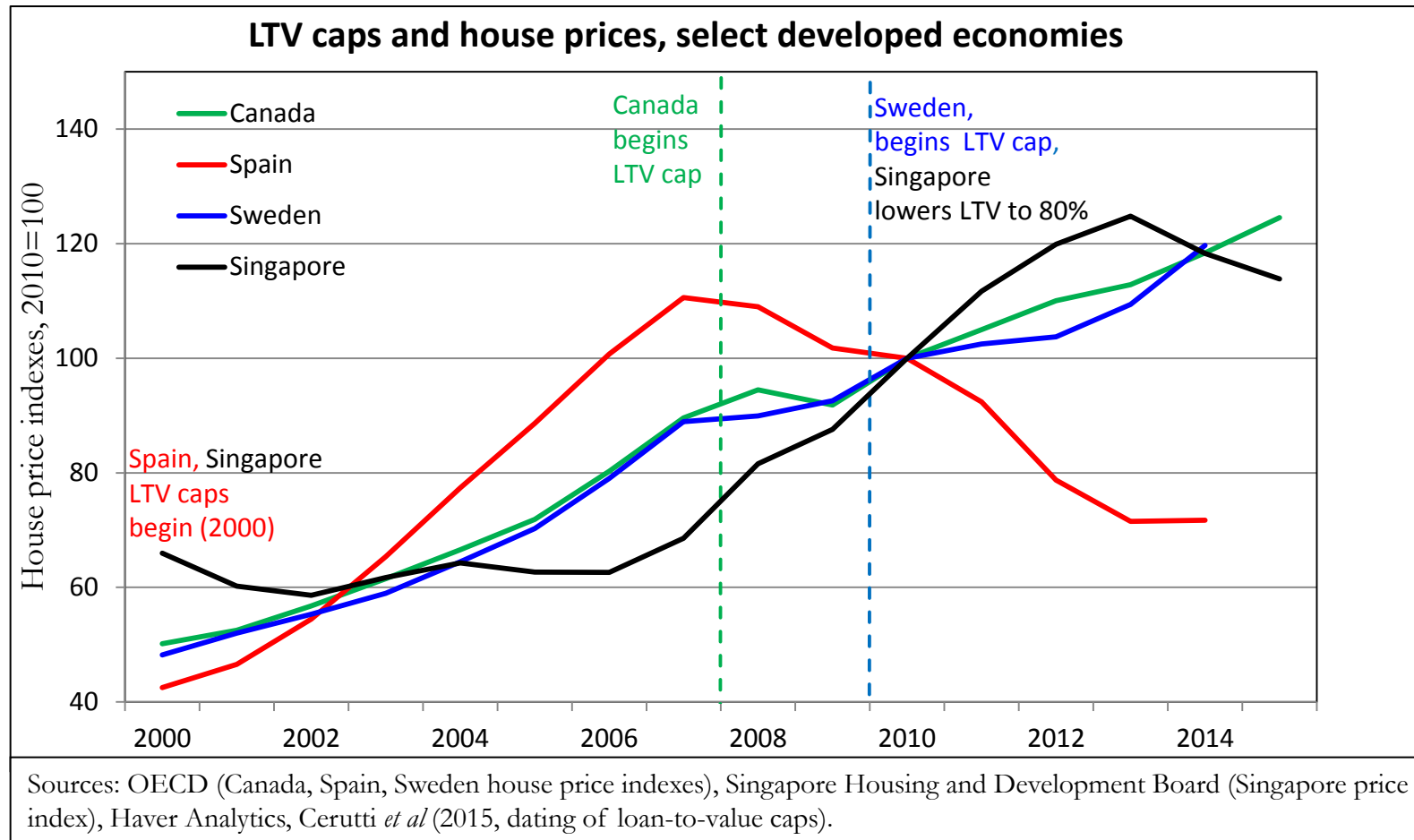
How to mitigate financial instability

1. Macroprudential tools: Evidence on Efficacy

- If macroprudential tools are fully effective, little need to consider using monetary policy to address financial instability
- But the effectiveness of macroprudential tools is uncertain
- Evidence on cyclical tools used by advanced foreign economies (AFE)s
 - Most countries choose not to use monetary policy to address financial instability
 - Macroprudential tools may be effective in slowing borrowing. Effects on price appreciation are less clear.

Exhibit 4

Experience with LTV caps



- Caps don't reliably stop or slow house price appreciation
- Perhaps because implementation has been too timid?

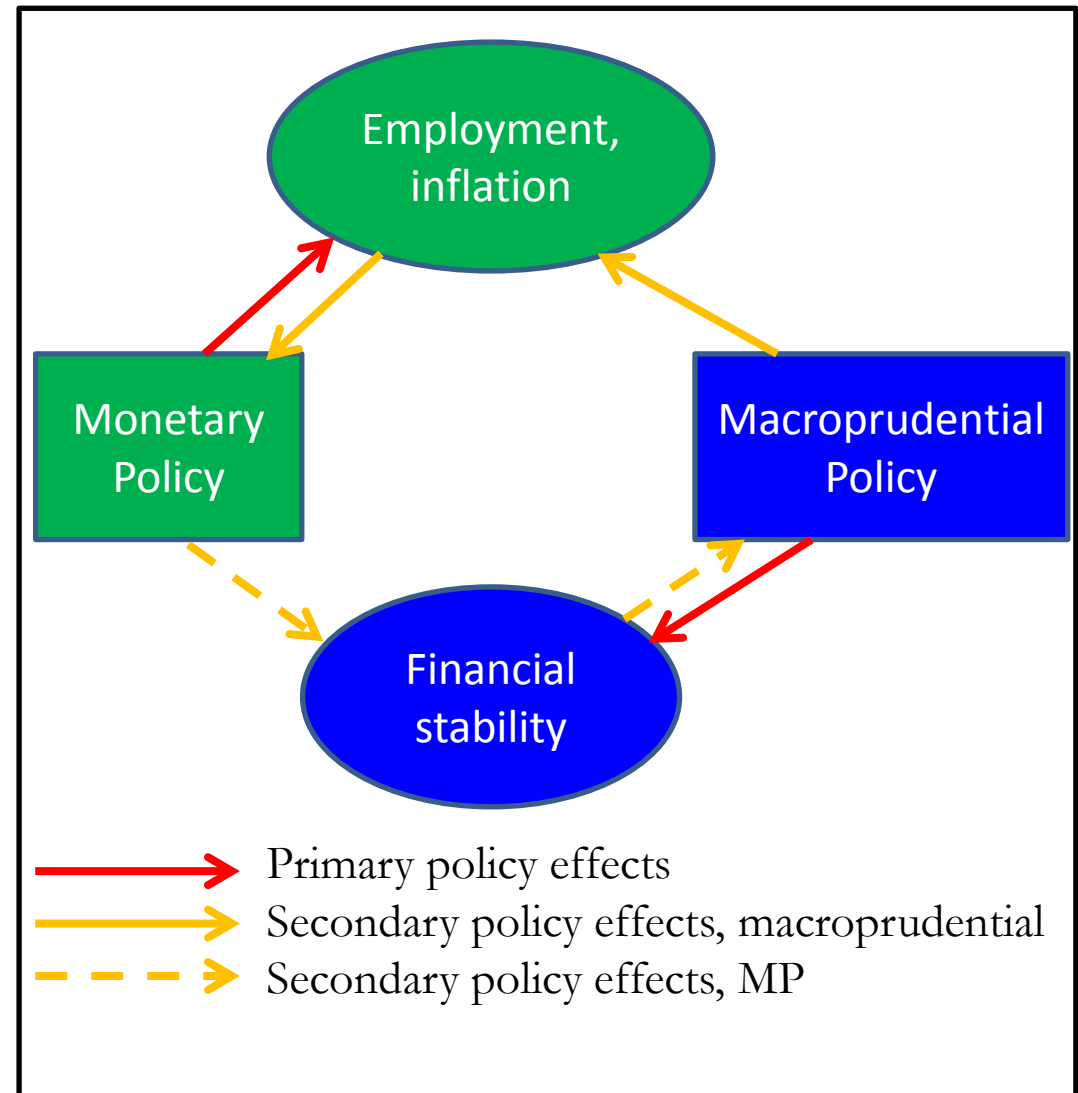
How to mitigate financial instability

2. Monetary policy (MP)

- Can MP slow or avoid instability and crises?
 - Can policymakers detect unsustainable increases in debt and asset prices early enough?
 - Can monetary policy reliably affect asset prices and debt accumulation?
 - These are also challenges for macroprudential policy
- Will use of monetary policy to address financial instability cause too much collateral damage to the economy?
 - Svensson (2015): Cost of damage done to the economy greater than benefit in improved financial stability

Interactions between monetary and macroprudential policy

- Long-run goals coincide, plus or minus
- Short-run goals, tools differ
- Some coordination is likely necessary
 - Minimum: Take into account effects of each other's actions in setting policies
 - More coordination would be helpful, given the feedbacks



Monetary and macroprudential interactions: Institutional implications

- Same committee, or different committees?
 - Within the same institution, or different institutions?
- UK model
 - Separate committees within the same institution
 - High-level overlap in membership fosters collaboration and fairly tight coordination of policies
- Whatever the structure, strong cooperation would likely be helpful

What to conclude?

- Uncertainty about macroprudential tools means we must consider monetary policy as a tool
 - But we view it as a less-reliable “third resort”
- We can rely most on building resilience—increasing capital buffers, conducting stress tests, as we have done
- Macroprudential tools would be the first cyclical resort to combating financial instability
 - But we need to do more to build our confidence in macroprudential tools

A “to-do” list to improve confidence in macroprudential tools

- Expand the available set of macroprudential tools.
- Shorten implementation lags where possible.
- Add to extant research on the effectiveness of tools and new transmission channels.
- Consider better coordination of monetary and macroprudential policies.
- Assess the potential for regulatory arbitrage, and developing strategies to mitigate it.
- Establish independence of macroprudential regulators.

Financial Vulnerability and Monetary Policy: The Empirical Evidence

FEDERAL RESERVE BANK *of* NEW YORK

Tobias Adrian, Nina Boyarchenko, Richard Crump, Matthew Plosser

April 26, 2016

Exhibit 1: Two Views

1) Monetary policy and financial stability are separate

- Transmission of monetary policy is via interest rates
- Policy expectations summarize all market information
- Risk premia are constant or exogenous

2) Monetary policy and financial stability interact

- Monetary policy impacts risk taking of financial intermediaries
- Risk taking determines financial conditions and vulnerabilities
- Financial vulnerabilities matter for macroeconomic outcomes

➤ The second view is the risk-taking channel of monetary policy

- We review existing and new evidence



Exhibit 2: Credit Channel of Monetary Policy

- A lower short-term policy interest rate spurs lending and spending in pursuit of price stability and full employment
- The credit channel features an amplification mechanism beyond the interest rate channel, but does not incorporate risk taking of financial institutions
- Jordà, Schularick, and Taylor (2013, 2015) find sizable effects of lower short-term interest rates on mortgage credit and house prices
- Moreover, credit growth can threaten financial stability:
 - A one standard deviation higher credit growth associated with three percent lower GDP in crises
 - However, increasing interest rates preemptively to slow credit or house price growth involves tradeoffs



Exhibit 3: The Risk-Taking Channel of Monetary Policy

- 1) Monetary policy influences risk taking of financial institutions**
 - Risk taking determines leverage and maturity transformation, which are vulnerabilities for the system
- 2) Risk premia are endogenous and time varying**
 - Pricing of risk determines financial conditions
- 3) Endogenous risk taking increases downside risk to real activity**
 - Financial vulnerabilities create risks to the dual mandate



Exhibit 4: Existing Evidence on the Risk-Taking Channel

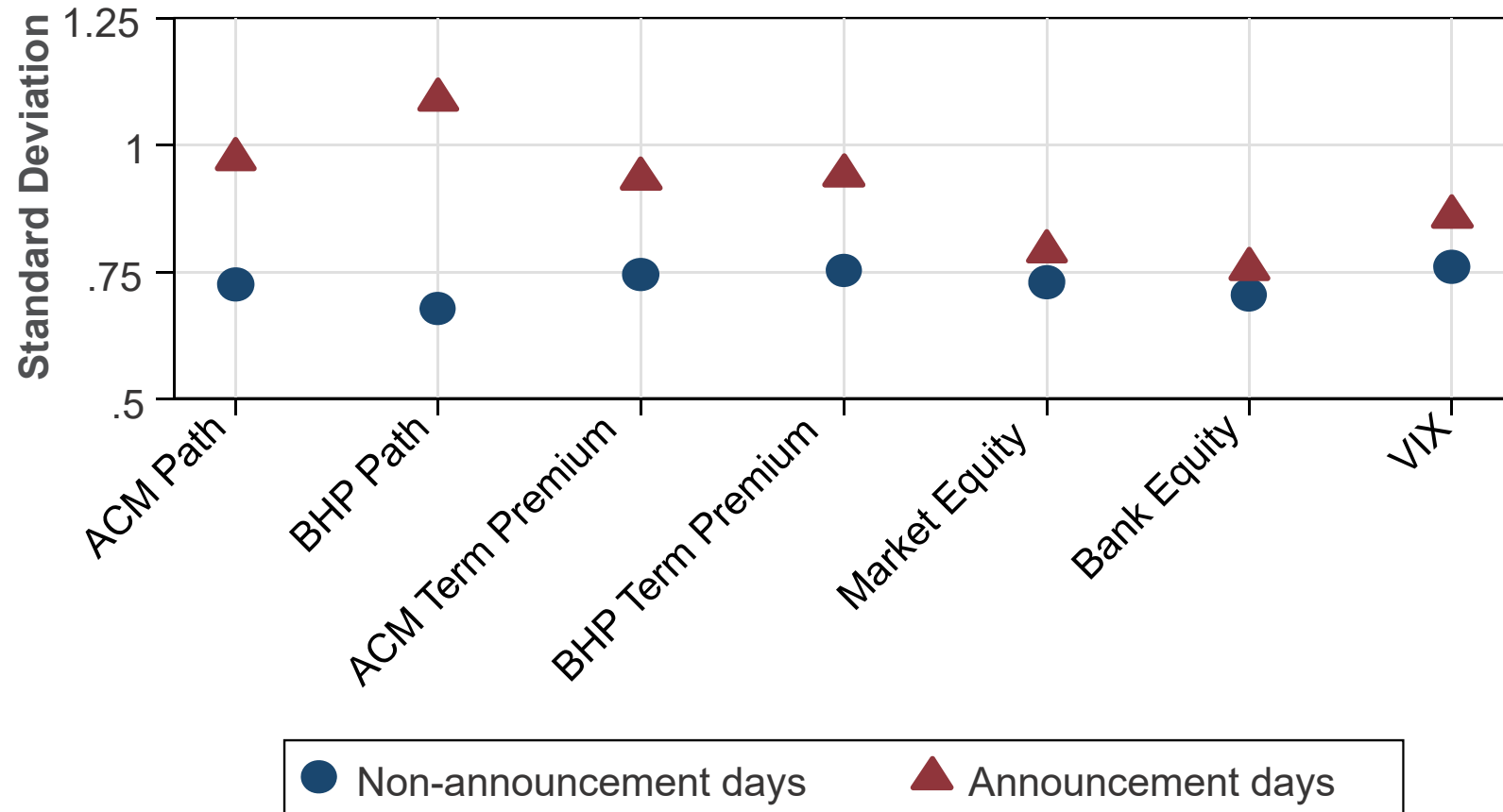
A number of studies have examined different dimensions of risk taking in the banking sector, finding that:

