Racial and Ethnic Differences in the Distribution of Urban-Suburban Poverty in U.S. Metropolitan Areas, 1980-2000*

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Throughout the 20th century urban America expanded, not only in population, but also in physical size. New suburbs were created as metropolitan areas spread over increasingly more land. This general pattern of expansion occurred in conjunction with the erosion of some barriers to suburban residence that has historically restricted access for some racial and ethnic minorities (Massey and Denton 1993). As metropolitan areas have increased in geographic size, with the development of exurban America and "edgeless cities", suburban housing stock has increased giving all groups, including those historically concentrated in central cities more access to the suburbs (Lang and LeFurgy 2003). This metropolitan phenomenon has attracted attention from both urban scholars and popular media as the suburbs are now where most Americans live and work. Two dominant narratives have emerged providing explanations for this major shift in the housing of America. The first, claims that suburbs were created as exclusive, white, elitist sites of affluence that continue to exist in this manner today. In addition it assumes that residents of them are motivated by racial considerations ultimately resulting in continuing high levels of residential segregation (Jackson 1987; Fishman 1987). This claim is not wholly wrong, postwar suburbs were highly racially exclusive. For example, the Levittown developments "publicly and officially refused to sell to blacks for two decades after the war" – as a result, in 1960 there were no blacks among the 82,000 residents of Long Island's Levittown (Jackson 1987: 241). Even though urban scholarship has shown for decades that suburbs have always been more diverse than presumed to be (Gans 1967; Logan 1976; Stahura 1987), some academic scholars continue to utilize this frame in their analyses of suburbanization. Jackson (1987: 4) sums up this narrative well:

> "Suburbia symbolizes the fullest, most unadulterated embodiment of contemporary culture; it is a manifestation of such fundamental characteristics of American society as conspicuous consumption, reliance upon the private automobile, upward mobility, the separation of the family into nuclear units, the widening division between work and leisure, and a tendency toward racial and economic exclusiveness."

Discussing and defining suburbia based on just an analysis of suburban growth in the early to mid 21st century would lead one to assume white, affluent exclusivity, but taking a broader historical view of the suburb shows that this was not necessarily the case throughout the development of metropolitan America.

Central city mayors have also perpetuated this narrative by blaming the ills of the city on uncaring, selfish, materialistic, exclusive, and indifferent suburbanites (Teaford 2008). The stereotype of the exclusive, idyllic suburb is problematic as some interpret minority group suburbanization as a clear signal of advances in racial equality (Harris 1999). Recent changes in suburban demography created minor revisions to this frame, with scholars now arguing that "good" suburbs continue to be sites of white affluence, while those suburbs that some minorities reside in largely resemble neighborhoods of the central city. For example, Orfield (2002) shows that 40% of the residents in the 25 largest metropolitan areas in the United States lived in "at risk suburbs" that were "often more fragile than the central city communities they surround" (38-39). Although recently scholars are revising their assessments of the social composition of the suburbs, the inherent assumption remains that they were not this way in the past – in this sense they are converging with the second dominant narrative.

The second dominant narrative, particularly salient in popular news media, argues that suburbs used to be sites of elite, white exclusivity, but now that is changing. For example, a recent article reported on National Public Radio is titled, "For First Time, More Poor Live in Suburbs Than Cities" (NPR 12/07). Another article in *The Nation* is titled "The New Suburban Poverty". These articles, along with many others, essentially argue that suburbs are undergoing a major transformation – both race and class based. These arguments rely on compositional data, which fails to take into account the larger context of increasing suburbanization for all groups. Academic

scholarship also supports this frame as some have pointed out the nontrivial number of suburban locations with large nonwhite populations, few affluent residents, weak schools, and crime problems (Bourne 1996; Frey 1998; Phillips 1997). The major flaw then is their lack of attention given to the trend in metropolitan America of suburban living becoming the dominant residential form for everyone and the extent to which suburban variation has existed for much longer. The more important question to consider is whether racial/ethnic minorities or the poor are increasing their presence in the suburbs, relative to the past and whether determinants of suburbanization for poor varies by racial/ethnic group. Holliday and Dwyer (2009) provide evidence that these mechanisms do vary by racial/ethnic group, by claiming a Latin American model of metropolitan development distinct from ecological frameworks of urban development. Our analysis examines racial and ethnic differences in the suburbanization of the poor and finds evidence that the two dominant narratives are both (partially) incorrect. For example, our data shows that in 1980 nearly half of the white poor in metropolitan America lived in the suburbs and approximately 1/3 of both the Asian and Hispanic poor were suburban (see figure 1). While a race and class transformation is occurring in the suburbs, the extent to which it is happening appears to be overstated. Suburbs have actually been rather heterogeneous for longer than some scholarship assumes. In addition, for every disinvested suburban place, there are many places that are thriving – contrary to what much popular news media claim.

In this paper, trends in the suburbanization of poverty are examined from 1980-2000 in American metropolitan areas (MAs). This period is an important one to study, since 1980 suburban living has increasingly become the norm for all Americans. Since 1980, commuting within suburbs, rather than between cities and suburbs, has been the modal commuting pattern in the U.S. (Baldassare 1992). In other words, suburban living increasingly became the way Americans lived. While there has always been suburban variation, recent transformations have led some to argue that

suburbs now differ from central cities primarily because of arbitrary political boundaries, rather than differences in social composition (Baldassare 1992; Frey 1998; Jackson 1987). This work generally focuses on the spread of poverty and its associated social ills to the suburbs with little attention paid to racial and ethnic differences in the suburbanization of the poor. Therefore, our analysis examines trends in and determinants of suburban poverty by racial/ethnic group between 1980 and 2000 in order to determine whether the study period was as rapidly transforming as perceived to be and to pin point the mechanisms creating this change. Much of the prior research on economic segregation and the suburbanization of the poor is limited for three reasons. First, it uses two Census years to examine change over time. This is problematic because only relative differences can be examined, with more data points growth trajectories are estimated. Secondly, it does not incorporate the most recent 2000 Census data. Finally, it only examines a limited number of American MAs. This analysis improves on these general trends in the literature by examining data over three time points (1980, 1990, and 2000), using the 2000 Census, and by examining a large sample of MAs.

We use data from the National Change Database (NCDB) and Hierarchical Linear Modeling (HLM) techniques to estimate levels and determinants of poverty suburbanization for non-Hispanic blacks, non-Hispanic whites, and Asians and Hispanics of all races in 2000, as well as change from 1980 to 2000. We think it is important to examine racial and ethnic differences as housing patterns are a major mechanism through which poverty is perpetuated for some groups and not others. Residential patterns play a major role in the maintenance of a racialized class structure in the United States, therefore to discuss "the poor" as one group fails to theoretically acknowledge and analytically take account of the interconnected nature of race and class in the broader social system. This paper has two major empirical goals. The first is to document variation in poverty suburbanization across racial and ethnic groups. Few comprehensive analyses exist that examine this variation both in the cross section and over time. The second major goal examines reasons for

variation in poverty suburbanization across groups both in the cross section and over time. Three major reasons are tested. First increasing suburban housing supply, relative to that in the central city, may predict increasing suburbanization for all groups, including the poor. Second, that the suburbanization of jobs (a major dimension of economic restructuring in the U.S.) explains why the poor may migrate to suburban areas. Finally, we test the impact of the availability of affordable housing on poverty suburbanization. As overall supply of housing increases in the suburbs, some locations become affordable options for the poor.

