



Job Sprawl and the Spatial Mismatch between Blacks and Jobs

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“Job sprawl strongly relates to spatial mismatch for blacks.”

Findings

An analysis of data on the location of people and jobs, including a “job sprawl” measure of employment decentralization, for metropolitan areas in 2000 finds that:

- **Metropolitan areas with higher levels of employment decentralization exhibit greater spatial mismatch between the relative locations of jobs and black residents.** Detroit, for example, has one of the highest levels of job sprawl among the 102 largest metropolitan areas, and blacks are extremely physically isolated from jobs there. Conversely, Greenville, SC, and other southern and western metropolitan areas rank low on both job sprawl and spatial mismatch for blacks.
- **Greater job sprawl is associated with higher spatial mismatch for blacks, but not for whites.** The relationship between these measures also holds for Latinos but to a lesser extent. Overall, metropolitan job sprawl is nearly twice as important a factor affecting spatial mismatch for blacks as for Latinos.
- **Blacks are more geographically isolated from jobs in high job-sprawl areas regardless of region, metropolitan area size, and their share of metropolitan population.** Still, the gap in spatial mismatch for blacks between high and low job-sprawl areas is wider in the Midwest, in metropolitan areas with a larger black share of the population, and in small- to medium-sized metropolitan areas.
- **Metropolitan areas characterized by higher job sprawl also exhibit more severe racial segregation between blacks and whites.** Adjusted for metropolitan area size, the average level of racial segregation is 15 percent higher in high job-sprawl areas than in low job-sprawl areas. This indicates that black/white segregation may be one mechanism through which metropolitan job sprawl translates into greater spatial mismatch for blacks.

The results strongly suggest that job sprawl exacerbates certain dimensions of racial inequality in America. By better linking job growth with existing residential patterns, policies to promote balanced metropolitan development could help narrow the spatial mismatch between blacks and jobs, and improve their employment outcomes over time.





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.¹ 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 have served to increase the physical distance between predominantly black residential areas and suburbanizing employment centers. Certainly, blacks have located in suburbs in increasing numbers in recent decades. The proportion of African Americans living in the suburbs of large metropolitan areas rose faster than for any other racial/ethnic group in the 1990s, and was associated with a rise in the black “middle class” in many markets.² Yet compared to these other groups, black residential locations remain fairly centralized and concentrated in older urban and suburban neighborhoods of the nation’s metropolitan areas, while employment has continued to decentralize towards new metropolitan suburbs and exurbs.

Many argue and document 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.³ Given the difficulties of reserve commuting to suburbs in many metropolitan areas via public transit, coupled with the fact that high proportions of blacks do not own cars, spatial mismatch may disconnect blacks from many jobs for which they may be suited, thereby increasing their employment difficulties.⁴

One manifestation of suburbanizing employment is “job sprawl,” used here to indicate low-density, geographically spread-out patterns of employment

growth. Job sprawl could exacerbate the geographic imbalance between the location of black communities and employment opportunities.⁵ To the extent that recent metropolitan employment growth is characterized by job sprawl, those growth patterns may increase the physical isolation of blacks from jobs, as the spatial mismatch hypothesis suggests. This is likely to be especially true where racial segregation has limited blacks’ residential access to fast-growing, job-rich suburbs.

On the other hand, it is also plausible that job sprawl could accompany reductions in blacks’ physical isolation from jobs. Some research has identified an association between low-density metropolitan growth and increased housing affordability. This type of growth produces housing rapidly relative to demand, thereby lowering housing prices and potentially raising housing consumption, especially that of blacks.⁶ If new homes affordable to blacks in high job-sprawl areas locate disproportionately in suburbs, blacks’ physical proximity to growing suburban employment centers could be improved. In theory, increases in black residential mobility and moderate decreases in racial segregation observed over the 1990s might indicate that job sprawl reduced spatial mismatch for blacks in the last decade.

This survey measures the relationship between job sprawl and spatial mismatch across roughly 300 metropolitan areas in the U.S. in 2000. The analysis provides for the first time evidence of a strong and positive relationship between job sprawl and spatial mismatch for African Americans. After explaining the methodology, the survey demonstrates the strength of this relationship while accounting for a host of other potential factors. It concludes by reviewing what policies might be used to address the growing connection between job sprawl and spatial mismatch for blacks, with an eye towards improving their spatial access to jobs and economic opportunities more broadly.

Methodology

The data used in this survey are drawn from two primary sources: Census 2000 and the 1999 U.S. Department of Commerce’s ZIP Code Business Patterns files. The latter provide information on total employment counts by U.S. ZIP code. ZIP Code Business Patterns data are extracted from the Standard Statistical Establishments List, a file maintained and updated by the Census Bureau on the location of all known single and multi-establishment companies.⁷ These employment data are used to measure “job sprawl” in each of roughly 300 metropolitan areas as the proportion of metropolitan jobs located outside of a 5-mile radius of the metropolitan area’s Central Business District (CBD).⁸ This measure of employment decentralization has been used elsewhere, and is correlated with other concepts of sprawl, such as the concentration/centralization of people (since the spatial distribution of all people and jobs is highly correlated), and measures of employment density.⁹

This job sprawl measure has a straightforward interpretation: higher percentages of a metropolitan area’s employment located outside a 5-mile ring around the CBD imply higher job sprawl, while lower percentages of employment outside the 5-mile ring indicate lower job sprawl. For example, Figure 1 shows a job sprawl measure of 64.7 for all metropolitan areas, indicating that on average 64.7 percent of jobs in metropolitan areas are located at least 5 miles outside of CBDs.¹⁰ Figure 1 also shows a job sprawl index of 71.1 for larger metropolitan areas, indicating that levels of job sprawl are higher in large metropolitan areas (those with at least 500,000 people in 2000).

