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UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

# An Ex-Ante Analysis of Housing Location Choices Due to Housing Displacement: The Case of Bristol Place

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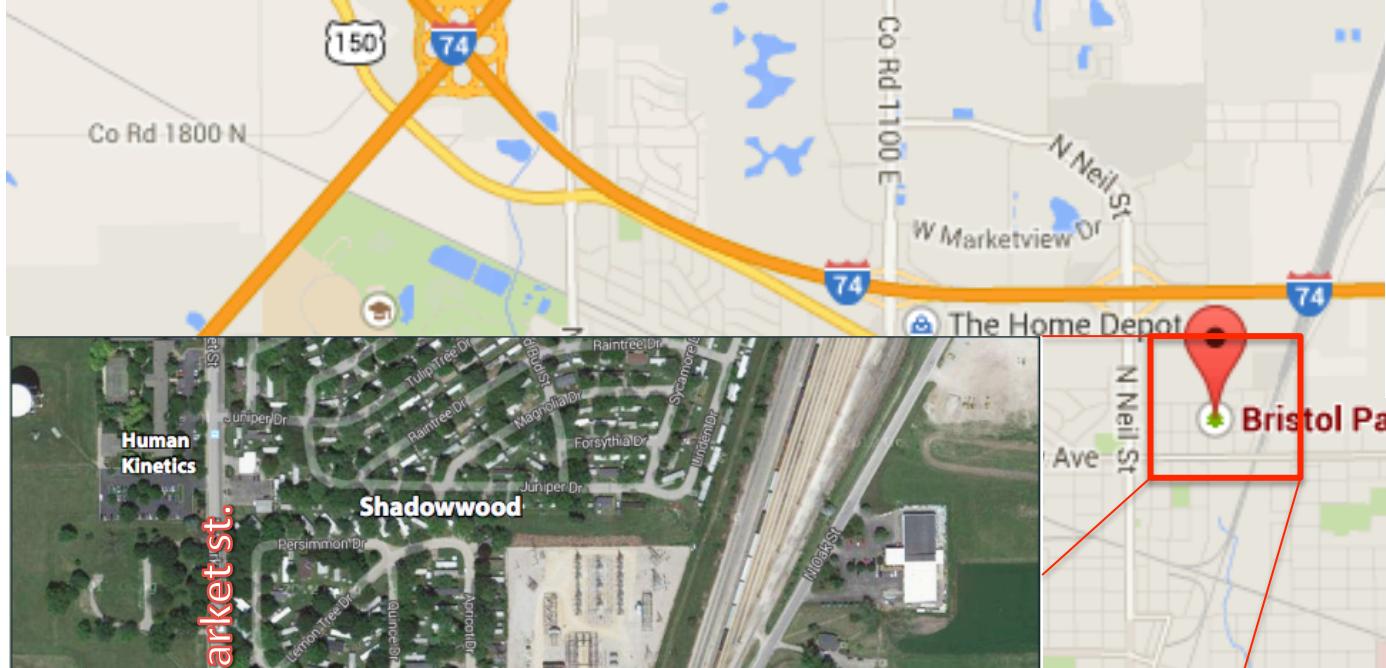
# Key points

- *Housing Displacement (HD)* as a special case of Residential Mobility (RM)
  - Spatial Location choice (LC) outcomes?
  - We only know HD spatial LC outcomes from ex-post studies
- HD alleviation measures focus in the financial dimension disregarding many others
  - Is low-income displacement a way to do urban renewal in the 21<sup>st</sup> century?
- Ex-Ante Contribution: A model to predict location of future displacees.
  - Help implement better alleviation policies

# Context/ Case of Study:

## *Champaign-Urbana (IL)*

- Dynamic and growing city with high demand for housing.
  - City of Champaign and Housing Authority objective:  
Promotion of “harmonic neighborhoods”
- Bristol Place has been chosen to be redeveloped
  - BP residents are intended to be compensated for their current dwellings.
  - They are expected to be displaced in the next months.



Population 150K approx.

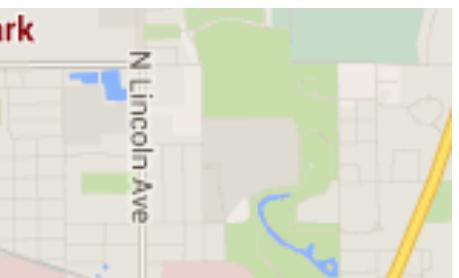


Figure 1. Study Area Population and Households

	Bristol Place	Garwood	Shadow Wood
Population	232	413	613
Households	76	135	265

Source (Population): US Bureau of the Census 2000, STF1

Source (Households): Champaign County Assessor's Office, 2009

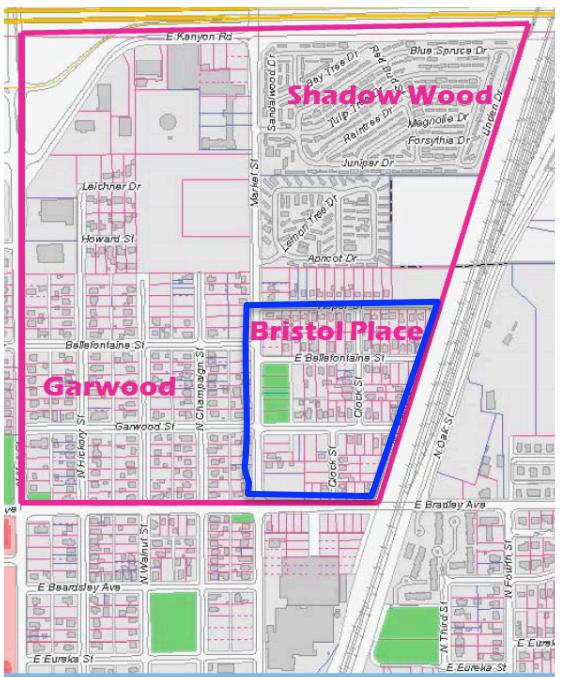
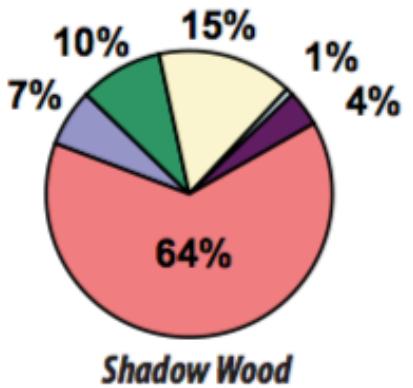
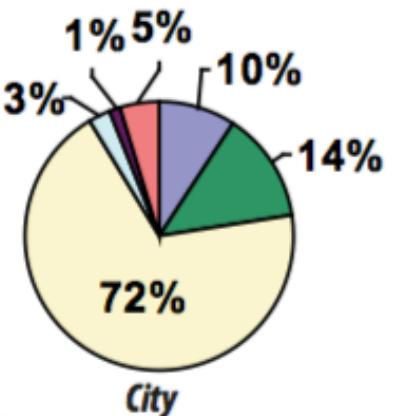
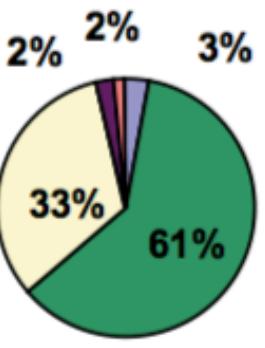
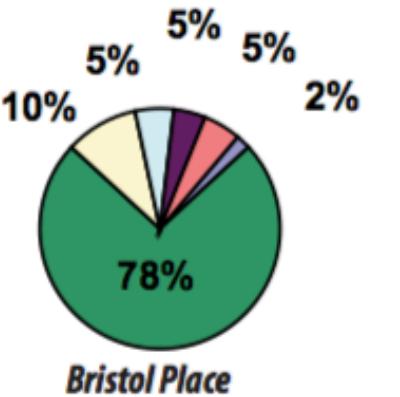


