Kiel Institute for the World Economy
The Global Financial Crisis: Lessons and Outlook
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The Fault of the Fed?
Lessons for Monetary Policy

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* Disclaimer: Duisenberg Research Fellow. The views expressed should not be attributed to the European Central Bank or its staff.

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Outline

1. The Taylor critique of pre-crisis Fed policy
2. The connection between FOMC projections and FOMC decisions before the crisis
3. Some lessons for post-crisis monetary policy
4. FOMC projections and policy during the crisis
5. Beyond interest rates: Quantitative easing

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1. The Taylor critique of Fed policy

John B. Taylor on „Housing and Monetary Policy" at the Jackson Hole Conference 2007:

„From 2003 to 2006 the federal funds rate was well below what experience during the previous two decades of good macroeconomic performance would have predicted."

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Consequences according to Taylor

Boom:
　too low interest rates ➔ large amounts of liquidity
　➔ extraordinary surge in demand for housing
　➔ housing price inflation ➔ upward spiral
　➔ low delinquency/foreclosures
　➔ encourage credit ratings that are unsustainable

Bust:
　when interest rates returned to normal level
　➔ decline in housing demand, construction and prices
　➔ sharp rise in delinquency and foreclosures
　➔ meltdown in subprime market and its derivatives.

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Taylor's benchmark for comparison

A simple rule:

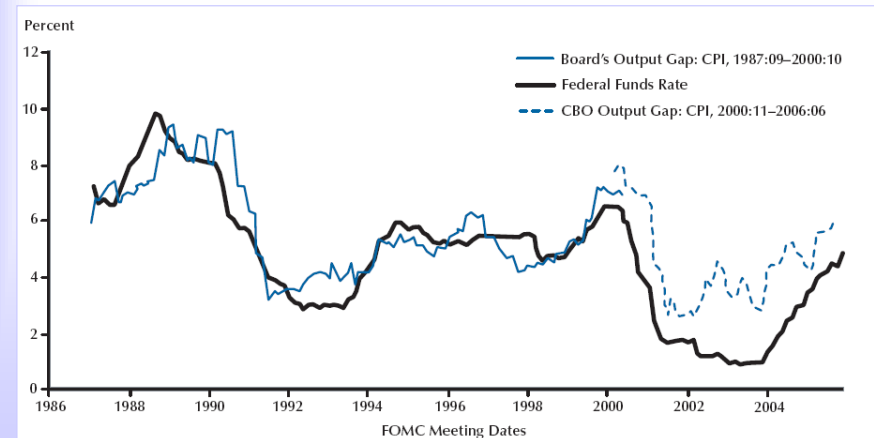$$f_t = r^* + \pi_t + 0.5(\pi_t - \pi^*) + 0.5(y_t - y_t^*)$$

f: federal funds rate   r*: real equilibrium rate

π: inflation   π*: inflation target

y: real output   y*: potential output

William Poole (2007) (then-President of St.Louis Fed)

``The FOMC … views the Taylor rule as a general guideline. Departures from the rule make good sense when information beyond that incorporated in the rule is available.``
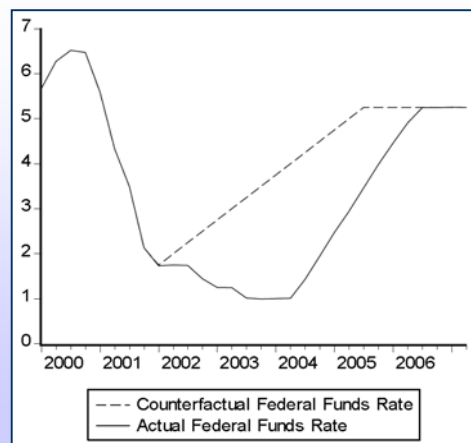
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Poole's 2007 version of Taylor's rule

Percent

Board's Output Gap: CPI, 1987:09–2000:10
Federal Funds Rate
CBO Output Gap: CPI, 2000:11–2006:06

FOMC Meeting Dates

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Monetary policy and housing: Taylor's counterfactual

☐ Federal funds rates

Counterfactual Federal Funds Rate
Actual Federal Funds Rate

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Taylor's counterfactual

☐ Effect on housing prices

(Thousands of Units)

