

# **“I’ll Have What She’s Having”: Identifying Social Influence in Household Mortgage Decisions**

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UNIVERSITY OF  
**TORONTO**

# Mortgage Decisions are Important and Complex

- **Mortgage Decisions are Important**

- An important role in precipitating the Great Recession
- 50 million owner-occupied households with \$10 trillion in outstanding mortgage debt

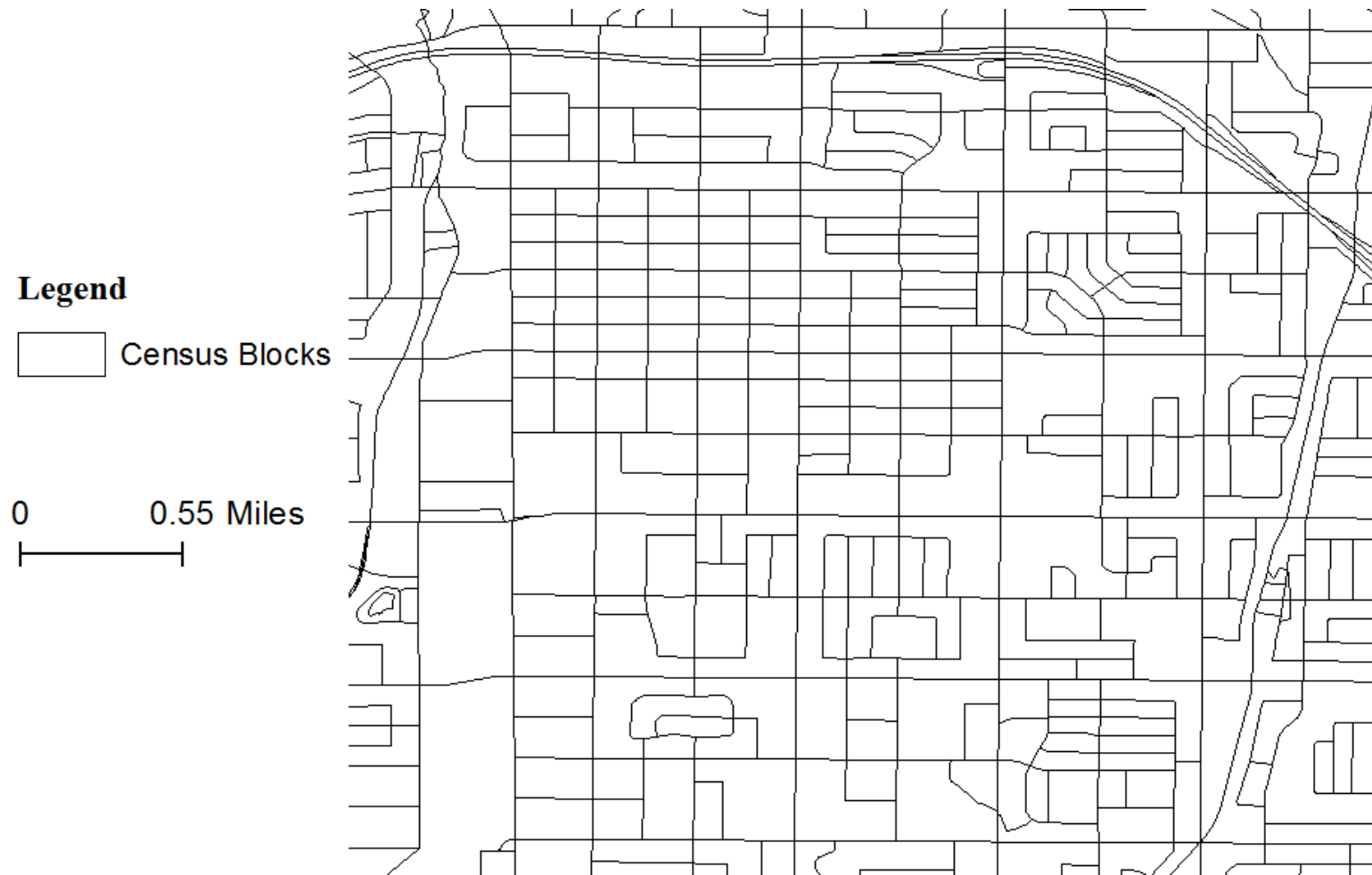
- **Mortgage Decisions are Complex**

- Households must incorporate a variety of market factors and personal characteristics
- Choose: lenders, fixed or adjustable interest rate, whether or not to refinance

