RACIAL INEQUALITY AND SEGREGATION: THEORY AND EVIDENCE

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Abstract

Standard intuition suggests that as income and education differences across race decline, so racial segregation in the United States will fall. In this paper, we argue that the very opposite should be expected. First, we identify a powerful mechanism underlying the persistence and even increase in segregation as racial differences in sociodemographics are eliminated. In essence, given the existing structure of many US cities, middle-class black neighborhoods are in short supply, forcing wealthy blacks either to live in white neighborhoods with high levels of neighborhood amenities or in more black neighborhoods with lower amenity levels. Increases in the proportion of highly educated blacks then permit the formation of new middle-class black neighborhoods, relieving the prior neighborhood supply constraint and leading to segregation increases. We present across-metro area evidence from the 2000 Census indicating that this mechanism does in fact operate: as the proportion of highly educated blacks in a metropolitan area increases, so the segregation of educated blacks and blacks more generally goes up. According to the leading alternative hypotheses as to the causes of segregation, the effect on segregation would be expected to go the other way. The research has implications for the shape of US cities of the future.

Keywords: segregation, racial sorting, critical mass, inequality, neighborhood (JEL: H0, J7, R0, R2)

1. INTRODUCTION

Racial differences in sociodemographic characteristics such as education and income are often thought to explain a significant portion of the residential segregation observed in cities throughout the United States. The reasoning is intuitive: given that housing demand increases with income and the clear differences in income across race, for example, we would expect neighborhoods with large houses to be primarily occupied by white households. More generally, as socioeconomic characteristics both vary markedly with race and affect where households choose to live, some racial segregation would be expected to emerge even in the absence of any sorting on the basis of race. In turn, under this view, reductions in across-race differences in income and other important sociodemographics would decrease the level of residential segregation.

In this paper, we consider the possibility that just the opposite would occur, given the current makeup of cities throughout the United States. In particular, we conjecture that the segregation of black households and high-SES black households in particular would *increase* as a result of a reduction in black-white differences in socioeconomic characteristics. This conjecture is motivated by two key observations about the current state of racial segregation in the United States. First, in almost every metropolitan area, few if any neighborhoods combine high fractions of both black and highly educated households, a fact we demonstrate very clearly below. The relative shortage of such neighborhoods means that highly educated black households are typically forced to choose between neighborhoods that are predominantly black versus predominantly white neighborhoods with high levels of amenities. Second, given this limited set of neighborhood alternatives, highly educated blacks do live in a very diverse set of neighborhoods. While a fraction live in neighborhoods with very few other black households and many college-educated neighbors, many live in neighborhoods that have a high fraction of black households and very few other college-educated households.

This diverse range of chosen neighborhoods suggests that neither race nor education is all-important in the location decisions of highly educated blacks. Further, it indicates that highly educated blacks may prefer to live in highly educated majority-black neighborhoods if they were actually available. It is this idea that opens up the possibility that segregation may actually rise with an increase in the number of highly educated blacks. New neighborhoods are able to form, neighborhoods that currently exist in only a handful of existing cities, and these would be very attractive to middle-class black households, leading to greater segregation.

We capture the essence of this mechanism using a simple formal model of household location choice within a single city. There are four types of household: black and white

households, with high and low levels of education respectively. Each householder has a job randomly located within the city and chooses a place of residence, conditional on place of work. In making this choice, all households dislike long commutes. Further, location preferences are heterogeneous: highly educated households prefer to live with highly educated neighbors, and black households prefer to live with black neighbors (and similarly whites with white neighbors).

In this simple setting, we characterize equilibrium location decisions and neighborhood formation for cases in which the proportion of highly educated black households in the metro area is low, moderate, and high respectively. We begin by showing that when the proportion of highly educated blacks is low enough, there is an insufficient mass for educated black neighborhoods to form. Consequently, the black neighborhoods that do arise are characterized by low levels of average education, and educated blacks choose between more-educated white neighborhoods and less-educated black neighborhoods (as seen in the aggregate data). When the proportion of highly educated black households in the metro area increases, highly educated black households become increasingly likely to choose the formerly less-educated black neighborhoods. This has the consequence of raising the average education level in these neighborhoods and increases the exposure of both less- and more-educated blacks to highly educated blacks. Finally, when the proportion of highly educated black households in the metro area is high, highly educated educated black households split off from less-educated blacks and form exclusively highly educated black neighborhoods. In this case, the exposure of highly educated blacks to one another again increases, while the exposure of less-educated blacks to more-educated blacks decreases.

The second main component of the analysis takes this decentralized sorting mechanism seriously, examining how changes in the structure of the population within a metropolitan area affect the way that households sort on the basis of race and education.[1] Our primary empirical hypothesis relates to whether the relative exposure of highly educated black households to blacks is an increasing or decreasing function of the education level of blacks in the metro area.[2] Using 2000 Census data from 277 US metropolitan areas (MSAs) and summarized at the tract level, we begin by establishing the empirical observations described above, characterizing the racial-educational composition of tracts throughout the US and the range of neighborhoods chosen by highly educated blacks within MSAs.

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[1] Throughout our analysis, we use education as a proxy for socioeconomic characteristics more generally.

[2] Note that the inclusion of MSA fixed effects in the analysis absorbs out any mechanical increase due to the changing composition.

The empirical analysis involves a series of regressions that relate the racial-educational composition of an individual's tract to an individual's own race-education category, a set of MSA fixed effects, and interactions of individual and MSA race-education characteristics. The results reveal that relative to other households in the MSA, highly educated blacks are increasingly exposed to other blacks as the education level of blacks in the metropolitan area increase. This change is driven primarily by a large relative increase in exposure to other highly educated blacks and is more than completely offset by a decrease in exposure to highly educated whites. These changes are likely to result in a slight decrease in the average level of education in the neighborhoods in which highly educated blacks reside. At the same time, highly educated blacks are also increasingly exposed to less-educated blacks and vice-versa. This effect is consistent with the predictions of our theoretical model when moving from a low to a moderate proportion of highly educated blacks, which suggests that this characterization is appropriate given the current sociodemographic structure of US metropolitan areas.

In testing our main hypothesis, we explore the relationship at the MSA level between the educational attainment of blacks and the segregation of highly educated blacks. We conjecture a positive correlation between these measures and find strong evidence for this. Many other explanations for a relationship between these two measures exist, but in most cases these alternative explanations imply a negative relationship. Cutler and Glaeser (1997), for example, explore the reverse channel of causality, studying the impact of segregation at the MSA level on educational outcomes for blacks aged 20-30, and finding a large negative effect. Likewise, most views of sorting would predict a reduction in segregation as racial differences in socioeconomic characteristics narrow. Finally, standard models of statistical discrimination would also generally predict a negative correlation, as highly educated blacks would be less likely to be discriminated against when the black population is more educated on average. Thus, many of the alternative explanations for a correlation between the educational attainment of blacks and the segregation of highly educated blacks would make it more rather than less difficult to see a positive correlation in the data. This suggests that the actual mechanism that we identify may in fact be stronger than our main estimates would imply.

One important alternative explanation that might give rise to a positive correlation relates to selection bias. The concern in this case would be that the highly educated blacks that select into MSAs with a higher fraction of educated blacks have a stronger taste for segregation. While selection of this kind may occur, we show that the results of our analysis are almost identical when the racial-educational composition of the MSA in which an individual lived in 1995 is used as an instrument for the current MSA racial-educational composition. This implies that selection

across MSAs cannot possibly be a significant factor driving our results, unsurprising given similar results relating to selection in Cutler and Glaeser (1997).

Our results have a number of important implications. First, they imply that racial segregation is unlikely to disappear with convergence in racial differences in socioeconomic characteristics. The results also have implications concerning the impact of racial sorting in the housing market on the long-run convergence of educational attainment across race. In particular, the results indicate that given the current sociodemographic structure of US metro areas, increases in the average education level of black households may result in a slight decrease in the relative exposure of both highly educated and less-educated blacks to educated neighbors, although the evidence is not fully conclusive on this point. A third implication relates to the sociology literature following Wilson (1987). This demonstrates that reductions in institutional discrimination in the housing market in the middle of the 20th century led to large-scale reductions in the exposure of less educated to more educated blacks as more educated blacks left the inner city neighborhoods to which they were formerly restricted. The evidence we present here suggests that this trend may not have been severe in cities in which the black population was more educated initially and may partially reverse itself as the black population becomes relatively more educated over time.

