Discussion of
"Monetary Policy and Bubbles in a New Keynesian Model with Overlapping Generations"
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Context

- Popular claim: Monetary policy focused on inflation & output gap
  - Neglects asset bubbles
  - Creates risk to financial stability in medium-term, and hence to macro stability
- NK models: focused on inflation & output gap
  - No scope for asset price bubbles
- This paper:
  - Introduces asset bubbles in NK model
  - Studies BGP, economic fluctuations with and w/o bubbles, monetary policy implications

Key Model Ingredients

- Infinite sequence of generations (Yaari - Blanchard)
  - $\Rightarrow$ TVC satisfied for any individual although bubble grows at rate r
- Retirement (Gertler 1999) $[1 - v =$ prob. of permanently losing job$]$
  - Essential for bubble
  - Retirement $\Rightarrow$ saving $\Rightarrow r < g \Rightarrow$ bubble bounded
- Nominal rigidities (Calvo 1983)
  - $\Rightarrow$ monetary policy affects bubble and activity

Findings

1. $r < g$ requires "reinforced Taylor principle" to guarantee locally unique equil (even in absence of bubbles)
2. Taylor principle generally fails to guarantee local uniqueness
   - Bubble-driven equilibria prevalent
   - Activity and inflation fluctuate with bubble
3. Monetary policy may insulate output and inflation from bubble
   - Requires either precise response to bubble or strong inflation targeting

Overall comments

1. Great paper!
2. Very elegant (Jordi did it again!)
3. Deceptively simple ... lots of insights
4. Important contribution above and beyond Galí (2014, AER): endogenous response of output; more realistic booms/busts

Quibbles

1. Focus on equilibrium determinacy
2. Policy implications
3. Role of bubbles too narrowly defined?
4. Quantitative aspect convincing?
5. Details

Monetary Policy and Determinacy

- Discussion of determinacy: Interesting but somewhat special
  - Based on specific (although popular) interest rate rule

$$i_t = \phi_\pi \pi_t + \phi_q q_t^B$$

- *Case 1*: Equilibrium around a bubbleless BGP (assuming $\phi_q = 0$)
  - Determinacy requires "reinforced Taylor principle":

$$\phi_\pi > max\left[1, \frac{\beta\gamma\theta_I/\theta - 1}{\kappa}\right]$$

  - Low slope of PC κ, or high relative price stickiness of incumbents θ_I/θ $\Rightarrow$ threshold for ϕ_π may be very high $\Rightarrow$ Equilibrium indeterminacy prevalent

Monetary Policy and Determinacy (cont.)

- *Case 2*: Equilibrium around a bubbly BGP

$$y_t = \frac{\Lambda\Gamma v}{\beta} E_t y_{t+1} - \frac{\Upsilon v}{\beta}\left(i_t - E_t \pi_{t+1}\right) + \Theta q_t^B$$

$$q_t^B = \Lambda\Gamma E_t q_{t+1}^B - q^B \left(i_t - E_t \pi_{t+1}\right)$$

$$\pi_t = \Phi E_t \pi_{t+1} + \kappa y_t$$

$$i_t = \phi_\pi \pi_t + \phi_q q_t^B$$

- Large bubble (q^B) $\Rightarrow$high wealth $\Rightarrow$stimulates output
- But setting $\phi_q = \frac{\Theta\beta}{\Upsilon v}$ fully stabilizes output & inflation
- $\Rightarrow$ Determinacy requirement close to Taylor principle:

$$\phi_\pi > \approx 1$$

Monetary Policy and Determinacy (cont.)

- When BGP close to bubbleless (with low r), indeterminacy is pervasive (may need very large ϕ_π for determinacy)
- When BGP has large bubble-output ratio (high r) $\Rightarrow$ equilibrium is determinate for low values of ϕ_π as long as $\phi_q > 0$
- So, determinacy region (ϕ_π, ϕ_q) very sensitive to r
- Isn't there a more robust approach for policy?

