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NOBEL SYMPOSIA



# Nobel Symposium “Money and Banking”

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Clarion Hotel Sign, Stockholm



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# Lessons of the long quiet ELB

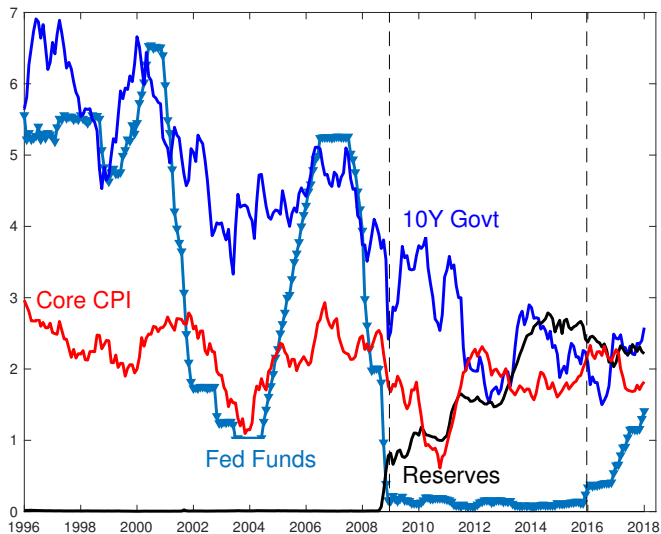
Comments on “Monetary policy: Conventional and unconventional”

Nobel Symposium on Money and Banking

John H. Cochrane  
Hoover Institution, Stanford University

May 2018

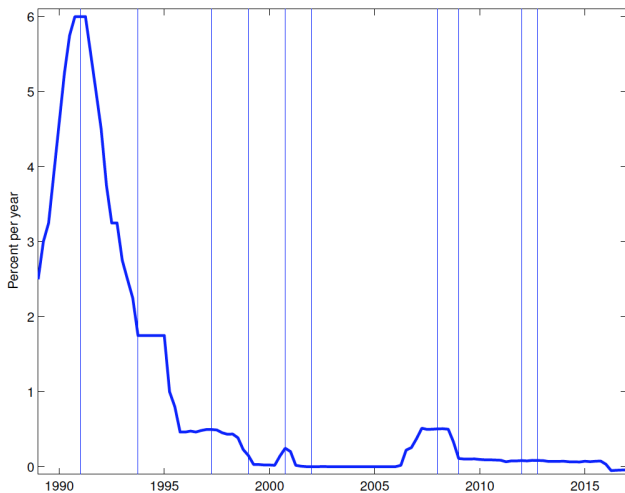
## Lessons of long quiet ELB, huge QE



- ▶ Dramatic experiment.  $i = 0$ . Reserves =  $300 \times$ .
- ▶  $\pi$  is *the same* (or slightly lower and quieter)!

# Japan has ~~been in a Liquidity Trap~~ ever since 1995

Had essentially 0% nominal rates and passive policy

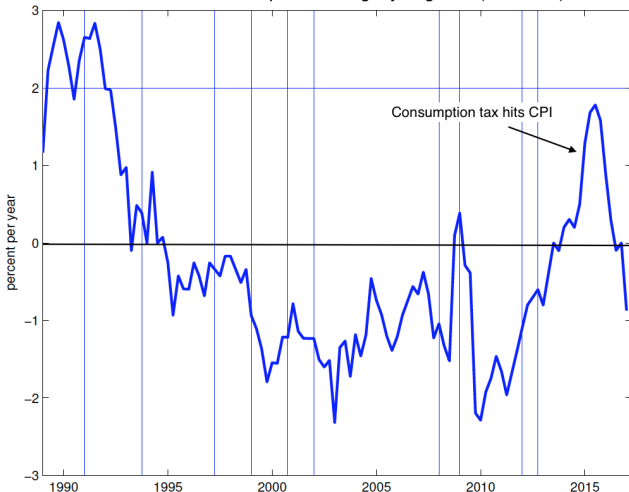


Source: Stephanie Schmitt-Grohé

- ▶ Japan. 23 years at the ELB with  $\phi < 1$ . And...

... and inflation has been ~~below target~~ throughout.

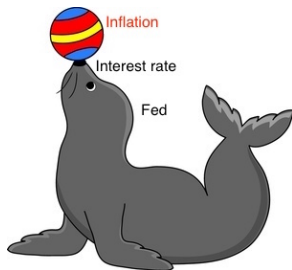
quiet and slightly negative (-1 to -2%)



Source: Stephanie Schmitt-Grohé

- ▶ 23 years of Friedman optimum ( $i = 0$ ,  $\pi = -r$ )?
- ▶ 2 atomic bombs (reserves, long ELB). Nothing happened!
- ▶ Important and revealing experiment.

