Modest Progress:
The Narrowing Spatial Mismatch Between Blacks and Jobs in the 1990s

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"...African Americans remain the most segregated racial/ethnic group from jobs, though this segregation declined by modest amounts over the 1990s."

Findings

An analysis of U.S. Census Bureau data on the location of people and jobs in U.S. metropolitan areas from 1990 to 2000 finds that:

■ **In 2000, no group was more physically isolated from jobs than blacks.** In nearly all metropolitan areas with significant black populations, the separation between residences and jobs was much higher for blacks than whites.

■ **During the 1990s, blacks' overall proximity to jobs improved slightly, narrowing the gap in "spatial mismatch" between blacks and whites by 13 percent.** Declines in spatial mismatch for blacks were smallest in metro areas in the Northeast, and in metro areas where blacks represent a relatively large share of the population.

■ **Metro areas with higher levels of black-white residential segregation exhibit a higher degree of spatial mismatch between blacks and jobs.** In metro areas that experienced declines in black-white segregation during the 1990s, such as Minneapolis-St. Paul, MN and Pittsburgh, PA, the spatial mismatch between blacks and jobs tended to decline as well.

■ **The residential movement of black households within metropolitan areas drove most of the overall decline in spatial mismatch for blacks in the 1990s.** By contrast, had black residential locations remained the same in 2000 as in 1990, the movement of jobs over the decade actually would have increased spatial mismatch for the metropolitan black population.

I. Introduction

D uring the latter half of the twentieth century, changes in the location of employment opportunities within metropolitan areas increased the physical distance between predominantly black residential areas and the locations of important employment centers.[2] While black residential locations have remained fairly centralized and concentrated in older urban neighborhoods of the nation's metropolitan areas, employment has continuously decentralized towards suburbs and exurbs. Many social scientists argue that this "spatial mismatch" between black residential locations and employment opportunities at least partly explains the stubbornly inferior labor-market outcomes experienced by African Americans.[3] The difficulties of reverse

commuting in many metropolitan areas, coupled with the fact that high proportions of blacks do not own cars,[4] may render inaccessible many jobs for which black workers are suited.[5]

Several developments during the 1990s, at the same time, suggest that the geographic isolation of minority communities from employment opportunities may have lessened. The economic boom over the latter part of the 1990s brought with it tremendous economic and employment growth— so much so that the hemorrhaging of central-city employment centers that characterized the previous four decades slowed, and in some cases reversed.[6] With talk of the revival of central cities, many middle- and upper-income households began to repopulate older urban neighborhoods, bringing with them consumer dollars and businesses that cater to such demand. With this revival came talk of the "competitive advantage of the inner city," in which poor, distressed, and predominantly minority urban neighborhoods were seen as strategic areas of capital investment because of their underserved retail markets and geographic proximity to central business districts, among other factors.[7] In fact, in some instances, the development and repopulation of these neighborhoods proceeded to the point where many observers of urban affairs increasingly turned their attention to the potentially negative consequences of gentrification.[8]

Together, these trends suggest that employment may have moved closer to black residential locations during the 1990s. Moreover, several economic trends indicate that black residential mobility may have increased. First, in large part because of the economic boom, black unemployment rates dropped to record lows during the decade, a development that is likely to have increased housing demand among black households.[9] Second, black homeownership rates also increased, a development that likely

indicates greater black representation in suburban communities.[10] These factors are largely consistent with reports that residential segregation between African Americans and whites declined by modest amounts in the United States over the 1990s.[11]

Central-city job growth, then, coupled with black residential mobility, may well have ensured that African Americans' spatial proximity to jobs improved over the 1990s. The magnitude of this improvement, however, has yet to be quantified. In this study, we assess the extent to which the geographic mismatch between blacks and jobs changed during the 1990s. Using data from the 1990 and 2000 decennial censuses, along with Census Bureau data on the geographic location of employment opportunities, we construct measures of the degree of geographic imbalance between people and jobs within the nation's 316 metropolitan areas. We use these measures to assess how the American urban landscape has changed along this dimension, and to compare the experience of African Americans to those of other racial and ethnic groups. We focus particular attention on the 20 metropolitan areas with the largest black populations, which together contain a majority of the nation's African American population.

Our analysis of these data provide new evidence that African Americans remain the most segregated racial/ ethnic group from jobs, though this segregation declined by modest amounts over the 1990s. Moreover, we find that these marginal improvements are driven entirely by the residential movement of blacks within metropolitan areas. Despite the impression of urban revitalization in many U.S. cities, we find that the overall patterns of job growth in the 1990s were biased towards aggravating the large spatial imbalance between blacks and employment opportunities.

II. Methodology

In the following pages, we measure the spatial imbalance between jobs and residential locations using the "index of dissimilarity." The dissimilarity index has been employed in the past to measure the extent of residential segregation between members of different racial and ethnic groups within a given metropolitan area. Our analysis substitutes jobs for one of the racial/ethnic groups, and measures the degree of separation at the metropolitan level between the physical locations of those jobs, and the locations of members of a particular racial/ethnic group.

We adopt the dissimilarity index to describe the imbalance between residential and employment distributions for each of the 300-plus U.S. metropolitan areas.[12] The dissimilarity index ranges from 0 to 100, with higher values indicating a greater geographic mismatch between populations and jobs being described, and a given index value describing the imbalance for an entire metropolitan area. Hence, the index value for blacks and retail jobs in Chicago describes the extent to which the neighborhoods that blacks reside in differ from the geographic locations where retail jobs are located for the nine-county Chicago metropolitan area. While this measure does not capture the actual distance that individual workers travel to reach their jobs, it does allow us to make useful comparisons between groups in the degree to which workers are co-located with employment opportunities.

The actual numerical value of the dissimilarity index has a convenient interpretation. In this analysis, the index can be interpreted as the percentage of either jobs or people that would have to be relocated to different neighborhoods to completely eliminate any geographic imbalance. For example, the 1990 index value describing the imbalance between the residential

distribution of blacks and the spatial distribution of total employment in Chicago is 73.7. This indicates that in 1990, 73.7 percent of blacks residing in Chicago would have had to relocate within the metro area to be spatially distributed in perfect proportion with the spatial distribution of employment opportunities.[13] A hypothetical index of zero, on the other hand, would indicate that black residences were distributed in exactly the same proportions as jobs throughout the metro area, and that no relocation would be necessary to achieve spatial balance.

