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# Spatial Factors and the Employment of Blacks at the Firm Level

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## Abstract

In this paper we use data from a new survey of over 3,000 employers in four major metropolitan areas to investigate the determinants of black employment and wages at the firm level. We focus specifically on two factors that are likely to influence the spatial distribution of black employment: the proximity of firms to the residential locations of various racial groups and to public transit. We also consider the effects on black employment of other factors, such as employers' skill needs and some likely determinants of their preferences across groups.

Our main finding is that employers' proximity to black residences and to public transit increases the likelihood that they will hire black employees. This is true even when we include detailed controls for the skills needed by employers and also for the race of customers and of those responsible for hiring, which independently affect the levels of black employment at firms.

Proximity to public transit and especially to black residences accounts for major portions of the higher black employment rates at central-city than suburban firms. The residential effects are relatively strong for employers who recruit through informal methods and weak for those who use newspapers, thus suggesting that information may play a role in the distance effects.

We also find some evidence that employers' proximity to black residential populations results in lower wages for workers whom they employ.

The results suggest that policies to improve the transportation and information available to black workers will improve their access to employment and to higher-wage jobs. Policies designed to enhance the residential mobility of black central-city residents should also have positive effects on their relative employment and earnings.

# Spatial Factors and the Employment of Blacks at the Firm Level

## I. INTRODUCTION

The notion that the employment and earnings of blacks might be adversely affected by housing discrimination that limits their residential choices, and by employer decisions to locate away from black neighborhoods, has long been embodied in the "spatial mismatch hypothesis." This hypothesis has been heavily debated over the past 25–30 years, and the most recent evidence seems to support it. The evidence also suggests that the negative effects of spatial factors on black employment may have grown more serious over time, as more and more employers continue to relocate away from central-city areas where low-income minorities continue to be concentrated.[1]

Still, important questions remain about the magnitude and nature of these spatial effects. For instance, what are the specific mechanisms or processes that limit black access to employment in suburban areas? To what extent is it because blacks frequently lack low-cost and direct *transportation* to many suburban employers, especially when they do not own their own cars? Do they lack *information* about these jobs, especially by not having access to informal networks that frequently link workers and jobs? Or are there other factors at work here as well, such as perceptions of hiring discrimination or local hostility?[2]

A better understanding of the underlying mechanisms through which spatial factors operate is a precondition for developing appropriate policy responses to the mismatch problem. For instance, many urban areas have developed public transit lines specifically to aid "reverse commuters" who are traveling from central-city residences to suburban job sites; but these are likely to be ineffective if the proximity of firms to public transit has little effect on their likelihood of hiring blacks.

A variety of other "job mobility" strategies, emphasizing more flexible types of transportation (such as van pools) and job placement services, are also based on the notion that transportation and information are the key barriers to suburban employment for inner-city residents. Alternatively,

proponents of "residential mobility" (through improved enforcement of antidiscrimination statutes in housing, rental housing vouchers for inner-city low-income residents, etc.) often argue that these other methods are likely to be insufficient, and that eliminating barriers to minority residential locations in suburban areas must be the top priority.[3]

More generally, all of these approaches assume that spatial factors per se are major independent determinants of black employment and earnings. But a variety of other barriers on the *demand* side of the labor market seem to limit black employment prospects as well, such as the demand among employers for skilled labor and discrimination against black applicants. The first of these factors clearly seems to be growing more serious over time, thereby reducing the relative earnings and employment of blacks and of the less-educated more generally as overall labor market inequality grows.[4]

Thus, it is possible that improving the access of central-city black workers to suburban employers might do little to improve their employment and earnings, if they continue to face these additional barriers to employment. This would especially be the case if the employers who are the least accessible to central-city blacks (for spatial reasons) also have relatively high skill demands and/or relatively strong preferences for whites (or other nonblack minorities).[5] Yet, few studies of spatial effects have taken account of these other demand-side factors in the labor market.

In this paper, we use data from a new survey of over 3,000 employers in four large metropolitan areas to analyze the determinants of black employment and wages at the firm level. We focus specifically on two factors that are likely to influence the spatial distribution of black employment: the proximity of firms to the residential locations of various racial groups and to public transit.

By using firm-level data, we can control for many of the demand-side barriers that allegedly limit the employment of blacks. These include the skill requirements of new jobs and the racial preferences of employers. As is generally the case, we do not have a direct measure of preferences, but

we should be able to capture much of this effect through an extensive set of proxy variables: the racial composition of the firms' customers; the race of the person responsible for hiring; use of Affirmative Action in hiring; and the size of the establishment.[6]

In Section II we describe the survey of employers that generated these data and some of the empirical evidence we will present. The evidence itself is presented in Section III, and then we conclude with a summary of our findings and their implications for public policy.

## II. DATA AND ESTIMATION ISSUES

The survey from which the data in this paper are drawn was administered to 800 employers in each of four metropolitan areas: Atlanta, Boston, Detroit, and Los Angeles.[7] The survey was administered between June 1992 and May 1994.

Interviews were done over the phone with "the individual responsible for hiring" at the establishment and averaged roughly 35 minutes in length. Questions focused on overall employer and employee characteristics (e.g., establishment size, presence of collective bargaining, recent hiring and turnover behavior, and composition of current employees by race and gender); the numbers and characteristics of all currently vacant jobs; and the characteristics of the most recently filled job in the establishment and of the worker hired into that job.

The sample of firms was drawn from two sources: (1) a random sample of firms and their phone numbers provided by Survey Sampling Inc. (SSI), stratified by establishment size; and (2) the employers of respondents in the household surveys that were administered in each of these four metropolitan areas as part of the Multi-City Study of Urban Inequality.[8] The SSI samples were drawn across establishment size categories so as to reproduce the distribution of employment across these categories in the workforce; and the household-generated sample implicitly weights firms in the same way.[9] No additional size-weighting of observations is therefore necessary when analyzing the data; and

the sample of recently filled jobs at these firms should reasonably represent the universe of new jobs that are currently available to job seekers.[10]

The response rate for the survey was roughly 67 percent among firms that were successfully screened. This response rate compares favorably with other recent surveys of employers that have been administered over the phone.[11] In addition, because we have some measured characteristics of firms in the SSI sample that did not complete the survey (e.g., establishment size, industry, and location), we checked for differences in response rates across these *observable* categories that might indicate sample selection bias. Few significant differences were found.[12] As a further check on the representativeness of the sample, we compared the industries and sizes of firms in our sample with those in *County Business Patterns* and with Census data on occupations for the relevant areas. These comparisons also indicated that our sampling procedures generated representative samples of firms and jobs in these areas.[13]

In this study we analyze the effects of various firm characteristics on the tendency to hire blacks and pay them a certain wage. Our data contain two variables for black employment at the firm: the percentage of noncollege employees at the firm who are black and whether or not the last worker hired is black. These are the primary dependent variables in our analysis.[14]

Since "spatial mismatch" should primarily affect the flow of black applicants to a firm (rather than the tendency of firms to hire from the pool of black applicants), equations were also estimated in which the dependent variable is the fraction of a firm's *applicants* who are black. Evidence is therefore provided on the extent to which locational variables influence black employment through their effects on the race of applicants. We also estimated equations in which the dependent variable is the log of hourly wages for the last worker hired, to see whether location affects earnings as well as employment.

