

# Household Leverage before and after the Great Recession?

## Time Series versus Cross-Sectional Evidence

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# Boom and Bust Cycles in US Housing Markets

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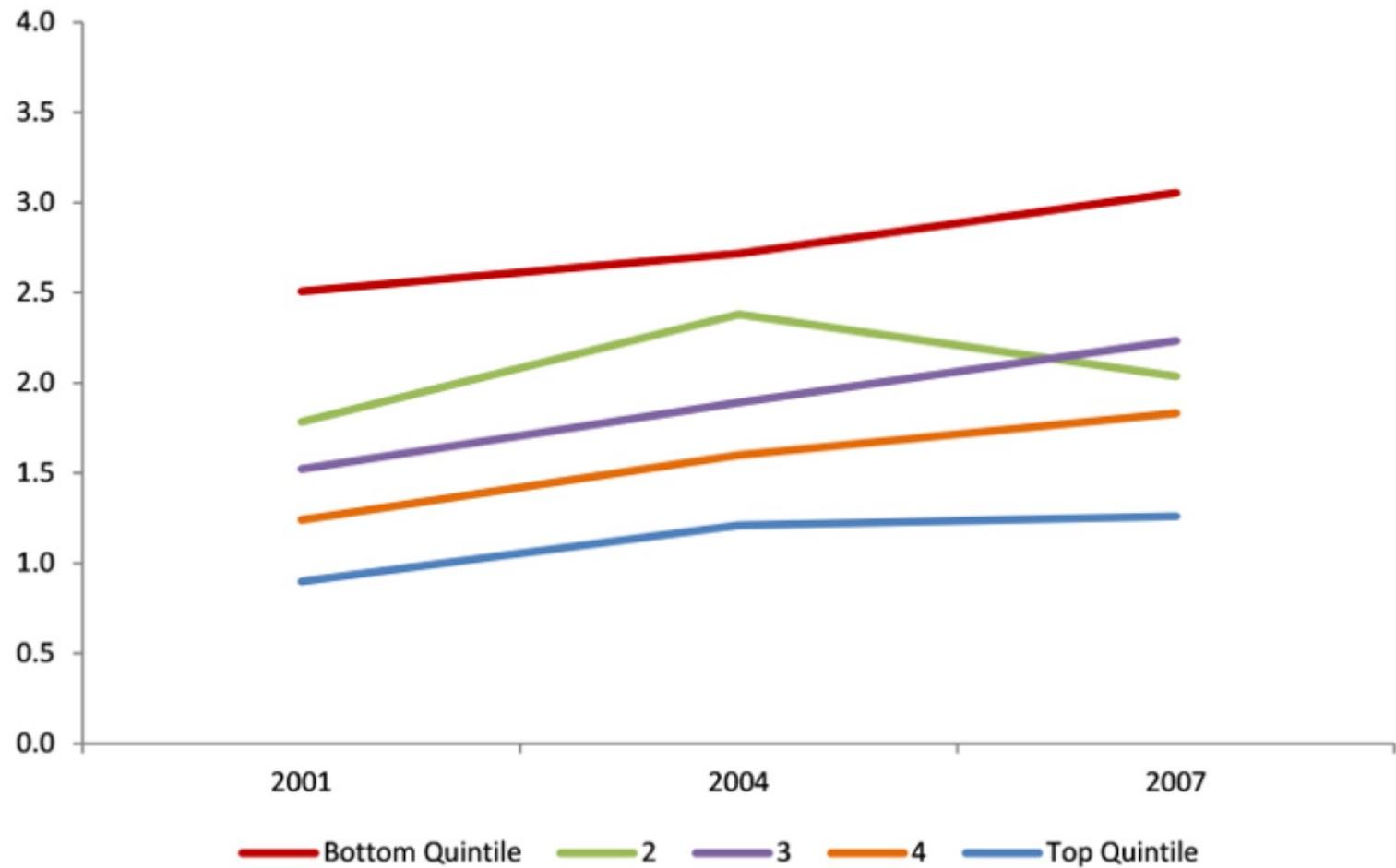
- US housing markets have gone through an extended boom, bust, and recovery phase since 2000
- Emerging consensus of the 2008 financial crisis: Housing markets were subject to a classic asset bubble
  - Rising house prices and over-optimistic expectations played a key role in the increase in mortgage debt and defaults.
  - Households increased demand for housing and mortgage debt across all income groups, especially middle-class borrowers. Not a “subprime crisis” but a middle-class crisis.
  - Banks lent against increasing collateral values and underestimated the risk of defaults. Financial sector acted as an amplification mechanism for changes in expectations by lending into the bubble.

# Features of the 2000-2008 Cycle

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- Relaxation of DTI constraints
  - Increased mortgage debt across all income groups.
  - No shift in credit allocation towards marginal or subprime borrowers.
  - Adelino et al (2016, 2017), Foote & Willen (2018), Albanesi et al (2019)
- Stable distribution of CLTV for purchase loans
  - Sources of high-CLTV loans switch between FHA/VA and private sector loans.
  - No change in the composition of high-CLTV borrowers: High-CLTV loans used by the same people and places over time.
  - Adelino et al (2020)

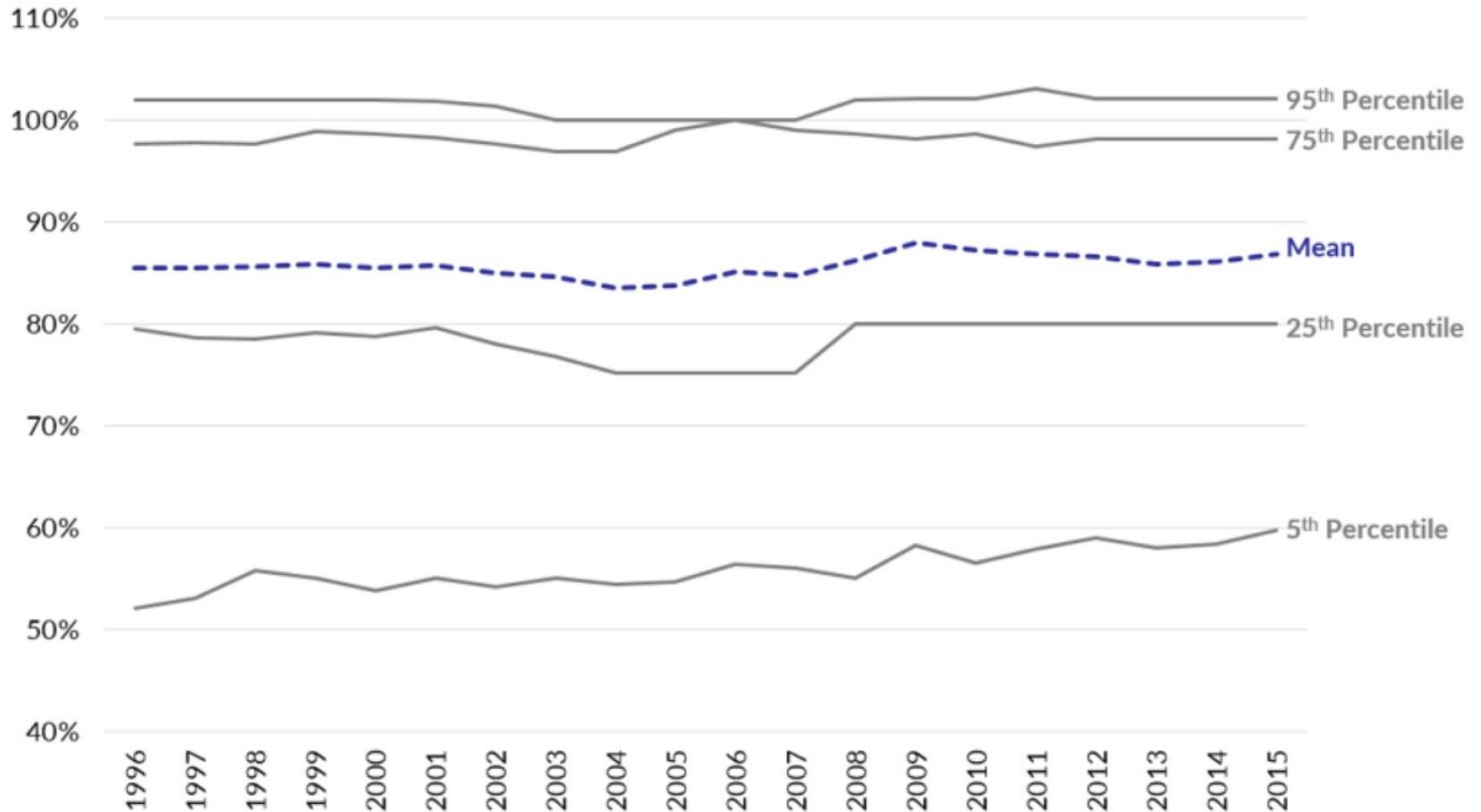
# Mortgage Debt (DTI) Expanded Proportionally



Data from Survey of Consumer Finances,  
Adelino et al (2017)

