What Explains Neighborhood Sorting by Income and Race?

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Abstract: Why do Black households live in neighborhoods with much lower socioeconomic status (SES) than the neighborhoods of white households with similar incomes? The explanation is not wealth. High-income, high-wealth Black households live in neighborhoods with similar SES as low-income, low-wealth white households. Instead, we provide evidence that many Black households prefer low-SES neighborhoods with Black residents to high-SES neighborhoods without Black residents. The variety of neighborhood SES available in a metro's Black neighborhoods, which is typically low, drives the neighborhood SES of Black households.

Keywords: Neighborhood, Income, Wealth, Race, Homophily
JEL Classification Codes: J15, J18, R11, R23

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1 Introduction

High-income Black households live in neighborhoods of similar socioeconomic status (SES) as low-income white households. This is true whether one measures SES in terms of a neighborhood's unemployment rate (Figure 1), its rate of poverty, educational attainment, or single-headed households (Pattillo (2005), Logan (2011), Reardon et al. (2015), Intrator et al. (2016)), or an index of all of these factors like the one we use in this paper.

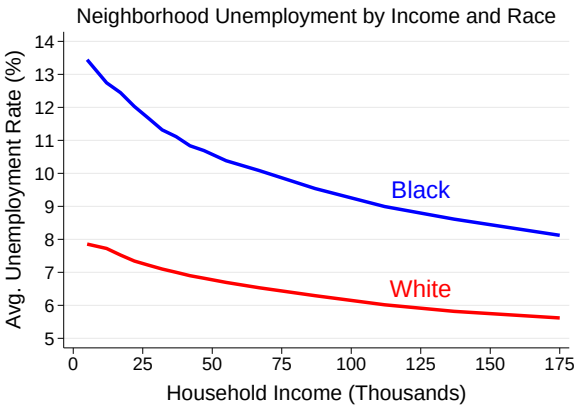


Figure 1: Black-White Gap in Neighborhood Unemployment Rates, by Income
Note: This figure displays data from the 2012-2016 American Community Survey (ACS) described in Section 4.1.

What accounts for the stark racial differences in neighborhood SES even within the same income groups? We consider two explanations and assess the empirical evidence for each.

The first explanation is that racial differences in wealth make high-SES neighborhoods unaffordable for Black households, even those with high incomes. The primary method for accessing many neighborhoods, particularly those at higher SES levels, is to purchase a house, and this typically requires a substantial down payment. If, after conditioning on income, Black households have lower access to credit, then wealth could be a more informative measure of financial resources than income. Black households hold substantially less wealth than white households at all levels of income (Barsky et al. (2002), Aliprantis et al. (2019)), and so it has been widely assumed that wealth plays an important role in racial differences in neighborhood location outcomes (Baradaran (2020); Killewald (2013); Hamilton and Darity (2010); Shapiro (2006)).

The second explanation is that households prefer same-race neighbors (or amenities correlated with race), and neighborhoods with a high share of Black residents tend to have low SES.[1,2] In the stylized case where households only care about the race of their neighbors and there are no frictions to moving, Schelling (1971) shows that even weak preferences can lead to segregation.

[1] We call neighborhoods with a high share of Black residents "Black neighborhoods" and define these neighborhoods using a cutoff of at least 20 percent Black residents. While not a majority, at this threshold there is a significant Black presence in the neighborhood. In Appendix D we discuss this choice and present results from setting higher thresholds.

[2] Another interpretation of our analysis is that discrimination in the housing market constraints Black households to reside in neighborhoods with a significant share of Black residents, and neighborhoods with a high share of Black residents tend to have low SES.

Such preferences contribute to the broader mechanism of homophily, which is the tendency of people to associate with others who share their characteristics. An empirical literature has studied the importance of racial homophily when preferences for other neighborhood characteristics and frictions to mobility are also taken into account.[3]

When we take these explanations to the data, we draw a clear conclusion in favor of homophily. Surprisingly, wealth has very little power to explain neighborhood sorting patterns. In contrast, Black households living in Black neighborhoods entirely explains the racial gap in neighborhood SES. The racial difference in neighborhood SES is determined by the amount of SES that a Black household must trade off to live with Black neighbors, as measured by the variety of SES available in the Black neighborhoods in their metro.

To study the role of wealth in neighborhood sorting, we combine household-level data from the 2015 Panel Study of Income Dynamics (PSID) with tract-level data from the 2012-2016 American Community Survey (ACS). We then regress a ranking of neighborhood SES on race, income, and wealth. We find no evidence that financial constraints are the reason Black families live in lower-SES neighborhoods than white families with similar incomes.[4] Instead, high-income, high-wealth Black households live in similar-SES neighborhoods as low-income, low-wealth white households. Wealth has almost no predictive power for neighborhood SES within racial groups, nor do we find evidence that Black households live in metros where SES is particulary expensive.

The data instead strongly favor the homophily explanation. Income and wealth are only weakly correlated with sorting into Black neighborhoods, and when residing in non-Black neighborhoods, Black households sort into neighborhoods with similar SES as those of white households with comparable incomes. But a Black household residing in a Black neighborhood is associated with a decline of 33 percentile points in neighborhood SES. As an example, for Black households in the 6th decile of income this translates into living in Census tracts with a mean poverty rate of 22.0 percent when living in Black neighborhoods, compared with 13.5 percent when living in non-Black neighborhoods. The analogous comparison for unemployment rates is 11.5 percent versus 7.0 percent.

Looking at sorting patterns across metros provides further evidence in favor of the homophily explanation. We document the scarcity of high-SES Black neighborhoods and then characterize metros by the variety of neighborhood SES available in neighborhoods with a high share of Black residents. Most metros belong to either the no variety or low variety type, meaning there are exceedingly few neighborhoods that are both high SES and have a high share of Black residents. We provide a basic model of preferences and constraints to show how homophily could interact with supply to generate the racial gap in neighborhood SES. As predicted by the model under an

[3]Some examples from the empirical literature include Bayer et al. (2004, 2007); O'Flaherty and Sethi (2007); Card et al. (2008); Bayer and McMillan (2012); Banzhaf and Walsh (2013); Badel (2015); Caetano and Maheshri (2021, 2022); Caetano and Macartney (2021); Bartik and Mast (2021); and Bayer et al. (2022). There is also a large literature studying homophily in a variety of settings beyond race and residential sorting (McPherson et al. (2001); Jackson (2021)).

[4]Our ranking of neighborhood SES combines labor market outcomes, educational attainment, poverty, and the share of single-headed households.

assumption of strong homophily, we find that the racial gaps in neighborhood SES are largest in low variety metros.

Our findings provide new evidence on the strength of racial homophily in neighborhood sorting. It has been shown that homophily could lead the racial composition of neighborhoods to become more concentrated as Black incomes rise and Black households have to trade off less neighborhood SES to reside with Black neighbors (Bayer et al. (2014); Sethi and Somanathan (2004)). We show that many Black households are already making this choice under the current income distribution, where high-SES Black neighborhoods are rare, meaning that Black households must trade off large amounts of neighborhood SES to reside with Black neighbors. What causes Black households to make this tradeoff? We speculate that avoiding racial hostility is an important component, while pointing to the need for further research.

Our findings are also relevant for thinking about the persistence of racial inequality in dynamic models of sorting. Neighborhood sorting can generate poverty traps (Durlauf (1996); Benabou (1996)) capable of perpetuating racial inequality even in the absence of racial discrimination (Wilson (1987); Aliprantis and Carroll (2018)). The racial composition of neighborhoods is still an important driver of the sorting process in the contemporary US. Future efforts to model racial inequality in a spatial environment will likely need to confront homophily directly as in Badel (2015).

Many public policies have important spatial components, with one prominent example being the housing mobility program (Bergman et al. (2020)). Our results suggest that a race-conscious design is critical for the success of such programs (Aliprantis et al. (2021)). Additionally, moving frictions are a key rationale for place-making policies to support local economies in the face of persistent spatial inequality (Schweitzer (2017), Austin et al. (2018)). Large racial frictions to mobility within cities suggest that more general spatial frictions could also be important (Zabek (2019)).

Finally, our results inform causal interpretations of the racial wealth gap. Wealth could affect labor income or intergenerational transfers through neighborhoods by way of beneficial labor market networks, high-quality public education, or high levels of house price appreciation. The racial wealth gap could perpetuate itself if low wealth prevented households from accessing the high-SES neighborhoods where these mechanisms are predominantly found. We show that wealth is not the fundamental constraint preventing Black households from accessing neighborhoods with SES similar to that of white households. These findings are in line with recent evidence from other studies showing surprisingly weak causal effects of wealth on economic disparities (Kaymak et al. (2020), Black et al. (2020), Bulman et al. (2021), Chetty et al. (2020)).

The remainder of the paper is organized as follows: Section 2 specifies a simple model of neighborhood choice and lists some of its predictions under alternative assumptions about financial constraints, choice sets, and homophily. Section 3 presents evidence on wealth and housing prices acting as financial constraints, and Section 4 presents evidence on the role of homophily in neighborhood sorting. Section 5 concludes.

2 Model

We begin by constructing a simple model of neighborhood choice with neighborhood choice sets that may be non-convex. The model illustrates how the gap in neighborhood SES by race could be generated by either (i) financial constraints or (ii) preferences for same-race neighbors combined with a limited supply of neighborhoods that are both high-SES and high Black share. The model makes testable predictions under cases (i) and (ii) that we take to the data.

Assume a collection $\mathcal{M}$ of metros where for each metro, $M \in \mathcal{M}$, there is a set $\mathcal{J}^M$ of neighborhoods. Household i in metro M is of race Black or White, $R_i \in \{B, W\}$, and chooses where to reside from a feasible set $\mathcal{J}_i^* \subseteq \mathcal{J}^M$. Each neighborhood $j \in J^M$ can be characterized by its socioeconomic status, SES_j, and the share of its residents who are Black, SB_j. Within neighborhoods, units are homogeneous with respect to both quality and price. The price of living in neighborhood j, p_j, is increasing in SES_j though not necessarily SB_j.

A household has indirect preferences, $U^R(SES_j, SB_j)$, over each neighborhood, and preferences are race-specific, U^B and U^W. Let $\frac{dU^R}{dSES} > 0$ for both R. We will say that preferences exhibit *homophily* if U^R is strictly increasing in SB_j when $R_i = B$ and strictly decreasing when $R_i = W$. Preferences over the share of Black residents in a neighborhood could be due to an affinity toward individuals of a given race, unmeasured amenities correlated with the share of Black residents, or a desire to avoid racial hostility.[5] A household has a units of financial resources, which determines the choice set $\mathcal{J}_i^* = f(\mathcal{J}^M, a_i)$.[6]

A household's choice set is also determined by the joint distribution of neighborhood SES and share Black in their metro. In Section 4.3 we use the data to classify metros into one of three types. A no variety metro has nearly no neighborhoods with a high share of Black residents. While there are many more neighborhoods with a high share of Black residents in low variety metros, those neighborhoods only offer low SES. The Black neighborhoods in high variety metros offer a range of SES.

When household utility exhibits homophily the variety of neighborhoods in a metro can greatly alter the pattern of SES choice by income. Figures 2-4 display the neighborhood choices of a Black household when residing in one of the three metro variety types. For simplicity, we assume that in each case the household has sufficient financial resources to afford any neighborhood in their metro. In the no variety metro, the marginal rate of transformation between SES and Black share is very high, and consequently the household chooses a location A with a high SES and low share Black. In a high variety metro, there are many high-SES, high Black share neighborhoods, so the household chooses point D where SES is similar to point A but where the share Black is much

[5] The Sociology literature distinguishes between choice and induced/structural homophily (McPherson and Smith-Lovin (1987); Blau (1977)). The first mechanism we list would be categorized as choice homophily while the latter two mechanisms would fall under induced or structural homophily.

[6] Discrimination in the search for housing (Turner et al. (2013); Christensen and Timmins (2021)) or in mortgage markets (Bhutta et al. (2021); Willen and Zhang (2020)) could also constrain the choice set. Additionally, beliefs about neighborhood dynamics can influence neighborhood choices (Caetano and Maheshri (2021); Bayer et al. (2016); Aliprantis and Carroll (2018)).

higher. The household in the low variety metro, however, faces a non-convex supply constraint. As drawn, the household is indifferent between point C, a high-SES, low Black share point (similar to point A) and point B, a neighborhood with much lower SES but a high share Black. Since these examples are designed to illustrate a concept, what specifically determines the choice between B and C is not important. The intuition from this basic model is that under homophily, the shortage of intermediate neighborhoods produces a severe tradeoff between SES and Black share.

In the case where households do not have preferences over the racial composition of neighborhoods, the households' indifference curves are represented by vertical lines, and each household chooses a neighborhood among those with the highest feasible SES. But in none of the three cases discussed above with homophily does the household choose the highest SES available. This is because the set of neighborhoods in each of the figures requires sacrificing too much Black share to reach the highest level of SES. Note that these figures are drawn to represent the critical features of the data. In every metro the upper rightmost region is empty.[7] If the model with homophily captures the key tradeoff for Black families when they decide where to live in a metro, then we should not only see that conditional on income Black families tend to live in lower SES neighborhoods than white families do, but also that in low variety metros the SES gap is most severe.

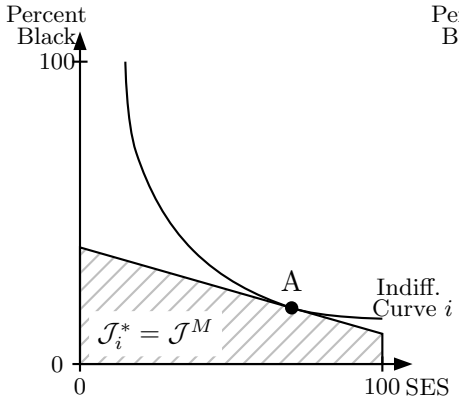


Figure 2: Household i in a No Variety Metro

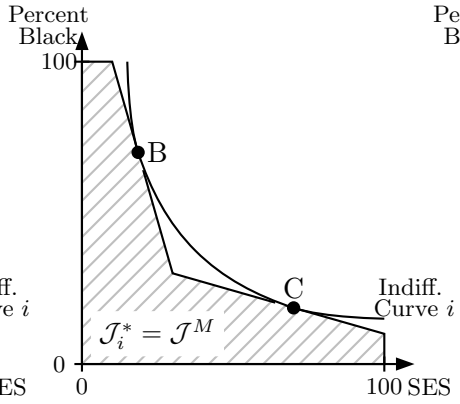


Figure 3: Household i in a Low Variety Metro

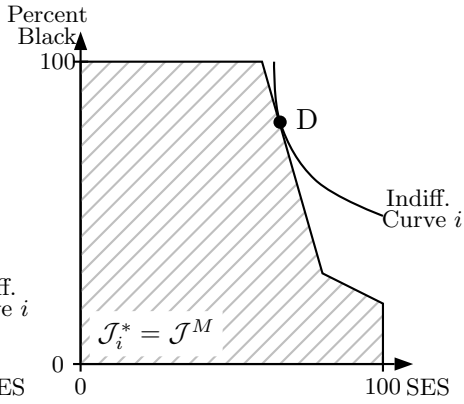


Figure 4: Household i in a High Variety Metro

2.1 Model Predictions

The model above makes predictions that we can test in the data. If homophily is either weak or absent entirely and sorting patterns are driven by financial constraints, then we should observe two things: If sorting patterns are driven by financial constraints in the absence of homophily

1. Black and white households will exhibit similar sorting patterns into SES by financial resources.
2. Black households' level of neighborhood SES will be uncorrelated with metro type.

[7] In contrast, almost every metro has a concentration of extremely low Black share tracts at the highest SES levels.

If, on the other hand, homophily plays a key role in sorting patterns, then we should observe two other things:

3. Black households trading off neighborhood SES to live in neighborhoods with a high share of Black residents;

4. The gap between Black and white households' level of neighborhood SES will vary across metro types. If homophily is strong enough, then the largest gap will be observed in low variety metros.

We show below that Predictions 1 and 2 are refuted by the data, while only Predictions 3 and 4 are consistent with the data.

3 Financial Constraints Driven by Wealth or Prices

As shown in the Introduction, Black and white households with similar incomes live in neighborhoods with very different levels of SES. It is possible that this pattern is the consequence of omitting other financial disparities by race beyond income. Before delving into the supply of neighborhoods by their SES and their racial composition, we first show that the neighborhood SES gap is not explained simply by racial differences in wealth nor by Black families disproportionately living in locations where neighborhood SES is especially expensive. We begin by describing the data used in our analysis.

3.1 Data on Wealth and Prices

We use individual-level survey data from the Panel Study of Income Dynamics (PSID, ISR (2019)). The first part of our analysis features extensive use of the net worth variable provided in the PSID. The constructed net worth variable in the PSID, ER65408, is defined as the sum of total assets net of debt value plus the value of home equity. Total assets are the sum of the values of farm/businesses, checking and savings accounts, real estate holdings other than one's main home, stocks, vehicles, other assets like life insurance policies or rights in a trust, and annuities/IRAs. Debt value is the sum of debt toward farm/businesses, real estate debt for holdings other than one's main home, credit card debt, student loan debt, medical debt, legal debt, loans from relatives, and other debts. We measure income using the total family income variable, ER65349, that is the sum of all taxable income, transfer income, and Social Security income of the head, his/her spouse/partner, and other family members. We prefer this measure of income relative to a labor income variable due to the importance of transfers (Meyer et al. (2019), Meyer and Sullivan (2012)), although our results are qualitatively similar when measuring income using labor income.

We use tract-level data from the 5 percent sample from the 2012-2016 American Community Survey (ACS) of the US Census, obtained from the National Historical Geographic Information System (NHGIS, Manson et al. (2017)). We follow Aliprantis and Richter (2020) and define neighborhood socioeconomic status (SES) in terms of a tract's poverty rate, employment to population

ratio, unemployment rate, high school attainment rate, BA attainment rate, and the share of households with children under 18 that are single-headed.[8] We measure these variables in terms of the percentiles of their national distributions, and then define neighborhood SES as the percentile of the first principal component of these variables. These neighborhood characteristics are strongly correlated with a neighborhood's upward mobility as estimated in Chetty et al. (2018), and are chosen to capture the neighborhood externality mechanisms described in Wilson (1987) and Galster (2019). Appendix A discusses this measure of neighborhood SES in greater detail.

All of our metro-level analyses uses a sample of 54 large metropolitan statistical areas (metros) in the 2012-2016 ACS sample.[9] The sample of metros comprises the 53 largest metros as ranked by population in the 2012-2016 ACS, each having a population of at least 1 million residents, as well as Tulsa, Oklahoma, included due to recent attention given to the history of its Greenwood District.

3.2 Wealth

If the racial gap in neighborhood SES highlighted above is due to the omission of other financial resources, wealth would be a prime suspect for the reasons discussed in the Introduction. To test this hypothesis, we combine our index of neighborhood SES from the 2012-2016 ACS with data from the 2015 wave of the PSID and estimate the following regression:

$$\begin{aligned} SES_i = \quad & \alpha + \alpha^B B_i \quad && + \beta_1 I_i + \beta_2 I_i^2 + \beta_1^B I_i \times B_i + \beta_2^B I_i^2 \times B_i \\ & + \gamma I_i \times NW_i && + \delta_1 NW_i + \delta_2 NW_i^2 + \delta_1^B NW_i \times B_i + \delta_2^B NW_i^2 \times B_i + \varepsilon_i \end{aligned} \tag{1}$$

where the unit i is families, SES_i is neighborhood SES as measured at the tract level, B_i is an indicator for the head of the family being Black versus non-Hispanic white, I_i is total family income, and NW_i is family net worth. To ensure common support, the estimation sample is restricted to families with incomes between the 10th and 90th percentiles of the income distribution within each wealth quintile×race bin. The regression is estimated on the sample of all families in the 2015 PSID with a Black or non-Hispanic white head, and weights are used to obtain all of our PSID estimates.

