Arrested Development: Theory and Evidence of Supply-Side Speculation in the Housing Market

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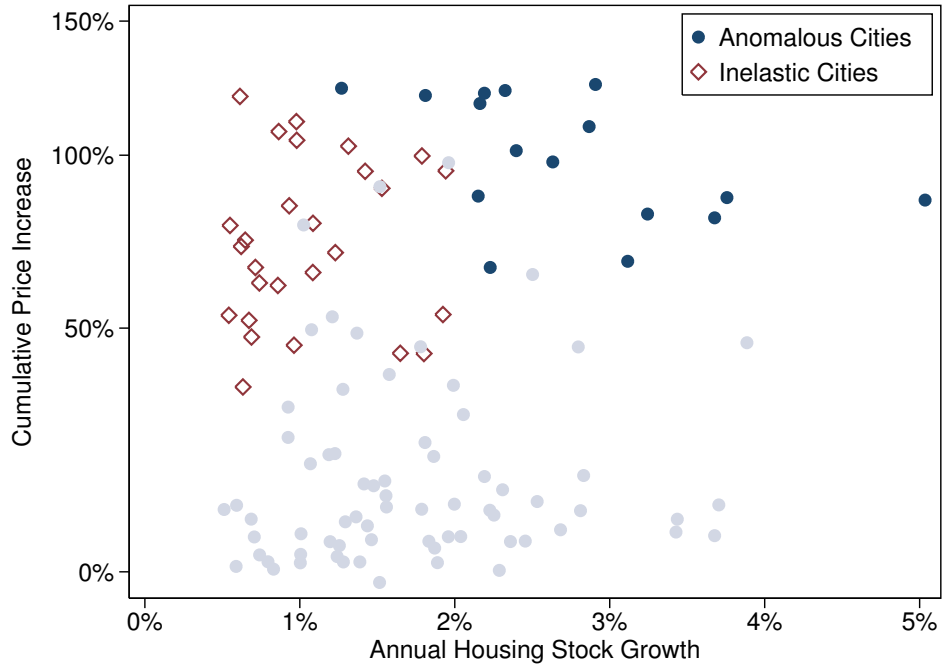
Broad Motivation

How do prices aggregate information?

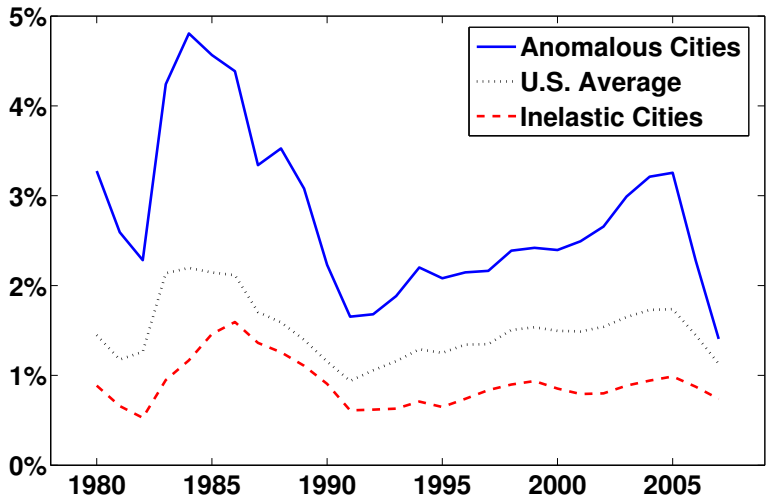
[Fama 1970, Grossman 1976, Hellwig 1980]

- Setting: housing market with heterogeneous beliefs
- Price bias towards optimists $\implies$ booms/busts amplified
- What types of housing markets have optimism bias?