# Stability lessons



Unstable

$$\pi_{t+1} = (\lambda > 1)\pi_t + \dots$$



Stable

$$\pi_{t+1} = (\lambda < 1)\pi_t + \dots$$

- ▶ Inflation is *stable* and *quiet* at long lasting ELB, & huge interest-paying reserves.
- ▶ → with passive policy ( $i_t = \phi\pi_t$ ;  $\phi < 1$ ); even a peg.
- ▶ This lesson of the long quiet ELB provides a crucial experiment finally separating previously hard-to-distinguish theories.

## Quantity lessons



### The optimal quantity of money

- ▶ Arbitrary interest-paying reserves do not cause inflation.  $MV=PY$ .
- ▶ We can live the Friedman-optimal quantity of money!
- ▶ Reserves can and should be huge, pay market interest.
- ▶ No need to control reserve quantity.
- ▶ Treasuries should issue reserve - like bonds.

# Interest rate lessons

Preview: a common theoretical structure

$$x_t = E_t x_{t+1} - \sigma(i_t - E_t \pi_{t+1} + v_t^r) \quad (1)$$

$$\pi_t = E_t \pi_{t+1} + \kappa x_t \quad (2)$$

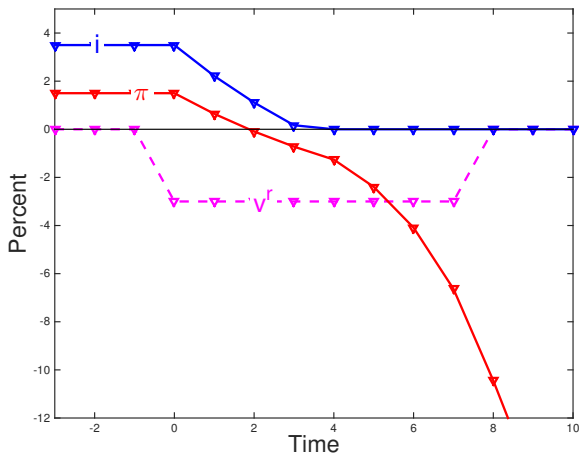
$$i_t = \max[i^* + \phi(\pi_t - \pi^*), 0] \quad (3)$$

$$(E_{t+1} - E_t)\pi_{t+1} = (E_{t+1} - E_t) \sum_{j=0}^{\infty} m_{t,t+j} s_{t+j} / b_t. \quad (4)$$

- ▶ Adaptive or rational  $E$ ? (Or halfway, e.g. Woodford  $k$ -step?)
- ▶ Handling multiple equilibria?
- ▶ Does (4) just “passively” determine  $s, \dots$
- ▶ Or does it solve all puzzles? (Yes!)



## Adaptive Expectations / Old-Keynesian



- ▶ Old K/Adaptive E, Friedman 1968:  $i$  peg,  $\phi < 1$  is *unstable*.
- ▶ Taylor  $\phi > 1$  stabilizes. ELB  $\rightarrow \phi < 1 \rightarrow$  *Deflation spiral*.
- ▶ *The deflation spiral did not happen. This theory is wrong.*

# Rational Expectations / New-Keynesian I

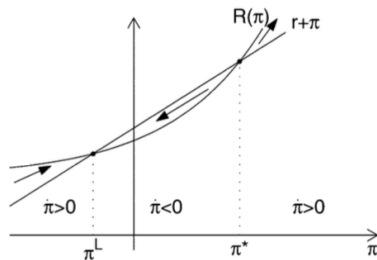
- ▶ ELB, peg, trap  $\rightarrow \pi$  is *stable*. :) !
- ▶ But *indeterminate* hence *volatile*.  
“Multiple equilibria.” “Self-confirming fluctuations.” “Sunspots.”

