

Job Sprawl, Spatial Mismatch, and Black Employment Disadvantage

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Abstract

This paper examines the relationship between job sprawl and the spatial mismatch between blacks and jobs. Using data from a variety of sources including the U.S. Census and the ZIP Code Business Patterns of the U.S. Department of Commerce, I control extensively for metropolitan area characteristics and other factors. In addition, I use metropolitan area physical geography characteristics as instruments for job sprawl to address the problem of simultaneity bias. I find a significant and positive effect of job sprawl on mismatch conditions faced by blacks that remains evident across a variety of model specifications. This effect is particularly important in the Midwest and West, and in metropolitan areas where blacks' share of the population is not large and where blacks' population growth rate is relatively low. The results also indicate that the measure of mismatch used in this analysis is highly correlated across metropolitan areas, with blacks' employment outcomes in the expected direction.

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I. INTRODUCTION

Scholars and policy makers concerned with racial inequality have long pointed to the racial segregation of African Americans as a key determinant of black poverty. The confinement of black households to geographically isolated inner-city neighborhoods has been linked to relatively poor employment outcomes, among other factors. During the latter half of the twentieth century, changes in the spatial location of employment opportunities within metropolitan areas served to increase the physical distance between predominantly black residential areas and the locations of important employment centers. Despite moderately increasing rates of residential mobility to the suburbs over the past few decades, black residential locations have remained fairly centralized and concentrated in older urban neighborhoods of the nation's metropolitan areas, but employment has continuously decentralized toward metropolitan area suburbs and exurbs.

Many argue and provide evidence that this “spatial mismatch” between the location of blacks and jobs is partly responsible for the stubbornly inferior labor market outcomes experienced by African Americans.¹ Given the difficulties of reserve commuting to suburbs in many metropolitan areas, especially by public transit, coupled with the fact that high proportions of blacks do not own cars,² such

¹For recent and extensive reviews of the empirical research on the spatial mismatch hypothesis see Ihlanfeldt and Sjoquist (1998) and Pugh (1998).

²See Raphael and Stoll (2001) for an analysis of the impact of racial differences in car ownership rates on racial labor market inequality.

spatial mismatch disconnects blacks from many jobs for which they may be suited, thereby increasing their employment difficulties.³

This paper provides an analysis of whether job sprawl has a direct effect on the geographic separation of blacks from jobs. There has been growing attention to the varied impacts of sprawl, understood here as low-density, geographically spreading patterns of development. Some have engaged in debate about how to measure sprawl (Lopez and Hynes, 2003; Wolman, et al., 2002) and whether it is increasing (Glaeser and Kahn, 2001a, 2001b), while others have examined its causes, such as the influence of physical characteristics of regions, the role of government policy, and preferences and discrimination (Burchfield et al., 2004; Squires, 2002; Rusk, 1999; Jackson, 1985). Some have attempted to identify the impacts of sprawl, either positive or negative, for example on increasing health problems, pollution, concentrated poverty, and other concerns, or on decreasing commute times (Bullard, Johnson, and Torres, 2000; Heinlich and Andersen, 2001; Cieslewicz, 2002; Jargowsky, 2002; Glaeser and Kahn, 2001b), but few have focused on its connection to race, with some exceptions (Powell, 2002).

This paper seeks to add to this literature by systematically examining the effect of job sprawl on blacks' mismatch conditions. A priori, one might expect a positive effect of job sprawl on blacks' mismatch, as the mismatch hypothesis suggests, per Kain's (1968) original formulation of the problem. Many urban areas continue to exhibit rapid growth patterns, especially over the past few decades (Lopez and Hynes, 2003; Glaeser and Kahn, 2001b). To the extent that these growth patterns are characterized by job sprawl, such employment opportunities will locate in areas far from areas where blacks are

³There is a large and established literature on why and how space matters in employment. It establishes that time and money costs of travel and information limit the distances workers are willing or able to commute to get to work, especially for those workers that are low-skilled or young. Public transit increases the time cost of travel, as does how far workers must commute to employment opportunities. Purchasing and maintaining a car, as well as paying for gas and insurance, increases the money cost of travel. Furthermore, distance from employment opportunities raises the costs of getting information about these jobs. As any of these costs rise, workers will be less willing to travel an additional mile. See Stoll (1999) and Holzer, Ihlanfeldt, and Sjoquist (1994).

