Institute of
Business and
Economic Research

Fisher Center for
Real Estate and
Urban Economics

PROGRAM ON HOUSING AND URBAN POLICY

WORKING PAPER SERIES

WORKING NO. W00-002

CAN BOOSTING MINORITY CAR-OWNERSHIP RATES NARROW INTER-RACIAL EMPLOYMENT GAPS?

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June 2000

This research is supported by a grant from the National Science Foundation, SBR-9709197, a Small Grant from the Joint Center for Poverty Research, and a year 14 UCTC grant.

Abstract

In this paper, we assess whether boosting minority car-ownership rates would narrow inter-racial employment rate differentials. We pursue two empirical strategies. First, we explore whether the effect of auto ownership on the probability of being employed is greater for more segregated groups of workers. Exploiting the fact that African-Americans are considerably more segregated from whites than are Latinos, we estimate car-employment effects for blacks, Latinos, and whites and test whether these effects are largest for more segregated groups. Second, we use data at the level of the metropolitan area to test whether the car-employment effect for blacks relative to that for whites increases with the degree of black relative isolation from employment opportunities. We find the strongest car effects for blacks, followed by Latinos, and then whites. Moreover, this ordering is statistically significant. We also find that the relative car-employment effect for blacks is largest in metropolitan areas where the relative isolation of blacks from employment opportunities is the most severe. Our empirical estimates indicate that raising minority car-ownership rates to the white car ownership rate would eliminate 45 percent of the black-white employment rate differential and 17 percent of the comparable Latinbo-white differential.

1. Introduction

Over the past three decades, considerable effort has been devoted to assessing the importance of spatial mismatch in determining racial and ethnic differences in employment outcomes. The hypothesis posits that persistent racial housing segregation in U.S. metropolitan areas coupled with the spatial decentralization of employment have left black and, to a lesser extent, Latino workers physically isolated from ever-important suburban employment centers.[1] Given the difficulties of reverse-commuting by public transit and the high proportions of blacks and Latinos that do not own cars, this spatial disadvantage literally removes many suburban locations from the opportunity sets of inner-city minority workers.

To the extent that mismatch is important, closing racial and ethnic gaps in employment and earnings requires improving the access of spatially-isolated minority workers to the full set of employment opportunities within regional economies. Improving accessibility can be accomplished through some combination of community development, residential mobility, and transportation programs.[2] Among the latter set of options, a potential tool for enhancing accessibility would be to increase auto access for racial and ethnic minorities. Racial differences in car-ownership rates are large, comparable in magnitude to the black-white difference in home-ownership rates documented by Oliver and Shapiro (1997). Moreover, car-ownership rates for low-skilled workers are quite sensitive to small changes in operating costs (Raphael and Rice 2000), suggesting that moderate

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[1]For recent, thorough reviews of the spatial mismatch literature and, see Ihlanfeldt (1999) and Pugh (1998).

[2]Examples of such programs include the federal Empowerment Zones, the experimental residential mobility program "Moving to Opportunities" (MTO), and the Department of Transportation's "Access to Jobs" programs. For evaluations of the program effects of MTO, see Ludwig (1998) and Katz et. al. (2000). For a description of the Access to Jobs program and evaluation of the initial implementation, see GAO (1999). For an evaluation of the job creation effects of state enterprise zone programs, see Papke (1993).

subsidies may significantly increase auto access for racial and ethnic minorities.

In this paper, we assess whether boosting minority car-ownership rates would narrow inter-racial employment rate differentials. We pursue two empirical strategies. First, we explore whether the effect of auto ownership on the probability of being employed is greater for more spatially isolated groups of workers. The literature on racial housing segregation clearly demonstrates that blacks are highly segregated from the majority white population (Massey and Denton, 1993) and in a manner that spatially isolates blacks from new employment opportunities (Stoll et. al. 2000). Latino households are also segregated, though to a degree considerably less than the level of segregation between blacks and whites (Massey and Denton 1999). If mismatch reduces minority employment probabilities, and if auto-ownership can partially undo this effect, the employment effect of auto ownership should be greatest for the most segregated workers. We test this proposition Using microdata from the Survey of Income and Program Participation (SIPP).

Second, we assess whether the differences in the car-employment effect between black and white workers increases with the severity of spatial mismatch. If spatial mismatch yields a car-employment effect for black workers that is larger than that for white workers, then the black-white difference in the car-employment effect should be larger in metropolitan areas where blacks (relative to whites) are particularly isolated from employment opportunities. We test this proposition using data from several sources. From the 1990 5 % Public Use Micro Data Sample (PUMS),we estimate the black-white difference in the car-employment effect for 242 metropolitan areas in the U.S. Next, we construct corresponding metropolitan-area measures of the relative spatial isolation of black workers from employment opportunities using data from the 1992 Economic Census and zip-code population counts from the 1990 Census of Population and Housing. We then test for a positive relationship between these two metropolitan-area level variables.

We find strong evidence that having access to a car is particularly important for black and Latino workers. We find a difference in employment rates between car-owners and non car-owners that is considerably larger among black workers than among white workers. Moreover, the car-employment effect for Latino workers is significantly greater than the comparable effect for non-Latino white workers yet significantly smaller than the effect for black workers. Finally, the difference between the car-employment effect for black workers and white workers is greatest in metropolitan areas where the relative isolation of black workers is most severe. Our estimates indicate that raising minority car ownership rates to the car ownership rate for whites would narrow the black-white employment rate differential by 45 percent and the comparable Latino-white differential by 17 percent.

2. Urban Mismatch and Auto Access

The proposition that having access to a reliable car provides real advantages in terms of finding and maintaining a job is not controversial. In most U.S. metropolitan areas, one can commute greater distances in shorter time periods and, holding distance constant, reach a fuller set of potential work locations using a privately-owned car rather than public transit.[3] For low-skilled workers, being confined to public transit may seriously worsen employment prospects for a variety

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[3]Stoll (1999) analyzing a sample of adults in Los Angeles and Holzer et. al. (1994) analyzing a national sample of youths show that car owners search greater geographic areas and ultimately travel greater distances to work than do searchers using public transit or alternative means of transportation.

of reasons. Such workers are more likely to work irregular hours[4] while public transit schedules tend to offer more frequent service during traditional morning and afternoon peak commute periods. This incongruity in schedules may result in longer commutes, a relatively high probability of being late, or both.

Moreover, the residential location choices of low-skilled workers are likely to be geographically constrained by zoning restrictions limiting the location and quantity of low-income housing. Such constraints may limit the ability of low-skilled workers to choose residential locations within reasonable public-transit commutes of important employment centers. In light of these considerations, it is not surprising that researchers have found large differences in employment rates between car-owners and non car-owners.[5]

For minority workers, residential location choices are particularly constrained by relatively low incomes and pervasive racial discrimination in housing rental and sales markets (Yinger 1995). Moreover, the existing mismatch literature clearly demonstrates that low- and semi-skilled employment opportunities are scarce in minority neighborhoods relative to the residential concentration of low- and semi-skilled labor (Stoll et. al. 2000). In addition, several authors have demonstrated intra-metropolitan patterns of employment growth that favor non-minority

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[4]Hamermesh (1996) analyzes the likelihood of working irregular hours in the U.S. Both education and age have strong negative effects on the probability of working shifts from 7PM to 10PM and 10PM to 6AM for both men and women. Hence, the young and the less educated are more likely to work non-traditional schedules. Black men are also significantly more likely to work these irregular hours, while for women there is no effect of race.