2. THEORETICAL FRAMEWORK

In this section, we describe a simple spatial model of residential location choice. This illustrates the relationship between cross-race inequality and residential segregation on the basis of race, drawing attention to the mechanism we focus on that drives segregation patterns.

Consider a metropolitan area located on a straight line with length 2, represented by the interval [-1, 1] (see Figure 1). Suppose that the population density in the metropolitan area is given by $N>0$, so its total population is $2N$. There are two racial groups $r \in (b, w)$, a proportion $\lambda_w \in (0,1)$ of which is white, while the remaining proportion $\lambda_b = 1 - \lambda_w$ is black. Agents within each racial group differ in terms of their educational attainment (the heterogeneity could equally be in terms of income). We assume that a fraction $r_r \in (0,1)$ of race-r workers are of the highly educated type (denoted by type-h) and the remaining fraction $1 - r_r$ are of the low-education type (denoted by type-l). Cross-race inequality will be reflected in this model by the difference $|r_w - r_b|$. For all metropolitan areas in the US, the relevant case is $r_w > r_b$ - that is, a larger

fraction of the whites are highly educated. An increase in r_b while keeping r_w fixed involves a narrowing in the racial gap in educational attainment.

For simplicity, we assume that whites' residential locations are fixed as follows: At each endpoint of the line, there are two communities, one for highly educated whites (called communities 1 and 1') and one for less-educated whites (called communities 2 and 2'). The focus of our analysis will then be on the *formation* of black neighborhoods and the residential location choices of black households.

To characterize the residential location decision of black households, we take the job locations of the blacks to be *uniformly* distributed on the straight line representing the metropolitan area. We assume that commuters experience a cost of $\theta > 0$ per unit distance between their work and place of residence. This has the effect of distributing the ideal (from the point of view of avoiding lengthy commutes) residential location of the set of individuals uniformly across the line.[3]

We also assume there is a cost of maintaining a community such that average cost is given by $c(n)$, where n is the number of residents of the community, and $c'(n)<0$. There are several interpretations of this. First, it captures the idea that the formation of a neighborhood and the production of neighborhood amenities both require fixed costs that have to be shared by its residents. Second, it can be viewed as a restriction to help rule out tiny enclaves of individuals claiming to form a neighborhood of their own.

We now describe the preference of blacks. Consider a black worker with education $e \in (l, h)$ whose job location is at point z on the straight-line. His utility from living in a community $j \in J$ where J is the set of available communities to be determined in equilibrium, is given by:

$$u(j; z, e) = \alpha[p_b(j) + \gamma_1 p_w(j)] + \beta[p_e(j) + \gamma_2 p_{-e}(j)] - \theta D(j, z) - c\big(n(j)\big) \tag{1}$$

where $-e$ represents the other education category; $p_r(j)$ is the *proportion* of residents in community j of race r ; $p_e(j)$ is proportion of residents in j with education level e; $D(j, z)$ is the commuting distance between community j and z's job location; $n(j)$ is the number of residents in community j; and $\alpha > 0$, $\beta > 0$, $\gamma_1 < 1$, $\gamma_2 < 1$ are parameters. In the utility function (1), the first

[3] Note that the characterization of job locations and the subsequent ideally preferred residential location is meant to introduce idiosyncratic variation in preferences for particular neighborhoods. In reality, this might arise, for example, because of heterogeneity in preferences for other neighborhood characteristics.

term $\alpha[p_b(j)+\gamma_1 p_w(j)]$ captures the utility from interacting with people of different races in the same community, where $\gamma_1 < 1$ captures the idea that individuals have stronger preference for interacting with neighbors with the same race. The interpretation of the second term $\beta[p_e(j)+\gamma_2 p_{-e}(j)]$ is subtler. While individuals may have stronger preferences for living with others of the same education level, it seems plausible that everyone would want to live with highly educated neighbors, because of positive human capital externalities (as in Benabou, 1993 and Cutler and Glaeser, 1997). However, housing prices in highly educated neighborhoods will typically be higher. For simplicity, we have abstracted away from the housing market. The parameter $\gamma_1 < 1$ is then meant to capture in a reduced-form way the idea that highly educated (or high income) workers will *on net* (taking into account both human capital externality and housing price) prefer to live in more expensive neighborhoods with many other highly educated residents, while low-education workers will prefer on net to live in cheaper neighborhoods with other low-education residents.

We start by analyzing an equilibrium in which a single black community, called community 0, emerges at point 0. It is straightforward to show that community 0, were it to emerge, would consist of blacks whose job locations were close to point 0. Let x_h and x_l be, respectively, the *marginal* highly educated black and the marginal low-education black who is indifferent between living in this hypothetical community 0 and his or her other choices. Clearly, for a highly educated black, community 1 (1') dominates community 2 (2'), and vice versa for a low-education black. An equilibrium of the model is a pair (x_l^*, x_h^*) such that the highly educated marginal type x_h^* is indifferent between living in community 0 and community 1, and the low-education marginal type x_l^* is indifferent between living in community 0 and community 2.

We now describe the conditions that characterize (x_l^*, x_h^*). Fix a candidate pair $(x_l, x_h) \in (0,1)$. The total measure of low- and high-education blacks in community 0 will be $2N\lambda_b(1-r_b)x_l$ and $2N\lambda_b r_b x_h$ respectively. Thus the population in community 0 will be $2N\lambda_b[r_b x_h + (1-r_b)x_l]$; and the relevant proportions in community 0 are given by

$$p_b(0)=1, \quad p_w(0)=0, \quad p_h(0)=\frac{r_b x_h}{r_b x_h+(1-r_b)x_l}, \quad p_l(0)=\frac{(1-r_b)x_l}{r_b x_h+(1-r_b)x_l},$$

Therefore, the utilities for a high- and low-education black with job location point z from living in community 0 are given, respectively, by

$$V_0^h(z, x_h, x_l) = \alpha + \beta\left(\frac{r_b x_h}{r_b x_h + (1-r_b)x_l} + \gamma_s \frac{(1-r_b)x_l}{r_b x_h + (1-r_b)x_l}\right) - \theta z - c\left(2\mathrm{N}\lambda_\mathrm{b}\left[r_b x_h + (1-r_b)x_l\right]\right) \tag{2}$$

$$V_0^l(z, x_h, x_l) = \alpha + \beta\left(\frac{(1-r_b)x_l}{r_b x_h + (1-r_b)x_l} + \gamma_s \frac{r_b x_h}{r_b x_h + (1-r_b)x_l}\right) - \theta z - c\left(2\mathrm{N}\lambda_\mathrm{b}\left[r_b x_h + (1-r_b)x_l\right]\right) \tag{3}$$

We can also calculate the utilities from living in communities 1 and 2. First consider community 1. Given (x_l, x_h), the measure of high-education blacks and whites in community 1 are respectively $N\lambda_b r_b(1\text{-}x_h)$ and $N\lambda_w r_w$. Thus, the proportions in community 1 are

$$p_b(1) = \frac{\lambda_b r_b(1-x_h)}{\lambda_b r_b(1-x_h) + \lambda_w r_w}, \quad p_w(1) = \frac{\lambda_w r_w}{\lambda_b r_b(1-x_h) + \lambda_w r_w}, \quad p_h(1) = 1, \quad p_l(1) = 0,$$

Thus the utility for a high-education black from living in community 1 is

$$V_1^l(z, x_h) = a\left(\frac{l_b r_b(1-x_h)}{l_b r_b(1-x_h) + l_w r_w} + g_1 \frac{l_w r_w}{l_b r_b(1-x_h) + l_w r_w}\right) + b - q(1-z) - c\left(N[l_b r_b(1-x_h)] + l_w r_w\right). \tag{4}$$

Similarly, the utility for a low-education black from living in community 2 is:

$$V_1^l(z, x_h) = a\left(\frac{l_b(1-r_b)(1-x_l)}{l_b(1-r_b)(1-x_l) + l_w(1-r_w)} + g_1 \frac{l_w(1-r_w)}{l_b(1-r_b)(1-x_l) + l_w(1-r_w)}\right) + b - q(1-z) - c\left(N[l_b(1-r_b)(1-x_l)] + l_w(1-r_w)\right).$$

In equilibrium, (x_l^*, x_h^*) must satisfy:

$$V_0^h(x_h^*, x_h^*, x_l^*) = V_1^h(x_h^*, x_h^*) \tag{5}$$

$$V_0^l(x_l^*, x_h^*, x_l^*) = V_2^l(x_l^*, x_l^*) \tag{6}$$

Condition (5) states that the marginal highly educated black x_h^* must be indifferent between living in community 0, an all-black mixed-education community, and community 1, a high-education community with a white majority; and condition (6) states that the marginal low-education black x_l^* must be indifferent between living in community 0 and community 2, a low-education community with white majority. We assume that the parameters of the model are such that equation system (5) and (6) have solutions (Figure 1 depicts the equilibrium of the model when r_b is small).