Table 1 displays estimated regression coefficients for specifications building to Equation 1. The first column shows that on average, households with a Black head live in a neighborhood with SES that is ranked 26 percentile points lower than households with a white head. The second column shows that income explains some of this gap; the coefficient on having a Black head of household falls to 20 percentile points when a quadratic of income is included in the regression. The third column display coefficients that include wealth in the regression, and the fourth column displays coefficients where the coefficients on income and wealth are race-specific. The changes from the second to fourth columns, in terms of coefficients and R^2's, show that wealth is not a fundamental

[8] This measure is designed to capture externalities on labor market outcomes. Some readers may tempted to interpret sorting into a neighborhood with low SES when higher SES neighborhoods are feasible as "irrational." Because other amenities may be present, however, we strongly caution against this interpretation.

[9] Also known as Core-Based Statistical Areas (CBSAs).

explanatory variable in the regressions. The most striking result is that having a Black head of household reduces neighborhood SES ranking between 19 and 22 percentile points – even after conditioning on income and wealth.

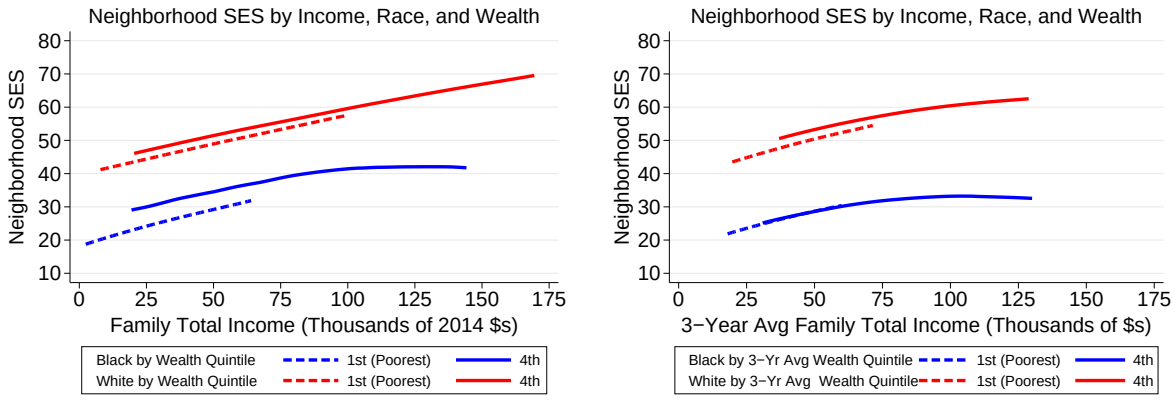
Table 1: Neighborhood SES Regression Coefficients

All Households				
Constant	54.3	38.8	39.6	39.9
	(0.4)	(0.9)	(0.9)	(0.9)
Black Head of Household	–26.4	–19.8	–19.2	–21.8
	(0.9)	(0.9)	(0.9)	(2.0)
Family Income		2.7	2.0	2.0
in $10,000s		(0.2)	(0.2)	(0.2)
Family Income^2		–0.02	–0.02	–0.02
		(0.1)	(0.1)	(0.1)
Family Wealth			1.3	1.2
in $100,000s			(0.01)	(0.1)
Family Wealth^2			–0.01	–0.01
			(0.001)	(0.001)
Family Income×Family Wealth			–0.5	–0.05
			(0.01)	(0.01)
Black×Family Income				0.9
				(0.08)
Black×Family Income^2				–0.1
				(0.1)
Black×Family Wealth				1.6
				(0.9)
Black×Family Wealth^2				–0.01
				(0.03)
R^2	0.12	0.21	0.22	0.22
N		6,600-6,700		

Note: This table reports coefficients from family-level OLS regressions of neighborhood SES ranking on an indicator for having a Black head, a quadratic in income (sometimes interacted with Black head), a quadratic in net worth (sometimes interacted with Black household head), and an interaction of income and net worth. The sample is identical for each regression and is taken from the 2015 PSID and joined with tract-level data from the 2012-2016 ACS.

Figure 5a plots the relation between neighborhood SES and income for Black and White as predicted by the final regression, which includes race-specific quadratics of income and wealth. For purposes of illustration, we show the results for two wealth quintiles: the first and the fourth, which

we will refer to as low- and high-wealth, respectively.[10] Black families tend to live in neighborhoods with much lower SES than their white counterparts with the same income and wealth. Moreover, among households of the same race and similar income there is little difference in SES between those with low-wealth and those with high-wealth, meaning again that wealth differences can explain very little of the SES gap *across* race. Notice that the predicted SES for high-income, high-wealth Black families is just equal to that of low-income, low-wealth white families.



(a) Income and Wealth in One Survey Wave

(b) Income and Wealth in Three Survey Waves

Figure 5: Neighborhood SES by Income, Race, and Wealth

Note: This figure reports results from a family-level OLS regression of neighborhood SES ranking on an indicator for having a Black head, a quadratic in income (interacted with Black head), a quadratic in net worth (interacted with Black household head), and an interaction of income and wealth. Note that results are reported in this figure by income and wealth rankings, but the estimation uses raw measures of income and wealth. The sample is taken from the 2015 PSID and joined with tract-level data from the 2012-2016 ACS. The left panel shows results when income and wealth are measured with the responses from the 2015 wave of the survey, and the right panel shows results when income and wealth are measured as the average over three waves of the survey, 2011, 2013, and 2015.

Two measurement issues are important for the interpretation of Figure 5a. The first measurement issue has to do with transitory fluctuations in income and wealth. Note that the difference in predicted SES between wealth groups is a bit wider for Black households, as represented by the gaps between the solid and dashed lines in Figure 5a. This could indicate that white households can better access credit. While plausible, we believe this difference between wealth groups is more likely attributable to Black families facing larger transitory income fluctuations (Ganong et al. (2020), Darity et al. (2019)). First, if tighter credit constraints were the cause, we would expect the gap between high- and low-wealth Black families to be larger at low levels of income and then narrow as income increased. Second, when we attempt to smooth income fluctuations by using a three-year average of income and wealth, the difference vanishes, as shown in Figure 5b.

A second measurement issue is that the small coefficient on wealth in our regression could be driven in part by attenuation bias from the PSID potentially measuring wealth with error. There are several reasons we are doubtful that measurement error is the main driver of this result. First, while the PSID is a self-reported survey, it has been designed carefully to measure wealth accu-

[10] Although estimation uses raw measures of both income and wealth, Figure 5a focuses on two quintiles of wealth for clarity of exposition.

rately (Pfeffer and Griffin (2017)).[11] The PSID matches the distribution of wealth in the Survey of Consumer Finances (SCF) below the top 1.5 percent of income (Heathcote et al. (2010)), allowing our analysis to cover large areas of the wealth distribution that should matter for neighborhood choices. Second, there is a non-trivial coefficient on income, and we know that there is also measurement error in income due the underreporting in large national surveys, especially in the tails of the distribution (Sullivan (2020); Meyer et al. (2021); Bollinger et al. (2019)). Third, if measurement error were contributing to our results, we should find a larger coefficient when measuring wealth as the average over three survey waves. Figure 5b shows this is not the case. Fourth, Golosov et al. (2021) similarly find that wealth shocks have weak effects on neighborhood choices. And fifth, the strength of our subsequent results on an alternative mechanism driving neighborhood sorting is consistent with a very limited effect of wealth on neighborhood sorting.

Appendix B explores some additional details of the data and documents the robustness of our result that wealth does not predict neighborhood SES after conditioning on income and race.

3.3 The Price of Neighborhood SES

Differential metro-level prices of neighborhood SES is another potential racial difference not captured by income which could explain neighborhood sorting patterns. High housing price to income ratios are found mostly in urban areas (Murray and Schuetz (2018)), and Black households are over-represented in urban counties relative to suburban counties (Parker et al. (2018)).

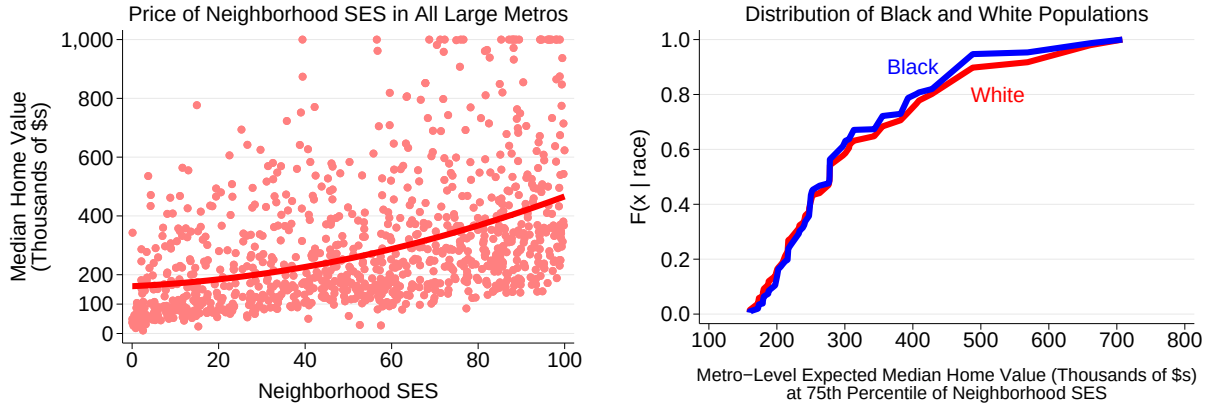
Here we show that the neighborhood SES gap is not a consequence of Black families disproportionately residing in metros where SES is more expensive. We measure the price of housing using median home values rather than rents due to the related issues of missing data and the low supply of rental units in high-SES tracts (Aliprantis et al. (2021)). In most metros, the price of housing increases as a function of SES, but not steeply, and the positive correlation between the price of housing and SES is not so strong as to eliminate "affordable" high-SES neighborhoods. The general relationship between price and neighborhood SES is illustrated in Figure 6a as a scatter plot of a random sample of 1,000 tracts from the 54 large metros in our sample. The displayed quadratic function of neighborhood SES is estimated on all tracts in our sample of large metros by an OLS regression.[12] The metro-level average (population-weighted) R^2 of median home value and a quadratic function of neighborhood SES is 0.22.

Digging into the metro-level data shows that Figure 6a does not mask heterogeneity in housing prices in the metros where Black households are more likely to reside. To measure the price of neighborhood SES at the metro level, we first estimate metro-specific regressions of median home values on a quadratic function of neighborhood SES, where we top code home values at $1 million to reduce the influence of extreme outliers. We then compute the expected median home value in each metro for a tract at the 75th percentile of neighborhood SES, and use this home value to order

[11] A definitional issue that could also matter is that Black households are less likely to have access to wealth through bequests or intervivos transfers (Thompson and Sablehaus (2022); Bhutta et al. (2020)).

[12] We abstract from the dimension of housing unit quality, which itself can generate important neighborhood effects (Ioannides and Zabel (2003), Brock and Durlauf (2001)).

the price of neighborhood SES in our metros. Figure 6b shows that Black and white households are distributed in metros with similar housing price-neighborhood SES elasticities. To the extent that there is any difference in the price of neighborhood SES faced by Black and white households due to the metros in which they reside, the lower prices are actually faced by Black households. The blue Cumulative Distribution Function (CDF) representing Black households is slightly above the red CDF in the right tail of the distribution where prices are highest, indicating that fewer Black households than white households reside in the most expensive metros.



(a) Median Home Value

(b) Black and White Populations

Figure 6: Neighborhood SES and the Price of Housing

Note: The left panel illustrates the price of neighborhood SES by plotting a random sample of 1,000 tracts from our sample of 54 large metros in the 2012-2016 ACS. Median home values are top-coded at $1 million in the scatter plot and in the estimation of the displayed quadratic function of neighborhood SES. The right panel displays the CDF of the Black and white populations in those metros over the metro-level expected home value in a neighborhood at the 75th percentile of SES, obtained via metro-specific OLS quadratic regressions of median home value on neighborhood SES.

We have shown that the large gap in neighborhood SES between Black and white households at all levels of income is not a consequence of omitting differences in wealth; and there is no evidence that it is the consequence of Black families disproportionately residing in metros with relatively high prices of SES. Combined with the large coefficient on race in equation 1, this evidence suggests an alternative explanation for why Black and white households of similar incomes live in different SES neighborhoods that takes race into account.

4 Homophily and Supply Constraints

An alternative explanation for neighborhood sorting patterns is that Black households have a preference for neighborhoods with a higher share of Black residents.[13] Such racial homophily could be due to an affinity for Black people, local amenities correlated with racial composition, or a desire to avoid racial hostility in neighborhoods with few Black residents. In the literature

[13]It is certainly possible the white households have an analogous preference white neighborhoods, though this need not be the case for this explanation to hold since white families do not face anything near the same degree of supply restrictions.

studying the importance of racial homophily in neighborhood sorting, our results are most consistent with findings that household characteristics explain relatively little of Black-white segregation (Bayer et al. (2004); Bayer and McMillan (2005)) and that Black households are willing to trade off neighborhood SES to reside with Black neighbors (Bayer et al. (2014); Sethi and Somanathan (2004)). New from our analysis are the results that wealth is not the source of omitted variable bias, and that Black households trade off not just some, but very large amounts of neighborhood SES to reside with Black neighbors.

4.1 Data on Homophily and Supply Constraints

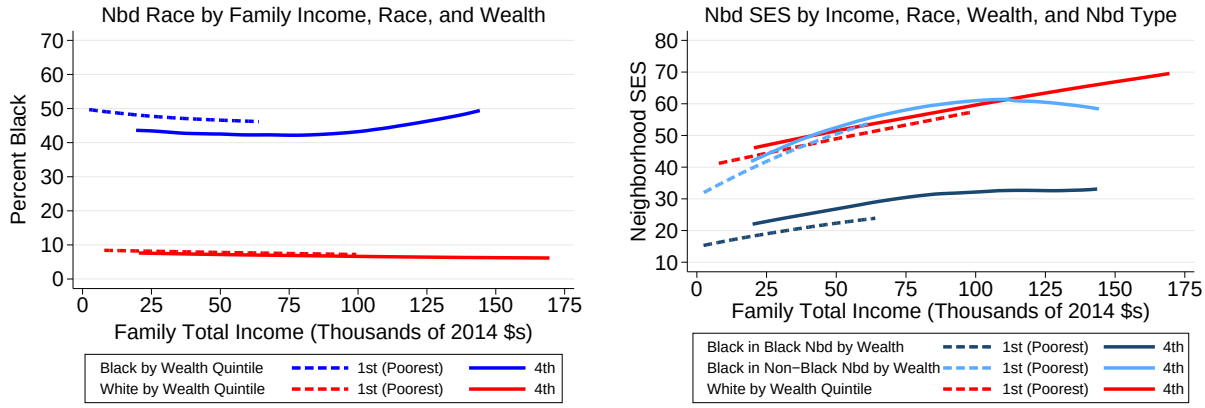
We examine tract-level outcomes by household income quintiles or deciles. Although the tract-level NHGIS data only provide counts of households that have incomes within bins, we can obtain counts of households in approximate income quintiles and deciles by matching the NHGIS bins to the appropriate cutoffs of the household income distribution in the individual-level 2012-2016 ACS data from the Integrated Public Use Microdata Series (IPUMS-USA, Ruggles et al. (2018)). The person-weighted household income deciles in terms of thousands of dollars in the IPUMS-USA 2012-2016 ACS data are $(-\infty, 17), [17, 29), [29, 41), [41, 53), [53, 67), [67, 83), [83, 103), [103, 132), [132, 193), [193, \infty)$, and we map these to the NHGIS bins as $[-\infty, 15), [15, 30), [30, 40), [40, 50), [50, 60), [60, 75), [75, 100), [100, 125), [125, 200), [200, \infty)$. We calculate statistics for Black and non-Hispanic white households in the deciles and quintiles defined by these cutoffs.

We define several variables to characterize the neighborhoods in each metro. We define a neighborhood as being "Black" if at least 20 percent of its residents are Black. Appendix D explores the robustness of our results to cutoffs of 30 or 50 percent Black, finding that results are robust when using a 30 percent cutoff but break down for the 50 percent cutoff, due to the fact that there are so few high-SES neighborhoods with more than 50 percent Black residents.

4.2 Sorting Patterns at the National Level

We begin the empirical analysis with additional evidence against the ability of financial constraints in explaining the gap in neighborhood SES between Black and white households. If financial constraints were driving neighborhood sorting patterns in the absence of homophily, we should observe fewer Black households sorting into Black neighborhoods as their income and wealth increases. We do not find evidence of differential sorting into Black neighborhoods by income or wealth. We estimate an analogue to Equation 1 where the dependent variable is the share of Black residents rather than SES. Figure 7a shows the results: High-wealth Black households sort into neighborhoods with the same high share of Black residents as low-wealth Black households. Similarly, low-wealth white households sort into neighborhoods with the same (lower) share of Black residents as high-wealth white households. The share of Black residents in one's neighborhood is only weakly related to income; among wealth, income, and race, a household's race is the only

variable strongly predictive of the share of Black residents in one's neighborhood, with the gap between Black and white households being 42 percentage points.



(a) Neighborhood Racial Composition

(b) Neighborhood SES

Figure 7: Neighborhood Sorting

Note: The left panel reports results from a family-level OLS regression of neighborhood SES on an indicator for having a Black head, a quadratic in income (interacted with Black head), a quadratic in net worth (interacted with Black household head), and an interaction of income and wealth, where the sample of Black families is split by whether they live in a Census tract that is at least 20 percent Black. The sample is taken from the 2015 PSID and joined with tract-level data from the 2012-2016 ACS. The right panel shows the distribution of neighborhood SES conditional on household income decile, race, and, for Black households, whether they live in a Census tract that is at least 20 percent Black. The sample comprises tract-level data from the 2012-2016 ACS. The right panel shows results from a family-level OLS regression of neighborhood racial composition on an indicator for having a Black head, a quadratic in income (interacted with Black head), a quadratic in net worth (interacted with Black household head), and an interaction of income and wealth. The sample is taken from the 2015 PSID and joined with tract-level data from the 2012-2016 ACS.

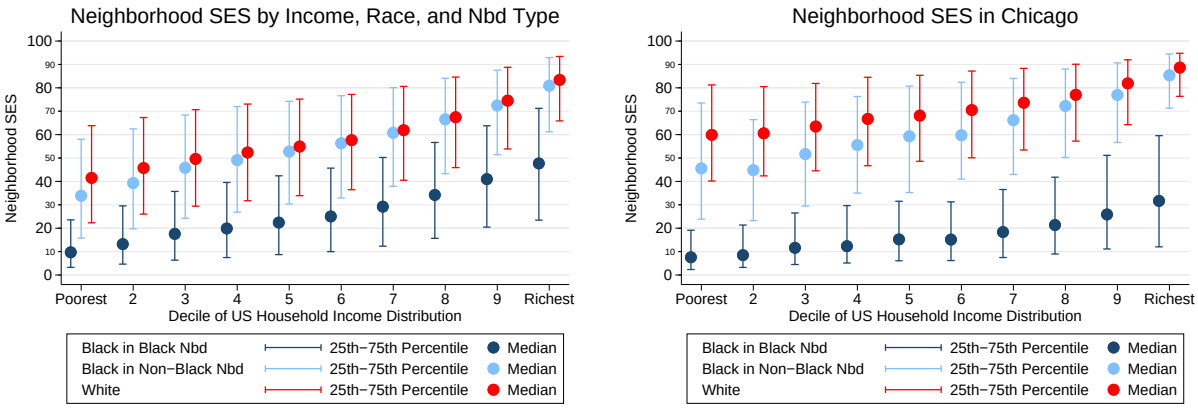
If Black households are compelled to live in predominantly Black neighborhoods, whether by preference, force, or habit, then the scarcity of high-SES Black neighborhoods would cause Black households to reside in low-SES neighborhoods. Indeed, we find that Black households sorting into Black neighborhoods explains the racial gap in neighborhood SES.

Figure 7b shows that conditional on income and wealth, Black households residing in non-Black neighborhoods sort into neighborhoods of SES comparable to their white counterparts, while Black households residing in Black neighborhoods sort into neighborhoods of significantly lower SES ranking than those of their white counterparts. These results are from estimating a version of Equation 1 that conditions on whether a Black household is residing in a Black neighborhood.