Figure 2. Study Area Ethnicity



- Asian
- Black/African American
- White
- Other
- More than one race
- Hispanic/Latino

Source: Census 2000;  
2009 Shadow Wood  
Administration Interview



## Master Plan:

- Different housing types
- Higher density neighborhood
- Expanded green areas
- Homeownership opportunities
- LEED-ND standards
  - Leadership in Energy & Environmental Design





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## What's going on in Bristol Place?

Submitted by Scott Humphrey on May 31, 2013 - 12:43pm

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This summer, the City of Champaign will begin the process of demolishing a neighborhood in the north end of the city. Bristol Place, northeast of Bradley and Market and home to nearly 200 residents, has been slated for total demolition by the city because of its low property values, old building stock and a purportedly high rate of crime. The city will use eminent domain to acquire the properties from even those residents who wish to stay in the neighborhood and who own and occupy houses that are in good condition. Although the city has been clear to say that the neighborhood's total demolition is a settled issue, many questions remain: Why was the neighborhood regarded as obsolete? What's next for residents? Is this a process that we will see for other low-income, predominately African-American neighborhoods in Champaign?

# What's next for residents?

# Research Questions:

## ➤ Understanding Residential Mobility:

1. How residential mobility works in regular conditions, what are the driving variables?
  - Exploratory analysis
  - Residential Mobility Binomial Logit Models

## ➤ Forecasting Spatial Location Choices

2. What would be the potential outcome in terms of housing situation for current BP residents?

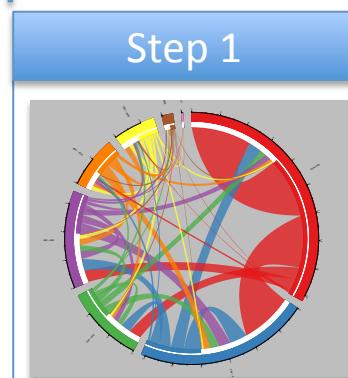
# Research Question & Design

*What are the potential Location choices of future displaces?*

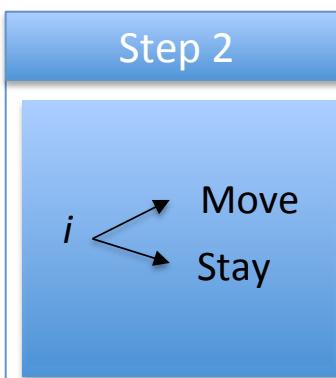
## STAGE 1

- Exploratory analysis of how does RM and LC works in the city
- Baseline to forecast location of future displaces

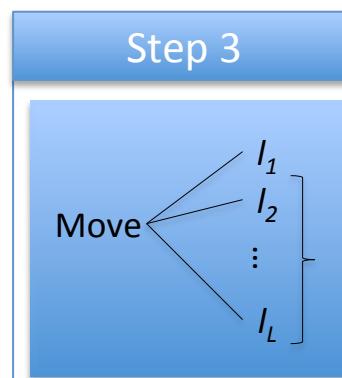
## STAGE 2



Exploratory Analysis



Residential Mobility  
Binomial Logit Model



Location Choice  
Multinomial Logit Model with random sampling of alternatives

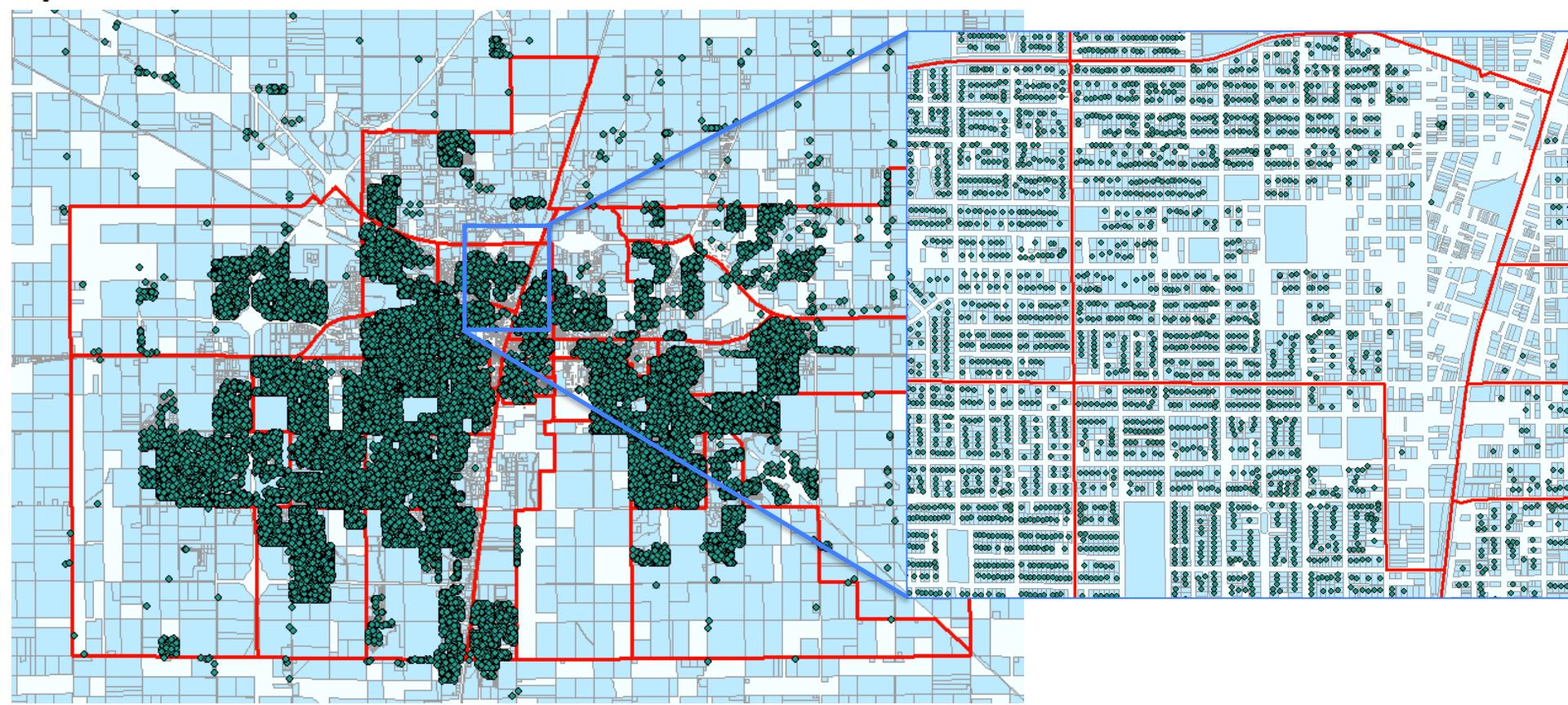
# Data

- *Source:* InfoUSA
- *Description:* Addresses and Names of residents
  - Address changes between quarters
- *Time frame:* 2013q1-2014q3 (t=7)
- *Spatial reference:* Champaign county, CUS
- *Unit of Analysis:* Household
- *Variable Groups:*
  - Identification [familyid, houseid, address]
  - Demographics
  - Financial Variables [income, purchase power]