Historical Data
Dynamic Simulation
Counterfactual Simulation
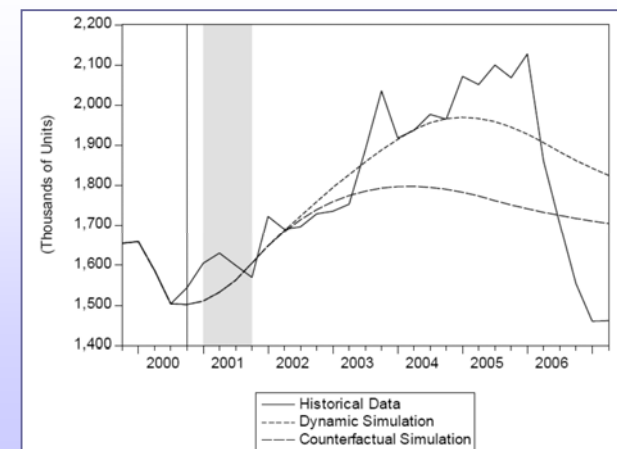
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Jarocinski & Smets 2008

Forecasts from a B-VAR:

Legend:
— Conditional Forecast Mean
···· 16 Percentile
···· 84 Percentile
---- Unconditional Forecast Mean
— Actual

House Prices Conditional on y, p

House Prices Conditional on y, p, i, s
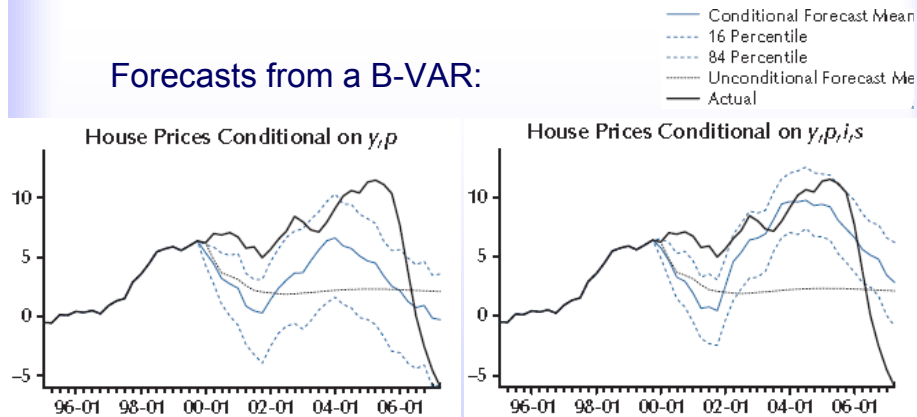
„These results suggest that the unusually low level of short-term and long-term interest rates (i,s) may have contributed to the boom in U.S. housing markets".

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The Jarocinski-Smets B-Var

❑ A Vector autoregression model in differences. It is specified in growth rates and uses Bayesian priors about the steady state.

$$\left[\Delta y_t \ \Delta c_t \ \Delta p_t \ HI_t / Y_t \ \Delta hp_t - \Delta p_t \ \Delta cp_t \ i_t \ s_t \ \Delta m_t\right],$$

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Departures from the rule

Poole (2007)

> " policy is forward looking; which means that from time to time the economic outlook changes sufficiently that it makes sense for the FOMC to set a funds rate either above or below the level called for in the Taylor rule which relies on observed recent data rather than on economic forecasts of future data."

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2. FOMC projections and decisions

❑ Humphrey-Hawkins report (February 2003)

Economic projections for 2003
Percent

Indicator	MEMO 2002 actual	Federal Reserve Governors and Reserve Bank presidents	
		Range	Central tendency
Change, fourth quarter to fourth quarter[1]			
Nominal GDP	4.1	4½–5½	4¾–5
Real GDP	2.8	3–3¾	3¼–3½
PCE chain-type price index	1.9	1¼–1¾	1¼–1½
Average level, fourth quarter			
Civilian unemployment rate	5.9	5¾–6	5¾–6