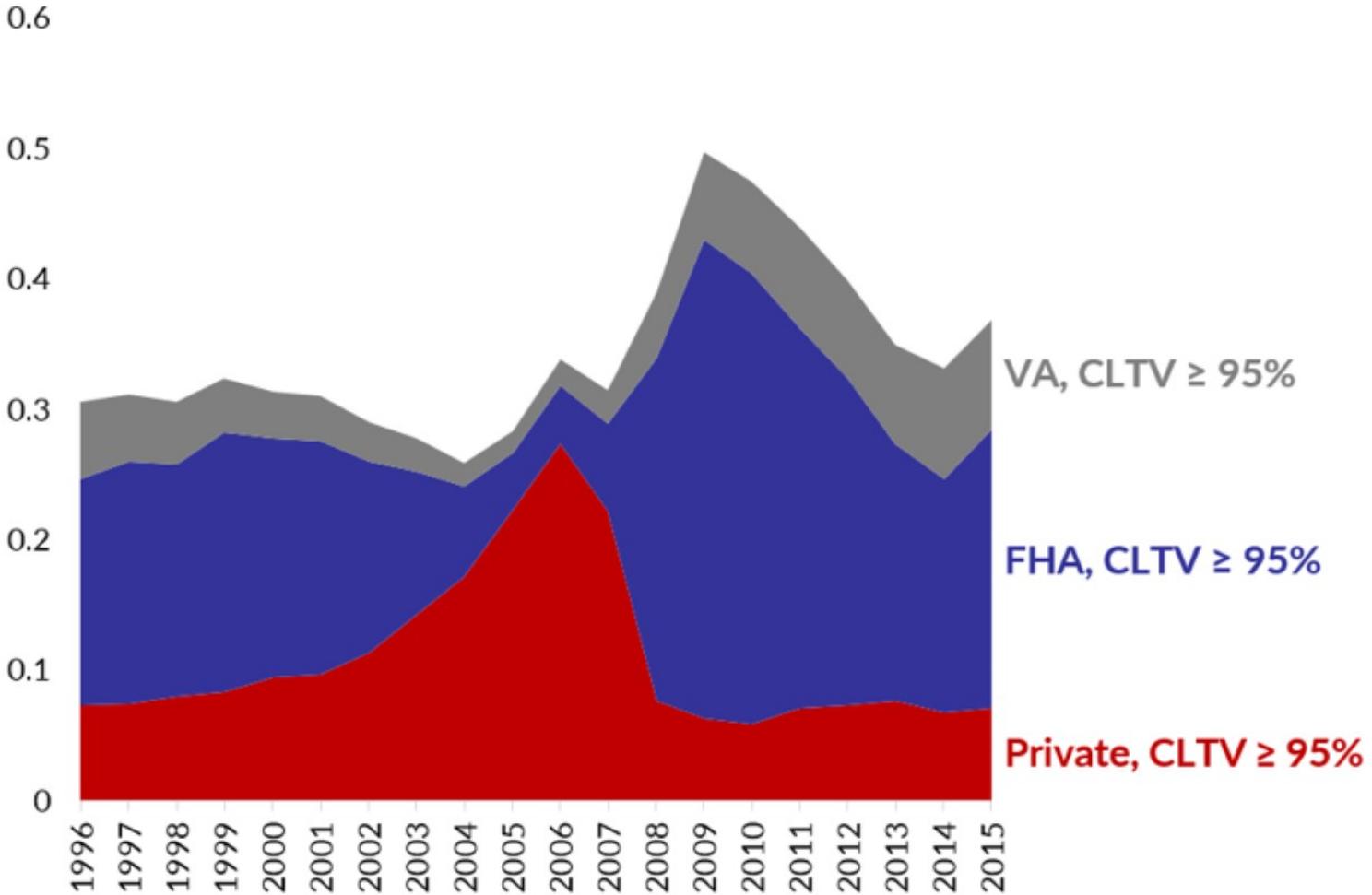
# Steady Distribution of CLTV

Purchase Mortgages, include 1st, 2nd, 3rd liens. Data from CoreLogic



# Sources of High CLTV Loans Over Time

FHA/VA mortgages are replaced by sub-prime and return to FHA/VA



# Heterogeneous effects of the recovery post 2012

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- Housing markets since 2012
  - House prices have risen to pre-crisis level
  - DTI levels well below pre-crisis levels but showing some signs of increasing
- Heterogeneous impact across households and geographies
  - Recovery of house prices was not uniform across the US
  - Large and persistent differences in home ownership across income groups. Lower income groups less likely to be homeowners and conditional on owning have much higher DTI
  - Large differences in the timing when different income groups came back into the housing market

# Heterogeneity in ownership trends across the US

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- Large literature has pointed out the importance of location for the quality of amenities and upward mobility, e.g. Katz and Kling (2005), Chetty et al (2018).
- We analyze ownership patterns and DTI levels across the US.
  - Level differences in house prices: Expensive versus cheaper cities as a proxy for places with better or worse amenities.
  - Changes in economic activity across MSAs. Identify places with changing fortunes:
    - **Late boom:** Low house price growth between 2000-2006, and high growth in the recovery, 2010-2019. Areas that recently improved their attractiveness.
    - **Early boom:** High HP growth in 2000-2006, but did not recover post-crisis.
    - **Always boom:** High house price growth in both pre- and post-financial crisis. Areas with very strong fundamentals across the entire time period.
    - **Never boom:** Low house price growth in both periods.

# Heterogeneity in How Places Recovered

- Compare HP growth 2000 to 2006 and 2012 to 2019
  - Among the 381 MSA/MD areas, all of them have positive HP growth.

		HP Change Quartiles 2012-2019				
		1	2	3	4	Total
HP Change Quartiles 2000-2006	1	20.8	37.6	26.7	14.9	100
	2	38.6	25.7	28.7	6.9	100
	3	26.7	25.7	30.7	16.8	100
	4	13.9	10.9	13.9	61.4	100

# Locations by house price growth cycle

## Boom 00-06, Boom 10-19

MSACode	MSATitle
31080	Los Angeles-Long Beach-Anaheim, CA
47900	Washington-Arlington-Alexandria, DC-VA-MD-WV
33100	Miami-Fort Lauderdale-West Palm Beach, FL
14460	Boston-Cambridge-Newton, MA-NH
41860	San Francisco-Oakland-Hayward, CA
40140	Riverside-San Bernardino-Ontario, CA
38060	Phoenix-Mesa-Scottsdale, AZ
42660	Seattle-Tacoma-Bellevue, WA
33460	Minneapolis-St. Paul-Bloomington, MN-WI
41740	San Diego-Carlsbad, CA
45300	Tampa-St. Petersburg-Clearwater, FL
38900	Portland-Vancouver-Hillsboro, OR-WA

## Non-boom 00-06, Boom 10-19

MSACode	MSATitle
19100	Dallas-Fort Worth-Arlington, TX
26420	Houston-The Woodlands-Sugar Land, TX
12060	Atlanta-Sandy Springs-Roswell, GA
19820	Detroit-Warren-Dearborn, MI
19740	Denver-Aurora-Lakewood, CO
38300	Pittsburgh, PA
16740	Charlotte-Concord-Gastonia, NC-SC
41700	San Antonio-New Braunfels, TX
17140	Cincinnati, OH-KY-IN
28140	Kansas City, MO-KS
18140	Columbus, OH
26900	Indianapolis-Carmel-Anderson, IN

## Boom 00-06, Non-boom 10-19

MSACode	MSATitle
35620	New York-Newark-Jersey City, NY-NJ-PA
16980	Chicago-Naperville-Elgin, IL-IN-WI
37980	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
41180	St. Louis, MO-IL
12580	Baltimore-Columbia-Towson, MD
47260	Virginia Beach-Norfolk-Newport News, VA-NC
39300	Providence-Warwick, RI-MA
33340	Milwaukee-Waukesha-West Allis, WI
25540	Hartford-West Hartford-East Hartford, CT
40060	Richmond, VA
49340	Worcester, MA-CT
14860	Bridgeport-Stamford-Norwalk, CT

## Non-boom 00-06, Non-boom 10-19

MSACode	MSATitle
17460	Cleveland-Elyria, OH
13820	Birmingham-Hoover, AL
40380	Rochester, NY
46140	Tulsa, OK
12940	Baton Rouge, LA
19380	Dayton, OH
32580	McAllen-Edinburg-Mission, TX
17900	Columbia, SC
24660	Greensboro-High Point, NC
10420	Akron, OH
30780	Little Rock-North Little Rock-Conway, AR
49180	Winston-Salem, NC

# Data

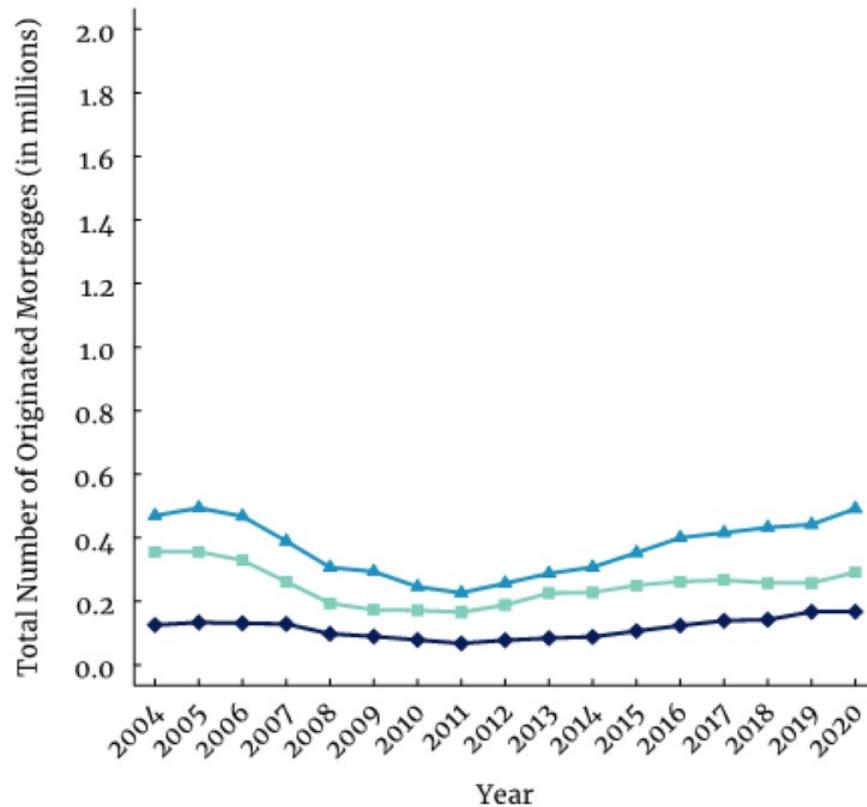
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- American Community Survey (ACS 5-year public use microdata samples) collapsed to the MSA level, 2005-2019
- Home Mortgage Disclosure Act (HMDA) mortgage data, 2004-2020
- IRS Statistics of Income
- Zillow Home Value Index (ZHVI)
- FHFA House Price Index (FHFA HPI)

