Supplementary Appendix for: Black Suburbanization: Causes and Consequences of a Transformation of American Cities

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Abstract

Since 1970, the share of Black individuals living in suburbs of large cities has risen from 16% to 36%. We first show that Black suburbanization has led to major changes in neighborhoods, accounting for the majority of recent increases in both the average Black individual's neighborhood quality and income segregation within the Black population. We then use an accounting exercise to show that changes in relative suburban amenities and housing prices explain a large share of Black suburbanization, while regional reallocation, changing educational attainment, and gentrification of Black city neighborhoods play only minor roles.

JEL Classification Codes: R23, J15, J11

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Appendices

This appendix contain further details about the exercises in main text. Section I contains more information about data sources and variable construction. Section II.A discusses how the main results are similar or different across different regions of the United States. Section II.B contains the additional figures and tables that are referenced in the main text.

I Data Preparation

I.A Panel of Census Tract Characteristics

The CBSAs included in our analaysis are Atlanta, GA, Baltimore, MD, Birmingham, AL,Boston, MA, Buffalo, NY, Charleston, SC, Charlotte, NC, Chicago, IL, Cincinnati, OH, Cleveland, OH, Dallas, TX, Detroit, MI, El Paso, TX, Greensboro, NC, Houston, TX, Jacksonville, FL, Kansas City, MO, Knoxville, TN, Los Angeles, CA, Memphis, TN, Miami, FL, Milwaukee, WI, Minneapolis, MN, Nashville, TN, New Orleans, LA, New York, NY, Orlando, FL, Philadelphia PA, Pittsburgh PA, Providence, RI, Richmond, VA, San Antonio, TX, San Diego, CA, San Francisco, CA, Seattle, WA, St. Louis, MO, Tampa, FL, Virginia Beach, VA, Washington, DC, Winston-Salem, NC. We classify Minneapolis and St. Paul, Oakland and San Francisco, and Kansas City, Missouri and Kansas City, Kansas, as central cities of their CBSA.

We combine three main sources to produce the tract panel data used in most of our analysis. The first is the Longitudinal Tract Data Base (LTDB),[1] which provides tract characteristics for the years 1970, 1980, 1990, 2000, and 2010, mapped to consistent 2010 tract boundaries (Logan, Xu and Stults 2014). The first four years of characteristics are taken from decennial censuses, while 2010 is drawn from the 2008-2012 American Community Survey (ACS). Second, IPUMS provides additional tract variables for the years 1970, 1980, 1990, 2000, 2010, and 2016 (Manson et al. 2017). For the IPUMS data, the first five years are taken from decennial censuses, while 2016

[1] This can be accessed at `http://www.s4.brown.edu/us2010/Researcher/Bridging.htm`.

is drawn from the 2014-2018 ACS. Finally, the third source is Census and American Community Survey (ACS) microdata for each of these years, again compiled by IPUMS (Ruggles et al. 2020).

The 1970-2010 LTDB forms the base of our panel, which we supplement with additional characteristics from IPUMS and the 2014-2018 ACS. To map the additional characteristics to consistent 2010 tract boundaries, we use the set of crosswalks provided in the LTDB. Finally, we impute some variables by combining the LTDB and the Census/ACS microdata. We do this when a variable of interest is not included in any of the data sets, but a similar variable is. For example, we may want the number of US-born non-Hispanic Black people who live in a census tract, but find that IPUMS contains only counts for non-Hispanic Black or US-born Black. This issue most frequently arises due to early censuses not distinguishing between Hispanic and non-Hispanic.

In these cases, we estimate the variable of interest by adjusting the available tract data using information from the microdata. Returning to the above example, we would use the microdata to calculate the share of non-Hispanic Black who were born in the US in the tract's city, then multiply the non-Hispanic Black count in the tract by this value. In the event that the microdata does not provide the necessary information at the city level, we calculate it at the county level. If it is not provided at the county level, we move to the CBSA level.

The following is a summary of the variables in our dataset and how they are constructed.

Population by race.— We draw the population of each race from the LTDB for the years 1970-2010 and the ACS for 2016. In the event that the non-Hispanic Black population is not available in a tract-year, we follow the imputation procedure described above.

Overall tract characteristics.— Characteristics of the overall tract population (that is, not of a particular race) are drawn directly from the LTDB and the 2014-2018 ACS. These characteristics are: median household income, share of occupied households, and share of college educated adults. We adjust incomes to 2018 dollars using the Consumer Price Index for all urban consumers

Characteristics by race.— We also include information on race-specific values of median household income, college education, and poverty. While race-specific tract poverty rates are available in all years, race-specific income and education rates are not. To construct them, we

draw the closest available variabls from IPUMS and again follow the imputation process described above. For example, suppose that we observed tract median income for Black households, but not non-Hispanic Black households. We would use the microdata to calculate the ratio between median income for non-Hispanic Black households and all Black households in a tract's county and then multiply tract median Black income by this value.

In addition, there is a further complication in the years 1970 and 1980—household income for different racial groups is not available. However, we do observe *family* income split by demographic groups and household income for the overall population. We use this information to estimate median household income by race in a slightly different way. First, we run a regression of median household income on median family income, the ratio between the number of families and households, and the interaction between these two variables for the overall population. Then, assuming these parameters are constant across demographic groups, we predict the value of median household income for each race using their respective explanatory variables. With these values in hand, we adjust for Hispanic status in the same way that we adjust in other years.

Income bins for Black households—We draw the distribution of Black households across income bins in each tract from IPUMS NHGIS. Due to data limitations, we use family income instead of household income in 1980. We classify suppressed income bins as zeros. The bins available in each year (not adjusted for inflation) are:

- 1970: less than 2,000; between 2,000 and 2,900; 3,000 and 4,999; 5,000 and 6,999; 7,000 and 9,999; 10,000 and 14,999; 15,000 and 24,999; 25,000 and more.
- 1980: less than 5,000; between 5,000 and 7,499; 7,500 and 9,999; 10,000 and 14,999; 15,000 and 19,999; 20,000 and 24,999; 25,000 and 34,999; 35,000 and 49,999; 50,000 and more.
- 1990: Less than 5,000; 5,000 to 9,999; 10,000 to 14,999; 15,000 to 24,999; 25,000 to 34,999; 35,000 to 49,999; 50,000 to 74,999; 75,000 to 99,999; 100,000 or more.
- 2000: Less than 10,000; 10,000 to 14,999; 15,000 to 19,999; 20,000 to 24,999; 25,000 to 29,999; 30,000 to 34,999; 35,000 to 39,999; 40,000 to 44,999; 45,000 to 49,999; 50,000

to 59,999; 60,000 to 74,999; 75,000 to 99,999; 100,000 to 124,999; 125,000 to 149,999; 150,000 to 199,999; 200,000 or more.

- 2010: Less than 10,000; 10,000 to 14,999; 15,000 to 19,999; 20,000 to 24,999; 25,000 to 29,999; 30,000 to 34,999; 35,000 to 39,999; 40,000 to 44,999; 45,000 to 49,999; 50,000 to 59,999; 60,000 to 74,999; 75,000 to 99,999; 100,000 to 124,999; 125,000 to 149,999; 150,000 to 199,999; 200,000 or more.

- 2016: Less than 10,000; 10,000 to 14,999; 15,000 to 19,999; 20,000 to 24,999; 25,000 to 29,999; 30,000 to 34,999; 35,000 to 39,999; 40,000 to 44,999; 45,000 to 49,999; 50,000 to 59,999; 60,000 to 74,999; 75,000 to 99,999; 100,000 to 124,999; 125,000 to 149,999; 150,000 to 199,999; 200,000 or more.

I.B Panel of Tract Population in Age x Race Bins

In addition to the main tract panel, we also construct a tract-level data set containing the population of each race in five-year age bins from 0 to 74, as well as 75 and older. A variety of imputations are required to obtain this information in each year, since the Census regularly changes the age and race bins that are released publicly. We again make these imputations by combining the available tract data and the census/ACS microdata. For example, if we observe the number of Hispanics in the age bin 20-30 in a tract in New York City, we use the share of Hispanics in their 20s that are between 20 and 25 in New York city to compute the tract value for the 20-24 and 25-29 age bins. Below is a description of the changes that must be made in each year of the sample.

- Year 1970: The data contains the correct age bins, but it does not distinguish non-Hispanic and Hispanic Black/White from Hispanic black/white. We use the micro data to estimate the share Hispanic in each age bin.

- Year 1980: The data contains the desired race bins, but the age bins are 0-5, 5-17,18-64,65 or more. We use the microdata to estimate the share of each race x bin that falls into each five-year bin.

- Year 1990: The original data contains age bins of 5 years or less, but there is not information regarding the race of the Hispanic population. We again use the microdata to estimate the share of Hispanic population in each age bin that are of a particular race.
- Years 2000-2010: The original data contains the desired age and race bins.
- Year 2016: NHGIS provides 10-year age bins for White, Black and Hispanic. We again adjust using the microdata.

II Additional Results

II.A Regional Heterogeneity

Given historical differences across regions in urban development, racial discrimination, and racial disparities, one question is whether the patterns we document are driven by a particular region or are similar throughout the country. In this section, we explore how some of our key results differ across Census regions (i.e. Northeast, Midwest, South, and West).

We start by replicating Figure 1—the time series of aggregate Black population in cities and suburbs—separately for each Census Region in Appendix Figure A6. This figure shows that the broad patterns in Figure 1 are similar across regions, with every region having a large decline in the share of Black households living in central cities and a rise in the suburbs. The magnitudes differ across regions, with the rise in the share of Black households living in the suburbs being smaller in the West and particularly large in the Midwest and the South. The Black population share living outside of originally large cities is also larger in the West than in other regions, likely because the West had a greater number of areas that grew rapidly during this time period.

In Appendix Figure A7, we perform this same replication by region for Figure 5, which shows the change in Black household income relative to White households overall and for households living in central cities and their suburbs. We again see that the general pattern of falling relative income for Black households in central cities, along with rising average and suburban relative

incomes, generally holds in most regions. In all regions, the majority of improvement in relative neighborhood incomes is driven by suburbanization. In most regions, this is entirely driven by rising relative neighborhood incomes in the suburbs and a rising share of households living in the suburbs. The exception is the West region, where relative Black neighborhood incomes in central cities do rise throughout the sample period. Still, even in the West, the majority of the increase in the average appears to be driven by the rising share of Black households living in the suburbs.

Finally, in Appendix Figure A8, we perform the income segregation exercise from Figure 4 separately for each region. The aggregate trend again seems to hold in every region, although increasing segregation within cities has played a larger role in the West than in other regions. On the whole, breaking these results out by region suggests that the overall patterns we find are replicated throughout the US and are not driven by idiosyncratic patterns in a particular region. Similarly, Figure 2 and Appendix Figures A3, , A4, and A5 plot maps of Black population change in the largest CBSA in each region. All look quite similar. Finally, Appendix Figure A12 shows that large cities across all regions lost total Black population between 2000 and 2016.

II.B Additional Migration Results

We use microdata to examine Black households' suburbanization decisions, studying both selection into suburbanization and choice of suburban neighborhood. Because the available data on migration is more limited than tract characteristics, our exercises here use more limited samples including fewer years and metro areas than the remainder of the paper.

First, we use data from the 1980 and 1990 long-form decennial censuses on place of residence five years ago and household demographic and economic characteristics. This allows us to observe households that moved from a central city to one of its suburbs. However, because the Public Use Micro Areas (PUMAs) location identifiers in the ACS do not necessarily align with municipal boundaries, we can only identify suburbanizers in the following CBSAs: Baltimore, MD; Boston, MA/NH; Buffalo-Niagara Falls, NY; Chicago, IL; Cleveland, OH; Dallas-Fort Worth, TX; Greensboro-Winston Salem-High Point, NC; Houston-Brazoria, TX; Knoxville, TN;

Los Angeles-Long Beach, CA; Memphis, TN/AR/MS; Minneapolis-St. Paul, MN; New Orleans, LA; New York, NY-Northeastern NJ; Orlando, FL Philadelphia, PA/NJ; Providence-Fall River-Pawtucket, MA/RI; Richmond-Petersburg, VA; San Antonio, TX; San Francisco-Oakland-Vallejo, CA; Seattle-Everett, WA; Norfolk-VA Beach–Newport News, VA; Washington, DC/MD/VA.

