A Perspective on Unconventional Monetary Policy

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The views I express here are my own and do not necessarily reflect the views of the Federal Reserve Bank of Chicago, my colleagues on the Federal Open Market Committee (FOMC) or within the Federal Reserve System.

Three Big Events in Fed History

- **The Great Depression (1929-1938)**
  - "Inept monetary policy" failed to adequately combat credit contraction, deflation, and depression

- **The Great Inflation (1965-1980)**
  - Monetary policy failed to recognize structural changes and expectational dynamics that led to double-digit inflation

- **The Treasury Accord (1951)**
  - An example highlighting the importance of central bank independence

Academic Foundations of Modern Central Banking

- **Great Depression: Central banks must address nominal crises**
  - Friedman and Schwartz (1963)
  - Bernanke (1983, 1985)

- **Great Inflation: Central banks must distinguish real from nominal cycles**
  - Friedman (1968)
  - Lucas (1972)
  - Kydland and Prescott (1982)

- **Central bank independence: Central banks must be able to act as necessary**
  - Kydland and Prescott (1977)
  - Barro and Gordon (1983)
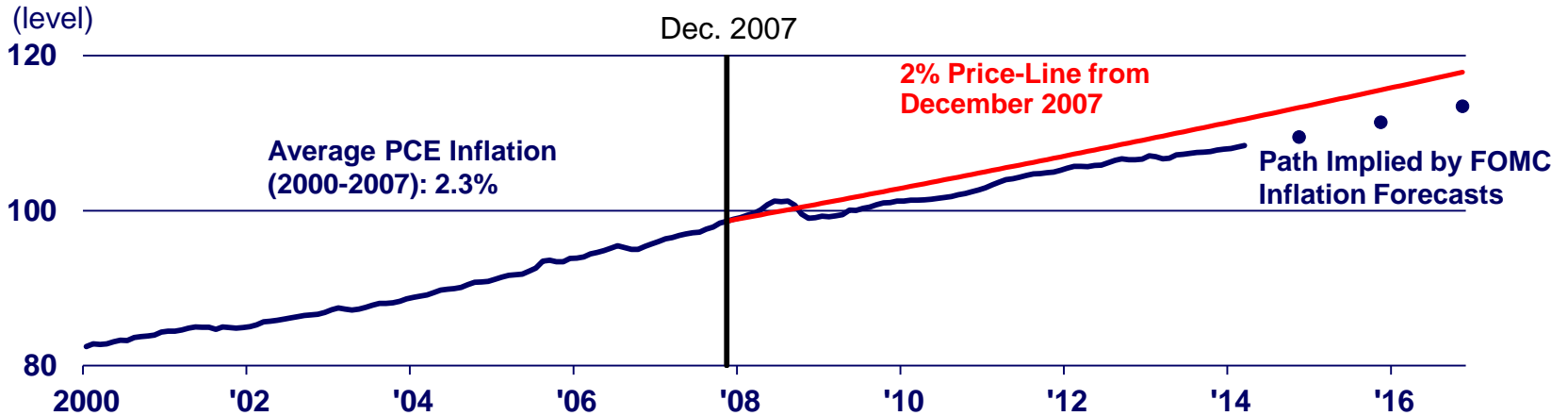 - Rogoff (1985)

Long-Run Strategy for Monetary Policy
(January 2012, reaffirmed thereafter every January)

- $\pi^* = 2\%$ **PCE inflation**

- $u_t^n \sim 5.2\% - 5.6\%$ **time-varying**
  - Central tendency of long-run sustainable level from the Summary of Economic Projections (SEP)

- **<u>Balanced approach</u> to reducing deviations of inflation and employment from long-run objectives**
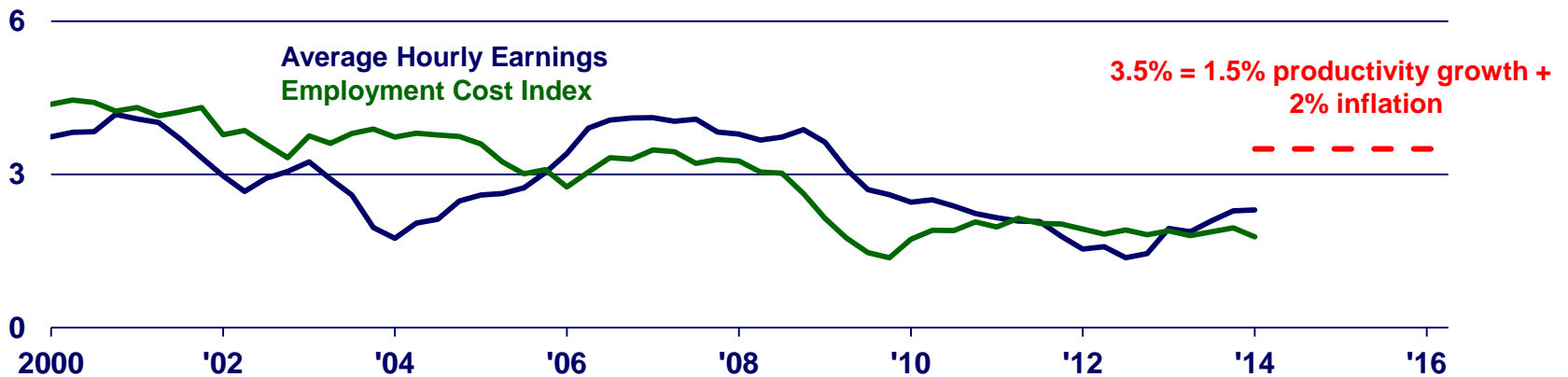
Persistently Low Inflation and Wage Growth

Total PCE Price Index
(level)

Dec. 2007

2% Price-Line from December 2007

Average PCE Inflation (2000-2007): 2.3%

Path Implied by FOMC Inflation Forecasts

120

100

80

2000   '02   '04   '06   '08   '10   '12   '14   '16

Wage and Compensation Growth
(percent change, year-over-year)

Average Hourly Earnings
Employment Cost Index

3.5% = 1.5% productivity growth + 2% inflation

6

3

0

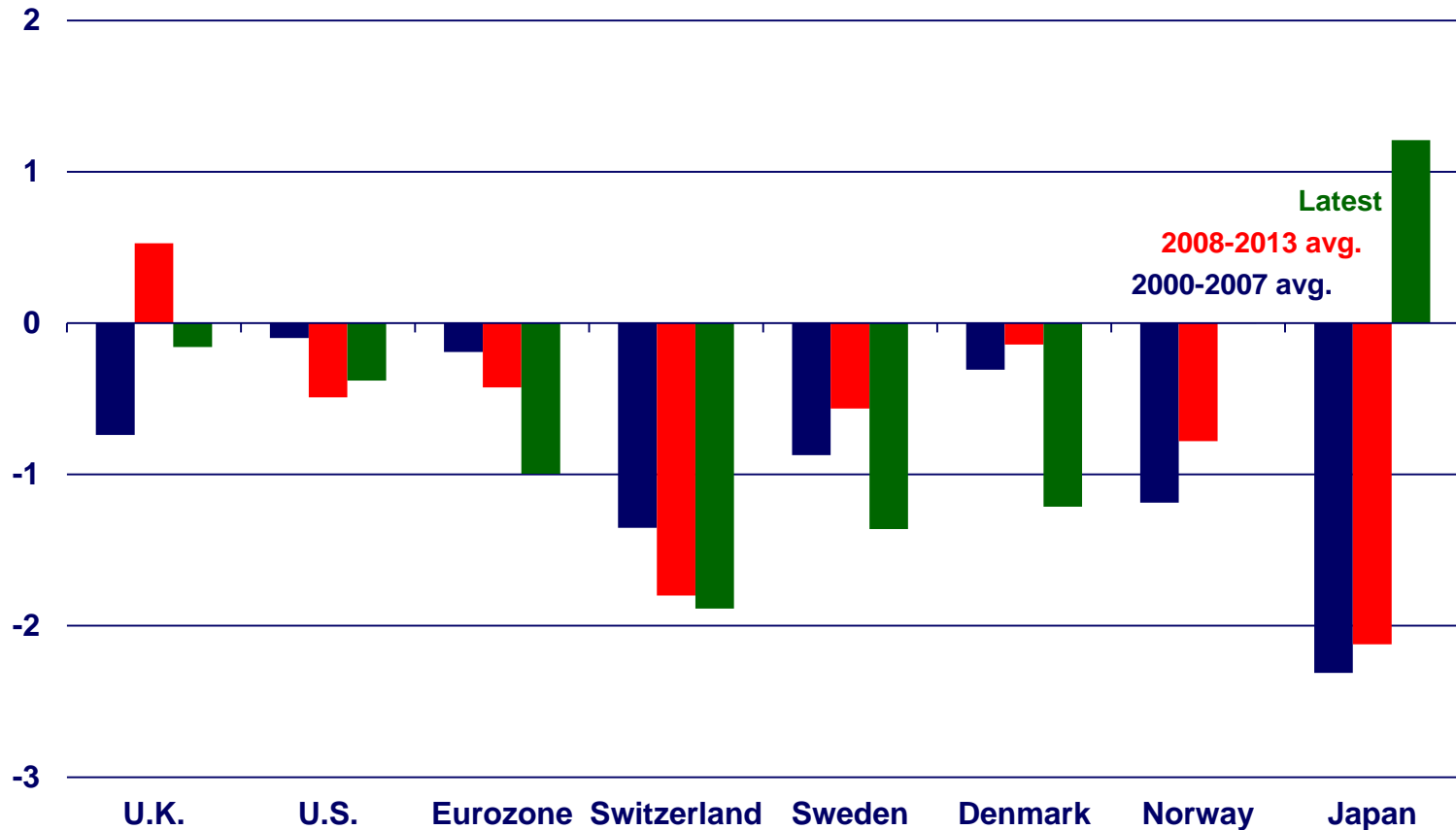2000   '02   '04   '06   '08   '10   '12   '14   '16

