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Making Monetary Policy: Rules, Benchmarks, Guidelines, and Discretion

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Boston, Massachusetts

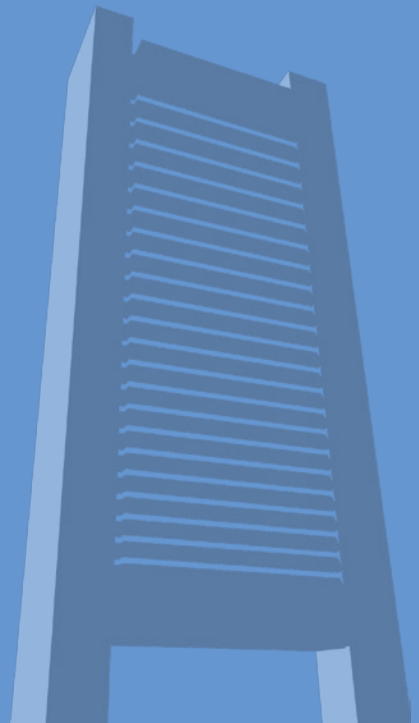

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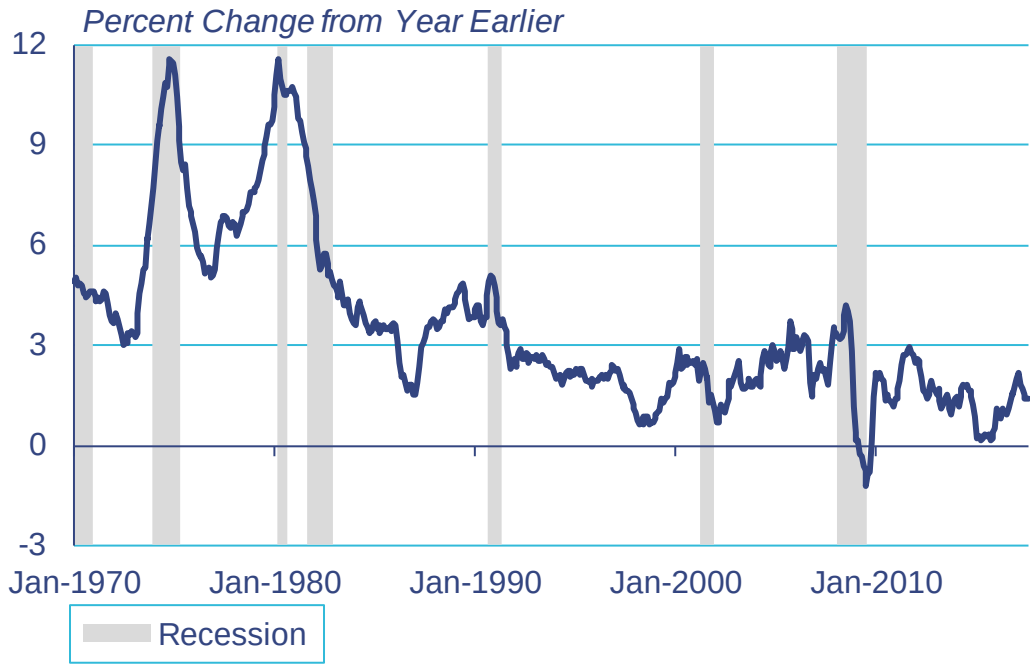
Figure 1: Inflation Rate: Change in Personal Consumption Expenditures (PCE) Price Index