To be suitable instruments, the physical geography variables must not affect blacks' spatial mismatch from jobs other than through the effects of these variables on job sprawl, i.e., the instruments must be correlated with Job Sprawl_i , and be uncorrelated with ε_{1i} from Equation (2). It is quite clear that the physical geography variables should have no bearing on the extent of blacks' spatial mismatch from jobs other than through their effects on sprawl and should be uncorrelated with unobserved factors that drive this geographic separation. Blacks' residential choice within metropolitan areas is unlikely to be influenced by whether it is adjacent to another country or a large lake, all else equal.

On the other hand, the physical geography variables appear to be exogenous determinants of sprawl, as they are for the most part determined by natural occurrences. One exception is the variables measuring whether the metropolitan area is located adjacent to a major park, military base, or reservation. The location decisions of these places are clearly social, but the factors that determined them are unlikely to be related to factors that are correlated with sprawl. Many national parks and military base location decisions, for example, were made in the 1930s and 1940s, well over 50 years ago or more (especially for Native American reservations), and well before the rapid growth of metropolitan areas and concerns about sprawl. Thus, these factors more likely exogenously influence urban form by directly affecting the extent of sprawl.

But the expected direction of the effects of these physical geography variables on job sprawl is not clear. On the one hand, physical constraints such as being located next to an ocean, large river, or another country may act to constrain extensive development and encourage density. On the other hand, it is conceivable that these factors, such as a large lake, could influence extensive development patterns if these physical constraints encourage leapfrog development (Burchfield et al., 2004).

collected data on whether the metropolitan area is located adjacent to another metropolitan area, state or to another country from U.S. Census maps. Rothstein provided the data on rivers. The data are from the 1999 Geographic Names Information System.

Table A.3 in the appendix shows the first-stage regression of job sprawl. The instrumental variables are all statistically significant at, at least, the .10 level. The results reveal that metropolitan areas adjacent to a major park, military base, or reservation as well as those adjacent to another country show lower levels of sprawl, implying that these factors constrain the geographic extent of sprawl. On the other hand, whether a metropolitan area is adjacent to a state, another MSA, or a large body of water are factors positively associated with sprawl, perhaps for a variety of reasons, including leapfrog development and other development tendencies. Importantly, the results from F-tests of the joint significance of the five instruments are significant at the .001 level with an F statistic of 19.91. Hence, the first-stage relationships are fairly strong.

C. Adjusted Results

Table 2 shows the results of regressions of the blacks/jobs mismatch. Models 1 through 4 are OLS estimates, while Model 5 presents the 2SLS estimate. Model 1 includes only the job sprawl measure and shows a statistically significant, positive coefficient that is identical to that shown in Table 2, column 1. The OLS estimate in Model 1 predicts a 3.1 percentage-point increase in spatial mismatch conditions for blacks given a 10 percentage-point increase in job sprawl.

Model 2 adds the metropolitan characteristics to the model specification. With their inclusion, the magnitude of the coefficient on job sprawl is reduced (by 25 percent), indicating that differences in metropolitan characteristics account for part of the association between job sprawl and spatial mismatch. In particular, metropolitan population size and metropolitan areas in the Northeast and Midwest account for much of this. Still, the coefficient on job sprawl remains statistically significant at the .01 percent level with their inclusion. Note that spatial mismatch conditions for blacks are much worse in larger metropolitan areas and for those in the Northeast and Midwest, as evidenced by the positive and significant coefficients on these variables.

Model 3 adds social and economic characteristics of metropolitan areas to the equation. The proportion of the population that is black or over 65 years of age is positively and significantly related to

