

How public housing applicants choose where to live

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What am I talking about

- It's hard to study preferences for housing: where people end up might not reflect preferences. Affordability, imperfect information, too large choice set
- In a setting where I observe choices directly, not just outcome, how do public housing applicants make choices about where to live?
- Denver Housing Authority, 1987-2005: unique features to get at those questions
 - Denver Housing Authority has a wider variety of potential neighbourhoods than most public housing programs in the US
 - Applicants face an interesting choice mechanism where offers arrive as-if at random

What am I going to show?

- An increase in expected wait time of 90 days on the waitlist leads to a 10pp higher acceptance rate in offers
- Applicants in marginalised groups accept offers at higher rates, but applicants with children are more selective
 - Black, foreign-born, female, and older applicants more likely to accept offers
 - Applicants with children reject offers at a 4.5 pp higher rate
- Applicants select on neighbourhood characteristics, but in surprising ways:
 - Whiter, higher poverty, lower-education neighbourhoods preferred
 - Applicants select **away** from neighbourhoods with higher share of own-ethnic group!

Why do we care

It matters where people live

- Moving to Opportunity experiment (lottery to assign housing vouchers)
 - **Short term** (Kling, Liebman, Katz 2007)
 - Neighbourhood poverty , safety , parent and child outcome 
 - **Long term** (Chetty, Hendren, Katz 2016)
 - No impact on adults
 - Children: college attendance , earnings , single-parent rate ,
 - neighbourhood income as adults  for children who moved to lower-poverty neighbourhoods when young

But how do they choose?

- It's hard to decide where to live, and it's hard to know which information to incorporate
- Seattle voucher recipients moved to “high-opportunity” areas at a much higher rate (54% vs 14%) when randomly assigned assistance with their search (Bergman et al 2019)
- Randomly giving housing voucher recipients more information on school quality induced them to move to neighbourhoods with better schools (Bergman, Chan, Kapor 2020)

Denver Housing Authority

- Public housing authority for the city and county of Denver
- ~3,900 units of publicly-owned housing, stable
- Residents pay up to a cap of 30% of their income in rent
- Small in absolute terms: Denver population in 2000: 555k
- But big share of subsidised housing in the city:
~4,400 Section 8 vouchers in 2000, ~7,800 vouchers in 2021