Source: Inflation forecasts are from the March 19, 2014 FOMC Summary of Economic Projections

4

Inflation is Low Globally

Consumer Inflation
(year-over-year percent change, deviation from target)

Legend:
- **Latest** (green)
- **2008-2013 avg.** (red)
- **2000-2007 avg.** (dark blue)

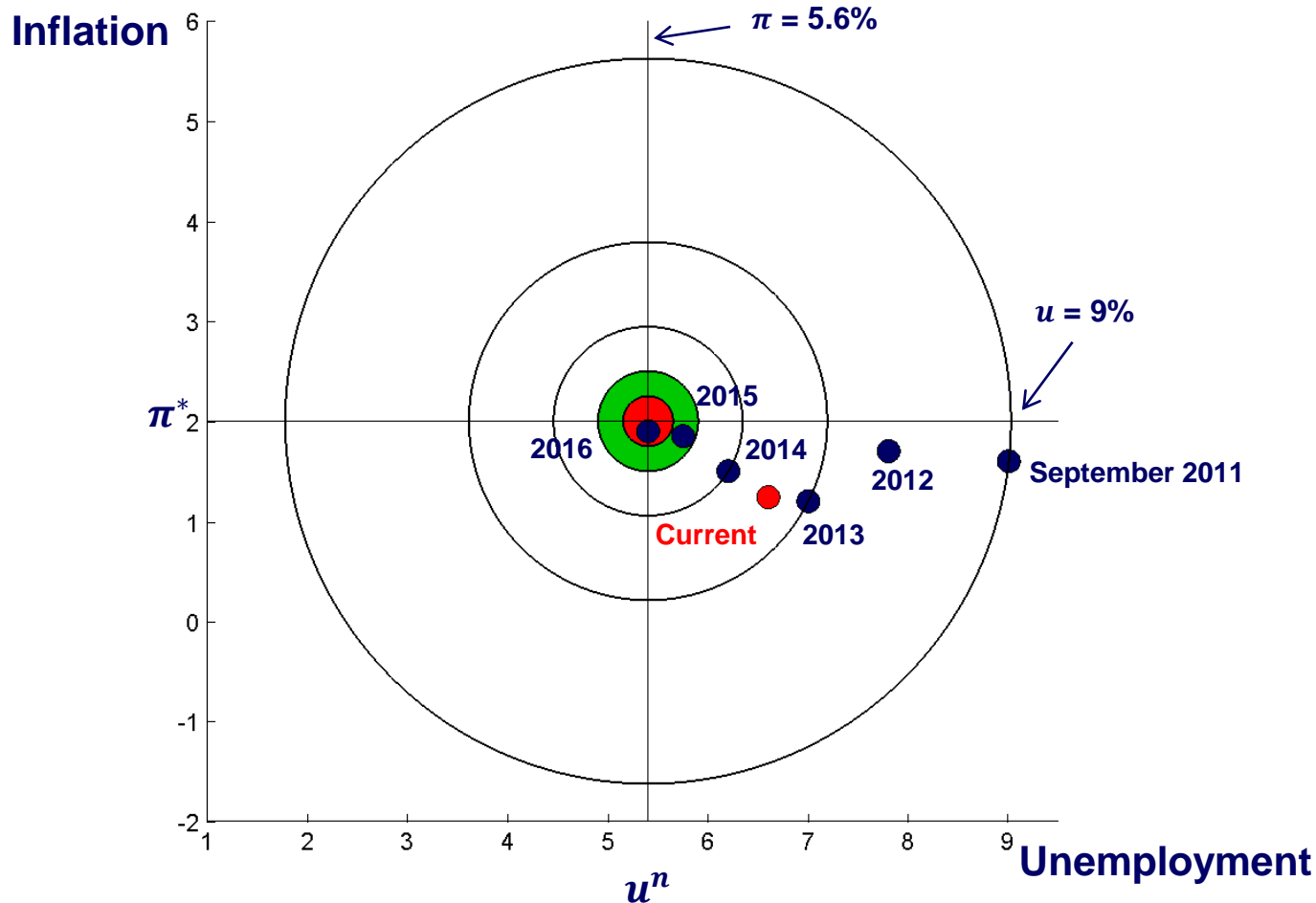Categories: U.K., U.S., Eurozone, Switzerland, Sweden, Denmark, Norway, Japan

Consumer inflation in the U.S. is as measured by the total price index for Personal Consumption Expenditures; in other countries, it is measured by the Consumer Price Index. Latest data are year-over-year changes in the most recently published monthly price index.

Bull's-Eye Accountability for Fed's Dual Mandate

Loss Function
(percent)

$$L = (\pi - \pi^*)^2 + 0.25(y - y^*)^2$$
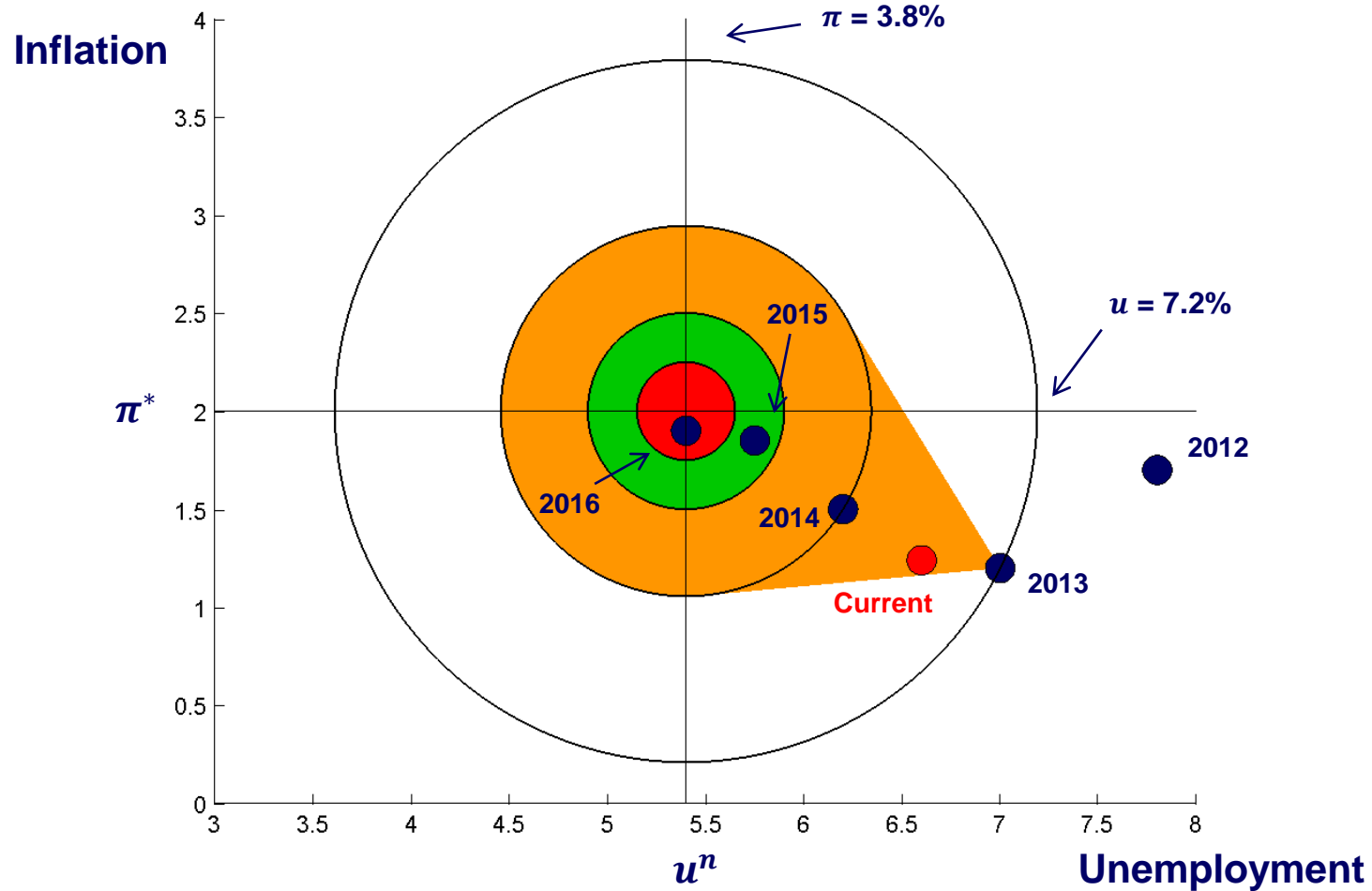
$$L = (\pi - 2)^2 + (u - u^n)^2$$