Table 2
OLS and Two-Stage Least Squares Regressions of Blacks/Jobs Mismatch

	(1)	(2)	(3)	(4)	(5)
Job sprawl	0.305*** (0.030)	0.228*** (0.032)	0.147*** (0.037)	0.139*** (0.044)	—
Job sprawl – instrumented (2SLS)	—	—	—	—	0.225*** (0.079)
Log (population size)	—	0.061*** (0.009)	0.059*** (0.012)	0.070*** (0.015)	0.058*** (0.012)
Northeast	—	0.107*** (0.029)	0.172*** (0.038)	0.165*** (0.047)	0.190*** (0.036)
Midwest	—	0.063*** (0.018)	0.092*** (0.027)	0.090*** (0.033)	0.110*** (0.036)
West	—	-0.026 (0.022)	0.012 (0.027)	-0.005 (0.035)	0.006 (0.028)
Log (city age)	—	-0.036 (0.034)	-0.114*** (0.039)	-0.107 (0.047)	-0.123*** (0.041)
Percent black	—	—	0.435*** (0.116)	0.336*** (0.137)	0.412*** (0.121)
Percent Latino	—	—	0.084 (0.070)	0.043 (0.083)	0.058 (0.077)
Percent over 65 years old	—	—	0.675** (0.312)	0.603* (0.348)	0.537 (0.365)
Percent with college degree or more	—	—	0.354* (0.209)	0.056 (0.291)	0.301 (0.223)
Share of employment in manufacturing	—	—	-0.146 (0.185)	-0.132 (0.226)	-0.194 (0.197)
Share of employment in retail trade	—	—	-1.035 (0.690)	-1.192 (0.773)	-1.013 (0.697)
Share of employment in service	—	—	-0.507** (0.226)	-0.330 (0.263)	-0.515** (0.229)
Log (number of political jurisdictions)	—	—	0.011 (0.011)	0.003 (0.014)	0.001 (0.017)
Log (land area)	—	—	—	-0.004 (0.018)	—
Adj. R ²	0.270	0.403	0.420	0.332	0.408
N	267	267	267	200	267

Note: ***, **, and * indicates statistically significant at the .01, .05, and .10 percent level, respectively. Std. errors in parentheses. Constant included in regressions but not shown. First-stage OLS regression of job sprawl is shown in the appendix, Table A.3.

mismatch conditions for blacks, while the fraction of employment that is in service is marginally significant and negatively related. With the inclusion of these variables, the statistically significant and positive coefficient on job sprawl is further reduced (by 36 percent), indicating that social and economic factors account for a nontrivial part of the association between job sprawl and spatial mismatch.

Model 4 adds a measure of land area to the specification to further account for metropolitan area size given the strong and positive association between job sprawl and metropolitan size.¹⁷ Land area is not statistically associated with blacks' spatial mismatch from jobs and its inclusion does not significantly affect the point estimate on job sprawl. Thus even after controlling for land area, which likely overcontrols for metropolitan characteristics, since job sprawl directly influences the amount of land encompassing metropolitan areas, job sprawl still remains significantly related to mismatch. In the remainder of the analysis, the land area variable is not included for this reason and because a large share of metropolitan areas in the sample are missing values for this variable.

Finally, Model 5 shows the results of the 2SLS estimate. Since there are five instrumental variables, I perform a test of the implicit overidentification restriction in the model. The overidentification restriction for the model is not rejected (at the 5 percent level). A rejection of the overidentification restriction indicates that the 2SLS estimate is sensitive to the choice of instruments.

Similar to the comparable OLS results shown in Model 3, the 2SLS estimate indicates that job sprawl exerts a positive and highly significant effect on blacks' spatial mismatch. Moreover, it exceeds the OLS estimate. The 2SLS estimate indicates that a 10 percentage-point increase in job sprawl would increase the spatial mismatch index by 2.1 percentage points, while the comparable number for the OLS estimate is 1.5 percentage points. Thus, after instrumenting for job sprawl, I find that job sprawl exerts a direct positive effect on blacks' mismatch conditions.

¹⁷The correlation coefficient between job sprawl and the log of land area is 0.319 and is statistically significant at the .001 level.

I further examine the validity of these results by examining the effect of job sprawl on mismatch for Latinos and whites. Conceivably, sprawl could harm other groups that might experience some residential concentration in the urban core, such as Latinos. Since Latinos are less concentrated in urban areas than blacks, it is expected that job sprawl should affect their mismatch conditions to a lesser extent than that of blacks (Stoll and Raphael, 2000). Job sprawl is unlikely to affect whites' mismatch conditions, given their residential concentration in suburban areas.

Table 3 presents the OLS regressions of spatial mismatch for blacks, whites, and Latinos. The models are identical to the specification in Model 3 in Table 2. I show this model specification because it presents more conservative estimates of the effect of job sprawl on blacks' mismatch than the 2SLS estimates, though use of the 2SLS estimates did not provide qualitatively different results for whites and Latinos than those shown here. The results show that job sprawl has no statistically significant effect on the spatial mismatch conditions of either whites or Latinos. This is likely true because whites and Latinos are much less residentially concentrated than blacks in the urban core (Iceland, 2004), so job sprawl is unlikely to have any significant influence on their geographic separation from jobs. There could be subgroups of whites or Latinos that may be more residentially concentrated, such as the less-skilled or different national origin Latino groups such as Puerto Ricans, whose mismatch might be affected by sprawl, but such investigation is beyond the scope of this paper.

