

MIGRATION FLOWS IN A MILLENNIAL CITY WASHINGTON, D.C. 2005-2014

By

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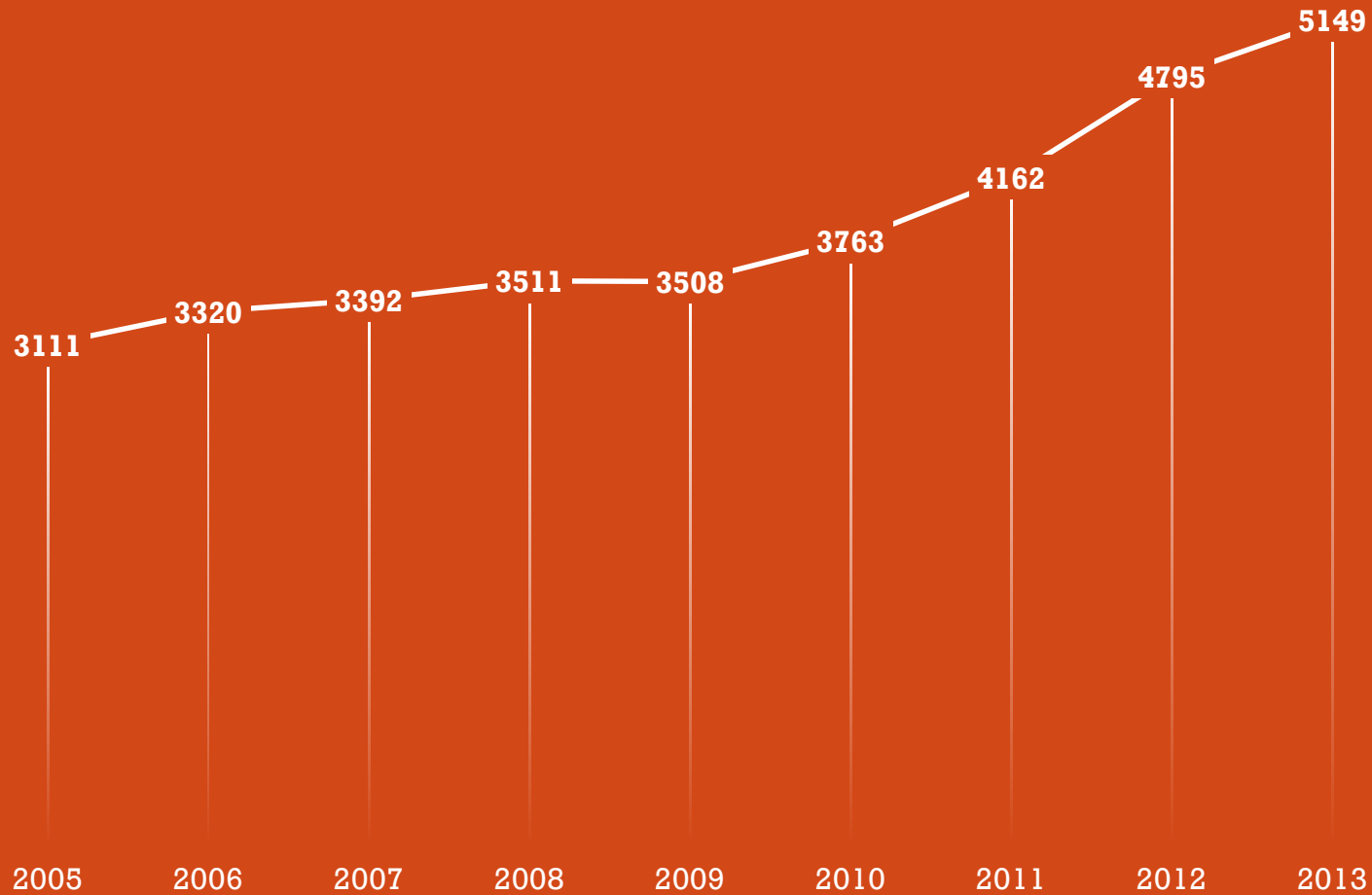
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OUTLINE

- Introduction
- Review of Literature
- Research Question
- Theoretical framework
- Data
- Results
- Conclusion

