Upward Neighborhood Succession and Class Segregation from 1970 to 2009

Abstract

The literature on upward neighborhood succession, defined as change from a predominately lower to a predominately higher socio-economic composition, has largely focused on low-income neighborhoods through the study of gentrification. While the gentrification literature suggests income mixing in low-income neighborhoods, the literature on income segregation finds a growing distance between lower income and higher income individuals over time. More recent studies of "hyper" or "super" gentrification suggest that upward neighborhood succession could contribute to increasing income segregation, but this scholarship is recent and relatively limited. This paper addresses whether upward neighborhood succession across income groups has contributed to the growing trends of income segregation. Using Census data from 275 Metropolitan Statistical Areas, I find that despite the emphasis on poor neighborhoods in the gentrification literature, higher income census tracts make up at least two-thirds of all tracts experiencing upward succession between 1970 and 2009. In fact, when controlling for other characteristics, low-income tracts were equally likely to be upward as higher income tracts in three of the four decades studied. When compared with trends of income segregation, I find that upward succession in high-income tracts consistently aligns with trends of increasing income segregation, unless counteracted by significant income mixing in lower income tracts. This shows that, while studies of neighborhood change processes generally focus on one process in isolation, multiple processes are at work in ways that compete and complement each other in a broader spatial organization of class in the United States.

Upward Neighborhood Succession and Class Segregation from 1970 to 2009

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Studies of income inequality and segregation show a growing residential distance between the affluent and the poor and middle-class (Coulton, Chow, Wang, & Su, 1996; C. S. Fischer, Stockmayer, Stiles, & Hout, 2004; M. J. Fischer, 2003; Ioannides, 2004; Jargowsky, 1996; Massey, 1996; Massey & Eggers, 1993; Massey & M. J. Fischer, 2003; Reardon & Bischoff, 2011a, 2011b; Watson, 2006, 2009). Yet studies of gentrification suggest an increase in income mixing as the middle-class returns to live in low-income city neighborhoods (Pattillo, 2008; Schaffer & Smith, 1986; Smith, 1996; Taylor, 2002; Wyly & Hammel, 1999; Zukin, 1987). While the low-income neighborhoods studied in the gentrification literature may not be prevalent enough to affect the trends of income segregation over time, the broader process of upward neighborhood succession, defined as the change from a predominately lower to a predominately higher socio-economic composition, could contribute to changes in income segregation over time. This paper documents the relationship between trends of income segregation and upward neighborhood succession between 1980 and 2009, providing a theory about the relationship between these two spatial processes.

Studies of upward succession have largely focused on the in-movement of the middle-class to low-income neighborhoods through the study of gentrification, leaving similar change in higher income neighborhoods undocumented with the recent exception of studies of "super" or "hyper" gentrification (Centner, 2008; Lees, 2010). Given that income segregation has increased more for the poor and the rich than middle income groups since 1970, upward succession in higher income neighborhoods may be one of the spatial reorganization processes creating income segregation. Yet, the relationship between income segregation and upward neighborhood succession is uncertain both empirically and theoretically from the prior research. While the gentrification literature suggests that upward succession in low

income neighborhoods is likely to produce income mixing, thus reducing income segregation, upward succession in higher income neighborhoods may lead to an increase in income segregation as these neighborhoods become even more economically exclusive. To understand the relationship between these two processes, we need a comprehensive understanding of the class dynamics of upward neighborhood succession beyond that provided by the gentrification literature, and a comparison of income segregation and upward neighborhood succession trends over time.

This study uses Census data from 275 Metropolitan Statistical Areas (MSAs) to provide such an analysis. The descriptive findings show that, in contrast to the attention given to gentrification, higher income census tracts make up approximately two-thirds to three-quarters of all upward tracts between 1970 and 2009. Furthermore, when controlling for neighborhood and regional characteristics, low-income tracts were equally likely to experience upward succession as some higher income tracts in three of the four decades studied here. I find that the relationship between upward succession and income segregation varies depending on the income characteristics of the tracts most likely to be upward. More specifically, I find that upward low-income tracts are likely to not change income segregation due to other spatial processes such as displacement, which re-concentrates low-income residents in previously low-income areas. In contrast, patterns of upward succession among high-income tracts is closely associated with trends in income segregation, suggesting that increased exclusivity created in higher income areas through upward succession is one contributor to increases in income segregation.

Ultimately, this paper contributes to the literature in three ways. First, it documents the prevalence of upward succession in middle-income tracts that has been largely overlooked in the gentrification literature. Second, it shows that the areas affected by upward succession are not consistent over time, as suggested by the consistent study of low-income neighborhoods. Finally, it suggests that a number of competing and complementing processes are at work in the spatial organization of class in the United States, including segregation, upward neighborhood succession,

downward neighborhood succession, and stagnant neighborhood characteristics. To understand spatial inequality, we must begin to understand the relationships between these processes.