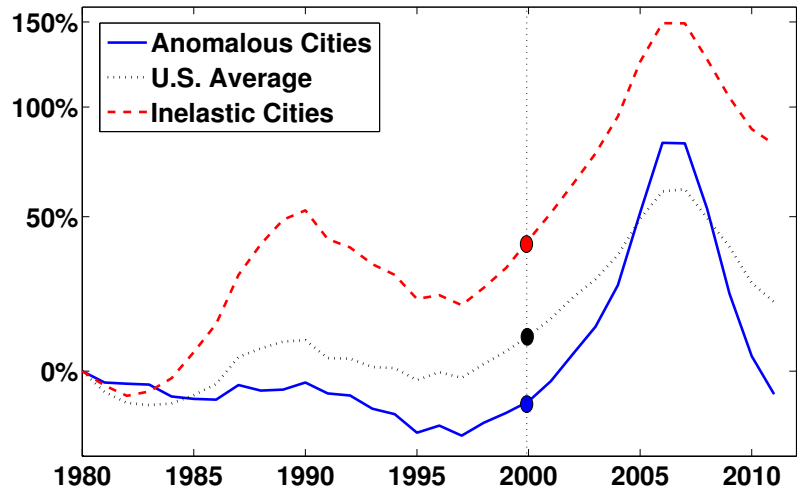
a) Price Increases and Construction, 2000-2006



