

*Harry J. Holzer and
Keith R. Ihlanfeldt*

Professor of Economics at Michigan State University and Professor of Economics at Georgia State University, respectively. The authors thank the Rockefeller Foundation for financial support.

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 to 30 years, and the most recent evidence seems to support the hypothesis. These results also suggest that the negative effects of spatial factors on black employment may have grown more serious over time, as more and more employers 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 (for example, 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 to specifically aid "reverse commuters" who are traveling from central city residences to suburban job sites; but these are likely to be ineffective if firms' proximity 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, also are 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, and the like) 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 or relatively strong preferences for whites (or for other nonblack minorities).⁵ Yet, few studies of spatial effects have taken account of these other demand-side factors in the labor market.

The negative effects of spatial factors on black employment may have grown more serious over time, as more employers relocate away from central city areas.

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 supported recently in Cutler and Glaeser (1995). Clear evidence of housing market discrimination against blacks has also been found in a variety of studies—for example, 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 account fully 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).

This study uses 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 likely to influence the spatial distribution of black employment: the proximity of firms to the residential locations of various racial groups and the proximity of firms 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; the use of Affirmative Action in hiring; and the size of the establishment.⁶

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 farthest away from blacks do so specifically to avoid hiring them; see, for instance, Mieszkowski 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 Affirma-

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

I. 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 (for example, 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 also administered in each of these four metropolitan areas.⁸ The SSI samples were drawn across establishment size categories so as to reproduce the distribution of employment across these categories in the work force; the household-generated sample implicitly weights firms in the same way.⁹ No additional size-weighting of

tive 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 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, which 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 and Russell Sage Foundations.

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

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 jobseekers.¹⁰

The overall 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 (for example, establishment size, industry, and location) of firms in the SSI sample that did not complete the survey, we could check for differences in response rates across these *observable* categories that might indicate sample selection bias. Few significant differences were found in response rates across the categories measured by these variables.¹²

As a further check on the representativeness of the sample, we performed comparisons of 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 non-college 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

constructed to correct for the undersampling of college jobs in the SSI sample, as well as for 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 (1996b). Comparisons of the occupational, educational, and race distributions between the last filled jobs and employees overall 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

Since “spatial mismatch” should affect primarily 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 from 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 from the black, white, or Hispanic populations in the Metropolitan Statistical Area (MSA).¹⁵ To compute the latter variable, we first had to “geocode” our firms—that is, 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 that defines 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 firms’ demand for black labor that operate through their need for skills and their racial preferences. The former are measured only for the most recently filled job. They include dummy variables for hiring requirements into that job—whether firms required the applicants to have college or high school diplomas, general or specific experience, references, and previous training¹⁸—and dummies for whether each of a set of tasks is performed on a daily basis—direct customer contact,

blacks then depend on the relevant elasticities of labor supply and demand, the presence of wage rigidities in the relevant markets, and so on; 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 In each MSA, 80 to 90 percent of the firms were successfully geocoded. The program MAPINFO was used in this procedure.

¹⁷ “Central city” here refers only to the primary central city in each metro area: the cities of Atlanta, Boston, and so on. The Census Bureau defines other cities as “central cities” within each area (based on the ratios of jobs to residents, size, and the like) but we include these other municipalities in our “suburban” category.

¹⁸ The variables for hiring requirements take on a value of “one” if they are “absolutely necessary” or “strongly preferred.”

reading or writing paragraphs, arithmetic calculations, and computer use.¹⁹

As noted above, the endogeneity of employer location with respect to 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; namely, 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

II. Estimation Results

Table 1 presents summary data on employment outcomes by race and on a variety of their determinants. All means are sample-weighted. Part A of the table gives these measures for the overall sample and separately for central city and suburban firms, using the pooled sample of MSAs. Part B presents the data separately by MSA, broken down by central city versus suburban location.

Results of Summary Measures

The results show that blacks account for roughly 27 percent of the applicants in these firms, 20 percent

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

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

²¹ The Affirmative Action variable is self-reported, and not based on federal contractor status, as was the case in Leonard (1990). Though it may be measured with some error, 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 (for example, the use of tests, interviews, and reference checks) and attitudes towards various types of applicants (for example, 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, which reduce the estimated effects of hiring requirements on racial outcomes but have little effect on the estimated effects of location.