Second, Infutor Data Solutions provides longitudinal individual address histories for the 2010-2016 time period, which have recently been used in a number of academic research papers (e.g. Diamond, McQuade and Qian 2019, Mast 2021). The address histories are created from a variety of public and private record sources, including USPS change of addresses, property records, phone books, and magazine subscriptions. It reports location of residence at the address level, along with an estimated move date. However, the data does not provide an individual's race, which limits its applications in our study.

First, Black suburbanizers appear to be positively selected from cities. In Appendix Figure A17, we plot the distributions of household income for Black households who moved from a central city to its suburbs in the five years prior to the 1980 or 1990 censuses versus those who remained in cities over the same period. The suburbanizer distribution is well to the right, with a median income for this group of $38,000 (in 2018 dollars) versus $23,000 for city-dwellers.

Second, Black suburbanizers may selectively migrate to areas with higher socioeconomic status than their origin. The Infutor data allows us to assess this by comparing the origin and destination tracts of movers; however, it does not identify race. This limits related exercises in an important way—we can only identify likely Black suburbanizers as those who moved out of city neighborhoods that were nearly all Black. This group may follow different patterns than, for example, Black households that suburbanized from predominantly White city tracts. With that caveat in mind, we restrict to suburbanizers from city tracts that were over 80% Black in 2010 and compare characteristics of their origin and destination neighborhoods.[2] In addition, because the Infutor data has a more limited time period, we consider only moves between 2010 and 2016.

[2]City tracts that meet this criteria are 93% Black on average. They contain 45% of the city Black population in our sample, and they are a particularly interesting set of neighborhoods because they saw the fastest Black population decline during our sample period.

Panel A of Figure A18 shows the relationship between median household incomes in the destination and origin tracts. In general, suburbanizers from these areas took a large step up in neighborhood income. At the average origin income of approximately $30,000, roughly 75% of suburbanizers saw an increase over $20,000. The average college share (Panel C) follows a similar pattern, and Panel B shows that migrants also typically move to tracts with higher median housing costs. While the median cost may misrepresent the availability of very cheap units, Panel D shows that suburbanizers also generally move to neighborhoods where a substantially lower share of two-bedroom apartments have gross rent under $1,000.

II.C Relationship Between Suburbanization and Directly Measured Amenities

To support our amenity-based explanation, we next explore the correlation between model-estimated amenities and direct amenity measures across CBSAs. We focus on changes between 1970 to 2000, which is when the suburban amenity premium rises and when amenity data is most complete. We study four amenities that changed significantly and likely differentially in cities and suburbs: job location (Miller 2020), school quality (Baum-Snow and Lutz 2011); racial animus (Bostic and Martin 2005, Turner et al. 2013); and crime (Evans, Garthwaite and Moore 2016).

We combine a number of data sources for this investigation. First, we compute the difference between the murder rate in a central city and its suburbs using the FBI's Uniform Crime Records.[3] Second, Miller (2020) provides data on the 1970 to 2000 change in the share of a CBSA's jobs that are located in the suburbs. For school quality, we employ a major shifter that occurred during our sample period: court-ordered desegregation of large central city school districts. Baum-Snow and Lutz (2011) show that these orders were valued by Black households and provide the years in which they occurred.[4] Finally, we construct a measure of the change in racial animus using two different data sources. We use George Wallace's vote share in the 1968 presidential election, drawn from Leip (2022), as a pre-period metric. For a post-period metric, we take the rate of

[3]We use the panel constructed by Kaplan (2021) and follow the cleaning procedure in Chalfin et al. (2022).

[4]The data on school desegregation orders in Baum-Snow and Lutz (2011) originally are mostly derived from Welch and Light (1987). We supplement and hand code the presence and timing of desegregation orders ourselves for the small number of medium-sized cities in our sample that were no in the original Welch and Light (1987) data.

Google searches for racial slurs between 2004 and 2007 from Stephens-Davidowitz (2014). We then take the difference between each CBSA's rank among sample CBSAs on the first metric and the second to yield an approximation of its change in animus. While this metric concerns the whole CBSA rather than a city-suburb differential, it likely disproportionately impacts Black households in predominantly White areas such as the suburbs.[5]

We then estimate the relationship between these measures and model-estimated amenities. Let g index CBSA, $X_{g,t}$ be a vector of measured amenities, and $A_{g,t}$ be the model-estimated relative amenities in suburbs versus cities. We estimate:

$$\Delta A_g = \alpha + \Delta X_g \beta + \epsilon_g \tag{1}$$

where X is expressed in standard deviations and model amenities as the residual in the model-predicted suburban share.[6] (For desegregation orders, X is instead a dummy variable for whether a CBSA's central city received an order between 1970 and 2000.)

Appendix Table A3 reports results. Column (1) shows bivariate regressions of model amenities on each metric. The relationship has the expected sign for three of the four, but increases in the city-suburban murder rate differential are surprisingly negatively associated with suburban amenity changes. There are two reasons this could occur. First, it may be that the initial murder differential is the primary determinant of differences in suburbanization rates across CBSAs, and changes in the differential are less important. To explore this possibility, we also regress the estimated amenity change on the level of the murder differential in 1980 (approximately the midpoint of the period). It exhibits a strong positive relationship. Second, it may be an artifact of the dramatic swings in the overall murder rate during the sample period. A sharp rise from 1960 to 1990 was followed by a sharp fall between 1990 and 2000. If the murder rate has lagged effects on neighborhood choice—perhaps due to slow-moving neighborhood reputations—then looking at contemporaneous changes

[5]Measuring relative racial animus in cities relative to suburbs is difficult, especially given the paucity of data sources that are consistently available from 1970 to 2020. Future work might explore alternative measures of animus.

[6]We use model-estimated amenities in the suburbs as a whole, rather than in each of our neighborhood categories, because data on observed amenity metrics is not available at the tract level.

may provide a misleading picture.

Next, Columns (2) and (3) report results from a multivariate regression of model-estimated amenities on all of the metrics, with Column (2) including the change in the murder differential and Column (3) instead including the 1980 level. The adjusted R^2 coefficients are both 0.40, and racial animus and job suburbanization appear to play the biggest roles. Adding region fixed effects in columns (4) and (5) reduces the adjusted R^2 slightly to 38% and 39%. While the coefficient estimates on individual amenity metrics are noisy, they are generally economically significant. For example, a one standard deviation improvement in the racial animus measure is associated with a two to five percentage point increase in the change in the Black suburban share (versus the mean change of 21 percent).

These exercises show that the model residual is strongly correlated with amenity metrics, which can explain a substantial share of its variance across CBSAs. This suggests that the model-estimated amenities are capturing real changes in neighborhood desirability, although reverse causality and endogenous amenities prevent us from drawing causal conclusions.

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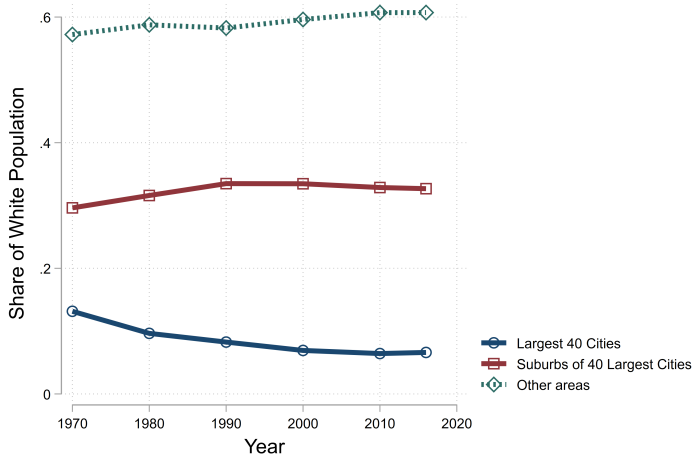
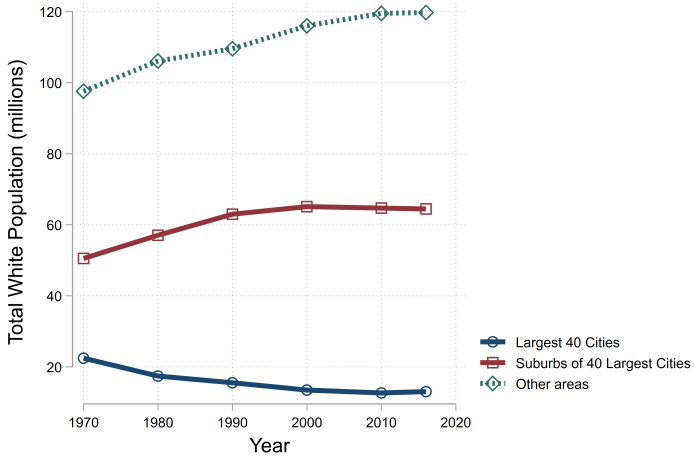
II.D Additional Figures and Tables

Figure A1: Change in Distribution of White Population Since 1970

Panel A: Share of White Population



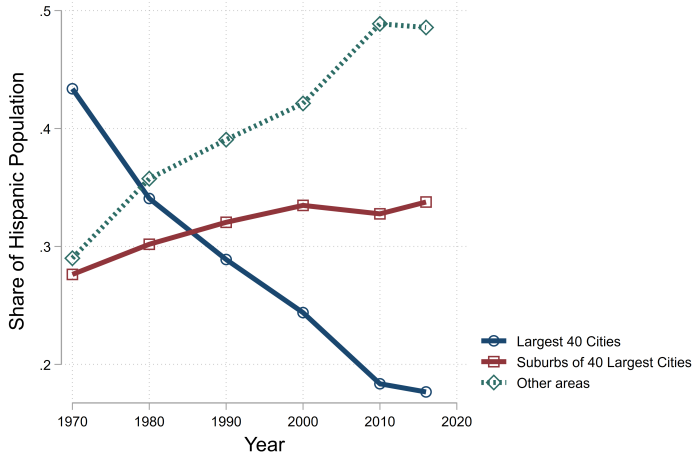
Panel B: Total White Population



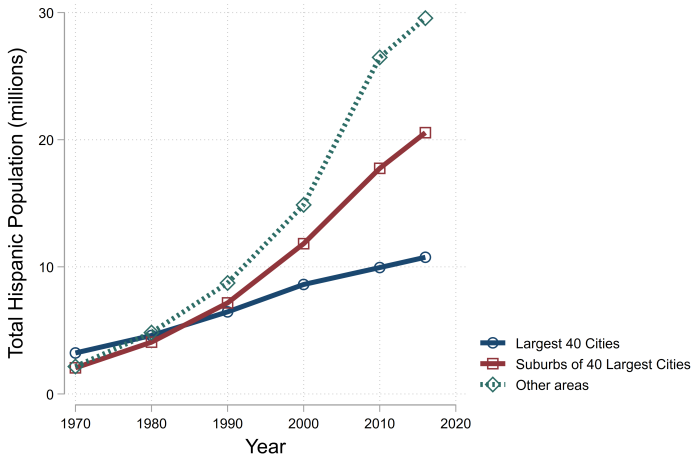
Notes: Total and share of White population in large central cities, their suburbs, and other areas. Largest 40 cities is defined as the central cities of the most populous 20 CBSAs in southern states and in all other states, as measured in 1970. Suburbs are defined as the CBSAs containing these cities, less the principal city itself. Municipalities and CBSAs are consistently defined according to 2010 boundaries. We assign areas that had not been assigned to a census tract in 1970 or 1980 to the other areas category, inferring their population from the national White population.