More important than just arguing against the dominant narratives of suburbanization, both in scholarship and the popular media, this paper contributes to a growing literature on the suburban poor and economic segregation in general. As economies have become more regional, the problems of poverty that used to be concentrated within central cities are now appearing in suburbs. Much scholarly work investigates racial residential segregation within and across metropolitan areas (to name a few - Massey and Denton 1993; Alba and Logan 1991; Alba and Logan 1993; Farley and Frey 1994); less attention is paid to economic segregation. The latter is important to focus on due to the negative quality of life outcomes that social scientists have shown come with residing in impoverished areas – increased school dropout rates, teenage pregnancy, unemployment, crime victimization, poor job opportunities, a lack of health care services, decent schools, and adequate municipal services (Swanstron et al. 2006; Holliday and Dwyer 2009).

It is also an important investigation as the old adage that "growth is good" may not be so true for everyone, as evidence suggests growth is of little to no benefit for the poor and can actually create more problems than benefits (Logan and Molotch 1987). Furthermore, if poverty is increasingly being suburbanized this has important and unique implications for public policymakers as some suburban locations have little history of providing for these populations. In the 1970s and

1980s economic segregation increased steadily for whites, blacks, and Hispanics of all races. These increases were particularly high for Hispanics and blacks in the 1980s (Jargowsky 1996). Research suggests that these numbers are only likely to increase, thus it is important to study this growing population (Jargowsky 2003).

Factors Contributing to the Suburbanization of Poverty

Historical Trends in the Geography of Poverty

While this analysis focuses on suburban change from 1980-2000, the process of suburbanization has been occurring throughout the history of the United States. Before the automobile, during a period of industrial dominance in central cities, the suburbs were places to avoid the dirty central city and the environmental ills associated with industrial production. In this sense, they were not sites of economic exclusivity, in which profit motivated everyone (Teaford 2008). Instead, they were places where alternative living arrangements were promoted. Places where people could avoid the cramped living in central cities. In fact, before the automobile, transportation throughout an urban area was more "democratic", in the sense that public transport was widely available. Most trolley companies during this period had a policy of five-cent fare, thus making it more affordable for all citizens (Jackson 1987).Therefore, the poor did not need to own their means of transportation, they needed only to have enough for the trolley/train fare – although it is important to note many of these suburbs were racially exclusive. The outskirts of cities in the mid-nineteenth century often housed jobs and establishments that catered to the poor and working class. For example, slaughterhouses, glue factories, social reform establishments such as poorhouses, orphanages, contagious disease hospitals, prisons, and squatter communities were all located in suburbs (Hayden 2003). The perception that the historical development of the suburbs was predominantly driven by the desire of rich whites to distance themselves from poverty and

racial/ethnic minorities is flawed. While elite whites certainly sought to distance themselves from racial and ethnic minorities, so did poor whites, resulting in increasing levels of racial residential segregation and suburban poverty. Generally, there appears to be a conflation between whiteness and affluence in some research that fails to acknowledge that racial considerations motivated much suburban development resulting in the increasing flight of all whites away from central cities, but whites' motivations did not create an American suburbia that was exclusively white, much variation existed throughout the development of the metropolis.

Suburbanization of jobs. A major factor in understanding how outward growth in urban areas occurred is that the physical location of jobs has changed. Suburban willingness to welcome business is arguably the major factor driving the decentralization of commerce in U.S. metropolitan areas. As the American economy transitioned from one creating capital intensive, production based jobs located in factories and shops in the central city to an economy based more on knowledge production and low-skill service work, increasingly located outside the central city, so too did residential settlement patterns transition. In addition, those capital intensive production jobs remaining in the U.S. increasingly moved to suburban areas, although employment moving to the suburbs is not as new a development. Historical evidence suggests that even in the late 19th century jobs were increasingly moving to newly emerging suburbs – along with much of the white working class[1] (Teaford 2008). These suburbs of the late 19th century were often inhabited by meatpacking plants and stockyards, bearing little resemblance to the idealized notions of suburbia at this time. In 1899, 55% of production workers in Pittsburgh, Pennsylvania were employed in the suburbs and the central city accounted for a minority of the area's manufacturing employment (Muller 2001). There is also evidence that the black working class was also developing a foothold in suburban America at

[1] It is important to keep in mind that during this time period there were still white ethnics categorized as racial minorities that today are considered "white". The boundaries of whiteness are always fluid.

the same time. Brooklyn, Illinois – east of St. Louis – was a black dominated community of working class residents in 1908. These workers commuted to the steel mills and slaughterhouses located in other suburbs (Teaford 2008). In addition, many poor minority suburbs developed contiguous to those of the elite as the upper class regarded the close proximity of a poor servant class as an advantage (Jackson 1987). This suggests that suburbia may have never been as white or as elite as scholars and popular perception assume. By the early 20th century, suburbs were seemingly as diverse as they are today – with some being upper class refuges where Victorian sensibility could be preserved, while others were manufacturing centers with low tax rates, and still others were ethnic villages.

While jobs have suburbanized for quite some time, the rapidity of post World War II decentralization of industry and suburbanization make it logical that newer immigrants would forego initial residence in central cities, relative to their historical peers. The considerable rate at which decentralization occurred throughout the past few decades has important implications for the residential location of the poor. Rising poverty rates in some suburbs throughout the 1990s is an indication that the poor may have relocated to suburban places, especially near those where job growth is occurring. Job suburbanization may prove particularly important in explaining the lack of poverty suburbanization of Blacks and Hispanics, as prior research on the spatial mismatch between poor members of these groups and the location of jobs leads us to believe that they are likely to be the most highly disadvantaged during this process (Wilson 1987). Additionally, there is evidence that employers tend to hold the most negative attitudes towards members of these groups (Moss and Tilly 2001). Job seekers are unlikely to seek jobs in which they anticipate racial or ethnic discrimination.

Housing Supply. The supply of suburban housing, relative to that in the central city, may help explain why some MAs have a higher share of poverty in their suburbs. In this case, the poor could attain suburban residence with little change in actual social relations between them and the non-poor. Furthermore, levels of suburbanization for groups may just be a reflection of overall urban growth, rather than upward mobility on various measures of human capital. Alba et al. (1999) find some evidence for this, in that immigrant suburbanization reflects MA growth patterns; this is especially the case for MAs that are not historic immigrant gateway destinations. In these places, migrants are more often directly settling in suburbs, rather than following the traditional city to suburb pattern in the major gateway cities. Along with creating more suburban poverty, this would likely mean increasing concentration of the affluent. There is evidence that this is exactly what may be happening. In the 1990s, inequality in suburbs increased. There was a decline in middle income suburbs and increases in both affluent and poor suburban municipalities. As a proportion of all suburbs, poor suburbs increased significantly in the 1980s (from 16.2% to 26%), but then fell slightly by the end of the 90s – to 24.7%. During the 1980's the proportion of suburbanites residing in poor places increased from 8.4% to 17.4%, by the end of the 1990's this proportion was 18.1%. In 1980 nearly 75% of suburbanites resided in middle income places, in 1990 this figure was 63.4%, and by 2000 it was 60.8% (Swanstrom et al. 2006). Although these figures show a decline in the proportion of poor suburbs from 1990 to 2000 and, basically, stagnation in the proportion of suburbanites residing in poor places during the same period, it is particularly striking that the decline in poor suburbs and the relative stagnation in the proportion of suburbanites residing in these poor places did not experience dramatic declines, considering the 1990s were a time of nearly decade long economic expansion; although evidence suggests that this expansion favored the affluent more than the poor (Kilborn and Clemenson 2002; Rodriguez and Dedman 2002).