# *What drives households' mortgage choices?*

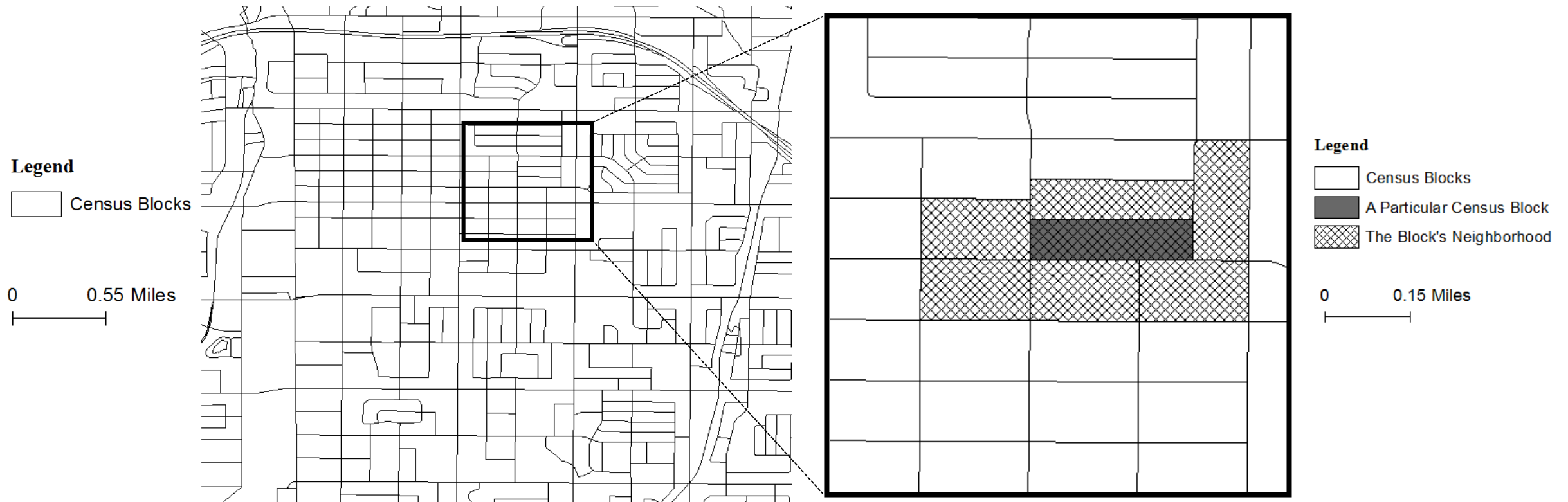
We find that one important economic force is **Neighbor Social Influence**, affecting lender choice, mortgage type (ARM vs. FRM), and the decision to refinance

