Should Central Banks Target Investment Prices?

by Basu and De Leo

Discussion by Christopher House
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Preliminaries

• What measure of inflation should the Fed respond to?
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\[ i_t = f(\Pi_t, \text{ other variables}) \]
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\[ i_t = \phi \Pi \Pi_t \]
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\[ i_t = \phi_{\Pi} \Pi_t \]

\[ \Pi_t = \frac{C}{GDP} \pi_{C,t} + \frac{I}{GDP} \pi_{I,t} \]
Preliminaries

• What measure of inflation should the Fed respond to?

• Natural reaction:

\[ i_t = \phi \left[ \frac{C}{GDP} \pi_{C,t} + \frac{I}{GDP} \pi_{I,t} \right] \]
Preliminaries

• What measure of inflation should the Fed respond to?

• Natural reaction:

\[ i_t = \left[ \phi_{\Pi} \frac{C}{GDP} \right] \pi_{C,t} + \left[ \phi_{\Pi} \frac{I}{GDP} \right] \pi_{I,t} \]
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• Basu and De Leo: react more to investment prices.
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• In practice, the Fed targets PCE inflation.

• Basu and De Leo: react more to investment prices.

Specifically, they suggest \( \phi_{\pi, C} = \phi_{\pi, I} \).
Inflation: Durables vs. Non-durables
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The diagram above illustrates the YoY inflation (percent) of Fixed Investment, Residential, and Nonresidential over time, from Q1/1990 to Q1/2010.

- **Fixed Investment** is represented by the blue line.
- **Residential** is represented by the red line.
- **Nonresidential** is represented by the yellow line.

The lines show fluctuations over time, with shaded areas possibly indicating significant events or data points.
Inflation: Durables vs. Non-durables
Why should we respond more to inv. prices?
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• Investment and durable goods purchases have a much higher IES.
Standard New Keynesian Model

Real interest rate, $r$

\[ r_t = i_t - E_t[\pi_{t+1}] \]

Output, $Y$

New Keynesian IS Curve
Real interest rate, $r$

\[ r_t = i_t - E_t[\pi_{t+1}] \]

Euler equation

Output, $Y = C$
New Keynesian Model with Investment

Real interest rate, $r$

$$r_{I,t} = i_t - E_t[\pi_{I,t+1}]$$

Output, $Y = C + I$
New Keynesian Model with Investment

Real interest rate, $r$

$\bar{r}_{I,t} = i_t - E_t[\pi_{I,t+1}]$

Output, $Y = C + I$
Why should we respond more to inv. prices?

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Why should we respond more to inv. prices?

• Investment and durable goods purchases have a much higher IES.

• **Strong** connection between investment inflation and output.
Closely related / companion paper:
Boehm, Barsky, House and Kimball (2018)
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- Similar to Basu and De Leo but with simplifications which allow for limiting analytical solutions.
Boehm, Barsky, House and Kimball (2018)

• Similar to Basu and De Leo but with simplifications which allow for limiting analytical solutions.

• Key common features:
  – Sector specific Phillips Curves
    \[
    \pi_{j,t} = \kappa_j m_c_{j,t} + \beta E_t [\pi_{j,t+1}]
    \]
  – Nearly constant shadow value of durable / investment good
    \[
    q_t \approx \bar{q}
    \]
New Keynesian Model with Investment

Real interest rate, $r$

$$r_{I,t} = i_t - E_t \left[ \pi_{I,t+1} \right]$$

Output, $Y = C + I$
New Keynesian Model with Investment

Real interest rate, $r$

$$r_{I,t} = i_t - E_t[\pi_{I,t+1}]$$

Investment Demand function

Output, $Y = C + I$
Boehm, Barsky, House and Kimball (2018)

- Key different features:
  - Aggregate labor supply

\[ \psi_n N_t^{\frac{1}{n}} = \frac{W_t}{P_{I,t}} q_t \]
Boehm, Barsky, House and Kimball (2018)

• Key different features:
  – Aggregate labor supply

\[ \psi_n^\eta \overline{N}_t^\eta \approx \frac{W_t}{P_{I,t}} \overline{q} \]
Boehm, Barsky, House and Kimball (2018)