The primary independent variables of interest are the distance of the firm to the closest public transit stop (asked of respondents in the survey and then recoded as a series of dummy variables) and the firm's average distance to the black, white and/or Hispanic populations in the Metropolitan

Statistical Area (MSA).[15] To compute the latter variable, we first had to "geocode" our firms—i.e., match each one to a census tract on the basis of its address.[16] We then computed weighted averages of the distances from the centroid of the firm's own census tract to each other census tract in the relevant metropolitan area, weighted by the fraction of each group's local population that resides in each of these tracts. The dummy variable for each firm's location in either the central city or the suburbs is also defined on the basis of its census tract.[17]

Additional control variables are primarily designed to capture other effects on the demand of firms for black labor that operate through their need for skills and their racial preferences. Need for skills is measured only for the most recently filled job. It includes dummy variables for hiring requirements for that job (college or high school diplomas, general or specific experience, references and previous training)[18] and dummies for whether each of a set of tasks is performed on a daily basis (direct customer contact, reading or writing paragraphs, arithmetic calculations, and computer use).[19]

As noted above, the endogeneity of employer location with respect to their desired racial employment may cause us to incorrectly attribute effects of employer preferences to location.[20] We therefore try to control for these preferences through a variety of measures: the percentages of the customers who are members of each racial group, dummies for the race of the respondent to the survey (since the respondent is generally the person responsible for new hiring at the firm), establishment size (measured as a series of dummy variables), use of Affirmative Action in either recruitment or hiring,[21] and controls for 1-digit industry and collective bargaining at the establishment.[22]

## III. ESTIMATION RESULTS

### A. Summary Measures

In Table 1 we present summary data on employment outcomes by race and on a variety of the determinants of employment. All means are sample-weighted. In part A of the table we present these

measures for the overall sample and separately for central-city and suburban firms using the pooled sample of MSAs. In part B of the table we present them separately by MSA broken down by central-city or suburban location.

The results show that blacks account for roughly 27 percent of the applicants in these firms, 20 percent of the noncollege employees and somewhat smaller percentages of new hires. Unadjusted hourly wages are roughly 25 percent less for blacks than whites, even though these are starting wages and therefore do not reflect racial differences in job tenure or wage growth over time.

Perhaps surprisingly, the data indicate that firms on average are *closer* to the black residential population than to Hispanics or whites, and they are closer to the former than the latter. This most likely reflects the greater proximity of minority residences to the central business districts of these areas and the relatively greater concentrations of white residences in outlying suburban areas. It does *not* necessarily imply that distances to employment are less of a problem for blacks than for whites, since the cost per mile traveled to work appears to be significantly higher among employed blacks than whites.[23] Indeed, the distribution of white residences likely reflects their choices (between commute times and housing costs) to a much greater degree than the distribution of black residences; black choices appear to be constrained by housing market discrimination.

**TABLE 1**
**Key Variables for Employment Outcomes: Means (Standard Deviations)**

A: Pooled Sample across Metro Areas

| | Total Sample | | Central City | | Suburbs | |
|---|---|---|---|---|---|---|
| *Outcome Variables* | | | | | | |
| Last hired is black | 15.7 | (39.4) | 23.4 | (43.3) | 15.3 | (40.0) |
| Percent workers black | 19.5 | (25.0) | 27.1 | (30.0) | 14.3 | (22.6) |
| Percent applicants black | 26.8 | (32.3) | 34.8 | (34.1) | 24.6 | (31.5) |
| Log hourly wage | | | | | | |
| Black | 2.02 | (.39) | 2.07 | (.37) | 2.00 | (.41) |
| White | 2.28 | (.58) | 2.42 | (.56) | 2.25 | (.59) |
| *Distance and Transit Measures* | | | | | | |
| Mean distance (miles) to: | | | | | | |
| Whites | 22.4 | (5.8) | 19.8 | (2.7) | 23.4 | (6.5) |
| Blacks | 17.6 | (8.2) | 12.7 | (5.0) | 19.4 | (8.4) |
| Hispanics | 20.5 | (7.7) | 16.5 | (4.5) | 22.1 | (8.1) |
| Dist. black/Dist. white | .76 | (.20) | .62 | (.16) | .81 | (.18) |
| Dist. black/Dist. Hispanic | .86 | (.25) | .77 | (.20) | .89 | (.26) |
| Transit distance (miles): | | | | | | |
| 0 | 33.5 | (51.1) | 46.0 | (50.9) | 33.8 | (52.5) |
| 0.01 to 0.25 | 23.4 | (45.8) | 37.5 | (49.0) | 19.3 | (43.8) |
| 0.26 to 0.50 | 6.2 | (26.2) | 6.2 | (24.7) | 7.2 | (28.6) |
| 0.51 to 1.00 | 6.2 | (26.2) | 3.6 | (18.9) | 7.3 | (28.8) |
| Greater than 1.00 | 22.7 | (45.3) | 6.6 | (25.4) | 32.5 | (52.0) |
| Distance to CBD center (miles) | 14.2 | (9.5) | 6.6 | (6.1) | 17.7 | (8.7) |
| *Racial Measures* | | | | | | |
| Percent customers: | | | | | | |
| Black | 12.6 | (19.8) | 23.1 | (23.8) | 16.5 | (20.4) |
| Hispanic | 13.5 | (21.5) | 17.8 | (25.0) | 11.4 | (19.2) |
| Respondent's race: | | | | | | |
| Black | 5.8 | (25.3) | 10.9 | (31.8) | 3.7 | (21.1) |
| Hispanic | 3.6 | (21.1) | 6.4 | (24.9) | 3.2 | (19.5) |
| Affirmative Action used (%) | 61.8 | (52.7) | 67.6 | (47.6) | 58.3 | (54.7) |
| *Skills* | | | | | | |
| Math performed daily | 67.7 | (50.8) | 62.7 | (49.2) | 70.1 | (50.8) |
| Computer performed daily | 56.4 | (53.8) | 59.7 | (50.0) | 55.3 | (55.1) |
| Talk to customers daily | 72.9 | (48.2) | 73.0 | (45.0) | 72.7 | (49.4) |
| Read/Write daily | 68.4 | (50.4) | 68.3 | (47.4) | 67.7 | (51.9) |
| *Requirements for Hiring* | | | | | | |
| College diploma | 24.6 | (46.6) | 21.8 | (42.0) | 24.7 | (47.8) |
| H.S. diploma | 78.4 | (44.6) | 79.0 | (41.4) | 77.0 | (46.6) |
| General experience | 70.0 | (49.7) | 75.2 | (43.9) | 69.2 | (51.2) |
| Specific experience | 64.2 | (57.0) | 72.2 | (45.6) | 61.8 | (53.9) |
| Reference | 75.9 | (46.4) | 76.3 | (43.3) | 75.5 | (47.7) |
| Vocational training | 42.5 | (53.5) | 45.2 | (50.6) | 40.2 | (54.3) |
| *Industry* | | | | | | |
| Manufacturing | 19.5 | (43.0) | 15.1 | (36.5) | 21.0 | (45.3) |
| Services | 48.9 | (54.3) | 55.0 | (50.7) | 46.9 | (55.5) |

(table continues)

**TABLE 1, continued**

B: By Metropolitan Area

| | Atlanta | | Detroit | | Boston | | Los Angeles | |
|---|---|---|---|---|---|---|---|---|
| | City | Suburbs | City | Suburbs | City | Suburbs | City | Suburbs |
| *Outcome Variables* | | | | | | | | |
| Last hired is black | 38.0 | 26.9 | 45.0 | 18.5 | 15.4 | 4.9 | 9.4 | 9.7 |
| Percent workers black | 43.9 | 26.2 | 44.3 | 14.2 | 22.6 | 5.6 | 13.2 | 9.5 |
| Percent applicants black | 52.6 | 35.1 | 52.1 | 27.5 | 33.4 | 11.7 | 17.1 | 24.4 |
| Log hourly wage | | | | | | | | |
| Black | 2.00 | 1.99 | 2.07 | 1.90 | 2.17 | 2.06 | 2.20 | 2.25 |
| White | 2.35 | 2.20 | 2.37 | 2.11 | 2.29 | 2.39 | 2.66 | 2.39 |
| *Distance and Transit Variables* | | | | | | | | |
| Mean distance (miles) to: | | | | | | | | |
| White | 20.9 | 25.5 | 18.9 | 20.5 | 17.1 | 23.7 | 20.6 | 23.9 |
| Blacks | 13.6 | 27.5 | 9.5 | 17.4 | 7.6 | 19.5 | 15.4 | 17.9 |
| Hispanics | 15.5 | 21.5 | 19.7 | 26.3 | 13.5 | 21.0 | 17.4 | 18.6 |
| Dist. black/Dist. white | .65 | .88 | .50 | .83 | .45 | .78 | .73 | .73 |
| Dist. black/Dist. Hispanic | .89 | 1.07 | .48 | .65 | .57 | .91 | .88 | .96 |
| Transit distance (miles): | | | | | | | | |
| 0 | 41.7 | 24.8 | 53.4 | 28.0 | 59.6 | 38.2 | 40.3 | 47.4 |
| 0.01 to 0.25 | 37.5 | 13.1 | 27.0 | 23.5 | 27.5 | 12.2 | 45.7 | 35.7 |
| 0.26 to 0.50 | 5.3 | 3.5 | 8.9 | 12.9 | 3.3 | 5.8 | 7.3 | 7.8 |
| 0.51 to 1.00 | 2.8 | 3.7 | 0.2 | 11.1 | 7.7 | 8.0 | 3.4 | 6.9 |
| Greater than 1.00 | 12.7 | 54.8 | 10.4 | 24.4 | 1.9 | 35.7 | 3.3 | 2.2 |
| Distance to CBD center (miles) | 4.1 | 18.2 | 5.2 | 19.9 | 4.7 | 16.6 | 10.2 | 15.2 |
| *Racial Measures* | | | | | | | | |
| Percent customers: | | | | | | | | |
| Black | 31.8 | 23.5 | 39.4 | 17.6 | 21.7 | 11.3 | 14.1 | 12.6 |
| Hispanic | 5.1 | 6.0 | 5.6 | 3.8 | 12.3 | 8.7 | 31.1 | 31.5 |
| Respondent's race: | | | | | | | | |
| Black | 16.1 | 6.5 | 24.6 | 2.0 | 4.9 | 0.8 | 5.3 | 7.0 |
| Hispanic | 1.8 | 1.4 | 1.4 | 2.2 | 5.5 | 1.0 | 11.3 | 11.0 |
| Affirmative Action used | 67.9 | 57.9 | 64.0 | 54.2 | 70.2 | 57.9 | 67.5 | 65.4 |

