DOES RACIAL RESIDENTIAL INTEGRATION IMPROVE BLACK EMPLOYMENT? REVISITING THE SPATIAL MISMATCH HYPOTHESIS

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Abstract

Spatial mismatch hypothesis argues that housing market discrimination limits black residential choice in the suburbs, making the jobs growing in suburbs inaccessible to them. This paper tests whether decline in housing market segregation reduces black unemployment in the event of job decentralization. Furthermore, the empirical framework used in this paper will also test whether there exists significant differences in the impact of job suburbanization on black unemployment due to difference in the residential segregation levels of metropolitan area. The long difference and panel instrumental variable regressions find no significant evidence that racial residential integration reduces black unemployment. The study concludes that spatial mismatch plays a relatively minor role in explaining the persistence of unemployment for blacks. If jobs fail to hire blacks for reasons unrelated to space, then improving access of blacks to areas with more jobs would not increase employment for blacks.

Keywords: Racial residential segregation, Employment decentralization, Black unemployment, Spatial mismatch hypothesis

JEL classification: J6, R1

Introduction

A substantial body of research has examined how discrimination in the housing market affects black workers' employment and income in inner cities. The spatial mismatch hypothesis (SMH) proposed by Kain (1968), argues that housing market discrimination restricts black residential choice in the suburbs and prevents them from accessing jobs growing the suburbs. With the steady dispersal of jobs from the central cities to the suburbs, coupled with housing market segregation, are responsible for low employment rates and low earnings of black workers in the central cities. Following Kain (1968), various studies have been conducted to test the SMH. Previous researches attempting to test the SMH come up with mixed results and do not always provide convincing evidence of spatial mismatch in creating black unemployment. However, recent studies use more reliable data and superior methodologies and therefore provide more reliable evidence on the SMH. For instance studies such as Kasarda and Ting (1996), Ross (1998), Weinberg (2000), provides support for the SMH and suggests that a significant factor in determining labor market outcomes is the inability to access job. On the other hand, Bertrand and Mullainathan (2004), Bayer et al (2003), Hellerstein et al. (2008) argues that space may play a minor role and that other factors such as racial discrimination in employment and neighbourhood effects have significant influence on black labor market outcome.

This paper hypothesises that the impact of spatial mismatch on blacks have been short-lived. Space plays a relatively minor role in explaining the persistence of unemployment for black population. If jobs fail to hire blacks for reasons unrelated to space, then improving access of blacks to areas with more jobs would not increase employment for blacks. This study, therefore particularly tests whether decline in housing market segregation reduces black unemployment in the event of job decentralization. The empirical framework will also test whether there exists significant differences in the impact of job suburbanization on black unemployment due to difference in the residential segregation levels of metropolitan area. Instrumental variable regressions ensure that the estimates of impact of residential segregation and job decentralization on black unemployment are purged out of endogeneity.

The evolution of cities is still among the most interesting and important social phenomenon. During the 19th century and the early 20th century, urban equilibrium in terms of employment and residential location was characterized by people living and working in the central city. 70 percent of MSA jobs were in the central cities in 1950. The percentage was 45 perent in 1990 compared to 55 percent in 1970 (Mieszkowski and Mills 1993). However, even though the MSAs saw a 72 percent increase in population between 1950 and 1990, the overall population of central cities in the US fell by 17 percent (Baum-Snow 2007). By the dawn of the 21st century, urban America has undergone a massive transformation where people both live and work in the suburbs.

The transition of urban equilibrium in terms of residence and job location from the central cities to the suburbs has been upheld as one of the reasons of rising unemployment of central city residents, particularly the racial minority group. Among the industries that experienced decentralization, the sharpest decline in central city employment were in manufacturing, wholesale and retail jobs. These are the industries where blacks are over-represented as they require relatively more workers as compared to other industries such as services. Mooney (1969) reports that the proportion of central city employment out of standard metropolitan statistical area (SMSA) total employment fell by about 17.5% for wholesale, 10.3% for retail, and 11% for manufacturing industries between 1948 and 1963. Logan and Golden (1986) find that between 1963 and 1977, the manufacturing jobs in central city fell by about 0.7 million in MSAs, while the same figure in suburbs grew by 1.1 million. Similarly for the wholesale and retail industries, central city employment fell by about 0.1 million while suburbs gained 1.8 million jobs. Between 1976 and 1986, most of the job growth in the urban peripheries of consolidated metropolitan statistical areas (CMSA) has been in the manufacturing, wholesale and retail industries (Gordon and Richardson, 1996).

The decentralization of jobs in the industries which employs blacks became a reason for job loss as the blacks were not able to relocate to the suburbs. This is evident from the high levels of racial residential segregation that prevailed during that time period. The trend in average racial residential segregation was upward between 1940 and 1970. The average black-nonblack dissimilarity index rose from .679 in 1940 to .726 in 1970 (Cutler, Glaeser and Vigdor 1999). The increase in segregation was particularly higher in the large industrial cities in the Northeast and the Midwest. However since 1970, residential segregation on average has been declining. In 1990, average dissimilarity index was .559, a decline of 23% from 1970 (Cutler, Glaeser and Vigdor 1999).