b) Historic Construction

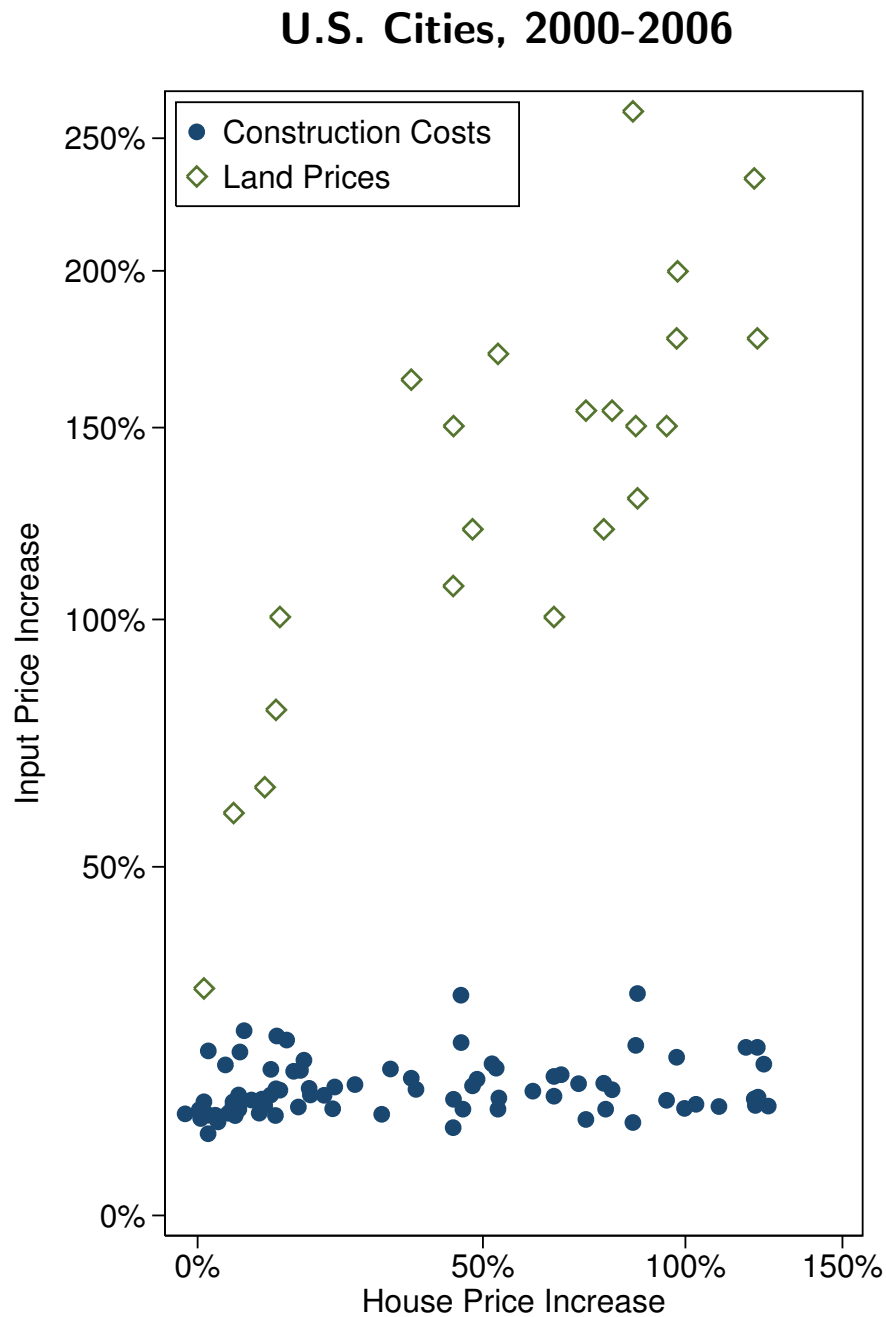


c) Historic Prices



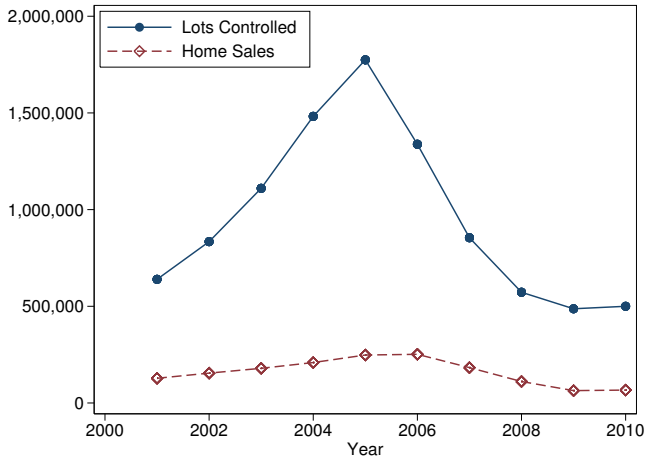
Related Research

1. **Anomalous City Puzzle:** Olesiuk & Kalser (2009), Davidoff (2013, 2014), Gao (2014), Sockin & Xiong (2014),
2. **Beliefs in Housing Markets:** Piazzesi & Schneider (2009), Gerardi, Foote, & Willen (2010, 2012), Scherbina & Schlusche (2012), Case, Shiller & Thompson (2012), Favara & Song (2014), Cheng, Raina & Xiong (2014)
3. **Real Estate Investors:** Haughwout, Lee, Tracy & van der Klaauw (2011), Bayer, Geissler & Roberts (2013), Chinco & Mayer (2014)
4. **Land Prices:** Davis & Heathcote (2007), Davis & Palumbo (2008), Kainer, Speigel & Yamori (2010), Haughwout, Peach, Sporn & Tracy (2012), Nichols, Oliner & Mulhall (2013), Davis, Oliner & Pinto (2014)
5. **Housing Supply:** Topel & Rosen (1988), Pollakowski & Wachter (1990), Mayer & Somerville (2000), Aura & Davidoff (2008), Glaeser, Gyourko, & Saiz (2008), Mian & Sufi (2009, 2011, 2014), Paciorek (2013), Davidoff (2014)
6. **Booms and Busts in Asset Markets:** Miller (1977), Harrison & Kreps (1978), Chen, Hong & Stein (2002), Abreu & Brunnermeier (2003), Scheinkman & Xiong (2003), Pastor & Veronesi (2009)

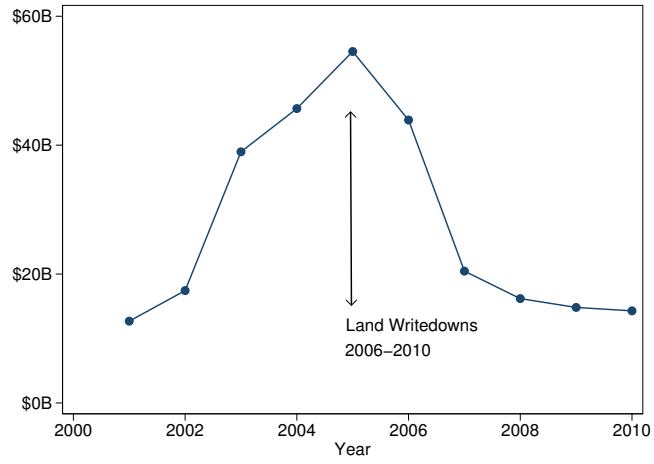


Note: Land prices from Nichols, Oliner & Mulhall (2013)