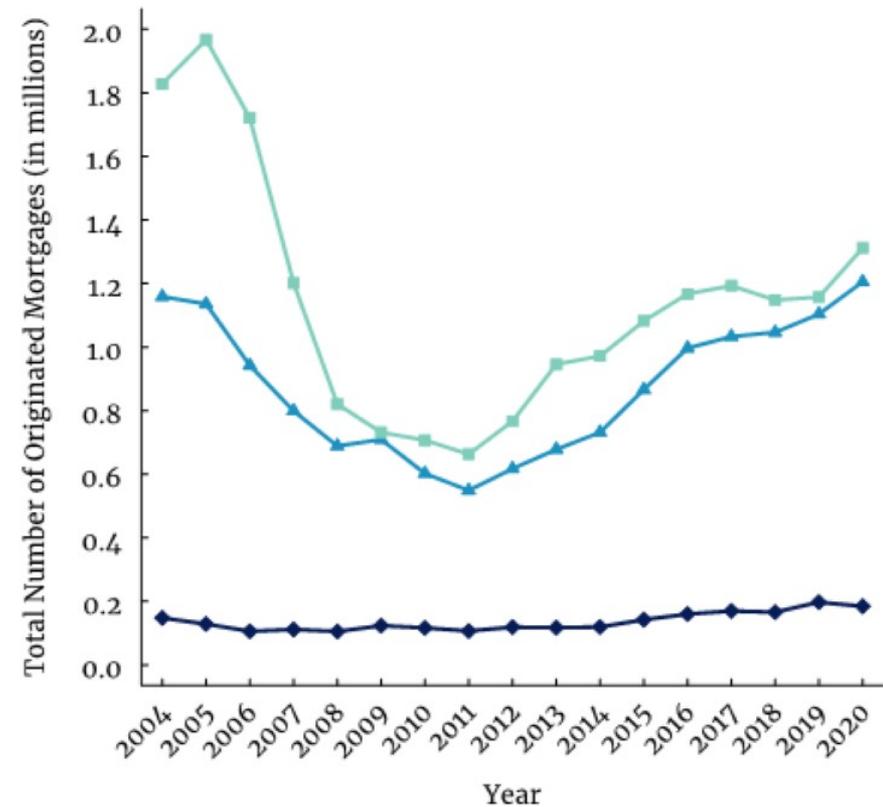
# Origination volumes for high/low house price areas

## HMDA data

MSAs with below-median house price level in 2015



MSAs with above-median house price level in 2015

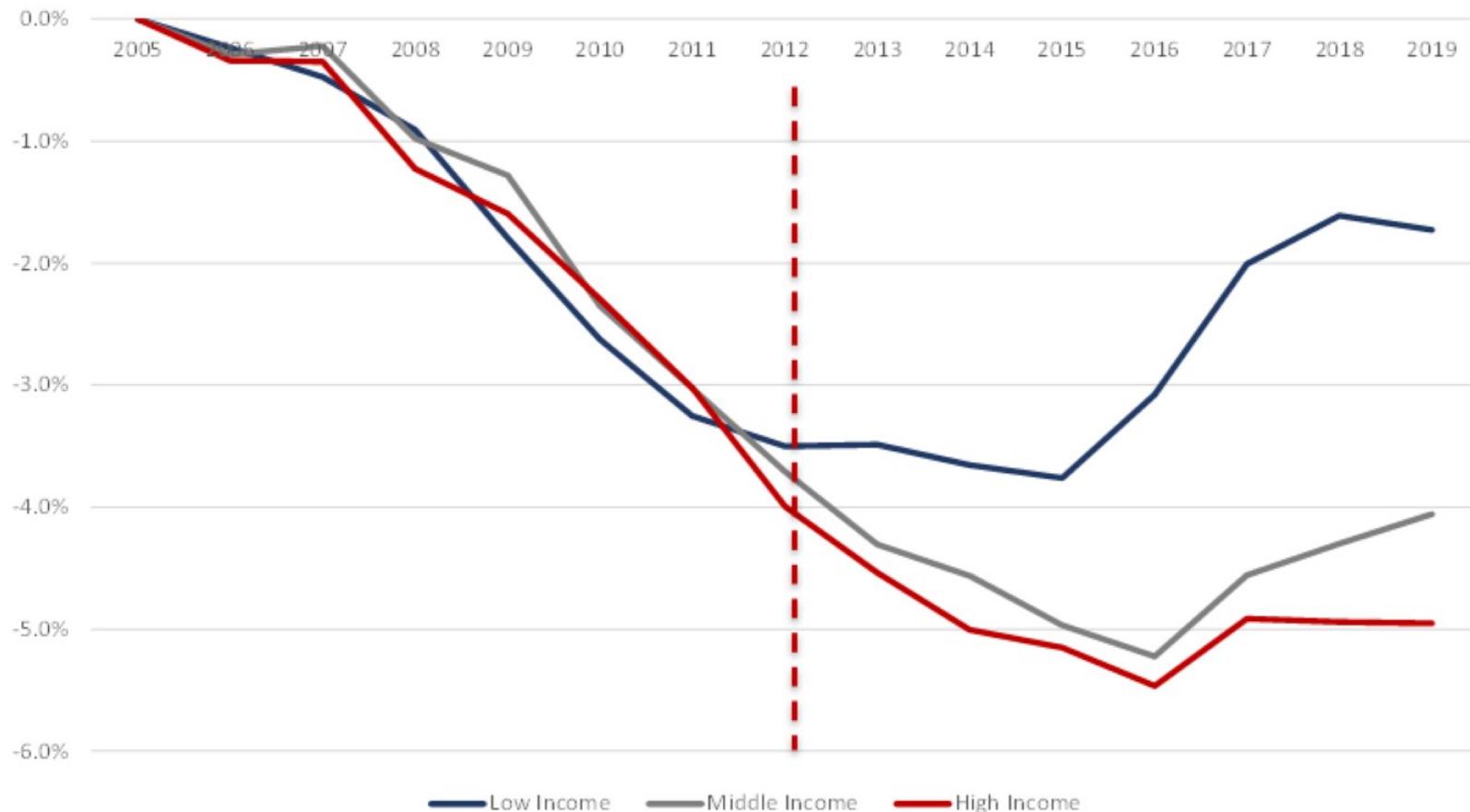


◆ Low Income   
 ▲ Middle Income   
 ■ High Income

Origination volumes recovered across all income groups, and across expensive and cheap MSAs.

# Homeownership by income groups

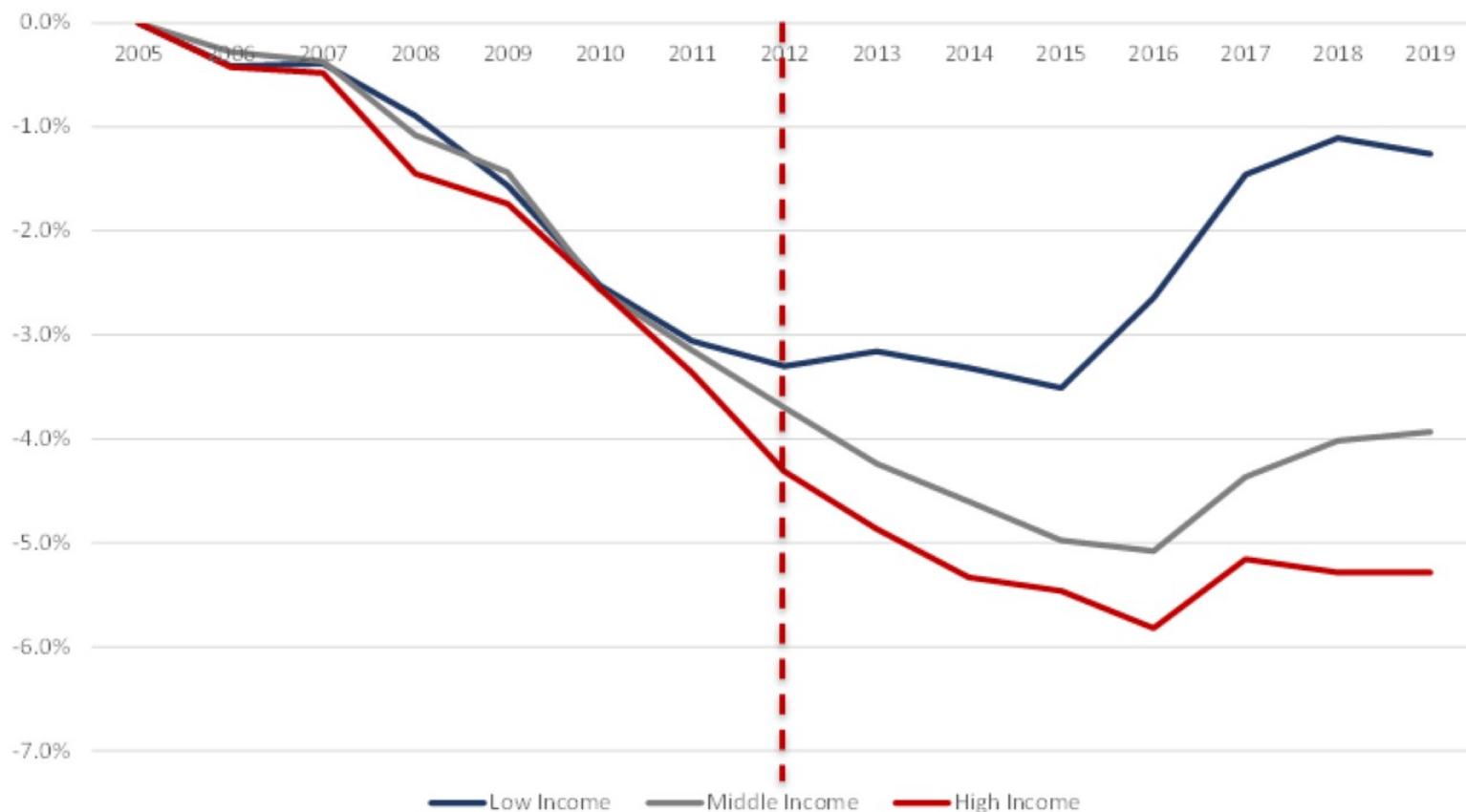
ACS data



Downward trend in ownership accelerated during the 2008 crisis. But recovery of ownership rates started earlier for low income groups.