Inflation

$\pi = 5.6\%$

$u = 9\%$

π^*

2015

2016

2014

2012

September 2011

Current

2013

u^n

Unemployment

2014 – 2016 values are midpoints of FOMC participants' Summary of Economic Projections as of March 19, 2014.

Bull's-Eye Accountability for Fed's Dual Mandate

Loss Function
(percent)

$$L = (\pi - 2)^2 + (u - u^n)^2$$

Inflation

π^*

$\pi = 3.8\%$

$u = 7.2\%$

2015

2016

2014

Current

2013

2012

u^n

Unemployment

2014 – 2016 values are midpoints of FOMC participants' Summary of Economic Projections as of March 19, 2014.
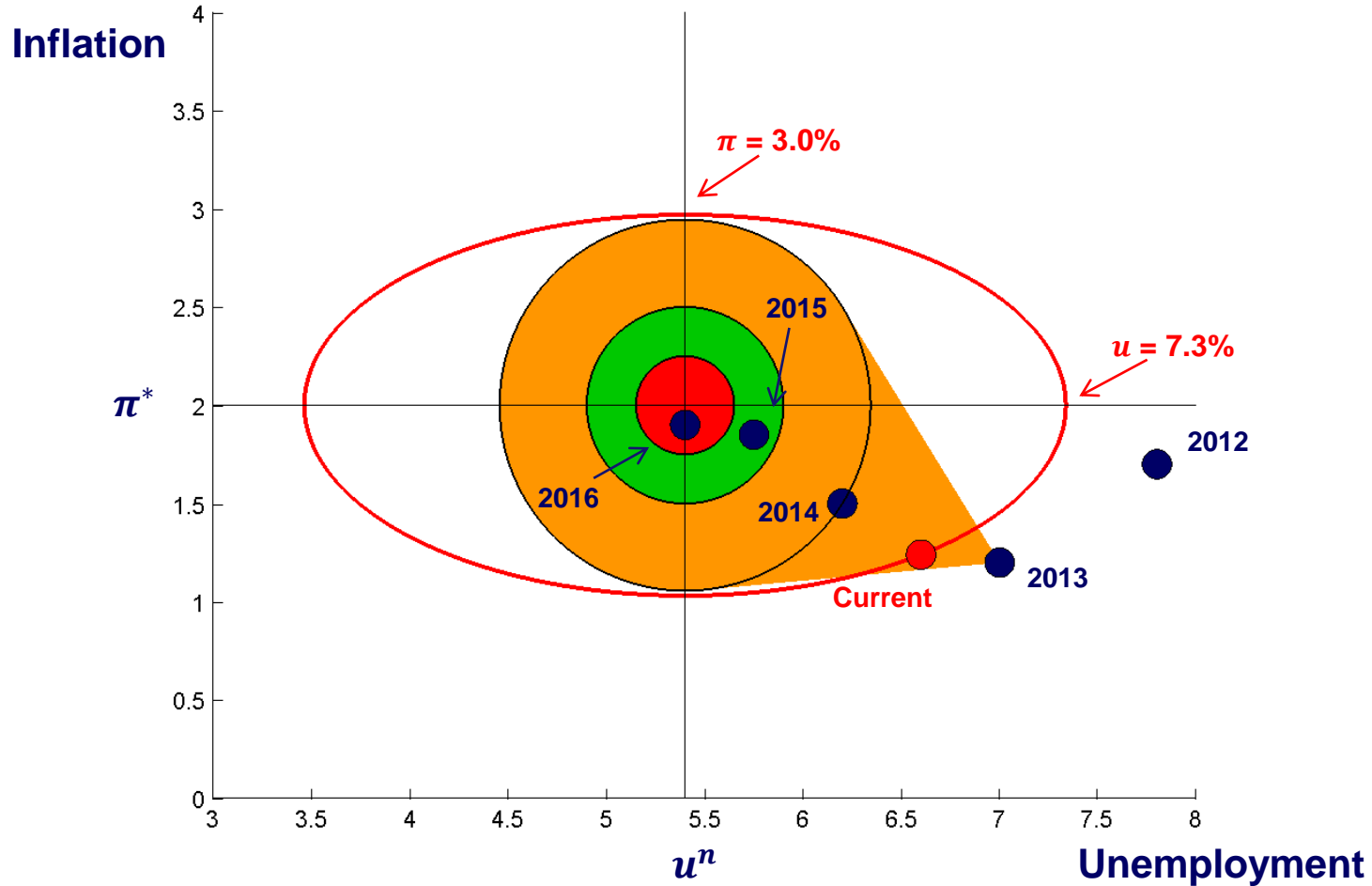
Bull's-Eye Accountability for Fed's Dual Mandate

Loss Function
(percent)

$$L = (\pi - 2)^2 + (u - u^n)^2$$

$$L = 2(\pi - 2)^2 + (u - u^n)^2$$

Inflation

$\pi = 3.0\%$

$u = 7.3\%$

2015

2016

2014

2012

2013

Current

π^*

u^n

Unemployment

*2014 – 2016 values are midpoints of FOMC participants' Summary of Economic Projections as of March 19, 2014.*

Why Has Achieving Dual Mandate Been So Hard?