“Traditional” public housing

~3/4 of units

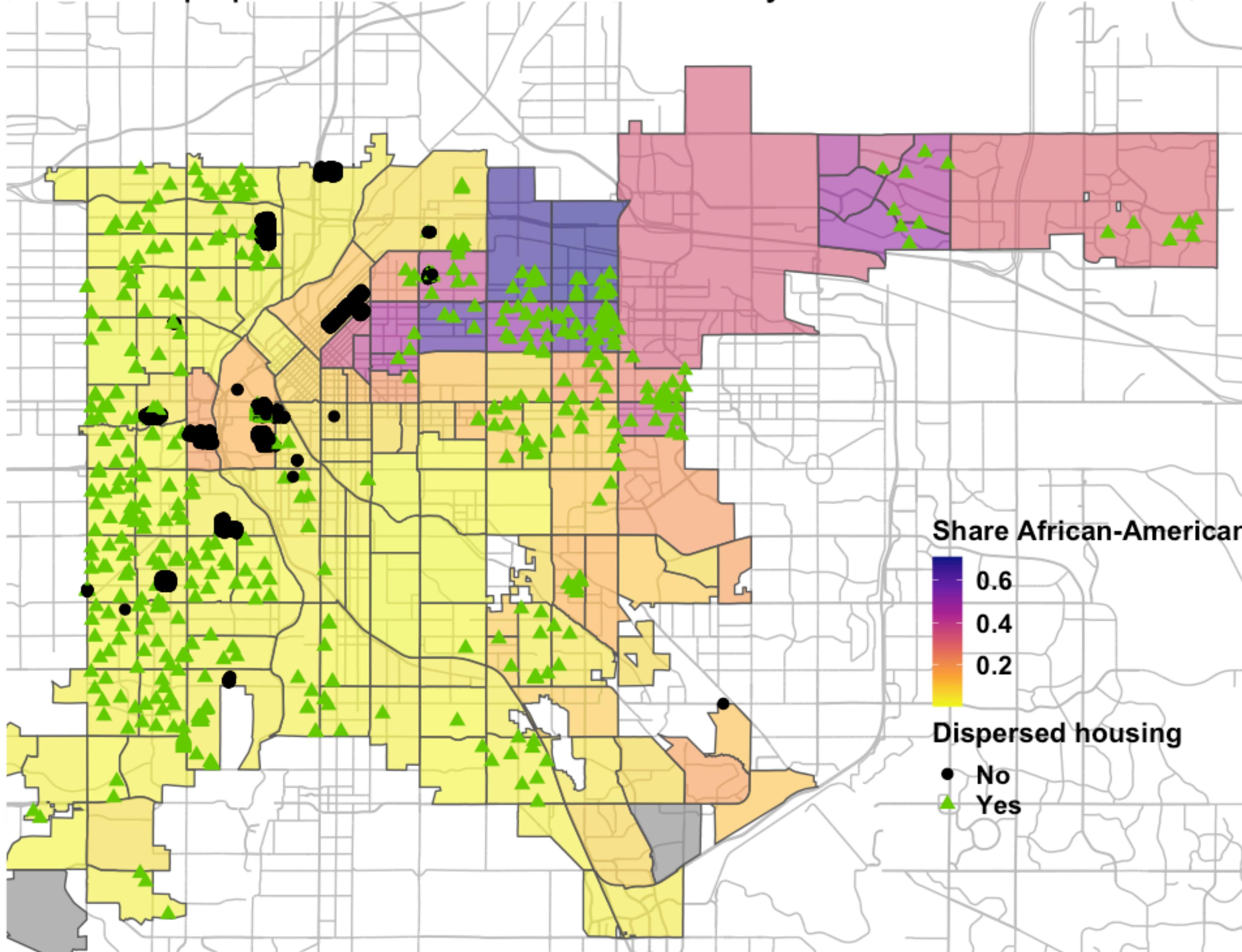


Dispersed housing

~1/4 of units



Share of population African-American by census tract in 2000, Denver



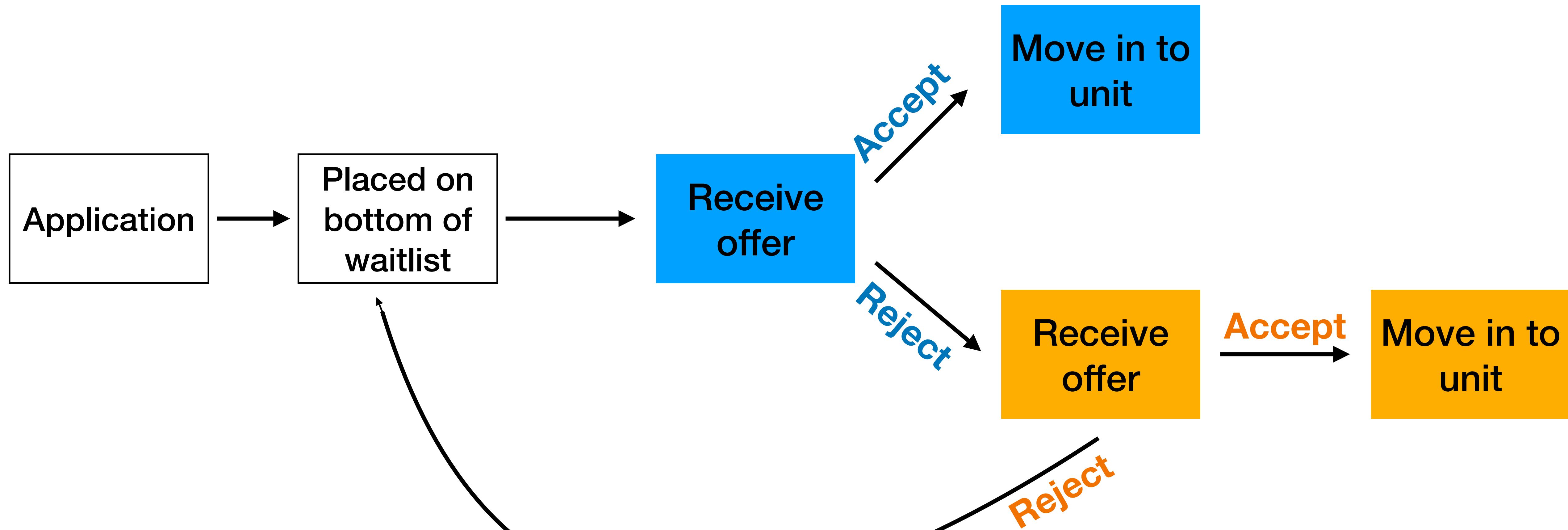
Denver Housing Authority allocation mechanism