- U.S. banks ease lending standards and charge smaller premiums to riskier borrowers during periods of easy monetary policy
 - Paligorova and Santos (2012), Maddaloni and Peydró (2011)
- U.S. banks' ex-ante risk taking is negatively associated with increases in short-term policy interest rates
 - Dell'Ariccia, Laeven and Suarez (2016)
- Nonbank financial intermediation tends to expand when monetary policy is expansionary
 - Adrian, Moench and Shin (2010)



Exhibit 5: Variability and FOMC Announcements 1994-2007

Absolute two-day change



ACM: Adrian Crump Moench (2013), **BHP:** Boyarchenko Haddad Plosser 2016)



Exhibit 6: Measuring Financial Vulnerability

- We use Adrian and Brunnermeier's CoVaR to measure vulnerability
- CoVaR is defined as the Value-at-Risk of the entire financial system conditional on the distress of a particular financial institution
- CoVaR as a summary measure correlates strongly with leverage, maturity transformation, and other measures of vulnerability
- Financial vulnerabilities can create systemic risk – the risk that the intermediation capacity of the financial system becomes impaired



Exhibit 7: Vulnerability and FOMC Announcements

We estimate the sensitivity of bank equity returns on FOMC announcement days to the expected path of interest rates, measures of risk premia, and CoVaR

- o A 25 basis point increase in the expected path of interest rates on an announcement day lowers bank equity returns by 36 to 50 basis points
- o A 15 percent increase in the risk premium on an announcement day lowers bank equity returns by 8 to 13 basis points
- o Comparing the most and least vulnerable banks, the decline in bank returns is 20 to 24 percent larger for either of these increases
- o Our results thus show that there are significant interactions between the monetary policy announcements, the evolution of risk and risk premia, and the performance of relatively vulnerable institutions



Exhibit 8: Conclusion

- The empirical evidence is consistent with the risk-taking channel of monetary policy transmission:
 - Easier policy can increase risk taking, compress risk premia, and thus could create vulnerabilities
- These findings suggest further work to quantify the effect of risk taking on downside risk to the dual mandate



Monetary Policy and Financial Stability: Lessons from DSGE Models

Bora Durdu (FRB), Matthias Paustian (FRB), Jae Sim (FRB)

Exhibit 1

Key question

- Should monetary policy react to financial imbalances? Lessons from DSGE models.

Exhibit 2

Motivations for using monetary policy

- Frictions in credit markets may contribute to excessive volatility in employment or inflation
 - Appropriate for monetary policy to lean against excessive credit fluctuations even for traditional dual mandate (Woodford (2012), Borio and Zhu (2012))
- Often rationalized with “risk-taking channel” of monetary policy
 - Low interest rate leads to high leverage
 - High leverage incentivizes high-risk projects
 - A blunt tool, but “gets in all the cracks”
 - Augment Taylor rule with credit variable

Exhibit 3

Monetary vs. macroprudential policies in DSGE models

- Monetary policy is an indirect tool to address the underlying microeconomic distortions
 - Some macroprudential policies may be more direct
- Coordination of monetary and macroprudential policies may improve economic outcomes

Exhibit 4

Measurement of Financial Imbalances: Nonfinancial Sector Credit-to-GDP Gap

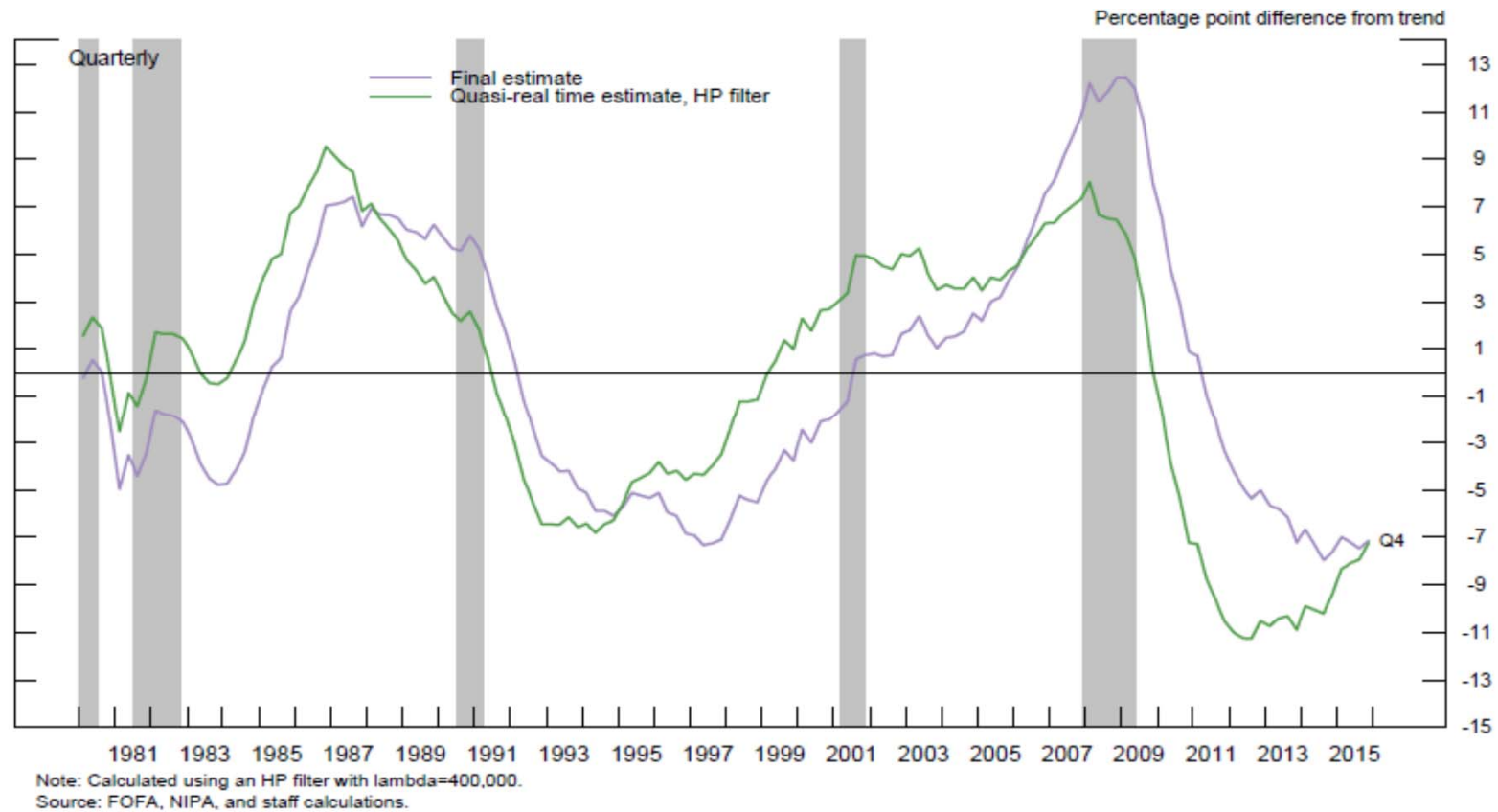


Exhibit 5

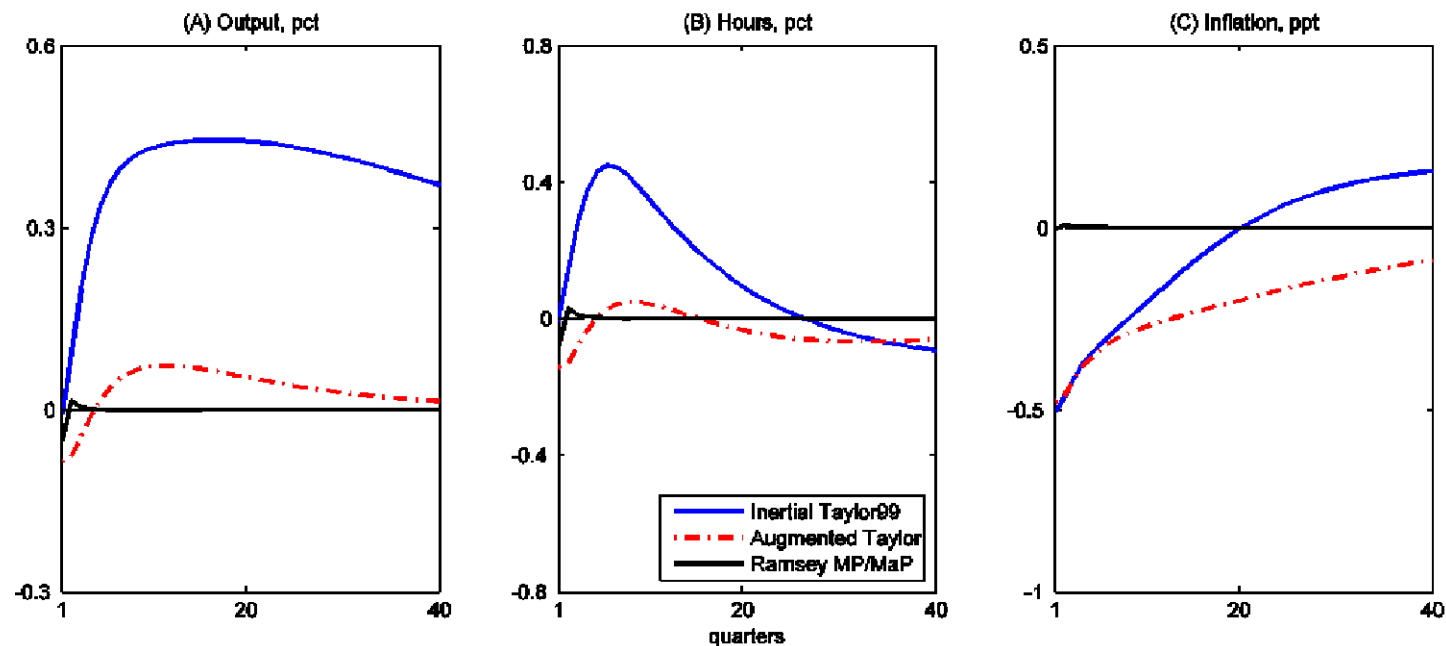
Kiley and Sim (2015)

- A model in which financial intermediaries choose the leverage ratio to maximize their own profits
 - But fail to take into account social costs of their choices
- Estimated with features suited for monetary policy analysis
- Allows for a quantitative evaluation of the potential for monetary policy to lean against the credit cycle

Exhibit 6

Inefficient Credit Cycle

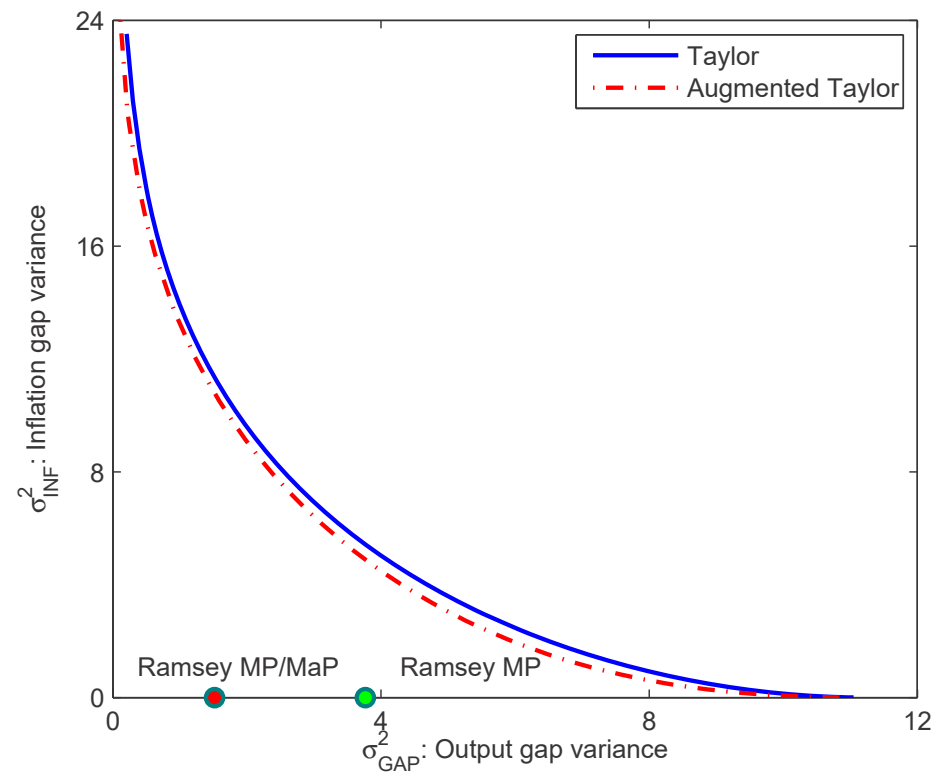
- Leaning against the wind improves outcomes



Note: Inertial Taylor 99 rule coefficients are 1.5, 1.0 and 0.85 for inflation rate, output gap and lagged interest rate, respectively. The augmented rule is identical with the Taylor rule except that it has an additional term on the credit-to-GDP with a coefficient of 0.5.