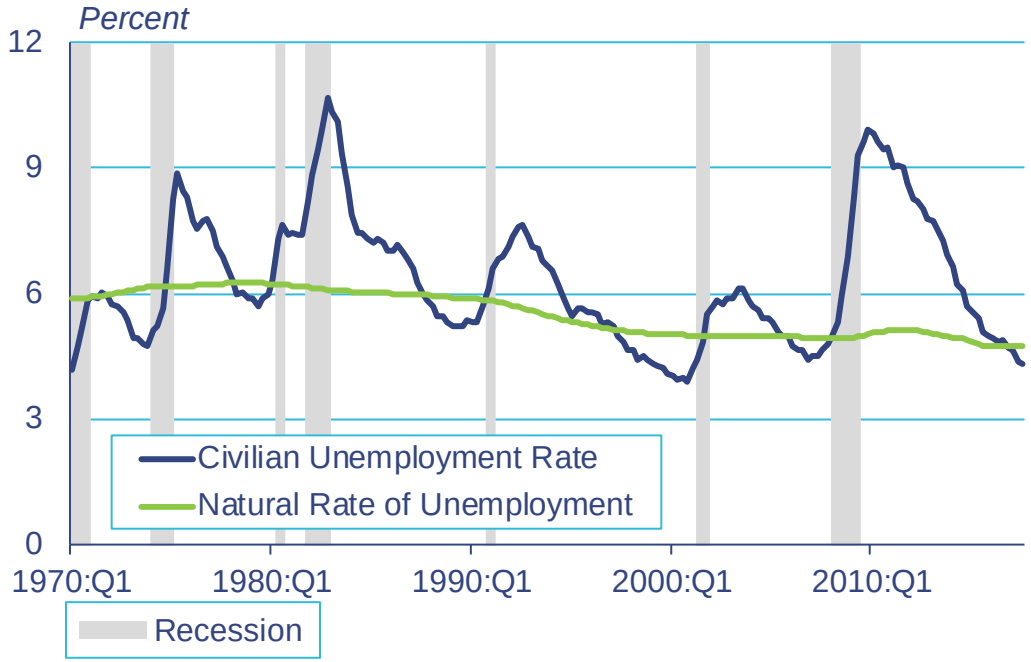
January 1970 - August 2017



Source: BEA, NBER, Haver Analytics

Figure 2: Civilian Unemployment Rate and the Natural Rate of Unemployment

1970:Q1 - 2017:Q3



Source: BLS, CBO, NBER, Haver Analytics

Figure 3: Specifications of Policy Rules for the Federal Funds Rate

December 8, 2011

Outcome-based rule	$i_t = 1.20i_{t-1} - 0.39i_{t-2} + 0.19[1.17 + 1.73\pi_t + 3.66(y_t - y_t^*) - 2.72(y_{t-1} - y_{t-1}^*)]$
Forecast-based rule	$i_t = 1.18i_{t-1} - 0.38i_{t-2} + 0.20[0.98 + 1.72\pi_{t+2\|t} + 2.29(y_{t+1\|t} - y_{t+1\|t}^*) - 1.37(y_{t-1} - y_{t-1}^*)]$
Taylor (1993) rule	$i_t = 2 + \pi_t + 0.5(\pi_t - \pi^*) + 0.5(y_t - y_t^*)$
Taylor (1999) rule	$i_t = 2 + \pi_t + 0.5(\pi_t - \pi^*) + (y_t - y_t^*)$
First-difference rule	$i_t = i_{t-1} + 0.5(\pi_{t+3\|t} - \pi^*) + 0.5(\Delta^4 y_{t+3\|t} - \Delta^4 y_{t+3\|t}^*)$

Note: i_t is the federal funds rate for quarter t, $y_t - y_t^*$ is the output gap estimate for the current period, π_t is the trailing four-quarter core PCE inflation for quarter t, and π_t^*, policymakers' long-run inflation objective, is assumed to be 2%. The symbol Δ^4 refers to the change over 4 quarters, and $\pi_{t+2|t}$ refers to inflation expectations formed at time t for two quarters ahead.