# DATA: Me moving two times in two years

> me

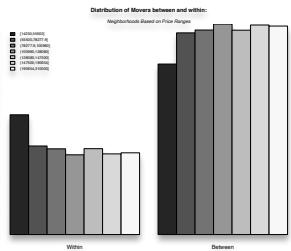
	individualid	year	qtr	contact_name	Match_addr	change
354085	702659686769	2013	1	ESTEBAN L OCHOA	505 E WHITE ST, CHAMPAIGN, IL, 61820	0
354086	702659686769	2013	2	ESTEBAN L OCHOA	505 E WHITE ST, CHAMPAIGN, IL, 61820	0
354084	702659686769	2013	3	ESTEBAN L OCHOA	306 E MICHIGAN AVE, URBANA, IL, 61801	1
354083	702659686769	2014	3	ESTEBAN L OCHOA	107 W CALIFORNIA AVE, URBANA, IL, 61801	1



# Complementary Data

- House Sales for Champaign County
  - Type: Assessor and historic files
  - Time frame: 1997-2014
  - Variables: Size, Features, Location, PIN.
- Neighborhood (census tracts) characteristics
  - Travel time to work
  - Income, income per-capita
  - % of Renters, Rental Vacancy, Ethnicities, etc.
- Zillow postings
  - July-August 2015