When such an equilibrium exists, and when r_b is sufficiently small, one can show that $x_l^* > x_h^*$. The reason is simple: when r_b is small, community 0 is necessarily a predominantly low-education all-black community. Because $\gamma_2 < 1$, the utility for a low-education black from community 0 is always higher than that for a highly educated black at the same location. Therefore, low-education blacks are more willing to commute longer distances to community 0. Now we describe what happens to the equilibrium as r_b starts to rise.

Increase in r_b when r_b is small. First, note that as r_b increases, the proportion of highly educated blacks in community 0 will increase even with (x_l^*, x_h^*) hypothetically unchanged as before. But as the proportion of highly educated blacks in community 0 increases, community 0 becomes more attractive vis-à-vis community 1 for highly educated blacks; thus the marginal highly educated black will commute to community 0, and x_h^* will increase. As a result, the probability that highly educated blacks will live in all-black community 0 with low-education blacks will initially increase in r_b.

The results for low-education blacks are more ambiguous in terms of location choices. On the one hand, community 0 becomes more educated, making it less attractive (given the price increase in the background). On the other hand, the increased number of residents drives the average community cost down. While it is possible that exposure of high- and low-education blacks to one another increases, it is certainly the case that exposure of highly educated blacks to other highly educated blacks increases at the expense of exposure to highly educated whites.

When r_b is sufficiently large. As r_b is sufficiently high, however, a threshold will be reached where it makes sense for high-education blacks in community 0 to form their own community at 0, labeled 0^h. This occurs when the benefit in terms of increased community size of living with low-education blacks exactly equals the difference in utility between living in an all high-education community versus a mixed-education community. The key insight of our simple model is that a black high-education community 0^h will emerge only when the proportion of high-educated blacks r_b is sufficiently high. Of course, the emergence of such a black highly

educated community also depends positively on the population density N and the overall proportion of blacks in the metropolitan area λ_b, and indirectly through the commuting cost θ and via x_h^* and the community cost function. Finally, it is worth pointing out that the emergence of community 0^h is likely to induce an accelerated emigration of high-education blacks from community 1 to community 0^h.

To summarize, our simple model of residential location choice has the following predictions: (see Figure 2 for graphical illustration, where $r_b < r_b' < r_b''$):

- When r_b is small, highly educated blacks will live either in a black but predominantly low-education community 0 or a highly educated but predominantly white community 1;
- For moderate levels r_b', community 0 becomes unambiguously more attractive for high-education blacks vis-à-vis community 1; thus high-education blacks are likely live in community 0 with low-education blacks;
- For high enough levels r_b'', an exclusive all-black highly educated community 0^h will emerge particularly when the benefits of separating exceed the costs for high-education blacks. The existence of community 0^h will lead to a further departure of highly educated blacks from community 1, resulting in greater racial segregation in residential locations.

Figure 3 shows the model's prediction of the relationship between r_b and the probabilities of high-education black living in community 1 and community 0. Figure 4 depicts the proportion of high-education blacks in community 0 as r_b increases.

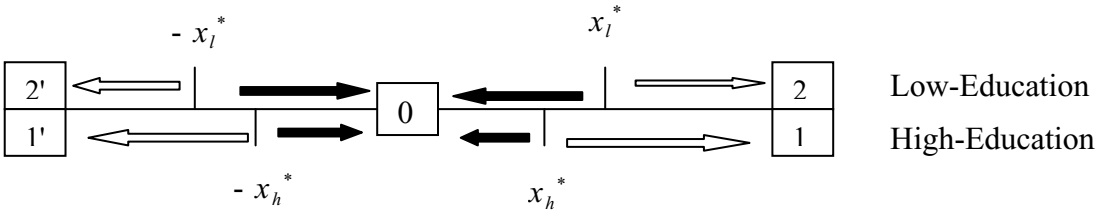

Figure 1: Equilibrium of the Model when r_b is small.

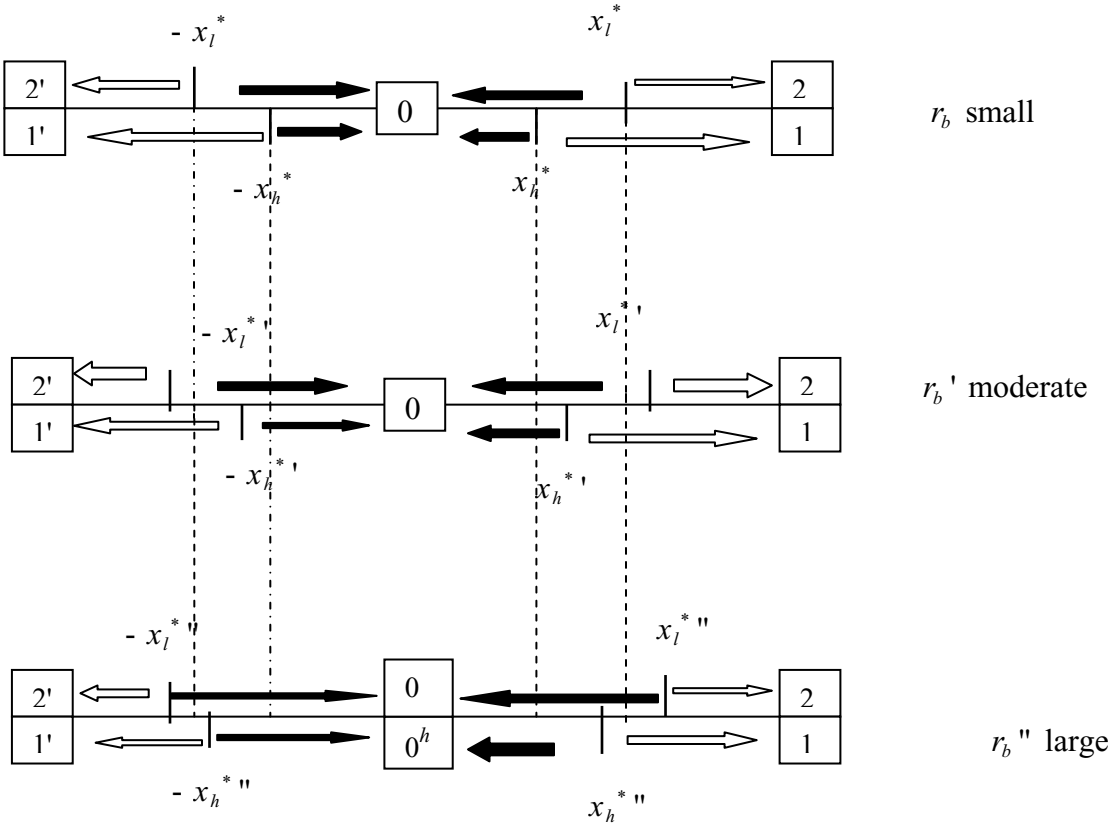

Figure 2: Comparative Statics with Respect to r_b.