In this fashion, we calculate dissimilarity indices for all metropolitan areas for the years 1990 and 2000. That is, we present jobs-people mismatch indices for four population groups: whites, blacks, Asians, and Hispanics. For each population group, moreover, we measure geographic mismatch relative to two measures of employment: total employment and retail employment. Indices based on total employment provide an overall measure of the imbalance between people and jobs. Indices based on retail employment provide estimates of the geographic imbalance between our four racial/ethnic groups and relatively low-skilled jobs since a large fraction of retail jobs require relatively little education or training.[14] To calculate the indices, we use data on total population measured at the zip code level from the 1990 and 2000 Census of Population and Housing, and employment data from the 1992 Economic Census and 1994 and 1999 Zip Code Business Patterns files. A technical discussion of the dissimilarity index along with a detailed discussion of our data sources follows the analysis, and is presented in the technical appendix.

One caveat to the interpretation of these measures is in order, however: In this study, we do not examine variation in black proximity to employment opportunities by differences in socioeconomic status among blacks. To the extent that any improvements we observe are driven by the residential mobility of upper-income black households, spatial proximity to employment for poor blacks, those arguably most affected by spatial isolation from employment, may not have improved at all. We do, however, provide evidence suggesting that black households across the socioeconomic spectrum may have shared in the overall trends on spatial mismatch in the 1990s.

III. Findings

A. In 2000, no group was more physically isolated from jobs than blacks. Trends over the latter part of the last century served to increase the physical separation between minority households—particularly African Americans—and jobs. Our analysis of spatial mismatch in the final decade of the century confirms that blacks remain at a significant disadvantage in their proximity to jobs relative to other racial/ethnic groups.

Figure 1 presents average values for our measures of geographic mismatch in 2000—the dissimilarity index for total employment, and that for retail employment—by race and ethnicity. These averages are weighted by the metropolitan area population counts for the racial/ethnic group being described by the index.[15]

The most striking pattern observed in Figure 1 is that clear racial/ethnic differences persist in the degree of mismatch between people and jobs. In 2000, the index values indicate that more than 50 percent of blacks would have had to relocate to achieve an even distribution of blacks relative to jobs. The comparable figures for whites are 20 to 24 percentage points lower. The degree of geographic mismatch from employment opportunities experienced by Asians and Hispanics lies between the values for whites and blacks. The values for the Asian mismatch indices are from 10 to 15 percentage points lower than those for blacks, while the index values for Hispanics are 9 to 12 percentage points lower. Interestingly, for all racial and ethnic groups, the degree of mismatch calculated using retail employment is comparable to the degree of mismatch calculated using total employment, suggesting that minorities are perhaps no more isolated from low-skilled jobs than they are from employment generally.[16]

Looking behind the aggregate national values, Table 1 presents total employment and retail employment index values for blacks and whites for the 20 metropolitan areas with the largest black populations.[17] (Appendix Table A presents comparable figures for the same 20 metropolitan areas for Hispanics and Asians.) The uniformity is striking: In 18 out of these 20 metropolitan areas, blacks contended with

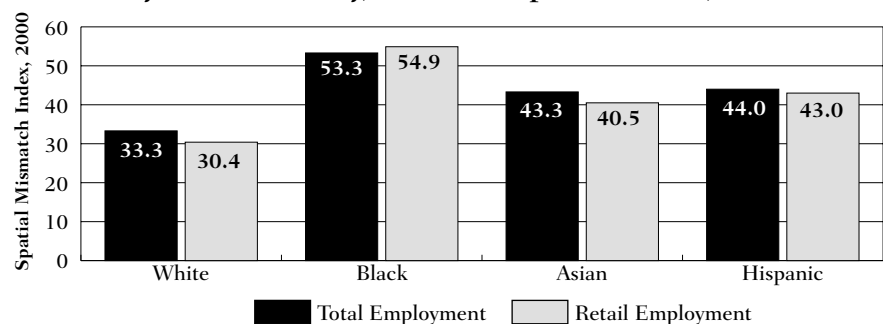**Figure 1. Spatial Mismatch Between People and Employment By Race/Ethnicity, U.S. Metropolitan Areas, 2000**

Spatial Mismatch Index, 2000

	White	Black	Asian	Hispanic
Total Employment	33.3	53.3	43.3	44.0
Retail Employment	30.4	54.9	40.5	43.0

Table 1
Spatial Mismatch Between Blacks, Whites and Total/Retail Employment, 20 Metropolitan Areas with the Largest Black Populations, 1990–2000

| | Total Employment Indices (percent) | | | | Retail Employment Indices (percent) | | | |
| | Blacks | | Whites | | Blacks | | Whites | |
	2000	Change 1990-2000	2000	Change 1990-2000	2000	Change 1990-2000	2000	Change 1990-2000
Atlanta	53.9	-3.2	39.6	1.0	52.4	-6.2	30.5	-2.4
Baltimore	51.9	-4.1	37.1	3.1	55.9	-1.0	31.0	2.3
Charlotte	34.5	-6.2	35.4	0.2	34.0	-12.8	31.9	-2.9
Chicago	69.5	-4.2	34.5	1.7	70.3	-4.1	27.7	-0.3
Cleveland	62.0	-2.5	31.0	0.0	64.6	-2.0	26.0	-0.3
Dallas	56.5	-1.2	40.4	0.4	51.9	-0.8	31.4	0.2
Detroit	71.4	-4.2	36.5	1.6	76.8	-2.6	30.1	3.7
Ft. Lauderdale	46.9	-4.0	30.0	4.0	47.1	-6.2	21.8	0.9
Houston	56.5	-2.0	39.6	1.2	54.2	-2.9	29.6	-1.4
Los Angeles-Long Beach	61.6	-3.2	37.3	2.8	61.2	-4.6	27.9	0.1
Memphis	46.7	-7.3	42.1	3.2	45.2	-8.7	38.3	5.3
Miami	64.7	2.5	35.8	1.9	62.0	1.9	28.6	3.7
New Orleans	49.9	1.5	39.6	1.0	49.9	1.1	33.7	-1.7
New York	70.3	0.4	44.4	-2.7	68.5	-2.0	34.4	-1.4
Newark	65.2	-3.0	33.6	2.4	67.0	-2.1	29.5	-0.2
Norfolk	36.2	0.3	37.1	3.4	41.3	-2.1	37.0	6.0
Oakland	55.4	-1.4	36.9	1.4	55.3	-5.4	31.0	2.6
Philadelphia	64.2	-4.3	34.4	-0.3	67.1	-4.7	28.5	-0.9
St. Louis	62.6	-2.3	38.4	2.3	66.7	-0.8	28.8	-0.4
Washington, DC	55.5	-2.9	42.3	2.0	52.6	-3.6	35.8	1.1

a much higher degree of spatial mismatch than whites in 2000. For instance, the separation between blacks and jobs in Chicago and Cleveland was roughly double that experienced by whites. The sole exceptions are the Charlotte and Norfolk metro areas, where the index values for whites and blacks were nearly identical.

