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Who Gentrifies Low Income Neighborhoods?*

by

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November 2007

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Abstract

This paper uses confidential Census data, specifically the 1990 and 2000 Census Long-Form data, to study the demographic processes underlying the gentrification of low income urban neighborhoods during the 1990's. In contrast to previous studies, the analysis is conducted at the more refined census-tract level with a narrower definition of gentrification and more narrowly defined comparison neighborhoods. The analysis is also richly disaggregated by demographic characteristic, uncovering differential patterns by race, education, age and family structure that would not have emerged in the more aggregate analysis in previous studies. The results provide little evidence of displacement of low-income non-white households in gentrifying neighborhoods. The bulk of the income gains in gentrifying neighborhoods are attributed to white college graduates and black high school graduates. It is the disproportionate in-migration of the former and the disproportionate retention and income gains of the latter that appear to be the main engines of gentrification.

I. Introduction

Over the past several decades, there has been substantial gentrification of low-income neighborhoods in many U.S. urban areas.[1] These neighborhoods typically experience large increases in household income and housing prices. Some laud the revitalization of decayed neighborhoods and others criticize the displacement of low-income, often minority, households. Despite the importance of gentrification in urban areas as an observed phenomenon and as a policy issue, there is a shortage of empirical evidence describing how gentrification occurs.

Some recent studies have examined the issue of displacement, and have found little to suggest that low-income households exit gentrifying neighborhoods any faster than they exit other neighborhoods. These studies, however, have been severely constrained by data limitations. As a result they either define neighborhoods as rather large geographic areas, or use overly broad definitions of gentrification. Additionally, despite the fact that the findings of these studies point to disproportionate in-migration of rich households, as opposed to disproportionate out-migration of low-income households, as the main engine of gentrification, very little analysis of in-migration to gentrifying neighborhoods has been conducted.

This paper takes advantage of access to confidential Census data, specifically the 1990 and 2000 Census Long-Form Data, to provide the richest study of gentrification to date. We study both in-migration to and out-migration from gentrifying low-income neighborhoods compared to other neighborhoods that are equally low income in 1990. We perform the similar analysis comparing neighborhoods that gentrified into middle-class neighborhoods over the 90's to those that were already established middle-class neighborhoods in 1990.

[1] While no precise consensus definition of gentrification exists, it is typically characterized by: (i) large increases in household income and housing prices in neighborhoods that were previously existing, lower income neighborhoods; (ii) higher-income households moving in; and (iii) urban. In this paper we will define a gentrifying neighborhood as an existing urban neighborhood that had relatively low average income in 1990 and experienced large increases in average income over the 1990s. We will give a more precise definition below, after we have defined our samples.

The key findings are: 1) The analysis points to the in-migration of college graduates, particularly white college graduates under 40 without children, as a key characteristic of a gentrifying neighborhood; 2) The presence of children, an elderly householder or a householder with low educational attainment dampens the likelihood that a white household moves into a gentrifying neighborhood, but these same effects are not present, or even reversed, for black and Hispanic householders; 3) Synthetic cohort analysis of out-migration finds no evidence of disproportionate exit of low-education or minority householders, but does find some evidence that gentrifying neighborhoods disproportionately retain black householders with a high school degree; 4) A decomposition of the total income gains in a gentrifying neighborhood attribute the bulk of the gains to two key groups: white college graduates (due to disproportionate in-migration and high incomes) and black high school graduates (due to disproportionate retention and income gains).

We highlight three key benefits from using confidential data that allow us to provide a much more detailed analysis of gentrifying neighborhoods than previous studies. First, we have the refined geographic detail, geographic coverage, and sample size to better define the set of gentrifying neighborhoods. Second, the same data characteristics allow us to better define a set of comparison neighborhoods, specifically other neighborhoods within the same CMSA that have comparable incomes in 1990 or 2000. Third, we disaggregate by demographic characteristic in much more detail than previous analysis. This uncovers differential patterns by race, education, age and family structure that would not have emerged in the more aggregate analysis in previous studies.

II. Literature Review

The literature most closely related to the current study is that on the link between gentrification and out-migration in low-income neighborhoods. This literature investigates whether there is empirical evidence to support the widely held belief that gentrification causes the displacement of low-income minorities from their neighborhoods. The most recent studies, although constrained by data limitations, find little evidence of displacement.

Vigdor (2002) studies gentrification in the Boston metro area using American Housing Survey (AHS) data from 1974-93 which identify "zones" of 100,000 to 200,000 individuals (The city of Boston contains 5 zones). He finds no evidence that low income households are less likely to remain in the current housing unit if they are located in a gentrifying zone. Freeman and Braconi (2004) conduct a similar study of gentrification in New York City in the 1990's using specialized data collected as part of the city's rent regulation policy. The data identify 55 subborough areas of approximately 46,000 households and 131,000 persons each. Identifying seven neighborhoods in Manhattan and Brooklyn that gentrified during the 90's, they find that low-income households in the gentrifying neighborhoods were less likely to move than low-income households in non-gentrifying neighborhoods.

Freeman (2005) extends this work to a sample of U.S. neighborhoods using the geocoded version of the Panel Study of Income Dynamics (PSID), which identifies Census tract of residence. A Census tract is a relatively permanent geographic unit designed to be as homogenous as possible with respect to population characteristics, economic status, and living conditions at the time it is established. Census tracts generally contain between 1,000 and 8,000 people, with an optimum size of 4,000 people. The PSID, therefore, allow Freeman to analyze a much larger set of neighborhoods at a much more refined level of geographic detail. Sample size

constraints, however, require he take a rather broad definition of gentrification. It is probably a result of this broad definition that his set of gentrifying neighborhoods actually experience a $4,000 *decrease* in median household income during the 1990's.[2] He again finds little evidence that gentrification is associated with displacement of low-income households.

The above discussion of these three recent studies highlights the data issues that plague research on residential mobility and gentrification. Data constraints typically have restricted analysis to individual cities and/or to studies in which the identified neighborhoods are unsatisfactorily large in size. The exception, Freeman (2005), conducted with PSID data, has insufficient sample size to allow analysis focused on the relatively small set of census tracts that are both low income and experience large and rapid income growth in a given time period. Our use of confidential Census Long-Form data allows us to circumvent these data issues as we have a very large, nationally representative sample that identifies census tract of residence.

Our paper is related to the above three studies, although we much more heavily investigate who moves *into* gentrifying neighborhoods, rather than just who moves out. The analysis to date suggests that gentrification is not associated with unusual levels of out-migration of the existing low income, often non-white, residents, which indicates that it is the characteristics of the in-migrants that are the key feature of gentrification. In other words, there is a high rate of residential mobility in the U.S., and there is little evidence that the rates are substantially higher in gentrifying neighborhoods. What is likely different is who moves in when a previous tenant vacates. Freeman and Braconi (2004) and Freeman (2005) provide descriptive statistics that indicate that in-movers to gentrifying neighborhoods are more likely to

[2] Freeman's most restrictive definition of gentrified neighborhood is one that meets 1) is a central city neighborhood, with 2) median income in previous census below the metro area's 40th percentile, 3)proportion housing built in last 20 years in the previous census below the metro area's 40th percentile, 4) above median growth in educational attainment in the intercensal period, and 5) an increase in real housing prices in the intercensal period.

be white, college-educated, and higher income than in-movers to non-gentrifying neighborhoods, but no formal, multivariate analysis is conducted.

There are two other related literatures that warrant discussion, one on mobility between rich and low-income neighborhoods, and the other on how neighborhood characteristics predict neighborhood change.

There is a relatively large literature that studies mobility between neighborhoods as a function of individual and neighborhood characteristics. Much of this research is conducted with the geocoded PSID, which records census tract of residence. Sample size constraints are less problematic in this literature, as there are far more observations of, for example, households moving in and out of the entire set of low income neighborhoods than in and out of the subset of gentrifying neighborhoods. Two of the most recent and relevant papers are Crowder and South (2005) and South, Crowder and Chavez (2005). While the primary focus on these papers is the migration of households from low income to higher-income neighborhoods, they also examine movement from higher-income to low income neighborhoods. While both Crowder and South (2005) and South, Crowder and Chavez (2005) find that white households are far less likely to move from higher-income to low income neighborhoods than black or Latino households, Crowder and South (2005) document that the rate of movement from higher-income to low income neighborhoods increased disproportionately for white households during the 1980's and 1990's, particularly for high-income white households. They consider this to be related to the gentrification of low-income neighborhoods that occurred during the same time period.