Similar to job suburbanization, the story of the poor living in the suburbs has historical roots that are often neglected by those advocating either of the dominant narratives on the changing suburb. Poor immigrants created self-built suburban communities early in the 20th century. In the 1920s, workers employed in Chicago's west side factories bought cheap lots in the suburban community of Westmont. Commenting on the economic status of these newly arriving residents a local priest reported that "Nearly all of my flock are about one month's wages ahead of poverty" (Heiden 1985). Even in urban areas where racially restrictive covenants barred non-whites, the black poor created their own suburban living. In 1924, a Cleveland black newspaper advertised a subdivision offering the chance to "raise chickens and garden truck, and still be close enough to the city of Cleveland so that residents could come and go from their work within 30 minutes time (Weise 2004; Hayden 2003). Although, non-whites found ways to attain suburban residence, they were still largely confined to specific suburbs as they were often met with racial violence and intimidation when attempting to reside in white suburbs. Sugrue (1996) described a self built African American suburb in the early 1940s outside of Detroit (in the Eight Mile-Wyoming area) that was viewed by developers as an obstacle to the growth of white suburbia. New Deal era housing policy allowed this community to receive some subsidies to help it develop, but in the post World War II era these services became unavailable as racist lending policies prevented them from receiving these services. These same policies required the neighboring white community to construct a wall between them in order to reap the rewards of the recently passed Fair Housing Act. The Eight Mile-Wyoming case provides a clear illustration that the suburbanization of blacks was highly contingent upon the political climate of the period, while white suburbanization was consistently subsidized by the Federal Government, regardless of era.

Compositional and redistributive shifts. Changes in the suburban share of poverty within an MA can result from compositional or redistributive shifts in population. Compositionally, formerly non-

poor individuals can be downwardly mobile and become poor over time. Poor individuals could achieve upward mobility and move out of poverty. In both these cases, changes in the suburban share of the poor within an MA could occur without any poor people having to migrate. In contrast, redistributive shifts alter the geography of poverty because both the poor and non-poor move within and across MAs. Our data indicate that a large share of increasing poverty in the suburbs is due to the migration of the poor (and the non-poor). For all groups, the suburban share of poverty has increased since 1980, while the suburban poverty rate has declined (see Figure 1, poverty rate data available upon request). An increasing share of suburban poverty in a time period when suburban poverty rates decreased could only occur with large numbers of poor people attaining suburban residence.

Shifting immigrant settlement patterns alter the geographical location of poverty, most notably for Hispanics and Asians, as they are the two major racial/ethnic groups migrating to the contemporary United States (U.S.). Nearly 94% of the nation's immigrant population lived in MAs in 2000, of which 52% lived in suburban places; therefore trends in immigration play a key role in the geographical location of poverty (Lewis Mumford Center 2004). This marks a change from historical trends in which immigrants were predominantly located in central cities. Having limited knowledge of housing and labor market conditions in the U.S. and an inclination to preserve their cultural heritage, they often settle in segregated neighborhoods with co-ethnics (Portes 1995; Bean and Bell Rose 1999). Although there are "middle class" Hispanic and Asian neighborhoods, evidence suggests that there are often poor co-ethnic neighborhoods nearby, if not within the same municipality.

In addition to being spatially near each other, immigrants are now being more dispersed throughout the U.S. While six states still had over 2/3 of the nations foreign-born in 2000

(California, New York, Texas, Florida, New Jersey, and Illinois), the share of the nation's immigrant population living in those states declined significantly for the first time during the 1990s from 72.9% of the total in 1990 to 68.5% in 2000 (Singer 2005). Due to "hot" labor markets in states such as North Carolina, Georgia, and Nevada (generally in construction, services, manufacturing, and technology sectors) the 1990s saw the highest growth in foreign born populations in places with little twentieth century history of receiving immigrants. Cities such as Dallas, Fort Worth, Atlanta and Las Vegas have seen their immigrant populations quadruple during the past 20 years (Singer 2005). Often times, these migrants settle directly in the suburbs, where, increasingly, jobs are located. Using 1990 Census data Alba, Logan, Zhang, and Stults (1999) found that immigrants were a growing presence in suburbs.

Ecological context. There is much regional variation in suburban poverty and suburbanization in general, which is largely due to the type of transportation that was dominant at the time of their greatest growth and the structure of the local economy (Jackson 1987). Using 2000 data, only 13% of Northeastern suburbs are considered poor, while 29% of Southern suburbs are poor (Singer 2005). Similar trends to those in the South are found in the West, while the Midwest resembles the Northeast. Interestingly, many of the newer poor suburban places are located on the fringe of MAs, not just in inner ring suburbs, as many urban scholars have assumed (Singer 2005). There is also regional variation in the gap between central city and suburban incomes. Metropolitan areas in the Northeast and Midwest have more municipalities relative to population and have lower rates of low income residents in the suburbs. In contrast, MAs in the West and South have fewer municipalities and low income residents are less confined to central cities, thus low income residents live in suburbs at higher rates. Suburban inequality is highest in Western and Southern locations. Many of these MAs never employed restrictive racial covenants that were commonplace in Midwestern and Northeastern cities that kept minority groups members confined to central cities.

Data

The data from this study come from the 1980 through 2000 U.S. Decennial Censuses concatenated in the Neighborhood Change Database (NCDB). The NCDB was developed by the Urban Institute in collaboration with GeoLytics, Inc. A major benefit of the NCDB is that all census tracts from 1980 to 2000 are consistently matched to Census 2000 boundaries. This feature allows for comparison over time that is not hindered by changing MA tract boundaries. Therefore, geographic consistency allows for the estimation of precise effects at both the tract and MA level. For more information on the NCDB, see Tatian (2003). Work place data is from the Department of Housing and Urban Development's State of the Cities Data System (SOCDS) (HUD 2009). These data allow for the measurement of suburban jobs, not just workers. This is valuable in assessing the suburban share of jobs, as residents of suburbs may or may not work in suburban places. In addition it allows for the disentangling of the effects of suburban housing supply and labor demand on poverty suburbanization.

The units of analysis in this paper are the metropolitan areas that were defined in all three censuses under consideration. The majority are Metropolitan Statistical Areas. The others are Primary Metropolitan Statistical Areas. Unweighted statistics are used to estimate the effects of MA-level characteristics on levels of minority poverty suburbanization.