B. During the 1990s, blacks' overall proximity to jobs improved slightly, narrowing the gap in "spatial mismatch" between blacks and whites by 13 percent.
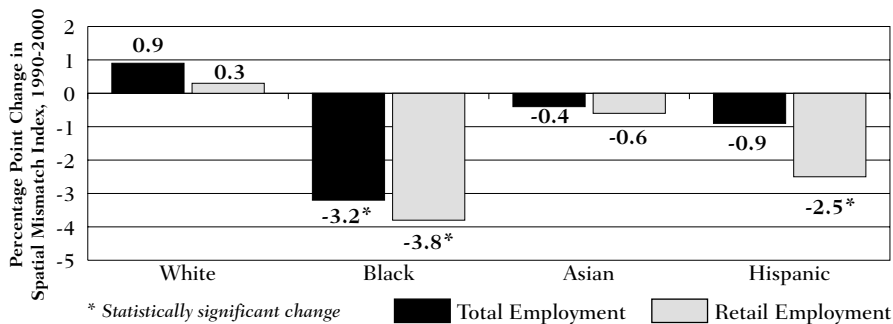As with residential segregation, spatial

mismatch between blacks and jobs declined in the 1990s, but the changes were modest in scale. The total employment mismatch index for blacks dropped by 3.2 percentage points between 1990 and 2000, while the retail employment index declined by 3.8 percentage points—both statistically significant changes (Figure 2). For Hispanics, there was no significant decline in the geographic imbalance between residences and total employment opportunities, but the retail employment mismatch index did decline by a statistically significant 2.5 percentage points. For whites and Asians, there were very small changes

in the average mismatch values—none large enough to be statistically significant. Overall, then, slight improvements in mismatch conditions for blacks in the 1990s, combined with no measurable change for whites, served to narrow the difference in average mismatch between these groups by approximately 13 percent.

The average trend documented in Figure 2 is also evident when we examine the indices for specific metropolitan areas. Table 1 shows that the improvements experienced by blacks in the aggregate occurred in nearly all of the metropolitan areas displayed in the table. Of the 20 metropolitan

Figure 2. Changes in Spatial Mismatch By Race/Ethnicity, U.S. Metropolitan Areas, 1990 to 2000

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* *Statistically significant change* Total Employment / Retail Employment

White: 0.9 (Total Employment), 0.3 (Retail Employment)
Black: -3.2* (Total Employment), -3.8* (Retail Employment)
Asian: -0.4 (Total Employment), -0.6 (Retail Employment)
Hispanic: -0.9 (Total Employment), -2.5* (Retail Employment)

areas with the largest black populations, 16 experienced declines in spatial mismatch between black residences and total employment, while 18 experienced declines in mismatch between black residences and retail employment. For whites, as well as Asians and Hispanics, fewer areas saw mismatch measures decline, and the changes in the indices were generally smaller. Indeed, among the 20 metro areas examined in Table 1, only New York exhibited a significant decrease in spatial mismatch between whites and total employment in the 1990s.

At the same time, black spatial mismatch within metro areas appears to vary by where the metro area is located, and the relative size of the black population there. Table 2, which presents mismatch indices by region and black share of the population; reveals these patterns:[18]

■ Blacks residing in metropolitan areas in the Northeast and Midwest were the most physically isolated from employment opportunities, and blacks residing in the South were the least isolated. While average mismatch indices declined in all areas, the declines were smallest in the Northeast. Midwestern metro areas, which had exhibited the highest average degree of mismatch between blacks and jobs in 1990, experi-

enced a comparatively large decline in overall mismatch during the decade.

■ The level of mismatch between blacks and jobs proved most severe in metros where a relatively large percentage of the population

is black. As black share of the population increased, the degree to which black residences were physically separated from jobs also increased. The gap in the blacks/jobs mismatch index between metros with high black representation (more than 15 percent) and low black representation (2 percent or less) was more than 20 percentage points. In addition, metro areas with smaller black population shares exhibited larger declines in spatial mismatch between blacks and total employment in the 1990s.

These patterns raise several questions about how regional differences in growth dynamics and racial composition impact the geographic imbalance between black residences and employment opportunities. The next section explores whether metro-

Table 2
Spatial Mismatch Between Blacks and Total/Retail Employment by Region and Black Share of Metropolitan Area Population, 1990–2000

	Total Employment (percent)		Retail Employment (percent)	
	2000	Change 1990–2000	2000	Change 1990–2000
Region				
Northeast	62.9	-1.9	65.0	-2.8
Midwest	62.5	-4.7	65.9	-4.0
South	45.4	-2.9	46.7	-3.2
West	51.9	-4.3	51.0	-5.2
Black Share of Metropolitan Population[a]				
Bottom Quarter	31.8	-4.7	35.9	-2.5
Lower-Middle Quarter	48.2	-4.3	50.5	-4.6
Upper-Middle Quarter	52.7	-3.8	55.4	-5.0
Top Quarter	54.5	-2.8	55.6	-3.3

a. The bottom quarter of metro areas have black population shares ranging from 0 percent to 2.2 percent; lower-middle quarter—2.3 percent to 6.9 percent; upper-middle quarter—6.9 percent to 15.4 percent; top quarter—15.4 percent and above.

area differences in residential segregation may explain differences in the spatial mismatch facing black households.

C. Metro areas with higher levels of black-white residential segregation exhibit a higher degree of spatial mismatch between blacks and jobs.
The patterns in Tables 1 and 2 indicate a fair degree of variation across metropolitan areas in the extent to which blacks are isolated from employment opportunities. Further analysis suggests that much of this this cross-area variation can be explained by the degree of housing segregation between blacks and whites in each of the 316 metropolitan areas. Moreover, it turns out that changes in the degree of black/white residential segregation played a role in changing regional mismatch conditions during the 1990s.[19]

First off, the data indicate a strong positive relationship between spatial mismatch for blacks and black/white segregation. Figure 3 presents a visual representation of this relationship for all metropolitan areas in 2000.[20] Each point on the scatter plot represents a single metropolitan area, with its black/white residential segregation index on the horizontal axis, and its blacks/total employment mismatch index on the vertical axis. Clearly, as residential segregation between blacks and whites increases, the physical separation of blacks from total employment also increases. Examples at the extremes illustrate the point. In the Portland, OR metro area, only 26 percent of the black population would have needed to relocate in 2000 to achieve an even distribution of blacks and whites across neighborhoods. There, the mismatch index between blacks and jobs was just 19 percent. In the Detroit, MI metro area, fully 85 percent of the black population would have had to relocate in 2000 to achieve an even black-white residential distribution, and the mismatch