**Note**: Since the skill needs and hiring requirements of employers displayed little variation across these metropolitan areas, we did not list these variables in Part B of Table 1. (CBD = Central Business District.)

A number of differences between firms located in central-city or suburban areas are apparent. Those located in central cities are more likely to have black employees and applicants, and they pay more to both groups of employees, but especially to whites.[24] Central-city firms are closer to the populations of all groups, but especially to blacks, *relatively* as well as absolutely. They are also closer to public transit: over 80 percent are within a quarter mile of a public transit stop, whereas the corresponding percentage for suburban firms is 53 percent. The relatively higher fraction of black applicants at these establishments is therefore not surprising.

The data also suggest that central-city employers have stronger preferences for black applicants than do suburban employers. This is seen in the higher percentages of central-city firms that use Affirmative Action in hiring and the higher percentages of black customers and survey respondents at these firms. Some confirmation of the expectation of greater preferences for black applicants in central-city firms is provided by the fact that the ratios of black employees or of new hires to black applicants are higher in central cities than suburban areas.[25]

Finally, we note the relatively high average skill needs and hiring requirements of firms in newly filled jobs. Only a fourth of the recently filled jobs at these firms require college diplomas; yet over two-thirds of the jobs require daily use of arithmetic and reading/writing of paragraph-length material, and well over half require use of computers. Experience (both general and specific) and references are each required at the time of hiring in roughly two-thirds of these firms, and previous training is required at over 40 percent. In general, skill requirements are somewhat higher in central-city than in suburban jobs;[26] and manufacturing firms are now more likely to be located in the suburbs, whereas services are more heavily concentrated in the central cities.

Part B of Table 1 shows that the four metropolitan areas vary in racial outcomes and in their determinants. The percentages of blacks among employees, applicants and customers are higher in Atlanta and Detroit than in Boston and Los Angeles, reflecting their higher fraction of the residential

populations in the first two areas. The percentage-point gap between black representation in central-city and suburban firms is highest in Detroit, apparently reflecting a relatively high degree of residential segregation (Frey and Farley, 1993). Mass transit is relatively more available in some places (e.g., Boston) than others, whereas central-city/suburban gaps in Los Angeles are generally weaker than elsewhere in virtually every measure.

The strong parallels across MSAs in the racial employment patterns of the central cities and suburbs suggests that housing market discrimination and segregation do indeed have consequences, at least for *where* blacks and whites work in metropolitan areas, if not for whether they work or at what wage. These results also suggest a need to disaggregate our analysis by MSA, at least some of the time, to allow for potentially different effects of location, transit, and racial variables among these areas.

B. Equations for Percentage of Blacks among Employees and Applicants

Table 2 presents the results of estimated equations explaining the percentage of black, noncollege employees at each firm. The independent variables include a set of dummy variables for proximity of the firm to a public transit stop and the firm's distance to the black population divided by its distance to the white population in the MSA.[27] A wide range of additional variables are included to control for other potential determinants of the employer's relative demand for black labor. These include the variables listed in Table 1 and sets of dummies for metropolitan area, establishment size, industry, and the percentage of employees covered by collective bargaining.[28]

Three specifications are presented in Table 2: one includes the variables described above; the second adds a dummy variable for presence of the firm in the central city; and the third adds a variable for the percentage of blacks among applicants to the firm. All of these specifications are estimated using both Ordinary Least Squares (OLS) and Tobit.[29]

**TABLE 2**
**Percentage of Noncollege Employees Who Are Black: Estimation Results**

| Variables | OLS 1 | Tobit 2 | OLS 3 | Tobit 4 | OLS 5 | Tobit 6 |
|---|---|---|---|---|---|---|
| Transit distance (miles): | | | | | | |
| 0 | .052 | .074 | .045 | .067 | .024 | .036 |
| | (.012) | (.017) | (.012) | (.017) | (.012) | (.017) |
| 0.01 to 0.25 | .051 | .067 | .041 | .057 | .028 | .039 |
| | (.013) | (.018) | (.013) | (.018) | (.013) | (.019) |
| 0.26 to 0.50 | .040 | .037 | .035 | .031 | .008 | -.012 |
| | (.017) | (.025) | (.017) | (.025) | (.017) | (.025) |
| 0.51 to 1.00 | .011 | .006 | .009 | .003 | .010 | .009 |
| | (.019) | (.028) | (.019) | (.027) | (.018) | (.026) |
| Dist. black/Dist. white | -.283 | -.389 | -.224 | -.328 | -.095 | -.155 |
| | (.025) | (.035) | (.027) | (.038) | (.028) | (.039) |
| Percent customers black | .473 | .580 | .465 | .572 | .224 | .269 |
| (×100) | (.025) | (.033) | (.025) | (.033) | (.026) | (.034) |
| Black respondent | .190 | .203 | .186 | .199 | .146 | .149 |
| | (.017) | (.022) | (.017) | (.021) | (.016) | (.020) |
| Central city location | — | — | .058 | .056 | .058 | .053 |
| | | | (.011) | (.015) | (.011) | (.015) |
| Percent applicants black | — | — | — | — | .004 | .005 |
| | | | | | (.000) | (.000) |
| Obs. | 2186 | 2186 | 2186 | 2186 | 1682 | 1682 |
| $R^2$ .499 | — | .496 | — | .644 | — | |
| Log likelihood | — | -484 | — | -477 | — | -179 |

**Note**: Standard errors in parentheses.
All equations include dummies for industry, establishment size, whether Affirmative Action was used in recruiting or hiring, and metropolitan area. Also included are the percentage of nonprofessional/managerial employees covered by collective bargaining, and a constant term.