Measures

Dependent Variables

The dependent variables are the percentages of poor residents in the suburbs of the three minority groups – non-Hispanic blacks and Asians and Hispanics of all races. Thus, this variable represents the proportion of the poor population that resides in the suburbs of metropolitan areas. The most

common method and the one used in this analysis, examines the spatial distribution of the poor by relying on the federal poverty standard which does have flaws that limit its usefulness. Over time the federal poverty standard has tended to undercount the actual number of families unable to afford life's basic necessities[2] (Swanstrom et al. 2006). The most serious problem for this analysis is that the federally defined poverty line does not take into account differences in cost of living across metropolitan areas. Utilizing such an absolute standard is problematic for two reasons. First, the federal measure pulls poverty out of its regional context (Citro and Michael 1995). Certainly, living on $14,680 (poverty level income in 2003) in Jackson, Mississippi is a different experience than doing so in Boston, Massachusetts. Secondly, the federally defined poverty line does not capture the spatial and economic gap between rich and poor within an MA. It is important to know whether poor people suburbanize because middle and upper class residents are pushed outward by social and economic deterioration or if they were pulled by privileged places in the MA. Behaviors of the middle and upper classes are integral to understanding the geography of poverty.

Independent Variables

Housing supply. We measured 2000 levels and 1980-2000 changes in suburban housing supply using a housing ratio measure. It captures the extent to which the housing supply of a metropolitan area is predominantly in the central city or the suburbs and provides evidence of whether the suburbs or central city are more dominant. The ratio compares the total number of housing units in the suburban rings of each MA to the total number of housing units in the central city. For example, in 2000 San Antonio, Texas had a score of .334, indicating that for every 1 housing unit in the

[2] Originally calculated in the 1960s, the federal poverty line measured how much it cost to purchase a minimally nutritional diet and then multiplying that value by three. This was based on evidence that suggested families spent approximately 1/3 of its income on food. More recently, the consumer price index has been used for inflation adjustments. In 2000, the poverty threshold for a family of three was $13,738. In addition, current evidence suggests that families spend about 1/7 of their income on food.

central city, there are .33 in the suburbs. At the other end of the spectrum is Atlanta, Georgia with a score of 7.56, indicating that for every 1 housing unit in the central city there are 7.56 in the suburbs.

We also included measures to control for the effect of suburban housing supply. The percentage of all jobs in an MA that are suburban was calculated We decided to use the total job measure, as there is a high level of correlation across industry types. We also included two measures of affordable housing supply, rental and owner-occupied. These measures are operationalized as the percentage of housing units located in suburban tracts with average housing prices that are below the median for each MA, both rental and owner-occupied. It is unclear from prior research whether movers were pulled by the suburbanization of jobs or whether it was residential mobility that influenced job suburbanization, but it is clear that both employers and residents seek out the market advantages – broadly defined (Crozet 2004; Bayoh et al. 2006; Rhee 2008).

Ecological context. In line with much prior research, we estimate the effects of several ecological variables on levels and change in poverty suburbanization. First, the natural log of population size and percentage of each group is controlled for to account for two well known ecological relationships – larger cities and cities with larger minority populations tend to be more segregated, therefore influencing levels of suburbanization for minority groups. Region and age effects were controlled for using dummy variables for the census region of the MA and the period in which the central city of the MA passed 50,000 in population. A measure of the percentage of each group

Decadal rates of change. In models predicting change from 1980 to 2000, measures of MA-level decadal rates of change (in the time varying coefficients) are included. For each MA, these rates of change *r* follow this formula:

$$r_{1980,2000} = \left(\frac{\left[\sum_{t=1980}^{2000} \ln\left(\frac{Z_{t+10}}{Z_t} \right) PY_{t,t+10} \right]}{PY_{1980,2000}} \right) 100 \quad (1)$$

where Z is a MA level characteristic measured in census years t and $t + 10$, $PY_{t,\,t+10}$ are person years lived between census years t and $t + 10$, and $PY_{1980,\,2000}$ are person years lived between 1980 and 2000 (Preston et al. 2001, p. 12). Person years is estimated with the following formula:

$$PY_{t,t+T} = \frac{(N_{t+T} - N_t)T}{\ln\left(\frac{N_{t+T}}{N_t} \right)}, \quad (2)$$

where T is the length of the intercensal period (10 or 20 years), and N_t and N_{t+T} are the populations of each MA in census year t and $t + T$, respectively (Preston et al. 2001, p. 15). Equation 1 yields decadal rates of change in MA characteristic Z (in percent per decade), weighted by decade specific rates of population growth to account for variations in the timing of that growth over the 10- to 20-year period.

Methods

We use Hierarchical Linear Modeling (HLM) techniques to investigate change in MA-level poverty suburbanization over time. The HLM linear growth model treats multiple observations of MAs as nested within MAs, yielding estimates of average decadal change in poverty suburbanization from 1980 to 2000. Linear growth models are used because of the small number of observations (3) on each MA. With more observations over time, it would be advantageous to model non-linear change; however, as noted by Raudenbush and Bryk (2002, p. 163), the linear growth model "can provide a

good approximation for more complex processes that cannot be fully modeled because of the sparse number of observations."

The growth models used in this analysis are one type of "intercepts- and slopes-as-outcomes" models, in which poverty suburbanization in 2000 (intercepts) and MA-level change in poverty suburbanization (slopes) are estimated for each MA using level 1 data (repeated observations of MAs). In this analysis the level 1 model is specified as

$$Y_{tj} = \beta_{0j} + \beta_{1j} (CENSUS)_{tj} + r_{tj},$$

where Y_{tj} is the observed level of poverty suburbanization for each group in census year *t* in MA *j*. The *CENSUS* variable is coded -2 for the 1980 census, -1 for the 1990 census, and 0 for the 2000 census. Therefore, the intercepts (β_{0j}) are interpreted as the predicted level of poverty suburbanization in for city *j* in 2000 and the *CENSUS* slopes (β_{1j}) are interpreted as estimated growth from 1980 to 2000 in poverty suburbanization per decade. For example, if β_{0j} were 30.0 and β_{1j} were 3.0, it would mean that MA *j* had increased its share of suburban poverty by an average of 3 points per decade from a predicted level of 24 in 1980 to a predicted level of 30 in 2000.

At level 2, the β_{0j} and β_{1j} become outcomes to be predicted by MA level characteristics. HLM regresses the intercepts (the predicted level of group specific poverty suburbanization in 2000) and the slopes (the predicted per decade change in group specific poverty suburbanization) on MA-level covariates, as in the following examples:

$$\beta_{0j} = \gamma_{00} + \sum_{k=1}^{K} \gamma_{0k} \left(Z_{kj} - \overline{Z}_k \right) + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \sum_{k=1}^{K} \gamma_{1k} \left(\Delta Z_{kj} - \overline{\Delta Z}_k \right) + u_{1j}$$

The covariates are grand mean centered (each MA-level covariate is centered around the sample mean), γ_{00} is interpreted as the covariate-adjusted average level of poverty suburbanization in 2000 for the sample of MAs, the γ_{01} to γ_{0k} are effects of MA-level characteristics measured in 2000 on poverty suburbanization in 2000, γ_{10} is the covariate adjusted average decadal change in poverty suburbanization from 1980 to 2000 for the sample of MAs, the γ_{11} to γ_{1k} are effects of change in MA-level characteristics from 1980 to 2000 (except for the time invariant measures) on change in poverty suburbanization from 1980 to 2000, and u_{0j} and u_{1j} are level 2 random effects. Intercepts are modeled as a function of static characteristics in MAs in 2000 and the slopes as a function of changing MA characteristics.

