Asset Bubbles and Economic Policy

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Maintained hypothesis

- There are large and persistent deviations from NPV valuation in asset markets.

Questions

- What is the source of these deviations?

- What should policymakers do when they observe these deviations?

Asset bubbles are pyramid schemes

- A pure bubble with price B_t yields as a return for the holding period t to $t+1$ its price appreciations or growth, i.e. $\dfrac{B_{t+1}}{B_t}$.

- The price of any asset can be decomposed into fundamental and bubble components, i.e. $V_t = F_t + B_t$.

- A rational investor buys an asset with a positive bubble component if the growth of this component compensates him/her for the risk of holding it.

- An equilibrium bubble must grow fast enough to create its own demand, but not too fast to outgrow it.

- In the model of today's presentation, I assume that we can strip assets into their fundamental and bubbly components. This is only a simplifying assumption.

Plan for the talk

1. A benchmark model.

2. Financial frictions, asset bubbles and productivity growth.

3. Economic policy (I): a normative reading of the theory.

4. Economic policy (II): a positive reading of the theory.

5. The design of policy reforms with bubbles.

A benchmark model

- Two period OLG model with constant population size.
- Young receive a wage W_t and maximize $E_t\{U(C_{t+1})\}$ with $U(C_{t+1}) = \dfrac{C_{t+1}^{1-\theta} - 1}{1-\theta}$.
- Investment options: (1) real investments with return R_{t+1}; and (2) speculative investments with return $\dfrac{B_{t+1}}{B_t}$.
- Bubbles are possible if:
  1. They grow fast enough to create their own demand:
  $$E_t\left\{C_{t+1}^{-\theta} \cdot \left(\frac{B_{t+1}}{B_t} - R_{t+1}\right)\right\} \geq 0$$
  2. They do not grow too fast to outgrow their own demand:
  $$B_t \leq W_t$$
- To determine whether asset bubbles are possible we need to specify labor productivity and the return to real investments, i.e. W_t and R_t.

Samuelson-Tirole case

- $W_t = 1$ and $R_t = \rho < 1$ for all t.

- Without asset bubbles (pessimistic beliefs):

$$C_t^F = \rho \text{ for all } t$$

- With asset bubbles that pop up and burst with probabilities δ and π, with $\pi > \rho > \delta$ (alternance of optimistic and pessimistic beliefs):

$$C_{t+1}^B = \begin{cases} B^* + \rho \cdot (1 - B^*) & \text{if } B_t = B_{t+1} = B^* \\ \rho \cdot (1 - B^*) & \text{if } B_t = B^* \text{ and } B_{t+1} = 0 \\ \rho & \text{if } B_t = B_{t+1} = 0 \\ \rho + B^* & \text{if } B_t = 0 \text{ and } B_{t+1} = B^* \end{cases} \quad \text{with} \quad B^* = \frac{\rho \cdot \left[\left(\frac{\pi \cdot (1-\rho)}{(1-\pi) \cdot \rho} \right)^{\frac{1}{\theta}} - 1 \right]}{1 + \rho \cdot \left[\left(\frac{\pi \cdot (1-\rho)}{(1-\pi) \cdot \rho} \right)^{\frac{1}{\theta}} - 1 \right]} \leq 1$$

  If $\pi - \delta \geq \rho$, the young prefer to arrive to the world when there is an asset bubble $E_t \left\{ U \left(C_{t+1}^B \right) | B_t = B^* \right\} \geq E_t \left\{ U \left(C_{t+1}^F \right) | B_t = 0 \right\}$.

- *Result:* Asset bubbles are welfare-improving $E_t \left\{ U \left(C_{t+1}^B \right) \right\} \geq E_t \left\{ U \left(C_{t+1}^F \right) \right\}$.

  Why? The economy without bubbles is dynamically inefficient and (at the margin) consuming is better than investing. The bubble eliminates inefficient investments, creates consumption and restores efficiency.

Beyond the standard case: financial frictions

- With financial frictions, existing investments might be efficient relative to consumption but inefficient relative to other potential investments.

- In such a context bubbles can stop the inefficient investments and raise the efficient investments:

  1. (Intragenerational imperfections) Bubbles can stop inefficient investments and channel funds to efficient investments.

  2. (Intergenerational imperfections) Bubbles can help current generations appropriate future returns to their investments.

- We focus next on an example of the second type.

Beyond Samuelson-Tirole

- $W_{t+1} = \begin{cases} \gamma \cdot W_t & \text{if } L_t = \mu \\ W_t & \text{if } L_t = 0 \end{cases}$ with $W_0 = 1$ and $R_t = \rho > 1$ for all t.

- Productivity growth requires μ workers to do a public investment (basic research, improvement in institutions, ...)

- *Financial friction*: the returns to the public investment cannot be appropriated.