The inability to respond to the changes in job location for central city residents, particularly minorities, may be partly attributed to housing market discrimination. The spatial mismatch hypothesis (Kain 1968) argues that the steady dispersal of jobs from the central cities coupled with housing market discrimination resulted in rising unemployment for the inner city blacks. The labor supply of minorities is slow to adjust as firms relocate to the suburbs. Racial obstacles to residential location in suburban housing markets make it difficult for inner city inhabitants to follow the jobs growing in the suburbs.

Their job search cost rise as a result of their information networks becoming less useful in helping them find jobs. (Kasarda, 1985; Wilson, 1987). Thus lack of access to jobs growing in the suburbs has contributed toward rise in unemployment rates for central blacks facing involuntary housing market segregation.

The spatial mismatch was more of a problem for black laborers till 1970, when residential segregation and was at its peak. This time period also observed steady dispersal of jobs from the central cities to the suburbs. However, fall in housing market segregation and improvement in transportation facilities raises concern regarding the persistence of the effect of spatial mismatch on black unemployment. The question that remains is that with decline in residential segregation, do we see reduction in black unemployment. Do blacks get hired even if they have access to jobs?

This paper attempts to test the following hypotheses: 1) whether the decline of central city employment in industries where blacks are over-represented, raises black unemployment; 2) whether employment decentralization has a larger impact on black unemployment in metropolitan areas with greater degree of racial residential segregation; 3) whether residential integration reduces black unemployment rate.

Results from this study indicate that job decentralization significantly increases unemployment for blacks. However, it is not necessarily true that decline in residential segregation improves the employment outcome for blacks. Improved job accessibility as indicated by fall in residential segregation, didn't significantly improve employment for blacks. Furthermore, no significant evidence has been found to state that job decentralization increases black unemployment more in metropolitan areas with greater residential segregation. The findings from this study may therefore suggest that factors such as skill mismatch, racial mismatch in terms of employer discrimination and other neighbourhood effects have influence on the employability of blacks. It is not the lack of jobs in the vicinity of black's residence, but rather it is the lack of jobs where blacks are hired, even if the jobs are located where blacks live (Hellerstein et al, 2008).

Residential Segregation, Job Decentralisation and Black Unemployment

Over the past 50 years, social scientists have been trying to address the gap between the economic well-being of the inner city residents, especially African-Americans and Latinos, and the mainstream. Residential segregation and employment decentralization has been held as one of the causes of rising unemployment for central city black residents. The mismatch between job location and residential location that happened because of jobs growing in the suburbs and blacks' inability to relocate to the suburbs is known as the spatial mismatch hypothesis. It is argued that the growing unemployment of central city blacks was because jobs were moving out of central cities, where majority of the blacks lived. Thus job inaccessibility problem can raise black unemployment because of the inability of the labor supply to adjust fully to the change in the spatial distribution of jobs.

The lack of access of central city workers to suburban jobs may be due to their rational choice of living in the central cities. First of all, because central locations make it relatively easy to get jobs, low-income workers choose to live in these cities. Second, low-income households may choose to stay in central cities due to the comparatively large supply of older, inexpensive homes and rental units in these areas. But as jobs become more decentralized, the advantage that central city workers had historically derived from being in one place might be dissolving quickly.

One major contributing factor to the problem of employment accessibility for residents of central cities is the low-wage workers' difficulty to travel long distances for work. According to Holzer, Ihlanfeldt, and Sjoquist (1994), people who live in central cities are typically less responsive to employment

suburbanisation in the job seeking behavior. Workers from lower-income households typically commute shorter distances than workers from higher-income households, suggesting that wages may have a significant role in a worker's choice of job search location. One of the traits of workers from low-income groups in central cities is their propensity for short commutes. The economic hypothesis underlying low-income central city workers' short commutes is that their net pay falls short of their reservation wage beyond a threshold distance due to low wage offers and high transportation expenditures. (Clark and Whiteman, 1983).

Another friction that resulted in unemployment problems for central city residents is due to the skill mismatch arising from industrial transformation and deficit in human capital. Profound structural changes and industrial transformation in the late 20th century in the U.S. economy have caused a shift in demand away from the inner-city workers. The key elements of the structural change were: transformation in the technology and organization of manufacturing industries and the relative growth of the service sector. The main forces behind the process were changes in the market and technology, which made manufacturing in inner cities less profitable. (Vernon, 1960). The lost sectors and employment in the central cities were replaced by high-skilled service sectors. According to John Kasarda's (1985, 1989, 1993), there is a growing educational gap between those who live in cities and those who work there, which he referred to as the "skill mismatch". Central city workers thus faced unemployment problems from loss of job opportunities due to technologically improved manufacturing jobs growing in the suburbs and high-skilled service industries taking its place in the central cities.

If inequalities in human capital were the only factor influencing employment and earnings gaps across various demographic segments, then increasing skill levels to fulfill labor demand may potentially reduce unemployment and poverty. However, discrimination based on race when looking for work could keep labor markets from adjusting. Employment discrimination on the basis of race impedes central city black employment and fosters employment and earning disparities between minority and nonminority racial groups.

