The fiscal theory of the price level and monetary policy: An agenda

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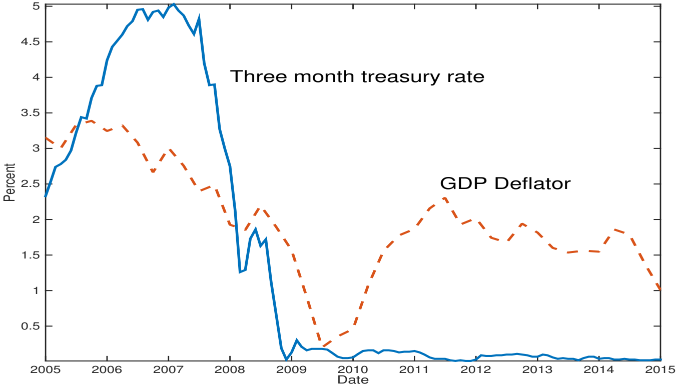
Outline:

- FTPL theoretical controversies settled.
- Now: How to apply it – data, history and policy?
- Founding equation:

$$\frac{B_{t-1}}{P_t} = E_t \sum_{j=0}^{\infty} \beta^j \frac{\Lambda_{t+j}}{\Lambda_t} s_{t+j}$$

- Theme: We've spent too much time on $\{E_t s_{t+j}\}$. $\frac{\Lambda_{t+j}}{\Lambda_t}$ and B_{t-1}!
- Discount rate variation matters a lot.
- Monetary policy matters a lot, can fix standard model problems.
- Paper plugs:
  1. "The New-Keynesian Liquidity Trap"
  2. "Monetary Policy with Interest on Reserves"
  3. "Do Higher Interest Rates Raise or Lower Inflation?"
  4. Next papers too!

Understanding Cyclical Inflation (R)



$$\frac{B_{t-1}}{P_t} = E_t \sum_{j=0}^{\infty} \beta^j \frac{\Lambda_{t+j}}{\Lambda_t} s_{t+j} = E_t \sum_{j=0}^{\infty} \beta^j \frac{1}{\prod_{k=1}^{j} R_{t+k}} s_{t+j}$$

- s_t, $E_t s_{t+j}$, B, all point to *in*flation.
- R decline; $P/D = 1/(r-g)$ equivalent is large.
- Asset pricing: Variation in P/X is all from Λ, R, not s.
- R version is an identity. No test. *Why* R? "Flight to quality." Fed?

Fiscal theory and monetary policy (B)

- Start very simple – constant R, no monetary or pricing frictions. $\rightarrow$

$$\frac{B_{t-1}}{P_t} = E_t \sum_{j=0}^{\infty} \beta^j s_{t+j}$$

$$\frac{B_{t-1}}{P_{t-1}} (E_t - E_{t-1}) \left(\frac{P_{t-1}}{P_t} \right) = (E_t - E_{t-1}) \sum_{j=0}^{\infty} \beta^j s_{t+j}. \tag{1}$$

$$\frac{B_{t-1}}{P_{t-1}} E_{t-1} \left(\frac{P_{t-1}}{P_t} \right) = E_{t-1} \sum_{j=0}^{\infty} \beta^j s_{t+j}. \tag{2}$$

- *Unexpected inflation π is determined entirely by expectations of future surpluses.* $\rightarrow$ Solves determinacy issues.
- *The government can entirely determine expected inflation by "monetary policy" – nominal bond sales B_{t-1}, with no change in surpluses.* (Currency reform/Share split)

Interest rate targets

- *"Monetary policy" (B, no s) can set a nominal interest rate target. Interest rate targets completely control expected inflation.*

$$Q_{t-1} = \frac{1}{1+i_{t-1}} = \beta E_{t-1}\left(\frac{P_{t-1}}{P_t}\right). \quad (3)$$

$$\frac{B_{t-1}}{P_{t-1}}\frac{1}{1+i_{t-1}} = E_{t-1}\sum_{j=0}^{\infty}\beta^{j+1}s_{t+j}. \quad (4)$$

- Story 1 (simple): Fix i_t, not B_t in bond auction.
- Story 2 (realistic): Fed raises i_t, ior. Treasury sees i_t, (4) says how much B_t to sell. (More i, more B to raise same s).