1. Change from average for fourth quarter of previous year to average for fourth quarter of year indicated.

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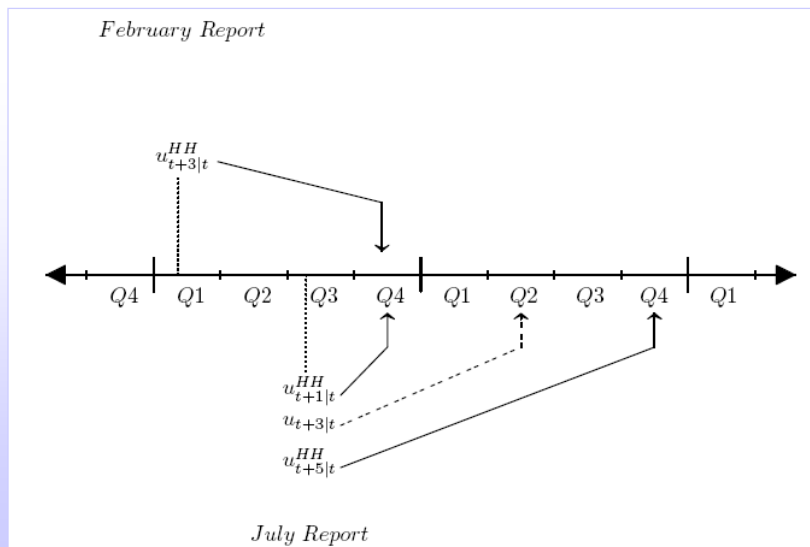## Slide 1 (July 2003)

Economic projections for 2003 and 2004

Percent

Indicator	Federal Reserve Governors and Reserve Bank presidents	
	Range	Central tendency
2003		
Change, fourth quarter to fourth quarter[1]		
Nominal GDP	3½–4¾	3¾–4½
Real GDP	2¼–3	2½–2¾
PCE chain-type price index	1–1¾	1¼–1½
Average level, fourth quarter		
Civilian unemployment rate	6–6¼	6–6¼
2004		
Change, fourth quarter to fourth quarter[1]		
Nominal GDP	4¾–6½	5¼–6¼
Real GDP	3½–5¼	3¾–4¾
PCE chain-type price index	¾–2	1–1½
Average level, fourth quarter		
Civilian unemployment rate	5½–6¼	5½–6

Slide 2

Orphanides and Wieland (2008)

❑ Construct a time series of **constant horizon** (t+3 quarters) FOMC forecasts
  ➢ from semi-annual Humphrey-Hawkins reports.
❑ Estimate and compare forecast-based versus outcome-based policy rules.
  ➢ Real-time outcomes from FRB Greenbook and ALFRED real time database.
❑ Investigate whether FOMC projections help explain deviations from outcome-based Taylor rule.

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Slide 3

FOMC projections – notation and data

February Report

$u_{t+3|t}^{HH}$

Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1

$u_{t+1|t}^{HH}$
$u_{t+3|t}$
$u_{t+5|t}^{HH}$

July Report

Slide 4

FOMC projections – notation and data

❑ Time t in terms of quarters
❑ 2 reports per year ➔ semi-annual observations
❑ Construct t+3 projections made in period t

❑ **February report:** data can be used as is. *u* denotes unemployment, *π* denotes inflation.

$$u_{t+3|t} \equiv u_{t+3|t}^{HH} \qquad \pi_{t+3|t} \equiv \pi_{t+3|t}^{HH}$$

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FOMC projections – notation and data

☐ **July report:** t+3 data needs to be constructed.

$$u_{t+3|t} = \frac{1}{2}(u_{t+1|t}^{HH} + u_{t+5|t}^{HH})$$

$$\pi_{t+3|t} = \frac{1}{2}(\pi_{t+1|t}^{S} + \pi_{t+3|t}^{S})$$

☐ Construct semi-annual inflation projections:

$$\pi_{t+1|t}^{S} = 2\pi_{t+1|t}^{HH} - \pi_{t-1|t}^{S}$$

$$\pi_{t+3|t}^{S} = \pi_{t+5|t}^{HH}$$

Estimate forecast-based versus outcome-based rules

☐ Specification estimated by non-linear least squares with data from 1988 to 2007:

