# THE EFFECT OF THE GHETTO ON THE DISTRIBUTION AND LEVEL OF NONWHITE EMPLOYMENT IN URBAN AREAS

John F. Kain, U.S. Air Force Academy and The RAND Corporation*

Numerous researchers have evaluated the effects of racial discrimination and racial segregation on the operation of the housing market, on the cost and the quality of nonwhite housing, and on several other aspects of nonwhite welfare.[1] The author has commented extensively on the effects of residential segregation on the travel behavior of both whites and nonwhites and on the resulting urban transportation demands.[2] He has also pointed out that many current urban problems, the demands for urban transportation subsidies, the near failure of urban renewal programs, and the demands for many other urban programs have their roots deeply implanted in the desire to avoid facing up to the problem of housing segregation.[3] Still other researchers have investigated discrimination in employment and have attempted to determine the extent to which fewer job opportunities and the higher unemployment rates among nonwhites are attributable to factors other than racial discrimination, such as the lower levels of educational attainment.[4]

To the author's knowledge, this paper is the first to link discrimination in the housing market to the distribution and level of nonwhite employment in urban areas. The hypotheses evaluated here are that racial segregation in the housing market: (1) affects the distribution of nonwhite employment, and (2) reduces nonwhite job opportunities. These hypotheses are tested empirically, using origin and destination data obtained from the 1952 Detroit Area Traffic Survey and the 1956 Chicago Area Transportation Study (CATS).[5] To understand how housing-market segregation affects the distribution and level of employment in United States metropolitan areas, it is first necessary to understand the distribution of nonwhite housing — the spatial characteristics of the ghetto.

## THE GHETTO

The means for perpetuating racial segregation in the housing market are well documented in both popular and scholarly literature.[6] Both legal and extra-legal means have been used, including racial covenants; racial zoning; violence; threats of violence; preemptive purchase; various petty harassments; implicit or explicit collusion by realtors, banks, mortgage lenders, insurance companies, and other lending agencies; and, in the not so distant past, various Federal agencies. Since the fact of racial segregation is well established and the ways it is maintained are well documented, no extensive documentation of these practices is attempted here. This paper is limited to a discussion of historical patterns of racial occupancy in Detroit and Chicago, and a brief description of the general patterns in other United States cities.

The nonwhite ghettos in Detroit and Chicago, as in most other U.S. metropolitan areas, lie mostly within the central city near the Central Business District (CBD). In some instances secondary nonwhite housing areas are found in the central parts of older suburbs and sometimes in previously rural areas. In the postwar period, the latter variety have often been surrounded by new housing developments during suburbanization. Both kinds of outlying nonwhite residence areas may importantly affect the distribution of nonwhite employment and the actual or potential job-loss that may result from racial segregation.

Figures 1 and 2 indicate the broad outlines of the Detroit and Chicago ghettos. The geographic areas shown are the zones used for the empirical analysis that follows. The two figures clearly show the central location of the principal ghetto and the boundaries of the smaller outlying nonwhite residence areas, or "ghettoettes." The Detroit area has "ghettoettes" in three places: one about 16 miles from the CBD, far to the north; one about 8 miles from the CBD along Woodward Avenue; and one to the southwest about 11 miles from the CBD.

Detroit's principal ghetto lies within the central city. The ghetto has a slight sectoral pattern, with the heaviest concentrations of Negro workers residing along Woodward Avenue. The extent of segregation is indicated by the proportions of the white and nonwhite labor forces residing within the principal ghetto. If the principal ghetto is defined to include only those contiguous central zones with a population more than 10 per cent Negro, 89 per cent of Detroit's Negroes live there, but only 28 per cent of its whites. If the zones adjacent to this concentration containing between 2 and 10 per cent Negroes are included, the area houses approximately 93 per cent of Detroit's nonwhite work force. Nearly all of the remaining 7 per cent live in one of the small outlying nonwhite residence areas. The geographic size and quantitative importance of these outlying residence areas are badly exaggerated by the size of the zones used in tabulating the data collected in the 1952 study. Zone 76 houses only 280 Negro workers as compared to over 5,000 white workers. Zones 59 and 60 house about 3,600 Negro workers and 17,000 workers. Zones 94 and 95 have approximately 2,800 Negroes and 11,300 whites.

The preponderance of Chicago's Negroes live in the notorious South Side. In addition, fingers of the ghetto extend due west and due north from the

*This paper was prepared for presentation at the Annual Meeting of the American Statistical Association in Chicago, December 27-30, 1964. The author wishes to acknowledge the many useful suggestions and comments of Professor John C. Ries. Any errors or oversights that remain are, of course, the author's sole responsibility.

