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THE SPATIAL MISMATCH HYPOTHESIS: ARE THERE TEENAGE JOBS MISSING IN THE GHETTO?

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ABSTRACT

This paper examines the hypothesis that the extraordinarily high rates of unemployment among black youth can be linked to a geographic mismatch between the residences of black youth and the jobs they might occupy. Chicago's labor market is examined in detail. The paper reports that black youth do in fact seem to live further from jobs than white youth do. However, the differences are not great enough to generate large differences in employment rates unless geographic search costs are very high. To explore the possible impact the differences really do have, a wide variety of models are examined and estimated. These models uniformly reject the hypothesis that a geographic mismatch is a major cause for black-white differences. Blacks who live near large concentrations of jobs seem to fair only slightly better than those who live far from such concentrations. And in areas where whites and blacks live in close geographic proximity, the racial employment differences remain very large.

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Introduction

Unemployment among black teenagers has reached astounding proportions. Half of all black teenagers who are out of school report themselves as looking for work but unable to find it. Another group of almost equal size say that they are neither working nor looking for work. Just 40 percent of the out-of-school black youth in this country have a job -- any job. To many observers, the ghetto is the first place to look for an explanation. Even the most casual glance at the poorer sections of the nation's central cities reveals their weak economic condition. It seems quite plausible that black teenagers are trapped in blighted neighborhoods where the blue collar, retailing and service jobs that teenagers can perform have largely vanished. The result may be unemployment, frustration, alienation.

This paper explores the so-called spatial mismatch hypothesis as an explanation for the poor labor market experiences of young blacks. At the core of the mismatch story is the spatial expansion of hte American industrial cities. Wealthy families seeking less congestion, better services, safer neighborhoods and a wide array of other amenities have fled the central cities leaving behind the poor, the old, the minorities. Industry, particularly manufacturing and retail trade, has been drawn outward by related desires: cheap land, better transportation networks, superior environments,

wealthy customers, and to some extent, skilled workers. What remains in the city are high-skill white collar jobs and low-skill blue collar workers. The fear is that the movement of people and firms has left those least able to find and commute to employment trapped far away from the areas where new jobs are opening up. The young black poor struggle in a weak secondary labor market.

There are many formulations of the mismatch hypothesis. Often the formulation is affected by the author's desired policy prescription. In this paper I hope to test whether spatially rearranging jobs in one metropolitan area would significantly improve the prospects of black teenagers. Logically, the question could be asked in reverse: would rearranging the residences of black teenagers in the metropolitan area improve their prospects? The problem with the latter formulation is that it involves a large number of changes. Ghetto dispersal would not only change Black employment accessibility, it would alter the social and educational environment of teenagers. Job rearrangement would have some of these effects, but nothing like massive desegregation.

It is also important to realize that the story being tested here takes aggregate demand in the metropolitan area as fixed. The idealized experiment is not one where new jobs are created in the ghetto. That policy has two components. Aggregate demand in the city is increased and the spatial distribution of employment is altered. I want to test only the effects of the latter. The idealized experiment is one where jobs are taken from one neighborhood and placed into another. It should be clear that whether or

not the mismatch hypothesis proves to be valid, aggregate demand could influence teenage labor market performance.

The paper begins by summarizing a theoretical model which explores the necessary and sufficient conditions for labor market outcomes of otherwise identical individuals to differ depending on their residential location within a metropolitan area. The methodological insight offered here is that by observing the behavior of existing workers, along with general movement of population and industry, we can determine which groups and neighborhoods are spatially disadvantaged. Then the labor market and job patterns in one metropolitan area -- Chicago -- are explored in detail.

The paper shows that:

- Low skilled jobs have been leaving the city faster than low skilled workers. As a result there are now more low skilled city residents who work in the suburbs than vice versa.
- Young and low skilled blacks in Chicago spend far more time getting to work on the average than comparable whites.
- Most workers, even young workers, work far outside any area that might reasonably be classified as a neighborhood.

Blacks are being gradually disadvantaged by job movements in Chicago. At the same time the fact tha most workers labor far away from home hints at a more fluid labor market than might be envisioned by a mismatch theory.

