Discussion of Supply Restrictions, Subprime Lending and Regional US Housing Prices

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Supply Restrictions, Subprime Lending and Regional US Housing Prices by André Kallåk Anundsen and Christian Heebøll

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Summary

- Big picture: Asymmetry in role of elasticity
  - effect of elasticity may differ between booms and busts
- Analyzes effect of demand shocks and supply restrictions in a reduced form supply and demand model of the housing market
  - durability of housing supply means that supply is perfectly inelastic in bust regardless of long run supply elasticity
- Empirical model estimates simultaneous equations system of home price changes, housing supply changes, and subprime lending
  - model estimated separately for boom and bust period
  - identification from regulatory and geographic supply restrictions

Theoretical Model

- Two versions of the model:
  1. Demand does not depend on credit availability: $p_{i,t} = \nu_{0,i,t} + \nu_{1,i,t} h^d_{i,t}$
  2. Financial Accelerator: Demand depends on credit availability which is nonlinearly increasing in home prices

- In version without financial accelerator, the same downward shift in demand in the bust has exactly same effect on prices and quantities in both a market with high LR supply elasticity and low LR supply elasticity

- Key insight is that, in the SR in a bust, change in quantity supply from bust is exactly the same - 0!!
  - same insight as Glaeser and Gyourko (2005, JPE)
  - Haughwout, Peach, Sporn, and Tracy (2012) and Liu, Nowak, and Rosenthal (2013) make a similar point

Theoretical Model

Version with Financial Accelerator

- In version with financial accelerator
  - demand depends on availability of credit according to $p_{i,t} = \tilde{\nu}_{0,i,t} + \eta b_{i,t} + \nu_{1,i,t} h^d_{i,t}$
  - availability of credit depends non-linearly on home prices

$$b_{i,t} \leq \begin{cases} \kappa_0 + \kappa_1 p_{i,t}, & \text{for } p_{i,t} > p_{i,t-1} \\ \kappa_0, & \text{for } p_{i,t} \leq p_{i,t-1} \end{cases}$$

- Financial accelerator increases price response in more inelastic cities in boom periods

Theoretical Model
Version with Financial Accelerator

- Paper states that price drop is significantly larger in more inelastic cities when there is a financial accelerator
  - for same drop in demand in inelastic and elastic cities?
  - or assuming drop in demand is greater in elastic city?
  - conditional on being at same equilibrium in period 2?
  - for same period 2 equilibrium, seems to me that same sized drop in $\tilde{\nu}_{0,i,t}$ will have same effect on prices both with and without financial accelerator
- Paper needs to clarify math and intuition for this assertion

Empirical Model: Boom Period

Without Financial Accelerator

- Estimates simultaneous equations system for changes in home prices and changes in housing quantities in boom
- Conducts simulations of response of price to demand shock (proxied by increase in subprime volume)

Equations without financial accelerator:

$$
\begin{aligned}
D \quad &: \quad \Delta p_i^{Boom} = \alpha_1 + \beta_{1,\Delta h} \Delta h_i^{Boom} + \boldsymbol{\beta}_{1,x}^{'} \mathbf{x}_i^{Boom} + \varepsilon_{\Delta p,i} \\
S \quad &: \quad \Delta h_i^{Boom} = \alpha_2 + \left(\beta_{2,\Delta p} + \boldsymbol{\beta}_{2,\Delta p \times \mathrm{Re}\, g}^{'} \mathrm{Re}\, \mathbf{g}_i \right) \Delta p_i^{Boom} \\
&\qquad\qquad + \boldsymbol{\beta}_{2,z}^{'} \mathbf{z}_i^{Boom} + \varepsilon_{\Delta h,i}
\end{aligned}
$$

- Not obvious that this is how elasticity affects supply

Table 2: The boom period model, 2000–2006

Variables	Δp_{boom}	Δh_{boom}
Δh_{boom}	−13.27	
	(−4.94)***	
Δp_{boom}		0.75
		(3.72)***
una × Δp_{boom}		−0.21
		(−2.32)***
wrl × Δp_{boom}		−0.77
		(−3.54)***
Δsp_{boom}	0.60	
	(6.20)***	
ΔHH income$_{boom}$	5.96	0.21
	(5.62)***	(1.90)*
Δc. cost$_{boom}$		−0.23
		(−3.45)***
Controls		
una		0.12
		(1.48)
wrl		−0.17
		(−2.49)***
HH income$_{1996}$	0.79	−0.17
	(1.83)*	(−1.92)*
log pop$_{1996}$	−0.13	−0.01
	(−2.41)***	(−1.33)
pop density$_{1996}$	0.02	0.00
	(0.47)	(−0.28)
unemp$_{1996}$	−2.22	−1.81
	(−1.23)	(−3.90)***
Std. error and correlations		
$\varepsilon_{\Delta p,boom}$	0.287	
$\varepsilon_{\Delta h,boom}$	0.230	0.009
Vector normality test	$\chi^2(4) = 22.314[0.0002]$***	
Obs.	242	

Empirical Model: Boom Period
Without Financial Accelerator

- Simulates how much prices change in response to 1% increase in subprime by solving for prices and using coefficients of simultaneous equation model
- Increase in subprime is interpreted as demand shock
- As elasticity decreases
  - prices increase more
  - housing supply decreases more

Empirical Model: Boom Period
With Financial Accelerator

- Subprime lending:

$$\Delta sp_i^{Boom} = \alpha_3 + \beta_{3,\Delta p} \Delta p_i^{Boom} + \boldsymbol{\beta}_y^{'} \mathbf{y}_i^{Boom} + \varepsilon_{\Delta sp,i}$$

- Assumption is that subprime captures increase in lending that results from rising home prices
  - not entirely clear that this is reasonable
- Why not just allow home prices to nonlinearly affect demand to be consistent with the theoretical model?

Empirical Model: Boom Period

With Financial Accelerator

- Finds that effect of supply elasticity is amplified in model with financial accelerator
- Finds that growth of subprime is higher the more inelastic the housing supply is
- Finds that home price growth is positively associated with subprime growth

Empirical Model: Bust Period

- Adds another demand equation

$$\Delta p_i^{Bust} = \mu + \gamma_{\Delta p} \Delta p_i^{Boom} + \gamma_{\Delta h} \Delta h_i^{Boom} + \boldsymbol{\gamma}_{\omega}^{'} \boldsymbol{\omega}_i^{Bust} + e_i$$

- Finds that supply elasticity remains relevant in bust
  - consistent with Huang and Tang (2012) for the US
- However, supply elasticity seems to matter less in bust than in boom
  - paper needs to spend more time discussing the magnitudes of the differences in the bust and boom
  - consistent with Hilber and Vermeulen (2013) for the UK
- Seems more natural to estimate a completely separate system for the bust period given the theoretical model

Empirical Model: Bust Period

- Contrasts with Glaeser, Gyourko, and Saiz (2008) who find no relationship between elasticity and price response in bust
- Need to explain why the results differ from Glaeser, Gyourko, and Saiz (2008)
  - different data?
  - different sample period?
  - different empirical approaches?

Conclusion

- Basic point regarding asymmetry of effect of supply elasticity is intriguing
- Need more clarity regarding why financial accelerator reverses this intuition
- Empirical model seems a bit *ad hoc* and not that tightly related to theory