NUMBER OF HOUSEHOLDS PER SQ. MILE



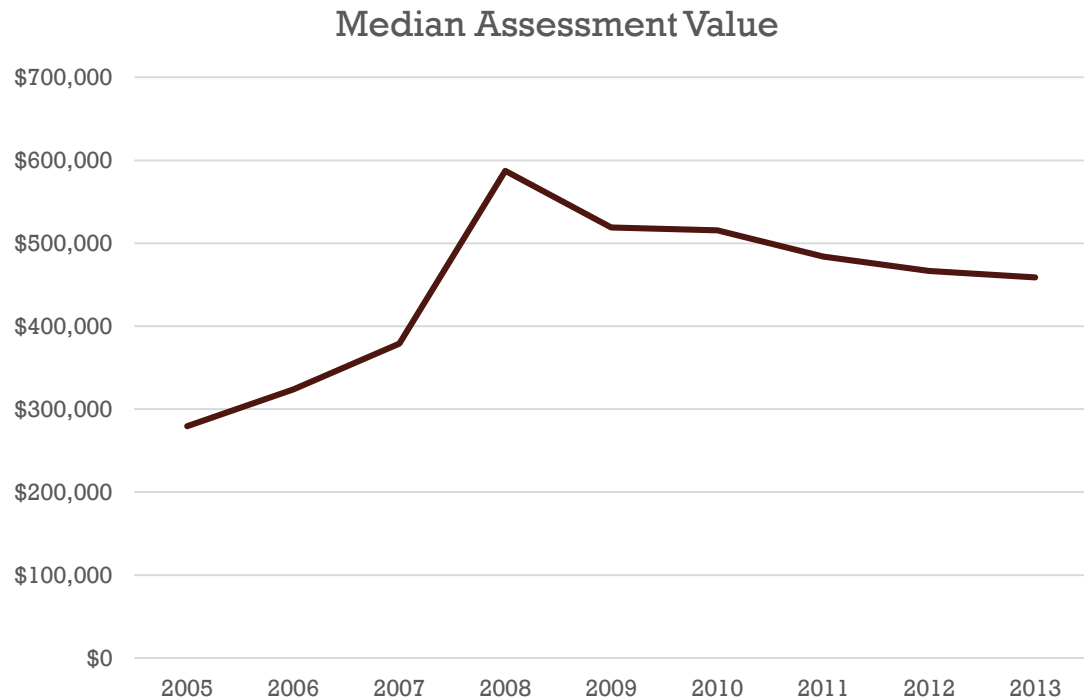
INTRODUCTION: WHY WASHINGTON, D.C.?

- Recent migration patterns of households living in urban cities
 - Case Study: Washington D.C
- Population growth since after the millennium: since 2005

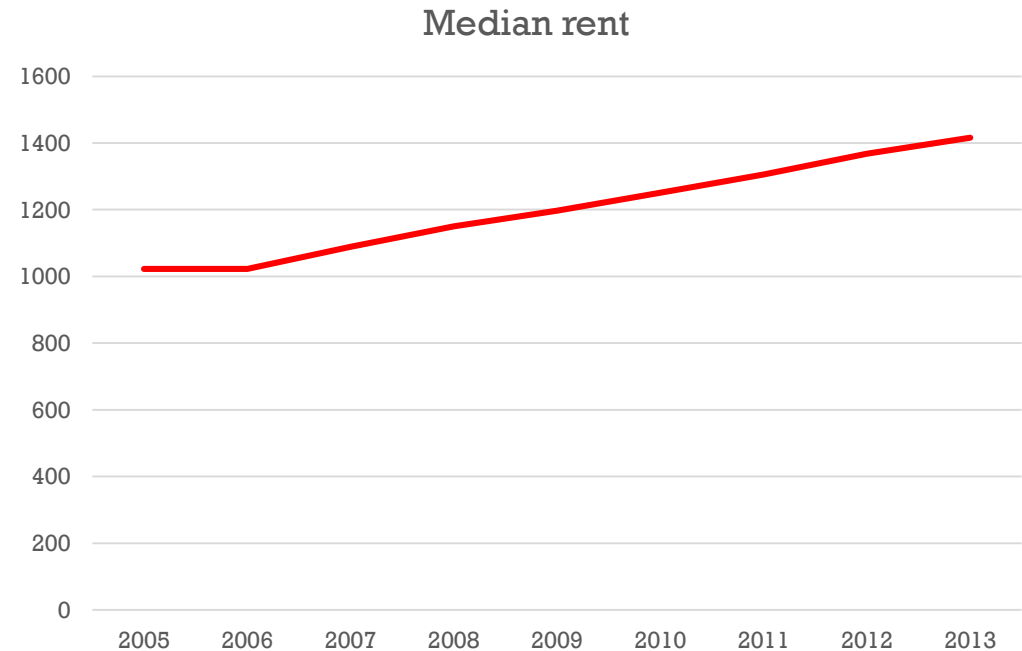
INTRODUCTION: WHY WASHINGTON, D.C?

- Affordable housing

Single family homes



Median Rent



INTRODUCTION: WHY WASHINGTON, D.C?

- A city experiencing demographic changes
 - In 1980, 70 percent of the District's population was black; in 2000, the share of black population fell to 61 percent and then to 51 percent by 2010 (Tatian, and Lei, 2014).
 - The influx of white population has driven the population growth in D.C (Sturtevant, 2013).
- Neighborhood change / gentrification/ youthification
 - Migration flows play an important role in the demographic composition of local communities
- DC is unique: a operates as a city and state
 - Study neighborhood changes
 - Impact of government policies on household behavior
 - EITC

WHY PEOPLE MOVE



Economic

Housing cost

Jobs

Transportation costs



Amenities

Entertainment, culture, restaurants

Schools,

Grocery stores

Crime

Weather, nature

PRIOR RESEARCH

■ Economic Migration

- Housing affordability (Quigley and Raphael, 2004; Schachter, 2001)
 - The highest percentage of people relocates for housing related reasons.
 - Quigley and Raphael (2004) : Housing affordability comes from two factors: the cost of housing the largest single expenditure for most households; and rental and housing cost has escalated in most U.S metropolitan areas.
- Gentrification-(Sturtevant, 2013; Brown-Robertson, Muhammad, Ward, & Bell, 2013).
 - There is evidence of displacement both within the city and to other places in the Washington, DC metropolitan area.
 - Less educated and lower income households are more likely to move than college-educated and higher income households.