Bottom line:

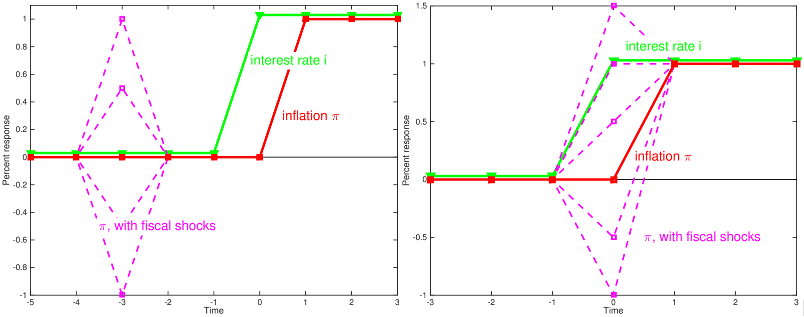
- FTPL rehabilitates even fixed nominal interest rate targets! No indeterminacy (Sargent-Wallace, Woodford) or instability (Friedman 1968, old-Keynesian policy establishment)

$$i_t = \text{set by Fed} \approx r + E_t\pi_{t+1}$$

$$\pi_{t+1} - E_t\pi_{t+1} = (E_{t+1} - E_t)\sum_{j=0}^{\infty}\beta^j s_{t+j}$$

- Compelling story for recent experience: $i = 0$, π declines as r rises.

Interest rate targets – impulse-response



Model

$$i_t = r + E_t\pi_{t+1};\ \pi_{t+1} - E_t\pi_{t+1} = (E_t - E_{t-1})\sum \beta^j s_{t+j}$$

- Agenda: Pricing frictions? Monetary frictions? Standard prediction of (temporarily) lower π?
- Agenda: You can import the whole NK/DSGE model *except* "active" off-equilibrium interest rate rules, and thus different jumps after shocks (indexed by $\Delta E_{t+1}(s_{t+j})$). This makes a big difference!

FTPL, i targets, pricing frictions – simple example

Model

$$c_t = E_t c_{t+1} - \sigma(i_t - E_t \pi_{t+1})$$
$$\pi_t = \kappa c_t$$

To solve,

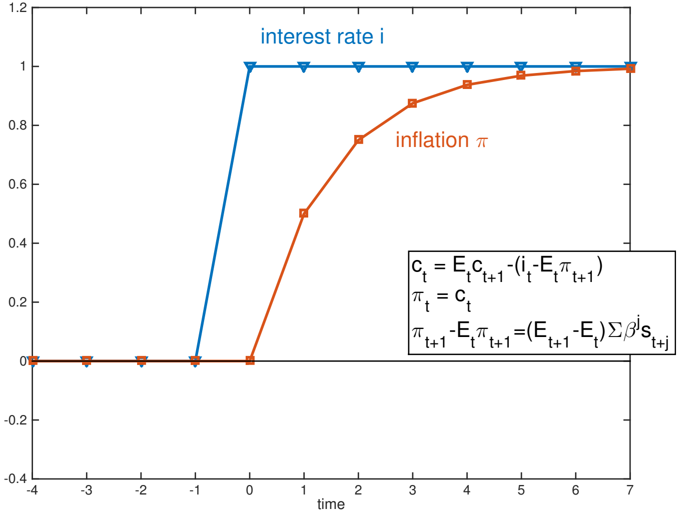
$$\pi_t = E_t \pi_{t+1} - \sigma\kappa(i_t - E_t \pi_{t+1})$$

So solution:

$$E_t \pi_{t+1} = \frac{1}{1+\sigma\kappa}\pi_t + \frac{\sigma\kappa}{1+\sigma\kappa} i_t$$
$$\pi_{t+1} - E_t \pi_{t+1} = (E_{t+1} - E_t)\sum_{j=0}^{\infty} \beta^j s_{t+j}$$

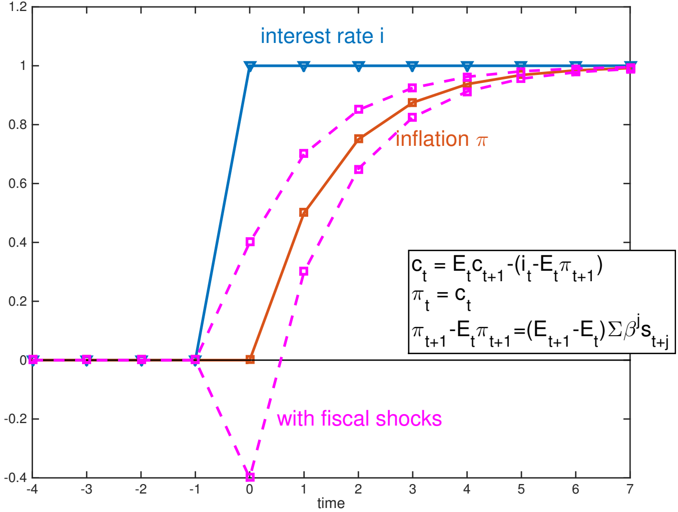
- IR $\{E_t \pi_{t+j}\}$ does not depend on expected vs. unexpected i
- π response is *stable*, hence follows i.