Table 1

Means (Standard Deviations) of Key Variables Related to Employment Outcomes

	Total Sample	Central City	Suburbs
A: Pooled Sample Across Metro Areas			
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)
Distance black/Distance white	.76 (.20)	.62 (.16)	.81 (.18)
Distance black/Distance Hispanic	.86 (.25)	.77 (.20)	.89 (.26)
Transit distance (miles):			
0	33.5 (51.1)	46.0 (50.9)	33.8 (52.5)
.01 to .25	23.4 (45.8)	37.5 (49.0)	19.3 (43.8)
.26 to .50	6.2 (26.2)	6.2 (24.7)	7.2 (28.6)
.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)
High school 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)

of the non-college 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.

Table 1 (con't.)

Means (Standard Deviations) of Key Variables Related to Employment Outcomes

	Atlanta		Detroit		Boston		Los Angeles	
	City	Suburbs	City	Suburbs	City	Suburbs	City	Suburbs
B: By Metropolitan Area								
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
Distance black/Distance white	.65	.88	.50	.83	.45	.78	.73	.73
Distance black/Distance 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
.01 to .25	37.5	13.1	27.0	23.5	27.5	12.2	45.7	35.7
.26 to .50	5.3	3.5	8.9	12.9	3.3	5.8	7.3	7.8
.51 to 1.00	2.8	3.7	.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	.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

Perhaps surprisingly, the data indicate that firms on average are located *closer* to the black residential population than to Hispanics or whites, and they are closer to Hispanics than to whites. This 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 among whites.²³ Indeed, the

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

distribution of white residences likely reflects their choices (between commute times and housing costs) to a much greater degree than the residences of blacks, whose choices appear to be constrained by housing market discrimination.

A number of differences between firms located in central city versus those in suburban areas are apparent. Those located in central cities are more likely to have black employees and applicants, and they pay

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. Blacks who are not employed because of spatial reasons, such as long-distance jobs that they do not choose to apply for, would likely exacerbate racial differences in travel costs if they were included in these calculations.

more to both groups of employees but especially to whites.²⁴

Central city firms are closer to the populations of all groups, but they are especially close to blacks—in other words, they are *relatively* as well as absolutely closer to blacks. They are also closer to public transit, with over 80 percent within a quarter mile of a public transit stop (the corresponding percentage for suburban firms is 53 percent). The relatively higher fractions of black applicants at these establishments is therefore not surprising.

Firms 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.

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 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 one-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, while previous training is required at over 40 percent. In general, skill requirements are somewhat higher in central city jobs than in suburban jobs;²⁶ and manufacturing firms now are more likely to be located in the suburbs, while services are more heavily concentrated in the central cities.

Part B of Table 1 indicates the variance across the four metropolitan areas in racial outcomes and in their determinants.²⁷ The percentages of blacks among employees, applicants, and customers are higher in Atlanta and Detroit than in Boston and Los Angeles, reflecting their fractions of the residential populations in the former 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 (for example, Boston) than others, while central city/suburban gaps in Los Angeles are generally smaller than elsewhere in virtually every measure.

The strong parallels across MSAs between racial populations and employment patterns in central cities and suburbs suggest 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 across these areas.

Equations Explaining the Percentage of Blacks among Employees and Applicants

Table 2 presents the results of estimated equations explaining the percentage of non-college employees at each firm who are black. The independent variables include a set of dummy variables for proximity (in miles) of the firm to a public transit stop and for the firm's distance from the black population in its MSA divided by its distance from the white popu-

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 farther away) and with greater compensation for commute times among whites than blacks (Holzer, Ihlandfeldt, and Sjoquist 1994; Zax 1991). Of course, these comparisons do not control for any differences in the relative characteristics of workers and jobs in the central cities and suburbs between whites and blacks.

²⁵ See Holzer (1996a, 1996b) for more evidence and discussion of this last finding. Although 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 is 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 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 the table.

Table 2
*Percent of Non-College Employees Who Are Black:
Estimation Results*

Estimation Technique: Equation:	OLS 1	Tobit 1	OLS 2	Tobit 2	OLS 3	Tobit 3
Transit distance (miles):						
0	.052 (.012)	.074 (.017)	.045 (.012)	.067 (.017)	.024 (.012)	.036 (.017)
.01 to .25	.051 (.013)	.067 (.018)	.041 (.013)	.057 (.018)	.028 (.013)	.039 (.019)
.26 to .50	.040 (.017)	.037 (.025)	.035 (.017)	.031 (.025)	.008 (.017)	-.012 (.025)
.51 to 1.00	.011 (.019)	.006 (.028)	.009 (.019)	.003 (.027)	.010 (.018)	.009 (.026)
Distance black/Distance white	-.283 (.025)	-.389 (.035)	-.224 (.027)	-.328 (.038)	-.095 (.028)	-.155 (.039)
Percent customers black (multiplied by 100)	.473 (.025)	.580 (.033)	.465 (.025)	.572 (.033)	.224 (.026)	.269 (.034)
Black respondent	.190 (.017)	.203 (.022)	.186 (.017)	.199 (.021)	.146 (.016)	.149 (.020)
Central City			.058 (.011)	.056 (.015)	.058 (.011)	.053 (.015)
Percent applicants black					.004 (.000)	.005 (.000)
Observations	2186	2186	2186	2186	1682	1682
R ²	.499		.496		.644	
Log Likelihood		-484		-477		-179

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 non-professional/managerial employees covered by collective bargaining and a constant term.