## Step 1

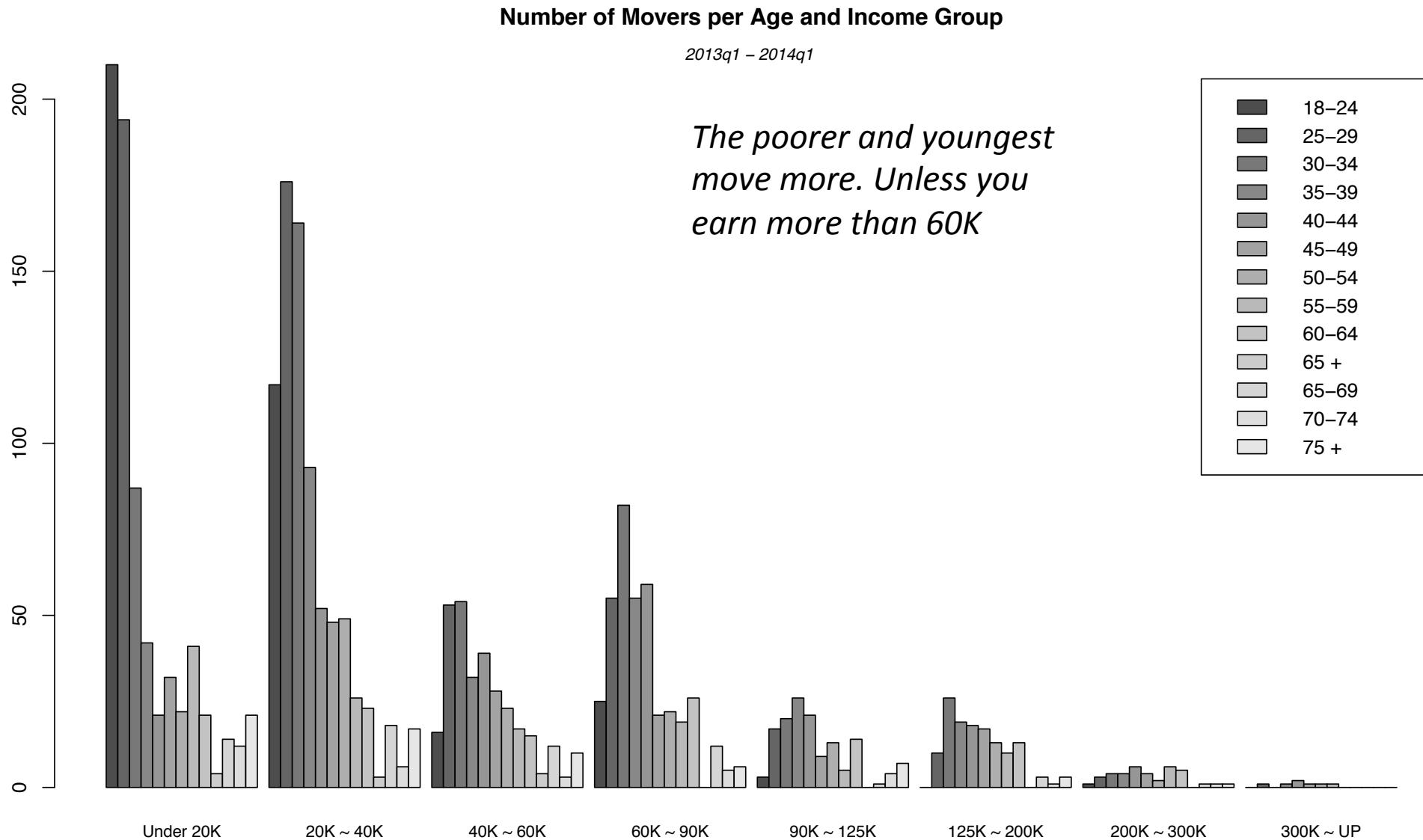


### Exploratory Analysis

Exploring Residential Mobility

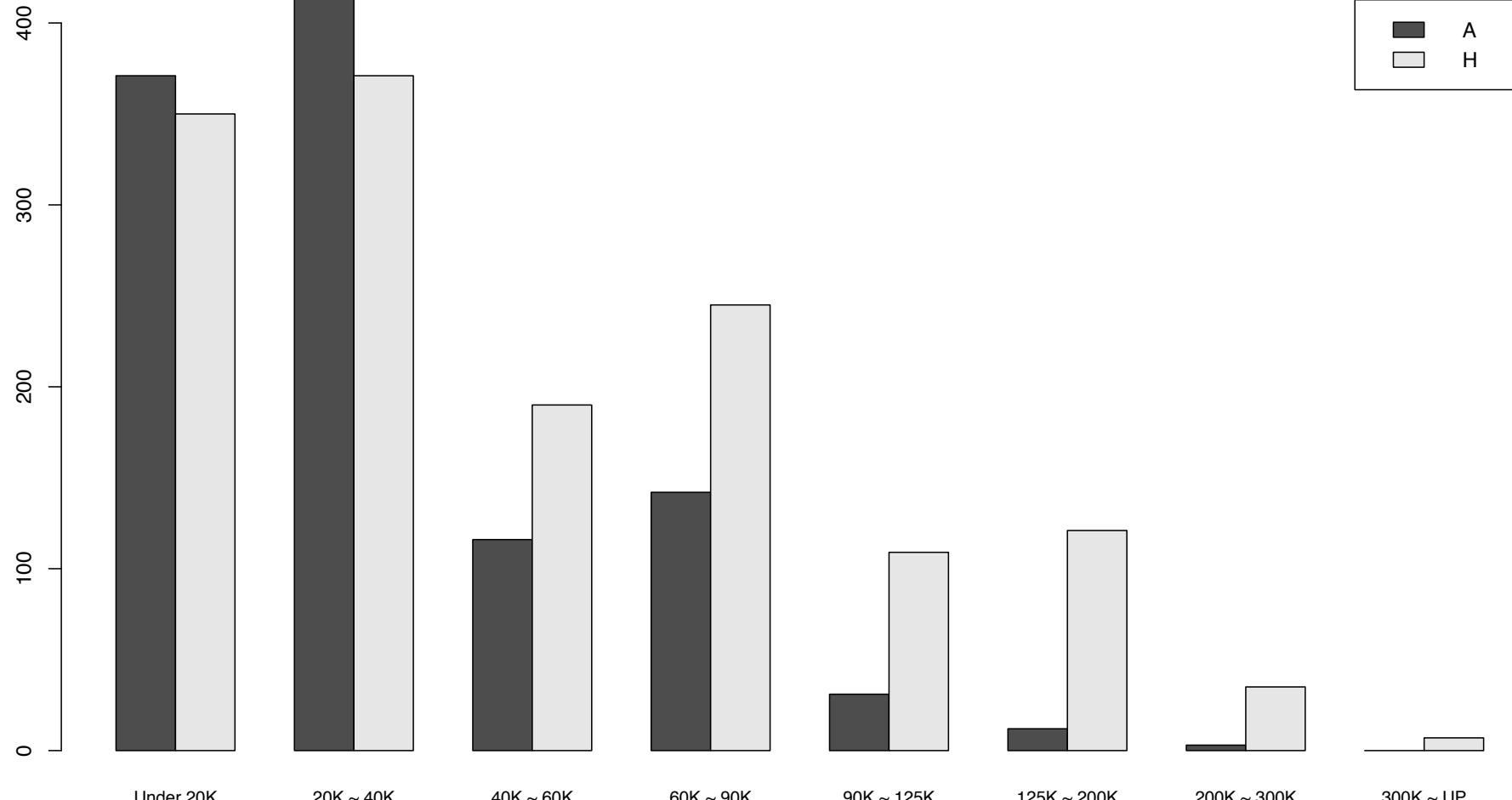
# STEP 1: DESCRIPTIVE WORK

# Descriptive Analysis: *Tables*



## Number of Movers per House Type and Income Group

2013q1 – 2014q1

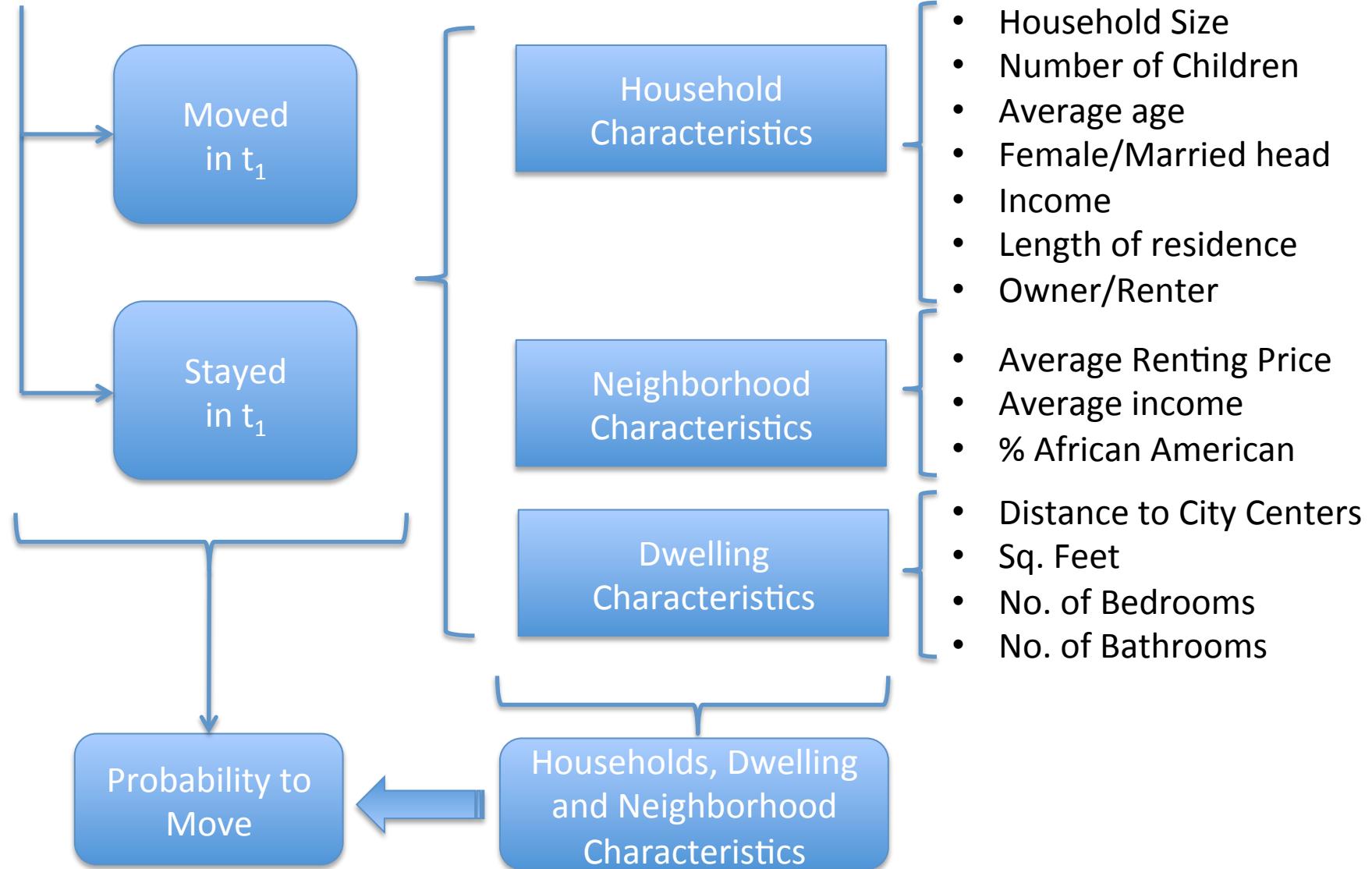


*Apartment residents  
move more in lower  
income brackets*

*House residents move  
more in the 40K+ income  
zones*

# Predicting Residential Mobility

Starting in  $t_0$



# Residential Mobility Logit Models



*Most housing career and life cycle regularities are met*

*Parameters change size around the university housing season*

*Allows predicting the probability to move/stay in normal conditions*

Dependent variable: Move=1

	Base period 2013:q1					
	(1) 2013:q2	(2) 2013:q3	(3) 2013:q4	(4) 2014:q1	(5) 2014:q2	(6) 2014:q3
Household Size	0.106 (0.085)	0.008 (0.050)	0.024 (0.047)	0.045 (0.058)	0.064 (0.055)	0.090 (0.043)**
Children per Household	0.312 (0.079)***	0.146 (0.051)***	0.132 (0.050)***	0.124 (0.062)**	0.043 (0.065)	0.107 (0.053)**
Average Age in Household	0.016 (0.002)***	0.011 (0.001)***	0.008 (0.001)***	0.008 (0.001)***	0.006 (0.001)***	0.005 (0.001)***
Marital Status Score	0.164 (0.044)***	0.181 (0.024)***	0.157 (0.023)***	0.112 (0.029)***	0.147 (0.028)***	0.129 (0.022)***
Female Head = 1	0.365 (0.131)***	0.500 (0.069)***	0.523 (0.065)***	0.549 (0.085)***	0.506 (0.086)***	0.337 (0.066)***