Source: FOMC, Tealbook B, December 8, 2011

Figure 4: Near-Term Prescriptions of Policy Rules for the Federal Funds Rate

December 8, 2011

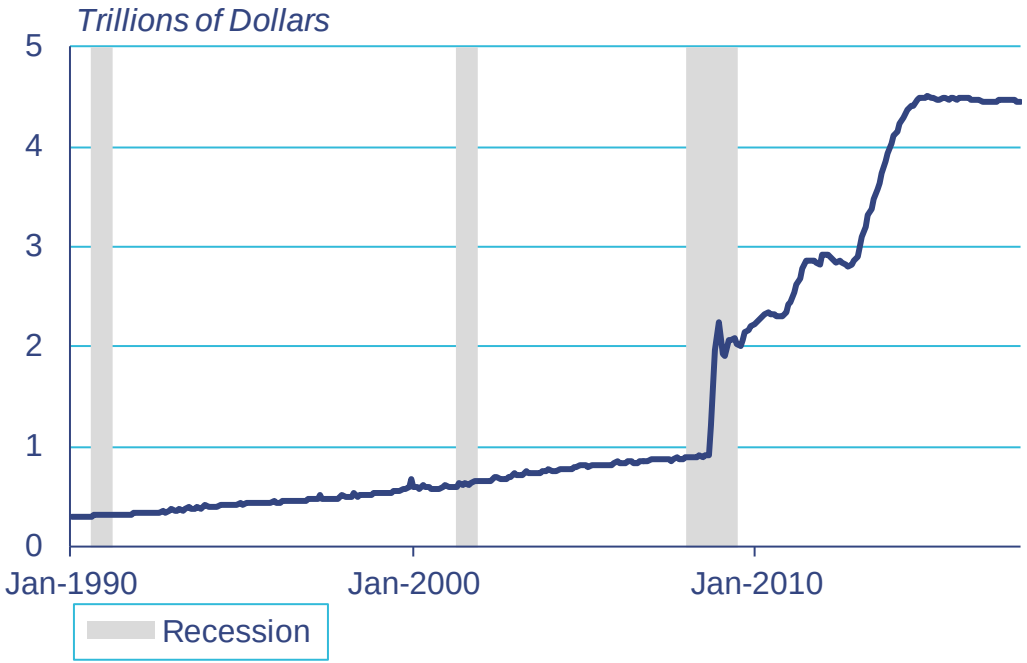
	2012Q1	2012Q2
Taylor (1993) rule	0.90	0.59
Taylor (1999) rule	-1.82	-2.15
Estimated outcome-based rule	-0.11	-0.42
Estimated forecast-based rule	-0.27	-0.61
First-difference rule	-0.02	-0.14

MEMO	2012Q1	2012Q2
Staff assumption	0.08	0.10
Fed funds futures	0.10	0.13
Median expectation of primary dealers	0.13	0.13
Blue Chip forecast (December 1, 2011)	0.10	0.10