# Homeownership by income groups, expensive MSAs

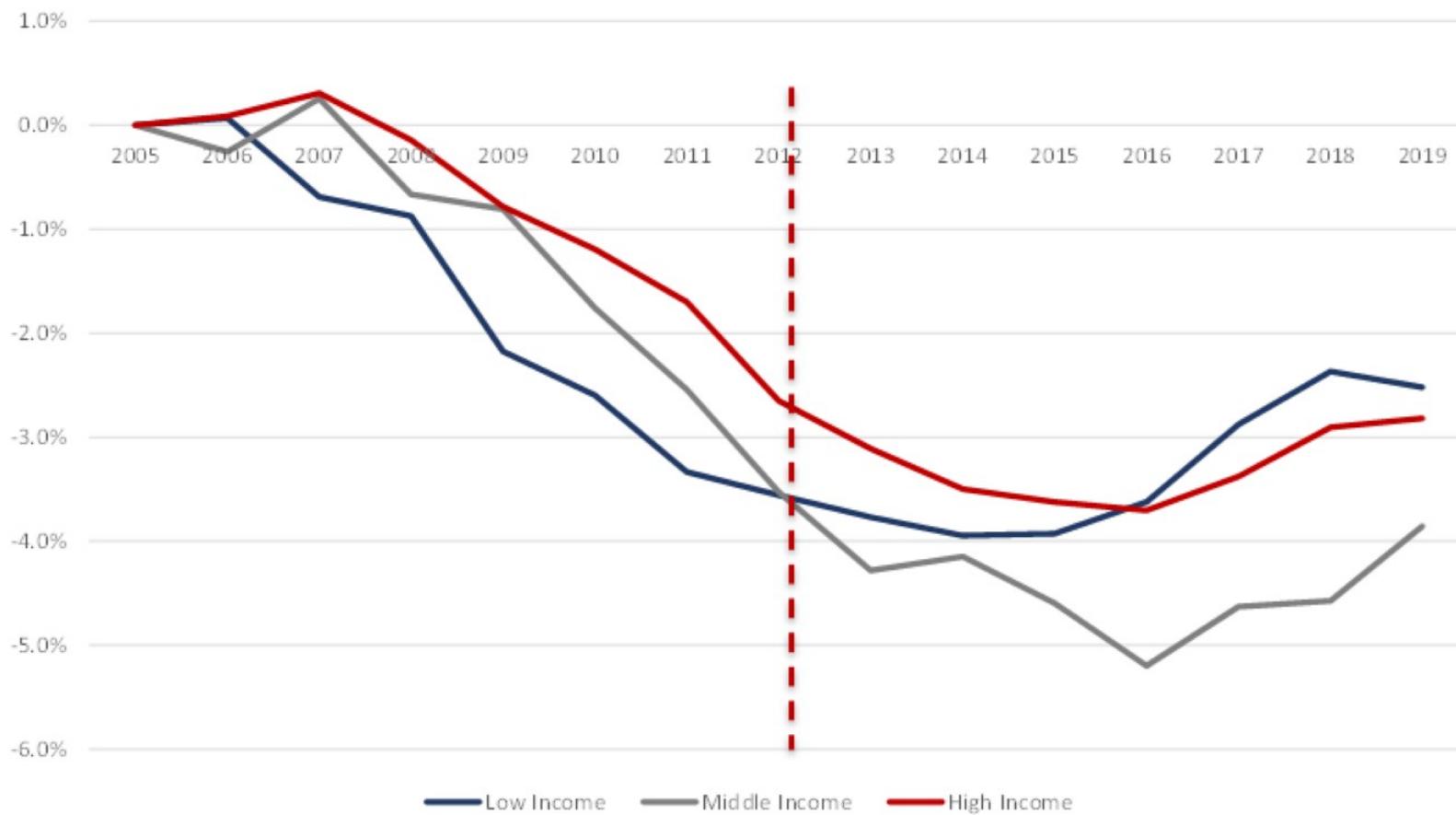
Expensive MSAs have house prices in 2015 above the median house price of 381 MSA in the sample.



Lower income groups expand ownership more quickly in high house prices areas after the 2008 crisis.

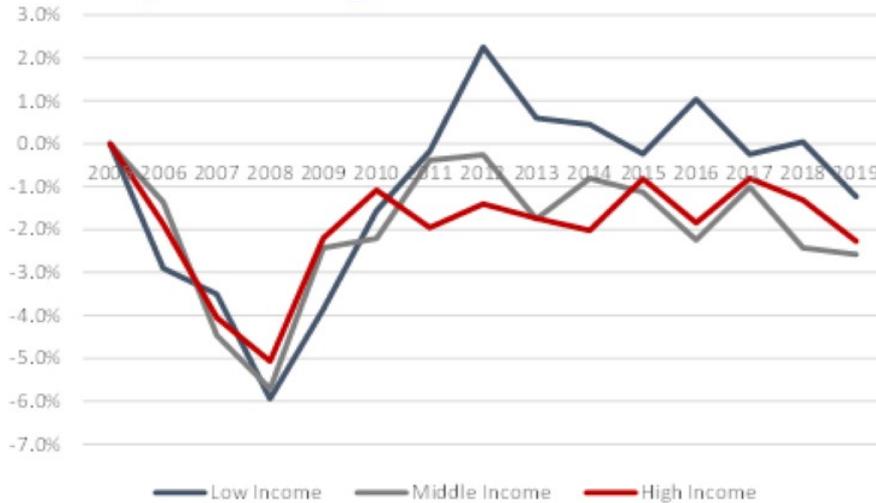
# Homeownership by income groups, cheap MSAs

Cheap MSAs have house prices in 2015 below the median house price of 381 MSA in the sample.

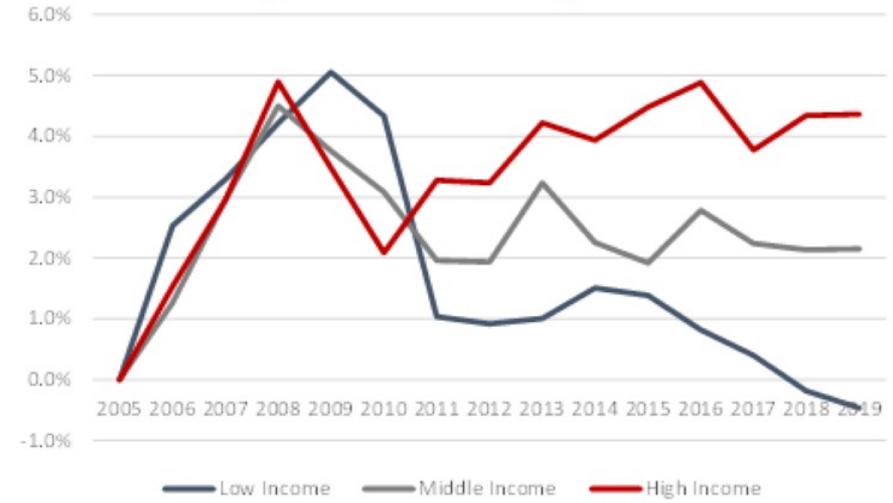


# Location of owner movers by house price growth

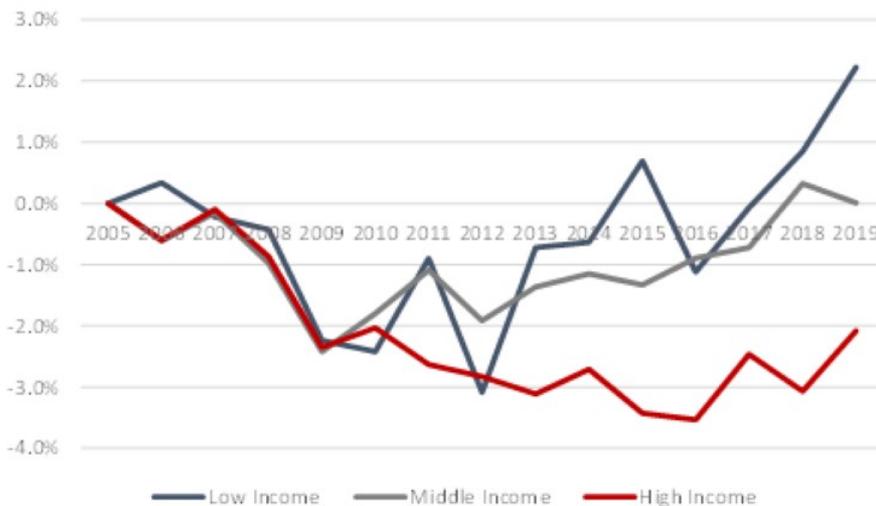
Always boom: High  $\Delta$ HIP 00-06 and 10-19



