DYNAMICS OF HOUSING DEBT IN THE RECENT BOOM AND BUST

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Motivation

• Lasting impact of the 2008 mortgage crisis on US the economy
  • Households significantly increased their stock of mortgage debt over the boom period
  • Once the housing market slowed down, large increases in defaults particularly for prime borrowers
  • These losses impaired banks and the shadow banking system, and led to the Great Recession

• **Key question: What led to an increase in mortgage debt?**
What drove credit expansion?

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<th>Subprime view</th>
<th>Expectations view</th>
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<td>- Financial innovation and deregulation created perverse incentives in the financial sector, which provided unsustainable credit, especially to low income, low credit score borrowers.</td>
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<td>- These distorted credit flows led to higher house prices and mortgage crisis (e.g., Mian and Sufi, 2009, 2016)</td>
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<td>- Inflated house prices (expectations) led banks to underestimate the potential for losses. Banks lent against high house values.</td>
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<td>- Borrowers increase demand for housing, exploit increased supply.</td>
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<td>- Savings glut and lower interest rates might be triggers for original increase in house prices.</td>
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Credit expansions and expectations are endogenous variables
Empirical Challenge

• Difficulty in testing the two views:
  • Explanations are not mutually exclusive, may reinforce each other
  • Credit screening might go down as a result of high house price expectations, since lenders feel protected by increased prices. But more access to credit can then feed into higher prices

• Proper diagnosis of the origins of the mortgage crisis has different implications for policy
  • Fixing incentives and monitoring in banks vs. macro-prudential regulation
Summary of Results I

• House price expectations and increased collateral values played an important role in the credit expansion
  - *Flow* (new purchase mortgages) and *stock* of credit increased across all income groups over the boom → no cross sectional dislocation of credit flows towards poor households
  - Credit expansion was significantly larger in areas with high house price growth
  - CLTVs stayed stable over the boom = lending against “V”
Summary of Results II

- Quicker buying and selling of homes in the boom
  - Attempt of households to buy into increasing house prices
  - Stock of mortgage debt “resets up” when household buys new home

- Homeownership rates increase during boom for all households except for the poorest
  - Credit did not expand to allow poor borrowers to become homeowners

- Large increase in cost of owning relative to renting during the boom

- Share of defaults by middle income and middle credit score borrowers increases in the bust.
Data

- Household-level survey data from American Community Survey (public use microdata sample)
  - Housing costs for owners and renters
  - Homeownership (confirmed with data from American Housing Survey and Current Population Survey)
  - Value-to-income

- Home Mortgage Disclosure Act (HMDA)
  - Balance and location of individual mortgages originated in the US

- Corelogic (formerly Dataquick)
  - Ownership transfers of residential properties from deeds and assessors records (1996-2012)
  - Allows us to compute LTVs

- Mortgage performance from LPS (formerly McDash)
  - 5% random sample

- IRS income at the zip code level.

- House prices from Zillow.
Credit Flows, Stock, and DTI

• No significant cross-sectional dislocations in credit flows or stock of household debt across income or FICO bins
  • Flow of (purchase) mortgages increases across all income groups (HMDA data)
  • Stock of mortgage debt also increases proportionally (SCF data)
  • Cost of owning a house increases predominantly in areas with high house price growth (ACS data)

• Cost of owning relative to renting goes up dramatically in the boom and collapses after the crisis, especially in boom states
Flow of new purchase mortgages
$ bn, HMDA data, IRS income quintiles

[Graph showing the flow of new purchase mortgages from 2001 to 2015 for different income quintiles.]
Flow of new purchase mortgages
Shares by quintile, HMDA data, IRS income quintiles

[Bar chart showing the flow of new purchase mortgages by quintile from 2001 to 2015. Each year is represented with a vertical bar, divided into quintiles.]
Debt-to-income

Owners with positive debt, SCF data

Graph showing the debt-to-income ratio for different quintiles from 2001 to 2007.
Cost of owning, boom and non-boom states
Recent movers, ACS data

**Boom states (above median HPA)**

**Non-boom states**
Difference between cost of owning and renting
Recent movers, ACS data
Homeownership rates

• Increases in homeownership for all except the lowest income households, ACS data
  • Confirm the fact with other Census sources (AHS, CPS)

• Similar pattern holds across high and low house price states
Homeownership Rates (all states)

ACS data

[Graph showing homeownership rates from 2001 to 2015 across different quintiles]
Homeownership Rates ("Boom states")

ACS data
Homeownership rate (historical)
Census and ACS data

![Homeownership rate graph](chart.png)

- **Quintile 1 (lowest)**
- **Q2**
- **Q3**
- **Q4**
- **Quintile 5**
Speed of Flipping Homes (Churn)

• Speed at which homeowners sold and bought homes
  • Was high in early 2000s and peaked in 2006: Approximately 8% of homeowners had bought their home in the previous 12 months
  • Rate drops to 4% in the crisis, only increases after 2012
  • Churn rates are higher for high and middle vs. low income households
Churn
Share of owners moving in last 12 months, ACS data
Loan-to-value

• Distribution of Combined LTV at origination
  • Very stable over the boom period, even when we condition on mortgage size.
  • No pronounced differences in areas with high and low house price growth.
Loan-to-value
New home purchases, Corelogic (formerly Dataquick)
Loan-to-value in boom states

New home purchases, Corelogic (formerly Dataquick)
Defaults

• Middle-income and prime borrowers sharply increase their share of total delinquencies in the crisis
  • Particularly in areas with large house price increases and subsequent drops
Share of Delinquent Mortgages
3 Years Out, by Cohort – Value Weighted, LPS data

![Chart showing share of delinquent mortgages by FICO score and year]

- **2003**
  - FICO < 660: 71
  - 660 ≤ FICO < 720: 20
  - FICO ≥ 720: 9

- **2004**
  - FICO < 660: 63
  - 660 ≤ FICO < 720: 25
  - FICO ≥ 720: 12

- **2005**
  - FICO < 660: 47
  - 660 ≤ FICO < 720: 34
  - FICO ≥ 720: 18

- **2006**
  - FICO < 660: 39
  - 660 ≤ FICO < 720: 38
  - FICO ≥ 720: 23
Share of Delinquent Mortgages
3 Years Out, by house price growth in 2002-06
Who are the "marginal borrowers"?
Stability of employment
Households with full-time employment, ACS data
Loan Approval Rates
Conclusion

• House prices played a major role in the expansion of credit and delinquencies
  • Credit expansion and subsequent defaults significantly stronger in areas with high house price growth
  • Stable CLTV levels at origination over the boom suggest lenders lent “mechanically” against increasing house price values (V).

• Post crisis policy response
  • Mortgage credit and homeownership rates to lower income borrowers drops dramatically after the crisis
  • Changes in policy targeted at lower income households may have prevented them buying when prices were low, without improving the stability of the mortgage market.