With our results focusing attention away from wealth as an explanatory variable, we turn to Census data and conduct a more detailed analysis of income, race, and neighborhood composition. Figure 8a presents the results. We estimate the 25th, 50th, and 75th percentiles of Black and white households' neighborhood SES, conditional on their income decile and, for Black households, whether they reside in a Black neighborhood. At all income levels, the racial gap in neighborhood SES can be explained by Black households residing in Black neighborhoods.

The national sorting pattern documented in Figure 8a is not simply an artifact of aggregating to the national level. The gap in neighborhood SES is still explained by Black households sorting into Black neighborhoods when the analysis is conducted at the metro-level. Figure 8b shows the case

of Chicago (Appendix F shows the analogous figure for each metro.). At high incomes in Chicago, living in a Black neighborhood almost entirely explains the gap in Black and white neighborhood SES conditional on income. At lower levels of income Chicago, living in a Black neighborhood explains most of that gap.



(a) Neighborhood SES

(b) Neighborhood Racial Composition

Figure 8: Neighborhood Sorting

Note: The left panel reports results from a family-level OLS regression of neighborhood SES on an indicator for having a Black head, a quadratic in income (interacted with Black head), a quadratic in net worth (interacted with Black household head), and an interaction of income and wealth, where the sample of Black families is split by whether they live in a Census tract that is at least 20 percent Black. The sample is taken from the 2015 PSID and joined with tract-level data from the 2012-2016 ACS. The right panel shows the distribution of neighborhood SES conditional on household income decile, race, and, for Black households, whether they live in a Census tract that is at least 20 percent Black. The sample comprises tract-level data from the 2012-2016 ACS.

We note that the neighborhood sorting patterns documented here are not driven by our measure of neighborhood SES. Results identical to those in Figure 8a are obtained when measuring neighborhood SES in terms of a Census tract's homicide rate or intergenerational income ranking (Appendix B.5).

Given the predictive power of residing in a Black neighborhood, we characterize which Black households live in Black neighborhoods and the tradeoff this outcome represents. Table 2 presents the results from a linear probability model where the dependent variable is an indicator for residing in a Black neighborhood and the sample is families with a Black head. The constant terms is 0.79, and most age or family composition variables have small and/or statistically insignificant coefficients. One economically significant coefficient is for educational attainment: Relative to a high school dropout, a family whose head holds a BA is 10 percentage points less likely to reside in a Black neighborhood. In the multivariate regression, this is the same change associated with an extra $500,000 in wealth. The largest expected difference in the probability of living in a Black neighborhood is associated with having a non-Black spouse; the associated decrease is 45 percentage points with a white spouse.

Table 2: Coefficients from a Linear Probability Model of Residing in a Black Neighborhood

Families with a Black Head							
Constant	0.79	Age<30	–	HS Dropout	–	No Spouse	–
	(0.03)						
Family Income	–0.07	Age in 30s	0.05	GED	–0.04	Black Spouse	0.04
in $1,000,000s	(0.21)		(0.03)		(0.03)		(0.02)
Family Wealth	–0.20	Age in 40s	–0.01	HS	–0.02	White Spouse	–0.45
in $1,000,000s	(0.03)		(0.03)		(0.02)		(0.04)
Family Size	0.00	Age in 50s	0.03	BA	–0.10	Other Race Spouse	–0.15
	(0.01)		(0.03)		(0.03)		(0.11)
Children in Family	–0.03	Age in 60s	0.02				
	(0.03)		(0.03)				
Home owner	–0.02	Age in 70s+	0.02				
	(0.02)		(0.03)				
R^2	0.07	N	3,100-3,200				

Note: This table reports coefficients from a family-level linear probability model OLS regression of an indicator for residing in a Black neighborhood, or one in which at least 20 percent of residents are Black. The sample is taken from the 2015 PSID and joined with tract-level data from the 2012-2016 ACS.

Under the assumption that these sorting patterns reflect preferences, the compensating differential is simply the difference in neighborhood SES between those Black-headed households in Black and non-Black neighborhoods. Figure 9 plots the compensating differential for the medians in each income decile; this is the difference between the light blue and dark blue dots in Figure 8a. The actual tradeoff faced by households is about 30 percentile points of neighborhood SES, which is considerably larger than the 22 percentile points that is implied by the regression coefficient on a Black household head reported in Table 1. To put the 30 percentile point gap in SES into perspective, the median Black households in the 6th decile of household income living in a Black and non-Black neighborhood live in neighborhoods with, respectively, unemployment rates of 10.3 and 6.3 percent; poverty rates of 20.2 and 11.1 percent; and BA attainment rates of 19.7 and 29.2 percent.

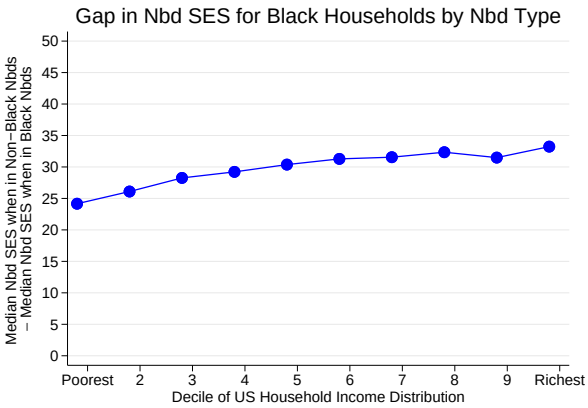


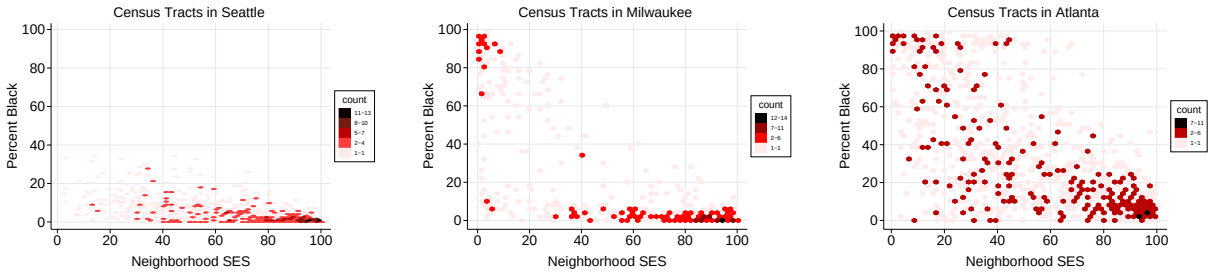
Figure 9: Compensating Differential in Terms of Neighborhood SES
Note: This figure shows the difference, conditional on household income decile, in the neighborhood SES of the median Black household in a neighborhood that is non-Black (<20 percent) versus Black (≥20 percent). This figure uses tract-level data from the 2012-2016 ACS/NHGIS.

4.3 Sorting Patterns across Metros

Not all combinations of neighborhood SES and share Black are available in a given metro, regardless of financial constraints. In particular, high-SES Black neighborhoods are extremely rare in most large metros in the US (Bayer et al. (2014); Bayer and McMillan (2005); Bayer et al. (2021)).

We categorize metros into three discrete types based on the variety of SES among the neighborhoods that have a high share of Black residents: no variety, low variety, and high variety. Figure 10 shows an example of each type. A no variety metro (e.g., Seattle) has zero tracts with a share of residents that is over 50 percent Black, and the vast majority of its tracts are under 20 percent Black. A low variety metro (e.g., Milwaukee) is one with a considerable number of tracts with a high share of Black residents but where those tracts are almost entirely low-SES. The distribution of tracts in these metros have a sort of 'L' or 'winged' shape where there are many low-SES, high-Black share tracts; many tracts with low-Black share and a range of SES; and very little in-between. Finally, a high variety metro (e.g., Atlanta) has a mixture of tracts at different combinations of share Black and SES. Relative to a low variety metro, a high variety metro will have a more densely populated intermediate region offering a range of SES within majority Black tracts. High variety metros usually feature some tracts with both above median SES and over 80 percent share Black.

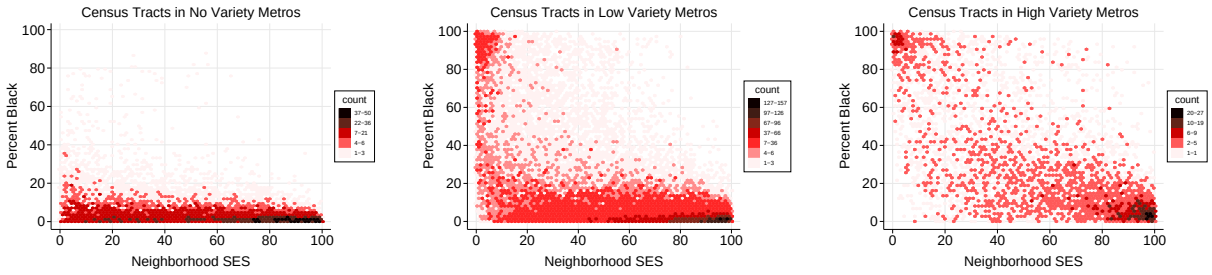
We apply these definitions to metros as follows: We measure the percentage of tracts in a metro that are under 20 percent Black, and define a metro as no variety if at least 90 percent of its tracts meets this criterion. We measure the percentage of tracts in a metro that are both over 20 percent Black and ranked over the 20th percentile in neighborhood SES, and define a metro as high variety if at least 20 percent of its tracts meets these criteria. All other metros are low variety metros. Appendix E shows the joint distribution of neighborhood SES and share Black for each individual metro, grouped by types.



(a) No Variety (b) Low Variety (c) High Variety

Figure 10: The Joint Distribution of Neighborhood SES and Share Black, Three Examples
Note: This figure shows the joint distribution of neighborhood SES and percentage Black for tracts in three metros in the 2012-2016 ACS.

Figure 11 shows these distributions aggregated by metro type. The neighborhoods in no variety metros are nearly all less than 20 percent Black. The Black neighborhoods in low variety metros, especially those tracts with more than 50 percent of residents being Black, are almost entirely low SES. The Black neighborhoods in high variety metros, however, exhibit a range of SES, including for tracts with more than 50 percent of residents being Black.



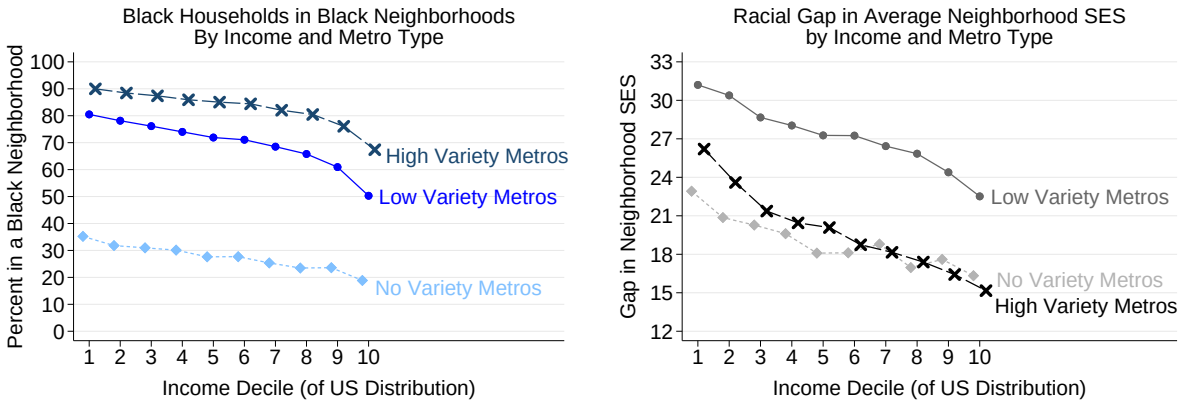
(a) No Variety (b) Low Variety (c) High Variety

Figure 11: The Joint Distribution of Neighborhood SES and Share Black, by Metro Type
Note: This figure shows the joint distribution of neighborhood SES and percentage Black for tracts in three mutually exclusive groups of metros defined in the text. The left panel shows the sample of *No Variety* metros comprising Phoenix, Riverside, Seattle, San Diego, Denver, San Antonio, Portland, Sacramento, Austin, San Jose, Providence, Salt Lake City, Tucson, and Tulsa. The middle panel shows the sample of *Low Variety* metros comprising New York City, Los Angeles, Chicago, Dallas, Houston, Miami, Philadelphia, Boston, San Francisco, Detroit, Minneapolis, Tampa Bay, St. Louis, Orlando, Pittsburgh, Las Vegas, Cincinnati, Kansas City, Columbus, Cleveland, Indianapolis, Nashville, Milwaukee, Jacksonville, Oklahoma City, Louisville, Hartford, Birmingham, Buffalo, Rochester, and Grand Rapids. The right panel shows the sample of *High Variety* metros comprising DC, Atlanta, Baltimore, Charlotte, Virginia Beach, Memphis, Raleigh, Richmond, and New Orleans.

Under the assumption that households have a preference for higher SES neighbors and no homophily, the simple model makes two predictions about the sorting patterns we should observe across metros. First, similarly low shares of Black households would live in Black neighborhoods in both no variety and low variety metros. Second, the gap in neighborhood SES between Black and white households would have no relationship with metro type, or the variety of SES among high share Black neighborhoods in a metro. Figure 12 presents clear rejections of these predictions from the data.

Figure 12a shows that a much higher share of Black households live in Black neighborhoods in

low variety metros than in no variety metros. This indicates that when given the chance to live in low-SES neighborhoods with Black neighbors, many Black households of all income levels will choose to do so over living in a much higher SES neighborhood with non-Black neighbors. Indeed, these preferences are confirmed in Figure 12b, which documents that two predictions from the model under strong homophily are found in the data. First, the highest racial gaps in neighborhood SES are in metros with a low variety of SES among their Black neighborhoods, so that Black households must trade off larger amounts of neighborhood SES in such metros in order to reside next to Black neighbors. Many Black households are willing to make such a tradeoff. Second, we also see that the racial gap in neighborhood SES is smaller in high variety metros than it is in low variety metros.



(a) Black Households in Black Neighborhoods

(b) Racial Gap in Neighborhood SES

Figure 12: Neighborhood Sorting by Income, Race, and Metro Type

Note: The left panel displays the percentage of Black households in a neighborhood that is 20 percent Black or more by income decile and metro type. The right panel displays the racial gap in average neighborhood SES by income decile and metro type. Both panels use data from the 2012-2016 ACS. The difference between low variety metros and no variety or high variety metros in these figures is always highly statistically significant. When the regressions for these figures are run for each decile (a linear probability model for being in a Black neighborhood or predicting neighborhood SES) with full interactions between race and metro type, F-tests of equality between the coefficient on low variety metros with those on either no or high variety metros all yield p-values below 0.0001.

This final result is important for understanding how our analysis builds on the results from Bayer et al. (2014). Consistent with their analysis, we find that sorting into a Black neighborhood is highest in high variety metros (Figure 12a). But the finding that the gap in neighborhood SES is larger in low variety metros than in high variety metros (Figure 12b) is somewhat surprising. This means that the mechanism proposed in Bayer et al. (2014) is even stronger than originally supposed. It is not only the case that Black households are willing to trade off some neighborhood SES to reside around Black neighbors, but that Black households are willing to trade off very large amounts of neighborhood SES to reside around Black neighbors.

5 Conclusion

This paper documented new facts about neighborhood sorting in the US. It was previously known that Black and white households of similar incomes live in neighborhoods with different

levels of socioeconomic status (SES). It was also previously known that the racial composition of neighborhoods affects location choices. What was not known before this paper was whether wealth or the price of neighborhood SES were omitted variables that could explain racial differences in neighborhood SES, and the extent to which racial composition affects African Americans' neighborhood SES.[14] We have shown that financial constraints related to wealth or the price of housing do not explain neighborhood sorting by income and race, and that race is a central determinant of the neighborhood externalities experienced by African Americans. Future research will be needed to quantify the relative importance of psychological costs and benefits, white flight, and racial discrimination in the housing market.

Our results focus attention on the tradeoff Black households face between their neighborhood's racial composition and its SES.[15] While previous studies have considered this tradeoff, the strength of the tradeoff does not seem to be fully appreciated, whether in terms of the low variety of neighborhood SES in Black neighborhoods available in most metros, or in terms of the large quantities of neighborhood SES that Black households trade off to reside around other Black households. A seemingly natural question is: Why do Black households hold these preferences?

While our results could be driven by several mechanisms, they have drawn our attention to the psychological costs of being "Black in white space" (Anderson (2022)). The psychological costs of living in predominantly-white neighborhoods are large enough for many African Americans to outweigh any educational, labor market, or safety benefits they might experience due to living in a higher-SES neighborhood. Interpreted in terms of this mechanism, our results provide one way of quantifying how costly it is for Black people to interact with white people. As suggested here at the level of neighborhoods, and in other studies at the levels of schools and workplaces (Fletcher et al. (2020), Ananat et al. (2020), Hellerstein and Neumark (2008)), making "white spaces" more welcoming for Black people appears to be important not only for psychological comfort, but also for achieving racial equality in economic opportunity.

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[14]The nearest published results on wealth of which we are aware are in Woldoff and Ovadia (2009), Crowder et al. (2006), and Freeman (2000); the nearest related results on the supply of high-SES Black neighborhoods are in Bayer and McMillan (2005) and Bayer et al. (2014); and the nearest published results on stated race preferences are in Ihlanfeldt and Scafidi (2002) and Vigdor (2003). Bayer et al. (2021) study similar questions as our paper in an analysis that also does not include wealth.

[15]Our results could also be framed in terms of the preferences of white households; see Ellen (2000) or De la Roca et al. (2014) for related discussions.

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Appendix to
"What Explains Neighborhood Sorting by Income and Race?"

Dionissi Aliprantis Daniel Carroll Eric Young

A Measuring Neighborhood SES

There are reasons to exercise caution when focusing on a single dimension to characterize neighborhood SES (Chetty et al. (2020)). Important neighborhood characteristics are not perfectly collinear, and this can generate surprising implications for sorting patterns. An important example is that Black low-poverty neighborhoods in Moving to Opportunity (MTO) cities looked like white high-poverty neighborhoods in terms of characteristics such as educational attainment, unemployment, and the share of single-headed households (Aliprantis and Kolliner (2015)).

With this consideration in mind, we discuss our measure of neighborhood SES. To begin, note that each of the variables we use in our measure of neighborhood SES is motivated by Wilson (1987)'s original discussion of the mechanisms driving neighborhood effects. These mechanisms include the concentration of poverty generating social isolation (Chapter 2); the importance of educational attainment in the face of secular changes in the labor market (Chapter 2); the importance of Black males' labor market outcomes such as employment and participation in terms of role models and household formation (Chapters 2 and 3); and the importance of single-headed households in driving child poverty (Chapter 3). A more recent discussion of related mechanisms can be found in Chapter 8 of Galster (2019).

Figure 1 and Table 1 show that if we were to summarize the neighborhood variables poverty rate, high school graduation rate, BA attainment rate, employment-to-population ratio, unemployment rate, and share of single-headed households, a principal components analysis would indicate that these variables can be summarized by a univariate index. In other words, it appears reasonable to focus on the first principal component of these variables alone, and to define this univariate index as neighborhood SES. Table 2 shows that the coefficients on the variables are relatively similar.

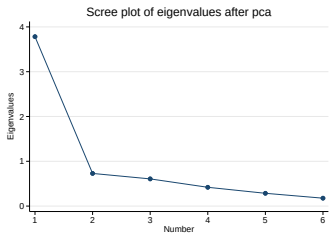


Figure 1: Scree Plot of Eigenvalues

Table 1: Percent of Variance Explained

Principal Component	Marginal Contribution of Single Vector	Cumulative
1st	64	64
2nd	12	76
3rd	10	86
4th	7	92
5th	5	97
6th	3	100

Note: See the text for further details.