There is also a substantial literature on how current neighborhood characteristics predict neighborhood change. One recent example is Card, Mas and Rothstein (2007), which estimates racial "tipping points," points at which the concentration of non-white households is sufficiently

high that the neighborhood will "tip," generating an exodus of white households. Two recent studies that specifically address neighborhood growth and renewal are Brueckner and Rosenthal (2005) and Rosenthal (2006). Both papers argue that age of housing stock is a key determinant of neighborhood growth. As a neighborhood's housing stock ages, richer households exit for neighborhoods with newer housing and are replaced by lower-income households. Eventually, the housing stock ages to the point it is ripe for re-development, at which the neighborhood gentrifies and rich households return. Both papers provide analysis to suggest that aged housing stock is an important predictor of gentrification. An alternative view provided by Coulson and Bond (1990) suggests that is square footage, not age of housing per se, which predicts residential turnover.

III. Data

This section describes how the analysis sample and key variables are constructed using 1990 and 2000 Census data. The data are constructed in 2 stages. First, 1990 and 2000 Census tracts are linked and a sample of urban census tracts are selected. Census tract-level variables are constructed. These tract-level characteristics are used to further refine the set of tracts in the analysis sample and to identify tracts that gentrified between 1990 and 2000. In the second stage, the sample of householders that reside in the tracts in the analysis sample is drawn from the 2000 data, and household-level variables are calculated.

A. Census Demographic Long Form Data

The analysis in this paper uses the 1990 and 2000 Decennial Census Long Form Data. These are confidential data products of the U.S. Census Bureau that can only be accessed from a Census Research Data Center (CRDC).[3] The Long Form Data contain the population of

[3] All analysis for this paper was conducted at the Triangle Census Research Data Center (TCRDC) at Duke University.

households that respond to the Long Form survey in the Decennial Census, which is administered to a 1-in-6 sample of all households in the U.S. The samples include 14.3 million households and 38.6 million individuals in the year 1990 and 16.6 million households and 43.5 million individuals in the year 2000.

The analysis in this paper would not be possible with publicly available data. The Public Use Microdata Samples (PUMS) contain a random sample of household-level responses from the Decennial Long Form surveys, but only identify geographic location down to the level of Public Use Microdata Areas (PUMAs), which are areas of at least 100,000 people. In contrast, the confidential Long Form data identify census tracts that, as described above, contain an average of 4,000 individuals.[4] There are also public Census data sets that report aggregate census tract-level characteristics based on the Long Form data. These tabulated data, however, are not sufficiently disaggregated for the purposes of our analysis. For example, they do not disaggregate by the migration status of the household, which is a key variable in our analysis.

B. Census Geography and Sample Criteria

While the census tracts are designed to be relatively permanent geographic units, they do change over time as neighborhoods evolve and as tract populations increase or decrease. Therefore, the census tracts must be linked between the 1990 and 2000 Censuses. Census Tract Relationship Files from the U.S. Census Bureau show how 1990 census tracts relate to 2000 census tracts. Using this information, we developed a concordance file that creates neighborhood definitions that are unique and consistent across the two census years. If, for example, a 1990 tract split into two tracts in 2000, the two 2000 tracts were merged into a single

[4] The census block, an even smaller geographic unit, is also identified. Because, however, CRDC researchers are not currently allowed to link census data over time at the block level, and because the tract more closely relates to our concept of neighborhood, we conduct our analysis at the tract level. Using survey data, Lee and Campbell (1990) find that self reported neighborhoods of residence on average cover 15 square blocks. This finding suggests that census tracts offer a reasonable neighborhood definition.

neighborhood that would be consistent with the original 1990 tract. There were some cases of overlapping tract splits and merges, which required that we aggregate over several tracts to obtain one consistent neighborhood.[5] In this paper, the terms neighborhood and census tract will refer to these census tract groupings that we have linked between 1990 and 2000.

We select our sample of census tracts for analysis by first focusing on Consolidated Metropolitan Statistical Areas (CMSAs) as defined by the Census Bureau. We select only those CMSAs in the continental U.S. with populations of at least 500,000 in 1990, producing a sample of 72 CMSAs. Most CMSAs include some areas that are very rural and in which census tracts cover very large geographic areas. For this reason, we further refine our sample. The Census Bureau has compiled a list of incorporated places with populations of 100,000 or more in 1990. We only include tracts from the 72 largest CMSAs that are within a 5km buffer of one of these large incorporated places. This effectively selects off the more densely populated areas of the CMSAs, and excludes some of the less-populous CMSAs that do not contain a single Census place. Our final sample consists of 15,040 linked tracts from 64 CMSAs. A list of included CMSAs appears in Appendix A

C. Definition of Gentrification and Comparison Groups

Table 1 provides some descriptive statistics on income and income change for our sample of 15,040 urban area tracts, by quintile of average family income in 1990.[6] The construction of the family income variable is described below in section D. The most interesting result in Table 1 is that the bottom quintile of neighborhoods has median income growth substantially above that experienced by neighborhoods in the four richer quintiles, and the 90th percentile of

[5] 82% of the constructed time-consistent neighborhoods contain only one 2000 census tract, and 94% contain no more than two 2000 census tracts.
[6] Note that all income figures reported in the paper are in year 2000 dollars.

income growth is only higher in the top quintile. This indicates that gentrification is an important phenomenon among the lowest-income neighborhoods during this period.

To create our primary analysis sample, we first take the set of tracts that are in the bottom quintile of average family income in 1990.[7] These neighborhoods have average family income less than $30,079 in 1990. We refer to this set of neighborhoods as the low-income neighborhood sample. We take gentrifying neighborhoods to be those tracts in the low income neighborhood sample that experience an increase in average family income between 1990 and 2000 of at least $10,000. 15.2% of tracts in the bottom quintile experience income growth of this magnitude. Only 13.2% of tracts in the upper 4 quintiles experience growth of this magnitude.

Most of our analysis compares gentrifying neighborhoods to non-gentrifying neighborhoods in the low-income neighborhood sample. The fact that most gentrifying tracts have exited the bottom quintile suggests another interesting comparison. We also take a sample of middle-class neighborhoods in 2000 and distinguish those that were low-income neighborhoods in 1990 from those that were not low income in 1990. To be more specific, we take as our middle-class neighborhood sample those tracts that have average family income in 2000 between $33,000 and $47,000. This sample is comprised of neighborhoods from the very top of the first quintile through the middle of the 3rd quintile of average family income in 2000. These cut-off points for the middle-class neighborhood sample are chosen to maximize the concentration of gentrifying tracts. For analysis with the middle-class neighborhood sample, gentrification is still defined as those neighborhoods in the sample that were originally in the bottom quintile in 1990 and for whom average family income increased by at least $10,000 between 1990 and 2000. 5.8% of tracts in the middle-class sample are gentrifiers and 63.4% of

[7] We also conducted alternative analysis in which we selected tracts from the bottom quintile of neighborhood income *within* MSA and found this had little effect on the results.

gentrifying tracts in the low-income neighborhood sample appear in the middle-class neighborhood sample.

D. Measurement of Key Variables

Having identified two samples of urban neighborhoods, the low-income neighborhood sample and the middle-class neighborhood sample, we then select the sample of all householders in the 2000 Long Form Census data who reside in these tracts to create the data for analysis.[8] Key variables in our analysis include family income of the householder and migration status of the householder. To create the family income measure, we sum all forms of income across all members of the householder's family.[9] This excludes income from individuals in the household who are not related to the householder (such as roommates or boarders), with the important exception of income from unmarried partners.

We wish to distinguish those householders who moved into their neighborhood between 1990 and 2000 from those who lived in the neighborhood prior to 1990. The PUMS data report, for each household member, whether or not he or she lived in the same housing unit 5 years prior to the survey. The confidential data, fortunately, provide even more detailed information on when the householder moved into the housing unit, which allows us to exactly identify whether or not the householder moved into the housing unit in the past 10 years. In this paper, householders who moved into their housing unit in the past 10 years are referred to as migrants.

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[8] We define "household" and "householder" the same way the Census Bureau does: a household refers to the people living in a household, with the householder being the one in whose name the home is owned, being bought, or rented, in any kind of housing unit. Thanks to B.K. Atrostic for suggesting this clarification.