Figure 3. Blacks/Jobs Mismatch Versus Black/White Residential Segregation, U.S. Metropolitan Areas, 2000
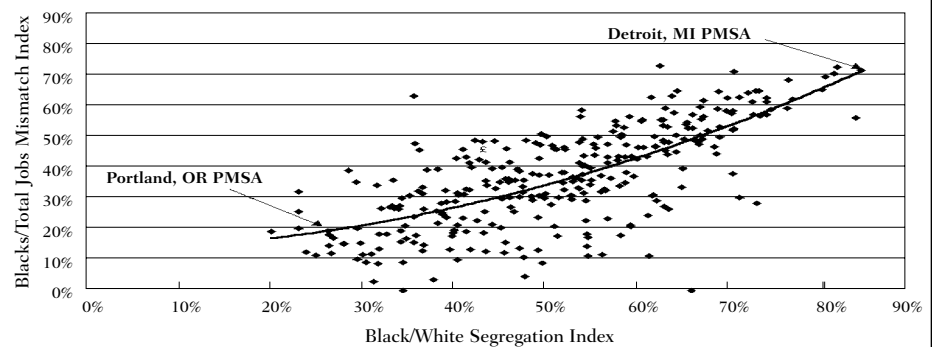
index for blacks and total employment was 71 percent.

Our analysis further finds that nearly 50 percent of the variation in the mismatch index across metropolitan areas in 2000 can be explained by variation in the degree of black/white residential segregation. These results go a long way in explaining the findings in Tables 1 and 2 documenting lower mismatch indices for blacks in the South and in areas with smaller black populations. Historically, racial residential segregation has been relatively low in both of these types of metro areas.[21] For instance, in Southern metros like Charlotte and Norfolk with a lower degree of spatial mismatch for blacks, black/white segregation indices are 20 to 30 percentage points lower than in Midwestern metros like Chicago and Cleveland where blacks are more isolated from employment. Hence, the figures imply that a direct cost of black/white segregation is the physical isolation of blacks from employment opportunities. This is not too surprising, considering that our mismatch indices indicate that jobs and white residential locations tend to be co-located (as can be seen by the low mismatch values for whites in Figure 1 and Table 1).

To assess whether changes in the degree of black/white residential segregation were in any way related to

declines in mismatch between blacks and jobs, Figure 4 presents a similar scatterplot of the changes in these two indices over the 1990s. As can be seen, changes in mismatch conditions are positively associated with changes in residential segregation. Again, to use examples from the extremes, as residential segregation between blacks and whites declined by 16–17 percentage points in the Minneapolis-St. Paul, MN and Pittsburgh, PA metro areas, the mismatch index for blacks declined by 11 percentage points. On the other hand, segregation climbed by 11 percentage points in the Mansfield, OH metro area, and the mismatch between blacks and jobs increased by 17 percentage points.

Overall, the relationship displayed in Figure 4 suggests that the general trend of decreasing black-white segregation in metropolitan areas in the 1990s contributed to a modest decline in spatial mismatch between blacks and jobs over the decade. Nonetheless, while the positive relationship shown in Figure 4 is highly statistically significant, only 10 percent of the variation in the change in the mismatch index can be explained by the change in black/white housing segregation. The implication is that other factors beyond changing residential segregation clearly contributed to the changing imbalance between black residences and employment in the 1990s.

Figure 4. Change in Blacks/Jobs Mismatch Versus Change in Black/White Residential Segregation, U.S. Metropolitan Areas, 1990 to 2000
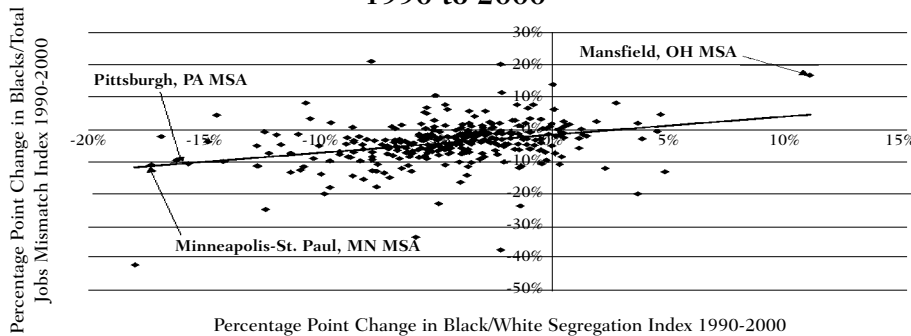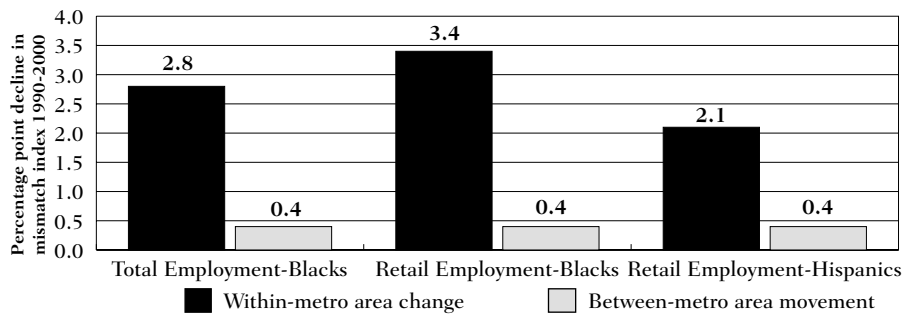

Percentage Point Change in Blacks/Total Jobs Mismatch Index 1990-2000

Mansfield, OH MSA

Pittsburgh, PA MSA

Minneapolis-St. Paul, MN MSA

Percentage Point Change in Black/White Segregation Index 1990-2000

Figure 5. Causes of Decline in Spatial Mismatch for Blacks and Hispanics, U.S. Metropolitan Areas, 1990 to 2000

Percentage point decline in mismatch index 1990-2000

Total Employment-Blacks: 2.8, 0.4
Retail Employment-Blacks: 3.4, 0.4
Retail Employment-Hispanics: 2.1, 0.4

■ Within-metro area change   □ Between-metro area movement

Of course, our results cannot confirm that lower-income black households saw an across-the-board decline in their spatial isolation from job opportunities, because our analysis does not take into account the socioeconomic status of black households across metro areas. Nonetheless, the fact that the vast majority of metro areas saw declines in spatial mismatch, together with the association between declining mismatch and declines in black/white housing segregation, strongly suggests that the benefits of narrowing spatial mismatch in the 1990s were not confined to upper-income black households alone.

