Discussion of “Economic Growth with Bubbles” by Alberto Martin and Jaume Ventura

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Paper

- Very nice paper! Beautiful exposition, intriguing message.
- Motivation:
  - we observe large swings in asset prices
  - hard to reconclide with observed changes in fundamentals
  - tend to comove positively with economic activity ('generalized booms and busts')
- Model: take standard rational bubbles model and add
  1. stochastic bubbles
  2. financial frictions: bubbles can transfer resources from unproductive to productive investments
- Main findings:
  1. characterize bubbly equilibrium: asset valuations exceed that of fundamentals.
  2. bubbles shocks: potentially able to generate positive comovement btw prices and activity

Non-fundamentals shocks

- Renewed interest in shocks that are not manifested in 'fundamentals' (technology, preference, policy)
- Some recent approaches:
  1. noise shocks
     - ⋆ news shocks literature, Lorenzoni, 2009, Barsky and Sims, 2010 ...
  2. sunspots
     - ⋆ Farmer, 2009, 2010
  3. higher-order beliefs shocks
     - ⋆ Angeletos and La'O, 2011
  4. Knightian uncertainty ('confidence') shocks
     - ⋆ Ilut and Schneider, 2011
- Here: stochastic bubbles (investor 'sentiment' shocks).

My discussion

- Go a bit through the model
- Comments:

1. Parameterization to get the positive comovement
2. Risk-neutrality.
3. Policy implication: ‘fuel the bubble?’

Standard model: Samuelson-Tirole

- Problems:
  1. Deterministic bubbles
  2. Bubbles lower output (raise C and lower Investment)
     - ★ bubbles reduce inefficient investments
- Solutions proposed by this paper:
  1. Stochastic bubbles
  2. Financial frictions: Bubbles *can* raise ouput (raise both C and I)
- Financial frictions: both efficient and inefficient investments exist
- Intuition: bubbles
  1. reduce inefficient investments, *but also*
  2. increase efficient investments
- Overall effect on output depends on the two effects

Martin-Ventura Model

- OLG. Agents work and invest labor income when young, consume when old (risk neutral)
- Output:

$$F(k_t, l_t) = l_t^{1-\alpha} k_t^{\alpha}$$

  - wage: $w_t = (1-\alpha)k_t^{\alpha}$
- Investment opportunities:
  - fraction ε productive (P)
  - $1-\varepsilon$ unproductive (U) : produce $\delta < 1$ units of capital with one unit of output
  - financial frictions: U are forced to make their own investments
  - aggregate efficiency of investment ($A \equiv \varepsilon + (1-\varepsilon)\delta$)

$$k_{t+1}^{NB} = A(1-\alpha)k_t^{\alpha}$$

Bubbles

- Technological properties:
  - start randomly, no initial cost
  - benefit: possibility to sell them later
- Without further structure, theory has implications for:
  - b_t : price of all old bubbles
  - b_t^P and b_t^U : price of all new bubble created by P and U
- Market for bubbles:
  - owners: old (acquired when young) and young (new bubbles)
  - buyers: only young (old only consume)
- Equilibrium bubbles: a stochastic process $(b_t, b_t^P, b_t^U)_{t=0}^{\infty}$ st:
  - $b_t + b_t^P + b_t^U > 0$
  - a sequence for k_t satisfying individual max and mkt clearing:

$$E_t R_{t+1}^{bubble} = E_t R_{t+1}^K$$
$$0 \leq b_t \leq w_t$$

Conditions for bubbly equilibrium

$$E_t\left\{\frac{b_{t+1}}{b_t+b_t^P+b_t^U}\right\}\begin{cases}=\delta\alpha k_{t+1}^{\alpha-1} & \text{if } \frac{b_t+b_t^P}{(1-\varepsilon)sk_t^{\alpha}}\leq 1 \qquad (1)\\ =\alpha k_{t+1}^{\alpha-1} & \text{if } \frac{b_t+b_t^P}{(1-\varepsilon)sk_t^{\alpha}}>1 \qquad (2)\end{cases}$$

- Implied capital accumulation:

$$k_{t+1}\begin{cases}=k_{t+1}^{NB}+(1-\delta)b_t^P-\delta b_t & \text{if } (1)\\ =k_{t+1}^{NB}\frac{1}{A}-b_t & \text{if } (2)\end{cases}$$

1. classic crowding-out: old sell bubbles to young, total inv. *falls*
   - bubble eliminates first U.$\rightarrow$ in fact raises average efficiency
   - if large enough (see (2)) can then move to eliminate P
2. reallocation effect: when in (1), young P sell to young U
   - P investments *replace* U $\rightarrow$ *raises* total investment
   - when $\delta=1$, only crowding-out: $k_{t+1}=k_{t+1}^{NB}-b_t$