Of course, this measure of sprawl has some potential problems. Most importantly, this measure could depend on and correlate with metropolitan area population, as the above



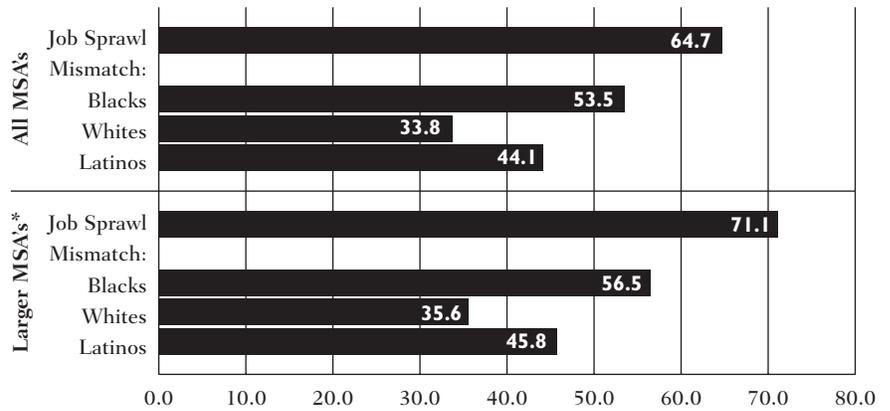
statistics illustrate. In a larger metropolitan area, one might expect that the share of employment located outside the 5-mile radius would be higher, since the 5-mile radius around the CBD is fixed even as suburban boundaries may grow. Yet the development patterns driving growth of larger metropolitan areas need not be characterized by true job sprawl. This survey deals with this potential issue by adjusting the relationship between sprawl and mismatch to account for, where appropriate, differences in population and land area size among metropolitan areas.¹¹

The spatial mismatch index is calculated using data on jobs from the same 1999 U.S. Department of Commerce's ZIP Code Business Patterns, and data on people from Census 2000, for the roughly 300 Metropolitan Statistical Areas in the U.S. in 2000. The measure of mismatch between blacks and jobs is based on the index of dissimilarity, which is well known in the social science literature as a measure of residential segregation between groups. The mismatch index of dissimilarity measures the degree of segregation between blacks and jobs.¹² A more detailed discussion of the dissimilarity index is presented in the technical appendix.

The spatial mismatch dissimilarity index ranges from zero to 100, with higher values indicating greater segregation between people and jobs. Hence, the index value between blacks and jobs for all metropolitan areas in the U.S. describes the extent to which the areas (ZIP codes) in which blacks tend to reside are different from the areas in which jobs are located.¹³ In this analysis, mismatch indexes are calculated for whites and Latinos as well for comparison purposes.¹⁴

The actual numerical value of the dissimilarity index has a convenient interpretation. Specifically, the index can be interpreted as the percentage of either population or jobs that would have to relocate to different areas to completely eliminate any geographic

Figure 1. Average Levels of Job Sprawl and People/Jobs Mismatch, 2000



*Larger MSAs are those with 500,000 people or more.

Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).

imbalance. For example, as Figure 1 indicates, the 2000 index value describing the imbalance between the residential distribution of blacks and jobs is 53.5 for all metropolitan areas.¹⁵ This indicates that in 2000, a little over half of blacks would have had to relocate within metropolitan areas to be geographically distributed in the same way as jobs. Figure 1 shows that, consistent with recent research, blacks are the most spatially isolated racial group from jobs, and that spatial mismatch is higher for blacks in larger metropolitan areas.¹⁶

Findings

A. Metropolitan areas with higher levels of employment decentralization exhibit greater spatial mismatch between the relative locations of jobs and black residents.

As described in the Introduction, greater job sprawl might influence spatial mismatch for blacks in a couple of ways. It might put jobs farther out of the reach of the significant numbers of black households that reside in the urban core. Conversely,

job sprawl might be associated with lower-density residential development that, in turn, could provide more affordable homeownership opportunities for blacks near fast-growing suburban employment centers.

On the question of whether job sprawl improves or exacerbates spatial mismatch conditions for blacks, Figure 2a presents some preliminary evidence. It plots the job sprawl index value for each of the roughly 300 metropolitan areas in the sample against the mismatch index value for blacks in each these areas in 2000. Each point on the scatter plot represents a single metropolitan area, with its measure of job sprawl noted on the horizontal axis, and its blacks/jobs spatial mismatch index indicated on the vertical axis. The scatter plot also includes a trend line that is fitted to the data using a simple linear regression.

The data clearly show that at the metropolitan-area level, job sprawl correlates positively and significantly with the physical separation between blacks and jobs. Metropolitan areas characterized by higher job sprawl are also characterized by greater spatial



mismatch for blacks. This finding strongly suggests that job sprawl does not do much to improve mismatch conditions by spurring black residential mobility to job-rich suburban areas.

Holding metropolitan population constant, on average, a 10 percentage-point increase in the job sprawl index (roughly the difference between Indianapolis and St. Louis—see Table 1) is associated with a 3.1 percentage point increase in the mismatch index for blacks.¹⁷ Moreover, variation in the degree of job sprawl explains 27 percent, or about a quarter, of the variation in the blacks/jobs mismatch index.

Comparing metropolitan areas with high and low levels of both mismatch and job sprawl makes evident the relationship between job sprawl and spatial mismatch for blacks. To make this comparison, large metropolitan areas (with at least 500,000 people) were sorted by their blacks/jobs mismatch index and by their job sprawl index. Of these roughly 100 metropolitan areas, 30 metropolitan areas with the highest and lowest mismatch index levels were examined to see which ones also ranked in the top and bottom 30 on job sprawl. If there were no systematic relationship between these measures, one would expect nine metropolitan areas to overlap in these indices.¹⁸

Table 1 shows instead that 15 of the 30 metropolitan areas with the highest blacks/jobs mismatch indices also ranked among the top 30 on job sprawl (located in panel A—and in the upper right area of Figure 2a). Metropolitan areas with both high mismatch and job sprawl include large cities such as Detroit, Chicago, Los Angeles, Philadelphia, Atlanta and Newark. These 15 metropolitan areas are also somewhat regionally concentrated; six sit in the Midwest, and the remaining nine divide evenly among the other three regions.¹⁹

At the other end of the distribution, 12 of the 30 metropolitan areas with

Figure 2a. Blacks/Jobs Mismatch Versus Job Sprawl in U.S. Metropolitan Areas, 2000

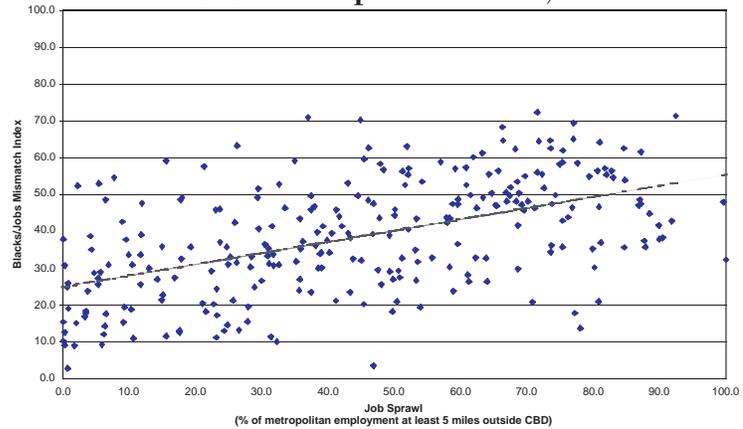


Figure 2b. Whites/Jobs Mismatch Versus Job Sprawl in U.S. Metropolitan Areas, 2000