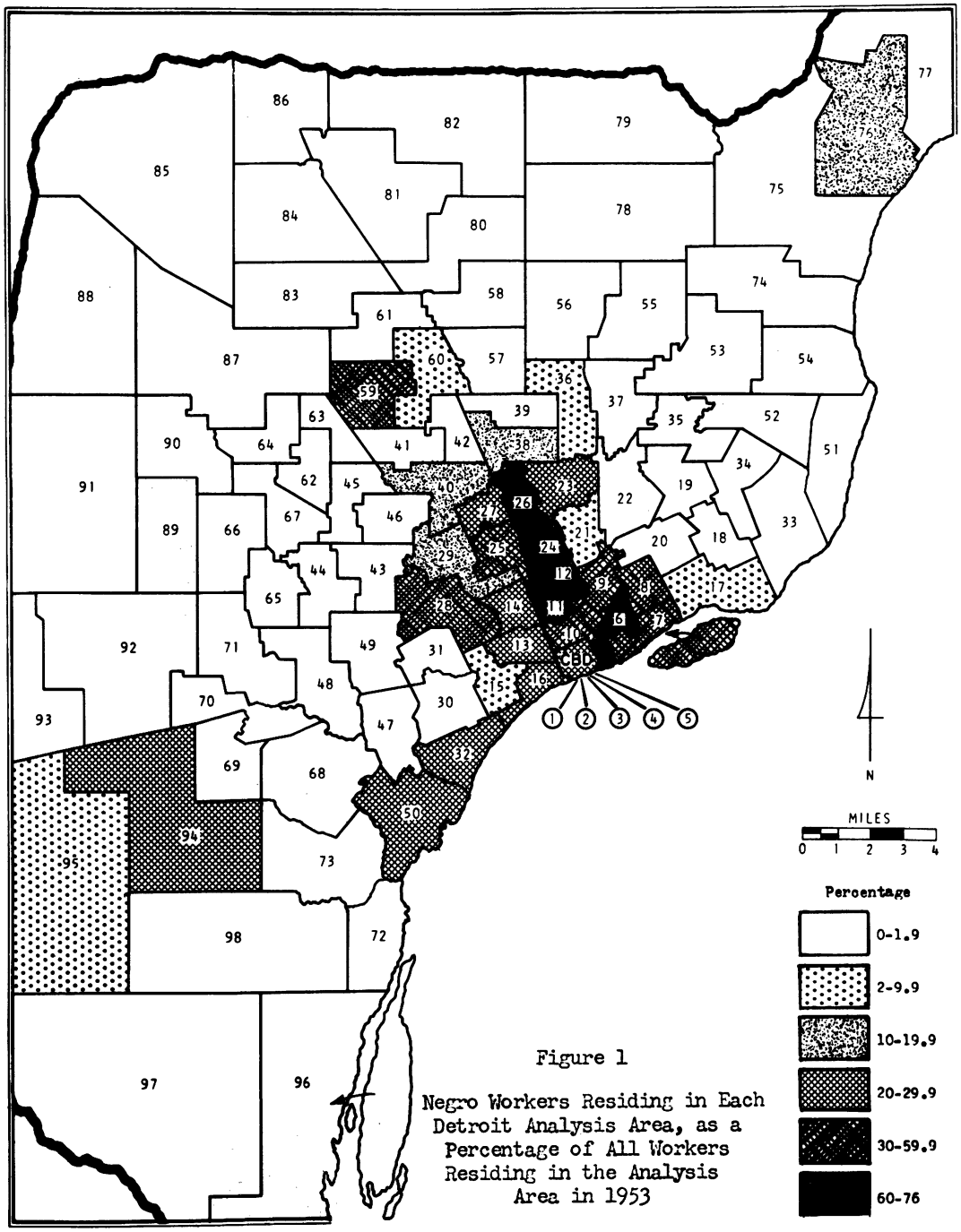


Figure 1

Negro Workers Residing in Each Detroit Analysis Area, as a Percentage of All Workers Residing in the Analysis Area in 1953

CBD. The only other significant nonwhite settlement in the Chicago area is far to the north in the suburb of Evanston; it houses about 1,900 nonwhite workers, or just under 1 per cent of the nonwhite labor force. The size of the aggregation areas used in Fig. 2 also badly exaggerates the size of the Negro ghetto. If smaller areas were used, the southern tail of the ghetto would be separated from the major Negro concentration by white residence areas and would appear as several islands.

Chicago's principal ghetto houses an even larger percentage of its nonwhite workers than does Detroit's: 94 per cent of Chicago's nonwhite workers reside there, but only 20 per cent of its white workers. If contiguous central areas having between 3 and 10 per cent of nonwhite residents were added, nearly 96 per cent of Chicago's Negro workers live there.

The patterns of Negro residence in Chicago and Detroit are by no means of recent origin. In their study of the growth and geographic expansion of the Negro population in Chicago, Otis and Beverly Duncan conclude that the spatial outline of the Negro community in Chicago had been established by 1920, if not by 1910, and that further expansion of the Negro community occurred within areas which already had been accommodating a