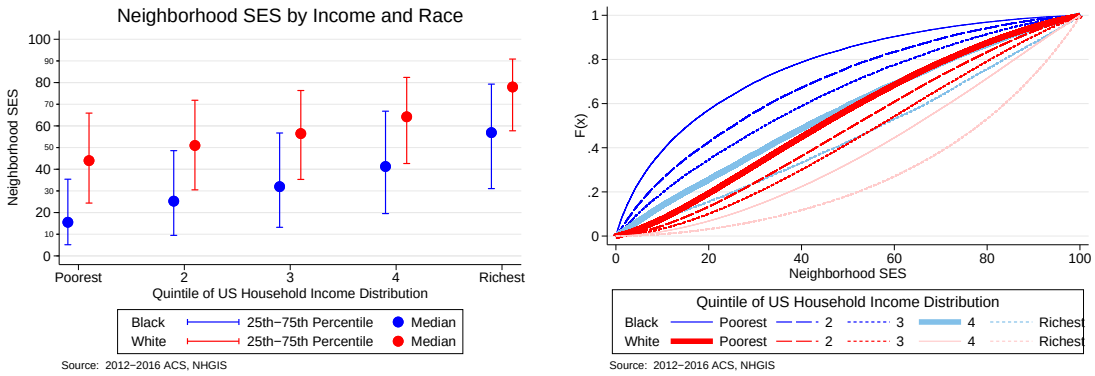
Table 2: Coefficient for First Principal Component

Characteristic	Princ Comp	Characteristic	Princ Comp
Poverty Rate	0.45	Emp-to-Pop Ratio	0.35
HS Grad Rate	0.44	Unemp Rate	0.39
BA Attainment Rate	0.43	Share Single-Headed HHs	0.39

Note: See the text for further details.

It is important to be mindful that our measure of neighborhood SES will sometimes miss in its univariate summary of a multivariate world, as well as the fact that many criteria would define neighborhood externalities in terms of additional neighborhood characteristics. Nevertheless, we find our univariate index to be a useful abstraction; it summarizes information in a way that allows us to conduct an analysis in terms of the types of neighborhood effects discussed in Wilson (1987).

Figure 2 uses the NHGIS data to replicate the result from the literature that neighborhood SES is lower for Blacks than whites at all levels of income (Pattillo (2005), Logan (2011), Reardon et al. (2015)). Note that the gap is large enough so that high-income Black households live in neighborhoods with characteristics similar to those of low-income white households. Whites in the first (poorest) quintile of household income live in neighborhoods of similar SES to those of Blacks in the fourth quintile of household income.



(a) Neighborhood SES

(b) CDFs

Figure 2: Household Income and Neighborhood SES in the 2012-2016 ACS, by Race

B Robustness: The 2015 Wave of the PSID

It might come as a surprise to find that wealth only weakly predicts neighborhood SES after conditioning on race and income. There are several reasons we might see such a result that are not related to the explanation that neighborhood sorting is driven by race and income.

For this reason we now consider the robustness of our result that sorting into neighborhood SES is not driven by wealth once income and race are taken into account. We first present evidence on whether our result is driven by family composition of our sample, assumptions about how to measure neighborhood SES, or the functional form assumptions made about the relationship between SES and family characteristics. We also look at issues related to measuring wealth.

B.1 Family Composition

One possibility is that Black households in the 4th quintile of wealth are older, less likely to have children than their white counterparts, or less likely to be homeowners. We test this possibility by estimating versions of Equation 1 on our estimation sample that also include a quadratic in the age of the head of the household, a dummy for the presence of children 18 or younger, a dummy for homeownership, and each of these controls. These estimates are shown in Table 3, with there being two main findings. The first is that the coefficient on having a Black head of household is stable, and the second is that the R^2 does not increase after including the additional controls. Both of these findings indicate that the main results in the text are not driven by compositional issues across race.

Table 3: Neighborhood SES Regressions

Black Head of Household	–21.8	–21.2	–21.0	–22.7	–21.5	–21.2
	(2.0)	(2.0)	(2.0)	(2.1)	(2.1)	(4.7)
Child $\leq$ 18 in Household		X			X	
Quadratic in Age of Head			X		X	
Rent/Own Dummy				X	X	
'11+'13+'15 Avg I, NW						X
R^2	0.22	0.22	0.23	0.23	0.23	0.17

We run a similar set of regressions where the dependent variable is the percentage of Black residents in the household's neighborhoods, where again we progressively add a quadratic in the age of the head of the household, a dummy for the presence of children 18 or younger, a dummy for homeownership, and each of these controls. These estimates are shown in Table 4, with there again being two main findings. The first is that the coefficient on having a Black head of household is stable, and the second is that the R^2 does not increase after adding more controls. Both of these findings indicate that the main results in the text are not driven by compositional issues across race.

Table 4: Racial Composition Regressions

Black Head of Household	41.5	41.5	41.2	41.1	41.0
	(1.3)	(1.3)	(1.3)	(1.4)	(1.4)
Child $\leq$ 18 in Household		X			X
Quadratic in Age of Head			X		X
Rent/Own Dummy				X	X
R^2	0.46	0.46	0.46	0.46	0.46

B.2 Measuring Neighborhood SES

We also investigate whether one variable in our neighborhood SES index is by itself driving our results. Table 5 shows the coefficient on the Black indicator when Equation 1 is estimated with SES_i measured as each individual component of our index.

No single variable drives our results on the relationship between neighborhood SES, race, income, and wealth. Most of the neighborhood characteristics yield results similar to the penalty of 22 percentile points in neighborhood SES ranking for having a Black family head. The coefficient on the Black indicator is –20 percentile points or more for the poverty rate, unemployment, and the share of single-headed household; –16 percentile points for the employment-to-population ratio and the share of high school graduates; and smallest in magnitude for the BA attainment rate at –12 percentile points. These results are not surprising given the relatively even coefficients across characteristics under our definition of SES (Table 1 in Appendix A), and the relatively higher value given to the educational attainment of neighbors is consistent with the recent hedonic results in Bishop and Murphy (2019).

Table 5: Neighborhood Characteristic Regressions

Coefficient on Black Household Head for Percentile of	Coefficient	s.e.
Poverty Rate	–19.5	(2.1)
Share of Single-Headed HHs	–25.6	(2.1)
Unemployment Rate	–23.0	(2.2)
Employment-to-Population Ratio	–15.8	(2.3)
HS Attainment Rate	–16.0	(2.1)
BA Attainment Rate	–11.9	(2.2)

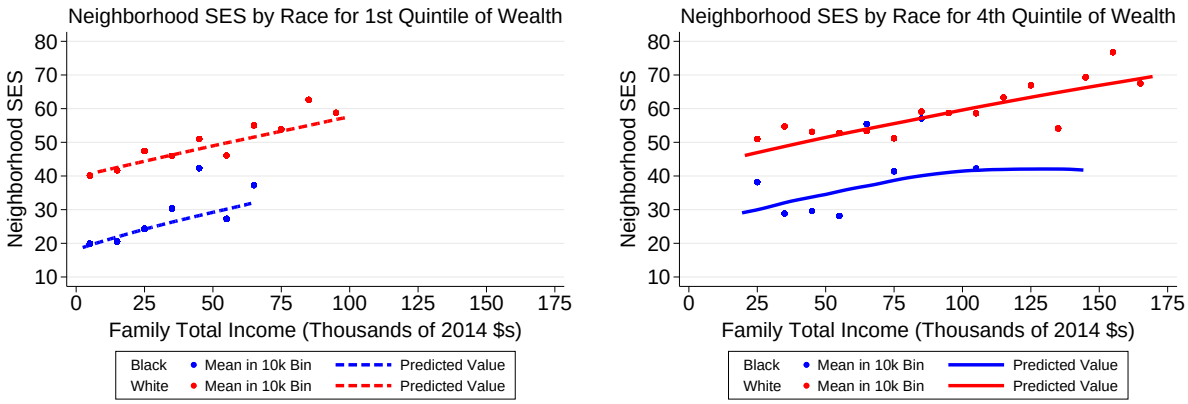
B.3 Functional Form Assumptions

Another possibility is that Black families with high wealth actually do sort into higher-SES neighborhoods than those without wealth, but that this relationship is blurred by the limited number of high-income and high-wealth Black families we observe in the data. As highlighted in

Barsky et al. (2002), this could mean that our results are being driven by functional form assumptions over the parts of the income and wealth distribution where there is not common support between Black and white households.

Figure 3 presents evidence on this issue by showing means within $10,000 income bins by race and wealth quintile. Figure 3b shows the area of concern for having a limited sample size, high-income and high-wealth Black families. Each $10,000 income bin with a dot shown has at least 15 families to prevent indirect data disclosure. When the cell size is decreased to 10 families, which is not shown here, we see that the variance of neighborhood SES for high-income, high-wealth Black families is higher than it is for their white counterparts. However, the relationship characterized by the curve in Figure 3b accurately characterizes the mean relationship. Most importantly, there remains a clear gap between means across Black- and white-headed families that are high income and high wealth.

Related analyses using the propensity score to relax functional form assumptions imposed by OLS regression (Imbens (2015)), both to impose common support (Heckman et al. (1998)) and to conduct nearest neighbor matching, produce similar results.



(a) 1st Quintile of Wealth

(b) 4th Quintile of Wealth

Figure 3: Neighborhood SES by Income and Race, 2015 PSID

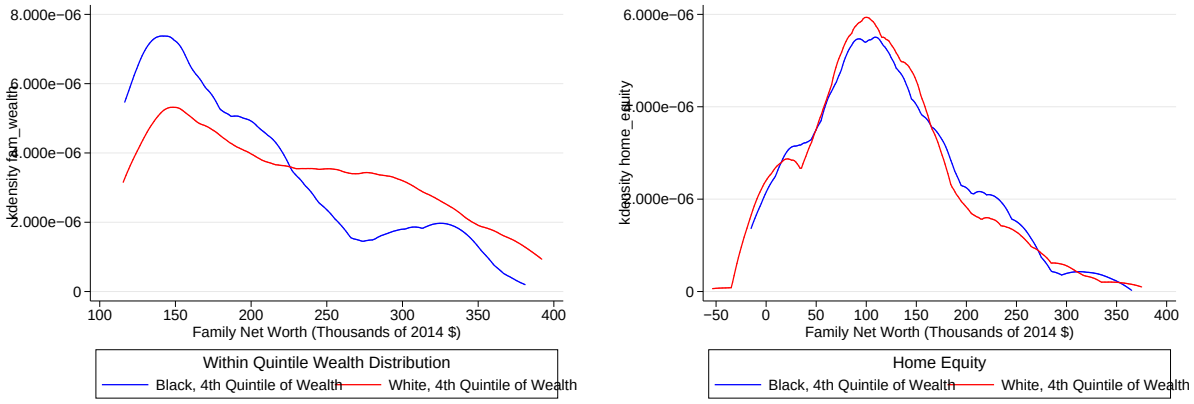
B.4 Measuring Wealth

Turning to the issue of measuring wealth, net worth might be less informative for a family's credit constraints than either total assets or liquid wealth. Two households with identical net worth but different levels of total assets, and therefore debt, might have different access to credit, just based on past access. Similarly, two households with identical net worth but different levels of liquid wealth have different needs for credit. We measure total assets as net worth plus total debt, and we measure liquid wealth as the sum of two asset classes; checking/savings accounts and stocks. We do not show the results here, but the qualitative results are almost identical regardless of whether we measure wealth as net worth, total assets, or liquid wealth.

It could also be the case that families within quintiles of wealth are too heterogeneous to be

compared, especially across race. Figure 4a shows the distribution of wealth across race in the 4th quintile of wealth, which we use as our high-wealth category. The means for Black and white families are, respectively, $155,000 and $180,000.

One might also suspect that high-wealth households of different races make different investments in home equity, and that this is somehow driving neighborhood sorting patterns. Figure 4 shows that the distribution of home equity is very similar for Black- and white-headed families in the 4th wealth quintile. Homeownership rates are very high among the 4th wealth quintile, and the rates are (statistically) identical by race.



(a) Net Worth

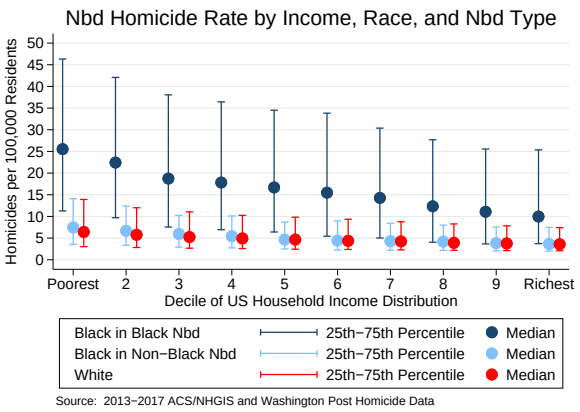
(b) Home Equity

Figure 4: Net Worth and Home Equity by Income and Race, 2015 PSID

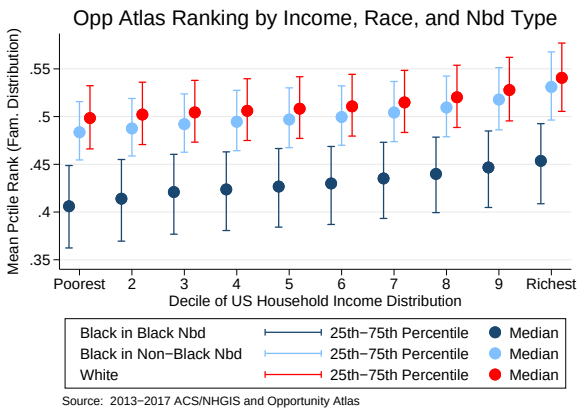
B.5 Alternative Measures of Neighborhood SES

We employ two data sets that include alternative measures of neighborhood SES. For tract-level homicide rates, we use data from the Washington Post Unsolved Homicide Database (Rich et al. (2018)). This database contains criminal homicides that occurred between 2007 and 2017 in the main county or counties of 55 of the largest American cities, and we are able to calculate tract-level homicide rates because the database contains the exact coordinates of each killing. For intergenerational mobility, we use publicly-available estimates from the Opportunity Atlas (Chetty et al. (2018)). The tract-level estimates we use are the average child's household income percentile when growing up in a household with median-income.

Figures 5a and 5b show that the neighborhood sorting patterns documented here are not driven by our measure of neighborhood SES. Identical results obtain when measuring neighborhood externalities in terms of a Census tract's homicide rate (Appendix Figure 5a) or intergenerational income coefficient (Appendix Figure 5b). These results indicate that our measure of neighborhood SES is generating meaningful results, given the importance of exposure to violence for outcomes (Aliprantis (2017), Sharkey and Friedson (2019)) and the importance of racial segregation for intergenerational income mobility (Andrews et al. (2017)).



(a) Homicide Rate



(b) Intergenerational Correlation of Income

Figure 5: Alternative Measures of Neighborhood Externalities

Note: Both panels show the distribution of neighborhood SES conditional on household income quintile, race, and, for Black households, whether they live in a Census tract that is at least 20 percent Black. The left panel measures neighborhood SES using the tract-level homicide rate calculated from the Washington Post Unsolved Homicide Database and the right panel measures neighborhood SES using the tract-level intergenerational family income ranking estimated for 50th income percentile parents in the Opportunity Atlas pooled over race and gender as measured in 2014-2015 (ie, kfr_pooled_pooled_p50).

C Robustness: The 1989 Wave of the PSID

In order to test whether our result reflects a new trend in sorting due to the Great Recession, we replicate the previous analysis using the 1990 decennial Census together with the 1989 wave of the PSID. We find almost identical results to those using the 2012-2016 ACS and 2015 wave of the PSID: In the 1989 wave of the PSID wealth had little role in sorting into neighborhood SES once race and income are accounted for.

Table 6 shows results from estimating Equation 1 using the 1990 decennial Census and the 1989 wave of the PSID, where the estimation sample is all families in the 1989 PSID with a Black or non-Hispanic white head. To impose common support, the sample is restricted to families with incomes between the 10th and 90th percentiles of the within-wealth-quintile Black income distribution. The coefficient on Black head of household is –25, which indicates that Black families live in neighborhoods that are ranked, on average, 25 percentile points lower than those of white families. Figure 6 displays these results graphically.

Table 6: Neighborhood SES Regression, 1989 PSID

All Households			
Constant	40.7	Black Head of Household	–25.1
	(1.2)		(2.1)
Family Income	5.1	Black×Family Income	–1.6
in $10,000s	(0.6)		(1.5)
Family Income^2	–0.2	Black×Family Income^2	0.2
	(0.07)		(0.2)
Family Wealth	3.7	Black×Family Wealth	3.3
in $100,000s	(0.5)		(1.9)
Family Wealth^2	–0.06	Black×Family Wealth^2	–0.05
	(0.01)		(0.04)
		Family Income×Family Wealth	–0.3
			(0.07)
R^2	0.29	N	4,400-4,500

Tables 7 and 8 again investigate whether differences in family composition or homeownership can explain the main results in the 1989 PSID. We again find that the coefficient on Black head of household is stable and that explanatory power does not increase when adding these covariates.

Table 9 shows the coefficient on the Black indicator when Equation 1 is estimated with SES_i measured as each individual component of our index. Again for the 1989 wave, just as we saw in the 2015 wave of the PSID, no single variable drives our results on the relationship between neighborhood SES, race, income, and wealth. Most of the neighborhood characteristics yield results similar to the penalty of 25 percentile points in neighborhood SES ranking for having a Black family head.

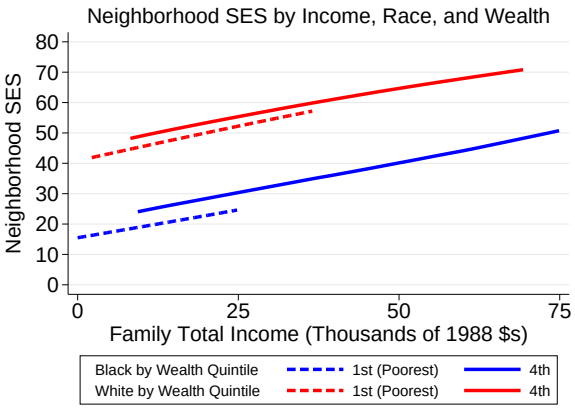


Figure 6: Neighborhood SES by Income, Race, and Wealth, 1989 PSID

Table 7: Neighborhood SES Regressions, 1989 PSID

Black Head of Household	–25.1	–22.5	–26.0	–24.9	–23.0
	(2.1)	(2.1)	(2.1)	(2.2)	(2.2)
Child $\leq$ 18 in Household		X			X
Quadratic in Age of Head			X		X
Rent/Own Dummy				X	X
R^2	0.29	0.29	0.29	0.29	0.31

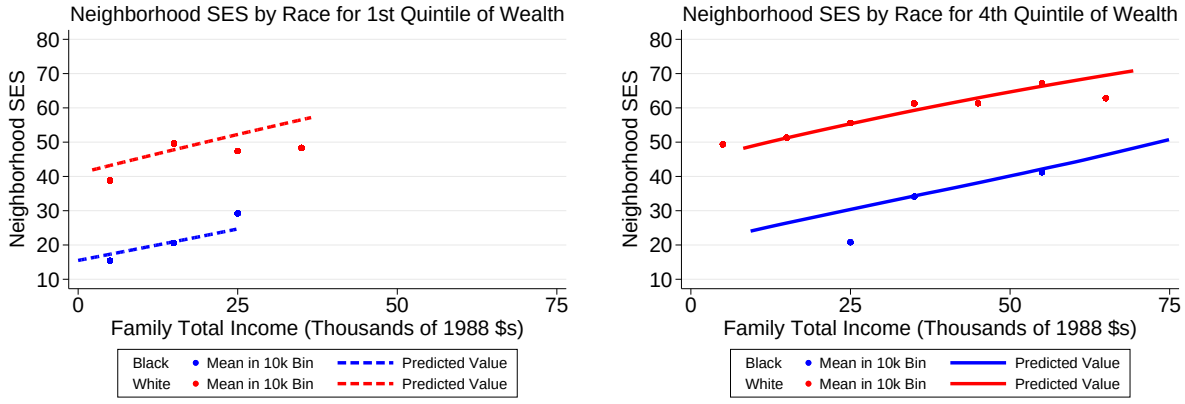
Table 8: Racial Composition Regressions, 1989 PSID

Black Head of Household	56.5	56.7	56.8	56.4	57.0
	(1.3)	(1.4)	(1.4)	(1.4)	(1.4)
Child $\leq$ 18 in Household		X			X
Quadratic in Age of Head			X		X
Rent/Own Dummy				X	X
R^2	0.61	0.61	0.61	0.61	0.61

Table 9: Neighborhood Characteristic Regressions, 1989 PSID

Coefficient on Black Household Head for Percentile of	Coefficient	s.e.
Poverty Rate	–24.4	(2.1)
Share of Single-Headed HHs	–25.4	(2.1)
Unemployment Rate	–27.8	(2.1)
Employment-to-Population Ratio	–22.7	(2.2)
HS Attainment Rate	–22.5	(2.1)
BA Attainment Rate	–16.4	(2.2)

Turning to the possibility that the relationship between race, income, wealth, and neighborhood SES is blurred by the limited number of high-income and high-wealth Black families we observe in the data, Figure 7 shows means within $10,000 income bins by race and wealth quintile. Figure 7b shows the area of concern for having a limited sample size, high-income and high-wealth Black families. Each $10,000 income bin with a dot shown has at least 15 families to prevent indirect data disclosure. When the cell size is decreased to 10 families, which is not shown here, we see that the variance of neighborhood SES for high-income, high-wealth Black families is higher than it is for their white counterparts. However, the relationship characterized by the curve in Figure 7b accurately characterizes the mean relationship.