[9] The definition of family used by the Census Bureau is "two or more individuals related by birth, marriage, or adoption who reside together." Our definition of family income is similar to that used by the Census Bureau, the largest difference being that householders who do not reside with any relative are still included in our analysis as a family of size one. Unlike the definition of family income used by the Census Bureau, we include income from individuals designated as the unmarried partner of the householder. Individuals who do not live alone, but are not related to the householder, are not included in our analysis. Their income does not belong in the householder's family's income, but we do not have the migration information to create separate observations for them.

Unfortunately, there is no way to identify whether migrant householders previously lived in another housing unit in the same neighborhood or whether they moved in from another census tract.

IV. Methods

A. Migrants to Gentrifying vs Non-Gentrifying Neighborhoods.

We investigate the differences in characteristics between householders who moved into houses in neighborhoods that gentrified between 1990 and 2000 and those who moved into houses in neighborhoods that did not gentrify. Our primary analysis sample is the low-income neighborhood sample, which, as described above, contains those census tracts in the bottom quintile of average family income in 1990. Also as described above, tracts are considered to gentrify if they are in the low-income neighborhood sample and experience an increase in average family income between 1990 and 2000 of at least $10,000. Restricting the analysis sample to only those householders who moved into a housing unit in the low-income neighborhood sample between 1990 and 2000, we estimate a logit model of the form:

$$\log\left(\frac{\Pr(G_i = 1)}{\Pr(G_i = 0)}\right) = \beta_o + \sum_{j=1}^{35} \beta_j D_{ij} + X_i \gamma + \sum_{m=1}^{64} \delta_m MSA_{im} \,, \tag{1}$$

where G is an indicator variable that equals 1 if householder i moved into a housing unit in a gentrifying tract. The D_j*'s* are 35 demographic group indicator variables created by crossing 3 race/ethnicity categories (non-Hispanic white, non-Hispanic black, and Hispanic) with 3 education categories (less than a high school degree, high school degree, college degree) and 4 lifecycle stage categories (age less than 40 without children, age less than 40 with children, age 40-60, age greater than 60).[10] We omit the indicator for white, high school dropouts, under 40 and without children to create the reference category, leaving 35 demographic group indicators.

[10] Children must be under 18 and living in the same household.

X contains controls for householder's relationship status (married, cohabitating with unmarried partner, or single) interacted with the 3 race/ethnicity indicators and the householder's immigrant status interacted with the 3 race/ethnicity indicators. *X* also contains a control for the average 1990 income of the current tract of residence.[11] The model also includes CMSA fixed-effects.[12]

Our choice of specification in equation (1) warrants further explanation. A more complete specification would have crossed race/ethnicity with education with age with family structure (marital status and presence of children) and with immigration status, rather than simply including additional controls for marital status and immigration. In fact, we tried various more complete specifications. However these created a very large number of demographic groups and therefore an unwieldy number of coefficient estimates to report. Some of these more complete specifications also had quite a few small cells, generating many imprecise estimates. Additionally, all empirical results generated using confidential Census data must go through a review, and these small cells present a disclosure risk.[13]

We therefore picked the demographic variables to include in our "main cross" by determining which variables were the most important determinants of gentrifying mobility and which had the most interesting interactions with race and education. For example, we chose to include the interaction of presence of children with the youngest age category, but not with the 40-60 age category, because it was only for the younger householders that presence of children

[11] We control for average 1990 income for the tract in which the householder is located in 2000. Suppose, for example, that 1990 tract income is correlated with gentrification status. Further suppose, for example, that white householders are more likely to move into neighborhoods in the upper-end of the bottom quintile of 1990 income than the lower end. Failure to control for 1990 income would wrongly attribute a tendency to locate in the higher-income neighborhoods with a preference for gentrifying neighborhoods.

[12] Some CMSAs contain multiple MSAs. We also tried a specification with MSA fixed effects, but the change did not significantly affect the results. Every one of the 64 CMSAs that have tracts in the sample described in Section III.B and used in Table 1, contain tracts in the bottom quintile of 1990 income. 58 of these CMSAs contain gentrifying tracts.

[13] It is because of this same concern with small cells that householders that report a race other than white or black are not included in the analysis reported in Tables 4, 5 and 7. Once this "other race" category is sub-divided by age, education and family structure, the cells become very small. "Other Race" householders are included in the descriptive tables and in the decomposition in Table 8.

was such an important predictor of location choice. Additionally, we also initially estimated the model with marital status included in the "main cross", but found that presence of children, rather than marriage or cohabitation, was the more important predictor and had more important interaction effects with race and education.

In equation (1), β_o measures the differential between the migration rate into the gentrifying tracts and non-gentrifying tracts for the reference demographic group. A positive β_j therefore indicates that this differential is larger for demographic group j than for the reference group. These estimates indicate which demographic groups act as gentrifiers, in other words, which groups have disproportionately high rates of migration into gentrifying neighborhoods relative to other low-income neighborhoods.

A related question is, conditional on demographic group, how do incomes of gentrifying migrants compare to non-gentrifying migrants? For example, given that a group of migrant householders are white, elderly and hold high school degrees, how does the income of those moving into gentrifying low-income neighborhoods compare to the income of those moving into non-gentrifying low-income neighborhoods? We estimate the following model on the same sample of householders who have moved into a housing unit in the low-income neighborhood sample:

$$\log(Income_i) = \alpha_0 + \sum_{j=1}^{35} \alpha_j D_{ij} + \sum_{j=1}^{36} \beta_j (D_{ij} * G_i) + X_i \gamma + \sum_{m=1}^{64} \delta_m MSA_{im} + \varepsilon_i \,, \tag{2}$$

where *Income* is the householder's family income and all other variables are defined as they were for equation (1). We are interested in the coefficients on the interactions of the demographic group dummies with the gentrification dummy. A positive β_j, for example, indicates that, within demographic group *j*, migrants to the gentrifying neighborhoods have higher incomes than migrants to the non-gentrifying neighborhoods.

Estimation of equations (1) and (2) using our low-income neighborhood sample allows us to compare those moving into low-income neighborhoods that are gentrifying to those moving into low-income neighborhoods that are not gentrifying. In additional analysis, we estimate equations (1) and (2) on the sample of middle-class neighborhoods. This allows us to compare those who moved into houses in recently-gentrified middle-class neighborhoods compared to those who moved into houses in neighborhoods that were already middle-class in 1990. When using our middle-class sample, the control for tract-level income in 1990 is replaced with a control for tract-level income in 2000.[14]

B. Cohort Regression Analysis of Out-Migration

The final composition of the gentrifying tracts is determined both by who moves in and who moves out. The analysis described above in section A examines who moves into gentrifying neighborhoods. We would also like to characterize the out-migration. We would, in particular, like to determine if there is any evidence of displacement of low-income minorities in gentrifying neighborhoods. There are difficulties with the cross-sectional Census data because there is no way to create a sample of individuals who used to live in the gentrifying neighborhoods. We still, however, can study this issue by creating synthetic cohorts.

Consider all households in a single tract in 1990 with a householder who is age 20 to 29, white, and has a high school degree. Suppose there are 500 such households. Now, take all households in 2000 with a householder who is 30 to 39, white, has a high school degree, and has lived in the same housing unit for at least 10 years. If there has been no out-migration, there should be 500 such households. The observed changes in cohort size between 1990 and 2000 are

[14] Using the same logic described in footnote 7, we do not want to wrongly attribute a tendency for a group to locate in higher-income or lower-income middle-class neighborhoods with a preference for gentrifying neighborhoods. Because the middle-class tracts are selected based on 2000 income, it is appropriate to control for average family income in 2000, rather than 1990.

estimates of out-migration for different demographic groups in a neighborhood. Comparing changes in a cohort's size across neighborhoods produce estimates of relative out-migration from different types of neighborhoods for a particular demographic group.

We consider 4 cohorts:

	1990	2000
Cohort 1:	20-29	30-39 and in housing unit for at least 10 years
Cohort 2:	30-39	40-49 and in housing unit for at least 10 years
Cohort 3:	40-49	50-59 and in housing unit for at least 10 years
Cohort 4:	50-59	60-69 and in housing unit for at least 10 years

We divide each cohort into our 3 race/ethnicity groups crossed with our 3 education groups. We therefore use 4x3x3=36 cohorts in our analysis.