D. Further Empirical Probes

Table 4 shows the results of alternative specifications of the estimated effect of job sprawl on the blacks/jobs dissimilarity index to better examine the alternative question of whether job sprawl lessens mismatch conditions faced by blacks, as some have speculated. Columns 1 and 2 examine potential nonlinearities in these effects. Column 1 shows results of a model that includes the square of job sprawl that indicates that the strength of the job sprawl effect on blacks' mismatch conditions declines at higher levels of job sprawl. More important, column 2 examines whether, at higher levels of job sprawl, the effect of job sprawl on blacks' mismatch conditions becomes negative (as interpreted though the

Table 3
OLS Regressions of Total Jobs Mismatch by Race

	Total Jobs Mismatch:		
	Blacks (1)	Whites (2)	Latinos (3)
Job sprawl	0.147*** (0.037)	-0.031 (0.021)	0.022 (0.030)
Log (population size)	0.059*** (0.012)	0.063*** (0.015)	0.052*** (0.016)
Northeast	0.172*** (0.038)	-0.046** (0.021)	0.133*** (0.031)
Midwest	0.092*** (0.027)	-0.054*** (0.015)	0.018 (0.022)
West	0.012 (0.027)	0.005 (0.015)	0.044** (0.022)
Log (city age)	-0.114*** (0.039)	-0.024 (0.022)	-0.086*** (0.032)
Percent black	0.435*** (0.116)	0.211*** (0.066)	0.415*** (0.095)
Percent Latino	0.084 (0.070)	-0.025 (0.040)	0.182*** (0.058)
Percent over 65 years old	0.675** (0.312)	0.106 (0.177)	0.466* (0.255)
Percent with college degree or more	0.354* (0.209)	0.132 (0.118)	0.502*** (0.172)
Share of employment in manufacturing	-0.146 (0.185)	-0.232** (0.104)	-0.094 (0.151)
Share of employment in retail trade	-1.035 (0.690)	-0.083 (0.390)	-0.029 (0.564)
Share of employment in service	-0.507** (0.226)	-0.038 (0.127)	-0.456*** (0.184)
Log (number of political jurisdictions)	0.011 (0.011)	0.026*** (0.006)	0.014 (0.009)
Adj. R ²	0.420	0.330	0.343

Note: ***, **, and * indicates statistically significant at the .01, .05, and .10 percent level, respectively. Std. errors in parentheses. N=267. Constant included in regressions but not shown.

Table 4
Alternative Specifications of Job Sprawl Effect on the Blacks/Jobs Dissimilarity Index

	(1)	(2)	(3)	(4)	(5)
Job sprawl	0.370*** (0.118)	0.015 (0.263)	—	—	—
Job sprawl squared ^a	-0.237** (0.120)	0.719 (0.643)	—	—	—
Job sprawl cubed ^a	—	-0.681 (0.450)	—	—	—
Job sprawl – 1990 ^b	—	—	0.130*** (0.042)	—	—
Absolute change in job sprawl 1990 to 2000 ^c	—	—	—	-0.190 (0.132)	—
Percent change in job sprawl 1990 to 2000 ^c	—	—	—	—	0.031 (0.065)
Adj. R ²	0.463	0.469	0.381	0.067	0.072
N	267	267	267	267	267

Note: ***, **, and * indicates statistically significant at the .01, .05, and .10 percent level, respectively. Std. errors in parentheses. Constant included in all regressions but not shown.

^aIncludes all control variables listed in Model 3 in Table 2.

^bIncludes all control variables listed in Model 3 in Table 2 but measured with 1990 values.

^cIncludes time-varying control variables including relevant changes between 1990 and 2000 in log population size, percent metropolitan area that is black, percent metropolitan area that is Latino, percent population over 65 years old, percent population that are college graduates, percent employment in manufacturing, percent employment in retail trade, and percent employment in service. Dependent variables are absolute change in blacks/jobs mismatch between 1990 and 2000 (column 4) and percent change in blacks/jobs mismatch between 1990 and 2000 (column 5), respectively.

coefficient on job sprawl cubed). This result would be consistent with some who suggest sprawl could lessen mismatch conditions faced by blacks by spurring black residential mobility to suburbs through lower housing prices. Though the sign on the job sprawl cubed variables is negative, indicating some support for this hypothesis, it is not statistically significant.¹⁸

Column 3 presents results using 1990 data for the exact model using 2000 data shown in Model 3, Table 2. If sprawl lessens mismatch conditions faced by blacks, then evidence consistent with this idea would show that the coefficient on job sprawl would become smaller over time or that the coefficient on job sprawl would be smaller in magnitude in 2000 than in 1990. The results show no support for this hypothesis, as the job sprawl coefficient in 2000 is larger in magnitude than that in the earlier 1990 period.