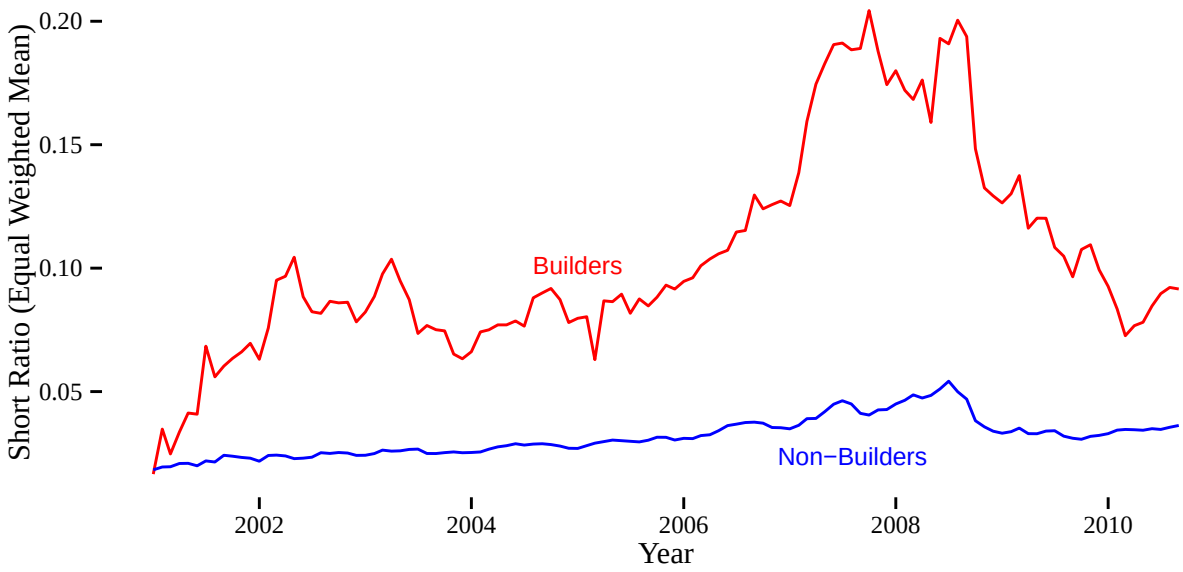
a) Homebuilder Land Holdings



b) Homebuilder Market Equity



c) Homebuilder Short Interest



Model

- Developers build houses, invest in land, issue equity $\rightarrow$ **sty. facts**
- Residents buy/rent housing. Flow utility:

$$c + v(a_i h^{own} + h^{rent})$$

- Demand shock $N_t = \overline{N}_t + \mu_t x$. At $t = 0$: observe x, disagree on $\boldsymbol{\mu}$
- Space S. Land demand $D_l(r_l)$ from farms; housing supply $S - D_l$
  - Short-run elasticity ϵ_t^S. Falls with development
  - Long-run elasticity $\widetilde{\epsilon}_t^S$. Averages future ϵ_t^S
- No short-selling of housing or land

Results

$$\frac{d \log p_0^h}{dx} = \overbrace{\left(\frac{\epsilon_0^S + (1-\chi)\epsilon^D}{\epsilon_0^S + \epsilon^D} \mu_{opt} + \frac{\chi \epsilon^D}{\epsilon_0^S + \epsilon^D} \mu_{avg} \right)}^{\text{aggregate belief}} \frac{1}{\widetilde{\epsilon}^S + \epsilon^D}$$

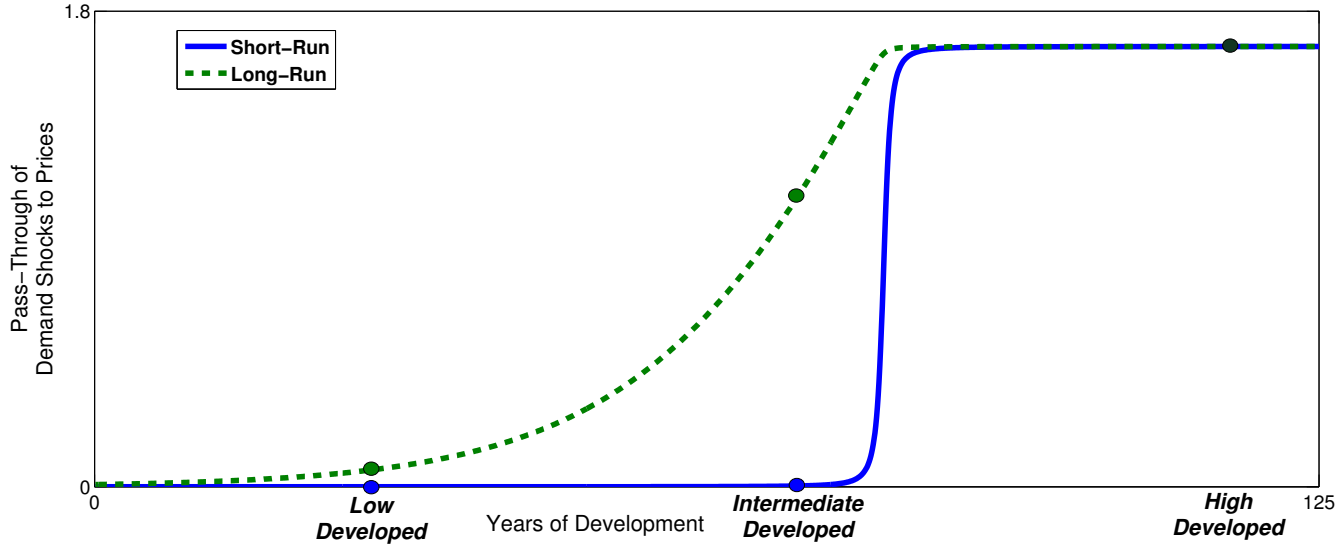
How do housing markets aggregate information?