Our first cohort regression model is:

$$\%\Delta Pop_{ct} = \alpha_o + \sum_{c=1}^{35} \alpha_c C_{ct} + \sum_{c=1}^{36} \beta_c (C_{ct} * G_t) + X_t \gamma + \sum_{m=1}^{70} \delta_m MSA_{mt} + \varepsilon \,. \tag{3}$$

For cohort c in tract t, the percent change in population is measured as:

$$\%\Delta Pop_{ct} = \frac{Pop2000_{ct} - Pop1990_{ct}}{Pop1990_{ct}} \,,$$

and the C_c's are indicator variables for each of the 36 cohorts. The coefficients on the interaction of the cohort indicators with the gentrification dummy indicate whether the out-migration for that particular demographic group is relatively higher or lower in gentrifying tracts compared to non-gentrifying tracts. A negative estimate for β_c indicates that the population loss for cohort c was on average greater in gentrifying tracts, which would be consistent with displacement.

It must be pointed out that in the 2000 Census, 67.3 % of householders in our sample of urban tracts have changed houses in the past 10 years, and 68.8% of householders in the low-income neighborhood sample have done so. The average %ΔPOP for cohorts in the estimation sample is –66.3%, and reflects the natural mobility of households in the U.S. This exercise only

picks up *differential* mobility out of different types of neighborhoods for different demographic groups.[15]

We also use synthetic cohorts to study changes in income among pre-existing residents with the following model:

$$\%\Delta Inc_{ct} = \sum_{c=1}^{36} \alpha_c C_{ct} + \sum_{c=1}^{36} \beta_c (C_{ct} * G_t) + X_t \gamma + \sum_{m=1}^{70} \delta_m MSA_{mt} + \varepsilon \ . \tag{4}$$

Where %ΔInc is the percent change in average family income for cohort *c* between 1990 and 2000. A positive coefficient for β_c, for example, indicates that there was a greater increase in average family income for cohort *c* in gentrifying neighborhoods than non-gentrifying neighborhoods. This increase in average income is experienced among the non-migrants in the cohort, and is therefore not merely a function of in-migration of richer households. Such a positive effect of gentrification could result from two very different causes. One is that in gentrifying neighborhoods, the households in a particular cohort that migrate out are disproportionately low-income compared to those in the same cohort leaving non-gentrifying neighborhoods. This would cause an increase in average family income due to a composition effect. The other possible explanation is that gentrification causes an increase in family income in that demographic group, for example by improving employment opportunities in the local area. Unfortunately, there is no way to directly test between these two interpretations with the data at hand.

[15] Because cohorts are based on a random sample, different individuals in the household could list themselves as the householder in successive censuses, and individuals could change or misreport their age, education or race/ethnicity in successive censuses, the change in cohort population will be measured with error. This can generate some attenuation bias in our estimates, but there is no reason to believe that the measurement error is systematically correlated with gentrification status.

V. Results

Table 2 provides a preliminary description of the differences between the gentrifying and non-gentrifying tracts in our low-income neighborhood sample. The first two columns report average tract-level characteristics in 1990 by gentrification status. Interestingly, the low-income neighborhoods that gentrify between 1990 and 2000 have lower average income and a smaller proportion of white households in 1990 than those low-income neighborhoods that do not gentrify, although the proportion of householders with a college degree is marginally higher. It is also noteworthy that the average income of householders that moved into the gentrifying neighborhoods between 1980 and 1990 is lower than those who moved into the non-gentrifying neighborhoods. By most measures, the low-income neighborhoods that gentrified during the 1990's were worse off in 1990 than those that did not gentrify during the 90's. There is little evidence of "lead" indicators, or, put another way, little evidence that the gentrifying neighborhoods were already improving prior to 1990.

The remaining two columns report average tract-level characteristics in 2000 by gentrification status. By definition, the gentrifying tracts have much higher average income in 2000. The most striking features is the growth in the fraction of householders with a college degree, increasing from 9.0 to 15.8 percent, compared to an increase from 8.2 to 10.1 percent for non-gentrifying neighborhoods. The gentrifying neighborhoods also experience a moderate increase in the proportion of householders who are white. The final rows of the table indicate that the average incomes of both migrants and non-migrants increase in gentrifying tracts.

A. Migration Logit and Income Regression Results, Low-Income Neighborhood Sample

Table 3 provides descriptive statistics for the sample of householders who moved into a housing unit in the low-income neighborhood sample in the 90's. The two columns report means

separately for the householders who have moved into a housing unit in gentrifying tracts vs non-gentrifying tracts. Not surprisingly, the gentrifying migrants are higher income, higher education, more likely to be white and less likely to be Hispanic than non-gentrifying migrants. They are also, however, more likely to be black than non-gentrifying migrants. At the bottom of the table, we see that gentrifying migrants are also a little younger, less likely to have children and less likely to be immigrants than non-gentrifying migrants.

In Table 4 we present the results from estimating equations (1) and (2) on the low-income neighborhood sample. Column 1 reports the logit coefficient estimates of the β_j's from equation (1). To better illustrate the magnitudes of the effects, we also report the predicted probability that a migrant has located in a gentrifying neighborhood (P(Gentrify)) for all 36 demographic groups in column 3. As a point of comparison, 11.2% of the migrants in the estimation sample used in Table 4 locate in a gentrifying tract. Therefore demographic groups with predicted probabilities above 0.112 have above average rates of gentrification.

The most obvious finding in Table 4 is the high gentrification rate of college-educated householders, particularly white householders with college degrees. The gentrification rates of householders in all race/ethnicity groups with less than a college degree are remarkably similar and typically range from 10 to 11 percent. A more careful look at the results suggests that the presence of children, an elderly householder or low-education householder diminishes the gentrification rate among white households, but that these effects are smaller for black and Hispanic households. These effects are subtle enough in Table 4 that they are only pointed out

because the same patterns are much stronger in the analysis of middle-class neighborhoods in Table 5.[16]

The estimates in column 1 of Table 4 do *not* indicate which groups are most likely to live in a gentrifying neighborhood. They tell us which householders are more likely to move into a gentrifying neighborhood *conditional* on the fact they have chosen to move into a neighborhood that was low-income in 1990. For example, statistics reported later in Table 8 of this paper will show that a 2000 householder in a gentrifying neighborhood is much more likely to be a black high school dropout than a white college graduate. This is because black high school dropouts are overall much more likely to move into neighborhoods that were low income in 1990 than white college graduates. The black high school dropouts are more likely than average to move into a non-gentrifying low-income neighborhood than a gentrifying low-income neighborhood, so their choice to locate in a neighborhood cannot be seen as a sign of gentrification. In contrast, if a white college graduate moves into a neighborhood that was low income in 1990, it is much more likely than average that it is a gentrifying neighborhood. The influx of white college graduates is a feature that distinguishes the gentrifying neighborhoods from other low-income neighborhoods.

The final two columns of Table 4 present the results from estimating equation (2). It is not very surprising that, within each demographic group, the incomes of those migrating to the gentrifying areas are higher than those migrating to non-gentrifying areas. This differential in income is particularly large for the college-educated householders, particularly white householders with college degrees.

[16] The estimates for marital status and immigration status, which are not reported in Table 4, indicate that married or cohabitating householders have higher gentrification rates than single householders. The effect of partnership is strongest for white householders and weakest for Hispanic householders. Among white householders, immigrants have lower gentrification rates, but there is no effect of immigration status for non-white householders.

B. Migration Logit and Income Regression Results, Middle-Class Neighborhood Sample

The first 3 columns of Table 5 report the results obtained estimating equation (1) on the middle-class neighborhood sample. The gentrification rate in the estimation sample used in Table 5 is 4.2%, so any group with a value above 0.042 in column 3 has a higher than average predicted gentrification rate. When the sample is limited to those householders who have moved into a housing unit in a lower-middle to middle-class neighborhood in the past 10 years, it is not surprising that black and Hispanic householders with less than a college degree are disproportionately likely to have moved into the recently-gentrified, rather than established, middle-class neighborhood. It is also not surprising that white householders typically have lower than average gentrification rate, but the one exception is for white college-educated householders who are under 40 without children.