WHAT EFFECTS DOES ECONOMIC AMENITIES (RENT, INCOME) HAVE ON MIGRATION FLOWS WITHIN THE DISTRICT OF COLUMBIA?



DOES DC'S GENEROUS EITC PROGRAM WORK AS A PULL FACTOR AGAINST THE DISPLACEMENT EFFECTS OF GENTRIFICATION?

RESEARCH QUESTIONS

THE ROLE OF EITC ON MIGRATION WITHIN THE DISTRICT OF COLUMBIA

- Why focus on Earned Income Tax Credit (EITC) recipients vs non-EITC?
 - EITC households about 18% of income tax filers.
 - Low income households: average median income \$14,748.
 - The EITC in DC also reduces negative income instability when income falls among residents, and city-level EITC expansions throughout the 2000s appear to have reduced poverty (Hardy, Muhammad, and Samudra 2015).
 - The District's EITC program equals 40 percent of the federal EITC and is the largest state or local supplement to the federal EITC in the country (Clark 2008).
 - There is little to no research on household's migration patterns within Washington, D.C. especially after the millennium with the rapid increase in population and median area income (AMI).

Theoretical Framework

• Gravity Model

➤ Basic equation:

$$T_{jk} = G \frac{P_j P_k}{d_{jk}},$$

$$\ln T_{jk} = \ln G + \alpha \ln(P_j) + \beta \ln(P_k) - \gamma \ln(D_{jk}) + \varepsilon_{jk}$$

where

- T_{jk} = total population flows (in both directions) between j and k
- G = constant,
- P_j = population of origin j,
- P_k = population of destination k, and
- d_{jk} = distance between j and k

THEORETICAL FRAMEWORK

- $T_{jk} = e^{(\ln\beta_0 + \beta_1\ln(\text{POP}_k/\text{POP}_j) + \beta_2\ln(X_{kj}) + \varepsilon_{kj})}$,

WHERE

- T_{jk} = TOTAL POPULATION FLOWS (FROM ORIGIN TO DESTINATION NEIGHBORHOODS) BETWEEN J AND K
- $\text{POP}_k/\text{POP}_j$ = LOG OF THE RATIO OF NEIGHBORHOOD DESTINATION TO NEIGHBORHOOD ORIGIN POPULATION,
- X_{kj} =
LOG OF THE RATIO OF NEIGHBORHOOD DESTINATION TO ORIGIN MATRIX VARIABLES

DATA AND METHODOLOGY

Methodology

- Poisson Pseudo-maximum-likelihood Estimator (PPML)
- Santos Silva, J.M.C. And Tenreyro, Silvana (2006); Chort And Rupelle (2015)

Data: 2005-2014

- Individual Income Tax And Real Property Tax Data (2005-2006, 2006-2007, 2007-2008, 2008-2009, 2010-2011, 2011-2012, 2012-2014, and 2013-2014)
- American Community Survey (ACS)
- Neighborhoodinfodc
- National Bureau of Economic Research (NBER)

WHO ARE WITHIN CITY MOVERS?

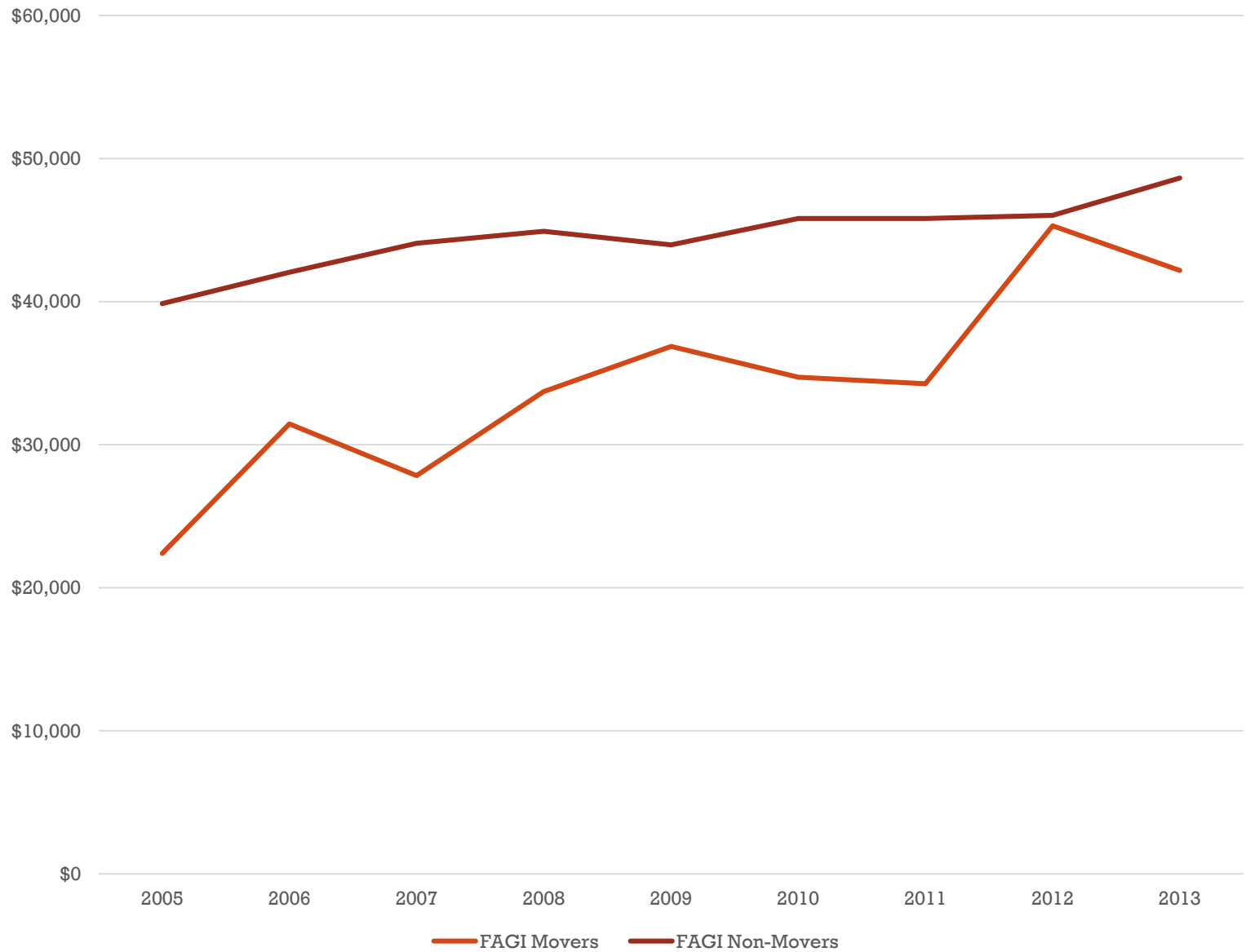
- Households whose geocoded address in the individual income tax data is in a census tract in Washington, D.C. at time t and whose geocoded address is in a different census tract in the District at time $t+1$.