Figure A2: Change in Distribution of Hispanic Population Since 1970

Panel A: Share of Hispanic Population



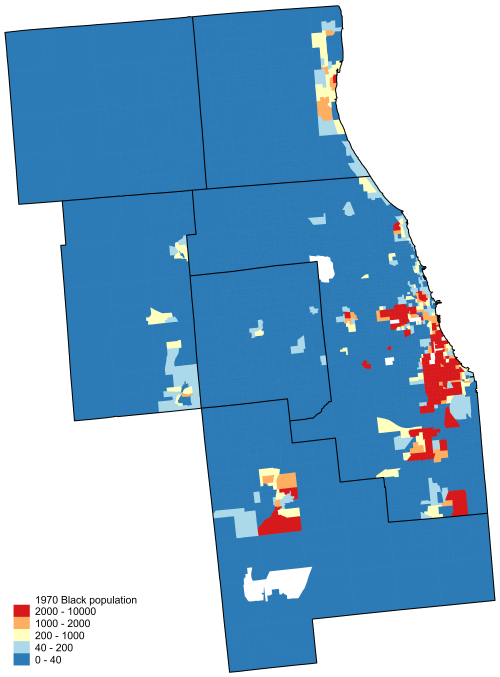
Panel B: Total Hispanic Population



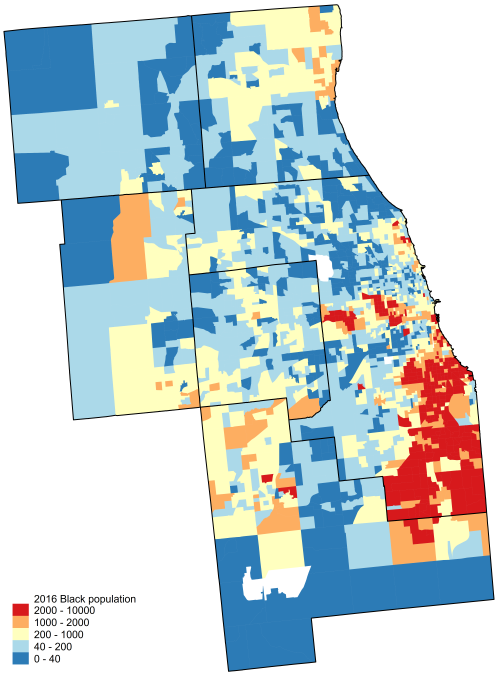
Notes: Total and share of Hispanic population in large central cities, their suburbs, and other areas. Largest 40 cities is defined as the central cities of the most populous 20 CBSAs in southern states and in all other states, as measured in 1970. Suburbs are defined as the CBSAs containing these cities, less the principal city itself. Municipalities and CBSAs are consistently defined according to 2010 boundaries. We assign areas that had not been assigned to a census tract in 1970 or 1980 to the other areas category, inferring their population from the national Hispanic population.

Figure A3: Black population in Chicago metro

Panel A: Census tract Black population in 1970



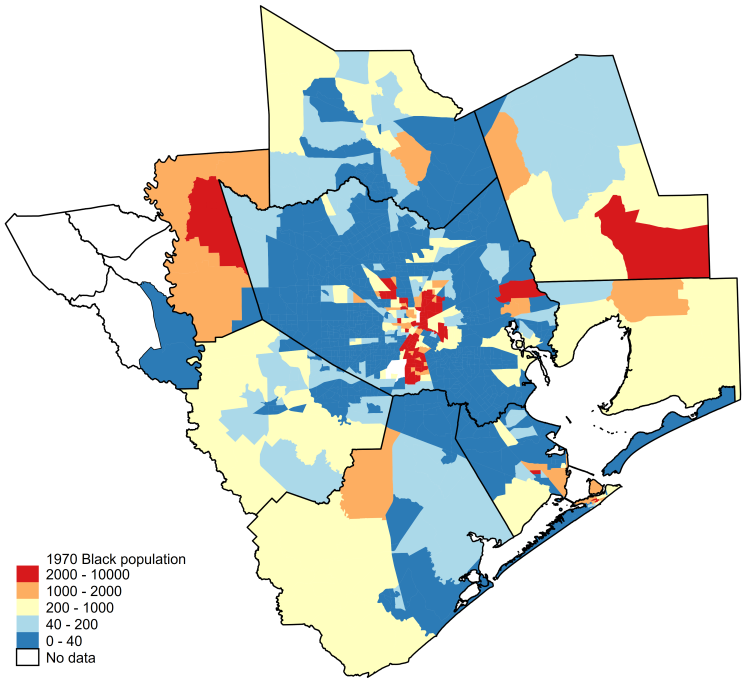
Panel B: Census tract Black population in 2016



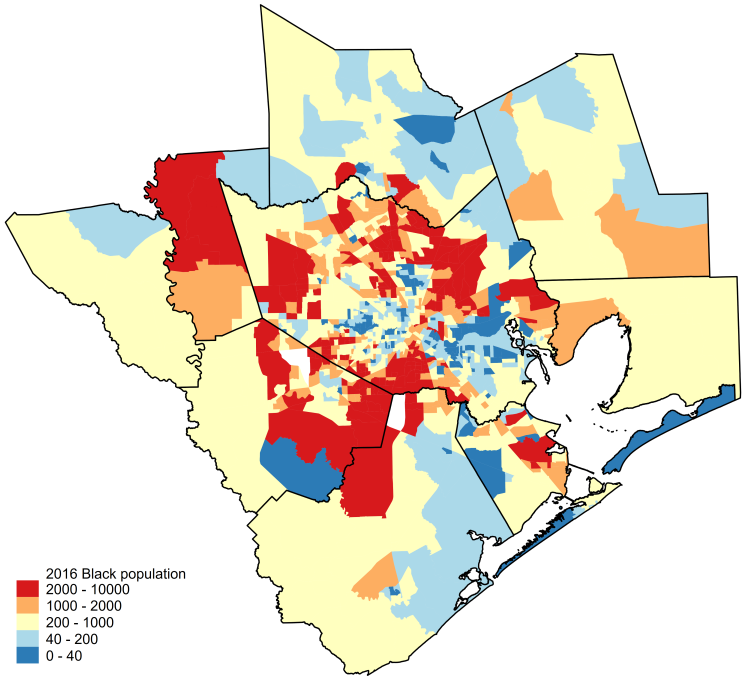
Notes: Total Black population by census tract in the Chicago CBSA in 1970 (Panel A) and 2016 (Panel B). Tracts with 0-40 Black individuals are shown in dark blue; 40-200, light blue, 200-1,000, beige; 1,000-2,000, orange; and 2,000 to 10,000, red. Data are drawn from the 1970 census and the 2014-2018 ACS. Census tract boundaries are from 2010. Black lines represent county boundaries.

Figure A4: Black population in Houston metro

Panel A: Census tract Black population in 1970



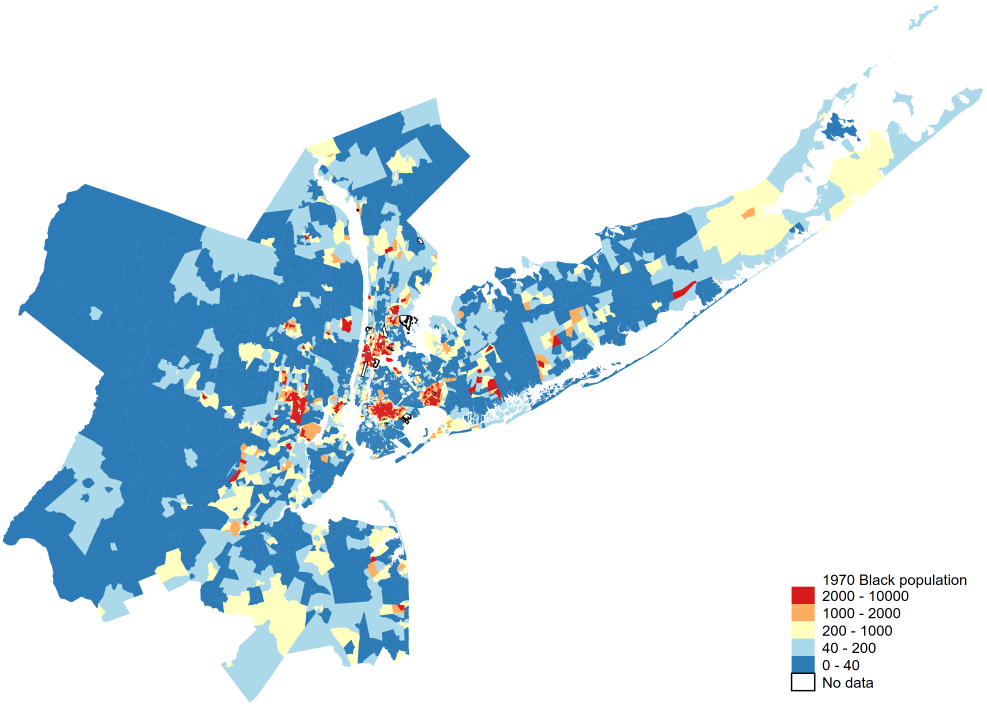
Panel B: Census tract Black population in 2016



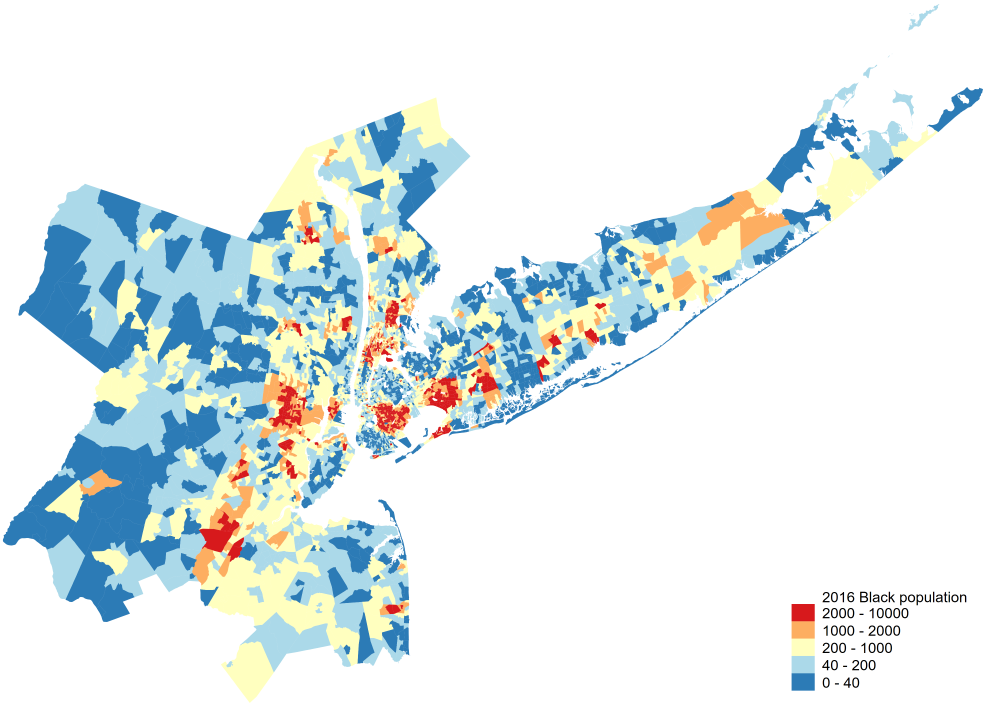
Notes: Total Black population by census tract in the Houston CBSA in 1970 (Panel A) and 2016 (Panel B). Tracts with 0-40 Black individuals are shown in dark blue; 40-200, light blue, 200-1,000, beige; 1,000-2,000, orange; and 2,000 to 10,000, red. Data are drawn from the 1970 census and the 2014-2018 ACS. Census tract boundaries are from 2010. Black lines represent county boundaries.