Contractionary and expansionary bubbles

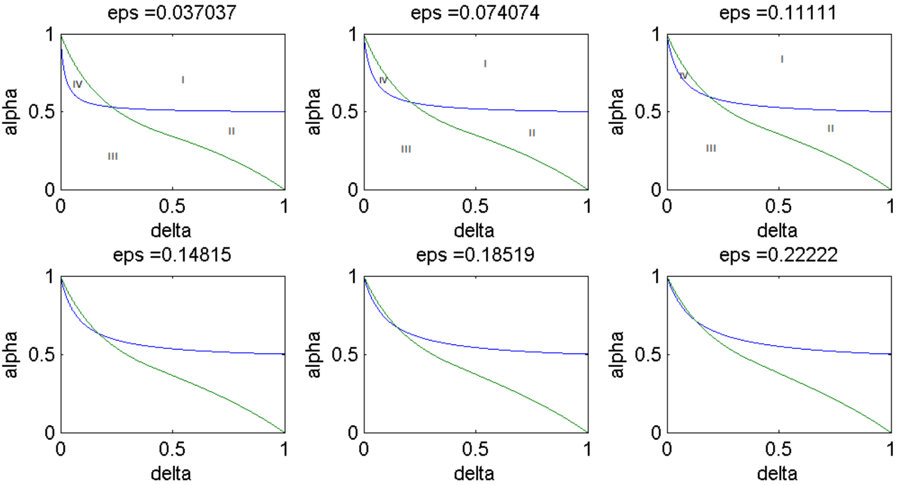
- Labels: if throughout a bubbles episode:
  - $(1-\delta)b_t^P - \delta b_t < 0 \rightarrow$ 'contractionary' (C)
  - $(1-\delta)b_t^P - \delta b_t > 0 \rightarrow$ 'expansionary' (E)
- Proposition 2:

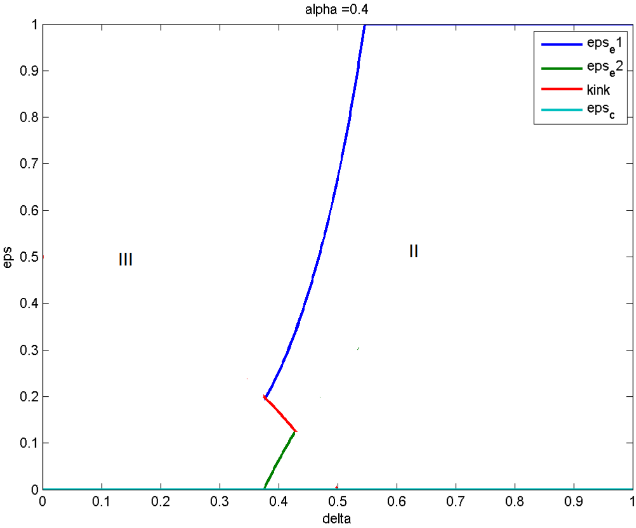
$$C \iff \alpha < (1-\alpha)\frac{A}{\delta}$$

$$E \iff \alpha < (1-\alpha)\frac{A}{\delta}\begin{cases} (1-\delta) \text{ if } A > 0.5 \\ \frac{1}{4(1-\varepsilon)A} \text{ if } A \leq 0.5 \end{cases}$$

- The higher δ, the more likely to get only C.

Comment 1: Parameter space





- region II: surely Contractionary, region III: either C or E.

Bubble shocks

- Can redefine: $x_t \equiv \frac{b_t}{(1-\alpha)k_t^\alpha}$, $x_t^P \equiv \frac{b_t^P}{(1-\alpha)k_t^\alpha}$ to rewrite:

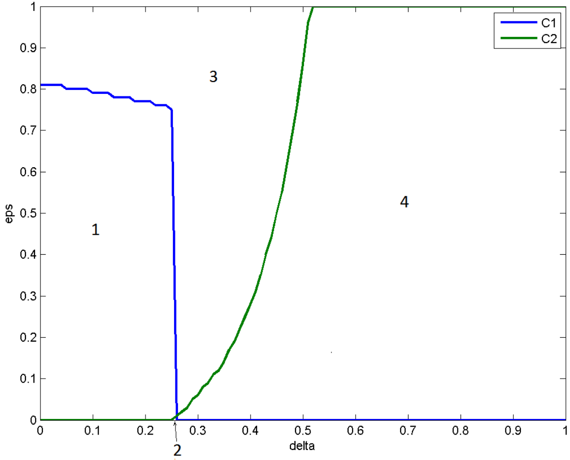
$$k_{t+1} \begin{cases} = (1-\alpha)k_t^\alpha \left[A + (1-\delta)x_t^P - \delta x_t\right] & \textit{if } \frac{x_t + x_t^P}{(1-\varepsilon)} < 1 \\ = (1-\alpha)k_t^\alpha (1-x_t) & \textit{if } \frac{x_t + x_t^P}{(1-\varepsilon)} \geq 1 \end{cases}$$