- Without asset bubbles, generations have no incentive to make the public investment, $L_t = 0$, and the equilibrium is:

$$C_t^F = \rho \text{ for all } t$$

- With asset bubbles that pop up and burst with probabilities δ and π, with $\pi \cdot \gamma > \rho > \delta$ generations make the public investment if the bubble is large enough:

$$L_t = \begin{cases} \mu & \text{if } B_t = B^* \cdot W_t \\ 0 & \text{if } B_t = 0 \end{cases} \quad \text{iff } B^* \geq \frac{\rho}{\pi \cdot \gamma - \rho} \cdot \mu$$

  Why? The bubble depends on *future* labor productivity and this provides incentives for the present generation to make the investment:

  1. Expected gain from public investment: $(\pi \cdot \gamma - \rho) \cdot B^* \cdot W_t$.
  2. Cost of public investment: $\rho \cdot \mu \cdot W_t$

- With asset bubbles, the equilibrium is:

$$C_{t+1}^{B} = \begin{cases} [\gamma \cdot B^* + \rho \cdot (1 - B^* - \mu)] \cdot W_t & \text{if } B_t = B_{t+1} = B^* \cdot W_t \\ \rho \cdot (1 - B^* - \mu) \cdot W_t & \text{if } B_t = B^* \cdot W_t \text{ and } B_{t+1} = 0 \\ \rho \cdot W_t & \text{if } B_t = B_{t+1} = 0 \\ (\rho + B^*) \cdot W_t & \text{if } B_t = 0 \text{ and } B_{t+1} = B^* \cdot W_t \end{cases}$$

$$\text{with } B^* = (1 - \mu) \cdot \frac{\rho \cdot \left[\left(\frac{\pi \cdot (\gamma - \rho)}{(1 - \pi) \cdot \rho} \right)^{\frac{1}{\theta}} - 1 \right]}{\gamma + \rho \cdot \left[\left(\frac{\pi \cdot (\gamma - \rho)}{(1 - \pi) \cdot \rho} \right)^{\frac{1}{\theta}} - 1 \right]}$$

- *Result:* Asset bubbles are welfare-improving $E_t \left\{ U \left(C_{t+1}^{B} \right) \right\} \geq E_t \left\{ U \left(C_{t+1}^{F} \right) \right\}$.

  Why? The economy without bubbles has no incentives to make the public investment and there is no efficient economic growth. The bubble creates these incentives and restores growth and efficiency.

A normative approach to the theory

- If we take the theory developed literally, equilibria can be Pareto-ranked by the time the bubble is around.

- How can the government coordinate expectations to the best possible equilibrium, i.e. the one in which the bubble is around for longer?

    1. *Price support scheme*: If the government promises to always buy the bubble at some price, i.e. $\varepsilon \cdot W_t$, the unique equilibrium of this economy is a bubble with $\pi = 1$. This is the best possible world and a policy 'free lunch'.
    2. *By creating the government's own 'bubbles':* government debt or a pay-as-you-go social security system. These bubbles are, in general, not the best ones since their returns reflect changes in politics and so on. But they could be improved (payoffs contingent on productivity growth) and are more stable.

- But perhaps the fluctuations in the bubble do not come from changes in expectations, but also from changes in fundamentals (example with alternance in risk aversion).

- In this case, supporting the bubble is not always a Pareto improving policy. It might be *good* policy for some welfare functions, but not a Pareto improvement.

A positive approach to the theory

- Could we use the theory to explain current policy?

1. The US has experienced a period of large current deficits since the mid 1990s that has substantially reduced its net foregn asset position. It started as an equity-driven reduction ("dot-com" bubble) and then transformed into a debt-driven decline ("Bush" deficits).

   – What is the connection between bubbles and public debt?

   * *Benevolent view*: Expansion of government debt is a welfare-improving response to exogenous collapse of bubble.

   * *Cynical view*: Opportunistic expansion of public debt bursts bubble and allows government to expropriate owners of bubble at home and abroad.

   – Do we understand the competition between productive capital, government debt and asset bubbles? Crowding-out models are more complicated in the presence of bubbles.

2. Europe is trying desperately to get rid of the bubble: (1) reduction in government debt, (2) move from a PAYG to fully funded social security systems, and (3) now the ECB does not like the housing bubble.

   – Why is Europe doing this?

1. – ∗ It does not know the model

   ∗ It knows the model all too well. If $B^* < \frac{\rho}{\pi \cdot \gamma - \rho - \delta} \cdot \mu$, we have that

$$E_t \left\{ U \left(C_{t+1}^B \right) | B_t = 0 \right\} \geq E_t \left\{ U \left(C_{t+1}^F \right) | B_t = B^* \cdot W_t \right\}$$

   – *Model 1*: All generations have the ability to coordinate to burst a bubble, but some want and some do not want.
   – *Model 2*: All generations would like to destroy the bubble, but some can and some others cannot.

- If one takes a positive approach, this theory might eventually be able to say something about the motivations of policy makers.

Policy reforms with bubbles

- Financial reforms:

    1. That solve the problem the bubble is addressing (capitalization of rents)
    2. That solve other problems that might also exist (increase return to real investments)

- Capital account liberalization:

    1. Makes bubbles worse at capitalizing rents
    2. Creates competition for bubbles