[5]Holzer et. al. (1994) find that youths with cars experience shorter unemployment spells and earn higher wages than youths without cars. Ong (1996) analyzes a sample of welfare recipient residing in California and finds substantial differences in employment rates and hours worked between those with cars and those without. O'Regan and Quigley (1999) find large car-employment effects for recipients of public aid using data from the 1990 decennial census.

neighborhoods (Mouw forthcoming, Raphael 1998, Stoll and Raphael 2000). Hence, one might argue that having access to a car would be particularly important in determining the employment outcomes of minority workers.[6]

These ideas can be formalized with a simple linear probability model of employment determination. Assume that the categorical variable, E_i, indicating whether individual *i* is employed depends on individual skills, S_i, and one's spatial accessibility to employment locations, A_i. Spatial accessibility is akin to the density of one's employment opportunity set, where accessible employment opportunities are defined as those jobs within a reasonable commute distance from one's residential location. We assume that both accessibility and skills positively affect the probability of being employed according to the linear equation

$$E_i = \alpha_1 A_i + \alpha_2 S_i + \alpha_3 B_i + \varepsilon_i . \tag{1}$$

where ε_i is a mean-zero, randomly distributed disturbance term and B_i is a dummy variable indicating a black worker.

Car ownership (denoted by the indicator variable, C_i) affects the probability of being employed by improving accessibility – i.e., car owners can access a greater proportion of a metropolitan area's labor market than can non-car owners. In terms of the variables in the model, this assumption implies that $E(A\ |B,\ C{=}1) > E(A|B,\ C{=}0)$. For black workers, the expected difference in employment rates between car owners and non-car owners is given by the expression

$$\begin{gathered}\Delta_B = E(E|B=1,C=1) - E(E|B=1,C=0)\\ = \alpha_1[E(A|B=1,C=1) - E(A|B=1,C=0)] +\\ \alpha_2[E(S|B=1,C=1) - E(S|B=1,C=0)]\\ \Delta_B = \alpha_1 \Delta_B^A - \alpha_2 \Delta_B^S\end{gathered} \tag{2}$$

[6]In fact, Holzer et. al. (1994) find larger effects of car-access on unemployment spells for black youth relative to white youth.

where Δ^A_B is substituted for the expected accessibility difference between black car owners and non car-owners and Δ^S_B is substituted for the comparable expected skill differential. The "true" car effect for black workers is given by the first term (the improvement in accessibility multiplied by the marginal effect of accessibility) while the second term provides that portion of the mean difference in employment rates between black car owners and non-car owners due to inherent productivity differences.

As is evident from equation (2), assessing the real effect of car access on the probability of being employed requires statistically distinguishing the portion of the employment rate differential caused by improved accessibility from the portion of the differential reflecting differences in average skill endowments between those with and without cars. One approach to tackling this issue would estimate an adjusted employment difference between car owners and non-car owners holding constant all relevant factors that determine employment and differ systematically across these two groups of workers. Unfortunately, the set of covariates included in most micro-data sources is likely to be incomplete and, hence, such regression-adjusted estimates of the car-employment effect may be biased by the omission of important unobservable factors.[7]

Fortunately, a lower-bound estimate of the car-employment effect for blacks that addresses omitted-variables bias can be computed by comparing the employment rate differential in equation

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[7]A strategy for addressing omitted-variables bias as well as the possibility of reverse causality would be to find exogenous determinants of car-ownership and use these variables as instruments in a 2SLS model of employment determination. Raphael and Rice (2000) pursue this strategy using inter-state variation in gas taxes and average car-insurance premiums as instruments for car ownership. They find car-employment effects that are large, statistically significant, and comparable in magnitude across OLS and 2SLS models. Hence, after adjusting for variables readily available in most microdata sets, there is little evidence of omitted-variables or simultaneity bias in simple OLS estimates of car-employment effects.

(2) to a comparable differential for white workers. Define Δ_w as the employment rate difference between car owners and non-car owners for white workers comparable to the difference for black workers defined above. Subtracting this difference for white workers from that for blacks yields the expression

$$\Delta_B - \Delta_W = \alpha_1(\Delta_B^A - \Delta_W^A) + \alpha_2(\Delta_B^S - \Delta_W^S), \tag{3}$$

where Δ^A_w and Δ^S_w are the expected differences in accessibility and skill endowments between white workers with and without cars. Assuming that the skill differential between car owners and non-car owners is comparable across races (i.e., ,$\Delta^S_B = \Delta^S_w$) the double-difference in equation (3) reduces to

$$\Delta_B - \Delta_W = \alpha_1(\Delta_B^A - \Delta_W^A). \tag{4}$$

This final expression gives the differential effect of cars on the probability of being employed caused by racial differences in the accessibility boost of having access to a car.

Equation (4) is a lower-bound estimate of the car-employment effect for black workers since it differences-away the accessibility improvement realized by white car owners. If we were to assume that the entire employment rate differential between white car owners and white non-car owners was due to unobservable heterogeneity (that is to say, $\Delta^A_w = 0$, $\Delta^S_w > 0$), then equation (4) provides an accurate estimate of the black car-employment effect. This, however, is unlikely. For reasons discussed above, even the residents of jobs-rich suburban communities are likely to benefit from access to a car. Morever, instrumenting for car-ownership in linear employment probability models estimated on representative samples of the U.S. working-age population yields positive significant estimates of the car-employment effect that are comparable to simple regression-adjusted car effect estimates (Raphael and Rice 2000). This suggests that on average, cars exert positive causal effects on the probability of being employed. Nonetheless, using lower bound estimates of the car-employment effect for blacks should partially mitigate concerns about omitted variables bias.

The quantity in equation (4) will be greater than zero if two conditions are satisfied. First, accessibility must matter (i.e., $\alpha_1 > 0$). Otherwise, there would be no employment benefit to car-ownership. Second, the accessibility benefits of owning a car must be greater for blacks than for whites -- i.e, $\Delta^A_B > \Delta^A_w$. This latter condition may fail to hold for several reasons. First, blacks may be no more spatially isolated from employment opportunities than are whites, and hence, there would be no differential benefit associated with having access to a car -- i.e., spatial mismatch is not an important contributor to black-white inequality. Alternatively, the spatial isolation of blacks may be so extreme that even having access to a car does not in any way neutralize the deleterious employment consequences of mismatch. If this were the case, there may still be some benefit to car-access for both black and white workers, but there would be no differential improvement in accessibility for black workers. Hence, testing for a positive double-difference estimate as described by equation (4) provides a rather strict test of the mismatch hypothesis.

The simple double-difference framework outlined in equations (1) through (4) form the basis for the empirical tests that we implement below. We now turn to making these arguments operational, outlining specific hypotheses, and assessing the relative contributions of mismatch and differences in car ownership rates to the inter-racial employment rate differential.

3. Empirical Strategy and Data Description

The arguments presented in the previous section posit that the effect of auto access on the probability of being employed should be larger for more spatially isolated workers. Here, we outline two specific empirical strategies designed to assess this proposition. Our first strategy exploits the differences in the extent of segregation between backs and whites and between Latinos and whites. Both blacks and Latinos are residentially segregated from the majority non-Latino white population. In addition, the intra-metropolitan patterns of segregation are similar, with both Latinos and blacks more likely to reside in older inner-city and inner-ring suburban communities. However, conventional segregation indices show that blacks are much more segregated, and in turn, spatially isolated from high-growth suburban employment centers, than are Latinos. Hence, if car-ownership partially neutralizes the adverse employment effects of being spatial isolated, we would expect the largest employment differentials between those with and without cars for black workers, the next largest differential for Latinos, and the smallest differential for non-Latino white workers.

We estimate the double-difference car effect in equation (4) using a black-white comparison, a black-Latino comparison, and a Latino-white comparison.[8] The simplest test of the mismatch hypothesis would be the test of whether the black-white double-difference estimate is positive and statistically significant. The more stringent test of the mismatch hypothesis would be to test for positive significant double-difference estimates in the black-white and Latino-white comparisons, as well as a positive significant effect in the black-Latino comparison. Affirmative findings in all three comparisons would suggest that the ordering of the car-employment effects is statistically significant.

To be sure, the key assumption identifying equation (4) (that the skill differentials between

[8]In all models, we define exclusive racial/ethnic categories – i.e., non-Latino black, non-Latino white, and Latino.

car-owners and non-car owners are equal across race and ethnicity) is strong. While we feel that there are no reasons a priori to suspect that these skill differentials vary across racial and ethnic groups,[9] if the assumption is violated the double-difference estimate in equation (4) may not be fully purged of the effects of skills. For example, if the skill differentials between car owners and non-car owners are larger for blacks than for whites, the estimate of the differential car effect would be biased upward, since not all of the difference in skills is differenced-away. Alternatively, the skill differential between car owners and non-car owners may be larger for whites than for blacks. In this scenario, the double-difference in equation (4) would "over-adjust" for skill differentials and underestimate the differential boost that blacks receive from car ownership above and beyond the effect on white employment rates.

