The Changing Spatial Concentration of Income and Poverty Among Suburbs of Large U.S. Metropolitan Areas

WP #396

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* This research was partially supported by the Brookings Institution Center on Urban and Metropolitan Policy.

March 2002

Lower income households have become more concentrated in the central cities of large U.S. metropolitan areas (MSAs) and higher income households have become more concentrated in the suburbs at least since 1969. The increased concentration of poor and other lower income households in the central city and of higher income households in the suburbs characterize large metropolitan areas in the United States has been widely recognized.

Some observers have suggested that there is also a growing spatial concentration of poorer households within some suburban municipalities.[1] Many scholars[2] have identified suburban areas that are experiencing increasing poverty (or unemployment, or other indicators of low income). Madden (2002) found evidence that poverty became slightly more concentrated *among suburbs* of large central cities in the last twenty years, but found no evidence that household income was becoming more concentrated. She found that the suburbs of Boston, Chicago, Cleveland, Detroit, New York City, St. Louis, Philadelphia and Pittsburgh showed some evidence of increasing concentration of both lower household income and poverty within their metropolitan areas, but that the central cities (with the exception of Boston and Chicago) experienced much greater rates of increase in these concentrations than did their suburbs. Bourne (1993), in his study of Canadian suburbs, found that suburbs that have been primarily residential, functioning as "bedroom communities," were less likely to experience increasing poverty than those that have industrial bases similar to the central city.

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[1] See, for example, Katz and Bradley (1999). Orfield (1997) identified "older suburbs" as well as "inner ring" suburbs as more recent sites for residential concentrations of the urban poor.

[2] Examples include the work of Bollens (1988), Bourne (1993), Hill and Wolman (1997), Logan and Golden (1986), Orfield (1997), Persky (1990), and Schneider and Logan (1985).

In this study, I examine changes in the spatial distribution of income and poverty within MSAs, especially among suburbs. I develop a longitudinal data set capable of tracking changes in household income and poverty within all municipalities of the MSA. I develop these data for 27 MSAs for 1970, 1980 and 1990. They are described in the next section. I use the data to characterize the suburbs that are changing and the extent of the change, as well as the circumstances underlying those changes. The general approach is described briefly in the third section. The fourth section describes the results of the analysis of which suburbs and central cities are changing; the fifth section describes analyses of whether the classical theories of suburbanization account for changes among suburbs. The last section presents a summary of results and conclusions.

Data

This study uses the CMSA (consolidated metropolitan statistical area) and the PMSA (primary metropolitan statistical area) boundaries and designations of the U.S. Census for the 1990 Census to create a data set on the economic, demographic, and geographic characteristics of central cities and suburban municipalities of 27 large metropolitan areas for 1970, 1980 and 1990.[3] As the same geographic boundaries must be used to define a city or a suburban municipality in each year of the study, civil divisions are combined, when necessary, to create spatial units that are the same for all three years.[4]

[3] Census 2000 data on income within municipalities are not available yet and it will require some time after they become available to create a consistent geography with the 1970, 1980 and 1990 Censuses. Furthermore, Lucy and Phillips' analyses of population (*not income or poverty)* changes for a proportion of suburbs of large MSAs do not show any trends that differ from the older, but longer term trends, shown here.

[4] When quantifying changes in characteristics of a city or suburb between 1990 and either 1980 or

The general concept of a metropolitan area is one of a large population nucleus, together with adjacent communities that have a high degree of economic and social integration with that nucleus. The boundaries of metropolitan areas, as designated and periodically updated by the United States Office of Management and Budget, are used by federal agencies to produce, analyze and publish data on metropolitan areas. For this study, if the central city is part of a larger CMSA, the PMSA is used to define the metropolitan area (MSA) with four exceptions. For the Dallas-Fort Worth and San Francisco-Oakland-San Jose metropolitan areas, I use the CMSA because all of the PMSAs in the CMSA include large central cities. For Los Angeles and Boston, I also use the CMSA because of the strong relationships among the constituent PMSAs.

Central Cities

The central city is the "population nucleus," that is the largest city, of the metropolitan area. In some cases, more than one city in the metropolitan area is labeled as a central city by the Census in 1990. Because I am interested in the relationship between the largest city and outlying jurisdictions, I use only the largest city as the central city in the metropolitan area, with four exceptions in three metropolitan areas. The exceptions, which are metropolitan areas where the central cities are relatively closer in size than in other MSAs, include Dallas-Fort Worth, Minneapolis-St. Paul, and San Francisco-Oakland-San Jose. All other civil divisions in the metropolitan area are considered to be suburbs.

1970, it is necessary to use spatial units defined by the same boundaries. If there were not common boundaries, then differences in characteristics could arise from the artifact of a boundary change rather than from any change in the people who reside in a geographic area.

Suburbs

Because the study of changes in the intra-metropolitan concentrations of income and poverty requires data that allow comparisons among suburbs within a metropolitan area, it is necessary to distinguish among suburbs, as well as between the central city and the suburbs. Therefore, the study requires consistent data for individual suburbs within each metropolitan area.

There are three forms in which income and demographic data on individual suburbs across the nation are reported: the census tract, the minor civil division/census county division, and the county.[5]

Census tracts represent reasonably detailed (or geographically small) enumeration areas that are designed for the reporting of the decennial censuses. They are geographic areas that are defined so as to include similar numbers of residents. Census tracts are not necessarily associated with any economic or politically meaningful boundaries. The task of defining consistent boundaries for three U.S. Censuses (1970, 1980, and 1990) is a major undertaking.[6] Census tract boundaries change more frequently between decennial Censuses than do civil division boundaries. Census tracks also involve many more geographic units. The costs of defining consistent geographic boundaries across these three decennial Censuses are prohibitive.[7]

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[5] Some data (e.g., American Housing Survey and some special reports from the U.S. Census) are also available at the "urban place" level. This level includes subcounty local governments but does not cover all territory in the suburbs. These omitted geographic areas change with changes in place boundaries making it impossible to create the geographically consistent time series data required for a study of changes in income and poverty concentrations. In addition, the decennial census does not report economic and social data at this level of aggregation.

[6] There are no electronic data available that describe the 1970 U.S. Census geography in a way that allows a GIS package to compare 1970 boundaries with those used in subsequent Census geographies.

[7] Also, once census tracts are combined to create consistently bounded spaces for all three years, they would no longer be areas with the same numbers of residents. Regions with greater levels of

Counties represent geographic areas that have governmental functions, rare changes and boundaries, and include substantially larger areas (less detail) than do census tracts or minor civil/census county divisions.

I use minor civil division (MCD) or census county division (CCD) aggregations of the data because they describe, in many cases, a politically significant geography and, in all cases, an economically significant geography.[8] MCDs are primary subcounty governmental or administrative units, most frequently towns and townships; they have legal boundaries as well as governmental functions. In the west and south, however, many states have no subcounty governmental units. In these states, CCDs, statistical entities established cooperatively by the Census Bureau and state and local officials, represent community areas focused on trading centers or land use. They have permanent and "easily described" boundaries, but not governmental functions. CCDs are typically defined so as to include one or more census tracts.

I study the suburbs of 31 large central cities, located in 27 metropolitan areas (MSAs). These MSAs include a total of 2,975 MCDs/CCDs, based on the STF4B for 1970 and STF3A counts of the U.S. Census.[9] Table 1 lists the MSAs studied here as

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population change, either positive or negative, would require more combining of tracts.