Then to explore possible labor market impacts of differences in local job accessibility, the relationship between job proximity and labor market outcomes in Chicago's neighborhoods are examined in detail. The findings include:

- No measure of accessibility proves to have any predictive power in employment equations for young people. Black/white differences are wholly unaffected by their inclusion.

- When we allow for fixed neighborhood effects of any type, we still have no impact on this racial differential. Indeed, the data does not reject the hypothesis of their being no spatial neighborhood effects for employment at all!

- Labor market outcomes for young blacks on the West Side ghetto are remarkeably similar to outcomes for those on the South Side, in spite of the dramatic differences in proximity to jobs.

- Black and white teenagers who live in the same neighborhood fare just as differently as blacks and whites who live across town from each other!

Thus we simultaneously understand the appeal of the mismatch model and its failure. Blacks really are being gradually disadvantaged by job movements. However, the labor market is wide enough geographically and fluid enough that at least by 1970, neighborhood job movements could not be blamed for much of the poor performance of minorities in Chicago. Most teenagers, black and white, don't work in their neighborhoods. And in black areas where there are many jobs for youth, white youngsters tend to fill them.

This work does show that poverty and education have a very strong influence on black teenage unemployment rates, just as they do for whites. Efforts should continue to focus on these problems. Large differences remain, however, in the outcomes of measurably simular blacks and whites. Neighborhood job proximity does not seem to account for much of these differences, at least in Chicago. Race not space remains the key explanatory variable.

In 1968, John Kain published a very influential paper where he advanced and sought to test a 'mismatch hypothesis."[1] Kain argued that housing market segregation "(1) affects the distribution of Negro employment, and (2) reduces Negro job opportunities, and (3) postwar suburbanization has seriously aggravated the problem." He conjectured numerous links between the housing market and the labor market. The links included not only the direct effects of accessibility, but also the influence that neighborhood characteristics might have on an employer's willingness to hire blacks Employees with more contact and experience with blacks are presumably more disposed toward hiring them.

Kain performs empirical work with which he argues that there would be substantially more employment for blacks in Chicago and Detroit if neighborhoods were desegregated. Kain's work has since come under close scrutiny. His work clearly demonstrates that the spatial distribution of black employment and black residences are similar, confirming his first proposition. However, his conclusion that black employment opportunities are reduced seems to hinge critically on his functional form assumptions.[2] Indeed, there is something troubling about a model which predicts more employment for Black workers when the number of workers used in generating the prediction is unchanged. Thus, while Kain's pathfinding work

surfaced a variety of tantalizing hypotheses, it left their validity largely unresolved.

Many other authors have attempted to test the hypothesis. Mooney found that non-white unemployment rates in different SMSAs were correlated with the percent of employment in the city and the extent of reverse commuting.[3] The percent of all employment in the city will be as much affected by where the boundaries of the city are drawn as by economic forces so it is difficult to understand why these variables should have any predictive power. On the other side, Masters found that segregation indices do not help predict black unemployment rates in cities.[4] While intriguing, the result fails to test the mismatch hypothesis. A combination of segregation and job movement is what causes a problem, not the degree of segregation.

Most vehement in his attacks on the mismatch hypothesis has been Bennet Harrison.[5] He has collected a variety of data which he believes shows that suburbanization of employment has not increased recently. He suggests that flight of whites from the cities could even have left blacks in a stronger position for the central city jobs. Moreover, he notes that blacks living outside the central city have incomes no higher than blacks living outside the poverty areas within the city. This latter result is difficult to interpret since he has explicitly selected non-poor city blacks to compare with their suburban counterparts.

Kalachic[6] and Weinstein[7] found little evidence of a wage differential for ghetto and non-ghetto jobs in several cities.

Recently, Strazheim has found large differentials in another.[8] Many other authors have looked at one or another aspect of the issues.

With this patchwork of evidence often derived without a strong theoretical base it remains difficult to assess the validity of the mismatch hypothesis. Comparison between cities is dangerous with history and jurisdictional boundaries largely arbitrary. The hypothesis is distinctly neighborhood based. It implies differences in labor market outcomes depending on the neighborhood a potential worker lives in. The strategy of this paper is to take that distinctly neighborhood approach in one city: Chicago. I seek to explore in detail the spatial character of the labor market with a particular focus on teenagers. I am interested in the location of jobs and workers and changes in both over time. The complexity of even one city is almost sufficient to frustrate a comprehensive treatment of the labor market. Residential and industrial locations often reflect accidents of history as much as the workings of narrow economic forces.