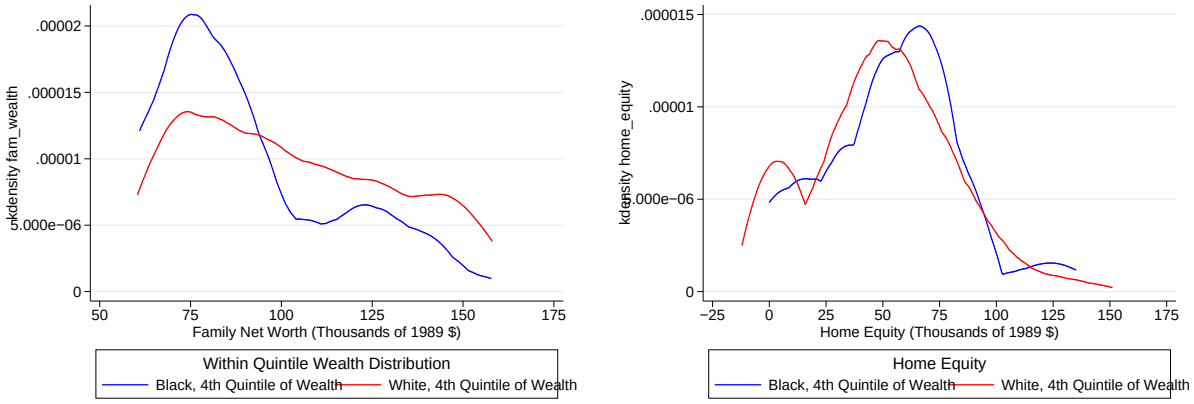


(a) 1st Quintile of Wealth

(b) 4th Quintile of Wealth

Figure 7: Neighborhood SES by Race, Income, and Wealth, 1989 PSID

Figure 8a shows again that within wealth quintile differences in wealth across race are unlikely to drive our results. Homeownership rates are very high among the 4th wealth quintile and (statistically) identical across race. Figure 8b shows that in the 1989 wave of the PSID, just as in the 2015 wave, home equity was very similar across race in the 4th quintile of wealth.



(a) Net Worth

(b) Home Equity

Figure 8: Net Worth and Home Equity by Race, Income, and Wealth, 1989 PSID

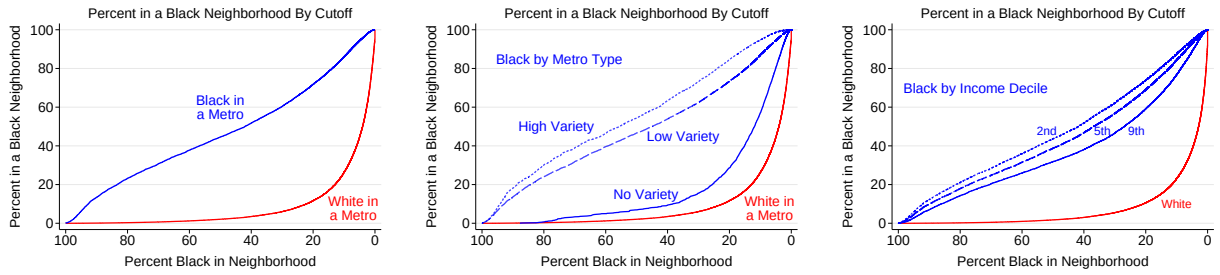
D The Cutoff for Defining Black Neighborhoods: Discussion and Robustness

D.1 Discussion

Figure 9 presents Cumulative Distribution Functions (CDFs) that allow one to determine the percent of residents in a given group that would be residing in a Black neighborhood under various cutoffs used to define what is a Black neighborhood.

Figure 9a starts the conversation on why we prefer a cutoff of 20 percent Black as defining Black neighborhoods. This figure shows that if one defines a Black neighborhood as one in which 10, 20, 30, 40, or 50 percent of households are Black, then in our sample of large metros the percentage of Black households residing in a Black neighborhood would be, respectively, 86, 72, 60, 52, and 45. A 20 percent cutoff captures the neighborhoods where a clear majority of Black households reside.

Moving beyond Figure 9a, we think an analysis focused on Black neighborhoods defined as those being 40 or 50 percent Black or greater would be missing an important share of the tradeoffs Black households are making between the SES of their neighborhood and its share of Black residents. We consider 20 or 30 percent Black residents to be reasonable cutoffs for defining a Black neighborhood to capture these tradeoffs. Our primary reasoning on this point comes from the metro-level choice sets shown in Appendix E. Some findings from the literature that we think further support this view include: Card et al. (2008)'s finding of tipping points in the range of 5 to 20 percent minority between 1970 and 2000; Blair (2017)'s finding that the mean tipping point in metros increased to 35 percent minority by 2010; Ellen (2000)'s finding that 10 percent is an inflection point for the willingness of Black residents to move into a neighborhood; Caetano and Maheshri (2022)'s finding that 20 percent Black is a stable equilibrium for schools; and the Gautreaux program's definition of neighborhood eligibility in terms of a cutoff of 30 percent Black (Polikoff (2006)).



(a) By Race Alone (b) By Metro Type (c) By Income Decile

Figure 9: Neighborhood Sorting by Race, Income, Metro Type, and the Cutoff for a Black Nbd

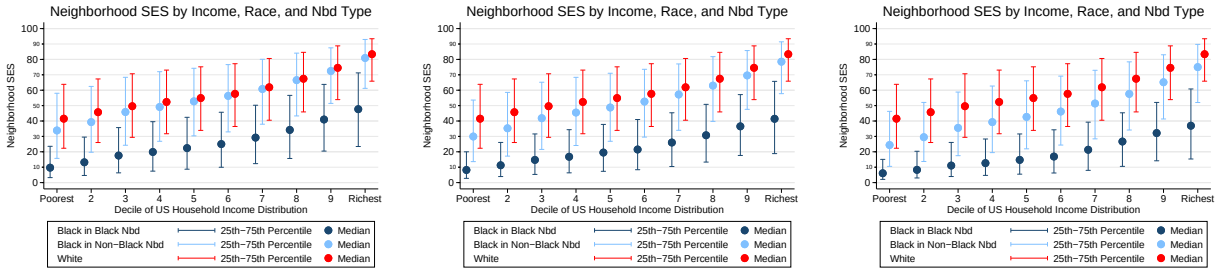
Black households live in neighborhoods with a much higher share of Black residents than white households whenever such neighborhoods are available. Figure 9b shows that Black households live in neighborhoods with a similar share of Black residents, regardless of whether they live in metros where Black neighborhoods offer a high or low variety of SES. Black households live in

neighborhoods with a much more similar share of Black residents compared to white households when they reside in no variety metros, or metros in which there are very few Black neighborhoods at all.

Even at high levels of income, Black households live in neighborhoods with a much higher share of Black residents than white households. Figure 9c shows that nationally, 11 percent of white households live in a neighborhood that is 20 percent Black or more. For Black households in the 2nd, 5th, and 9th income deciles of the US income distribution, this percentage is, respectively, 74, 69, and 59.

D.2 Robustness of Key Results

Figure 10 shows sorting into neighborhood SES conditional on race, income, and residing in a Black neighborhood under various cutoffs used to define a Black neighborhood. The share of the racial gap in neighborhood SES explained by sorting into a Black neighborhood declines as one defines a Black neighborhood in terms of a higher share of Black residents. Nevertheless, our result that Black households sorting into a Black neighborhood explains the racial gap in neighborhood SES is robust across definitions, especially in the range we consider to be most reasonable for reasons discussed above.

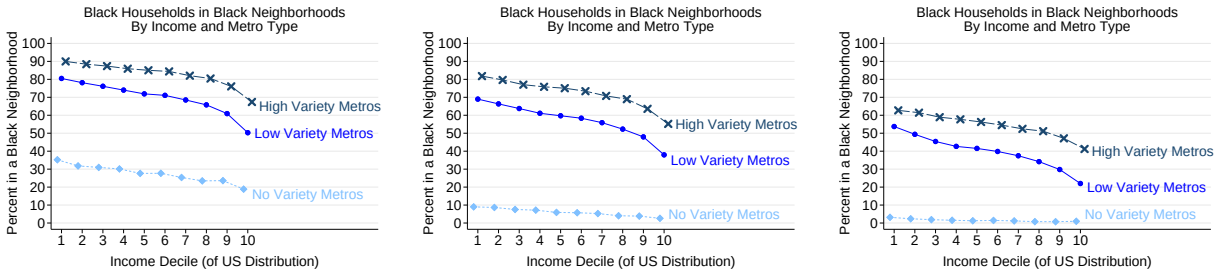


(a) ≥20% Black (b) ≥30% Black (c) ≥50% Black

Figure 10: Neighborhood Sorting by the Cutoff for a Black Neighborhood

Figures 11 and 12 show outcomes when metro type is defined in terms of neighborhoods with 20, 30, or 50 percent Black. The cutoff for quality remain the same, at 20, across definitions of metro types. The percentages of tracts in a metro used in the text change, though. In this exercise we order metros by their percentages in the no and high variety regions, and then select the top metros to match the number chosen when using the 20 percent Black definition.

Figure 11 again shows the result that Black households live in Black neighborhoods whenever such neighborhoods are available. While the levels change depending on the cutoff, the gap between no variety metros versus high and low variety metros remains regardless of the cutoff used to define Black neighborhoods.

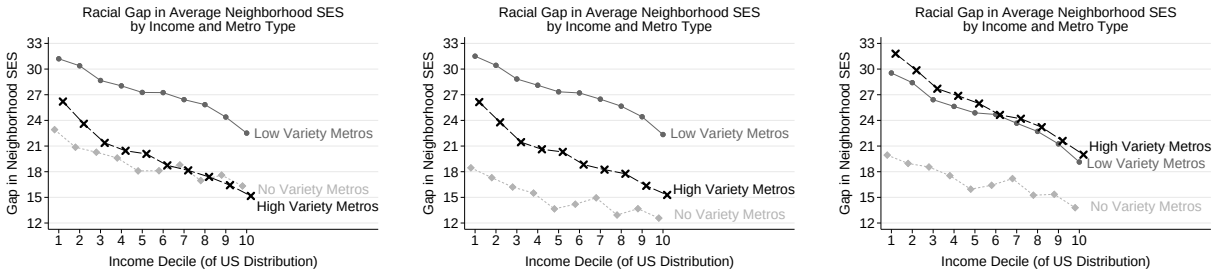


(a) ≥20% Black (b) ≥30% Black (c) ≥50% Black

Figure 11: Neighborhood Sorting by Income, Race, Metro Type, and Cutoff for Black Neighborhood

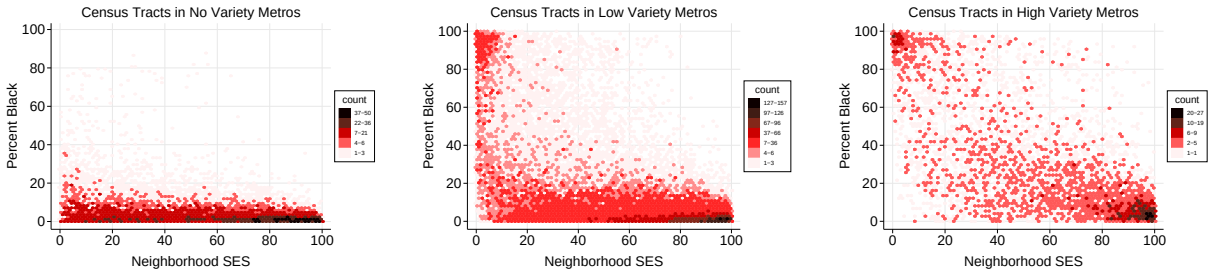
Figure 12 shows that our result of the largest gaps being in low variety metros is robust to a cutoff of 20 or 30 percent Black defining a Black neighborhood. Figure 12c, however, shows that high variety metros have larger gaps in neighborhood SES when using a cutoff of 50 percent to define Black neighborhoods.

Figures 13-15 help to illustrate another reason why we think a cutoff of 50 is too high for defining Black neighborhoods, as it would focus attention away from the neighborhood tradeoffs that we believe are the focus of our analysis. These figures show the join distributions of neighborhood SES and percent Black by metro type depending on the cutoff used to define Black neighborhoods. The figure notes for each figure lists the metros included in each type under each cutoff, with bolded and underlined metros denoting changes relative to the 20 percent cutoff. When the cutoff for defining Black neighborhoods is raised to 50 percent, New York City, Detroit, and Birmingham replace Charlotte and Raleigh, and New Orleans. Looking at the metro-level distributions of New York City, Detroit, and Birmingham in Appendix E, it is not surprising that each is defined as a low variety metro when the cutoff is 20. The result is therefore to be expected that raising the cutoff to 50 results in a higher share of tracts in high variety metros that are below the 20th percentile in SES and less than 50 percent Black.



(a) ≥20% Black (b) ≥30% Black (c) ≥50% Black

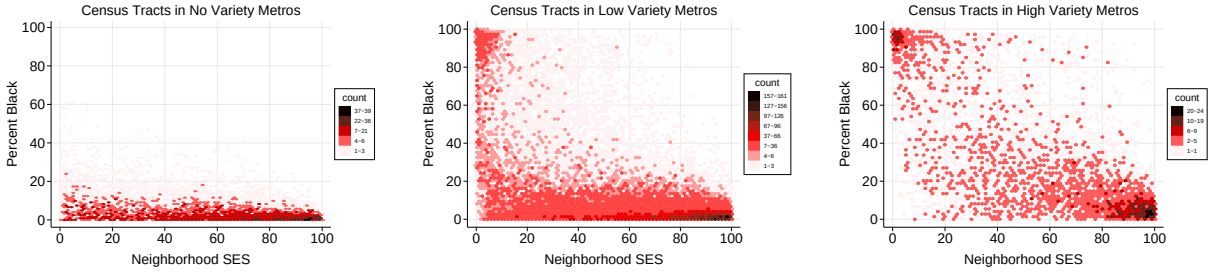
Figure 12: Gap in Neighborhood SES by Income, Race, Metro Type, and Cutoff for Black Nbd



(a) No Variety (b) Low Variety (c) High Variety

Figure 13: Distributions by Metro Type when the Cutoff for Black Neighborhood is 20% Black

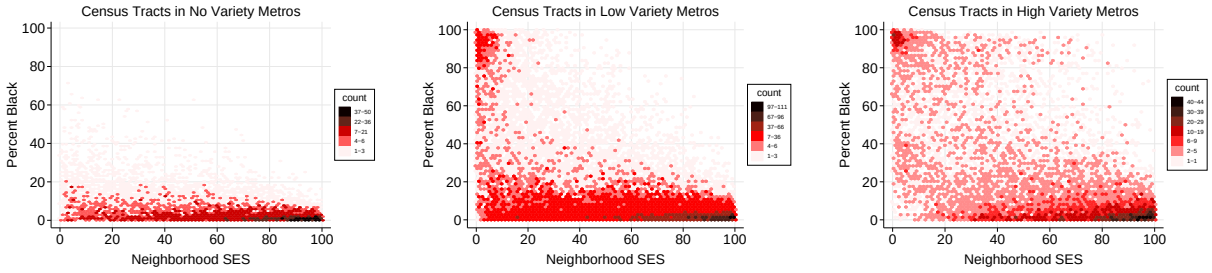
Note: This figure shows the joint distribution of neighborhood SES and percentage Black for tracts in three mutually exclusive groups of metros defined in the text. The left panel shows the sample of *No Variety* metros comprising Los Angeles, Phoenix, Riverside, Seattle, San Diego, Denver, San Antonio, Portland, Sacramento, Austin, San Jose, Providence, Salt Lake City, Tucson, and Tulsa. The middle panel shows the sample of *Low Variety* metros comprising New York City, Chicago, Dallas, Houston, Miami, Philadelphia, Boston, San Francisco, Detroit, Minneapolis, Tampa Bay, St. Louis, Orlando, Pittsburgh, Las Vegas, Cincinnati, Kansas City, Columbus, Cleveland, Indianapolis, Nashville, Milwaukee, Jacksonville, Oklahoma City, Louisville, Hartford, Birmingham, Buffalo, Rochester, and Grand Rapids. The right panel shows the sample of *High Variety* metros comprising DC, Atlanta, Baltimore, Charlotte, Virginia Beach, Memphis, Raleigh, Richmond, and New Orleans.



(a) No Variety (b) Low Variety (c) High Variety

Figure 14: Distributions by Metro Type when the Cutoff for Black Neighborhood is 30% Black

Note: This figure shows the joint distribution of neighborhood SES and percentage Black for tracts in three mutually exclusive groups of metros defined in the text. The left panel shows the sample of *No Variety* metros comprising Phoenix, Riverside, Seattle, San Diego, Denver, San Antonio, Portland, Sacramento, **Las Vegas**, Austin, San Jose, Providence, Salt Lake City, and Tucson. The middle panel shows the sample of *Low Variety* metros comprising New York City, **Los Angeles**, Chicago, Dallas, Houston, Miami, Philadelphia, Boston, San Francisco, Detroit, Minneapolis, Tampa Bay, St. Louis, Orlando, Pittsburgh, Cincinnati, Kansas City, Columbus, Cleveland, Indianapolis, Nashville, Milwaukee, Jacksonville, Oklahoma City, **Raleigh**, Louisville, Hartford, Buffalo, Rochester, and **Tulsa**. The right panel shows the sample of *High Variety* metros comprising DC, Atlanta, Baltimore, Charlotte, Virginia Beach, Memphis, Richmond, New Orleans, and **Birmingham**.