Findings

Descriptive Statistics

Dependent variables. Figure 1 shows average growth trajectories from 1980 to 2000 rates of poverty suburbanization for the four racial/ethnic groups included in this study. The data comes from random coefficient models estimated in HLM (Raudenbush and Bryk 2002, pp. 75-80), in which the models depicted in the level 1 equation above are estimated. At level 2, data come from models with no covariates, providing unadjusted estimates. Figure 1 shows that the suburban share of poverty has been increasing for all four groups since 1980. In 1980, the HLM estimate for blacks was nearly 20%, indicating that about 1/5 of the black poor were suburbanites. For Asians and Hispanics this same figure was over 30%, while it was considerably higher for whites (nearly 50%). Over the next two decades the share of the black poor in the suburbs increased by approximately 9% per decade. The share of Hispanic poor in suburbs increased over the same time period by nearly 7% per decade. For Asians this figure was 4.5% per decade and whites had the lowest rate of change at 4.3% per decade. The relatively low starting position for blacks in 1980 has led to continuing inequality in

terms of poverty suburbanization. The low growth in the suburbanization of the white poor is largely due to the fact that by 1980 nearly half of this population had already achieved suburban status.

(Figure 1 about here)

Independent variables. Table 1 presents MA-level means of the independent variables used in this analysis, broken down by racial/ethnic group. The figures in the left hand panel are MA-level averages from Census 2000, while those in the right hand panel are MA-level average decadal rates of change from 1980-2000 (see equation 1). The housing supply measure shows that in 2000 the average MA had about 2.0 housing units in the suburbs for every one unit in the central city. This ratio increased an average of 21% per decade (with some variation by racial/ethnic group). Prior research indicates that this growth in suburban housing stock is a major predictor of minority suburbanization rates and we hypothesize that it will also be a major explanatory variable in the suburbanization of poverty.

The share of affordable owner occupied housing in the suburbs ranged from 20 to 21% and declined over the study period. This is largely explained by the fact that affordable suburban rental housing during the period increased by about 7 to 9%, reaching a 2000 level of 21%. In sum, approximately 42% of housing (rental and owner occupied combined) in suburbs could be categorized as affordable in 2000. The suburban share of total employment ranged from 46 to 48% and increased from 1980 to 2000 by around 6 to 7%. Growth in suburban employment and suburban housing are highly correlated and this development has been the norm in American metropolitan areas for several decades as urban areas have continued to decentralize.

Regarding the ecological context variables, it is important to note the striking growth in the Asian and Hispanic populations. The Asian population grew at a rate of 72% per decade, over five

times the growth rate in MAs as a whole, and the Hispanic population grew at a rate of 39% per decade, nearly three times the overall growth rate in the MAs under consideration. The Black population grew more slowly, an average of 14.5% per decade, which is consistent with overall growth in the 224 MAs analyzed in the Black sample. While whites continued to be the largest group in American MAs, they experience negative growth during the study period (-5.3% per decade). This may owe itself to continued out-migration of the white population in some MAs, into exurban areas that may not lie within Census designated MAs.

(Table 1 about here)

MA Level Effects

Interpretation of parameter estimates. The 2000 intercepts and 1980 to 2000 slopes shown in figure 1 are averages across MAs used in this analysis. There is considerable variation across MAs around these slopes and intercepts. Tables 2 and 3 (below) examine the extent to which this variation is related to group housing supply, affordable housing, suburban employment, and ecological context measures. Because all covariates have been grand mean centered, the intercepts can be interpreted as covariate-adjusted averages for all MAs. Coefficients are interpreted as variation in 2000 levels of poverty suburbanization associated with one unit changes in the independent variables. The MA population variable is interpreted as effects of 1 percent changes in MA population (due to the measure being the natural log of the MA population). The coefficients on the time varying variables are interpreted as effects of 1 percent per decade changes in the independent variables on average decadal change in poverty suburbanization for each group. The region and age dummies are interpreted as increments or decrements to the intercepts for the included regions and age categories relative to the omitted categories (the West and older than 1900).

Interpretation of statistical significance. Due to HLM using samples of level one units nested within level 2 units the robust standard error estimates are generally used for interpretation as the software assumes some kind of probability sample. For this analysis, repeated measures from a census of MAs are utilized. In this case, the standard errors should be interpreted as "estimates of parameter dispersion contaminated by measurement error" (Grodsky and Pager 2001, p. 552). Smaller standard errors indicate more consistent effects of the independent variables on poverty suburbanization. Therefore, conventional methods of assuming statistical significance (such as the use of alpha levels) are not recommended. Instead, consistent effects are denoted with an asterisk, an indication that the coefficient is at least twice its standard error.

(Tables 2 and 3 about here)

Effects of housing supply. In model 1 of Tables 2 and 3 the effect of housing supply is estimated, allowing for a baseline estimate of the extent to which each group took advantage of the increasing supply of suburban housing. Table 2 shows that relative suburban housing supply is associated with the suburbanization of the poor for all four groups in 2000, although the effect size varies. For Asians, a one unit increase in the suburban:central city housing stock is associated with a nearly 10 point increase in the share of the Asian poor in the suburbs. For whites, a one unit increase is associated with a nearly 9 point increase in the share of the white poor in the suburbs. A one unit increase in the suburban:central city housing stock is associated with a 7 point increase in the share of the Hispanic poor in the suburbs and a 4.6 point increase in the share of the Black poor in the suburbs. When looking across models it is important to note that the housing supply effect is only consistent for whites and Asians. The magnitude of the effect declines, but remains associated with increasing suburbanization of the poor for these groups. This is an indication that the poor for all

groups do not turn increases in suburban housing relative to that in the central city into suburban residence. The mechanisms predicting the suburbanization of the Black and Hispanic poor are distinct from those of the Asian poor. For whites, as will be discussed, all relevant measures (housing supply, growth in affordable housing and employment in the suburbs) predicts the suburbanization of the poor. In a sense, the suburbs were deliberately crafted (both politically and socially) to be a white space, thus it is unsurprising that access to the suburbs for this group would be rather over determined. As noted, housing supply had consistent effects across all three models in table 2 for whites and Asians. In the full model (3), the effect of housing supply on the suburbanization of the Asian poor was 40% smaller, for whites the effect size was 80% smaller. Explanations for this are investigated in the paragraphs below detailing the effects of affordable housing, suburban employment, and ecological context.

Table 3 examines the effect of changes in the housing ratio on changes in the suburbanization of poverty. These effects are less consistent than those predicting poverty suburbanization levels in 2000. For Blacks and Hispanics the effect of changes in the suburban supply of housing relative to the central city on changes in the rate of poverty suburbanization. In model 3, a one percent per decade change in the housing ratio is associated with poverty suburbanization rate increases of 0.85 for Blacks and 1.07 for Hispanics. In more intuitive terms, an MA experiencing the average amount of per decade change in the housing ratio (approximately 21%, from table 1) would have experienced increases of 17.9% in the share of the Black poor that are suburban and 22.5% in the share of the Hispanic poor that resides in the suburbs. For whites and Asians, in the fullest model, there is no association between changes in the housing ratio and changes in the rate of poverty suburbanization.