D. The residential movement of black households within metropolitan areas drove most of the overall decline in spatial mismatch for blacks in the 1990s.

The declines in the degree of spatial isolation experienced by blacks could have been the result of several forces. One possible explanation is that blacks are increasingly choosing to live in metropolitan areas with low levels of spatial isolation between blacks and jobs. If this were the case, even in the absence of any metro-level improvement in these indices, black migration between metropolitan areas would lower the average value (since migration patterns would increase the weight placed on low-mismatch areas).

Alternatively, the improvements observed during the 1990s may be driven entirely by changes in job location occurring within metropolitan areas. It may be the case that the

decentralization of employment, a long-term trend in U.S. cities extending back to at least World War II, reversed during the 1990s. In this scenario, the decline in urban crime, the gentrification of older urban neighborhoods, and federal, state, and local urban-development policies geared towards encouraging job growth in central cities may all have improved the balance between where blacks live and where jobs are located.

Another possible contributor is black residential mobility within metropolitan areas. To the extent that black households suburbanized during the 1990s, or more generally, tended to move where the jobs are, such movement would cause improvements in the mismatch indices we are measuring here. In fact, the observed relationship between declines in the extent of mismatch and declines in black/white housing segregation documented in the previous section suggests that black residential mobility is an important factor.[22]

In this section, we assess the causes of the modest improvements in the mismatch indices for blacks and Hispanics documented above. We first consider whether the observed improvements are driven by between-area migration or within-area improvements. We then analyze whether the improvements occurring within metropolitan areas are driven by a more favorable geographic pattern of employment growth, or by the residential mobility of black households. (A detailed description of the methodology we used to conduct this part of the analysis can be found in the Technical Appendix.)

1. Nearly all of the improvement in overall mismatch between blacks and jobs in the 1990s was driven by within-metro-area changes, as opposed to movement between metro areas.
Our first finding is that the modest overall decline in spatial mismatch between blacks and jobs in the 1990s was driven not by the relocation of the

black population to metro areas with lower degrees of spatial mismatch, but by actual within-metro-area reductions in the physical isolation of black residences from employment locations. Figure 5 presents the results of these decompositions for the indices that changed by statistically significant amounts in the 1990s—retail employment for Hispanics, and both total employment and retail employment for blacks.

The interpretation of Figure 5 is straightforward; each bar represents the total contribution, in percentage points, of either the within-metro or the between-metro trend to the total decline in the spatial mismatch measure indicated. For instance, 2.8 percentage points out of the overall 3.2 percentage point decrease in the mismatch between blacks and total employment was driven by improvements within metropolitan areas. By contrast, the movement of black households between metro areas contributed only 0.4 percentage points to the overall 3.2 percentage point decline.

Figure 5 in this fashion clearly demonstrates that the lion's share of the improvement in the jobs-people mismatch for blacks and Hispanics resulted from changes within metropolitan areas. This finding is not too surprising given the visible declines in these indices for blacks presented in Table 1. Conversely, it seems that very little inter-area migration was driven by the desire of black or Hispanic households to reside in metropolitan areas with lower spatial isolation from jobs.

2. The within-metropolitan area improvements in mismatch conditions over the 1990s were driven entirely by the residential mobility of blacks. We now turn to the question of whether the large within-area improvement is caused by black and Hispanic residential mobility, or changes in the geography of job growth. To address this question, we compute two hypothetical indices that, when compared

to the actual values for 1990 and 2000, allow us to discern the forces driving the within-area reductions in mismatch. Both indices, along with actual values for 1990 and 2000, are displayed in Table 3:

■ The first hypothetical mismatch measure uses 1990 population data and 2000 employment data. It can be interpreted as measuring the imbalance between people and jobs that would have resulted if the black population had not moved during the 1990s, while employment distributions underwent their actual change over the course of the decade.

■ Our second hypothetical mismatch measure uses 2000 population data and 1990 employ-

ment data. It can be interpreted as the level of spatial imbalance between jobs and people that would have resulted had the geographical distribution of employment not changed during the 1990s, while population distributions underwent their actual change during the decade.

Our analysis indicates that the residential movement of blacks within metropolitan areas drove declines in the spatial mismatch between blacks and jobs in the 1990s. In fact, we find that, in the absence of this movement, changes in the geography of employment opportunities would have aggravated the spatial imbalance between blacks and jobs.

Focusing first on the hypothetical indices that assume movement of jobs,

Table 3
Contribution of Residential Movement and Job Movement to Changing Spatial Mismatch between Blacks, Hispanics and Employment, U.S. Metropolitan Areas, 1990 to 2000

	Blacks (percent)		Hispanics (percent)
	Total Employment	Retail Employment	Retail Employment
Actual 1990 mismatch index	56.5	58.7	45.5
Hypothetical index assuming population distribution did not change[a] (Job movement)	60.4	60.3	45.1
Hypothetical index assuming employment distribution did not change[b] (Residential movement)	52.4	53.7	44.1
Actual 2000 mismatch index	53.3	54.9	43.0

a. *The average values of the indices presented here are weighted by 1990 metro area population figures.*
b. *The average values of the indices presented here are weighted by 2000 metro area population figures.*

but not blacks, we note that they are higher than the actual mismatch indices for 2000 (Table 3). This indicates that had the black population remained in place, and jobs redistributed as they did during the 1990s, the spatial mismatch index for blacks and total employment would have risen by approximately 4 percentage points. On the other hand, had jobs remained in place, and black residences changed as they did over the decade, our second hypothetical index indicates that the spatial mismatch index for total employment would have dropped by approximately 4 percentage points – more than the actual decline. As it turned out, the residential mobility of black households in the 1990s was the more dominant trend, and the overall index declined by a little over 3 percentage points (as shown here and in Figure 2).

The results for Hispanics are slightly different. The hypothetical retail employment index that assumes mobility of jobs, but not people, is only slightly lower than the actual average in 2000. The more significant contribution to the reduced mismatch between Hispanics and retail jobs appears to have resulted from the residential mobility of the population. Together, these trends effected a 2.5 percentage point drop in the index over the 1990s.

To summarize, our calculations indicate that nearly all of the reduction in the average geographic imbalance between where blacks live and where jobs are was driven by within-metropolitan area improvement during the 1990s, rather than black migration between metropolitan areas. The same is true for the improvement in the imbalance between retail jobs and Hispanics. Behind these within-area improvements, we find that changes in the spatial location of employment opportunities during the decade actually contributed to the further isolation of blacks from jobs. However, the residential movement of

blacks within areas was sufficient to both undo the negative impact of job decentralization, and create a net reduction in mismatch between blacks and jobs.