- **Deleveraging in the aftermath of the financial crisis**

- **Global risks**

- **Unusually restrictive fiscal policy**

- **Monetary policy constrained by zero lower bound**

Policy Rate Constrained by Zero Lower Bound

Fed Funds Rate
(percent)
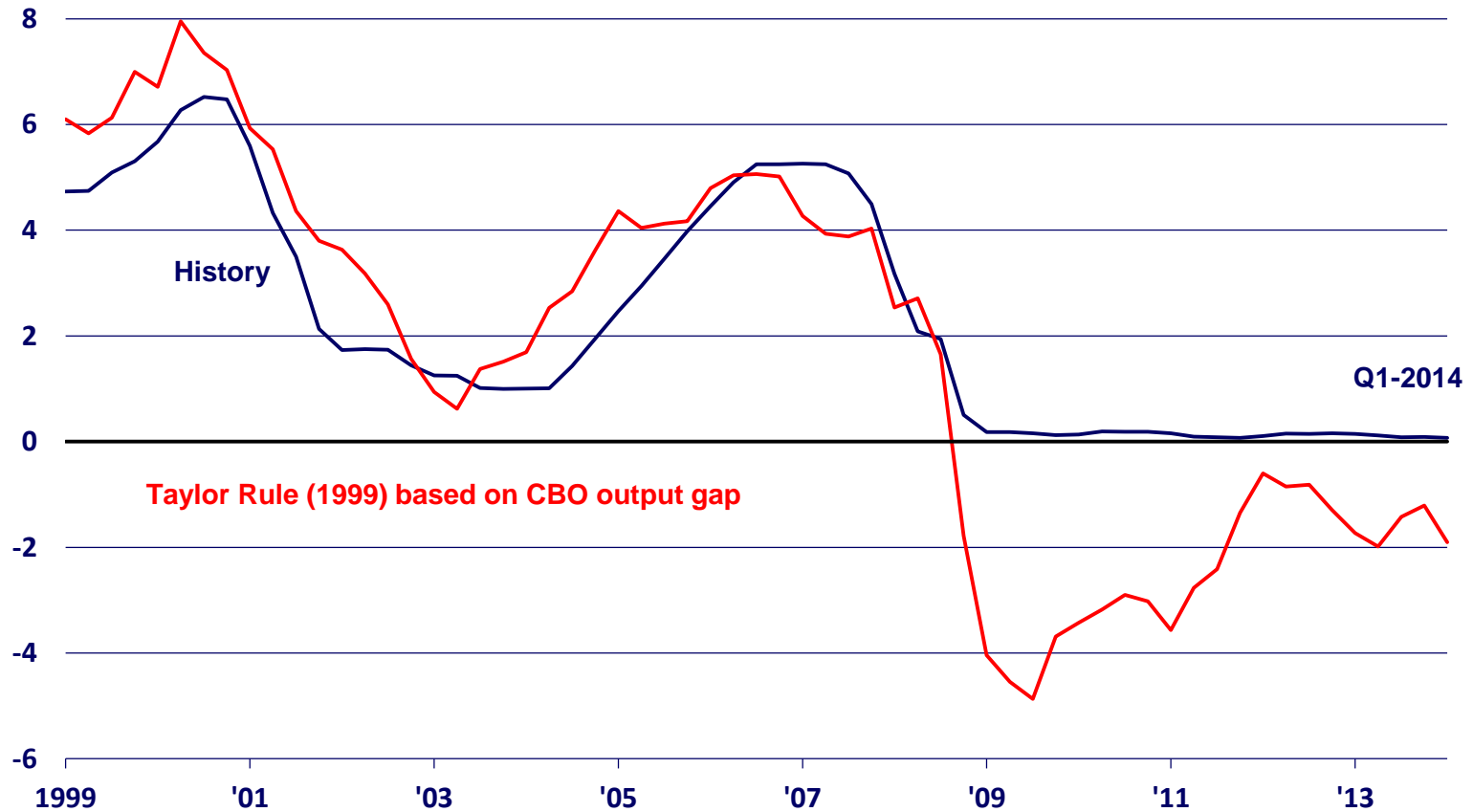
In the period prior to the explicit inflation target set by the FOMC, the Taylor Rule is constructed using long-run inflation forecasts from the Survey of Professional Forecasters, *or when available, from the* Summary of Economic Projections. *After 2012, the Taylor Rule is constructed using the FOMC's 2 percent long-run inflation target.*
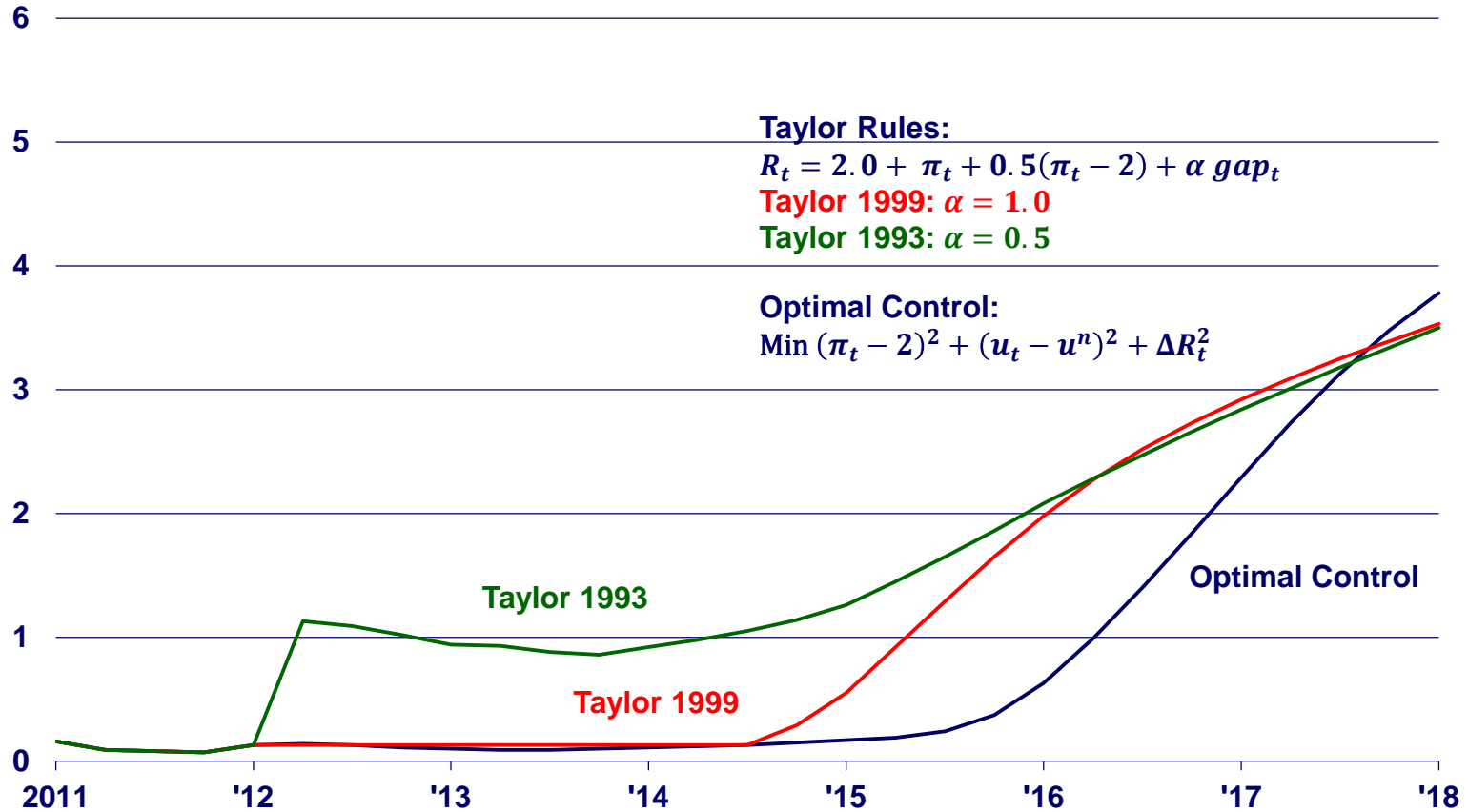
Policy Tools at the Zero Lower Bound