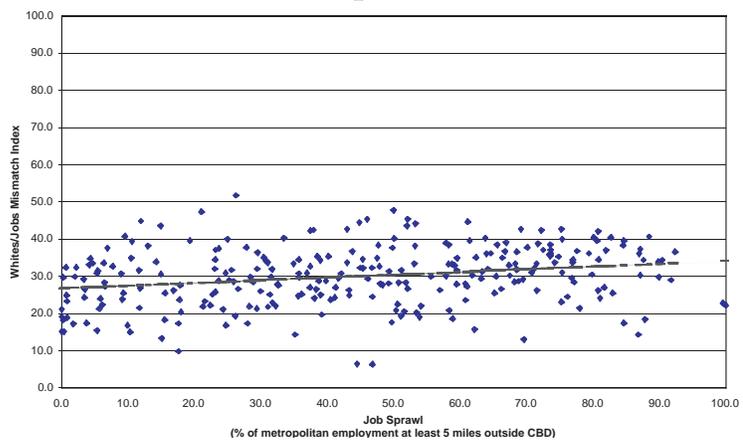
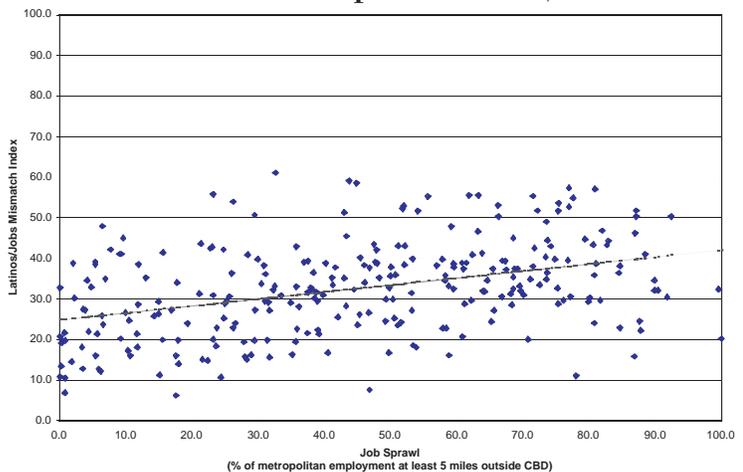


Figure 2c. Latinos/Jobs Mismatch Versus Job Sprawl in U.S. Metropolitan Areas, 2000



Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).

the lowest mismatch indices also ranked among the bottom 30 in their degree of job sprawl (panel B of Table 1—and the lower left area of Figure 2a). Greenville, in particular, exhibits a very low level of blacks/jobs mismatch and very little job sprawl. Notably, all of these metropolitan areas are located in the South and West. (Job sprawl and spatial mismatch indices for all large metropolitan areas are displayed in Appendix A.)

B. Greater job sprawl is associated with higher spatial mismatch for blacks, but not for whites.

Job sprawl may not be associated with mismatch conditions for blacks alone. Conceivably, job sprawl could harm other groups that might experience some residential concentration in the urban core, such as Latinos. Even whites may face widening spatial mismatch if job growth occurs in a rapid, low-density fashion that outpaces residential movements to suburban and exurban areas.

Figures 2b and 2c show the association between sprawl and mismatch conditions for whites and Latinos, respectively. Figure 2b shows that sprawl has virtually no relationship with spatial mismatch conditions for whites—increases in the job sprawl index across metropolitan areas do not seem to relate to increases in whites/jobs mismatch. In fact, regression analysis (not shown here) confirms that the relationship between these two measures is not statistically significant.

The pattern for Latinos, on the other hand, bears a greater resemblance to that for blacks. Figure 2c presents the association between mismatch conditions for Latinos and job sprawl. The relationship for Latinos is positive and significant, but is weaker than that for blacks. On average, a 10 percentage-point increase in the job sprawl index is associated with a 1.7 percentage-point increase in mismatch conditions for Latinos (as opposed to 3.1 percentage

Table 1. Large Metropolitan Areas with High (Low) Blacks/Jobs Mismatch and Job Sprawl (metropolitan areas with at least 500,000 population)

	Mismatch Index	Job Sprawl Index
A. Metro Areas with High Mismatch and High Job Sprawl		
1. Detroit, MI	71.4	92.4
2. Chicago, IL	69.5	77.0
3. Newark, NJ	65.2	76.9
4. Philadelphia, PA	64.2	80.9
5. St. Louis, MO	62.6	84.6
6. Cleveland, OH	62.0	75.4
7. Los Angeles, CA	61.6	87.1
8. Cincinnati, OH	58.8	75.3
9. San Diego, CA	58.6	77.6
10. Indianapolis, IN	58.3	74.9
11. Houston, TX	56.5	80.6
12. Dallas, TX	56.4	82.7
13. Oakland, CA	55.4	82.0
14. New Haven, CT	54.7	82.9
15. Atlanta, GA	53.9	84.6
B. Metro Areas with Low Mismatch and Low Job Sprawl		
1. Greenville, SC	29.8	27.0
2. Charleston, SC	30.4	58.3
3. Albuquerque, NM	34.2	40.2
4. Columbia, SC	34.9	53.1
5. McAllen, TX	37.5	39.8
6. Bakersfield, CA	38.4	43.3
7. Fresno, CA	40.5	52.1
8. Knoxville, TN	42.4	57.9
9. Little Rock, AR	43.5	53.3
10. Oklahoma City, OK	43.7	57.9
11. Colorado Springs, CO	45.8	41.2
12. Tacoma, WA	45.9	50.1

Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).

points for blacks). Effectively, job sprawl is nearly twice as important a determinant of spatial mismatch for blacks as for Latinos.

C. Blacks are more geographically isolated from jobs in high job sprawl areas regardless of region, metropolitan area size, and their share of metropolitan population.

The relationship between job sprawl and spatial mismatch for blacks is not necessarily a straightforward one.

Other factors that correlate with either measure could help account for the differences witnessed across metropolitan areas. This section examines, and introduces controls for, a number of these factors so as to identify the true connection between employment decentralization and blacks/jobs mismatch.

