Boom-bust Cycles and Monetary Policy

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- It has often been argued that there is advanced information about technology shocks.
  - Beaudry-Portier, Michelle Alexopoulos, Jaimovic-Rebelo, Christiano-Illut-Motto-Rostagno
- In the presence of such advance information, standard monetary policy can create an inefficient boom, followed by a bust.

Objective

- Estimate a model in which technology shocks are partially anticipated
  - ‘Normal’ technology shock:
    \[ a_t = \rho a_{t-1} + \xi_t \]
  - Shock considered here (J Davis):
    \[ a_t = \rho a_{t-1} + \xi_t + \xi^1_{t-1} + \xi^2_{t-2} + \xi^3_{t-3} + \xi^4_{t-4} + \xi^5_{t-5} + \xi^6_{t-6} + \xi^7_{t-7} + \xi^8_{t-8} \]
- Evaluate importance of \( \xi^i_{t-i} \) for business cycles
- Explore implications of \( \xi^i_{t-i} \) for monetary policy.

Outline

- Estimation
  - Results
  - ‘Excessive optimism’ and 2000 recession
- Implications for monetary policy
  - Monetary policy causes economy to overreact to signals....inadvertently creates ‘boom-bust’

Model

- Features (version of CEE)
  - Habit persistence in preferences
  - Investment adjustment costs in change of investment
  - Variable capital utilization
  - Calvo sticky (EHL) wages and prices
    - Non-optimizers: \( P_{it} = P_{i,t-1}, W_{jt} = \mu z W_{j,t-1} \)
    - Probability of not adjusting prices/wages: \( \xi_p, \xi_w \)
Observables and Shocks

- Six observables:
  - output growth
  - inflation
  - hours worked
  - investment growth
  - consumption growth
  - T-bill rate

Sample Period: 1984Q1 to 2007Q1

Shock representations

\[
\begin{align*}
\text{markup shock} & : \epsilon_{t} \sim \text{iid } \text{N}(0, \sigma_{\epsilon}) \\
\text{technology shock} & : \eta_{t} \sim \text{iid } \text{N}(0, \sigma_{\eta}) \\
\text{discount rate} & : \delta_{t} \sim \text{iid } \text{N}(0, \sigma_{\delta}) \\
\text{interest rate} & : \mu_{t} \sim \text{iid } \text{N}(0, \sigma_{\mu}) \\
\text{inflation} & : \pi_{t} \sim \text{iid } \text{N}(0, \sigma_{\pi}) \\
\text{consumption growth} & : y_{t} \sim \text{iid } \text{N}(0, \sigma_{y})
\end{align*}
\]

Variance Decomposition, Technology Shocks

\[
\text{variance of Log of科技创新 } = 46.6 \quad \text{variance of Log of Output } = 49.0
\]

\[
\begin{align*}
\text{discount rate} & : 0.161 \\
\text{investment growth} & : 0.161 \\
\text{consumption growth} & : 0.454 \\
\text{inflation} & : 0.490 \\
\text{interest rate} & : 0.521
\end{align*}
\]
Estimated technology shock process:

\( \text{Centered 5-quarter moving average of shocks} \)

Signals 5-8 quarters in past

NBER trough

Current shock plus most recent four quarters' signals

NBER peak

\( \text{The standard New-Keynesian Model} \)

Intuition easy to see in Clarida-Gali-Gertler model

- Monetary policy is expansionary
  - Under Taylor rule, real rate not allowed to jump, so
  - Ramsey-efficient (natural) real rate of interest jumps
  - Positive signal induces expectations that consumption will be high in the future
  - Problem: Estimated monetary policy rule induces over-reaction to signal shock

- Estimation monetary policy rule induces over-

Implications for Monetary Policy

- Estimated technology shock process:
Let's see how a signal that turns out to be false works in the full estimated model.
Why is the Boom-Bust So Big?

Most of boom-bust reflects suboptimality of monetary policy.

What's the problem?

- Ramsey-efficient allocations require sharp rise in rate of interest.
- Standard monetary policy does not deliver.
- Ramsey rate of interest is not exogenous in response to signal shocks.

Monetary policy appears to be overly expansionary in

- Boom-bust of late 1990s seems to correspond to a period in which there was a lot of initial optimism about technology, which later came to be seen as excessive.

In importance of variance decompositions

- Business cycle dynamics
- Advance information seems to play an important role in
- Information about technological shocks.

Estimated a model in which agents receive advance knowledge about technology shocks.

Conclusion

- Monetary policy ought to respond to natural (Ramsey) rate of interest.

Why? Targeting sticky wages and inflation:

- Relatively sticky natural rate of interest.
- Monetary policy ought to respond to the
- What's the problem?

- Most of boom-bust reflects suboptimality of monetary policy.

Policy solution

- Modify the Taylor rule to include:
  - Natural rate of interest
  - Credit growth
  - Stock market
  - Credit growth
  - Wage inflation instead of price inflation.

Explored consequences of adding credit growth and/or stock market by adding Bernanke-Gertler-Gilchrist financial frictions.

- Boom-bust of late 1990s seems to correspond to a period in which there was a lot of initial optimism about technology, which later came to be seen as excessive.

- Monetary policy appears to be overly expansionary in response to signal shocks.

- Ramsey-efficient allocations require sharp rise in rate of interest, which `standard monetary policy does not deliver'.

- Problem is most severe when wages are sticky relative to prices.