- **Constrained optimal policy approach (Taylor 1979)**

- **Three ways to approximate optimal policy at the ZLB**
  - **State-contingent price level targeting**
  - **LSAPs**
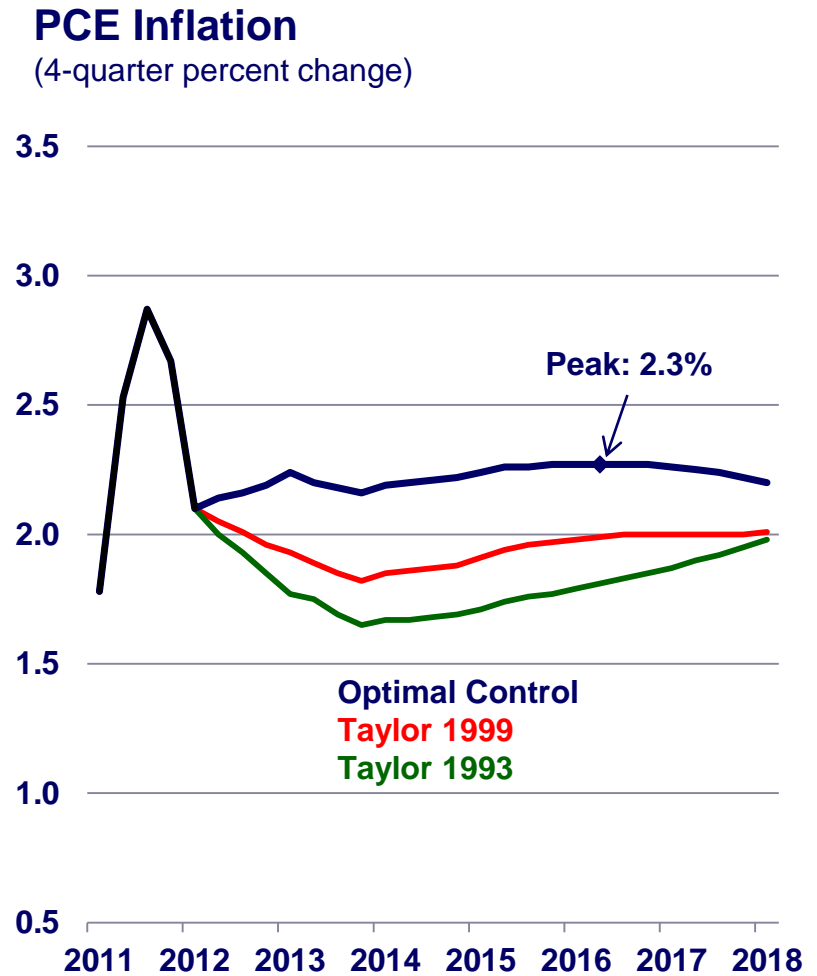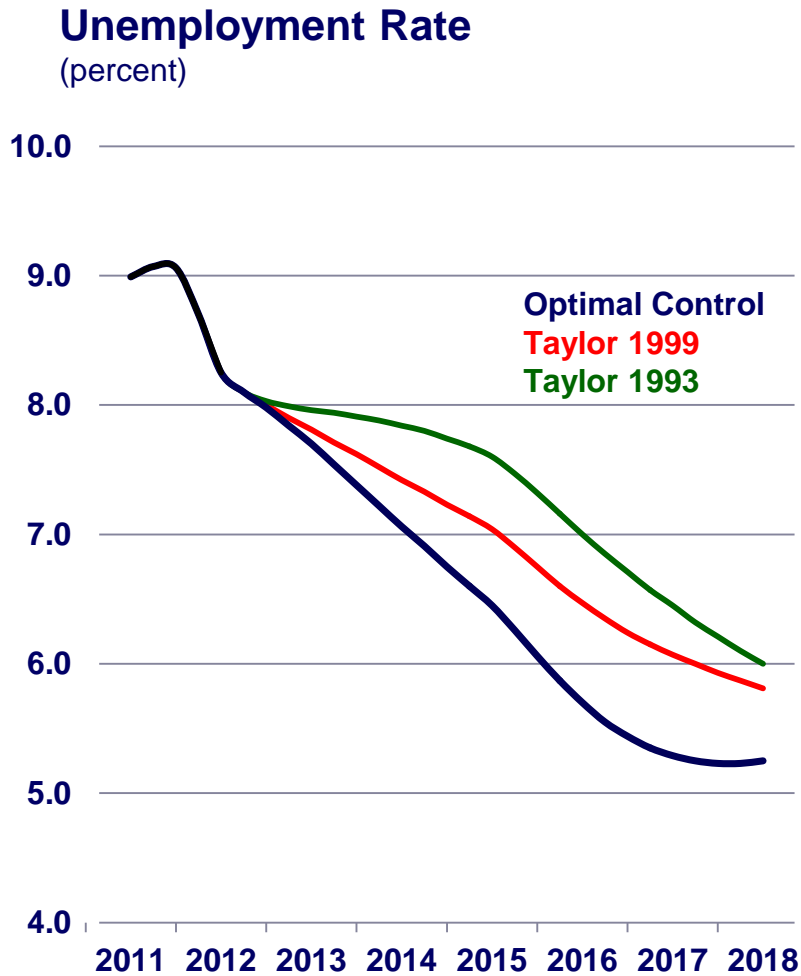 - **Forward guidance and inertial policy rule**

Alternative Policy Prescriptions – Yellen (2012)

Federal Funds Rate
(percent)

Taylor Rules:
$$R_t = 2.0 + \pi_t + 0.5(\pi_t - 2) + \alpha\,gap_t$$
Taylor 1999: $\alpha = 1.0$
Taylor 1993: $\alpha = 0.5$

Optimal Control:
$$\text{Min}\,(\pi_t - 2)^2 + (u_t - u^n)^2 + \Delta R_t^2$$

Taylor 1993

Taylor 1999

Optimal Control

Source: Janet L. Yellen, "Perspectives on Monetary Policy." Boston. June 6, 2012

# Progress toward the Dual Mandate Goals with Alternative Policies– Yellen (2012)

Unemployment Rate
(percent)

Optimal Control
Taylor 1999
Taylor 1993

PCE Inflation
(4-quarter percent change)

Peak: 2.3%

Optimal Control
Taylor 1999
Taylor 1993

Source: Janet L. Yellen, "Perspectives on Monetary Policy." Boston. June 6, 2012

State Contingent Price Level Targeting – Evans (2010)