Exhibit 7

Overall Assessment of the role for leaning against the credit cycle



Note: Each point in the volatility frontiers corresponds to the outcome when all policy coefficients are optimized under different weights on inflation gap and output gap in the policymakers' quadratic loss function.

Exhibit 8

Policy Coordination

- De Paoli and Paustian (2016): a setting where separate institutions conduct monetary and macroprudential policy
- Coordination problems tend to be smaller
 - If both authorities given effective tools
 - If commitment technologies available
 - If prudential policy less frequently adjusted
- Literature still developing, no consensus results

If you would like to comment, it would be helpful if you would address some or all of the following questions:

1. Among economists there is a growing agreement that macroprudential policy measures are the primary instruments through which policymakers should promote financial stability and address any such concerns. In light of this emerging consensus,
 - a. Do you view the set of macroprudential tools available to policymakers in the United States as sufficient to ensure financial stability most of the time?
 - b. Would you draw any distinctions between the sufficiency and efficacy of tools available for addressing “through-the-cycle” risks and tools available for addressing risks that are more cyclical (or time-varying)?
 - c. Does the dispersion of responsibilities for regulation of the different sectors of the U.S. financial system, or other challenges associated with coordination of macroprudential actions, factor significantly in your assessment of the sufficiency and efficacy of macroprudential tools?
2. Given your assessment of the sufficiency and efficacy of macroprudential tools,
 - a. Would you support using the stance of monetary policy to pursue financial-stability goals, even if such efforts would imply deviations from the FOMC’s dual mandate for some time?
 - b. If so, what conditions do you view as most likely to call for such monetary policy adjustments, and do you view such conditions as likely over the next several years?

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

Class II FOMC – Restricted (FR)

Material for the Briefing on

**Financial Developments and
Open Market Operations**

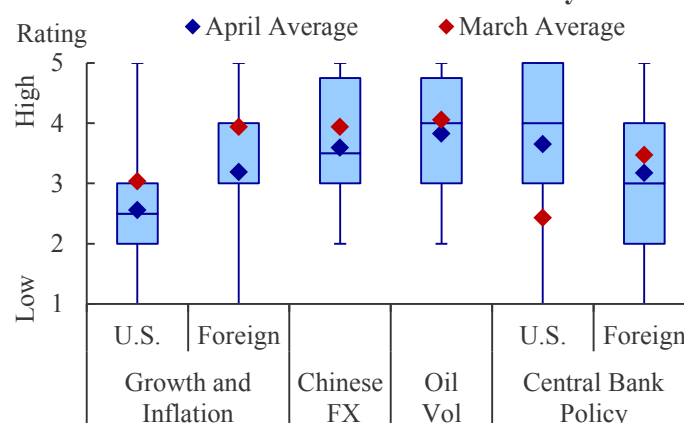
Simon Potter and Lorie Logan

April 26, 2016

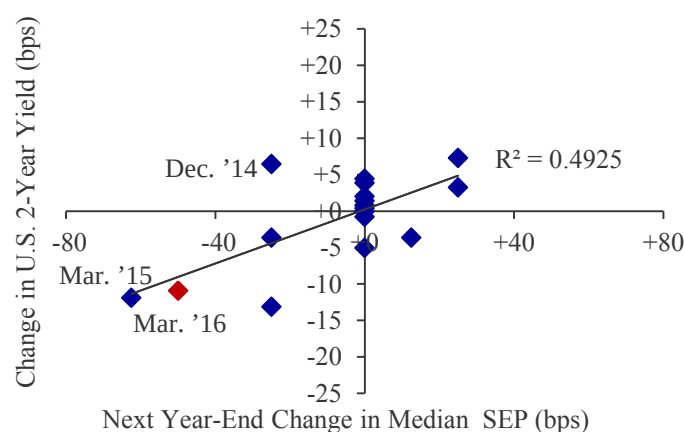
(1) Changes in Financial Conditions

	Since March FOMC	Since August RMB Deval
U.S. 2-Year Treasury	-15 bps	+10 bps
U.S. 10-Year Treasury	-8 bps	-34 bps
U.S. Broad T.W. Dollar	-2.0 %	+1.2 %
S&P 500 Index	+3.8 %	-0.6 %
High-Yield OAS	-59 bps	+73 bps
Brent Crude	+16.4 %	-10.5 %
5-Year, 5-Year BE	+9 bps	-30 bps

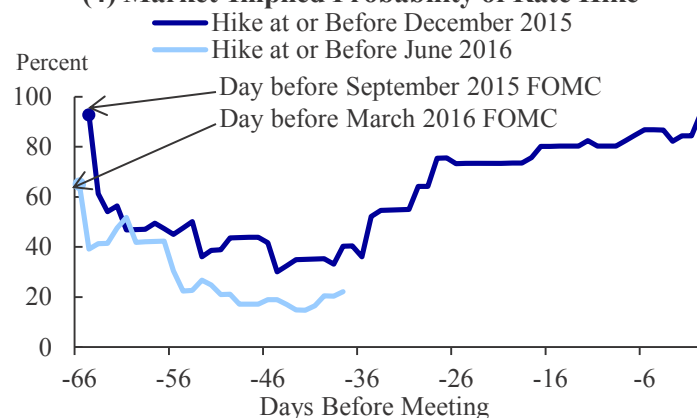
Source: Barclays, Bloomberg, Federal Reserve Board of Governors

(2) Importance of Factors Explaining Recent Financial Market Volatility*

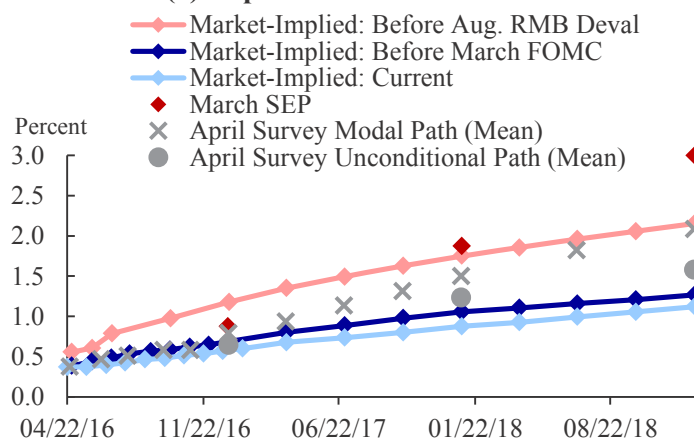
*Based on all responses from the March and April Surveys of Primary Dealers and Market Participants. Ranges reflect responses to the April Survey.
Source: Federal Reserve Bank of New York

(3) Change to Next-Year Ahead Median SEP Dot and U.S. Two Year Yield*

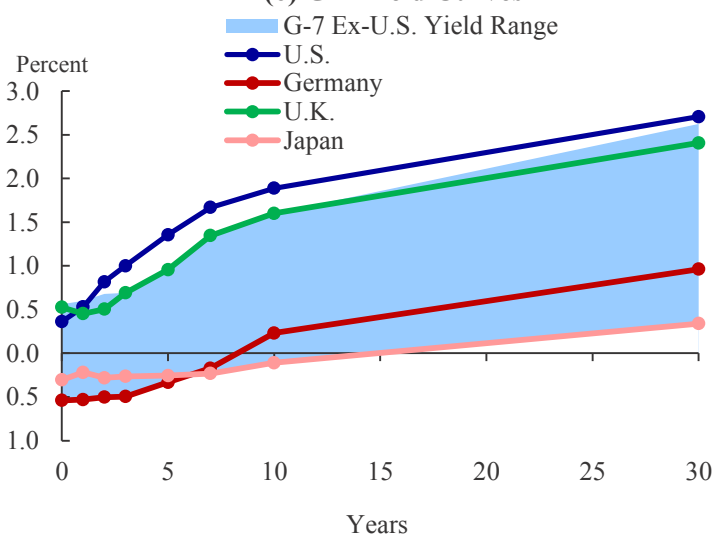
*Daily changes on SEP release since 2012.
Source: Bloomberg, Federal Reserve Board of Governors

(4) Market-Implied Probability of Rate Hike*

*Probability of a hike at or before Dec. uses the median expected EFFR post-lift-off from the December Survey of Primary Dealers and Market Participants. Probability of a hike at or before June assumes a 25-bps increase in the EFFR from recent levels. Based on Jan. '16 and Jul. '16 fed funds futures contracts.
Source: Bloomberg, Desk Calculations

(5) Implied Federal Funds Rate Path*

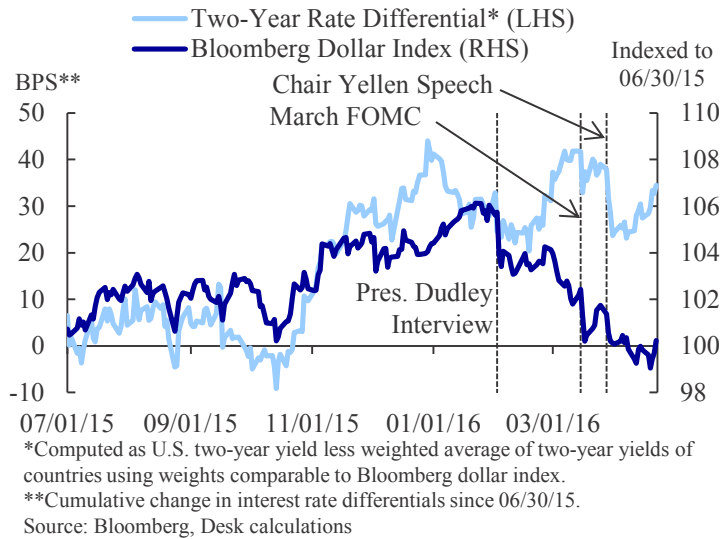
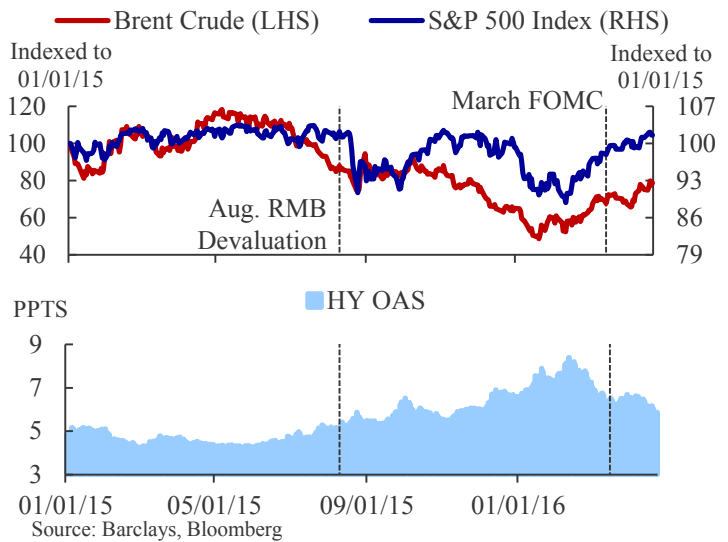
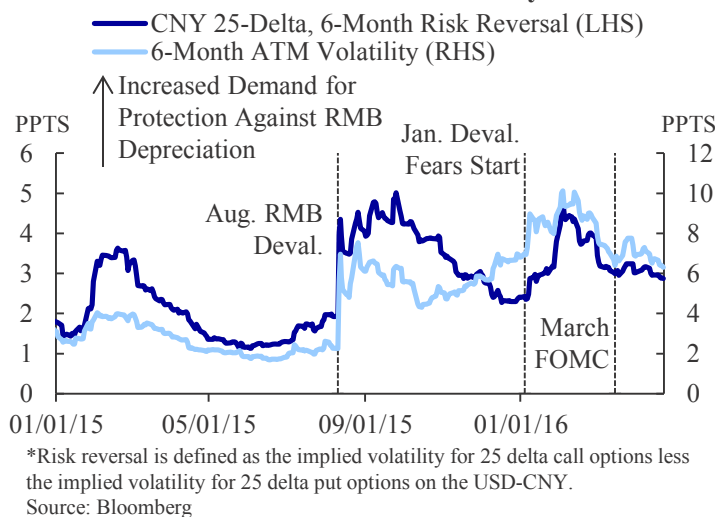
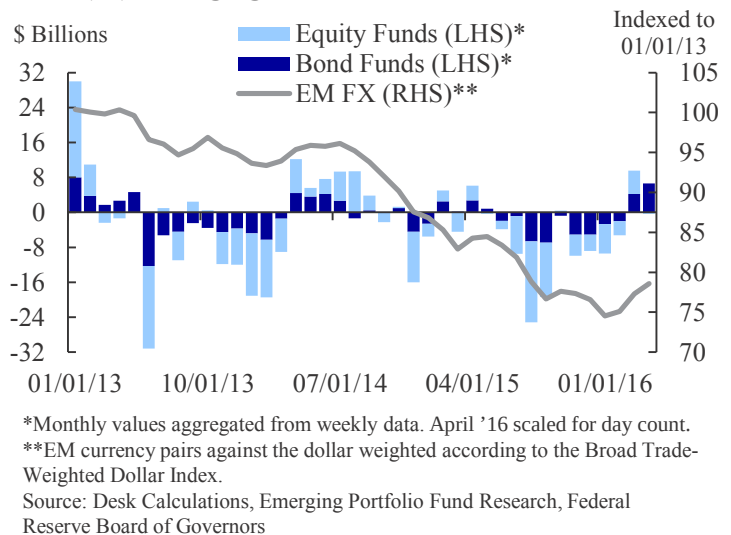
*Market-implied paths derived from federal funds and Eurodollar futures, survey paths are the average response from the April Survey of Primary Dealers and Market Participants.
Source: Bloomberg, Desk Calculations, Federal Reserve Board of Governors