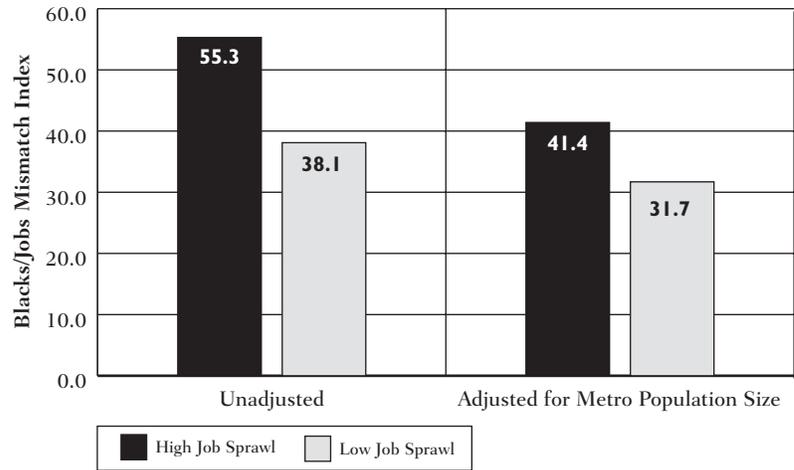
Job sprawl could depend on, and correlate with, metropolitan area population. In turn, this could lead researchers to incorrect inferences

about the relationship between the blacks/jobs mismatch and job sprawl. To probe the potential contribution of population and other factors, this section divides metropolitan areas into two categories based on their job sprawl indices. In “high job sprawl” metropolitan areas (where the index exceeds the average for all metropolitan areas, or 64.7 percent), about 55 percent of blacks would have to move to achieve parity with the distribution of jobs; the comparable number for blacks in “low job sprawl” metropolitan areas (below 64.7 percent) is 38 percent (left-hand side of Figure 3).²⁰

How much of this difference is associated with employment decentralization, rather than metropolitan area size? One problem in describing this independent relationship is that almost all of the high job sprawl metropolitan areas are very large (with over one million people). To control for the influence of metropolitan population, regression analysis is used to purge its contribution from the relationship between spatial mismatch and job sprawl.²¹ The right-hand side of Figure 3 shows the average mismatch index values for blacks in high and low job sprawl metropolitan areas adjusted for metropolitan population. Though this adjustment reduces the gap in blacks/jobs mismatch between high and low job sprawl metropolitan areas, the difference remains substantial at roughly 10 percentage points.

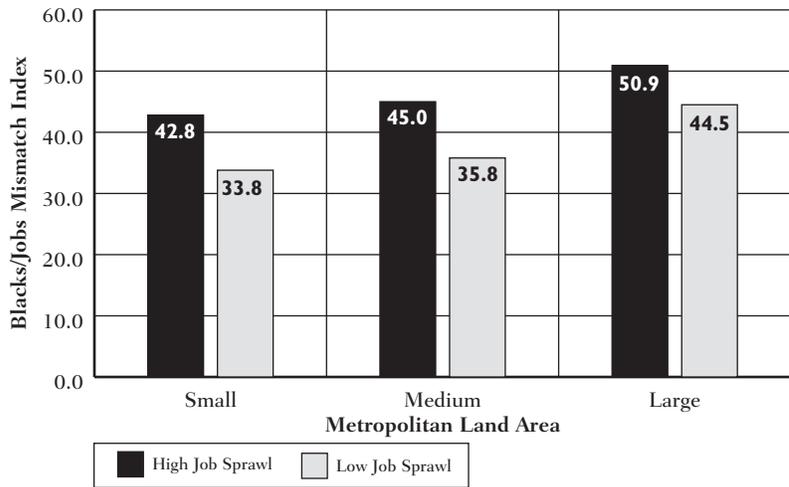
The physical size of metropolitan areas might also contribute to greater physical separation between blacks and jobs. (Job sprawl correlates to a much lesser degree with metropolitan land area than metropolitan population.) Figure 4 shows the average mismatch values for blacks across high and low job sprawl metropolitan areas categorized by their land area size.²² The data indicate that spatial mismatch for blacks is worse in high job sprawl areas regardless of metropolitan land area, but that the strength of the relationship between mismatch

Figure 3. Black/Jobs Mismatch by Job Sprawl, 2000 (Unadjusted and Adjusted for Metropolitan Area Population Size)



Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).

Figure 4. Blacks/Jobs Mismatch by Job Sprawl and Metropolitan Land Area*, 2000



* See text for description of land area categories.

Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).

and sprawl is stronger in small- and medium-sized metropolitan areas.

It is also possible that mismatch conditions for blacks could relate more strongly to job sprawl in metropolitan areas with larger black populations. In such metropolitan areas, “white flight” might involve

moves farther away from the urban core. More generally, established barriers for blacks in these areas may make it more difficult for them to move to suburban or exurban areas near employment. These ideas are consistent with evidence that racial segregation between blacks and whites

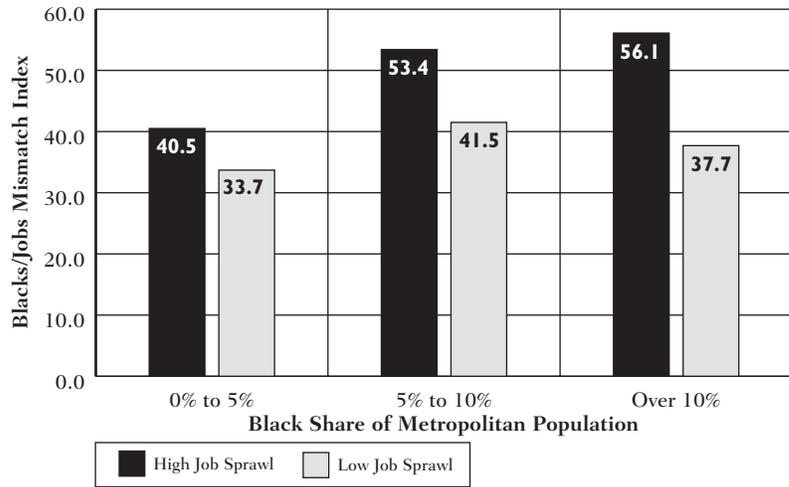
is much stronger in metropolitan areas where blacks make up larger proportions of population.²³

Roughly controlling for population composition, the blacks/jobs mismatch index remains worse in high job sprawl areas (Figure 5). However, the strength of the association between mismatch and sprawl is greatest in metropolitan areas that have over 10 percent of their population that is black. In these metropolitan areas, the gap between high and low sprawl areas in spatial mismatch for blacks is about 18 percentage points, compared to 7 percentage points in metropolitan areas with relatively small black populations.

