TAKE THE MONEY AND RUN: ECONOMIC SEGREGATION IN U.S. METROPOLITAN AREAS*

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Compared to residential segregation by race, economic segregation has received relatively little attention in recent empirical literature. Yet a heated debate has arisen concerning Wilson's (1987) hypothesis that increasing economic segregation among African Americans plays a role in the formation of urban ghettos. I present a methodological critique of the measure of economic segregation used by Massey and Eggers (1990) and argue that their measure confounds changes in the income distribution with spatial changes. I develop a "pure" measure of economic segregation based on the correlation ratio and present findings for all U.S. metropolitan areas from 1970 to 1990. Economic segregation increased steadily for Whites, Blacks, and Hispanics in the 1970s and 1980s, but the increases have been particularly large and widespread for Blacks and Hispanics in the 1980s. I explore the causes of these changes in a reduced-form, fixed-effects model. Social distance and structural economic transformations affect economic segregation, but the large increases in economic segregation among minorities in the 1980s cannot be explained by the model. These rapid increases in economic segregation, especially in the context of recent, albeit small, declines in racial segregation, have important implications for urban policy, poverty policy, and the stability of urban communities.

Residential segregation by race in the United States has been declining since about 1970, but the decreases have been so modest that segregation of African Americans remains high (Farley and Frey 1994; Massey and Denton 1987, 1989). Economic inequality has also been increasing since 1979, if not before (U.S. Bureau of the Census 1992, 1993). Both phenomena have been extensively documented. A third dimension of socioeconomic differentiation has received much less attention in recent years: *economic* segregation (i.e., the spatial segregation of households by income or social class). The relative dearth of studies in this area is surprising in light of the importance ascribed to economic segregation by Wilson (1987) in his classic work, *The Truly Disadvantaged*.

I document increasing economic segregation in recent decades, particularly for African Americans and Hispanics in the 1980s. The phenomenon is widespread, affecting virtually every metropolitan area in the United States. I also develop an exploratory causal model, which suggests that structural economic transformations and changes in the "social distances" among racial groups affect economic segregation, but do little to account for the rapid increases in economic segregation among minorities in the 1980s. Under-

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standing the causes of these changes is a prerequisite to effective analysis of urban policies and programs.

ECONOMIC SEGREGATION AND ASSIMILATION

A rich literature describes the interrelationship of racial segregation and economic segregation. Much of this literature can be traced to the classic paper by Park (1926), who predicted that "successful individuals [of minority groups] move out" so that "changes of economic and social status . . . tend to be registered in changes of location" (p. 9). More generally, Park argued that "social relations are . . . inevitably correlated with spatial relations; . . . physical distances . . . are, or seem to be, the indexes of social distances" (p. 18). Subsequent research has focused on these two related but conceptually distinct hypotheses: the "social distance" hypothesis and the "assimilation" hypothesis (Massey 1981:642–43). According to the social distance hypothesis, racial or ethnic residential segregation is "positively associated with differences between groups" (Massey 1981:642). The assimilation hypothesis states that the better-off strata within a minority group will translate individual gains into spatial assimilation.

As assimilation occurs, racial segregation will decline for high-status minorities relative to low-status minorities and, as a result, economic segregation within the minority group will increase. Erbe (1975), addressing the issue of socioeconomic segregation by social class within racial groups, questioned Kantrowitz's finding that "the better off black is as separated from the poorer black residentially as the better off white is from the poor white" (Kantrowitz 1973:*v*). Erbe argued that Kantrowitz's use of the index of dissimilarity (*D*) to measure economic segregation was conceptually inadequate because the index—which measures the evenness of the spatial distribution of two groups—is insensitive to the relative sizes of the two groups. She argued that "intergroup contact" is "a function both of residential segregation of populations and their relative size in the total population" (Erbe 1975:803).

Erbe (1975) favored a measure of "asymmetric intergroup contact," known as the exposure index (*P**), which gives the average probability of contact between members of one group and members of another group. Using census data for Chicago, Erbe found that within-race indices of dissimilarity for various measures of social class differed little between Whites and Blacks. In contrast, exposure measures showed that high-status Blacks were far more likely to live near low-status Blacks than high-status Whites were to live near low-status Whites. Erbe concluded:

> Middle-class blacks are not randomly distributed throughout the ghetto and thus are segregated from the black lower class in this sense. Nevertheless they live in much closer propinquity with the lower class than do middle-class whites, simply because the black lower class is [proportionally] larger than the white lower class. To the extent that neighborhoods are the functional locus of many institutions, most especially schools, this is of great consequence. . . . In particular, it may be one factor in accounting for the low degree of occupational inheritance between high-status black fathers and their sons and the high degree of intergenerational downward mobility among blacks compared to whites. (1975:803)

This quote sounds incongruous today, when the issue has been turned on its head. Wilson (1987) argued that the out-migration of the Black middle class has isolated poor Blacks in the inner city, with disturbing "concentration effects."

Erbe's analysis demonstrated the importance of distinguishing between measures of economic segregation that are conditioned on the underlying income distribution and those that are not. Each measure has a value, but the different measures answer different questions. If the incomes of all Black households were to rise in real terms by a fixed amount and no households moved, the *P** index measuring contact with persons in poverty would change a great deal because there would be less Black poverty to be exposed to. In contrast, there should be little if any change in the index of dissimilarity, since the spatial distribution of the social strata within the Black community would be unaffected.