Core PCE Price Index

(Index, 2005 = 100)
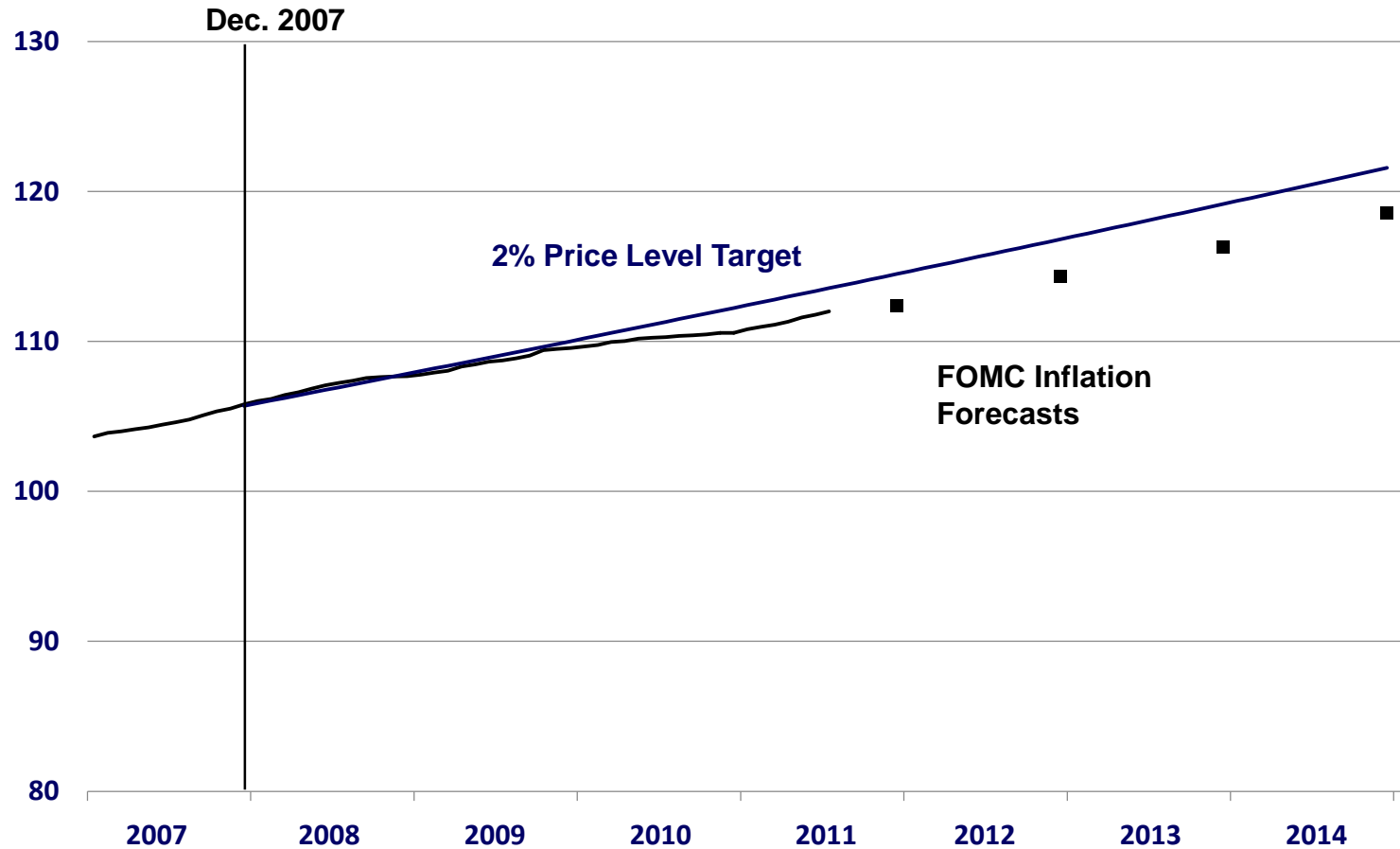
Dec. 2007

2% Price Level Target
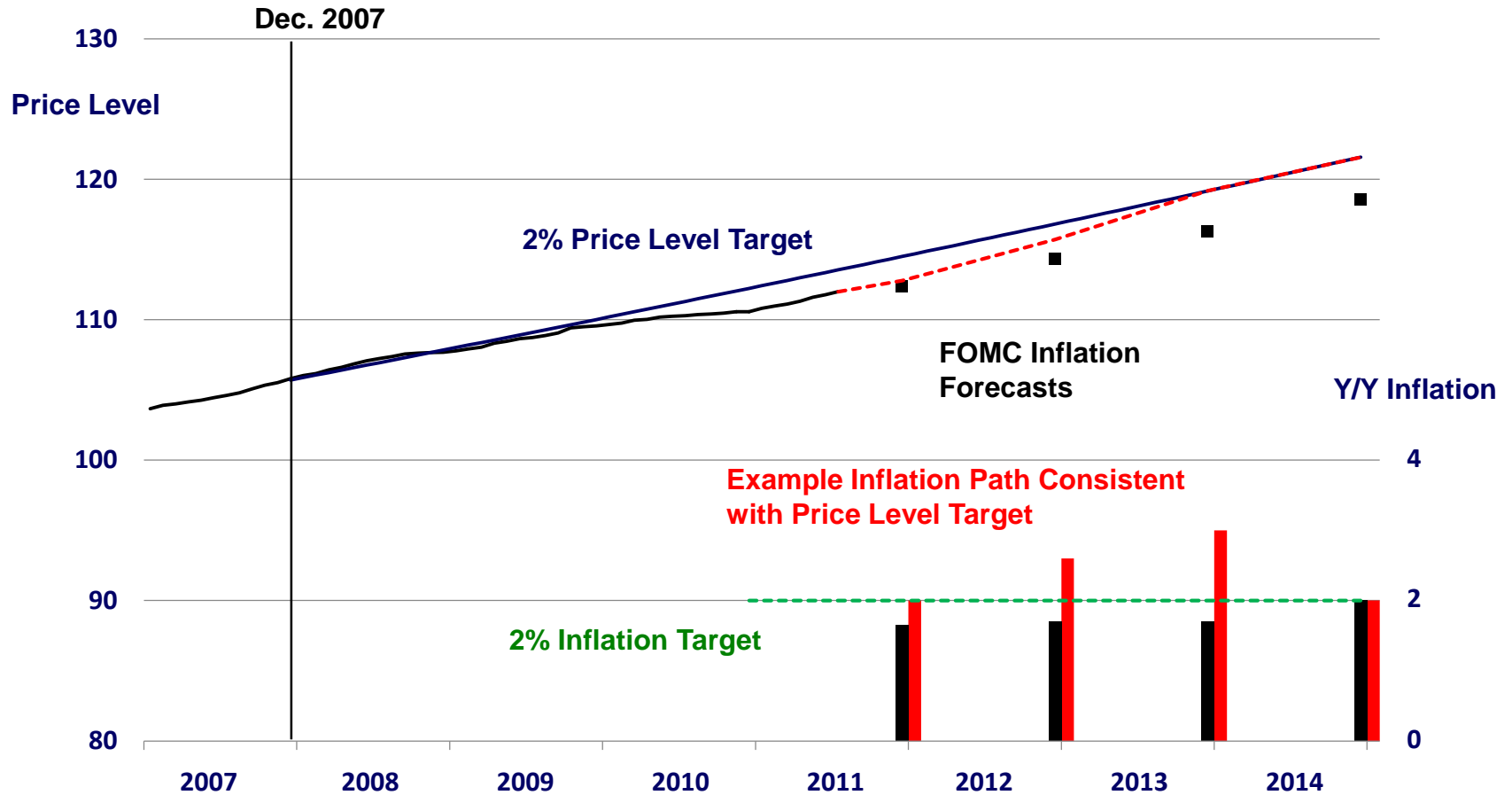
FOMC Inflation Forecasts

Source: Core PCE data are from the Bureau of Economic Analysis. Inflation forecasts are from the June 2010 FOMC Summary of Economic Projections.

State Contingent Price Level Targeting – Evans (2010) (cont.)

Core PCE Price Index and Inflation
(Index, 2005 = 100, Q4/Q4 inflation)

Source: Core PCE data are from the Bureau of Economic Analysis. Inflation forecasts are from the June 2010 FOMC Summary of Economic Projections.

LSAP Effects on Long-Term Interest Rates

- **Wide range of estimates regarding the effect of LSAP on Treasury rates through**
  - **Portfolio balance effect on term premia**
    - **Reasonable estimate is $500 billion of LSAP worth about 25 bps on 10-year Treasury rates**
  - **Signaling effect on expected future short-term rates**
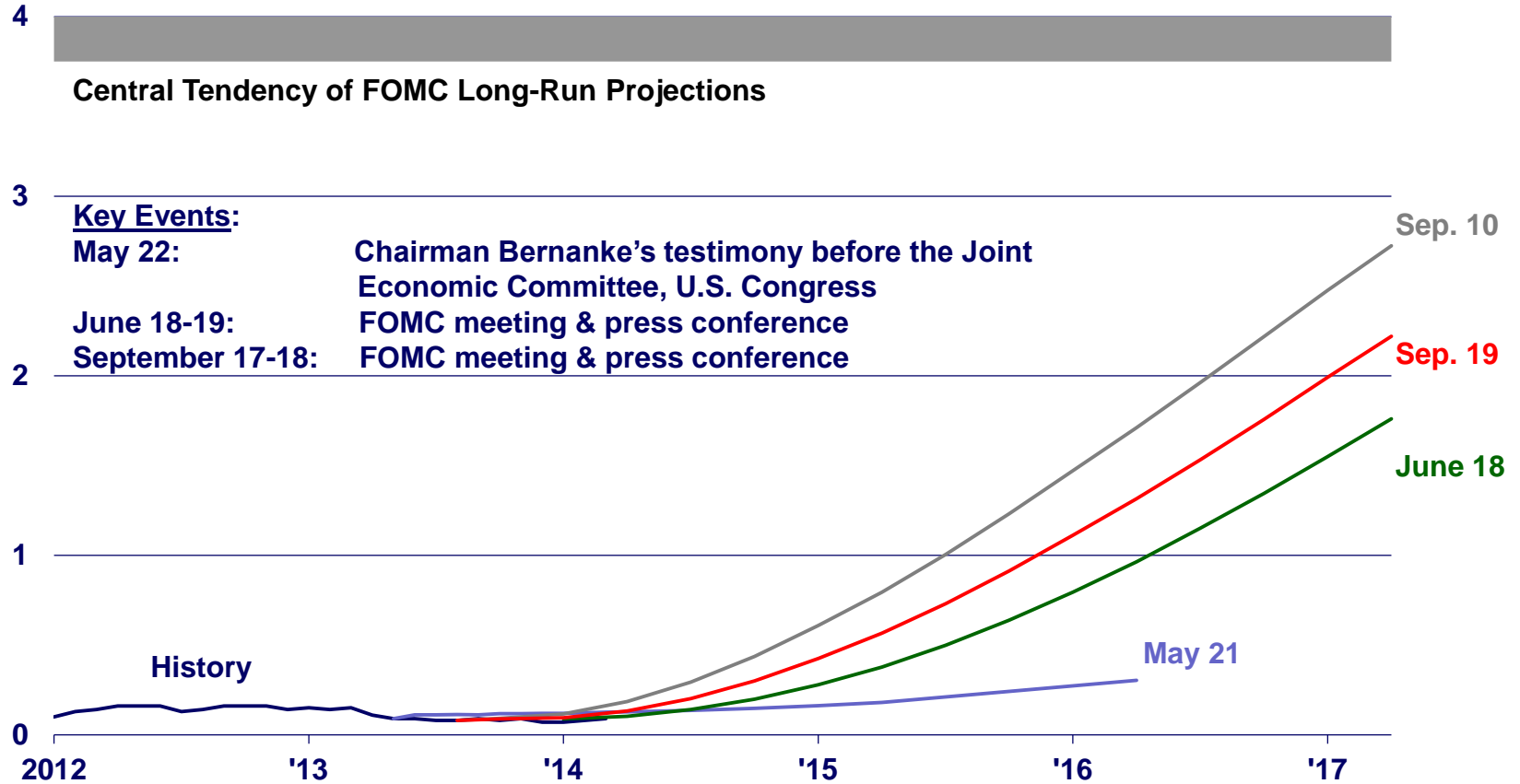
Forward Guidance – Numerical Thresholds (December 2012)