Figure A5: Black population in New York metro

Panel A: Census tract Black population in 1970

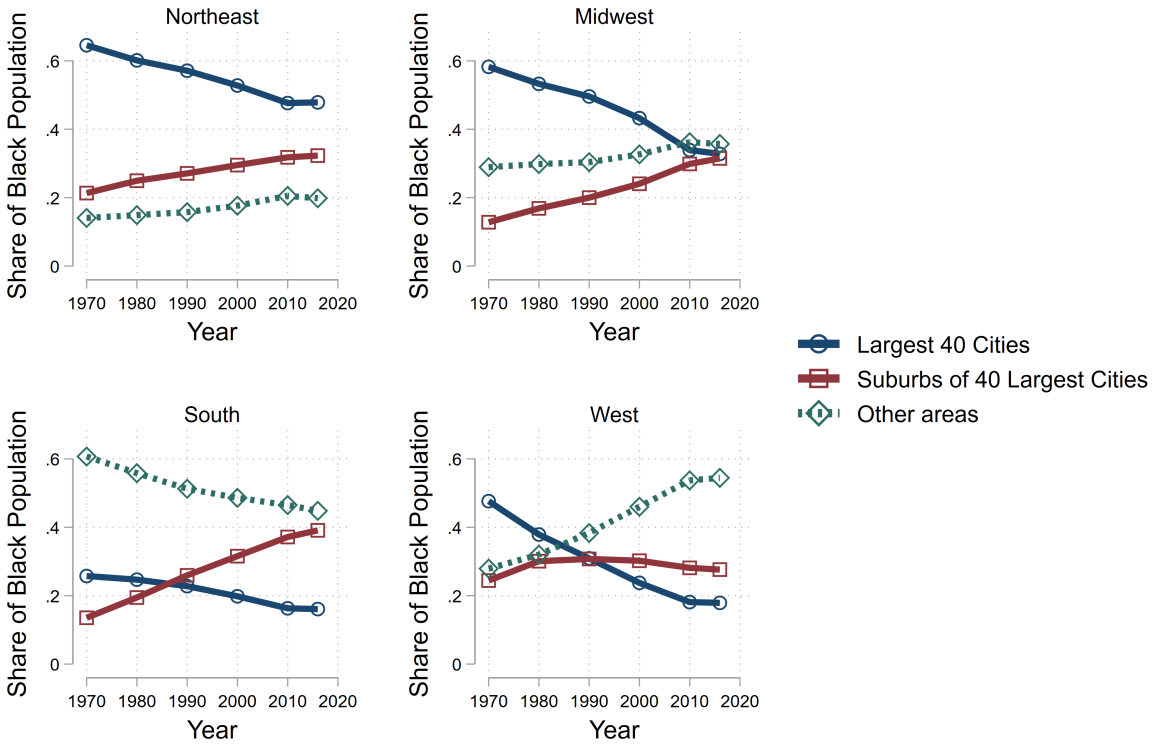


Panel B: Census tract Black population in 2016



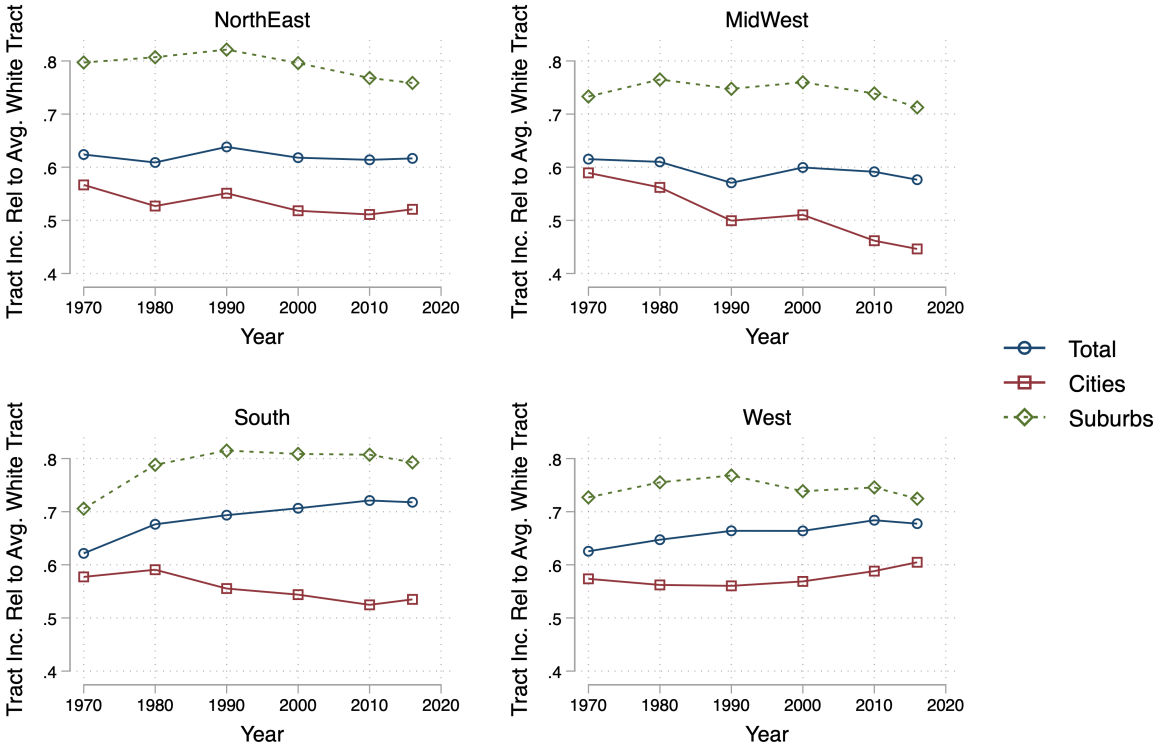
Notes: Total Black population by census tract in the New York CBSA in 1970 (Panel A) and 2016 (Panel B). Tracts with 0-40 Black individuals are shown in dark blue; 40-200, light blue, 200-1,000, beige; 1,000-2,000, orange; and 2,000 to 10,000, red. Data are drawn from the 1970 census and the 2014-2018 ACS. Census tract boundaries are from 2010. Black lines represent county boundaries.

Figure A6: Change in Distribution of Black Population Since 1970 by Region



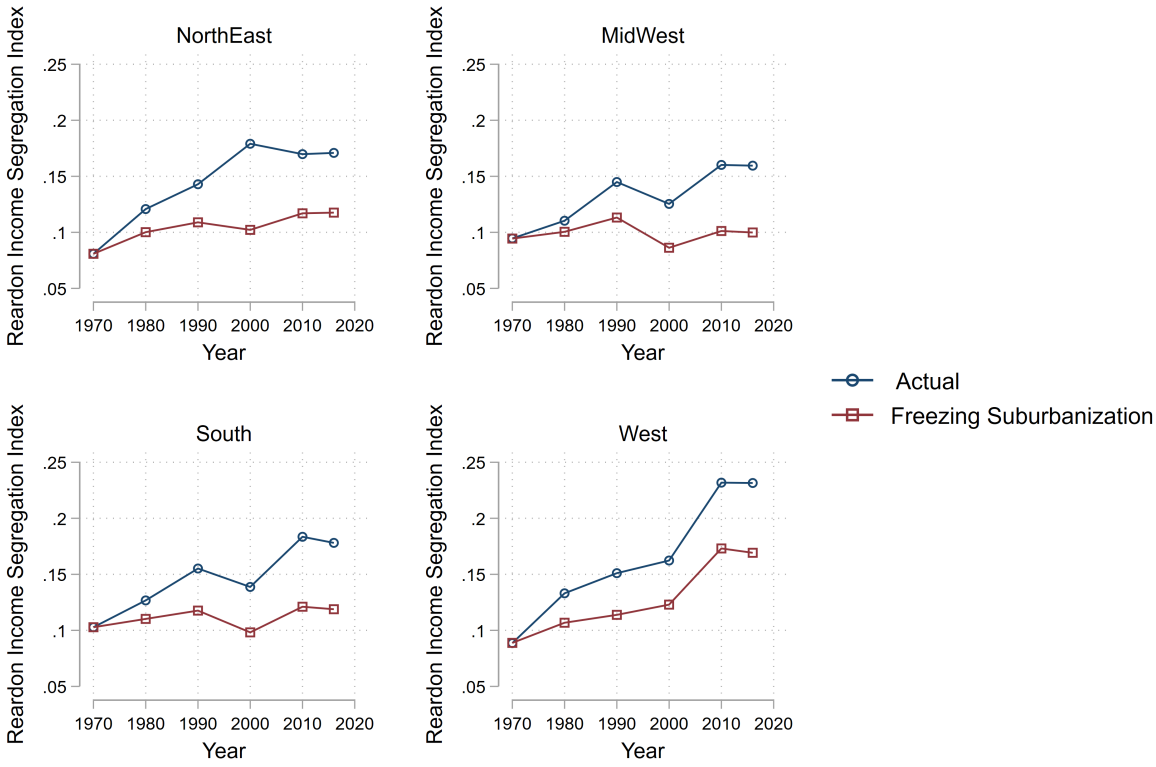
Notes: Total and share of Black population in large central cities, their suburbs, and other areas, separately for each Census Region. Largest 40 cities is defined as the central cities of the most populous 20 CBSAs in southern states and in all other states, as measured in 1970. Suburbs are defined as the CBSAs containing these cities, less the principal city itself. Municipalities and CBSAs are consistently defined according to 2010 boundaries. We assign areas that had not been assigned to a census tract in 1970 or 1980 to the other areas category, inferring their population from the total Black population in the Census Region.

Figure A7: Neighborhood Income for Black Individuals Relative to White Individuals by Region