$$f_t = \rho f_{t-2} + (1-\rho)(a_0 + a_\pi \pi_{\tau|t} + a_u u_{\tau|t})$$

➢ *u: unemployment rate*
➢ Outcome-based: *τ=t-1*
➢ Forecast-based: *τ=t+3*

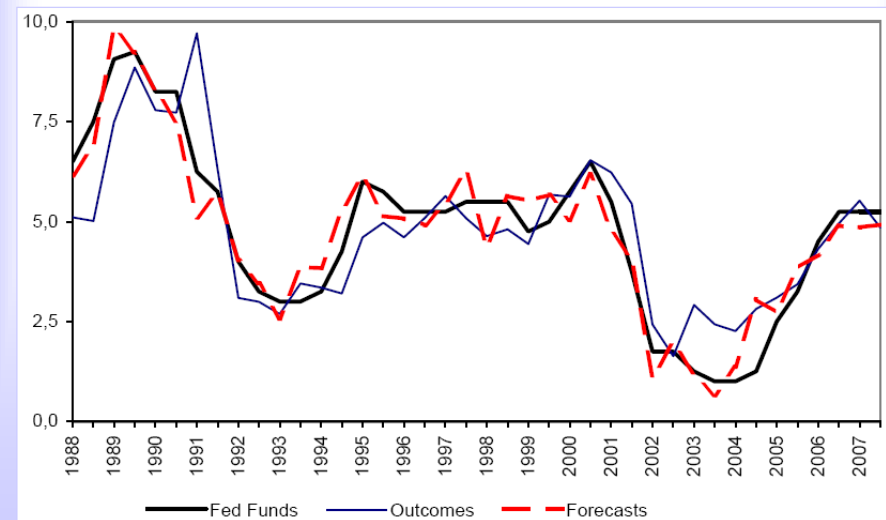## Regression results: 88-07

	outcomes		forecasts	
	(1)	(2)	(3)	(4)
a_0	8.29	10.50	6.97	8.25
	1.08	3.07	0.69	0.85
a_π	1.54	1.29	2.34	2.48
	0.16	0.43	0.12	0.14
a_u	−1.40	−1.70	−1.53	−1.84
	0.21	0.55	0.14	0.17
ρ	0	0.69	0	0.39
		0.14		0.06
$\bar{R}^2$	0.74	0.84	0.91	0.96
SEE	1.10	0.85	0.64	0.44
DW	1.00	1.03	1.74	1.94

Outcomes versus FOMC Forecasts 1988-2007:2 — Regression based on
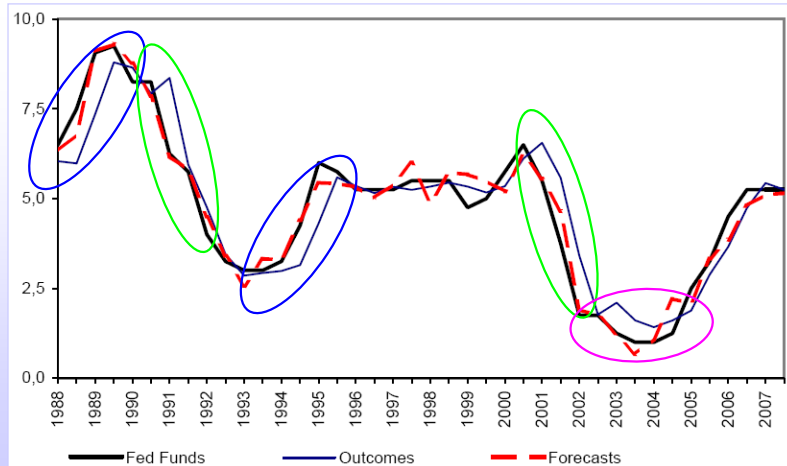

Actual Fed Funds vs Estimated Rules

No interest-rate smoothing, (1) and (3) in Table 1.

Rules with Smoothing
### Examine Deviations

With interest-rate smoothing, (2) and (4) in Table 1.

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But, FOMC Switched Inflation Measures!

- ☐ Changes in forecasts:
  - ➤ 2000:1 from consumer price index (CPI) to personal consumption expenditures price index (PCE)
  - ➤ 2004:2 from PCE to core PCE exluding food and energy
- ☐ Possible implications for the rule:
  - ➤ Change in estimated coefficients? Therefore, re-estimate over CPI period.
  - ➤ Change in implied interest rates? Use other CPI forecasts in place of FOMC PCE forecasts.
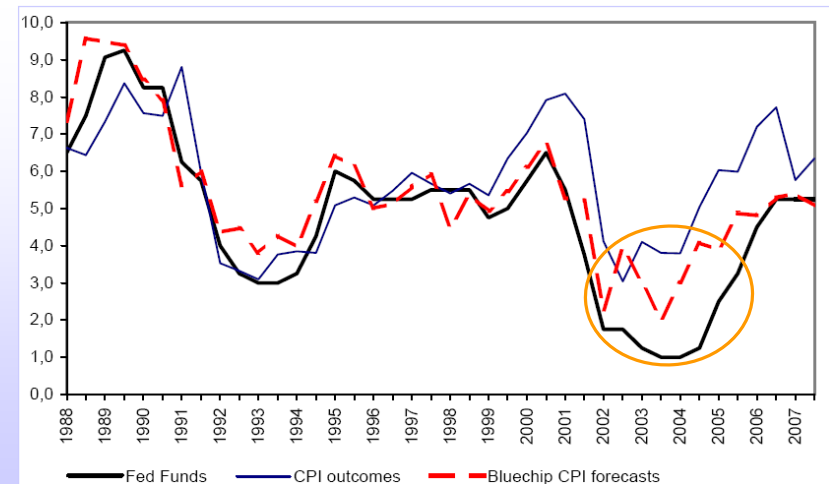- ☐ What about forecast errors?