Prior Studies of Income Segregation and Upward Succession

Income segregation increased between 1970 and 2009, with the greatest increases in the 1980s and 2000s according to studies of decennial snapshots of income segregation (M. J. Fischer, 2003; Reardon & Bischoff, 2011b; Watson, 2009). While these trends likely capture patterns of mobility, the studies themselves do not reveal dynamics of how and where income segregation has changed. In contrast, studies tracking neighborhood change in specific locations have focused on a small subset of neighborhoods through a focus on gentrification, thus leaving the broader process of upward neighborhood succession undocumented. Two recent case studies of "hyper" or "super" gentrification alert us that some middle-class neighborhoods experience upward succession (Centner, 2008; Lees, 2010), but provide no sense of the broader frequency of such change nor how common this may have been in earlier time periods. A few new statistical studies provide some insight, challenging the focus on low-income neighborhoods by showing that most low-income neighborhoods are more likely to be stagnate than to experience upward succession (Cortright & Mahmoudi, 2014; Hwang & Sampson, 2014; Sampson, 2012). Nonetheless, they tell us little about upward succession across all neighborhoods.

Based on the prior literature, I expect that upward succession in higher income tracts will contribute to an increase in income segregation and upward succession in lower income tracts will contribute to income mixing that decreases income segregation. However, upward low-income tracts are also susceptible to residential displacement or the out-migration of low-income residents, particularly when there are low rates of home ownership (Atkinson, 2000; Smith, 1996). When displacement is high, this is likely to re-concentrate low-income residents in other low-income tracts, which contributes to increasing income segregation. Data limitations restrict my ability to directly test

this important contributing process. However, characteristics of low-income upward tracts indicate low

rates of homeownership, which is one proxy for measuring potential concerns with displacement, as

renters are displaced before home owners.

This paper thus addresses three gaps in the literature. First, it documents upward neighborhood

succession across neighborhoods of all income groups. Second, it explains how patterns of upward

succession change over time. Finally, it analyzes the relationship between upward succession and

income segregation to explain how these interrelated processes contribute to spatial patterns of income

inequality.

Operationalizing Upward Neighborhood Succession

This paper uses data from the U.S. Census Bureau from the years 1970, 1980, 1990, and 2000

and the American Community Survey (ACS) estimates for 2005-2009.[1] Data from 1970 through 2000

come from the Neighborhood Change Database (NCDB), a product developed by Geolytics that provides

data normalized to 2000 census tract definitions for all four decades.[2] The normalization process adjusts

all census tract boundaries to match the 2000 census tract definitions geographically. Because census

tracts are defined by population size, there are census tracts with missing data due to the normalization

process. The 1970 data has the most missing observations, which declines over each subsequent Census

year. Missing data tracts either included no population at the time of the Census collection or

represented a geographic area for which no data was collected in that year. The 2009 ACS data is made

up of five-year estimates, which average annual estimates from 2005 to 2009 to provide census tract

level data. Importantly, the 2009 ACS data contains estimates from both before and during the housing

bubble. Given that these figures are averaged across five years of data, dramatic fluctuations that may

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[1] I refer to the 2005-2009 ACS estimates as 2009 data throughout.
[2] Normalization provides data for all four Census years with the same geographic boundaries.

have occurred during the period are smoothed by multiple observations. In each decade of data, there are 51,437 tracts from 275 Metropolitan Statistical Areas (MSAs).

Census data is arguably the best source for a study of upward neighborhood succession. The data include characteristics of census tract residents and housing that is captured at regular intervals, which is otherwise only available for specific locales. While the longer term snapshot obscures short-term change, a longer period of time is necessary to capture the sometimes gradual change of upward neighborhood succession, which may continue over several decades. The major drawback of Census data is that census tracts rarely align with neighborhood areas. However, tracts are the best estimate of what is happening at the neighborhood level at a national scale, given that it is the smallest geographic area available for multiple decades of data. Census data, thus, provides the best data for measuring upward neighborhood succession.

Operationalizing Upward Neighborhood Succession

The literature to date has included two types of measures in the operationalization of upward succession. Scholars of neighborhood succession have largely used measures of compositional changes in neighborhood residents, including change in racial and class composition. The gentrification literature uses similar measures for class composition, but also includes changes in housing values to capture changes in who can reside in a given neighborhood. Despite consistent ideas of how to measure upward succession, the operationalization is highly debated.

Due to the lack of an agreed upon measure, I developed a measure of upward succession that captures changes in both residential make-up and housing values. Building on the prior quantitative literature (Atkinson, 2000; Atkinson & Wulff, 2009; Bostic & Martin, 2003; Freeman, 2005; Owens, 2012; Wyly & Hammel, 1999), I define a tract as experiencing upward succession if it had a significantly greater increase in the socio-economic characteristics of residents and in the price of housing than that of the

MSA as a whole. Specifically, a tract is "upward" if it experienced (1) a percent increase in either (a) the proportion of residents with at least a college degree or (b) in mean family income,[3] and (2) a percent increase in either (a) average housing values or (b) average rental costs,[4] with both the percent change in class and in housing costs being at least one-half standard deviation above the comparable percent change in the MSA.[5] Thus, an increase in socio-economic status could be due to an increase in the proportion of residents with a college degree, an increase in median household income, or both, as illustrated in Figure 1. Tracts that exhibit increases in both socio-economic composition and housing values are considered tracts experiencing upward succession, also called "upward" in this paper. Tracts that do not exhibit both increases including those that experience no change, declines, and increases in only one of the contributing factors are considered "not upward" and make up the comparison group in the analysis presented here.