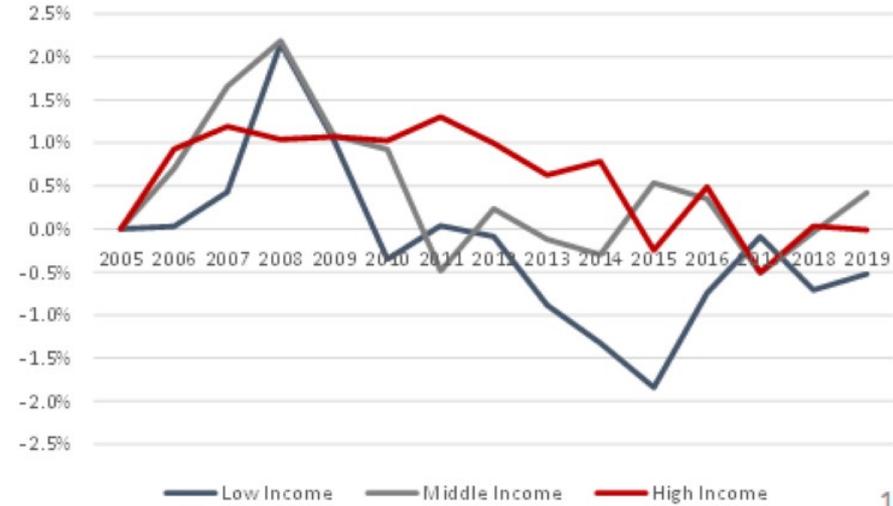
Late boom: High  $\Delta$ HIP 10-19 only



Early boom: High  $\Delta$ HIP 00-06

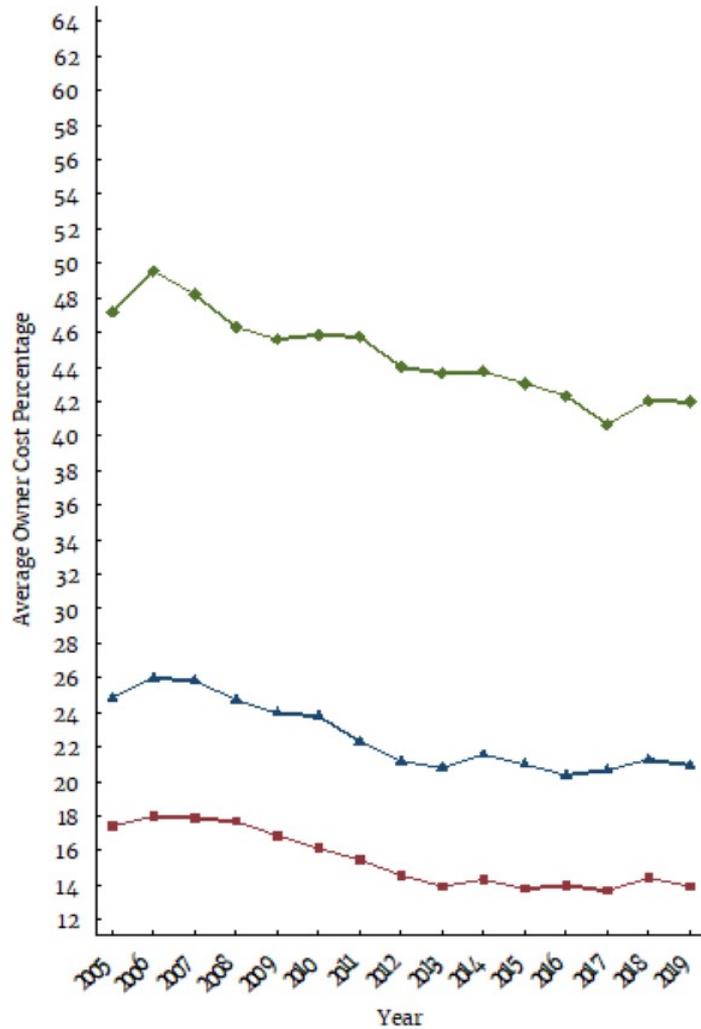


Never boom: Low  $\Delta$ HIP 00-06 and 10-19

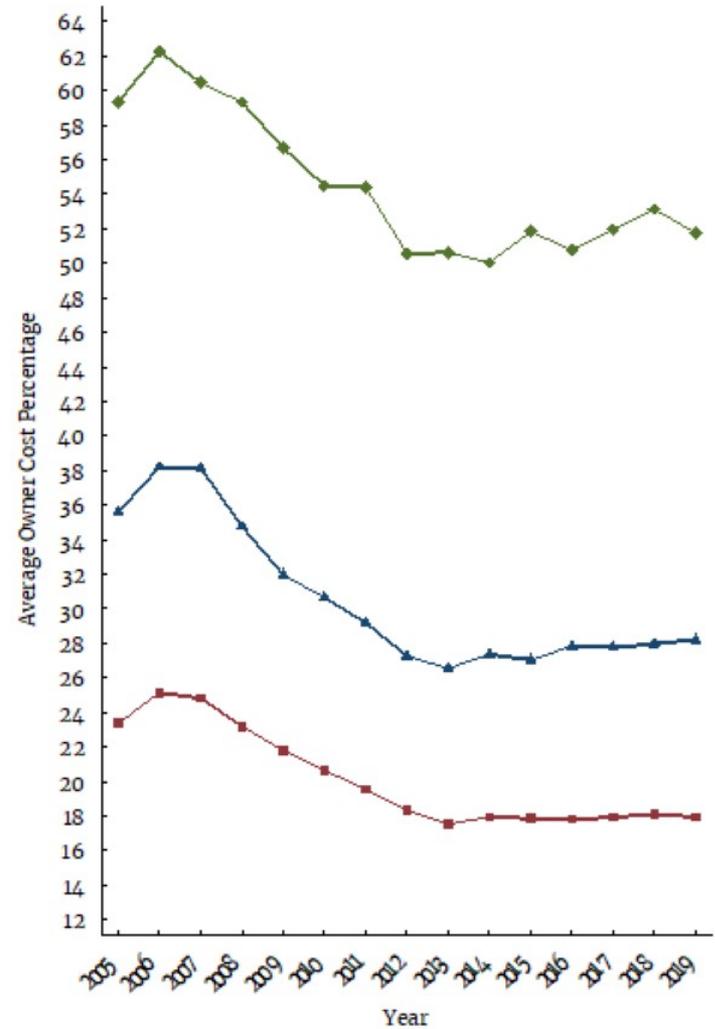


# Annual cost of owning as a percentage of income is substantially lower than in the previous boom (recent movers)

MSAs with below-median house price level in 2015



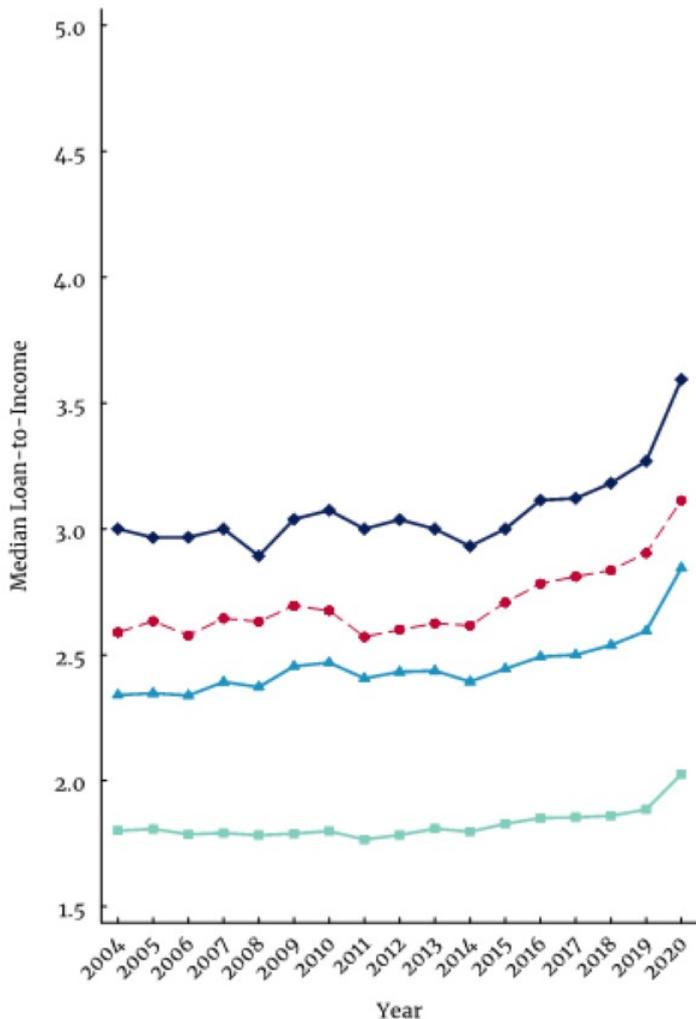
MSAs with above-median house price level in 2015