  - bubble shocks look like investment shocks (Justiniano et al., 2010)
  - implied consumption and aggregate welfare (identical):

$$c_t = [\alpha + x_t(1-\alpha)]\, k_t^\alpha$$

- Positive shocks to x_t, x_t^P have two effects:

1. increase c_t because old sell to young (irrespective of type of bubbles)
2. affect k_t- depends on the type of bubble
   - if Contractionary (i.e. $(1-\delta)x_t^P < \delta x_t$) reduce $k_t, c_t \rightarrow$ 'Bad'
   - if Expansionary (i.e. $(1-\delta)x_t^P > \delta x_t$) increase $k_t, c_t \rightarrow$ 'Good'



- Parameters as in the benchmark, but vary ε and δ
  - C1: bubbly episodes never exceed U's savings, i.e. $x_t + x_t^P < (1 - \varepsilon)$
  - C2: bubbly episodes are always expansionary, i.e. $(1 - \delta)x_t^P > \delta x_t$
    - ★ Region 1: both C1 and C2 hold; Region 2: C1 holds, C2 not
    - ★ Region 3: C2 holds, C1 not, Region 4: neither holds

Comment 2: on the role of risk-neutrality

- Here assume risk neutrality.
- What if allow for risk aversion?
- Bubbles add a lot of volatility.
- When bubbles appear, to compensate for risk the required expected return on bubbles may need to be significantly larger.
    - may make conditions for bubbly equilibrium tighter.
    - reason: now bubbles must grow even faster than before.
    - but cannot grow too fast (can't exceed savings of young)
- Implications for risk premia on bubbles?
    - may be large in economic booms driven by bubbles.
    - time-variation?
- Welfare implications: bubbly equilibrium may be welfare-reducing if account for the added volatility.

Comment 3: On the policy implications of bubbles

- Here, expansionary bubbles are 'Good' : increase level of c_t
  - for example, interpret the US booms as 'desirable'.
- A very stark policy implication: should 'fuel the bubble' !
- A different view (Christiano, Ilut, Motto and Rostagno, 2008, 2010): news about future technology level
  - start with a (modified) RBC model. Good news about the future

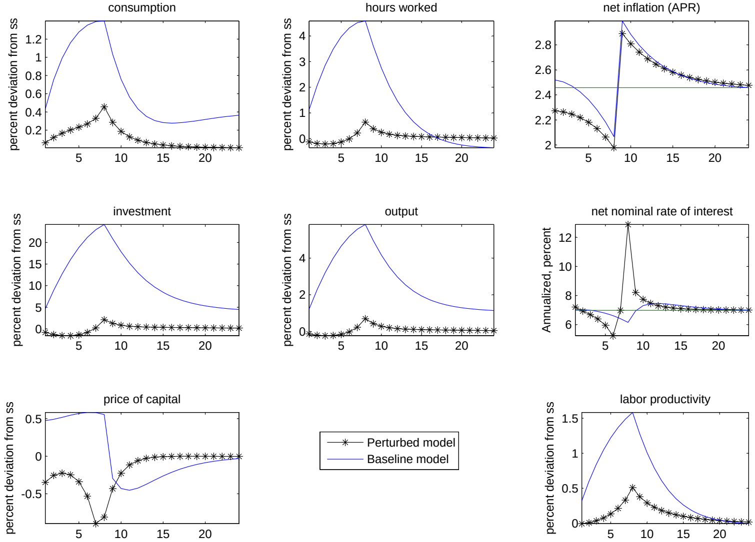
  1. agents work, consume and invest more
  2. real interest rate jumps, price of capital $\downarrow$

  - Add nominal rigidities and a standard Taylor rule:

  1. agents work, consume and invest **much** more than Ramsey plan (RBC)
  2. $\pi \downarrow$, nominal rate $\downarrow$, 'fuels' asset prices $\uparrow$

- Different picture: an **inefficient** boom with asset price '**bubbles**'
  - bubble: asset value $>$ PDV of fundamentals when news not realized

Figure 6: Response of Baseline and Perturbed Model to Signal Shock (Signal not realized); Perturbation = Ramsey



Optimal policy

- 'Conventional wisdom': no need to separately respond to credit/'bubbles' (Bernanke and Gertler, 1999, 2001)
- In CIMR, it's optimal to 'lean against the boom in credit'
  - because inflation is not particularly high in the news-driven booms.
  - an inflation targeting rule fails to raise the interest rate
- In this model, optimal to sustain bubbles.
- Important to think about potentially different **sources** of 'bubbles':
  - some may be efficient, some not.
  - very different responses.
- How can we distinguish them?
  - they may look the same in asset prices, credit growth, macro aggregates

Conclude

- Very interesting and timely paper
- An exciting research agenda
- Thoughts: quantitative evaluation
  - what features (reasonable parameterizations) needed to get bubbles be expansionary
  - optimal policy and bubbles.
  - how to distinguish from other sources of bubbles.