Effects of suburban share of affordable housing and suburban employment. Model 2 and 3 in Tables 2 and 3 include measures of affordable housing in the suburbs and suburban employment. The inclusion of these measures allows a test of whether increasing poverty suburbanization is not merely due to increases in suburban housing supply, but more specifically due to the availability of affordable owner occupied and rental housing, as well as the availability of suburban jobs. It stands to reason that for the poor these factors would be especially important. There is considerable racial/ethnic variation in the effect of these measures on levels of poverty suburbanization in 2000.

For Asians, suburban employment is positively associated with poverty suburbanization in 2000, in both models 2 and 3 of table 2, while affordable owner occupied and rental housing is not. In this case, our observations indicate that the suburbanization of the Asian poor results from increasing suburban employment. Much of the effect of housing ratio captured in model 1 is due to the suburban share of total employment. This indicates that the Asian poor migrate to the suburbs largely for job-related reasons. For Blacks, our observations indicate a different story. Affordable housing, both owner-occupied and rental, is positively associated with the suburbanization of the poor. In addition, the effect of the housing ratio measure in model 1 is explained away after the inclusion of the affordable housing measures. Thus, it is not simply increasing availiabilty of suburban housing that predicts the suburbaniztion of the Black poor, rather it is increases in the availability of affordable rental and owner occupied housing. We observed a negative association between increasing suburban share of employment and the suburbanization of the Black poor (table 2, model 2). This finding is supported by prior work indicating a spatial mismatch between poor inner city Blacks and the availability of jobs, many of which have relocated to the suburbs, as well as work on the construction of inner city ghettos (Wilson 1990, 1996; McLafferty and Preston 1992; Houston 2005). In the fully specified model, this negative association goes away with the inclusion of several ecological measures. It may be the case that there is regional variation in the extent to

which the spatial mismatch impacts poor Blacks. This effect may be particularly deleterious for those residing in MAs in the Northeast and Midwest, areas where historical factors have located poor Blacks predominantly within the inner city.

For Hispanics, we observed consistent positive effects across models for affordable suburban rental housing, less consistent effects for suburban owner-occupied affordable housing, and a positive association between increasing suburban share of employment and the suburbanization of the poor (in model 3). Generally, this indicates that the suburbanization of the Hispanic poor is driven by both employment opportunities and the availability of affordable rental housing. Similar to Blacks, the effect of housing ratio (model 1) goes away with the inclusion of the affordable housing and suburban employment measures. Thus, it is not just increases in suburban housing that predicts the suburbanization of the Hispanic poor; rather it is the availability of jobs in the suburbs and affordable suburban housing. For whites, both housing and employment measures consistently predict the suburbanization of the white poor. In both models 2 and 3, increasing shares of employment in the suburbs predicts increases in the presence of the white poor in the suburbs. Effects of the affordable housing measures are mixed, with affordable rental units consistently associated across models and affordable owner-occupied housing only showing an association in model 2. In general, for whites, Hispanics, and Blacks affordable rental housing is more predictive of poverty suburbanization. Given that the cost of moving into rental housing is typically lower than that needed to have an owner-occupied house it is logical that the suburbanization of the poor would be impacted more by the availability of affordable rental housing.

Table 3, models 2 and 3, shows the effects of changes in affordable housing and suburban employment on changes in the rate of poverty suburbanization. In general, these measures have little predictive power. In other words, they explain little of the variation in slopes from 1980-2000. There

are two exceptions. First, increases in the amount of suburban rental housing are associated with a declining rate of the suburbanization of the Asian poor. Secondly, for whites, increases in the share of affordable owner occupied housing is associated with increasing rates of poverty suburbanization.

Effects of ecological context. There are several ecological effects of note in table 2. For Asians, Blacks, and Hispanics there is considerably less poverty suburbanization in both the Northeast and Midwest (relative to the West). These consist of cities whose historical racial and ethnic geography concentrated non-whites in the central city, with suburban attainment largely only open to whites. There was no regional effect on white poverty suburbanization in the Northeast and Midwest. In the South, there is a larger presence of poor whites in the suburbs (relative to the West). This is likely the product of the annexation of formerly rural areas in the South which increased the share of suburban white poor, without these poor whites actually having to move. There is a larger presence of the Black and Hispanic poor in the youngest MAs (those whose central city reached 50,000 in 1970 or later). These are likely predominantly located in the South and West. MAs with larger Black populations tend to have more of the Black poor in the suburbs. This is in line with the demographic principle that predicts more of a particular group in the suburbs with increasing size of that group.

Finally, table 3 shows several effects associated with changes in the rate of poverty suburbanization. For whites, in Midwestern, Southern, and Northeastern MAs the rate of poverty suburbanization is higher over the study period than that in Western MAs. In Southern MAs, rates of Hispanic poverty suburbanization are higher, relative to the West. This is likely due to direct settlement into suburbs in this region. Rates of poverty suburbanization are lower in the youngest MAs for all groups, except Blacks. It is likely that there is a ceiling effect in these MAs. Considering they are already those with higher levels of suburban poor, their rates of increase are more

constrained than those MAs with lower levels of suburban poor. There are similar effects in MAs reaching 50,000 in central city population between 1940 and 1969 for Asians and Blacks. Larger MAs have higher rates of changes in the suburbanization of the Asian and white poor. These are likely those MAs with increasing suburban housing supplies as well, therefore it is unsurprising that these two groups would share this association, as they also shared the distinction of being the ony two groups with a positive, consistent relationship between the housing ratio and the suburbanization of the poor.

Random effects. There are several notable points to be made upon inspection of the random effects presented in tables 2 and 3. First, there is considerably more variation in 2000 levels of poverty suburbanization than in 1980 to 2000 change (see the "unconditional variance" rows). This is consistent with past understandings of the segregation of the poor, especially the non-white poor. Class and race segregation are highly related to both ecological variables and political action/inaction (Massey and Denton 1993; Sugrue 1996). Therefore, levels of poverty suburbanization in 2000 for minority groups is a product of these historical decisions and an indication that the segregation of the non-white poor in central cities persists. The suburban:central city housing ratio explains a large share of the variation for Asians (58%) and whites (64%). It explains considerably less variation for Hisapnics (24%) and Blacks (19%). This is potentially evidence of a dual housing market for the poor of these two groups, in which overall increases in suburban housing supply does not necessarily predict increases in suburban attainment. The inclusion of affordable housing and employment measures explains much variation for Blacks and Hispanics and to a lesser extent for whites. Ecological factors most dramatically impact Hispanics and Blacks, again due to historical factors in the development of MAs (especially those in the Midwest and Northeast). For Asians and whites, ecological factors play a small role in explaining level-2 variation. In sum, our models explain

a large majority of variation for whites (82%), while explaining, roughly, 2/3 of the variation for minority group members.

Variation in 1980 to 2000 changes in poverty suburbanization is low, especially for whites. By 1980, nearly half of the white poor was already in the suburbs, so in this sense, there is less "change" that could occur relative to the other three groups. Changes between 1980-2000 are less well predicted by our models, which suggests that other processes not captured by our housing supply, affordable housing, suburban employment, and ecological measures explain this variation. It could be that declining white resistance to race and class integration in the suburbs is a better explanation. We cannot test this effect with our models, but this is a possible alternate explanation.