(6) G-7 Yield Curves

Source: Bloomberg

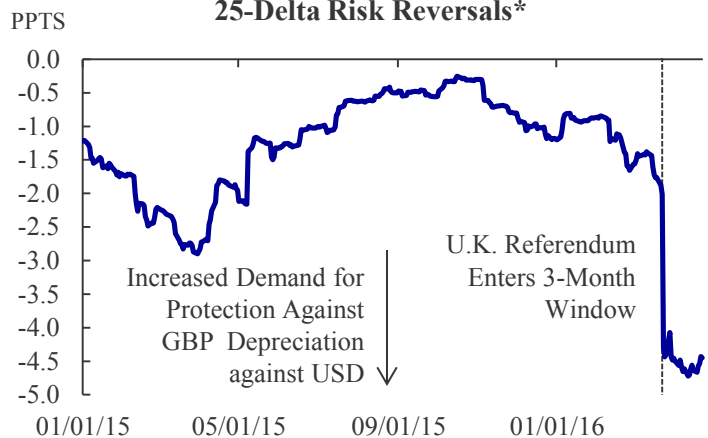
Class II FOMC – Restricted (FR)

Exhibit 2

(7) Two-Year Rate Differential and Dollar Index**(8) Oil, S&P 500 Index, High-Yield Credit OAS****(9) Six-Month Onshore RMB Risk Reversals and ATM Volatility*****(10) Emerging Market Fund Flows Ex. China****(11) Asset Price Changes**

	Since March FOMC	Since Easing*
Euro Area		
Euro-Dollar	+1.0 %	+2.0 %
5Y-5Y Inflation Swaps	-7 bps	-8 bps
Euro Stoxx Bank Index	-0.7 %	+4.2 %
Credit Spread	-8 bps	-23 bps
Japan		
Dollar-Yen	-1.2 %	-5.9 %
5Y-5Y Inflation Swaps	+20 bps	-29 bps
Topix Banks Index	+1.0 %	-10.5 %
Credit Spread	-13 bps	-23 bps

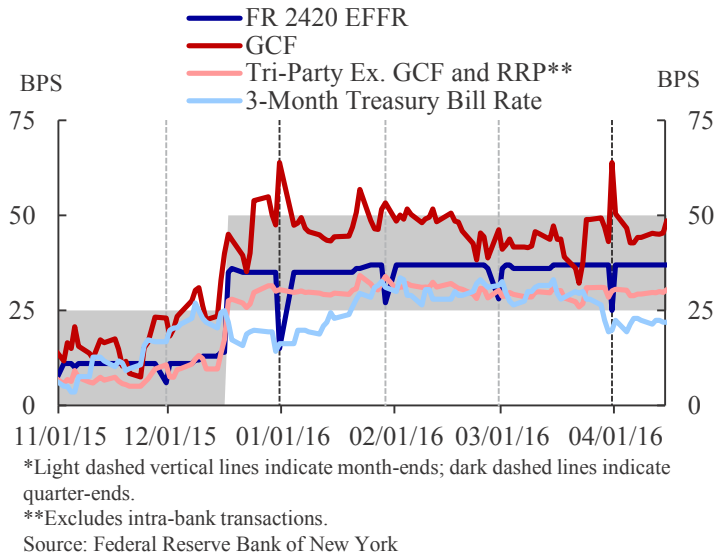
*Changes for Euro Area asset prices taken from day before the 3/10/16 ECB meeting and for Japanese asset prices taken from day before the 01/29/16 BoJ meeting.
Source: Bloomberg, Markit iTraxx

(12) Three-Month GBP-USD 25-Delta Risk Reversals*

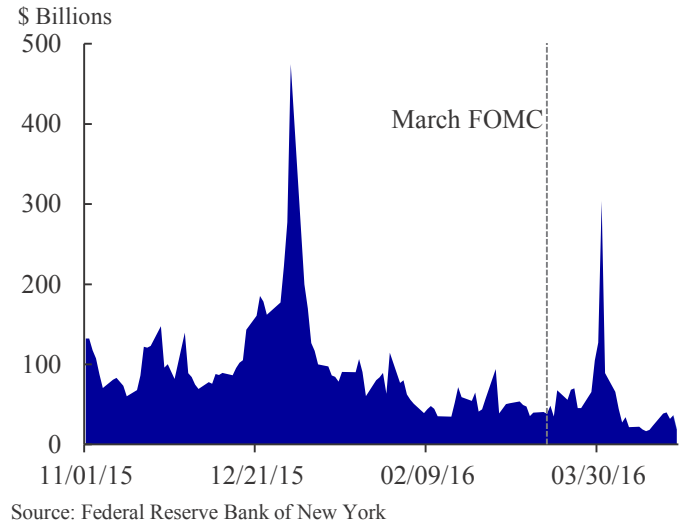
Class II FOMC – Restricted (FR)

Exhibit 3

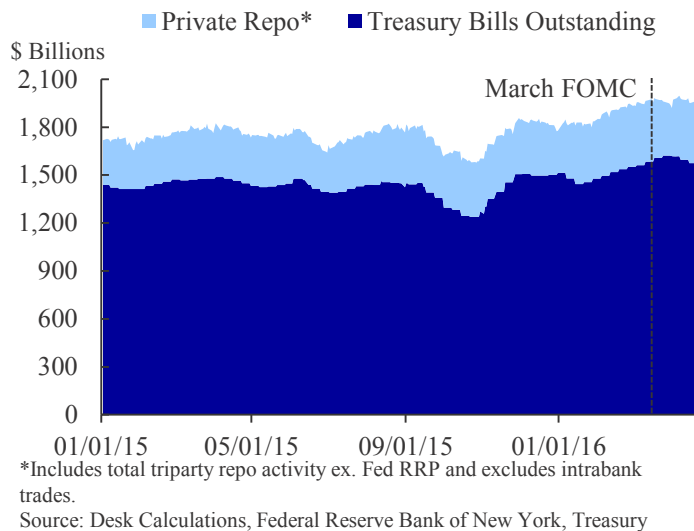
(13) Money Market Rates*



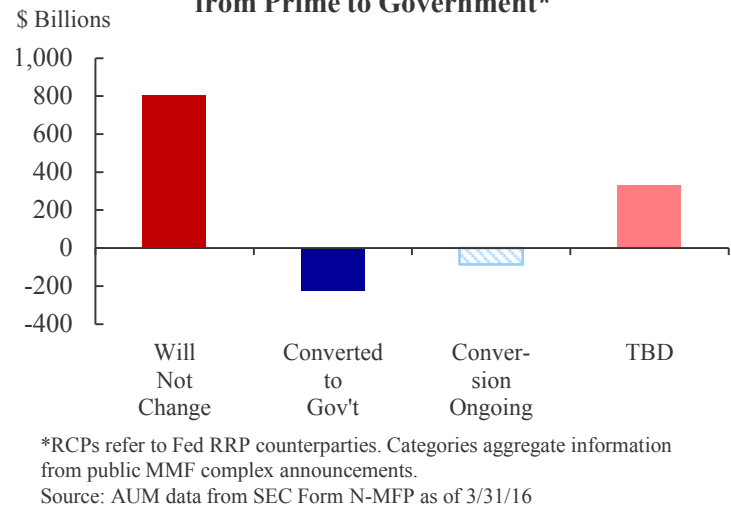
(14) Overnight RRP's Outstanding



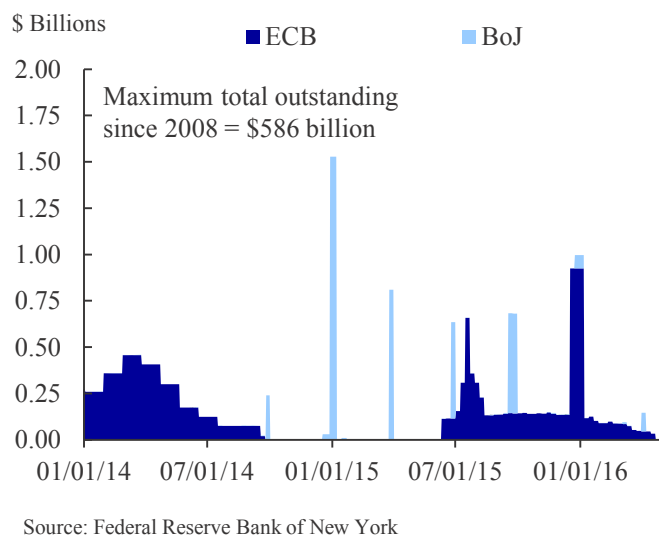
(15) Money Market Investment Alternatives



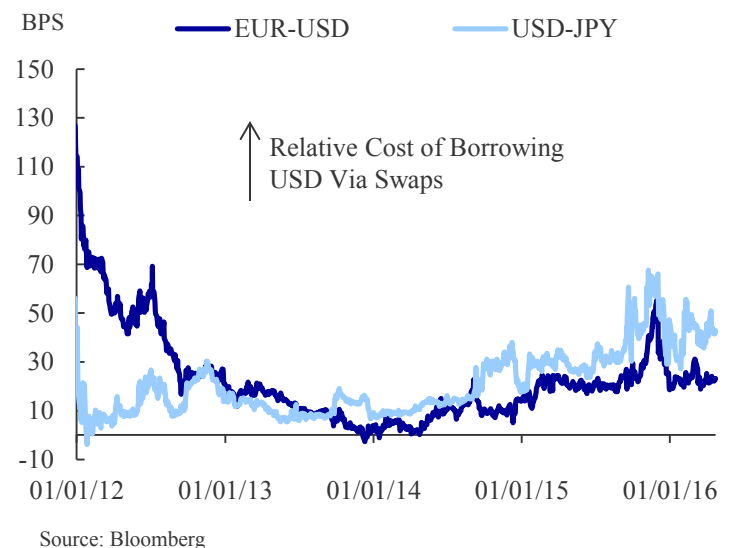
(16) RCP Money Market Mutual Fund Conversions from Prime to Government*



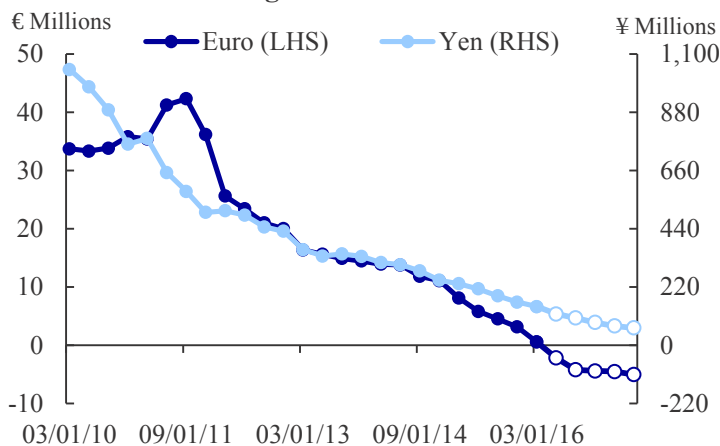
(17) Central Bank Liquidity Swaps Outstanding



(18) Three-Month Implied Swap Basis



(19) Quarterly Realized and Projected Foreign Portfolio Income*



*Unfilled dots are projections; filled dots are realized.