I chose to compare the change in each tract to the broader MSA in order to control for some broader social and economic changes. For example, between 1970 and 2009 there have been significant increases in the proportion of Americans completing a college education. Measuring for percent change above and beyond that of the MSA ensures that I do not capture normal or average change as upward succession, only exceptional change. The threshold of one-half standard deviation provides similar, although slightly smaller, estimates to the prior literature.

Although I calculated upward succession for every tract in the dataset, data were not available for all tracts in every year. Due to the normalization described above, there are tracts that included zeroes for all relevant data due to either a lack of population or a lack of data for the geographic area in

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[3] Mean values of income, housing values, and rental costs are used here due to variation in the availability of median values across the Census years.

[4] The 1980 data included a number of significant outliers due to a particularly low number of housing units. Instead of recoding these values to missing, I top coded these values at five times the median rent. This was not a problem for any other Census year.

[5] All dollar amounts included in this analysis are adjusted to 2009 dollars.

that Census year, which I replaced with missing values.[6] After replacing these zero values, I used the

definition described above to measure the presence of upward succession between the years 1970 and

1980, 1980 and 1990, 1990 and 2000, and 2000 and 2009. Thus, a tract is only considered to be upward

if it exhibits the characteristics of upward succession during the measured period. For example, a tract

that is upward in 1980 experienced a percent increase in socio-economic characteristics of its residents

and housing values that is one-half standard deviation above the percent change in the tract's MSA

between 1970 and 1980. If that same tract does not exhibit characteristics of upward succession

between 1980 and 1990, it would be considered not upward in that period.

This measure of upward succession identifies 2,945 tracts as upward in 1980, 7,226 in 1990,

7,452 in 2000, and 6,979 in 2009. They represent a modest estimate of 6 to 15 percent of all census

tracts across the years, largely due to the requirement that increases be at least one-half standard

deviation above the change in the larger MSA. The not upward comparison group for this paper

includes 60 to 67 percent of all census tracts, depending on the year. Calculations of upward succession

were not always possible due to missing data, thus upward and not upward neighborhoods do not equal

100 percent of all census tracts contained in this analysis.

Characteristics of Upward Tracts

The patterns of upward succession by income group vary over time. As described further below,

low-income tracts are 22 to 34 percent of upward tracts over the years. However, the remaining 66 to

88 percent of upward tracts are medium to high income. In fact, 8 to 27 percent of upward tracts were

high-income. Furthermore, in 1980, high income tracts surpassed low-income tracts to make up the

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[6] Replacing the zeros with missing values avoids falsely identifying upward succession where it would be impossible to confirm change between year 1 and year 2.

largest proportion of upward tracts. These findings demonstrate that most upward neighborhood

succession is overlooked in the prior literature.

Figure 2 provides detail on the income composition of upward tracts.[7] The graph uses the

income group categories low, low-medium, medium, medium-high, and high, which represent the

quintiles of average family income.[8] That is, each year's data is divided into five categories with the

same number of observations. Figure 2 shows the proportion of upward tracts in each income group by

Census year. This proportion is based on the characteristics of the upward tracts in the Census year

prior to being upward. That is, tracts described as medium-income in 1970 were upward in 1980.

In 1970, low income tracts are the largest group of upward tracts, but only by a small margin. In

fact, the distribution of the income groups are fairly close in comparison to other years, ranging from 14

percent to 28 percent. The pattern changes rather dramatically in 1980, which is unique in that the

largest group of upward tracts are high-income (27 percent), followed by low-income tracts (22

percent). This trend is mostly reversed by 1990 when low-income tracts again make up the largest

group (30 percent). While high-income upward tracts became a smaller proportion of upward tracts,

they had a slightly higher proportion than medium-high tracts (17 v. 16 percent). Finally, by 2000, the

patterns look similar to 1970 with a larger difference between income groups. In fact, the range

increases to 8 percent (high income tracts) to 34 percent (low income tracts).

These descriptive findings demonstrate that upward neighborhood succession has affected

tracts with a wider range of socio-economic characteristics than suggested by the literature to date.

While low income tracts are the largest proportion of upward tracts in all years but 1980, two-thirds to

three-quarters of upward tracts are higher income. In fact, low-medium, medium, and medium-high

tracts make up over 50 percent of all upward tracts in each year. This illustrates that the gentrification

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[7] The prior literature shows that neighborhood trends by income and education are similar, so I have chosen to focus only on income (Ioannides, 2004).

[8] See Appendix A for the distribution of each income group by Census year.

literature has overlooked the majority of upward neighborhood succession, limiting our understanding

of broader patterns of neighborhood change.

Predicting Upward Neighborhood Succession with Income Group

In this section, I test whether the descriptive findings outlined above hold when controlling for

other relevant factors using an ordinary least squares regression model. Similar to the descriptive

findings, I find significant variation by year in the relationship between tract income group and

experiencing upward neighborhood succession. In fact, the differences between all income groups are

not significant in three of the four decades. The overall pattern indicates that low income tracts are less

distinct from higher income tracts in their likelihood to be upward over time.