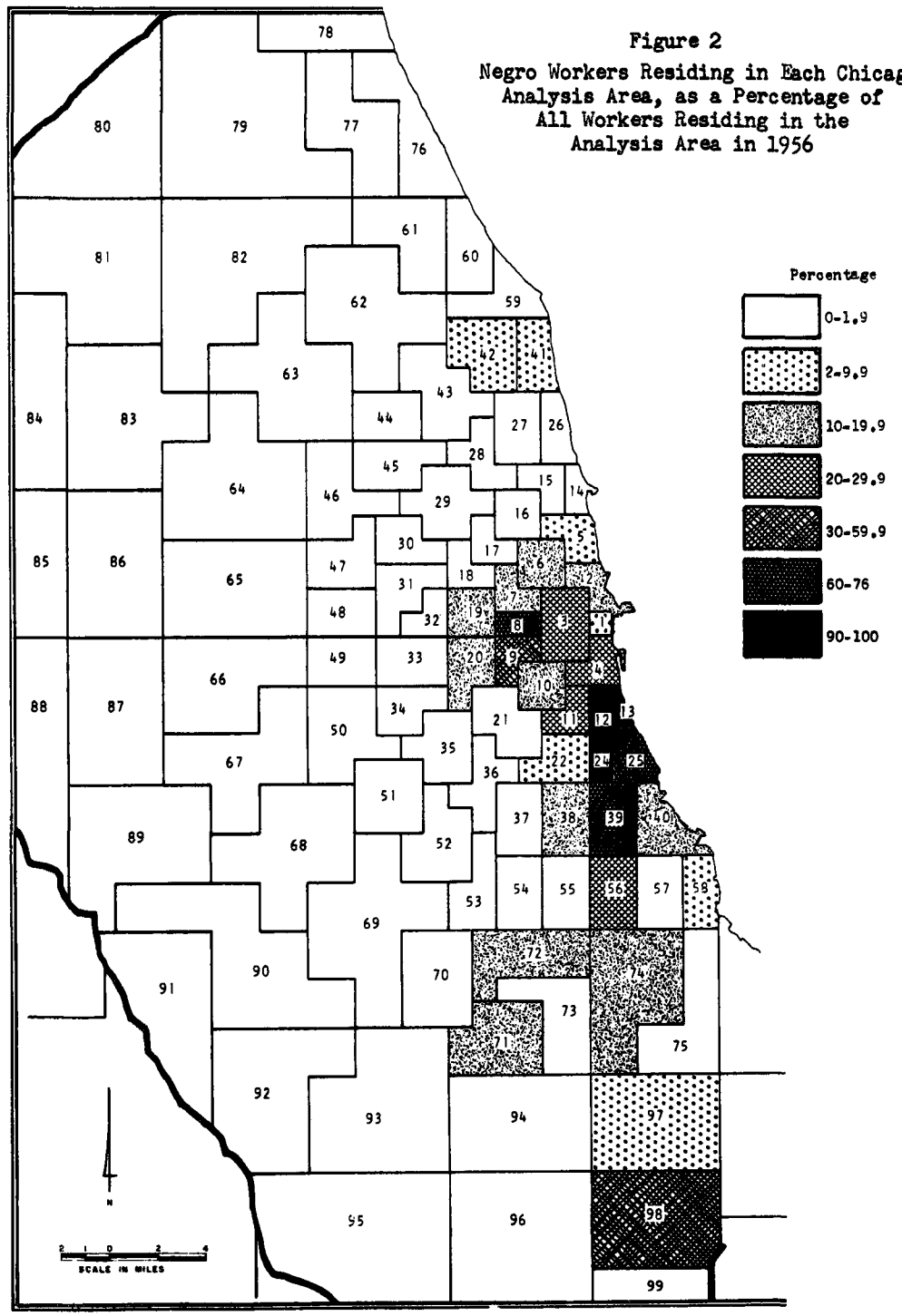


**Figure 2**
**Negro Workers Residing in Each Chicago Analysis Area, as a Percentage of All Workers Residing in the Analysis Area in 1956**

nucleus of Negro residents in 1920.[7] Insofar as expansion of the Negro residential areas has occurred, it has been in terms of adding areas contiguous to existing Negro concentrations, with most of the apparent exceptions reflecting the locational pattern of publicly financed housing developments.[8] The authors conclude, "Apparently, this pattern of expansion has resulted in an increase of residential segregation for Negroes in Chicago and a consolidation of the Negro community."[9]

Observers have also commented extensively on Detroit's Negro ghetto; Robert Weaver traces it back to 1942. The growth of Detroit's Negro population occurred later than Chicago's; thus the development and expansion of its ghetto occurred later. Even so, Weaver reports that in 1940 approximately 85 per cent of the nonwhite residents of Detroit were concentrated in census tracts with 20 per cent or more Negro residents and that over two-thirds of them were in tracts 50 per cent or more Negro. He further notes that of the city's total 19,500 blocks, less than 1,900 had Negro occupants despite a rather widespread dispersion of the Negro settlers prior to 1910. Also in 1940, 416 blocks were from 10 to 49 per cent Negro, 335

blocks were from 50 to 99 per cent Negro, and 139 blocks were 100 per cent Negro. Most of these blocks were concentrated in the principal Negro ghetto, where at least 80 blocks were solidly Negro and 125 blocks were from 90 to 99 per cent Negro. In all, the main area of Negro concentration included almost half the total number of blocks in the city occupied by any Negroes.[10]

Weaver's findings for Detroit were corroborated by the Committee on Race and Housing studies. In these studies, McEntire reports that in 1950, 55 per cent of the Negroes living in Detroit and adjacent areas resided in tracts more than 75 per cent nonwhite, 19 per cent in tracts between 50 and 74 per cent nonwhite, 13 per cent in tracts between 25 and 49 per cent nonwhite, and only 1 per cent in tracts less than 1 per cent nonwhite.[11] In 1940 and in 1950 Detroit appears less segregated by census tracts than does Chicago, although the concentration of both seems greater in 1950 than in 1940.

These patterns of racial segregation are by no means limited to Detroit and Chicago. They are typical of nearly all U.S. metropolitan areas, as Tables 1 and 2 illustrate by the statistics they contain regarding Negro and white population composition since 1900. Table 2 is especially graphic in showing how more and more Negroes are taking up residence in the central city, while the white population is shifting to the ring.

Table 1

NEGROES AS A PERCENTAGE OF TOTAL STANDARD METROPOLITAN AREA, CENTRAL CITY, AND RING POPULATION

| Year | Total | Central City | Outside Central City |
|---|---|---|---|
| 1960 | 10.8 | 16.8 | 4.6 |
| 1950 | 9.4 | 12.4 | 5.2 |
| 1940 | 8.0 | 9.6 | 5.5 |
| 1930 | 7.5 | 8.4 | 5.7 |
| 1920 | 6.8 | 6.9 | 6.5 |
| 1910 | 6.7 | 6.3 | 7.5 |
| 1900 | 7.4 | 6.5 | 8.9 |

SOURCE: U.S. Bureau of the Census, U.S. Census of Population: 1960, Selected Area Reports, Standard Metropolitan Statistical Areas, Final Report PC(3)-ID, Government Printing Office, Washington, D. C., 1963, pp. 1-5.

Davis McEntire summed up the findings of the study he directed for the Committee on Race and Housing by saying, "Characteristic of all cities studied is a principal area of nonwhite concentration near the business center of the city. This area consists of a 'segregated' core surrounded by successive zones of 'concentrated,' 'mixed,' and 'dispersion' tracts."[12]

Donald Cowgill has made a comprehensive attempt to measure racial segregation in American cities, calculating segregation scores from block statistics for 197 cities in 1940 and 209 cities in 1950.[13] His index gives Chicago a segregation score of .893 in 1940 and .880 in 1950. These statistics suggest that Chicago's nonwhite population was less concentrated in 1950 than in 1940. Its rank among 187 cities in 1940 was 13th; in 1950 its rank among 209 cities was 42d. This also suggests that Chicago's nonwhite population was less concentrated in 1950 than in 1940.