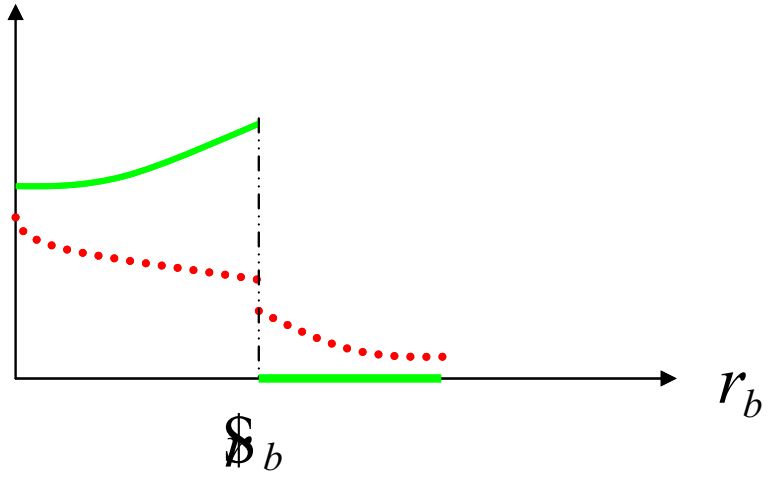

Figure 3: The Residential Location of High Education Blacks as r_b Increases.

Notes: Dashed Line: Probability of High-Education Black living in Community 1; Solid Line: Probability of High-Education Blacks living in Community 0. Community 0^h emerges at $\$_b$

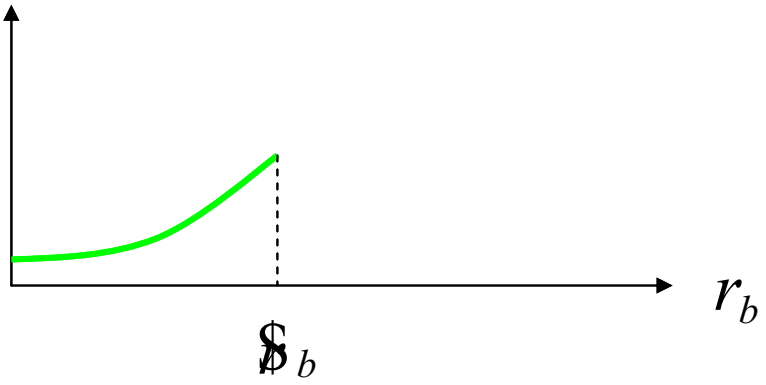

Figure 4: The Fraction of High-Education Blacks in Community 0 as r_b increases.

Notes: Community 0^h emerges at $\$_b$

3. CHARACTERIZING NEIGHBORHOODS IN US METRO AREAS

To motivate the central hypothesis of this paper, we begin our empirical analysis by characterizing the two broad patterns for the US as a whole already referred to: (i) that neighborhoods that combine high fractions of both college-educated and black households are in extremely short supply in almost every metropolitan area throughout the United States and (ii) that faced with the resulting trade-off between black versus other college-educated neighbors, college-educated blacks in every metropolitan area choose a very diverse set of neighborhoods. This pattern of choices suggests the constraint imposed by the short supply of neighborhoods that combine high fractions of both highly educated and black households is binding for highly educated black households.

The analysis is based on data compiled from the 2000 Census. For the most part, we use the Summary Files, which give information on the distribution of education by race for each Census tract in the United States. To work at this detailed level of geography – tracts typically contain 3,000 to 5,000 individuals -- we take household education to proxy for socioeconomic status more generally. We characterize the race and educational attainment of households as that of the head of household and focus specifically on non-Hispanic black and non-Hispanic white households throughout our analysis.[4] Based on this definition, black and white households constitute 11.1 and 69.5 percent of US households that reside in metropolitan areas, respectively. Among black households, 15.4 percent have a college degree, while the comparable figure for white households is 32.5 percent, and for all US households, 27.7 percent. Table 1 describes the joint distribution of education and race.

Table 2 documents the number of tracts in the United States by the percentage of households with a college degree and the percentage of households that are black and white, respectively. The first row describes the number of tracts in which more than 0, 20, 40, 60, and 80 percent of head of households are college-educated, respectively. The next four rows report the number of tracts in each of these categories that contain a minimum fraction of black households equal to 20, 40, 60, and 80 percent, respectively. As the corresponding numbers show, a much smaller fraction of the tracts with a high fraction of black households have a high fraction of households with a college degree. For example, while 23 percent of all tracts are at least 40 percent college educated (a number comparable to the fraction of US households with a college degree), only 2.5 percent of tracts that are at least 40 percent black are at least 40 percent

[4] The vast majority of households that checked two races can be characterized as either Hispanic or non-Hispanic Asian or Pacific Islander. Other households that checked two or more races - a very small fraction overall - were dropped from this analysis.

college educated, and only 1.1 percent of tracts that are at least 60 percent black are at least 40 percent college educated. The final four rows of Table 2 show analogous numbers for white households, reporting the number of tracts in the US that meet the education criterion described in each column heading subject to a minimum fraction of white households equal to 20, 40, 60, and 80 percent, respectively. As the corresponding figures show in this case, a markedly different pattern emerges for white households, with a significantly greater fraction of neighborhoods with at least 40, 60, and 80 percent white households meeting each education criterion.

Tracts that combine high fractions of both black and college-educated households are in fact concentrated in just a handful of metropolitan areas, most notably Washington, DC, implying that the supply of such neighborhoods in most metropolitan areas is extremely limited. Table 3 illustrates, for example, that of the 44 tracts (less than 0.1 percent of all tracts) that are at least 60 percent black and 40 percent college-educated, 13 are in the Washington DC PMSA, 8 in Detroit, 6 in Los Angeles, and 5 in Atlanta. Almost 75 percent of these tracts can thus be found in one of only four PMSAs. Of the 142 tracts that are at least 40 percent black and 40 percent college-educated, almost two-thirds are in the PMSAs listed above along with Chicago and New York.

Taken together, this characterization of the composition of US neighborhoods makes clear that while neighborhoods that combine high fractions of both college-educated and white households are amply supplied in metropolitan areas throughout the US, neighborhoods that combine high fractions of both college-educated and black households are in extremely short supply. This implies that college-educated black households in most metropolitan areas face a clear trade-off between living with other black versus other college-educated neighbors

Given this trade-off, Table 4 demonstrates that college-educated black households in fact choose a very diverse set of neighborhoods within metropolitan areas throughout the country. To explore the variation in the consumption of local public goods associated with these choices, we first rank college-educated black households in each metropolitan area by the fraction of blacks in the household's Census tract.[5] The upper panel of Table 4 then summarizes the average fractions of black and college-educated households in the corresponding tract for the quintiles of this distribution. Thus the first column, for example, characterizes the average neighborhood composition for the 20 percent of college-educated black households that reside with the smallest fraction of other black households in their metropolitan area. A clear trade-off is apparent between the fraction of a household's neighbors that are black and the fraction that are college-

[5] For this portion of the paper, we use the fraction of college-educated neighbors as a proxy for local public goods more generally. As we show below for the San Francisco Bay Area, the pattern for other local public goods matches that for average neighborhood education level very closely.

educated; the average fraction of college-educated neighbors falls from 38.0 percent for those college-educated blacks living with the smallest fraction of black neighbors to 13.5 percent for those living with the largest fraction. The lower panel of Table 2 reports analogous results for white households. While not perfectly monotonic, the resulting pattern for whites is almost exactly opposite that for blacks: those whites residing with the greatest fraction of neighbors of the same race within each metropolitan area generally reside with a greater rather than smaller fraction of college-educated neighbors.

4. INEQUALITY AND SEGREGATION

We now turn to the central empirical analysis of this paper. We begin this section by characterizing the pattern of segregation broken out by race and education in US metro areas. We then explore how this pattern varies with the sociodemographic composition of the metropolitan area, focusing on how the segregation of highly educated blacks (and blacks more generally) is affected by the fraction of highly educated blacks in the metropolitan area.

In this analysis, we focus on two thought experiments. The first is an increase in the fraction of highly educated blacks holding the fraction of black households constant. This corresponds to increasing the average education level of black population. The second is an increase in the fraction of highly educated blacks holding the fraction of highly educated individuals in the metropolitan area constant. This corresponds to increasing the fraction of the educated population that is black.