DESCRIPTIVE ANALYSIS

YEAR	TOTAL FILERS IN DC	TOTAL FILERS THAT MOVED TO ANOTHER CENSUS TRACT	MOVERS AS A % OF TOTAL POPULATION	EITC MOVERS AS A % OF TOTAL MOVERS	EITC MOVERS AS A % OF EITC POPULATION
2005-2006	212614	4003	1.88	44.2	4.68
2006-2007	226898	18333	4.04	18.7	8.89
2007-2008	231777	8805	3.80	33.0	7.09
2008-2009	239963	11979	4.99	24.6	6.96
2009-2010	239768	39	0.02	5.1	0.00
2010-2011	257181	9659	3.76	22.2	4.64
2011-2012	284461	20017	7.04	24.2	9.42
2012-2013	327720	14001	4.27	12.0	3.03
2013-2014	351895	39251	11.15	21.5	14.00

- Characteristics of movers within D.C
 - 126,087 households moved between census tracts within the District between 2006 and 2014. An average of 5% per year
 - Among EITC recipients, about 28,151 households moved within D.C., which makes up about 22.3 percent of movers

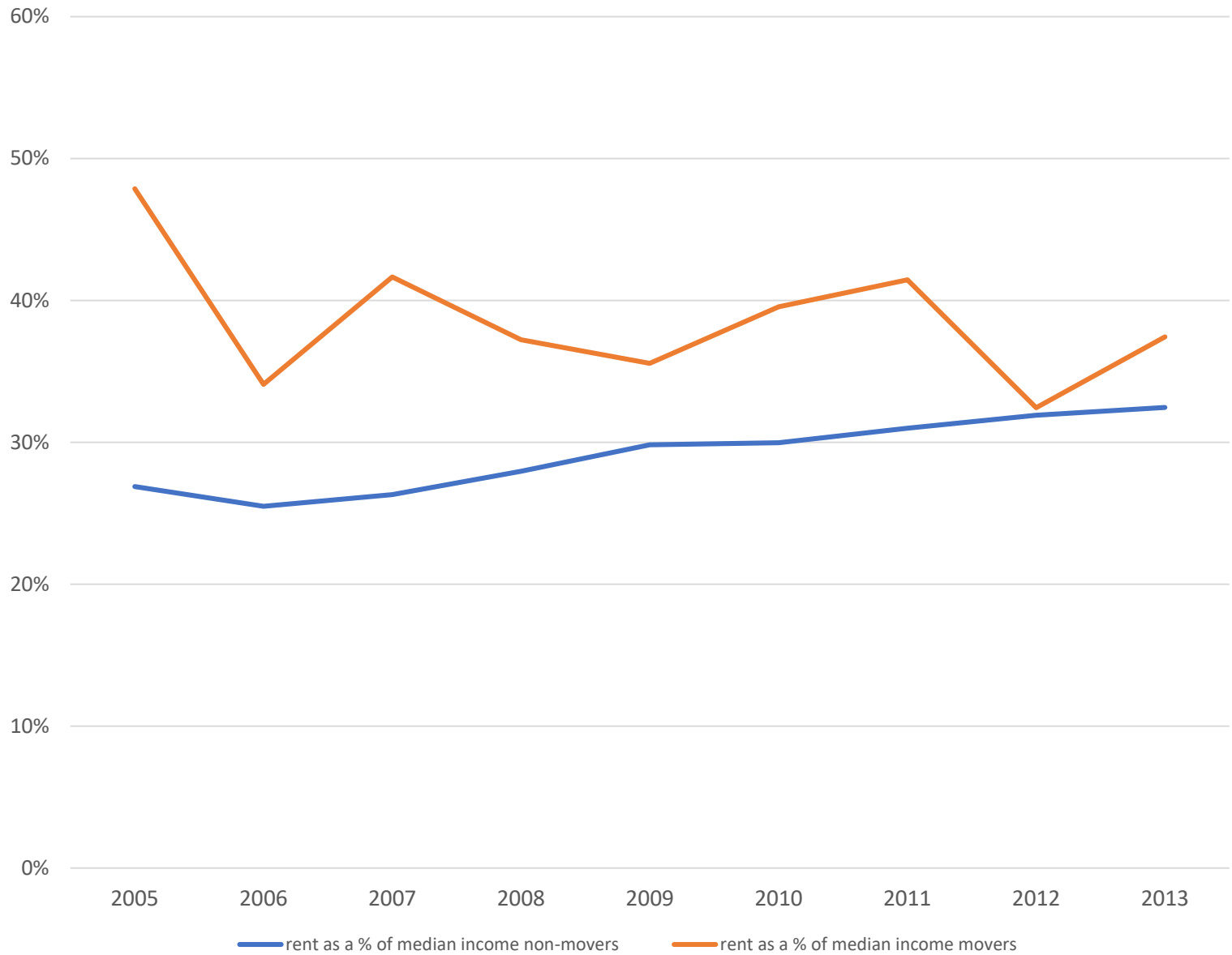
Median income: movers vs. non movers



• CHARACTERISTICS OF MOVERS WITHIN D.C

- Within city movers are low-to-moderate income households

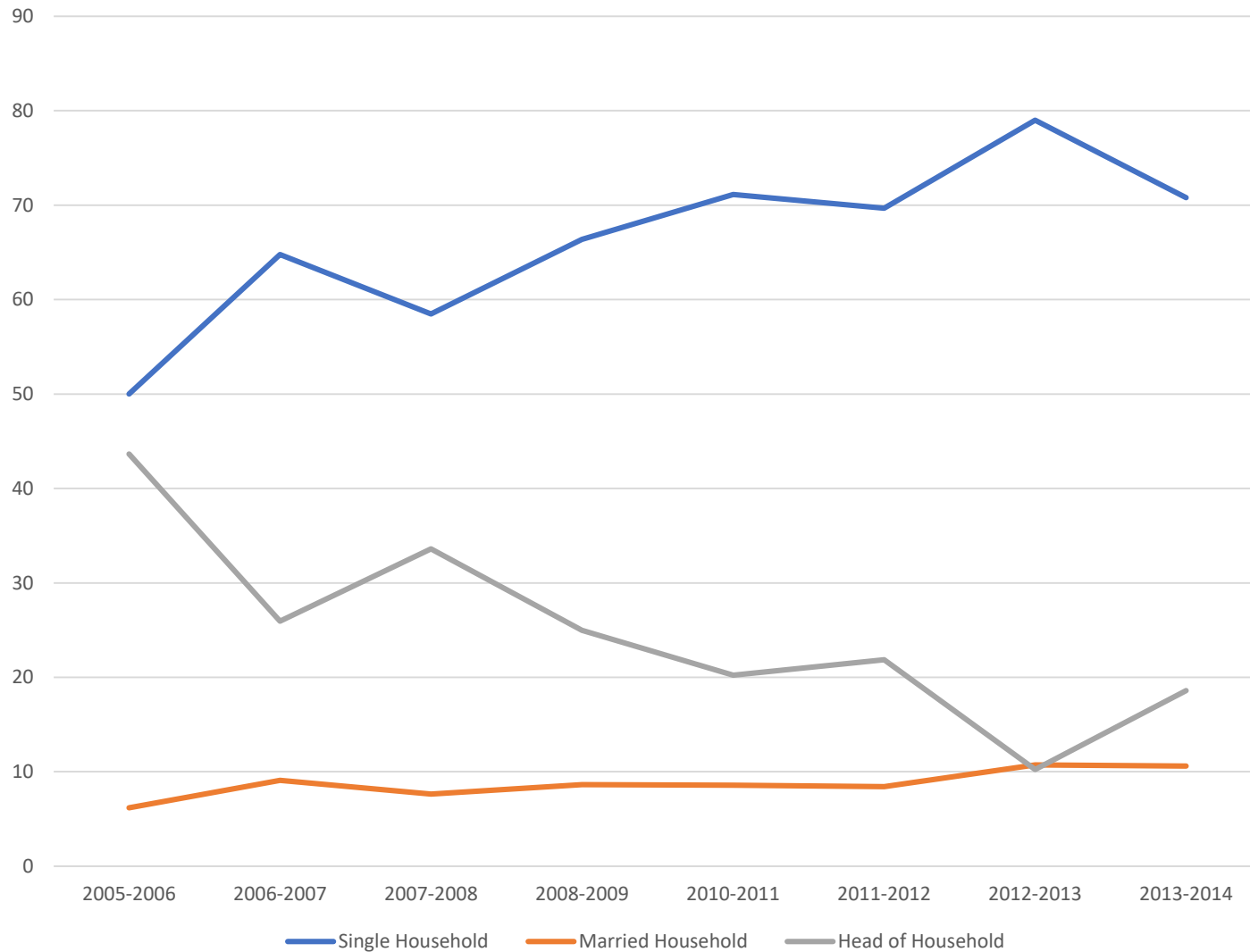
Rent as a percentage of median monthly income



