How Does Home Equity Affect Homeowner Mobility?

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Presentation Outline

Topics

- Research Questions
- Literature Review
- Theoretical Framework
- Data
- Methodology
- Estimation Results

Research Questions

Research Question 1

How did the distribution of home equity change during the most recent boom-bust cycle?

- Highly-leveraged purchases
- Cash-out refinancing
- HELOCs

Research Question 2

How does equity erosion affect...

- Default behavior and foreclosure?
- Voluntary moves?

Preview of Findings

Equity and Mobility

- The recent erosion of equity reduced mobility by 25 percent in Florida between 2006 and 2010
- Increasing mortgage default rates marginally reduced the equity "lock in" effect

Equity and Labor Market Outcomes

- Decline in home equity may have exacerbated unemployment and reduced wage growth
- Indirect support for "Oswald Hypothesis"
  - Homeowners with less equity less mobile

Motivation
U.S. Housing Policy

Homeownership is promoted and heavily subsidized

- The creation of GSEs, FHLBs
- Tax treatment of mortgage interest, imputed rent and property taxes
  - $304 billion in 2010

Motivation

Does homeownership produce *positive* externalities?

DiPasquale and Glaeser (1999)

Homeowners have incentive to invest more heavily in their communities than renters because of

- Longer tenure
- Amenity capitalization into housing values

Positive Externalities of Homeownership

Higher homeownership rates result in

- Greater "social capital"
- Increased civic participation
- Better schools
- Lower crime rates

Motivation

Does homeownership produce *negative* externalities?

The "Oswald Hypothesis" (1996, 1997)

Homeownership is characterized by high transactions costs

- Homeowners less likely to move in response to labor market shocks
- Increased matching frictions increase equilibrium unemployment rate
- Financial frictions may make it impossible for some households to sell their homes
  - Owners with limited equity may not be able to cover transaction costs and net enough from sale to finance down payment on next property
  - Owners with negative equity may not have sufficient funds to pay off the mortgage balance

Motivation

Homeownership, "Lock In" and Transaction Costs

Why Are Homeowners Less Mobile?

- High transaction costs (e.g., search costs, realtor fees)
- Loss aversion
- Home equity and interest rate "lock in"

Implications for Post-Bubble Labor Market

- Surge in homeownership and reduction in equity during housing crash may have dramatically reduced mobility
- Lower mobility may help explain persistently high unemployment

Motivation

Our Contribution

Current State of the Literature

- Equity "lock in" has received renewed attention as a result of the housing crisis
- Mixed results in previous literature may reflect data methodological limitations

Improvements Over Previous Studies

- Control for mortgage defaults ignored in previous studies
- Accurate equity measures reflecting
  - Assessor's estimated market value
  - Balances on all mortgage loans
- Credit bureau data used to
  - Measure aggregate debt secured by property
  - Capture the cost of default using credit score

Literature Review

Early Literature

Voluntary Mobility

- Stein (1995) develops theoretical model of financial frictions
- Chan (2001) finds evidence of equity lock-in for GSE loans originated between 1989 and 1994
- Engelhardt (2003) finds equity constraints reduced mobility between 1985 and 1996

Default-induced Mobility

- Optimal to default when property values are sufficiently below mortgage debt
- Mortgage default triggers mobility through foreclosure
- Default literature reviewed in Vandell (1995)
- Evidence of strategic default in Guiso et al. (2009) and Bhutta et al. (2010)

Literature Review

Ferreira et al. (2010)

Framework and Findings

- Use American Housing Survey (AHS) data from 1985 to 2007
- Estimate interest rate and home equity "lock in" effects
- Homeowners with negative equity one-third less mobile
- Evidence of interest rate "lock in"

Limitations

- Relies on owner-estimated housing values
- Outstanding mortgage balance is self-reported
- Data does not cover housing bust
- Only 3% of sample with negative equity
- No control for default or delinquency

Literature Review

Schullhofer-Wohl (2010)

Framework and Findings

- Same data as Ferreira et al. (2010)
- Includes observations that transitioned from owner-occupied to renter-occupied or vacant
  - These observations were dropped in Ferreira et al. (2010)
- Finds that homeowners with negative equity are *more* likely to move
- Attributes differences in findings to sample construction

Limitations

- Relies on owner-estimated housing values
- Same data limitations as Ferreira et al. (2010)
- Unclear how to interpret findings because of the inclusion of defaults