High racial residential segregation and steady dispersal of jobs from the central cities to the suburbs was one of the key characteristics of U.S. metropolitan areas during the mid-90s. However, fall in segregation levels and improvement in public transportation facilities during the later half of the twentieth century may lessen the concern of spatial mismatch being responsible for black unemployment. Therefore, persistent increase in the average unemployment rate for blacks can be attributed to factors such as shift in demand away from the laborers in industries where they usually get hired and racial discrimination in hiring. In that light, the methodology adopted in this paper tests the SMH in a long difference and panel setting, and controls for demand and supply side factors for black unemployment. The empirical specification for the long difference model is:

$$\Delta Y_i = \beta_0 + \beta_1 \Delta R_i + \beta_2 \Delta \log(M_i) + \beta_3 R_{d1} \Delta \log(M_i) + \beta_4 R_{d2} \Delta \log(M_i) + \beta_5 \Delta B_i + \beta_6 \Delta G_i + \beta_7 W_i + \varepsilon_i \quad (1)$$

where Y_i represents prime-age percentage of black unemployment in MSA i, R_i measures the degree of residential segregation between black and nonblack, and M_i is the central city employment in MWR industries for city i. Thus $\Delta \log(M_i)$ measures the degree of job suburbanization. The coefficient estimate of the interaction between the initial level of residential segregation with job suburbanization tests whether job decentralization has a greater impact on the black unemployment in MSAs with higher

levels of segregation level. For that, dummy variables R_{d1} and R_{d2} are used which are measured as follows:

R_{d1}=1 if 1970 level of segregation is high in an MSA, 0 otherwise

R_{d2}=1 if 1970 level of regression is medium in an MSA, 0 otherwise [†]

The coefficient of the interaction term would measure the differential impact of job decentralization due to differences in the initial level of segregation in an MSA. If housing market segregation limits black to live in the central cities, then MSAs with above average levels of residential segregation may observe more black unemployment in the event of job decentralization. Thus, the sign of the coefficient is expected to be negative in the event of such spatial mismatch. Equation (1) is estimated for 1970-80, 1970-90, and 1970-2000 changes using OLS and instrumental variable (IV) regression methods.

If rising black unemployment is attributed to spatial mismatch, then fall in residential segregation should improve job accessibility and reduce the impact of the mismatch in the event of job decentralization. In order to test whether for a given level of job decentralization, decline in black unemployment has been significantly greater in MSAs with greater decline in segregation, the following equation is estimated:

$$\Delta Y_i = \beta_0 + \beta_1 \Delta R_i + \beta_2 \Delta \log(M_i) + \beta_3 \Delta R_i \Delta \log(M_i) + \beta_4 \Delta B_i + \beta_5 \Delta G_i + \beta_6 W_i + \varepsilon_i$$
$$(2)$$

The coefficient of the interaction term of change in segregation and job decentralization therefore would measure the impact of change in segregation on change in black unemployment for different levels of job decentralization. Thus for the spatial mismatch hypothesis to hold true, for MSAs with higher levels of job decentralization, a greater fall in segregation level would mean a lesser rise in black unemployment. Alternatively, it can also be stated that for MSAs showing greater racial residential integration, the negative impact of job decentralization on black unemployment will be lesser.

ΔB_i measures the change in black share of population in an MSA. ΔG_i is a vector of control variables such as change in the proportion of blacks receiving welfare assistance income, employment growth index, and change in the share of population with no more than high school education. All long difference regressions estimated as specified in equations (1) and (2) include regional dummies denoted by W_i.

The empirical specification of the long difference regressions provides estimates of the effect of changes in racial residential segregation and central city employment on changes in black unemployment. If housing market segregation hinders black employment opportunities, a fall in segregation in an MSA between the two differenced years should lead to a fall in black unemployment during that period. A positive coefficient estimate of the change in residential segregation between two points in time in the long difference regressions would mean that black unemployment should fall more in MSAs which experienced greater fall in residential segregation. Job decentralization on the other hand should have a negative impact on black unemployment because a greater decline in central city MWR employment should lead to a lesser fall in black unemployment.

Given the diversity of metropolitan areas, any time-invariant heterogeneity between MSAs would be controlled by employing panel fixed effect regression. The empirical specification for the panel regression is:

[†] The categorization of an MSA as high, medium or low levels of segregation is based on Massey and Denton's categorization of Index of dissimilarity. Dissimilarity index between 0-0.3 is categorized as low segregation, greater than 0.3 to 0.6 is medium segregation, and greater than 0.6 to 1 is high segregation.

$$Y_{it} = \beta_0 + \beta_1 R_{it} + \beta_2 \log(M_{it}) + \beta_3 R_{it} \log(M_{it}) + \beta_4 D_{it} + \beta_5 G_{it} + \beta_6 T_t + \varepsilon_{it}$$
(3)

where T_t is a vector of year dummies and the remaining variables are the same as described above.[‡]

The dependent variable Y_i is the percentage of prime age unemployed blacks at the metropolitan area level.[§] This unemployment measure is calculated for the sample of black population aged between 25 and 60, the data for which is obtained from Integrated Public Use Census Microdata Samples (IPUMS) 5% sample data. [**]

The Duncan and Duncan (1955) index of dissimilarity is used to quantify residential segregation between black and non-blacks. This frequently used index calculates how different sections of an MSA are inhabited by Blacks and Non-Blacks. The interpretation is that it refers to the percentage of Black people (or non-Black people) who would have to relocate in order for the racial distribution to be equal. The dissimilarity index has a value between 0 and 1. Neighborhoods in the index are Census tracts, and it is computed at the level of the metropolitan statistical area.[††]

The extent of job decentralization at the MSA level for MWR industries is measured using the employment data for MWR industries in the central cities of MSAs.[‡‡] These data are obtained from the Economic Census' Census of Manufactures, Census of Retail Trade and Census of Wholesale Trade which is conducted every five years. Using data from 1967 to 1997, job decentralization at the MSA level is measured as the difference in the logarithm of central city employment in MWR industries between two years. For instance, for the 1970-80 long difference regression, job decentralization is measured as the change in the logarithm of employment in MWR industries between 1967 and 1977.