IV. Conclusion

The patterns observed in the 1990 and 2000 decennial censuses are quite clear. Black households in both years are consistently the most physically isolated from employment opportunities, followed by Hispanic, Asian, and white households. While the decade of the 1990s did reduce the separation between blacks and jobs, those improvements were modest, and large racial differences in physical access to jobs remained at the close of the century. Moreover, employment growth in central cities over the decade did little to alter this imbalance. In fact, as in past decades, the geography of employment growth in U.S. metropolitan areas was such that, in the absence of black residential mobility, the physical isolation of black households from jobs would have increased.

One encouraging finding from our analysis is that the residential location decisions of black households appear to be determined in part by the geographical distribution in employment opportunities. In fact, all of the improvements in the spatial imbalance between blacks and jobs that we observe can be attributed to black residential mobility. To what extent black residential mobility over the decade was actually driven by black citizens' desire to move closer to employment opportunities or other factors remains an open question.

At the same time, our cautious optimism is tempered by the fact that we did not examine the socioeconomic distribution of African American residential mobility. If residential mobility was concentrated among middle- and upper-income African Americans, the

black poor, who arguably are most affected by mismatch conditions, are likely to remain in older, urban, and increasingly jobless neighborhoods. What's more, the high levels of mismatch for African Americans and the modesty of the improvements in mismatch conditions that we observe indicate that spatial mismatch is a deep structural pattern in U.S. urban areas that survived a period characterized by the strongest economic conditions in decades. Hence, while the news from Census 2000 invites cautious optimism, the problem of geographic access to employment opportunities for minorities has certainly not been solved.

To be sure, policies aimed at fostering residential mobility among blacks are not the only tools that can be used to mitigate the negative consequences of spatial mismatch on African American employment prospects. The far reaches of a metropolitan area can also be made accessible by transportation policies that either improve public transit or that encourage car-ownership among black households. Our recent work, for example, shows that blacks who own cars have employment rates that are no lower than whites that own cars, while among those without cars, the racial difference in employment rates is substantial.[23] In addition, research suggests that extending public transportation into job-rich suburban corridors can enhance employment opportunities for inner-city minority populations.[24] These findings suggest that much can be accomplished through effective transportation policy.

Alternatively, the mismatch conditions experienced by blacks could be mitigated by effective inner-city development policies. But the results shown here indicate that even in the best of economic circumstances, such development was not sufficient to undo the spatial disadvantage of blacks. Our results strongly suggest that promoting black residential mobility seems an

effective and efficient policy approach for improving black people's access to jobs. Additionally, encouraging the residential mobility of black households may also generate benefits that go beyond greater access to employment opportunities. For example, differences in housing quality, school quality, and other local amenities, in addition to fostering greater interracial contact, may also argue for a residential mobility strategy.

The evidence presented here confirms that despite modest progress in the 1990s, America's black and other minority citizens continue to live in places that are farther removed from metropolitan jobs than white neighborhoods. Whatever the approach, alleviating this stubborn geographic barrier to their wellbeing merits a serious policy response.

Technical Appendix

Description of the Dissimilarity Index and Data Sources Used

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, we use data 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,...,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 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 given by

(1)

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

As written, the dissimilarity index ranges between 0 (perfect balance) and 1 (perfect imbalance). We multiply this figure by 100. This permits us to interpret the index values as the percent (rather than the proportion) of either of the populations that would have to move to yield perfect balance.

We use total population data tabulated at the zip code level from the 1990 and 2000 U.S. Census of Population and Housing. The 1990 population data are drawn from the 1990 Summary Tape File 3B while the 2000 population data come from the 2000 Summary Tape File 1. We calculate jobs-people mismatch indices for four population groups: whites, blacks, Asians, and Hispanics. Since the 2000 Census permitted respondents to describe themselves by more than one racial category, a brief discussion of how we defined racial groups in the 2000 census is needed.

For the year 2000, we experimented with three different sets of criteria for defining race. First, we restricted the population counts to those who chose a single racial descriptor only. Second, we defined racial categories in the most inclusive manner possible, counting all respondents who self-identify as white in the white totals, all respondents who self-identify as black in the black totals, and so on. Finally, we used a hierarchical set of definitions to tabulate populations, defining black as all those who self-identify as black, Asians as all those who self-identify as Asian excluding those who also self-identify as black, and whites as all those who self-identify as white excluding those who self-identify as either black or Asian. The first set of criteria is the most restrictive, dropping all multiracial respondents. The second set of criteria is most inclusive and involves double counting multiracial respondents across categories. The final set of criteria is intended to capture phenotypic differences from the perspective of how others are likely to define the respondent. Since informa-

tion on whether the respondent is Hispanic was collected in a similar manner in both years, we did not experiment with alternative measures for this group in 2000. All those who self-identify as Hispanic are included in the Hispanic total.

For whites and Asians, the 2000 mismatch index values using the three alternative racial definitions are nearly identical. For blacks, the 2000 index values using the more inclusive definition of black are slightly smaller than the average value using the restrictive single-race only definition. This pattern indicates that multiracial blacks live in closer proximity to jobs than blacks that self-identify as being black only. Since one of our key findings is that the geographic mismatch between blacks and jobs improved during the 1990s, we have chosen to employ the more restrictive definition of race. Hence, we present conservative estimates of these improvements.

Despite this choice, the difference between the 2000 estimates of the black/jobs mismatch using the restrictive and inclusive definitions of black is quite small, with the dissimilarity scores using the inclusive definition of black roughly 0.6 percentage points lower (for an index ranging from 0 to 100) on average than the comparable index using the more restrictive definition. This difference is also quite small relative to the black-white differences observed in these indices (on the order of 20 percentage points) and relative to average improvements in these indices for blacks observed during the 1990s (on the order of 3 to 4 percentage points). Hence, choosing the more conservative definition does not qualitatively alter our conclusions. The alternative calculations using the more inclusive definitions of race are available upon request.

We use employment data from several sources. To measure retail employment, we use zip-code level data from the 1992 Economic Census and the 1999 Zip Code Business Pat-

terns files. One problem is that while the 1992 Economic Census provides data on total retail employment in each zip code in the country, the 1999 Zip Code Business Patterns file provides data on the number of retail establishments by establishment size categories only (i.e., the number of establishments with one to four employees, five to nine employees, 10 to 19 employees, 20 to 49 employees, 50 to 99 employees, 100 to 249 employees, 250 to 499 employees, 500 to 999 employees, and 1000 + employees). To overcome this discrepancy, we convert the establishment data to total employment counts. To do this, we multiply the number of establishments in each category by the average of the two endpoints defining the category. For example, for establishments with one to four employees, we multiple the number of establishments by 2.5 to estimate the number of jobs at firms in this size category. For firms with 1000+ employees, we multiply the number of establishments by 3,000.