The results show that the employer's proximity to both public transit and to the black residential population affects the likelihood of hiring black employees. Being within a quarter mile of a transit stop (relative to being more than a mile away) raises the probability of hiring blacks by 5–7 percentage points, and being within a quarter to half a mile raises the probability by a smaller amount. Being 10 percent closer in distance to blacks relative to whites (or roughly 2.2 miles closer to blacks) raises the probability of hiring them by about 3–4 percentage points. Controlling for the percentage of blacks among applicants reduces the coefficients on the transit and population measures by 50–60 percent. We expect spatial factors to affect the employment of blacks primarily through the racial composition of applicants to firms, and these results suggest that a large fraction of the estimated effects of proximity to public transit and to blacks reflect these spatial factors per se, rather than unobserved racial preferences of employers. This point is also observed in Table 3, where estimated equations are directly comparable to those listed in the first four columns of Table 2, but the dependent variable is now the fraction of blacks among *applicants* rather than employees. The coefficients on relative distance in Table 3 are comparable or larger than those in Table 2, whereas those for proximity to transit are substantially larger than (or roughly double) those in Table 2.[30]

Other measures in Tables 2 and 3, however, suggest that the racial preferences of employers also affect their tendencies to hire blacks. In particular, black respondents to the survey and firms with more black customers are more likely to hire black employees. In addition, results not reported in these tables suggest that blacks are more likely to be hired by establishments with larger numbers of employees.[31]

As we noted above, all of these findings likely reflect the racial preferences of employers vis-à-vis applicants, affecting employment results independently of location per se. The importance of controlling for these factors when analyzing spatial effects is thereby confirmed.[32]

**TABLE 3**
**Percentage of Applicants Who Are Black: Estimation Results**

| Variables | OLS 1 | Tobit 2 | OLS 3 | Tobit 4 |
|---|---|---|---|---|
| Transit distance (miles): | | | | |
| 0 | .103 | .127 | .101 | .126 |
| | (.018) | (.021) | (.018) | (.021) |
| 0.01 to 0.25 | .080 | .098 | .078 | .096 |
| | (.020) | (.023) | (.020) | (.023) |
| 0.26 to 0.50 | .053 | .073 | .051 | .072 |
| | (.026) | (.030) | (.026) | (.030) |
| 0.51 to 1.00 | .018 | .029 | .017 | .028 |
| | (.028) | (.032) | (.028) | (.032) |
| Dist. black/Dist. white | -.308 | -.348 | -.294 | -.339 |
| | (.037) | (.042) | (.040) | (.047) |
| Percent customers black | .590 | .639 | .589 | .638 |
| (×100) | (.035) | (.040) | (.035) | (.040) |
| Black respondent | .096 | .097 | .095 | .097 |
| | (.024) | (.027) | (.024) | (.027) |
| Central city location | — | — | .014 | .008 |
| | | | (.016) | (.018) |
| Obs. | 1682 | 1682 | 1682 | 1682 |
| $R^2$ | .445 | — | .445 | — |
| Log likelihood | — | -441 | — | -441 |

**Note**: Standard errors in parentheses.
All equations include dummies for industry, establishment size, whether Affirmative Action was used in recruiting or hiring, and metropolitan area. Also included are the percentage of nonprofessional/managerial employees covered by collective bargaining, and a constant term.

C. Equations for the Probability That the Last Hire Is Black

Results from estimating the probability that the last employee hired by the firm is black are presented in Tables 4 through 7. The specifications of these equations are comparable to those presented in Tables 2 and 3, with the central-city dummy first omitted and then included. All of the *firm*-specific independent variables from those tables (except for the fraction of applicants who are black) are included; several more *job*-specific measures are now added as well, measuring daily task performance, hiring requirements, and recruitment methods used in filling this job.[33] The equations are estimated using a linear probability model, with standard errors corrected for heteroscedasticity.

Table 4 presents results for equations pooled across the four metropolitan areas, with separate estimates for the entire sample, noncollege jobs, and jobs filled by employees with high school diplomas or less. But given the very different sizes, locational patterns and racial compositions of the four metropolitan areas, Table 5 presents separate estimates for the high school or less sample in each of the four areas.[34]

The results show that proximity to transit and to the black residential population have significant effects on the probability that the last hired worker is black. The magnitudes are quite comparable to those reported in Table 2, though the transit effects are somewhat larger (location at a transit stop raises black employment by .08 relative to location over a mile away) and residential proximity effects are a bit smaller. The effects of both sets of variables rise somewhat when the sample is limited to less-educated workers or to jobs not requiring a college degree.

As above, the presence of blacks among customers and respondents raises the probability of hiring black workers; and the effect of a central-city location is substantially reduced. In addition, important effects are found for the variables measuring skill requirements on these jobs. For instance, daily use of arithmetic on the job reduces the likelihood that a firm will hire blacks by 6 percentage points. Daily reading/writing of paragraphs and use of computers also have marginally significant

**TABLE 4**
**The Probability That the Last Worker Hired Is Black: Estimation Results for Pooled Sample**

| | Total Sample | | Noncollege Jobs | | Last Hire Has H.S. or Less | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Transit distance (miles): | | | | | | |
| 0 | .081 | .077 | .088 | .083 | .105 | .098 |
| | (.021) | (.021) | (.022) | (.022) | (.029) | (.029) |
| 0.01 to 0.25 | .078 | .071 | .098 | .090 | .082 | .071 |
| | (.023) | (.023) | (.025) | (.025) | (.033) | (.033) |
| 0.26 to 0.50 | .052 | .047 | .061 | .055 | .088 | .082 |
| | (.029) | (.029) | (.030) | (.031) | (.041) | (.041) |
| 0.51 to 1.00 | .053 | .052 | .072 | .069 | .080 | .075 |
| | (.032) | (.032) | (.034) | (.034) | (.051) | (.051) |
| Dist. black/Dist. white | -.243 | -.195 | -.251 | -.198 | -.354 | -.293 |
| | (.043) | (.045) | (.045) | (.047) | (.061) | (.064) |
| Percent customers black | .528 | .522 | .514 | .508 | .427 | .414 |
| (×100) | (.049) | (.049) | (.051) | (.051) | (.071) | (.071) |
| Black respondent | .178 | .175 | .184 | .180 | .182 | .177 |
| | (.035) | (.035) | (.037) | (.037) | (.053) | (.052) |
| Tasks performed daily: | | | | | | |
| Math | -.063 | -.062 | -.060 | -.058 | -.066 | -.065 |
| | (.017) | (.017) | (.018) | (.018) | (.024) | (.024) |
| Computer | -.026 | -.027 | -.032 | -.032 | -.044 | -.044 |
| | (.016) | (.016) | (.017) | (.017) | (.024) | (.024) |
| Talk to customers | .004 | .004 | -.005 | -.006 | -.007 | -.005 |
| | (.019) | (.019) | (.020) | (.020) | (.026) | (.026) |
| Read/write | -.028 | -.028 | -.025 | -.025 | -.027 | -.027 |
| | (.017) | (.017) | (.017) | (.017) | (.023) | (.022) |
| Requirements for hiring: | | | | | | |
| College diploma | -.058 | -.058 | — | — | — | — |
| | (.026) | (.026) | | | | |
| H.S. diploma | -.008 | -.007 | -.007 | -.006 | .013 | .015 |
| | (.019) | (.019) | (.019) | (.019) | (.025) | (.025) |
| General experience | -.004 | -.005 | -.006 | -.009 | -.005 | -.007 |
| | (.018) | (.018) | (.019) | (.019) | (.025) | (.025) |
| Specific experience | -.019 | -.020 | -.013 | -.015 | -.017 | -.019 |
| | (.018) | (.018) | (.018) | (.018) | (.024) | (.024) |
| References | -.004 | -.004 | .008 | .008 | .024 | .025 |
| | (.018) | (.019) | (.019) | (.019) | (.024) | (.024) |
| Vocational training | -.032 | -.032 | -.045 | -.045 | -.050 | -.050 |
| | (.016) | (.016) | (.017) | (.017) | (.023) | (.023) |
| Central city location | — | .045 | — | .052 | — | .061 |
| | | (.019) | | (.020) | | (.027) |
| Obs. | 2375 | 2375 | 2168 | 2168 | 1259 | 1259 |
| $R^2$ | .275 | .276 | .279 | .281 | .289 | .292 |

**Note**: Standard errors in parentheses.
All equations include dummies for industry, establishment size, whether affirmative action is used in recruiting or hiring, and metropolitan area. Also included are the percentage of nonprofessional/management employees covered by collective bargaining, and a constant term.