Summary of a Theoretical Formulation of the Mismatch Hypothesis

In a previous paper I have explored a model of the spatial mismatch between workers and jobs.[9] Actually, the mismatch story turns most urban models on their heads. Normally in these models mobile workers choose their residences with an eye toward the location of their jobs which are typically fixed in space. In the current story, some potential workers cannot move while the jobs they might fill shift away. There simply isn't space to detail the theoretical model

in this paper, thus I shall only present the key results. The results described here are generated by an international trade type model with a twist: people can commute between zones at a cost. We divide urban space into a series of neighborhoods. Within each neighborhood housing prices and factor costs (and rewards) are identical.

Workers' utility is influenced by the housing prices in the neighborhood in which they live, the wage rate in the neighborhood where they work, and a measure of the transportation (or search) cost associated with the workers commute.

In the simplest form of the model, we assume there are two output sectors. The price of each good is uniform across all neighborhoods. Each sector employs labor, land, and captial. Capital costs are assumed uniform and constant across zones, just like output prices. Wages and industrial land rents are free to vary between zones. Finally zones may differ in efficiency of production. (Crime or distribution costs or parking costs may be higher in certain neighborhoods.)

Unemployment is not explicitly modeled in this general equilibrium treatment, but the model easily captures the notion that labor market outcomes may be influenced by place of residence. The mismatch story implies that labor market opportunities will differ for persons in different neighborhoods. We might just as well model this implication as very low wages (or wages net of transport costs) in some zones relative to others. And if we impose some wage rigidities in areas where equilibrium wages are low we could instead have high wages and high unemployment.

In the context of such a model three forces will tend to equalize

labor market opportunities across neighborhoods: the movement of people to new residences; the movement of capital or firms between neighborhoods; and the commuting of workers between zones. Thus, three conditions must be met for a mismatch story to have force:

- Residential location decisions must be constrained. Free mobility of residences would equalize utility of identical workers
- Conditions for business must be unfavorable either due to excessive costs of production or a "shortage" of land in the same areas where residences are constrained. As a result, wage rates are low or else business leaves (or never enters) and few jobs are found in the neighborhood
- Commuting or search costs must be non-trivial for jobs outside the neighborhood. Otherwise, workers forced to live in undesirable areas would simply commute to jobs in other neighborhoods.

The results are largely self evident, so they receive only passing discussion here.

One confusion that easily arises in the mismatch hypothesis is the difference between labor market outcomes and utilities. The mismatch story could be construed to indicate that labor market outcomes will differ depending on residential location, whether or not utilities differ. Variables other than labor market outcomes enter the utility function. Areas with weak labor market opportunities may offer offsetting advantages, as in our model where low housing costs may compensate for poor accessibility. If all persons are freely mobile so they may select any homesite, then all persons will achieve identical utilities by definition. If one area were more attractive as a home or worksite, new workers would try to move there, raising housing costs and/or lowering wage rates.

Indeed if we took job locations and wage rates as exogenous this model largely mimics the traditional Alonso/Kain models where land rents decline with distance from employment centers.[10] Clearly mismatch theorists have in mind labor market problems serious enough that there are insufficinet compensating advantages in housing markets. If so, then, the mobility of the disadvantaged workers must be limited. Note, however, that a result showing differing labor market opportunities by neighborhood need not indicate any market failures. We should naturally expect some differences. But, if people voluntarily choose to live in such a neighborhood, we can be sure there are offsetting benefits. It might still be interesting to explore the differences in labor market opportunities even if no limits were imposed on mobility. But utility variations can occur only when such limits exist.