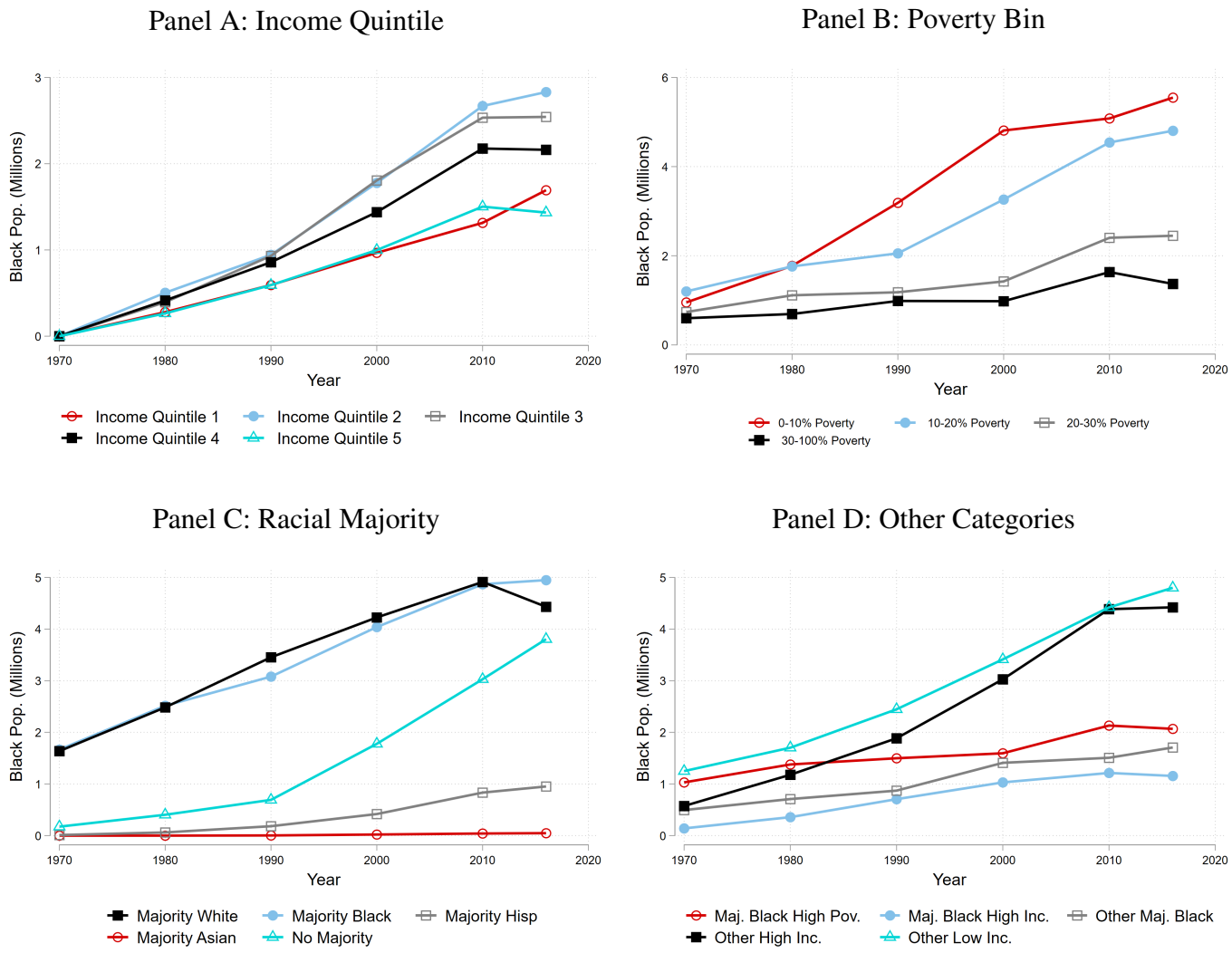
Notes: This figure plots, separately for each Census Region, the time series of average neighborhood median household income for Black individuals divided by the same statistic for White individuals. The blue line contains Black individuals in all sample tracts in the region, while the green and red lines include only Black individuals in the suburbs and cities, respectively. In all cases, neighborhood income among White individuals (the denominator) includes all tracts in the full national sample. Census tract income data comes from the 1970 to 2000 decennial censuses and the 2008-2012 and 2014-2018 ACS. The exercise uses our primary sample of 40 large cities and their suburbs.

Figure A8: Change in Income Segregation Within Black Households by Region



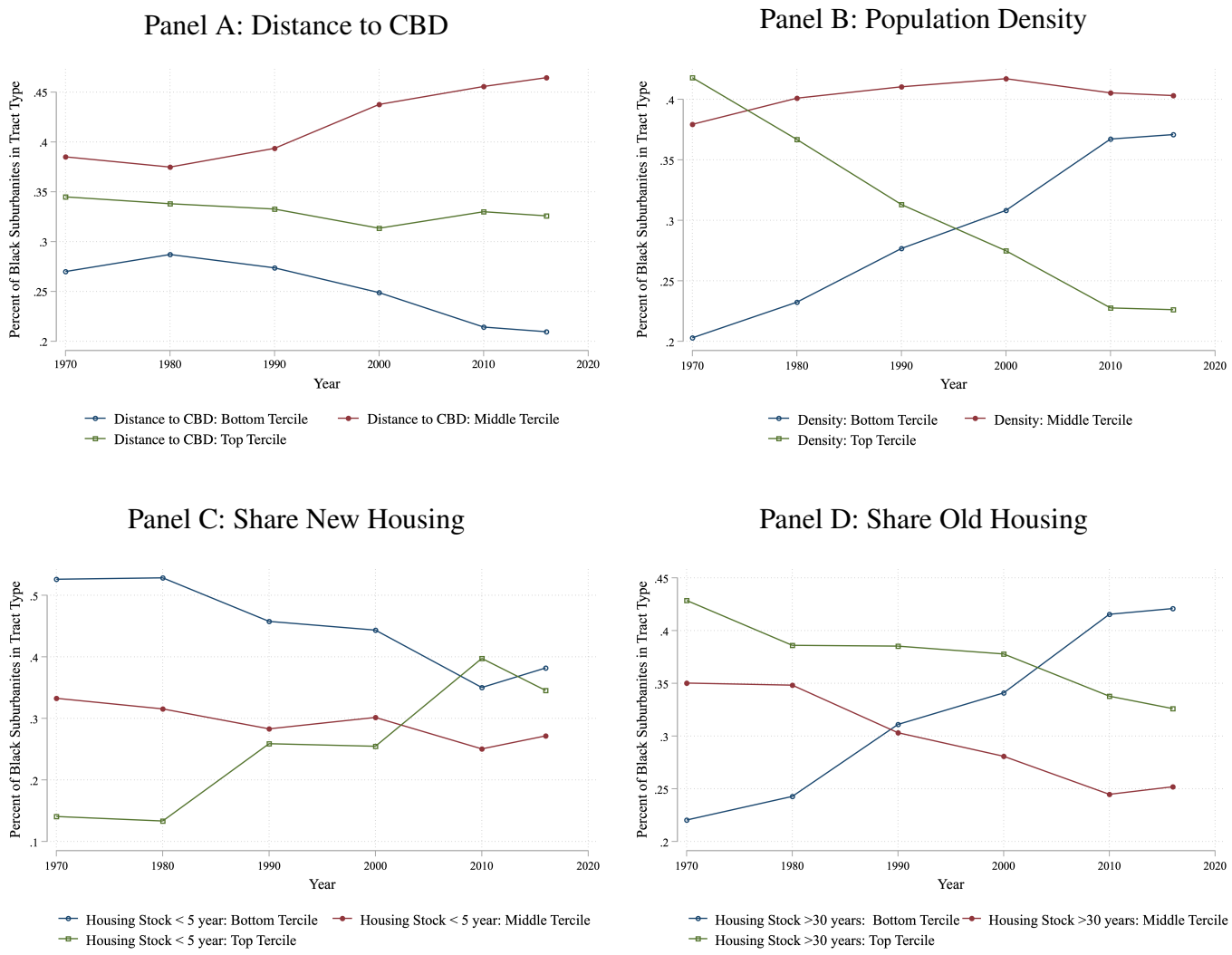
Notes: This figure shows the evolution of the Reardon and O'Sullivan (2004) income segregation index within Black households from 1970 to 2016, separately for each Census Region. The index can be interpreted as the share of the variation in household income that is between census tracts. The blue line shows the actual evolution of this index, while the red line shows the evolution under the counterfactual assumption that the share of Black households living in the suburbs and the income segregation of Black households in suburban tracts both remained frozen at their 1970 values. The index is computed using Census and ACS data on the distribution of Black households across income bins within census tracts, as detailed in Appendix I. The exercise uses our primary sample of 40 large cities and their suburbs.

Figure A9: Black Population in Suburban Neighborhood Categories



Notes: This figure shows Black population levels since 1970 in different types of suburban neighborhoods. All neighborhood characteristics are measured contemporaneously in each year. Panel A shows quintiles of median household income, computed within CBSAs. Panels B and C categorize tracts based on poverty rate and racial majority, respectively. Panel D focuses on growth in majority-Black neighborhoods with different socioeconomic status, defining high poverty as above 20% and high income as above the CBSA median. Data come from the 1970 to 2010 decennial censuses and the 2008-2012 and 2014-2018 ACS. This exercise uses our primary sample of 40 large cities and their suburbs.

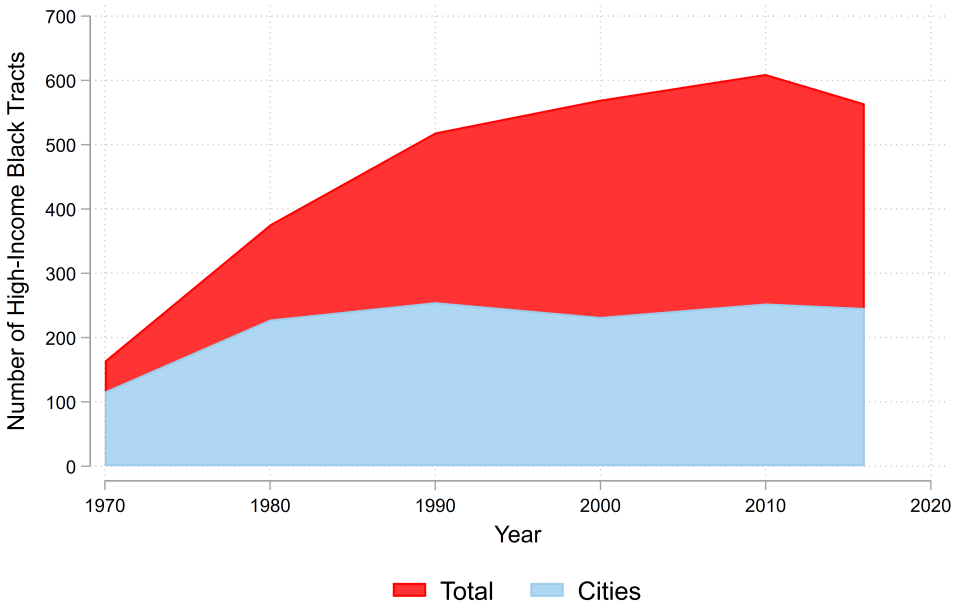
Figure A10: Physical Characteristics of Black Suburbanite Neighborhoods



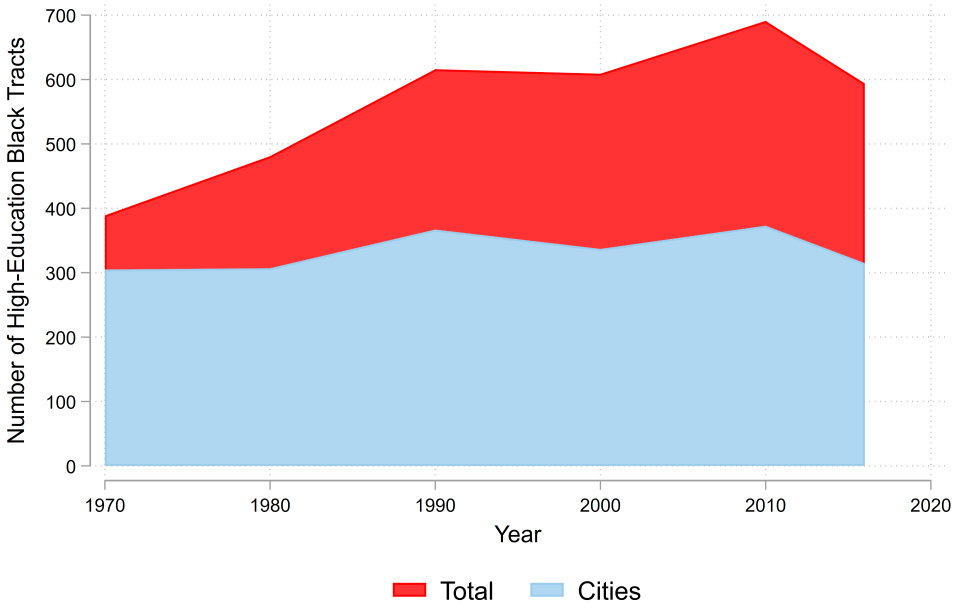
Notes: This figure shows the share of the Black suburban population living in different categories of census tracts. Panel A shows the share in different terciles of distance from tract centroid to CBSA central business district. Panel B shows terciles of population density. Panel C classifies tracts into terciles based on the share of their housing units that were built in the last 5 years. Panel D instead uses the share of housing units that are older than 30 years. Data come from the 1970 to 2000 decennial census long forms and the 2008-2012 and 2014-2018 ACS. This exercise uses the suburban tracts in our primary sample of 40 large cities.