Source: FOMC, Tealbook B, December 8, 2011

Figure 5: Federal Reserve System Assets

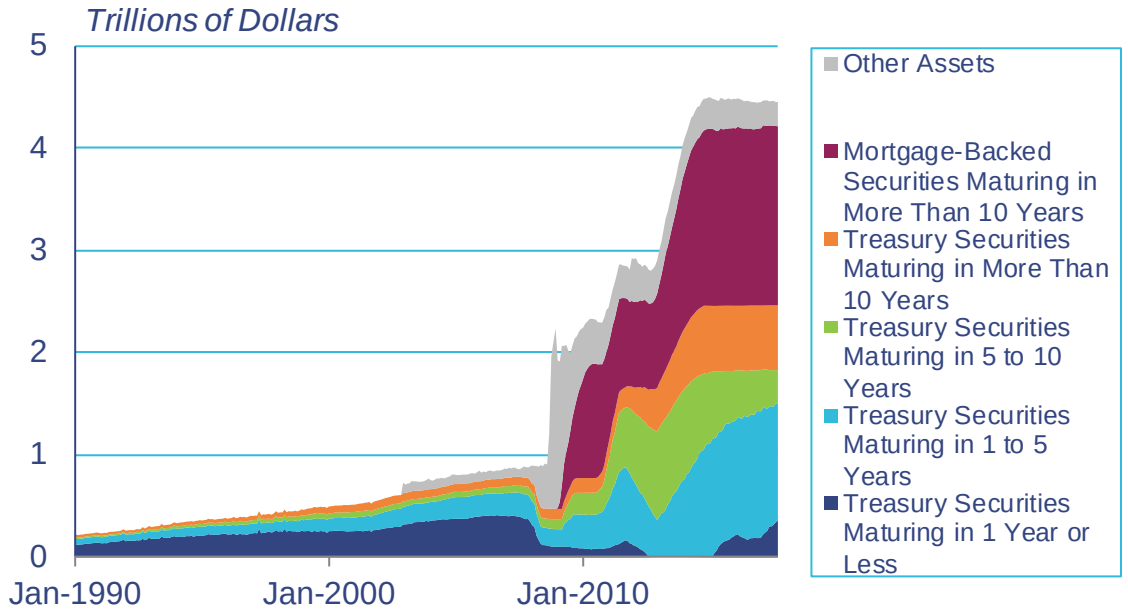
January 1990 - September 2017



Source: Federal Reserve Board, NBER, Haver Analytics

Figure 6: Federal Reserve System Balance Sheet Composition

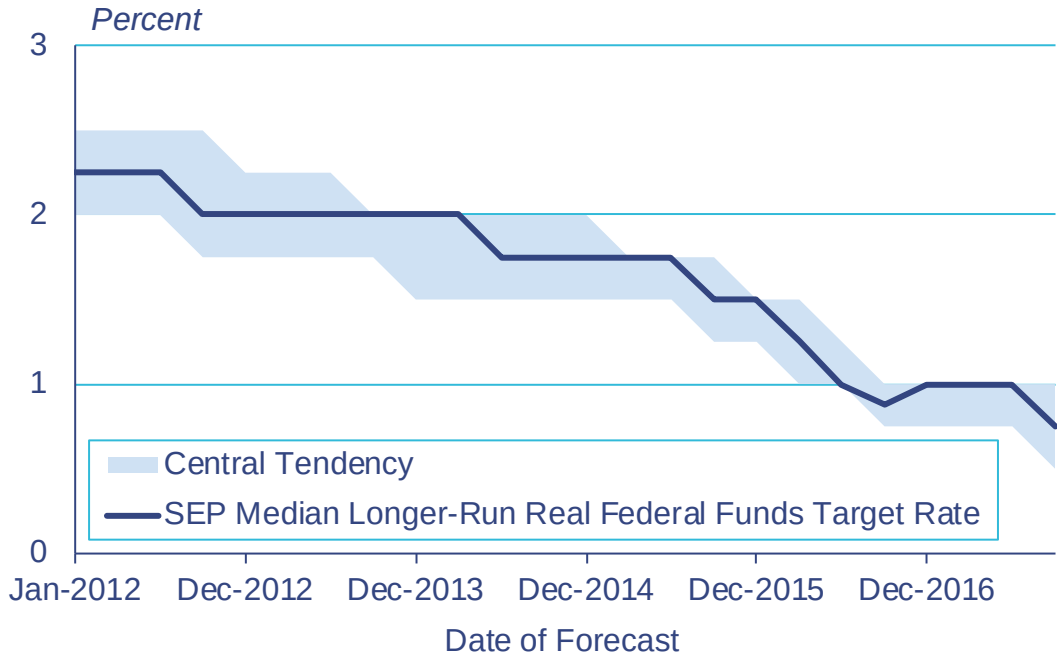
January 1990 - September 2017



Source: Federal Reserve Board, NBER, Haver Analytics

Figure 7: Estimates of the Equilibrium Real Interest Rate