One way to partially address this concern would be to estimate a regression-adjusted double-difference estimate that holds constant those human capital and demographic characteristics that are observable. For the black-white comparison, an adjusted double-difference comparable to that in equation (4) comes from estimating the equation

$$E_i = \beta_0 + \beta_1 B_i + \beta_2 C_i + \beta_3 C_i * B_i + \delta X_i + \nu_i, \qquad (5)$$

where all observable determinants are included in the vector X_i, and the adjusted double-difference is given by the coefficient β_3 on the interaction term between the indicator variables for car owners and black workers. This coefficient measures the extent to which the car-employment effect for

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[9]In fact, tabulations from the 1992 and 1993 SIPP indicate that the average difference in educational attainment and age between those with and without cars is slightly larger for whites than for blacks (by one-tenth of a year for educational attainment and approximately half a year for age).

blacks exceeds that for whites. Holding constant all observable variables, the identification assumption reduces to assuming comparable differentials across racial and ethnic groups in unobserved skills between those with and without cars. Below, we present estimates of both the unadjusted double-difference in equation (4) and the adjusted double-difference estimate in equation (5).

We estimate equations (4) and (5) using microdata from the fourth waves of the 1992 and 1993 Survey of Income and Program Participation (SIPP). These surveys provide large nationally representative samples that include standard labor force participation, demographic, and human capital variables. In addition, the fourth wave topical modules of the SIPP collect information on up to three cars per household, including the age of the automobile, the financing status, and the person identifier of the car owner within the household. We use this latter variable to explicitly identify individuals that own a car rather than individuals residing in a household where someone owns a car. We restrict the sample to civilians, 16 to 65 years of age, with no work-preventing disabilities. In addition, we further restrict the sample to individuals that are either white, black, or Latino. Given that the survey collects complete information on all household automobiles only for those households with 3 or fewer cars, we restrict the sample throughout to individuals residing in such households. After taking into account the other sample restrictions, this restriction eliminates approximately 6 percent of the observations.

Table 1 presents car ownership rates for whites, blacks, and Latinos calculated from the combined 1992 and1993 SIPP samples.[10] The table presents figures for the three racial/ethnic groups

[10]Since the data are drawn from the fourth waves of each panel, the figures correspond to the years 1993 for the 1992 panel and 1994 for the 1993 panel.

Table 1
Car-Ownership Rates by Race/Ethnicity, Educational Attainment, and Age 1993/1994

	White	Black	Latino
All	0.757 (0.002)	0.468 (0.007)	0.522 (0.007)
Educational Attainment			
Less than 12 years	0.507 (0.007)	0.284 (0.014)	0.435 (0.012)
12 years	0.767 (0.004)	0.455 (0.011)	0.520 (0.013)
13 to 15 years	0.773 (0.004)	0.526 (0.015)	0.611 (0.018)
16 years	0.823 (0.005)	0.700 (0.023)	0.714 (0.029)
More than 16 years	0.873 (0.005)	0.740 (0.027)	0.746 (0.036)
Age			
16-19	0.143 (0.006)	0.036 (0.007)	0.088 (0.012)
20-24	0.522 (0.008)	0.206 (0.017)	0.330 (0.019)
25-34	0.803 (0.004)	0.489 (0.014)	0.589 (0.014)
35-44	0.870 (0.004)	0.612 (0.014)	0.693 (0.014)
45-54	0.891 (0.004)	0.679 (0.018)	0.685 (0.020)
55-65	0.874 (0.005)	0.705 (0.021)	0.638 (0.026)

Standard errors are in parentheses. The sample combines the fourth wave of the 1992 and 1994 Survey of Income and Program Participation.

overall and for the three groups stratified by educational attainment and age. As is evident, there are large and statistically significant inter-racial and inter-ethnic differences in car ownership rates. For all whites in our sample, 76 percent own cars, compared with 47 percent of blacks, and 52 percent of Latinos. Moreover, within educational attainment categories whites have higher (and statistically distinguishable) car ownership rates than do blacks and Latinos. For example, 51 percent of whites with less than 12 years of education own cars, compared with 28 percent of blacks and 44 percent of Latinos with comparable educations. Similarly, among individuals with 16 plus years of schooling, 87 percent of whites, 71 percent of blacks, and 64 percent of Latinos own cars.

The largest racial/ethnic differences in car ownership rates occur for the relatively young workers in our sample. For example, the black/white difference in car ownership rates are approximately 11 percent for those 16 to 19 years of age, 31 percent for those 20 to 24, and 31 percent for those 25 to 34. The Latino/white differences for these age groups are also large, though smaller than the differences between blacks and whites. Hence, to the extent that owning a car has real employment effects, the large differences evident in Table 1 indicate that closing these gaps may narrow inter-racial employment differentials.

Our first empirical strategy infers differential spatial isolation by assuming that segregation from whites and being spatially-isolated from employment opportunities are synonymous. Based on this indirect inference, we then test for an interaction between the car-employment effect and mismatch by comparing the car effects for groups that differ with respect to their degree of residential segregation. An alternative approach would directly measure the degree of spatial isolation from employment and test for a positive relationship between empirically observed car effects and the direct measure of mismatch. Our second empirical strategy takes this form.

Specifically, for the black-white comparisons only,[11] we estimate the adjusted double-difference car effect (equation 5) separately for 242 U.S. Primary Metropolitan Statistical Areas (PMSAs) using data from the 5% Public Use Microdata Sample (PUMS) of the 1990 Census of Population and Housing. We restrict the PUMS sample to civilian black and white observations that are 16 to 65 years of age with no work-preventing disabilities. Unlike the SIPP, the census only identifies whether someone in the household owns a car. Hence, our estimates of the car effects using the PUMS are based on this less precise household level measure of auto-access. This PMSA-level measure of the double-difference car effect is now our dependent variable.

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[11]For this strategy we focus on the black-white comparisons only due to the fact that in many PMSAs, the numbers of Latino observations are prohibitively small.

Next, we construct race-specific, PMSA-level measures of spatial isolation from employment opportunities. Using zip-code level, place-of-work employment data from the 1992 Economic Census and zip-code population counts from the 1990 Census Summary Tape Files 3B, we construct MSA-level indices by race that measure the imbalance between residential distributions and employment distributions. Specifically, we estimate jobs/people dissimilarity indices for four employment measures.[12] The dissimilarity index ranges from zero to one and can be interpreted as the proportion of people (or jobs) that would have to move to yield a perfectly even distribution of persons and jobs across zip codes within the metropolitan area. For example, our dissimilarity index between blacks and retail jobs in Chicago is 0.74, while the comparable dissimilarity index for whites is 0.28. These figures indicate that 74 percent of blacks and 28 percent of whites would have to move (across zip codes) to be spatially distributed in perfect proportion with the spatial distribution of retail employment.

We construct jobs/people dissimilarity indices for blacks and whites separately using four separate zip-code level measures of employment: the 1992 levels of retail employment, the 1992 levels of service employment, new retail jobs added between 1987 and 1992, and new service jobs added between 1987 and 1992.[13] For each employment measure, we subtract the white/jobs dissimilarity index from the black/jobs dissimilarity index to arrive at a PMSA-level measure of the

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[12]Define $Black_i$ as the black population residing in zip-code i, $Employment_i$ as the number of jobs located in zip-code i, *Black* as the total black population in the metropolitan area, and *Employment* as the total number of jobs in the metropolitan area. The dissimilarity score between blacks and jobs is calculated using the equation, $D = \sum|Black_i/Black - Employment_i/Employment|$, where the summation is over all zip-codes in the metropolitan area.