Farley (1977) also examined the interactions of residential segregation by race and social class. As proxies for social class, Farley used the educational attainment of adult males, the occupations of employed

males, and family income. Education, for example, was coded in 10 levels by the Bureau of the Census, and for each racial group Farley calculated all possible pair-wise indices of dissimilarity among the education levels. Farley found that residential segregation by social class, regardless of the proxy variable used, was low relative to racial residential segregation. In a more recent study, White (1987:114) also found that residential segregation by income, education, or occupation is "relatively modest," especially in contrast to segregation by race, which he called "a pervasive feature of the metropolitan landscape." Moreover, Farley (1977, table 4) found that racial segregation was nearly constant across levels of education, ranging from a low of 82 for adult males with 1 to 4 years of education to a high of 89 for adult males with 4 years of college.[1] The findings were similar when social class was proxied by occupation of employed men or family income. Farley (1977) concluded that "racial residential segregation . . . is not primarily a consequence of racial differences in economic status" (p. 514). In a similar vein, Miller and Quigley (1990), using the entropy measure of residential segregation, concluded that "only a small fraction . . . of segregation by race can be explained by economic forces leading to a clustering by demographic group" (pp. 17–18).

Massey (1981), summarizing the large body of empirical work on the social distance and assimilation hypotheses, concluded that "social distance is highly correlated with residential dissimilarity between particular ethnic groups. . . . In contrast, the assimilation hypothesis has not received consistent support" (p. 643). Massey attributed some of this lack of support for the assimilation hypothesis to the use of "indirect standardization" in much of the research. He argued that direct standardization (i.e., examining the index of dissimilarity between ethnic groups at fixed levels of social status) is preferable. Studies employing the latter technique, such as Farley's study cited above, tend to support assimilation for Hispanics but not for Blacks (Massey 1981, figure 1).

[1] A score of 100 represents complete segregation. The figures are averages for 29 urban areas.

Several conclusions can be drawn from the empirical literature. First, racial segregation is far more extensive than segregation by social class. Neighborhoods are more heterogeneous along class lines than they are along racial lines (Erbe 1975; Farley 1977, 1991; White 1987). Second, although social distance is useful in predicting cross-sectional patterns of segregation, the prediction that residential assimilation follows from economic advancement has not been supported for Blacks, again highlighting the persistence of racial segregation. Assimilation is supported for Hispanics (Massey 1981).

Finally, racial segregation is not an artifact of economic segregation: The primary organizing principles of the metropolis are race and ethnicity, not social class. Kain (1986) concluded that "virtually every systematic study has concluded that black and white differences in income and other socioeconomic variables account for very little of the current and past patterns of racial segregation" (p. 114). Hence, it makes sense to study economic segregation within racial and ethnic groups; otherwise, some of the observed economic segregation will be an artifact of the underlying racial residence patterns.

MEASURING ECONOMIC SEGREGATION

To measure economic segregation, Erbe and most other pre-1987 researchers used the index of dissimilarity applied to variables which served as proxies for social class, such as occupation or educational attainment (Duncan and Duncan 1955b; Erbe 1975; Farley 1977). For computational purposes, the variables must be broken down into discrete categories. Unfortunately, changes in the social meaning of occupational categories over time and changes in the relation between social class and educational attainment complicate longitudinal comparisons of economic segregation based on these variables.

In contrast, household income provides greater comparability over time once inflation is taken into account. Massey and Eggers (1990:1159), comparing interclass segregation using census tract data from 1970 and 1980, defined four social classes based on specific income thresholds: poverty income, lower-middle class, upper-middle

class, and affluent. Then, for each racial and ethnic group, they computed the six pairwise indices of dissimilarity among the four social classes and averaged these indices to come up with a final aggregate measure (hereafter, D_I).[2] Based on this analysis, Massey and Eggers (1990) concluded that interclass segregation among Blacks "increased over the 1970s, often quite sharply" (p. 1170).[3] This measure, however, revealed declines in interclass segregation for Whites, Hispanics, and Asians.

While ingenious, this method of measuring interclass segregation has several problems. First, the cutoff points between income classes are unavoidably arbitrary. Second, income is a continuous variable, and collapsing it into four categories discards information. Third, and most important, the measure is not independent of the mean and variance of the income distribution. As the mean and variance change, the cutoff points for the income categories "cut" the income distribution at different percentiles. In other words, like P^*, the index of dissimilarity *used in this way* may confound changes in the underlying income distribution with changes in spatial organization.

A simulation illustrates the problem. Imagine a metropolitan area with 100 neighborhoods, each containing 100 households, with a modest degree of economic segregation. Shifts in either the mean or variance of the income distribution can move households from one class category to another, even though they have not moved from one neighborhood to another. Table 1 shows the effect of such shifts on the D_I measure. For a given value of mean household income, increases in the standard deviation reduces economic segregation as measured by D_I even though no household has moved and all households stand in the same relative position in the income distribution. Increases in household mean income, holding the standard deviation constant, increase D_I although less so at high income levels. Thus, *the index of dissimilarity applied to the income distribution confounds changes in the income distribution with changes in spatial organization.*

Table 1. Simulation of Massey and Egger's Measure of Economic Segregation (D_I) By Mean and Standard Deviation of the Income Distribution.

Mean Income	Standard Deviation			
	$10,000	$15,000	$20,000	$25,000
$20,000	.57	.49	.44	.41
25,000	.58	.50	.45	.42
30,000	.61	.50	.45	.42
35,000	.67	.52	.47	.43

Note: One hundred neighborhoods with 100 households each were generated by a random process in which income is determined by a random normal deviate and spatial location is determined by two random normal deviates, one of which is retained from the income determination.