- Abundant land or rent. hous. [$\epsilon_0^S = \infty$ or $\chi = 0$] $\rightarrow$ **only** μ_{opt} **matters**
- No land & all hous. owner-occ. [$\epsilon_0^S = 0$ & $\chi = 1$] $\rightarrow$ **only** μ_{avg} **matters**

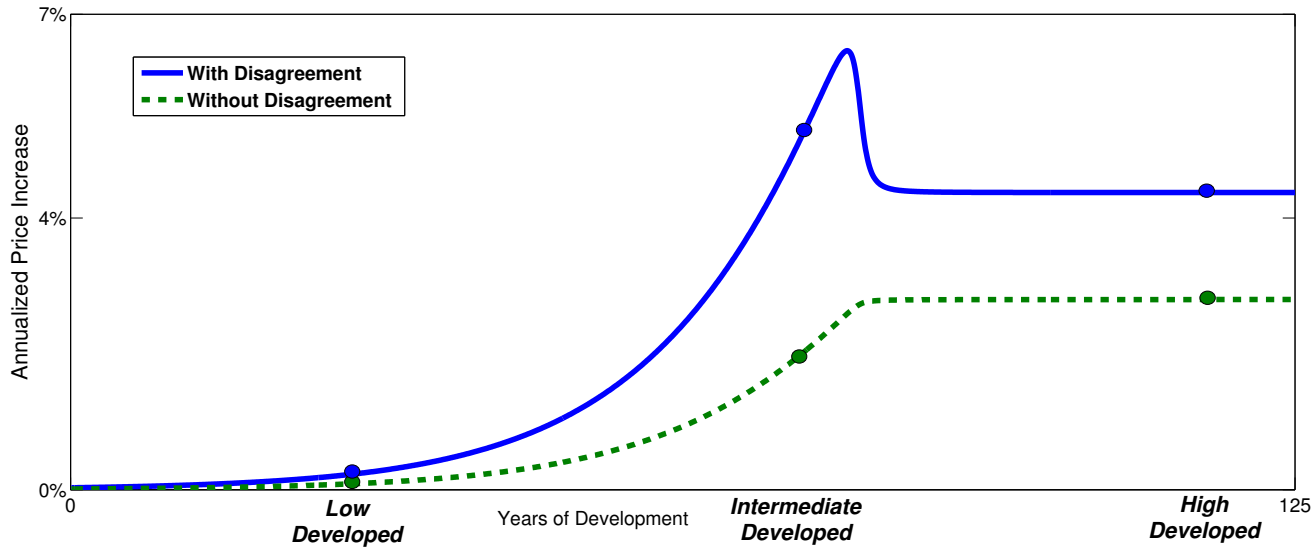
When does optimism bias amplify prices most?