Source: Federal Reserve Bank of New York

(20) Review of Foreign Reserves Portfolio

- The review addressed policy purpose, investment approach, and internal processes
 - Based on feedback from Foreign Currency Subcommittee and U.S. Treasury officials
 - Size and currency composition taken as given
- In current framework, funds are laddered across maturity spectrum for eligible assets
- Staff proposes a new framework that:
 - Assesses policymakers' investment preferences
 - Uses robust risk-return methodology

(21) New Investment Framework Components

- (1) *Establish the policy purpose for foreign reserves portfolio:* tool to counter disorderly FX markets and influence value of the dollar
- (2) *Establish the investment objectives for foreign reserves portfolio:* liquidity, safety, return
- (3) *Determine funding needs:* estimate \$8 billion across both SOMA and ESF
- (4) *Establish constraints based on policymakers' willingness to bear risk:* establish minimum cash allocation; set eligible issuers, diversification, and liquidity constraints; establish maximum expected shortfall
- (5) *Formulate an asset allocation given these funding needs and investment risk preferences:* benchmark allocation that reflects policymakers' risk tolerances

(22) Foreign Portfolio Proposal

	Euro Portfolio		Yen Portfolio	
	Current	New*	Current	New*
<i>Asset Allocation**</i>				
Cash	7%	29%	44%	51%
ST Instruments	86%	50%	56%	49%
LT Instruments	8%	21%	0%	0%
<i>Projected 1-Yr. Return</i>				
Yield (bps)	-23	+12	-2.8	-2.5
Nominal Amount (MM)	- €25	+ €13	- ¥264	- ¥234
<i>Tail Risk (MM)***</i>	€ 215	€ 431	¥5,562	¥5,540

*Target portfolio allocation after three months in the new framework. Euro benchmark allocation is based on interest rates as of March 11, 2016. Actual allocation may differ. Yen portfolio allocation assumes the transfer of incoming cash flows to the BoJ deposit account.

**ST Instruments are securities with 5 years or less in maturity and time deposits; LT Instruments are securities with maturities between 5 and 10 years.

***Amount intervention capacity would be reduced if the portfolio realizes a return in the bottom 1st percentile.

Source: Federal Reserve Bank of New York

Appendix: Summary of Operational Testing*Summary of Operational Tests in prior period:*

- Foreign Authorization
 - o April 12: Completed euro-denominated overnight repo for €1 million
 - o April 19: Partially completed liquidity swap with the European Central Bank for €51 thousand
 - o April 21: Completed liquidity swap with the Swiss National Bank for CHF51 thousand

Upcoming Operational Tests

- Three tests scheduled under the Domestic Authorization
 - o May 24: Outright Treasury sale for approximately \$200-250 million
 - o May 25: Overnight repo for approximately \$500-700 million
 - o May 25: Outright MBS Sale (specified pool) for no more than \$100 million
 - o June 1: Outright MBS Sale (basket) for no more than \$30 million
- One test scheduled under the Foreign Authorization
 - o June 7: Liquidity swap with the Bank of Canada for approximately CAD51 thousand

Appendix 3: Materials used by Mr. Wascher

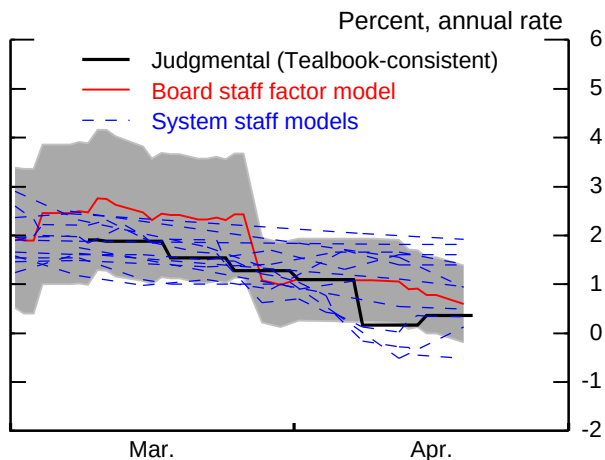
Class II FOMC – Restricted (FR)

Material for Briefing on
The U.S. Outlook

William Wascher
April 26, 2016

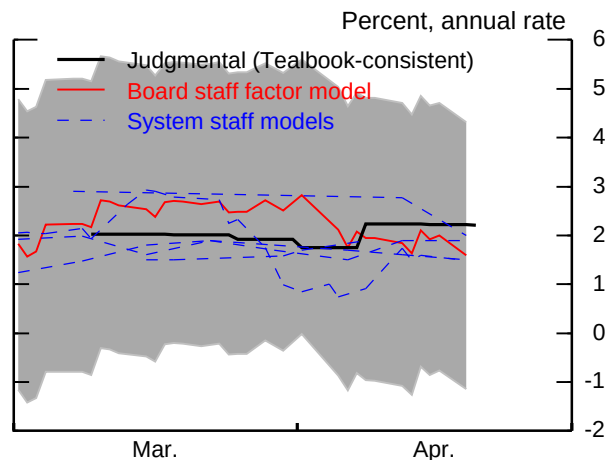
Forecast Summary

1. Evolution of 2016:Q1 GDP Growth Nowcasts



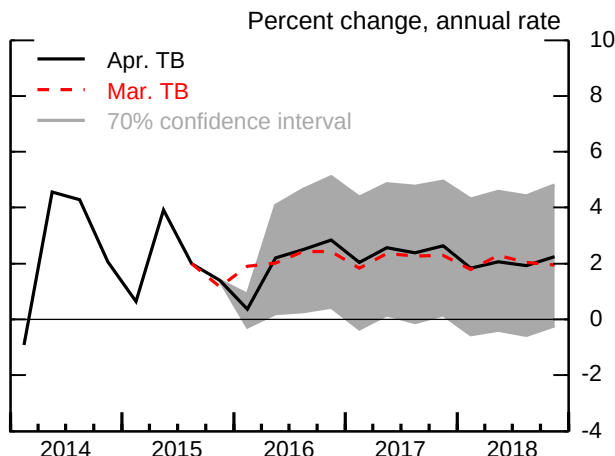
Note: The shaded region is a 70 percent confidence interval around the Board staff factor model estimate.

2. Evolution of 2016:Q2 GDP Growth Forecasts



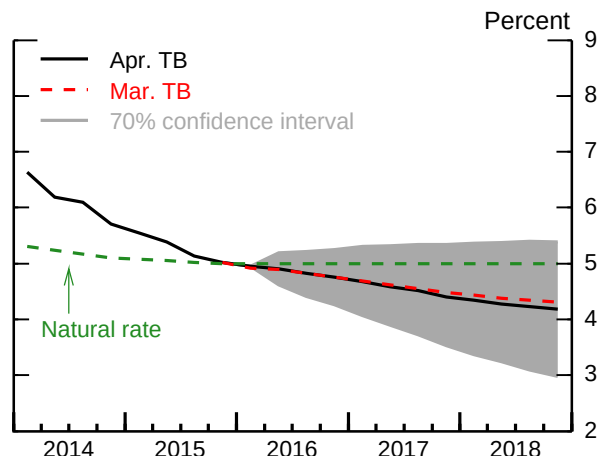
Note: The shaded region is a 70 percent confidence interval around the Board staff factor model estimate.

3. Real GDP

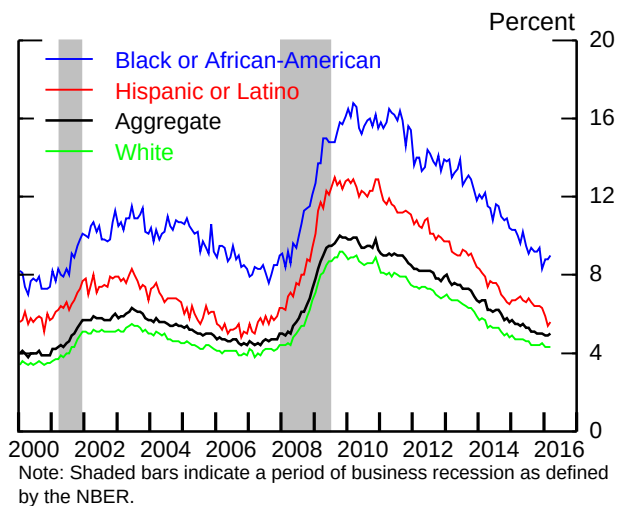


Note: Confidence intervals for panels 3,4,7, and 8 based on FRB/US stochastic simulations.

4. Unemployment Rate

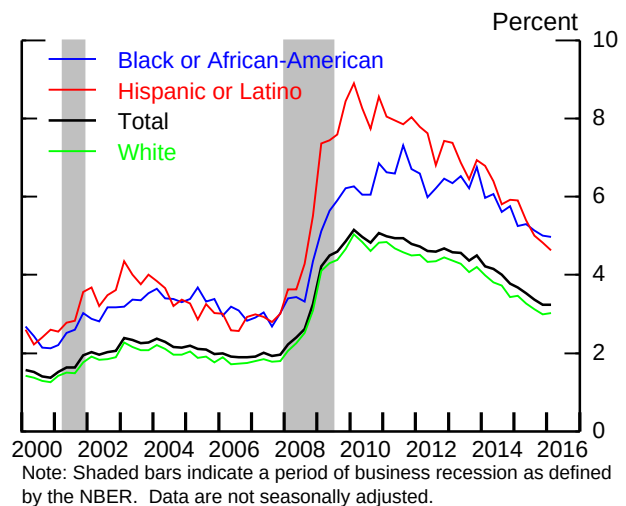


5. Unemployment Rates by Group



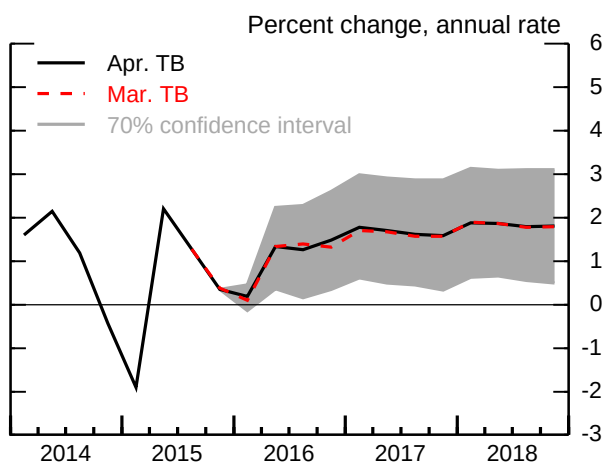
Note: Shaded bars indicate a period of business recession as defined by the NBER.

6. Part-Time for Economic Reasons by Group

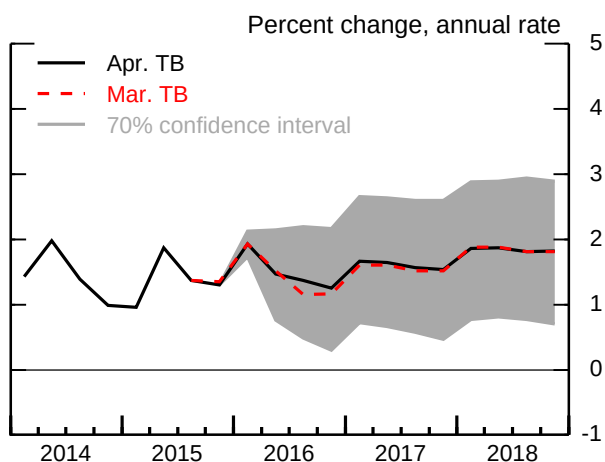


Note: Shaded bars indicate a period of business recession as defined by the NBER. Data are not seasonally adjusted.

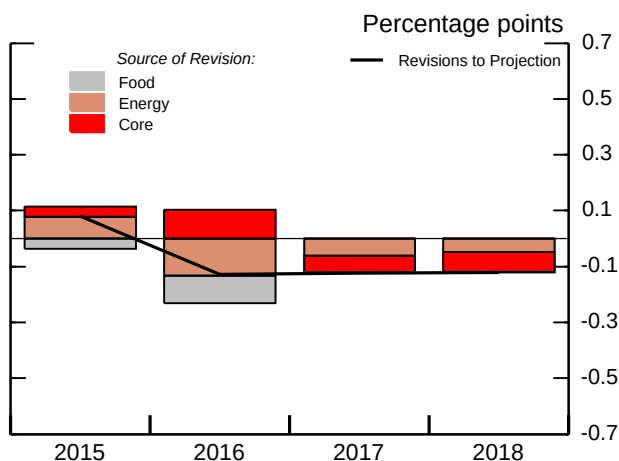
7. PCE Prices



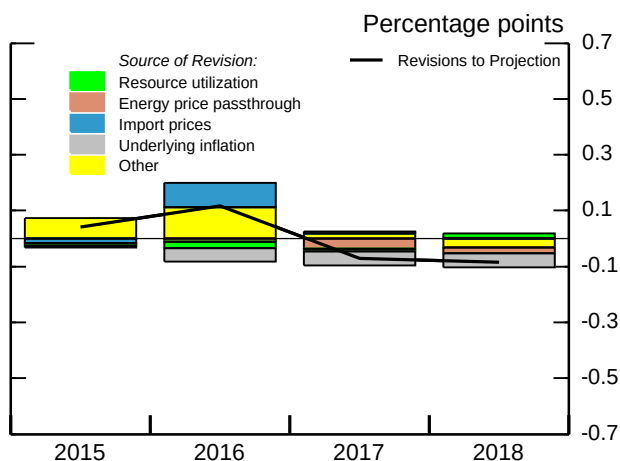
8. PCE Prices Excluding Food and Energy



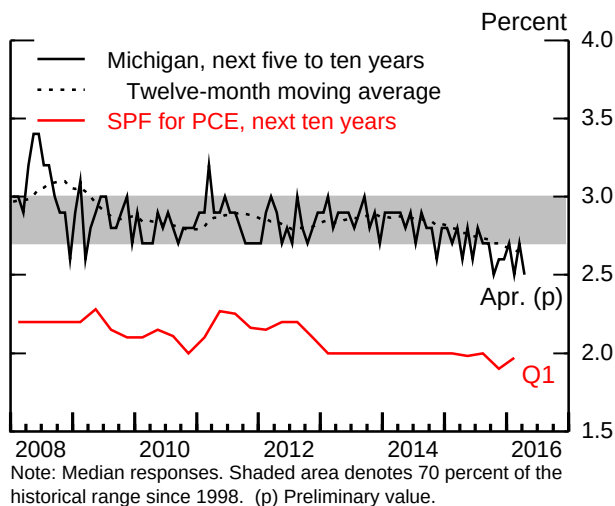
9. Inflation Revisions Since December: Total PCE



10. Inflation Revisions Since December: Core PCE



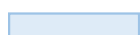
11. Longer-Term Inflation Expectations



Key Economic Indicators for the April, June, and July FOMC Meetings

(Percent change at annual rate, except as noted)

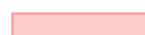
	2015 Dec.	----- Jan.	Feb.	Mar.	2016 Apr.	May	June
Total PCE price index							
3-month change	0.5	0.6	-0.3	0.2	0.9	1.5	1.6
March Tealbook	0.6	0.7	-0.4	0.1	0.4	1.6	2.0
12-month change	0.7	1.2	1.0	0.8	1.0	0.7	0.6
March Tealbook	0.7	1.3	0.9	0.8	0.9	0.8	0.7
Core PCE price index							
3-month change	1.1	1.9	1.9	1.9	1.5	1.3	1.6
March Tealbook	1.2	2.0	1.9	2.0	1.5	1.5	1.6
12-month change	1.4	1.7	1.7	1.5	1.5	1.5	1.5
March Tealbook	1.5	1.7	1.7	1.6	1.5	1.6	1.5
Unemployment rate (percent)	5.0	4.9	4.9	5.0	4.9	4.9	4.9
March Tealbook	5.0	4.9	4.9	4.9	4.9	4.9	4.9
Payroll employment (change in 000s)	271	168	245	215	202	202	202
March Tealbook	271	172	242	216	202	202	202
Gross Domestic Product	3rd Q3 est.		2nd Q4 est.	3rd Q4 est.		2nd Q1 est.	3rd Q1 est.
March Tealbook	2.0		1.0	1.4		0.4	0.4
	2.0		1.2	1.2		1.9	1.9

Key: Estimate first available at:

April meeting



June meeting



July meeting

Note: The June CPI will be released prior to the July FOMC meeting.