The major source of this problem is that the index of dissimilarity is built around the idea of two well-defined groups.[4] White (1986:215) argued that when the number of groups exceeds two, a "weighted average or pairwise adaptation" of the index of dissimilarity is "rather unsatisfactory." Moreover, the high frequency of households changing categories as their annual income changes, which could not occur for race or ethnicity, clouds the interpretation of a segregation statistic based on income categories. More advanced measures, such as the entropy index, handle multiple categories with ease, but such measures are still subject to shifts in the underlying distribution that change the implicit meaning of the categories.

The correlation ratio, also referred to as eta-squared or the segregation statistic, has also been used to measure segregation (Bell 1954; Farley 1977; Schnare 1980; Zoloth 1976). While often applied to dichotomous variables, the correlation ratio is also capable of measuring spatial segregation by continuous variables like income (White 1986:216). Farley (1977), for example, ap-

[2] A simpler but more inexact approach is to calculate an index of dissimilarity for the poor and non-poor (Abramson and Tobin 1994).

[3] It should be noted, however, that Massey and Eggers (1990) found no evidence that this increased economic segregation played a role in the increased isolation of the Black poor as claimed by Wilson (1987) and Jargowsky (1991, 1994).

[4] Several authors have developed variations of the index of dissimilarity that can account for more than two groups, but the groups still must be finite in number and well-defined (Morgan and Norbury 1981; Sakoda 1981).

plied the correlation ratio to years of education to get a "succinct measure" of social-class segregation:

> Each individual in the sample was assigned a number equaling the years of schooling he had completed. Using these data, we calculated an estimate of the variance of the educational attainment of blacks and whites in the entire urbanized area. . . . [U]sing the attainment of each person in a tract and the tract mean, we developed a within-tract estimate of the variance in attainment. The correlation ratio, sometimes referred to as eta squared, equals one minus the within tract variance divided by the estimate of variance developed from the total sample. . . . This may be thought of as a one-way analysis of variance model in which the overall variance in socioeconomic status is divided into within census tract and between census tract variances. (P. 503)

In the case of dichotomous variables, the correlation ratio is equivalent to the P^* (exposure) measure after standardizing the latter for the underlying population proportions of the groups being compared (Duncan and Duncan 1955a:213; White 1986:207–208). However, unlike P^*, it easily extends to polytomous variables and "for [continuous] characteristics like income and education it is particularly attractive" (White 1986:210, 215).

Conceptually, the application of the correlation ratio to income is straightforward. I define the *Neighborhood Sorting Index* (NSI) as:

$$\mathrm{NSI} = \frac{\sigma_N}{\sigma_H} = \frac{\sqrt{\dfrac{\sum_{n=1}^{N} h_n(\bar{y}_n - \bar{y})^2}{H}}}{\sqrt{\dfrac{\sum_{i=1}^{H}(y_i - \bar{y})^2}{H}}},$$

where y is household income, i indexes households, n indexes neighborhoods, h_n is the number of households in neighborhood n, and H and N are the total number of households and neighborhoods respectively. As in most segregation research, neighborhoods are proxied by census tracts.[5] The square of NSI is the between-tract variance over the total variance of household income (i.e., the correlation ratio with respect to the distribution of income across neighborhoods, treating income as truly continuous and not a set of categories).

This specific implementation of the correlation ratio has several desirable properties. It is a "pure" measure of economic segregation. It implicitly controls for the overall income level because it is based on *deviations* from mean household income and also controls for income inequality because it is expressed as a percentage of total income variance. In contrast to D_I and other measures based on breaking the income distribution into fixed classes, NSI is invariant with respect to changes in the mean and variance of the income distribution. When the simulation of Table 1 is repeated for NSI, an identical value appears in each cell.

NSI also has an intuitive interpretation in terms of the income distribution. Each household in a metropolitan area has an income, and the distribution of these incomes has a mean and a standard deviation. In addition, each household is located in a neighborhood. Each neighborhood has a mean income, and the distribution of households by the mean income of their neighborhood also has a mean and a standard deviation. NSI is simply the ratio of these two standard deviations. In the unlikely event that all neighborhoods have the same mean income (i.e., there is no economic segregation) then the standard deviation of the neighborhood distribution is 0 and NSI would be 0 as well. At the other extreme, if all households live in neighborhoods that have mean incomes identical to their own incomes, than the standard deviation of the neighborhood distribution will be identical to the standard deviation of the household distribution and NSI will be 1.0. Values close to 1.0, therefore, indicate high levels of economic segregation.

In addition to controlling for shifts in the underlying income distribution, the NSI has conceptual advantages as well. Stearns and Logan (1986) note that dissimilarity indices, exposure-type measures, and variance-based measures (like NSI) reflect different dimensions of segregation (1986:147). In reference to racial segregation, they conclude:

> Indeed, if we examined our true theoretical interest, we might often find that we are more

[5] See White (1987) for a discussion of the advantages and disadvantages of using census tracts in research on neighborhoods and segregation.

Table 2. Neighborhood Sorting Index (NSI) by Racial and Ethnic Group: U.S. Metropolitan Areas (MSAs), 1970 to 1990

Sample and Year	White		Black		Hispanic	
	Mean NSI	Number of MSAs	Mean NSI	Number of MSAs	Mean NSI	Number of MSAs
All Metropolitan Areas						
1970	.310	228	.341	76	.384	30
1980	.343	318	.395	111	.419	49
1990	.374	336	.480	131	.487	68
Constant Set of Metropolitan Areas						
1970	.310	228	.341	76	.384	30
1980	.351	228	.397	76	.417	30
1990	.385	228	.481	76	.486	30

Note: Includes metropolitan areas with 10,000 or more households for each racial or ethnic group indicated; means are weighted by number of households.