[8] One potential problem is the broad range of population sizes for MCDs and CCDs. MCDs and CCDs are geographic areas that include populations ranging from 34 to almost 8 million (New York City). These ranges can be addressed, however, in the statistical analyses by weighting each MCD/CCD observation by its population size.

[9] The 33 largest central cities in 1996 were: New York, NY; Los Angeles, CA; Chicago, IL; Houston, TX; Philadelphia, PA; San Diego, CA; Phoenix, AZ; San Antonio, TX; Dallas, TX; Detroit, MI; San Jose, CA; Indianapolis, IN; San Francisco, CA; Jacksonville, FL; Baltimore, MD; Columbus, OH; El Paso, TX; Memphis, TN; Milwaukee, WI; Boston, MA; Washington, DC; Austin, TX; Seattle, WA; Nashville, TN; Cleveland, OH; Denver, CO; Portland, OR; Fort Worth, TX; New Orleans, LA; Oklahoma City, OK; Tucson, AZ; Charlotte, NC; Kansas City, MO. We exclude Phoenix, San Antonio, El Paso, Oklahoma City, Tucson, and Kansas City because these metropolitan areas had only a handful of civil divisions. San Jose is included in the San Francisco CMSA and Fort Worth is included in the Dallas CMSA. New Orleans is not included in this paper because there were too many changes in the boundaries of the suburban divisions to allow comparisons across Census years. Washington DC could not be

identified by their central cities. The total number of civil divisions included in each MSA for this study is also listed. To assure that the trends and relationships observed in this study are enduring and are not artifacts of a particular part of a business cycle, I examine data for three decennial censuses: 1970, 1980, and 1990.[10] These include times of expansion and low unemployment (1970) and of contraction and high unemployment (1980).

Characteristics of Central Cities and Suburbs

Table 2 reports some of the characteristics of MCDs and CCDs for the 31 large central cities and their suburbs included in this study. The suburbs are categorized as those that share a boundary with their central city (municipalities adjacent to central cities or "inner suburbs") and the remaining suburbs (or "outlying suburbs"). The first column of numbers in each cell reports unweighted means for municipalities and, therefore, does not reflect metropolitan population means; the second column of italicized numbers in each cell reports population-weighted means for the civil divisions.

Although 45% of the central cities are in the northeast or midwest, 89% of the outlying suburbs and 66% of inner suburbs are in these regions. Western MSAs include fewer suburban civil divisions than southern MSAs that, in turn, include fewer suburban civil divisions than northeastern or midwestern MSAs. Therefore, the data reported on

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included in analyses using the 1970 Census data for the same reason. In addition, Atlanta GA, Miami, FL, Minneapolis, MI, St. Louis, MO, and Pittsburgh, PA are added. These latter central cities are within the top 50 in size, but not in the top 33. St. Paul is included, with Minneapolis, as a central city civil division.

[10] To the best of my knowledge, the 1970 MCD/CCD data have not been analyzed before this study. The 1970 data were only partially released by the U.S. Census. This study is the first to analyze a longitudinal suburban civil division data set for the 1970 through 1990 period.

Table 2 for suburbs include relatively more northeastern and midwestern civil divisions than is the case for central cities.

Table 2 also includes data on household income[11] and poverty rates[12] for 1970, 1980, and 1990 for the central city and suburban civil divisions included in this study. The poverty rate and the ratio of the median household income in the civil division to the median income for its MSA measure two related, but different, phenomena. The poverty rate is a measure of the ability of the household to afford a minimal level of shelter, nutrition, and other goods and services. The determination of whether a household is above the poverty line varies with the age and number of persons in the household and is defined by a national income standard that does not reflect regional differences in incomes or prices. It measures the proportion of the population whose income is insufficient to cover minimal expenses. Median household income is a measure that is more sensitive to the full range (high and middle, as well as low) of incomes of households. By measuring the median household income of a civil division relative to

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[11] Household income is current household income as defined by the U.S. Census Bureau. It is the sum of money wages and salaries, net income from self-employment, transfers from government programs, property income (for example, interests, dividends, net rental income), and other forms of cash income (such as private pensions and alimony). Current income does not include capital gains, imputed rents from owner-occupied housing, government or private benefits in-kind (such as food stamps, health care benefits, employer-provided health insurance or other fringe benefits) nor does it subtract taxes, although all of these affect a household's or an individual's consumption levels.

[12] The U.S. Census Bureau definitions of poverty are used here. The Census considers persons or households to be poor, or in poverty, if their incomes are below the threshold poverty income level. The poverty threshold income level is based on a standard developed by the U.S. Social Security Administration in 1963. The level threshold levels are defined separately by family size and the age of the household head -- in each case based on the 1963 cost of an inexpensive, but nutritionally sound, food plan designed by the threshold levels are defined separately by family size and the age of the household head -- in each case based on the 1963 cost of an inexpensive, but nutritionally sound, food plan designed by the U.S. Department of Agriculture. This cost of purchasing the food plan is multiplied by three, assuming that households spend one-third of their income on food and is adjusted upward by changes in the Consumer Price Index since 1963. For a household of four persons, the 1989 threshold poverty income level was $12,675, based on inflationary adjustments to the 1963 level of $3,128. For a one-person household, under age 65, the 1989 poverty level income was $6,311. As a one-person household requires half of the income of a four-person household to be above the poverty level, there is an equivalence scaling implicit in the poverty rate that reduces the necessary per capita income as household size increases.

the median for the MSA, variations arising from differences in income and prices across MSAs are minimized.

The population-weighted poverty rate in central cities increased from 13.8% to 17.7% between 1970 and 1990. The population-weighted poverty rate in inner suburban civil divisions increased from 7.3% to 8.7%. For the outlying suburbs, the poverty rate remained about the same, at 7.3%. In large U.S. MSAs, poverty rates grew more -- and, therefore, metropolitan poverty is concentrating -- in central cities.

In 1990, the median household income for the 31 central cities included in this study was 82.2% of the median for the metropolitan area, down from 92.8% in 1970. For both the inner suburbs and the outlying suburbs, median household income increased relative to the median for the metropolitan area although the outlying suburbs experienced greater improvement.

The racial characteristics of central cities, inner suburbs, and outlying suburbs also changed between 1970 and 1990. In these data, all three types of civil division locations -- central cities, inner suburbs, and outlying suburbs -- saw increasing representation of African-Americans among their residents. The increase was small for the average municipality in the outlying suburbs (from 5.2% to 6.7% weighted for population[13]) and larger for both the central cities (from 22.6% to 25.5% adjusted for population) and the inner suburban municipalities (from 6.5% to 10.7%).

The total population of the central cities in this study has grown slightly between 1970 and 1990, but the population of the suburbs has grown more rapidly. As a result,

[13] The larger percentages for population-adjusted averages occur because the larger civil divisions have the greater proportions of African-Americans in their populations.

the proportion of metropolitan area residents living in suburban civil divisions increased from 57% to 62% over the period.

The data for central cities and suburbs in Table 2 indicate that there are substantial economic differences between cities and their suburban municipalities. The table also indicates that the size of central cities relative to suburban municipalities and the numbers of suburban municipalities vary by region. Many central cities, especially in the south and west where the physical capital used in goods and services production is of more recent vintage, have boundaries that include most of the population of the metropolitan area.

In sum, poverty rates have increased more, and household income has increased less, in the central cities of large U.S. MSAs than in their inner suburbs, and in the inner suburbs than in the outlying suburbs. The remainder of the study examines the determinants of these changes.