$$E_t \pi_{t+1} = r_t + i_t; \pi_{t+1} = E_t \pi_{t+1} + \delta_{t+1}$$

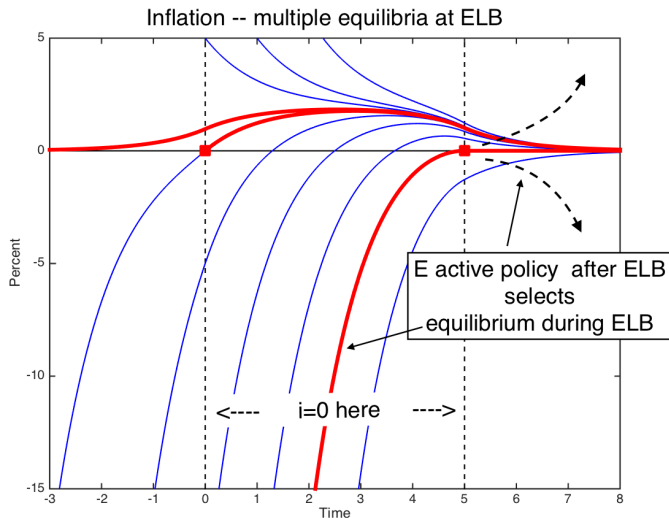
- ▶ Taylor  $\phi > 1$  makes economy *unstable*, hence locally determinate.
- ▶  $\phi < 1$  volatility is a core prediction.  
Clarida Galí Gertler. 1990s Japan ELB fears. Main “trap” problem.

- ▶ Extra sunspot volatility *did not happen*. *This theory is wrong*.  
(Incomplete.) Inflation can be stable, *determinate* and *quiet* at ELB.

AVOIDING LIQUIDITY TRAPS

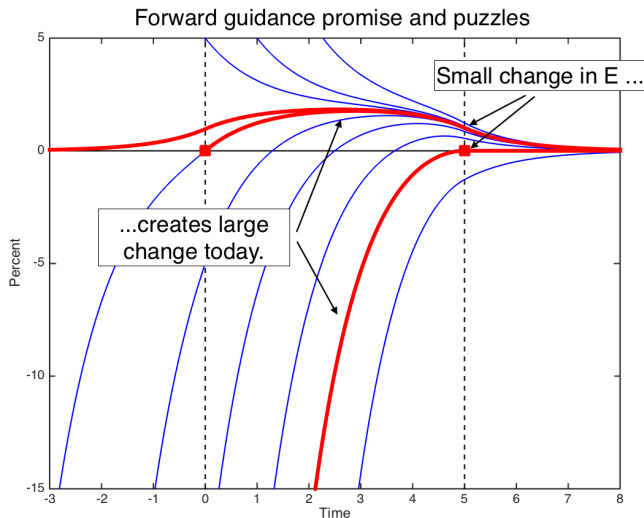


## NK II: Selection by future active policy



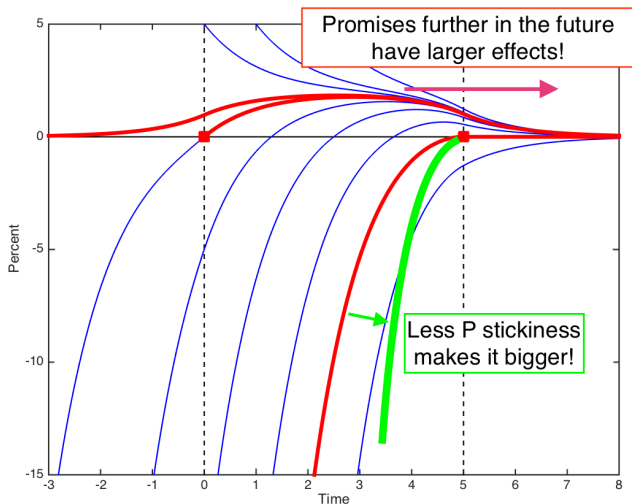
- ▶ Expected future  $\phi > 1$  selects equilibria  $\rightarrow$  determinate.
- ▶ (Why not 1970s?)

## NK II: Selection by future active policy



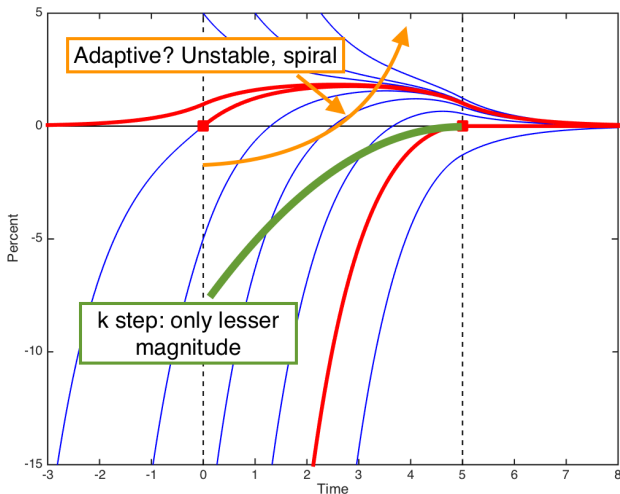
- ▶ Small changes to  $E_0\pi_T$  can have big effect on  $\pi_0, y_0$
- ▶  $\rightarrow$  Forward guidance. Woodford: Commitment? Price level target. Schmitt-Grohé: Raise  $i_T$  to raise  $\pi_T \rightarrow \pi_0$ .