# Identification Strategy – The Problem

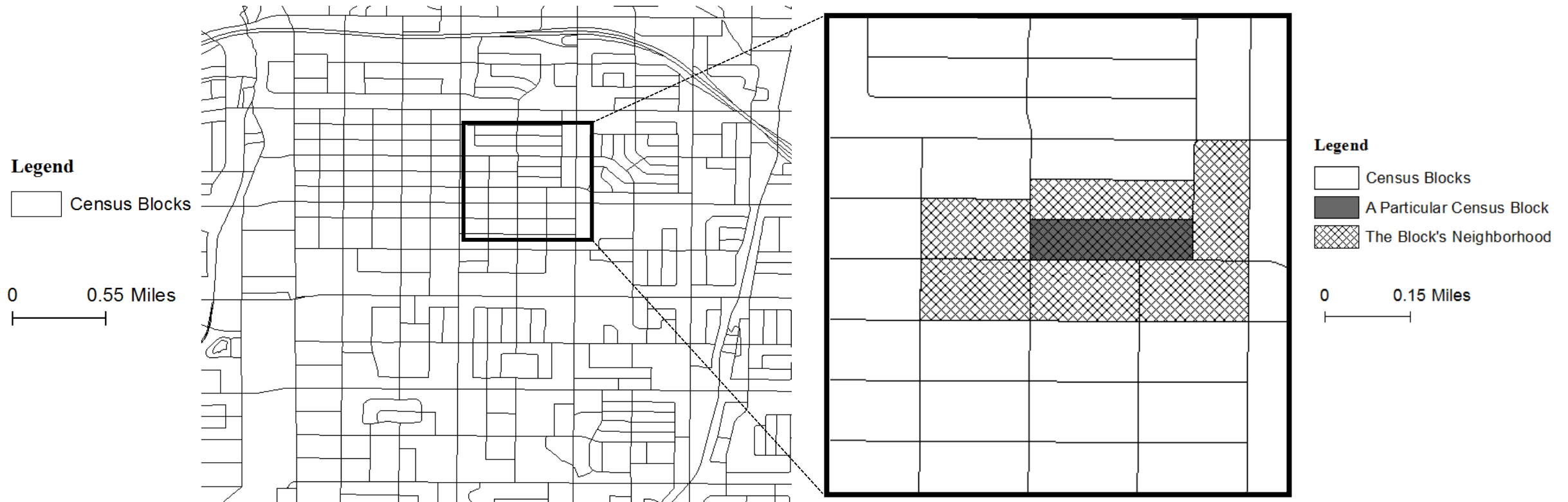


1. Endogenous Group Formation
2. Correlated Unobservables

# Identification Strategy – Blocks & Neighborhoods



# Identification Strategy – The Assumption



Assumption: Households choose neighborhood, but are less likely to choose the precise block: **Conditional on neighborhood peers, block peers are randomly assigned.**

# Identification Strategy – The Model

Linear Probability Model:

$$y_{it} = \alpha + \beta_1 * \textit{blockshare}_i + \beta_2 * \textit{neighborhoodshare}_i + \gamma * \mathbf{X}_i + \tau_t + \varepsilon_{it}$$

$y_{it}$

the binary mortgage decision

$\textit{blockshare}$

share of block peers with, e.g., ARMs

$\textit{neighborhoodshare}$

share of neighborhood peers with, e.g., ARMs

**Note:** block peers are also neighborhood peers.

# Results – Preview

Households behave especially like their hyperlocal, block peers when choosing lenders, ARMs vs FRMs, and whether or not to refinance.

- Refinancing households do, purchasing households do not.
- Movers do not initially behave like their peers, but eventually do.
- Non-occupant owners do not behave like the property's neighbors.
- Non-occupant owners do behave like their primary residence neighbors.



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**Conclusion: Social influence from hyperlocal peers is an important economic force in explaining household mortgage decisions.**

# Methodology – Dataset




- Panel Structure
  - Household owned single family homes in Los Angeles County
  - Quarterly observations between 2008Q1 – 2011Q4
  - Information on their new loan / outstanding loan
- Key Variables (1992 – 2012)
  - Dataquick Information Systems and HMDA
  - Mortgage: date, purpose, ARM
  - Borrower: name, filing jointly, income, race, ethnicity
  - Property: latitude, longitude, square feet, appraised value
  - Lender: name, type of institution

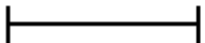
# Los Angeles Loans, Originated 2008 – 2011