Segregation Patterns in US Metro Areas. We begin by describing the general pattern of segregation in the United States as a whole. For the remainder of the paper, we define *highly educated* as a household that is headed by an individual with at least some college attendance. With this definition, the fraction of households in US metro areas that are highly educated is 54 percent, the fraction that are both highly educated and black is 5 percent, and the fraction of black households that are highly educated is 45 percent. Our primary objective in expanding the definition of the highly educated category in this way is to increase the precision of our analysis given that college-educated blacks make up such a small part of the overall population. The results that follow are generally more precise although smaller in magnitude with this expanded definition.

The upper panel of Table 5 illustrates the average tract-level exposure to households in four race-education categories (black-white; highly-less educated) for US metropolitan areas. Average exposures are displayed for individuals in each race-education category. The first entry,

for example, implies that the average less-educated black household in the US lives in a tract in which 24.5 percent of the households are black with a high school degree or less. This compares to the national average exposure to less-educated blacks of 6.1 percent.

A more meaningful description of segregation patterns is illustrated in the lower panel of Table 5. In this case, we report the average exposure of households in each race-education category to those in each race-education category, reporting these averages relative to the MSA average. In this case, the first row states that relative to an average household in the same metro area, less-educated blacks are exposed to 13.7 percentage points more less-educated blacks, 7.2 percentage point more highly educated blacks, etc. More generally, these average exposure rates illustrate a clear pattern of racial segregation in US metro areas for highly educated blacks as well as those with lower levels of educational attainment.

Table 6 provides some initial evidence as to how segregation patterns vary with the sociodemographic composition of the metropolitan area. Specifically, we report segregation patterns in a manner analogous to the lower panel in Table 5, separately for metropolitan areas with above and below the median fraction of highly educated black households (4.26 percent). As the table clearly shows, the *relative* exposure of blacks in each education category to both highly- and less-educated blacks is significantly greater in metro areas with a larger fraction of highly educated black households. For both highly- and less-educated blacks, the average tract-level exposure to blacks relative to the fraction of blacks in MSAs above the median is more than double that for MSAs below the median.

A Regression-Based Approach. To control more formally for the sociodemographic structure of the metropolitan area, Table 7 reports the results of a series of regressions of various tract-level composition measures analogous to those shown in Tables 5 and 6 on individual and MSA characteristics. Each regression includes a complete set of controls for individual race-education categories and MSA fixed effects. The inclusion of the MSA fixed effects ensures that all of the other parameters characterize tract-level exposure relative to the MSA average for each set of individuals. In addition, the regressions also include individual characteristics interacted with MSA characteristics. Without including these interactions, the coefficients on the individual characteristics in these regressions would return the estimates reported in the middle panel of Table 5. The coefficients on the interaction terms, then, characterize how tract-level exposure for various sets of individuals varies with MSA characteristics.

Using these regressions, we are interested in two pairs of statistical tests. The first is whether an increase in the fraction of highly educated blacks holding the fraction of black

households constant changes the relative tract-level exposure of less- and more-educated blacks, respectively, to households in the given race-education category. This corresponds to examining the impact of an increase in the average education level of black population. In Table 7, the corresponding tests are reported as $\beta_1-\beta_2=0$ for highly educated households and $\beta_5-\beta_6=0$ for less-educated black households. The second is whether an increase in the fraction of highly educated blacks holding the fraction of highly educated individuals in the metropolitan area constant changes the relative tract-level exposure of less- and more-educated blacks, respectively, to households in the given race-education category. This corresponds to increasing the fraction of the educated population that is black. The corresponding tests are reported as $\beta_1-\beta_3=0$ for highly educated households and $\beta_5-\beta_7=0$ for less-educated black households in this case. We report the results of all four statistical tests under the regression results reported in each column.

Table 7 shows the results of these regressions and the corresponding test statistics. The results indicate that the relative exposure of both highly- and less-educated blacks to blacks is an increasing function of the fraction of the metropolitan area that is highly educated and black. This result holds whether the fraction of highly educated blacks is increased by reducing the fraction of less-educated blacks (i.e., increasing the average education level of the black population) or by reducing the fraction of highly educated whites (i.e., increasing the fraction of the educated population that is black). For both highly- and less-educated blacks, the increased relative exposure to blacks is driven by increased exposure to blacks in both education categories. These relative increases are offset by a decrease in the exposure to (especially highly educated) whites. On net, an increase in the average education of the black population has a slightly negative (although statistically insignificant) effect on the average education level in the neighborhoods that blacks reside in relative to the metropolitan area average.

To demonstrate that the results of Table 7 are not driven by the form of the dependent variable that we employ, Table 8 reports a series of regressions analogous to those reported in Table 7 using an alternative definition for the dependent variable. In this case, the dependent variable is defined as the fraction of households in a given category in an individual's tract divided by the fraction in the metropolitan area as a whole. In this way, an increase in tract-level exposure to households in a given category from 6 to 12 percent following an increase in the proportion of these households in the metro area from 3 to 6 percent would not result in an increase in the dependent variable in this case, while it would result in a 3 percentage point increase in the dependent variable used in the regressions reported in Table 7. The resulting parameter estimates lead to a qualitatively identical set of conclusion, thereby ensuring that our initial results are not driven by the functional form of the dependent variable. Throughout the

remainder of the paper, we present the results of regressions analogous to those reported in Table 7.

Table 9 reports a series of regressions that include additional interaction terms. Specifically, these regressions include interactions of individual race-education categories with the population of the metropolitan area. As the test statistics reveal, adding these additional controls increases the magnitudes of each of the key parameters and the statistical significance of the test statistics in every almost case, thereby implying that the initial results were not driven by omitted variable bias associated with city size.

5. ROBUSTNESS – SELECTION BIAS

In testing our main hypothesis, we essentially explore the relationship at the MSA level between the educational attainment of blacks and the segregation of highly educated blacks. We conjecture a positive correlation between these measures and find strong evidence for this. Many other explanations for a relationship between these two measures exist, but in most cases these alternative explanations imply a negative relationship. Cutler and Glaeser (1997), for example, explore the reverse channel of causality, studying the impact of segregation at the MSA level on educational outcomes for blacks aged 20-30, and finding a large negative effect. Likewise, most views of sorting would predict a reduction in segregation as racial differences in socioeconomic characteristics narrow. Finally, standard models of statistical discrimination would also generally predict a negative correlation, as highly educated blacks would be less likely to be discriminated against when the black population is more educated on average. Thus, many of the alternative explanations for a correlation between the educational attainment of blacks and the segregation of highly educated blacks would make it more rather than less difficult to see a positive correlation in the data. This suggests that the actual mechanism that we identify may in fact be stronger than what our main estimates would imply.

One main alternative explanation that might give rise to a positive correlation relates to selection bias. The concern in this case would be that the highly educated blacks that select into MSAs with a higher fraction of educated blacks have a stronger taste for segregation. To address this possibility, we make use of an alternative organization of the 2000 Census – the Public Use Microdata Sample (PUMS). This organization of the Census data has the advantage that observations are at the individual level, but has the disadvantage relative to the summary files used above, that a less detailed level of geographic specificity is provided. In this case, individuals are assigned to PUMAs, which contain greater than 100,000 households. From our perspective the key additional variable contained in the PUMS data is the metropolitan area in

which each individual resided fiver years ago (i.e., in 1995). This variable allows us to explore whether the pattern of active selection across metro areas over this five year period is in the direction of causing an over- or under-statement in the coefficients estimated in our main specifications.

Before exploring the selection bias issue with these data, we first replicate our main specifications reported in Table 7 for this organization of the Census data. Due to the increased geographic aggregation in this dataset, we would generally expect to observe a similar pattern of relative exposures to those seen in Table 7 but at rates that are smaller in magnitude. As Table 10 clearly shows, this is exactly what we the data reveal.