Appendix 4: Materials used by Mr. Kamin

Class II FOMC – Restricted (FR)

Material for

The International Outlook

Steven B. Kamin

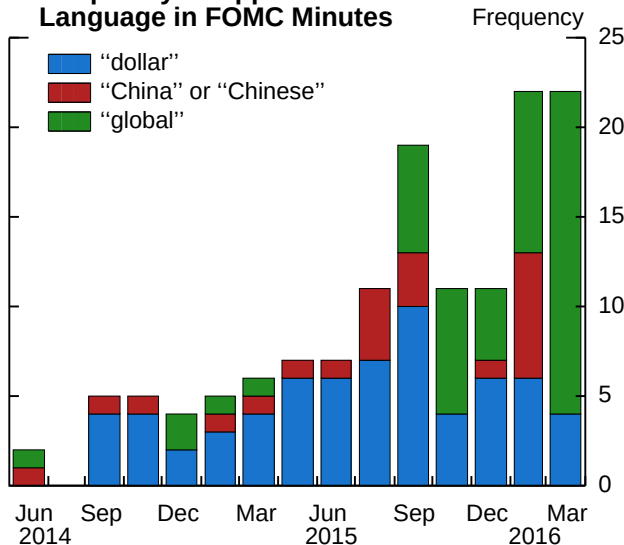
April 26, 2016

Class II FOMC - Restricted (FR)

Exhibit 1

The International Outlook

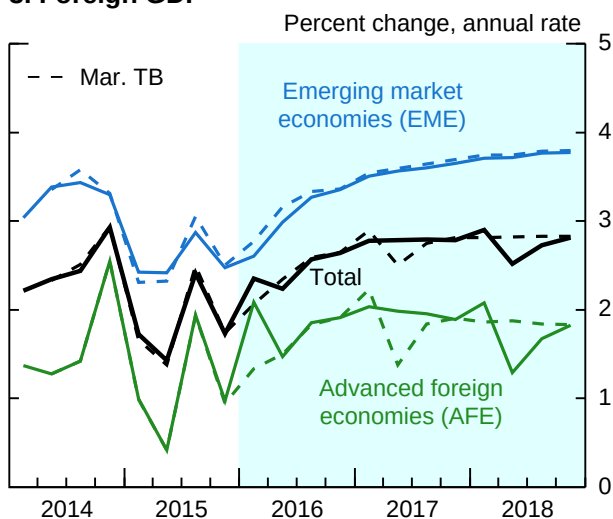
1. Frequency of Appearance of International Language in FOMC Minutes



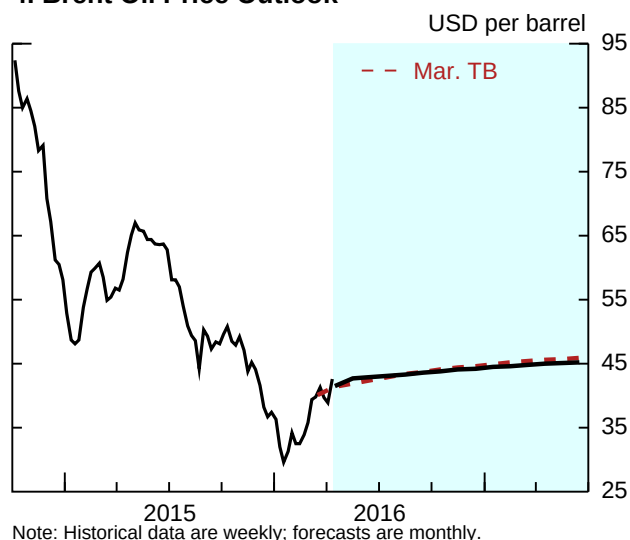
2. Checklist for Abatement of Global Headwinds

	Yes	No	Maybe
1. Recent pickup in foreign GDP growth?	☐	☐	☐
2. Greater confidence in forecast, absent new shocks?	☐	☐	☐
3. Sustained improvement in investor sentiment?	☐	☐	☐
4. Subsiding of fundamental risks?	☐	☐	☐

3. Foreign GDP



4. Brent Oil Price Outlook



5. Foreign Recession Probability Model

Monthly probit model, including:

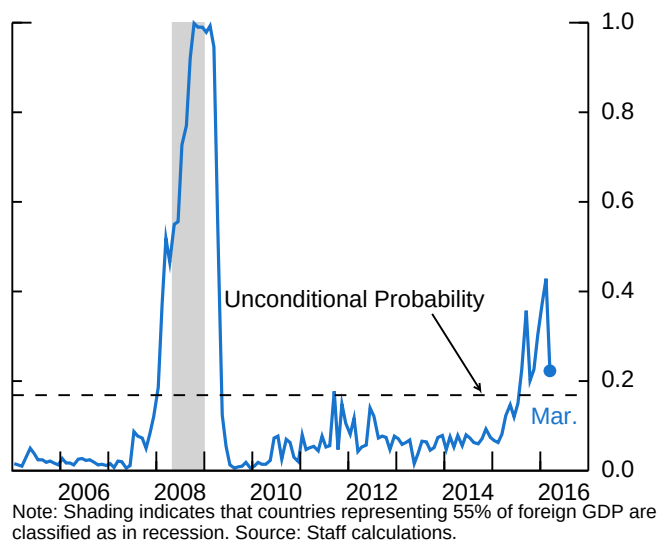
- Index of foreign macro indicators: IP, retail sales, new export orders, and GDP*
- Index of financial stress: excess bond premium**

Recession abroad defined as countries comprising 55 percent of foreign GDP in recession.

* Aruoba, Diebold, Scotti Index (JBES, 2009).

** Gilchrist and Zakrajsek Index (AER, 2012).

6. Probability of Foreign Recession

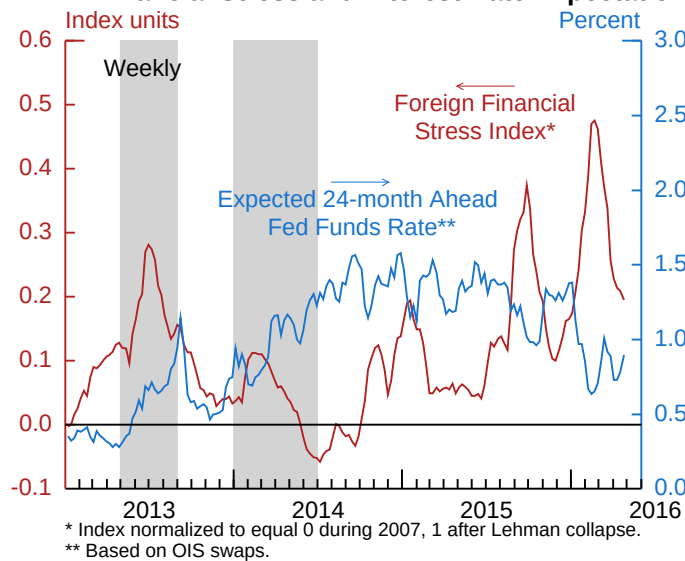


Class II FOMC - Restricted (FR)

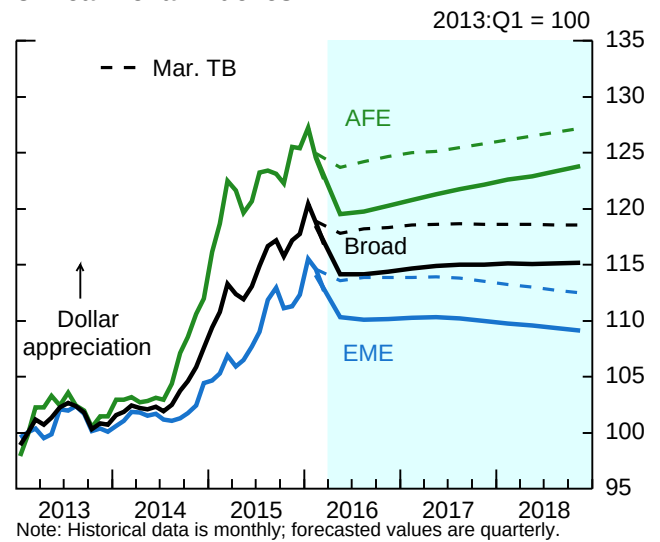
Exhibit 2

The International Outlook (2)

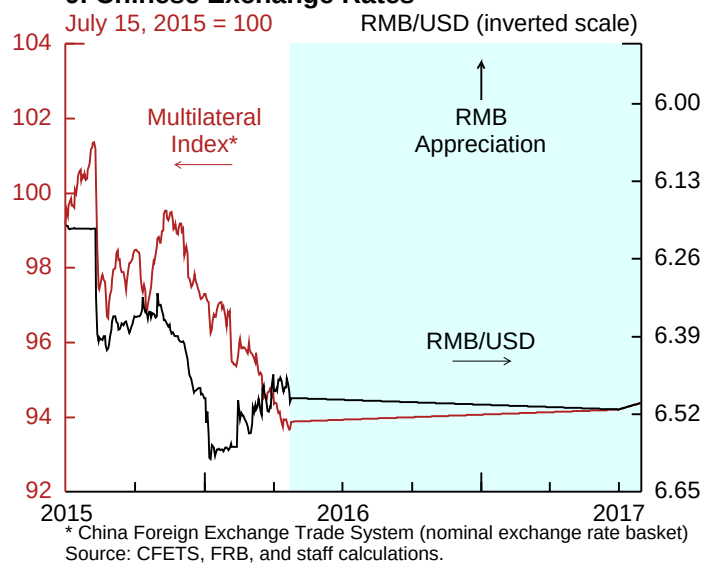
7. Financial Stress and Interest Rate Expectations



8. Real Dollar Indexes



9. Chinese Exchange Rates



Appendix 5: Materials used by Ms. Liang

Class II FOMC – Restricted (FR)

Material for Briefing on

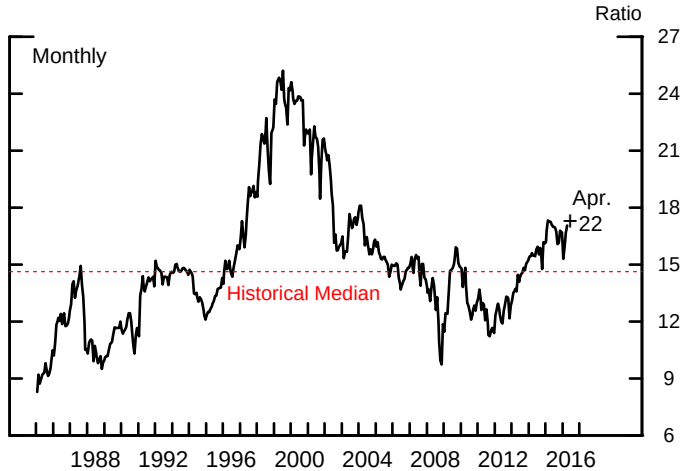
Financial Stability Developments

Nellie Liang

April 26, 2016

Asset Valuations and Nonfinancial Credit

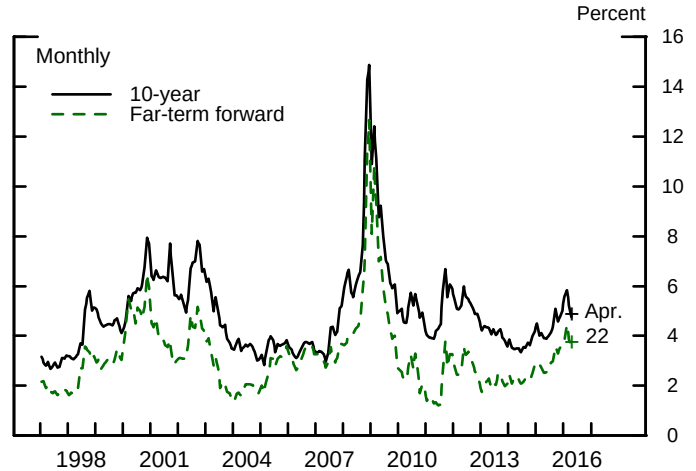
Forward Price-to-Earnings Ratio of S&P 500 Firms



Note: Aggregate forward price-to-earnings ratio of S&P 500 firms. Based on expected earnings for twelve months ahead. + denotes the latest daily observation.