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Extrapolation 1988 – 2007
Rule estimated with 1988-99 sample
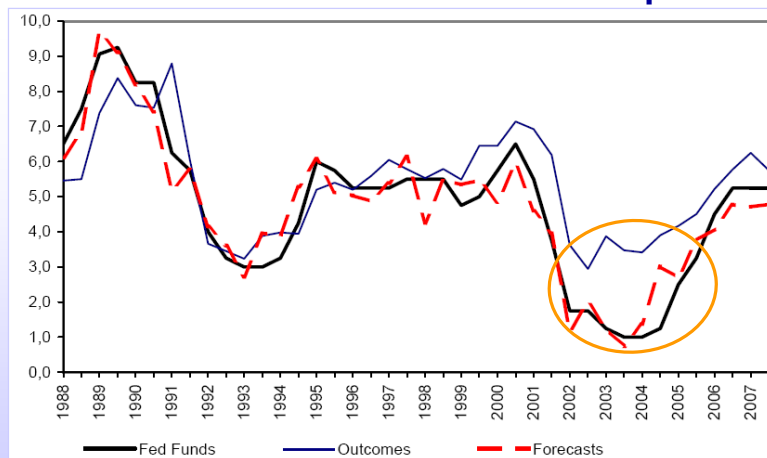
Uses FOMC preferred measures in terms of FOMC Projections as well as recent outcomes.
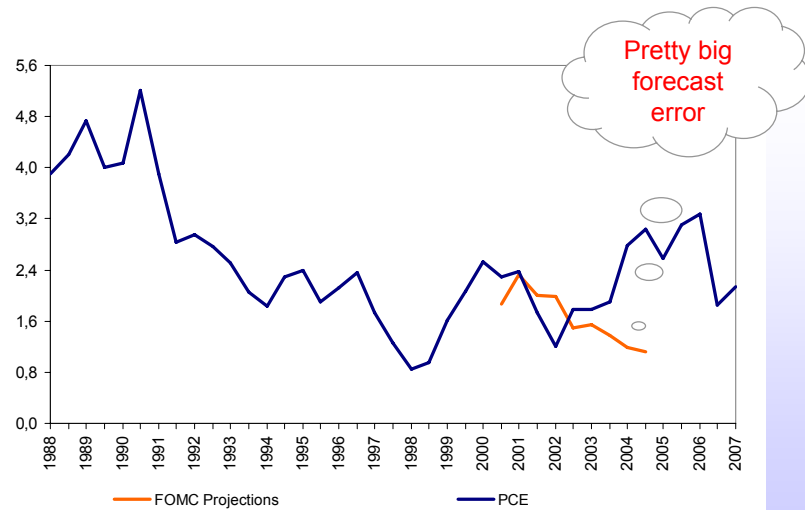
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Extrapolation Using CPI Outcomes and Bluechip CPI Forecasts

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PCE Inflation: Actual vs Projected

Compares real-time FOMC projections to outcomes as measured using the July 2007 vintage data.

3. Some Lessons for Post-Crisis Monetary Policy

YES, Taylor has a point. It's awfully hard to claim that Fed policy had no role in the housing boom and collapse that triggered the financial crisis,

AND, central banks should take simple rules more seriously. Deviations ought to be systematic and well explained.

DON'T rely too much on forecasts, particularly if those measures may be revised substantially.

Lessons cont'd

AND NO, it is not yet self-evident that central banks should respond to asset prices directly over and above output and inflation.

AND, it is not necessary to fix exchange rates or return to the gold standard.