Finally, columns 4 and 5 show results from first-differencing regressions that eliminate the unobserved time-invariant effects from the equations that also influence the degree of mismatch conditions faced by blacks. Column 4 shows first-differences estimates for the absolute change in the blacks/jobs dissimilarity index between 1990 and 2000 as a function of the absolute change in job sprawl, as well as the change in all other relevant time-varying variables listed in Table 4. Column 5 shows these first-differences estimates for the percentage change in the blacks/jobs dissimilarity index between 1990 and 2000. The means and standard deviations of the main variables in all of these models are provided in appendix Table A.2.

In general, the results of both first-differences regressions show virtually little support for the hypothesis that job sprawl lessens mismatch conditions faced by blacks (nor for the hypothesis that job sprawl exacerbates mismatch conditions), though the coefficient on the absolute change in job sprawl is

¹⁸Because of the high degree of correlation between the squared and cubed job sprawl variables, I took the predicted probabilities of the blacks/jobs dissimilarity index generated by Model 3 in Table 2, calculated the deciles of these and plotted them to see whether the effect of job sprawl on blacks' mismatch conditions changed directions (and became negative) at higher levels of job sprawl. It did not; it only became flat, corroborating results from the regression with job sprawl cubed shown here.

negative and nearly statistically significant at the .10 level.¹⁹ A possible explanation for why the results of the first-differences equations differ from the cross-sectional results is that there is less variation across metro areas in the change in spatial mismatch and job sprawl over the decade than across metro areas in the degree of mismatch and job sprawl in one time period. A longer time period over which changes in the mismatch and job sprawl measures are observed could help increase this variation. Unfortunately, 1990 is the earliest period available to measure these variables because of data availability constraints.

E. Heterogeneity in the Effect of Job Sprawl

To explore heterogeneity in the effect of job sprawl, Table 5 presents OLS regression results of blacks' spatial mismatch from jobs disaggregated by region, metropolitan population size, the percentage of the metropolitan area that is black, and the percentage change (1990 to 2000) of the metropolitan area that is black. All control variables included in Model 3 in Table 3 are included in these regressions, though their results are not shown. The results in Panel A show a positive coefficient on job sprawl for each region, but are much stronger in the Midwest and West. The coefficients are not statistically significant in the South or Northeast, though limited statistical power in the Northeast sample size is probably influencing this result.

Panel B shows the results with metropolitan areas stratified by metropolitan area population size and shows no effect of job sprawl in either small or large (population over 500,000) metropolitan areas, suggesting that all of the effect of job sprawl on blacks' mismatch conditions is driven by differences in moving from smaller to larger metro areas.

¹⁹Hanushek (1986) critiques these first-differences change regressions because they assume that the change over the decade is independent of the starting level of spatial mismatch (in 1990). To address this, I regressed spatial mismatch for blacks in 2000 on the level of spatial mismatch for blacks in 1990 and on the change in all other relevant time-varying variables, including the change in job sprawl. The results of these regressions were no different than shown here. Also, the coefficient estimate on the level of spatial mismatch for blacks in 1990 was less than one, indicating that the change in mismatch over the decade was not independent of its starting level. It indicates that metro areas with high levels of spatial mismatch at the beginning of the period had smaller increases over the decade.

Table 5
OLS Regressions of Blacks/Total Jobs Mismatch by Metropolitan Area Characteristics

	(1)	(2)	(3)	(4)
A. Region	Northeast	Midwest	South	West
Job sprawl	0.123 (0.160)	0.173** (0.071)	0.021 (0.053)	0.201** (0.098)
R ²	0.339	0.541	0.309	0.683
N	30	73	92	47
	(1)	(2)		
B. Population size	Less than 500,000	Greater than or equal to 500,000	—	—
Job sprawl	0.006 (0.053)	0.001 (0.064)	—	—
R ²	0.193	0.452	—	—
N	148	94	—	—
	(1)	(2)	(3)	
C. Percent black	Less than .05 percent	.05 to .10 percent	Greater than .10 percent	—
Job sprawl	0.150* (0.082)	0.121* (0.072)	0.042 (0.051)	—
R ²	0.300	0.263	0.517	—
N	74	67	101	—
	(1)	(2)	(3)	
D. Percent change in black population (1990 to 2000)	Less than .10 percent	.10 to .20 percent	Greater than .20 percent	—
Job sprawl	0.102** (0.050)	0.118 (0.074)	-0.019 (0.071)	—
R ²	0.582	0.386	0.421	—
N	94	61	87	—

Note: ***, **, and * indicates statistically significant at the .01, .05, and .10 percent level, respectively. Std. errors in parentheses. Includes all control variables listed in Model 3 in Table 3. Constant included in regressions but not shown.