[13]We set net new jobs to zero in zip-codes experiencing net employment losses. This tends to overstate the economic health of predominantly black zip-codes, since blacks are more likely to reside in zip-codes with net job loss than are whites.

isolation of blacks from employment opportunities *relative* to the spatial isolation of whites. This is our key explanatory variable. If mismatch is important, and if having a car partially undoes the consequences of mismatch, then the relative employment effect of car-access for blacks should be largest in those metropolitan areas where blacks are most isolated (relative to whites) from employment opportunities.

Table 2 presents weighted averages of our jobs/people dissimilarity indices for 242 PMSAs.[14] All four measure indicate that blacks are more segregated from employment opportunities than are whites. Moreover, the black-white differences in the dissimilarity indices are highly statistically significant in all cases. Comparisons of individual cities indicates that, for the most part, the jobs/people dissimilarity indices are uniformly higher for blacks than they are for whites. Table A1 presents such comparisons for the twenty metropolitan areas with the largest black populations in 1990 (accounting for roughly 60 percent of the black metropolitan population in this year). In all comparisons, black dissimilarity indices exceed white dissimilarity indices. For all 242 PMSAs, the overwhelming majority of comparisons indicate that black dissimilarity indices exceed white dissimilarity indices.[15] Hence, these figures suggest strongly that African-American in the United States have near uniformly inferior access to jobs relative to whites. What remains to be seen is

[14]We cannot calculate dissimilarity indices for the full 272 PMSAs identified in the 5 percent PUMS due to differences in geography between the Economic Census and Census of Population and Housing. The thirty metropolitan areas that we are missing are generally smaller areas with relatively small black populations. The figures presented in Table 4 are weighted by the black populations of the MSAs. Hence, these figures indicate the isolation experienced by the typical black resident in these 242 PMSAs relative to whites.

[15]White dissimilarity indices are larger than black indices for 30 retail level comparisons, 22 retail growth comparisons, 51 service level comparisons, and 37 service growth comparisons. All PMSAs where black indices exceed comparable values for whites are small metropolitan areas with small black populations.

Table 2
Mean Dissimilarity Scores Measuring Segregation Between Population and Employment Opportunities for Metropolitan Areas Identified in the 1990 PUMS

	Blacks/Jobs Indices	Whites/Jobs Indices	Difference (Black-White)
Retail Dissimilarity Indices			
Levels, 1992	0.59 (0.007)	0.31 (0.003)	0.28 (0.008)
Net Growth, 1987 to 1992	0.81 (0.006)	0.63 (0.006)	0.18 (0.005)
Service Dissimilarity Indices			
Levels, 1992	0.62 (0.008)	0.42 (0.004)	0.21 (0.008)
Net Growth, 1987 to 1992	0.75 (0.007)	0.57 (0.005)	0.18 (0.006)

Standard errors are in parentheses. Each figure is the mean for the 242 PMSAs for which we were able to calculate double-difference car effects. The figures are weighted by the number of black observations observed in each PMSA. The levels dissimilarity index is calculated using zip-code level information on the number of jobs located in the zip-code in 1992 and the number of people of the relevant race residing in the zip-code in 1990. The net growth indices uses net job growth between 1987 and 1992, setting growth to zero for zip codes that lose employment over this time period. Information on population vby zip code comes from the 1990 Census of Population and Housing Summary Tape Files 3b. Information on job counts by zip codes comes from the Economic Census for 1987 and 1992.

whether the benefits of auto access for blacks is largest in metropolitan areas where relative isolation is the greatest.

4. Empirical Results

A. Inter-Group Comparisons of the Car-Employment Effect

Table 3 presents employment rate tabulations using data from the two SIPP surveys. The table provides employment rates by race and ethnicity for all individuals in each sub-group, employment rates for those with and without cars, and the difference in employment rates between car owners and non-car owners. Starting with employment rates in the first row by race and

Table 3
Employment Rates by Race/Ethnicity and Car-Ownership States and the Unadjusted Double-Difference Estimates

	White	Black	Latino	$\Delta^2_{Black\text{-}White}$	$\Delta^2_{Black\text{-}Latino}$	$\Delta^2_{Latino\text{-}White}$
All	0.746 (0.002)	0.631 (0.007)	0.619 (0.007)	-	-	-
With Car	0.800 (0.002)	0.833 (0.008)	0.765 (0.009)	-	-	-
Without Car	0.580 (0.005)	0.453 (0.010)	0.460 (0.011)	-	-	-
Difference	0.220 (0.005)	0.380 (0.013)	0.305 (0.014)	0.160 (0.013)	0.075 (0.019)	0.085 (0.013)

Standard errors are in parentheses. The data come from combining the fourth waves of the 1992 and 1994 Survey of Income and Program Participation.

ethnicity, blacks and Latinos have considerably lower employment rates than whites. The overall white employment rate exceeds the black employment rate by approximately 11 percentage points and exceeds the Latino employment rate by roughly 13 percent. These differences, however, are either non-existent or much smaller among workers with cars. Blacks with cars actually have a higher employment rate (0.833) than whites with cars (0.800) while Latinos with cars have a slightly lower employment rate (0.765) than both blacks and whites. For those who do not own cars, the racial and ethnic employment rate differentials are quite pronounced. Specifically, among workers without cars, the white employment rate exceeds the blacks employment rate by nearly 13 percentage points and the Latino employment rate by 12 percentage points.

These patterns translate into larger car-employment effects for blacks and Latinos than for whites. The bottom row of the table (corresponding to the first three columns) presents unadjusted, group-specific estimates of the car-employment effect. The difference in employment rates between those with and without cars is 22 percentage points for whites, 38 percentage points for blacks, and 31 percentage points for Latinos. Recall, the spatial mismatch hypothesis predicts that the effect of car access should be largest for those workers who are most isolated from employment opportunities. To the extent that segregation from whites proxies for spatial isolation, the patterns evident in Table 3 confirm this prediction.

To test whether these differences in the car-employment effect are statistically significant, the last three columns of Table 3 present calculations of three unadjusted double-difference estimates (corresponding to equation (4) of the previous section) and the accompanying standard errors. The first double-difference subtracts the white car effect from the black car effect, the second subtracts the Latino car effect from the black car effect, while the final estimate subtracts the white car effect from the Latino car effect. All three double-difference estimates are positive and highly significant. Hence, the larger car-employment effect for blacks is statistically distinguishable from the Latino and white employment effects and the larger Latino car effect is statistically distinguishable from the white car-employment effect.

To be sure, the figures and double-difference estimates presented in Table 3 do not adjust for differences in skills and other characteristics that affect labor market outcomes and that may differ inter-racially and between those with and without cars. To account for this possibility, Table 4 presents regression-adjusted estimates of the differential car effects comparable to the specification in Equation (5). For the three comparisons (black/white, black/Latino, and Latino/white), we estimate two linear-probability employment models. The first specification controls only for race/ethnicity, having access to a car, and the interaction between these two dummy variables. The coefficient on the interaction term is the unadjusted double-difference estimate and corresponds directly to the calculations presented in Table 3. The next specification adds controls for several variables available in the SIPP including age, gender, educational attainment, marital status, whether the individual is enrolled in school, and whether there is an infant present in the household. The model also includes 90 dummy variables for state groups, hence adjusting for any differences in the state economy that might affect employment probabilities.[16]

The first two regressions present results for the black/white comparisons, the next two regressions present results for the black/Latino models, while the final two regressions present results for the Latino/white comparisons. The results indicate that controlling for observable characteristics

[16]For each year of the SIPP, we created 45 state dummy variables. We cannot create dummy variables for the full 50 states due to the fact that the SIPP aggregates some states with small populations into larger groups.