Owner/Renter Score	0.045 (0.029)	-0.014 (0.016)	-0.017 (0.015)	0.023 (0.019)	-0.041 (0.020)**	-0.041 (0.015)***
Length of Residence	-0.577 (0.036)***	-0.718 (0.024)***	-0.597 (0.019)***	-0.356 (0.017)***	-0.358 (0.017)***	-0.697 (0.022)***
Income (thousnds)	-0.005 (0.002)***	0.001 (0.001)	0.002 (0.001)**	0.002 (0.001)*	0.002 (0.001)**	0.003 (0.001)***
Home Price	0.0002 (0.0005)	-0.0001 (0.0003)	-0.0003 (0.0003)	-0.0004 (0.0004)	-0.0004 (0.0004)	-0.0002 (0.0003)
% African American	0.894 (0.305)***	0.300 (0.172)*	0.169 (0.168)	0.798 (0.208)***	0.806 (0.208)***	0.264 (0.165)
Distance to Campus	0.068 (0.050)	-0.135 (0.026)***	-0.169 (0.024)***	-0.063 (0.033)*	0.053 (0.033)	-0.075 (0.024)***
Single Family = 1	-0.158 (0.150)	-0.014 (0.088)	-0.147 (0.085)*	-0.500 (0.111)***	-0.120 (0.115)	-0.103 (0.083)
Median Renting Price	-0.0001 (0.0003)	-0.00003 (0.0002)	-0.0001 (0.0002)	-0.001 (0.0002)***	-0.001 (0.0002)***	-0.0004 (0.0002)**
Constant	-5.062 (0.288)***	-2.807 (0.151)***	-2.498 (0.144)***	-3.192 (0.190)***	-3.214 (0.189)***	-2.126 (0.145)***
Observations	110,980	108,257	106,459	105,480	107,332	109,263
Log Likelihood	-2,799.636	-7,999.113	-8,676.592	-5,668.779	-5,676.678	-8,464.546
Akaike Inf. Crit.	5,627.271	16,026.230	17,381.190	11,365.560	11,381.360	16,957.090

Note:

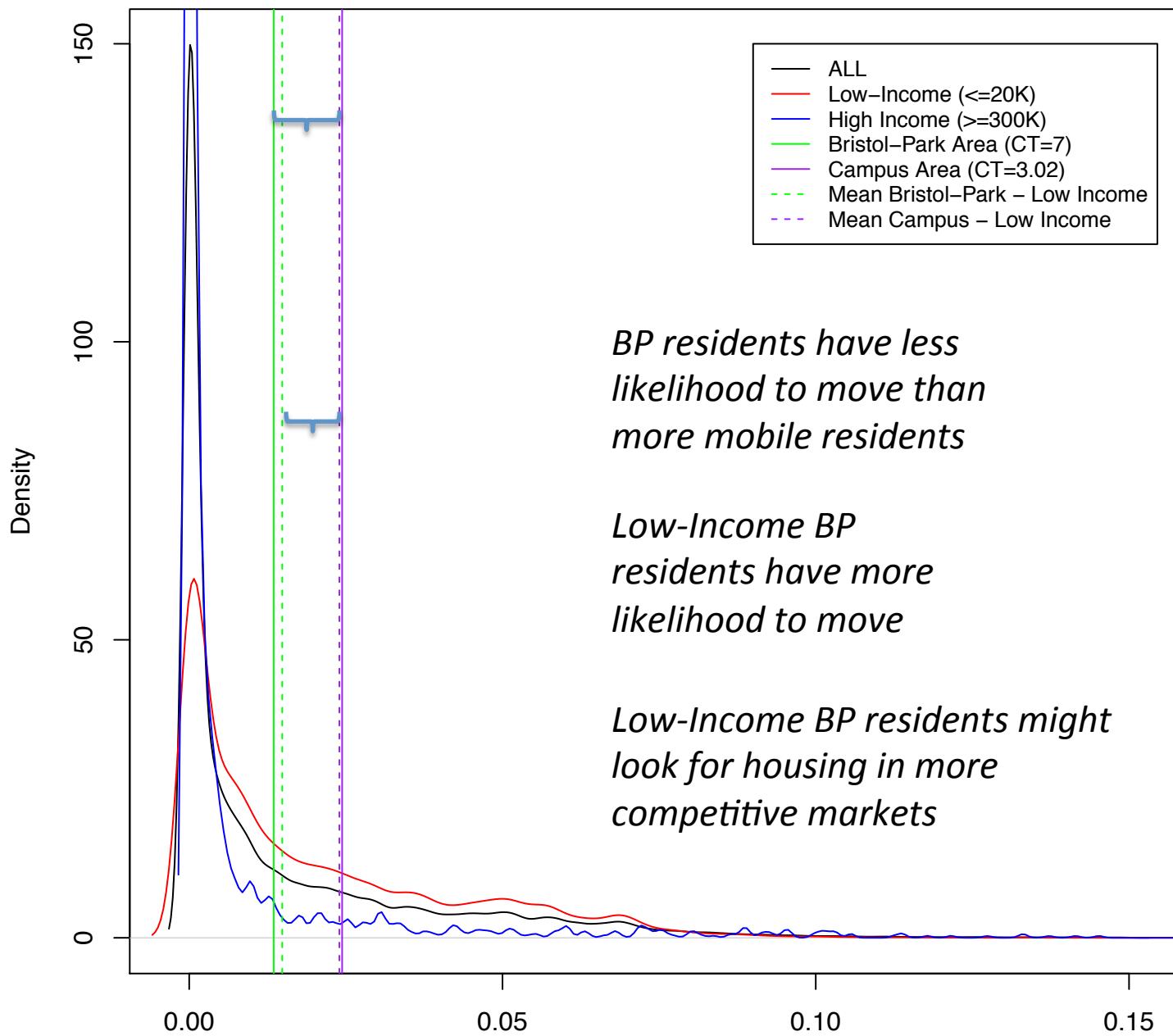
\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