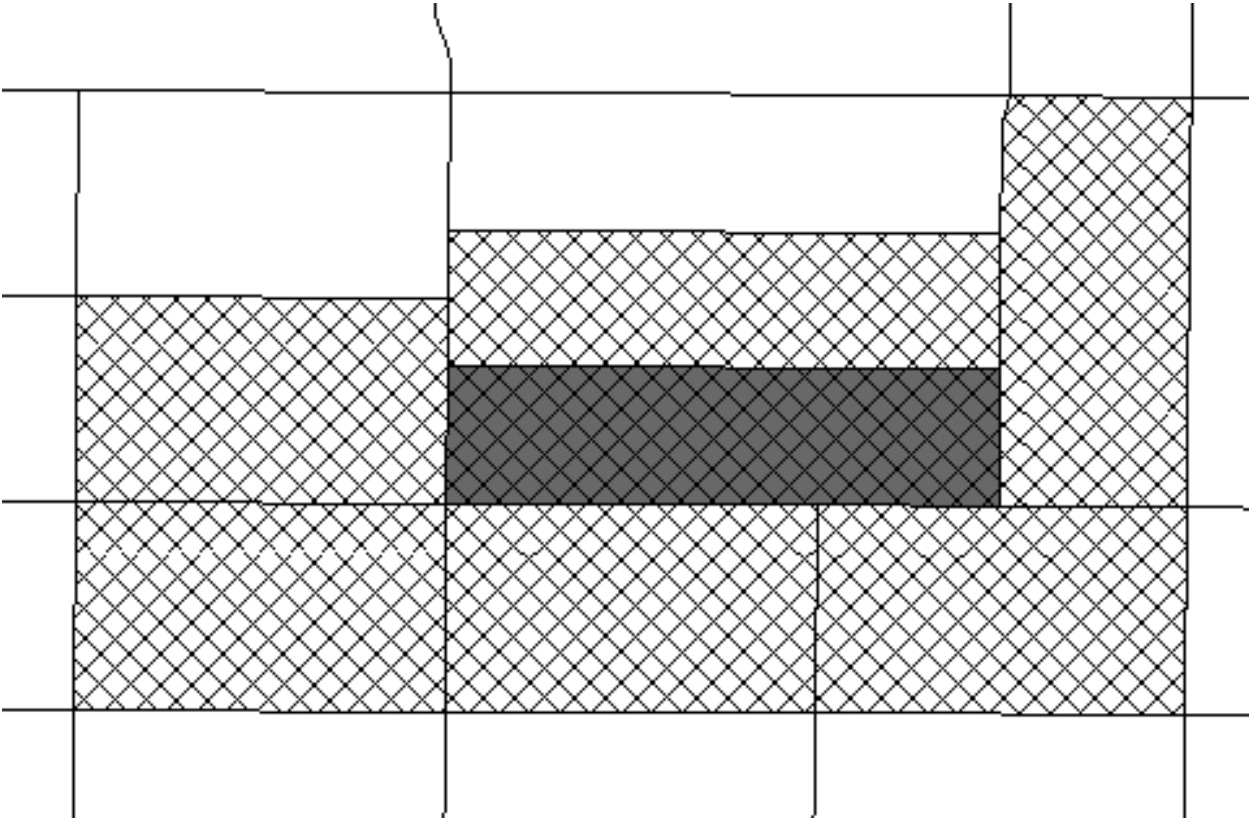
	Mean	Std. dev.	N
<i>Panel A: Loan Characteristics</i>			
Refinance (=1)	80.2%	39.9%	548,437
Adjustable Rate Mortgage (=1)	18.4%	38.8%	548,437
<i>Panel B: Lender Characteristics</i>			
Bank Lender (=1)	49.7%	50.0%	548,437
Wells Fargo Lender (=1)	13.0%	33.6%	548,437
<i>Panel C: Borrower Characteristics</i>			
Distance to Property (miles)	0.36	2.68	548,211
Co-applicant (=1)	49.8%	50.0%	548,437