(a) No Variety (b) Low Variety (c) High Variety

Figure 15: Distributions by Metro Type when the Cutoff for Black Neighborhood is 50% Black

Note: This figure shows the joint distribution of neighborhood SES and percentage Black for tracts in three mutually exclusive groups of metros defined in the text. The left panel shows the sample of *No Variety* metros comprising San Francisco, Riverside, Seattle, Minneapolis, San Diego, Denver, San Antonio, Portland, Sacramento, Las Vegas, Austin, San Jose, Providence, Salt Lake City, and Tucson. The middle panel shows the sample of *Low Variety* metros comprising Los Angeles, Chicago, Dallas, Houston, Miami, Philadelphia, Boston, Phoenix, Tampa Bay, St. Louis, Charlotte, Orlando, Pittsburgh, Cincinnati, Kansas City, Columbus, Cleveland, Indianapolis, Nashville, Milwaukee, Jacksonville, Oklahoma City, Raleigh, Louisville, New Orleans, Hartford, Buffalo, Rochester, Grand Rapids, and Tulsa. The right panel shows the sample of *High Variety* metros comprising New York City, DC, Atlanta, Detroit, Baltimore, Virginia Beach, Memphis, Richmond, and Birmingham

E Metro-Level Neighborhood Sorting and Choice Sets

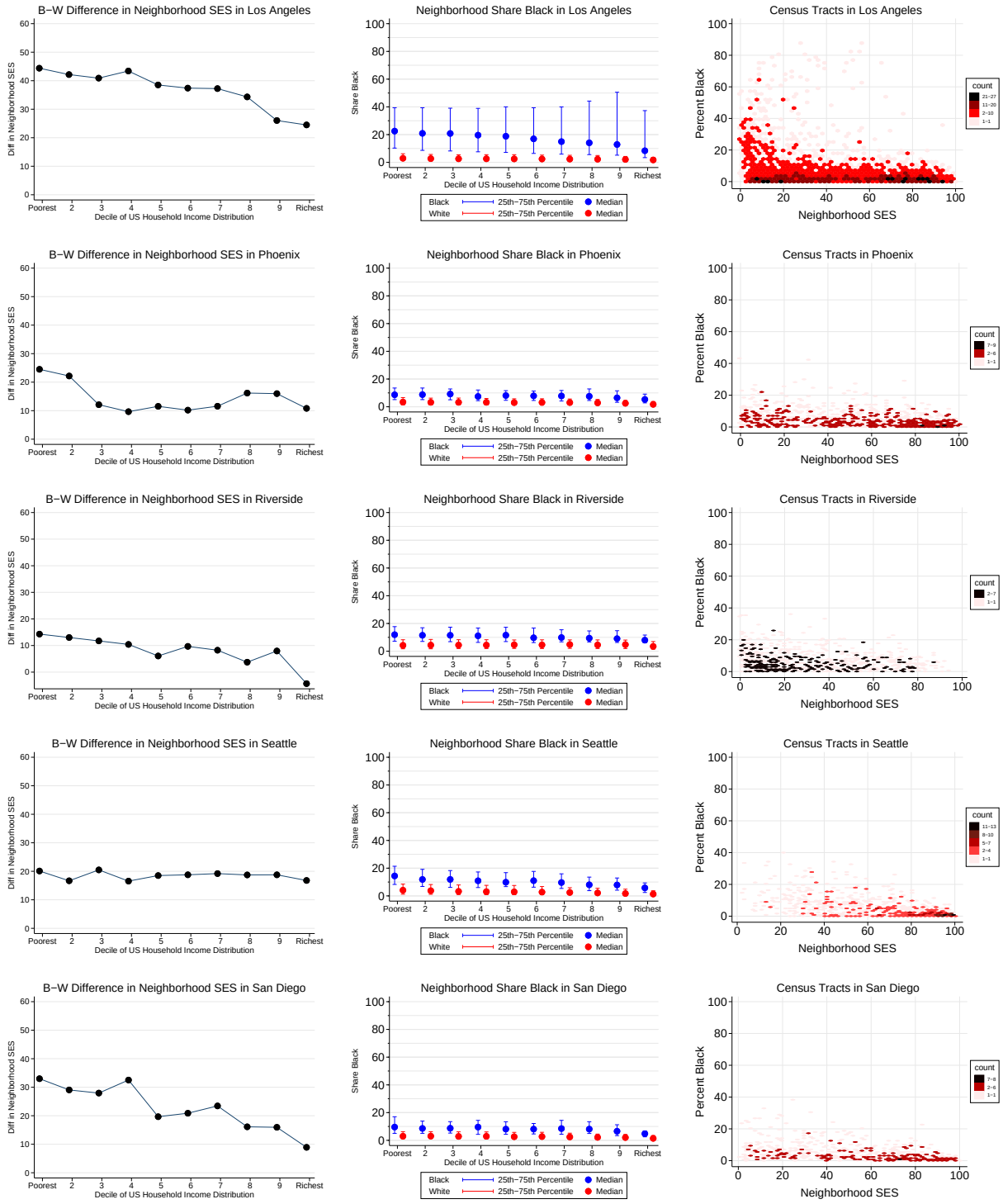


Figure 16: Neighborhood Sorting in No Variety Metros

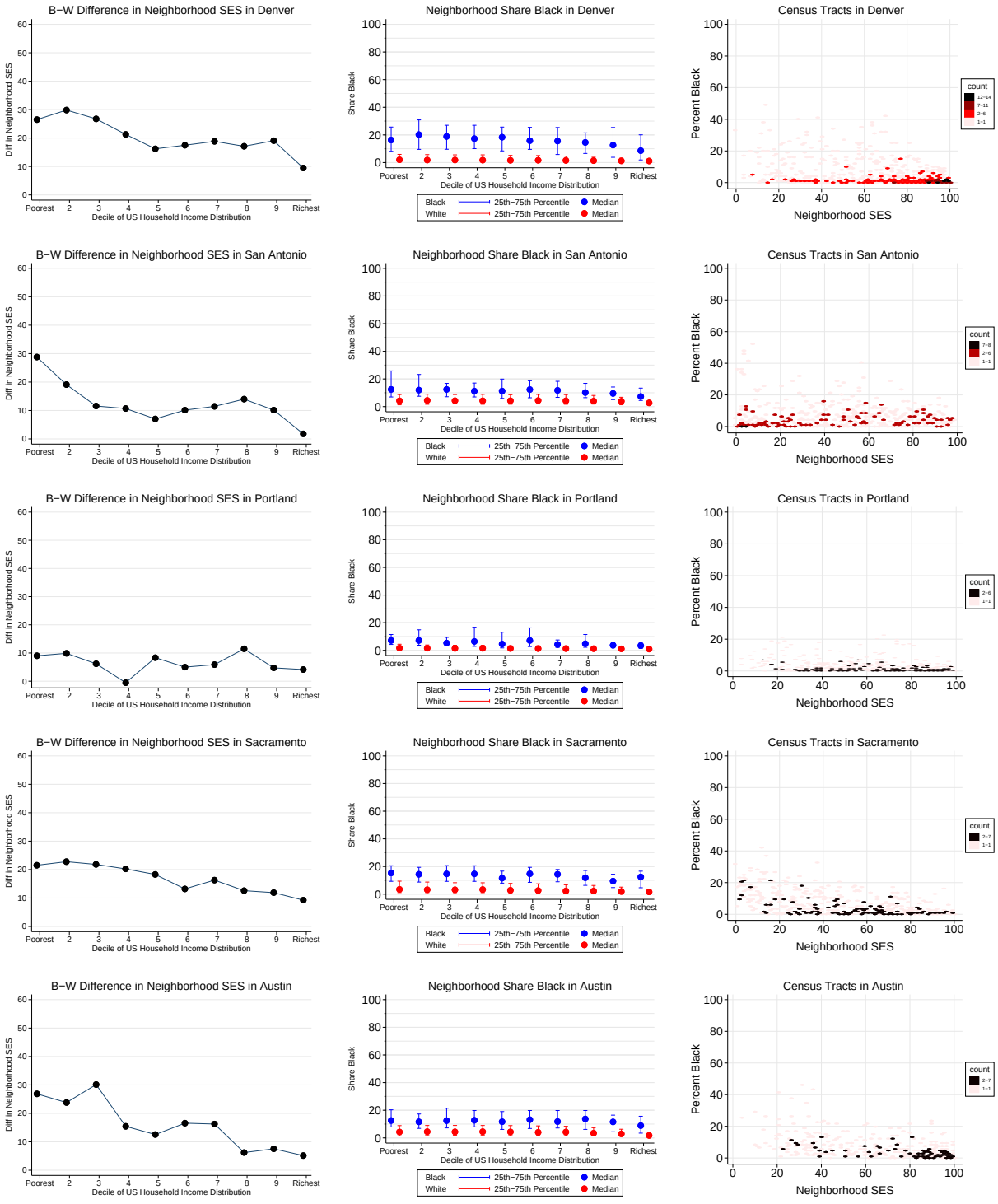


Figure 17: Neighborhood Sorting in No Variety Metros

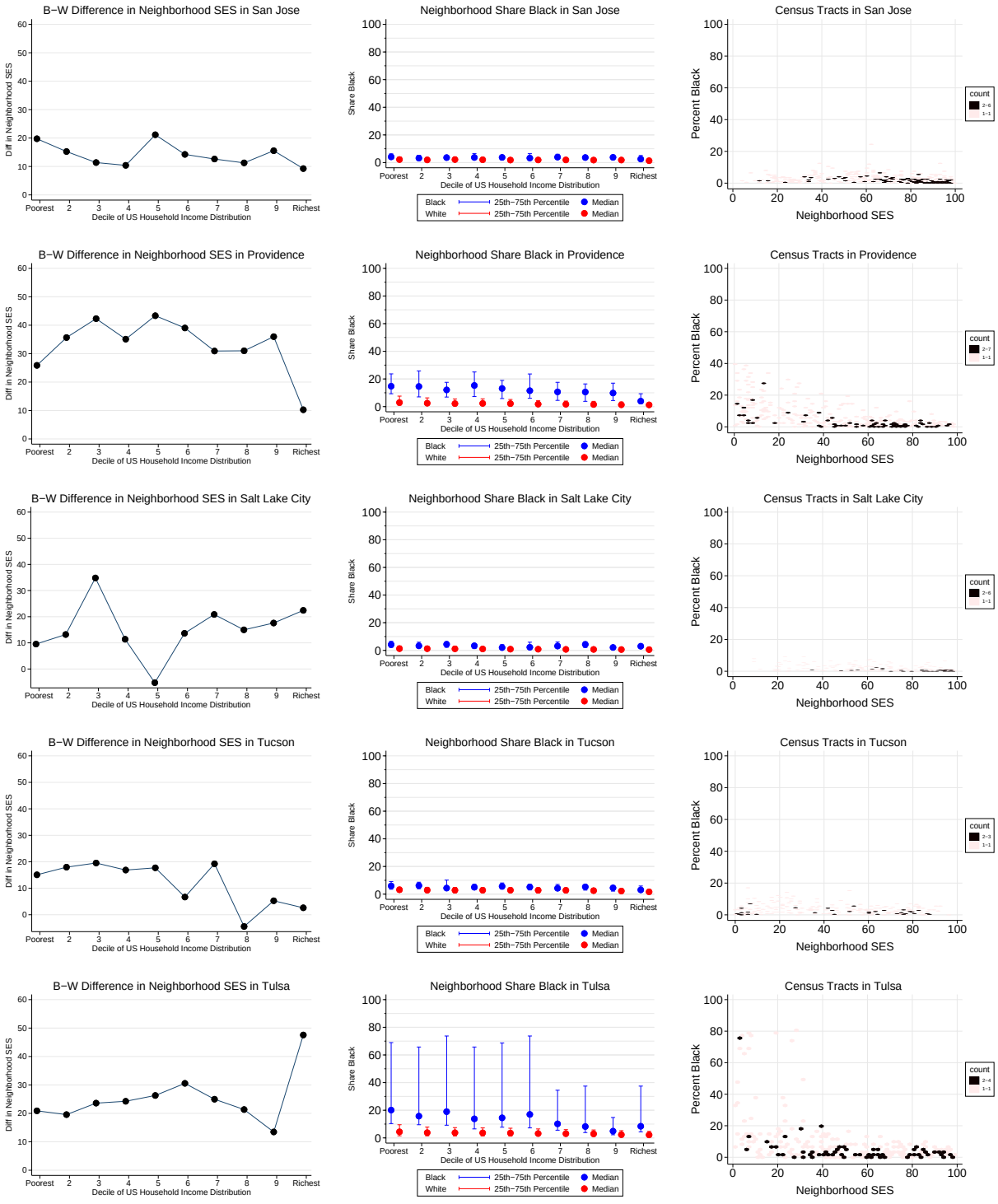


Figure 18: Neighborhood Sorting in No Variety Metros