Finally, job sprawl and spatial mismatch for blacks both vary by region, with midwestern metropolitan areas ranking high on each measure.²⁴ Yet regional variation alone cannot explain the gap in mismatch between high and low job sprawl areas. Even within regions, mismatch is considerably greater in high job sprawl than low job sprawl areas (Figure 6). The association between spatial mismatch and job sprawl is especially strong in the Midwest. There, the mismatch level for blacks in high job sprawl areas is nearly 22 percentage points higher than in low sprawl areas. This is consistent with Table 1, which shows that most of the metropolitan areas with high levels of both blacks/jobs mismatch and job sprawl are found in the Midwest.

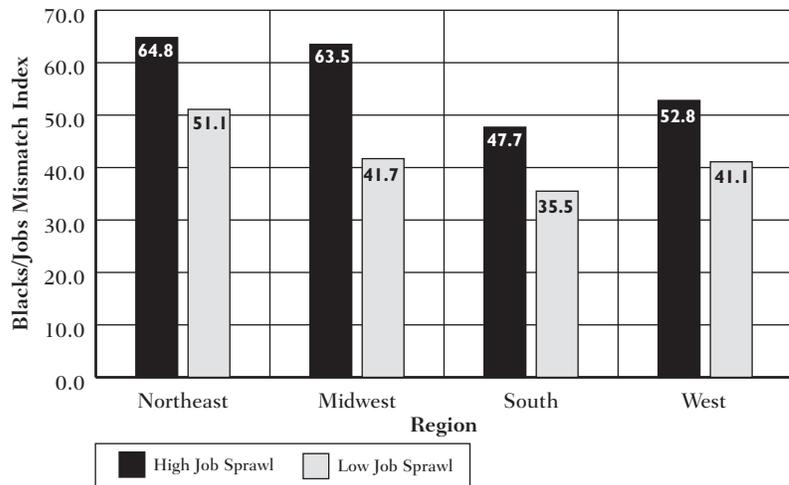
Differences in residential segregation by race may help explain these regional variations. Recent evidence indicates that racial segregation is strongly related to mismatch for blacks, is much more severe in the Midwest than other regions in the U.S, and accounts for much of the stronger association between sprawl and mismatch in the Midwest.²⁵ The next section sheds some light on the relationship between these three measures.

Figure 5. Blacks/Jobs Mismatch by Job Sprawl and Black Share of Metropolitan Population, 2000



Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).

Figure 6. Black/Jobs Mismatch by Job Sprawl and Region, 2000



Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).

D. Metropolitan areas characterized by higher job sprawl also exhibit more severe racial segregation between blacks and whites.

Racial segregation is a potentially important mechanism influencing the relationship between mismatch and sprawl. The degree of spatial

mismatch experienced by blacks across metropolitan areas is strongly related to measures of racial segregation, as the spatial mismatch hypothesis posits.²⁶ In areas where blacks are more segregated from whites, blacks tend to live apart from job-rich suburban areas (where dispropor-

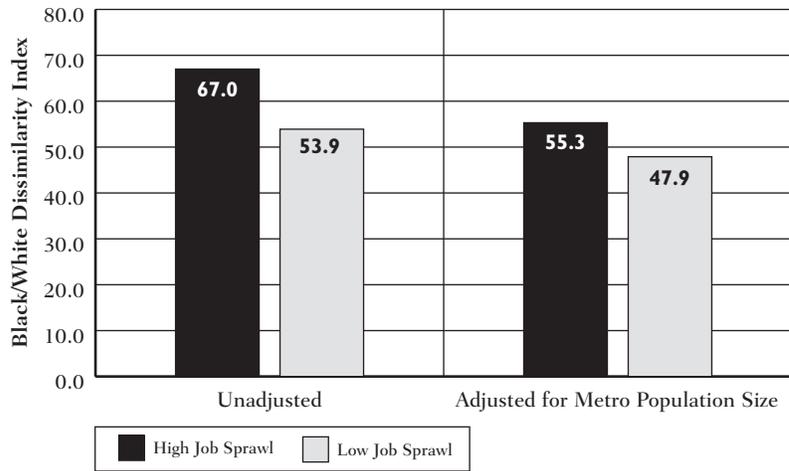
tionate shares of whites live). Thus, in metropolitan areas characterized by more job sprawl, residential segregation by race may itself contribute to blacks' physical isolation from employment centers.

Segregation and job sprawl are highly correlated. The left-hand side of Figure 7 shows that the average level of black/white segregation is much higher in high job sprawl than low job sprawl metropolitan areas. In high job sprawl areas, about 67 percent of blacks would have to move to achieve geographic parity with the residential distribution of whites, compared with 54 percent of blacks in low job sprawl metropolitan areas. However, this relationship does not imply that the association between mismatch and job sprawl is spurious, operating through segregation alone. Regression analysis (not shown here) demonstrates that both job sprawl and segregation have independent effects on mismatch conditions for blacks.²⁸ But black/white segregation may be one mechanism through which metropolitan job sprawl translates into greater spatial mismatch for blacks.

The right-hand side of Figure 7 also compares the average level of residential segregation in high and low job sprawl metropolitan areas after adjusting for metropolitan population. The black/white segregation index remains about 15 percent higher in high job sprawl metropolitan areas, but adjusting for population reduces the size of the gap. This implies that the positive correlation between population and job sprawl at the metropolitan level can account for some of the gap in segregation levels between areas with high and low levels of job sprawl.

It is difficult to separate out the independent effects of population, segregation, and job sprawl on spatial mismatch conditions, since the three relate closely to one another. Yet each factor seems to influence—directly or indirectly—the degree to which blacks are physically isolated from jobs at the metropolitan level.

Figure 7. Black/White Index of Segregation by Job Sprawl (Unadjusted and Adjusted for Metropolitan Area Population)



Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).

Conclusions

This survey provides an analysis of the relationship between job sprawl and the spatial mismatch between blacks and jobs. Much attention has focused on the question of sprawling development patterns more broadly, especially whether they are on the rise, and how they impact certain dimensions of social and economic life, such as health problems, pollution, and concentrated poverty. But there is little evidence on how and in what ways job sprawl connects to questions around race.

The results shown here strongly suggest that job sprawl exacerbates certain dimensions of racial inequality in America. Job sprawl seems to lead to greater spatial mismatch conditions for blacks, thereby creating potentially greater employment challenges for blacks in areas where employment is more decentralized. The findings also suggest that racial segregation is one mechanism contributing to greater mismatch conditions for blacks in areas with higher job sprawl, which also exhibit higher segregation levels.