Conclusion

In this paper, we examined racial and ethnic differences in levels and change in the suburbanization of the poor from 1980 to 2000 in American Metropolitan Areas for whites, Blacks, Hispanics, and Asians. We hypothesized that the supply of housing within an MA could be associated with access to suburbs for the poor, a housing ratio measure is included to test for this effect. In order to control for potential confounding effects, we included measures of job suburbanization, affordable housing and several ecological measures.

In general, for all groups, the supply of suburban housing, relative to the central city, is positively associated with the suburbanization of the poor in 2000, although this focal relationship has some important caveats. First, with the inclusion of other relevant controls the effect only remains for whites and Asians. For Blacks and Hispanics, the availability of affordable housing in the suburbs predicts increasing presence of the poor. This may be evidence that in MAs with growth in their suburban rings, the Hispanic and black poor attain suburban residence at a lower rate than their nonpoor counterparts; instead the upwardly mobile of their groups may be increasingly

separating themselves from the poor. In this way, Wilson's (1990) thesis that the creation of central city black ghettos is largely a result of the outward movement of the black middle class may be supported by these findings. Caution must be taken in this interpretation, as the scope of this analysis does not inform where upwardly mobile blacks or Hispanics are residing. It may be the case that the non-poor of these groups are residing just outside the boundaries of the central city, in inner ring suburbs, contiguous to poor neighborhoods. Patillo (2007) and Colocousis (2005) find evidence that this is the case for minorities and the poor. Adelman (2004) finds that middle class blacks live in neighborhoods that, on average, have considerably more poverty, more boarded up homes, and fewer college graduates than neighborhoods that middle class whites inhabit. Poverty suburbanization for whites and Asians has to do with the availability of jobs in the suburbs (as well as relative housing supply). In examining change from 1980 to 2000 in the suburbanization of poverty we found mixed results. Housing supply positively influences the rate of poverty suburbanization for Blacks and Hispanics. The age of a city and its region impact the rate of change in poverty suburbanization, likely owing to differences in historical development. In younger cities and those in the South and West rates of poverty suburbanization are lower as these MAs likely had higher shares of the poor already residing in the suburbs in 1980.

Our paper improves upon prior literature for three major reasons. First, it examines change over time using three data points therefore allowing for the estimation of growth trajectories. Secondly, it uses a measure of housing supply that captures the extent to which suburbs are the dominant living arrangement within an MA and includes controls for jobs suburbanization and affordable housing, two major mechanisms through which the poor suburbanize. Finally, it examines the suburbanization of the poor across a large sample of MAs. This is a considerable improvement over prior work that use case studies or focus on a limited number of MAs. In sum, this paper demonstrates two important points. First, that increasing suburban housing supply may

only predict increasing rates of poverty suburbanization for specific groups. The suburbanization of the Black and Hispanic poor is differentially associated with housing supply than that for whites and Asians. Secondly, the suburbanization of the poor is not just a recent development. By 1980, approximately half of metropolitan white poor lived in suburban places. Therefore, the description of suburbs undergoing a massive class transformation over the last 30 years is overstated. There is evidence that a racial transformation of the suburbs has occurred (at least in relative terms), but claims that this is a new development are also overstated, as historical evidence shows that racial and ethnic minorities have always resided in the suburbs to a certain extent. Both dominant narratives introduced earlier in this analysis appear to be partially incorrect as suburbs have never just been sites of white affluence nor have they undergone a never before seen compositional transformation in the last twenty to thirty years.

Achieving suburban residence is not necessarily an improvement in quality of life, as both dominant narratives inherently assume it is or has been. Suburbs are not only areas with larger lawns and bigger houses, they are governmentally independent. It is not just a neighborhood, but a political unit with the power to mold its own destiny (Teaford 2008). Therefore, the economic profile of an individual suburb is vitally important in its ability to fashion a destiny that resembles the positive quality of life measures that some assume have always existed in suburbs. Future research needs to focus on where in the suburbs the poor, the affluent, and people of all races and ethnicities are located. We would argue that the segregation of the poor in suburban places may be even more problematic than when the population was largely confined to central cities. Harris (1999), in an analysis of Census data from 1980 to 1990 shows that low status suburbs are less advantaged than central cities. If poverty suburbanization is occurring in conjunction with the concentration of affluence as has been suggested (Dwyer 2007), then what is happening is much more similar to a reconstitution of old spatial arrangements, rather than an integrating process.

There is evidence suggesting that the mobility of the poor to suburban areas are an effort to escape the isolation and decrease their exposure to poverty. The residential behavior of the poor alone would have resulted in increased exposure to the nonpoor (Strait 2006). However, migratory behavior of the nonpoor prevented this from being the norm across metropolitan America pointing to the important influence that the behaviors of the affluent have on the outcomes of the poor. When affluence is segregated in suburban enclaves, they sever the social relations that provide low and moderate income communities with job networks, role models, and political clout. The damaging effects of what Robert Reich calls the "secession of the successful", are more pronounced when they move not just into separate neighborhoods, but separate municipalities siphoning off fiscal and political resources. By 2002 there were almost as many poor people living in suburbs (13.3 million) as in central cities (13.8 million) (Swanstrom et al. 2006). The next steps to further this analysis focus more on the precise geographical location of these 13.3 million poor suburbanites.

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Figure 1. HLM Estimates of MA-Level Group Poverty Suburbanization, 1980-2000

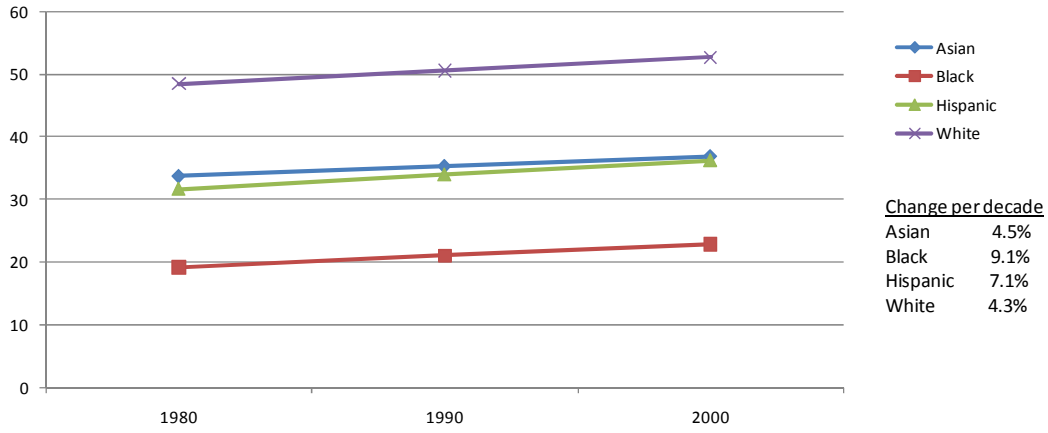

Table 1: MA-Level Means of the Independent Variables Used in the Analysis, by Racial/Ethnic Group