Unemployment Rate
(percent)

PCE Inflation
(4-quarter percent change)
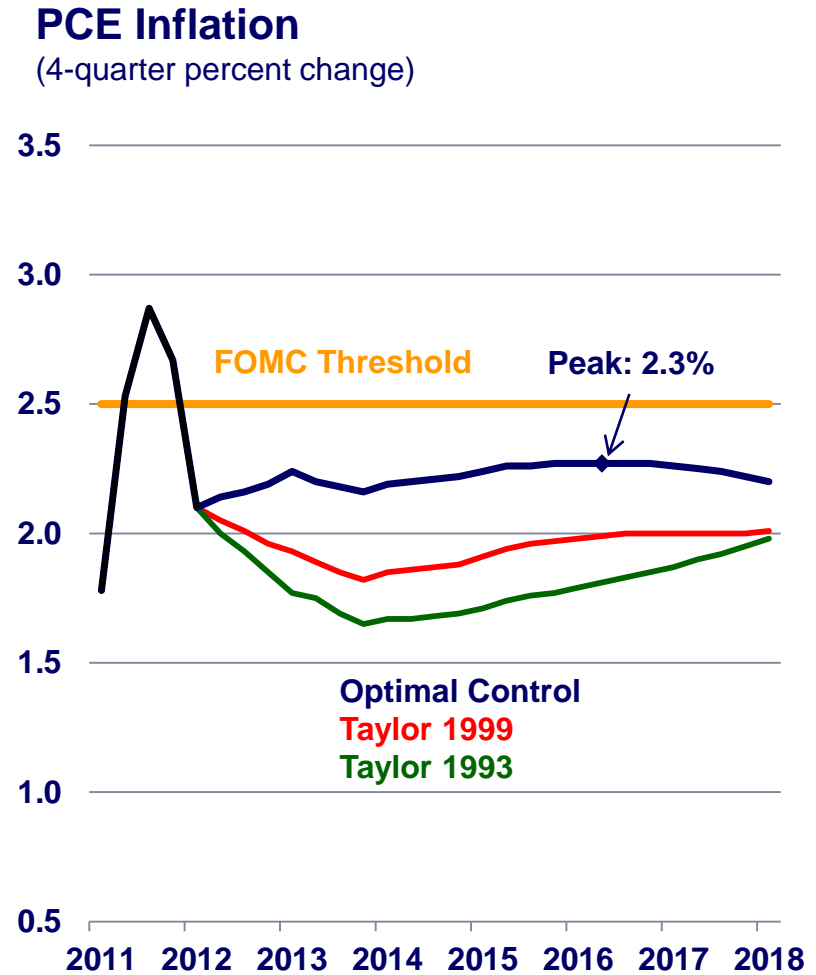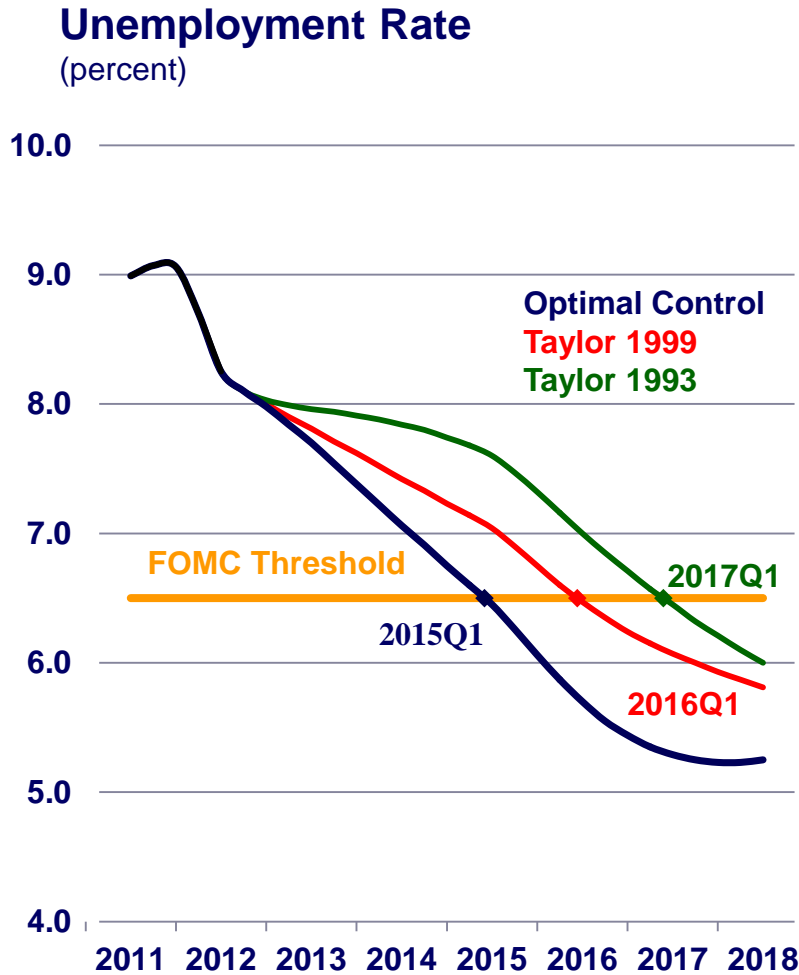
Source: Janet L. Yellen, "Perspectives on Monetary Policy." Boston. June 6, 2012

# 2013 Taper Tantrum - Forward Guidance, LSAPs, and Signaling

Fed Funds Rate
(percent)

Central Tendency of FOMC Long-Run Projections

Key Events:

May 22:	**Chairman Bernanke's testimony before the Joint Economic Committee, U.S. Congress**
June 18-19:	**FOMC meeting & press conference**
September 17-18:	**FOMC meeting & press conference**

Sep. 10

Sep. 19

June 18

May 21

History

2012   '13   '14   '15   '16   '17

Balance Sheet Normalization

Projected SOMA Holdings
(Billions of dollars)