# Descriptive Analysis: *Demographics*

Variable	Bristol Place	Champaign-Urbana
<i>Mean Household Income</i>	35807	59515
<i>% Single-Family Residences</i>	0.60	0.50
<i>% Multi-Family Residences</i>	0.40	0.50
<i>Median of Rooms</i>	4.80	5.07
% Owners	0.46	0.45
% Renters	0.54	0.55
Average Household Size (Owners)	2.53	2.04
Average Household Size (Renters)	2.41	2.14
<i>Median Owner House Price</i>	63700	139032
<i>Median Renting Price</i>	691	849
<i>Average Age Inhabitants</i>	29.30	32.81
% Male	0.54	0.50
<i>% African-American</i>	0.32	0.16
<i>% White</i>	0.56	0.70
% Latino	0.26	0.05
<i>Average Travel to work time (min)</i>	13.7	15.4

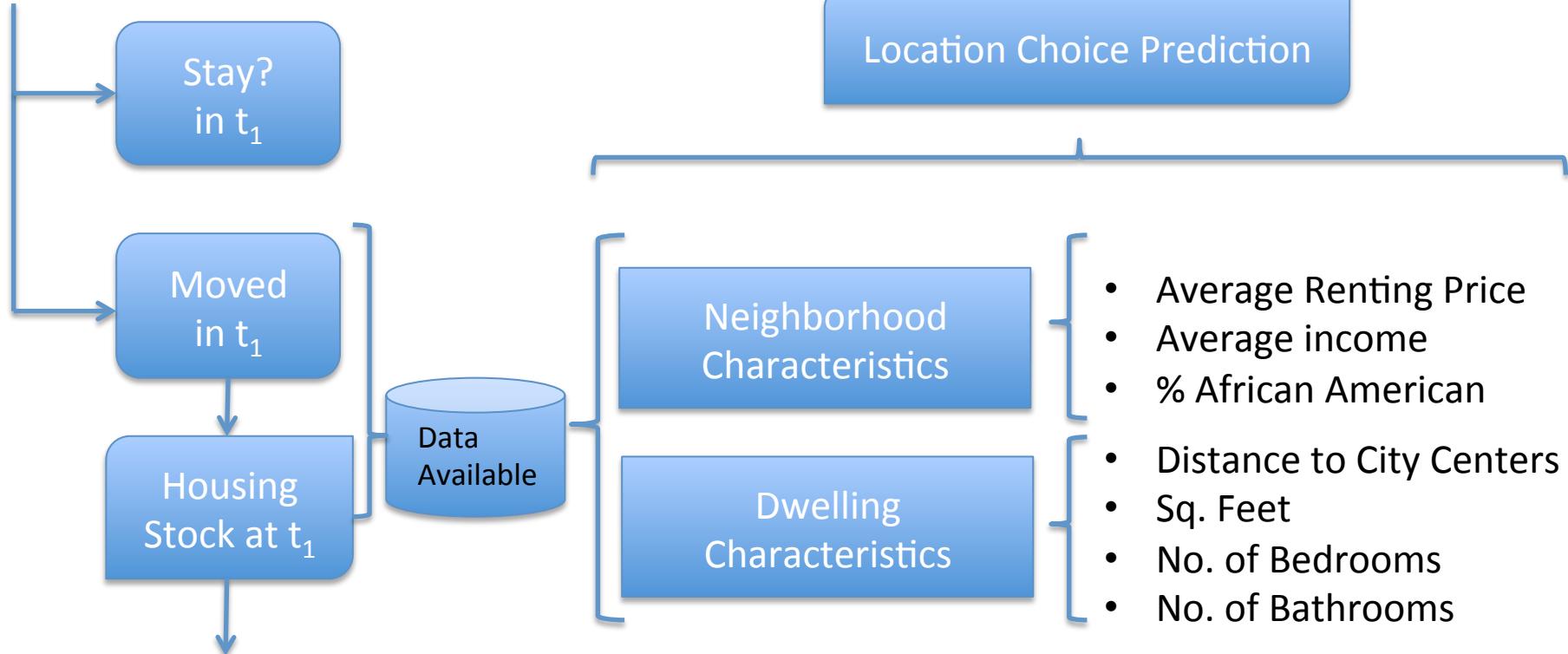
Source: American Community Survey. Note: Mean values at the Census Tract level.

## Distribution of the Predicted Probability to Move



# Estimating Location Choices

Starting in  $t_0$



Subset of alternatives



What alternative gives the best fit?

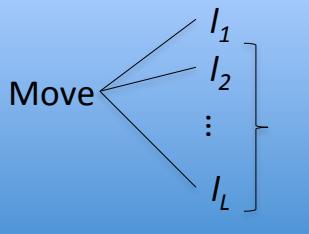
Am I the only one that wants this house?

Location Choice

Market Clearing

# MNL Models

with random sampling of alternatives



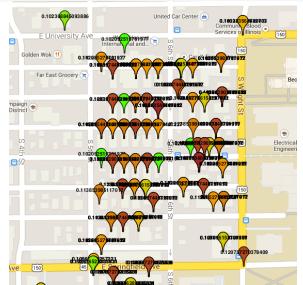
Dependent variable:  $\text{Move}=\{I_1=1\}$

*Base period 2013:q1*

	(1) 2013:q2	(2) 2013:q3	(3) 2013:q4	(4) 2014:q1	(5) 2014:q2	(6) 2014:q3
Estimated House Price	0.002 (0.001)***	0.001 (0.0003)**	0.001 (0.0005)*	0.002 (0.001)***	0.002 (0.0005)***	0.001 (0.0002)***
Distance to Campus	0.446 (0.099)***	0.086 (0.057)	0.382 (0.082)***	0.209 (0.104)**	0.275 (0.086)***	0.027 (0.060)
Distance to Downtown Urbana	-0.106 (0.070)	0.048 (0.042)	-0.035 (0.059)	0.156 (0.073)**	0.064 (0.059)	0.118 (0.043)***
% African American	-0.820 (0.359)**	-0.928 (0.221)***	-1.527 (0.337)***	-0.755 (0.416)*	-1.044 (0.348)***	-0.689 (0.218)***
Median Number o Rooms	0.129 (0.073)*	-0.016 (0.037)	-0.099 (0.061)	-0.161 (0.080)**	-0.103 (0.057)*	-0.056 (0.037)
Average Household Size X Household Size	0.084 (0.029)***	0.038 (0.020)*	0.081 (0.023)***	0.062 (0.032)*	0.059 (0.023)**	0.026 (0.019)
Average Age X Average Age in Household	-0.0001 (0.00002)***	-0.0001 (0.00001)***	-0.0001 (0.00002)***	-0.0001 (0.00003)***	-0.0001 (0.00002)***	-0.0001 (0.00001)***
Observations	507	1,462	702	475	702	1,455
Log Likelihood	-1,116.126	-3,337.820	-1,567.966	-1,052.702	-1,559.991	-3,312.273