Panel C shows the results for metropolitan areas stratified by the percentage black of their populations. The coefficients on job sprawl are all positive and significant in all cases, but are statistically significant and much larger in magnitude in metropolitan areas with small (< .05 percent) and moderate (.05 to .10 percent) percentages of the population being black. Panel D shows that the effect of job sprawl on blacks' spatial mismatch is most important in metropolitan areas where black population growth is limited (< .10 percent). Thus, these results suggest that the effect of job sprawl on blacks' spatial mismatch from jobs is much stronger in metropolitan areas where the share of the population that is black is small to moderate or where black population growth is limited, perhaps because blacks' residential mobility to suburban areas in these areas is more limited.²⁰

F. Spatial Mismatch and Blacks' Employment Outcomes

Finally, this section examines the degree to which the measure of spatial mismatch used in this analysis correlates with blacks' actual employment outcomes. So far, I have assumed that worsening spatial mismatch conditions (as measured in this analysis) imply worsening employment outcomes for blacks, or vice versa. This section provides a direct test of this assumption. Table 6 provides estimates of regression equations of blacks' employment-to-population ratios, for all blacks and stratified by sex and

²⁰These findings suggest that racial segregation is one potential mechanism that could influence the relationship between mismatch and sprawl. The degree of spatial mismatch experienced by blacks across metropolitan areas is strongly related to the extent of racial segregation. Raphael and Stoll (2002) demonstrate that in 2000, 50 percent of the variation in mismatch conditions faced by blacks (as measured by the spatial mismatch index used in this analysis) in metropolitan areas is accounted for by racial segregation of blacks and whites (as measured by the index of dissimilarity between whites and blacks). Though not shown here, I estimated the effect of job sprawl on racial segregation between blacks and whites (the index of dissimilarity with 2000 U.S. Census data) using OLS and the 2SLS estimates and including the same metropolitan area characteristics controls. In both models, job sprawl has a direct effect on worsening racial segregation of whites and blacks, though the effect of sprawl on segregation is larger in magnitude in the 2SLS than the OLS estimates. The important point is that the significant effect of job sprawl on racial segregation does not imply that the association between mismatch and job sprawl is a spurious one, operating instead through segregation. Both job sprawl and racial segregation have significant, independent effects on blacks' spatial mismatch when both are included in the regressions of blacks' spatial mismatch. Still, mismatch and segregation are very highly correlated and thus the inclusion of the segregation variable in to the equation introduces multicollinearity concerns.

Table 6
OLS Regressions of Employment-to-Population Ratios for Blacks

	Employment to Population Ratio for:						
	All Blacks (1)	Males (2)	Females (3)	No High School Degree (4)	High School Degree (5)	Some College (6)	College Degree or More (7)
Blacks/total jobs mismatch	-0.140*** (0.0523)	-0.225*** (0.065)	-0.026 (0.052)	-0.131*** (0.050)	-0.189*** (0.074)	-0.084 (0.058)	0.014 (0.067)
Adj. R ²	0.189	0.206	0.077	0.158	0.096	0.072	0.031

Notes: ***, **, and * indicates statistically significant at the .01, .05, and .10 percent level, respectively. All models include control variables listed in Model 3, Table 3, except the job sprawl variable. Constant included in all regressions but not shown. Std. errors in parentheses. N=267.

educational attainment. All control variables listed in Model 3 in Table 3 (except job sprawl) are included in the analysis. The metropolitan area employment-to-population ratios (for blacks) are calculated using the 2000 Census Public Use Microdata (5 percent) Samples. The sample is restricted to those between 21 and 65 years of age who are out of school and have no reported disability. Means (std. devs.) of these ratios are presented in the appendix Table A.2.

