Consumption and House Prices in the Great Recession: Model Meets Evidence

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Four questions

1. What shock(s) drove the boom-bust in $p_h$?
   - Financial deregulation vs beliefs about future growth in $p_h$
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2. Why the corresponding boom-bust in $C$?
   • Channels: Collateral vs wealth effects
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   - Study large-scale Principal Reduction program
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4. What do we learn about the macro elasticity of $C$ to $p_h$?
   • Sufficient statistic approach
Methodology

• Model: aggregate shocks move equilibrium $p_h$
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• Parameterize: match cross-sectional and lifecycle micro data
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• Simulate boom-bust

• Compare against aggregate time-series data

  • House prices
  • Consumption
  • Rent-price ratio

• Compare against micro data

  • Home ownership
  • Leverage
  • Foreclosures
Model
Model

Demographics

• OLG lifecycle economy with work & retirement

Endowments

• Workers face uninsurable risk in individual earnings $y$

Preferences

• Utility over nondurable $c$ and housing services $h$

Housing

• Households can buy a unit of $h$ at price $p_h$, or rent it at rate $\rho$

• Linear transaction cost $\kappa_h \cdot (p_h h)$ for sellers
Financial instruments

**Liquid saving** \((b > 0)\): one-period bond, exogenous interest rate \(r_b\) (fixed)
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Mortgages \((m)\): long-term, fixed-rate debt contract

- Price schedule \(q_j(h, m, b, y)\) competitively determined
- Refinancing option available (cash-out)
- Max Loan-to-Value constraint binds at origination only \(m \leq \lambda^m p_h h\)
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**Foreclosure**

- **Default on mortgage debt**: incur a utility loss
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Foreclosure
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HELOCs \((b < 0)\)
  - One-period borrowing, non-defaultable
  - Collateralized by housing, \(b \geq -\lambda^b p_h h\)
Closing the model

Final good sector

- $Y = Z\bar{N} \implies w = Z$

Construction sector

- Determines aggregate housing investments

Rental sector

- Buys housing from sellers and rents them out, or vice-versa, sells rental units to home buyers
- Zero-profit condition yields equilibrium rental rate $\rho$

Government

- Taxes workers (with mortgage interest deduction) and properties, and pays SS benefits to retirees
Aggregate shocks

Underlying shocks that cause equilibrium house price to fluctuate:

1. Aggregate labor income: \( Z \)
2. Credit conditions: collateral parameters \( m; b \)
3. Beliefs / News about future housing demand:
   - Three regimes for \( \phi \) (share of housing services in \( u \)):
     - (a) \( \phi_L \): low housing share and unlikely transition to \( \phi_H \)
     - (b) \( \phi_L \): low housing share and likely transition to \( \phi_H \)
     - (c) \( \phi_H \): high housing share

Boom-Bust: shift from (a) to (b), and back to (a)

Analyze IRFs of the model economy to these realized shocks
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Analyze IRFs of the model economy to these realized shocks
What caused the boom-bust in $\rho_h$ and $C$?
Consumption and house price dynamics

![House Price](image1)

![Consumption](image2)
Consumption and house price dynamics

House Price

Consumption
Dynamics of rent-price ratio

\[ \rho = p_h - \left( \frac{1 - \delta_h}{1 + r_b} \right) \mathbb{E}_{p_h}[p'_h] \]

- Belief about **future appreciation** essential
Dynamics of home ownership

Financial deregulation drives rise in home-ownership
• It’s the young who go in/out of housing market
Dynamics of leverage and foreclosure

- Financial deregulation key for constant leverage pre-boom
- Interaction belief-deregulation important for foreclosure
Revisited narrative of the crisis

• **Original narrative:**
  • Mian-Sufi: credit growth and default concentrated in low-income and high-risk groups

• **New narrative based on refined micro data:**
  1. Adelino et al.: credit growth evenly distributed across risk-type
  2. Foote et al.: credit growth evenly distributed across income groups
  3. Albanesi et al.: default share increases for middle income

• **Model:**
  • Low-income hh go from rent to buy, high-income hh upsize
  • Findings consistent with new narrative, replicates facts 1.-3.
Q2
How does the fall in $p_h$ transmit to $C$?
Deleveraging or wealth effect in the bust?

Deleveraging: WEAK

Wealth effect: STRONG

Consistent with Kaplan-Mitman-Violante (2016): 'Non-durable Consumption and Housing Net Worth in the Great Recession: Evidence from Easily Accessible Data'
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Q3
Could a massive debt forgiveness program have cushioned the bust?
Counterfactual principal reduction program

All homeowners with LTV >95%: forgive excess debt

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
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</thead>
<tbody>
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<td>House Price Bench. Mod.</td>
<td>0.95</td>
<td>1.05</td>
<td>1.10</td>
<td>1.15</td>
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<tr>
<td>Consumption</td>
<td>0.00</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
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<tr>
<td>Foreclosure rate</td>
<td>0.80</td>
<td>1.00</td>
<td>1.20</td>
<td>1.40</td>
</tr>
<tr>
<td>Leverage</td>
<td>0.80</td>
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Beneficiaries account for small share of C+ do not foreclose
Counterfactual principal reduction program

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Summary: what did we learn from the model?

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4. Two observations on the macro elasticity of $C$ to $p_h$
   - Magnitude depends strongly on the underlying shock
   - Caution about the sufficient statistic approach
Thanks!