A More Robust Approach: Optimal Target Criterion

- Suppose CB seeks to minimize fluctuations around BGP

$$E_0 \sum_{t=0}^{\infty} \beta^t \left[\pi_t^2 + \lambda_y y_t^2\right]$$

subject to private sector equil. conditions

- FOCs imply OTC

$$\pi_t + \frac{\lambda_y}{\kappa} \left(y_t - \frac{\Phi}{\beta} y_{t-1} \right) = 0$$

regardless of bubbliness of BGP

A More Robust Approach: Optimal Target Criterion

- Commitment to setting policy instruments so as to satisfy OTC

$$\pi_t + \frac{\lambda_y}{\kappa}\left(y_t - \frac{\Phi}{\beta}y_{t-1}\right) = 0$$

  - is feasible
  - optimal
  - results in determinate equilibrium (for all parameter values)
  - robust to addition of any number of shocks
  - very similar to prescription in standard NK model (e.g., CGG 1999), except $\frac{\Phi}{\beta} = 1$

  [Giannoni-Woodford, 2017, JET]

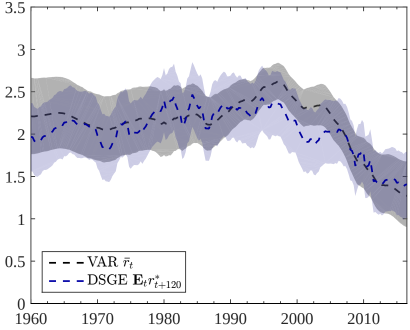
- Fragility of determinacy conditions in paper related to choice of particular (though popular) interest rate rule

Role of Bubbles Too Narrowly Defined?

- Optimal policy almost identical to standard NK model, even with bubbles
- Is the model capturing it all, or is it missing something?
- Bubbles $\Rightarrow$ relaxation of financial constraints (leverage cycle)
  - $\Rightarrow$ Rising vulnerabilities ....
  - Borio et al. (...), Adrian-Shin (...), Adrian-Duarte (2017) ...

Quantitative Relevance

- How prevalent are bubbles in model?
  - Bubbly BGP requires $\beta > v = 0.9973$ or alternatively $r \leq g$
  - Since late 1990s: Trend in r has declined by about 1.5 pp and trend in productivity growth has declined by about 1.0 pp
  - $\Rightarrow$ bubbles more likely!



Source: Del Negro, Giannone, Giannoni, Tambalotti (2017)

Quantitative Relevance: A Few Questions

- But decline in r largely due to preference for liquidity and safety (convenience yield)
- Which interest rate is relevant for bubble in model (risky or riskless)?
- Role of financial frictions, constraints....?
- Probability of retirement key:
  - High prob. of retirement $\Rightarrow$ high saving $\Rightarrow$ low $r \Rightarrow$ bubbles
  - But offsetting force: more retirees $\Rightarrow$more dissaving$\Rightarrow$ higher r $\Rightarrow$ bubbles less likely?

NKPC

- Price rigidities assumption:
  - Incumbent firms reset prices with prob. $1-\theta_I$
  - Fraction $1-\theta_N$ of newly-born firms set prices optimally, while θ_N set price equal to last period's average. Why?
- Implied NKPC

$$\pi_t = \Phi E_t \pi_{t+1} + \kappa y_t$$

where

$$\Phi = \frac{1+g}{1+r} v\gamma \frac{\theta_I}{\theta}$$

"*depends on depends on demographic parameters ($v\gamma$), the relative degree of price stickiness (θ_I/θ)...*"

- But this is due to θ_N! Setting $\theta_N = 0$, we have $\frac{\theta_I}{\theta} = \frac{1}{v\gamma}$, and so

$$\Phi = \frac{1+g}{1+r} \qquad \text{No demographics!}$$

Convoluted Boundary Conditions

- Equilibrium around a bubbleless BGP (assuming $\phi_q = 0$)
  - Determinacy requires "reinforced Taylor principle":

$$\phi_\pi > max\left[1, \frac{\beta\gamma\theta_I/\theta - 1}{\kappa}\right]$$

  - Jordi emphasizes role of avg price stickiness θ relative to incumbents' θ_I: somewhat confusing
  - But if $\theta_N = 0$, can write: If prob. of retaining job $v < \frac{\beta}{1+\kappa}$ (i.e., if prob of retiring is sufficiently large $\Rightarrow$ low r), then threshold for $\phi_\pi > 1$.

Conclusion

1. Great paper!
2. Very elegant and lots of insights
3. Would prefer less emphasis on indeterminacy and more on bubble-driven fluctuations