

# Monetary policy in a low-interest rate environment

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# Fed review of strategies, tools, and communications

- ▶ In November 2018, the Federal Reserve **announced** that in 2019 it “will review the strategies, tools, and communication practices it uses to pursue its congressionally-assigned mandate of maximum employment and price stability.”
- ▶ In this talk:
  - ▶ Quick summary of the FOMC’s current framework
  - ▶ Evidence related to the current low-rate environment
  - ▶ Some work relevant to the topics of the review

# The Federal Reserve's "dual mandate" for monetary policy

*The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates. Federal Reserve Act, Section 2A*

- ▶ Moderate long-term interest rates usually seen as achieved by preserving stable prices and maximum employment, hence "dual mandate."
- ▶ Not a hierarchical mandate.
- ▶ How to operationalize this?

# The FOMC's Consensus Statement

- ▶ [FOMC Statement on Longer-Run Goals and Monetary Policy Strategy](#) adopted in January 2012, since then reaffirmed annually.
- ▶ “The Committee reaffirms its judgment that inflation at the rate of 2 percent... is most consistent over the longer run with the Federal Reserve’s statutory mandate. The Committee would be concerned if inflation were running persistently above or below this objective.”
- ▶ “The maximum level of employment is largely determined by nonmonetary factors... The Committee’s policy decisions must be informed by assessments of the maximum level of employment, recognizing that such assessments are necessarily uncertain and subject to revision.” States median SEP estimate of longer-run unemployment.
- ▶ “These objectives are generally complementary. However, under circumstances in which the Committee judges that the objectives are not complementary, it follows a balanced approach in promoting them...”

## Observations on the current framework and review

- ▶ Current framework has allowed FOMC to provide accommodation to get economy back to full employment.
- ▶ Since January 2012, inflation has on average run below target.
- ▶ Review will not contemplate changes to mandate or 2 percent longer-run goal.
- ▶ Examine different approaches to pursuing 2 percent inflation “over the longer run.”

## Low $r^*$ : How severe is the ZLB problem?

- ▶ Estimates of the neutral interest rate in several major economies declined in and after 2008 and have remained low.
- ▶ Likely determinants of  $r^*$  suggest further declines to come.
- ▶ Based on current estimates of  $r^*$  in the US, short-term interest rates may be at the lower bound 1/4 to 1/3 of the time. Decline in inflation expectations would exacerbate the problem.

## $r^*$ : Empirical definition

- ▶ Low-frequency measure that could be used in benchmarks for monetary policy (e.g. intercept in interest rate rules):
  - ▶ Captures highly persistent determinants such as changes in trend productivity growth and demographics.
  - ▶ Time series and survey evidence suggest productivity growth has a very persistent trend component masked by transitory noise.
  - ▶ Other factors that could cause time variation include persistent changes in risk premia, global savings glut, fiscal policy.

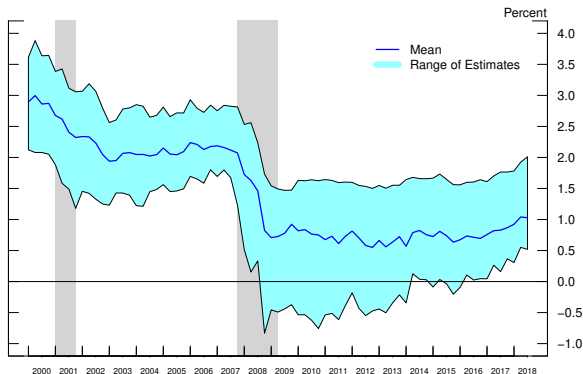
# Output gap and inflation dynamics and the NRI

- ▶ Basic assumptions:
  - ▶ The output gap depends on the real rate *gap* (IS curve)
  - ▶ Inflation driven by the output gap (Phillips curve)
  - ▶ Shocks at normal cyclical frequency do not enter  $r^*$ .
- ▶ Use reduced-form model (simplified)

$$\begin{aligned}\tilde{y}_t &= a_y \tilde{y}_{t-1} + a_r (r_{t-1} - r_{t-1}^*) + \epsilon_{\tilde{y},t}, \text{ s.d.}(\epsilon_{\tilde{y},t}) = \sigma_{\tilde{y}} \\ \pi_t &= b_\pi \pi_{t-1} + b_y \tilde{y}_{t-1} + \epsilon_{\pi,t}, \text{ s.d.}(\epsilon_{\pi,t}) = \sigma_\pi\end{aligned}$$



## US $r^*$ estimates from seven models

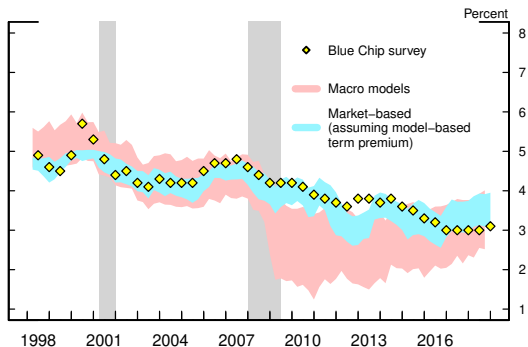


Sources: [Del Negro et al. \(2017\)](#); [HLW \(2017\)](#); [Johannsen and Mertens \(2016\)](#); [Kiley \(2015\)](#); [LW \(2003\)](#); [Lewis and Vazquez-Grande \(2017\)](#); [Lubik and Matthes \(2015\)](#).