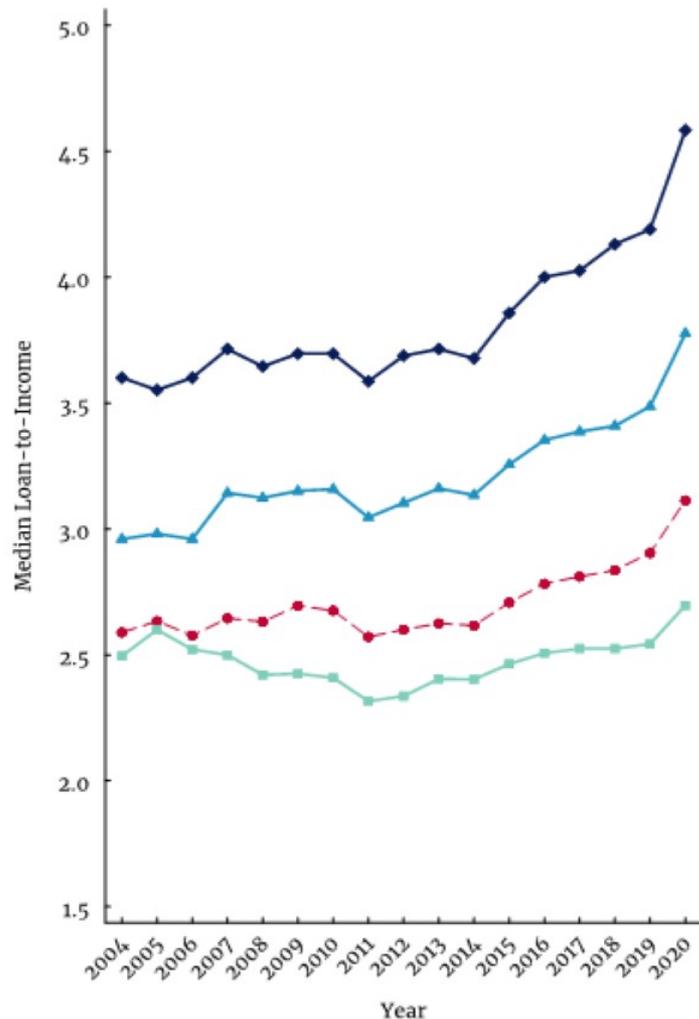
Whole Sample (All MSAs)    Low Income    Middle Income    High Income

# But much larger mortgages as a proportion of income, due to much lower interest rates and stable LTVs

MSAs with below-median house price level in 2015

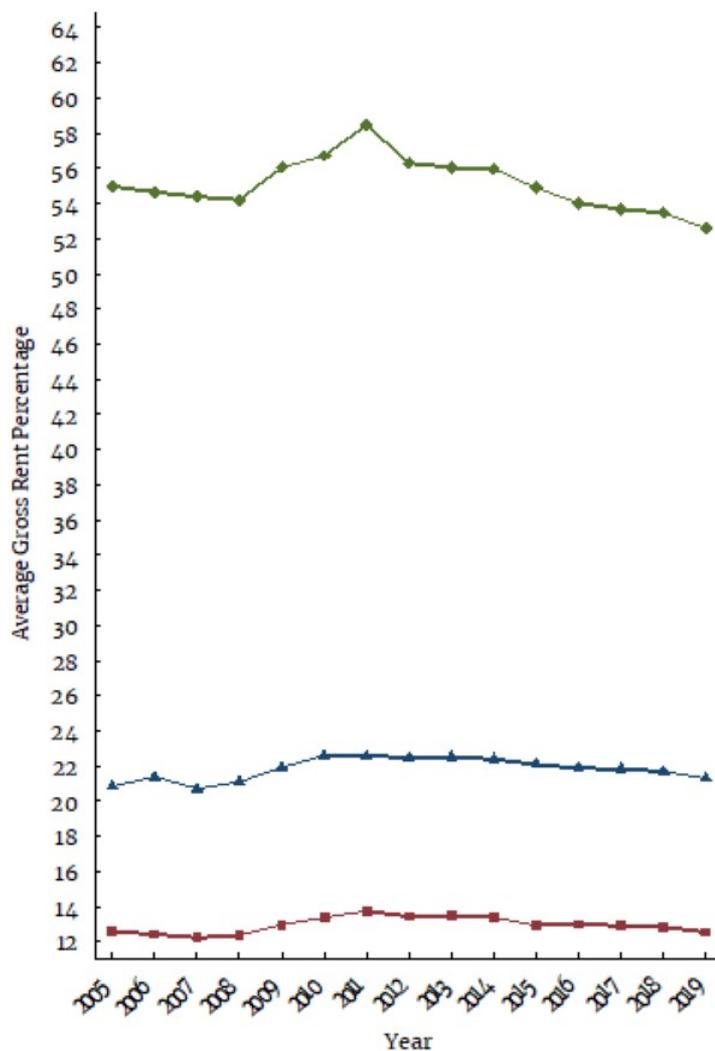


MSAs with above-median house price level in 2015

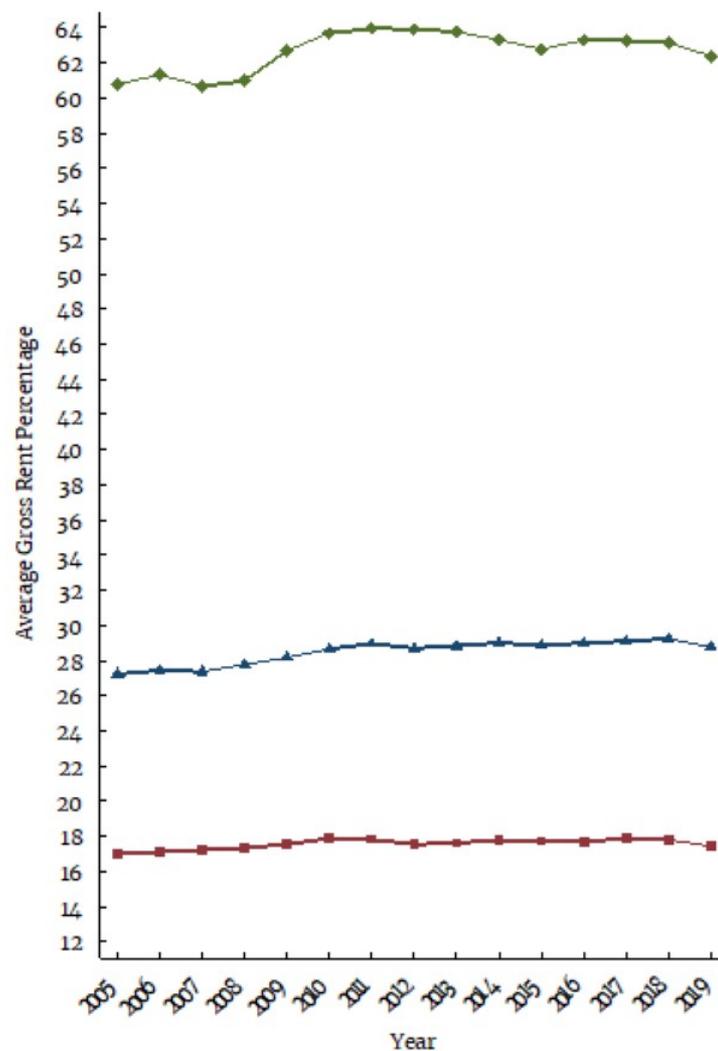


# Rental costs largely flat or slightly increasing

MSAs with below-median house price level in 2015



MSAs with above-median house price level in 2015



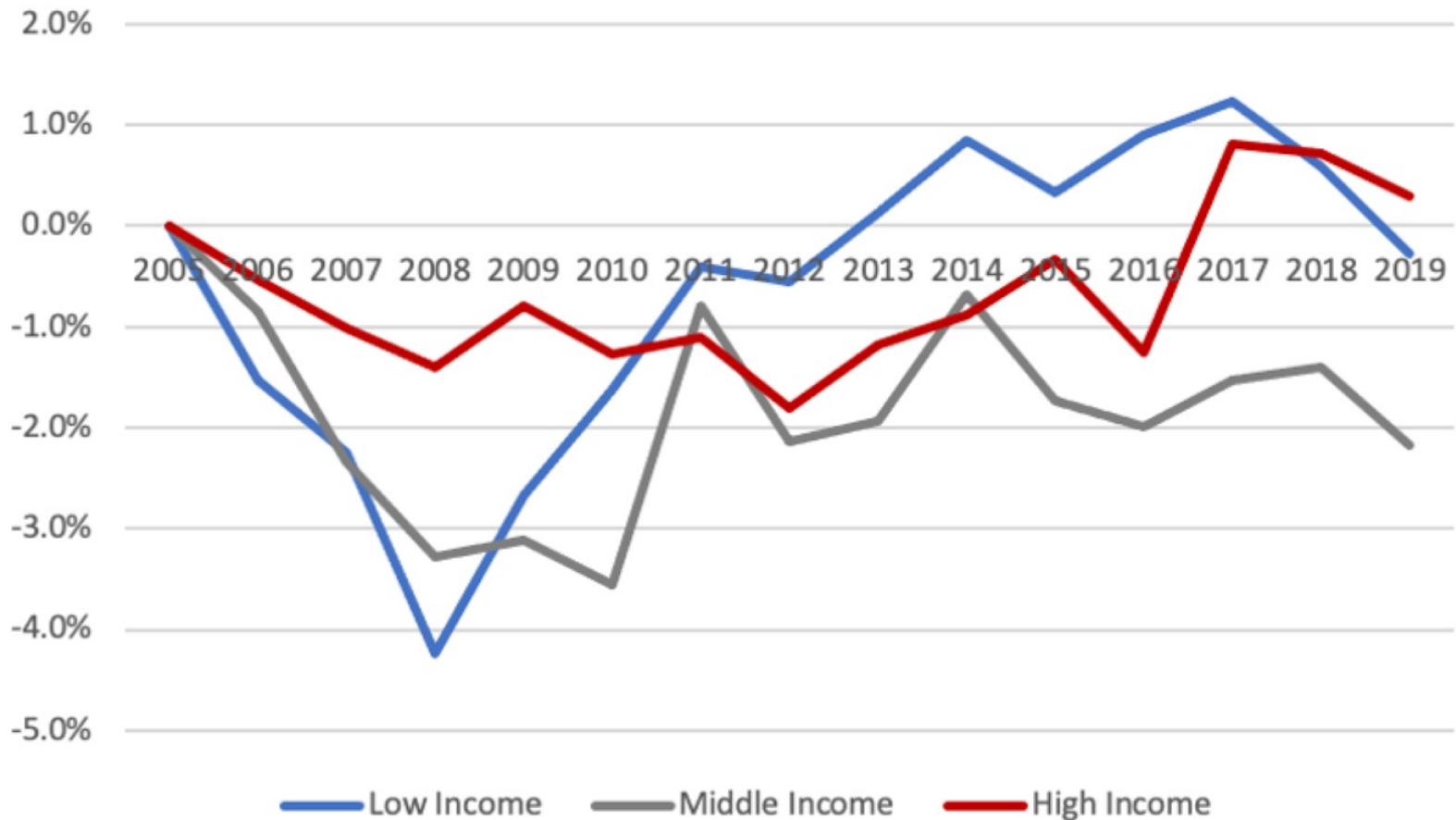
Whole Sample (All MSAs)    Low Income    Middle Income    High Income