Table 1 displays the regression results by income group, the main independent variable of

interest due to the focus on what tracts experience upward succession rather than why.[9] While logistic

models are often used for binary variables in order to account for the limited possible outcomes, logistic

regression results cannot be compared across models (Mood, 2010), which is central to the analysis

used here to understand how trends vary by decade. Thus, I use ordinary least squares (OLS) regression

with the binary outcome variable experiencing upward succession, in order to provide coefficients that

are comparable across models. The logistic results were comparable in both direction and statistical

significance. The outcome of interest is the likelihood of experiencing upward succession, which is equal

to 0 when a tract has not experienced upward succession in the decade of interest and equal to 100

when it has. I have used 0 and 100 for the OLS models rather than 0 and 1 to simplify the interpretation

of the coefficients so that the results are a percentage of change rather than a decimal point.[10]

The regression model described below controls for a number of theoretically and empirically

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[9] Table 1 only displays findings for the income group variables of interest. See Appendix Table 2 for full
model results.
[10] The results with the 0/100 binary equal the 0/1 coefficients multiplied by 100.

important resident, neighborhood, and metropolitan characteristics that are likely to influence the probability of experiencing upward succession. The residential characteristic controls capture factors that contribute to the socially desirability of a neighborhood. The tract poverty rate provides both an indicator of the class composition of the tract, but also a proxy for crime, since poverty and crime are highly correlated in neighborhood studies. Tracts with a high poverty rate are likely to be less desirable, and thus, less likely to be upward. I include the percent children as the presence of children in a neighborhood is an important factor for families with children in mobility decisions, which may make neighborhoods with children present more desirable and thus make a neighborhood more likely to be upward. Finally, the tract's affordability is captured in average rent and average home values. These two variables define who can afford to live in each tract, but also who would want to live in each tract given that middle and higher income individuals are unlikely to want to live in areas that are so affordable that they house the extremely low-income.

The desirable neighborhood characteristics include several measures that indicate the availability of housing. Homeownership captures the availability of potential buying options for in-movers, but also provides a suggestion of residential upkeep and population density in the area. Areas with lower homeownership rates are more likely to be upward due to available homes for purchase, but only to a certain threshold after which low homeownership rates may be associated with less well maintained property and thus be less likely to be upward. Similarly, the percent vacant property captures both the availability of property for purchase or development and the potential state of visible disorder portrayed by the housing stock itself. Tracts with high proportions of vacant housing are likely to be less upward because of the disorder that vacant housing presents. However, tracts with moderate proportions of vacant housing may be more likely to be upward due to the availability of housing and land for renovation and development. Finally, the natural log of the total housing units provides a measure of the density of housing in the tract. Higher density of housing is likely associated with lower

likelihood of being upward as overcrowding would make an area less appealing. However, low density

of housing might also make a tract look uninhabitable, lowering its' likelihood of being upward.

Additionally, I include the racial composition of the tract to capture racial preferences that influence

decisions in moving to new neighborhoods (Charles, 2006; Emerson, Chai, & Yancey, 2001).

Finally, the metropolitan area controls capture the context in which each tract is located. This

includes the region of the United States, as there is regional variation in home values and economic

outcomes. Additionally, I include a set of variables that provide the average of some neighborhood

variables described above including the poverty rate, income group, average rent, average home value,

and racial composition. While I do not expect these variables to be associated with any particular

pattern of upward succession, the characteristics of the MSA at large should influence the patterns of

upward succession at the tract level. For example, MSAs with lower proportions of high-income group

tracts should experience different patterns of upward succession by tract's income group than MSAs

with high proportions of high-income group tracts. Thus, these measures control for the class and race

composition of the MSA in which each tract is located.

The results are displayed in Table 2 with one model for each year of data. As with the

descriptive findings, the characteristics described are of the tracts upward in the subsequent decade.

That is, the results described below as 1970 are for tracts that were upward in 1980.

In 1970, low-income tracts are the most likely to be upward while controlling for tract and MSA

level characteristics. All other tracts are significantly less likely to be upward (-3.6 to -9.3 percent).

Much like the descriptive pattern, low-medium tracts are the closest to the rate of low-income tracts,

while the high-income tracts the furthest.

By 1980, low- and low-medium-income tracts experienced similar rates of upward succession,

while higher income tracts were more likely to be upward during this time. Medium-, medium-high-,

and high-income tracts were all more likely to be upward (3.4, 7.2, and 17.5 percent). The decade of

1980 stands out as the only year with increasing likelihood of being upward for tracts with higher average income. Additionally, 1980 is the year with the largest differences in likelihood of being upward.

While the pattern of upward succession by income group returns to less likelihood with higher income by 1990, the difference between income groups is less distinct than that of 1970. The low-medium-, medium-, and medium-high-income group tracts are only 2.9 to 3.2 percent less likely to be upward. These coefficients are not statistically different from each other, which indicates that these three income group tracts had a similar likelihood of being upward.[11] Furthermore, the high-income group is just as likely as the low income group to be upward.

Finally, in 2000, the difference between income groups is less distinct. Only the low-medium- and high-income tracts were less likely to be upward than the low-income tracts (-2.5 and -2.8 percent). But the medium- and medium-high-income tracts were just as likely to be upward as low-income tracts.