Literature Review

Coulson and Grieco (2013)

Framework and Findings

- PSID data from 1999 through 2009
- Multinomial Logit model of move decision
  - No move, in-state move, out-of-state move
- Finds that moderate negative equity does not reduce mobility
- Households with LTV ratios above 1.2 *more* likely to move

Limitations

- Relies on owner-estimated housing values
- Sample pre-dates housing crash
  - Only 1.3% of sample has negative equity

Theoretical Framework

Home Equity, Mobility, and Default

Simple Theoretical Model

- Two-period model and two types of housing units
- Households have exogenous level of equity in first period
- Household receives taste shock that affects housing demand
- In response to shock, household chooses to
  1. Stay in current home
  2. Sell home and change housing unit type
  3. Default on mortgage and rent
- Ability to purchase a new home constrained by down payment requirements

Theoretical Framework

Home Equity, Mobility, and Default

Home Equity Affects Mobility Through Two Distinct Channels

A fall in home equity can...

Channel 1

Decrease mobility because it is more difficult to sell home and pay off debt

Channel 2

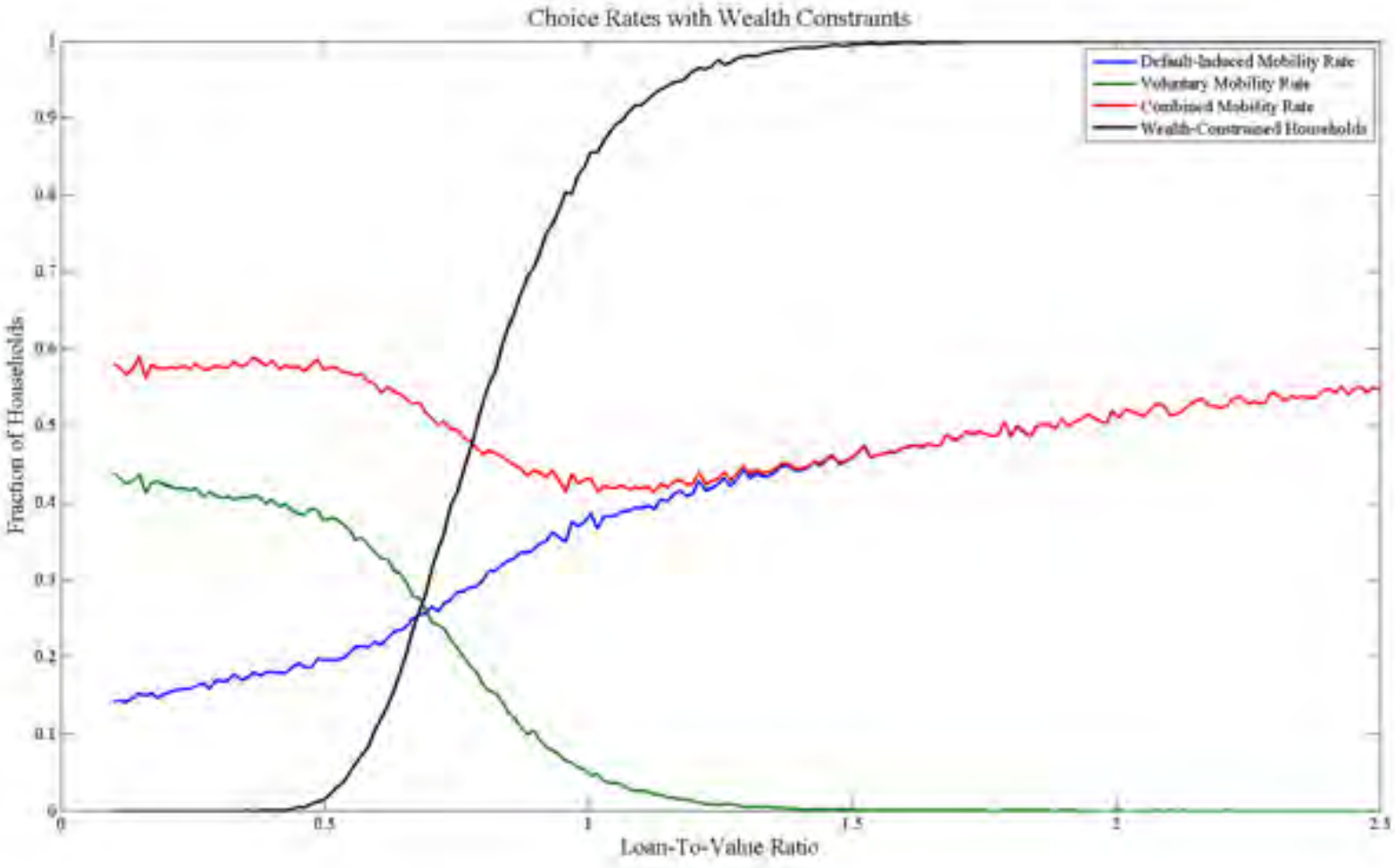
Increase mobility because of the increased incentive to default on the loan