	2000				1980-2000 change[a]			
Variables	Asian	Black	Hispanic	White	Asian	Black	Hispanic	White
Housing Supply								
Suburban:central city housing stock	2.0	2.0	2.0	2.0	21.9	21.3	21.2	21.2
Affordable Housing								
Suburban share of owner occupied	21.0	20.9	20.7	20.7	-4.9	-4.0	-4.0	-3.9
Suburban share of rental housing	21.8	21.5	21.4	21.4	7.5	7.9	8.3	9.0
Suburban Employment								
Suburban share of total employment	48.4	46.9	46.3	46.3	7.0	6.1	5.8	5.9
Ecological context								
Percent group	3.5	12.0	10.4	74.5	72.2	14.5	39.1	-5.3
MA population (in 100,000)	13.2	13.1	13.1	13.1	14.9	14.4	14.5	14.3
Region								
Northeast	0.19	0.19	0.18	0.18	-----	-----	-----	-----
Midwest	0.24	0.23	0.25	0.26	-----	-----	-----	-----
South	0.36	0.40	0.39	0.38	-----	-----	-----	-----
West	0.21	0.18	0.18	0.18	-----	-----	-----	-----
Age of MA								
Earlier than 1900	0.22	0.20	0.21	0.20	-----	-----	-----	-----
1900 to 1939	0.39	0.37	0.36	0.36	-----	-----	-----	-----
1940 to 1969	0.26	0.28	0.28	0.28	-----	-----	-----	-----
1970 or later	0.13	0.15	0.15	0.16	-----	-----	-----	-----

Notes: N (MAs) is 197 for Asians, 224 for Blacks, 228 for Hispanics, and 234 for Whites

[a] These are person-year weighted rates of change (in % per decade) from 1980 to 2000.

Table 2: Fixed and Random Effects from HLM Regression of 2000 Levels of Poverty Suburbanization on Measures of Housing Supply, Affordable Housing, Suburban Employment, and Ecological Context

	1				2				3			
Parameter	Asian	Black	Hispanic	White	Asian	Black	Hispanic	White	Asian	Black	Hispanic	White
Fixed Effects												
Intercept	36.78	22.86 *	38.53 *	52.66 *	36.70 *	22.86 *	38.53 *	52.66 *	36.57 *	22.85 *	36.28 *	52.66 *
Housing Supply												
Suburban:central city housing stock	9.98 *	4.65 *	7.11 *	8.88 *	5.76 *	1.51	2.27	2.87 *	5.96 *	0.76	1.96	1.82 *
Affordable Housing												
Suburban share of owner occupied	-----	-----	-----	-----	-0.04	0.74 *	0.70 *	0.32 *	-0.36	0.52 *	0.31	0.18
Suburban share of rental housing	-----	-----	-----	-----	0.22	0.68 *	0.89 *	0.40 *	0.15	0.53 *	0.66 *	0.48 *
Suburban Employment												
Suburban share of total employment	-----	-----	-----	-----	0.41 *	-0.25 *	-0.14	0.36 *	0.66 *	0.07	0.25 *	0.49 *
Ecological context												
% own group	-----	-----	-----	-----	-----	-----	-----	-----	0.10	0.31 *	0.03	-0.01
Log MA population (in 2000)	-----	-----	-----	-----	-----	-----	-----	-----	0.27	0.61	-0.48	0.23
Northeast	-----	-----	-----	-----	-----	-----	-----	-----	-17.00 *	-11.81 *	-24.33 *	-0.36
Midwest	-----	-----	-----	-----	-----	-----	-----	-----	-9.56 *	-9.01 *	-8.68 *	0.12
South	-----	-----	-----	-----	-----	-----	-----	-----	0.37	-1.70	1.39	9.58 *
1900 to 1939	-----	-----	-----	-----	-----	-----	-----	-----	-0.75	3.38	-0.60	1.12
1940 to 1969	-----	-----	-----	-----	-----	-----	-----	-----	3.87	11.10 *	6.36	1.27
1970 or later	-----	-----	-----	-----	-----	-----	-----	-----	-0.87	12.99 *	10.09 *	-1.43
Random Effects												
Level 2 unconditional variance	489.3	310.8	443.6	339.8	489.3	310.8	443.6	339.8	489.3	310.8	443.6	339.8
Model residual variance	201.4	249.7	333.7	121.1	186.1	166.8	241.1	78.3	162.7	121.0	153.4	59.2
% of level-2 variance explained	58.8	19.7	24.8	64.4	62.0	46.3	45.6	77.0	66.7	61.1	65.4	82.6

Notes: All covariates have been grand mean centered.
* indicates coefficient is at least twice the size of its standard error.

Table 3: Fixed and Random Effects from HLM Regression of 1980 to 2000 Change in Levels of Poverty Suburbanization on Measures of Housing Supply, Affordable Housing, Suburban Employment, and Ecological Context

	1				2				3			
Parameter	Asian	Black	Hispanic	White	Asian	Black	Hispanic	White	Asian	Black	Hispanic	White
Fixed Effects												
Intercept	1.49	1.83 *	2.30 *	2.41 *	1.43	1.83 *	2.31 *	2.41 *	1.17	1.80 *	2.27 *	2.41 *
Housing Supply												
Suburban:central city housing stock	.73	1.05 *	.86 *	.28 *	0.72	0.98 *	0.82 *	0.24 *	0.73	0.85 *	1.07 *	0.11
Affordable Housing												
Suburban share of owner occupied	-----	-----	-----	-----	0.01	0.01	0.01	0.02	-0.03	0.01	-0.01	0.03 *
Suburban share of rental housing	-----	-----	-----	-----	-0.11 *	0.02	0.05	0.01	-0.13 *	0.02	0.00	0.00
Suburban Employment												
Suburban share of total employment	-----	-----	-----	-----	0.09	0.06	0.01	0.03	0.02	0.08	-0.08	0.02
Ecological context												
% own group	-----	-----	-----	-----	-----	-----	-----	-----	-0.02	-0.03	-0.04	0.08 *
Log MA population (in 2000)	-----	-----	-----	-----	-----	-----	-----	-----	0.29 *	0.11	0.07	0.07 *
Northeast	-----	-----	-----	-----	-----	-----	-----	-----	-2.30	0.76	-1.18	1.59 *
Midwest	-----	-----	-----	-----	-----	-----	-----	-----	-1.19	1.90	2.37	1.96 *
South	-----	-----	-----	-----	-----	-----	-----	-----	-1.04	0.57	2.90 *	2.34 *
1900 to 1939	-----	-----	-----	-----	-----	-----	-----	-----	-3.54	-1.74	-1.74	-0.67
1940 to 1969	-----	-----	-----	-----	-----	-----	-----	-----	-8.24 *	-2.07 *	-3.28	-0.80
1970 or later	-----	-----	-----	-----	-----	-----	-----	-----	-13.26 *	-0.53	-8.86 *	-2.26 *
Random Effects												
Level 2 unconditional variance[a]	89.9	34.8	31.9	4.5	89.9	34.8	31.9	4.5	89.9	34.8	31.9	4.5
Model residual variance	91.1	31.7	30.0	4.3	91.1	31.2	30.6	4.0	84.2	29.9	24.5	2.9
% of level-2 variance explained	-1.3	8.9	6.0	4.4	-1.3	10.3	4.1	11.1	6.3	14.1	23.2	35.6

Notes: All covariates have been grand mean centered. Covariates in italics are person year adjusted decadal rates of change.
* indicates coefficient is at least twice the size of its standard error.
[a] These are estimates of the level-2 variance in the intercepts from a HLM random-coefficient model (i.e. one with no level-2 covariates).