Source: Thompson Reuters Financial.

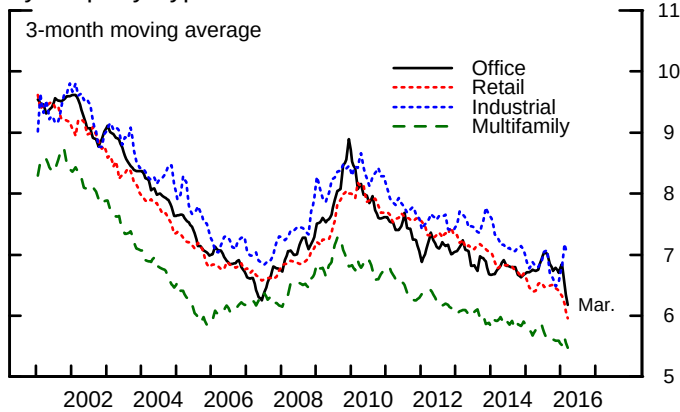
High-Yield Bond Spreads



Note: Credit spreads are estimated from curve fit to Merrill Lynch bond yields. Far-term forward spreads are computed between years nine and ten. + denotes latest daily observation.

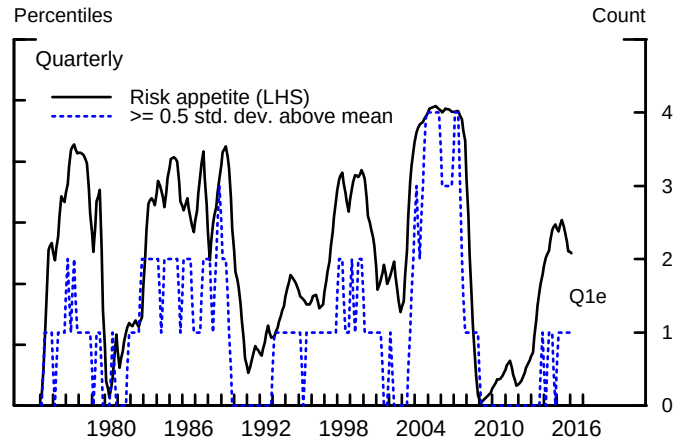
Source: Staff estimates.

Commercial Real Estate Capitalization Rates by Property Type



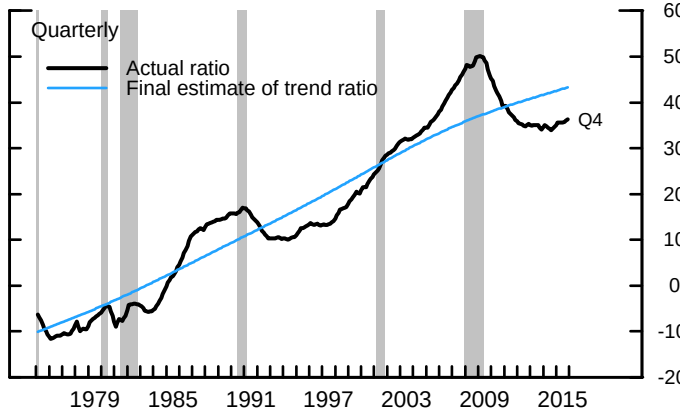
Source: Real Capital Analytics.

Aggregate Risk Appetite and Components



Source: Staff estimates.

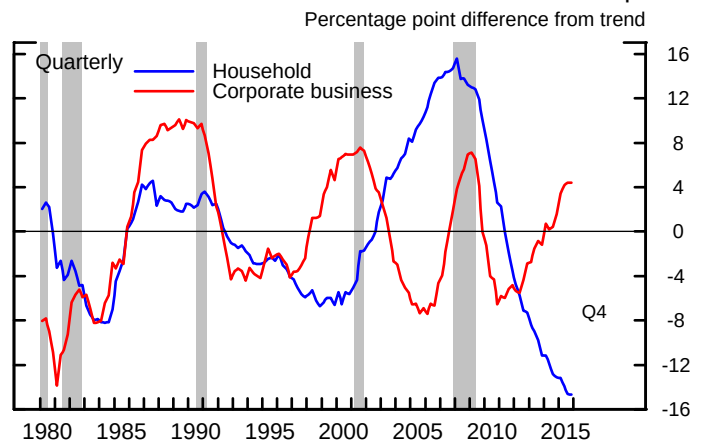
Private Nonfinancial Business Sector Credit-to-GDP ratio



Note: Calculated using an HP filter with $\lambda=400,000$.

Source: FOF, NIPA, and staff calculations.

Private Nonfinancial Sector Credit-to-GDP Ratio Gaps

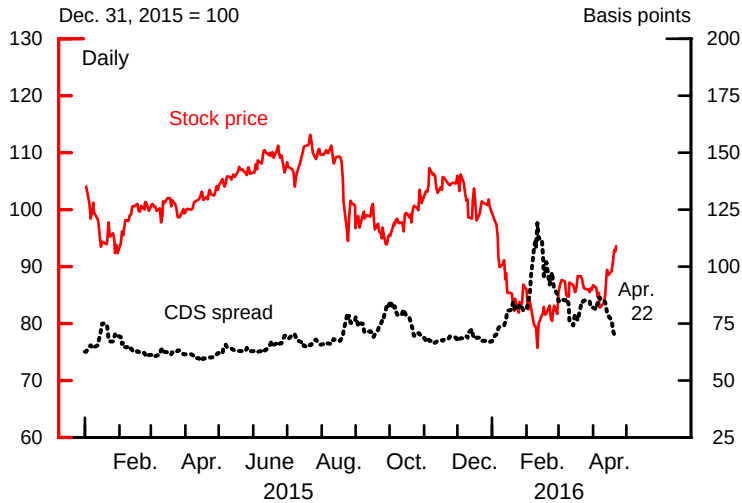


Note: Calculated using an HP filter with $\lambda=400,000$.

Source: FOFA, NIPA, and staff calculations.

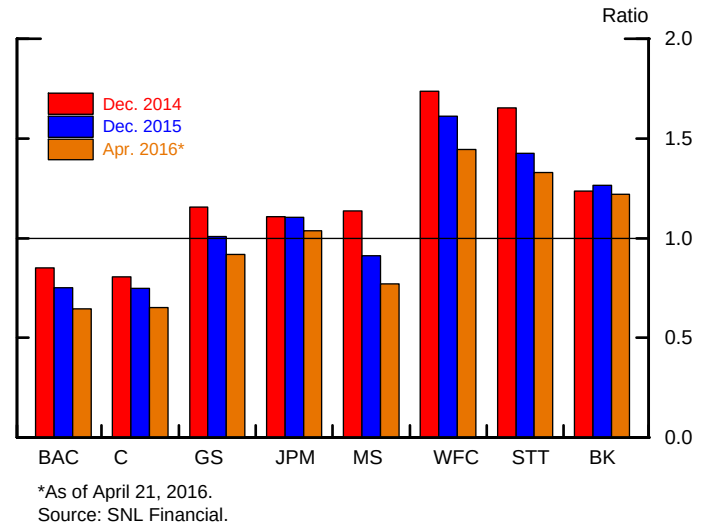
Financial Sector Vulnerabilities

Stock Price and CDS Spreads, LISCC Firms

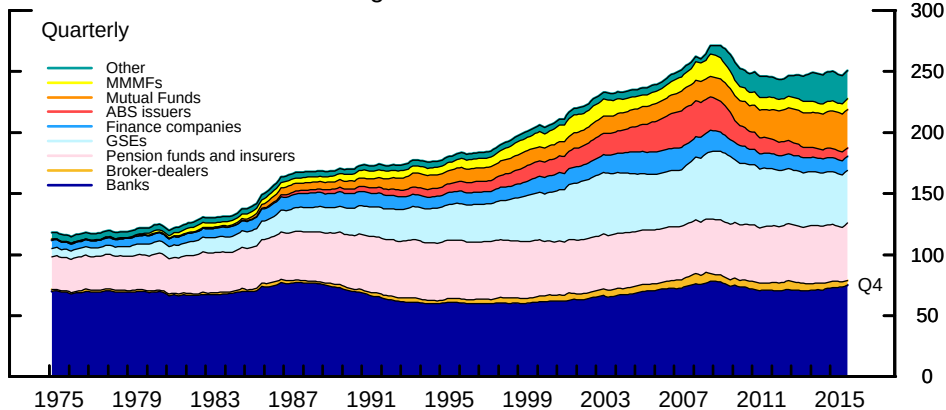


Source: Bloomberg, Yahoo Finance, Google Finance, SNL Financial, and FR Y-9C.

Price-to-Book Ratios for LISCC Firms



Credit Market Debt Outstanding

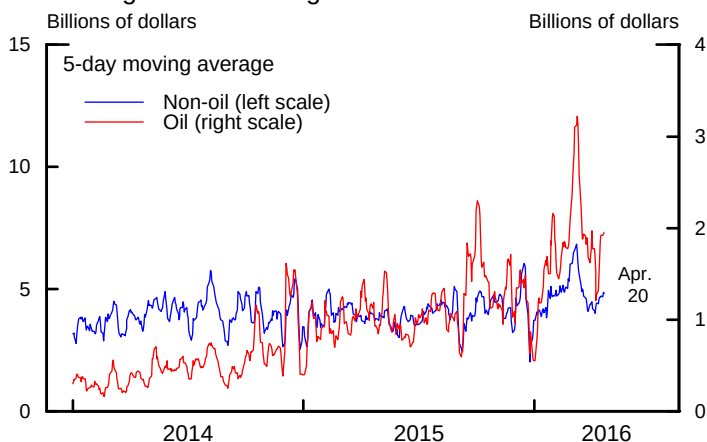


Source: Federal Reserve Financial Accounts of the United States.

Recent Steps

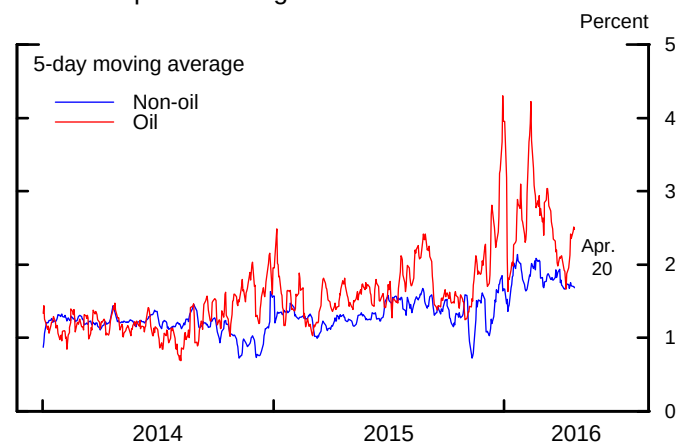
- ABS - Risk-retention and enhanced disclosure and reporting
- MF leverage - Data and disclosure, risk management, limits
- MF liquidity and redemption - Strengthen risk management, clarify less-liquid asset limits, reduce first-mover

Trading Volume for High-Yield Bonds



Note: Only trades of bonds that have been issued for 60 days or more at the time of trading are included. Excluding 144a bonds.
Source: FINRA, Mergent, Moody's DRD.

Bid-Ask Spread for High-Yield Bonds



Note: All measures are computed for non-defaulted bonds on the secondary market that have traded at least 10 times between 10:30am and 3:30pm. Excluding 144a bonds. Bid-ask spread is the difference between weighted average dealer bid prices and ask prices scaled by the mid price.
Source: FINRA, Mergent, Moody's DRD.

Appendix 6: Materials used by Mr. Laubach

Class I FOMC – Restricted Controlled (FR)

Material for the Briefing on

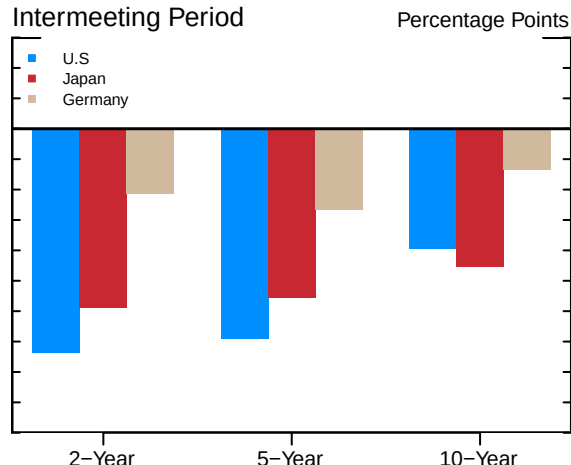
Monetary Policy Alternatives

Thomas Laubach

April 26–27, 2016

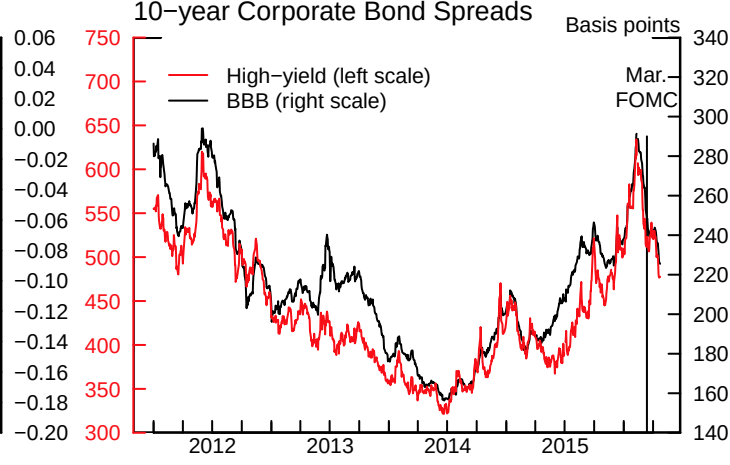
Exhibit 1: Monetary Policy Alternatives

Changes in Sovereign Bond Yields over the Intermeeting Period



Note: Bars represent change in bonds yields over the intermeeting period.
Source: Bloomberg.