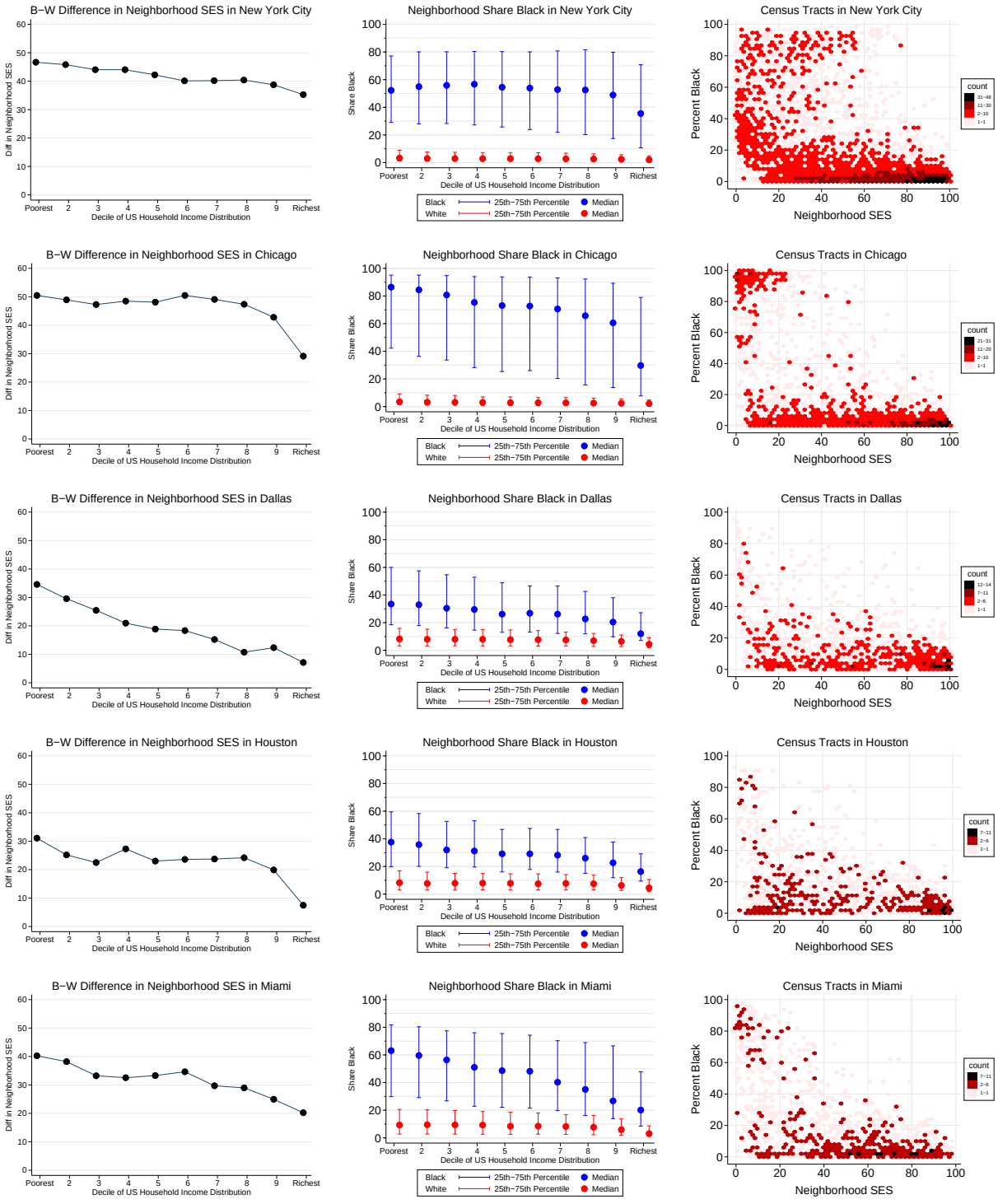


Figure 19: Neighborhood Sorting in Low Variety Metros

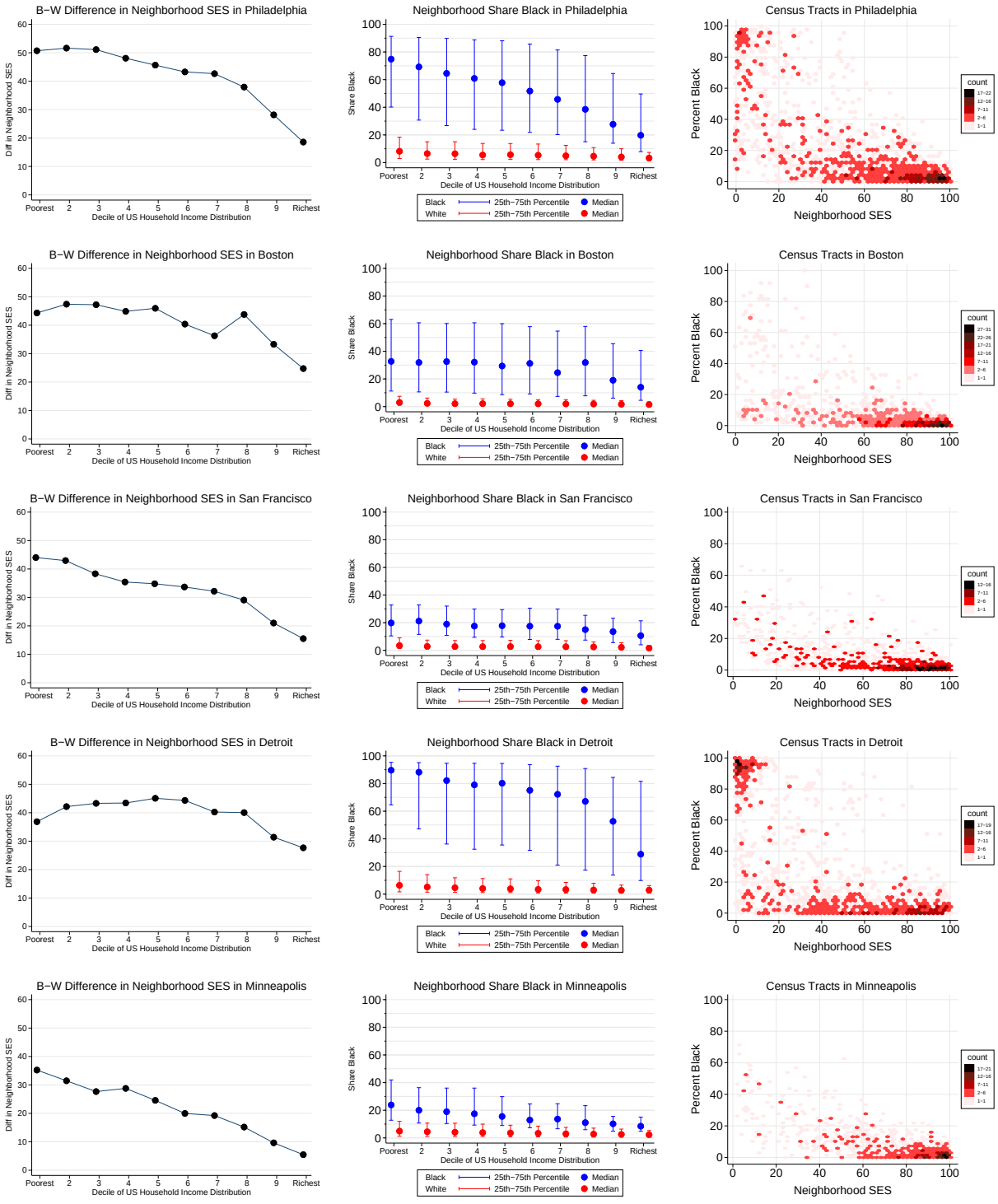


Figure 20: Neighborhood Sorting in Low Variety Metros

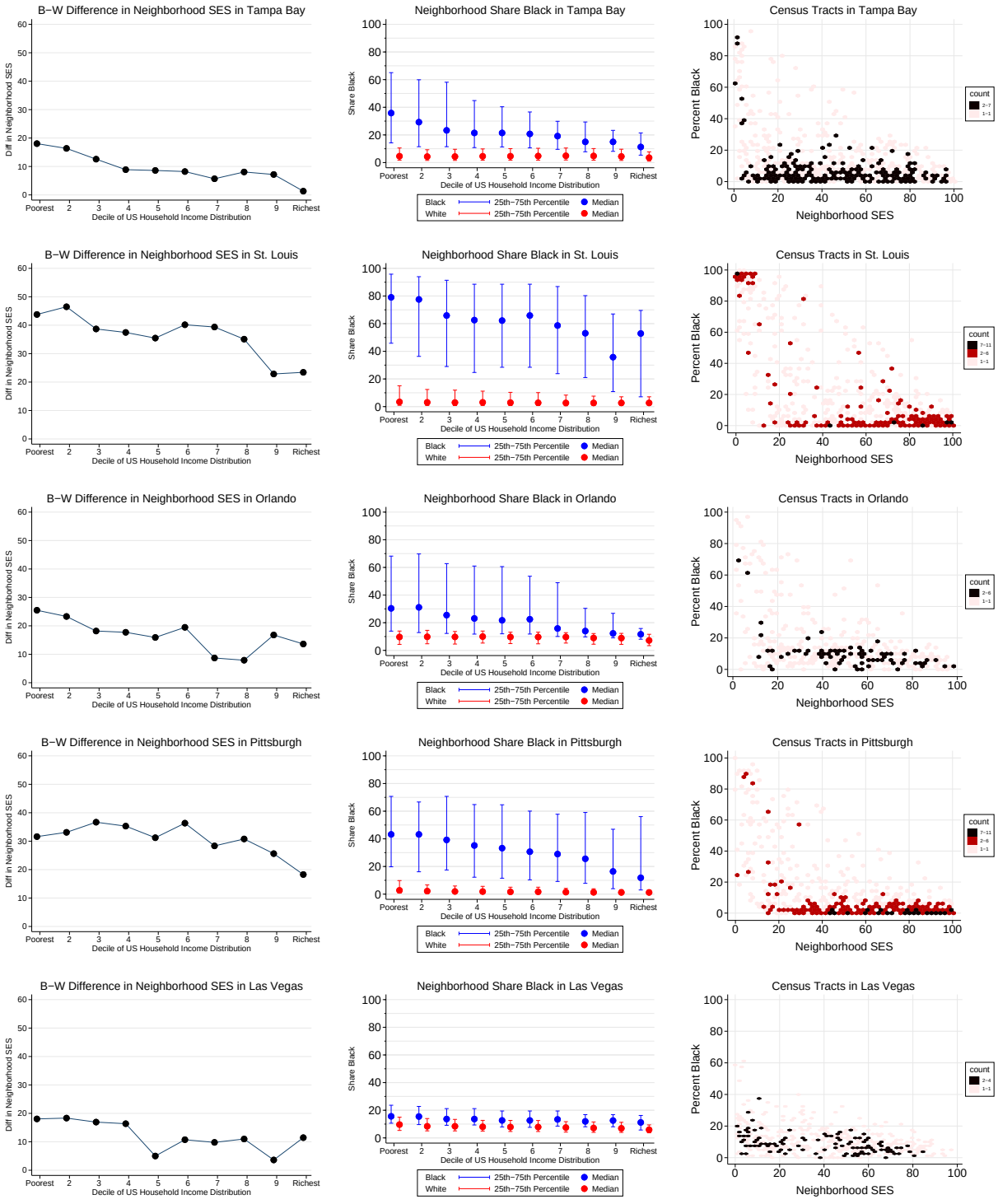


Figure 21: Neighborhood Sorting in Low Variety Metros

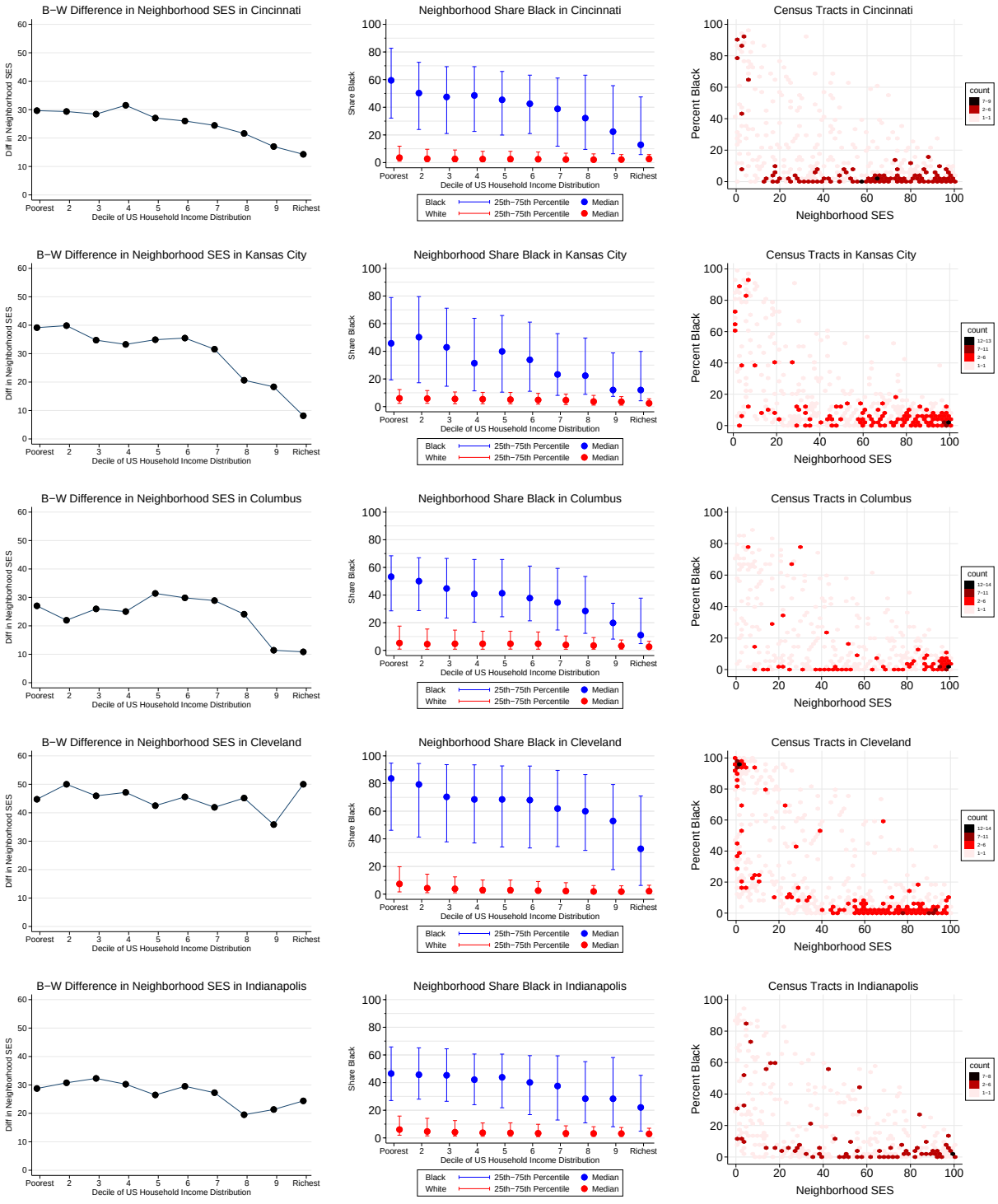


Figure 22: Neighborhood Sorting in Low Variety Metros

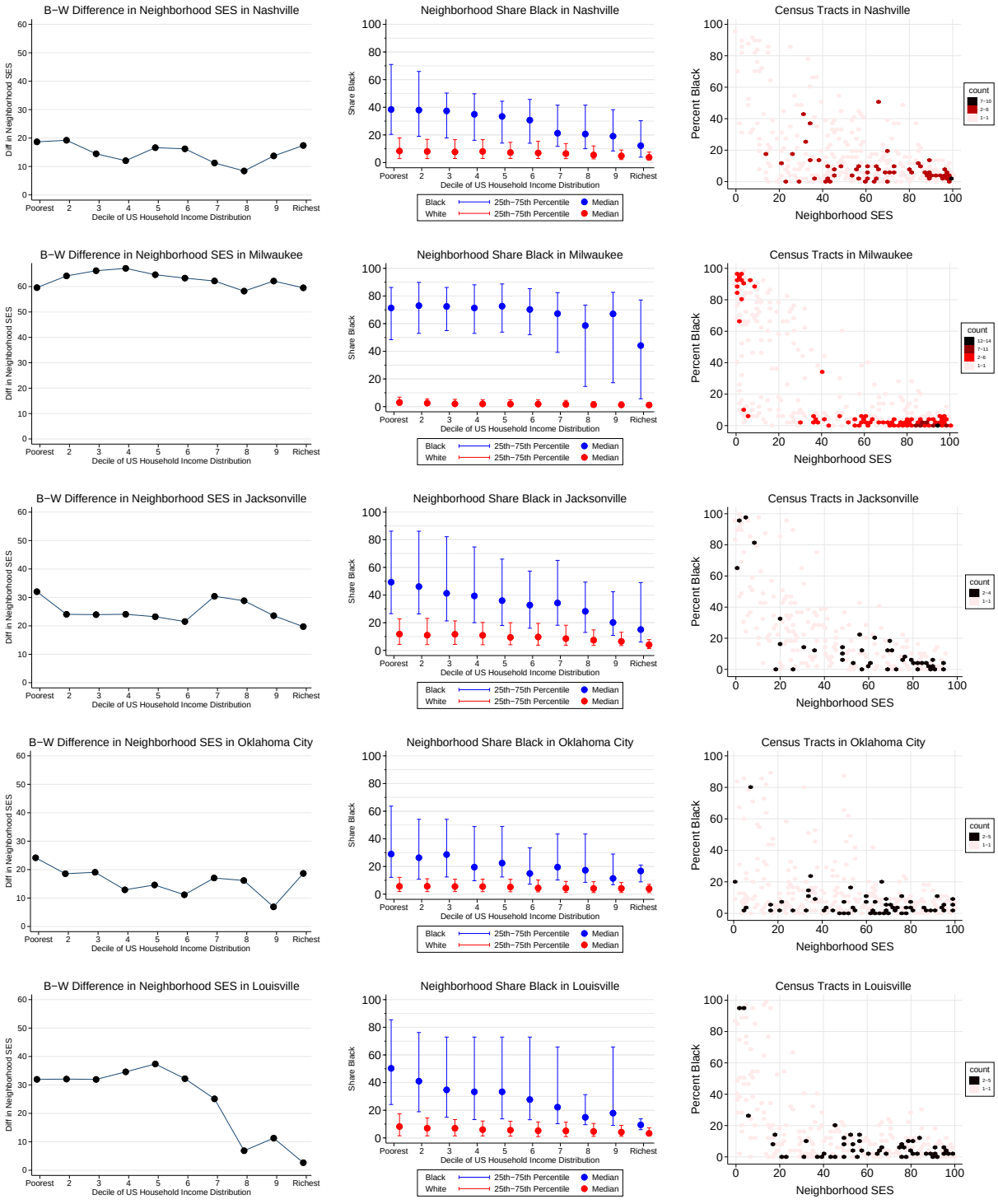


Figure 23: Neighborhood Sorting in Low Variety Metros

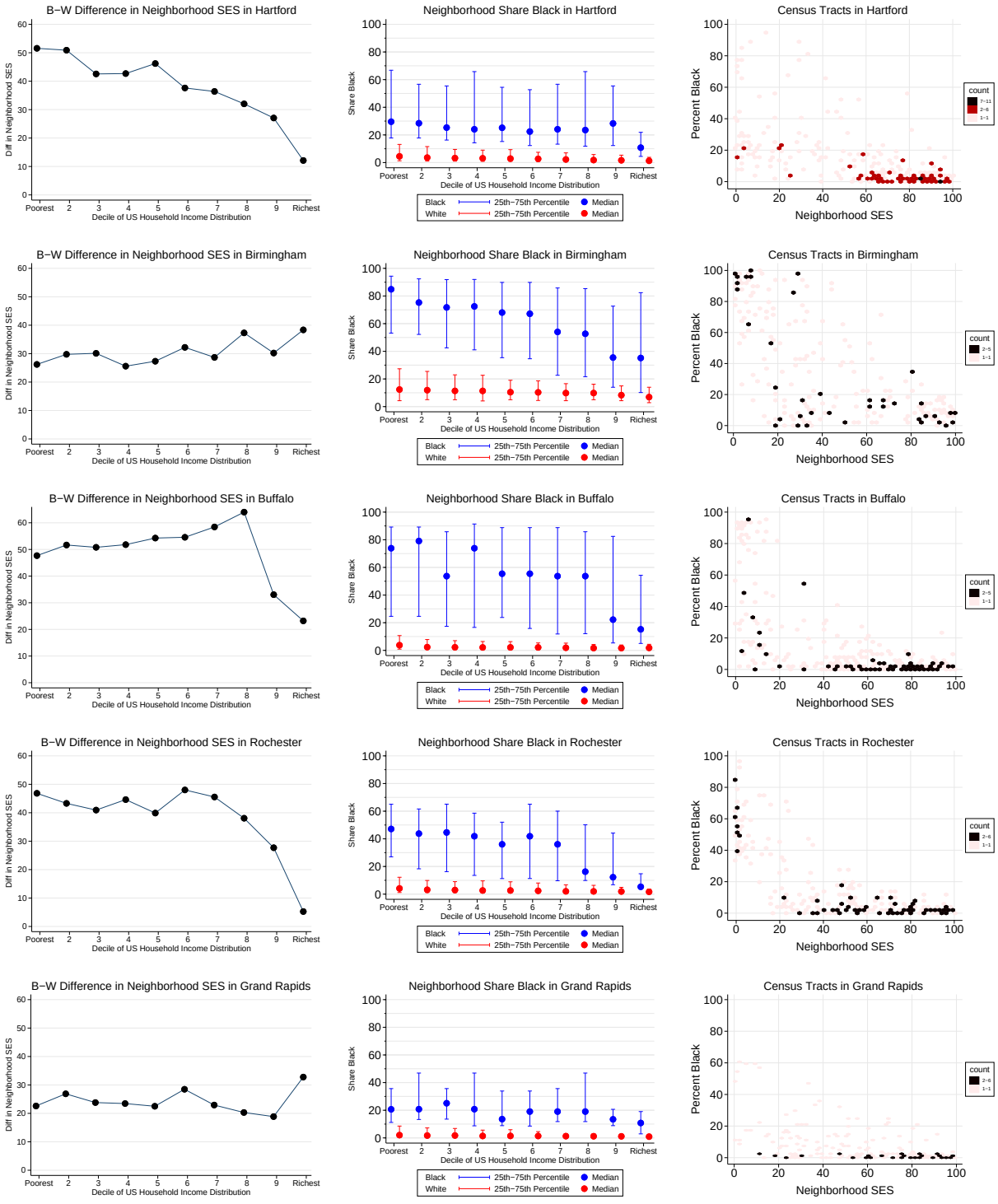


Figure 24: Neighborhood Sorting in Low Variety Metros

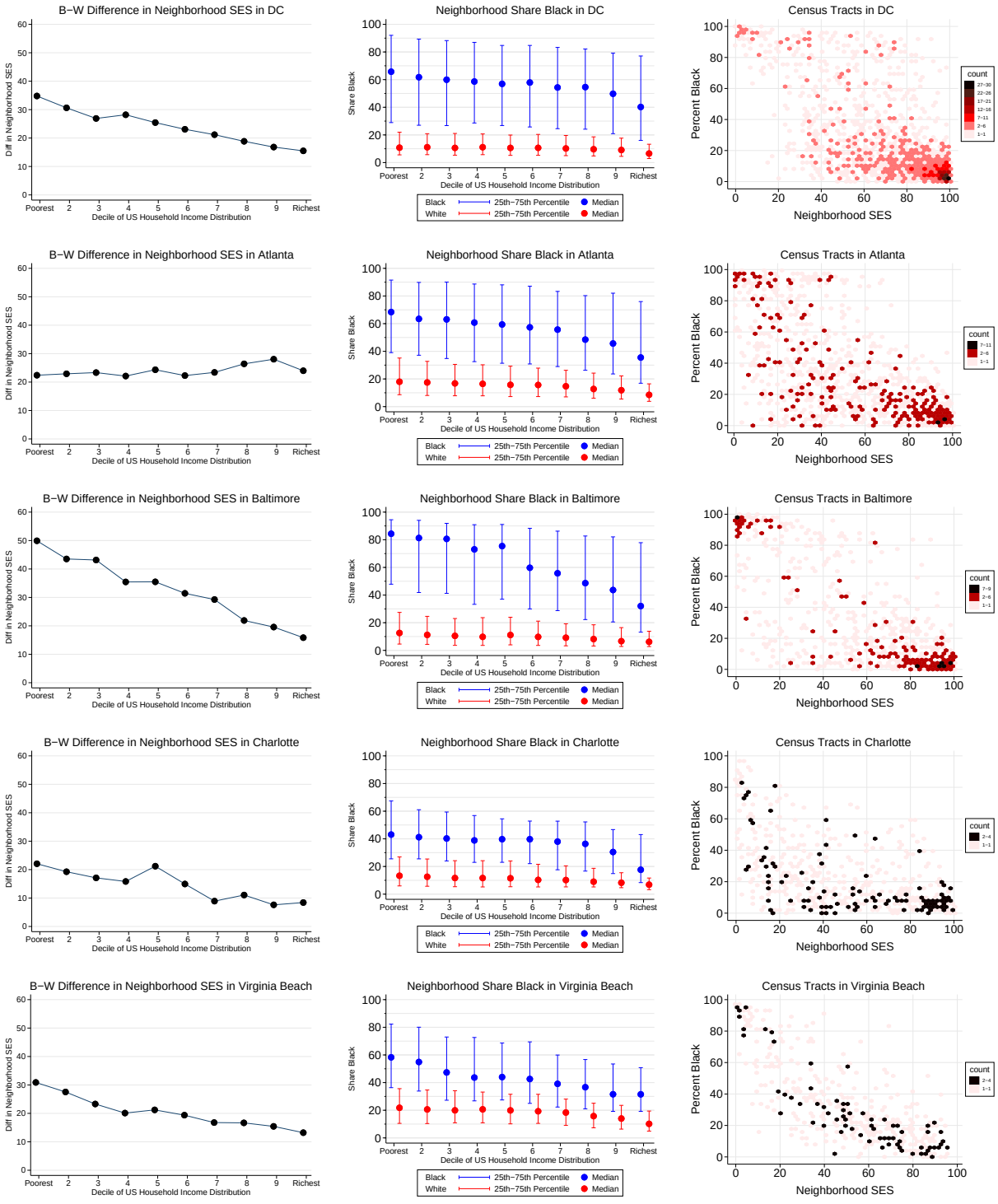


Figure 25: Neighborhood Sorting in High Variety Metros

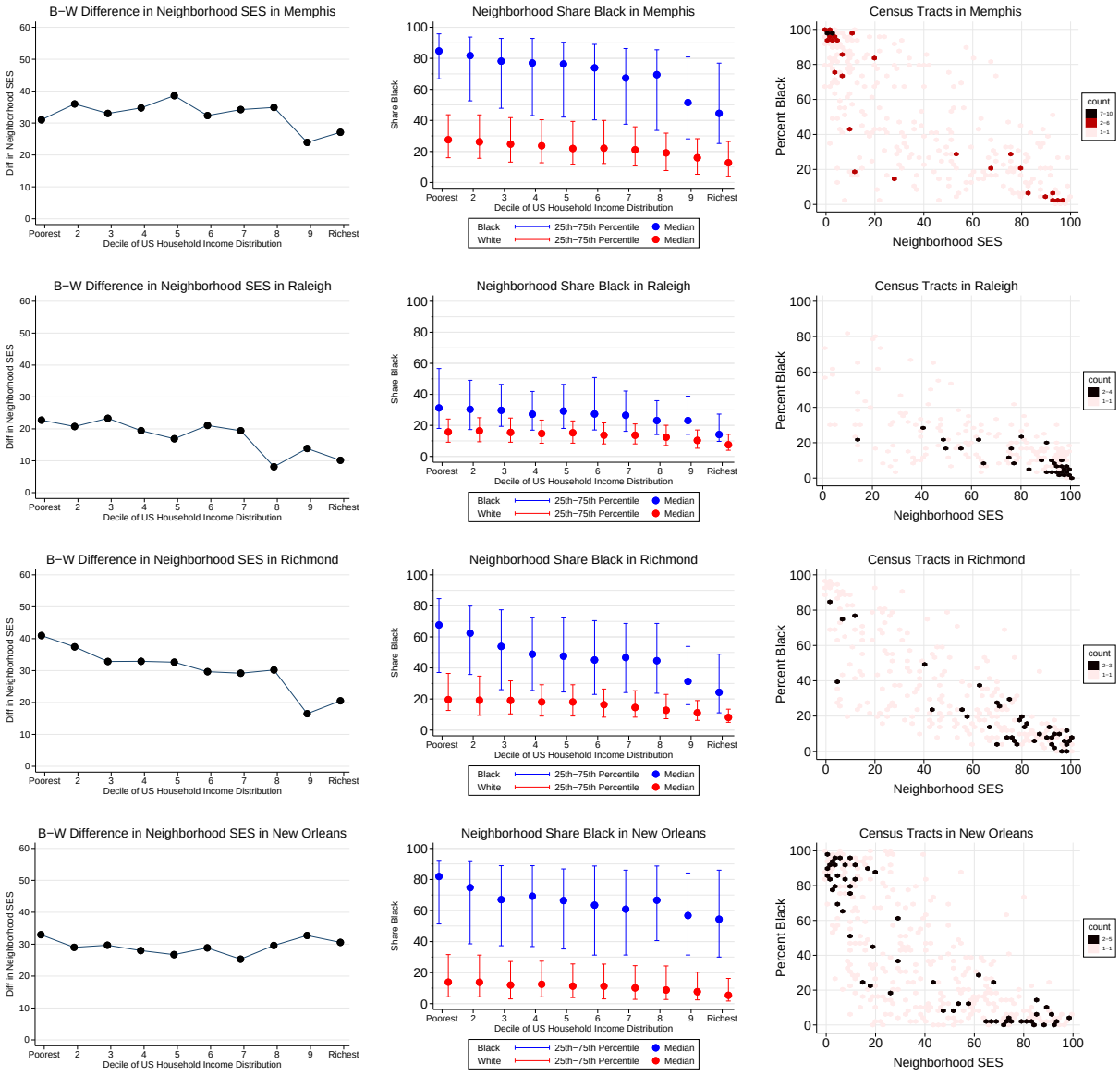


Figure 26: Neighborhood Sorting in High Variety Metros

F Metro-Level Sorting by Neighborhood Racial Composition

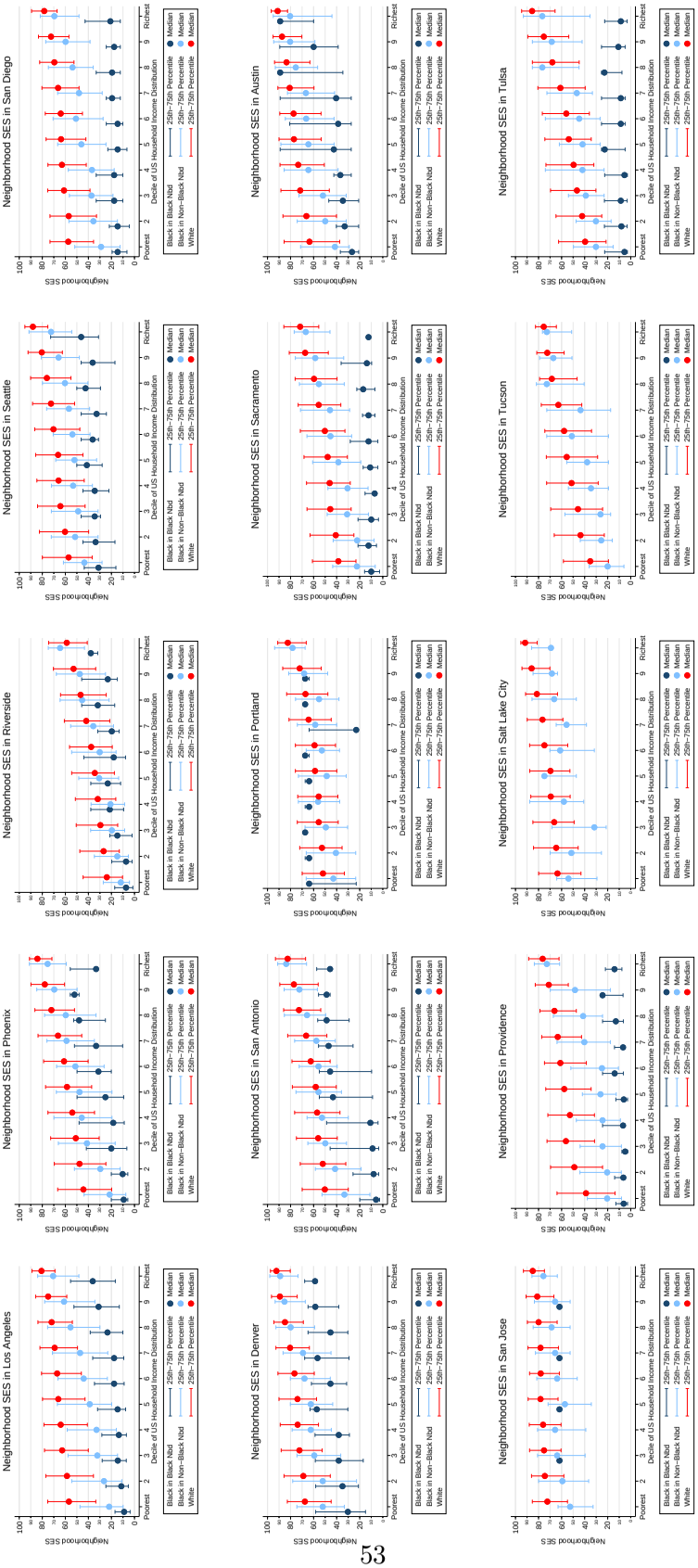


Figure 27: Neighborhood Sorting in No Variety Metros

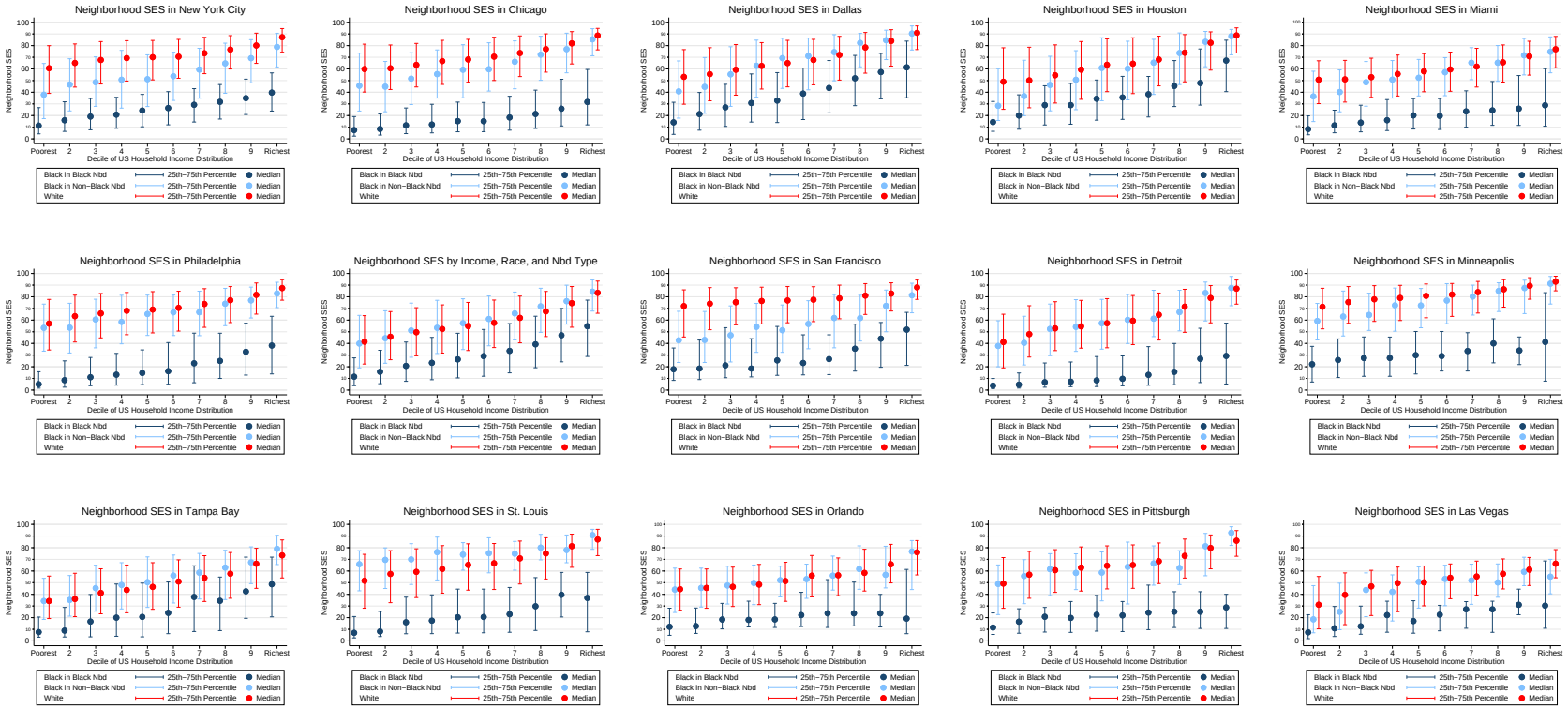


Figure 28: Neighborhood Sorting in Low Variety Metros

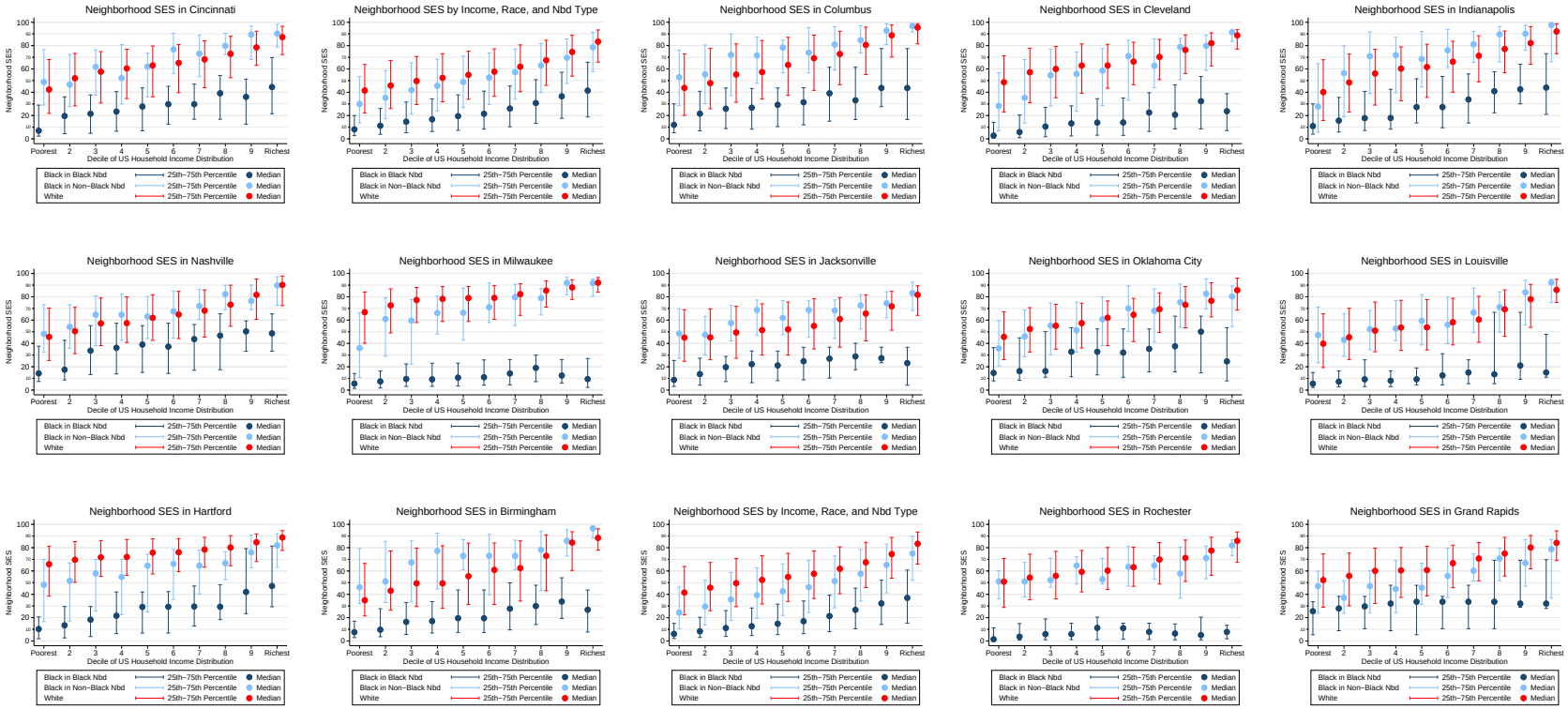


Figure 29: Neighborhood Sorting in Low Variety Metros

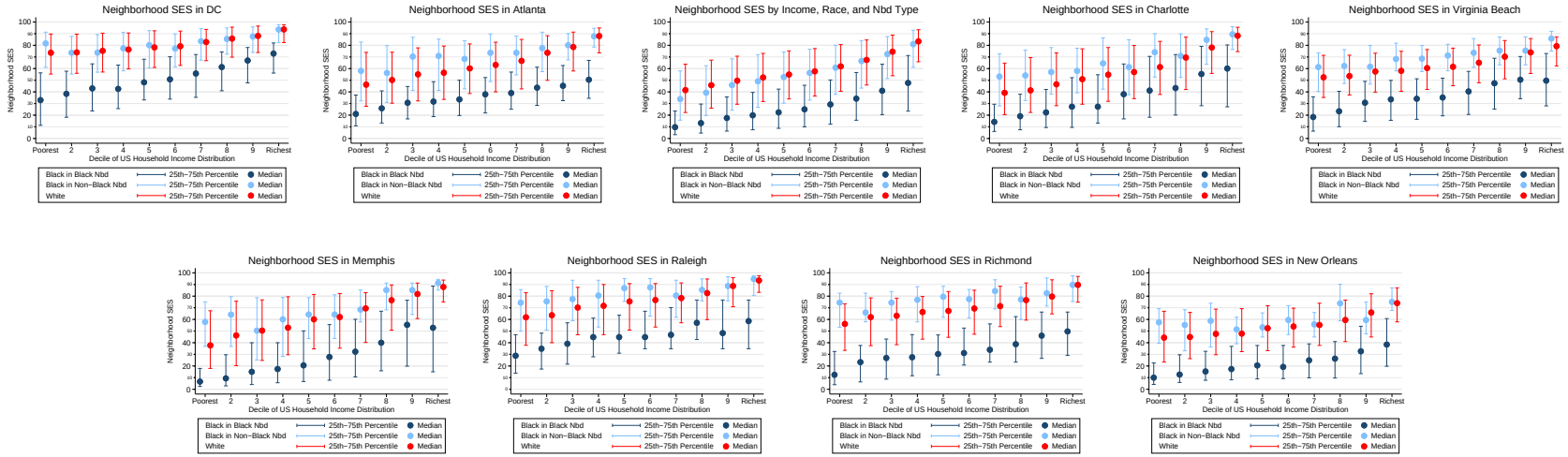
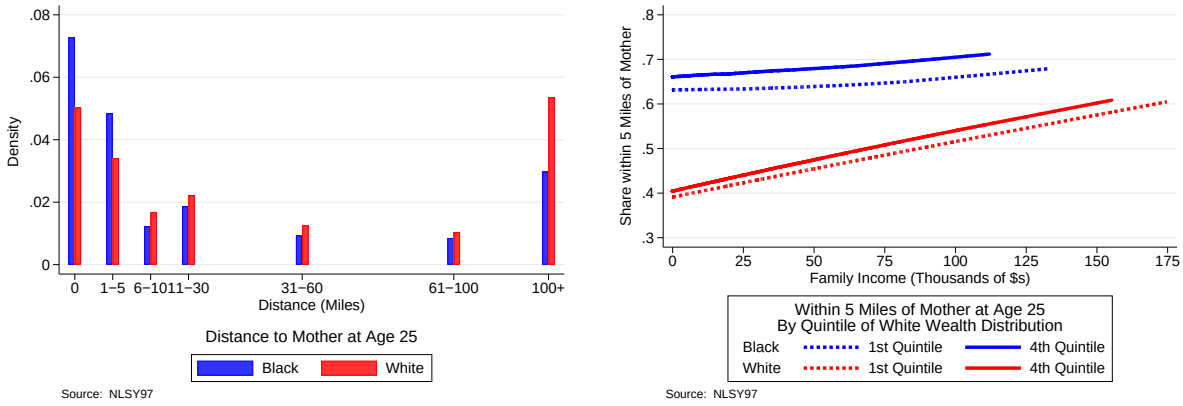


Figure 30: Neighborhood Sorting in High Variety Metros

G Additional Evidence on Race-Specific Locations

G.1 The National Longitudinal Survey of Youth 1997 (NLSY97)