The sum of these figures across categories provides an estimate of the number of retail jobs in each zip code. To check whether this imputation is reasonable, we imputed retail employment for 1994 using the earliest year of the zip code business patterns data and compare these imputations to data from the economic census for 1992. The correlation between these two zip-code level measures of retail employment is 0.97. In addition, we compared the distribution of total retail employment across size categories for 1999 for the nation implied by our 1999 imputation to comparable figures published by the Bureau of Labor Statistics for 2002. Again, our imputations and the published figures are qualitatively similar. The 1999 employed data are matched to the 2000 population data while the 1992 employment data are matched to the 1990 population data.

For total employment, the Zip Code Business Patterns files provide an actual enumeration of the number of jobs located in each zip code in the country. Hence, to measures total employment, we use these series from the 1999 and 1994 Zip Code Business Pattern Files. Unfortunately, 1994 is the earliest year of the Zip Code Business Pattern data files, and data on total employment by zip code is not provided in the 1992 Economic Census. Hence, we are forced to use the 1994 total employment data for the 1990 jobs/total employment mismatch indices.

For the total employment/population mismatch indices, we match the 1999 employment data to the 2000 population data and the 1994 employment data to the 1990 population data. In the main text, we refer to the mismatch indices by the year from which the population data are drawn and by whether the employment data used are total employment or retail employment.

Description of Decomposing the Average Change in Dissimilarity into Within-Metropolitan Area Improvements and Between-Metropolitan Area Population Movements

We decompose the average change in the mismatch indices into components attributable to within-metropolitan area improvements and between-metropolitan area migration in the following manner. Define w_i^{90} as the proportion of the 1990 black population residing in metropolitan area i, w_i^{2000} as the proportion of the 2000 black populations residing in metropolitan are i, I_i^{1990} as the jobs/blacks dissimilarity index value for metropolitan area i in 1990, and I_i^{2000} as the jobs/blacks dissimilarity index value for metropolitan area i in 2000. The weighted averages of the indices for 1990 and 2000 are given by

(2)
$$\mu_{1990} = \sum_i w_i^{1990} I_i^{1990}, \ \mu_{2000} = \sum_i w_i^{2000} I_i^{2000},$$

respectively. The change in the average value over the decade is given by the equation

(3)
$$Change = \sum_i (w_i^{2000} I_i^{2000} - w_i^{1990} I_i^{1990}).$$

To decompose the change into the components discussed above, one needs to add and subtract the term within the parentheses of the change equation. Factoring this equation yields the decomposition of the change,

(4)
$$Change = \sum_i [w_i^{2000}(I_i^{2000} - I_i^{1990}) + I_i^{1990}(w_i^{2000} - w_i^{1990})]$$

The first term in this equation gives the weighted average of the change in the indices using the 2000 population distribution as a weighting variable. This term gives the portion of the change driven by within-metropolitan area changes in the index values. The second term provides an estimate of the impact of the change in the weights (i.e., the distribution of blacks across metropolitan areas) on the overall average index using the 1990 index values to calculate the contribution. This second term is the component of the change that is attributable to inter-metropolitan area migration of blacks.

An alternative decomposition would add and subtract $w_i^{1990} I_i^{2000}$ to our original expression for the change in the index value. After factoring, this would yield the decomposition

(5)
$$Change = \sum_i [w_i^{1990}(I_i^{2000} - I_i^{1990}) + I_i^{2000}(w_i^{2000} - w_i^{1990})],$$

where again, the first term is the component driven by within-area improvements in the index and the second term is the component driven by between-area migration. These two decompositions may differ slightly depending on the average changes in the index values and the distribution of the changes in weights. To account for these differences, our decomposition in Figure 5 is based on the average of these two equations (as is the convention). Specifically, our estimate of the within-area improvement component is

calculated by computing both decompositions [given by Equations (4) and (5)] and taking the average of the first terms from the two equations. Our estimate of the between-area contribution to the improvement is calculated by taking the average of the second terms from the two equations. Since both decompositions yield very similar results, our conclusions are not sensitive to the averaging or the choice of decomposition.

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Appendix Table A
Spatial Mismatch Between Hispanics, Asians and Total/Retail Employment,
20 Metropolitan Areas with the Largest Black Populations, 1990-2000

| | Total Employment Indices (percent) | | | | Retail Employment Indices (percent) | | | |
| | Hispanics | | Asians | | Hispanics | | Asians | |
	2000	Change 1990-2000	2000	Change 1990-2000	2000	Change 1990-2000	2000	Change 1990-2000
Atlanta	38.1	3.4	38.8	-0.9	38.3	5.8	36.2	-3.0
Baltimore	33.4	-2.0	38.8	2.2	30.8	-1.8	34.3	1.8
Charlotte	34.8	-4.8	38.8	-10.8	30.4	-5.2	35.6	-10.0
Chicago	57.3	-2.9	45.7	-0.5	57.4	-3.6	43.3	-2.5
Cleveland	53.6	-1.1	29.8	-3.8	57.9	0.0	31.5	-1.9
Dallas	43.2	-1.1	44.8	3.1	42.4	0.2	45.9	3.6
Detroit	50.3	3.0	41.2	2.4	48.6	5.0	43.2	4.8
Ft. Lauderdale	37.4	6.2	40.9	4.9	33.1	2.1	33.3	-0.6
Houston	43.3	0.3	52.2	-0.8	42.7	0.2	47.8	-1.6
Los Angeles-Long Beach	50.3	2.7	48.4	1.6	47.7	-1.2	42.1	-0.2
Memphis	35.9	-6.4	38.5	-4.5	28.9	-11.3	38.4	2.6
Miami	40.3	0.6	43.1	-3.0	33.3	-2.8	37.0	-1.3
New Orleans	38.9	-0.4	49.0	-3.2	34.5	-2.3	44.8	-8.2
New York	58.6	-2.3	57.4	0.8	56.1	-3.7	50.4	1.9
Newark	52.7	-4.4	34.4	0.5	53.5	-6.2	35.4	0.0
Norfolk	36.5	-4.9	43.5	-2.9	37.9	0.4	44.7	2.0
Oakland	46.8	3.4	43.8	0.2	41.6	4.3	37.3	-0.5
Philadelphia	57.0	-2.5	38.9	-1.2	57.1	-3.9	37.5	-2.6
St. Louis	36.4	-0.1	37.4	2.3	32.9	-1.6	37.9	1.9
Washington, DC	51.8	5.4	42.8	-2.2	46.3	2.0	41.4	0.5

Endnotes

1   Steven Raphael is an associate professor at the Goldman School of Public Policy, University of California, Berkeley. Michael A. Stoll is an associate professor at the School of Public Policy and Social Research, University of California, Los Angeles.