January 2012 - September 2017

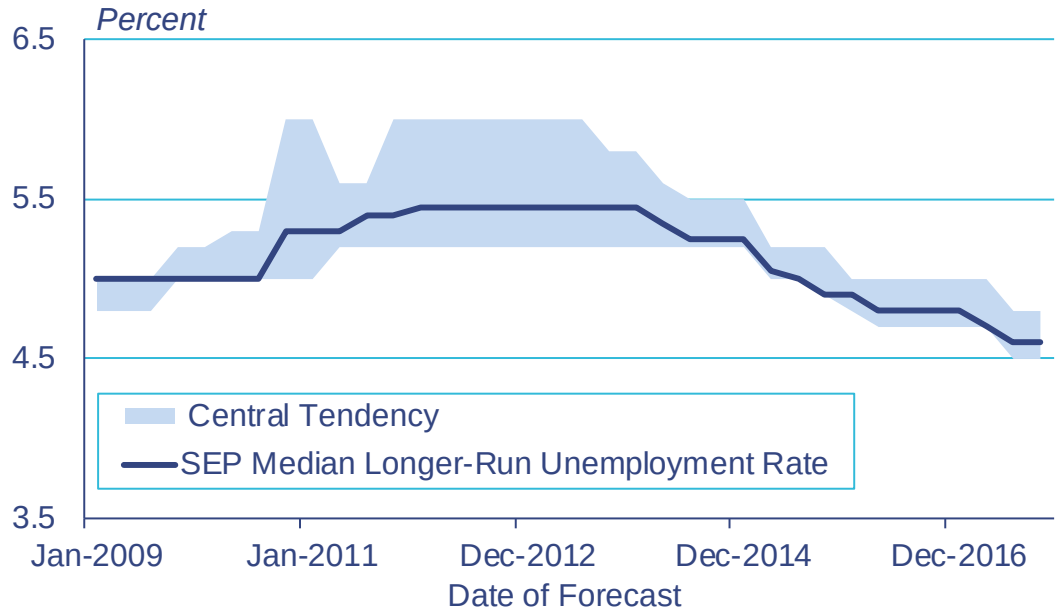


Note: The equilibrium real interest rate is calculated as the SEP median longer-run federal funds rate forecast less an inflation rate of 2%. The central tendency excludes the three highest and three lowest observations.

Source: FOMC, Summary of Economic Projections (SEP)

Figure 8: Estimates of the Natural Rate of Unemployment: SEP Forecasts of the Longer-Run Unemployment Rate