> centrally concerned with community development processes which lead black neighborhoods to greater or lesser racial homogeneity. For this purpose, the correlation ratio is the more suitable index. (P. 147)

With respect to *economic* segregation, we are interested in precisely those community development processes that produce greater or lesser economic homogeneity among neighborhoods. Zoloth (1976:291) argued that, like entropy-based measures and in contrast to the index of dissimilarity, the correlation ratio gives more emphasis to areal units that differ sharply from the mean. From a policy perspective, this weighting is appropriate because often the concern is with the most highly segregated neighborhoods. On the other hand, all correlation ratio-based measures (including NSI) are essentially aspatial (i.e., they do not capture some important physical dimensions of segregation, such as clustering and centralization) (Massey and Denton 1988).

While theoretically straightforward, data limitations complicate the calculation of the NSI. While the between-tract variance is easy to estimate (it is simply the household-weighted variance of the neighborhood means), the total variance of household income is not published by the Bureau of the Census. I use the available counts of households by income category and make some assumptions about the distribution of households within income categories. Based on comparisons with Public Use Microdata Sample estimates, I assume a linear distribution of households in lower income categories and a Pareto distribution for income categories above the metropolitan area mean. I then take the integral of the appropriate density function times the squared difference from the mean and evaluate it for each income category. Summing these squared deviations and dividing by the total number of households yields an estimated variance of household income (for details, see Jargowsky 1995, app. A).

When the number of households for a given racial group in a given metropolitan area is too small, it becomes more difficult to estimate the Pareto parameters for the upper brackets. Thus, I calculate the NSI only for those racial/ethnic groups with at least 10,000 households in any given metropolitan area. Future research could overcome this limitation by working directly with the household records in the census database, in which case the variance could be calculated directly for all metropolitan areas. However, access to this database is limited due to confidentiality concerns.

PATTERNS OF ECONOMIC SEGREGATION: 1970 TO 1990

Previous studies have found relatively low levels of economic segregation, regardless of the measures employed (Erbe 1975; Farley 1977, 1991; Massey and Eggers 1990; White 1987). Similarly, I find that values of the

Table 3. Neighborhood Sorting Index: The 10 Largest Metropolitan Areas, 1970, 1980, and 1990

Metropolitan Area	Whites			Blacks			Hispanics		
	1970	1980	1990	1970	1980	1990	1970	1980	1990
New York	.30	.38	.49	.34	.43	.46	.36	.47	.57
Los Angeles	.49	.42	.48	.37	.44	.52	.42	.43	.46
Chicago	.31	.38	.40	.37	.41	.48	.43	.44	.52
Philadelphia	.31	.39	.40	.35	.41	.48	—	.69	.81
Detroit	.39	.46	.49	.37	.41	.55	.47	.62	.83
Dallas	.30	.38	.41	.31	.43	.51	.44	.44	.55
Washington, D.C.	.38	.44	.42	.38	.45	.47	.52	.74	.55
San Francisco	.38	.39	.41	.43	.50	.51	.42	.48	.48
Houston	.33	.42	.41	.27	.40	.52	.48	.41	.51
Boston	.30	.37	.33	.40	.40	.51	—	.57	.53

Neighborhood Sorting Index are relatively modest, though increasing. Table 2 shows the weighted mean NSI for Whites, Blacks, and Hispanics.[6] Figures in the upper panel are for all metropolitan areas in the United States that had at least 10,000 households for that group in that year; the lower panel shows the weighted means for a constant set of metropolitan areas. The 1990 NSI for Whites is .374 (i.e., the standard deviation of the distribution of neighborhood mean incomes is about four-tenths of the standard deviation of overall income distribution). Thus, between-neighborhood variance accounts for about 14 percent (.374 squared) of the total variance in household income.

Despite the low levels, however, the results show *a pronounced trend toward increasing economic segregation*. Looking at the upper panel, the increases are largest for Blacks: the NSI increased more than 40 percent between 1970 and 1990—from .341 to .480. Most of this increase was in the 1980s. For Whites, the NSI increased by about 10 percent in both the 1970s and 1980s.[7] For Hispanics, the NSI increased by about 9 percent in the 1970s and by 16 percent in the 1980s. These findings are not driven by the inclusion of more metropolitan areas in the later years—indices for a constant set of metropolitan areas (lower panel) show a virtually identical pattern of results. Although the results are weighted by the number of households in each racial/ethnic group, the trends are not driven by a few large cities—averages computed for small, medium, and large metropolitan areas (not shown) showed similar trends (Jargowsky 1995, table 3).

The trend toward greater economic segregation was remarkably widespread. In the 1980s, 108 out of the 111 (97.3 percent) metropolitan areas for which I calculate a change in NSI had an increase in NSI among Blacks. For Whites, the NSI increased in 253 out of 318 metropolitan areas (79.6 percent); for Hispanics, the NSI increased in 39 out of 49 (79.6 percent). Values for the 10 largest metropolitan areas, presented in Table 3, show a fairly consistent pattern of increases. In New York, economic segregation increased most rapidly in the 1970s; in Los Angeles, economic segregation increased most in the 1980s. For Whites, a few metropolitan areas had decreased economic segregation—Los Angeles in the 1970s; the District of Colum-

[6] The indices for Hispanics for 1970 are based on the "Spanish American" category used by the Bureau of the Census. Bean and Tienda (1987: 36–55) have reviewed the shifting definitions and procedures employed by the Bureau to count the Hispanic population. Because of the these changes, the Hispanic indices from 1970 are not strictly comparable to later years. Also note that the counts of Whites, Blacks, and Hispanics by income category used in this analysis are not unduplicated. That is, the White and Black figures include some Hispanics, who may be of any race.