Detroit's segregation index was smaller than Chicago's in each year and also declined between 1940 and 1950. In 1940, Detroit's segregation score was .841 and its rank was 28th; in 1950, the score was .831 and its rank was 89th. The unweighted mean segregation score for the 185 cities having block statistics in both 1940 and 1950 increased by .033, from .734 to .767. Since an unweighted mean gives equal weight to cities of all sizes, Cowgill computed a combined weighted index based upon the sums of all of the original figures. The obsolute change in this weighted index was exactly the same as for the unweighted one, increasing from .830 to .863.

The differences in the weighted and unweighted means indicate that, using this measure of segregation at least, larger cities were more segregated than smaller ones in both 1940 and 1950. Table 3 gives the segregation scores and ranks for Chicago and Detroit as well as 12 other large U.S. cities.

Table 2

PERCENTAGE OF NEGROES AND WHITES LIVING IN THE CENTRAL CITY AND RINGS

| | White | | | Negro | | |
|---|---|---|---|---|---|---|
| Year | Total | Central City | Ring | Total | Central City | Ring |
| 1960 | 100.0 | 47.8 | 52.2 | 100.0 | 79.6 | 20.4 |
| 1950 | 100.0 | 56.6 | 43.4 | 100.0 | 77.2 | 22.8 |
| 1940 | 100.0 | 61.6 | 38.4 | 100.0 | 74.6 | 25.4 |
| 1930 | 100.0 | 63.9 | 36.1 | 100.0 | 72.8 | 27.2 |
| 1920 | 100.0 | 65.9 | 34.1 | 100.0 | 67.2 | 32.8 |
| 1910 | 100.0 | 64.9 | 35.1 | 100.0 | 60.4 | 39.8 |
| 1900 | 100.0 | 62.8 | 37.2 | 100.0 | 54.5 | 45.5 |

SOURCE: U.S. Bureau of the Census, U.S. Census of Population: 1960, Selected Area Reports, Standard Metropolitan Statistical Areas, Final Report PC(3)-ID, Government Printing Office, Washington, D. C., 1963, pp. 1-5.

When interpreting these scores, one should remember that they refer only to central cities where the overwhelming preponderance of the Negro population lives and where the greatest increases in Negro population have occurred. Had the indexes for each year been calculated for the entire metropolitan area, it seems highly unlikely that those for Chicago and Detroit would have exhibited declines in 1950. If the idea had been calculated for the entire metropolitan area, it certainly would have been both higher in each year and would have increased between 1940 and 1950. Thus,

Cowgill's method provides an extremely conservative measure of both the extent of and increase in racial segregation in U.S. urban areas.

Since these data on segregation in other U.S. cities indicate that racial segregation is the norm in American cities, the findings of this paper have relevance beyond the Detroit and Chicago metropolitan areas. The data are not ideal, however, because they do not describe precisely the compactness of the segregated area — and it makes a great deal of difference whether the pattern of racial segregation is one of a single massive ghetto or whether it consists of several geographically dispersed ones.

Table 3

SEGREGATION SCORES OF 14 AMERICAN CITIES, 1940 AND 1950

| City | Segregation Score | | Rank | |
|---|---|---|---|---|
| | 1940 | 1950 | 1940 | 1950 |
| Baltimore | .847 | .910 | 45 | 18 |
| Boston | .853 | .836 | 36 | 93 |
| Chicago | .893 | .880 | 13 | 42 |
| Cleveland | .874 | .855 | 20 | 72 |
| Detroit | .861 | .838 | 28 | 89 |
| Los Angeles | .821 | .798 | 61 | 121 |
| Miami | .974 | .969 | 1 | 2 |
| Minneapolis | .781 | .789 | 92 | 130 |
| New York | .798 | .794 | 81 | 122 |
| Philadelphia | .813 | .821 | 67 | 103 |
| Pittsburgh | .789 | .809 | 88 | 115 |
| St. Louis | .813 | .857 | 68 | 68 |
| San Francisco | .516 | .693 | 64 | 174 |
| Washington, D. C. | .624 | .540 | 150 | 192 |
| Composite Index (185 cities) | .830 | .863 | | |

SOURCE: Donald O. Cowgill, "Trends in Residential Segregation of Nonwhites in American Cities, 1940-1950," Amer. Soc. Rev., Feb. 1956, Table 1, p. 45.

## THE DISTRIBUTION OF NEGRO EMPLOYMENT

This section investigates the effect of the ghetto on the distribution of employment in urban areas. To evaluate this subject empirically, special tabulations were made from data contained in the Detroit and Chicago origin and destination studies. The data were obtained from home interviews — approximately 50,000 conducted in Detroit (1952) and 60,000 conducted in Chicago (1956). Home-interview origin and destination data are the only source giving detailed place of residence and place of work by race.

The tabulations shown in Fig. 3, by concentric rings in Chicago and Detroit, suggest an interrelationship between workplace and dwelling. In both cities, Negroes tend to work and reside in central sections of the city, while the white population tends to work and reside in outlying or suburban rings.

It might by tempting to try to explain these differences in white and Negro residence patterns by the differences in their employment patterns. Such an explanation might contend that the jobs held by nonwhites are more centrally located for historical and technological reasons than are those of whites and that, in turn, Negro residences are more centrally located than those of whites because, ceteris paribus, workers prefer to live near their places of work. Such an analysis would argue that causation runs from place of work to place of residence and that decisions about where to work are major determinants of residential location. Indeed, this is the causation assumed in most of the author's empirical work on residential and travel behavior.

The work-to-residence causation is an obviously unsatisfactory framework, however, for evaluating nonwhite travel behavior and choices of residential and employment locations. For example, given the significant constraints on the Negro's choice of residential location described earlier, it seems probable that the choice of a workplace location might be significantly be affected by the limitations on his residential choice. Some job locations are so far from Negro areas as to impose prohibitive costs on those who might seek employment there.

There are several reasons why housing-market segregation may limit Negro employment opportunities. The most obvious are: (1) the distance and difficulty of reaching certain jobs from acceptable Negro residence areas may impose costs on Negroes high enough to discourage them from seeking employment there. (2) Negroes may have less information about and less opportunity to learn about jobs distant from their housing areas.[14] (3) Employers may discriminate against Negroes out of real or imagined fears of retaliation from white customers for "bringing Negroes into all-white residential areas," and there may be little pressure for him not to discriminate. (4) Similarly, employers in or near the ghetto may discriminate in favor of Negroes.