General Approach

This analysis of the changes in the determinants of the intrametropolitan locations of income and poverty has three components, which are described briefly in this section. First, I identify the geographic (region of the U.S. and location in the MSA) characteristics of suburbs and cities that are associated with changes in the income and poverty levels of their residents. Second, I examine whether the geographic characteristics that are related to economic changes occur because of shifts in the intrametropolitan locations of poor, or of non-poor, residents. Third, I explore the reasons for the shifts in the suburban locations of the metropolitan populations of non-poor and poor residents.

Geographic Characteristics and Changes in Income

To describe how the locations of civil divisions within MSAs are associated with changes in the distributions of household income and poverty within each of these 27 large MSAs, I regress the 1970, 1980, and 1990 poverty rates and the median household incomes of civil divisions (relative to the rest of their MSA) on their geographic characteristics, weighted by population of the civil division. The resulting coefficients for the geographic characteristics of civil divisions in each year show how the relationships between intrametropolitan location and income of MSA residents change over time and also whether the effects vary by region. Changes in the coefficients of geographic characteristics reflect the changing attractiveness of a civil division to higher income and lower income MSA residents.

Shifts in the Locations of the Poor and Non-poor.

I examine the extent to which the movements of lower income households (either by moving within the MSA, into or out of the MSA, or by maintaining physical location but moving to higher income levels) account for the changes in poverty and household income distribution within an MSA by regressing the 1970 to 1990 changes in the proportions of the MSA's poor population who reside in civil divisions on their geographic characteristics. I repeat the analysis using the 1970 to 1990 changes in the proportions of the MSA's non-poor population who reside in civil divisions as the dependent variable. The resulting coefficients of the characteristics of civil divisions are used as the basis for a discussion of how the geographic characteristics of a civil division affected its relative ability to attract poor and non-poor MSA residents.

Classical Theories of Suburbanization and Empirical Evidence

To understand why some municipalities attract non-poor residents while others do not, I review the classical theories of suburbanization. Then, I repeat the regression analyses described above adding municipality characteristics as suggested by the classical theories. I discuss the implications of regression results for determining the relative importance of the various suburbanization theories.

Geographic Characteristics and Changes in Income

Table 3 reports the results of the regression of the civil division's poverty rate on its location within the metropolitan area in 1970, 1980, and 1990; Table 4 reports the results of a similar analysis of the effects of these same characteristics on the ratio of the civil division's median household income to that of its MSA for 1970, 1980, and 1990. The tables report the results of a linear (population-weighted) regression of these characteristics (and a dummy variable identifying each MSA) on the poverty rate and on the ratio of civil division median income to that of the entire MSA.

For Table 3, a municipality characteristic is associated with an increase in poverty if the sign of the coefficient is positive; if the coefficient increases between 1970 and 1980 or 1990, municipalities with that geographic characteristic experienced an increase in poverty over the time period. For Table 4, a municipality characteristic is associated with a relative decrease in the median household income of its residents if the sign of the coefficient is negative; if the coefficient decreased between 1970 and 1980 or 1990, municipalities with that geographic characteristic experienced a decrease in median household income relative to other metropolitan municipalities over the time period.

Central Cities

Northeastern and midwestern central cities experienced an increase in poverty and a decrease in their median household income relative to other central cities and relative to their own suburbs over the time period. The coefficients reported in the first row of Table 3 are positive and they increase over time; the coefficients reported in the first row of Table 4 are negative and they decrease over time. Furthermore, the absolute magnitudes of these coefficients are larger than for any others in their columns. Consistent with the descriptive data reported in Table 2, the regression analyses confirm that: poverty is highest within northeastern and midwestern central cities; these central cities also have the lowest ratio of household income to the MSA median; and these central city disadvantages increased relative to their suburbs over the two decades.

Western central cities (second row of Tables 3 and 4) also show some evidence of relative economic decline over the time period. While western central city median household income was close to the MSA median in 1970 (Table 4, row 2), it became significantly lower in 1980 and remained so in 1990. Western central cities have less poverty, however, than central cities in other regions (Table 3) and there is no evidence that their relative poverty rates increased.

While southern central cities also have higher poverty rates and lower median household income than their suburban civil divisions, there is little evidence of changes in their relative poverty or median household income over the time period.

Suburbs

Suburbs overall are faring better than their central cities with respect to the poverty status and the household income of their residents. Not all suburbs are equal, however. Tables 3 and 4 delineate economic changes among suburbs by region and by

their proximity to the central city as reflected both in overall distance measures and in sharing boundaries.[14]

While the coefficients reported in the fourth rows of Tables 3 and 4 show that northeastern and midwestern inner suburbs experienced relative increases in their poverty rates between 1980 and 1990 and decreases in their median household income relative to their MSA between 1970 and 1980 and between 1980 and 1990 given their distance from the central city, the coefficients for distance measures (inner suburbs average 9 miles from the central city) for these suburbs (rows 7 and 10) combined to offset the changes reflected by the fourth row coefficients. The coefficients do show, however, that suburbs adjacent to the central city were disadvantaged relative to the suburbs "adjacent to the adjacent" suburbs. The fewer than one tenth of the northeastern and midwestern suburbs that were more than 48 miles from the central city had lower median household incomes than the rest of the MSA in 1980 and 1990; suburbs that were 56 to 65 miles from the central city had higher poverty rates than other U.S. civil divisions in 1980 and 1990.

The coefficients for western inner suburbs show no evidence of changing relative economic circumstances over the time period. While they have higher poverty rates than other U.S. civil divisions in each decade (but lower than their central cities), there is no pattern of increase or decrease over time. Their median household income is statistically equivalent to their MSA median in each decade. The coefficients on the distance

[14] Changes in the poverty rates or median household income of suburbs adjacent to the central city are reflected in the coefficients of the variable indicating they are adjacent and in the coefficients of the distance variables. For example, the adjacent suburbs of the northeastern and midwestern MSAs are, on average, 9 miles from the central city centroid and the remaining suburbs are, on average, 28 miles from the central city. For the western MSAs, these distances are 22 and 57 miles respectively, and, for the south, 20 and 32 miles.

variables, however, show that outlying western MSA suburbs experienced decreases in poverty and increases in median household income relative to other U.S. civil divisions.

The coefficients in Table 4 for southern inner suburbs, when added to the effects (coefficients and extent) of their distances from their central cities, show that these suburbs had higher median household incomes relative to the MSA level than either their central cities or other U.S. civil divisions did. These results also show that the inner southern suburbs experienced a significant increase in median household income relative to their MSAs between 1970 and 1990. Similar analyses of the poverty coefficients for distances of suburbs and their adjacency to the central city in Table 3 show little time pattern or difference from other civil divisions with respect to poverty rates.

The analyses reported in this section show that inner ring suburbs improved, as measured by their poverty rates and their median household incomes, relative to their central cities. There is some evidence, however, that inner ring suburbs have declined relative to other suburbs, especially those in the next "ring" out from the central city.

Summary

Inner ring suburbs in the northeast, the midwest, and the west have improved greatly relative to their central cities and declined slightly relative to their outlying suburbs with respect to both poverty and median household income. Inner ring suburbs in the south have also improved relative to their central cities, but have experienced more of an economic decline relative to their outlying suburbs. The decline is due to the inner ring suburbs losing their substantial advantage over the outlying suburbs. The inner ring suburbs in the south became more comparable to the outlying suburbs in term of their poverty rates and their median household income.