Table 4
Linear Probability Employment Models that Provide the Regression-Adjusted Double-Difference Estimates of the Effects of Car Ownership on Minority Employment Prospects

	Black-White Comparisons		Black-Latino Comparisons		Latino-White Comparisons	
	(1)	(2)	(3)	(4)	(5)	(6)
Black[a] (Latino)	-0.127 (0.004)	-0.147 (0.009)	-0.007 (0.013)	-0.049 (0.014)	-0.120 (0.009)	-0.088 (0.010)
Car	0.219 (0.005)	0.134 (0.005)	0.305 (0.013)	0.188 (0.014)	0.219 (0.005)	0.136 (0.006)
Black*Car[a] (Latino*Car)	0.160 (0.013)	0.179 (0.013)	0.075 (0.019)	0.077 (0.018)	0.085 (0.013)	0.090 (0.012)
Female	-	-0.115 (0.004)	-	-0.141 (0.009)	-	-0.133 (0.004)
Married	-	-0.061 (0.005)	-	-0.027 (0.011)	-	-0.059 (0.004)
Years of Schooling	-	0.018 (0.001)	-	0.023 (0.002)	-	0.018 (0.001)
Age	-	0.042 (0.001)	-	0.039 (0.002)	-	0.041 (0.001)
Age^2	-	-0.0005 (0.0000)	-	-0.0005 (0.0000)	-	-0.0005 (0.0000)
Infant	-	-0.106 (0.007)	-	-0.093 (0.013)	-	-0.109 (0.007)
In School	-	-0.170 (0.007)	-	-0.194 (0.015)	-	-0.174 (0.007)
R^2	0.072	0.196	0.128	0.251	0.063	0.191
N	40,847	40,847	9,301	9,301	40,580	40,580

Standard errors are in parentheses. The models including the control variables in columns (2), (4), and (6) also include 90 state dummy variables accounting for the 45 state groupings provided in the SIPP for the two separate years of the sample.
a. For the Latino-White comparisons, the label in parentheses applies.

does not affect the size of the inter-racial/ethnic estimates of the relative car effects. In the black/white comparisons, adjusting for observable characteristics yields a slight increase in the relative car effect from 0.160 to 0.179. Similarly, in the black/Latino and Latino/white models, adjusting the models leads to slight increases in the relative car effects. Notably, the base car effect declines considerably (for example, from 0.219 to 0.134 in the black/white comparisons), indicating that a significant portion of the overall employment rate differential between car owners and non-car owners is explained by differences in observable human capital variables. The fact that the relative car effects (the coefficients on the interaction terms) are not affected, however, suggests that the relatively large effects for blacks and Latinos are not driven by differential selection biases by race and ethnicity.

The results in Tables 3 and 4 combined with the figures on car-ownership rates in Table 1 can be used to estimate the proportion of the black-white and Latino-white employment rate differentials that would be eliminated by raising minority car-ownership rates up to that for whites. We start by making the conservative assumption that the entire base car effect in regressions (2) and (6) captures unobserved skill differentials between car owners and non-car owners (and by extension, that there is no employment effect of car ownership for whites). Under this assumption, the differential effects for blacks and Latinos present lower bound estimates of the impact of car ownership on the probability of being employed for members of these groups. Hence, multiplying the difference in car ownership rates between blacks and whites by the differential effect of car ownership provides a lower bound estimate of the effect on black employment rates of eliminating the racial gap in car ownership rates.

The figures in Table 3 indicate a black/white employment rate differential of 11.5 percentage points and a Latino/white differential of 12.7 percentage points. Assuming that having access to a car increases the probability of being employment for blacks by 0.179 (estimate from regression (2)), eliminating the approximate 30 percentage point black/white difference in car ownership rates would narrow the black/white employment rate gap by 5.2 percentage points. This equals nearly 45 percent of the black/white employment rate differential. A similar calculation indicates that eliminating the Latino/white difference in car-ownership rates would close the Latino/white employment rate differential by 2.1 percentage points. This amounts to 17 percent of the Latino/white differential observed for the sample.

The results in Tables 3 and 4 indicate that the low car-ownership rates of blacks and Latinos explain a fair portion of the black/white and Latino/white employment rate differentials. Moreover, the results presented here provide support for the hypothesis that auto access matters considerably more for workers that are more physically isolated from employment opportunities. In these tests, we draw indirect inferences about the interactions between mismatch and the effect of auto access based on the assumption that being residentially segregated from whites is equivalent to being spatially isolated from employment opportunities. We now turn to a direct test of the relationship between relative car effects and spatial mismatch.

B. Cross-Metropolitan Area Evidence

Here we present the results from our cross-metropolitan area analysis using data from the 1990 5% PUMS and the 1992 Economic Census. Recall, the analysis here focuses exclusively on the black/white relative car effect due to the small number of Latino observations in many metropolitan areas. We begin by describing the model we use to estimate the PMSA-specific relative effects. Appendix Table A2 provides regression results for two linear employment probability models using the entire 5% PUMS. We restrict our sample to black and white survey respondents 16 to 65 years of age with no work preventing-disabilities. The models estimated are quite similar to the model specifications estimated with the SIPP data in Table 4, with a few notable exceptions. First, it is impossible to identify the exact owners of automobiles in the Census. Hence, our proxy for auto access is coded to one if someone in the household owns a car. Second, our specification of the effect of education is slightly different due to the categorical nature of the educational attainment variable in the PUMS.[17] Again, we first present estimation results with a black indicator, a car access indicator, and the interactions between the two. We then add the other covariates to the specification.

The results in Appendix Table A1 using the full national sample correspond closely with the results using the SIPP sample. Access to a car has a much larger effect for blacks than for whites. Moreover, adjusting for observable covariates does not appreciably alter the size of the relative car effect. One difference from the SIPP results, however, concerns magnitude. While in the SIPP data we find a differential car employment effect for blacks of approximately 18 percentage points, we find a 10 percentage point differential effect using the PUMS sample. We attribute this disparity to the difference in the way auto access is measured with the two samples. Surely, identifying the actual owner of the car is a more precise measure of auto access than the household counterpart.

We estimate the second specification separately for each of 242 PMSAs. The PMSA-specific coefficients on the interaction term between the black indicator variable and car access dummy from these regressions provides our dependent variable. Our principal tests entail bivariate regressions

[17]Two minor differences in the PUMS specifications include the fact that we do not control for the presence of an infant in the household and that we add an indicator variable indicating a work-limiting disability.

of the PMSA-level relative car effects on the PMSA-level black-white differences in the four jobs/people segregation indices described above. Figures 1 and 2 present the results from these bivariate regressions. Figures 1A and 1B present scatter plots of the double-difference car effects against the black-white differences in the retail employment level indices and the retail employment growth indices, respectively. Figures 2A and 2B provide similar scatter plots using the black-white differences in the service level and service growth dissimilarity indices.

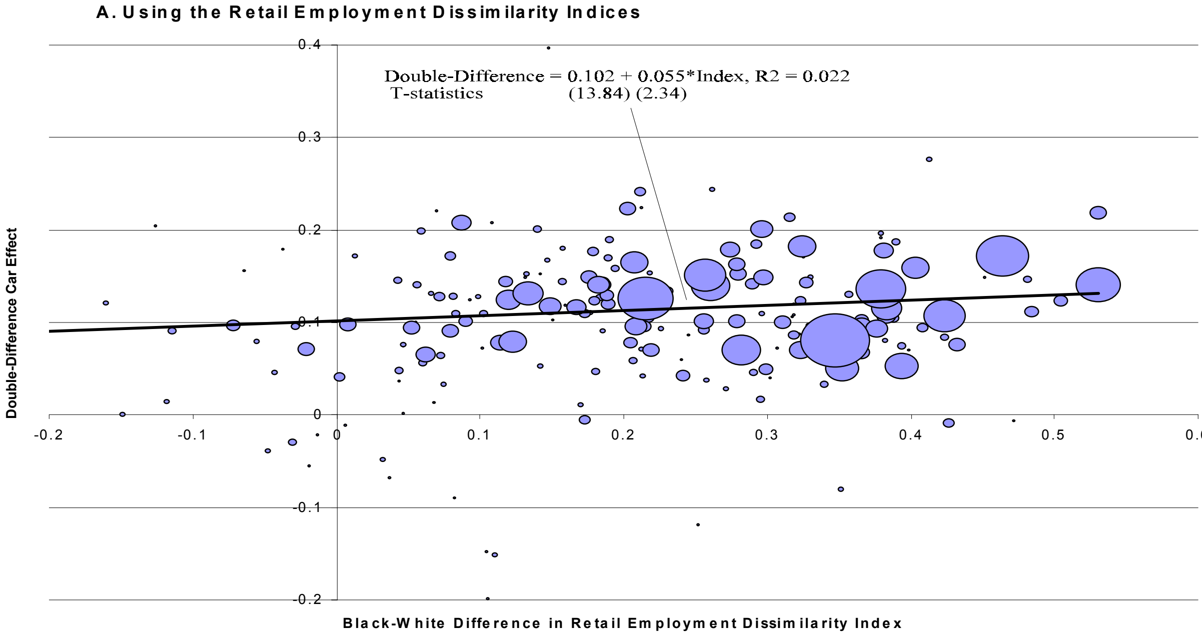
In each scatter plot we include the regression line as well as the coefficient estimates and R^2 from a weighted regression of the double-difference car effects on the differences in dissimilarity indices.[18] We weight each regression by the number of black observations for the PMSA used to compute the double-difference estimate.[19] The relative weight placed on each observation is indicated by the size of the bubble in the scatter plot.