Of course, in the real world, it is hard to separate all of these effects since they often occur simultaneously and in the same places. For example, big metropolitan areas with larger-than-average black populations seem to develop more job sprawl, and blacks in these areas often end up living far from job growth centers (either in the urban core, or on the “wrong side” of the region) in part because of racial segregation.²⁹ This paper attempts to control for many of these competing factors, establishing a relationship between job sprawl and mismatch that is robust to many regional and metropolitan area characteristic differences.

What do these results imply for policy? They suggest that efforts aimed at limiting the degree of job sprawl could potentially improve blacks' spatial access to employment, among other factors. These efforts could include regional coordination that may, for example, forge the development of urban growth boundaries, protect open space, or target investment and economic development in established neighborhoods near the urban core. Fragmented governance in metropolitan areas has made this sort



of coordination politically difficult. Still, arguments for increased regional coordination may be more politically potent when they move beyond the “suburbs gain when central cities do well” variety and include discussion of the issues of unemployment, poverty, and race confronting suburbs and central cities alike

Of course, as some research has indicated, certain actions to counteract sprawl—especially *growth controls* such as moratoria and development quotas—may result in a smaller supply of affordable homeownership units. Such reductions may disproportionately affect blacks, possibly limiting their residential access to job-rich suburban areas. But properly designed *growth management* policies have been shown to improve the supply and location of affordable housing.³⁰ In particular, targeting development in established areas closer to the urban core where abandoned buildings and/or vacant land exist could be particularly effective at mitigating these negative effects. To the extent that these efforts link residential development with existing public transit routes, they may bring additional benefits to blacks, who rely disproportionately on transit for trips to work and elsewhere.

Technical Appendix

Description of the Dissimilarity Index

To calculate the jobs-people dissimilarity index described in the main text, one needs data on population and job totals for sub-geographic units of the metropolitan area. In this study, data are measured at the ZIP code level. The actual equation for the dissimilarity index is quite straightforward. Define $Black_i$ as the black population residing in ZIP code i (where $i=(1,\dots,n)$ and indexes the ZIP codes in a given metropolitan area), $Employment_i$ as the number of jobs in ZIP code i , $Black$ as the total black popula-

tion in the metropolitan area, and $Employment$ as the total number of jobs in the metropolitan area. The dissimilarity score between blacks and jobs is given by

$$(1) \quad D = \frac{1}{2} \sum_i \left| \frac{Black_i}{Black} - \frac{Employment_i}{Employment} \right|$$

As written, the dissimilarity index ranges between 0 (perfect balance) and 1 (perfect imbalance). Multiplying this figure by 100 permits one to interpret the index values as the percentage of either of the populations that would have to move across ZIP codes to yield perfect balance.

Population data are tabulated at the ZIP code level from Census 2000 Summary File 1. The jobs-people mismatch indices are calculated for whites and blacks. This study considers as white or black those individuals who marked one race alone; those indicating more than one race are excluded from calculations (but represent a small enough proportion of the population so as not to influence the results).

Employment data come from 1999 ZIP Code Business Patterns files. These files provide an actual enumeration of jobs located in each ZIP code in the country. For the total employment/population mismatch indices, 1999 employment data are matched to 2000 population data.

The dissimilarity score is also used to measure racial segregation between whites and blacks in this survey:

$$(2) \quad D = \frac{1}{2} \sum_i \left| \frac{Black_i}{Black} - \frac{White_i}{White} \right|$$

The variables are interpreted as in Equation (1).





Appendix A. Black Spatial Mismatch Index and Job Sprawl Index, Metropolitan Areas over 500,000 Population, 2000

Metropolitan area	Population, 2000	Job sprawl index	Black spatial mismatch index
Ann Arbor, MI PMSA	578,736	99.6%	48.0%
Detroit, MI PMSA	4,441,551	92.4%	71.4%
Greensboro—Winston-Salem—High Point, NC MSA	1,251,509	90.4%	38.3%
Riverside-San Bernardino, CA PMSA	3,254,821	89.9%	41.7%
Tampa-St. Petersburg-Clearwater, FL MSA	2,395,997	88.5%	44.9%
Los Angeles-Long Beach, CA PMSA	9,519,338	87.1%	61.6%
Hartford, CT MSA	1,183,110	87.1%	47.5%
West Palm Beach-Boca Raton, FL MSA	1,131,184	87.0%	48.5%
Vallejo-Fairfield-Napa, CA PMSA	518,821	86.9%	47.1%
Atlanta, GA MSA	4,112,198	84.7%	53.9%
St. Louis, MO-IL MSA	2,603,607	84.6%	62.6%
New Haven-Meriden, CT PMSA	542,149	83.0%	54.7%
Dallas, TX PMSA	3,519,176	82.7%	56.5%
Oakland, CA PMSA	2,392,557	82.0%	55.4%
Allentown-Bethlehem-Easton, PA MSA	637,958	81.1%	37.0%
Philadelphia, PA-NJ PMSA	5,100,931	80.9%	64.2%
Memphis, TN-AR-MS MSA	1,135,614	80.8%	46.7%
Houston, TX PMSA	4,177,646	80.6%	56.5%
Raleigh-Durham-Chapel Hill, NC MSA	1,187,941	79.9%	35.3%
Minneapolis-St. Paul, MN-WI MSA	2,968,806	79.4%	55.0%
San Diego, CA MSA	2,813,833	77.6%	58.6%
Chicago, IL PMSA	8,272,768	77.0%	69.5%
Newark, NJ PMSA	2,032,989	77.0%	65.2%
Fort Worth-Arlington, TX PMSA	1,702,625	76.8%	46.5%
Scranton—Wilkes-Barre—Hazleton, PA MSA	624,776	76.1%	43.9%
Cleveland-Lorain-Elyria, OH PMSA	2,250,871	75.4%	62.0%
Cincinnati, OH-KY-IN PMSA	1,646,395	75.4%	58.8%
San Jose, CA PMSA	1,682,585	75.3%	42.9%
Indianapolis, IN MSA	1,607,486	74.9%	58.3%
San Antonio, TX MSA	1,592,383	74.3%	49.9%
Orlando, FL MSA	1,644,561	73.7%	47.5%
Norfolk-Virginia Beach-Newport News, VA-NC MSA	1,569,541	73.7%	36.2%
Charlotte-Gastonia-Rock Hill, NC-SC MSA	1,499,293	73.6%	34.5%
Denver, CO PMSA	2,109,282	73.6%	62.6%
Miami, FL PMSA	2,253,362	73.5%	64.7%
Baltimore, MD PMSA	2,552,994	72.5%	51.9%
Washington, DC-MD-VA-WV PMSA	4,923,153	72.2%	55.5%
Kansas City, MO-KS MSA	1,776,062	71.8%	64.5%
Milwaukee-Waukesha, WI PMSA	1,500,741	71.6%	72.4%
Gary, IN PMSA	631,362	71.5%	56.0%
Albany-Schenectady-Troy, NY MSA	875,583	71.1%	46.4%
Baton Rouge, LA MSA	602,894	70.2%	48.1%
El Paso, TX MSA	679,622	69.5%	45.6%
Seattle-Bellevue-Everett, WA PMSA	2,414,616	69.2%	47.3%
Grand Rapids-Muskegon-Holland, MI MSA	1,088,514	68.8%	50.4%
Phoenix-Mesa, AZ MSA	3,251,876	68.6%	41.6%
Columbus, OH MSA	1,540,157	68.6%	53.5%