January 2009 - September 2017

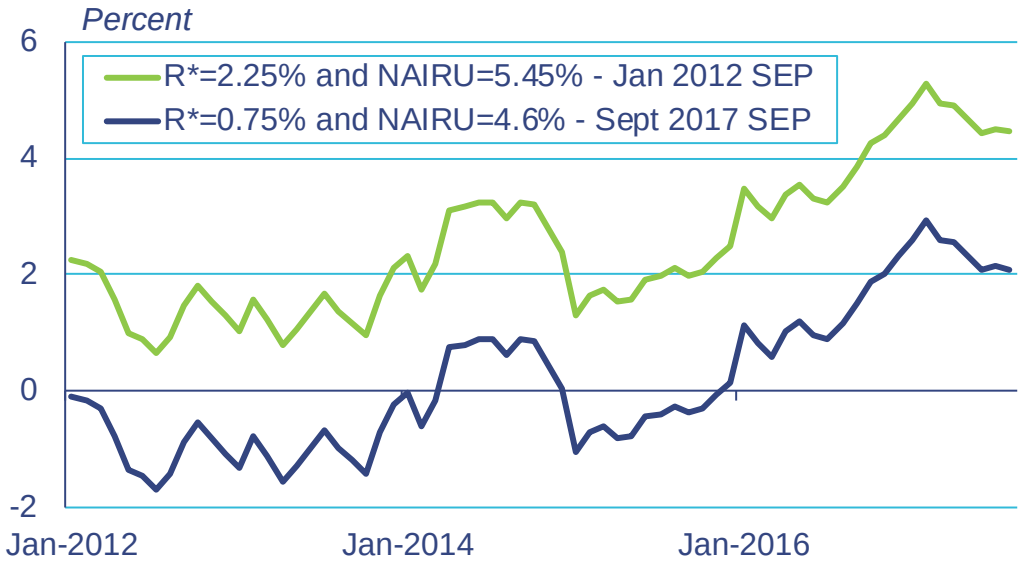


Note: Prior to the June 2015 median, SEP median unemployment rates are publicly available only with a five-year lag. Proxies for the medians for 2012 - March 2015 are calculated from the distribution of participants' projections reported in ranges of tenths in the meeting minutes. The central tendency excludes the three highest and three lowest observations.

Source: FOMC, Summary of Economic Projections (SEP)

Figure 9: Taylor Rule Prescriptions for the Federal Funds Rate

January 2012 - August 2017

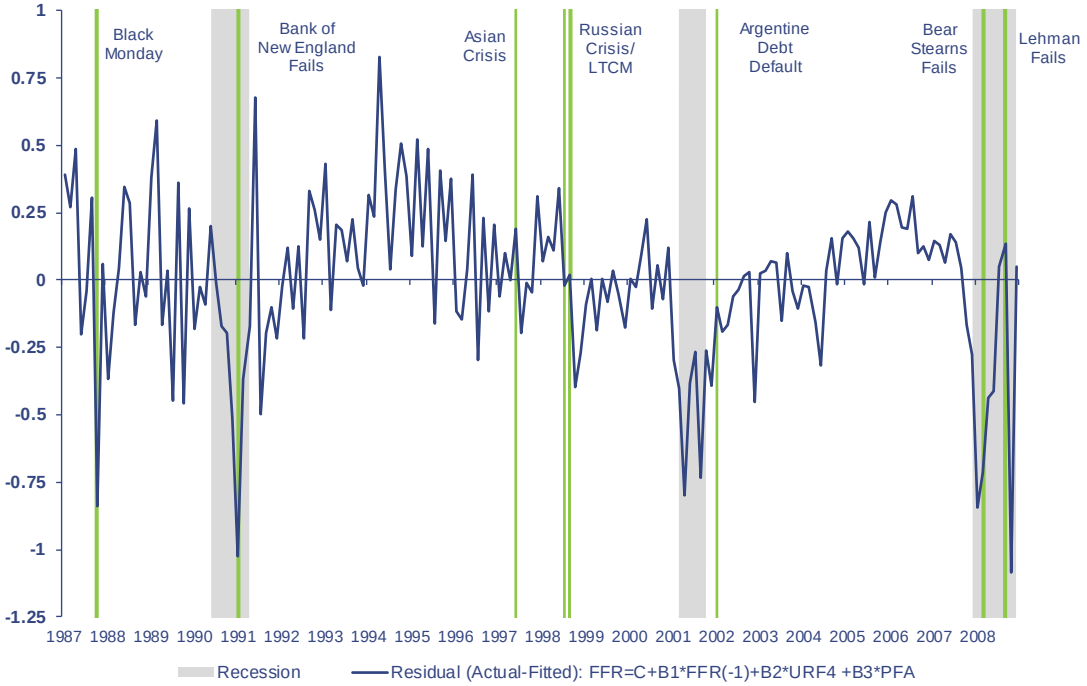


Note: To specify the rule in terms of the Fed's dual mandate, which is stated in terms of employment rather than output, the output gap has been replaced by the gap between the longer-run and actual rates of unemployment, using Okun's Law. The calculation uses the PCE inflation rate.

Source: FOMC, Summary of Economic Projections (SEP); Taylor Rule (1993)

Figure 10: Errors in the Estimated Taylor Rule and Periods of Instability

February 11, 1987 - December 15, 2008



Source: Peek, Rosengren and Tootell. (2016) "Does Fed Policy Reveal a Ternary Mandate?" Federal Reserve Bank of Boston Working Paper 16-11