Empirical Relationship Between Equity and Mobility

U-shaped relationship between equity and mobility

Theoretical Framework

Home Equity, Mobility, and Default



Data Sources

Property Transactions

DataQuick Property Database

Includes information on

- Residential property transactions in Florida from 1999-2010
- Type of transaction
- Dates on which a property transacts
  - Used to identify start and stop of tenure period
  - A move is classified as an ownership-changing transaction
- Information on loan originations on property
  - Balances at origination
  - Refinancing activity
- Property identifier that can be linked to property tax records

Data Sources

Property Tax Data

Florida Department of Revenue Property Tax Database

- Can be linked to DataQuick data using tax identifier
- Estimated market value of every property in Florida from 1995-2011
  - Estimate value as of January of given year
  - Updated annually and audited for accuracy
  - Found in previous studies to be a very strong predictor of sales prices
  - Salient measure of housing values
- Property type (e.g., single-family, condo)
- Year of construction
- Transaction data used to construct house price index at county level

Data Sources

Property Tax Data

	Dependent Variable: Sales Price		
	Valuation Type		
Coefficient	Assessor	County HPI	State HPI
Intercept	11667.9	28645.2	20110.9
Estimated Market Value	1.013	0.886	0.919
RMSE	44585	57058	58732
R^2	0.909	0.8507	0.8418
Observations	78464	78464	78464

Data Sources

Credit Bureau Information

Experian Data

- Linked with transaction DataQuick transaction data
  - Origination amount, zipcode, and origination date
    - Matches validated using longitudinal loan information
  - Tradelines on property identified using loan dates from DataQuick
- Includes information on
  - Outstanding balances on mortgages
  - Credit scores
  - Other debt
  - Age