The regression results described here illustrate a change in the types of tracts experiencing upward succession over time. In 1970, low-income tracts are significantly more likely to be upward. However, in every subsequent decade, low-income tracts are no longer distinct. Even if 1980 is an outlier, the results for 1990 and 2000 suggest that low-income tracts are no longer the main areas experiencing upward succession. While the patterns for high-income tracts are not consistent, the differences by year show a general shift in the trends of upward succession over time from predominately occurring in low-income tracts to occurring in both low-income and middle-income tracts. As described further below, the patterns for high-income tracts appear to be closely related to patterns of income segregation.

Upward Succession and Income Segregation Patterns

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[11] These calculations were computed separately and are not displayed in Table 2.

These patterns of upward neighborhood succession over time can be understood and help explain other broad spatial trends, such as income segregation. In this section, I compare the patterns of upward succession by income group with the findings from the income segregation literature for the decade when upward neighborhood succession occurred. Stated differently, I describe the income characteristics of upward tracts in the decade prior to experiencing upward neighborhood succession and compare that to the patterns of income segregation in the year the tract was upward. For example, the income group characteristics from 1970 in Figure 1 describe the tracts that were upward in 1980. Thus, the 1970 data is compared to income segregation patterns in the 1980s below. The findings suggest that upward succession and income segregation are both competing and complementary. Upward succession contributes to income segregation when it is occurring in higher income tracts, but creates areas of income integration when occurring in lower income tracts, as described further below.

As previously described, income segregation has generally increased between 1970 and 2009 (M. J. Fischer, 2003; Reardon & Bischoff, 2011b; Watson, 2009). In particular, the high-income have become more segregated from the low-income and middle-class (M. J. Fischer, 2003; Reardon & Bischoff, 2011a; Watson, 2006). During this same period, upward succession affected a growing percentage of tracts, starting at 6 percent and rising to 15 percent (see Table 1).

During the 1980s, income segregation increased (Massey & Fischer, 2003; Reardon & Bischoff, 2011a, 2011b; Watson, 2009; Wheeler & La Jeunesse, 2006). In fact, the change in the 1980s was the largest increase between 1970 and 2009 (Reardon & Bischoff, 2011a). Upward neighborhood succession at that time was a relatively rare occurrence. In fact, upward tracts made up only 6 percent of all tracts. Upward succession was most frequent in low-income tracts, which could have contributed to income integration, particularly given that home ownership rates in upward tracts were higher than those in not upward tracts in this decade (71 percent v. 67 percent). However, the small scale of upward succession during this period produced little effect on income segregation.

The 1990s saw little change in income segregation (Massey & Fischer, 2003; Reardon & Bischoff, 2011b; Watson, 2009). While there was a slight decline in income segregation measures (Watson, 2009), the change was not enough to reverse the sharp increase of income segregation during the 1980s. During this same period, upward neighborhood succession increased to affect 14 percent of all tracts during this period, which was more likely with increasing income. In fact, high income tracts were most likely to be upward during this period. Thus, high income upward tracts were becoming more economically exclusive, while moderate income tracts experienced some income mixing. These processes seem to have countered each other, producing little change in income segregation from the 1980s.

Finally, in the 2000s, there was another increase in income segregation (Massey & Fischer, 2003; Reardon & Bischoff, 2011a, 2011b; Watson, 2009), although smaller than that in the 1980s. By the end of the decade, both high-income and low-income families were increasingly residentially isolated from other Americans (Reardon & Bischoff, 2011b; Watson, 2009). In this period, the percentage of upward succession was 15 percent of all tracts, almost the same rate as the 1990s. The likelihood of experiencing upward neighborhood succession was highest for the low- and high-income tracts during this period, while all middle-income tracts had a similarly lower likelihood of being upward. High income upward tracts were thus likely to experience changes that contributed to increasing income segregation, while low-income upward tracts were experiencing income mixing. The increase in income segregation during this period suggests that the increased exclusiveness of high-income tracts had more influence than the income mixing in low-income tracts. Processes like displacement were also likely to contribute in this period due to a decline in the percentage of home ownership across tracts to around 62 percent in both upward and not upward tracts, but also due to government intervention of HOPE VI in the 1990s, which demolished public housing across the nation, often re-concentrating low-income residents to other high poverty neighborhoods.

While there are yet to be studies of changes in income segregation for the final period of study, the economic recession and foreclosure crisis of 2008 likely led to a decline in income segregation, particularly for middle-class areas. This pattern is certainly reflected in the data on upward succession, which maintains a similar rate to the 2000s at 14 percent, but is more likely in low-, medium-, and medium-high-income tracts than low-medium- and high-income tracts. The higher rates for the moderate income tracts aligns with the patterns suggested by the economic circumstances of the time, as higher income households sought lower housing costs in lower income areas.

As described above, patterns of upward succession have implications for broader patterns of income segregation and inequality, a reflection of how residential preferences and mobility patterns affect spatial patterns of where similar households reside. The analysis above suggests that the rate of upward succession and the income groups affected determines whether patterns of upward succession contribute to or reduce income segregation. However, change in higher income areas seems more relevant to changes in income segregation than changes in lower income areas as previously suggested in the gentrification literature.