Three specifications are presented in Table 2: one includes the variables described above; the second adds a dummy variable for the presence of the firm in the central city; and the third adds a variable for the percent of blacks among applicants to the firm. All of these specifications are estimated using both Ordinary Least Squares (OLS) and Tobit.³⁰

The results show that the employer's proximity to both public transit and 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 to 7 percentage points, and being within a quarter to one-half mile raises the probability by a smaller amount. A firm's 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 to 4 percentage points.

Controlling for the percentage of blacks among applicants reduces the coefficients on the transit and population measures by 50 to 60 percent. Since it is primarily through the racial composition of

applicants to firms that we expect spatial factors to affect the employment of blacks, these results suggest that a large fraction of the estimated effects of proximity to public transit and to blacks reflects 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, except that the dependent variable is now the fraction of blacks among *applicants* rather than em-

lation.²⁸ 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.²⁹

²⁸ We use the *ratio* of distances to blacks and whites since the two separate measures are highly correlated (above 0.80) 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 0.96. Relative distance to the Hispanic population is not included here, given its high correlation with distance to the white population (above 0.9). However, it is used in separate equations for Los Angeles that are reported below.

²⁹ Also estimated were equations that included the distance

from 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.

³⁰ The percentage of firms with no blacks among their employees is roughly 30 percent, while the fraction with only blacks is much smaller (roughly 5 percent).

Table 3
*Percent of Job Applicants Who Are Black:
Estimation Results*

Estimation Technique: Equation:	OLS 1	Tobit 1	OLS 2	Tobit 2
Transit distance (miles):				
0	.103 (.018)	.127 (.021)	.101 (.018)	.126 (.021)
.01 to .25	.080 (.020)	.098 (.023)	.078 (.020)	.096 (.023)
.26 to .50	.053 (.026)	.073 (.030)	.051 (.026)	.072 (.030)
.51 to 1.00	.018 (.028)	.029 (.032)	.017 (.028)	.028 (.032)
Distance black/Distance white	-.308 (.037)	-.348 (.042)	-.294 (.040)	-.339 (.047)
Percent customers black (multiplied by 100)	.590 (.035)	.639 (.040)	.589 (.035)	.638 (.040)
Black respondent	.096 (.024)	.097 (.027)	.095 (.024)	.097 (.027)
Central City			.014 (.016)	.008 (.018)
Observations	1682	1682	1682	1682
R ²	.445		.445	
Log Likelihood		-441		-441

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 non-professional/managerial employees covered by collective bargaining and a constant term.

employees. The coefficients on relative distance in Table 3 are comparable or larger than those in Table 2, while those for proximity to transit are substantially larger than (or roughly double) those in Table 2.³¹

On the other hand, a variety of other measures in Tables 2 and 3 suggest that the racial preferences of employers also affect their tendencies to hire blacks. In particular, firms with 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

³¹ To the extent that the applicants select employers partly on the basis of expected likelihood of being hired, the racial composition of applicants is endogenous, and therefore may be capturing employer preferences to some extent. 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.

likely to be hired by establishments with larger numbers of employees.³²

As 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.³³

Equations Estimating 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.³⁴ The equations are estimated using a linear probability model, with standard errors corrected for heteroskedasticity.

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

³² The smallest establishment size category (firms with 1 to 20 employees) had 10 to 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, although it does raise the fractions of employees who are white females and Asians (Holzer 1996a).

³³ 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.

³⁴ The applicant measure is excluded here, since spatial effects seem to occur at least partly through this measure, and because it is a firm-wide variable that performs more weakly in this equation for job-specific employment outcomes.