To explore the likely direction of selection bias in our main specification, should it exist, Table 11 reports the results of the following specification. Using the metropolitan area that each individual resided in five years prior to the Census, we decompose the sociodemographic composition of each individual's current metropolitan area into a component due to the composition of the metro area in which that person live five years and the difference between the current and lagged measures. For about 90 percent of the population that does not move, this difference is zero, while for movers this difference reflects whether the change in metro sociodemographics associated with their move. We then include distinct interaction terms with both measures in the same specification. The estimated coefficients on the lagged versus differenced measures indicate the direction of the selection bias. As the table indicates, the estimated coefficients on the differenced measures are smaller in magnitude than those on the lagged measures. This indicates that the active across-metropolitan selection observed over the past five years is leads to an understatement of the main coefficients in our main specification. To the extent that selection in previous periods in time was qualitatively similar to that over the past five years, we would generally expect, then, that our main specification understates the impact of the average education of the black population on the segregation of both highly- and less-educated blacks.

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TABLE 1: SUMMARY STATISTICS

Race	Education	Percentage of Overall Population	Percentage by Race
Black	*Less than HS*	0.029	0.258
Non-Hispanic	*HS*	0.032	0.291
	Some College	0.033	0.297
	College Degree	0.011	0.102
	Advanced Degree	0.006	0.052
White	*Less than HS*	0.091	0.132
Non-Hispanic	*HS*	0.185	0.266
	Some College	0.192	0.277
	College Degree	0.124	0.178
	Advanced Degree	0.102	0.147
Asian	*Less than HS*	0.008	0.194
Non-Hispanic	*HS*	0.006	0.154
	Some College	0.008	0.205
	College Degree	0.011	0.268
	Advanced Degree	0.007	0.179
Hispanic	*Less than HS*	0.051	0.472
	HS	0.024	0.219
	Some College	0.022	0.201
	College Degree	0.007	0.069
	Advanced Degree	0.004	0.039
Other	*Less than HS*	0.024	0.529
Non-Hispanic	*HS*	0.010	0.217
	Some College	0.008	0.180
	College Degree	0.002	0.051
	Advanced Degree	0.001	0.024

Note: Percentages are with respect to US households residing in metropolitan areas. Race and educational attainment of head of household is reported.

Table 2: Number of Tracts in United States in 2000 by Race and Education

	Percent College Degree or More at least			
All Tracts	*0%*	*20%*	*40%*	*60%*
Number	49,021	26,351	11,094	3,005
Fraction of tracts at least 0% black	100.0%	53.8%	22.6%	6.1%
Percent Black	*0%*	*20%*	*40%*	*60%*
at least 20%				
Number	9,149	2,567	641	59
Fraction of tracts at least 20% black	100.0%	28.1%	7.0%	0.6%
at least 40%				
Number	5,657	1,164	142	14
Fraction of tracts at least 40% black	100.0%	20.6%	2.5%	0.2%
at least 60%				
Number	3,921	623	44	5
Fraction of tracts at least 60% black	100.0%	15.9%	1.1%	0.1%
at least 80%				
Number	2,559	271	21	1
Fraction of tracts at least 80% black	100.0%	10.6%	0.8%	0.0%
Percent White	*0%*	*20%*	*40%*	*60%*
at least 20%				
Number	43,179	25,178	11,041	2,999
Fraction of tracts at least 20% black	100.0%	58.3%	25.6%	6.9%
at least 40%				
Number	39,602	24,566	10,839	2,967
Fraction of tracts at least 40% black	100.0%	62.0%	27.4%	7.5%
at least 60%				
Number	35,154	22,543	10,214	2,870
Fraction of tracts at least 60% black	100.0%	64.1%	29.1%	8.2%
at least 80%				
Number	26,910	17,539	8,102	2,339
Fraction of tracts at least 80% black	100.0%	65.2%	30.1%	8.7%

Note: Tracts considered have a minimum of 800 households (the average tract in the US has almost 3,000 households). Analysis based on race and educational attainment of head of household.

Table 3: Locations of Tracts with High Fractions of Both Black and College-Educated Households

Percentage black *Percentage w/ college degree*	*>80%* *>40%*	*>60%* *>40%*	*>40%* *>40%*	*Percent* *Black*	*% of Black Hhlds* *College-Educated*
Washington, DC	5	13	29		
Detroit, MI	5	8	17		
Chicago, IL		3	16		
New York, NY		4	12		
Los Angeles, CA	4	6	10		
Atlanta, GA	5	5	8		
Cleveland, OH		1	6		
Philadelphia, PA		1	5		
Oakland, CA			5		
Baltimore, MD			4		
Raleigh-Durham, NC		1	3		
Indianapolis, IN			3		
Newark, NJ			3		
Jackson, MS	1	1	2		
Houston, TX	1	1	2		
Columbia, SC			2		
Ann Arbor, MI			2		
New Orleans, LA			2		
Total	**21**	**44**	**142**		

Notes: Tracts considered have a minimum of 800 households (the average tract in the US has almost 3,000 households).

Table 4: Neighborhood Patterns for College-Educated Households in the United States

Panel A: Neighborhood Patterns for College-Educated Black Households

Households first ranked by percent black in Census tract within its MSA
Measures reported by household's corresponding quintile within its MSA

Quintile	1	2	3	4	5	Total
Percent Black	5.7	14.4	28.3	54.6	78.9	36.4
Percent College-Educated	38.0	31.6	26.2	18.4	13.8	25.6

Panel B: Neighborhood Patterns for College-Educated White Households

Households first ranked by percent white in Census tract within its MSA
Measures reported by household's corresponding quintile within its MSA

Quintile	1	2	3	4	5	Total
Percent White	54.6	78.1	86.3	90.5	94.6	80.8
Percent College-Educated	26.9	36.1	40.6	39.2	39.6	36.5

Table 5: Average Tract-Level Exposure by Race and Education

	Average Tract-Level Exposure					
Household	Black-Low Ed	Black - High Ed	White - Low Ed	White High-Ed	High Ed	**Black**
Black Low-Ed	0.245	0.148	0.195	0.261	0.458	**0.393**
Black High-Ed	0.191	0.148	0.195	0.299	0.507	**0.339**
White Low-Ed	0.053	0.039	0.359	0.431	0.516	**0.092**
White High-Ed	0.051	0.041	0.292	0.486	0.585	**0.092**

	Average Tract-Level Exposure Relative to MSA Average					
Household	Black-Low Ed	Black - High Ed	White - Low Ed	White High-Ed	High Ed	**Black**
Black Low-Ed	0.137	0.072	-0.079	-0.135	-0.071	**0.209**
Black High-Ed	0.091	0.073	-0.066	-0.098	-0.030	**0.164**
White Low-Ed	-0.019	-0.012	0.039	0.009	-0.008	**-0.031**
White High-Ed	-0.020	-0.012	0.007	0.054	0.040	**-0.032**

Note: Table reports average tract characteristics for households in the race-education category shown in row heading. The lower panel reports average tract characteristics relative to the average characteristics of the household's metropolitan area.

Table 6: Average Tract-Level Exposure by Race and Education

Panel A: Metropolitan Areas Below Median Fraction of Highly-Educated Blacks (<4.26 percent)

	Average Tract-Level Exposure Relative to MSA Average					
Individual	Black-Low Ed	Black - High Ed	White - Low Ed	White High-Ed	High Ed	**Black**
Black Low-Ed	0.044	0.073	-0.058	-0.097	-0.057	**0.117**
Black High-Ed	0.049	0.045	-0.042	-0.066	-0.023	**0.094**
White Low-Ed	-0.005	-0.003	0.022	0.001	-0.006	**-0.008**
White High-Ed	-0.007	-0.004	0.002	0.045	0.038	**-0.011**

Panel B: Metropolitan Areas Above Median Fraction of Highly-Educated Blacks (>4.26 percent)

	Average Tract-Level Exposure Relative to MSA Average					
Individual	Black-Low Ed	Black - High Ed	White - Low Ed	White High-Ed	High Ed	**Black**
Black Low-Ed	0.155	0.081	-0.085	-0.146	-0.075	**0.236**
Black High-Ed	0.104	0.082	-0.073	-0.109	-0.032	**0.186**
White Low-Ed	-0.033	-0.022	0.058	0.017	-0.011	**-0.055**
White High-Ed	-0.035	-0.021	0.012	0.064	0.041	**-0.056**

Note: Table reports average tract characteristics relative to the average characteristics of the household's metropolitan area. The upper panel reports averages for households residing in metro areas in which college-educated black households constitute less than 4.26 percent of the metropolitan area. The lower panel reports averages for metro areas in whcih black college-educated households constitute more than 4.26 percent of the population.