Intra-metropolitan Shifts in the Locations of Poor and Non-poor Populations

The 1970 to 1990 changes in poverty and in household income among the central city, the inner ring suburbs, and the other suburbs of an MSA that are obvious in Tables 3 and 4 were the results of the movements of the non-poor population within the MSA. Table 5 provides the 1970, 1980 and 1990 distributions of the non-poor and the poor populations for the MSAs in this study. For both regions, the proportions of the MSA poor residing in the central city, the inner ring (or adjacent) suburbs and the other suburbs changed little over the period. The larger changes were for the non-poor shifting from the central city to suburbs.[15] For the northeastern and midwestern MSAs, the non-poor shifted from central city and inner ring suburbs to the other suburbs. Slightly different patterns are evident in the southern and western MSAs. For these MSAs, there is very small movement of the poor from the central cities into the inner and the outlying suburbs. As there are much larger movements of the non-poor from the central cities to both the inner and the outlying suburbs, however, these MSAs also experienced an increasing concentration of the poor in their central cities. Because the proportions of the poor in the suburbs of the southern and western MSAs are closer in value to the

[15] These changes in residential patterns by income may arise from different dynamics. A civil division may have experienced a relative increase in its poverty rate or decrease in its median household income relative to the rest of the MSA for one, all, or a subset of the following reasons:

1. Higher income residents of the civil division in the initial period have disproportionately relocated to other civil divisions in the MSA or left the MSA.
2. The civil division may have attracted fewer of the higher income in-migrants to the MSA over the time period than did other civil divisions.
3. Lower income residents from elsewhere in the MSA (or from outside the MSA) in the initial period may have disproportionately relocated to the civil division.
4. Residents of the civil division may be the same people as in the initial period, but they may have become relatively poorer or richer over the decade.

All, or some subset, of these dynamic processes shift the proportions of the MSA poor and non-poor residents who live within any civil division and account for relative changes in the distribution of household income and poverty rates within the MSA over a time period.

proportions of the non-poor in those suburbs than is the case for the northeastern and midwestern MSAs, poverty is less concentrated in the southern and western MSAs.

Table 6 reports the coefficients for the regression of the 1970-90 changes in a civil division's shares of its MSA's poor (columns 1 and 3) and non-poor populations (columns 2 and 4) on its regional and intra-metropolitan locations. Columns 1 and 2 report the coefficients for a "suburbs only" estimation, while columns 3 and 4 report coefficients that include both the central city and the suburban civil divisions. The population-weighted characteristics of central cities are used to estimate the coefficients in Columns 3 and 4. While the effects of region and intrametropolitan location on changes in the proportions of the MSA poor and non-poor populations residing in the suburban civil divisions are more precisely measured when the model is restricted to suburbs,[16] the effects of a suburb's intrametropolitan location and region on changes in its share of its MSA's poor and non-poor population are similar in both analyses.

Central cities in all regions are loosing their shares of their MSA's non-poor population,[17] and the loss has been particularly large for central cities in the midwest and northeast. The midwest and northeast central cities are also increasing their shares of their MSA's poor population.

Midwestern and northeastern suburbs that are adjacent to their central city have had no significant relative change in their poor population, but have decreased their shares of the MSA non-poor population relative to other suburbs. Western and southern

[16] The t-statistics are larger for the suburban characteristics in columns 1 and 2 than they are for columns 3 and 4.)

[17] Note that central cities that are experiencing overall increases in their total population may actually be increasing their non-poor or poor populations while losing shares of one or the other or both to their suburbs.

inner suburbs have increased their shares of both the MSA poor and non-poor populations. In the west, the increase has been greater for share of the non-poor population.

Summary

The changes in poverty rates and income among the suburbs are primarily the results of the changes in the locations of the non-poor within the suburbs. The inner ring suburbs in the northeastern and midwestern MSAs are like central cities of large MSAs around the nation, however, in that they are experiencing decreases in their share of the MSA non-poor population, albeit at a much lower rate than their central cities have.

Classical Theories of Suburbanization

Numerous theories have been suggested that explain why higher income groups are more likely to suburbanize than lower income groups (or for the poor to be concentrated in the center of the MSA). First, the non-poor may place a higher value than the poor on land prices when they tradeoff commuting time for lower land prices (referred to as "land preferences"). Second, the poor may place a higher value on the size of the housing unit when they tradeoff size for age of structure (referred to as "house filtering"). Third, whites (and the non-poor of any race) may avoid areas with more African Americans, and given racial differences in income and historic settlement patterns, the effect is for the poor to be concentrated in the central city (referred to as "white flight"). Fourth, because each municipality raises its own revenue from taxes and provides services to its residents, the non-poor may avoid municipalities with more poor (referred to as "local public finance.") While numerous studies have explored these explanations by comparing cities with their suburbs, none have considered whether these

theories explain changes *among* suburbs. I briefly review each of these explanations and how they would apply to shifts among suburbs below.

Land Preferences

To the extent that employment concentrates more in the center of the MSA than in other locations, a more suburbanized residence increases commuting costs. The classic Alonso-Muth urban model shows that, in equilibrium, suburban residents are compensated for increased commuting costs by lower land prices. MSA residents decide where to live in the MSA by trading off commuting costs and land prices (controlling for other characteristics of land). If a rise in income increases the (time) cost of commuting less than it increases the demand for land, higher income residents will reside in the suburbs and lower income residents will reside in the city.[18]

House Filtering

The earliest settlements and production sites within an MSA, and therefore the earliest building construction, were generally concentrated within the boundaries of the current central city. Once built, these structures shape the central city environment – that is, housing stock and industrial plant – for succeeding decades. The central city has an older housing stock than its more recently developed suburbs. Because older houses depreciate (have higher repair costs and are designed based on older technologies and tastes), they cost less than newer houses of the same size. If the marginal rate of substitution between the housing characteristics of age of structure and size is higher for poorer households than for richer households, older houses are more attractive to lower income households. Older houses are more plentiful in the central city. The "filtering"

[18] See Mills and Hamilton (1984), pp.100-05.

of the MSA's aging housing stock to poorer households makes central cities relatively more attractive for poorer MSA residents than for the non-poor.[19]

White Flight

Other research has argued that white households have left the central cities to avoid contact with African-Americans as neighbors and as schoolmates for their children.[20] "White flight" may be motivated by an explicit desire of some households to live in racially segregated neighborhoods or it may arise from fear that civil divisions with more African Americans will ultimately have fewer resources to provide public goods and services. Because of the correlation between race and income, changes in the racial composition of civil divisions may lead to differences in the income distribution within MSAs.

Local Public Finance

In the United States, the central city and each individual suburb are independent municipalities that tax their residents and provide primary and secondary education, fire and police protection, sanitation, and other governmental services. They use their taxation and public goods and services packages to compete with each other for metropolitan residents. Because a given level of governmental goods or services is more costly to provide to poorer residents than to richer residents and similar levels of governmental goods and services are ultimately provided to each resident of a given jurisdiction or municipality, jurisdictions with proportionately more poor residents must

[19] See Glaesar and Gyourko (2001) for a recent statement of the filtering theory and Mills and Hamilton (1984), pp. 205-6 for a textbook presentation.

[20] See Clotfelter (2001) and Crowder (2000), for example.

tax richer residents at significantly higher rates than those jurisdictions with fewer poor.[21] For this reason, the U.S. local governmental system provides incentives, in addition to those arising from the changing spatial economics of production, changing characteristics of housing, or changing preferences for land, for the non-poor to locate outside central cities. These additional incentives to locate in the suburbs increase as the city's poverty rate grows relative to that of competing suburban jurisdictions.[22]

Application of Theories among Suburbs.