• CHARACTERISTICS OF MOVERS WITHIN D.C

- Within city movers are low-to-moderate income households
- Have a higher housing cost burden

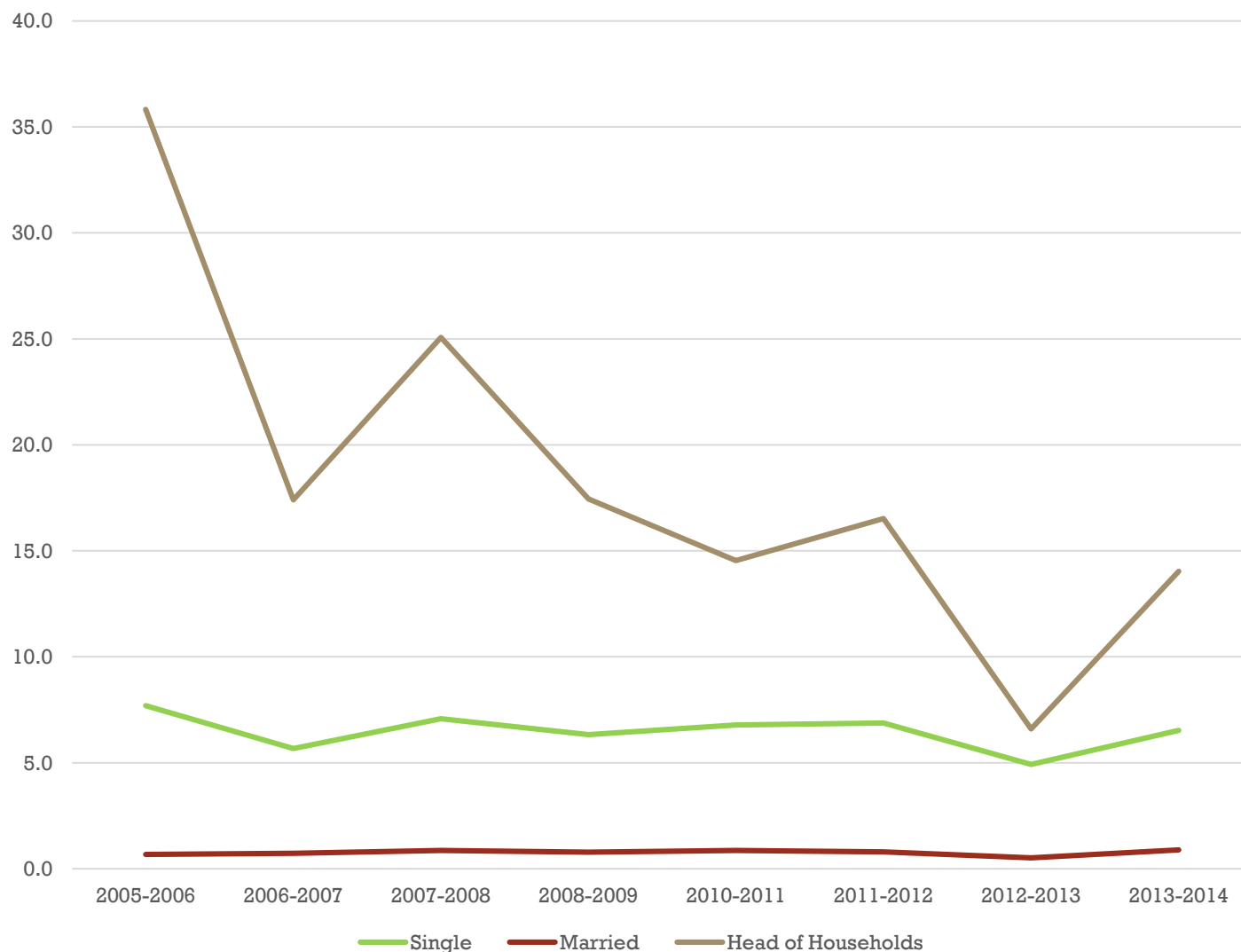
Percentage of movers by filing status



• CHARACTERISTICS OF MOVERS WITHIN D.C

- Within city movers are low-to-moderate income households
- Have a higher housing cost burden
- Mostly single households

Percentage of EITC Movers by Filing Status



• CHARACTERISTICS OF MOVERS WITHIN D.C

- Within city movers are low-to-moderate income households
- Have a higher housing cost burden
- Mostly single households
- EITC: more single families with dependents

CHARACTERISTICS OF MOVERS WITHIN D.C

- Within city movers are low-to-moderate income households
- Have a higher housing cost burden
- Mostly single households
- EITC: more single families with dependents
- Higher percentage move to higher income census tract