Among white householders, having less than a college degree, the presence of children, or elderly status all substantially diminish the probability the householder will choose a gentrifying neighborhood over an established middle-class neighborhood. These same patterns are substantially diminished, or even reversed, for most of the black and Hispanic demographic groups. Elderly status, lower education and presence of children are often associated with higher gentrification rates for non-white householders.[17]

The income results from estimating equation (2) on the middle class sample are reported in the last two columns of Table 5. It is not surprising that, for most demographic groups, among those who moved into houses in the middle-class sample of tracts, the incomes of those who are in recently-gentrified tracts are typically below those in the established middle-class tracts. The

[17]Estimates for marital status and immigration status, which are not reported in Table 5, indicate that for all racial/ethnic groups, married couples are more likely than average to move to an established middle-class neighborhood than a gentrifying neighborhood. Black immigrants living in middle-class neighborhoods are less likely than average to have moved into a gentrifying neighborhood, but Hispanic immigrants are more likely than average to have chosen the gentrified middle-class neighborhood.

only statistically significant exceptions are for white householders with college degrees, in which case the incomes of the gentrifiers exceed the incomes of those moving to established middle-class neighborhoods.

The results in Tables 4 and 5 point to in-migration of young, college-educated white householders without children as a particular hallmark of gentrifying neighborhoods. The results also indicate that among white householders, presence of children, age and education play a different role in determining the choice to locate in a gentrifying neighborhood than they do for black and Hispanic householders.

C. Cohort Regression Results

Table 6 provides some preliminary evidence regarding who *exits* gentrifying neighborhoods relative to non-gentrifying neighborhoods. Table 6 reports descriptive statistics for the sample of non-migrants, householders who have lived in their housing unit for at least 10 years, in the low-income neighborhood sample in 2000. Columns 1 and 3 report average 1990 tract-level characteristics of non-migrants for gentrifying and non-gentrifying neighborhoods, respectively. Columns 2 and 4 report average householder characteristics for non-migrants in 2000. If gentrification is associated with widespread displacement, we should see a differential change between columns 1 and 2 compared to columns 3 and 4. For the racial/ethnic and educational composition variables, there is little evidence to suggest that black or Hispanic householders are disproportionately exiting the gentrifying neighborhoods. There is, however, modestly higher exit of low-education households and retention of high-education households in the gentrifying neighborhoods. There is also a much bigger increase in average income between columns 1 and 2, compared to columns 3 and 4, suggesting that the "stayers" in gentrifying

neighborhoods either experience disproportionate income gains or are disproportionately selected from the higher income households within each demographic group.

The results from the cohort regression in equation (3) are reported in the first two columns of Table 7. This analysis is conducted on the low-income neighborhood sample. Recall that a large, negative and significant coefficient is evidence that a particular cohort lost more population in gentrifying areas than non-gentrifying low income neighborhoods, and is therefore consistent with displacement. The results in Table 7 provide little evidence of displacement. Most of the coefficients are statistically insignificant, very small in magnitude, and equally likely to be negative or positive. The one statistically significant coefficient suggests disproportionate *retention* of prime-aged black householders with a high school degree.

The remaining two columns report the results for the income change regression described in equation (4).[18] These results combined with those in the first column suggest that black householders with a high school degree benefit from gentrification. The first column, while not suggests that gentrifying neighborhoods disproportionately retain. Further, the third column estimates indicate that average incomes in cohorts of black householders with high school degrees increase roughly 20% more in gentrifying than non-gentrifying neighborhoods. Again, we cannot distinguish whether this is because gentrification improves the earnings of these householders, or disproportionately reduces exit of the highest earning householders in these cohorts. There are also significant income gains for white householders with college degrees.

[18] The sample of cohorts used to estimate this regression is smaller than that used in column 1 for two reasons. First, because many of these tract-level cohorts are relatively small in population in 1990, and because the average mobility rate is quite high, almost 40% of the tract-level cohorts have zero population in 2000. Because these cohorts with zero population in 2000 have no 2000 income information, they are dropped from the analysis. In addition, for some of the smaller cohorts that have non-zero population in 2000, the income change is calculated on such a small number of observations that the percentage change in income can be quite dramatic. For this reason, we trim another 3% of the sample that has greater than 400% change in average income.

The estimates in Table 7 again demonstrate that it is useful to disaggregate the analysis by detailed demographic group. Specifications that control linearly for race and education or poverty, and most previous studies have done, would not observe the results that the effects for black high school graduates are different than those for white high school graduates and that the effects for black high school graduates are quite different from black high school dropouts.

D. Decompositions

The previous results describe who is moving in and out of gentrifying neighborhoods. We would like to summarize our results in a way that indicates how much of the gentrification is due to each demographic group. In other words, how much of the increase in average family income in gentrifying neighborhoods is generated by each demographic group?

To answer this question, we make use of the following expression:

$$\Delta\overline{I} = \overline{I}^{00} - \overline{I}^{90} = \sum_{j=1}^{36} \left(P_j^{00}\overline{I}_j^{00} - P_j^{90}\overline{I}_j^{90} \right) \tag{5}$$

where $\Delta\overline{I}$ is the change in average family income from 1990 to 2000 for the group of low income neighborhoods that gentrify, $\overline{I}_j$ is the average family income for demographic group j in the gentrifying neighborhoods, and P_j is the fraction of householders in the gentrifying neighborhoods that belong to demographic group j. Using equation (5), we decompose the total amount of gentrification into the part due to each individual demographic group.

We make two adjustments to our demographic categories from those used in tables 4, 5 and 7. First, in order to avoid a small cell that would not meet Census Bureau confidentiality guidelines, we combine the two oldest age groups for Hispanic householders with a college degree. Second, we include a single "Non-Hispanic Other Race" category. While we excluded other race householders from the analysis in tables 4, 5 and 7, and we cannot disaggregate the

contribution of other race householders by age or education, we can report an aggregate income contribution for all other race householders.

The decomposition results are reported in Table 8 using the sample of gentrifying low-income neighborhoods. Columns 4 and 5 report the main decomposition results, with column 4 reporting the income change contributed by each of the 36 demographic groups using equation (5). Column 5 simply reports the income change in column 4 divided by the total average income change of $16,901. The first 3 columns of Table 8 report several of the component parts of the decomposition. An individual demographic group can have a large contribution to total income change either due to being a large fraction of the population in gentrifying neighborhoods, having a large intercensal average income change, or both. Reporting the population proportions for 1990 and 2000 and the average intercensal income change for each demographic group allows us to distinguish these cases.

The results in Table 8 indicate that a substantial 33% of the total income gain in gentrifying tracts is contributed by black householders with a high school degree. This sizeable contribution results from the fact that black householders are a large fraction of the population in gentrifying tracts in 1990, increase as a fraction of the population in the 90's, and display particularly large increases in average income. This creates an interesting contrast with black householders with less than a high school degree, which are also a sizeable fraction of the population in gentrifying low-income neighborhoods in 1990. These households, however, fall as a fraction of the population in gentrifying neighborhoods and experience much smaller changes in average income, resulting in a contribution of only 7% of the total income gain.

The second largest contribution to the total income gain is by white householders with a college degree, who contribute 20% of the total gain, with over half of this gain coming from

young householders without children. This is in direct contrast to the minute contribution of less than 3% by white householders with less than a college degree.

VI. Conclusions

The key findings of our analysis of gentrifying urban neighborhoods in the 1990's are: 1) The analysis points to the in-migration of white college graduates, particularly those under 40 without children, as a key hallmark of gentrifying neighborhoods. 2) The presence of children, having less than a college degree, or elderly status dampens the likelihood that a white household moves into a gentrifying neighborhood, but these same effects are much diminished, or even reversed, for black and Hispanic householders; 3) Synthetic cohort analysis of out-migration finds no evidence of displacement of non-white households, but does find evidence of disproportionate retention of black householders with a high school degree; 4) A decomposition of the total income gains in a gentrifying neighborhood attribute the bulk of the gains to two key groups: black high school graduates (due to disproportionate retention and income gains) and white college graduates (due to disproportionate in-migration and high incomes).

The findings suggest that rather than dislocating non-white households, gentrification creates neighborhoods that are attractive to middle-class minority households, particularly those with children or with elderly householders. One reasonable interpretation is that because these neighborhoods are experiencing income gains, but also more diverse with regards to race/ethnicity and income than established middle-class neighborhoods, they are desirable locations for non-white middle-class households.