There is no reason, however, why "land preferences," "house filtering," "white flight," or "local public finance" would affect only movements from the central city within the MSA. If the spatial concentration of low income and poverty in central cities can be explained by any of these theories of suburbanization, suburbs that are more similar to the central city, in that they were developed earlier and include older industrial infrastructure (have older housing and smaller lots), have less developable land (land preferences), have larger concentrations of African Americans (white flight), or that include more poor initially (local public finance) would be expected to experience increasing concentrations of poverty and low income relative to other suburbs. In other words, among suburban municipalities, income and poverty may be becoming more spatially concentrated within the older suburbs and/or those with greater representations of African Americans relative to other suburbs.

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[21] Janet Pack (1998) provides a series of estimates of the increases in the costs of providing local public goods and services to poor populations in central cities of more than 300,000 populations. She finds that per capita expenditures on *non-poverty* related public goods and services are 21% higher in high poverty central cities than in low poverty ones.

[22] Tiebout (1956) provides the classic presentation of this theory of suburbanization. Fisher and Wassmer (1998) provide a more recent empirical analysis of U.S. suburbs that shows that U.S. MSAs with greater variation in the demand for local public goods and services have more civil jurisdictions.

Empirical Evidence of the Classical Suburbanization Theories

To evaluate whether the evidence is consistent with changes in the intrametropolitan distribution of household income and of poverty arising from the classical theories of suburbanization, I repeat the analyses of the previous sections adding characteristics that more directly measure the characteristics of the physical structures and the racial composition of the civil division at the start of the period (1970) to the analyses of poverty and household median income by year and to the analyses of changes in the proportions of the MSAs poor and non-poor residents in the civil division over the 1970-90 time period and examine how these characteristics affect the dependent variables and also how they change the effects of the geographic characteristics that may also be proxies for these characteristics in the previous analyses.

Variables Added to the Analyses

Racial composition. Racial composition, useful in assessing the role of "white flight," is measured by the proportion of the population resident within the civil division that is African-American at the start of the period (1970).

Population density. The physical structure and land availability characteristics that are included in the regression analyses must be measured indirectly and cannot be distinguished from one another with these data. Older civil divisions, where physical infrastructures were constructed either before cars were widely used to transport workers or to accommodate manufacturing industries that have since declined in employment or disappeared, are the intra-metropolitan locations expected to experience increasing concentrations of poor or lower income households. The age of housing is a central variable for the housing filtering hypothesis. Data on the median year in which the

housing stock was built within the civil division are not available for the start of the time period (1970). While the data are available for 1990, it is problematic to use a measure of age of housing at the end of the time period analyzed. There are two reasons why a civil division may have newer housing at the end of the period of analysis: (1) the civil division had old housing in 1970 but attracted new residents since 1970 requiring new housing to be built that decreased the median age of the housing stock since 1970; or (2) the civil division had relatively new housing in 1970 and did not attract new residents or new construction. Because the 1990 age of housing cannot tell us the age of the housing stock in the civil division in 1970, we cannot evaluate the effect of age on subsequent changes in income and poverty of residents using 1990 data on the age of the housing stock.

One potential measure or indicator of the age of physical structures in the suburb (and of the central city) that is available is the residential population density of the civil division. Suburbs and central cities that provided housing for workers employed in manufacturing earlier in the century when automobile transportation was less prevalent were more likely to include multifamily housing, row houses and other higher density construction. In the 1990 data, the age of housing structures is highly correlated with the density of residents.[23] The age of housing within the civil division in 1970 is reflected in its residential population density in 1970.

Unfortunately, density also indirectly measures land availability, reflecting the potential role of "land preferences" in the sorting of non-poor and poor among suburbs. This study cannot distinguish between "house filtering" and "land preferences" in

[23] The population-weighted correlation coefficient between the median year that housing was constructed in a civil division and the residential population density of the civil division in 1990 was -.66.

affecting location shifts among suburbs. These two explanations can only be compared together to the "white flight" and "local public finance" explanations of intrametropolitan location shifts.

The geography used to characterize municipalities also is related to the age of the physical structures and the availability of land within the civil division. Municipalities more distant from the central city are likely to have been settled more recently and have more land intensive housing. Both western and southern MSAs, and especially the suburbs in those MSAs are likely to have been settled more recently and have more developable land than their counterparts in most of the midwestern and northeastern MSAs.

Population density in 1970 and the geographic characteristics of the civil divisions reflect both the relative age of buildings and the relative availability of land to residents within the MSA.

Poverty rate. The proportion of the civil division's population that was poor in 1970 provides an indicator of the redistribution of local public goods and services from the non-poor within the civil division. The initial period poverty rate is used to measure the effect of the local public finance issues on shifts of poor and non-poor populations within the MSA.

Analyses of Geographic Characteristics and Changing Income

I repeat the analyses reported in Tables 3 and 4 and discussed in the previous section adding population density, racial composition and poverty rates for the civil divisions. Tables 7 and 8 add these characteristics to the geographic characteristics examined in Tables 3 and 4.

The absolute sizes of the coefficients of the geographic characteristics reported in Tables 7 and 8 are substantially smaller than in Tables 3 and 4. The coefficients for the population density and racial composition of civil divisions reported in Tables 7 and 8 are highly statistically significant. Consistent with "land preferences," "house filtering" and "white flight" theories, the location of the civil division contributes less to changes in its poverty rates and household income when population density and racial composition are considered. In addition, in both Tables 7 and 8, the effects of racial composition increased between 1970 and 1990.

Analyses of Shifts in the Locations of the Poor and Non-poor.

Similarly, I repeat the analyses reported in Table 6 and discussed in the previous section adding controls for population density, racial composition, and poverty rate and also the civil division's overall change in the proportion of the MSA population between 1970 and 1990. These variables are also interacted with region.

I add controls for the 1970-90 changes in the proportion of the MSA population to sort out the effects of the income composition of population change from that of overall population suburbanization. If a suburb is growing relative to the rest of the MSA, it may have increases in both the proportion of the MSA poor and non-poor. By controlling for its overall change in the proportion of MSA population, I can determine whether relative population growth (or decline) is concentrated among the poor or the non-poor.

As with Table 6, the first two columns of Table 9 include only suburbs, so the coefficients for all variables are determined only by suburban characteristics. The third and fourth columns include the central cities and the population weighted roles of central city characteristics (which with the greatest population in the MSA are large) have a

strong role in determining the coefficients reported. I will first discuss columns one and two, the coefficients measured only by suburban characteristics.

Civil divisions that increased their relative share of MSA population did so by disproportionately increasing their share of the non-poor population. The differences between the poor and the non-poor in accounting for shifts in the MSA population were most dramatic among suburbs in the northeast and the midwest. For every one percent increase in a midwestern or northeastern suburban civil division's share of the MSA population, the civil division increased its share of the MSA non-poor population by 1.093% and of the poor population by only 0.207% (columns 1 and 2). While there were also large discrepancies between shifts in the poor and non-poor populations among southern and western suburbs, the differences were less than for the midwestern and northeastern suburbs.