Figure A11: Growth in Majority-Black Neighborhoods with High Levels of Income and Education

Panel A: Median Income Above Sample Median

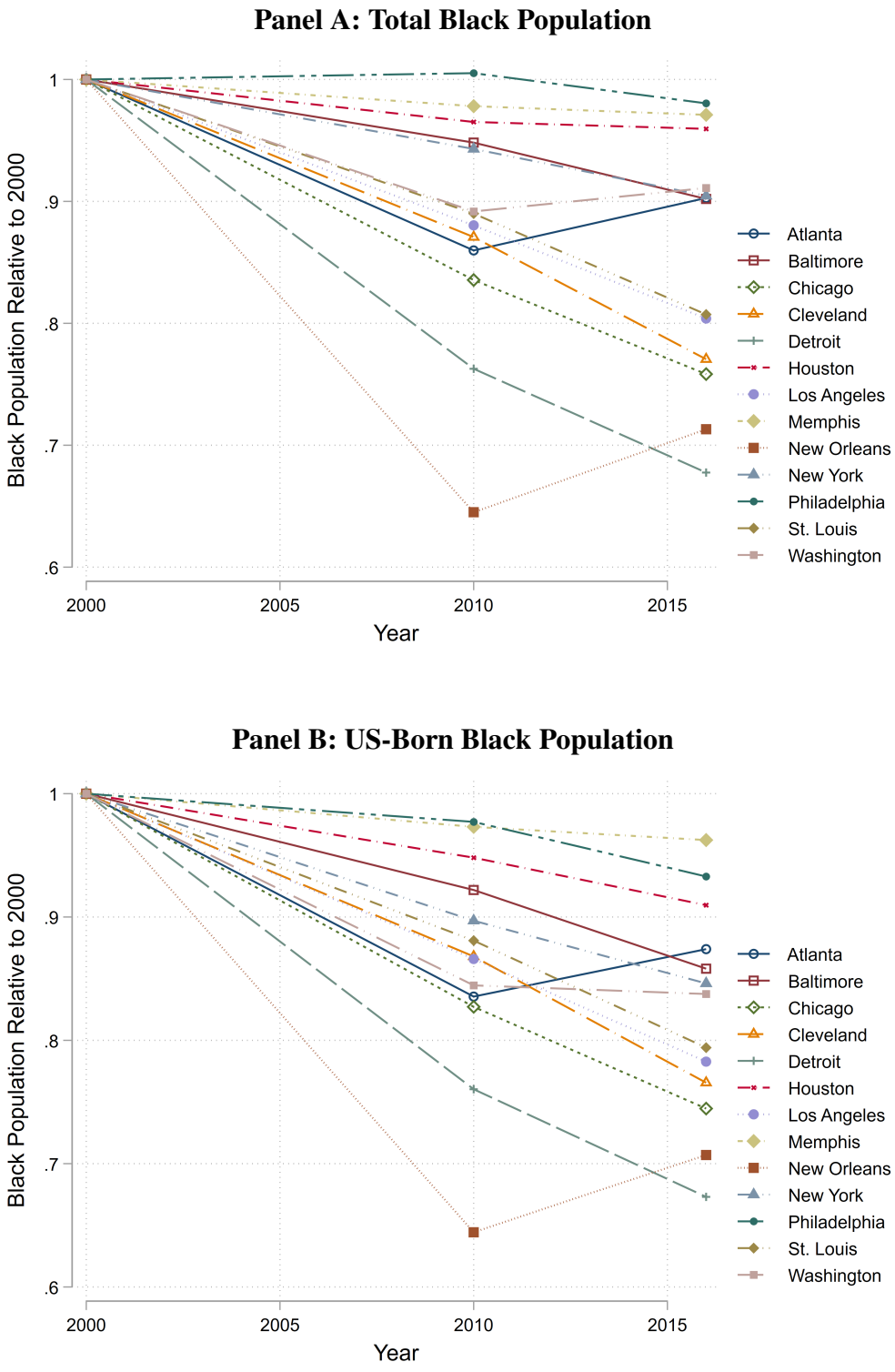


Panel B: College Share Above Sample Median



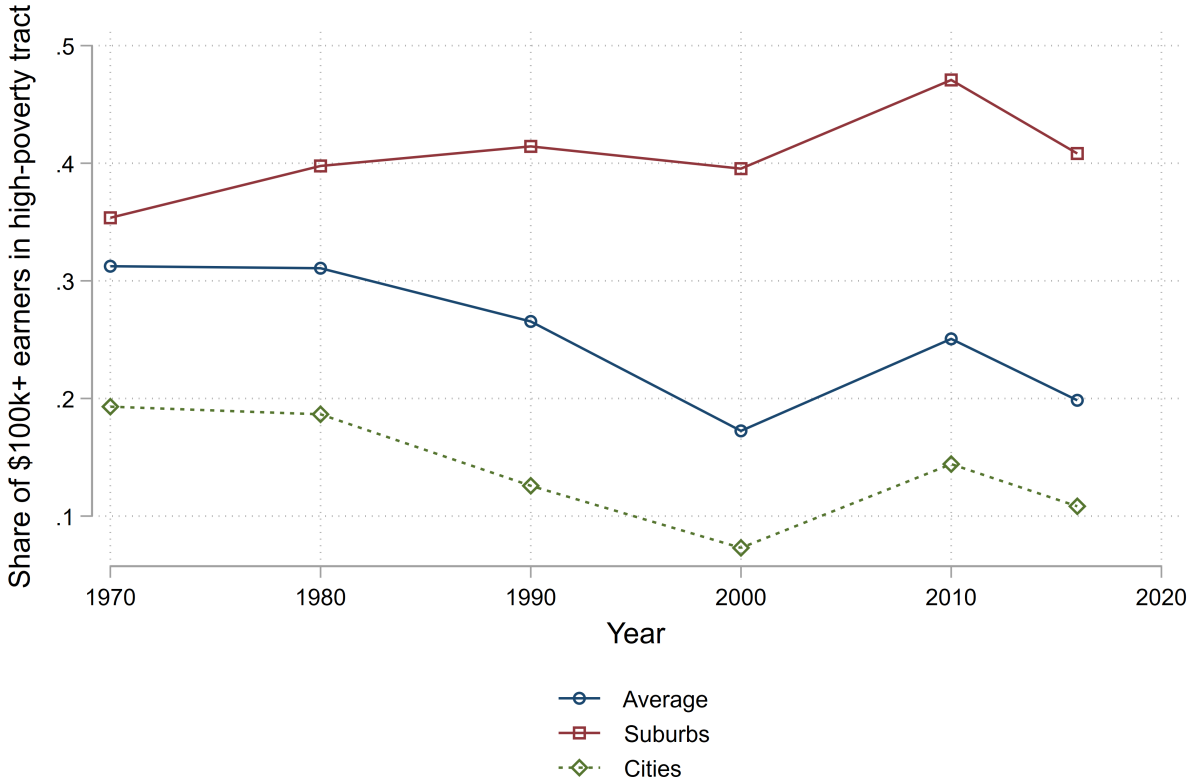
Notes: This figure shows the number of census tracts that are majority Black and either high income (Panel A) or high education (Panel B). High-income is defined as having tract median income above the median value in the sample, and high-education is defined analogously for share of residents over age 25 that have at least a bachelor's degree. In both panels, the blue area represents the number of tracts that fit the definition in central cities, while the red shows the total number of tracts that fit the given definition. The exercise uses our primary sample of 40 large cities and their suburbs.

Figure A12: Black Population Decline in Major Cities



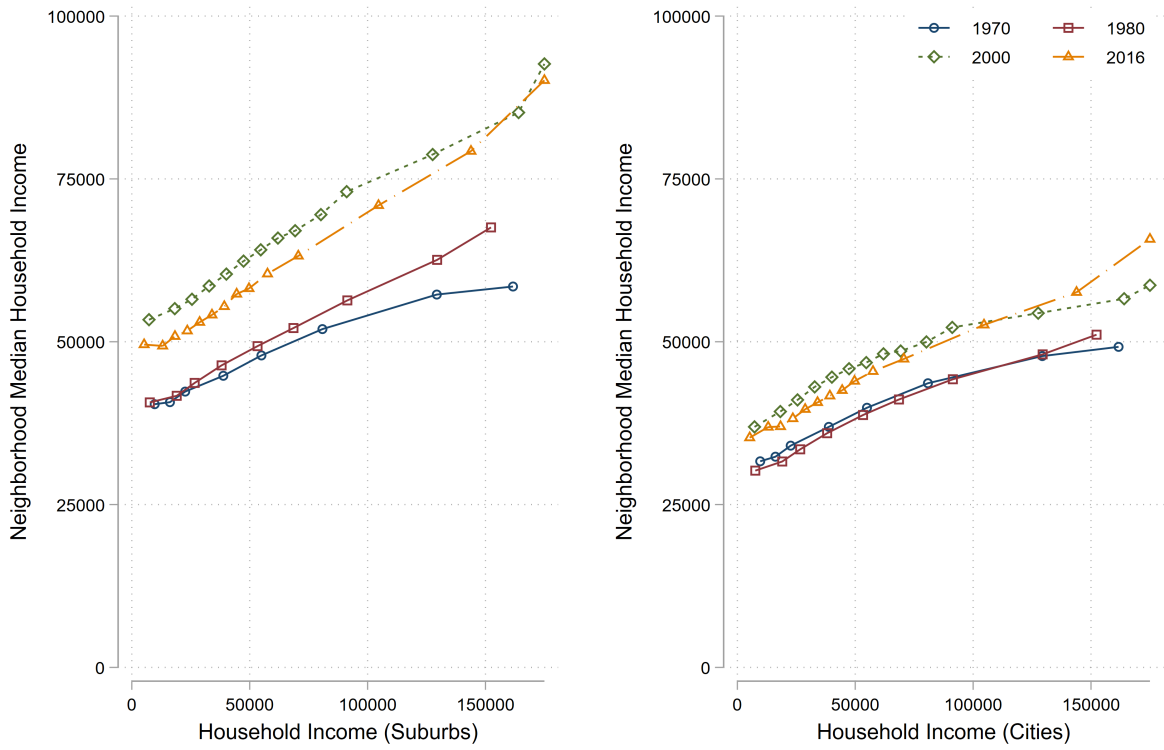
Notes: This figure shows the Black population in major central cities since 2000. The 13 central cities with the largest Black population in 1970 are included. Data for 2000 and 2010 come from the decennial census, while data for 2016 come from the 2014-2018 ACS.