Appendix A. continued

Metropolitan area	Population, 2000	Job sprawl index	Black spatial mismatch index
Mobile, AL MSA	540,258	68.3%	48.2%
Dayton-Springfield, OH MSA	950,558	68.2%	62.4%
Sacramento, CA PMSA	1,628,197	67.4%	49.8%
Jacksonville, FL MSA	1,100,491	66.9%	48.2%
Tulsa, OK MSA	803,235	66.8%	50.6%
Omaha, NE-IA MSA	716,998	66.4%	64.7%
Buffalo-Niagara Falls, NY MSA	1,170,111	66.2%	68.4%
Fort Lauderdale, FL PMSA	1,623,018	65.4%	46.9%
Louisville, KY-IN MSA	1,025,598	64.6%	50.4%
Pittsburgh, PA MSA	2,358,695	64.2%	55.6%
Salt Lake City-Ogden, UT MSA	1,333,914	64.0%	26.4%
Youngstown-Warren, OH MSA	594,746	63.2%	61.4%
Austin-San Marcos, TX MSA	1,249,763	62.4%	46.4%
Boston, MA-NH PMSA	3,406,829	61.9%	60.2%
New Orleans, LA MSA	1,337,726	61.5%	49.9%
Tucson, AZ MSA	843,746	61.0%	28.3%
Akron, OH PMSA	694,960	60.8%	52.6%
Harrisburg-Lebanon-Carlisle, PA MSA	629,401	60.8%	57.4%
Portland-Vancouver, OR-WA PMSA	1,918,009	59.6%	48.8%
Wilmington-Newark, DE-MD PMSA	586,216	59.5%	36.6%
Rochester, NY MSA	1,098,201	59.2%	57.1%
Richmond-Petersburg, VA MSA	996,512	58.8%	47.5%
Charleston-North Charleston, SC MSA	549,033	58.3%	30.4%
Knoxville, TN MSA	687,249	57.9%	42.4%
Oklahoma City, OK MSA	1,083,346	57.9%	43.7%
Toledo, OH MSA	618,203	57.0%	58.9%
Stockton-Lodi, CA MSA	563,598	53.4%	31.7%
Little Rock-North Little Rock, AR MSA	583,845	53.3%	43.5%
Columbia, SC MSA	536,691	53.1%	35.0%
Birmingham, AL MSA	921,106	52.1%	57.2%
Fresno, CA MSA	922,516	52.1%	40.5%
San Francisco, CA PMSA	1,731,183	52.0%	55.4%
Springfield, MA MSA	591,932	51.2%	56.4%
Tacoma, WA PMSA	700,820	50.1%	46.0%
Greenville-Spartanburg-Anderson, SC MSA	962,441	49.8%	27.0%
Wichita, KS MSA	545,220	47.7%	43.5%
Las Vegas, NV-AZ MSA	1,563,282	46.0%	48.4%
Sarasota-Bradenton, FL MSA	589,959	45.4%	59.7%
New York, NY PMSA	9,314,235	44.8%	70.3%
Bakersfield, CA MSA	661,645	43.3%	38.4%
Syracuse, NY MSA	732,117	43.0%	53.1%
Colorado Springs, CO MSA	516,929	41.2%	45.8%
Albuquerque, NM MSA	712,738	40.2%	34.2%
McAllen-Edinburg-Mission, TX MSA	569,463	39.8%	37.5%
Fort Wayne, IN MSA	502,141	36.9%	70.9%
Honolulu, HI MSA	876,156	26.2%	63.2%
Jersey City, NJ PMSA	608,975	7.7%	54.6%

Source: Author's calculations of data from U.S. Census Bureau and Chu (2000).