Table 4
*The Probability That the Last Worker Hired Is Black:
 Estimated Equations for Pooled Sample*

Equation:	Total Sample		Non-College Jobs		Last Hire Has High School or Less	
	1	2	1	2	1	2
Transit distance (miles):						
0	.081 (.021)	.077 (.021)	.088 (.022)	.083 (.022)	.105 (.029)	.098 (.029)
.01 to .25	.078 (.023)	.071 (.023)	.098 (.025)	.090 (.025)	.082 (.033)	.071 (.033)
.26 to .50	.052 (.029)	.047 (.029)	.061 (.030)	.055 (.031)	.088 (.041)	.082 (.041)
.51 to 1.00	.053 (.032)	.052 (.032)	.072 (.034)	.069 (.034)	.080 (.051)	.075 (.051)
Distance black/Distance white	-.243 (.043)	-.195 (.045)	-.251 (.045)	-.198 (.047)	-.354 (.061)	-.293 (.064)
Percent customers black (multiplied by 100)	.528 (.049)	.522 (.049)	.514 (.051)	.508 (.051)	.427 (.071)	.414 (.071)
Black respondent	.178 (.035)	.175 (.035)	.184 (.037)	.180 (.037)	.182 (.053)	.177 (.052)
Tasks performed daily:						
Math	-.063 (.017)	-.062 (.017)	-.060 (.018)	-.058 (.018)	-.066 (.024)	-.065 (.024)
Computer	-.026 (.016)	-.027 (.016)	-.032 (.017)	-.032 (.017)	-.044 (.024)	-.044 (.024)
Talk to customers	.004 (.019)	.004 (.019)	-.005 (.020)	-.006 (.020)	-.007 (.026)	-.005 (.026)
Read/write	-.028 (.017)	-.028 (.017)	-.025 (.017)	-.025 (.017)	-.027 (.023)	-.027 (.022)
Requirements for hiring:						
College diploma	-.058 (.026)	-.058 (.026)				
High school diploma	-.008 (.019)	-.007 (.019)	-.007 (.019)	-.006 (.019)	.013 (.025)	.015 (.025)
General experience	-.004 (.018)	-.005 (.018)	-.006 (.019)	-.009 (.019)	-.005 (.025)	-.007 (.025)
Specific experience	-.019 (.018)	-.020 (.018)	-.013 (.018)	-.015 (.018)	-.017 (.024)	-.019 (.024)
References	-.004 (.018)	-.004 (.019)	.008 (.019)	.008 (.019)	.024 (.024)	.025 (.024)
Vocational training	-.032 (.016)	-.032 (.016)	-.045 (.017)	-.045 (.017)	-.050 (.023)	-.050 (.023)
Central City		.045 (.019)		.052 (.020)		.061 (.027)
Observations	2375	2375	2168	2168	1259	1259
R ²	.275	.276	.279	.281	.289	.292

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 non-professional/management employees covered by collective bargaining and a constant term.

four are also presented, in Table 5.³⁵

The results show that proximity to transit and proximity to the black residential population have significant effects on the probability that the last hired worker is black. The magnitudes are comparable to those reported in Table 2, although the transit effects are somewhat larger (being at a transit stop raises black employment by 0.08 relative to being 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 of hiring blacks by 6 percentage points. Daily reading/writing of paragraphs and use of computers also have marginally significant negative effects on black employment, with each reducing such employment by 2 to 3 percentage points. Requirements that individuals have college diplomas or previous vocational training also reduce black employment by several percentage points each.

On the other hand, these skill measures are not highly correlated with the proximity

Table 5

The Probability That the Last Worker Hired Is Black: Estimated Equations for Each Metro Area, for Sample with High School or Less

Equation:	Atlanta		Detroit		Boston		Los Angeles		
	1	2	1	2	1	2	1	2	3
Transit distance (miles):									
0	.097 (.059)	.086 (.060)	.173 (.068)	.180 (.069)	.018 (.039)	.019 (.038)	.122 (.062)	.119 (.061)	.137 (.057)
.01 to .25	.158 (.067)	.145 (.069)	.164 (.072)	.170 (.071)	.016 (.061)	.024 (.062)	.084 (.064)	.078 (.063)	.088 (.059)
.26 to .50	.110 (.096)	.097 (.096)	.124 (.085)	.139 (.085)	-.019 (.054)	-.019 (.053)	.174 (.080)	.171 (.080)	.183 (.077)
.51 to 1.00	-.012 (.135)	-.024 (.135)	.062 (.113)	.072 (.113)	.034 (.066)	.040 (.067)	.243 (.103)	.244 (.102)	.265 (.099)
Distance black/Distance white	-.460 (.146)	-.397 (.167)	-.592 (.129)	-.474 (.166)	-.092 (.094)	-.144 (.116)	-.183 (.103)	-.186 (.104)	.018 (.129)
Distance black/Distance Hispanic									-.363 (.158)
Percent customers black (multiplied by 100)	.506 (.127)	.506 (.126)	.434 (.136)	.418 (.136)	.569 (.133)	.581 (.135)	.343 (.160)	.314 (.158)	.308 (.161)
Percent customers Hispanic									-.001 (.000)
Black respondent	.057 (.081)	.057 (.080)	.158 (.100)	.131 (.104)	.189 (.178)	.191 (.176)	.071 (.103)	.074 (.101)	.089 (.103)
Hispanic respondent									.098 (.053)
Central City		.048 (.063)		.088 (.085)		-.048 (.069)		.044 (.031)	.002 (.037)
Observations	367	367	273	273	312	312	308	308	308
R ²	.334	.335	.385	.388	.290	.292	.223	.228	.255