- ▶ Individual  $r^*$  estimates are uncertain, in part because output and inflation data are not very informative.
- ▶ Although point estimates differ, large and persistent decline post-crisis found in many models and approaches.

## Other approaches to inferring $r^*$

- ▶ Estimates of long-horizon expectations of short-term nominal rate from term structure models, surveys suggest central estimates of 3 to 3 1/2 percent.



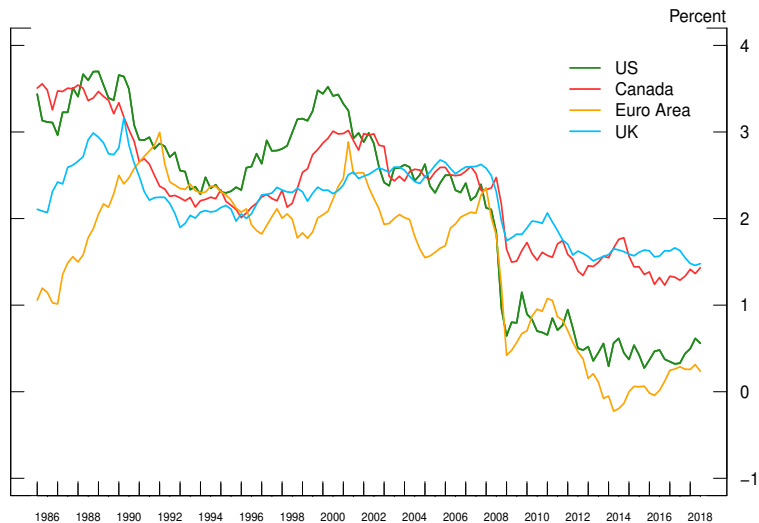
Note: Blue shading shows range of federal funds rate five to ten years ahead from alternative term structure models. Pink shading shows range of  $r^*$  estimates based on five macro models. Gray shading shows NBER-dated recessions.

Source: FRBNY, NBER, and Board staff calculations.

## Low $r^*$ is common across many economies

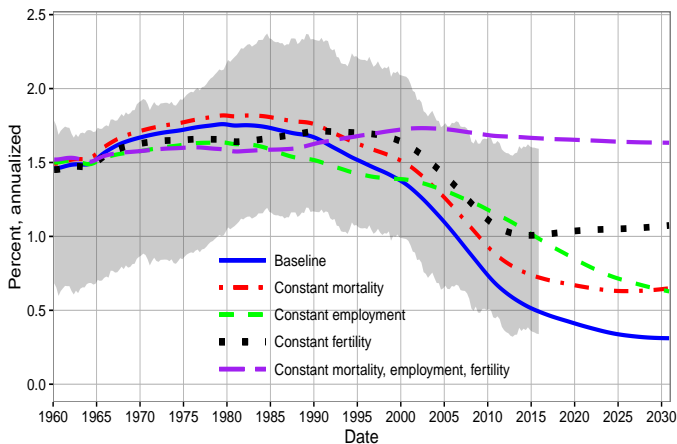
- ▶ Neutral rates could comove across countries reflecting common causes:
  - ▶ Global TFP slowdown
  - ▶ Changes in risk aversion post crisis
- ▶ Neutral rates could also comove reflecting transmission of country-specific developments (such as demographics) across economies in the presence of increasingly integrated capital markets.
- ▶ [Holston, Laubach, Williams \(2017\)](#) apply the same methodology across four economies: US, Euro Area, Canada, and UK.

# $r^*$ estimates from four economies



# The role of demographics for $r^*$

- ▶ Gagnon et al (2016): Simulate OLG model using U.S. demographic data over the past century.
- ▶ Fixing demographic variables in 1960, fertility, mortality, and employment rates all contribute to decline in real interest rates.



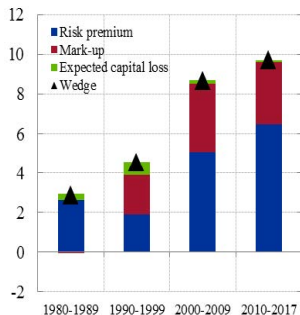
## Risk aversion and $r^*$

- ▶ Del Negro et al. (2017): Preference for safe assets driving  $r^*$  lower.
- ▶ Brand et al. (2018): Risk premium is major driver of wedge between return on capital and risk-free rate.