Our findings highlight the benefits of richly disaggregating by demographic characteristic in studies of neighborhood choice and mobility. Specifications with basic controls for race, education, age and family structure, but without interactions, would not have uncovered many of

the interesting findings of this paper. The divergent experience of black householders with and without high school degrees, for example, would be unlikely to emerge. Our analysis also demonstrates the benefits of studying both in-migration and out-migration to understand gentrification of low-income neighborhoods. Finally, this study benefited enormously from data that allowed careful comparisons of neighborhoods at the census tract level.

References

Brueckner, Jan and Stuart Rosenthal. 2005. "Gentrification and Neighborhood Housing Cycles: Will America's Future Downtowns be Rich?" Working Paper.

Card, David, Alexandre Mas and Jesse Rothstein. 2007. "Tipping and the Dynamics of Segregation." NBER Working Paper #13052.

Coulson, N. Edward and Eric Bond. 1990. "A Hedonic Approach to Residential Succession." *The Review of Economics and Statistics* 72(3): 433-444.

Crowder, Kyle and Scott South. 2005. "Race, Class and Changing Patterns of Migration between Poor and Non-Poor Neighborhoods." *American Journal of Sociology* 110(6):1715-63.

Freeman, Lance. 2005. "Displacement or Succession? Residential Mobility in Gentrifying Neighborhoods." *Urban Affairs Review* 40(4):463-491.

Freeman, Lance and Frank Braconi. 2004. "Gentrification and Displacement: New York City in the 1990's." *Journal of the American Planning Association* 70(1):39-52.

Lee, B. and K. Campbell. 1990. "Common Ground? Urban Neighborhoods as Survey Respondents See Them," Unpublished Manuscript.

Rosenthal, Stuart. 2006. "Old Homes, Externalities and Poor Neighborhoods: A Model of Urban Decline and Renewal." Working Paper.

South, Scott, Kyle Crowder, and Erick Chavez. 2005. "Exiting and Entering High-Poverty Neighborhoods: Latinos, Blacks and Anglos Compared." *Social Forces* 84(2): 873-900.

Vigdor, Jacob. 2002. "Does Gentrification Harm the Poor?" *Brookings-Wharton Papers on Urban Affairs* 133-1715.

Appendix A. MSA/CMSAs used in the urban neighborhoods sample (table 1)

Code	MSA/CMSA Name
0200	Albuquerque, NM
0240	Allentown-Bethlehem-Easton, PA
0520	Atlanta, GA
0640	Austin-San Marcos, TX
0680	Bakersfield, CA
0760	Baton Rouge, LA
1000	Birmingham, AL
1122	Boston-Worcester-Lawrence, MA--NH--ME--CT
1280	Buffalo-Niagara Falls, NY
1520	Charlotte-Gastonia-Rock Hill, NC-SC
1602	Chicago-Gary-Kenosha, IL-IN-WI
1642	Cincinnati-Hamilton, OH-KY-IN
1692	Cleveland-Akron, OH
1840	Columbus, OH
1922	Dallas-Fort Worth, TX
2000	Dayton-Springfield, OH
2082	Denver-Boulder-Greeley, CO
2162	Detroit-Ann Arbor-Flint, MI
2320	El Paso, TX
2840	Fresno, CA
3000	Grand Rapids-Muskegon-Holland, MI
3120	Greensboro--Winston-Salem--High Point, NC
3280	San Diego, CA
3362	Houston-Galveston-Brazoria, TX
3480	Indianapolis, IN
3760	Kansas City, MO
3840	Knoxville, TN
4120	Las Vegas, NV
4400	Little Rock-North Little Rock, AR
4472	Los Angeles-Riverside-Orange County, CA
4520	Louisville, KY-IN
4920	Memphis, TN-AR-MS
4992	Miami-Ft. Lauderdale, FL

5082	Milwaukee-Racine, WI
5120	Minneapolis-St. Paul, MN-WI
5360	Nashville, TN
5560	New Orleans, LA
5602	New York-Northern New Jersey-Long Island, NY--NJ--CT--PA
5720	Norfolk--Virginia Beach--Newport News, VA--NC
5880	Oklahoma City, OK
5920	Omaha, NE--IA
5960	Orlando, FL
6162	Philadelphia--Wilmington--Atlantic City, PA--NJ--DE--MD
6200	Phoenix--Mesa, AZ
6280	Pittsburgh, PA
6442	Portland--Salem, OR--WA
6480	Providence--Fall River--Warwick, RI--MA
6640	Raleigh--Durham--Chapel Hill, NC
6760	Richmond--Petersburg, VA
6840	Rochester, NY
6922	Sacramento--Yolo, CA
7040	St. Louis, MO--IL
7160	Salt Lake City--Ogden, UT
7240	San Antonio, TX
7320	San Diego, CA
7362	San Francisco--Oakland--San Jose, CA
7602	Seattle--Tacoma--Bremerton, WA
8000	Springfield, MA
8160	Syracuse, NY
8280	Tampa--St. Petersburg--Clearwater, FL
8400	Toledo, OH
8520	Tucson, AZ
8560	Tulsa, OK
8872	Washington--Baltimore, DC--MD--VA--WV

Table 1: Census Tract-Level Income and Income Change, by Quintile of 1990 Income

	1990 Average Family Income				
	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
1990 Income:					
Min	2,679	30,023	39,227	48,140	61,115
Average	23,434	34,766	43,628	54,043	85,287
Max	30,079	39,221	48,134	61,112	370,891
Income Change 1990 to 2000:					
10th Percentile	-1,857	-3,943	-5,615	-7,580	-13,406
Median	3,725	1,739	829	234	468
90th Percentile	11,908	9,568	9,607	10,634	20,870

Notes: Table divides sample of 15,040 urban linked tracts into 5 quintiles based on 1990 average family income.

Table 2: Tract-Level Characteristics of by Gentrification Status of Tract, Low-income Neighborhood Sample, 1990 and 2000 Census, means (standard deviations in parentheses)

	1990 Tract Characteristics		2000 Tract Characteristics	
	Gentrifying Tracts	Non-Gentrifying Tracts	Gentrifying Tracts	Non-Gentrifying Tracts
Average Family Income	21,738 (5,477)	23,734 (4,889)	38,294 (10,399)	26,408 (5,824)
% White	0.240 (0.29)	0.283 (0.31)	0.229 (0.27)	0.221 (0.26)
% Black	0.574 (0.39)	0.504 (0.38)	0.553 (0.38)	0.515 (0.37)
% Hispanic	0.156 (0.24)	0.182 (0.26)	0.179 (0.25)	0.219 (0.28)
% No H.S. Degree	0.499 (0.17)	0.485 (0.16)	0.366 (0.16)	0.415 (0.15)
% H.S Degree	0.412 (0.13)	0.433 (0.11)	0.476 (0.25)	0.485 (0.11)
% College Degree	0.090 (0.09)	0.082 (0.09)	0.158 (0.17)	0.101 (0.10)
% Age<40	0.414 (0.15)	0.416 (0.14)	0.412 (0.15)	0.403 (0.13)
% Age 40-60	0.301 (0.10)	0.305 (0.09)	0.361 (0.11)	0.354 (0.08)
% Age 60+	0.285 (0.14)	0.279 (0.13)	0.227 (0.12)	0.243 (0.11)
Migration Rate	0.667 (0.15)	0.661 (0.15)	0.694 (0.16)	0.685 (0.14)
Income of Migrants	20,133 (6,105)	21,756 (5,314)	36,547 (14,236)	24,680 (6,046)
Income of Non-Migrants	24,718 (10,187)	27,740 (8,437)	38,993 (20,399)	30,289 (9,699)
N	458	2,550	458	2,550

Notes: Low-income neighborhood sample consists of urban tracts in bottom quintile of 1990 average family income. Gentrifying neighborhoods are those who experience at least a $10,000 increase in average family income between 1990 and 2000. Migrant is defined as a householder who did not live in the current residence 10 years ago.