Data Sources

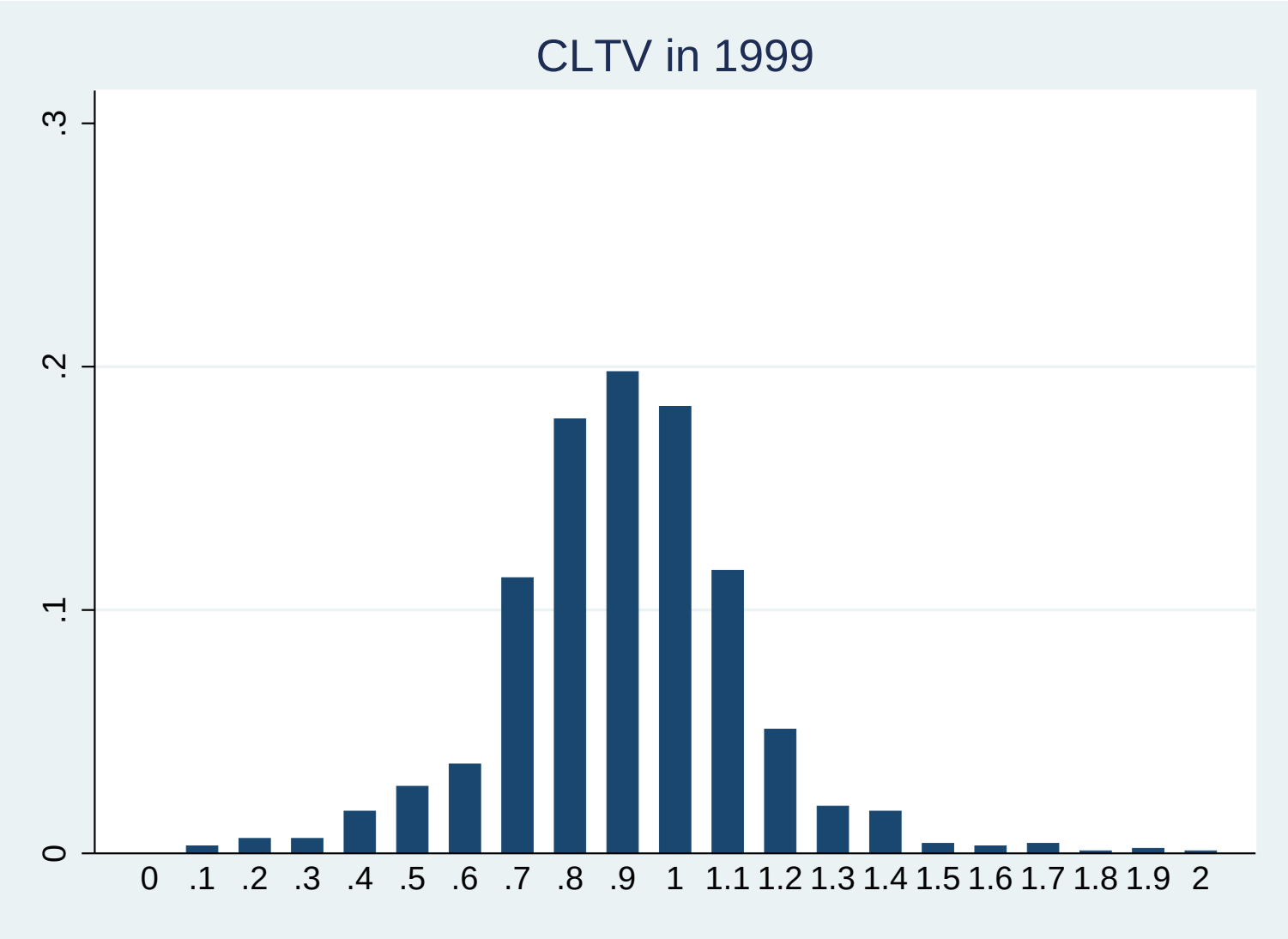
Home Equity Measure

Calculating Debt and Value

- Assessor's estimated market value captures local market information as of January each year
  - Values updated to June each year using county-level HPI
- Loan balance reflects precise information on all first and second lien balances secured by the property

Year: 1990
Housing Prices
Prices in 2010 Dollars
Gulf of Mexico
Montgomery
Auburn
Columbus
Selma
Thomaston
Warner Robins
Swainsboro
Statesboro
Beaufort
Savannah
Vidalia
Americus
Helena
Hinesville
Eufaula
Greenville
Troy
Fitzgerald
Albany
Jesup
Monroeville
Tifton
Douglas
Enterprise
Dothan
Moultrie
Waycross
Brunswick
Brewton
Thomasville
Valdosta
Okefenokee N.W.R.
Okefenokee Swamp
Kingsland
Crestview
Marianna
Pensacola
Fort Walton Beach
Tallahassee
Jacksonville
Live Oak
Panama City
Perry
Apalachicola
Cross City
Gainesville
Palm Coast
Ocala
Daytona Beach
Beverly Hills
Delton
Orlando
Spring Hill
Merritt Island
Lakeland
Florida Turnpike
Clearwater
Tampa
Palm Bay
St Petersburg
Pinellas Park
Sebring
Sarasota
Fort St
North Port
Port Charlotte
Lake Okeechobee
Belle Glade
Cape Coral
The Everglades
East Naples
Big Cypress Swamp
Pembroke Pines
Hialeah
Everglades National Park
Biscayne N.P.
Florida Bay
Key West
Straits of Florida