For the most part, the absolute sizes of the coefficients of the geographic characteristics reported in Table 9 are smaller than in Table 6. Once I control for the initial poverty rate, population density, and racial composition and for overall population shifts, the inner ring suburbs in the south and west were no longer increasing their shares of the non-poor population relative to other suburbs (columns 1 and 2). Rather, all inner suburbs regardless of region experienced no significant change in either poor or non-poor population shares.

The effects of population density varied less by region and more for poor and non-poor populations. Consistent with the expectations of the "house filter" and "land preferences" hypotheses, suburban civil divisions with higher population densities increased their shares of the poor population and decreased their shares of the non-poor.

There is less support for the "white flight" hypothesis in Table 9. Civil divisions in southern MSAs with larger African American representation in 1970 increased their relative shares of the MSA non-poor population between 1970 and 1990. Racial composition had no significant effects on shifts in the relative shares of poor and non-poor within the MSA among suburbs in other regions.

There is also less support for the "local public finance" hypothesis. The initial poverty rate for the suburb had no effect on relative shifts in the poor and non-poor populations for northeastern and midwestern MSA suburbs and opposite effects from those expected by the hypothesis for the southern and western MSA suburbs. For the southern and western MSAs, the poor populations shifted away from those civil divisions with higher initial poverty and the non-poor populations shifted toward those suburbs.

When central cities are added to the analyses (columns 3 and 4), most of the relationships remain. There are, however, a few differences to note.

When central cities are included, a higher initial poverty rate for a civil division in western MSAs led to a decreased shift of the non-poor to the civil division and an increase in the poor. When population density, racial composition, and overall population shifts are held constant, those western central cities with more poor attracted relatively less of their MSA non-poor. In contrast to the analyses restricted to suburbs, this result is consistent with the "local public finance" hypothesis explaining movements from the central cities.

Among civil divisions in southern and western MSAs, civil divisions with higher initial population densities experienced increased shifts of the non-poor and a decrease in the poor. When initial racial composition and poverty rates and overall population shifts are held constant, those western and southern central cities with higher population

densities attracted relatively more of their MSA non-poor and less of their poor. In contrast to the analyses restricted to suburbs, this is inconsistent with the "house filter" and "land preference" hypotheses explaining movements from the central cities.

Among civil divisions in northeastern and midwestern MSAs, a higher initial representation of African Americans led to relative decreases in the non-poor in the civil division. This occurred because midwestern and northeastern central cities with more African Americans attracted relatively less of their MSA non-poor. In contrast to the analyses restricted to suburbs, this is consistent with the "white flight" hypothesis explaining movements from the central cities.

Summary

Consistent with the "housing filter" and "land preference" hypotheses of changes in the intrametropolitan location of income and poverty, suburban civil divisions with relatively higher populations densities in 1970 experienced relatively higher poverty rates in 1970, 1980 and 1990 and also experienced relatively greater declines in the median household incomes of their residents in each of those years. An analysis of shifts in the locations of the poor and the non-poor within MSAs also supported the "housing filter" and "land preference" hypotheses of change for MSAs. Suburbs with higher population densities tended to increase their share of the MSA poor population and lose their share of the MSA non-poor populations.

The evidence for the "white flight" hypothesis is less consistent and therefore less compelling. On the one hand, civil divisions with relatively higher representations of African Americans in 1970 experienced relatively higher poverty rates in 1970, 1980 and 1990 and also experienced relatively greater declines in the median household incomes of their residents in each of those years. The size of the racial effect also increased

between 1970 and 1990. On the other MSAs between 1970 and 1990 were not consistent with the hypothesis. But, northeastern and midwestern central cities with more African Americans in 1970 lost relatively more of their non-poor populations to their suburbs.

The evidence for "local public finance" conditions creating greater sorting of the MSA population by income is also weak. For all suburbs across all regions, there is no evidence that the non-poor shifted to civil divisions with fewer poor. The only evidence consistent with "local public finance" conditions creating greater sorting of the MSA population by income is for the shifts of the non-poor from western central cities to their suburbs.

Conclusions

Large, older central cities in the northeastern and midwestern regions of the United States have experienced increasing poverty and decreases in the median household income of their residents, relative to their own history and relative to the current rates of their surrounding suburbs. They have lost a larger proportion of their MSA's non-poor population to their suburbs than have central cities in other regions. Large central cities in the south and the west also have higher rates of poverty and lower median household incomes than their suburbs, but the differences are not as large as those for cities in the northeast and midwest. Western central cities have not experienced growth in poverty although their median household income has declined, in relation to that of their suburbs. Southern central cities have decreased their poverty rates and experienced no change in their median household income relative to their suburbs. Nonetheless, both southern and western central cities have lose their shares of the MSA

non-poor population to their suburbs at higher rates than they have lost shares of the their MSA poor population.

There is some evidence of economic decline in the inner suburbs of the northeastern and midwestern central cities relative to other suburbs, but not relative to their central cities. These suburbs have experienced increasing poverty and decreases in median household income relative to their own history and relative to the current rates of the outlying suburbs in their MSAs. These suburbs have lost a small share of their MSA non-poor population to the outlying suburbs, the only suburban category in the study to do so. There is no evidence that the inner suburbs of southern and western central cities have experienced increasing poverty or decreases in median household income. For the south, the evidence suggests the opposite. The inner suburbs of large southern MSAs have decreased their relative poverty rates and increased their median household income.

Because there are more intrametropolitan shifts in the locations of the non-poor than of the poor, suburbs that attract relatively more of the MSA population also attract a disproportionately non-poor population.

The patterns of differential shifts in the MSA population by income among suburbs between 1970 and 1990 were most consistent with an explanation based on differences in the preferences of the poor (relative to those of the non-poor) for land intensive housing and/or a higher marginal evaluation of size of housing unit relative to its age or quality by the poor. Across all regions, the poor in large MSAs systematically moved to suburbs with larger population densities and the non-poor moved to those with lower population densities, after considering the effects of other characteristics of the suburb. Because there was no evidence that the initial racial composition or the poverty rate of the suburb discouraged shifts of the non-poor to the suburb, there is little support

for “white flight” or local public financial conditions as an explanation for the differential movement of the non-poor to particular suburbs.

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Table 1
Metropolitan Areas, Central Cities and Number of Civil Divisions by Metropolitan Area and Region

Northeast and Midwest:

Baltimore (57)
Boston (147)
Chicago (176)
Cleveland (108)
Columbus (106)
Detroit (201),
Indianapolis (80)
Milwaukee (90)
Minneapolis-St. Paul (292)
New York City (464)
Philadelphia (338)
Pittsburgh (299)
St. Louis (109)

South:

Atlanta (82)
Austin (8)
Charlotte (57)
Dallas-Fort Worth (38)
Houston (20)
Jacksonville (12)
Memphis (29)
Miami (7)
Nashville (41)

West:

Denver (9)
Los Angeles (61)
Portland (19)
San Diego (10)
San Francisco (19)

Table 2
Economic and Geographic Characteristics of Civil Divisions
(Numbers in Italics are Means Weighted by Population of the Civil Division)