The results in Table 6 confirm the reasonableness of the assumption. They indicate that blacks' employment-to-population ratios are significantly and negatively related to the blacks/total jobs mismatch index, as the spatial mismatch hypothesis suggests. Model 1 for all blacks indicates that a 10 percentage-point increase in mismatch conditions faced by blacks is associated with a 1.4 percentage-point reduction in their employment-to-population ratio. For a variety of reasons not explored here, the remaining models indicate that mismatch conditions are more important to males' than females' employment-to-population ratios and those considered less educated (i.e., those with a high school degree or less). These results are consistent with the mismatch literature (Ihlanfeldt and Sjoquist, 1998; Pugh, 1998).

IV. CONCLUSIONS

This paper has provided an analysis of the relationship between job sprawl and the spatial mismatch between blacks and jobs. Much attention has been recently paid to the question of sprawl, especially whether it is increasing and what its impacts are on certain dimensions of social and economic life, such as health problems, pollution, concentrated poverty, and other concerns. But there is little evidence on the question of how and in what ways job sprawl is connected to questions of race.

A major concern in estimating the effect of job sprawl on blacks' mismatch conditions is that the direction of causality in the relationship is not clear. On the one hand, sprawl could affect blacks' distance from jobs in ways implied by the mismatch hypothesis. On the other hand, factors underlying spatial mismatch conditions may spur job sprawl. For example, employers may view black workers as less desirable for a variety of reasons, and thus may locate to the outer fringe of metropolitan areas far from areas with concentrations of blacks.

To address this problem of simultaneity, I used measures of a metropolitan area's physical geography as instruments for job sprawl in two-stage least squares regressions as well as other model specifications. Measures of geographical features of metropolitan areas are good instruments for job sprawl, since they exogenously influence urban form and have little to do directly with blacks' geographic separation from jobs. After instrumenting for job sprawl in this manner, I still find a strong, significant and direct negative effect of job sprawl on the mismatch conditions faced by blacks. Analysis further demonstrates that this effect is particularly important in the Midwest and West, and in metropolitan areas where blacks' share of the population is not large and where blacks' population growth rate is relatively low, perhaps because black residential mobility is lower in these areas.

Taken together, the results of this paper are more favorable to the idea that job sprawl exacerbates certain dimensions of racial inequality in America: job sprawl increases mismatch conditions for blacks, thereby resulting in greater employment challenges faced by blacks in areas of more sprawl. Thus, the idea that sprawl could reduce blacks' geographic separation from jobs by spurring black residential mobility through lower housing prices is not well supported in this analysis.

What do these results imply for policy? They suggest that efforts aimed at limiting the extent of job sprawl should have some potentially beneficial effects on improving blacks' spatial access to employment, among other factors. These activities could include regional coordinating efforts that may, for example, forge the development of urban growth boundary policies. But because of political fragmentation, such efforts are likely to prove politically difficult, as many have documented. Still, arguments for increasing regional coordinating efforts that move beyond the "suburbs gain when central cities do well" variety to include identifying problems of unemployment, poverty, and race that confront both suburbs and central cities alike are likely to be more politically potent.

Of course, limiting sprawl could have some potentially negative consequences as well, such as, among other factors, decreasing housing affordability. These consequences are likely to disproportionately negatively harm blacks, possibly including reducing their residential mobility to

suburban job-rich areas. But the promotion of smart growth development strategies in central cities and inner-ring suburbs could mitigate these potential negative effects as well as generate positive ones.

Targeting development smartly in these areas where abandoned buildings and/or vacant land exists could be particularly effective at mitigating these negative effects. Smart growth development efforts are also likely to disproportionately benefit blacks, who are overly reliant on public transportation to get to work, especially if such development is placed near public transit routes.

Table A.1
Linear Regression of Blacks/Total Jobs Mismatch using Alternative Sprawl Measures
(and their Correlations)

	(1)	(2)	(3)	(4)
	Job Sprawl	Average Density	Population Density-Distance Gradient	Sprawl Index (Lopez and Hynes, 2003)
A. Regressions ^a				
Coefficient (std. error)	0.147*** (0.037)	-3.27e-05*** (5.75e-06)	0.901*** (0.117)	0.245*** (0.044)
Adj. R ²	0.420	0.305	0.330	0.310
B. Correlations of sprawl measures				
Job sprawl	1.00	0.108*	0.665***	0.213***
Average density	0.108*	1.00	0.129**	0.579***
Population density-distance gradient	0.665***	0.129**	1.00	0.122**
Sprawl index (Lopez and Hynes, 2003)	0.213***	0.579***	0.122**	1.00

Notes: ***, **, and * indicates statistical significance at the .01, .05, and .10 percent level, respectively. Std. errors in parentheses. N=267.