Current Loan-To-Value Ratio For Active Mortgages



Summary Statistics

	Sample Means				
			Sample Type		
Variable	Full Sample	No Move	Any Move	Voluntary Move	Involuntary Move
Any Move	0.0286	-	1.0	1.0	1.0
	(0.1666)	-	-	-	-
Voluntary Move	0.0255	-	0.8927	1.0	-
	(0.1576)	-	(0.3096)	-	-
Involuntary Move	0.0031	-	0.1073	-	1.0
	(0.0553)	-	(0.3096)	-	-
Age	47.5028	47.5932	44.4276	44.5108	43.7352
	(12.4031)	(12.3655)	(13.2653)	(13.6703)	(9.258)
Years Since Purchase	4.1124	4.1626	2.4041	2.3204	3.1
	(3.1943)	(3.2128)	(1.779)	(1.7879)	(1.5437)
Credit Score Buckets					
$600 \leq Score < 700$	0.1665	0.1662	0.174	0.1642	0.2556
	(0.3725)	(0.3723)	(0.3793)	(0.3707)	(0.4386)
$700 \leq Score < 800$	0.2799	0.2795	0.2956	0.3138	0.1444
	(0.449)	(0.4488)	(0.4566)	(0.4643)	(0.3535)
$800 \leq Score \leq 900$	0.4589	0.4612	0.3826	0.4206	0.0667
	(0.4983)	(0.4985)	(0.4863)	(0.494)	(0.2508)
Loan-to-Value Ratio (LTV) Buckets					
$0.8 \leq LTV < 0.95$	0.1652	0.164	0.205	0.2176	0.1
	(0.3713)	(0.3703)	(0.4039)	(0.4129)	(0.3017)
$0.95 \leq LTV < 1.1$	0.1143	0.1148	0.0954	0.0908	0.1333
	(0.3181)	(0.3188)	(0.2939)	(0.2875)	(0.3418)
$1.1 \leq LTV < 1.3$	0.0824	0.083	0.0632	0.0574	0.1111
	(0.275)	(0.2758)	(0.2434)	(0.2328)	(0.316)
$LTV > 1.3$	0.1067	0.107	0.0965	0.0521	0.4667
	(0.3088)	(0.3092)	(0.2955)	(0.2223)	(0.5017)
Observations	29378	28539	839	749	90
Property Types in Sample	Single-Family and Condo	Single-Family and Condo	Single-Family and Condo	Single-Family and Condo	Single-Family and Condo
Age Group in Sample	All	All	All	All	All

Standard Deviations in Parentheses

Logit Model Results

General Mobility Models

	Dependent Variable Any Move (Voluntary of Involuntary) Over Next 12 Months?			
	Model/Sample Type			
Coefficient	(1)	(2)	(3)	(4)
Age	-0.0903***	-0.0857***	-0.0877***	-0.144***
	(0.0159)	(0.0159)	(0.0191)	(0.0469)
Age^2	0.000811***	0.000770***	0.000787***	0.00150**
	(0.000157)	(0.000157)	(0.000192)	(0.000607)
Years Since Purchase	0.286***	0.310***	0.295***	0.284***
	(0.0575)	(0.0580)	(0.0635)	(0.0680)
Years Since $Purchase^2$	-0.0765***	-0.0757***	-0.0752***	-0.0776***
	(0.00935)	(0.00949)	(0.0102)	(0.0110)
Credit Score Buckets				
$600 \leq Score < 700$	-0.527***	-0.524***	-0.598***	-0.466***
	(0.126)	(0.127)	(0.146)	(0.139)
$700 \leq Score < 800$	-0.504***	-0.483***	-0.464***	-0.469***
	(0.115)	(0.116)	(0.131)	(0.129)
$800 \leq Score \leq 900$	-0.671***	-0.609***	-0.616***	-0.596***
	(0.113)	(0.113)	(0.127)	(0.127)
Loan-to-Value Ratio (LTV) Buckets				
$0.8 \leq LTV < 0.95$	-0.161*	-0.171*	-0.198*	-0.198*
	(0.0952)	(0.0965)	(0.109)	(0.110)
$0.95 \leq LTV < 1.1$	-0.586***	-0.536***	-0.508***	-0.633***
	(0.127)	(0.129)	(0.140)	(0.146)
$1.1 \leq LTV < 1.3$	-0.594***	-0.493***	-0.871***	-0.636***
	(0.152)	(0.157)	(0.192)	(0.174)
$LTV > 1.3$	-0.307**	-0.259**	-0.456***	-0.269*
	(0.123)	(0.126)	(0.149)	(0.140)
Observations	29,378	29,378	24,625	20,993
Psuedo-R^2	0.0690	0.0879	0.0691	0.0753
Include Year Fixed Effects?	No	Yes	No	No
Property Types in Sample	Single-Family and Condo	Single-Family and Condo	Single-Family	Single-Family and Condo
Age Group in Sample	All	All	All	Younger than 50

Standard Errors Clustered on Household Reported in Parentheses
***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Logit Model Results