# Methodology – Blocks & Neighborhoods

**Legend**

-  Census Blocks
-  A Particular Census Block
-  The Block's Neighborhood

0      0.1 Miles  


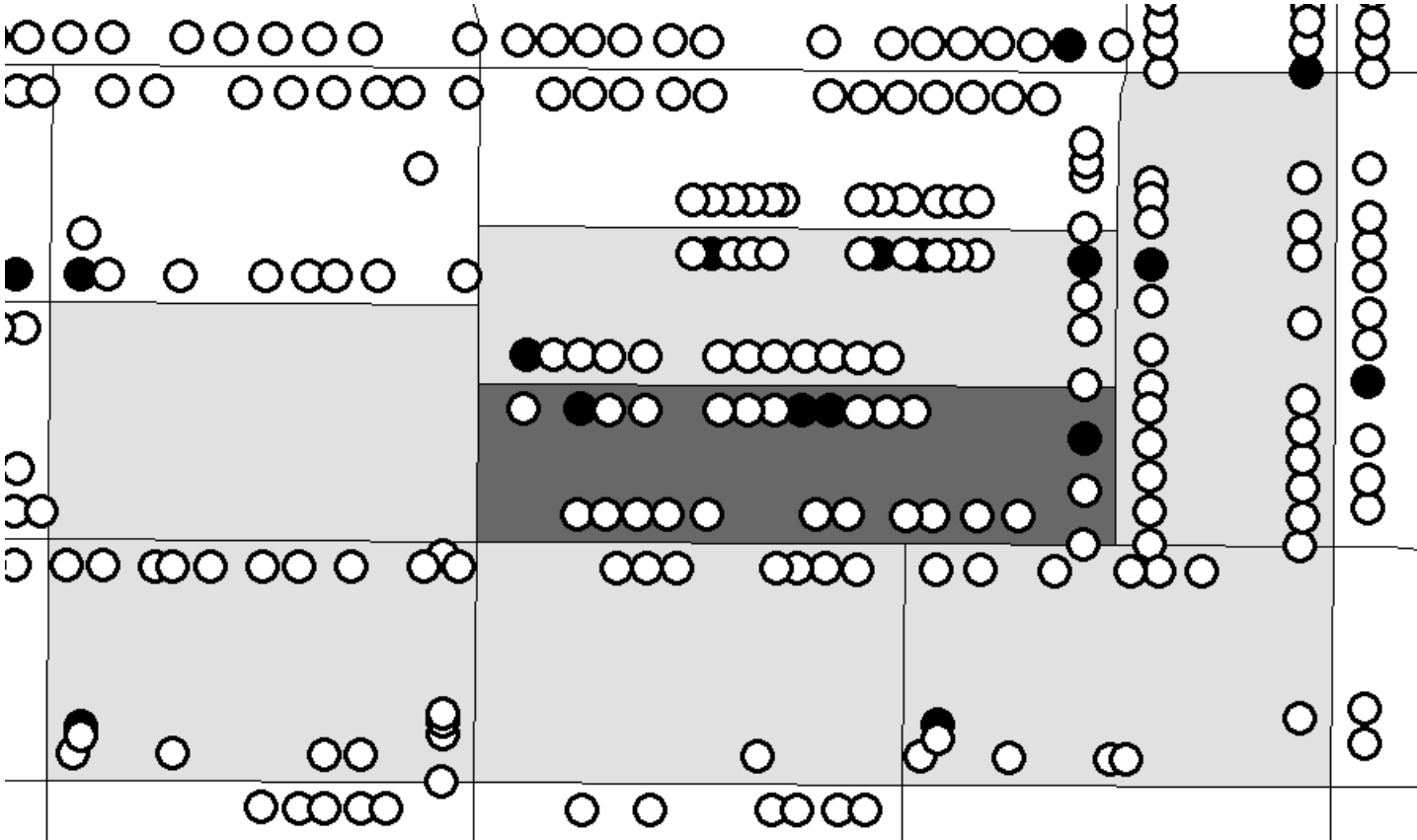


# Methodology – Wells Fargo Loans

**Legend**

- Wells Fargo Loans
- Non Wells Fargo Loans
- Census Blocks
- A Particular Census Block
- The Block's Neighborhood

0 0.1 Miles  
|-----|



# Wells Fargo Loan Choice for Refinancers

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dependent variable: new mortgage is originated by Wells Fargo (=1)			
(1)	(2)	(3)	(4)
<i>sample</i>	<i>owner-occupied refinances</i>		

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# Spatial Clustering in Wells Fargo Loan Choice

	dependent variable: new mortgage is originated by Wells Fargo (=1)			
	(1)	(2)	(3)	(4)
<i>sample</i>	<i>owner-occupied refinances</i>			
Share of all outstanding block loans originated by Wells Fargo	0.177*** (17.10)			
New Loan is an ARM (=1)	Y			
Co-applicants (=1)	Y			
N	427,377			