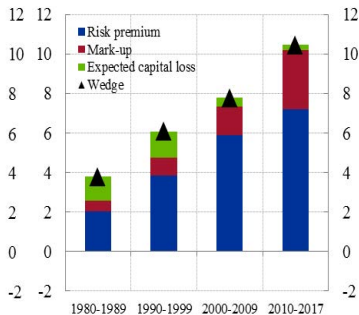
### Decomposition of the wedge between return on capital and risk free rate

(percentages)

(a) Euro area



(b) US



Source: ECB Occasional Paper Series –“The natural rate of interest: estimates, drivers, and challenges to monetary policy”.

## Implications for ZLB probabilities

- ▶ Low  $r^*$  implies higher frequency of ZLB spells. [Kiley and Roberts \(2017\)](#) find that for  $i^* = 3$  percent, ZLB binds 1/4 of the time.
- ▶ [Chung et al \(2019\)](#): ZLB probability endogenous to policy strategy, but for any given strategy, ZLB probability is higher the lower  $r^*$ .
- ▶ With ZLB binding 1/4 of the time or more, inflation would run on average below target,  $i^*$  less than  $r^* + \pi^*$ , unless CB commits to make up inflation shortfalls.

# Beyond inflation targeting: Potential adjustments to policy strategy

- ▶ Examine options for providing accommodation at the lower bound and ensuring that inflation averages 2 percent over time.
- ▶ More explicit commitment to make up for inflation or accommodation shortfalls during ZLB episodes:
  - ▶ Unconditional: (Flexible) price level targeting, average inflation targeting ([Nessén and Vestin 2005](#)).
  - ▶ Conditional: Reversing cumulative rule shortfalls ([Reifschneider and Williams 2000](#)), temporary PLT ([Evans 2010](#), [Bernanke 2017](#)).



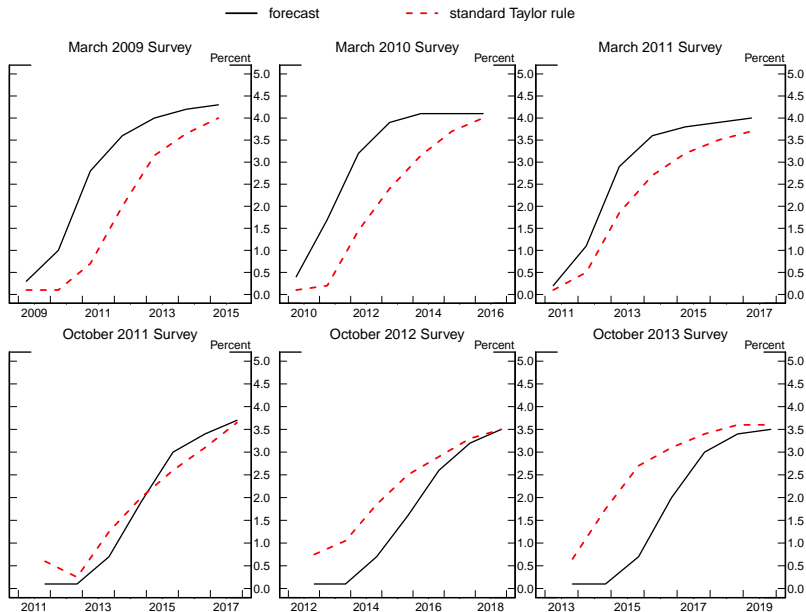
# Tools for providing policy accommodation

- ▶ Tools used by the Federal Reserve in the aftermath of the crisis:
  - ▶ Forward guidance (calendar-based, threshold-based)
  - ▶ QE (fixed-amount, state-contingent)
- ▶ Additional tools used by other CBs:
  - ▶ Negative policy rates
  - ▶ Yield curve control
  - ▶ Measures to stimulate bank lending to nonfinancial sector

## How effective were forward guidance and QE?

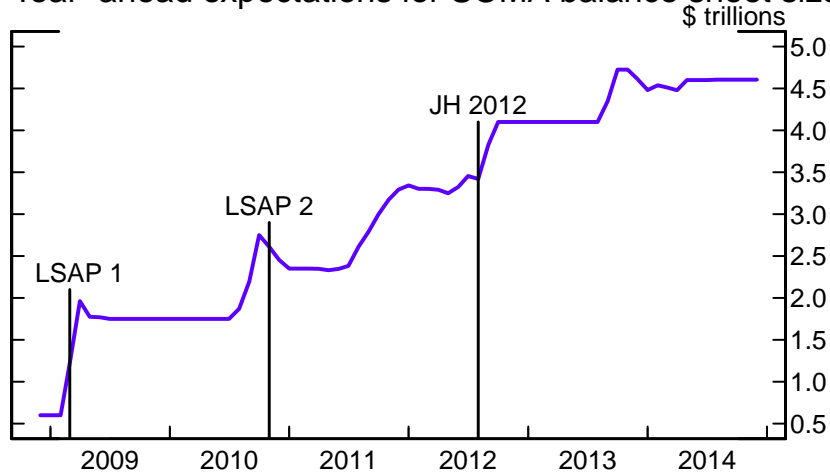
- ▶ Engen, Laubach, Reifschneider (2015): Effects of unconventional policies in 2008-13 were limited by the fact that they came as surprise, initially not well understood.
- ▶ Should expect stronger automatic stabilizers through anticipation effects next time.