**TABLE 5**
**The Probability that the Last Worker Hired Is Black: Estimation Results for Each Metro Area**

| | Atlanta | | Detroit | | Boston | | Los Angeles | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Transit distance (miles): | | | | | | | | | |
| 0 | .097 | .086 | .173 | .180 | .018 | .019 | .122 | .119 | .137 |
| | (.059) | (.060) | (.068) | (.069) | (.039) | (.038) | (.062) | (.061) | (.057) |
| 0.01 to 0.25 | .158 | .145 | .164 | .170 | .016 | .024 | .084 | .078 | .088 |
| | (.067) | (.069) | (.072) | (.071) | (.061) | (.062) | (.064) | (.063) | (.059) |
| 0.26 to 0.50 | .110 | .097 | .124 | .139 | -.019 | -.019 | .174 | .171 | .183 |
| | (.096) | (.096) | (.085) | (.085) | (.054) | (.053) | (.080) | (.080) | (.077) |
| 0.51 to 1.00 | -.012 | -.024 | .062 | .072 | .034 | .040 | .243 | .244 | .265 |
| | (.135) | (.135) | (.113) | (.113) | (.066) | (.067) | (.103) | (.102) | (.099) |
| Dist. black/Dist. white | -.460 | -.397 | -.592 | -.474 | -.092 | -.144 | -.183 | -.186 | .018 |
| | (.146) | (.167) | (.129) | (.166) | (.094) | (.116) | (.103) | (.104) | (.129) |
| Dist. black/Dist. Hispanic | — | — | — | — | — | — | — | — | -.363 |
| | | | | | | | | | (.158) |
| Percent customers black | .506 | .506 | .434 | .418 | .569 | .581 | .343 | .314 | .308 |
| (×100) | (.127) | (.126) | (.136) | (.136) | (.133) | (.135) | (.160) | (.158) | (.161) |
| Percent customers Hispanic | — | — | — | — | — | — | — | — | -.001 |
| | | | | | | | | | (.000) |
| Black respondent | .057 | .057 | .158 | .131 | .189 | .191 | .071 | .074 | .089 |
| | (.081) | (.080) | (.100) | (.104) | (.178) | (.176) | (.103) | (.101) | (.103) |
| Hispanic respondent | — | — | — | — | — | — | — | — | .098 |
| | | | | | | | | | (.053) |
| Central city location | — | .048 | — | .088 | — | -.048 | — | .044 | .002 |
| | | (.063) | | (.085) | | (.069) | | (.031) | (.037) |
| Obs. | 367 | 367 | 273 | 273 | 312 | 312 | 308 | 308 | 308 |
| $R^2$ | .334 | .335 | .385 | .388 | .290 | .292 | .223 | .228 | .255 |

**Note**: Standard errors in parentheses.
Sample restricted to jobs held by workers with a high school education or less.
All equations include dummies for industry, establishment size, whether Affirmative Action was used in recruiting or hiring, work tasks, and hiring requirements. Also included are the percentage of nonprofessional/management employees covered by collective bargaining, and a constant term.

negative effects on black employment; each reduces such employment by 2–3 percentage points. Requirements that individuals have college diplomas or previous vocational training also reduce black employment by several percentage points each.[35]

On the other hand, these skill measures are not highly correlated with the proximity of the firm to transit or to the minority population; and their omission from or inclusion in these equations does little to change the results. There also remains some question as to whether these results represent the real skill deficiencies of black applicants, or just those suspected or perceived by employers.[36] Nevertheless, the skill requirements of jobs must be considered when analyzing black employment rates at these firms.

The separate estimates of Table 5 for each metropolitan area show relatively strong effects of proximity to transit and to black residences in Atlanta and especially Detroit, and relatively weak effects in Boston. The spatial pattern of public transit effects in Atlanta and Detroit is quite comparable to that observed in Table 2 with the pooled data: the effects are strongest for firms within a quarter mile of a transit stop and then dissipate for those more than half a mile away.

To some extent, the relatively stronger estimated effects in some metropolitan areas than in others may merely reflect the relative concentrations of blacks in the populations of these areas; the larger this concentration, the greater should be the magnitude of a given change in proximity (either to transit or to the black population) on the probability of employing blacks.[37] Alternatively, the differences in estimates across areas may reflect differences in factors such as the availability of public transit or the degree of segregation in these areas; Detroit and Atlanta rank relatively low on the first and high on the second.

In addition to the equations presented above, one was estimated for Los Angeles that included the firm's distance to the black population divided by its distance to Hispanics (Los Angeles is the only metropolitan area with significant variation between the locations of the white and Hispanic

populations). We also control for the presence of Hispanics among customers and among survey respondents in this equation. The results suggest that, in Los Angeles, a firm's relative distances to blacks and Hispanics plays a greater role in determining black employment outcomes than does its relative distance to blacks and whites. This suggests greater substitutability between black and Hispanic labor in this area than between blacks and whites. A greater presence of Hispanics in the customer pool also reduces black employment probabilities, though Hispanic respondents have a more positive effect on black employment.

To what extent do these explanatory variables account for gross racial differences in the data, such as the tendency of central-city firms to hire more blacks than suburban firms do? This question is addressed in Table 6, which presents decompositions of the gross central-city/suburban differences in black employment probabilities, based on the estimated coefficients from equations that include central-city dummies reported in Tables 4 and 5.[38] In Table 6, results are presented only for those variables that account for major fractions of the gross central-city/suburban differences.[39]

The results show that the relative distance of the firm to the black populations accounts for over 30 percent of the central-city/suburban racial employment difference in the pooled equation, while proximity to transit accounts for roughly 13 percent. Only in Los Angeles are these two effects negligible, with the relative distances to blacks and Hispanics accounting for most of the small central-city effect. The percentage of customers who are black also has an important effect on this differential in each of the four metropolitan areas. The presence of a black respondent in the firm also has noteworthy but more modest effects on the central-city differential.[40]

One final consideration involves the extent to which the estimated effect of relative distance varies according to the method of recruitment used by the firm.[41] Since recruitment methods differ in the extent to which they rely on local populations as sources of job applicants, we might expect the effects of local distance to vary with these methods. Furthermore, the pattern of variation might tell

**TABLE 6**
**Accounting for Central-City/Suburbs Difference in the Probability That the Last Worker Hired Is Black**

| | Pooled Sample | Atlanta | Detroit | Boston | LA w/o Hisp. | LA w/ Hisp. |
|---|---|---|---|---|---|---|
| Central-city–suburbs difference | .183 | .274 | .380 | .170 | .050 | .050 |
| Percentage explained by: | | | | | | |
| Transit | 12.7 | 20.6 | 8.3 | 5.6 | -8.9 | -9.9 |
| Dist. black/Dist. white | 30.9 | 33.7 | 36.8 | 30.0 | 2.2 | -0.2 |
| Percent customers black | 20.6 | 17.7 | 15.9 | 56.8 | 22.2 | 22.2 |
| Black respondent | 7.8 | 1.8 | 8.4 | 5.5 | -0.4 | -0.5 |
| Percent customers Hispanic | — | — | — | — | — | 6.6 |
| Hispanic respondent | — | — | — | — | — | -0.3 |
| Dist. black/Dist. Hispanic | — | — | — | — | — | 71.1 |

us something about the underlying mechanisms through which distance effects operate. Table 7 therefore presents the results for the relative black/white distance variable, for the entire sample and for workers with only a high school or less education, estimated separately for each recruitment method.[42]

The results show that relative distance has its strongest negative effects on black employment when recruitment is done through the posting of help-wanted signs. Similarly, the use of walk-ins results in strong negative distance effects, especially among the less-educated. Referrals from current employees and from other sources are also associated with significant negative distance effects; whereas referrals from various institutions (such as schools, unions, community agencies, or employment services) are generally associated with negative effects of varying magnitudes and significance levels that are limited by sample sizes. In contrast, when recruiting is done through newspapers, the effects of distance are smaller and relatively insignificant.

It is not surprising that distance has its most negative effects on blacks when firms recruit through walk-ins or signs, since one would expect these methods mostly to generate applicants who live in close proximity to the firm. The general association between referral networks and distance is striking, and seems to confirm that such networks are at least in part geographically based. The relatively small estimated effects when recruiting is done through newspapers indicate that, when firms choose to use this method in recruiting particular types of employees, they can overcome the adverse effects of distance by disseminating information over a wide geographic area.[43] The role of information as a mechanism through which spatial effects sometimes operate is suggested by these results.