Black unemployment rate arising from shifts in labor supply and demand is controlled by adding variables such as share of population between age 30 and 55 with no more than high school education and the employment index. The employment index is calculated for the long difference regressions to measure the growth potential for industries in an MSA. Another popular explanation for the growing unemployment rate for less-educated black population is the mismatch between the skill level and the changing skill requirement of jobs (Wilson 1987). In a series of papers, Kasarda has also argued that the industrial transformation of U.S. metropolitan areas has contributed toward the decline in the demand for less-educated labor, resulting in rising unemployment for them. For the long difference regressions, the index of growth potential for an MSA is measured as the 1950 share of industry employment at the MSA level times the national growth in this industry from 1950 to 2000 summed over all industries. Data on national trends should be exogenous to what is happening in an MSA and the 1950 employment share is exogenous to current unemployment rates due to long lag. The national level industry

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[‡] The independent variables of regression specifications (1), (2) & (3) are standardized.

[§] People who do not currently have a job, are looking for work, and have not yet found one are considered unemployed. Unemployed people are those who have never worked but are actively looking for their first job (also known as "new workers").

[**] IPUMS provides data on whether the respondent was a part of the labor force —working or seeking work —and, if so whether the person was currently unemployed.

[††] Index of dissimilarity $= 1/2 \sum_{i=1}^{N} \left| \dfrac{black_i}{black_{total}} - \dfrac{nonblack_i}{nonblack_{total}} \right|$, where $black_i$ and $nonblack_i$ is the number of blacks and nonblacks in tract i and $black_{total}$ and $nonblack_{total}$ are the number of nonblacks in the MSA.

[‡‡] Each metropolitan area is assigned with one central city. The city with the largest population in 1970 is considered as the central city of an MSA.

employment data is obtained from the Bureau of Economic Analysis (BEA) and the data for 1950 industry employment is obtained from the 1952 CCDB. For the panel regressions, the employment index is calculated as the share of industry employment at the MSA level in time *t-10* times the national growth in this industry between *t-10* and *t* summed over all industries. Data for computing the share of industry employment at the MSA level from 1970 to 2000 is obtained from BEA. For 1960, employment data by industry is obtained from CCDB.

The regression framework used in this paper is however not free of endogeneity. Rise in black unemployment, particularly in central cities, may lead to population suburbanization and increase racial residential segregation in MSAs. It is argued that population suburbanization generally entailed affluent whites relocating from central cities to the suburbs of MSAs. Racial residential segregation is instrumented using variables that should influence segregation but are unlikely to be directly related to black employment outcomes in order to address the endogeneity between segregation and black unemployment. Following Cutler and Glaeser (1997), the number of municipal and township governments encompassed in an MSA and the share of local revenue that comes from intergovernmental sources is used as instruments for segregation. The number of local governments can have an impact on segregation through Tiebout mechanism. The need for sorting grows with the number of local governments because of the wider variations in tax rates and service availability within a given area. Similarly, local taxes rise in response to a decrease in funding from intergovernmental sources, and there is a greater benefit to sorting to capitalize on these tax differentials. These political factors provide a valid instrument because it might affect black unemployment by fostering racial residential segregation but is not directly correlated with black unemployment in other ways.[§§] Thus the variables measuring change in segregation and its interaction with job decentralization variable in equations (1) and (2) are instrumented with the number of municipal and township governments encompassed in an MSA and the share of local revenue that comes from intergovernmental sources.

The instrument for the panel regression is measured as: (number of highways in the 1947 national interstate highway plan)*(MSA mileage of highways running through the central city at time t-1)/ (MSA mileage of highways running through the central city in 2000). Construction of highways causes population suburbanization (Baum-Snow, 2007), which may affect residential segregation in an MSA. Racial residential segregation may rise if improvement in transportation facility enables the affluent whites to move to the suburbs. The 1947 national interstate highway plan is exogenous because the intention of the plan was not to provide people with highways so that they can segregate in response to poor economic outcomes for blacks.

Findings and Discussion

Table 1 shows the distribution of employment across industries for a sample of black population aged between 30 and 55 from 1970 to 2000. The descriptive statistics in this table indicate that the distribution of employment is gradually shifting from manufacturing to wholesale, retail and professional and related services industry. This is represented by a steady decline of black employment in manufacturing sector while wholesale, retail industries and professional and related services industry gaining employment. Nonetheless, majority of the black employment were in MWR industries. Given that the degree of employment decentralization was among the highest in these industries (Gordon and Richardson, 1996), the key is to understand whether black employment in these industries would have been significantly higher had there been no job decentralization.

[§§] For detailed discussion on the instruments, see Cutler and Glaeser (1997).

Table 1. Percentage of black employment by industry

Employment figures are in million.