2   We use the terms black and African American interchangeably.

3   For recent and extensive reviews of the empirical research on the spatial mismatch hypothesis see Keith Ihlanfeldt and David Sjoquist, "The Spatial Mismatch Hypothesis: A Review of Recent Studies and Their Implications for Welfare Reform." *Housing Policy Debate* 9, 4 (1998), pp. 842-892 and Margaret Pugh, "Barriers to Work: The Spatial Divide Between Jobs and Welfare Recipients in Metropolitan Areas." Washington, DC: 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), pp. 99-137 for an analysis of the impact of racial differences in car-ownership rates on racial labor market inequality. In 1995, 24 percent of black households had no car, compared to 5 percent of white households and 12 percent of Latino households.

5   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 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), pp. 129-155 and Harry Holzer, Keith Ihlanfeldt, and David Sjoquist, "Work, Search, and Travel among White and Black Youth." *Journal of Urban Economics* 35 (1994), pp. 320-345.

6   See U.S. Department of Housing and Urban Development, "The State of the Cities 2000," for evidence on central city and suburban employment growth during the 1990s.

7   See Michael Porter, "The Competitive Advantage of the Inner City," *Harvard Business Review* May-June (1995), pp. 55-71 for a thorough discussion of this argument, and the entire volume of *The Review of Black Political Economy,* 1995, Vol. 24, for critics of this approach to inner city development.

8   For research on the impact of gentrification on the poor, see Jacob Vigdor, "Does Gentrification Harm the Poor?" *Brookings-Wharton Papers on Urban Affairs* 3 (2002), pp. 133-182.

9   In 1999, the black unemployment rate was 8 percent. While this was nearly double the national unemployment rate, the annual rate of 8 percent is the lowest recorded value for black unemployment rates since the Bureau of Labor Statistics began to collect separate unemployment figures for African Americans in 1972. See Table B-42 in *Economic Report of the President,* U.S. Government Printing Office, 2001.

10   Between 1994 and 2001, the black homeownership rate from 42.3 percent in 1994 to 47.7 percent. U.S. Census Bureau, "Housing Vacancies and Homeownership: Annual Statistics 2001." Available at **http://www. census.gov/hhes/www/housing/hvs/ annual01/ann01tb7.html** accessed on September 12, 2002. See also William Frey, "Melting Pot Suburbs: A Census 2000 Study of Suburban Density," Washington, DC: Brookings Institution, 2001.

11   For direct evidence on this question see Lewis Mumford Center for Comparative Urban and Regional Research, "Ethnic Diversity Grows, Neighborhood Integration Lags Behind," Albany: University at Albany, 2001. For indirect evidence see Edward Glaeser and Jacob Vigdor, "Racial Segregation in the 2000 Census: Promising News," Washington, DC: Brookings Institution, 2001.

12   Our universe of metro areas includes Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Statistical Areas (PMSAs) as defined by the U.S. Office of Management and Budget.

13   As noted in the text, 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 from one another or 20 miles apart will not influence the dissimilarity measure. In both instances, the dissimilarity index will be equal to 100. Nonetheless, as a summary measure, the dissimilarity index does allow comparison of geo-

graphic areas over time as well as comparisons across geographic areas. For mismatch measures that take into account distance between populations and jobs, see Steven Raphael, "The Spatial Mismatch Hypothesis of Black Youth Joblessness: Evidence from the San Francisco Bay Area." *Journal of Urban Economics* 43, 1 (1998), pp. 79-111.

14 In 2001 the U.S. Bureau of Labor Statistics estimated that retail trade accounted for 18 percent of all jobs.

15 Weighting the calculation of the average places more weight on metropolitan areas with large populations. For example, New York, Chicago, and Atlanta will all receive relatively large weights in the calculation of the black mismatch measures, given the relatively large black populations of these cities. The weighting permits us to interpret the patterns in Figures 1 and 2 as the average degree of mismatch experienced by the typical member of each group.

16 In tabulations not reported here, we also calculated the mismatch indices using the number of retail establishments as the measure of employment opportunities rather than the number of retail jobs. For blacks, Asians, and Hispanics, the mismatch indices using retail establishments were nearly identical to the mismatch indices calculated with retail employment. For whites, however, the retail establishment indices were nearly 10 points lower than the retail employment indices. This pattern indicates that there is an abundance of small retail establishments in white zip codes relative to predominantly black, Asian, or Hispanic zip codes. These figures are available from the authors upon request.

17 The cumulative black populations of these metropolitan areas accounted for nearly 52 percent of the black population residing in metropolitan areas in 2000.

18 Concerning the percentage of the metropolitan area that is black, we first rank the 300-plus MSAs/PMSAs by the percent black and then separately identify the quarter of PMSAs with the lowest values of this variable, the lower-middle quarter, the upper-middle quarter, and the quarter with the highest percent black. In these calculations, the average values are weighted by the black population counts for each metropolitan area within the sub-stratum defined in the table.

19 To show this, we append data on black/white dissimilarity indices for 1990 and 2000 to our data series measuring the degree of mismatch between blacks and jobs. Similar to our interpretation of the mismatch indices, the dissimilarity index between blacks and whites is interpreted as the proportion of blacks (or whites) that would have to relocate to yield perfectly even distributions of black and white households across the neighborhoods of a given metropolitan area. Data on black/white dissimilarity for 1990 and 2000 come from the Lewis Mumford Center for Comparative Urban and Regional Research website. These data are available at **http://mumford1.dyndns.org/cen2000/data.html**.

20 We omit the scatterplot using the blacks/retail employment indices since it is nearly identical to the scatterplot presented for the total-employment mismatch indices.

21 See the studies cited in endnote 11 for evidence documenting these racial residential segregation results.

22 Note that both the gentrification of urban neighborhoods and black residential mobility are likely to reduce the degree of black/white housing segregation as well as the degree of mismatch between blacks and jobs. In light of this fact, the findings in the previous section regarding the association between changing mismatch conditions and changing black/white segregation do not allow us to discriminate among these alternative explanations.

23 Raphael and Stoll, "Can Boosting Minority Car Ownership Rates Narrow Inter-Racial Employment Gaps?"

24 See Harry Holzer, John Quigley, and Steven Raphael, "Public Transit and the Spatial Distribution of Minority Employment," Working paper W01-002, University of California, Berkeley Institute of Business and Economic Research, 2002.

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