Table 3: Characteristics of In-Migrants by Gentrification-Status of Tract, Low-income Neighborhood Sample, 2000 Census, means (standard deviations)

	Migrants to Gentrifying Tracts		Migrants to Non-Gentrifying Tracts	
	mean	(s.d.)	mean	(s.d.)
Average Family Income	36,524	(71,664)	25,835	(38,269)
% White	0.289	(0.453)	0.251	(0.434)
% Black	0.429	(0.495)	0.411	(0.492)
% Hispanic	0.230	(0.421)	0.278	(0.448)
% No H.S. Degree	0.339	(0.473)	0.384	(0.486)
% H.S. Degree	0.464	(0.499)	0.494	(0.500)
% College Degree	0.197	(0.398)	0.122	(0.327)
% Age<40	0.578	(0.494)	0.562	(0.496)
% Age 40-60	0.305	(0.460)	0.307	(0.461)
% Age 60+	0.117	(0.322)	0.132	(0.338)
% with Children in Household	0.371	(0.483)	0.407	(0.491)
% Married	0.292	(0.455)	0.295	(0.456)
% Cohabitating	0.084	(0.278)	0.079	(0.269)
% Immigrant	0.235	(0.424)	0.288	(0.453)
N	38,308		316,355	

Notes: Sample of migrant householders in the low-income neighborhood sample. Low-income neighborhood sample, gentrifying tract, and migrant householder are defined in notes to Table 2.

Table 4: Logit and OLS results, Migrants to Gentrifying vs Non-Gentrifying Neighborhoods

			Destination			Income	
			β	(s.e.)	P(Gentrify)	β	(s.e.)
			(1)	(2)	(3)	(4)	(5)
White							
No H.S.	20-40	No Child			0.101	0.118	(0.066)
	20-40	Child	-0.024	(0.091)	0.099	0.061	(0.062)
	40-60	No Child	-0.003	(0.084)	0.101	-0.010	(0.051)
	60+		-0.035	(0.084)	0.098	0.016	(0.052)
H.S.	20-40	No Child	-0.019	(0.070)	0.100	0.235***	(0.023)
	20-40	Child	-0.182*	(0.080)	0.087	0.157***	(0.044)
	40-60	No Child	0.092	(0.072)	0.109	0.171***	(0.028)
	60+		-0.131	(0.082)	0.091	0.009	(0.048)
College	20-40	No Child	0.750***	(0.069)	0.182	0.356***	(0.020)
	20-40	Child	0.492***	(0.098)	0.150	0.416***	(0.067)
	40-60		0.642***	(0.075)	0.168	0.381***	(0.034)
	60+		0.145	(0.100)	0.114	0.261***	(0.073)
Black							
No H.S.	20-40	No Child	0.014	(0.080)	0.102	0.164***	(0.045)
	20-40	Child	-0.085	(0.073)	0.094	0.175***	(0.028)
	40-60	No Child	-0.005	(0.072)	0.101	0.179***	(0.026)
	60+		0.067	(0.073)	0.107	0.078**	(0.028)
H.S.	20-40	No Child	0.050	(0.072)	0.106	0.128***	(0.026)
	20-40	Child	0.042	(0.070)	0.105	0.136***	(0.018)
	40-60	No Child	0.100	(0.070)	0.110	0.141***	(0.019)
	60+		0.078	(0.078)	0.108	0.210***	(0.039)
College	20-40	No Child	0.430***	(0.083)	0.143	0.331***	(0.048)
	20-40	Child	0.303***	(0.095)	0.129	0.130*	(0.064)
	40-60	No Child	0.370***	(0.082)	0.136	0.252***	(0.046)
	60+		0.220	(0.129)	0.121	0.092	(0.108)
Hispanic							
No H.S.	20-40	No Child	0.061	(0.080)	0.107	0.147***	(0.038)
	20-40	Child	0.147*	(0.076)	0.112	0.115***	(0.022)
	40-60	No Child	0.198**	(0.077)	0.117	0.189***	(0.026)
	60+		0.038	(0.086)	0.106	0.189***	(0.048)
H.S.	20-40	No Child	0.060	(0.079)	0.108	0.121**	(0.039)
	20-40	Child	0.049	(0.077)	0.100	0.088**	(0.030)
	40-60	No Child	0.098	(0.081)	0.111	0.114***	(0.041)
	60+		0.136	(0.126)	0.125	0.172	(0.103)
College	20-40	No Child	0.408***	(0.097)	0.173	0.149*	(0.067)
	20-40	Child	0.092	(0.124)	0.107	0.250*	(0.099)
	40-60	No Child	0.424***	(0.115)	0.147	0.302***	(0.088)
	60+		-0.453	(0.323)	0.076	0.321	(0.310)
N				323,693		317,997	

Notes: Low-income Neighborhoods Sample. Column 1 reports estimates of β_j's from estimating the logit model in equation (1) on the sample of migrant householders in the low-income

neighborhood sample. Column 3 reports the predicted value of the probability a migrant in the low-income neighborhood sample locates in a gentrifying neighborhood. Column 4 reports estimates of β_j's from estimating the model in equation (2) on the same sample.

Table 5: Logit and OLS results, Gentrifying vs Non-Gentrifying Migrants

			Destination			Income	
			β	(s.e.)	P(Gentrify)	β	(s.e.)
			(1)	(2)	(3)	(4)	(5)
White							
No H.S.	20-40	No Child			0.032	-0.047	(0.063)
	20-40	Child	-0.088	(0.099)	0.029	-0.213***	(0.058)
	40-60	No Child	-0.088	(0.094)	0.029	-0.304***	(0.051)
	60+		-0.156	(0.092)	0.027	-0.097*	(0.049)
H.S.	20-40	No Child	-0.042	(0.077)	0.030	-0.156***	(0.022)
	20-40	Child	-0.771***	(0.087)	0.015	-0.119**	(0.041)
	40-60	No Child	-0.401***	(0.079)	0.022	-0.131***	(0.027)
	60+		-0.528***	(0.089)	0.019	-0.175***	(0.045)
College	20-40	No Child	0.532***	(0.076)	0.051	0.068***	(0.020)
	20-41	Child	-0.142	(0.105)	0.028	0.076	(0.063)
	40-60		0.072	(0.082)	0.034	0.068*	(0.032)
	60+		-0.298**	(0.111)	0.024	0.007	(0.071)
Black							
No H.S.	20-40	No Child	1.04***	(0.092)	0.080	-0.049	(0.048)
	20-40	Child	1.08***	(0.082)	0.083	-0.080**	(0.030)
	40-60	No Child	1.13***	(0.081)	0.086	-0.130***	(0.029)
	60+		1.33***	(0.083)	0.101	-0.104***	(0.031)
H.S.	20-40	No Child	0.553***	(0.080)	0.052	-0.152***	(0.027)
	20-40	Child	0.664***	(0.077)	0.058	-0.130***	(0.019)
	40-60	No Child	0.713***	(0.077)	0.060	-0.193***	(0.020)
	60+		0.999***	(0.089)	0.077	-0.034	(0.042)
College	20-40	No Child	0.386***	(0.095)	0.045	0.078	(0.051)
	20-40	Child	0.375***	(0.108)	0.044	-0.101	(0.066)
	40-60	No Child	0.509***	(0.094)	0.050	-0.043	(0.048)
	60+		0.736***	(0.151)	0.061	-0.143	(0.110)
Hispanic							
No H.S.	20-40	No Child	0.418***	(0.090)	0.046	-0.063	(0.038)
	20-40	Child	0.576***	(0.084)	0.053	-0.124***	(0.021)
	40-60	No Child	0.609***	(0.085)	0.055	-0.090***	(0.026)
	60+		0.518***	(0.098)	0.051	-0.021	(0.051)
H.S.	20-40	No Child	0.158	(0.088)	0.036	-0.141***	(0.039)
	20-40	Child	0.182*	(0.085)	0.037	-0.126***	(0.030)
	40-60	No Child	0.097	(0.090)	0.034	-0.178***	(0.041)
	60+		0.164	(0.146)	0.037	-0.141	(0.108)
College	20-40	No Child	0.382***	(0.107)	0.045	-0.052	(0.065)
	20-40	Child	0.108	(0.140)	0.035	-0.086	(0.098)
	40-60	No Child	0.177	(0.128)	0.037	0.096	(0.086)
	60+		-0.535	(0.394)	0.019	0.280	(0.326)
N				557,673		592,982	

Notes: Middle-Class Neighborhood Sample, 2000 Census.

Column 1 reports estimates of β_j's from estimating the logit model in equation (1) on the sample of migrant householders in the middle-class neighborhood sample. Column 3 reports the predicted value of the probability a migrant in the middle-class neighborhood sample locates in a gentrifying neighborhood. Column 4 reports estimates of β_j's from estimating the model in equation (2) on the same sample.