Given the knowledge that there are great disincentives for Negroes to locate outside of the ghetto, the data presented in Fig. 3 seem to indicate that the centrally located Chicago and Detroit ghettos cause nonwhite jobs to be more centrally located. While this evidence is highly suggestive, a more rigorous test is desirable. Such a test can be obtained by fitting a multiple series of regression models for each city. The percentage of total Negro employment in each of 98 workplace areas is the dependent variable; the explanatory variables are a series of proxy variables that measure the factors causing Negroes to be underrepresented in distant workplaces.

Transportation costs from the workplace area to the ghetto, and the effect of distance on knowledge of job opportunities, are proxied by two variables: the airline distance from the workplace to the nearest Negro residence area (the nearest residence zone having more than two per cent Negro residents), and the airline distance from the workplace to the nearest point in the major ghetto. The residence zones shown in Figs. 1 and 2 have the same boundaries as the workplace zones. The percentage of Negro residents for each zone is a proxy for the employers' propensity to discriminate in favor of or against nonwhites

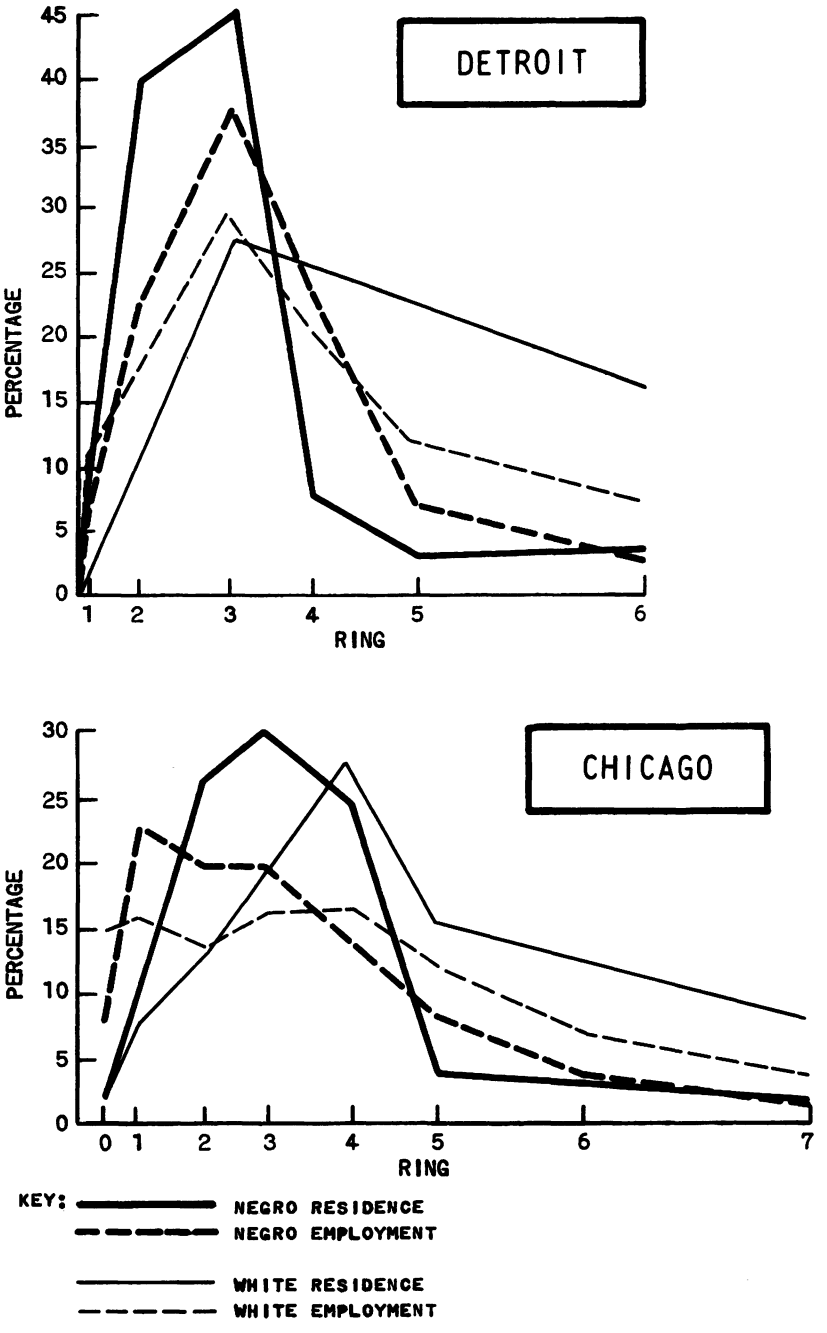


Fig. 3 — Percentages of Detroit and Chicago Workers Residing in Each Distance Ring

because of attitudes the resident population has toward the employment of Negroes. It seems likely that this measure also picks up some of the transportation-cost and information-cost effects. (Its correlation with the distance from the major ghetto variable is $r = -.34$ in Chicago and $r = -.45$ in Detroit. Its correlation with the distance from the nearest ghetto variable in Detroit is even higher, $r = -.52$.) The regression equations, the correlation matrices, the means, and the standard deviations of the variables are presented below for each city.

Since distance from the major ghetto and distance from the nearest ghetto are highly intercorrelated, using them both in the equation does not add much to the explained variance. Thus three equations are fitted for each city. The nonwhite residence variable is included in all three. The first equation for each city, R1 and R4, includes the distance variable from the nearest ghetto; Eqs. (R2) and (R5) include the distance variable from the major ghetto; and Eqs. (R3) and (R6) include both distance variables. Including both distance variables in the same regression

equation greatly reduces the statistical significance of their coefficients. This is especially true for the Chicago models. When only one distance proxy is used, the coefficients of all variables are highly significant.