Industry	1970	1980	1990	2000
Agriculture	2.2	1.7	2.1	1.8
Mining	0	0	0	0
Construction	5.1	6.0	5.8	6.6
Manufacturing	25.2	27.6	19.4	17.5
Transportation	7.7	6.9	6.6	7.6
Wholesale and retail	15.6	17.9	25.4	26.0
Finance, insurance and real estate	2.6	3.3	3.1	3.1
Business and repair services	2.3	3.6	6.2	7.9
Personal services	16.1	8.3	7.1	5.2
Entertainment and recreational services	1.0	1.3	1.6	1.6
Professional and related services	17.1	20.1	19.3	19.9
Public administration	4.6	2.5	2.7	2.2

The average trend in black-nonblack residential segregation, job decentralization in MWR industries and black unemployment rate is shown in table 2. Black unemployment increased by 6 percentage points between 1970 and 1980. After 1980, although average black unemployment declined, it continued to remain at higher levels until 2000. On the other hand, residential segregation on average was at its peak in the 1970, which by 2000 declined by about 25 percent. Along with that, we see lesser employment opportunities in MWR in central cities as it shows a declining trend. In addition to that, table 3 indicates that overall employment in central cities has been declining despite of rising employment at the metropolitan area level. Thus the period between 1970 and 2000 can be marked as an era of job decentralization, declining residential segregation, and high levels of black unemployment. If employment growth in the suburbs limits job accessibility for black, then as per the spatial mismatch hypothesis, fall in residential segregation should result into improvement in black employment outcome. The key is to understand whether cities that experienced greater decline in residential segregation had a lesser rise in black unemployment rate.

Table 2. Trend in black-nonblack residential segregation, CC employment, and black unemployment

Year	Dissimilarity index	Central city (CC) employment in MWR industries	Black Unemployment
1970	0.75 (0.122)	0.0396 (0.105)	8.9% (0.039)
1980	0.66 (0.128)	0.03818 (0.091)	14.9% (0.051)
1990	0.61 (0.129)	0.03607 (0.083)	12.6% (0.046)
2000	0.56 (0.124)	0.02523 (0.055)	7.9% (0.041)

Employment figures are in million. Standard deviations are in parentheses

Table 3. Aggregate trend in job suburbanization

Year	Total CC employment	Total MSA employment	Share of CC employment
1970	14.61	25.90	0.56
1980	13.56	26.60	0.51
1990	12.83	27.51	0.46
2000	13.03	29.81	0.43

Employment figures are in million.CC stands for central city. Share of CC employment is measured as Total CC employment/Total MSA employment.

Long Difference Regression

The long difference regression estimates the degree to which long run changes in residential segregation and central city jobs influence the changes in black unemployment rates. In addition to that, long difference regression as specified in equation (1) tests the hypothesis that in MSAs with lower levels of segregation, loss of central city jobs would lead to lesser increase in black unemployment than MSAs with higher racial residential segregation. On the other hand, the interaction term in regression equation (2) examines that for a given level of job decentralization, decline in black unemployment has been significantly greater in MSAs with greater decline in segregation. Long difference regressions are estimated for long run changes from 1970-80, 1970-90, 1970-00. The change in dissimilarity index is instrumented with the number of municipal and township governments encompassed in an MSA and the share of local revenue that comes from intergovernmental sources in 1962.

The results from first stage of the instrumental variable regression testing the endogeneity of the residential segregation variable and the validity of the instruments are reported in table 4. Results obtained from the Durbin-Wu-Hausman test conducted to test the endogeneity of the dissimilarity index variable rejects the hypothesis of no endogeneity between segregation and black unemployment. F-stat values greater than 10 from the first stage regression indicates significant correlation between the instruments and the endogenous regressor. Furthermore, the Hansen J statistic is reported to test the

overidentifying restrictions in the IV regressions. Low values of Hansen J statistic indicates that the null hypothesis of the validity of instruments cannot be rejected. The first stage results therefore suggest that 1962 number of local governments and 1962 share of revenue serve as a valid instrument for changes in residential segregation. For regression specification (2), since there are multiple endogenous variables (change in segregation and its interaction with job decentralization), standard partial R^2 and Shea's partial R^2 statistic value has been reported to check for instrument irrelevance. Since the standard partial R^2 doesn't exceed the Shea's partial R^2, it may be concluded that the instruments don't lack sufficient relevance to explain all the endogenous regressors (refer to table 5).

Table 4: Long difference regression results from regression equation (1)

	1970-80		1970-90		1970-00	
	OLS	IV	OLS	IV	OLS	IV
Δ segregation	0.0091** (0.0041)	0.0054 (0.0072)	0.0068* (0.0037)	0.0039 (0.0056)	0.0055 (0.0049)	0.0027 (0.0043)
Δ log central city employment	-0.0085*** (0.0016)	-0.0071** (0.0032)	-0.0052*** (0.0018)	-0.0048** (0.0041)	-0.0055** (0.0026)	-0.0053** (0.0029)
Δlog central city Employment* 1970 segregation_hig	-0.0034 (0.0028)	-0.0041 (0.0049)	-0.0011 (0.0022)	-0.0025 (0.0029)	-0.0008 (0.0019)	-0.0020 (0.0038)
Δlog central city Employment* 1970 segregation_me	-0.0021 (0.0023)	-0.0029 (0.0030)	-0.0013 (0.0017)	-0.0012 (0.0026)	-0.0003 (0.0019)	-0.0009 (0.0015)
Δ proportion of blacks receiving welfare assistance	0.0029** (0.0011)	0.0036* (0.0020)	0.0053* (0.0028)	0.0031 (0.0039)	0.0016 (0.0017)	0.0022 (0.0030)
Δ share of population with no more than high school education	0.013* (0.0069)	0.010* (0.0055)	0.025* (0.014)	0.020** (0.010)	0.021** (0.009)	0.019** (0.0061)
Employment index	-0.0055 (0.0032)	-0.0063 (0.0048)	-0.0042 (0.0029)	-0.0031* (0.0016)	-0.00021 (0.0011)	-0.00083 (0.0014)
First stage F stat		13.42		12.11		14.67
R squared	0.665	0.512	0.601	0.496	0.588	0.553
Hansen J statistic		0.72		0.86		0.69
Durbin-Wu_Hausman		8.21		8.65		9.59
N		198		198		198

*p<0.10, **p<0.05, ***p<0.01. Clustered standard errors are in parentheses.