Impulse-response, simple price stickiness model



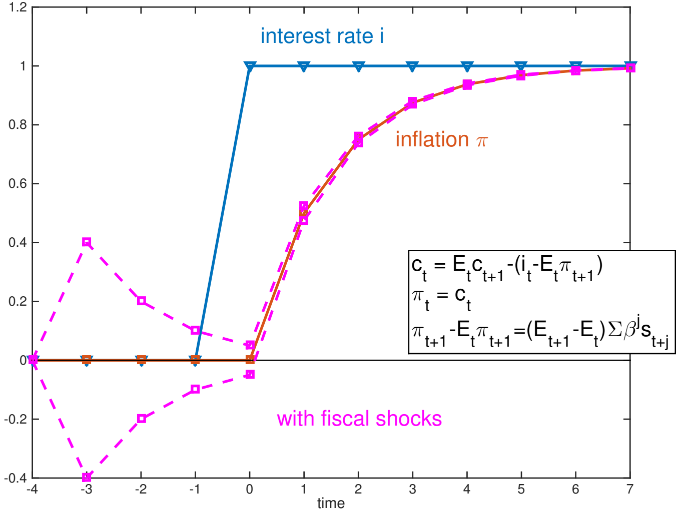
- Expected vs. unexpected the same. "Neo-Fisherian."

Impulse-response, simple price stickiness model



- Mix i rise with fiscal shock. (Conventional NK. Data?)

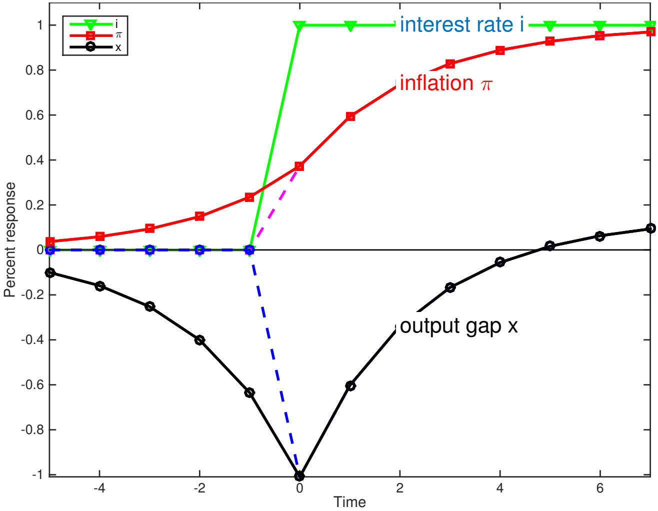
Impulse-response, simple price stickiness model



- Pre-announced interest rate rise.

A Real New-Keynesian + FTPL model

$$x_t = E_t x_{t+1} - \sigma(i_t - E_t \pi_{t+1})$$
$$\pi_t = \beta E_t \pi_{t+1} + \kappa x_t$$



Agenda

- To impulse-response, effects of monetary policy
  1. FTPL + pricing frictions + monetary frictions (money in U) + maturity structure + real rates alter PV(s):
  2. Interest rate rise (without fiscal shock) robustly raises inflation.
  3. Standard NK adds a negative fiscal shock to reduce inflation
  4. Key ingredient: Forward-looking "IS" curve. (Robust to money, Phillips)

$$c_t = E_t c_{t+1} - \sigma(i_t - E_t \pi_{t+1})$$

- Impulse response future
  1. Lots and lots of frictions (liquidity constraints, irrational expectations abandon IS?)
  2. Or, maybe evidence for negative sign has combined money and fiscal shocks. Interest alone *does* raise inflation?
- Next steps:
  1. Optimal monetary policy?
  2. Better monetary/fiscal arrangements? (Communicate and commit)
  3. Example: Target real/nominal spread to target $E_t \pi_{t+1}$. "Fiscal Taylor Rule" that s will defend P just enough.

$$b_{t-1} = \sum \beta^j (s_0 + s_1 P_{t+j})$$