- Supply easy now, difficult soon [ϵ_0^S big, $\widetilde{\epsilon}^S$ small]: "arrested development"

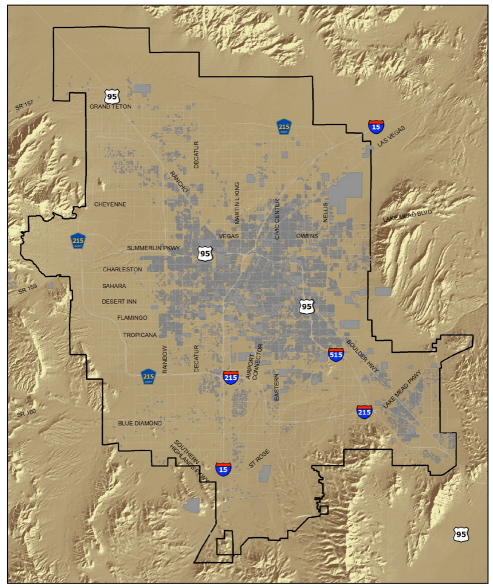
a) Inverse Supply Elasticity



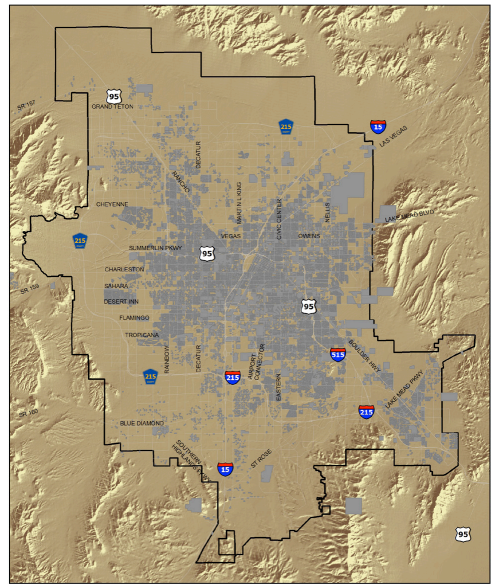
b) Price Increase



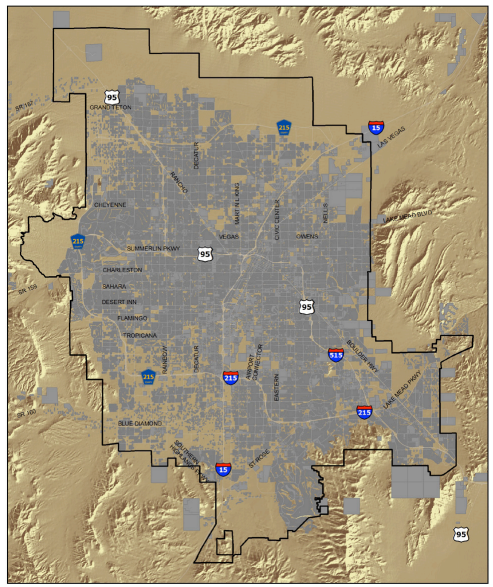
Long-Run Development Constraints in Las Vegas



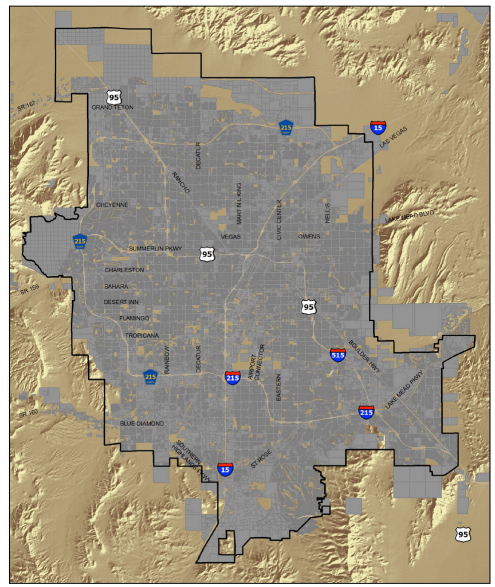
1980



1990



2008



2030

New prediction: within city, higher $\chi \rightarrow$ lower price boom

1. **Neighborhoods.** std(χ) over ZIPs is 0.17 in 2000 Census
   - Reg. $\Delta \log p$ '00-'06 on χ & city f.e $\rightarrow$ coeff. -0.10 (0.026)
   - Caveat: corr(χ, income) $= 0.4$ & lower income $=$ higher shocks
2. **Structures.** $\chi = 0.87$ for detached single-family; 0.14 for multifamily
   - Example: Stuy. Town/Peter Cooper Village [large NYC rental complex]
   - Record price '06 [investors: CalPERS & Church of Eng.], foreclosure '10