Thus, at the very heart of the mismatch story are constraints on residential (and possibly worksite) location. Proponents argue that residential choices of blacks are particularly constrained because of discrimination in urban housing markets. And this point arouses little dispute. I know of no author who has argued that residential choices for blacks in Chicago are unconstrained, though considerable disagreement persists about whether these constraints lead to unusually high housing costs.[11] For teenagers, the problem of mobility leading to identical utilities even if labor market opportunities differ by location may not be serious anyway. Over 90 percent of all teenagers live at home. They have little option about their homesites. Whatever the advantages or disadvantages of the particular homesite the parents have found, they surey will not exactly offset any accessibility differences faced by teenagers.

Regardless our attention will be on the narrow question of whether identical individuals achieve "vastly" different labor market outcomes because of their residential location. We cannot pretend to completely ferret out any offsetting features in other markets. If large differences in labor market outcomes are found, it will be important to consider the possibility of a utility difference separately.

Assuming residences are counstrained, we must then consider under what conditions we ought to see very different labor market outcomes by neighborhood of residence. It is still quite plausible that mobility of firms will cause equalization of opportunity. There will naturally be pressure for the production sector to move in such a way so as to equalize access to labor and wages. The geographic labor market which fails to achieve such equality must suffer from at least two other important distortions. First, the conditions for factor price equalization must not be met. Second, commuting and/or search costs must be non-trivial.

The most famous theorem in international trade states quite simply that if certain conditions are met, factor prices in all countries will be identical. Thus, if these assumptions are met wage rates (and thus opportunities) will not differ accross neighborhoods. For a two sector model the most important assumptions are that all neighborhoods allow for equally efficient production, and that both goods be produced in each zone.[12]

In our model there are two particularly pertinent cases where the theorem may break down. If efficiency does differ depending

on location the theorem fails. Or if one or another zone has a superabundance of labor relative to land or vice versa equalization will again be thwarted. The first condition is obvious. If it is more expensive to produce one or another product in certain locations, either factor prices must fall or production simply will not occur there. There is no reason a priori to believe that higher production costs will lead to falls only in wage rates or only in land prices. Indeed, there are unusual cases where one factor price actually rises. In general though we can predict downward pressure on both land prices and wages. The lower limit on both prices naturally depends on opportunity costs of the factors. If laborers have strong opportunities in nearby neighborhoods, the wage cannot fall below the net wage received by the commuters. If land has other uses such as housing or speculation, the fall in rents also will be limited. Quite plainly it is possible that production inefficiencies and opportunity costs of factors may be such that no production will occur in some areas.

Yet even if all areas allow for equally efficient production, where labor is very abundant in some neighborhoods relative to land or vice versa, the theorem may again fail. We noted earlier that the factor price theorem works only when production occurs in both sectors in a neighborhood. At the equalized factor prices each sector will use a particular combination of land and labor. Equilibrium requires that all factors be exhausted. Thus, some combination of production of good X and good Y must allow for full use of resources. So long as the overall land-labor ratio in

the zone falls between that implied by the equalized wage-land rental ratio for production of good X and Y, we have no problem. That is if our zone has three workers per acre of industrial land and good X uses four workers per acre while good Y requires two workers per acre, then by using half our land for the production of X and half for Y we will absorb all of the workers. But should a zone have a land-labor ratio outside the bounds of production for X and Y, there is a problem. A zone with five workers per acre cannot produce both X and Y. When labor is too abundant, wages must fall and production (if it occurs at all) will be confined to the labor intensive sector. There is nothing mystical here. When land is very scarce relative to labor, it is quickly used up. Prices for land rise and wage rates must fall or local employers cannot compete. Once again opportunity costs place a floor on the fall in factor prices. Wage rates thus may not fall sufficiently in neighborhoods with large concentrations of labor to accommodate all nearby workers and many residents may be forced to commute to other neighborhoods for work. Equilibrium is achieved when the net wage of all residents is identical. Those who work nearby command less gross pay but local employers must pay more for land so they make no excess profit. Those workers who commute get larger paychecks but bear search and commuting costs. Either way, if efficiency differs by neighborhood or if there are very large differences in the ratio of land to labor across zones, factor prices and thus opportunities are likely to differ.