Central banks should remain independent and in charge of interest rate policy, with more weight given to simple rules than sophisticated discretion.
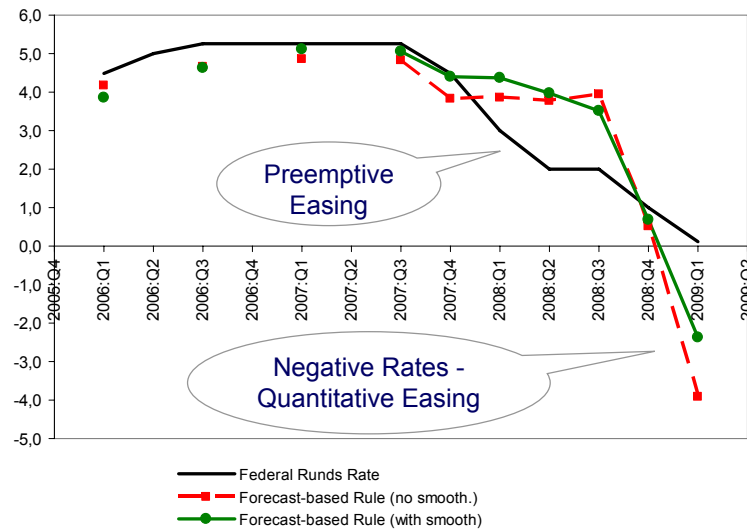
4. FOMC projections and decisions during the financial crisis

❑ Starting in October 2007 the FOMC has been publishing projections on a quarterly basis.
  ➢ Inflation measures include PCE and core PCE, but not CPI.
  ➢ The horizon has been extended.
❑ We apply the rule estimated in Orphanides and Wieland (2008) to generate interest rate predictions based on the new quarterly FOMC projections data.
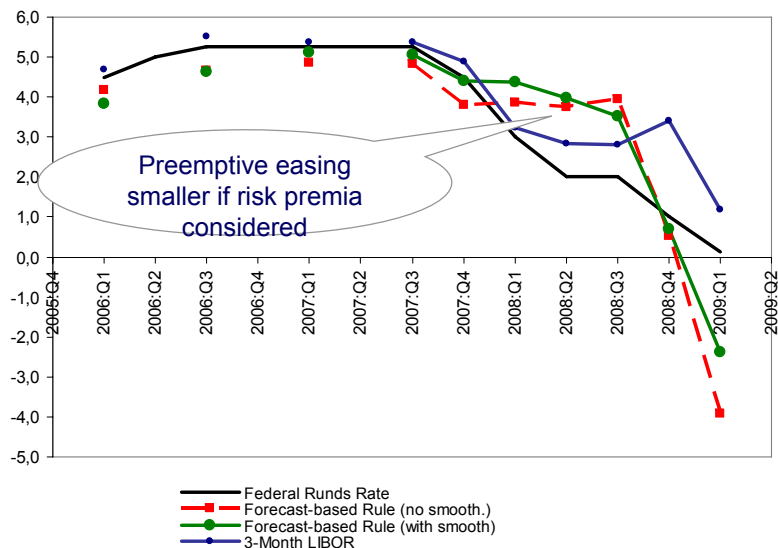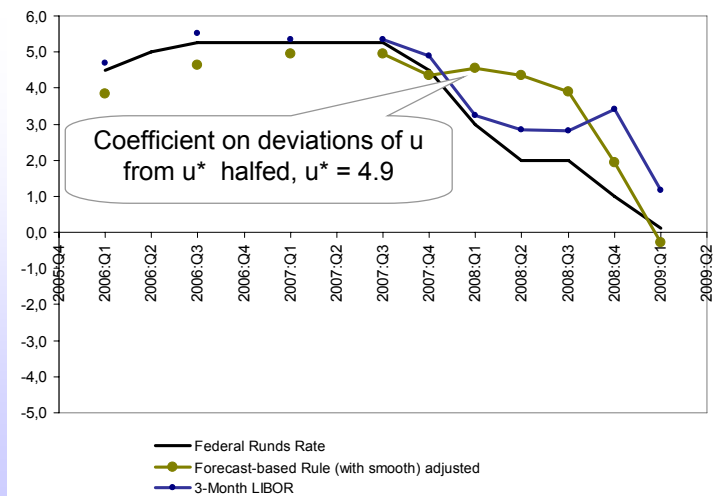
Extrapolation with 2007-09 projections

Preemptive Easing

Negative Rates - Quantitative Easing

— Federal Runds Rate
-■- Forecast-based Rule (no smooth.)
-●- Forecast-based Rule (with smooth)