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 is used in recruiting or hiring, work tasks, and hiring requirements. Also included are the percentage of non-professional/management employees covered by collective bargaining and a constant term.

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 on those effects. Some question³⁶ also remains as to whether these results represent the real skill deficiencies of black applicants or just those suspected or perceived by employers.³⁷

³⁵ F-tests consistently reject the equality of coefficients across the four metropolitan areas at conventional levels of statistical significance in these equations.

³⁶ 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).

³⁷ 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)

Nevertheless, the skill requirements of jobs must be considered when analyzing black employment rates at these firms.

The separate estimates in Table 5 for each metropolitan area show relatively strong effects of proximity to transit and to black residences in Atlanta and

have grown much more important in recent years, a period of learning may be needed, during 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 seem to suggest (Grissmer et al. 1994). On the other hand, these results are consistent with those found by O'Neill (1990), Ferguson (1993), and Neal and Johnson (1994), who find large effects of gaps in test scores on the relative wages of blacks.

Table 6

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

	Pooled Sample	Atlanta	Detroit	Boston	Los Angeles without Hispanics	Los Angeles with Hispanics
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
Distance black/Distance white	30.9	33.7	36.8	30.0	2.2	-.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	-.4	-.5
Percent customers Hispanic						-6.6
Hispanic respondent						-.3
Distance black/Distance Hispanic						71.1

especially Detroit, and relatively weak effects in Boston. The spatial pattern of public transit effects in Atlanta and Detroit is 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 one-half mile away.

To some extent, the relatively stronger estimated effects in some metropolitan areas than others may just 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 (to either transit or the black population) on the probability of employing blacks.³⁸ Alternatively, the differences in estimates across areas may reflect differences in factors such as the availability of public transit or the degree of segregation across these areas, with Detroit and Atlanta ranking relatively low on the first and high on the second.

In addition to the equations presented above, an equation was estimated for Los Angeles that included the firm's distance to the black population divided by its distance to Hispanics as well as the ratio of its distances to blacks and to whites. This specification was limited to the sample of firms in Los Angeles because that metropolitan area is the only one 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 play 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 than whites 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? This question is addressed in Table 6, where decompositions are presented 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 5.³⁹ In Table 6, results are presented only for those variables that account for major fractions of the gross central city/suburban differences.⁴⁰

³⁸ This is true because 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, even though the percent effects might not be larger.

³⁹ 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.

⁴⁰ 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

The results show that the relative distance of the firm from the black population 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 percent of customers who are black also has an important effect on this differential, in each of the four metropolitan areas. Also, the presence of a black respondent in the firm has noteworthy but more modest effects on the central city differential.⁴¹

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.⁴² Since recruitment methods vary 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 across these methods. Furthermore, the pattern of variation might tell us something about the underlying mechanisms through which distance effects operate.

Table 7 presents the coefficients (and standard errors) on the relative black/white distance variable, estimated separately for each recruitment method.⁴³ The results are presented for the entire sample and for workers with only a high school education or less.

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. 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, the effects of distance when recruiting is done through newspapers are smaller and relatively insignificant.

industrial composition also contributed just a few percentage points to the locational difference in employment.

⁴¹ Including the percentage of applicants at the firm who are black in these equations reduces the extent to which these variables, including the percentage of blacks among customers, account for the central city effect, but only by a few percentage points each.

⁴² The estimated effects of proximity to public transit did not differ significantly by recruitment method.

⁴³ The results are based on an equation comparable to no. 2 in Table 4, except that the relative distance term is now interacted with each recruitment method.

Table 7

The Effect of Relative Distance to Blacks on the Probability that the Last Worker Hired Is Black: By Recruiting Method

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

Standard errors in parentheses.

That distance has its most negative effects on blacks when firms recruit through walk-ins or signs is not surprising, since one would expect these methods to generate mostly 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 partly geographically based.