[7] The NSI for the total population (without regard to race) follows the same pattern as the indices for Whites, although at slightly higher levels.

bia, Houston, and Boston in the 1980s. For Blacks, no metropolitan area had a significant decline in economic segregation in either decade.

These findings differ substantially from past research. Massey and Eggers (1990) found increased economic segregation for Blacks in the 1970s, but not for Whites, Asians, or Hispanics, based on data from 60 metropolitan areas. White (1987:189), calculating the entropy index for several variables for 19 metropolitan areas, found that "segregation change by socioeconomic status is mixed" in the 1970s. White also noted that segregation of the poor from the nonpoor increased and concluded that "segregation of the poorest, least educated, and least mobile segments of the population has become more pronounced" (p. 191). On the other hand, the entropy index for income (all races combined) showed a decrease in the 1970s (White 1987, table 6.3). The differences between prior results and those presented here may stem from shifts in the underlying income distribution, as discussed above. Another possibility is that the correlation ratio places greater emphasis on changes in more segregated neighborhoods. Schnare (1980), for example, compared changes in racial segregation over the 1960s using the correlation ratio and the index of dissimilarity and found substantial differences.

Some researchers have found evidence of increasing economic segregation. The figures in Table 2 are consistent with those of Abramson and Tobin (1994), who found increases in the index of dissimilarity comparing the poor and the nonpoor in the 1970s and 1980s. Unfortunately, their findings are not reported separately by race. Massey and Eggers (1993) found that most cities had increases in *overall* economic segregation between 1970 and 1980. In earlier work, Massey and Eggers (1990) showed declines in economic segregation for all groups except Blacks, but there is no real conflict in these findings—the overall level of economic segregation is determined by a complex interaction of economic segregation *within* racial groups, the degree of racial segregation, and the relative economic status of the subgroups.

In summary, there was a nearly ubiquitous trend toward increased economic segregation as measured by the Neighborhood Sorting Index. For Whites, the increases were modest but consistent over time. For Blacks and Hispanics, increases were modest in the 1970s but much larger on average in the 1980s. These rapid increases in economic segregation, especially among Blacks, have been implicated in the increasing concentration of poverty (Jargowsky 1991; Wilson 1987). (For a contrary view, see Massey and Eggers 1990 and Massey, Gross, and Shibuya 1994.) Against a backdrop of modest decreases in racial segregation (Farley and Frey 1994; Harrison and Weinberg 1992; Massey and Denton 1987), these trends suggest a reconsideration of the importance of economic segregation. To understand whether economic segregation will continue to increase, a better understanding is needed of the process driving the current changes.

ECONOMIC SEGREGATION: AN EXPLORATORY CAUSAL MODEL

I developed an exploratory causal model to explain the changes in economic segregation from 1970 to 1990. According to the standard tenets of urban ecology, the distribution of households within a metropolitan space is conditioned by "variations among three easily identifiable factors—economic status, family status, and ethnic classifications" (Flanagan 1993:53). In particular, *economic* segregation is the outcome of a cyclical interaction between the labor market and the housing market. The labor market largely shapes the income distribution and the overall extent of income inequality, both across and within racial and ethnic groups. While the labor market generates income inequality, the housing market is the arena in which the spatial distribution of that inequality is determined. As Park (1926) argued, individuals of high social status try to convert social distances into physical distances, producing segregation along racial, ethnic, cultural, and socioeconomic lines. Finally, the resulting residential patterns can in turn have independent effects on the income distribution (Kain 1968).

While it is beyond the scope of this analysis to fully model the dynamics of the labor and housing markets and their interactions, the models presented below test two sets of hypotheses. First, have structural economic transformations affected economic segrega-

tion? Second, have changes in "social distance," both among and within racial groups, contributed to the observed increases in economic segregation? In testing these hypotheses, account must be taken of idiosyncratic features of metropolitan areas—such as physical configuration, room for expansion, accumulated housing stock, and historical ownership patterns—that may influence economic segregation. Thus, I employ a reduced-form, fixed-effects model. First, I calculate the metropolitan-level changes in NSI for both Blacks and Whites in the 1970s and 1980s.[8] The four resulting sets of changes in NSI (Whites, 1970–1980; Whites, 1980–1990; Blacks, 1970–1980; Blacks, 1980–1990) are pooled and regressed against a set of dummy variables for race, decade, and their interaction. Following the standard path-analytic paradigm (Alwin and Hauser 1975), vectors of variables are added sequentially; these vectors include measures of metropolitan context, structural economic transformations, and social distance. Thus, the basic model is:

$$\Delta \mathrm{NSI}_{mrd} = f(\textit{Race, Decade, Metropolitan Context, Structural Economic Transformations, Changes in Social Distance}),$$

where NSI is the Neighborhood Sorting Index, m indexes metropolitan areas, r indexes race (White or Black), and d indexes decade (1970–1980 or 1980–1990).[9] The specific variables included in each vector, the hypotheses they test, and the expected signs of the coefficients are discussed below. Given the dissimilar conditions for Blacks and Whites in the United States, I have allowed for separate slopes by estimating regressions with interaction terms between the dummy variable for race and the key economic and social distance variables. These terms are retained and reported when they increase the explanatory power of the model.