# (Quasi-Random) Block Neighbors Matter

	dependent variable: new mortgage is originated by Wells Fargo (=1)			
	(1)	(2)	(3)	(4)
<i>sample</i>	<i>owner-occupied refinances</i>			
Share of all outstanding block loans originated by Wells Fargo	0.177*** (17.10)	0.0415*** (3.52)		
Share of all outstanding neighborhood loans originated by Wells Fargo		0.557*** (24.040)		
New Loan is an ARM (=1)	Y	Y		
Co-applicants (=1)	Y	Y		
N	427,377	427,377		



# Even With Quarter-by-Group Fixed Effects

	dependent variable: new mortgage is originated by Wells Fargo (=1)			
	(1)	(2)	(3)	(4)
<i>sample</i>	<i>owner-occupied refinances</i>			
Share of all outstanding block loans originated by Wells Fargo	0.177*** (17.10)	0.0415*** (3.52)	0.0412*** (3.51)	0.0393*** (3.12)
Share of all outstanding neighborhood loans originated by Wells Fargo		0.557*** (24.040)	0.415*** (17.510)	0.0707* (1.750)
New Loan is an ARM (=1)	Y	Y	Y	Y
Co-applicants (=1)	Y	Y	Y	Y
Quarter Fixed Effects			Y	
Quarter-by-Group Fixed Effects				Y
N	427,377	427,377	427,377	410,640

# Random Block Neighbors Affect ARM Choice

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	dependent variable: new mortgage is an ARM (=1)			
	(1)	(2)	(3)	(4)
<i>sample</i>	<i>owner-occupied refinances</i>			
Share of all outstanding block loans with adjustable rates	0.277*** (45.04)	0.0275*** (3.94)	0.0273*** (3.99)	0.0194*** (2.65)
Share of all outstanding neighborhood loans with adjustable rates		0.796*** (56.840)	0.577*** (37.660)	0.0588** (2.420)
Lender type Fixed Effects	Y	Y	Y	Y
Outstanding loan is an ARM	Y	Y	Y	Y
Co-applicants on the loan	Y	Y	Y	Y
Quarter Fixed Effects			Y	
Quarter-by-Group Fixed Effects				Y
N	338,042	338,042	338,042	319,507

# Block Neighbors Affect Refinancing Choice

# Block Neighbors Affect Refinancing Choice

	dependent variable: household refinanced this quarter (=1)			
	(1)	(2)	(3)	(4)
<i>sample</i>	<i>all households</i>			
Share of all block loans that have refinanced in the last 2 quarters	0.136*** (88.84)	0.0290*** (16.50)	0.0285*** (16.24)	0.0260*** (14.57)
Share of all neighborhood loans that have refinanced in the last 2 quarters		0.370*** (109.870)	0.424*** (116.950)	0.153*** (26.220)
Outstanding Loan in an ARM	Y	Y	Y	Y
Outstanding Loan is a Refinance	Y	Y	Y	Y
Co-applicants (=1)	Y	Y	Y	Y
Quarters Since Last Transaction FE	Y	Y	Y	Y
Previous Lender Type FE	Y	Y	Y	Y
Quarter Fixed Effects			Y	
Quarter-by-Group Fixed Effects				Y
N	10,985,347	10,985,347	10,985,347	10,984,645

# Robustness Tests

- Controls
  - Borrower Demographics
  - Lender Fixed Effects (18 largest lenders)

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- Controls
  - Borrower Demographics
  - Lender Fixed Effects (18 largest lenders)
- Defining Hyperlocal Neighbors
  - Census Blocks and Adjacent Census Blocks (preferred definition)
  - Census Blocks and Census Block Groups
  - .1 Mile Radius around Property and .5 Mile Radius

# Main Results – Magnitudes

## **Block Neighbors: McCartney, Shah (2016)**

a **ten percentage point increase** in the share of block peers

with Wells Fargo loans increases a households likelihood of choosing **Wells Fargo by 3.17%**

with ARMs increases a households likelihood of choosing an **ARM by 1.5%**

who have recently refinanced increases a household's likelihood of **refinancing this quarter by 9.8%**



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## **Teacher Co-workers: Maturana, Nickerson (2016)**

teachers **having peer teachers** who have refinanced increases their probability of **refinancing by 9.5%**

