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

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ESSIM

after-dinner-seminar version
Evoking Tom Sargent again
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*It’s never too late in the day for some dynamic programming!*
Evoking Tom Sargent again

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I wanna see Ramon’s paper again...
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I wanna see Ramon’s paper again...

... and James discussion!
The Question

Year

Logs (1997:Q1 = 0)
-0.2 -0.1 0 0.1 0.2 0.3

Relative House Price

Boom

Bust
What caused the boom and bust in house prices?
Two Views

1. Credit view

- Availability of credit to marginal borrowers determines demand for housing and house prices

- Financial innovations in early 2000s (i.e., PLS) led to ‘unsustainable’ lending to subprime low-income borrowers
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2. Expectations view

- Waves of optimism and pessimism affect desire of borrowing, housing demand and house prices

- Middle class (i.e., prime borrowers) crucial to the story

▶ What do the microdata say?
Micro data

- **Credit view**: credit growth (in boom) and defaults (in bust) concentrated among marginal borrowers
- **Main-Sufi**: influential body of work
Micro data

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- Recently, evidence in favor of credit supply view has been challenged by Albanesi et al., Adelino et al., Foote et al.

![Graph showing share of originations and delinquencies](image-url)
Micro data

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- Suggestive evidence: need measurement through **structural models**
Equilibrium Models of the Credit View

Favilukis-Ludvigson-van Nieuwerburgh (2015); Justiniano-Primiceri-Tambalotti (2015); Greenwald (2016)

- Successful in generating large house price movements
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• What does it take for looser credit to push up house prices?

  1. Large effect on housing risk premium

  2. Many constrained households
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- Model features that deliver these outcomes:
  1. Short-term debt: makes housing very risky
  2. No rental market: many households that want to consume more housing, but can’t
Our Paper

- Equilibrium model with rental market and long-term mortgages

- **Aggregate shocks**: income, credit, and beliefs

- Parameterize to cross-sectional and life-cycle facts

- Compare to time-series on: house prices, rent-price ratio, home ownership, leverage, and foreclosures

- Decompose role of each shock

- Compare with ‘new’ micro evidence

- Study transmission of house prices to consumption
Model: Household and Financial Sectors

- OLG with two phases in lifecycle: work and retirement
- CES utility over ND consumption \((1 - \phi)\) and housing \((\phi)\)
- Idiosyncratic uninsurable earnings shocks
- Saving in risk-free bonds with exogenously fixed interest rate
- Housing can be bought at \(p_h\) (sold s.t. transaction cost) or rented at \(\rho\)
- **Long-term mortgages** (to be repaid before death), with cash-out refi option, defaultable, competitively priced by financial intermediaries
- **At origination**: max LTV and max PTI constraints \((\lambda^m, \lambda^{\pi})\) and origination cost (proportional to loan size) \(\kappa^m\)
- HELOCs: one-period debt, non defaultable \((\lambda^b)\)
Closing the Model

Final good sector

- Linear technology in labor with productivity $Z \rightarrow w = Z$

Construction sector

- Housing permits + labor $\rightarrow$ aggregate housing investments $I(p_h)$

Rental sector

- Frictionless conversion of rental units into OO units and viceversa
- Zero-profit condition yields equilibrium rental rate $\rho$

Government

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

- **Aggregate labor income**: $Z$
- **Credit conditions**: $(\lambda^m, \lambda^b, \lambda^{\pi})$ and $\kappa_m$
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- **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
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- **Calibration of news shock**: use data on expectations... but residual
• Belief shock accounts for all boom-bust in house prices
• Households unconstrained with respect to housing consumption
Rent-Price Ratio

\[ \rho = \psi + p_h - \left( \frac{1 - \delta_h - \tau_h}{1 + r^b} \right) \mathbb{E}_{p_h} [p_h'] \]

- Belief about future appreciation shared by investment company
Cheap credit drives rise in home ownership

Households constrained with respect to their tenure choice
Explaining the effects of credit shocks

• Why looser/tighter credit does not affect housing demand?
  ▶ Long-term debt: housing risk premium is small
  ▶ Rental market: buyers are not constrained in housing choice
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• Why is rise in home ownership disconnected from house prices?
  ▶ Renters buy houses of **similar size of those they rented**
  ▶ It’s the current home owners who upsize and push up demand
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- If hh’s consume optimal amount of housing, why buying more?
  - Housing is both a consumption good and an asset
  - Many households buy larger houses to realize expected capital gains
Credit loosening is crucial to maintain constant leverage pre-boom.
Endogenous credit boom through beliefs
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- Lender’s optimist beliefs $\rightarrow$ lower expected default rates $\rightarrow$ lower mortgage rates, especially for subprime borrowers
- Foreclosure spike due to interaction between optimistic belief and looser credit
Comparison with New Evidence

• Fact: credit growth occurred throughout distrib. of FICO scores
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House prices explain 1/2 of boom and bust in C
Consumption

- House prices explain 1/2 of boom and bust in C
- It’s a wealth effect (through household balance sheet)
Summary: what did we learn from the model?

- Shift in expected house appreciation key to boom-bust in $p_h$
- Credit important for home ownership, leverage, and foreclosures
- Rental market + long-term mortgages are the key model features
- Model tells us that aggregate time series and micro evidence agree
- $p_h$ transmits to $C$ through balance sheet effects
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Thanks!