# Perceived reaction function shifted substantially



# Limited anticipation of the Fed's LSAP programs

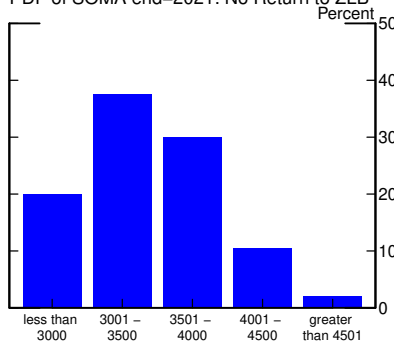
## Year-ahead expectations for SOMA balance sheet size



Surveys of Primary Dealers, FRBNY

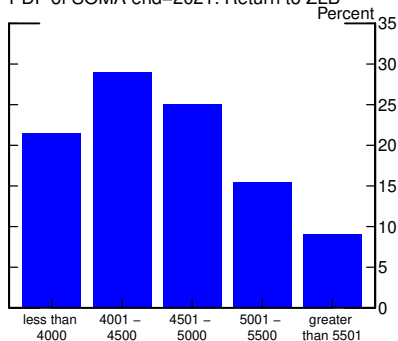
# Reaction function better understood now

PDF of SOMA end-2021: No Return to ZLB



Note: Values are an average of SMP and SPD results.  
Source: FRBNY September 2018 Primary Dealer and Market Participants surveys.

PDF of SOMA end-2021: Return to ZLB



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Source: FRBNY September 2018 Primary Dealer and Market Participants surveys.

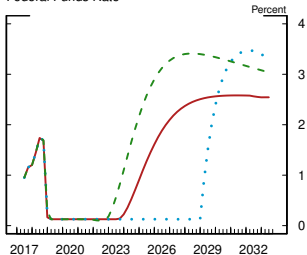
September 2018 Surveys of Primary Dealers and Market Participants, FRBNY.

## Forward guidance and QE in a recession

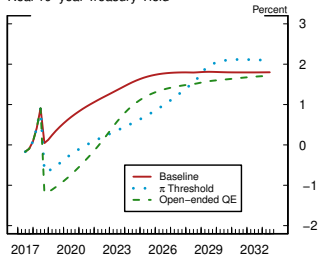
- ▶ [Chung et al \(2019\)](#): Recession scenario calibrated such that, under inertial Taylor rule, ZLB binds for 5 years, unemployment rises to 10 percent.
- ▶ Consider two policies to provide additional accommodation:
  - ▶ Forward guidance with an inflation threshold of 2.25 percent
  - ▶ Open-ended QE that continues until policy rate lifts off, unemployment drops below 5.5 percent, or inflation rises above 1.75 percent.
- ▶ Balance sheet endogenous to model simulations, using methodology of [Chung et al. \(2018\)](#); in this scenario, size nearly doubles to 33 percent of GDP, reduces 10-year TP by 100 bps.

# Forward guidance and QE in a recession

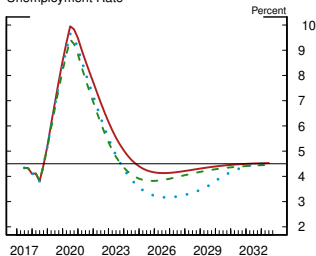
Federal Funds Rate



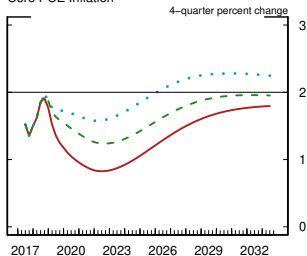
Real 10-year Treasury Yield



Unemployment Rate



Core PCE Inflation



## Open issues

- ▶ Reaction function and tools at ZLB better understood in light of post-crisis experience.
- ▶ But starting point for long-term yields much lower.
- ▶ Will low-for-long policies have as strong expectational effects as RE model analyses suggest?
- ▶ Political support and institutional ability to sustain commitments to time-inconsistent policies?
- ▶ Money-financed fiscal programs ([English, Erceg, Lopez-Salido 2017](#)): Rethinking CB independence?