10-year Corporate Bond Spreads



Note: Spreads over 10-year Treasury yield; daily.
Source: Staff estimates of smoothed corporate yield curves based on Merrill Lynch data and smoothed Treasury yield curve.

Near-term Uncertainties

- Will spending indicators pick up?
- Will labor market continue to improve?
- Will financial conditions deteriorate again, possibly because of Brexit concerns?

Medium-term Uncertainties

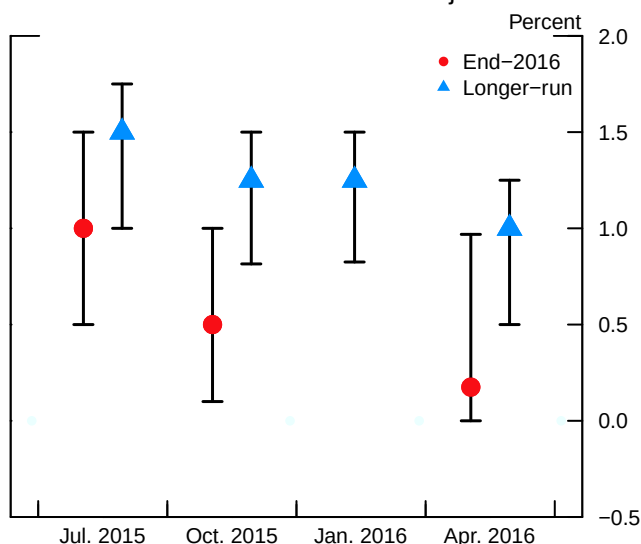
- How persistent will the productivity growth slowdown be?
- Will inflation pick up, and against which backdrop?
- How much policy space remains for central banks in advanced economies?

Policy Responses to Alternative Outcomes

2016 Unemployment Rate (Q4)				
		-50 bps	Current Median 4.7%	+50 bps
2016 Core PCE inflation (Q4/Q4)	-50 bps	0.38%	0.38%	0.13%
	Current Median 1.6%	0.88%	0.88%	0.38%
	+50 bps	1.13%	0.88%	0.63%

Note: Shaded region represents the current baseline assumptions.
Source: FRBNY Primary Dealer and Market Participants surveys.

Neutral Real Federal Funds Rate Projections



Note: The January surveys did not ask for end-2016 real fed funds rate projections. Data symbols show medians. The whisker bars show the range from the 75th percentile to the 25th percentile.
Source: FRBNY Primary Dealer and Market Participants surveys.

MARCH 2016 FOMC STATEMENT

1. Information received since the Federal Open Market Committee met in January suggests that economic activity has been expanding at a moderate pace despite the global economic and financial developments of recent months. Household spending has been increasing at a moderate rate, and the housing sector has improved further; however, business fixed investment and net exports have been soft. A range of recent indicators, including strong job gains, points to additional strengthening of the labor market. Inflation picked up in recent months; however, it continued to run below the Committee's 2 percent longer-run objective, partly reflecting declines in energy prices and in prices of non-energy imports. Market-based measures of inflation compensation remain low; survey-based measures of longer-term inflation expectations are little changed, on balance, in recent months.
2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee currently expects that, with gradual adjustments in the stance of monetary policy, economic activity will expand at a moderate pace and labor market indicators will continue to strengthen. However, global economic and financial developments continue to pose risks. Inflation is expected to remain low in the near term, in part because of earlier declines in energy prices, but to rise to 2 percent over the medium term as the transitory effects of declines in energy and import prices dissipate and the labor market strengthens further. The Committee continues to monitor inflation developments closely.
3. Against this backdrop, the Committee decided to maintain the target range for the federal funds rate at $\frac{1}{4}$ to $\frac{1}{2}$ percent. The stance of monetary policy remains accommodative, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation.
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 objectives of maximum employment and 2 percent inflation. 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. In light of the current shortfall of inflation from 2 percent, the Committee will carefully monitor actual and expected progress toward its inflation goal. The Committee expects that economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data.
5. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at

auction, and it anticipates doing so until normalization of the level of the federal funds rate is well under way. This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions.

APRIL 2016 ALTERNATIVE A

1. Information received since the Federal Open Market Committee met in ~~January~~ March suggests indicates that labor market conditions have improved further even as growth in economic activity has ~~been expanding at a moderate pace despite the global economic and financial developments of recent months~~ slowed. Growth in household spending has ~~been increasing at a moderate rate, and~~ declined. Since the beginning of the year, the housing sector has improved further; ~~however,~~ but business fixed investment and net exports have been soft. A range of recent indicators, including strong job gains, points to additional strengthening of the labor market. Inflation ~~picked up in recent months; however,~~ it has continued to run below the Committee's 2 percent longer-run objective, only partly reflecting earlier declines in energy prices and ~~in~~ falling prices of non-energy imports. Market-based measures of inflation compensation remain low; survey-based measures of longer-term inflation expectations are little changed, on balance, in recent months.
2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee currently expects that, with ~~gradual adjustments in the stance of~~ appropriately accommodative monetary policy, growth in economic activity will ~~expand at~~ pick up to a moderate pace and labor market indicators will continue to strengthen. ~~However, global economic and financial developments continue to pose risks.~~ Inflation is expected to remain low in the near term, in part because of earlier declines in energy prices, but to rise to 2 percent over the medium term as the transitory effects of declines in energy and import prices dissipate and the labor market strengthens further. The Committee ~~continues to~~ sees downside risks to the economic outlook and is closely monitoring inflation, ~~developments~~ indicators of longer-term inflation expectations, and global economic and financial developments closely.
3. Against this backdrop, the Committee decided to maintain the target range for the federal funds rate at ¼ to ½ percent. ~~The stance of monetary policy remains accommodative, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation.~~ The Committee judges that an increase in the target range will not be warranted until inflation moves closer to 2 percent on a sustained basis and the risks to the economic outlook are more closely balanced.
4. In determining the When adjustments to the target range become appropriate, their timing and size of future adjustments to the target range for the federal funds rate, the Committee will assess will depend on the Committee's assessment of realized and expected economic conditions relative to its objectives of maximum employment and 2 percent inflation. 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. ~~In light of the current shortfall of inflation from 2 percent, the Committee will carefully monitor actual and expected progress toward its inflation goal.~~ The Committee expects that economic conditions will evolve in a

manner that will, **for some time**, warrant ~~only gradual increases in~~ **maintaining** the federal funds rate; ~~the federal funds rate is likely to remain, for some time, below~~ **at** levels **below those** that are expected to prevail in the longer run. However, the actual path of the federal funds rate will depend on the economic outlook as informed by incoming data.

5. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, and it anticipates doing so until normalization of the level of the federal funds rate is well under way. This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions.

APRIL 2016 ALTERNATIVE B

1. Information received since the Federal Open Market Committee met in ~~January~~ March suggests indicates that labor market conditions have improved further even as growth in economic activity ~~has been expanding at a moderate pace despite the global economic and financial developments of recent months~~ appears to have slowed. Growth in household spending ~~has been increasing at a moderate rate~~ moderated, and although households' real income has risen at a solid rate and consumer sentiment remains high. Since the beginning of the year, the housing sector has improved further; ~~however~~, but business fixed investment and net exports have been soft. A range of recent indicators, including strong job gains, points to additional strengthening of the labor market. Inflation ~~picked up in recent months; however, it~~ has continued to run below the Committee's 2 percent longer-run objective, partly reflecting earlier declines in energy prices and ~~in~~ falling prices of non-energy imports. Market-based measures of inflation compensation remain low; survey-based measures of longer-term inflation expectations are little changed, on balance, in recent months.
2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee currently expects that, with gradual adjustments in the stance of monetary policy, economic activity will expand at a moderate pace and labor market indicators will continue to strengthen. ~~However, global economic and financial developments continue to pose risks~~. Inflation is expected to remain low in the near term, in part because of earlier declines in energy prices, but to rise to 2 percent over the medium term as the transitory effects of declines in energy and import prices dissipate and the labor market strengthens further. The Committee continues to closely monitor inflation indicators and global economic and financial developments ~~closely~~.
3. Against this backdrop, the Committee decided to maintain the target range for the federal funds rate at $\frac{1}{4}$ to $\frac{1}{2}$ percent. The stance of monetary policy remains accommodative, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation.
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 objectives of maximum employment and 2 percent inflation. 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. In light of the current shortfall of inflation from 2 percent, the Committee will carefully monitor actual and expected progress toward its inflation goal. The Committee expects that economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path

of the federal funds rate will depend on the economic outlook as informed by incoming data.

5. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, and it anticipates doing so until normalization of the level of the federal funds rate is well under way. This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions.

APRIL 2016 ALTERNATIVE C

1. Information received since the Federal Open Market Committee met in ~~January~~ March suggests indicates that labor market conditions have improved further even as growth in economic activity ~~has been expanding at a moderate pace despite the global economic and financial developments of recent months~~ appears to have slowed. Household spending has been increasing at a moderate rate, and the housing sector has improved further; however, business fixed investment and net exports have been soft. A range of recent indicators, including strong job gains, points to additional strengthening of the labor market. Inflation ~~picked up in recent months~~ has stepped up since last year; however, though it has continued to run below the Committee's 2 percent longer-run objective, partly reflecting largely because of earlier declines in energy prices and in falling prices of non-energy imports. Market-based measures of inflation compensation remain low; survey-based measures of longer-term inflation expectations are little changed, on balance, in recent months.
2. Consistent with its statutory mandate, the Committee seeks to foster maximum employment and price stability. The Committee currently expects that, with gradual adjustments in the stance of monetary policy, economic activity will expand at a moderate pace and labor market indicators will continue to strengthen. ~~However, global economic and financial developments continue to pose risks.~~ The Committee sees the risks to the outlook for both economic activity and the labor market as nearly balanced but is monitoring global economic and financial developments. Inflation is expected to remain low in the near term, in part because of earlier declines in energy prices, but to rise to 2 percent over the medium term as the transitory effects of declines in energy and import prices dissipate and the labor market strengthens further. The Committee continues to monitor inflation developments closely.
3. Against this backdrop, the Committee decided to ~~maintain~~ increase the target range for the federal funds rate ~~at ¼ to ½~~ to ¾ percent. The stance of monetary policy remains accommodative, thereby supporting further improvement in labor market conditions and a return to 2 percent inflation.
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 objectives of maximum employment and 2 percent inflation. 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. In light of the current shortfall of inflation from 2 percent, the Committee will carefully monitor actual and expected progress toward its inflation goal. The Committee expects that economic conditions will evolve in a manner that will warrant only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run. However, the actual path

of the federal funds rate will depend on the economic outlook as informed by incoming data.

5. The Committee is maintaining its existing policy of reinvesting principal payments from its holdings of agency debt and agency mortgage-backed securities in agency mortgage-backed securities and of rolling over maturing Treasury securities at auction, and it anticipates doing so until normalization of the level of the federal funds rate is well under way. This policy, by keeping the Committee's holdings of longer-term securities at sizable levels, should help maintain accommodative financial conditions.

Implementation Note for April 2016 Alternative A and Alternative B

Release Date: ~~March 16~~ **April 27**, 2016

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 ~~March 16~~ **April 27**, 2016:

- The Board of Governors of the Federal Reserve System left unchanged the interest rate paid on required and excess reserve balances at 0.50 percent.
- 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 ~~March 17~~ **April 28**, 2016, 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 $\frac{1}{4}$ to $\frac{1}{2}$ 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 0.25 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 maturing Treasury securities at auction and to continue reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. 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.”

More information regarding open market operations may be found on the Federal Reserve Bank of New York’s [website](#).

- The Board of Governors of the Federal Reserve System took no action to change the discount rate (the primary credit rate), which remains at 1.00 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.

Implementation Note for April 2016 Alternative C*Release Date:* ~~March 16~~ **April 27**, 2016**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 ~~March 16~~ **April 27**, 2016:

- The Board of Governors of the Federal Reserve System ~~left unchanged the interest rate paid on required and excess reserve balances at 0.50 percent~~ **voted [unanimously] to raise the interest rate paid on required and excess reserve balances to 0.75 percent, effective April 28, 2016.**
- 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 ~~March 17~~ **April 28**, 2016, 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 ~~¼ to ½~~ **to ¾** 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 ~~0.25~~ **0.50** 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 maturing Treasury securities at auction and to continue reinvesting principal payments on all agency debt and agency mortgage-backed securities in agency mortgage-backed securities. 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.”

More information regarding open market operations may be found on the Federal Reserve Bank of New York’s [website](#).

- **In a related action**, the Board of Governors of the Federal Reserve System ~~took no action to change the discount rate (the primary credit rate), which remains at 1.00~~ **voted [unanimously] to approve a ¼ percentage point increase in the discount rate (the primary credit rate) to 1.25 percent, effective April 28, 2016. In taking this action, the Board approved requests 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.