Figure A13: Share of Black High-Earners in High-Poverty Tracts



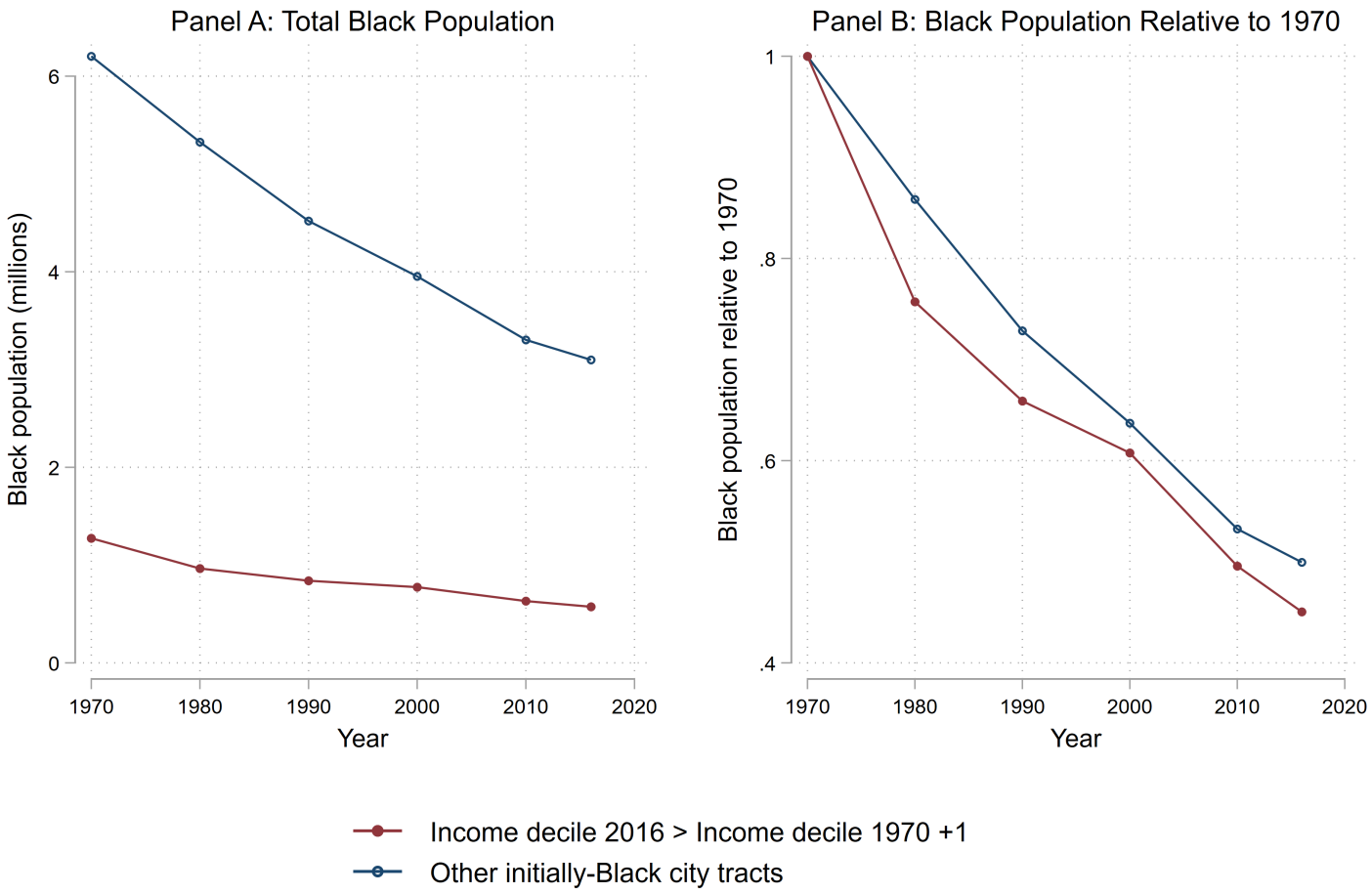
Notes: This figure shows the share of Black high-earners (households with income above $100k in 2018 dollars) who live in high-poverty census tracts (defined as poverty rates greater than 20%). The sample average is shown in blue, the average for high earners in central cities is shown in red and the average for high earners suburbs is shown with the dotted green line. The contemporaneous federal poverty threshold is used in each year. We identify high earners as those in income bins with midpoint above $100,000 (inflation adjusted to 2018). Data come from the 1970 to 2000 decennial census long forms and the 2008-2012 and 2014-2018 ACS. This exercise uses our primary sample of 40 large cities and their suburbs.

Figure A14: Black Household Income versus Neighborhood Income



Notes: Evolution of the relationship between Black households' income and their neighborhood's median income. Each line shows the relationship in a different year, with median neighborhood income on the y-axis and household income on the x-axis. The left panel represents suburban households, while the right contains those in central cities. Household income is inflation-adjusted and set at the midpoint of each income bin provided by the Census Bureau in a given year. The exception is income bins with a lower limit exceeding $175,000, for which we set household income to $175,000 in order to remove top-coding differences across years. The exercise uses our primary sample of 40 large cities and their suburbs.

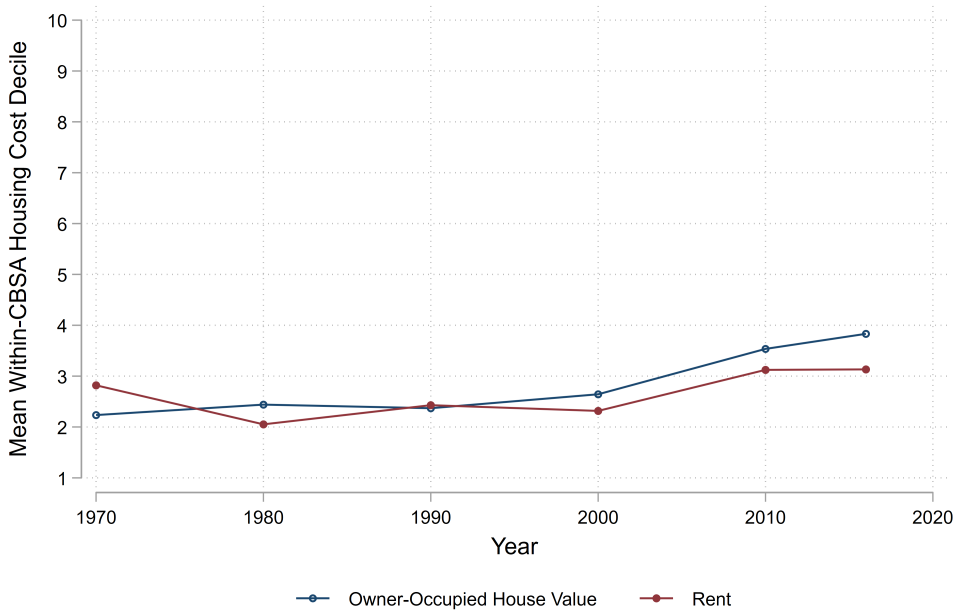
Figure A15: Gentrification and Black Population Change in Historically-Black City Neighborhoods



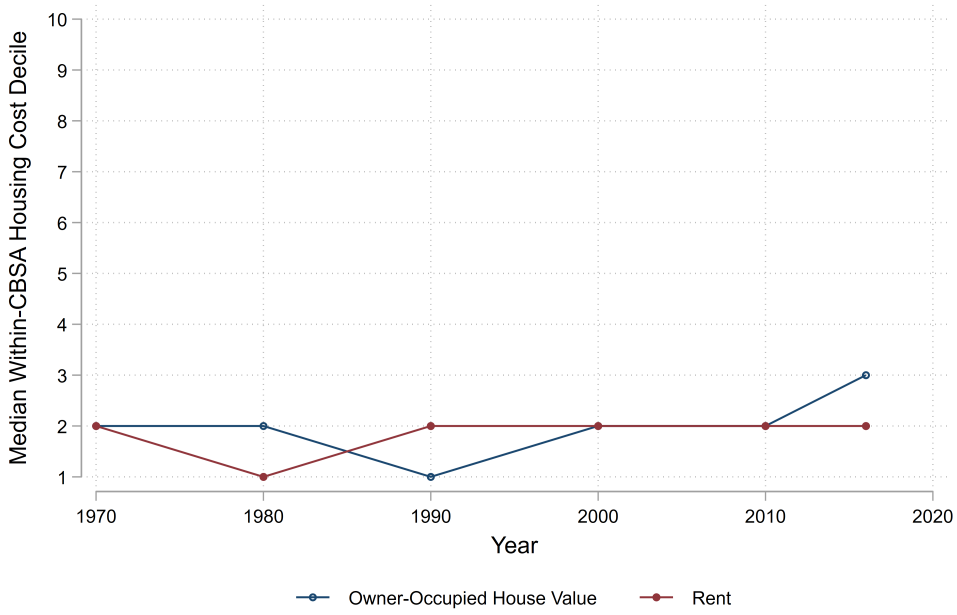
Notes: This figure examines Black population change in city neighborhoods that were majority-Black in 1970. Panel A shows total Black population in the subset of these neighborhoods that experienced a median income increase of greater than one decile (measured within CBSA) between 1970 and 2016 and in the subset that did not. Panel B shows Black population in the two sets of neighborhoods as a share of their 1970 Black population.

Figure A16: Housing Costs in City Neighborhoods (Weighted by 1970 Black Population)