In contrast, 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.⁴⁴ The role of

⁴⁴ 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

Table 8
Effect of Relative Distance to Blacks on Log Wage

A: Estimated Equations for Pooled Sample

	All Workers	Black Workers	Non-Black 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)
Observations	2318	539	1779

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)
Observations	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)
Observations	243	175	55	66

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 Central Business District; metro dummies.
- Equation 2: variables in Equation 1; job tasks and hiring requirement variables; industry and size of firm; percentage of non-professional/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.

information as a mechanism through which spatial effects sometimes operate is therefore suggested by these results.

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 of these shifts with their own residential relocations, then the wage levels

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.

of blacks should be lower. The wages of whites who work together with blacks (those who are complements to them in the production process) might be affected as well.⁴⁵

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 across 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.

⁴⁵ This assumes, of course, that wages for these groups are not rigid, and that labor supply among blacks is not highly elastic.

Four specifications of each equation are presented that are similar to those estimated for Tables 4 and 5, above. Unlike the earlier equations, each contains a set of control variables for 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 employer's proximity to both public transit and the black residential population affects the likelihood of hiring black employees.

the center of the Central Business District, 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, firm respondent, and use of Affirmative Action) are added in the third, since these controls may partly capture the effects of relative distance.⁴⁶ The central city dummy is then added, in the fourth equation.

The results show that, *when controlling for the firm's distance to the Central Business District*, wages for employees rise with distance of the firm from the black population.⁴⁷ 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).⁴⁸ As before, effects of distance are generally largest in Detroit and (to a lesser extent)

⁴⁶ 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 independent of location, then the controls should be included.

⁴⁷ 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.

⁴⁸ Distance coefficients in the third and fourth specifications are only marginally significant for blacks (that is, at the 10 percent level in a one-tailed test) and not at all for non-blacks in the pooled

Atlanta; they are especially larger for blacks than for non-black workers in these two areas.

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 Central Business District constant) raises the wages of their black employees by 5 to 10 percent in Atlanta and by 9 to 14 percent in Detroit.⁴⁹

III. Discussion and Policy Implications

In this study, we have shown that employers' proximity to black residences and to public transit both 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 farther away, rather than solely because of a 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 appear 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 (that is, those in central cities) have somewhat higher skill needs. More important, the greater distances for whites likely reflect their freedom to trade off longer commute 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

sample. Results for Boston and Los Angeles are generally quite weak, especially for blacks.

⁴⁹ These ranges represent changes of roughly 0.14 to 0.29 standard deviations of wages for blacks in Atlanta and of 0.21 to 0.33 standard deviations for blacks in Detroit.

choose to work relatively close to home, without there being 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 lower only 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 non-blacks as well (though the latter effects are smaller and less significant than those for blacks); and the finding in earlier work of a relative lack of compensation for commute times among blacks suggests that this phenomenon 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 in the decennial Censuses, and even this evidence is somewhat mixed. Between 1980 and 1990, the percentages of the metropolitan area's employment and population located in the central city declined in all of the areas in our sample except Los Angeles; and percentage declines in employment were greater than percentage declines in population in the cities of Atlanta and especially Detroit (although in Boston the declines were more comparable).⁵⁰ 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 1980s, thereby contributing to their deteriorating employment and earnings rates during that time.⁵¹

⁵⁰ The declines in employment and population during the decade were roughly 7 and 6 percentage points in Atlanta and 4.5 and 3.5 percentage points in Detroit. In both areas, the fractions of suburban residents commuting into the city for work declined quite substantially (26 percent to 21 in Atlanta and 16 percent to 12 in Detroit), while commuting patterns of central-city residents changed much less, again suggesting that relative distances improved for suburban workers.

⁵¹ 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

Regarding the racial preferences of employers, our findings suggest that they do not fully account for the fact that employers farther 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 controlling for the firm's proximity to the black population and the presence of blacks among applicants.

Racial preferences of employers matter; the percentages of blacks among customers, the presence of blacks who control hiring, and establishment size all are positively related to levels of black employment at firms.

The variety of skill needs on the job also is associated with reduced hiring of blacks. Elsewhere, we have shown that these skill needs have grown in magnitude over time, and that they are associated with higher wages (Holzer 1995). Taken together, these results imply that rising skill needs have also contributed to the relative declines in the employment and earnings of blacks in recent years.