^aIncludes all control variables listed in Model 3 in Table 2.

Table A.2
Means (Std. Devs.) of Variables

	(1)	(2)
	Unweighted	Weighted by Population Size
Log (population size)	12.887 (1.052)	14.249 (1.180)
Northeast	0.127 (0.334)	0.173 (0.379)
Midwest	0.300 (0.459)	0.243 (0.430)
South	0.390 (0.489)	0.341 (0.475)
West	0.184 (0.388)	0.242 (0.429)
Log (city age)	5.128 (0.330)	5.186 (0.363)
Percent black	0.112 (0.104)	0.142 (0.092)
Percent Latino	0.099 (0.150)	0.143 (0.153)
Percent over 65 years old	0.117 (0.029)	0.111 (0.028)
Percent with college degree or more	0.169 (0.051)	0.189 (0.050)
Share of employment in manufacturing	0.141 (0.067)	0.130 (0.054)
Share of employment in retail trade	0.122 (0.0138)	0.116 (0.012)
Share of employment in service	0.427 (0.050)	0.432 (0.038)
Log (number of political jurisdictions)	2.995 (1.177)	3.826 (1.180)
Log (land area)	2,303.904 (3,094.133)	4,203.161 (4,880.430)
Adjacent to park	0.227 (0.420)	0.227 (0.419)
Adjacent to major body of water	0.259 (0.439)	0.429 (0.496)
Adjacent to MSA	0.738 (0.440)	0.865 (0.342)
Adjacent to state	0.379 (0.486)	0.426 (0.495)
Adjacent to another country	0.038 (0.191)	0.030 (0.170)

(table continues)

Table A.2, continued

	(1)	(2)
	Unweighted	Weighted by Population Size
Log (number of rivers/streams)	4.563 (1.051)	5.099 (1.047)
Average density	1,198.35 (1,450.88)	2,730.90 (4,178.10)
Population density-distance gradient	-0.115 (0.074)	-0.075 (0.046)
Lopez and Hynes (2003) sprawl index	0.664 (0.202)	0.506 (0.237)
Employment-to-population ratio for blacks:		
All blacks	0.594 (0.103)	0.615 (0.051)
Males	0.581 (0.129)	0.608 (0.061)
Females	0.618 (0.093)	0.622 (0.044)
Less than high school degree	0.539 (0.097)	0.561 (0.048)
High school degree	0.575 (0.139)	0.0586 (0.058)
Some college	0.672 (0.105)	0.697 (0.049)
College degree or more	0.807 (0.115)	0.827 (0.041)
Job sprawl – 1990 ^a	0.427 (0.258)	0.623 (0.210)
Blacks/jobs mismatch – 1990 ^b	0.422 (0.159)	0.569 (0.134)
Absolute change in job sprawl 1990 to 2000 ^c	0.018 (0.033)	0.021 (0.028)
Absolute change in blacks/jobs mismatch 1990 to 2000 ^d	-0.039 (0.066)	-0.036 (0.058)
Percent change in job sprawl 1990 to 2000 ^c	0.074 (0.200)	0.047 (0.103)
Percent change in blacks/jobs mismatch 1990 to 2000 ^d	-0.073 (0.234)	-0.059 (0.186)
N	267	267

^aWeighted by population size in 1990.

^bWeighted by black population size in 1990.

^cWeighted by population size in 2000.

^dWeighted by black population size in 2000.

Table A.3
First-Stage Regression of Job Sprawl

Log (population size)	0.144*** (0.020)
Northeast	-0.247*** (0.065)
Midwest	-0.220*** (0.046)
West	0.071 (0.049)
Log (city age)	0.087 (0.070)
Percent black	0.275 (0.201)
Percent Latino	0.225* (0.134)
Percent over 65 years old	1.143 (0.542)
Percent with college degree or more	0.594* (0.360)
Share of employment in manufacturing	0.563* (0.321)
Share of employment in retail trade	0.711 (1.235)
Share of employment in service	0.239 (0.396)
Log (number of political jurisdictions)	0.119*** (0.017)
Adjacent to park, military base, or reservation	-0.063* (0.036)
Adjacent to major body of water	0.085*** (0.031)
Adjacent to MSA	0.124*** (0.032)
Adjacent to state	0.045* (0.028)
Adjacent to another country	-0.108* (0.061)
Adj. R ²	0.437
N	267

Notes: Constant included in model but not shown. ***, **, and * indicates statistically significant at the .01, .05, and .10 percent level, respectively. Std. errors are in parentheses.

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