Metropolitan Context

Many features of metropolitan labor and housing markets can affect the extent to which high- and low-income individuals are segregated from other members of their own race. For example, each metropolitan area has a particular set of institutional arrangements and information networks. To the extent that such features are invariant within a given metropolitan area between 1970 and 1990, the fixed-effects structure of the model implicitly controls for them. Other features may be correlated with region, hence a set of dummy variables for census division is included.

Large metropolitan areas encompass greater differentiation of neighborhoods than do small metropolitan areas (Hoch 1987; White 1987), so the log of total population measured at the beginning of the decade should have a positive effect on economic segregation. A rapid influx of new households puts pressure on the housing market and, in the short run at least, should reduce economic segregation.[10] One migration variable included is the proportion of metropolitan area residents age five or older who lived outside the metropolitan area five years before the base year of the decade (i.e., 1965 or 1975). The relative change in total population over the decade is also included. Negative coefficients are expected for both of these variables. In contrast, a high rate of internal turnover in the housing market may advance the ecological process and increase economic segregation. The proportion of metropolitan area residents (excluding the in-migrants) who moved *within* the metropolitan area in the previous five years captures this effect. The overall mean household income at the beginning of the decade is included in quadratic form.

[8] Hispanics are omitted from consideration owing to data limitations.

[9] Technically, this dependent variable violates Gauss-Markov assumptions because it is restricted to be between −1.00 and +1.00. I rescaled the variable to range between 0 and 1 and repeated all regressions after performing the standard logit transformation. The transformation had virtually no effect on the relative sizes of the coefficients or their statistical significance. I present the untransformed regressions here because the coefficients are easier to interpret.

[10] This is a disequilibrium condition. In the long run, the increased demand in the housing market could lead to new construction, which could create greater opportunities for the rich to reside apart from the poor (Cadwallader 1992: 155).

Structural Economic Transformations

The economic restructuring that affects other aspects of urban spatial structure (Frey and Speare 1988; Kasarda 1985; Kleinberg 1995; Stanback and Noyelle 1983) may also affect economic segregation within race groups. A smaller share of jobs in manufacturing, greater dispersion of jobs away from the urban core, and an increasing share of jobs in the managerial or professional occupations may increase income inequality. These factors may also affect economic segregation by drawing skilled Blacks away from traditional minority enclaves to jobs in dispersed locations. Specifically, decreases in the proportion of jobs in manufacturing should increase economic segregation as new firms locate in a more dispersed pattern with concurrent adjustments in the residence patterns of employees. Thus, the expected sign on this variable is negative. Increasing skill requirements, reflected in the change in the proportion of jobs in professional and managerial occupations, could accentuate social class differences within racial groups, decrease group cohesion, and increase economic segregation within the Black and White communities (Wilson 1980). Hence, the expected sign for the change in the proportion of jobs in professional and managerial occupations is positive.

Changes in Social Distance

The literature on racial segregation generally supports the hypothesis that social distance between groups is translated into physical distance (Massey 1981). What is less clear is how the social distance between racial and ethnic groups affects the economic segregation within those groups. A plausible hypothesis is that greater social distance between groups constricts the housing options available to all members of the lower-status group—guilt by association—and leads to lower economic segregation within the group. Thus, the expected sign for the change in the ratio of the group's mean household income to the overall mean household income is positive.

Decreases in racial segregation, whether spurred by changes in social distance, public policy, or other causes, should increase economic segregation as the artificial boundaries limiting housing options are removed. Thus, a negative sign is expected on the change in racial segregation, as measured by the index of dissimilarity. With respect to the 1970s, Massey and Eggers (1993) found that increasing economic inequality "provided the impetus for a broader increase in the degree of residential segregation between income groups" (p. 308). Their finding concerned overall economic segregation, but the same argument applies to economic segregation within racial groups. Two measures of social distance *within* groups are included in the model to test this effect: the change in the group's poverty rate[11] and the change in the proportion of families headed by a female. Increases in either variable could encourage more privileged group members to isolate themselves, so a positive sign is expected for both variables.

Data

The data are drawn from a variety of sources. Census-tract-level data, used to compute racial and economic segregation measures, come from the 1970 Fourth Count File A, 1980 Summary Tape File 4A, and 1990 Summary Tape File 3A (CD-ROM version). The 1980 data were adjusted to correct for the effects of complementary suppression (for details, see Jargowsky 1991, app. A). Metropolitan-level variables were taken from the "C" versions of these files. To the extent possible, I have adjusted for changes in metropolitan boundaries, which were extensive (for details, see Jargowsky 1994).

RESULTS

Table 4 presents the weighted regression results.[12] Model 1 includes only the dummy variables for race and decade, and their interaction. Thus, the constant in this regres-

[11] The poverty rate is defined as the proportion of the members of a group living in families or households with income below the applicable federal poverty threshold.

[12] To deal with heteroskedasticity associated with size of the metropolitan area, regressions are weighted by the square root of the number of households entering into the calculation of the dependent variable (Maddala 1977:268).

sion represents the component of the change in economic segregation common to Whites and Blacks in both decades—an increase of 3.6 percentage points. In this simple model, there was no significant difference between Blacks and Whites until the 1980s, when the economic segregation among Blacks increased by 5.4 percentage points over and above the common increase. These findings parallel those in Table 2.