Regarding the policy implications of our findings, by specifying at least two of the mechanisms through which spatial factors affect black employment rates, the results do suggest some particular responses to the mismatch problem. Transportation programs to generate more reverse commuting, whether implemented

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 the central city while employers and white suburbanites both locate farther away. The latter observation parallels the one made by Kasarda (1995) on the growth of "edge cities" in many metropolitan areas.

through mass transit or other approaches such as van pools, may be relatively more effective in raising the 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 near suburban employers, also appear to have some real potential for raising employment rates and earnings among blacks. Our evidence on recruiting methods suggests that efforts to better disseminate information about jobs distant from blacks could have some payoff 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 and 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 of inner-city minorities and government monitoring of their prospective employers is likely to make such programs all the more effective.

Although a more complete appraisal of the costs and benefits of various mobility policies is well beyond the scope of this paper, 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.

References

- Becker, Gary S. 1971. *The Economics of Discrimination*. Chicago: University of Chicago Press.
- Bound, John and Richard Freeman. 1992. "What Went Wrong? The Erosion of Relative Earnings and Employment for Blacks." *Quarterly Journal of Economics*, vol. 107, no. 1, pp. 201-32.
- Cain, Glen. 1986. "The Economic Analysis of Labor Market Discrimination: A Survey." In O. Ashenfelter and R. Layard, eds., *Handbook of Labor Economics*, Amsterdam: North-Holland.
- Card, David and Thomas Lemieux. 1994. "Changing Wage Structure and Black-White Wage Differentials." *The American Economic Review*, vol. 84, no. 2, pp. 29-33.
- Carrington, William, Kristin McCue, and Brooks Pierce. 1995. "On Using Establishment Size to Measure the Impact of Title VII and Affirmative Action." Working Paper No. 347, Johns Hopkins University, June.
- Carrington, William and Kenneth Troske. 1995. "Interfirm Segregation and the Black-White Wage Gap." Working Paper No. 349, Johns Hopkins University, August.
- Cutler, David and Edward Glaeser. 1995. "Are Ghettos Good or Bad?" National Bureau of Economic Research, Working Paper No. 5163.
- Ellwood, David. 1986. "The Spatial Mismatch Hypothesis: Are There Jobs Missing in the Ghetto?" In Richard Freeman and Harry Holzer, eds., *The Black Youth Employment Crisis*. Chicago: University of Chicago Press.
- Ferguson, Ronald. 1993. "New Evidence on the Growing Value of Skill and Consequences for Racial Disparity and Returns to Schooling." Mimeo, Harvard University.
- Fix, Michael and Raymond Struyk. 1994. *Clear and Convincing Evidence*. Washington, D.C.: Urban Institute Press.
- Freeman, Richard. 1977. "Fixed Coefficient and Manpower Analysis of Labor Markets: A Synthesis." In Ronald Ehrenberg, ed., *Research in Labor Economics*, Volume 1. Greenwich, CT: JAI Press.
- Frey, William and Reynolds Farley. 1993. "Latino, Asian, and Black Segregation in Multi-Ethnic Metro Areas: Findings from the 1990 Census." Working Paper No. 93-278, Population Studies Center, University of Michigan.
- Grissmer, David, Sheila Kirby, Mark Berends, and Stephanie Williamson. 1994. "Student Achievement and the Changing American Family." Rand Corporation.
- Holzer, Harry J. 1987. "Informal Job Search and Black Youth Unemployment." *The American Economic Review*, vol. 77, no. 3, pp. 446-52.
- . 1991. "The Spatial Mismatch Hypothesis: What Has the Evidence Shown?" *Urban Studies*, vol. 28, no. 1, pp. 105-22.
- . 1994. "Black Employment Problems: New Evidence, Old Questions." *Journal of Policy Analysis and Management*, vol. 13, no. 4, pp. 699-722.
- . 1995. "Employer Skill Needs and Labor Market Outcomes." Working Paper No. 84, Russell Sage Foundation, December.
- . 1996a. "Employer Hiring Decisions and Antidiscrimination Policy." In Richard Freeman and Peter Gottschalk, eds., *Demand-Side Strategies for Low-Wage Labor Markets*. New York: Russell Sage Foundation.
- . 1996b. *What Employers Want: Job Prospects for Less-Educated Workers*. New York: Russell Sage Foundation.
- Holzer, Harry J., Keith R. Ihlanfeldt, and David J. Sjoquist. 1994. "Work, Search and Travel Among White and Black Youth." *Journal of Urban Economics*, vol. 35, no. 2, pp. 320-45.
- Hughes, Mark and Janice Madden. 1991. "Residential Segregation and the Economic Status of Black Workers: New Evidence for an Old Debate." *Journal of Urban Economics*, vol. 32, no. 1, pp. 28-49.
- Hughes, Mark and Julie Sternberg. 1992. *The New Metropolitan Reality*. Washington, D.C.: Urban Institute.
- Ihlanfeldt, Keith R. 1995. "Information on the Spatial Distribution of Job Opportunities Within Metropolitan Areas." Mimeo, Georgia State University.
- Ihlanfeldt, Keith R. and David J. Sjoquist. 1990. "Job Accessibility and Racial Differences in Youth Employment Rates." *The American Economic Review*, vol. 80, no. 3, pp. 267-76.
- . 1991. "The Effect of Job Access on Black Youth Employment: A Cross-Sectional Analysis." *Urban Studies*, vol. 28, no. 2, pp. 255-65.
- Ihlanfeldt, Keith R. and Madelyn Young. 1996. "The Spatial Distribution of Black Employment between the Central-City and the Suburbs." *Economic Inquiry*, forthcoming.
- Jencks, Christopher and Susan Mayer. 1989. "Residential Segregation, Job Proximity and Black Job Opportunities: The Empirical Status of the Spatial Mismatch Hypothesis." In Michael McGeary and Lawrence Lynn, eds., *Concentrated Urban Poverty in America*. Washington, D.C.: National Academy Press.
- Johnston, John. 1972. *Econometric Methods*, Second Edition. New York: McGraw Hill.
- Juhn, Chinhui, Kevin Murphy, and Brooks Pierce. 1993. "Wage