The January 2009 Outlook

Percent

Variable	Central tendency[1]			
	2009	2010	2011	Longer Run
Change in real GDP	-1.3 to -0.5	2.5 to 3.3	3.8 to 5.0	2.5 to 2.7
October projection	-0.2 to 1.1	2.3 to 3.2	2.8 to 3.6	n.a.
Unemployment rate..................................	8.5 to 8.8	8.0 to 8.3	6.7 to 7.5	4.8 to 5.0
October projection	7.1 to 7.6	6.5 to 7.3	5.5 to 6.6	n.a.
PCE inflation..	0.3 to 1.0	1.0 to 1.5	0.9 to 1.7	1.7 to 2.0
October projection	1.3 to 2.0	1.4 to 1.8	1.4 to 1.7	n.a.
Core PCE inflation[3]..................................	0.9 to 1.1	0.8 to 1.5	0.7 to 1.5	
October projection	1.5 to 2.0	1.3 to 1.8	1.3 to 1.7	

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Risk-Premia Offset vs. Preemptive Easing

Preemptive easing smaller if risk premia considered

— Federal Runds Rate
-■- Forecast-based Rule (no smooth.)
-●- Forecast-based Rule (with smooth)
-●- 3-Month LIBOR

Aggressiveness depends a lot on response to unemployment

Coefficient on deviations of u from u* halfed, u* = 4.9

— Federal Runds Rate
-●- Forecast-based Rule (with smooth) adjusted
-●- 3-Month LIBOR

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5. Beyond interest rates: Quantitative easing

❑ Orphanides and Wieland (2000), Coenen and Wieland (2003):

  ➤ Usually monetary policy is conducted via open market operations but with an operating target for the money market rate.

  ➤ Taylor-rule style monetary policy may be re-formulated as a rule in terms of the monetary base.

  ➤ When rate is at zero-interest rate floor, central bank can continue with direct purchases of assets (government debt , private sector debt) and/ or longer-term operations in the money market.

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Quantitative easing

Does quantitative easing have any real effects?

  ➤ Direct effects of money on demand and inflation, (real balance and portfolio-balance effects) still remain active at zero-interest rate floor.

  ➤ The effect of an increase in the monetary base is smaller than in normal times and estimates are rather imprecise.

  ➤ May justify pre-emptive interest rate reduction and aggressive quantitative easing.

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Policy as a base money rule

❑ m = base money / (price level * real income)

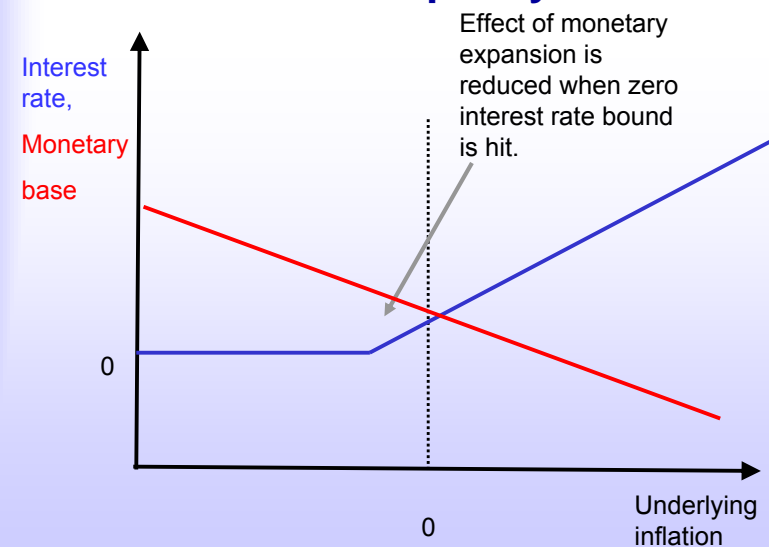❑ Base money rule in normal times (f> 0), similar to interest rate rule but not as practical.