Voluntary Mobility Models

	Dependent Variable Voluntary Move Over Next 12 Months?			
	Model/Sample Type			
Coefficient	(1)	(2)	(3)	(4)
Age	-0.112***	-0.106***	-0.110***	-0.169***
	(0.0162)	(0.0163)	(0.0195)	(0.0483)
Age^2	0.00101***	0.000962***	0.000993***	0.00173***
	(0.000159)	(0.000160)	(0.000195)	(0.000630)
Years Since Purchase	0.208***	0.236***	0.240***	0.209***
	(0.0595)	(0.0599)	(0.0663)	(0.0707)
Years Since $Purchase^2$	-0.0679***	-0.0645***	-0.0692***	-0.0686***
	(0.00968)	(0.00971)	(0.0107)	(0.0114)
Credit Score Buckets				
$600 \leq Score < 700$	-0.231	-0.226	-0.319*	-0.183
	(0.149)	(0.149)	(0.172)	(0.164)
$700 \leq Score < 800$	-0.0955	-0.0682	-0.0738	-0.0871
	(0.136)	(0.137)	(0.155)	(0.152)
$800 \leq Score \leq 900$	-0.229*	-0.137	-0.194	-0.175
	(0.135)	(0.134)	(0.151)	(0.149)
Loan-to-Value Ratio (LTV) Buckets				
$0.8 \leq LTV < 0.95$	-0.189*	-0.178*	-0.219*	-0.230**
	(0.0978)	(0.0996)	(0.112)	(0.113)
$0.95 \leq LTV < 1.1$	-0.729***	-0.630***	-0.641***	-0.792***
	(0.136)	(0.139)	(0.150)	(0.157)
$1.1 \leq LTV < 1.3$	-0.766***	-0.569***	-1.029***	-0.793***
	(0.166)	(0.172)	(0.209)	(0.189)
$LTV > 1.3$	-0.957***	-0.786***	-1.206***	-1.028***
	(0.172)	(0.172)	(0.219)	(0.203)
Observations	29,378	29,378	24,625	20,993
Psuedo-R^2	0.0726	0.0983	0.0748	0.0805
Include Year Fixed Effects?	No	Yes	No	No
Property Types in Sample	Single-Family and Condo	Single-Family and Condo	Single-Family	Single-Family and Condo
Age Group in Sample	All	All	All	Younger than 50

Standard Errors Clustered on Household Reported in Parentheses
***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Logit Model Results

Involuntary Mobility Models

	Dependent Variable Involuntary Move Over Next 12 Months?			
	Model/Sample Type			
Coefficient	(1)	(2)	(3)	(4)
Age	0.215**	0.212**	0.164	0.277
	(0.0966)	(0.101)	(0.0997)	(0.215)
Age^2	-0.00235**	-0.00234**	-0.00170	-0.00313
	(0.00106)	(0.00109)	(0.00106)	(0.00266)
Years Since Purchase	1.099***	0.830***	0.885***	0.919***
	(0.225)	(0.215)	(0.232)	(0.237)
Years Since $Purchase^2$	-0.172***	-0.148***	-0.141***	-0.155***
	(0.0352)	(0.0334)	(0.0351)	(0.0392)
Credit Score Buckets				
$600 \leq Score < 700$	-1.127***	-1.060***	-1.202***	-1.099***
	(0.264)	(0.267)	(0.311)	(0.299)
$700 \leq Score < 800$	-2.107***	-2.059***	-2.059***	-1.964***
	(0.336)	(0.343)	(0.385)	(0.368)
$800 \leq Score \leq 900$	-3.218***	-3.281***	-3.128***	-2.842***
	(0.453)	(0.452)	(0.506)	(0.454)
Loan-to-Value Ratio (LTV) Buckets				
$0.8 \leq LTV < 0.95$	0.203	0.0716	0.103	0.138
	(0.422)	(0.427)	(0.469)	(0.483)
$0.95 \leq LTV < 1.1$	0.881**	0.511	0.842*	0.873*
	(0.399)	(0.401)	(0.436)	(0.447)
$1.1 \leq LTV < 1.3$	0.993**	0.316	0.611	0.840*
	(0.421)	(0.446)	(0.514)	(0.492)
$LTV > 1.3$	1.850***	1.050***	1.728***	2.018***
	(0.312)	(0.337)	(0.353)	(0.352)
Observations	29,378	29,378	24,625	20,993
Psuedo-R^2	0.220	0.252	0.197	0.205
Include Year Fixed Effects?	No	Yes	No	No
Property Types in Sample	Single-Family and Condo	Single-Family and Condo	Single-Family	Single-Family and Condo
Age Group in Sample	All	All	All	Younger than 50