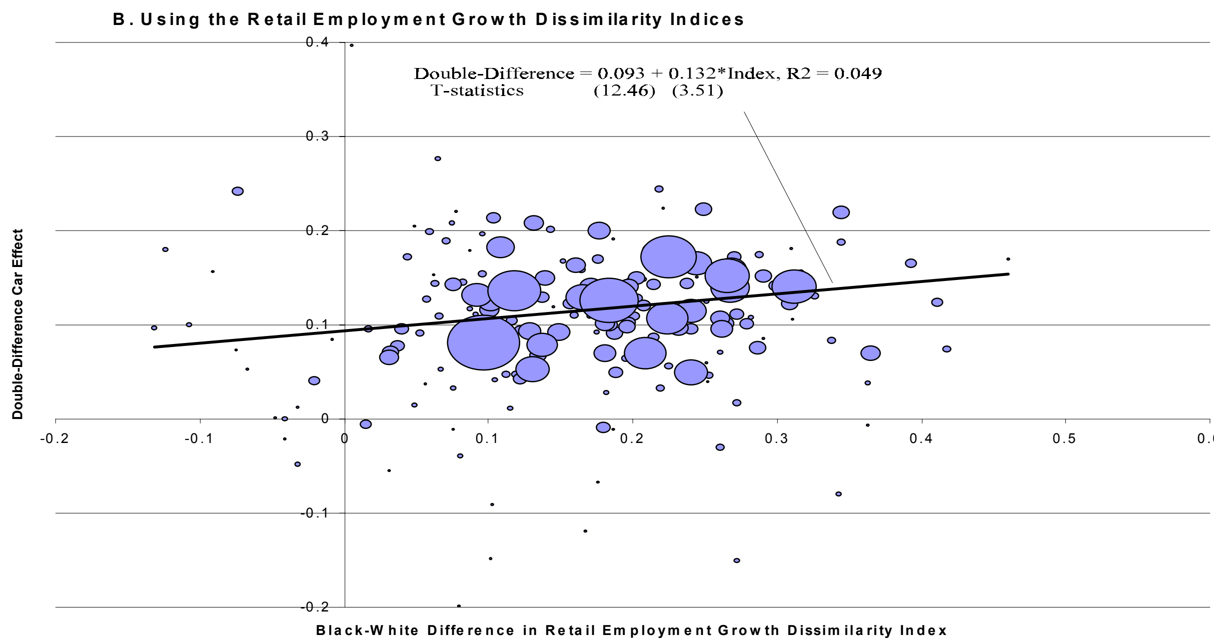
Before discussing the regression results, we should highlight a few notable aspects of the distributions of the explanatory and dependent variables that are revealed in the scatter plots. First, in all four figures, the mass of the distribution of observations lies to the right of the vertical axis, thus indicating that in nearly all metropolitan area (with the exception of a hand full) the blacks/jobs

[18]We also ran regressions of the double-difference car effect on the ratio of the black-to-white jobs/people dissimilarity indices. This specification yields nearly identical results to those in the figures. In addition, we estimated models where the black and white dissimilarity indices were entered separately rather than as differences. Using these alternative models, we tested the implicit parameter restriction of the difference model that the coefficient on the white/jobs dissimilarity index is equal to the negative of the coefficient on the black/jobs dissimilarity index. In all four models we failed to reject this restriction, thus, supporting the specification depicted in Figures 1 and 2.

[19]We also estimated the models in Figures 1 and 2 not weighting the data. This uniformly leads to larger and more statistically significant coefficient estimates.

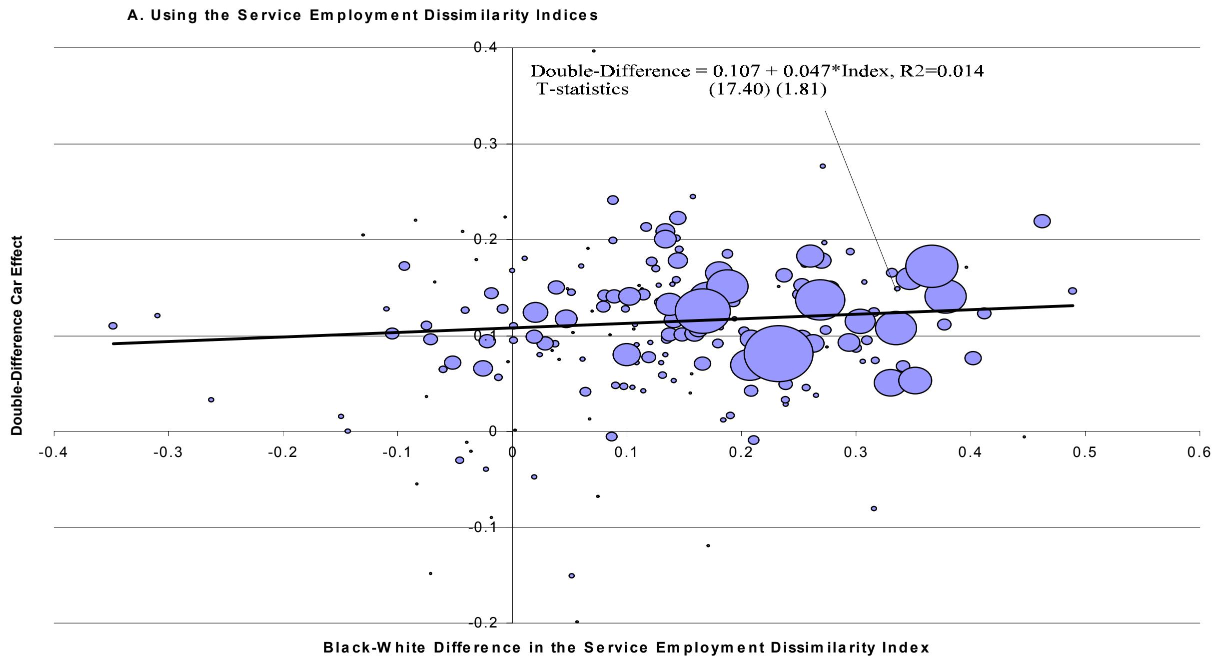
Figure 1: Scatter Plots of the Double-Difference Car Effects Against Black-White Differences in the Retail Dissimilarity Indices