Table 6: Comparing 1990 Tract Characteristics to 2000 non-Migrant Characteristics, by Gentrification Status of Tract, Low-income Neighborhood Sample, 1990 and 2000 Census

	Gentrifying Tracts		Non-Gentrifying Tracts	
	(1)	(2)	(3)	(4)
	1990 Tract Characteristics	2000 Non-Migrants	1990 Tract Characteristics	2000 Non-Migrants
	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)
Average Household Income	23,520 (4,488)	40,730 (82,374)	24,840 (4,070)	31,643 (46,321)
%White	0.214 (0.27)	0.200 (0.40)	0.250 (0.30)	0.238 (0.43)
%Black	0.600 (0.38)	0.605 (0.49)	0.514 (0.38)	0.520 (0.50)
%Hispanic	0.163 (0.25)	0.170 (0.38)	0.211 (0.29)	0.213 (0.41)
% No H.S. Degree	0.498 (0.14)	0.438 (0.50)	0.499 (0.13)	0.466 (0.50)
% H.S Degree	0.426 (0.10)	0.463 (0.50)	0.431 (0.10)	0.453 (0.50)
%College Degree	0.076 (0.08)	0.098 (0.30)	0.070 (0.07)	0.081 (0.27)
%Age<40	0.393 (0.12)	0.112 (0.32)	0.384 (0.11)	0.115 (0.32)
%Age 40-60	0.307 (0.07)	0.385 (0.49)	0.321 (0.07)	0.377 (0.48)
%Age 60+	0.300 (0.11)	0.502 (0.50)	0.295 (0.11)	0.508 (0.50)
N	16,927		144,034	

Notes: Sample of non-migrant householders in the low-income neighborhood sample. Low-income neighborhood sample, gentrifying tract, and migrant householder are defined in notes to Table 2. Columns 1 and 3 report tract-level characteristics, averaged over sample of non-migrant householders. Columns 2 and 4 report householder-level characteristics, averaged over sample of non-migrant householders.

Table 7: Cohort Regression Results, Low-income Neighborhood Sample, 1990 and 2000 Census

		% Change in Population		%Change in Income	
		(1)	(2)	(3)	(4)
		β	(s.e.)	β	(s.e.)
White					
No H.S.	Cohort 1	-0.028	(0.044)	0.054	(0.237)
	Cohort 2	0.012	(0.042)	-0.021	(0.143)
	Cohort 3	0.009	(0.042)	0.096	(0.128)
	Cohort 4	0.002	(0.040)	0.003	(0.108)
H.S.	Cohort 1	0.025	(0.037)	0.011	(0.110)
	Cohort 2	-0.009	(0.036)	0.174	(0.090)
	Cohort 3	-0.031	(0.038)	0.158	(0.095)
	Cohort 4	0.038	(0.039)	0.060	(0.097)
College	Cohort 1	0.034	(0.044)	-0.067	(0.194)
	Cohort 2	0.049	(0.042)	0.254*	(0.113)
	Cohort 3	0.032	(0.045)	0.367***	(0.116)
	Cohort 4	0.012	(0.051)	0.209	(0.161)
Black					
No H.S.	Cohort 1	0.019	(0.030)	-0.371***	(0.108)
	Cohort 2	-0.008	(0.029)	0.103	(0.080)
	Cohort 3	-0.025	(0.030)	0.028	(0.073)
	Cohort 4	0.006	(0.029)	0.309***	(0.065)
H.S.	Cohort 1	-0.027	(0.028)	0.203**	(0.073)
	Cohort 2	0.008	(0.028)	0.237***	(0.062)
	Cohort 3	0.056*	(0.029)	0.237***	(0.063)
	Cohort 4	0.013	(0.030)	0.198**	(0.069)
College	Cohort 1	-0.015	(0.053)	0.084	(0.242)
	Cohort 2	0.012	(0.037)	0.035	(0.113)
	Cohort 3	0.060	(0.041)	-0.216	(0.114)
	Cohort 4	-0.062	(0.049)	-0.067	(0.150)
Hispanic					
No H.S.	Cohort 1	-0.008	(0.041)	0.212	(0.114)
	Cohort 2	0.056	(0.039)	0.096	(0.101)
	Cohort 3	-0.041	(0.041)	0.055	(0.101)
	Cohort 4	-0.040	(0.043)	0.072	(0.102)
H.S.	Cohort 1	-0.009	(0.040)	-0.116	(0.124)
	Cohort 2	0.066	(0.040)	0.201	(0.103)
	Cohort 3	0.047	(0.045)	0.213	(0.118)
	Cohort 4	-0.037	(0.052)	0.107	(0.143)
College	Cohort 1	0.080	(0.079)	-0.401	(0.477)
	Cohort 2	-0.037	(0.064)	0.292	(0.237)
	Cohort 3	-0.057	(0.071)	-0.084	(0.290)
	Cohort 4	-0.005	(0.122)	0.437	(0.928)
	N	50,983		27,219	

Notes: Column 1 reports estimates of β_c's from estimation of equation (3) on the low-income neighborhood sample. Column 1 reports estimates of β_c's from estimation of equation (4) on the low-income neighborhood sample. Unit of observation is a synthetic cohort in a census tract. Cohort 1 consists of householders ages 20-29 in 1990, Cohort 2 of householders ages 30-39 in 1990, Cohort 3 of householders ages 40-49 in 1990, and Cohort 4 of householders ages 50-59 in 1990. See section IV.B of text for further details.

Table 8: Decomposition of Total Income Change, Gentrifying Tracts

			(1)	(2)	(3)	(4)	(5)
			P^{90}	P^{00}	$\overline{I}^{00} - \overline{I}^{90}$	$P^{00}\overline{I}^{00} - P^{90}\overline{I}^{90}$	Fraction of Total
White							
No H.S.	20-40	No Child	0.006	0.004	1056	-23	-0.002
	20-40	Child	0.011	0.005	2399	-10	-0.002
	40-60		0.018	0.012	1815	-68	-0.007
	60+		0.049	0.022	3626	-263	-0.018
H.S.	20-40	No Child	0.031	0.031	3850	308	0.013
	20-40	Child	0.017	0.010	1383	-120	-0.010
	40-60		0.027	0.037	9331	743	0.051
	60+		0.030	0.020	6744	24	0.002
College	20-40	No Child	0.027	0.052	10620	2178	0.109
	20-40	Child	0.005	0.004	7535	157	0.007
	40-60		0.011	0.024	18156	1459	0.077
	60+		0.004	0.006	9109	207	0.011
Black							
No H.S.	20-40	No Child	0.021	0.015	6139	68	0.004
	20-40	Child	0.056	0.036	6085	127	0.010
	40-60		0.081	0.060	8776	315	0.014
	60+		0.140	0.097	10819	845	0.043
H.S.	20-40	No Child	0.036	0.039	8748	379	0.027
	20-40	Child	0.088	0.081	7210	657	0.045
	40-60		0.083	0.122	13311	2635	0.165
	60+		0.044	0.056	17060	1329	0.092
College	20-40	No Child	0.006	0.015	9273	494	0.025
	20-40	Child	0.006	0.007	5383	124	0.006
	40-60		0.010	0.021	15880	753	0.046
	60+		0.006	0.007	12284	256	0.018
Hispanic							
No H.S.	20-40	No Child	0.009	0.010	6755	160	0.013
	20-40	Child	0.038	0.038	5425	565	0.043
	40-60		0.037	0.038	7926	733	0.051
	60+		0.022	0.020	4467	196	0.016
H.S.	20-40	No Child	0.008	0.012	7158	228	0.017
	20-40	Child	0.021	0.022	5398	301	0.022
	40-60		0.013	0.022	7008	631	0.037
	60+		0.003	0.006	5372	120	0.008
College	20-40	No Child	0.002	0.004	8111	133	0.009
	20-40	Child	0.002	0.003	4701	67	0.005
	40+		0.002	0.005	12889	247	0.015
Other Race			0.030	0.039	16029	944	0.060
Total			1.00	1.00		16,901	1.00

Notes: Low-income Neighborhood Sample, 1990 and 2000 Census
Table reports results of performing decomposition described in equation (5) on the sample of gentrifying low-income neighborhoods. Columns 1-3 report individual components of the expression in equation (5). Column 4 reports each demographic groups total contribution to the average income growth of $16,876 in the gentrifying neighborhoods using the expression in equation (5). Column 5 divides Column 4 by 16,901.