The OLS and second stage IV estimates from the long difference regressions as specified in equation (1) are showed in Table 4. Change in residential segregation between two years has a positive relation with change in black unemployment rate. Thus for the IV estimates, this means that greater decline in segregation leads to greater fall in black unemployment. This finding therefore conforms the previous literature that prevalence of high levels of segregation (lesser decline in this case) corresponds to higher unemployment level for blacks. For instance, one standard deviation greater fall in racial residential segregation between 1970 and 1980 leads to 0.54 percentage points greater fall in black unemployment. The effect, however is not statistically significant. For other long difference years as well, the magnitudes of the IV estimates are even lesser and insignificant. Insignificant estimates from the IV regressions suggest no causal influence of long run changes in racial residential segregation on changes in black unemployment levels. MSAs with greater racial residential integration (measured by greater fall in segregation level) didn't observe significantly greater decline in black unemployment rate. Greater fall in racial residential segregation in an MSA would generally mean that residential concentration of blacks in central cities is lesser. As per SMH, in the event of job decentralization, this would therefore not worsen the employment outcomes for blacks. However, results indicate that it is not necessarily true that greater physical access to jobs growing in the suburbs leads to more employment for blacks.

Job decentralization has a significant negative impact on change in black unemployment. A negative coefficient value indicates that greater job decentralization is associated with lesser fall in black unemployment. Estimates from the IV regressions reveal that for MSAs with greater decline in central city jobs, reduction in black unemployment rate is significantly lesser. This means, had there been no job decentralization, black unemployment would have declined more. Thus for the 1970-80 long difference regression, one standard deviation greater decrease in central city jobs significantly decreases the rate of fall in black unemployment by 0.71 percentage points. Similar results are obtained for other long difference regression. Job decentralization has significantly decelerated the decline in black unemployment. Thus jobs growing in the suburbs didn't improve the employment outcome of blacks in MSAs on average. At the same time, given that racial residential segregation in MSAs on average was falling, it appears to be less convincing that weak access to jobs growing in the suburbs made unemployment levels for blacks persistently high during that time period, as predicted by the spatial mismatch hypothesis.

Although, the coefficient estimates of the variable measuring the interaction between initial segregation level in an MSA and job decentralization have the expected negative sign, the magnitude is small and statistically insignificant. Given the small size and insignificant impact, it is not necessarily true that in the event of job decentralization, black unemployment will rise at a significantly lesser pace in MSAs with lower level of segregation. Even if a metropolitan area is relatively more residentially integrated, there would not be much difference in the impact of job decentralization on black unemployment. This reinforces the argument that lack of physical proximity increases black unemployment is not necessarily binding.

The employment index is measured to capture the growth potential for industries in an MSA. Results for the long difference years 1970-80 and 1970-90 indicate a negative relation between employment index and changes in black unemployment. A one standard deviation increase in the employment index is associated with a 0.31 percentage lesser rise in black unemployment. This means, an increase in growth potential of an MSA raises the employment opportunities of blacks. This result is in line with the observation that if, for example, an MSA has a greater representation of manufacturing industry and that the industry is growing at the national level, then employment opportunities for black will increase. Given that blacks are over represented in manufacturing industries, this result is not surprising. However

for 1970-00 long difference regression, an increase in growth potential of industries in MSAs has a weak impact on change in black unemployment and doesn't significantly reduce the pace of increase in black employment between 1970 and 2000. This may be an indication of shift in labour demand away from blacks in industries where employment growth is happening. The estimates of the employment index for regression equation (2) as reported in table 5, although is negative, is of considerably less magnitude and is statistically insignificant. Overall, coefficient estimates of the employment index indicates that labor demand for blacks doesn't significantly pick up with the increased growth potential of industries in MSAs.

Table 5: Long difference regression results from regression equation (2)