We present further evidence that conditional on income and wealth, Blacks and whites have different locational preferences. We look first at data from the National Longitudinal Survey of Youth 1997 (NLSY97), a nationally representative longitudinal survey of individuals born between 1980 and 1984. Figure 31a shows that at age 25 in the NLSY97, Black respondents were more likely than their white counterparts to live within five miles of their mothers. Figure 31b shows that this fact is not driven by financial constraints, as it remains true conditional on both income and wealth.



(a) Distributions over Distance

(b) Shares Living within 5 Miles

Figure 31: Distance to Mother at Age 25, NLSY97

G.2 2012-2016 American Community Survey (ACS)

We next look at anonymized individual-level data from the 2012-2016 wave of the ACS drawn from IPUMS-USA. Figure 32 shows that Black individuals "pay" for their locational characteristics, including that of being near their mothers, by spending more time traveling to work, even conditional on income. This result is consistent with those in bunton et al. (2022) and provides suggestive evidence that high-income households' neighborhood sorting is not driven by access to employment (Ellen et al. (2013)). The estimates in Figure 32 are precise, even for high-income African Americans, since the IPUMS ACS sample has more than 15 million individuals.

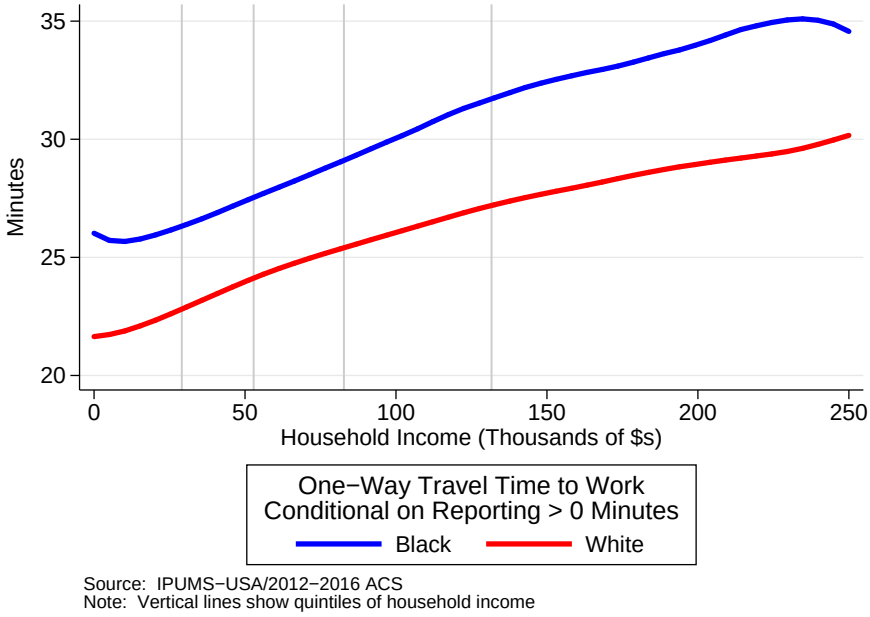


Figure 32: One-Way Travel Time to Work, 2012-2016 ACS

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