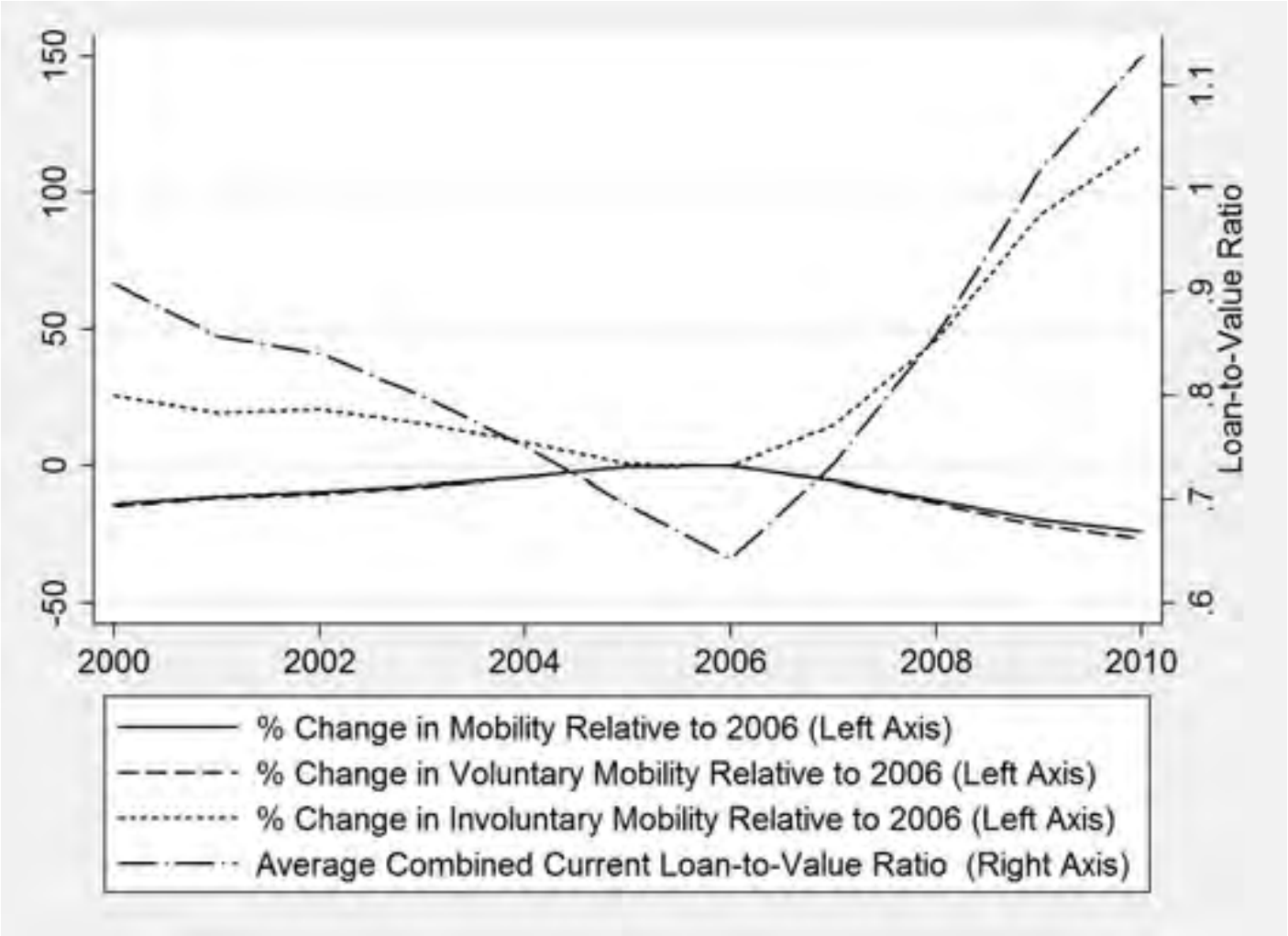
Standard Errors Clustered on Household Reported in Parentheses
***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Multinomial Logit Model Results