## D. Results of Wage Equations

If firms that locate relatively far away from the black population or from public transit effectively shift labor demand away from the black labor force, and if blacks cannot offset the effects

**TABLE 7**

**The Effect of a Firm's Relative Distance to Blacks (Distance Coefficient) on the Probability That the Last Worker Hired Is Black, by Recruiting Method**

| | Total Sample | Education<br>High School or Less |
|---|---|---|
| Posted help-wanted sign | -.768<br>(.208) | -1.187<br>(.253) |
| Listed ad in newspaper | -.040<br>(.082) | -.155<br>(.123) |
| Accepted walk-in | -.254<br>(.114) | -.526<br>(.150) |
| Referrals from current employees | -.232<br>(.077) | -.206<br>(.101) |
| Referrals from state emp. service | -.040<br>(.293) | -.291<br>(.389) |
| Referrals from private emp. service | -.214<br>(.171) | -.028<br>(.318) |
| Referrals from community agency | -.368<br>(.362) | -.468<br>(.484) |
| Referrals from schools | -.055<br>(.213) | -.647<br>(.321) |
| Referrals from union | .586<br>(.696) | .286<br>(.837) |
| Referrals from other sources | -.253<br>(.102) | -.243<br>(.167) |

**Note**: Standard errors in parentheses.

of these shifts with their own residential relocations, then the wage levels of blacks should be lower. The wages of whites who work together with blacks (i.e., those who are complements to them in the production process) might be affected as well.[44]

Table 8 presents the results of estimated equations in which the dependent variable is the log of the starting hourly wage for the most recently hired employee. Results are presented for pooled samples across the metropolitan areas and for different racial groups, as well as for all workers and for black workers only in each area separately. Coefficients are presented only for the relative distance of the firm to the black population.

Four specifications of each equation are presented; they are similar to those estimated for Tables 4 and 5 above. Unlike the earlier equations, each of these contains a set of control variables for the personal characteristics of the last worker hired, such as age, education, gender, and race (unless separate estimates are presented for blacks). All equations also control for the distance to the center of the Central Business District (CBD), in addition to the variables for transit and relative distance to blacks. The various firm- and job-specific variables (such as industry, size, collective bargaining and the skill/task requirements) are added in the second equation, and the various other racial variables (for customers, respondent and for use of Affirmative Action) are added in the third, since these controls may partly capture the effects of relative distance.[45] The central-city dummy is then added in the fourth equation.

The results show that, *when controlling for the firm's distance to the CBD*, wages for employees rise with the distance of the firm from the black population.[46] Controlling for additional characteristics of firms and jobs, as well as for various racial factors, reduces the magnitudes and significance levels of the estimates (though most remain at least marginally significant).[47] As before, effects of distance are generally largest in Detroit and (to a lesser extent) Atlanta; they are especially larger for blacks than for nonblack workers in these two areas.

**TABLE 8**
**Effect of a Firm's Relative Distance to Blacks on Log Wage**

A: Estimated Equations for Pooled Sample

| | All Workers | | Black Workers | | Nonblack Workers | |
|---|---|---|---|---|---|---|
| Equation No. | | | | | | |
| 1 | .153 | (.071) | .329 | (.147) | .118 | (.081) |
| 2 | .108 | (.059) | .237 | (.125) | .085 | (.069) |
| 3 | .073 | (.060) | .152 | (.129) | .065 | (.069) |
| 4 | .084 | (.061) | .165 | (.132) | .077 | (.069) |
| Obs. | 2318 | | 539 | | 1780 | |

B: Estimated Equations for All Workers, by Metro Area

| | Atlanta | | Detroit | | Boston | | Los Angeles | |
|---|---|---|---|---|---|---|---|---|
| Equation No. | | | | | | | | |
| 1 | .195 | (.118) | .448 | (.263) | .261 | (.124) | .053 | (.155) |
| 2 | .278 | (.103) | .333 | (.213) | .086 | (.110) | .032 | (.139) |
| 3 | .175 | (.105) | .262 | (.218) | .057 | (.107) | .013 | (.144) |
| 4 | .196 | (.109) | .290 | (.223) | .191 | (.129) | -.052 | (.144) |
| Obs. | 622 | | 567 | | 548 | | 581 | |

C: Estimated Equations for Black Workers, by Metro Area

| | Atlanta | | Detroit | | Boston | | Los Angeles | |
|---|---|---|---|---|---|---|---|---|
| Equation No. | | | | | | | | |
| 1 | .599 | (.183) | .769 | (.411) | -.325 | (.500) | -.230 | (.489) |
| 2 | .392 | (.163) | .571 | (.322) | -.447 | (.677) | .039 | (.650) |
| 3 | .295 | (.170) | .500 | (.345) | -.414 | (.796) | .346 | (.865) |
| 4 | .315 | (.176) | .476 | (.350) | -.564 | (.723) | .664 | (.922) |
| Obs. | 243 | | 175 | | 55 | | 66 | |

**Note**: Standard errors in parentheses.
Control variables entering each equation are as follows:

*Equation 1*: proximity of firm to transit; age, education, gender, and race of worker; distance to center of CBD; metro dummies.

*Equation 2*: variables in Equation 1; job tasks and hiring requirement variables; industry and size of firm; percentage of nonprofessional/managerial workers covered by collective bargaining.

*Equation 3*: variables in Equation 2; percent customers black; whether respondent is black; whether Affirmative Action used in hiring and recruiting.

*Equation 4*: variables in Equation 3; central city dummy.

The magnitudes of these effects are not trivial. Using the smallest and largest coefficients for black workers in Detroit and Atlanta, we find that a standard deviation increase in firms' relative distance from blacks (while keeping distance from the CBD constant) raises the wages of their black employees by 5–10 percent in Atlanta and by 9–14 percent in Detroit.[48]

## IV. DISCUSSION

In this paper, we have shown that the proximity of employers to areas of black residence and to public transit increase the likelihood that they will hire black employees. It is likely that these effects occur at least partly because of reduced black access to firms located further away, rather than solely because of the tendency of discriminatory employers to locate away from blacks. We also find that wages are somewhat lower for those who work relatively close to the black population. Both of these findings seem consistent with the notion of spatial mismatch, in which labor demand shifts away from black areas and labor supply adjustments among blacks are limited by housing segregation and other factors.

The fact that employers are, on average, relatively closer to the black populations than to the white ones does not imply that spatial factors play no role in the employment and earnings disadvantages of blacks. As we have noted above, the costs per mile of travel are substantially higher for black workers than for whites, and the jobs located relatively close to blacks (i.e., those in central cities) have somewhat higher skill needs. More importantly, the greater distances for whites may reflect their freedom to trade off longer commuting times for better housing, whereas the locations of blacks are more constrained by housing market discrimination. Eliminating these constraints (either by reducing discrimination or providing housing vouchers) might enable at least some blacks to locate closer to suburban rather than central-city employers.

Furthermore, it would be incorrect to infer from these results that both blacks and whites merely choose to work relatively close to home, without any adverse effects on their employment outcomes. Elsewhere, we have shown that the ratios of vacant jobs to resident unemployed workers are higher in heavily white suburbs than in central cities and other areas with heavily black populations, thus suggesting that relative labor demand is lower near the residences of blacks (Ihlanfeldt, 1995; Holzer, 1996b).

The lower wages in areas closer to the residences of blacks reinforce the view that the labor demand is lower relative to supply in these areas. If wages in these areas were only lower for blacks, one might infer that those who work near their own communities are merely forgoing compensation for commute times. But we have found lower wages near black residences not only for blacks but for nonblacks as well (though the latter effects are smaller and less significant than those for blacks); and the finding in earlier work that blacks are relatively uncompensated for commuting times suggests that shorter commutes cannot explain the lower wages that we find among blacks working closer to their residences.

Another issue of interest is whether or not the spatial gap in relative labor demand is growing over time. Our evidence is limited to the percentages of jobs and people located in central-city areas reported in the decennial censuses, and even this evidence is somewhat mixed. Between 1980 and 1990, the percentages of metropolitan-area employment and population located in the central city declined in all of the areas in our sample except Los Angeles; and percentage employment declines were greater than percentage population declines in the cities of Atlanta and especially Detroit (though in Boston the declines in population and employment were more comparable).[49] Thus, in the two areas where the vast majority of blacks in our sample are located, and where relative distance was found to have its greatest effects on black employment and earnings, it appears that the spatial gap in relative demand for blacks

grew worse in the 1980's, thereby contributing to their deteriorating employment and earnings rates during that time.[50]

Our findings regarding the racial preferences of employers suggest that these preferences do not fully account for the fact that employers further away from blacks tend to hire them less frequently. Nonetheless, we do find evidence that these preferences matter—the percentages of blacks among customers, the presence of black survey respondents (who control hiring in these firms), and establishment size all are positively related to levels of black employment at firms, even when we control for the firm's proximity to the black population and the presence of blacks among applicants.