- Inequality and the Rising Returns to Skill." *Journal of Political Economy*, vol. 101, no. 2, pp. 410-42.
- Kain, John. 1968. "Housing Segregation, Negro Employment and Metropolitan Decentralization." *Quarterly Journal of Economics*, vol. 82, no. 3, pp. 175-97.
- . 1992. "The Spatial Mismatch Hypothesis Three Decades Later." In *Housing Policy Debate: Discrimination in the Housing and Mortgage Markets*. Washington, D.C.: Fannie Mae.
- Kasarda, John. 1995. "Industrial Restructuring and the Consequences of Changing Job Locations." In Reynolds Farley, ed., *State of the Union*. New York: Russell Sage Foundation.
- Kling, Jeffrey. 1995. "High Performance Work Systems and Firm Performance." *Monthly Labor Review*, vol. 18, no. 5, pp. 29-36.
- Leonard, Jonathan. 1987. "The Interaction of Residential Segregation and Employment Discrimination." *Journal of Urban Economics*, vol. 21, no. 4, pp. 323-46.
- . 1990. "The Impact of Affirmative Action Regulation and Equal Opportunity Law on Black Employment." *Journal of Economic Perspectives*, vol. 4, no. 4, pp. 47-63.
- Massey, Douglas and Nancy Denton. 1992. *American Apartheid*. New York: Basic Books.
- Mieskowski, Peter and Edwin Mills. 1992. "The Determinants of Employer Location." Paper Presented at the TRED Conference, Lincoln Institute, October.
- Moss, Philip and Chris Tilly. 1992. "Why Black Men Are Doing Worse in the Labor Market: A Review of Supply-Side and Demand-Side Explanations." New York: Social Science Research Council.
- Nardinelli, Clark and Curtis Simon. 1990. "Customer Racial Discrimination in the Market for Memorabilia: The Case of Baseball." *Quarterly Journal of Economics*, vol. 105, no. 3, pp. 575-96.
- Neal, Derek and William Johnson. 1994. "The Role of Pre-Market Factors in Black-White Wage Differences." Mimeo, University of Chicago.
- O'Neill, June. 1990. "The Role of Human Capital in Earnings Differences Between White and Black Men." *Journal of Economic Perspectives*, vol. 4, no. 4, pp. 25-45.
- O'Regan, Katherine and John Quigley. 1996. "Spatial Effects upon Employment Outcomes: The Case of New Jersey Teenagers." *New England Economic Review*, this issue.
- Rosenbaum, James and Susan Popkin. 1991. "Employment and Earnings of Low-Income Blacks Who Move to Middle-Class Suburbs." In Christopher Jencks and Paul Peterson, eds., *The Urban Underclass*. Washington, D.C.: The Brookings Institution.
- Turner, Marjorie. 1992. "Discrimination in Urban Housing Markets: Lessons from Fair Housing Audits." *Housing Policy Debate*, Washington, D. C.: Fannie Mae.
- Yinger, John. 1995. *Closed Doors, Opportunities Lost*. New York: Russell Sage Foundation.
- Zax, Jeffrey. 1991. "Compensation for Commutes in Labor and Housing Markets." *Journal of Urban Economics*, vol. 30, no. 2, pp. 192-207.