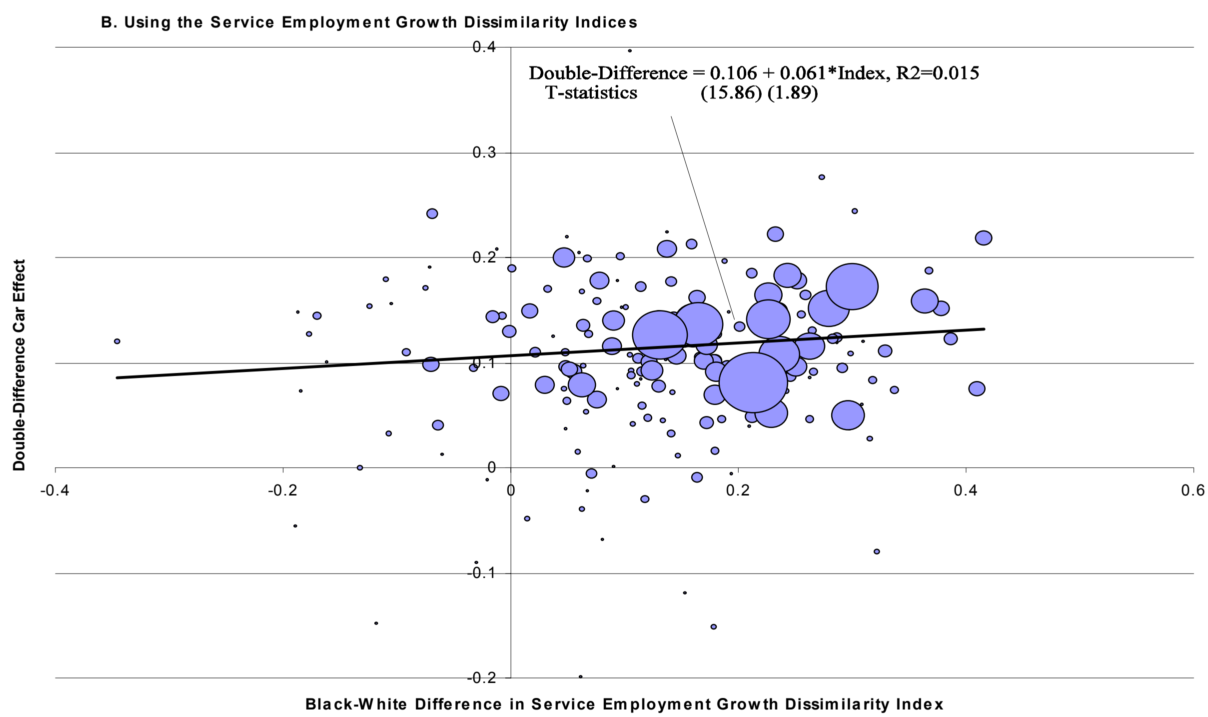




Notes: The size of the bubbles are proportional to the number of black observations used to compute the double-difference car effects. The depicted regression lines are weighted by the number of black observations per PMSA.

Figure 2: Scatter Plots of the Double-Difference Car Effects Against Black-White Differences in the Service Dissimilarity Indices





Notes: The size of the bubbles are proportional to the number of black observations used to compute the double-difference car effects. The depicted regression lines are weighted by the number of black observations per PMSA.

dissimilarity indices exceed the whites/jobs dissimilarity indices. Moreover, for those metropolitan areas where the reverse is true (leading to negative black-white differences in the dissimilarity indices) black populations are quite small (as is evident from the small bubbles used to mark the observations). Hence, the basic plots in Figures 1 and 2 demonstrate, in an alternative manner, the nearly uniform inferior access of blacks to employment opportunities relative to the accessibility enjoyed by whites.

Concerning the distribution of the dependent variable, the mass of observations lies above the horizontal axis. This indicates that in all but a few metropolitan areas, the effect of car ownership on the employment rates of blacks exceeds the comparable effects for whites. Moreover, the size of the bubble plots where the reverse is true (white car effects are larger than black car effects yielding adjusted double-differences that lie below the horizontal axis) is generally small. This has two implications. First, in those cities where we observe larger car effects for whites, there are few black observations, thus yielding imprecise estimates of the double-difference car effect. Hence, the smaller car effects for blacks in these instances may be attributable entirely to measurement error. Second, given the small number of PMSAs lying below the horizontal axis and the small numbers of black survey respondents accounted for by these observations, the figures indicate that the overwhelming majority of blacks residing in metropolitan areas live in regions where owning a car matters more for blacks than for whites (as measured by our adjusted double-differences).

In Figures 1A and 1B, there are clear positive relationships between the PMSA-level relative car effects and the relative isolation of blacks from retail employment opportunities. The coefficient on the difference in dissimilarity indices is positive and significant for both the retail levels indices (p-value of 0.019) and the retail growth indices (p-value of 0.005). In Figures 2A and 2b, we also observe a statistically significant positive relationship between the relative car effects and differences in the service employment dissimilarity indices, though the relationships are a bit weaker than those for the retail indices (the difference in the service level indices is significant at the7 percent level of confidence while the difference in the service growth indices is significant at the 6 percent level of confidence). Hence, these simple bivariate relationship indicate a clear positive relationship between the relatively large car-employment effects for blacks and the degree of relative spatial isolation from employment opportunities.

One might argue that the bivariate regressions presented in Figures 1 and 2 do not control for possible selection across metropolitan areas along personal and human capital characteristics that may be driving these significant relationships. However, the double-differences used as the dependent variable are already purged of the effect of educational attainment, age, and the other covariates listed in Appendix Table 2A, as well as any inter-PMSA sorting that is occurring among white workers.[20] Moreover, since the regressions used to generate the dependent variable where estimated separately for each metropolitan area, the relative car effect estimates have also been purged of any possible differences in the returns to observable covariates (in terms of the marginal effects on employment probabilities) that may vary across PMSAs. For these reasons, we feel that the bivariate regressions presented in the figures are not being driven by systematic variation across PMSAs in relative skill differentials or difference in some other relevant personal characteristics.

Nonetheless, there still may be omitted metropolitan area characteristics that coincide with

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[20]Recall, our dependent variable measures the *differential* car effect for blacks after eliminating the base car effect for whites.

racial differences in spatial isolation from employment. For example, the quality of public transit may vary from area to area or the total area covered by the PMSA may vary. While we do not have extensive controls and PMSA level characteristics, we do have a few measures that we add to the specifications of the models in Figures 1 and 2. Table 5 presents weighted regression results where the dependent variable is the PMSA-level adjusted double-difference. For each dissimilarity index we estimate two specifications: the first controlling for the racial difference in dissimilarity scores only, and the second adding the proportion of PMSA workers that commute to work by private auto (calculated from our 5% PUMS sample), and the total land area of the PMSA.[21] The first eight models present separate regressions for the four dissimilarity indices while the final two models control for all of the dissimilarity scores in the same specification.

With the exception of the two regressions for the black-white difference in retail growth dissimilarity scores, adding these two variables to the specification increases the point estimates of the effect of relative black spatial isolation on the relative employment effect of owning a car. In the models that add the two additional variables to the specification, the relative isolation measures exert positive statistically significant (at the one percent level) effects in all four specifications. Hence, the bivariate results survive (and in three of the four cases, are strengthened by) adding additional covariates to the models. Controlling for all four dissimilarity scores at the same time yields rather imprecise point estimates. This is not too surprising considering that the four measures are highly

[21]We also experimented with controlling for average population density and differences in mean travel times between blacks and whites. Including these variables did not alter the effect of the spatial isolation variable on the relative car effects. We also estimated models interacting the racial difference in dissimilarity indices with the proportion commuting by private auto and the total land area. The interaction terms were not significant in any of the regressions.

Table 5
Regression of the Adjusted Double-Difference Car Effect on the Black-White Differences in the Dissimilarity Indices Measuring Segregation Between Population and Employment Opportunities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Retail Dissimilarity Indices										
Black-White Difference in 1992 Levels	0.055 (0.023)	0.081 (0.024)	-	-	-	-	-	-	0.061 (0.056)	0.129 (0.058)
Black-White Difference in 1987 to 1992 Net Growth	-	-	0.132 (0.037)	0.101 (0.040)	-	-	-	-	0.121 (0.045)	0.011 (0.055)
Service Dissimilarity Indices										
Black-White Difference in 1992 Levels	-	-	-	-	0.047 (0.026)	0.068 (0.026)	-	-	-0.036 (0.069)	-0.093 (0.069)
Black-White Difference in 1987 to 1992 Net Growth	-	-	-	-	-	-	0.061 (0.032)	0.084 (0.032)	-0.015 (0.052)	0.049 (0.054)
Proportion Commuting to Work by Private Auto	-	0.080 (0.021)	-	0.043 (0.022)	-	0.072 (0.021)	-	0.070 (0.021)	-	0.079 (0.025)
Land Area[a]	-	0.011 (0.012)	-	0.010 (0.012)	-	0.011 (0.012)	-	0.013 (0.012)	-	0.012 (0.012)
R^2	0.022	0.091	0.049	0.071	0.014	0.072	0.015	0.073	0.056	0.100
F-statistic[b] (P-value)	-	-	-	-	-	-	-	-	3.481 (0.008)	3.502 (0.008)
N	242	242	242	242	242	242	242	242	242	242

Standard errors are in parentheses. All regression include a constant and are weighted by the number of black observations used to calculate the double-difference.
a. Land area is measures in tens of thousands of acres.
b. This row presents the test-statistics and p-values from a test of the joint significance of the four segregation indices.

correlated with one another. Nonetheless, F-test of the cumulative significance of all four measures fails to reject the hypothesis that all of the coefficient are zero.