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01



# Forecasting

Bootstrap with  
100 replications

Get estimated  
coefficients from  
2014.q3 ( $\beta_T$ )

From MNL Model  
2014.q3

Randomly Sample  
 $n=10$  alternatives  
from Available  
Housing  $C$

From Zillow  
postings Jul-Aug  
2015

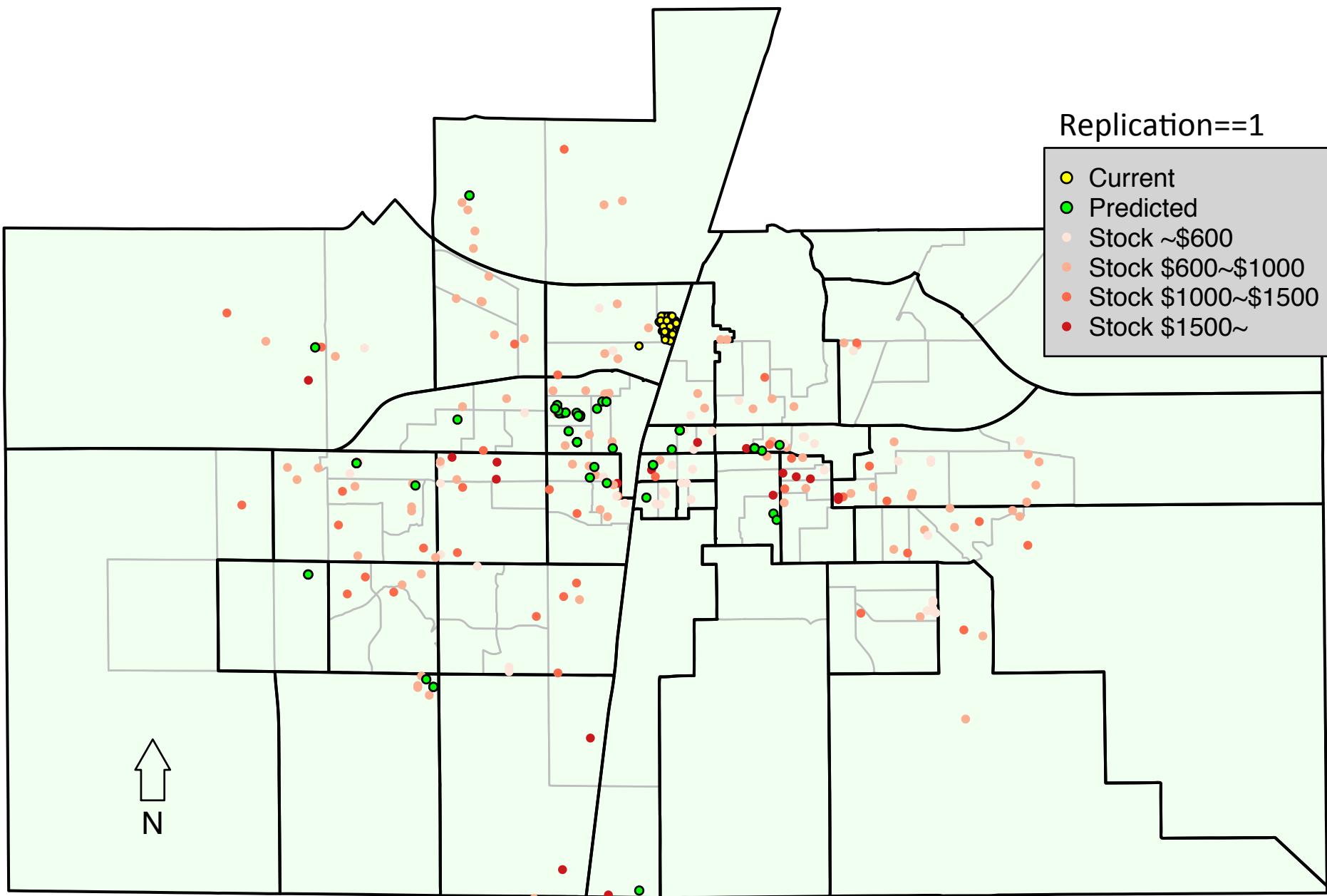
Calculate  $V_i = \sum \beta'_T X$   
and  $\Pr(V_i)$   
for each  $i$

What's the best  
fit?

Assign household  $h$   
a location  $i^* > i_j$

Market Clearing

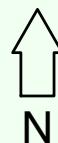
# Current vs. Predicted Location of BP residents



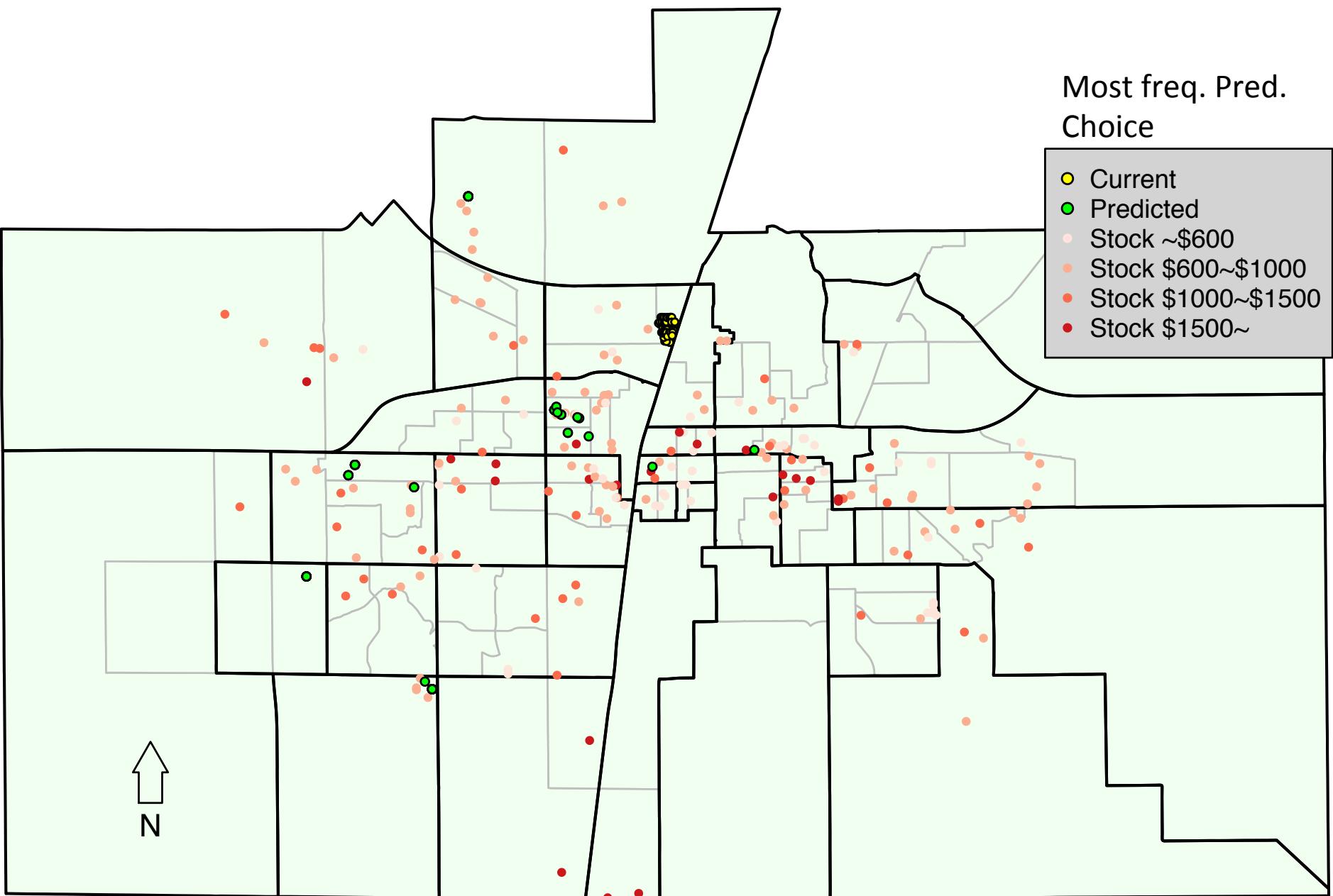
# Current vs. Predicted Location of BP residents