Table 7: Segregation and Metropolitan Area Sociodemographics - Average Tract-Level Exposure

Dependent Variable:		**Tract-Level Exposure**					
		% Black & High Ed	**% Black & Low Ed**	**% White & High Ed**	**% White & Low Ed**	**% High Ed**	**% Black**
I_BlackHighEd* M_BlackHighEd	**β_1**	**1.884** (0.411)	**1.409** (0.751)	**-1.897** (0.728)	**-0.962** (0.309)	**-0.206** (0.464)	**3.293** (1.137)
I_BlackHighEd* M_BlackLowEd	β_2	-0.824 (0.238)	-0.276 (0.465)	0.874 (0.442)	0.294 (0.201)	0.097 (0.283)	-1.100 (0.684)
I_BlackHighEd* M_WhiteHighEd	β_3	-0.146 (0.048)	-0.183 (0.066)	0.256 (0.077)	0.133 (0.039)	0.127 (0.047)	-0.329 (0.109)
I_BlackHighEd* M_WhiteLowEd	β_4	0.107 (0.080)	0.250 (0.096)	-0.010 (0.116)	-0.218 (0.074)	0.119 (0.056)	0.357 (0.172)
I_BlackLowEd* M_BlackHighEd	**β_5**	**1.861** (0.456)	**2.433** (0.839)	**-2.505** (0.795)	**-1.069** (0.387)	**-0.884** (0.508)	**4.294** (1.266)
I_BlackLowEd* M_BlackLowEd	β_6	-0.849 (0.251)	-0.693 (0.502)	1.219 (0.457)	0.410 (0.232)	0.433 (0.301)	-1.541 (0.731)
I_BlackLowEd* M_WhiteHighEd	β_7	-0.133 (0.044)	-0.243 (0.071)	0.339 (0.087)	0.155 (0.045)	0.253 (0.053)	-0.375 (0.110)
I_BlackLowEd* M_WhiteLowEd	β_8	0.132 (0.077)	0.280 (0.115)	-0.032 (0.138)	-0.193 (0.089)	0.171 (0.074)	0.412 (0.187)
I_BlackHighEd		0.026 (0.029)	0.004 (0.034)	-0.035 (0.039)	0.030 (0.021)	-0.037 (0.023)	0.030 (0.060)
I_BlackLowEd		0.022 (0.031)	0.023 (0.047)	-0.080 (0.056)	0.002 (0.033)	-0.111 (0.030)	0.045 (0.074)
I_WhiteHighEd		-0.015 (0.005)	-0.026 (0.007)	0.138 (0.020)	0.045 (0.008)	0.098 (0.018)	-0.042 (0.012)
I_WhiteLowEd		-0.016 (0.004)	-0.024 (0.007)	0.094 (0.018)	0.080 (0.009)	0.051 (0.016)	-0.040 (0.011)
Test: β_1-β_2=0		***0.000***	***0.159***	***0.016***	***0.011***	***0.680***	***0.014***
Test: β_1-β_3=0		***0.000***	***0.040***	***0.004***	***0.001***	***0.471***	***0.002***
Test: β_5-β_6=0		***0.000***	***0.017***	***0.002***	***0.015***	***0.094***	***0.003***
Test: β_5-β_7=0		***0.000***	***0.002***	***0.000***	***0.002***	***0.022***	***0.000***

Note: All regressions include metropolitan area fixed effects. Standard errors adjusted for clustering at the metropolitan area level are reported in parentheses; p-values are reported for tests

Table 8: Segregation and Metropolitan Area Sociodemographics

Dependent Variable:		**Tract-Level Exposure Divided by Metro-Level Exposure**					
		% Black & High Ed	**% Black & Low Ed**	**% White & High Ed**	**% White & Low Ed**	**% High Ed**	**% Black**
I_BlackHighEd*	**β_1**	**9.901**	**9.615**	**-5.124**	**-4.314**	**-0.188**	**9.560**
M_BlackHighEd		(5.118)	(6.685)	(2.470)	(1.159)	(0.786)	(5.763)
I_BlackHighEd*	β_2	-11.239	-11.530	2.550	1.657	0.053	-11.245
M_BlackLowEd		(3.261)	(4.083)	(1.564)	(0.779)	(0.507)	(3.598)
I_BlackHighEd*	β_3	-2.569	-2.925	1.652	0.568	0.272	-2.787
M_WhiteHighEd		(1.059)	(1.242)	(0.362)	(0.163)	(0.083)	(1.124)
I_BlackHighEd*	β_4	1.323	1.968	0.354	0.081	0.224	1.747
M_WhiteLowEd		(1.508)	(1.509)	(0.566)	(0.269)	(0.111)	(1.498)
I_BlackLowEd*	**β_5**	**10.462**	**17.460**	**-6.718**	**-4.378**	**-1.191**	**13.224**
M_BlackHighEd		(5.508)	(7.529)	(2.712)	(1.303)	(0.834)	(6.447)
I_BlackLowEd*	β_6	-12.405	-17.949	3.714	1.945	0.533	-14.585
M_BlackLowEd		(3.373)	(4.576)	(1.609)	(0.800)	(0.531)	(3.937)
I_BlackLowEd*	β_7	-2.260	-3.696	2.117	0.720	0.544	-3.027
M_WhiteHighEd		(0.896)	(1.153)	(0.413)	(0.195)	(0.103)	(0.993)
I_BlackLowEd*	β_8	2.236	2.290	0.379	0.293	0.337	2.496
M_WhiteLowEd		(1.260)	(1.600)	(0.673)	(0.333)	(0.153)	(1.382)
I_BlackHighEd		1.696	1.669	-0.403	-0.086	-0.075	1.679
		(0.733)	(0.709)	(0.192)	(0.100)	(0.042)	(0.715)
I_BlackLowEd		1.486	2.349	-0.691	-0.255	-0.235	1.894
		(0.553)	(0.746)	(0.267)	(0.146)	(0.059)	(0.618)
I_WhiteHighEd		-0.333	-0.536	0.653	0.242	0.189	-0.435
		(0.067)	(0.078)	(0.127)	(0.043)	(0.038)	(0.072)
I_WhiteLowEd		-0.343	-0.502	0.472	0.366	0.101	-0.422
		(0.063)	(0.077)	(0.109)	(0.047)	(0.034)	(0.070)
Test: β_1-β_2=0		***0.008***	***0.042***	***0.051***	***0.002***	***0.849***	***0.020***
Test: β_1-β_3=0		***0.022***	***0.077***	***0.007***	***0.000***	***0.555***	***0.044***
Test: β_5-β_6=0		***0.007***	***0.002***	***0.013***	***0.002***	***0.190***	***0.005***
Test: β_5-β_7=0		***0.030***	***0.008***	***0.001***	***0.000***	***0.033***	***0.017***

Note: All regressions include metropolitan area fixed effects. Standard errors adjusted for clustering at the metropolitan area level are reported in parentheses; p-values are reported for tests

Table 9: Segregation and Metropolitan Area Sociodemographics With Additional Controls