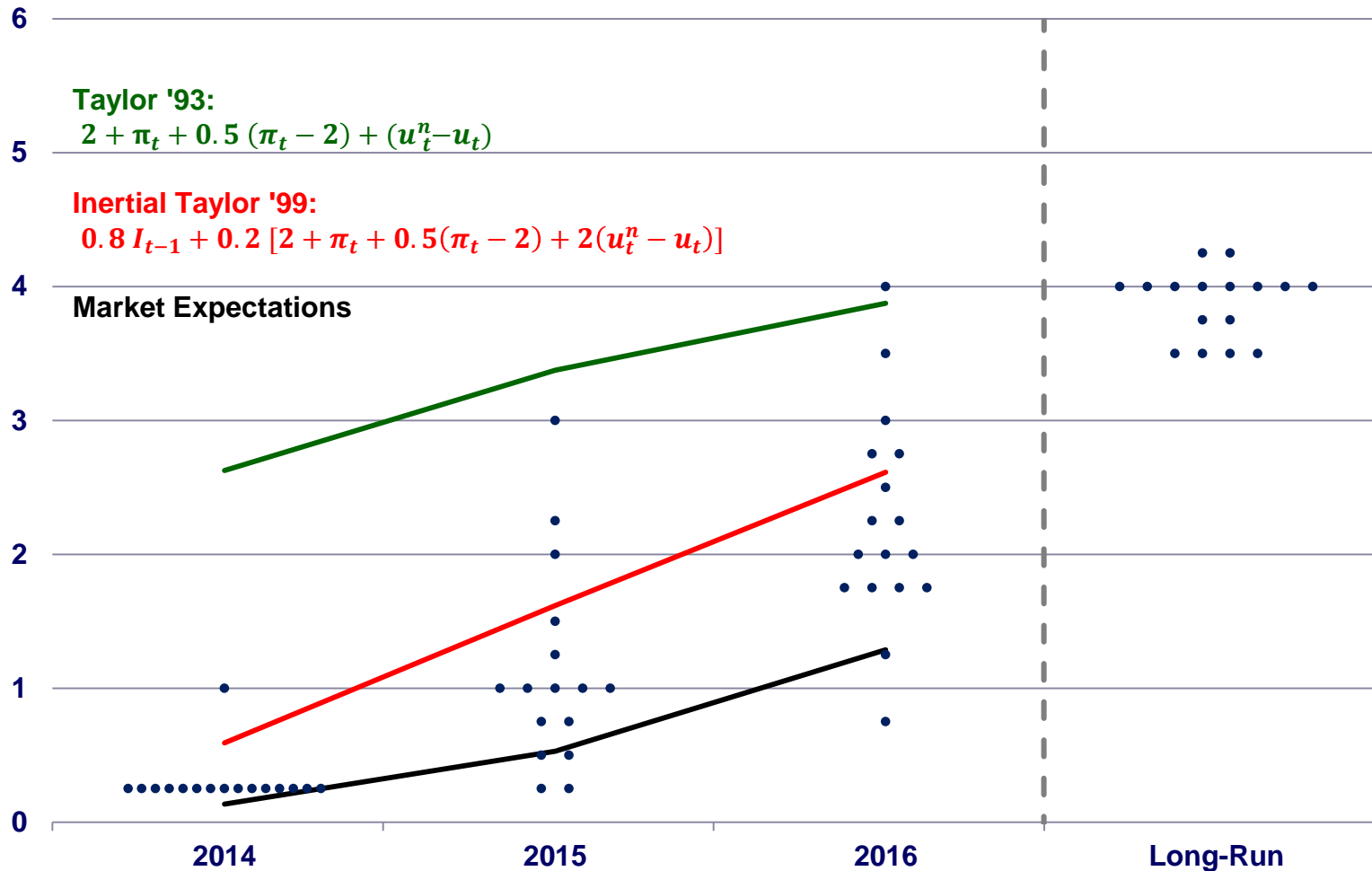**2016 Q4 (FOMC SEP):**
$\pi = 1.85\%$
$u = 5.4\%$
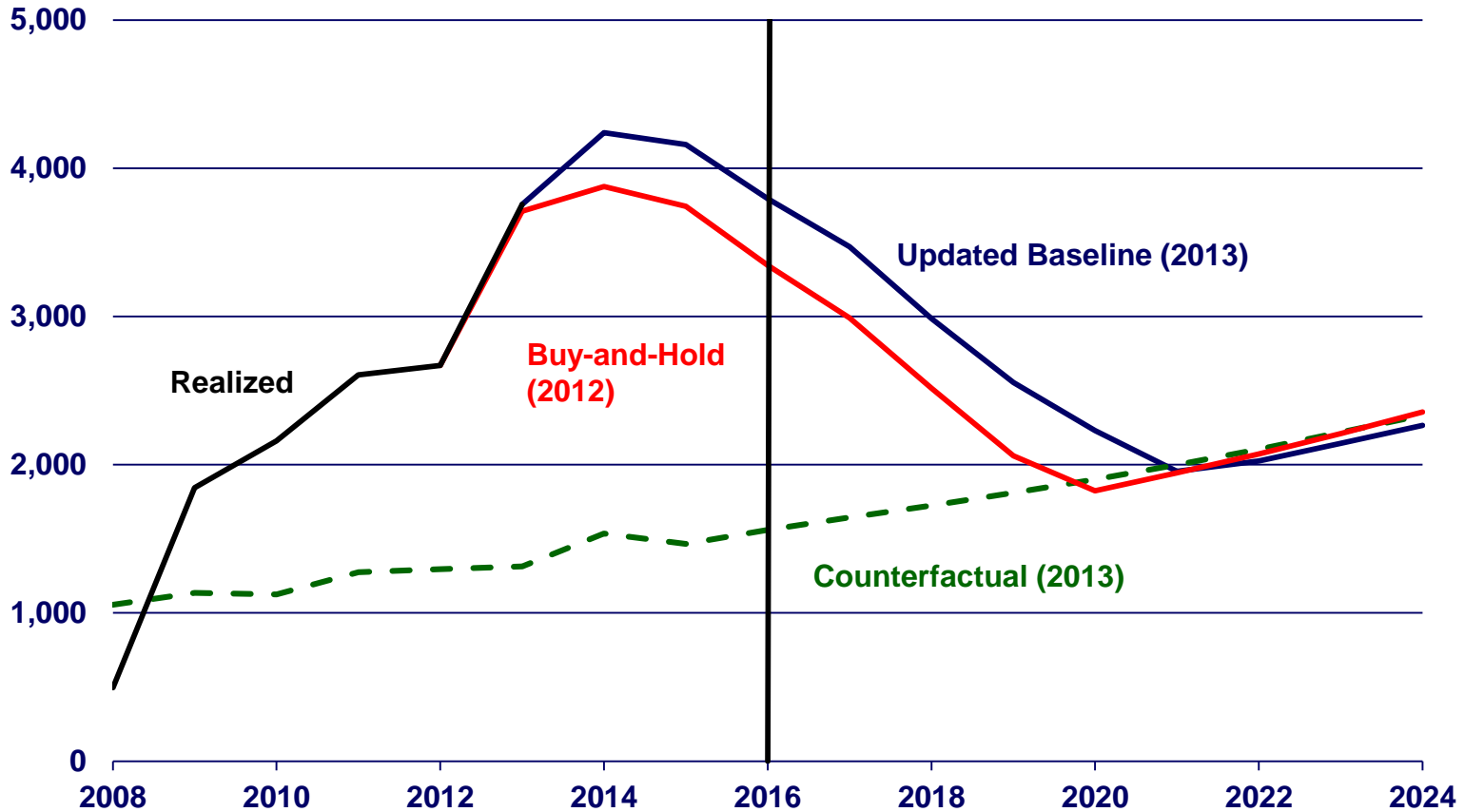
Source: Federal Reserve Bank of New York. LibertyStreetEconomics.NewYorkFed.org.
Baseline SOMA projections based on primary dealer expectations. Counterfactual scenario assumes the use of only conventional monetary policy tools (Treasury bond purchases at roughly the rate of growth of currency in circulation). Buy-and-Hold scenario assumes no asset sales. Date of projection given in parentheses (end of year).

FG and FOMC "Appropriate" Policy Rates

Taylor '93:
$2 + \pi_t + 0.5\,(\pi_t - 2) + (u_t^n - u_t)$

Inertial Taylor '99:
$0.8\,I_{t-1} + 0.2\,[2 + \pi_t + 0.5(\pi_t - 2) + 2(u_t^n - u_t)]$

Market Expectations

2014 2015 2016 Long-Run

Source: Interest rate forecasts are from the March 19, 2014 FOMC Summary of Economic Projections.
Market expectations are from OIS futures as of May 29, 2014

Additional Topics

- **Monetary Policy and Financial Stability Risks**

- **Exit Principles**

MP and Financial Stability: Mandates and Tools

- **Tensions from low interest rates**

  - **Highly accommodative MP appropriate at ZLB to obtain (u^n, π^*).**

  - **But such policy can encourage additional risk taking**

- **Degrading MP tools to mitigate financial instability risks would lead to inflation below target and additional resource slack**

- **In order to avoid excess risk-taking, use combination of supervisory oversight, macro-prudential tools (separate from MP tools), and market discipline**

Looking Ahead: Policy Normalization

- **At some point, achievement of bulls-eye (u^n, π^*) will dictate higher interest rates**

- **Need to make sure we can raise short-term market interest rates in the presence of a large balance sheet**

- **New tools to tighten linkages to market rates**
  - **IOER, ON RRP, TDF**

- **These are operational issues the in first stages of monetary policy transmission mechanism**
  - **No change in transmission from short rates to long rates, asset prices, etc.**