## **Facebook Friends: Bailey, Cao, Kuchler, Stroebel (2016)**

individuals whose friends experienced a **5 percentage point larger house price increase**  
are **3.1% more likely to switch from renting to owning**  
buy a **1.7% larger house**

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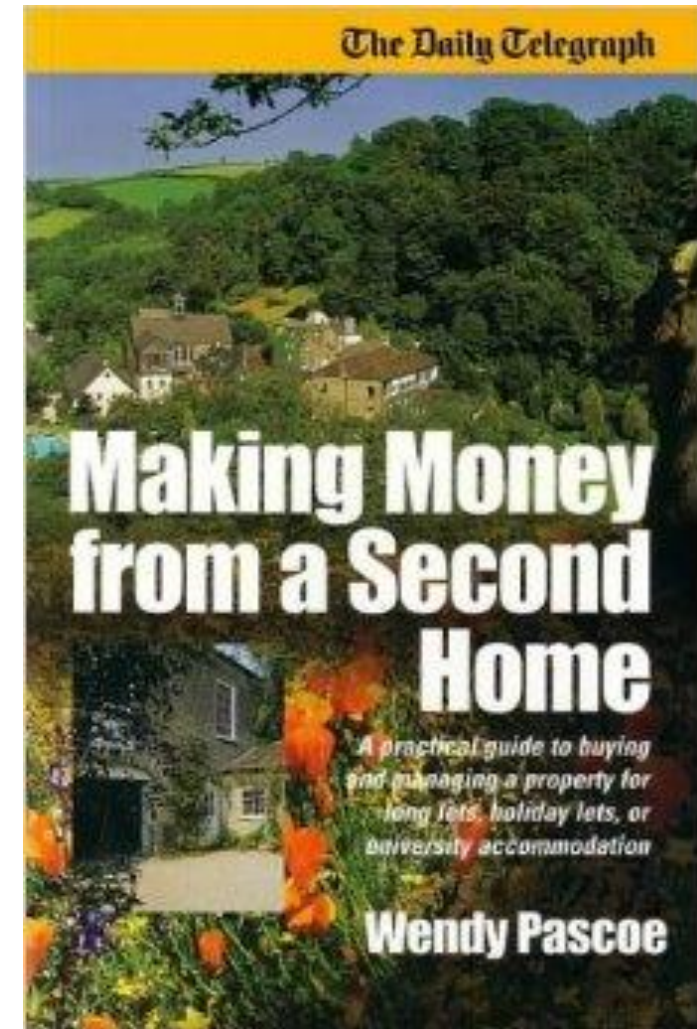
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**Likely that all estimates are lower bounds of the true magnitude.**

# What about Non-Occupant Owners?



# Non-Occupant Owners Are Not Socially Influenced when Refinancing

	dependent variable: household refinanced this quarter (=1)			
	(1)	(2)	(3)	(4)
<i>sample</i>	<i>non-occupant owners</i>			
Share of all block loans that have refinanced in the last 2 quarters	0.0359*** (5.94)	0.00632 (0.92)	0.00656 (0.96)	0.00181 (0.22)
Share of all neighborhood loans that have refinanced in the last 2 quarters		0.109*** (7.870)	0.0954*** (6.530)	0.0233 (0.900)
Outstanding Loan in an ARM	Y	Y	Y	Y
Outstanding Loan is a Refinance	Y	Y	Y	Y
Co-applicants (=1)	Y	Y	Y	Y
Quarters Since Last Transaction FE	Y	Y	Y	Y
Previous Lender Type FE	Y	Y	Y	Y
Quarter Fixed Effects			Y	
Quarter-by-Group Fixed Effects				Y
N	326,544	326,544	326,544	306,528

# Non-Occupant Owners Are Not Socially Influenced when Choosing ARMs

	dependent variable: new mortgage is an ARM (=1)	
	(1)	(2)
<i>sample</i>	<i>refinances by non-occupant owners</i>	<i>refinances by occupant owners</i>
Share of all outstanding block loans with adjustable rates	0.00548 (0.14)	0.0273*** (3.99)
Share of all outstanding neighborhood loans with adjustable rates	0.122 (1.520)	0.577*** (37.660)
Lender Type Fixed Effects	Y	Y
Outstanding Loan is an ARM (=1)	Y	Y
Co-applicants (=1)	Y	Y
Quarter Fixed Effects	Y	Y
N	6,699	338,042

What About Their *Actual* Neighbors?