# Conclusion

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- Housing markets have returned almost to pre-2008 price levels, but significant heterogeneity across regions and people.
- Homeownership overall is still below pre-crisis levels.
  - Downward trend more persistent for higher income groups. Low income groups reversed downward trend early, though they started from lower ownership levels.
  - Lower income groups more likely to buy in more expensive MSAs during recovery, but less likely to buy in MSAs with a recent boom in house prices.
- Cost of owning a home as a fraction of income dropped sharply for all income groups post 2008, especially in MSAs with high HP levels.
  - But the fraction of income spent on housing is still very high, especially for lower income groups. Mortgage levels have recently risen above 2008.
- Cost of rental has been flat or slightly increasing, especially for lower income groups.

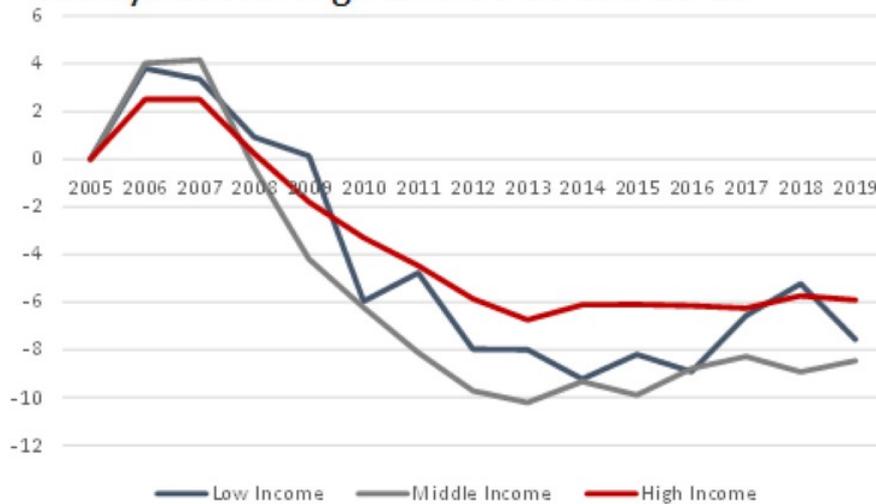
## Appendix: Change in location choice conditional on buying a home



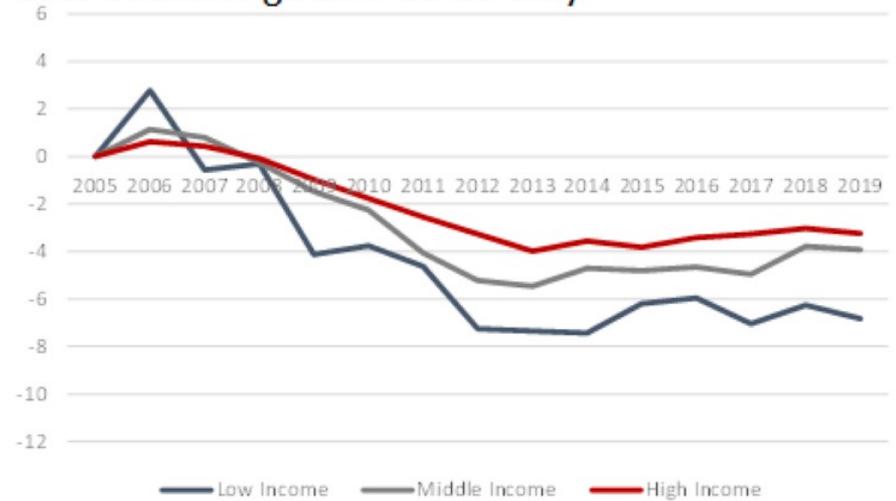
Changes of the proportions within each income group for owners and recent movers in MSAs that had above-median house prices in 2015, relative to base year 2005.

# Appendix: Cost of owning for recent movers by house price growth

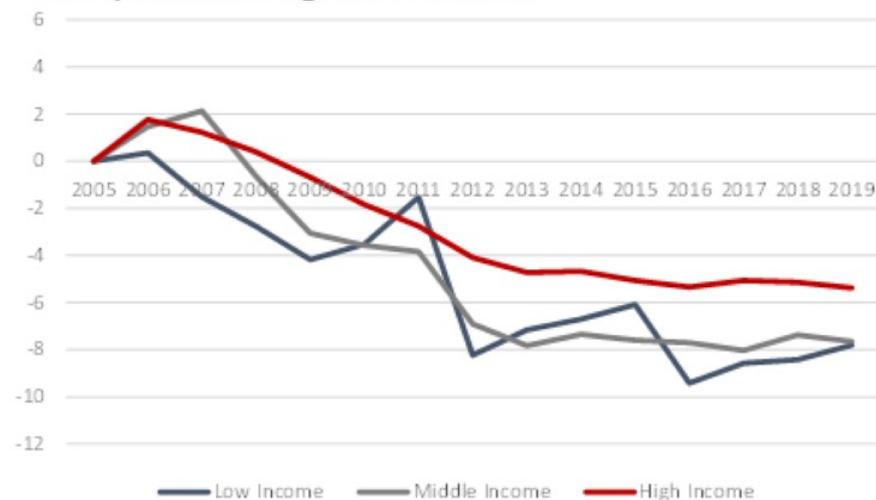
Always boom: High  $\Delta$ HP 00-06 and 10-19



Late boom: High  $\Delta$ HP 10-19 only



Early boom: High  $\Delta$ HP 00-06

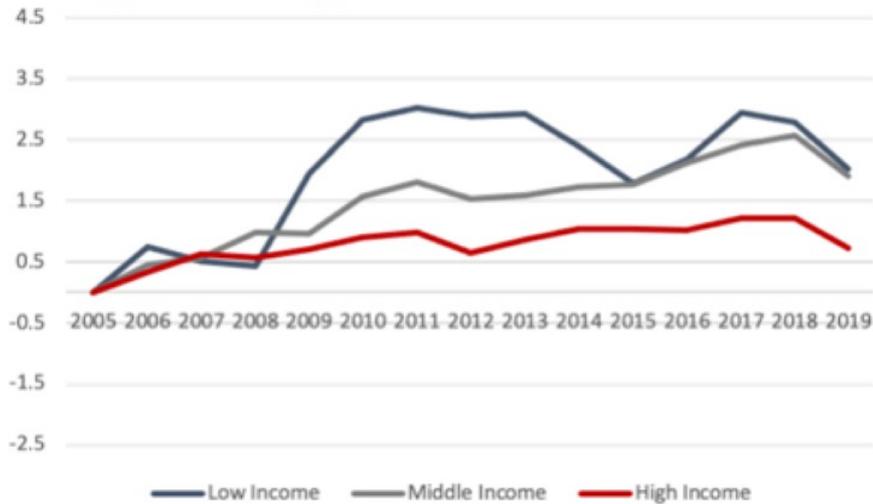


Never boom: High  $\Delta$ HP 00-06 and 10-19

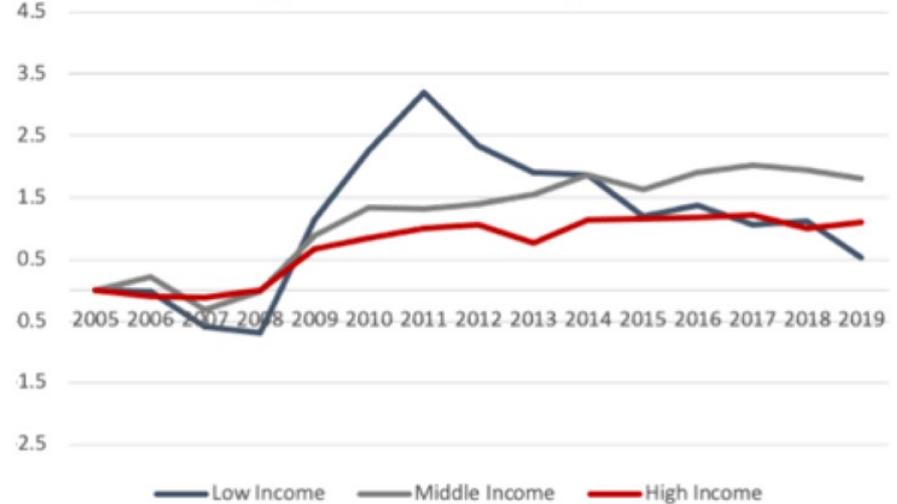


# Appendix: Cost of renting for recent movers by house price growth

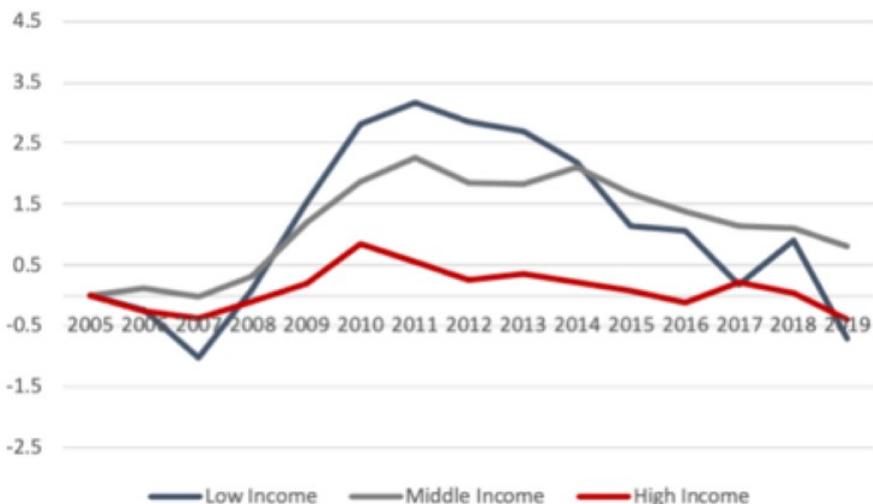
Always boom: High  $\Delta$ HP 00-06 and 10-19