$$m_t = -k_\pi(\pi_t - \pi^*) - k_y(y_t - y_t^*)$$

❑ Base money rule at zero-interest floor (f=0), magnification factor x.
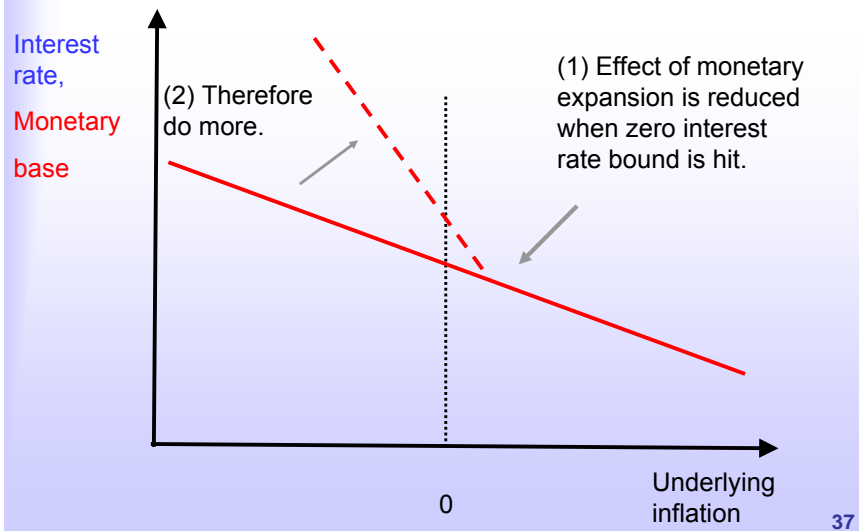
$$m_t = -xk_\pi(\pi_t - \pi^*) - xk_y(y_t - y_t^*)$$
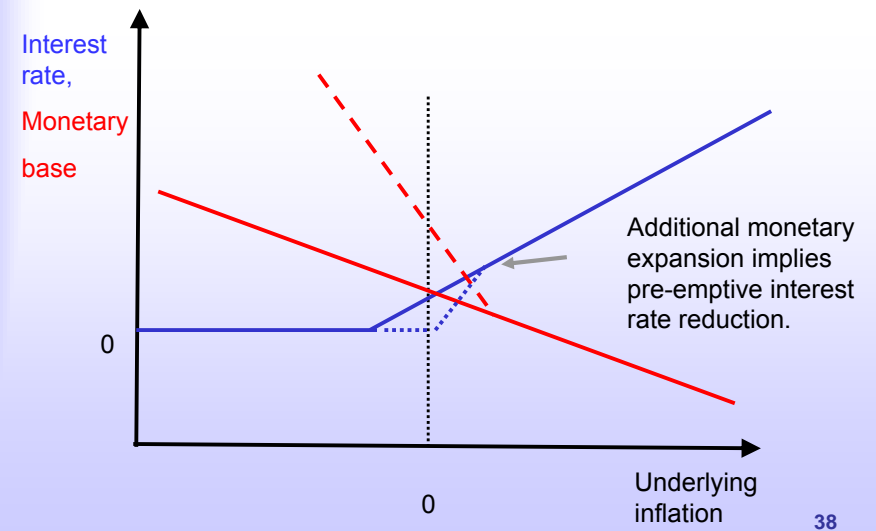
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Zero bound on policy interest rate

Interest rate,

Monetary base

Effect of monetary expansion is reduced when zero interest rate bound is hit.

0

0   Underlying inflation

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Zero bound and quantitative easing

Interest rate,

Monetary base

(2) Therefore do more.

(1) Effect of monetary expansion is reduced when zero interest rate bound is hit.

0

Underlying inflation

37

Zero bound on policy interest rate

Interest rate,

Monetary base

Additional monetary expansion implies pre-emptive interest rate reduction.

0

0

Underlying inflation

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Questions regarding Fed

- ❑ Excessively loose policy driven by pessimistic forecasts and aggressive policy response to unemployment and output?
- ❑ Quantitative easing without targets for money base or for longer-term rates. What happened to systematic policy?
- ❑ Credit easing at positive rates, I suppose, did not help much?

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Questions regarding ECB

- ❑ The monetary pillar gave warning signals prior to crisis, possibly a good reason to strengthen its role post-crisis.
- ❑ Where should rates be now? Taylor rule?
- ❑ Perceived floor for the real interest rate?
- ❑ Why the aversion against zero nominal rates?
- ❑ Often-cited money market argument seems to be based on a misunderstanding. MRO, EONIA, deposit rate.
- ❑ How would quantitative easing best be implemented?

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References

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Orphanides, A. and V. Wieland, Efficient Monetary Policy Design Near Price Stability, *Journal of the Japanese and International Economies*, Vol. 14, December 2000, pp. 327-365.

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Beck, G. and V. Wieland, Central Bank Misperceptions and the Role of Money in Interest Rate Rules, *Journal of Monetary Economics,* Vol 55 (1), November 2008.