	1970-80		1970-90		1970-00	
	OLS	IV	OLS	IV	OLS	IV
Δ segregation	0.0126* (0.0066)	0.0036 (0.0103)	0.0105* (0.0057)	0.0028 (0.0089)	0.0096 (0.0063)	0.0012 (0.0074)
Δ log central city employment	-0.0077** (0.0036)	-0.014** (0.0068)	-0.0062** (0.0029)	-0.0084** (0.0041)	-0.0059* (0.0032)	-0.0046 (0.0040)
Δlog central city Employment* Δ segregation	0.0014 (0.0013)	0.0019 (0.0026)	0.0015 (0.0018)	0.0023 (0.0028)	0.0012 (0.0008)	0.0003 (0.0026)
Δ black share of population	0.0058** (0.0029)	0.0049** (0.0023)	0.0072* (0.0038)	0.0052* (0.0028)	0.0061* (0.0033)	0.0055* (0.0029)
Δ proportion of blacks receiving welfare assistance	0.0043* (0.0023)	0.0017* (0.0009)	0.0089* (0.0048)	0.0021 (0.0019)	0.0087 (0.0061)	0.0019 (0.0017)
Δ share of population with no more than high school education	0.018** (0.0048)	0.013** (0.0031)	0.013** (0.0052)	0.016** (0.0044)	0.0086** (0.0038)	0.011** (0.0052)
Employment index	-0.0022 (0.0019)	-0.0038 (0.0026)	-0.0017 (0.0023)	-0.0026 (0.0028)	-0.0020 (0.0022)	-0.0013 (0.0031)
First stage F stat (Δ segregation)		10.19		10.78		11.02
First stage F stat (interaction)		9.55		9.10		9.12
R squared	0.533	0.514	0.591	0.462	0.536	0.522

Durbin-Wu_Hausman		6.43		6.25		6.61
Standard partial R square (Δ segregation)		0.0086		.0045		0.103
Shea Partial R squared (Δ segregation)		0.0097		0.0051		0.114
Standard partial R square (interaction)		0.0631		0.0727		0.0698
Shea Partial R squared (interaction)		0.0853		0.0824		0.0881
N		198		198		198

*p<0.10, **p<0.05, ***p<0.01. Clustered standard errors are in parentheses.

The interaction term in regression equation (2) tests the hypothesis whether black unemployment increases less due to greater job decentralization in MSAs with greater fall in racial residential segregation. Table 5 presents the estimation results of regression equation (2). A positive sign of the coefficient of the interaction variable conforms the hypothesis. For 1970-80 long difference IV regression, the impact of residential segregation changes by 0.19 percentage points for every level of job decentralization. In other words, as job decentralization increases, the influence of change in residential segregation increases. That means greater decline in residential segregation will increase the speed of the fall in black unemployment in MSAs with greater job decentralization. Alternatively, it can be stated that the impact of job decentralization changes by 0.19 percentage points for every level of change in residential segregation. This means, the rate at which black unemployment would increase with greater job decentralization is lesser in MSAs with greater fall in residential segregation. The implication of SMH is that if black unemployment increases because of jobs growing at suburbs and blacks find them difficult to access, then greater accessibility would reduce black unemployment. Although the sign of the estimate of the interaction term points toward that direction, it is of considerably less magnitude. SMH may have been a short run phenomenon since in the longer run, greater accessibility of jobs growing in the suburbs doesn't significantly reduce unemployment rate of blacks.

The results obtained from the long difference regressions suggest that decentralization of MWR jobs significantly raises black unemployment rate. On the other hand, racial residential desegregation does not necessarily improve employment outcome for the blacks. Among other reasons, changes in skill requirement in MWR industries might have induced them to decentralize to suburbs for access to appropriate skilled laborers. However, fall in residential segregation did not significantly improve black employment outcome in MSAs since the nature of the mismatch was more due to skill than due to space.

Panel Regression

Table 6 shows the results from the panel OLS and IV regressions as described in equation (3). Dissimilarity index in the panel regression is instrumented with the number of interstate highways in the 1947 national highway plan times the fraction of highway miles completed in time t-1. Durbin-Wu-

Hausman test is conducted to test the endogeneity of the variable measuring residential segregation. High value of the statistic indicates that the test rejects the hypothesis of no endogeneity between black unemployment rate and segregation. F-statistic from the first stage regression of the IV coefficient estimate indicates that the instrument is correlated with the endogenous dissimilarity index variable.

Table 6: Panel regression results from regression equation (3)

	OLS	IV
Segregation	0.0121*	0.0067
	(0.0066)	(0.0132)
Log Central city employment	-0.0167**	-0.0118**
	(0.00695)	(0.00484)
Black share of population	0.018	0.0091
	(0.0077)	(0.0048)
proportion of blacks receiving welfare assistance	-0.0103	-0.0119
	(0.0155)	(0.0094)
share of population with no more than high school education	0.0211**	0.0177**
	(0.0102)	(0.0081)
Employment index	-0.0113	-0.0128
	(0.0142)	(0.0121)
First stage F stat		9.72
R squared	0.499	0.386
Durbin-Wu-Hausman		11.29
N	792	792
MSA Fixed Effects	Yes	Yes

*p<0.10, **p<0.05, ***p<0.01. Clustered standard errors are in parentheses. Controls not shown: year dummies.

Results from the IV regression as shown in the table suggests that increase in residential segregation increases black unemployment rate. However, the effect is not significant. For the IV regression, a one standard deviation increase in the dissimilarity index cause black unemployment to rise by 0.67 percentage points. The result therefore finds a weak and insignificant influence of racial residential segregation on black unemployment rate. Job decentralization, on the other hand, has a significant negative impact on black unemployment. A one standard deviation fall in the central city employment in MWR industries leads to a rise in black unemployment rate by 1.18 percentage points. Thus job loss in central cities of industries where blacks are over represented significantly increases unemployment for blacks. Following the spatial mismatch hypothesis, this finding may be interpreted as that job displacement away from central cities resulted in reduced access to jobs for central city blacks, thereby raising unemployment for blacks. In that case, given that segregation on average has been falling since 1970, it should have significantly decelerated the rise in unemployment level for blacks, had physical proximity to jobs been a significant deterrent to black employment. However, results from panel instrumental variable regression did not find any significant evidence in favour of this hypothesis.