1987-2005

- Participants are placed on a single waitlist (after eligibility is verified)
- When a unit is freed up, it is offered to the suitable applicant closest to the top of the waitlist
 - (Unsuitable: Two bedroom apartment, but applicant in number one slot needs three bedrooms)
- Applicant chooses **Accept offer** or **Reject offer**
- Applicant can reject first offer without penalty. Rejecting a second offer bumps applicant down to the bottom of the waitlist.

What matters when choosing where to live?

Applicants' choice tree



Data

Denver Housing Authority

- **Offers database**
 - Set of offers made to applicants from 1987-2005
 - Offer date, accept/refuse status, housing development ID, applicant ID
 - No exact address or demographics
- **Residents database**
 - Denver Housing Authority residents for same period
 - Exact address
 - Head of household demographics - birth date, sex, race/ethnicity, marital status, income at time of application, household composition, applicant ID
- Merged on a common applicant ID: conditional on applicant ever moving in, I can offers can be matched to demographics

Denver Housing Authority

Who lives here?

Unique residents, 1987-2005	15,245
Age at move in (mean)	41
Female (%)	69
White (%)	18
Non-Hispanic Black (%)	28
Hispanic (%)	45
Asian (%)	6
Single parent (%)	36
Foreign born (%)	18
Income at application (2000 \$) (mean)	9,471

Denver Housing Authority mechanism

How do people use their choices

Unique applicants receiving an offer	17,008
Offers made	27,018
Offers accepted	12,257
1st offers accepted	8,989
2nd offers accepted	2,609
3rd+ offers accepted	659
Mean wait time between first and second offer (days)	54
Mean wait time between second and third offer (days)	145

Cost to waiting

$$accept_{ik} = \beta_0 + \beta_1 I(Offer_k N = 1) + \beta_2 I(Offer_k N = 2) + \beta_3 I(Offer_k N = 3) + \varepsilon_{ik}$$

Applicant i receives a housing offer in year k

- Hazard regression: coefficients give “risk” of accepting a first, second, third offer
- Costlier to refuse a second offer than first or third, because shunted to bottom of the waitlist
- Estimating using logistic regression, reporting average marginal effects

Cost to waiting

$$accept_{ik} = \beta_0 + \beta_1 I(Offer_k N = 1) + \beta_2 I(Offer_k N = 2) + \beta_3 I(Offer_k N = 3) + \varepsilon_{ik}$$

	Average marginal effect	Average marginal effect	Average wait time until next offer (if refused)
First offer	-0.1482*** (0.0226)	-0.1636*** (0.0214)	54 days
Second offer	-0.0484* (0.0237)	-0.0628** (0.0222)	145 days
Third offer	-0.0993*** (0.0266)	-0.1063*** (0.0248)	90 days
Offer-year FE	NO	YES	
N	27,018	27,018	

