Discussion of

”Inflation Scares and Forecast-Based Monetary Policy”

by Athanasios Orphanides and John C. Williams

Martin Ellison

University of Warwick and CEPR

1st Conference of the Euro Area Business Cycle Network, Frankfurt am Main, December 2003

Summary of model

Loss function $\mathbf{L} = (1-\omega)\,\mathrm{Var}\, y + \omega\,\mathrm{Var}\,(\pi-\pi^{*})$

Monetary policy transmission $y_{t+1} = x_t + u_{t+1}$

Phillips curve $\pi_{t+1} = \phi\,\pi^{e}_{t+1} + (1-\phi)\,\pi_t + \alpha\, y_{t+1} + e_{t+1}$

Optimal policy

Perfect knowledge

Private agents know structure of economy and central bank's policy

Outcome-based rule: $x_t = - \theta_\pi (\pi_t - \pi^*)$

Forecast-based rule: $x_t = - \theta_{\pi^e} (\pi^e_{t+1} - \pi^*)$

} equivalent

Imperfect knowledge

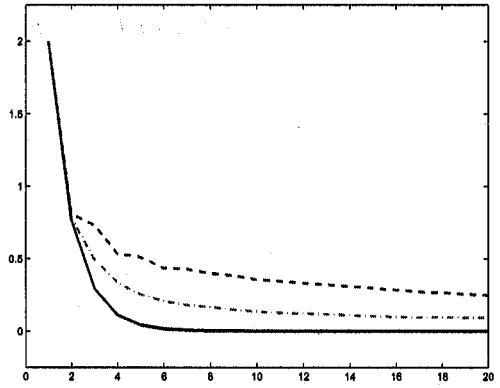
Private agents use reduced form of model for expectations

$$\pi_i = C_{0,t} + C_{1,t} \pi_{i-1} + v_i$$

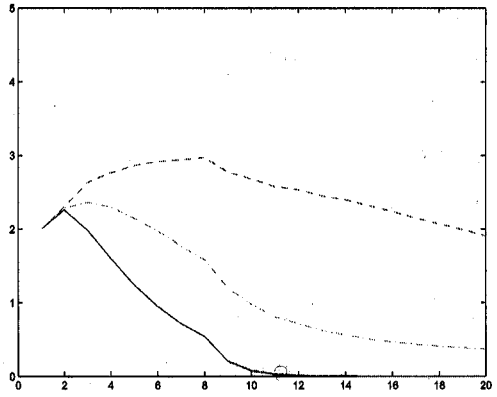
$C_{0,t}$ and $C_{1,t}$ are estimated using recursive least squares but with small constant gain $\kappa > 0 \Rightarrow$ *perpetual learning*

Results

Response to positive inflation shock



Response to series of positive inflation shocks



Some intuition

A decomposition

$$\pi_{t+1} = \underbrace{C_0^* + C_1^* \pi_t}_{\text{true structural parameters}} + \underbrace{(C_0^P - C_0^*) + (C_1^P - C_1^*) \pi_t}_{\text{long-run errors due to misspecification of reduced form}} + \underbrace{(C_{0,t} - C_0^P) + (C_{1,t} - C_1^P) \pi_t}_{\text{short-run errors due to imprecise parameter estimates}} + v_t$$

2 possible sources of inflation scares

i) Imprecise parameter estimates - *incomplete learning*.

ii) Incorrect specification of reduced form - *misspecification*.

Decomposing scares I

<u>With serially uncorrelated shocks</u>

Structural form: $\pi_{t+1} = C_0^* + C_1^* \pi_t + e_{t+1}$ (i.i.d.)

Reduced form: $\pi_{t+1} = C_{0,t} + C_{1,t} \pi_t + v_t$ (i.i.d.)

No misspecification in reduced form.

$C_{1,t} \rightarrow C_1^P = C_1^*$
$C_{0,t} \rightarrow C_0^P = C_0^*$

Inflation scares due to imprecise parameter estimates.

Decomposing scares II

With serially correlated shocks

$$e_{t+1} = \rho\, e_t + \hat{e}_t$$

Structural form: $\pi_{t+1} = C_0^* + C_1^*\, \pi_t + e_{t+1}$

Reduced form: $\pi_{t+1} = C_{0,t} + C_{1,t}\, \pi_t + v_t$

i.i.d.

Reduced form is misspecified.

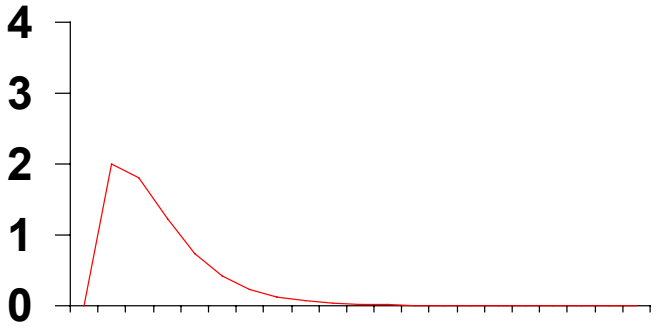
$$C_{1,t} \rightarrow C_1^P = \frac{C_1^* + \rho}{1 + \rho\, C_1^*} \qquad C_{0,t} \rightarrow C_0^P = \frac{1 - \rho}{1 + \rho\, C_1^*}\, C_0^*$$

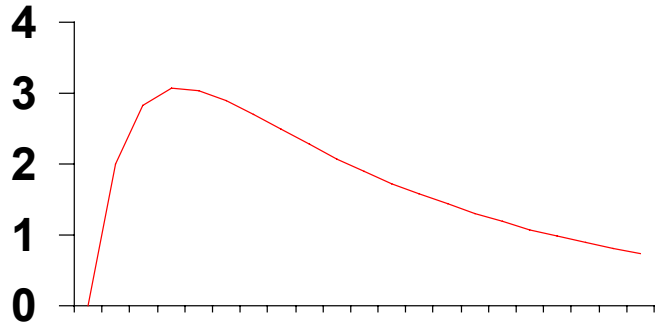
Inflation scares due to mixture of imprecise parameter estimates and misspecification of reduced form.

Example

Serially correlated shocks $e_{t+1} = \rho\, e_t + \hat{e}_t$

Parameter estimates precise $C_{0,t} = C_0^P$, $C_{1,t} = C_1^P$





Perfect knowledge

$\pi_{t+1} = C_0^* + 0.4\, \pi_t + e_{t+1}$

Perfect learning

$\pi_{t+1} = C_0^* + 0.91\, \pi_t + e_{t+1}$

Calibration

$\phi = 0.9$
$\alpha = 0.1$
$\theta_\pi = 0.6$
$\rho = 0.5$

Concluding remarks

1. What is causing scares? Learning or misspecifications?

2. Question applies equally to results for term structure and monetary policy design.

3. Do we also have output scares?