Spatial mismatch as a cause for rising black unemployment may have been a short run phenomenon where unemployment for blacks got pronounced due to job suburbanization and high levels of racial residential segregation. The period between 1970 and 1990 was a phase with pronounced employment suburbanization. However, 1970 also marked the era of industrial transformation where production processes was becoming increasingly capital intensive, which required a specific skill level. During the same time period, racial residential segregation, which was at its peak in 1970, started to decline gradually. Thus even with physical access to jobs in the later years, blacks didn't gain employment due to shift in demand toward relatively more skilled labor. One of the many reasons why jobs would decentralize is access to labor (Glaeser and Kahn, 2001). Along with job decentralization, U.S. metro areas were also experiencing substantial population suburbanization, which to a certain extent would have lessened the concern of job accessibility. Although residential segregation, on average has fallen over time indicating blacks becoming proximate to job locations, no significant improvement in black unemployment rate was realized. This may postulate that black unemployment arising from spatial mismatch was short lived. Persisting unemployment for black may be a result of reasons such as skill mismatch or racial discrimination in the labor market.

Conclusion

The objective of this paper has been to examine the persistence of the spatial mismatch hypothesis. In particular, the long difference regressions test whether residential integration over time improves black employment outcome. Furthermore, the study also tests whether loss of MWR jobs from central cities significantly hurts the employment opportunities of blacks and whether this impact is disproportionately greater in metropolitan areas with greater degree of racial residential segregation. Previous research argues that housing market segregation significantly reduces the employment rate for minorities in the presence of job decentralization. However, the question arises whether blacks get hired even if they live close to their job location. If lack of access to jobs causes labor market disadvantages for blacks, then racial residential desegregation should improve black employment outcome.

Results obtained from this study suggest that employment suburbanization of MWR jobs from central cities significantly raises unemployment rate for blacks in metropolitan areas. However it is not that blacks living in metro areas with higher segregation level are at more disadvantageous position in terms of employment in the event of job decentralization. In fact, greater job accessibility as measured by fall in segregation levels doesn't significantly improve employment levels for blacks. Had there been no residential integration between 1970 and 2000, average unemployment rate for would have only been 0.82 percentage points more than the average.[***]

The findings from this study indicates that although the spatial mismatch between residence and jobs for central city blacks got steadily dissolved with improvement in transportation network and accessibility of suburban housing market, the unemployment of blacks in metro areas didn't reduce significantly. Results from this study do not find significant evidence that job decentralization raises black unemployment rate more in MSAs which are more residentially segregated. Findings from the long run changes in residential segregation and central city jobs thus imply that physical inaccessibility of jobs had a lesser role in explaining the persistence of black unemployment in U.S. metro areas.

The initial years of the second half of the 20th century also records high degree of population suburbanization in U.S metro areas. A significant portion of the people who relocated to the suburbs were white American's, who are presumably more high-skilled (Farley et. al, 1978). Glaeser and Kahn

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[***] This is measured as the difference between the actual percentage change in black unemployment rate and predicted change black unemployment rate when change in residential segregation is assumed to be zero.

(2001) point out that access to workers is a strong determinant of job suburbanization. Those industries would tend to move to the suburbs whose workers are more likely to suburbanize. This is particularly surprising because among the industries which suburbanized, job suburbanization of MWR industries, which is presumably not a high-skilled sector, was amongst the highest. This might imply that labor demand in MWR industries is gradually shifting away from the workers. If jobs follow people, and given that MWR jobs suburbanized, it may be argued that there had been a shift in labor demand in these industries toward relatively high skilled labor. Since majority of the black employment happens in these industries, a shift in labor demand away from the blacks would make them unemployable, even if the jobs are accessible to them. Blacks in a comparatively residentially integrated MSA would still face unemployment problem as there would be lack of jobs which would employ them.

Whereas the spatial mismatch hypothesis links the spatial distribution of jobs to reduced employment of blacks, the alternative hypothesis places more emphasis on the distribution of jobs that employ blacks. Apart from skill mismatch, other factors that may impede blacks from performing relatively poorly in gaining employment are labor market discrimination, race-specific labor networks or neighbourhood effects. If, for instance, there was perfect access in terms of physical mobility or spatial closeness, would employer discrimination still lead to mismatch? Space may play a relatively minor role in low black unemployment when blacks are not inadvertently refused employment. Employer's discrimination on the basis of race is an important reason for poor labor market outcomes of blacks (Bertrand and Mullainathan, 2004). Another reason for the lack of access of central city workers to suburban jobs may be due to their rational choice of living in the central cities. Living in close proximity to people of similar race may give advantage related to race-specific labor networks or neighbourhood effects. In fact, social interactions and living in same neighbourhood with people of similar socio-demographic characteristics significantly influences labor force participation through neighbourhood referrals (Bayer et al, 2008).

The spatial mismatch hypothesis suggests that increasing blacks' access to locations with higher employment levels could raise black employment. This paper doesn't find any such significant evidence in favour of what is implied by spatial mismatch hypothesis, and concludes that it is the employability of blacks that matter in the long run and not the spatial proximity. This study implies that availability of jobs that employ blacks may play a crucial role in black labor market outcome and that other factors such as skill mismatch, employer discrimination and neighbourhood effects may drive the persistence of black unemployment.

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