Panel A: Mean Within-CBSA Decile

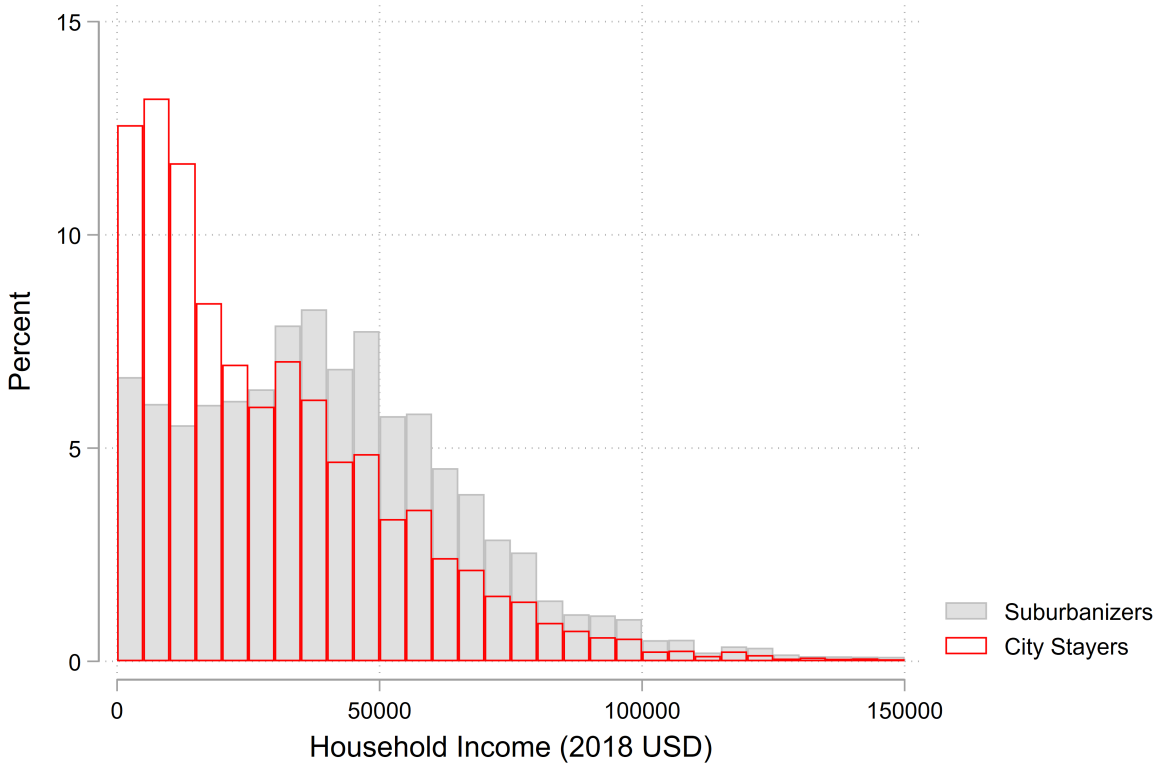


Panel B: Median Within-CBSA Decile



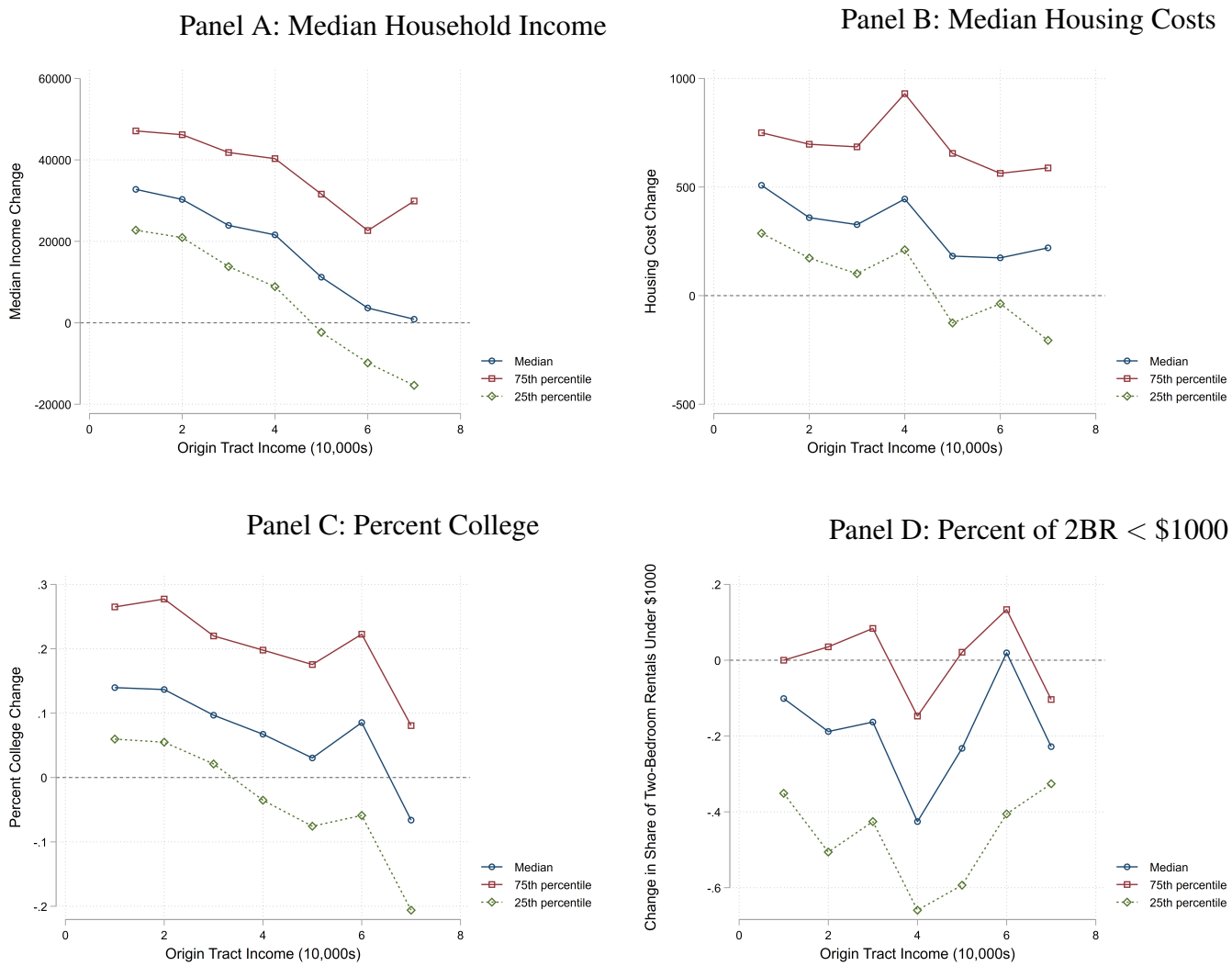
Notes: This figure shows the time series of the mean (Panel A) and median (Panel B) within-CBSA deciles of home value and rent for city neighborhoods, weighted by Black population in 1970. This illustrates the subsequent change in housing costs in the neighborhood of the average Black city dweller in 1970. The measure of both home values and rents in each tract is the median as reported by the Census and the ACS.

Figure A17: Selection of Suburbanizers from Cities



Notes: This figure plots the distributions of household income for Black households who suburbanized (solid gray rectangles) in the five years prior to the 1980 or 1990 censuses versus those who remained in central cities (hollow red rectangles). Suburbanizers are defined as moving from a central city to its suburbs. Data come from the 1980 and 1990 decennnial censuses. Only a subset of the CBSAs in our primary sample are included because the location identifiers in the census data do not always uniquely identify migrants from a city to its suburbs. More details are provided in Appendix I. The CBSAs included are: Baltimore, MD; Boston, MA/NH; Buffalo-Niagara Falls, NY; Chicago, IL; Cleveland, OH; Dallas-Fort Worth, TX; Greensboro-Winston Salem-High Point, NC; Houston-Brazoria, TX; Knoxville, TN; Los Angeles-Long Beach, CA; Memphis, TN/AR/MS; Minneapolis-St. Paul, MN; New Orleans, LA; New York, NY-Northeastern NJ; Orlando, FL Philadelphia, PA/NJ; Providence-Fall River-Pawtucket, MA/RI; Richmond-Petersburg, VA; San Antonio, TX; San Francisco-Oakland-Vallejo, CA; Seattle-Everett, WA; Norfolk-VA Beach–Newport News, VA; Washington, DC/MD/VA.

Figure A18: Comparing Origin and Destination Neighborhoods of Suburbanizers from Highly Black Areas



Notes: This figure shows the difference in neighborhood characteristics (destination minus origin) for people who suburbanized from city tracts that were over 80 percent Black, conditional on the median income of the origin tract. The blue line represents the median value of the difference, while the red and green are, respectively, the 75th and 25th quantiles. The sample includes only moves to the suburbs of the origin city during the years 2010-2016. Migration data is from Infutor Data Solutions, and tract characteristics are drawn from the 2008-2012 ACS. Median housing costs includes gross rent for renters and gross ownership costs for homeowners, and percent college is defined as the share of people over age 25 with at least a bachelor's degree. Panel D provides a measure of the availability of low-cost housing—the percent of two-bedroom rental units with gross rent below $1,000. The exercise includes our primary sample of 40 large cities and their suburbs.

Table A1: Summary Statistics on Census Tracts in Primary Sample

Area	*Year*	*Total Pop.*	*Black*	*White*	*Hispanic*	*Other*	*High-poverty tracts*	*Majority-Black tracts*	*Total tracts*
City	1970	35.49	9.20	22.44	3.22	0.63	2255	1886	9790
City	1980	33.22	9.99	17.40	4.60	1.23	3405	2445	9790
City	1990	34.03	10.16	15.53	6.45	1.88	3972	2602	9790
City	2000	35.87	10.74	13.47	8.61	3.05	4360	2780	9790
City	2010	36.06	9.95	12.66	9.94	3.50	4927	2673	9790
City	2016	37.83	9.59	13.03	10.75	4.46	4515	2468	9790
Suburb	1970	56.53	3.49	50.51	2.05	0.48	1238	553	22695
Suburb	1980	68.11	5.47	57.04	4.07	1.54	1275	850	22695
Suburb	1990	80.56	7.41	62.96	7.15	3.03	1835	1100	22695
Suburb	2000	93.33	10.48	65.10	11.81	5.94	1953	1377	22695
Suburb	2010	104.50	13.69	64.69	17.75	8.38	3604	1600	22695
Suburb	2016	110.48	14.19	64.45	20.55	11.29	3301	1572	22695

Notes: This table shows summary statistics of the census tracts included in our primary sample, stratified by year and central city status. Population counts are in millions, and the Black, White, Hispanic, and Other columns show the total population of that group. High-poverty tracts shows the number of tracts that have a poverty rate over 20%, and majority-Black count is the number that are over half Black. Finally, tract count is the total number of sample tracts in cities or suburbs in a given year.

Table A2: Number of City and Suburban Tracts in Sample CBSAs

CBSA Title	City tracts	Suburban tracts
New York-Newark-Jersey City, NY-NJ-PA	2214	2432
Los Angeles-Long Beach-Anaheim, CA	986	1921
Chicago-Naperville-Elgin, IL-IN-WI	790	1412
Houston-The Woodlands-Sugar Land, TX	424	644
Dallas-Fort Worth-Arlington, TX	391	930
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	376	1088
San Francisco-Oakland-Hayward, CA	307	666
Detroit-Warren-Dearborn, MI	293	996
San Diego-Carlsbad, CA	268	358
San Antonio-New Braunfels, TX	260	195
Milwaukee-Waukesha-West Allis, WI	206	222
Baltimore-Columbia-Towson, MD	199	476
Minneapolis-St. Paul-Bloomington, MN-WI	195	593
Kansas City, MO-KS	187	329
Washington-Arlington-Alexandria, DC-VA-MD-WV	179	1173
Cleveland-Elyria, OH	174	458
Boston-Cambridge-Newton, MA-NH	174	822
New Orleans-Metairie, LA	173	222
Jacksonville, FL	162	96
Memphis, TN-MS-AR	156	155
Charlotte-Concord-Gastonia, NC-SC	151	385
Nashville-Davidson–Murfreesboro–Franklin, TN	146	232
Pittsburgh, PA	131	574
Seattle-Tacoma-Bellevue, WA	131	587
El Paso, TX	123	38
Atlanta-Sandy Springs-Roswell, GA	117	830
St. Louis, MO-IL	106	509
Virginia Beach-Norfolk-Newport News, VA-NC	99	313
Cincinnati, OH-KY-IN	89	407
Miami-Fort Lauderdale-West Palm Beach, FL	89	1112
Tampa-St. Petersburg-Clearwater, FL	88	648
Buffalo-Cheektowaga-Niagara Falls, NY	79	217
Richmond, VA	66	226
Greensboro-High Point, NC	52	115
Birmingham-Hoover, AL	48	215
Winston-Salem, NC	46	104
Providence-Warwick, RI-MA	39	326
Knoxville, TN	37	165
Orlando-Kissimmee-Sanford, FL	24	365
Charleston-North Charleston, SC	15	139

Notes: This table shows the number of city and suburban tracts in each CBSA in our primary sample.

Table A3: Relationship Between Model Amenities and Directly Measured Amenities Across CBSAs

	Bivariate Regressions	Multivariate Regressions			
		No Controls		Region FE	
	(1)	(2)	(3)	(4)	(5)
Δ Racial animus percentile	-0.039	-0.048	-0.055	-0.024	-0.029
	(0.026)	(0.022)	(0.021)	(0.034)	(0.033)
Δ Job Suburbanization	0.085	0.095	0.085	0.103	0.093
	(0.022)	(0.022)	(0.027)	(0.025)	(0.028)
Δ Central city school deseg order	-0.002	-0.028	-0.022	-0.026	-0.018
	(0.027)	(0.021)	(0.022)	(0.022)	(0.023)
Δ City - Suburb Murder rate	-0.052	-0.023		-0.021	
	(0.025)	(0.022)		(0.022)	
1980 City - Suburb Murder rate	0.070		0.024		0.030
	(0.024)		(0.026)		(0.026)
Adjusted(-within) R2		0.40	0.40	0.38	0.39
N	35	35	35	35	35

Notes: This table reports the across-CBSA relationship between changes in model-estimated relative suburban amenities and direct measures of relative amenity changes. Changes are measured from 1970 to 2000. Column (1) shows results from bivariate regressions of the model amenity changes on each amenity measure, while Columns (2) through (5) show results from a multivariate regression of model amenity changes on changes in all amenity measures. Columns (4) and (5) additionally include Census Region fixed effects. Columns (2) and (4) include the 1970-200 change in the city versus suburban murder rate as the crime variable, while Colums (3) and (5) instead include the 1980 level. Change in racial animus is measured as the difference between a CBSA's percentile ranking in racially charged Google searches in the 2004 to 2007 period (taken from Stephens-Davidowitz (2014)) and its percentile ranking in vote share for George Wallace in the 1968 presidential election (taken from Leip (2022)). The change in job suburbanization is measured as the 1970 to 2000 change in the suburban share of total jobs in a CBSA, taken from Miller (2020) Appendix Table A2. The 1970 to 2000 change and the 1980 level of the murder rate in the central city relative to the suburbs is measured using the FBI's Uniform Crime Records. We use the panel constructed by Kaplan (2021) and follow the cleaning procedure in Chalfin et al. (2022). Central city school desegregation orders between 1970 and 2000 are taken from the Baum-Snow and Lutz (2011) data which are based on Welch and Light (1987) and a review of the history of desegregation orders for the small number of sample cities that were missing from the orignial Welch and Light (1987) data. Desegregation orders are represented with a dummy variable, while the other variables are measured in standard deviation units. The sample consists of the 35 CBSAs (out of 40 in the sample) with non-missing data for all amenity measures. Robust standard errors are reported in parentheses.