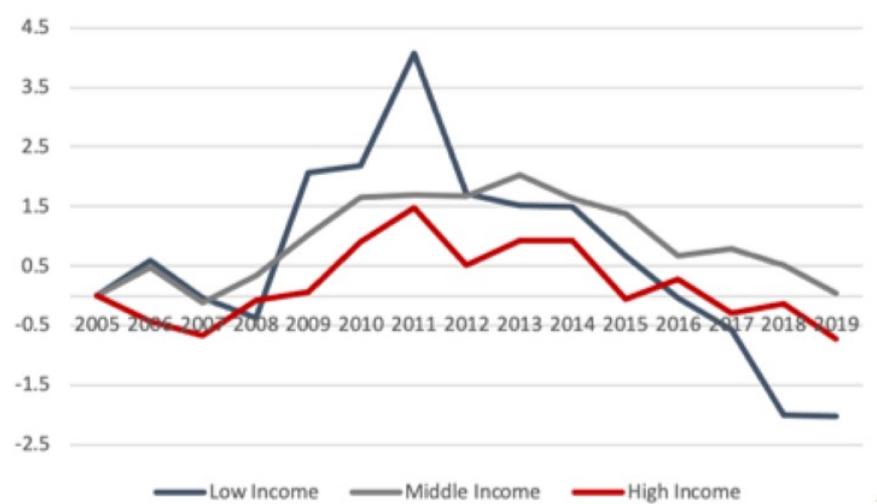
Late boom: High  $\Delta$ HP 10-19 only



Early boom: High  $\Delta$ HP 00-06



Never boom: High  $\Delta$ HP 00-06 and 10-19



## Appendix: Homeownership by income groups

### ACS data

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Year	Low Income	Middle Income	High Income
2005	46.2%	67.4%	86.4%
2006	46.0%	67.1%	86.1%
2007	45.7%	67.2%	86.1%
2008	45.3%	66.4%	85.2%
2009	44.4%	66.1%	84.8%
2010	43.6%	65.1%	84.1%
2011	43.0%	64.4%	83.4%
2012	42.7%	63.7%	82.4%
2013	42.7%	63.1%	81.9%
2014	42.6%	62.9%	81.4%
2015	42.5%	62.5%	81.3%
2016	43.1%	62.2%	81.0%
2017	44.2%	62.9%	81.5%
2018	44.6%	63.1%	81.5%
2019	44.5%	63.4%	81.5%

## Appendix: Income groups

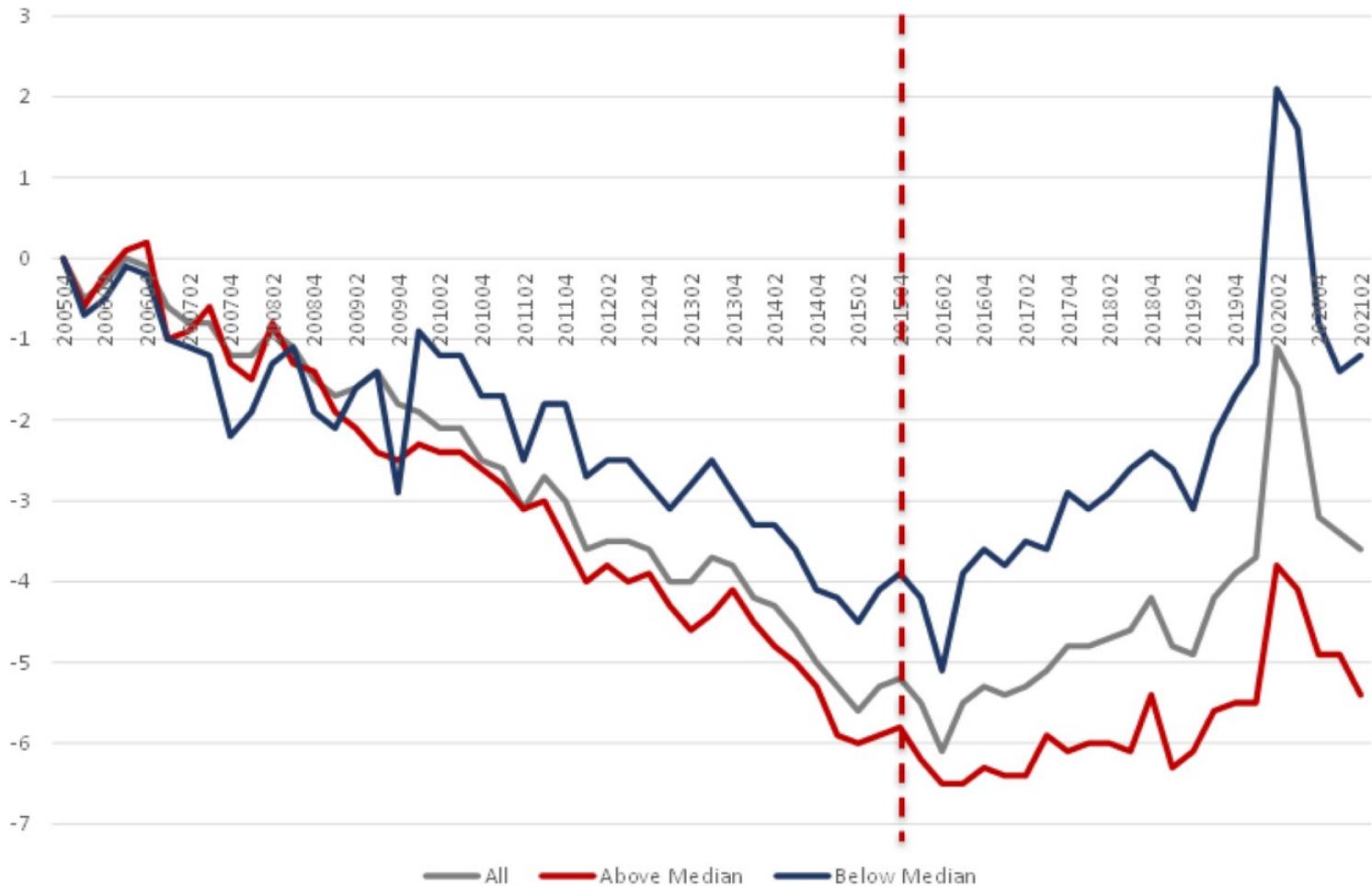
### ACS data

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Year	Low-Income Tercile Upper Limit	Middle-Income Tercile Upper Limit
2004	40269.52	87866.35
2005	40628.06	88298.31
2006	40901.37	89251.22
2007	41979.19	90827.70
2008	41716.51	90794.75
2009	39889.14	88239.63
2010	38319.58	86183.13
2011	37539.45	84463.76
2012	37621.56	85275.55
2013	38106.05	85290.32
2014	38628.79	86749.22
2015	39382.48	88610.59
2016	40648.16	91295.34
2017	41643.07	92789.30
2018	41773.12	93989.52
2019	43773.91	97161.73
2020	42307.83	94386.33

# Appendix: Homeownership by income groups

## CPS/HVS data



Housing Vacancies and Homeownership from Current Population Survey (CPS/HVS)

## Appendix: Origination volumes for high/low house price areas

### HMDA data

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#### MSAs with below-median house price level in 2015

Year	Low Income	Middle Income	High Income
2004	126,068	469,761	356,385
2005	134,053	494,145	356,170
2006	131,560	467,595	329,493
2007	129,130	389,637	262,324
2008	98,351	307,124	194,596
2009	89,769	293,935	173,573
2010	79,182	246,019	171,804
2011	68,163	227,030	166,587
2012	78,256	257,133	188,856
2013	84,505	287,944	226,126
2014	88,916	307,852	228,571
2015	106,995	353,368	250,589
2016	124,304	400,333	263,173
2017	139,515	415,919	267,201
2018	142,826	432,694	258,283
2019	167,587	442,050	258,371
2020	168,010	491,795	291,473

#### MSAs with above-median house price level in 2015

Year	Low Income	Middle Income	High Income
2004	148,072	1,158,732	1,828,441
2005	129,153	1,135,925	1,967,070
2006	106,155	942,427	1,720,380
2007	111,853	799,430	1,201,398
2008	105,518	689,120	820,854
2009	124,068	709,744	731,885
2010	116,974	602,619	707,511
2011	107,213	549,241	663,076
2012	119,378	617,461	767,027
2013	117,754	678,414	946,096
2014	119,849	732,236	971,812
2015	142,741	866,391	1,082,087
2016	160,396	996,851	1,167,301
2017	170,130	1,032,966	1,193,165
2018	166,405	1,046,488	1,148,297
2019	197,707	1,103,979	1,157,179
2020	184,893	1,205,314	1,311,673