Equations

Chicago

$R^2$

(R1) $W = 9.62 + 0.465R - 0.565D^n$ (0.036) (0.014) .720

(R2) $W = 9.75 + 0.464R - 0.447D^m$ (0.036) (0.011) .719

(R3) $W = 9.83 + 0.462R - 0.331D^n - 0.209D^m$ (0.036) (0.313) (0.251) .722

Detroit

(R4) $W = 12.78 + 0.091R - 1.141D^n$ (0.032) (0.262) .359

(R5) $W = 12.64 + 0.100R - 0.758D^m$ (0.034) (0.158) .382

(R6) $W = 13.45 + 0.082R - 0.563D^n - 0.524D^m$ (0.035) (0.345) (0.212) .400

W = % of zone i's workers who are Negroes.

$\left(\frac{\text{Negro employment}}{\text{Total employment}}\right)_i$ 100

R = % of zone i's residents who are Negroes.

$\left(\frac{\text{Negro residents}}{\text{Total residents}}\right)_i$ 100

$D^n$ = Airline distance in miles to nearest Negro residence area.

$D^m$ = Airline distance in miles to nearest point in the major ghetto.

Means and Standard Deviations

| | Chicago | | | Detroit | |
|---|---|---|---|---|---|
| W | 11.15 | 12.18 | W | 10.44 | 6.84 |
| R | 8.22 | 19.40 | R | 10.25 | 18.66 |
| $D^n$ | 4.06 | 5.07 | $D^n$ | 2.87 | 2.58 |
| $D^m$ | 5.39 | 6.36 | $D^m$ | 4.26 | 4.00 |

Simple Correlation Matrices

| | Chicago | | | | Detroit | | | |
|---|---|---|---|---|---|---|---|---|
| | W | R | $D^n$ | $D^m$ | W | R | $D^n$ | $D^m$ |
| W | 1.00 | .82 | -.48 | -.49 | 1.00 | .47 | -.56 | -.57 |
| R | | 1.00 | -.33 | -.34 | | 1.00 | -.52 | -.45 |
| $D^n$ | | | 1.00 | .91 | | | 1.00 | .75 |
| $D^m$ | | | | 1.00 | | | | 1.00 |

The most obvious difference between the Detroit and Chicago models occurs in the proportion of total variance explained by the equations. All three Chicago regressions explain more than seven-tenths of the variance in the dependent variable, while the Detroit regressions explain only about four-tenths. This difference occurs because racial segregation is greater in Chicago than in Detroit. As mentioned earlier, Detroit's major ghetto is larger and more dispersed than Chicago's, and Detroit also has more and better-placed outlying Negro residential areas. Thus it is natural that the model explain less about Detroit, where Negro residences are not so concentrated geographically. These differences are indicated by the means and standard deviations of the distance variables. The mean distance from the 98 Chicago workplace areas to the major ghetto is 5.39 miles and the standard deviation is 6.36 miles. The same mean distance for Detroit is only 4.26 miles and the standard deviation is only 4.00 miles. The mean distance from the 98 Chicago workplace areas to the nearest ghetto is 4.1 miles and the standard deviation is 5.1 miles. The same mean distance for Detroit is only 2.9 miles and its standard deviation is only 2.6 miles.

The coefficients for the two cities also differ considerably. The percentage residence coefficients for Chicago are much larger than for Detroit. A 1-per-cent increase in the number of Negro workers living in a Chicago residence area is associated with nearly a one-half-of-1-per-cent increase in Negro employment. In Detroit, by contrast, a 1-per-cent increase is associated with an increase in employment of only about one-tenth of 1 per cent.

The distance variables, however, are far more important in the Detroit models. With each 1-mile increase in distance from the major ghetto, the percentage of Negroes employed in a workplace area declines by eight-tenths of 1 per cent in Detroit, but only four-tenths of 1 per cent in Chicago. There is a similar correspondence for the distance-from-the-major-ghetto coefficients in Eqs. (R2) and (R5). In Chicago, the Negro percentage of the workforce declines by six-tenths of 1 per cent with each 1-mile increase in distance from the major ghetto; in Detroit the decline is 1.1 per cent. A similar relationship exists between the distance coefficients in the two cities when both are included in the model. Finally, the intercept in the Detroit equation is approximately one-third larger than in each of the comparable Chicago equations, despite the fact that the mean percentage of Negroes in the total of zone employees is higher in Chicago than in Detroit. I am not prepared, at this time, to speculate on the reasons for the differences in these coefficients and would welcome any views on the question.

The hypothesis that the ghetto, or the spatial distribution of Negro residence areas, importantly affects the distribution of Negro employment is strongly supported by the findings presented here. This is especially true in Chicago, where the segregation of Negroes is much greater.

## THE LEVEL OF NONWHITE EMPLOYMENT

This section investigates the second of the paper's two hypotheses — that racial discrimination in the housing market reduces nonwhite employment opportunities in metropolitan areas. As mentioned earlier, loss of opportunity may be attributed to several things: prohibitive transportation costs from the ghetto to the place of

employment, lack of knowledge about distant job opportunities, or greater discrimination by employers who are distant from the ghetto.

The regression equations for Chicago and Detroit can be used to estimate Negro job losses caused by housing segregation. To do so, it is assumed that the same proportion of Negro workers live in each residence area; this figure is identical to the percentage of Negro workers living in the metropolitan areas as a whole. These percentages are 13.6 for Detroit and 14.6 for Chicago. They are substituted in Eqs. (E1) to (E6) for R, which in Eqs. (R1) to (R6) denoted the percentage of zone i's workers who are Negroes. Since there would be no ghetto if there were no segregation, the distance from the major and nearest ghettos would be zero. Thus, the distance variables in Eqs. (R1) to (R6) drop out of Eqs. (E1) to (E6). Equations (E1) to (E6) thereby provide estimates of what percentage of Negro workers there would be in each workplace zone if there were no racial segregation, and if the proportion of the Negro population was the same for every residence zone. Since all zones included in Eqs. (E1) to (E6) have identical characteristics, these equations give the percentage of total metropolitan employment that would be Negro if there were no racial segregation in the housing market.