Conclusion

This paper documents upward neighborhood succession across the United States between 1970 and 2009. The findings contribute to urban scholarship in three ways. First, the literature on upward neighborhood succession has predominately focused on gentrification, a subset of broader patterns of neighborhood change. The findings presented here demonstrate that higher income neighborhoods make up two-thirds to three-quarters of neighborhoods affected by upward succession. This supports recent research that points to "super" or "hyper" gentrification in middle-income neighborhoods (Centner, 2008; Lees, 2010), as well as recent findings that gentrification is an exceptional trend for low-income neighborhoods, particularly low-income neighborhoods with high poverty rates (Cortright &

Mahmoudi, 2014; Hwang & Sampson, 2014; Orfield & Luce, 2013). As Massey states, "concentrated poverty creates an unstable and unattractive social environment that is at once a cause and a consequence of class segregation" (1996, p. 409).

Second, this paper shows that patterns of upward neighborhood succession have changed over time. While the literature has assumed a consistent pattern over time of low-income neighborhoods being most impacted, the findings described here illustrates that the likelihood of being upward for low-income tracts declines over time. In fact, over time, low-income tracts become equally likely to be upward as middle-income tracts.

Finally, I illustrate that analyzing competing and complementing spatial processes can contribute to our understanding of how inequality affects spatial organization. I find that the rate of upward succession and the income groups most affected define how upward succession contributes to income segregation. In fact, there are three key patterns that emerged from this analysis. First, when upward succession occurs in a high rate in higher income neighborhoods, it can contribute to income segregation. Second, when it occurs at a high rate in lower income neighborhoods, it can contradict income segregation. Finally, when it occurs at a low rate overall, it does little to contribute to or contradict the patterns of income segregation. Given that neither income segregation nor upward neighborhood succession occur as lone processes, these findings provide a better sense of how these two spatial processes relate.

While the field has begun to question the final product of the gentrification process, few have broached the research topic to consider how smaller-scale changes are part of a larger class reorganization of the American landscape. As part of this line of research, further study is needed on the broader process of upward neighborhood succession, including out-movement and displacement across class and racial groups in different types of neighborhoods. In addition, research is needed to

incorporate all of these processes into a broader understanding of the interaction of spatial processes in

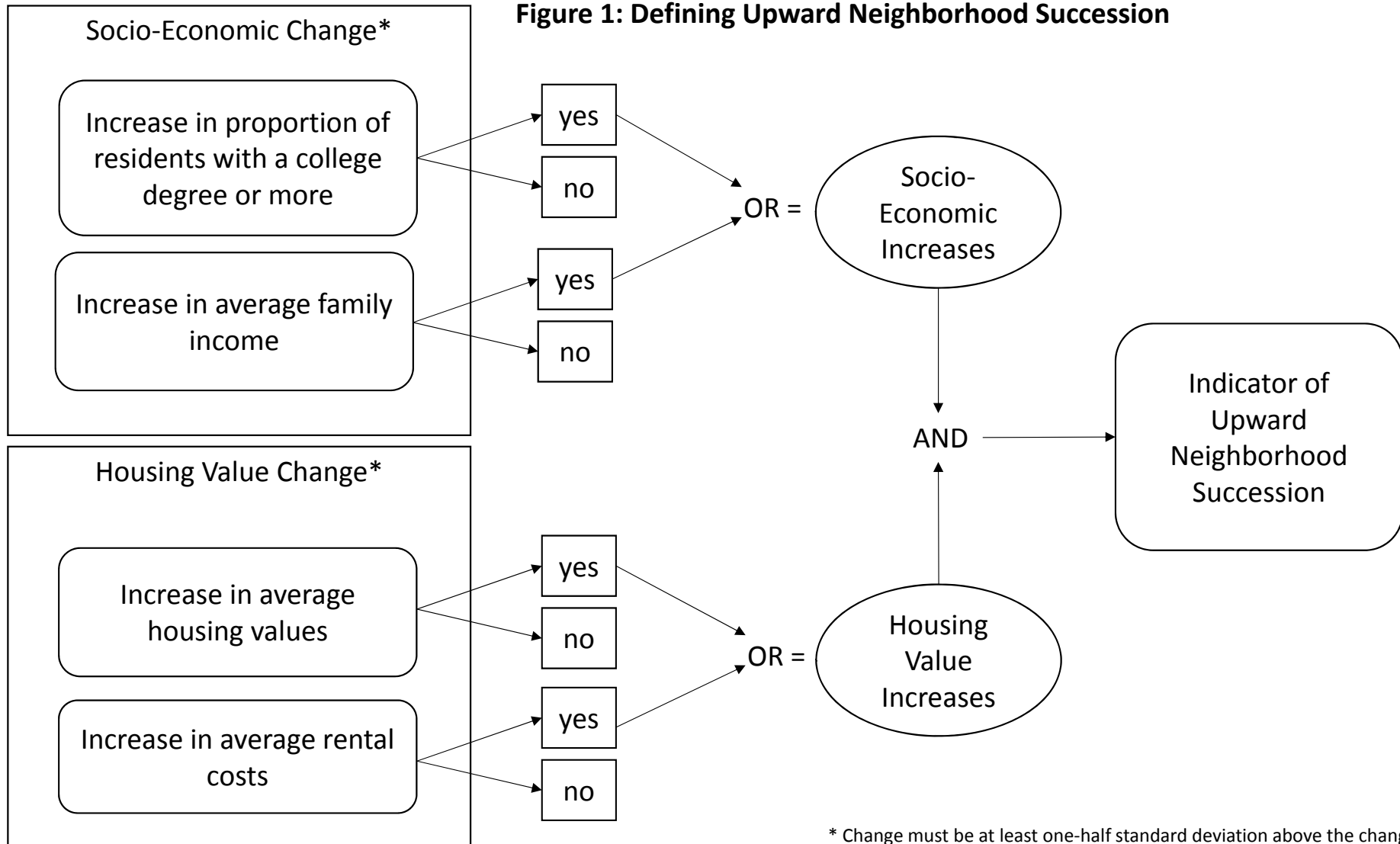forming the social worlds in which we live.

