Discussion of ”Financial Vulnerabilities and Monetary Policy”

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• Short description of the set-up

• A ”small” deviation

• Back to the this paper: optimal monetary policy

• What’s the difference with the presented results?
The set-up

- Standard households
- Standard technologies and goods market structure
- "Friction": assets hold by households are restricted
  - banks should intermediate between firms and households
  - households can hold deposits and bank’s equity
  - banks with a particular objective, a particular constraint and subject to shocks
A small deviation: a model with flexible prices

- Identical households and firms but flexible prices

- Continuum of intermediate goods, indexed by \( i \in [0, 1] \).

\[
Y_t = \left[ \int_0^1 Y_t(i) \frac{\epsilon - 1}{\epsilon} di \right]^{\frac{\epsilon}{\epsilon - 1}}, \theta > 1.
\]

Demand function for each intermediate input:

\[
Y_t(i) = \left( \frac{P_t(i)}{P_t} \right)^{-\epsilon} Y_t.
\]
\( P_t \) is the price level

\[
P_t = \left[ \int P_t(i)^{1-\epsilon} \, di \right]^{\frac{1}{1-\epsilon}}
\]
\[ Y_t(i) \leq AN_t(i) \]

FOC:

\[ P_t(i) = \frac{\epsilon}{(\epsilon - 1)} \frac{W_t}{A} \]

The price level

\[ P_t(i) = P_t = \frac{\epsilon}{(\epsilon - 1)} \frac{W_t}{A} \]
Flexibel price equilibrium (FPE):

\[ Y_t(i) = Y_t = AN_t = C_t \]

\[ \frac{N_t^\xi}{C_t^{\epsilon-\gamma}} = \frac{A}{\epsilon(\epsilon-1)} \]

\[ N_t = N^{FP} = \left( \frac{A^{1-\gamma}}{\epsilon(\epsilon-1)} \right)^{\frac{1}{\xi+\gamma}} \]
\[ C^{FP} = Y^{FP} = \left( \frac{A^{1+\xi}}{\epsilon} \right)^{\frac{1}{\xi+\gamma}} \]
Prices and returns FPE:

- \( D_t \) cost one unit of good and will pays \( R_t \) goods in every state of \( t + 1 \):

\[
R_t e^{-\beta} E_t \left[ \left( \frac{C_{t+1}}{C_t} \right)^{-\gamma} \right] = 1
\]

\[
R_t^{FP} e^{-\beta} = 1
\]

Monetary policy:

- Short term nominal risk free rate \( 1 + i_t \):

\[
(1 + i_t) e^{-\beta} E_t \left[ \left( \frac{C_{t+1}}{C_t} \right)^{-\gamma} \frac{P_t}{P_{t+1}} \right] = 1
\]
\[(1 + i_t^{FP}) e^{-\beta E_t \left[ \frac{P_t}{P_{t+1}} \right]} = 1\]
• Monetary policy neutral with $FP$:
  
  – allocations independent of $i$, $E_t \left[ \frac{P_t}{P_{t+1}} \right]$ and $P_t$.

  – a given $1 + i_t^{FP}$ determines $\frac{1}{E_t \left[ \frac{P_t}{P_{t+1}} \right]}$.

  – can be supported by very different paths for $P_t$. 

• Take a particular one, so that:

\[ P_t = P_{t+1} = P \]

\[ e^{-\beta} \left( 1 + i_t FP \right) = 1 \]

• Local determinacy:

\[ (1 + i_t FP) = e^\beta \left( \frac{P_{t+1}}{P_t} \right)^\alpha, \alpha < 1 \]
Back to this paper

- Calvo pricing as in Calvo (1983).
  - Every period, a firm is able to revise the price with probability $1 - \alpha$

\[
p_t^* = \frac{\epsilon}{(\epsilon - 1)} E_t \sum_{j=0}^{\infty} \eta_{t,j} \frac{W_{t+j}}{A},
\]

\[
\eta_{t,j} = \frac{(\alpha\beta)^j u_C(t + j) \left( P_{t+j} \right)^{\theta-1} Y_{t+j}}{E_t \sum_{j=0}^{\infty} (\alpha\beta)^j u_C(t + j) \left( P_{t+j} \right)^{\theta-1} Y_{t+j}}
\]
$$C_t = \left[ \sum_{j=0}^{t+1} \varpi_j \left( \frac{P^*_{t-j}}{P_t} \right)^{-\theta} \right]^{-1}$$

$$AN_t = \nu_t AN_t$$

$\varpi_j$ : share of firms set prices $j$ periods before, $\varpi_j = (\alpha)^j(1 - \alpha)$, $j = 0, 1, 2, \ldots, t$, and $\varpi_{t+1} = (\alpha)^{t+1}$, share of firms that have never set prices so far.

- when monetary policy is such that
  $$P_t = P^*_t = P_{t-1} = P$$

  then
  $$\nu_t = 1$$
• Calvo constraint is not bidding

• $FPE$ feasible in the implementable set
But:

• With Calvo pricing $FPE$ allocations is the Second Best: mark-up distortion.

• So this is the optimal monetary policy:

$$e^{-\beta} \left( 1 + i_t^{SB} \right) = 1$$

• Local determinacy:

$$\left( 1 + i_t^{SB} \right) = e^{\beta \left( \frac{P_{t+1}}{P_t} \right)^\alpha}, \alpha < 1$$
The results of this article:

- The solution that is presented is the one where, due to deviation from this rule, monetary policy with Calvo pricing creates volatility in this economy