	Central Cities		Municipalities Adjacent to Central Cities		Suburban Municipalities Not Adjacent to Central Cities	
Number						
Total	31		390		2451	
Western	7 (23%)	*(25%)*	39 (10%)	*(36%)*	72 (3%)	*(22%)*
Southern	10 (32%)	*(26%)*	94 (24%)	*(21%)*	190 (8%)	*(7%)*
Middle and Northeast	14 (45%)	*(49%)*	257 (66%)	*(43%)*	2189 (89%)	*(71%)*
Poverty Rate:						
1970	13.7%	*13.8%*	9.2%	*7.3%*	8.5%	*7.2%*
1980	15.6%	*16.4%*	8.0%	*8.3%*	7.1%	*7.4%*
1990	17.6%	*17.7%*	8.3%	*8.7%*	6.8%	7.3%
Ratio of Median Household Income to MSA Average						
1970	94.8%	*92.8%*	105.9%	*107.1%*	98.2%	*104.5%*
1980	83.7%	*83.1%*	112.8%	*110.7%*	112.7%	*115.5%*
1990	81.5%	*82.2%*	112.1%	*108.5%*	112.9%	*114.2%*
Proportion of Residents African-American						
1970	21.2%	*22.6%*	7.2%	*6.5%*	3.5%	*5.2%*
1980	25.4%	*25.5%*	8.1%	*9.2%*	3.6%	*6.0%*
1990	27.1%	*25.9%*	9.8%	*10.7%*	3.9%	*6.7%*
Population						
1970	35,882,594		15,847,748		29,831,333	
1980	35,310,514		17,345,866		34,063,221	
1990	37,501,545		19,766,843		38,861,748	
Distance of Centroid to Centroid of Central City	0		13.0	*15.9*	29.3	*29.5*

Table 3 Effect of Municipality Location on Municipality Poverty Rate: 1970, 1980 and 1990[24]			
Municipality Characteristics[25]	1970	1980	1990
Central City			
Midwest-Northeast	8.51 (21.81)	11.13 (22.40)	14.11 (25.69)
West	5.93 (7.87)	5.10 (5.71)	5.12 (5.74)
South	13.14 (7.30)	11.69 (5.84)	7.99 (4.09)
Adjacent to Central City			
Midwest-Northeast	0.07 (0.28)	0.41 (1.23)	1.48 (4.04)
West and Adjacent	1.50 (3.07)	1.91 (3.35)	1.61 (2.84)
South and Adjacent	-1.73 (-2.32)	0.20 (0.26)	-0.47 (-0.63)
Distance of Municipality Centroid from Central City			
Midwest-Northeast	-0.04 (-1.71)	-0.15 (-4.78)	-0.09 (-2.64)
West	0.05 (2.17)	-0.05 (-1.73)	-0.09 (-3.37)
South	0.71 (5.48)	0.24 (1.68)	-0.09 (-0.67)
Distance Squared			
Midwest-Northeast	0.0014 (3.44)	.0023 (4.87)	.0016 (3.10)
West	0.0001 (0.48)	.0004 (2.54)	.0008 (4.62)
South	-.004 (-2.60)	.0005 (0.18)	.0054 (2.07)
Adjusted R Squared	.61	.63	.65

[24] Numbers in parentheses are t-statistics in this table and all subsequent tables.

[25] Estimated equations, in this table and in all subsequent tables, also include a dummy variable for each MSA/CMSA and a dummy variable that indicates whether civil divisions were combined to create a consistent geography for each census year. For the estimations, each observation is weighted by its population size.

Table 4
Effects of Municipality Location on Ratio of Municipality Median Household Income to MSA Median, 1970, 1980 and 1990

Municipality Characteristics	1970	1980	1990
Central City			
Midwest-Northeast	-26.58 (-11.55)	-37.14 (15.02)	-39.31 (-13.75)
West	3.14 (0.71)	-16.48 (-3.71)	-13.33 (-2.87)
South	-11.01 (-1.04)	-27.79 (-2.79)	-10.32 (-1.02)
Adjacent to Central City			
Midwest-Northeast	0.40 (1.51)	-5.90 (-3.61)	-10.33 (-5.44)
West and Adjacent	4.41 (1.53)	-3.21 (-1.13)	-2.19 (-0.74)
South and Adjacent	5.23 (1.19)	6.96 (1.77)	10.77 (2.76)
Distance of Municipality Centroid from Central City			
Midwest-Northeast	0.10 (0.64)	1.07 (6.82)	1.07 (6.03)
West	0.06 (0.49)	0.29 (2.22)	0.39 (2.92)
South	-1.32 (-1.72)	-0.04 (-0.05)	1.09 (1.53)
Distance Squared			
Midwest-Northeast	-.0101 (-4.22)	-.0219 (-8.90)	-.0209 (-7.84)
West	-.0013 (-1.54)	-.0032 (-3.78)	-.0043 (-4.88)
South	.0087 (0.60)	-.0175 (-1.31)	-.0330 (-2.42)
Adjusted R Squared	.21	.45	.40

Table 5 Distribution of Population, by Poverty Status, Between Central Cities, Adjacent Suburbs, and Other Suburbs, by Region, 1970-90		
	Northeast and Midwest	**South and West**
Poor Population		
Adjacent Suburbs		
1970	11.0%	18.9%
1980	10.8%	20.7%
1990	10.8%	20.8%
1970-90 Change	***-0.2***	***+1.9***
Non-adjacent Suburbs		
1970	28.6%	21.8%
1980	28.5%	21.6%
1990	27.4%	22.8%
1970-90 Change	***-1.2***	***+1.0***
Central Cities		
1970	60.5%	59.3%
1980	60.7%	57.7%
1990	61.8%	56.4%
1970-90 Change	***+1.3***	***-2.9***
Non-poor Population		
Adjacent Suburbs		
1970	17.7%	24.5%
1980	17.1%	26.3%
1990	16.3%	27.8%
1970-90 Change	***-1.4***	***+3.3***
Non-adjacent Suburbs		
1970	44.9%	23.9%
1980	51.0%	25.4%
1990	53.6%	27.7%
1970-90 Change	***+8.7***	***+3.8***
Central Cities		
1970	37.4%	51.6%
1980	32.0%	48.3%
1990	30.1%	44.6%
1970-90 Change	***-7.3***	***-7.0***

Table 6
Effect of Suburban Municipality Location on
Changes in the Municipality's Share of the Metropolitan Poor and Non-poor Populations, 1970 to 1990

Municipality Characteristics	Suburbs Only		Central City and Suburbs	
	Share of Poor Population	Share of Non-poor Population	Share of Poor Population	Share of Non-poor Population
Central City				
Midwest-Northeast			0.007 (2.16)	-0.078 (-21.40)
West			-0.022 (-4.15)	-0.046 (-7.80)
South			0.002 (0.15)	-0.048 (-3.77)
Adjacent to Central City				
Midwest-Northeast	-0.0004 (-0.69)	-0.0034 (-3.77)	-0.003 (-1.39)	-0.0039 (-1.61)
West	0.0042 (4.15)	0.0103 (6.97)	0.011 (3.23)	0.0183 (4.90)
South	0.014 (9.80)	0.0089 (4.38)	0.026 (5.91)	0.0257 (5.20)
Distance of Municipal Centroid from Central City				
Midwest-Northeast	0.00003 (0.46)	0.0001 (0.68)	-0.0001 (-0.71)	-0.00007 (-0.33)
West	0.00022 (5.02)	0.0006 (8.81)	0.0003 (1.85)	0.00060 (3.57)
South	0.0030 (12.84)	0.0051 (14.72)	0.0022 (2.72)	0.0049 (5.41)
Distance Squared (in 10,000s)				
Midwest-Northeast	-0.0017 (-0.20)	-0.0071 (-0.56)	-0.012 (-0.40)	-0.0023 (-0.68)
West	-0.0125 (-4.38)	-0.0283 (-6.73)	-0.017 (-1.71)	-0.0032 (-2.89)
South	-0.508 (-11.41)	-0.866 (-13.22)	-0.438 (-2.83)	-0.871 (-5.06)
Adjusted R Squared	.602	.592	.394	.700