Once these figures are obtained, Eqs. (L1) to (L6) are used to convert the estimates of the percentage of total Negro employment to estimates of the loss of Negro employment. The estimated Negro proportion of total metropolitan employment is multiplied by the total metropolitan labor force. The loss of Negro jobs is obtained by subtracting the actual number of Negro jobs from this estimate of the number of Negro jobs. For Chicago, the loss estimates range from 31,662 to 34,654. The estimated losses in Detroit are much smaller, ranging from a low of 3,556 to a high of 9,113. The much smaller estimates for Detroit, like the smaller explanatory power of the Detroit models, are consistent with the lesser degree of racial segregation there. The ghetto in Detroit is larger and more extensive and there are more and better-situated secondary ghettos, housing is less of a constraint on nonwhite job choices in Detroit than in Chicago. Furthermore, Chicago's labor force is nearly twice as large as Detroit's; thus, the larger estimates of nonwhite job losses there are entirely plausible.

Estimates of nonwhite employment assuming a uniform distribution of Negro residents

Chicago

(E1) $W = 9.62 + 0.465\ (14.61) = 16.41$
(E2) $W = 9.75 + 0.464\ (14.61) = 16.52$
(E3) $W = 9.83 + 0.462\ (14.61) = 16.58$

(L1) $LNJ = 16.41\ (1{,}760{,}148) - 257{,}178 = 31{,}662$
(L2) $LNJ = 16.52\ (1{,}760{,}148) - 257{,}178 = 33{,}598$
(L3) $LNJ = 16.58\ (1{,}760{,}148) - 257{,}178 = 34{,}654$

Detroit

(E4) $W = 12.78 + 0.091\ (13.59) = 14.01$
(E5) $W = 12.64 + 0.100\ (13.59) = 14.00$
(E6) $W = 13.45 + 0.082\ (13.59) = 14.56$

(L4) $LNJ = 14.01\ (937{,}555) - 127{,}395 = 3{,}556$
(L5) $LNJ = 14.00\ (937{,}555) - 127{,}395 = 3{,}863$
(L6) $LNJ = 14.56\ (937{,}555) - 127{,}395 = 9{,}113$

LNJ = Loss of nonwhite jobs.

While these estimates must be considered highly tentative, they do suggest that housing-market segregation and discrimination may significantly affect the level of Negro employment in metropolitan areas. If this is true, it has grave welfare implications, since the costs that housing segregation imposes on Negroes may be even larger than is generally believed. The constraint placed upon job opportunities by housing-market discrimination may also partly explain the much higher unemployment rates of Negroes. Part of what is usually charged to employment discrimination may be an indirect effect of housing discrimination. This illustrates how pervasive various types of discrimination may be and how the indirect costs of discrimination may greatly exceed the direct costs.

## CONCLUSIONS

This paper has empirically tested the effect of racial segregation in the housing market on the distribution and level of nonwhite employment. There is very strong evidence that racial segregation is an important determinant of the distribution of nonwhite employment. Negro workers, for example, are significantly underrepresented in employment zones distant from the ghetto, and the underrepresentation increases as distance from the ghetto increases. There is less overwhelming but still highly suggestive evidence that segregation patterns in U.S. metropolitan areas affect nonwhite employment levels. Racial segregation may cost Negroes as many as 35,000 jobs in Chicago and 9,000 jobs in Detroit. Chicago's larger labor force and greater racial segregation account for the difference in the figures for the two cities.

In addition to the obvious effects that loss of job opportunities has on nonwhite welfare, several other considerations relate to these findings. If the dispersal and suburbanization of employment characterizing the past few decades continues, the loss of nonwhite employment opportunities resulting from patterns of housing segregation will probably increase.

The findings also bear on estimates of the amount of nonwhite residence relocation that would result from a lessening of racial prejudice. Many current estimates are based upon existing distributions of Negro employment. Findings presented here indicate that a reduction in housing segregation would lead to a dispersal of Negro residences and to a more even distribution of Negro employment.

The study further indicates that some findings, such as those of Anthony Pascal, are extremely conservative regarding the amount of racial segregation that can be explained by socio-economic factors.[15] Using multiple regression models, Pascal finds that socio-economic variables explain only 46 per cent of the variation among Chicago residence areas in the proportion of all

households headed by Negroes. The proportion explained by socio-economic variables in Detroit was even smaller -- 33 per cent.[16] Access to nonwhite jobs is included among the socio-economic variables in Pascal's equations; this variable is highly significant for Chicago, but not for Detroit. This is consistent with one of the findings presented above: that Detroit's lesser residential segregation reduces the effect of segregation on the distribution of nonwhite employment. Omitting the access variable from the Chicago model would considerably reduce the amount of residential segregation that can be explained by socio-economic differences.

In his estimating equations, Pascal recognizes and comments on the possibility of reverse causality in the use of the access variable. He argues, however, that "attributing the maximum degree of nonwhite residence patterns to job location . . . makes for the more conservative estimate of non-socio-economic segregation."[17] The findings of this paper indicate that the causation is the reverse of that assumed in Pascal's models, but confirm, as he anticipated, that his estimates of non-socio-economic segregation are conservative.

The importance of the findings of this paper depends, in part, on the degree to which the historical patterns of racial segregation persist in the future. There has been continual pressure toward relaxing the housing-market barriers. It appears, however, that progress has been slow. In an analysis of census data for 1930, 1940, 1950, and 1960, Mayer and Hoult conclude, "Negro Detroiters are more segregated in their housing today than they were three decades ago."[18] Discussing maps of the distribution of Negro residences, they state, "The most notable feature of these maps is their clear demonstration that Negroes in the 1960 decade live in essentially the same places that their predecessors lived during the 1930's — the only difference is that, due to increasing numbers, they occupy more space centered about their traditional quarters."[19] Thus, as late as 1960 there was no appreciable change in the patterns of nonwhite residences in Detroit. Maps of 1960 census-tract data for Chicago indicate a similar state of affairs in Chicago. Consequently, it seems unlikely that the findings of Mayer and Hoult will soon be rendered obsolete by changes in the pattern of racial occupancy in U.S. metropolitan areas.