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Figure 1: Defining Upward Neighborhood Succession

Socio-Economic Change*

Increase in proportion of residents with a college degree or more

yes

no

Increase in average family income

yes

no

OR =

Socio-Economic Increases

AND

Indicator of Upward Neighborhood Succession

Housing Value Change*

Increase in average housing values

yes

no

Increase in average rental costs

yes

no

OR =

Housing Value Increases

* Change must be at least one-half standard deviation above the change in the MSA.

Figure 2: Percentage of Income Groups among Upward Tracts
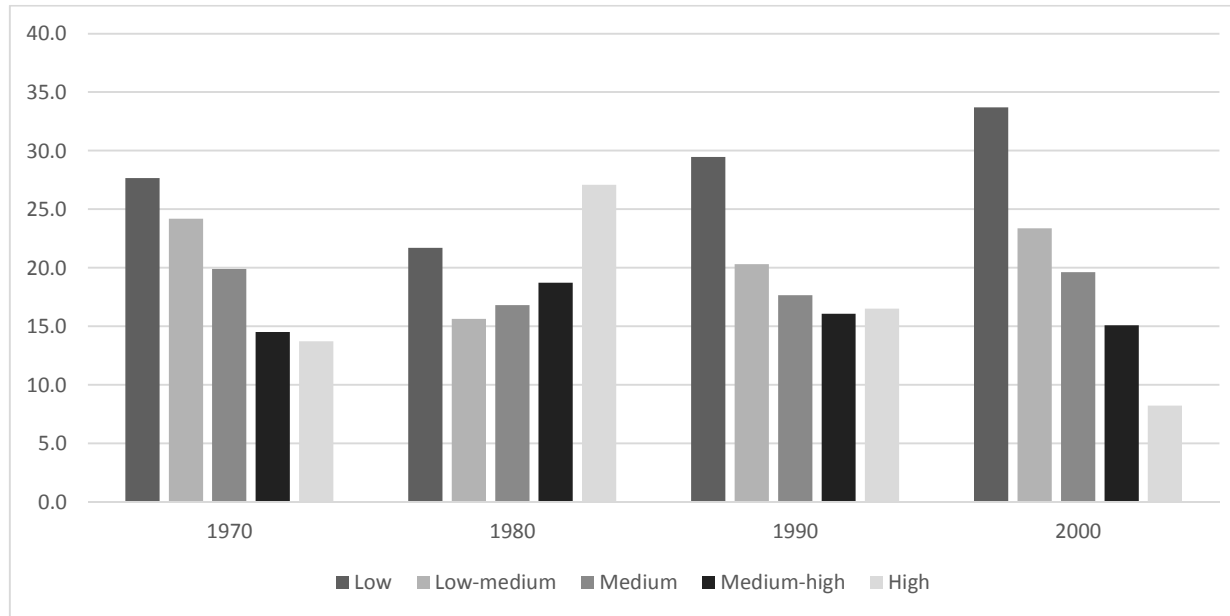
NOTE: Data from the U.S. Census for the years 1970, 1980, 1990, and 2000.

Appendix Table 1: Income Group Distribution by Year

	1970		1980		1990		2000	
	Min	Max	Min	Max	Min	Max	Min	Max
Low	0	49,112	0	46,434	0	48,993	0	52,814
Medium-low	49,115	58,273	46,435	55,936	48,993	61,578	52,815	66,439
Medium	58,273	66,494	55,936	64,697	61,579	74,452	66,439	81,094
Medium-high	66,495	77,918	64,698	76,822	74,452	93,481	81,094	104,083
High	77,919	1,080,417	76,825	441,564	93,482	602,209	104,087	1,094,083

NOTE: Data from the U.S. Census for the years 1970, 1980, 1990, and 2000. All dollar amounts are converted to 2009 dollars.

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Table 1: OLS Regression Results for Probability of Upward Succession

	1970	1980	1990	2000
Family income quintile low-medium (ref: low)	-3.575***	-0.0696	-2.872***	-2.456***
	(-5.92)	(-0.09)	(-3.99)	(-3.34)
Family income quintile medium	-6.713***	3.385***	-3.075***	-1.487
	(-9.46)	(3.84)	(-3.62)	(-1.71)
Family income quintile medium-high	-8.744***	7.167***	-3.242***	-1.324
	(-10.89)	(7.26)	(-3.31)	(-1.33)
Family income quintile high	-9.255***	17.47***	-1.471	-2.813*
	(-9.66)	(15.19)	(-1.22)	(-2.29)
Constant	88.24***	203.3***	81.73***	47.01*
	(5.02)	(10.48)	(5.14)	(2.53)
Total	35,320	37,678	41,738	38,208

NOTE: Data from the U.S. Census for the years 1970, 1980, 1990, and 2000. T statistics are displayed in parentheses. Stars of statistical significance are displayed with "*" indicating a p-value of 0.05, "**" for 0.01, and "***" for 0.001. Each regression is controlling for neighborhood and regional characteristics. See Appendix Table 2 for the full model.