## NK II: Problems



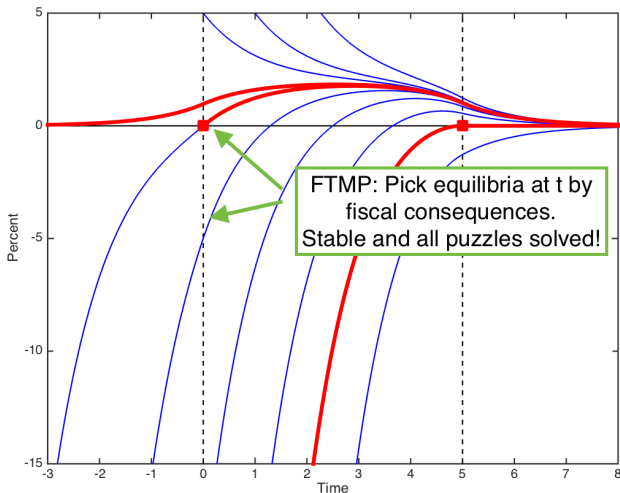
- ▶ Promises further in the future have bigger effects today.
- ▶ Prices *less* sticky, faster backward explosions. Frictionless limit.

## NK II: Solutions?



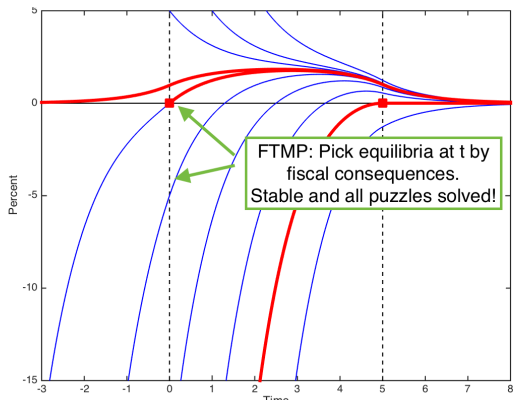
- ▶ Woodford, Gabaix, others: Abandon rational expectations.
- ▶ Woodford k-step. Complex. Only reduces the magnitude.
- ▶ Gabaix & others return to adaptive: Spiral?
- ▶ Basic stability properties are robust!

# Fiscal theory of monetary policy



- ▶ Stable, but select equilibria by  $\pi_t$  not  $\pi_T$ .
- ▶ Unexpected deflation  $\leftrightarrow$  more PV surplus to pay bondholders.
- ▶ Wealth effect of government bonds. Pigou vs. Keynes.

# Fiscal theory of monetary policy



- ▶ No deflation jump.
- ▶ Solves guidance puzzle, frictionless limit.
- ▶ Just bounding fiscal policy is enough.
- ▶ Allows (not requires) rational expectations.
- ▶ Simple!
- ▶ Saves NK program from self-destruction!

$$(E_t - E_{t-1})\pi_t = (E_t - E_{t-1}) \sum_{j=0}^{\infty} m_{t,t+j} s_{t+j} / b_t$$

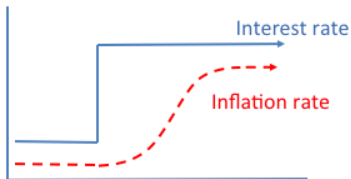


# Neo-Fisherism

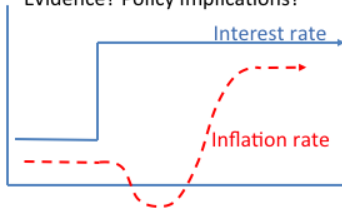


- ▶ If  $\pi$  is *stable* with passive policy, then if the Fed raises  $i$ , permanently, then  $\pi$  should eventually *rise*.
- ▶ Unavoidable consequence of stability. All NK models.
- ▶  $\pi$  could still decline in the *short run*. Does it? How?