	Dependent Variable Probability of Move Type Over Next 12 Months?							
	Model/Sample Type							
	(1)		(2)		(3)		(4)	
	Move Type							
Coefficient	Voluntary	Involuntary	Voluntary	Involuntary	Voluntary	Involuntary	Voluntary	Involuntary
Age	-0.112***	0.211**	-0.105***	0.209**	-0.110***	0.161	-0.168***	0.270
	(0.0162)	(0.0966)	(0.0163)	(0.101)	(0.0196)	(0.0997)	(0.0483)	(0.216)
Age^2	0.00101***	-0.00232**	0.000958***	-0.00231**	0.000989***	-0.00167	0.00172***	-0.00306
	(0.000159)	(0.00106)	(0.000160)	(0.00109)	(0.000195)	(0.00106)	(0.000630)	(0.00266)
Years Since Purchase	0.211***	1.100***	0.238***	0.833***	0.241***	0.887***	0.211***	0.920***
	(0.0595)	(0.225)	(0.0600)	(0.215)	(0.0664)	(0.232)	(0.0708)	(0.237)
Years Since $Purchase^2$	-0.0682***	-0.173***	-0.0648***	-0.149***	-0.0695***	-0.142***	-0.0689***	-0.156***
	(0.00970)	(0.0353)	(0.00973)	(0.0335)	(0.0108)	(0.0352)	(0.0114)	(0.0393)
Credit Score Buckets								
$600 \leq Score < 700$	-0.243	-1.134***	-0.236	-1.066***	-0.329*	-1.209***	-0.193	-1.104***
	(0.149)	(0.264)	(0.149)	(0.267)	(0.172)	(0.312)	(0.164)	(0.299)
$700 \leq Score < 800$	-0.110	-2.111***	-0.0803	-2.061***	-0.0860	-2.061***	-0.100	-1.967***
	(0.136)	(0.336)	(0.137)	(0.343)	(0.155)	(0.385)	(0.152)	(0.368)
$800 \leq Score \leq 900$	-0.245*	-3.225***	-0.150	-3.285***	-0.207	-3.133***	-0.190	-2.848***
	(0.135)	(0.453)	(0.134)	(0.453)	(0.151)	(0.506)	(0.149)	(0.455)
Loan-to-Value Ratio (LTV) Buckets								
$0.8 \leq LTV < 0.95$	-0.189*	0.197	-0.179*	0.0662	-0.219*	0.0971	-0.229**	0.131
	(0.0978)	(0.422)	(0.0996)	(0.427)	(0.112)	(0.469)	(0.113)	(0.483)
$0.95 \leq LTV < 1.1$	-0.726***	0.858**	-0.629***	0.494	-0.638***	0.823*	-0.790***	0.848*
	(0.136)	(0.399)	(0.139)	(0.401)	(0.150)	(0.437)	(0.157)	(0.447)
$1.1 \leq LTV < 1.3$	-0.763***	0.970**	-0.569***	0.301	-1.028***	0.585	-0.791***	0.815*
	(0.166)	(0.422)	(0.172)	(0.445)	(0.209)	(0.515)	(0.189)	(0.493)
$LTV > 1.3$	-0.942***	1.824***	-0.777***	1.032***	-1.193***	1.700***	-1.009***	1.989***
	(0.172)	(0.311)	(0.172)	(0.337)	(0.219)	(0.353)	(0.202)	(0.352)
Observations	29,378		29,378		24,625		20,993	
Psuedo-R^2	0.0946		0.121		0.0926		0.101	
Include Year Fixed Effects?	No		Yes		No		No	
Property Types in Sample	Single-Family and Condo		Single-Family and Condo		Single-Family		Single-Family and Condo	
Age Group in Sample	All		All		All		Younger Than 50	

Standard Errors Clustered on Household Reported in Parentheses
***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Marginal Impact of Change in Equity on Mobility



Conclusion

Summary of Empirical Findings

- The erosion of equity has significantly reduced geographic mobility
- The "lock in" effect has been mitigated only marginally by default-induced mobility

Policy Implications

- If reduction in geographic mobility has contributed to persistent unemployment...
  - Calls into question subsidies for homeownership
  - Policies aimed at reducing equity "lock in" effect may be warranted