YEAR	% MOVE TO LOWER INCOME CENSUS TRACT	% MOVE TO HIGHER INCOME CENSUS TRACT	EITC-% MOVE TO LOWER INCOME CENSUS TRACT	EITC-% MOVE TO HIGHER INCOME CENSUS TRACT
2005-2006	52.2%	47.8%	50.1%	49.9%
2006-2007	52.8%	47.2%	51.4%	48.6%
2007-2008	52.3%	47.7%	50.1%	49.8%
2008-2009	53.2%	46.8%	51.5%	48.5%
2010-2011	46.4%	53.6%	47.5%	52.6%
2011-2012	54.0%	46.0%	52.9%	47.1%
2012-2013	54.4%	45.6%	54.7%	45.5%
2013-2014	54.0%	46.0%	51.4%	48.7%

SUMMARY CHARACTERISTICS OF DESTINATION NEIGHBORHOODS

Variable	All Observations		Observation with Positive Flows			
	Mean	Std. Dev.	Mean-All	Std. Dev.	Mean-EITC	Std. Dev.
Transition population	0.106	0.448	2.052545	2.160338	1.394	0.915
Distance between census tracts	4.002	2.146	2.776169	1.802619	2.899	1.952
Assessment value	445845.600	335747.300	441338.9	312965.1	296048.400	200935.300
Income	46900.120	31033.760	45225.96	22783.42	33136.330	14095.190
Violent crime	16.622	41.821	14.11723	10.29556	16.948	8.104
Property crime	71.946	331.231	49.89408	53.16081	45.566	26.276
Age	41.595	6.403	40.36086	5.994279	40.719	5.011
Homeownership rate	0.431	0.225	0.4145855	0.20474	0.357	0.202
Renter rate	0.558	0.228	0.5839732	0.2053354	0.642	0.203
Distance to metro	0.638	0.392	0.6121326	0.3722217	0.684	0.384
White ratio	0.311	0.302	0.3024805	0.288016	0.136	0.199
Black ratio	0.546	0.356	0.5484617	0.3431582	0.751	0.273
Hispanic ratio	0.084	0.087	0.0934418	0.0944955	0.078	0.100
Total population	1365.029	639.124	1543.478	670.3681	1401.380	589.579
Single	0.596	0.135	0.6066338	0.1293052	0.539	0.115
Married	0.181	0.112	0.1679122	0.0909189	0.129	0.063
Head of household	0.224	0.168	0.225454	0.1643578	0.331	0.153
Observations	286758		65220		21833	

- **Observations with positive flow:**
 - Average of 2 households move within DC per year
 - EITC households: 1 per year
 - Mean income and assessment value lower than total sample
 - Distance between census tract is less than total sample
 - Distance to metro is lower for all observations but higher for EITC households

SUMMARY CHARACTERISTICS OF DESTINATION NEIGHBORHOODS

- Variables of interest
 - Income: measures neighborhood amenities, so that a higher income neighborhood equals more amenities.
 - Neighborhood quality
 - Housing assessment value: measure housing affordability in DC
 - Assessment value used because rent is correlated with income
 - Distance: measures commuting costs
 - Example: distance from friends, family, daycare centers, etc.

YEAR BY YEAR MIGRATION- ALL HOUSEHOLDS

VARIABLES	(1) 2006	(2) 2007	(3) 2008	(4) 2009	(5) 2011	(6) 2012	(7) 2013	(8) 2014
Age	-24.89*** (5.959)	-14.41*** (2.881)	-21.75*** (4.104)	-5.834** (2.959)	-7.343** (2.931)	-4.904** (2.043)	-9.121*** (2.398)	-8.261*** (1.658)
Income	-5.190*** (1.096)	-5.194*** (0.450)	-5.789*** (0.681)	-5.052*** (0.559)	-5.919*** (0.562)	-5.883*** (0.443)	-5.371*** (0.501)	-5.767*** (0.377)
Assessment value	-1.265*** (0.382)	-1.285*** (0.171)	-1.540*** (0.261)	-1.508*** (0.225)	-0.764*** (0.283)	-1.373*** (0.219)	-1.295*** (0.235)	-1.201*** (0.162)
Violent crime	-0.273* (0.157)	0.0201 (0.0696)	-0.318*** (0.106)	-0.284*** (0.0778)	-0.151* (0.0819)	-0.0213 (0.0639)	-0.157** (0.0727)	-0.158*** (0.0455)
Property crime	0.310 (0.382)	-0.106 (0.166)	0.436 (0.266)	0.689*** (0.197)	0.322 (0.211)	-0.0895 (0.161)	0.317** (0.142)	0.0980 (0.106)
Metro distance	-0.581** (0.267)	-0.649*** (0.123)	-0.529*** (0.187)	-0.927*** (0.146)	-0.830*** (0.163)	-0.922*** (0.127)	-0.757*** (0.135)	-0.609*** (0.0997)
White	-0.199*** (0.0648)	-0.322*** (0.0351)	-0.289*** (0.0476)	-0.366*** (0.0418)	-0.281*** (0.0428)	-0.227*** (0.0347)	-0.383*** (0.0460)	-0.194*** (0.0270)
Black	-0.355*** (0.131)	-0.140** (0.0582)	-0.527*** (0.0857)	-0.395*** (0.0806)	-0.492*** (0.0963)	-0.473*** (0.0769)	-0.0435 (0.102)	-0.157** (0.0726)
Hispanic	-0.187*** (0.0665)	-0.0950** (0.0381)	-0.0507 (0.0472)	-0.109*** (0.0403)	-0.0601 (0.0495)	-0.0736* (0.0399)	-0.0276 (0.0601)	-0.0994*** (0.0350)
Population	-0.107 (0.524)	-0.321 (0.261)	-1.148*** (0.378)	-0.604* (0.314)	0.0202 (0.319)	-0.292 (0.235)	-0.283 (0.262)	-0.464** (0.182)
Distance	-1.386*** (0.0482)	-1.511*** (0.0268)	-1.439*** (0.0367)	-1.519*** (0.0307)	-1.586*** (0.0335)	-1.511*** (0.0259)	-1.667*** (0.0320)	-1.490*** (0.0207)
Constant	26.46*** (5.085)	16.09*** (2.441)	17.75*** (2.971)	14.15*** (2.695)	5.766*** (2.081)	19.92*** (2.187)	4.686** (2.026)	15.60*** (1.447)
Observations	24,534	25,488	25,344	26,775	27,612	27,650	28,302	27,966
R-squared	0.265	0.577	0.404	0.498	0.508	0.620	0.633	0.702