Dependent Variable:		**Tract-Level Exposure**					
		% Black & High Ed	**% Black & Low Ed**	**% White & High Ed**	**% White & Low Ed**	**% High Ed**	**% Black**
I_BlackHighEd*	β_1	**1.938**	**1.489**	**-2.000**	**-1.019**	**-0.258**	**3.428**
M_BlackHighEd		(0.384)	(0.694)	(0.624)	(0.255)	(0.412)	(1.050)
I_BlackHighEd*	β_2	-0.832	-0.288	0.890	0.304	0.105	-1.119
M_BlackLowEd		(0.226)	(0.430)	(0.367)	(0.156)	(0.246)	(0.633)
I_BlackHighEd*	β_3	-0.091	-0.101	0.150	0.074	0.074	-0.192
M_WhiteHighEd		(0.047)	(0.069)	(0.069)	(0.034)	(0.044)	(0.110)
I_BlackHighEd*	β_4	0.213	0.406	-0.214	-0.331	0.016	0.620
M_WhiteLowEd		(0.087)	(0.109)	(0.112)	(0.071)	(0.054)	(0.191)
I_BlackLowEd*	β_5	**1.876**	**2.455**	**-2.537**	**-1.089**	**-0.898**	**4.331**
M_BlackHighEd		(0.426)	(0.794)	(0.688)	(0.331)	(0.469)	(1.191)
I_BlackLowEd*	β_6	-0.803	-0.622	1.116	0.344	0.385	-1.424
M_BlackLowEd		(0.237)	(0.481)	(0.392)	(0.196)	(0.279)	(0.695)
I_BlackLowEd*	β_7	-0.077	-0.158	0.219	0.079	0.197	-0.235
M_WhiteHighEd		(0.042)	(0.080)	(0.073)	(0.034)	(0.052)	(0.117)
I_BlackLowEd*	β_8	0.243	0.449	-0.271	-0.345	0.058	0.691
M_WhiteLowEd		(0.083)	(0.140)	(0.126)	(0.077)	(0.075)	(0.217)
I_BlackHighEd		-0.040	-0.093	0.091	0.100	0.028	-0.132
		(0.033)	(0.042)	(0.039)	(0.020)	(0.026)	(0.073)
I_BlackLowEd		-0.048	-0.083	0.071	0.099	-0.040	-0.131
		(0.034)	(0.064)	(0.050)	(0.025)	(0.034)	(0.095)
I_WhiteHighEd		-0.016	-0.027	0.139	0.046	0.098	0.042
		(0.005)	(0.008)	(0.020)	(0.008)	(0.018)	(0.012)
I_WhiteLowEd		-0.016	-0.025	0.095	0.080	0.051	-0.040
		(0.004)	(0.007)	(0.018)	(0.009)	(0.016)	(0.011)
Test: β_1-β_2=0		***0.000***	***0.108***	***0.003***	***0.001***	***0.574***	***0.006***
Test: β_1-β_3=0		***0.000***	***0.027***	***0.001***	***0.000***	***0.420***	***0.001***
Test: β_5-β_6=0		***0.000***	***0.014***	***0.001***	***0.005***	***0.077***	***0.002***
Test: β_5-β_7=0		***0.000***	***0.001***	***0.000***	***0.001***	***0.017***	***0.000***

Note: All regressions include metropolitan area fixed effects as well as controls for interactions of individual variables with the population size of the metropolitan area. Standard errors are adjusted for clustering at the metro area level and are reported in parentheses; p-values are reported for tests

Table 10: Segregation and Metropolitan Area Sociodemographics - PUMA-Level Exposures

Dependent Variable:		**PUMA-Level Exposure**					
Dependent Variable		**% Black & High Ed**	**% Black & Low Ed**	**% White & High Ed**	**% White & Low Ed**	**% High Ed**	**% Black**
I_BlackHighEd*	β_1	**1.570**	**0.914**	**-1.494**	**-0.639**	**-0.040**	**2.484**
M_BlackHighEd		(0.258)	(0.376)	(0.359)	(0.235)	(0.207)	(0.585)
I_BlackHighEd*	β_2	-0.724	-0.152	0.716	0.188	0.044	-0.876
M_BlackLowEd		(0.176)	(0.274)	(0.250)	(0.161)	(0.145)	(0.416)
I_BlackHighEd*	β_3	-0.168	-0.209	0.073	0.122	0.023	-0.377
M_WhiteHighEd		(0.065)	(0.097)	(0.105)	(0.056)	(0.054)	(0.159)
I_BlackHighEd*	β_4	0.064	0.089	0.057	-0.203	0.185	0.153
M_WhiteLowEd		(0.079)	(0.105)	(0.106)	(0.073)	(0.044)	(0.181)
I_BlackLowEd*	β_5	**1.547**	**1.600**	**-1.717**	**-0.790**	**-0.326**	**3.148**
M_BlackHighEd		(0.296)	(0.525)	(0.494)	(0.330)	(0.265)	(0.805)
I_BlackLowEd*	β_6	-0.850	-0.659	1.067	0.366	0.365	-1.508
M_BlackLowEd		(0.180)	(0.351)	(0.316)	(0.205)	(0.187)	(0.515)
I_BlackLowEd*	β_7	-0.157	-0.187	0.023	0.118	0.034	-0.344
M_WhiteHighEd		(0.076)	(0.120)	(0.128)	(0.079)	(0.059)	(0.193)
I_BlackLowEd*	β_8	0.017	0.023	0.169	-0.149	0.286	0.040
M_WhiteLowEd		(0.086)	(0.127)	(0.126)	(0.087)	(0.054)	(0.212)
I_BlackHighEd		0.073	0.098	-0.042	-0.010	-0.051	0.171
		(0.028)	(0.046)	(0.047)	(0.025)	(0.023)	(0.072)
I_BlackLowEd		0.101	0.138	-0.105	-0.036	-0.128	0.238
		(0.034)	(0.055)	(0.058)	(0.037)	(0.020)	(0.087)
I_WhiteHighEd		-0.013	-0.021	0.103	0.023	0.075	-0.034
		(0.002)	(0.003)	(0.013)	(0.003)	(0.011)	(0.005)
I_WhiteLowEd		-0.013	-0.018	0.064	0.052	0.034	-0.031
		(0.002)	(0.003)	(0.010)	(0.005)	(0.010)	(0.004)
Test: β_1-β_2=0		***0.000***	***0.092***	***0.000***	***0.032***	***0.805***	***0.001***
Test: β_1-β_3=0		***0.000***	***0.006***	***0.000***	***0.003***	***0.763***	***0.000***
Test: β_5-β_6=0		***0.000***	***0.008***	***0.000***	***0.027***	***0.115***	***0.000***
Test: β_5-β_7=0		***0.000***	***0.002***	***0.001***	***0.011***	***0.210***	***0.000***

Note: All regressions include metropolitan area fixed effects. Standard errors adjusted for clustering at the metropolitan area level are reported in parentheses; p-values are reported for tests

Table 11: Segregation and Metropolitan Area Sociodemographics - PUMA-Level Exposures

Dependent Variable:		**PUMA-Level Exposure**		
			SINGLE REGRESSION	
Measure:		**% Black**	**% Black**	**% Black**
Metro Characteristics:		***Actual***	***Lagged***	***Differenced***
I_BlackHighEd*	β_1	**2.484**	**2.610**	**1.578**
M_BlackHighEd		(0.585)	(0.603)	(0.642)
I_BlackHighEd*	β_2	-0.876	-0.940	-0.412
M_BlackLowEd		(0.416)	(0.423)	(0.475)
I_BlackHighEd*	β_3	-0.377	-0.387	-0.341
M_WhiteHighEd		(0.159)	(0.164)	(0.136)
I_BlackHighEd*	β_4	0.153	0.170	0.029
M_WhiteLowEd		(0.181)	(0.187)	(0.153)
I_BlackLowEd*	β_5	**3.148**	**3.206**	**2.209**
M_BlackHighEd		(0.805)	(0.816)	(0.733)
I_BlackLowEd*	β_6	-1.508	-1.530	-0.939
M_BlackLowEd		(0.515)	(0.523)	(0.487)
I_BlackLowEd*	β_7	-0.344	-0.341	-0.362
M_WhiteHighEd		(0.193)	(0.196)	(0.161)
I_BlackLowEd*	β_8	0.040	0.051	-0.168
M_WhiteLowEd		(0.212)	(0.215)	(0.172)
I_BlackHighEd		0.171		0.167
		(0.072)		(0.073)
I_BlackLowEd		0.238		0.233
		(0.087)		(0.087)
I_WhiteHighEd		-0.034		-0.034
		(0.005)		(0.005)
I_WhiteLowEd		-0.031		-0.031
		(0.004)		(0.004)

Note: This table reports the results of two regressions. The first includes each individual's actual metro characteristics in the interaction terms. The second includes each individual's lagged metropolitan characteristics from where he/she reisded five years ago and the difference between the current and lagged measure. All regressions include metropolitan area fixed effects. Standard errors adjusted for clustering at the metropolitan area level are reported in parentheses; p-values are reported for tests