*p<0.05, **p<0.01, *** p<0.001

Who refuses and accept offers?

$$acceptFirstOffer_{ik} = \beta_0 + \beta X_i + YearFE_k + \varepsilon_{ik}$$

Applicant i receives a housing offer in year k

- X_i vector of demographic variables
- Only applicants who eventually accept an offer included
 - No demographics available for never-accepters
- Restricting to the set of **first offers only**
 - Applicants who refuse a first offer and receive a second (third, etc) offer may differ systematically, so avoiding selection bias
- Estimating using logistic regression, reporting average marginal effects

Who refuses and accept offers?

$$acceptFirstOffer_{ijk} = \beta_0 + \beta X_i + YearFE_k + \varepsilon_{ijk}$$

	Average marginal effect	SE
Age	0.0021 ***	(0.0005)
Female	0.0397 ***	(0.0098)
Married	0.0344 *	(0.0138)
Has children	-0.0457 ***	(0.0115)
Black (non-Hispanic)	0.0404 ***	(0.0115)
Hispanic ethnicity	0.0006	(0.0102)
Foreign-born	0.0277 **	(0.0107)
Offer-year FE	YES	
N	12,835	

*p<0.05, **p<0.01, *** p<0.001

Which offers are accepted?

$$acceptFirstOffer_{ijk} = \beta_0 + \beta Z_j + YearFE_k + \varepsilon_{ijk}$$

Applicant i receives a housing offer with characteristics j in year k

- Z_j vector of census tract variables (2000 census)
- Only applicants who eventually accept an offer included
- Restricting to the set of **first offers only**
- Estimate separately for Hispanic and Black applicants
- Estimating using logistic regression, reporting average marginal effects

What offers are accepted?

$$acceptFirstOffer_{ijk} = \beta_0 + \beta X_i + YearFE_k + \varepsilon_{ijk}$$

Share of population in census tract (2000)	Average marginal effect	Standard error	Average marginal effect	Standard error
Black	-0.43***	(0.069)	-0.46***	(0.069)
Hispanic	-0.63***	(0.071)	-0.67***	(0.071)
Asian-American or Pacific Islander	-1.60***	(0.27)	-1.55***	(0.27)
Education: 9th grade to some college	-0.13	(0.15)	-0.13	(0.15)
Education: Bachelors or more	-0.36*	(0.13)	-0.39*	(0.15)
In poverty	0.098	(0.053)	0.050	(0.053)
Unit is dispersed housing			-0.083***	(0.017)
Offer-year fixed effects	YES		YES	
N	12,835		12,835	

*p<0.05, **p<0.01, *** p<0.001

What offers are accepted?

$$acceptFirstOffer_{ijk} = \beta_0 + \beta X_i + YearFE_k + \varepsilon_{ijk}$$

Share of population in census tract (2000)	Black applicants		Hispanic applicants	
Black	-0.68***	-0.70***	0.034	
Hispanic	-0.50**	-0.54***	-0.46***	-0.52***
Asian-American or Pacific Islander	-0.44	-0.38	-1.0**	-0.99**
Education: 9th grade to some college	-0.32	-0.36	-0.19	-0.15
Education: Bachelors or more	-0.57	-0.58	-0.22	-0.17
In poverty	-0.053	-0.09	-0.01	-0.07
Unit is dispersed housing		-0.08		-0.11***
Offer-year fixed effects	YES		YES	
N	2,617		4,317	

*p<0.05, **p<0.01, *** p<0.001

Conclusion

- Applicants willing to “pay” for another draw at a housing unit, but willingness to exercise choice varies a lot with applicant characteristics
- Applicants care about where they live, but the choices they make are surprising!
- Going forward: formally model applicant choice problem
- Can housing stock be better targeted to meet this population’s preferences?
- What happens under different allocation rules?