YEAR BY YEAR MIGRATION- EITC HOUSEHOLDS

VARIABLES	(1) 2006	(2) 2007	(3) 2008	(4) 2009	(5) 2011	(6) 2012	(7) 2013	(8) 2014
Age	-19.13 (13.32)	-16.37** (7.966)	-19.10** (9.014)	12.31 (7.883)	14.15* (7.510)	2.820 (4.750)	5.272 (7.252)	-0.161 (3.750)
Income	1.589 (2.932)	-0.248 (1.452)	0.333 (1.957)	-1.032 (1.622)	0.688 (1.482)	2.373** (1.085)	-1.116 (1.430)	0.425 (0.851)
Assessment value	-0.0570 (0.740)	-1.224*** (0.397)	-3.329*** (0.630)	-1.139*** (0.439)	-2.346*** (0.828)	-1.644*** (0.560)	-1.929** (0.858)	-0.769* (0.402)
Violent crime	-1.625*** (0.587)	-0.445* (0.254)	-1.179*** (0.346)	-0.724** (0.302)	-0.398 (0.252)	-0.702*** (0.202)	-0.573** (0.257)	-0.765*** (0.133)
Property crime	0.373 (1.035)	0.321 (0.475)	0.583 (0.582)	1.875*** (0.581)	1.712*** (0.610)	0.633 (0.415)	-0.344 (0.476)	0.187 (0.287)
Metro distance	0.494 (0.452)	0.372 (0.267)	0.390 (0.360)	-0.665** (0.316)	-0.387 (0.345)	-0.0294 (0.257)	-0.879** (0.409)	-0.251 (0.203)
White	0.00538 (0.0989)	-0.0315 (0.0620)	0.125 (0.0796)	-0.00278 (0.0689)	0.0323 (0.0691)	0.0276 (0.0493)	-0.0765 (0.0853)	0.0498 (0.0399)
Black	-1.255*** (0.375)	-0.324 (0.239)	-0.776** (0.352)	-1.183*** (0.394)	-0.619 (0.384)	-1.163*** (0.298)	-0.298 (0.424)	-0.441* (0.250)
Hispanic	-0.264*** (0.0888)	-0.266*** (0.0603)	-0.132* (0.0698)	-0.201*** (0.0571)	-0.143* (0.0731)	-0.263*** (0.0526)	-0.0591 (0.0958)	-0.199*** (0.0469)
Population	-2.074** (0.991)	-1.290** (0.571)	-2.294*** (0.720)	-2.502*** (0.665)	-1.381* (0.725)	-1.548*** (0.491)	-1.105 (0.775)	-1.167*** (0.406)
Distance	-1.259*** (0.0694)	-1.330*** (0.0463)	-1.253*** (0.0563)	-1.231*** (0.0526)	-1.261*** (0.0631)	-1.141*** (0.0441)	-1.279*** (0.0755)	-1.176*** (0.0342)
Constant	17.78* (10.38)	14.96** (7.295)	24.05*** (6.767)	-7.623 (6.713)	-7.396 (6.003)	-0.363 (4.133)	5.190 (5.338)	-2.105 (3.974)
Observations	17,097	23,525	20,187	24,131	24,552	26,524	26,707	27,492
R-squared	0.209	0.354	0.275	0.286	0.234	0.379	0.168	0.476

CONCLUSION/ POLICY RECOMMENDATIONS

- Movers: lower income households vs non-movers
- Migration flows within the District are such that households are in search for cheaper housing in lower quality neighborhoods
- EITC Movers: neighborhood quality is neither a pull nor push factor
 - Also search for cheaper housing cost (highlights housing affordability issue)
- The importance of the District EITC policies as a pull factor for migration flows
 - EITC policy as a factor in limiting the effects of gentrification
- POLICY RECOMMENDATIONS
 - Keep EITC policies and maybe extend it
 - Households in the same income brackets not receiving EITC

LIMITATIONS

Individual income
tax data may
underestimate total
population



Racial
demographics of
households not
included in tax data

