

Two Models of Land Overvaluation and Their Implications

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Overvalued Land

- 1996-2006: Residential land prices in the US more than tripled.
- 2006-2009: Residential land prices in the US fell by more than 60%.
- (Not uncontroversial) Conclusion: Land was overvalued in 2006.
- Paper analyzes two models of land overvaluation and their implications.

Model 1: Bank Creditor Guarantees

- Assume: bank creditors think their positions have partial/full guarantees.
 - Motivation: possibly underpriced deposit insurance and TBTF
- Assume: markets for bank debt, mortgages, and land are competitive.

Model 1 Results

- **Finding:** If there is a positive probability of a sufficiently low realization of land values, then land is overvalued.
- **Policy:** If the left tail of the pdf of future land values becomes longer, bank regulation should become tighter.

Model 2: Rational Bubble in Land Prices

- Apply standard model of rational bubbles:
- Price is higher than fundamentals today ...
- Only because people believe that it will be in the future.

Model 2 Finding

- If the aggregate bubble falls in size:
- Persistent fall in interest rate
- Holders of bubbly asset are less wealthy relative to non-holders.
- Together: they could generate large long-lasting fall in output.

Model 2 Policy

- Fiscal response: government can issue debt today.
- Government can use proceeds from debt issue to increase output.
- The government can possibly roll over the debt forever without new taxes.
- However, the debt rollover is unstable, much like the bubble was.

NOTE:

I'm describing the results of two theoretical models.

The models seem like reasonable first steps.

Their implications don't necessarily represent the views of others in the Federal Reserve System ...

Or even necessarily my own views.

2. Model 1 (Bank Creditor Guarantees)

Basic Elements

- 2 periods
- 4 types of agents: land owners, land buyers, bank equityholders, and bank creditors
- All agents are risk-neutral.

Land

Landowners are endowed with one unit of land each.

- All units of land have identical period 2 payoff V .
 - all risk is aggregate
- V is random, with support $[V_{\min}, V_{\max}]$

Markets and Regulation

- All markets are competitive: land, mortgage origination, and bank debt
- Down payment ratio for land buyers is required to be α
- Debt/equity ratio for banks is required to be κ

Debt Restrictions

- Mortgages are non-recourse (backed only by land)
- Taxpayers (outside model) fully guarantee bank creditors against any loss.

Equilibrium

- Let $\lambda = \frac{(1-\alpha)}{1+1/\kappa}$ be a measure of leverage.
- If $\lambda E(V) \leq V_{\min}$, then land price $p = E(V)$.
 - This is what we'd expect, given risk neutrality.
- But if $\lambda E(V) > V_{\min}$, then $p > E(V)$.

Intuition: Part 1

- Higher leverage means that debtholders are more exposed to loss.
- Lower α exposes banks to losses from land value fluctuations.
- Higher κ shifts that risk to bank debtors.
- In turn, that risk is absorbed by taxpayers (b/c of debt guarantees).

Intuition: Part 2

- Markets are competitive
- Bank debtors, bank equityholders, and land buyers earn zero economic profit.
- All rents accrue to the owners of the one scarce factor: land.
- So, $p - E(V) =$ expected value of taxpayer injections

Distribution of Knowledge and Rents

- The overvaluation of land occurs even if only creditors believe bank debt is guaranteed.
- Everyone else responds to competitive pressures.

- Bank equityholders borrow cheaply, given leverage.
- They respond by lending at a low interest rate to land buyers.
- Land buyers are willing to bid high prices for land, given low interest rates.
- All rents go to land owners.
- In richer model: other agents would get rents.

Bank Regulations

- In this model, good bank regulation does not depend on bank profits.
- It depends on the shape of the left tail of V .
- If $E(V)/V_{\min}$ is high, then regulation needs to be tight (high α , low κ).
- If $E(V)/V_{\min}$ is low, then regulation can be lax (low α , high κ).

3. Model 2: Rational Bubbles

Basics of the Model

- People are credit-constrained: they can't fully capitalize future incomes.
 - can't borrow against children's incomes (o.g.)
 - can't borrow against own incomes (incomplete markets models)

- Tighter borrowing constraints mean borrowers can't borrow as much ...
- If markets are to clear, prices must adjust so that lenders don't want to lend as much.
- Tighter borrowing constraints imply *lower* equilibrium interest rates

- If borrowing constraints are sufficiently severe, then some asset prices might have bubbles.
- That is, the asset price exceeds its "buy-and-hold-forever" value.

Why Do People Hold A Bubbly Asset?

- The bubble's expected growth rate is the same as r (ignoring risk).
 - Which implies that $r \leq g$
- Asset owners put a positive probability on selling off their holdings in finite time.
 - right before death
 - persistent unemployment

Benefits of Bubbles: Vehicle for Savings

- Credit constraints in bubbly economies restrict the ability of lenders to save.
- Bubbles allow savers to save more, and at a higher rate of return.

Costs of Bubbles: Instability

- Bubbles rely on mutual trust ...
- I buy at an inflated price because I trust that others will do so later.
- But that mutual trust is intrinsically fragile.
- If it falters, then the bubble will shrink or collapse.

Consequences of a Bursting Bubble

1. Real interest rate falls (because supply of savings falls).
2. Holders of bubbly asset are relatively less wealthy compared to non-holders.

Effects of the Fall in the Real Interest Rate

- Several effects:
 - larger demand for investment goods
 - labor supply falls
 - self-financing is harder for credit-constrained entrepreneurs
- The fall in the real interest rate is highly persistent.

Effects of the Wealth Redistribution

- Wealth winners: supply less labor.
- Wealth losers: supply more labor.
- Net effect: depends on joint distribution of wealth/productivity.

Fiscal Response to a Burst Bubble

- Once bubble has burst, interest rate r falls below g .
- Potentially, government can borrow more today, without ever increasing taxes.
 - repays the new debt by rolling it over perpetually.
 - but the perpetual rollover plan may be unstable (just like the bubble).
- Essentially, government could transfer bubble to its debt.

Effects of the Debt Issue

- The real interest rate increases.
- Savers can save more (through public debt) and at a higher interest rate.
- Borrowers pay a higher interest rate.
- People are more willing to supply labor

- If infinite debt rollover is successful, the government has free resources to spend.
- Many possible uses that will boost current output:
 - public good expenditure
 - transfers to consumers with high MPC and low productivity.
 - transfers to entrepreneurs with good projects

4. Conclusions

- I've talked through two abstract and simple models.
- They leave out many important features of the world.
- The models are likely too preliminary to give rise to definitive policy recommendations.

- Model 1 implies that bank regulation needs to look beyond banks themselves.

- Model 2 implies that there may be ways for fiscal policy to react to bubbles.

- Unanswered question: Can monetary policy create or stop bubbles?
- In model 2, the path of total government debt can affect the size of bubbles.
- But the *composition* of government debt doesn't really matter.

- In the US, the Fed conducts open market operations.
 - exchanges one kind of government liability (reserves) ...
 - for other kinds of government liabilities of equal value.
- This means that the Federal Reserve cannot expand the total *size* of government liabilities.
- It can only affect the *composition* of those liabilities.
- Model implication: the Fed can't affect the size of bubbles.