Endnotes

1. This paper employs the terms “black” and “African American” interchangeably.
2. William H. Frey, “Melting Pot Suburbs: A Census 2000 Study of Suburban Diversity” (Washington: Brookings Institution, 2001); William H. Frey, “Revival.” *American Demographics*, October 1, 2003.
3. For recent and extensive reviews of the empirical research on the spatial mismatch hypothesis see Keith R. Ihlanfeldt and David L. Sjoquist, “The Spatial Mismatch Hypothesis: A Review of Recent Studies and Their Implications for Welfare Reform,” *Housing Policy Debate* 9 (4) (1998): 849–892, and Margaret Pugh, “Barriers to Work: The Spatial Divide between Jobs and Welfare Recipients in Metropolitan Areas” (Washington: Brookings Institution, 1998).
4. See Steven Raphael and Michael A. Stoll, “Can Boosting Minority Car Ownership Rates Narrow Inter-Racial Employment Gaps?” *Brookings-Wharton Papers on Urban Affairs*, 2 (2001): 99–137, for an analysis of the impact of racial differences in car ownership rates on racial labor market inequality. There 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-skill 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 Michael A. Stoll, “Spatial Job Search, Spatial Mismatch, and the Employment and Wages of Racial and Ethnic Groups in Los Angeles.” *Journal of Urban Economics* 46 (1999): 129–155; and Harry J. Holzer, Keith R. Ihlanfeldt, and David L. Sjoquist, “Work, Search, and Travel among White and Black Youth.” *Journal of Urban Economics* 35 (1994): 320–345.
5. See Edward L. Glaeser and Matthew E. Kahn, “Decentralized Employment and the Transformation of the American City.” *Brookings-Wharton Papers on Urban Affairs* 2 (2001): 1–64, for data on increasing levels of job sprawl over time in the United States.
6. See Matthew E. Kahn, “Does Sprawl Reduce the Black/White Housing Consumption Gap?” *Housing Policy Debate* 12 (1) (2001): 77–86.
7. Most of the nation’s economic activity is covered in this series, though data are excluded for self-employed persons, domestic service workers, and most government employees. Glaeser and Kahn (2001).
8. The metropolitan areas used in the analysis are Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Areas (PMSAs) as defined by the Office of Management and Budget (OMB) in 1999 for Census 2000. Consolidated Metropolitan Statistical Areas (CMSAs), which are usually much larger than MSAs or PMSAs, were not included among these metropolitan areas. The CBD is a specific geographic area whose spatial boundaries are defined by the US Census Bureau and is that area within the central city of a metropolitan area commonly referred to as downtown. The locations of the CBDs in this analysis are drawn from the 1982 Economic Census, Geographic Reference Manual (U.S. Bureau of the Census, 1993). The data to calculate each ZIP code’s distance from the CBD ultimately come from Chenchuan Chu, *Employment Decentralization*. Undergraduate Thesis (Harvard University Department of Economics, 2000), which Matthew E. Kahn graciously provided to me.
9. Kahn (2001); Glaeser and Kahn (2001).
10. These average sprawl values are weighted by metropolitan area population, thus placing more emphasis on more populous metropolitan areas. For example, New York, Los Angeles, and Philadelphia all receive relatively large weights, given their large populations. The weighting permits us to interpret the patterns in Figure 1 as the average degree of job sprawl experienced by the typical metropolitan resident.
11. Still, because metropolitan areas that are large, growing rapidly, and/or spread out over large land areas could also have evolved that way through sprawling development patterns, the strength of the estimated relationship between metropolitan job sprawl and spatial mismatch is likely to be conservative when controlling for population.
12. See Steven Raphael and Michael A. Stoll, “Modest Progress: The Narrowing Spatial Mismatch between Blacks and Jobs in the 1990s” (Washington: Brookings Institution, 2002).
13. To be sure, a mismatch index based on the dissimilarity measure does not actually measure the physical distance between the average member of a given populations and jobs. The index measures the imbalance across geographic sub-units of the metropolitan area (for example, ZIP codes or census tracts) between members of the population and jobs. To take an extreme example, suppose that all black residents resided in one zip code of a city while all jobs were located in a different zip code. Whether these two zip codes are one mile apart or 20 miles apart will not influence the dissimilarity measure. In both instances, the dissimilarity index will equal 100. Nonetheless, as a summary measure, the dissimilarity measure does allow comparisons across geographic areas.
14. The survey calculates the dissimilarity index between these groups and total jobs. Calculating the index based on retail jobs could serve as a good indicator of the extent to which blacks and other groups are spatially isolated from low-skill jobs (retail jobs are disproportionately lower-





skilled jobs). Indices for retail jobs were calculated but results were not qualitatively different than those shown here for total employment. Note that “whites” denotes non-Latino members of that race, while Latinos may be of any race.

15. These mismatch index averages are weighted by metropolitan area population for the racial/ethnic group described by the index.
16. See Raphael and Stoll (2002). This research also indicated that over the 1990s, modest improvements occurred in blacks’ proximity to employment, principally from blacks’ increased residential mobility within metropolitan areas over the 1990s.
17. A linear regression of the mismatch index for blacks on job sprawl and metropolitan population produces a point estimate (3.1 percentage points) of the effect of job sprawl on spatial mismatch for blacks.
18. This expectation follows from the equation: $((30/100) * (30/100))=9/100$. Thus, in a random selection of metropolitan areas, we would expect about 9 of these to overlap in their degree of job sprawl and mismatch.
19. The job sprawl rankings here do not include controls for metropolitan population, which correlates with the proportion of jobs located at least 5 miles outside the CBD. See Finding C for analysis that accounts for these population differences.
20. The median sprawl measure is 45.3 percent, much lower than that measured by the mean. However, analysis using the median to split metropolitan areas into high and low sprawl areas did not produce qualitatively dissimilar results than those shown here.
21. This technique involves estimating a regression equation for the blacks/jobs mismatch index as a function of job sprawl and metropolitan population size. The predicted levels of mismatch for blacks are then estimated based on this regression equation by setting the effect of metropol-

itan population size to zero. These predicted levels of mismatch for blacks are purged of the contribution of metropolitan area population size towards the relationship between mismatch and job sprawl. Next, the predicted values of mismatch for blacks are then averaged over metropolitan areas characterized by high and low levels of sprawl. These are shown in Figure 3 as the average mismatch levels for blacks across high and low sprawl areas adjusted for metropolitan population size.

22. Small metropolitan areas are those with fewer than 1,140 square miles, while medium-sized metropolitan areas range between 1,141 and 2,155 square miles (the balance are classified as large). The sample size for these calculations is reduced by 42 metropolitan areas due to missing land area data.
23. Edward L. Glaeser and Jacob L. Vigdor, “Racial Segregation in the 2000 Census: Promising News” (Washington: Brookings Institution, 2001).
24. Glaeser and Kahn (2001); Raphael and Stoll (2002).
25. Raphael and Stoll (2002); Glaeser and Vigdor (2001). In a regression equation predicting mismatch for blacks as a function of job sprawl, metropolitan area population size and region, much of the larger, positive coefficient for the Midwest is accounted for by the inclusion of a measure of black/white segregation.
26. Raphael and Stoll (2002) show that in 2000, racial segregation between blacks and whites explains 50 percent of the variation in mismatch conditions faced by blacks.
27. The black/white index of segregation is measured in exactly the same way as the blacks/jobs mismatch index, except that whites replace jobs in the equation. The appendix includes a technical discussion of this dissimilarity index.

28. In a regression predicting mismatch conditions for blacks as a function of job sprawl, racial segregation between blacks and whites, metropolitan area population, region, and the percentage of metropolitan area that is black, the coefficients on job sprawl and racial segregation were both positive and statistically significant. More specifically, the regression equation is: $Spatial\ Mismatch\ Index_i = -0.113 + 0.099 * Job\ Sprawl\ Index_i + 0.780 * Black\text{-}White\ Segregation_i + 0.059 * Log(Population\ Size)_i + 0.046 * Northeast_i + 0.037 * Midwest_i + 0.090 * West_i - 0.029 * Percent\ Black_i$, where i indexes metropolitan areas.
29. Bruce Katz and Amy Liu, “A Region Divided: The State of Growth in Greater Washington, D.C.” (Washington: Brookings Institution, 1999).
30. Arthur C. Nelson and others, “The Link Between Growth Management and Housing Affordability: The Academic Evidence” (Washington: Brookings Institution, 2002).



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