• Key different features:
  – Aggregate labor supply
    \[ \psi_n N_t^{\frac{1}{n}} \approx \frac{W_t}{P_{I,t}} \bar{q} \]
  – Mobile factors of production
    \[ MC_t = \frac{W_t}{(1-\alpha)K^\alpha N_t^{-\alpha}} \]
Boehm, Barsky, House and Kimball (2018)

• Aggregate output is directly connected to real marginal cost in the durable goods sector
Boehm, Barsky, House and Kimball (2018)

- Aggregate output is directly connected to real marginal cost in the durable goods sector

\[ mc_{I,t} \approx \left( \frac{1}{1-\alpha} \right) \left( \frac{1}{\eta} + \alpha \right) Y_t \]
• Aggregate output is directly connected to real marginal cost in the durable goods sector

\[ mc_{I,t} \approx \left( \frac{1}{1-\alpha} \right) \left( \frac{1}{\eta} + \alpha \right) Y_t \]

\[ \pi_{I,t} = \kappa_I mc_{I,t} + \beta E_t \left[ \pi_{I,t+1} \right] \]
Boehm, Barsky, House and Kimball (2018)

- Aggregate output is directly connected to real marginal cost in the durable goods sector

\[ \pi_{I,t} = \kappa_I \left( \frac{1}{1-\alpha} \right) \left( \frac{1}{\eta} + \alpha \right) Y_t + \beta E_t \left[ \pi_{I,t+1} \right] \]

- Stabilizing output

\[ \iff \]

stabilizing investment / durable goods inflation
Boehm, Barsky, House and Kimball (2018)

- Welfare objective

\[ L = V[\hat{Y}_t] + W_\pi V[\tilde{\Pi}_t] \]
Boehm, Barsky, House and Kimball (2018)

• Welfare objective

\[ L = V[\hat{Y}_t] + W_\pi V[\tilde{\Pi}_t] \]

• Only care about inflation: \( W_\pi \to \infty \)

\[ \frac{\phi_{\pi,I}}{\phi_{\pi,C}} = \frac{I}{C} \]
Boehm, Barsky, House and Kimball (2018)

- Welfare objective

\[ L = V[\hat{Y}_t] + W_\pi V[\tilde{\Pi}_t] \]

- Only care about output: \( W_\pi = 0 \)

\[ \frac{\phi_{\pi,I}}{\phi_{\pi,C}} \rightarrow \infty \]
Other issues

- BDL’s Taylor rule

\[ i_t = \phi_{\pi,C}\pi_{C,t} + \phi_{\pi,I}\pi_{I,t} \]
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• BDL’s Taylor rule

\[ i_t = \phi_{\pi,C} \pi_{C,t} + \phi_{\pi,I} \pi_{I,t} \]

• Traditional Taylor rule

\[ i_t = \phi_\pi \pi_{c,t} + \phi_y \hat{Y}_t \]
Other issues

• BDL’s Taylor rule

\[ i_t = \phi_{\pi,C} \pi_{C,t} + \phi_{\pi,I} \pi_{I,t} \]

• Traditional Taylor rule

\[ i_t = \phi_{\pi} \pi_{c,t} + \phi_y \hat{Y}_t \]

\[ = \phi_{\pi} \pi_{c,t} + \phi_y \left[ \pi_{I,t} - \beta E_t \left[ \pi_{I,t+1} \right] \right] \]
Other issues

• Cost push shocks

\[ \pi_{I,t} = \kappa_I mc_{I,t} + \beta E_t \left[ \pi_{I,t+1} \right] \]
Other issues

- Cost push shocks

\[ \pi_{I,t} = \kappa_I m c_{I,t} + \beta E_t \left[ \pi_{I,t+1} \right] + u_{I,t} \]
Other issues

• Measurement of investment prices.
Summing up

Central banks should target investment prices.
• Investment / durables are much more interest sensitive – $\pi_{I,t}$
• Output is closely tied to durable goods inflation. (Boehm et al.)

Caveats:
1. Cost push shocks.