Concerning the performance of the two additional variables, the relative effect of car ownership for blacks is higher in metropolitan areas that are more car dependent. The effect of this variable is significant at one percent in all specifications with the exception of fourth regression (significant at the five percent level of confidence). Finally, land area does not exert a statistically measurable effect in any of the models.

In summary, the results in Figures 1 and 2 and Table 5 strongly confirm the proposition that the relative importance of auto access on the employment prospects of blacks is more important in metropolitan areas where blacks are more spatially isolated from employment opportunities than are whites. Moreover, the positive effect of relative isolation on the relative car employment effect survives additional controls for metropolitan area characteristics.

5. Conclusion

The results of this paper clearly indicate that having access to a car has disproportionately large effects on the employment rates of workers that are spatially isolated from employment opportunities. We find the largest car-employment effects for blacks, the next largest for Latinos, and the smallest effects for whites. Moreover, we find strong evidence that the disparity between the blacks and white car-employment effects is greatest in metropolitan areas where the relative isolation of blacks from employment opportunities is most severe. Given the large differences in car-ownership rates that we document, these results indicate that lack of access to transportation plays a large role in explaining black/white, and to lesser degree, Latino/white differences in employment rates. By extension, these results also suggest that subsidizing car-ownership may be an effective policy tool for narrowing these employment gaps.

To be sure, employment policies that increase auto ownership rates will also increase the externalities associated with increased private-auto work commutes and non-work trips. Nearly all metropolitan areas in the United States suffer from traffic congestion, given the practically insurmountable challenge of optimally pricing road usage. Increasing auto-ownership through, for example, a subsidy to operating costs will surely increase traffic congestion. In addition, more autos will certainly translate into more air pollution.

There are reasons, however, to suspect that increasing auto access for blacks and Latinos would not add appreciably to congestion and pollution. Concerning the congestion externality, since a disproportionately large share of blacks and Latinos live in central regions of metropolitan areas, those individuals who commute to jobs located within city centers are unlikely to increase congestion on inbound freeway routes. Moreover, those who locate employment in the suburbs will have commutes that are in the reverse direction of the largest peak-period flows. O'Regan and Quigley (1999) have made a similar point quite decisively in their discussion of the possible congestion consequences of increasing car-ownership rates among welfare recipients. Another factor limiting the addition to congestion costs concerns the fact that many of these individuals work non-standard schedules and, hence, would be making private-auto commuted at times of the day when the external costs of an additional trip are low. Finally, even an extreme policy that raises minority car ownership rates to the level of whites would purchase new autos for a minority of a minority of the U.S. working age population. Hence, both the congestion and pollution externalities caused by such policies are likely to be small.

An important issue that we have not addressed in this study concerns the reasons why car-ownership rates are so low for blacks and Latinos. Possible explanations include high insurance and parking costs in inner-city communities, differential access to capital markets, low incomes, and price discrimination in the markets for new and used cars. Sorting out the relative importance of these alternative factors, and any other relevant variables for that matter, would greatly aid in designing cost-effective policies that increase auto access.

Finally, the results presented here do not provide enough information to compare the relative efficacy (in terms of alleviating inner-city employment problems) of community development initiatives, residential mobility programs, training programs, and policies designed to increase automobile accessibility. Of course, to the extent that all such policies alleviate the spatial imbalance between labor supply and demand, these policy tools may be thought of as complements rather than substitutes, with the effects of one initiative increasing the probability of success of alternatives. Nonetheless, a careful comparative analysis of the marginal benefits per dollar spent may indicate that certain policy options dominate. The strong results presented here indicate that transportation policies geared towards fostering greater auto access should most definitely be considered in any comparative benefit-cost analysis of policy initiatives designed to alleviate the spatial concentration of joblessness.

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Appendix Table A1
Dissimilarity Scores Measuring Segregation Between Population and Employment for the 20 Metropolitan Areas with the Largest Black Population in 1990

	Retail Dissimilarity Indices				Service Dissimilarity Indices			
	Levels, 1992		Net Growth, 1987 to 1992		Levels, 1992		Net Growth, 1987 to 1992	
	Black	White	Black	White	Black	White	Black	White
Atlanta	0.59	0.33	0.80	0.53	0.65	0.46	0.77	0.49
Baltimore	0.57	0.29	0.88	0.67	0.60	0.40	0.84	0.63
Birmingham	0.60	0.42	0.73	0.56	0.64	0.54	0.71	0.62
Charlotte	0.47	0.35	0.85	0.75	0.48	0.46	0.78	0.62
Chicago	0.74	0.28	0.89	0.67	0.79	0.42	0.86	0.56
Cleveland	0.67	0.26	0.84	0.57	0.71	0.37	0.81	0.44
Dallas	0.53	0.31	0.85	0.68	0.63	0.46	0.68	0.53
Detroit	0.79	0.26	0.94	0.63	0.80	0.42	0.92	0.69
Houston	0.57	0.31	0.76	0.49	0.64	0.47	0.72	0.56
Los Angeles	0.66	0.28	0.88	0.76	0.70	0.44	0.84	0.68
Memphis	0.54	0.33	0.80	0.55	0.60	0.42	0.82	0.59
Miami	0.60	0.25	0.82	0.58	0.67	0.34	0.85	0.56
New Orleans	0.49	0.35	0.69	0.60	0.55	0.41	0.66	0.50
New York	0.71	0.36	0.87	0.77	0.77	0.54	0.82	0.61
Newark	0.69	0.30	0.89	0.76	0.70	0.35	0.83	0.60
Norfolk	0.43	0.31	0.69	0.55	0.46	0.36	0.47	0.41
Oakland	0.61	0.28	0.79	0.68	0.61	0.35	0.74	0.50
Philadelphia	0.72	0.29	0.91	0.68	0.75	0.42	0.83	0.60
St. Louis	0.67	0.29	0.83	0.59	0.72	0.41	0.80	0.54
Washington, D.C.	0.56	0.35	0.82	0.64	0.64	0.48	0.75	0.62

The levels dissimilarity index is calculated using zip-code level information on the number of jobs located in the zip-code in 1992 and the number of people of the relevant race residing in the zip-code in 1990. The net growth indices uses net job growth between 1987 and 1992, setting growth to zero for zip codes that lose employment over this time period. Information on population by zip code comes from the 1990 Census of Population and Housing Summary Tape Files 3b. Information on job counts by zip codes comes from the Economic Census for 1987 and 1992. Approximately sixty percent of the 1990 black population living in metropolitan areas resided in one of the twenty PMSAs listed above.

Appendix Table A2
Linear Probability Employment Models Using the 1990 5% PUMS and the Household Level Car-Ownership Variable

	(1)	(2)
Black	-0.159 (0.002)	-0.128 (0.002)
Car	0.132 (0.001)	0.104 (0.001)
Black*Car	0.115 (0.002)	0.103 (0.001)
Female	-	-0.149 (0.0003)
Married	-	0.016 (0.0001)
High School Graduate	-	0.113 (0.0005)
Some College	-	0.164 (0.0005)
College Graduate	-	0.180 (0.0007)
College +	-	0.213 (0.0008)
Age	-	0.045 (0.0001)
Age^2	-	-0.0006 (0.0000)
In School	-	-0.104 (0.0006)
Disabled	-	-0.047 (0.0009)
R^2	0.018	0.162
N	4,455,814	4,455,814

Standard errors in parentheses.