Various skills needed for jobs are also associated with reduced hiring of blacks. Elsewhere, we have shown that the need for these skills has grown in magnitude over time, and that they are associated with higher wages (Holzer, 1995). Taken together, these results imply that employers' rising skill needs have also contributed to the relative declines in the employment and earnings of blacks in recent years.

By specifying at least two of the mechanisms through which spatial factors affect black employment rates, the results do suggest some particular policy responses to the mismatch problem. Transportation programs to generate more reverse commuting, whether implemented through mass transit or other approaches, such as van pools, may be relatively more effective in raising employment of blacks among suburban firms than was previously thought. Residential mobility programs (such as Gautreaux or the more recent "Moving to Opportunity" programs), which might enable more blacks to locate themselves near suburban employers, also seem to have some real potential for raising employment rates and earnings among blacks. Our evidence on recruiting methods suggests that better efforts to disseminate information about jobs distant from blacks could have some effect as well, especially if combined with residential mobility or transportation programs.

Of course, the large estimated effects of employer skill needs and racial preferences on racial hiring patterns also suggest the importance of education/job training policies and antidiscrimination

efforts by the government. Indeed, the spatial policies described above should be thought of as *complements* to these other approaches rather than substitutes; combining mobility programs with skill enhancement for inner-city minorities and with government monitoring of their prospective employers is likely to make such programs all the more effective.

A more complete appraisal of the costs and benefits of various mobility policies is well beyond the scope of this paper, but our findings give us at least some hope that successful policy responses can be developed to the adverse spatial conditions that currently plague many blacks.

## Notes

[1]The strongest recent evidence in favor of "spatial mismatch" has been provided by Ihlanfeldt and Sjoquist (1990, 1991), while Kasarda (1995) presents data on employer relocations away from central-city areas and the declining employment rates of less-educated blacks in these areas over time. For various reviews of this literature see Holzer (1991), Jencks and Mayer (1989), and Kain (1992). Spatial factors can also affect black employment and earnings more indirectly, through "neighborhood" effects that limit the acquisition over time of human capital and social contacts among blacks; see, for instance, O'Regan and Quigley (1996). The more general notion that segregation adversely affects black economic outcomes (for either of the above reasons) is forcefully argued in Massey and Denton (1992) and is recently supported in Cutler and Glaeser (1995). Clear evidence of housing market discrimination against blacks has also been found in a variety of studies, e.g., Turner (1992) and Yinger (1995).

[2]Holzer, Ihlanfeldt, and Sjoquist (1994) provide evidence that black workers experience higher travel costs than whites, at least partly because of lower automobile usage; but this factor does not appear to fully account for spatial effects on black employment rates. For evidence on disadvantages for blacks in gaining employment through informal networks see Holzer (1987).

[3]See Hughes and Sternberg (1992) for arguments in favor of providing "job mobility" through transportation and job placement services. They describe a variety of these programs at the local level, though none has ever been formally evaluated. Kain (1992) is more skeptical about traditional public transit and newer placement approaches, and instead argues forcefully for "residential mobility" approaches. For evidence that the latter approach can successfully increase the earnings or employment of inner-city minorities see Rosenbaum and Popkin (1991) on the Gautreaux housing program in Chicago.

[4]The recent deterioration in the earnings and employment of blacks is analyzed by Bound and

Freeman (1992); Moss and Tilly (1992) and Holzer (1994) review the recent evidence on demand-side barriers facing blacks. The argument that blacks have been particularly disadvantaged by growing employer demand for skills has been made by Juhn, Murphy, and Pierce (1993) but is somewhat disputed by Card and Lemieux (1994); and evidence of hiring discrimination against blacks can most clearly be found in the audit studies reviewed in Fix and Struyk (1994).

[5]The claim that suburban employment of blacks is limited by "race, not space" (Ellwood, 1986) becomes more valid if employer locational decisions are driven at least partly by their racial preferences, so that those who locate furthest away from blacks do so specifically to avoid hiring them; see, for instance, Mieskowski and Mills (1992).

[6]The effects of customers' racial composition on discrimination by employers was first suggested by Becker (1971). Empirical evidence to date has been limited, though some has been found by Nardinelli and Simon (1990), Ihlanfeldt and Young (1996) and Carrington and Troske (1995). The best-known studies of Affirmative Action effects on minority employment are summarized in Leonard (1990). Firm-size effects on the hiring of blacks might occur because large firms use more formal human resource activities or because they feel more susceptible to legal pressure and/or bad publicity; and such effects have been found in Carrington, McCue, and Pierce (1995). See also Holzer (1995, 1996a, 1996b,) for more evidence on these factors using these employer data.

[7]The survey is part of a broader project known as the Multi-City Study of Urban Inequality, that consists of household surveys and an in-depth, qualitative study of a small sample of employers in each of these four metropolitan areas. The overall project has been financed by the Ford Foundation and Russell Sage Foundation.

[8]Roughly 1,000 firms were generated from the household surveys, while the rest were generated from SSI.

[9]SSI firms were questioned about the most recent job that they had filled that did not require a

college degree, whereas the household-generated firms were asked about the same occupations as were held by household respondents. Sample weights were constructed to correct for the undersampling of college jobs in the SSI sample, as well as other sources of nonrandomness in the sample of households that generated employers.

[10]Establishments that do a lot of hiring will be heavily represented in this sample of new hires if they are large, but not if their hiring rates are driven by high turnover or net new employment growth. The lack of extra weight for high-turnover firms seems appropriate, given that the stock of jobs they represent at any point in time may not be large.

[11]See, for instance, Kling (1995) for data on surveys recently administered to employers.

[12]For more information on these tests for selection on observables see Holzer (1996b).

[13]Holzer (1995). Comparisons of the occupational, educational, and race distributions between the last-filled jobs and the overall employees at these firms also indicated relatively small differences between "marginal" and "average" employees, and little effect of any overrepresentation of high-turnover jobs within the firms.

[14]The equations we estimate are in the spirit of Kain (1968), Leonard (1987) and others who analyzed the effect of location on *where* people are employed rather than whether they are employed. These equations attempt to measure the effects of employer location on the *supply* of black labor to firms and implicitly on the *demand* for labor faced by black workers. The effects of demand shifts associated with employer locations on the employment and wages of blacks then depend on the relevant elasticities of labor supply and demand, the presence of wage rigidities in the relevant markets, etc.; see Freeman (1977).

[15]The question on proximity to public transit did not differentiate across different modes of transit, such as subway versus bus.

[16]Of the firms in each MSA, 80–90 percent were successfully geocoded. The program

MAPINFO was used in this procedure.

[17]"Central city" refers only to the primary central city in each of the four metro areas, Atlanta, Boston, Detroit, and Los Angeles. The Census Bureau defines other cities as "central cities" within each area (based on the ratios of jobs to residents, size, etc.) but we include these other municipalities in our "suburban" category.

[18]The variables for hiring requirements take on a value of 1 if they are "absolutely necessary" or "strongly preferred."

[19]For more evidence on the effects of these skill measures on employment and wage differences across race/gender groups see Holzer (1995).

[20]A number of studies have dealt with the endogeneity of household location (Hughes and Madden, 1991; Cutler and Glaeser, 1995), but none has explicitly treated the possible endogeneity of employer location.

[21]The Affirmative Action variable is self-reported, and not based on federal contractor status as it was in Leonard (1990). Though there may be some error in the measurement, this variable should also capture firms who engage in Affirmative Action for voluntary reasons or because of state/local regulations.