# Non-Occupant Owners *Are* Socially Influenced by their Actual Neighbors

	dependent variable: new mortgage is an ARM (=1)	
	(1)	(2)
<i>sample</i>	<i>refinances by non-occupant owners</i>	
Share of all outstanding block loans on owner's block with adjustable rates	0.0609+ (1.52)	0.0589+ (1.47)
Share of all outstanding neighborhood loans in owner's neighborhood with adjustable rates	0.109 (1.330)	0.104 (1.240)
Share of all outstanding block loans on property's block with adjustable rates		0.024 (0.630)
Share of all outstanding neighborhood loans in property's neighborhood with adjustable rates		0.060 (0.760)
Lender Type Fixed Effects	Y	Y
Outstanding Loan is an ARM (=1)	Y	Y
Co-applicants (=1)	Y	Y
Quarter Fixed Effects	Y	Y
N	6,694	6,676

# How About Movers?





# Moving Households Become Influenced

	dependent variable: new mortgage is an ARM (=1)		
	(1)	(2)	(3)
<i>sample</i>	<i>purchase loans with different site and mailing zip codes</i>	<i>refinances by borrowers who continued to have different zips</i>	<i>refinances by those who used the same zip code for the refinance</i>
Share of all outstanding block loans with adjustable rates	0.0178 (0.75)		
Share of all outstanding neighborhood loans with adjustable rates	0.752*** (17.770)		
Lender Type Fixed Effects	Y		
Outstanding Loan is an ARM (=1)			
Co-applicants (=1)	Y		
Quarter Fixed Effects	Y		
N	25,978		

# Moving Households Become Influenced

	dependent variable: new mortgage is an ARM (=1)		
	(1)	(2)	(3)
<i>sample</i>	<i>purchase loans with different site and mailing zip codes</i>	<i>refinances by borrowers who continued to have different zips</i>	<i>refinances by those who used the same zip code for the refinance</i>
Share of all outstanding block loans with adjustable rates	0.0178 (0.75)	0.00989 (0.23)	
Share of all outstanding neighborhood loans with adjustable rates	0.752*** (17.770)	0.519*** (6.710)	
Lender Type Fixed Effects	Y	Y	
Outstanding Loan is an ARM (=1)		Y	
Co-applicants (=1)	Y	Y	
Quarter Fixed Effects	Y	Y	
N	25,978	7,799	

# Moving Households Become Influenced

	dependent variable: new mortgage is an ARM (=1)		
	(1)	(2)	(3)
<i>sample</i>	<i>purchase loans with different site and mailing zip codes</i>	<i>refinances by borrowers who continued to have different zips</i>	<i>refinances by those who used the same zip code for the refinance</i>
Share of all outstanding block loans with adjustable rates	0.0178 (0.75)	0.00989 (0.23)	0.0356* (1.92)
Share of all outstanding neighborhood loans with adjustable rates	0.752*** (17.770)	0.519*** (6.710)	0.477*** (13.750)
Lender Type Fixed Effects	Y	Y	Y
Outstanding Loan is an ARM (=1)		Y	Y
Co-applicants (=1)	Y	Y	Y
Quarter Fixed Effects	Y	Y	Y
N	25,978	7,799	42,266

# Conclusion – Neighbors Matter

- Households making mortgage decisions are socially influenced by the decisions of their neighbors
  - It is likely that our magnitudes represent the lower bound of the importance of social influence effects (e.g. co-workers, facebook friends, family)
- Distance movers are not initially influenced by neighbors but eventually refinance like neighbors
- Non-owner occupied households never experience social influence effects from property neighbors, but do from primary residence neighbors

# Conclusion – Neighbors Matter

- Consequences for Consumer Welfare
  - Keys, Pope, and Pope (2016): Failure to Refinance
  - Agarwal, Amromin, Ben-David, Chomsisengphet, Evanoff (2014): Predatory Lending
- Current Extensions
  - Role of expertise
  - Social influence during and after the bubble