## FOOTNOTES

1. Davis McEntire, Residence and Race: Final and Comprehensive Report to the Commission on Race and Housing, Univ. of Calif. Press, Berkeley and Los Angeles, 1960; Eunice and George Grier, Privately Developed Interracial Housing: An Analysis of Experience, Univ. of Calif. Press, Berkeley and Los Angeles, 1960; Nathan Glazer and Davis McEntire, Studies in Housing and Minority Groups, Univ. of Calif. Press, Berkeley and Los Angeles, 1960; Luigi Laurenti, Property Values and Race: Studies in Seven Cities, Univ. of Calif. Press, Berkeley and Los Angeles, 1960; Chester Rapkin and W. C. Grigsby, The Demand for Housing in Racially Mixed Areas: A Study of the Nature of Neighborhood Change, Univ. of Calif. Press, Berkeley and Los Angeles, 1960; O. D. Duncan and Beverly Duncan, The Negro Population of Chicago, Univ. of Chicago Press, 1957; Morton Grodzins, The Metropolitan Area as a Racial Problem, The University of Pittsburgh Press, Pittsburgh, 1958; Beverly Duncan and P. M. Hauser, Housing a Metropolis -- Chicago, The Free Press, Glencoe, Illinois, 1960.

2. J. F. Kain, "Commuting and the Residential Decisions of Central Business District Workers," National Bureau of Economic Research, Special Conference 17, Transportation Economics, Conference Monograph (forthcoming); J. R. Meyer, J. F. Kain, and Martin Wohl, The Transportation Problem, Harvard University Press, Cambridge, Mass. (forthcoming, Spring 1965).

3. Kain, op. cit.

4. H. J. Gilman, "Economic Discrimination and Unemployment," paper presented at the RAND Conference on Urban Economics, August 24-25, 1964, Santa Monica, Calif.; idem, "The White/Nonwhite Unemployment Differential," in Human Resources in the Urban Economy, Resources for the Future, Inc., The Johns Hopkins Press, Baltimore, 1963 , pp. 75-113; Jacob Mincer, "On the Job Training: Costs, Returns, and Some Implications," J. Polit. Econ., Vol. 70, Supp., October, 1962, pp. 50-79; R. H. Turner, "Foci of Discrimination in the Employment of Nonwhites," Am. J. Soc., Vol. 58, November, 1952, pp. 247-256.

5. Detroit Area Traffic Study, Report on the Detroit Metropolitan Area Traffic Study: Part I — Data Summary and Interpretation, Speaker-Hines and Thomas, Inc., State Printers, Lansing, Michigan, July 1955; Chicago Area Traffic Study, Vol. I, Western Engraving and Embossing Co., Chicago, Ill.

6. G. S. Becker, The Economics of Discrimination, University of Chicago Press, Chicago, 1957; Robert Weaver, The Negro Ghetto, Harcourt, Brace and Co., New York, 1948; Glazer and McEntire, op. cit.; Grodzins, op. cit.; McEntire, op. cit.; T. J. Woofter, Jr., Negro Problems in Cities, Doubleday, Doran and Company, Garden City, New York, 1928; Rapkin and Grigsby, op. cit.; Laurenti, op. cit.

7. Duncan and Duncan, op. cit., pp. 87-107.

8. Ibid., p. 95.

9. Ibid, p. 106. Similar observations have been made by other researchers viewing the phenomenon of Chicago's ghetto. In 1947, for example, Robert Weaver noted that, "Spatial separation of the races increased too. By 1934, slightly over nine out of every ten Negroes in Chicago were in blocks predominantly occupied by Negroes." At still another point he commented that ,"The black belt in Chicago was also expanding. Patterns of racial occupancy had long been set, and the delayed and inadequate accretions to the areas of established Negro occupancy occurred within the framework of the ghetto pattern. An island of whites surrounded by Negroes was wiped out. Smaller centers of coloured residences expanded slowly, but the principal effect of the steady flow of Negroes to the city was to increase the congestion that had long plagued the Negro South Side." Weaver, op. cit. p. 54, 61.

Similarly, Davis McEntire provides the following description of the 1950 pattern of residential segregation in Chicago: "In Chicago in 1950, there were six segregated areas detached from the major Black Belt, each with adjacent tracts of concentrated, mixed, or dispersion types." Segregated, concentrated, mixed, dispersion, and exclusive types refer to five classes of census tracts defined by McEntire according to the proportion of Negroes to the total resident population. Segregated tracts were 75 per cent or more nonwhite; concentrated tracts were 50 to 75 per cent nonwhite; mixed tracts were 10 to 49 per cent nonwhite; dispersion tracts were from 1 to 9 per cent nonwhite; and exclusive tracts had fewer than 1 per cent Negroes in their population. McEntire, op. cit., p. 34.

10. Weaver, op. cit., p. 115.

11. McEntire, op. cit., p. 362.

12. Ibid., p. 34.

13. D. O. Cowgill, "Trends in Residential Segregation of Nonwhites in American Cities, 1940-1950," Amer. Soc. Rev., Vol. 21, No. 1, February 1956, pp. 43-47.

14. Labor mobility studies show that few jobs are located from newspaper advertisements, employment offices, and the like. Workers most frequently learn of jobs from friends, by passing the place of work and seeing help wanted signs, and by other casual associations. Since nonwhites have few associations with white areas distant from the ghetto and since few of their friends and neighbors are employed there or make frequent trips there, the chances of their learning of distant job opportunities may be significantly lessened.

15. A. H. Pascal, Summary: The Economics of Housing Segregation, paper presented at the RAND Conference on Urban Economics, The RAND Corporation, Santa Monica, California, August 24-25, 1964.

16. Ibid., pp. 6-7.

17. Ibid., p. 6

18. A. J. Mayer and T. F. Hoult, Race and Residence in Detroit, Urban Research Laboratory, Institute for Urban Studies, Wayne State University, Detroit, August, 1962, p. 1.

19. Ibid., p. 2.