Model 2 adds variables to account for the geographic and spatial context of the metropolitan area. A set of dummy variables for census division (the omitted category is Pacific) captures features of metropolitan area housing markets and economic structure that vary by region.[13] Most are significant and positive; compared to the Pacific division, the remaining divisions had increases in economic segregation that were 2 to 3 percentage points higher. The highest coefficients appeared for the Mountain division and the East-Midwest division, the so-called "Rust Belt." As expected, cities with high proportions or residents moving into the area had smaller increases in the NSI. The proportion of residents moving within the metropolitan area, however, was not statistically significant in any of the models. The metropolitan area's average household income, measured in the base year, also affected the change in economic segregation over the decade, but in a nonlinear fashion.[14]

Interestingly, the introduction of these variables has little impact on the level or significance of the three dummy variables included in Model 1. The spatial and geographic context does not explain the dramatic increases in economic segregation among Blacks in the 1980s relative to Whites and Blacks in the 1970s.

Model 3 introduces several proxies for structural economic transformations. Slopes are allowed to vary by race. The effect of the percent *change* in mean income over the decade, unlike the *level* of mean income, does not have a significant effect on economic segregation. However, the change in the share of jobs in manufacturing has a significant effect in the expected direction: Declines in the manufacturing sector, which were the norm, are associated with increases in economic segregation, even after controlling for the metropolitan area's mean income level at the beginning of the decade and the percent change in mean income over the decade.

Increasing skill requirements, proxied by the change in the share of jobs in professional or managerial occupations, reduce economic segregation. This finding is contrary to my expectation that an increasing share of such jobs would emphasize class distinctions and encourage segregation along class lines, and therefore increase economic segregation. One possible explanation for the unexpected sign on the coefficient is that the increase in managerial and professional jobs leads to an increase in economic inequality. Since jobs and annual income probably change faster than do residential patterns, the negative coefficient may reflect a disequilibrium condition. If the overall variance in the distribution of household income changes faster than persons can change neighborhoods to reflect their new status, the between-neighborhood proportion of that variance may temporarily dip.

For all three economic variables, the estimated slopes were more negative for Blacks than for Whites, as indicated by the interactions of these variables with race (Table 4, Model 3). For changes in mean income and manufacturing, however, the differences between the slopes for Blacks and Whites were not statistically significant. However, economic segregation among Blacks is more responsive to changes in skill requirements than for Whites, as indicated by the significant coefficient on the interaction between dummy variable for race and the professional and managerial jobs variable.

The coefficient for the dummy variable for race remains nonsignificant after the introduction of variables for structural economic transformations. The coefficient on the dummy variable for the 1980s, equal to about 0 in Models 1 and 2, increases to .027 and becomes statistically significant. Because the total effect was close to 0, the in-

[13] Metropolitan areas that span several census divisions were coded to the division that contained the largest share of the area's total population.

[14] The point of inflection is about $32,000 in all the models. For metropolitan mean income less than this, income is negatively related to the change in economic segregation; for income levels above this point, they are positively related.

Table 4. Changes in the Neighborhood Sorting Index: Pooled Regression Results, U.S. Metropolitan Areas, 1970–1980 and 1980–1990

	Model 1		Model 2		Model 3		Model 4	
	β	(*t*)	β	(*t*)	β	(*t*)	β	(*t*)
Constant	.036	(10.29)	.128*	(2.17)	.158***	(2.69)	.188**	(3.09)
Race (1 = Black; 0 = White)	.011	(1.29)	.008	(.91)	–.025	(1.61)	–.060*	(2.41)
Decade (1 = 1980–1990; 0 = 1970–1980)	–.001	(.29)	–.000	(.06)	.027**	(2.55)	.024*	(2.19)
Race × decade (1 = Black, 1980–1990)	.054***	(4.87)	.052***	(4.83)	.127***	(4.94)	.160***	(5.59)
Metropolitan Context[a]								
New England division	—	—	.018	(1.48)	.020	(1.70)	.023	(1.91)
Mid-Atlantic division	—	—	.017	(1.47)	.018	(1.60)	.023*	(2.08)
East-Midwest division	—	—	.024**	(2.65)	.020*	(2.14)	.024**	(2.66)
West-Midwest division	—	—	.021*	(2.02)	.024*	(2.30)	.029**	(2.75)
South-Atlantic division	—	—	.015	(1.81)	.013	(1.54)	.021*	(2.45)
South-Central division	—	—	.020	(1.80)	.018	(1.64)	.026*	(2.34)
Southwest division	—	—	.019*	(2.10)	.016	(1.76)	.017	(1.91)
Mountain division	—	—	.031**	(2.71)	.028*	(2.45)	.031**	(2.69)
Total population (log)	—	—	.004	(1.33)	.007*	(2.41)	.005	(1.69)
Recent in-migration	—	—	–.113**	(2.78)	–.074	(1.77)	–.092*	(2.21)
Internal housing turnover	—	—	–.010	(.14)	.011	(.15)	.028	(.38)
Mean household income	—	—	–.009*	(2.56)	–.014***	(4.12)	–.016***	(4.49)
(Mean household income)^2/ 1,000	—	—	.141**	(3.16)	.218***	(4.76)	.232***	(5.09)
Population growth (percent change)	—	—	.005	(.32)	.029	(1.73)	.035*	(2.05)
Structural Economic Transformations								
Mean income (percent change)	—	—	—	—	–.043	(1.61)	.026	(.78)
Manufacturing share (change)	—	—	—	—	–.225**	(2.76)	–.213**	(2.63)
Professional/managerial (change)	—	—	—	—	– 125**	(2.72)	–.124**	(2.72)
Race × mean income	—	—	—	—	–.016	(.28)	.063	(.93)
Race × manufacturing share	—	—	—	—	–.253	(1.50)	–.175	(1.00)
Race × professional/ managerial	—	—	—	—	–.325**	(2.83)	–.354**	(3.09)
Social Distance (Changes)								
Mean income ratio	—	—	—	—	—	—	.362**	(2.73)
Racial segregation	—	—	—	—	—	—	–.022	(.71)
Group poverty rate	—	—	—	—	—	—	.338*	(2.33)
Female-headed families	—	—	—	—	—	—	.313	(1.46)
R^2	.106		.187		.236		.252	
Adjusted R^2	.102		.168		.212		.224	
N	732		732		732		732	