Appendix Table 2: OLS Regression Results of Experiencing Upward Succession by Year

	1970	1980	1990	2000
Family income quintile low-medium (ref: low)	-3.575***	-0.0696	-2.872***	-2.456***
	(-5.92)	(-0.09)	(-3.99)	(-3.34)
Family income quintile medium	-6.713***	3.385***	-3.075***	-1.487
	(-9.46)	(3.84)	(-3.62)	(-1.71)
Family income quintile medium-high	-8.744***	7.167***	-3.242***	-1.324
	(-10.89)	(7.26)	(-3.31)	(-1.33)
Family income quintile high	-9.255***	17.47***	-1.471	-2.813*
	(-9.66)	(15.19)	(-1.22)	(-2.29)
Controls				
Homeownership rate (%)	0.0882***	0.0000222	0.166***	0.168***
	(8.18)	(0.00)	(13.40)	(12.44)
Tract poverty rate (%)	0.347***	0.427***	0.484***	0.527***
	(10.56)	(10.51)	(15.36)	(14.54)
MSA poverty rate (%)	0.480***	-0.236	-0.436***	-0.00381
	(4.39)	(-1.49)	(-3.63)	(-0.03)
Percent children	0.110***	-0.202***	0.00876	0.150***
	(3.63)	(-5.17)	(0.21)	(3.30)
MSA proportion medium-low income quintile (ref: low)	-0.00878	0.114*	0.369***	0.263***
	(-0.23)	(2.27)	(7.32)	(4.44)
MSA proportion medium income quintile	0.135***	0.145**	0.315***	0.284***
	(4.20)	(2.95)	(5.90)	(4.71)

	1970	1980	1990	2000
MSA proportion medium-high income quintile	-0.159***	0.0955	0.348***	0.163*
	(-4.36)	(1.90)	(6.47)	(2.53)
MSA proportion high income quintile	0.114**	-0.0219	-0.000163	0.184*
	(2.79)	(-0.42)	(-0.00)	(2.56)
Midwest region (ref: northeast region)	-4.921***	-1.076	3.482***	0.880
	(-10.17)	(-1.67)	(5.10)	(1.40)
Southern region	-7.371***	0.956	4.732***	4.916***
	(-12.91)	(1.53)	(7.18)	(7.50)
Western region	-3.959***	3.138***	4.256***	1.922**
	(-7.92)	(3.59)	(6.10)	(2.68)
Average rent (ln)		-29.88***	-33.26***	-33.67***
		(-32.82)	(-36.63)	(-38.18)
Average home value (ln)	0.300	11.81***	14.61***	6.260***
	(0.41)	(18.91)	(20.65)	(9.31)
MSA average rent (ln)		20.94***	14.96***	31.42***
		(6.53)	(4.68)	(10.33)
MSA average home value (ln)	-5.009**	-17.29***	-5.478***	-2.305
	(-3.06)	(-9.10)	(-3.60)	(-1.44)
Vacant property (%)	0.201***	0.397***	0.504***	0.518***
	(6.85)	(10.85)	(18.03)	(15.76)

Appendix Table 2 (continued)

	1970	1980	1990	2000
Total housing units (ln)	-4.561***	-10.34***	-11.89***	-13.24***
	(-25.24)	(-33.10)	(-36.29)	(-33.85)
Percent black (ref: percent white)	-0.165***	-0.0658***	-0.128***	-0.0394***
	(-17.43)	(-5.59)	(-11.92)	(-3.39)
Percent Latino	-0.104***	0.0735***	-0.116***	0.0473**
	(-5.63)	(3.56)	(-6.86)	(2.84)
Percent Asian		-0.194***	-0.335***	-0.0349
		(-3.64)	(-9.22)	(-1.18)
MSA percent black (ref: percent white)	-0.0813*	-0.0378	0.0277	-0.153***
	(-2.13)	(-0.85)	(0.80)	(-4.61)
MSA percent Latino	-0.288***	-0.223***	0.0841*	-0.0642
	(-8.42)	(-5.68)	(2.47)	(-1.96)
MSA percent Asian		0.367***	0.300***	-0.201***
		(4.41)	(4.49)	(-3.62)
Constant	88.24***	203.3***	81.73***	47.01*
	(5.02)	(10.48)	(5.14)	(2.53)
Total	35,320	37,678	41,738	38,208

NOTE: Data from the U.S. Census for the years 1970, 1980, 1990, and 2000. T statistics are displayed in parentheses. Stars of statistical significance are displayed with "*" indicating a p-value of 0.05, "**" for 0.01, and "***" for 0.001. All dollar amounts are converted to 2009 dollars.