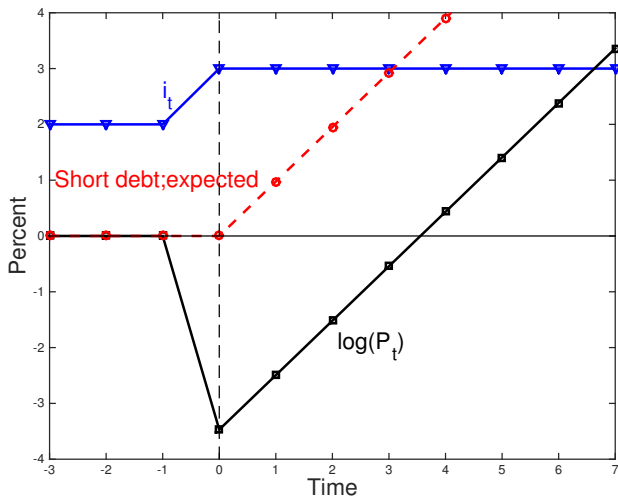
Implication of stability. Theory?



Minimum *necessary* assumptions?  
Evidence? Policy implications?

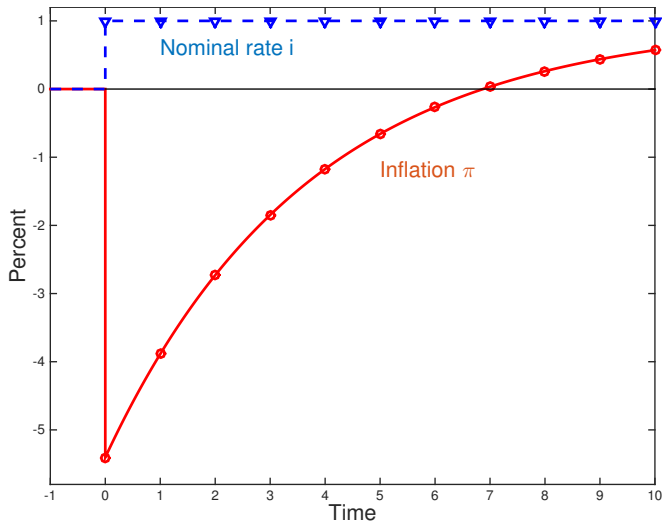


# FTMP, long-term debt $\rightarrow$ negative short run response



- ▶  $i_t = E_t \pi_{t+1}$ ; Nominal market value of debt /  $P_t =$  EPV surpluses.
- ▶ Higher  $i \rightarrow$  lower bond price  $\rightarrow$  lower  $P$ .

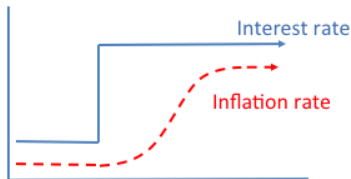
# FTMP, long-term debt, sticky prices $\rightarrow$ realistic response



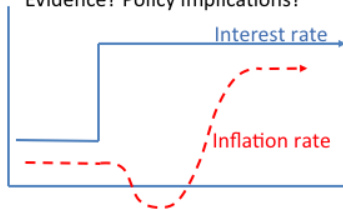
- ▶ NK IS and Phillips, FTPL, long term debt, no  $\Delta s$ ,  $i$  peg rises.
- ▶ Negative only for unexpected  $i$  + long term debt.

# Neofisherism?

Implication of stability. Theory?



Minimum *necessary* assumptions?  
Evidence? Policy implications?



- ▶ Long-run: An inescapable result of stability.
- ▶  $NK+FTPL = FTMP$  gives temporary negative response with long-term debt and unexpected shock.
- ▶ → Schmitt Grohé: Gradual, expected rise!
- ▶ US vs. Europe & Japan. Neo-Fisher at work?
- ▶ Turkey, Brazil, Venezuela, Argentina? Needs fiscal foundation!

## Advertisements

- ▶ “The New-Keynesian Liquidity Trap” 2017 *Journal of Monetary Economics* 92, 47-63.
- ▶ “Michelson-Morley, Fisher, and Occam: The Radical Implications of Stable Inflation at the Zero Bound” Forthcoming *Macroeconomics Annual* 2018.
- ▶ “Stepping on a Rake: the Fiscal Theory of Monetary Policy” January 2018. *European Economic Review* 101, 354-375.
- ▶ How FTMP provides a simple unified framework for interest rate policy, quantitative easing, and forward guidance, that works even in frictionless models. You add price stickiness to produce realistically slow dynamics.
- ▶ This talk and slides  
<http://faculty.chicagobooth.edu/john.cochrane/>