Note: Numbers in parentheses are absolute values of *t*-statistics for H_0:β=0.

[a] Omitted regional category is Pacific division.

*$p < .05$ **$p < .01$ ***$p < .001$ (two-tailed tests)

direct effect for the 1980s through structural economic transformations is therefore about –.027. In other words, economic segregation would have increased even more rapidly if the economic transformation variables had been constant over the 1980s. Similarly, the interaction of the race and decade variables, which measures the "extra" increase in economic segregation for Blacks in the 1980s, increases sharply from .052 to .127.

Finally, Model 4 adds proxies for changes in social distance between groups and within groups. The coefficient for the change in the group's mean income relative to the metropolitan area's mean income is significant and in the expected direction: Improvement in the relative social status of the group increases economic segregation. The coefficient for changes in racial segregation has the expected sign, but is not significant.

Changes in the group's poverty rate and the percentage of families headed by females are the only variables in the model that reflect within-group differences. Both have the expected sign (positive), but only the poverty rate coefficient is statistically significant. Increased poverty within the group thus increases spatial segregation, supporting the hypothesis of middle-class flight (Wilson 1987). Massey and Eggers (1993, table 5) also found that increased poverty produced increases in economic segregation.

Because it would not be surprising if the effects of the social distance measures differed for Whites and Blacks, I estimated a regression in which the social distance coefficients were allowed to vary by interacting those variables with the dummy variable for race. However, none of the coefficients for these interaction terms was significant, and their inclusion caused virtually no changes in the size or significance of the other coefficients in the regression (regression not shown). An F-test failed to reject the restriction of equal slopes for the social distance variables.

The social distance measures also fail to explain why the 1980s were different, especially for Blacks. The coefficient for the dummy variable for the 1980s decreased only slightly in Model 4, to .024. After including the social distance proxies, the coefficient on the interaction of the dummy variables for race and decade increased, yet again, to .16. At the same time, the dummy variable for race, not significant in the previous regressions, becomes negative and significant. Controlling for the other variables in the Model 4, Blacks had smaller increases in economic segregation than did Whites in the 1970s, but much larger increases in the 1980s.

The dummy variables, of course, are merely proxies for unknown factors in the process of generating economic segregation that particularly affect one group. If all relevant variables were included in a correctly specified model, the coefficient on these dummy variables should be reduced to 0 because the actual process driving economic segregation would be understood. In practice, however, the persistence of nonzero coefficients on variables indicating membership in a particular group indicates a "failure to generate adequate multivariate explanations of social processes from measurements on individuals" (Hauser 1970:662; also see Farkas 1974 and Hauser 1974). Put a different way, I hoped to explain the large increases in economic segregation among minorities in the 1980s by considering the economic and social variables driving these changes. Instead, the mystery has deepened as the gap to be explained has widened.

CONCLUSION

In the spatial and economic organization of metropolitan areas, households are sorted along a number of important dimensions:

(1) The spatial segregation of racial and ethnic groups from each other, usually measured by the index of dissimilarity;

(2) Economic inequality, either overall or within racial groups, which is nonspatial;

(3) The spatial segregation of social and economic groups from each other;

(4) The spatial segregation of racial groups from one another, after controlling for income or social class, which measures the degree to which spatial assimilation follows from economic assimilation ("direct standardization");

(5) The spatial segregation of economic groups from one another, controlling for

racial group (i.e., economic segregation within race), which bears on such issues as the "flight of Black middle class" proposed by Wilson, and which is measured by Massey and Eggers's (1990) measure of interclass segregation (DI), the Neighborhood Sorting Index (NSI), and similar measures.

I have primarily addressed the last of these five dimensions—economic segregation within racial and ethnic groups. The NSI measure I have proposed, which is closely related to the correlation ratio used in previous studies, is an appropriate measure for studying economic segregation. Unlike the index of dissimilarity, it is well suited for use with a continuous variable like income. The NSI is a pure measure of the degree of residential segregation of households of different income levels, after controlling for the mean level of income and the total amount of income inequality. Unlike the index of dissimilarity when applied to several income classes (Massey and Eggers 1990), the NSI is not sensitive to changes in the parameters of the income distribution, only to movements of households from one neighborhood to another.

The NSI reveals a steady trend toward increasing economic segregation. For Blacks and Hispanics, however, the increase in economic segregation was particularly acute in the 1980s. Increases in economic segregation were widespread, with few metropolitan areas bucking the trend. Given the tremendous variation among metropolitan areas in their economies, housing market characteristics, poverty trends, and so on, the prevalence of these changes suggests that a fundamental and important process is under way. An understanding of the future of America's cities requires a better understanding of the mechanisms driving economic segregation.

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