Choice with  
Highest Pred. Prob.

- Current
- Predicted
- Stock ~\$600
- Stock \$600~\$1000
- Stock \$1000~\$1500
- Stock \$1500~

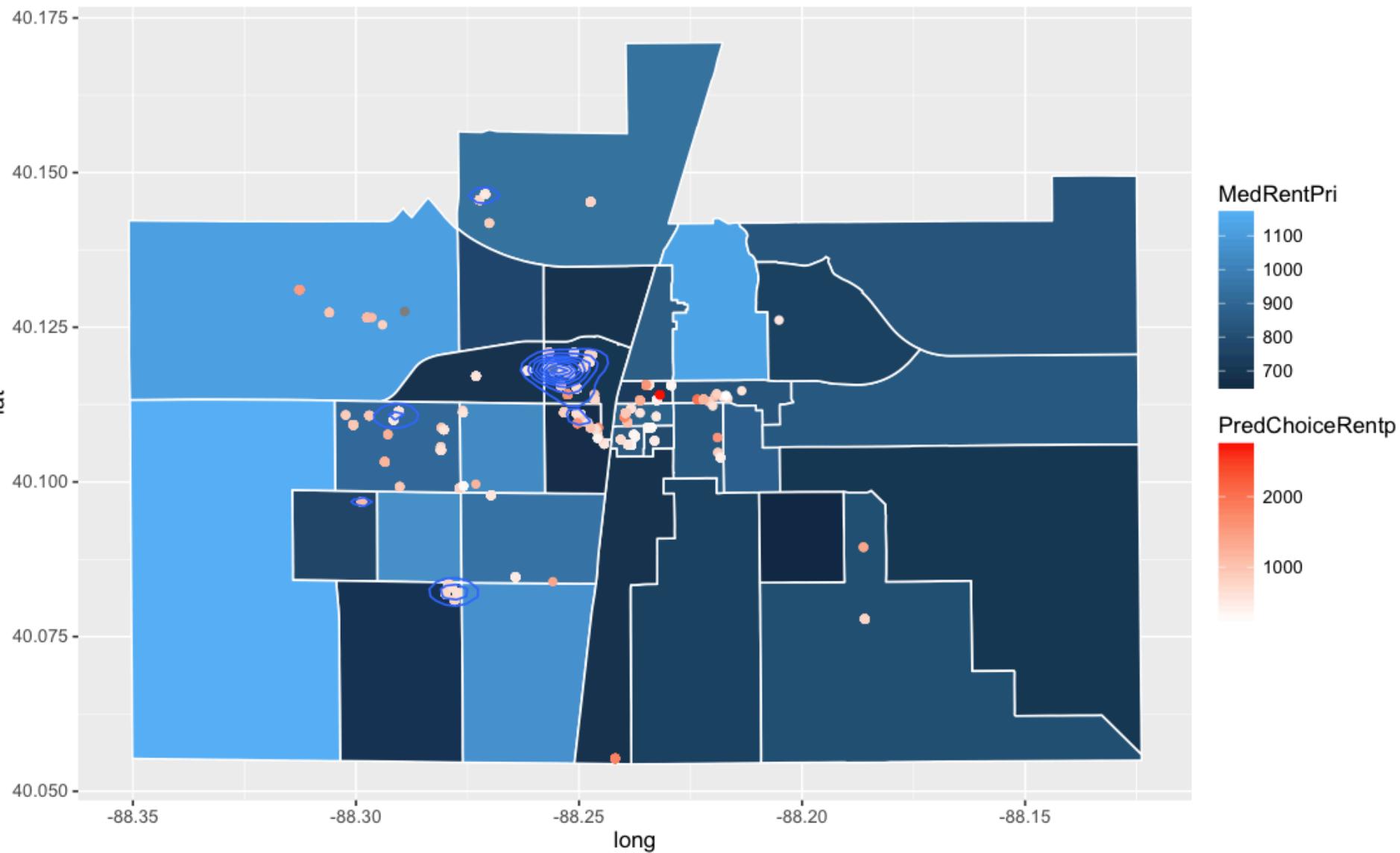


# Current vs. Predicted Location of BP residents



# Current vs. Predicted Location of BP residents

## Spatial Density of 100 Replications



# Comparison Current vs. After Displacement

	Variable	Before	After
Neighborhood Level	<i>% African American</i>	0.32	0.12
	<i>% Multi-Family</i>	0.02	0.83
	<i>Median Household Income</i>	35,807	59,754
	<i>% of Renters</i>	0.54	0.58
	<i>Median Renting Price</i>	691	781.69
	<i>Median Number o Rooms</i>	4.8	4.84
Household Level	<i>Average Houshold Size for Renters</i>	2.41	1.93
	<i>Distance to Campus</i>	1.7	2.35
	<i>Distance to Downtown Champaign</i>	0.84	1.62
	<i>Distance to Market Place</i>	0.94	2.66
	<i>Distance to Health Facilities</i>	0.24	0.34
	<i>Distance to Public Parks</i>	0.11	0.24
	<i>Distance to Educational Facilities</i>	0.4	0.27

# Further analysis

## *Policy Implications*

1. Characterization of the type of neighborhoods they are likely to locate
  - How similar it is in terms of social network potential?
2. Better definition of potential housing stock
  - Inclusion of Public Housing being offered as a solution
  - Incorporation of relocation subsidies to constraint the available housing considered by residents

# Next Steps

1. External Validation with Foreclosures
2. More data
  - Housing Characteristics
  - Historic Zillow
  - Supply increases (construction boom)
3. More complex sampling of alternatives
  - Monte Carlo simulations
4. More complex market clearing



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