Table 7
Effect of Municipality Location, Density and Racial Characteristics on Municipality Poverty Rate: 1970, 1980 and 1990

Municipality Characteristics	1970	1980	1990
Central City			
Midwest-Northeast	2.13 (7.72)	1.87 (6.02)	5.09 (12.17)
West	3.26 (6.53)	1.55 (2.99)	1.38 (2.19)
South	2.96 (2.48)	-0.42 (-0.36)	-2.92 (-2.12)
Adjacent to Central City			
Midwest-Northeast	0.09 (0.28)	0.30 (1.58)	1.27 (5.01)
West and Adjacent	0.09 (0.28)	-0.04 (-0.12)	-0.28 (-0.70)
South and Adjacent	-2.81 (-5.75)	-1.02 (-2.24)	-1.59 (-3.06)
Distance of Municipality Centroid from Central City			
Midwest-Northeast	0.16 (8.94)	0.12 (6.02)	0.12 (4.77)
West	0.11 (7.09)	0.04 (2.30)	-0.02 (-1.32)
South	0.42 (4.88)	-0.03 (-0.36)	-0.29 (-3.05)
Distance Squared			
Midwest-Northeast	-.0004 (-1.62)	.0000 (0.86)	-.0002 (-0.58)
West	-.0002 (-2.13)	.0000 (0.46)	.0005 (3.93)
South	-.0033 (-2.08)	.0022 (1.42)	.0061 (3.33)
Population Density (1970)	0.0003 (27.74)	0.0005 (33.45)	.0004 (19.55)
Population Density Squared (in 10000s)	-.0041 (-1.86)	-.0022 (-0.93)	.0017 (0.54)
Proportion African-American (1970)	0.25 (52.24)	0.35 (64.44)	0.36 (48.93)
Adjusted R Squared	.83	.88	.83

Table 8
Effects of Municipality Location, Density, and Racial Characteristics on Ratio of Municipality Median Household Income to MA Median, 1970, 1980 and 1990

Municipality Characteristics	1970	1980	1990
Central City			
Midwest-Northeast	-5.45 (-2.45)	-2.78 (-1.31)	-2.96 (-1.12)
West	7.30 (1.81)	-10.76 (-3.05)	-6.92 (-1.74)
South	16.90 (1.76)	7.66 (0.97)	23.02 (2.67)
Adjacent to Central City			
Midwest-Northeast	8.21 (2.09)	-4.76 (-1.28)	-8.82 (-5.52)
West and Adjacent	7.03 (2.71)	0.87 (0.39)	1.85 (0.74)
South and Adjacent	8.21 (2.09)	10.50 (3.41)	14.11 (4.30)
Distance of Municipality Centroid from Central City			
Midwest-Northeast	-0.96 (-6.57)	-0.44 (-3.38)	-0.36 (-2.23)
West	-028 (-2.32)	-0.24 (-2.26)	-0.12 (-1.01)
South	-0.58 (-0.85)	0.60 (1.09)	1.53 (2.55)
Distance Squared			
Midwest-Northeast	-.0007 (-0.33)	-.0084 (-4.39)	-.0090 (-3.93)
West	.0003 (0.34)	-.0008 (-1.15)	-.0019 (-2.53)
South	.0007 (0.05)	-.0213 (-2.04)	-.0330 (-2.42)
Population Density (1970)	-.0019 (-19.13)	-.0030 (-30.83)	-.0029 (-24.17)
Population Density Squared (in 10000s)	.0149 (0.93)	-.0330 (-2.35)	-.0486 (-2.90)
Proportion African-American (1970)	-0.64 (-16.58)	-0.96 (-25.98)	-1.03 (-22.33)
Adjusted R Squared	.37	.66	.58

Table 9
Effect of Suburban Municipality Location, Density, and Racial Characteristics on Changes in the Municipality's Share of the Metropolitan Poor and Non-poor Populations, 1970 to 1990

Municipality Characteristics	Suburbs Only		Central City and Suburbs	
	% of Poor Population	% of Nonpoor Population	% of Poor Population	% of Nonpoor Population
Central City				
Midwest-Northeast			0.053 (20.57)	-0.012 (-22.91)
West			-0.005 (-1.44)	-0.002 (-2.63)
South			0.002 (0.23)	-0.003 (-2.21)
Adjacent to Central City				
Midwest-Northeast	0.0001 (0.36)	0.0000 (0.76)	-0.0003 (-0.27)	0.00005 (0.22)
West	-0.0014 (-2.29)	-0.0001 (-1.89)	-0.0032 (-1.59)	-0.006 (-1.51)
South	-0.0008 (-0.98)	-0.0001 (-0.49)	-0.0010 (-0.39)	0.0010 (1.83)
Distance of Municipal Centroid from Central City				
Midwest-Northeast	0.0001 (1.50)	-0.00001 (-1.89)	0.0002 (1.60)	-0.00004 (-1.50)
West	0.0001 (1.76)	-0.00001 (-1.87)	-0.0006 (-5.98)	0.00008 (4.05)
South	0.0004 (2.98)	-0.00007 (-3.81)	-0.0015 (-3.18)	0.0001 (1.31)
Distance Squared (in 10,000s)				
Midwest-Northeast	-0.004 (-0.79)	0.0007 (1.07)	-0.012 (-0.70)	0.0031 (0.88)
West	-0.0021 (-0.99)	0.0003 (1.13)	0.027 (4.40)	-0.0035 (-2.80)
South	-0.092 (-3.34)	0.0135 (4.04)	0.331 (3.70)	-0.0520 (-2.84)
Change in Proportion of MSA Population 1970-90				
Midwest-Northeast	0.207 (8.38)	1.093 (366.39)	0.675 (23.72)	1.029 (176.53)
West	0.710 (43.44)	1.034 (524.70)	0.615 (39.64)	1.040 (327.02)
South	0.457 (30.92)	1.102 (617.57)	0.467 (16.70)	1.090 (190.22)
Population Density (1970) (in 10,000s)				
Midwest-Northeast	0.0011 (2.52)	-0.00013 (-2.42)	0.0066 (5.42)	-0.0011 (-4.45)
West	0.0008 (5.86)	-0.00114 (-6.53)	-0.0271 (-10.38)	0.0041 (7.63)
South	0.0406 (6.84)	-0.00265 (-3.70)	-0.189 (-13.54)	0.0184 (6.40)
Proportion African American (1970)				
Midwest-Northeast	-0.0021 (-1.07)	-0.00025 (-1.05)	0.0034 (0.52)	-0.00007 (-5.08)
West	0.0007 (0.19)	-0.00016 (-0.36)	0.0037 (0.35)	-0.00003 (-1.24)
South	-0.0030 (-0.67)	0.0014 (2.58)	0.1218 (9.60)	-0.00003 (-1.07)
1970 Poverty Rate				
Midwest-Northeast	-0.0029 (-0.56)	-0.0069 (-1.09)	-0.0008 (-4.80)	0.0002 (4.89)
West	-0.0589 (-6.66)	0.0022 (2.07)	.0008 (2.91)	-0.0002 (-4.12)
South	-0.0334 (-3.56)	0.0077 (6.79)	-0.0036 (-12.64)	0.0005 (9.18)
Adjusted R Squared	.871	.999	.811	.997