[22]In Holzer (1996b), we analyze a much wider range of survey questions on employer hiring procedures (e.g., the use of tests, interviews, and reference checks) and attitudes towards various types of applicants (e.g., welfare recipients or those with criminal records). We limit ourselves here to the set of skill and racial preference variables that had the most explanatory power in that analysis, and are most directly related to the issues of concern here. We have also included occupational dummies in many of our estimated equations; they reduce the estimated effects of hiring requirements on racial outcomes but have little effect on the estimated effects of location.

[23]The results of Holzer, Ihlanfeldt, and Sjoquist (1994) show that the time spent per mile of

travel is roughly 50 percent higher for blacks than for whites. The observed racial differences in average travel times may well understate true racial differences, since they are based on *employed* workers and the distances traveled to jobs that they have chosen. If we include in the calculations blacks who are not employed because of spatial reasons, and because they do not choose long-distance jobs, racial differences in travel costs would likely be exacerbated.

[24]The relatively higher compensation among whites for central-city employment is consistent with their relatively longer commutes to these jobs (since, on average, they live further away) and with greater compensation for commuting times among whites than blacks (Holzer, Ihlanfeldt, and Sjoquist, 1994; Zax, 1991). Of course, these comparisons do not control for any black-white differences in the relative characteristics of workers and jobs in the central cities and suburbs.

[25]See Holzer (1996a, 1996b) for more evidence and discussion of this last finding. Though it is at least theoretically possible that racial differences in applicant or job quality account for this, it does not appear to be the case empirically—as we note below, required skills are generally higher in central-city jobs than suburban ones, and the average educational attainment of blacks in the central cities are relatively lower than in the suburbs.

[26]The skills gap in central-city versus suburban firms is clearer when the sample is limited to jobs that do not require college degrees, since this particular requirement is higher in the suburbs and is correlated with all other task and hiring requirements listed.

[27]We use the *ratio* of distances to blacks and whites since the two separate measures are highly correlated (above .80) across firms. Including the two measures separately in estimated equations generated coefficients on each that were never significantly different from each other in absolute value. Using the arithmetic difference in distances to blacks and whites rather than the ratio generated virtually the same results, as the correlation between these two measures is roughly .96. Relative distance to the Hispanic population is not included here, given its high correlation with distance to the

white population (above .9).However, it is used in separate equations for Los Angeles that are reported below.

[28]Also estimated were equations which included the distance of the firm to the center of the city's Central Business District. This variable was found to have no significant effect on the racial composition of employment and had virtually no effect on the estimated effects reported in Tables 2 through 4.

[29]The percentage of firms with no blacks among their employees is roughly 30 percent, whereas that with only blacks is much smaller (roughly 5 percent).

[30]To the extent that the applicants select employers partly on the basis of the expected likelihood of being hired, the racial composition of applicants is endogenous, and therefore may be capturing employer preferences. But the fact that various measures of employer preference affect hiring in Table 2 even after controlling for the racial composition of applicants suggests that this self-selection process is limited and does not fully offset the effects of these preferences on outcomes.

[31]The smallest establishment size category (firms with 1–20 employees) had 10–20 percentage points fewer black employees than the largest category (>500). The use of Affirmative Action does not significantly raise the coefficient for the fraction of black employees in our equations, though it does raise the fractions of employees who are white females and Asians (Holzer, 1996a).

[32]On the other hand, the relatively high correlations between these variables and our distance and transit measures also suggest the possibility that we are "overcontrolling" by including them, since the racial variables may partly capture spatial effects.

[33]The applicant measure is excluded here, since spatial effects seem to occur at least partly through this measure, and since it is a firm-wide variable that performs more weakly in this equation for job-specific employment outcomes.

[34]F-tests consistently reject the equality of coefficients across the four metropolitan areas at

conventional levels of statistical significance in these equations.

[35]The requirement of specific experience becomes more significantly negative when general experience is omitted, and especially in separate estimates for black males. See Holzer (1995).

[36]For instance, statistical discrimination models (Cain, 1986) would predict that employers' perceptions of skills across groups are correct on average, but that misperceptions might occur in individual cases. Since some of these skills (such as computer use) have grown much more important in recent years, there may need to be a period of learning in which employers' expectations about skill levels across groups adjust. The actual skill gaps across groups may themselves adjust over time, as relative improvements in test scores among blacks seems to suggest (Grissmer, Kirby, Berends, and Williamson, 1994). On the other hand, these results are consistent with those found by O'Neill (1990), Ferguson (1993), and Neal and Johnson (1994); all find large effects of gaps in test scores on the relative wages of blacks.

[37]This is true since changes in outcomes are measured in *percentage points* rather than percent terms (where the latter decline as the base grows). The effects of a given change in distance on the percentage points of black employment at a firm should be larger when that distance involves a larger change in the number of blacks located nearby, though the percent effects might not be larger.

[38]Decompositions were done using an analog of the standard formula for omitted variable bias (see, for instance, Johnston, 1972), multiplying each coefficient from the relevant equation in Table 4 or 5 by the corresponding coefficient from a regression of that variable on a central-city dummy.

[39]The skill variables have negligible effects on the central-city/suburban difference, which would be expected from the fact that some of these are actually higher in the central city (and would therefore contribute *negatively* to this differential). Differences in industrial composition also contributed just a few percentage points to the locational difference in employment.

[40]Including in these equations the percentage of applicants at the firm who are black reduces the

extent to which the central-city effect is accounted for by these variables, including the percentage of blacks among customers, but only by a few percentage points each.

[41]The estimated effects of proximity to public transit did not differ significantly by recruitment method.

[42]The results are based on an equation comparable to no. 2 in Table 4, except that the set of recruitment dummies is now omitted from the equation, and the relative distance term is now interacted with each recruitment method.

[43]We note, however, that the choice of newspapers (or any other recruiting mechanism) may be endogenous with respect to the skill levels and characteristics of the workers whom the firm seeks to hire and to the jobs they are trying to fill. Results for any particular method might therefore not generalize to other types of workers or jobs. In this sample, the distance is somewhat more negative for newspapers when the sample is restricted to less-educated workers, though it remains statistically insignificant at conventional levels.

[44]This assumes, of course, that wages for these groups are not rigid, and that labor supply among blacks is not highly elastic.

[45]If these firm and job characteristics are differentially distributed by location, and if the resulting differences in relative distances to the white and black populations are the primary reasons that these characteristics differ across workers by race, then controlling for these characteristics would reduce estimated racial differences that really should be attributed to spatial factors. But if these firm and job characteristics have major effects on who gets hired by race *independently of location*, then the controls should be included.

[46]Distance of the firm to the CBD has a strong negative effect on wages, thereby generating a fairly typical urban wage gradient. Relative distance to the black population has insignificant effects on wages in equations that fail to control for distance to the CBD.

[47]Distance coefficients in the third and fourth specifications are only marginally significant for blacks (i.e., at the 10 percent level in a one-tailed test) and not at all for nonblacks in the pooled sample. Results for Boston and Los Angeles are generally quite weak, especially for blacks.

[48]These ranges represent changes of roughly .14–.29 standard deviations of wages for blacks in Atlanta and of .21–.33 standard deviations for blacks in Detroit.

[49]The declines in employment and population during the decade were roughly 7 and 6 percentage points in Atlanta and 4.5 and 3.5 points in Detroit. In both areas, the percentage of suburban residents commuting into the city for work declined quite substantially (26 percent to 21 percent in Atlanta and 16 percent to 12 percent in Detroit), whereas commuting patterns of central-city residents changed much less, again suggesting that relative distances improved for suburban workers.

[50]The greater declines in employment and population in Atlanta and Detroit than in Boston and Los Angeles are consistent with the pattern noted by Frey and Farley (1993), in which rising immigrant populations caused some central-city areas to grow substantially while white and black residents in most areas continued to suburbanize. Indeed, they note that residential segregation among blacks declined the most in areas with substantial numbers of immigrants, which is consistent with the relatively greater and growing distance problems of blacks in Atlanta and Detroit. Kain (1992) also argues that central-city and suburban patterns in population growth and employment understate the rising distance problems for blacks in many areas, since black suburbanites generally locate relatively near to the central city, whereas employers and white suburbanites both locate further away. The latter observation parallels that made by Kasarda (1995) on the growth of “edge cities” in many metropolitan areas.

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