The final condition for differential labor market outcomes for identical residents of several neighborhoods was non-travel commuting or search costs. We explicitly allow workers to search for and commute to jobs in neighborhoods outside their town. If the costs of doing so are small relative to the wage, then the net effect of neighborhood differences will also be small. These search and commuting costs limit the differences in opportunity across neighborhoods. In the extreme when such costs are trivial, all persons face equal labor market opportunities. Everyone in the entire metropolitan area would be attracted to any job paying a little extra. Ultimately it is this condition which we must explore most closely. Proximity to work does vary dramatically by neighborhood. But if such variations are important to consider when exploring the labor market outcomes of young people, search and commuting costs must be very high.

Let me summarize the conditions which must be met for a plausible mismatch theory. First, there must be constraints on the residential location decisions of workers. This condition is not essential for labor market opportunities to differ by neighborhood, but it is critical for there being differing utility levels by neighborhood. Second, either neighborhoods must vary in their productive efficiency or some zones must have an overabundance of labor or land or both. Otherwise, wages will be everywhere identical. Finally, commuting costs must be non-trivial.

It can be argued very effectively that the first two conditions are met for ghetto youth. Residential choices of these youths'

parents are obviously constrained. Moreover, the young people themselves are essentially constrained to live at home. It also appears that production is less efficient in the ghetto and even that usable land for industry is relatively scarce.

Production costs might be higher in the ghetto for many reasons. Theft and vandalism are unusually high. Noll argues that expansion is difficult because the acquisition of space is complicated by the need to buy land from several owners, each of whom potentially occupy a monopolistic position.[13] Hamer reports that demolition costs are high relative to acquisition costs of unfettered land in the suburbs.[14] Kain points to a reluctance of skilled workers, who tend to be white, to work in undesirable areas.[15] Parking is always a problem. A congested and outmoded transportation network often hampers movement of goods to national markets.

There is also good reason to suppose that usable land may be hard to find in the ghetto. The arguments of Noll and Hamer noted above not only suggest that production is costly, they also imply that usable land is limited. Population densities in urban ghettos are typically the highest of any area in the SMSA. The labor-land ratio in the ghetto is obviously manifoldly greater than that in the suburbs.[16]

The key question issue then, is likely to be whether search and commuting costs for young people are costly. And certainly such a scenario is plausible. Transportation costs may be very high. Cars are rarely available for poor young blacks and the

mass transportation system may not serve them well. Youth may value their leisure time very highly, implying a greater cost (relative to wage) of commuting time than adults. Perhaps an even more plausible story would emphasize the high cost of initial job search outside the neighborhood. Youngsters may be unfamiliar with the transportation system which they need to use to locate a job in the first place. Others may genuinely fear for their personal safety once they leave the familiar areas near home. It is widely claimed that young blacks simply will not set foot in some alien neighborhoods. Finally, the job search process for teenagers may rely heavily on informal networks which could decay rapidly with distance. We shall explore these issues in some detail later in this paper. Suffice it to say, however, it is quite plausible that commuting may impose a serious burden for many youngsters.

If the three conditions for our model are met in the ghetto, then we can make three very important predictions:

- There will be downward pressure on wage rates in the ghetto.

Whether ghetto production is less efficient or usable land is simply scarce, there will be downward pressure on wages. (For land prices, pressure will be downward if the area is less efficient and upward when land is scarce.) But wages may be constrained by the standard litany of rigidity inducing institutions. The minimum wage, unions, government payment rules all serve to prop up wages. Firms with several plants in the region are rarely willing to offer lower wages at one or another plant. Discrimination laws may also deter a company from offering lower wages in ghetto plants. As a

result wages may not adjust downward sufficiently to provide jobs to all who seek them. Unemployment would be the inevitable result.

- Ghetto firms will tend to be labor intensive.

The plentiful resource in a neighborhood with a depressed market would be labor. The firms most likely to offset added costs of business in the ghetto are ones which can exploit this resource. The conclusion is more than just the obvious result that firms needing low-skilled labor will be drawn to the ghetto. The result follows from the surplus of labor in the ghetto and not from their low skills. Even if all workers in the metropolitan area were identical, ghetto production--if it exists--is likely to be labor intensive.

- The ghetto will tend to export labor to other neighborhoods. Workers living in the ghetto will tend to travel farther to work.

If opportunities are more limited in the ghetto, workers will try to commute to jobs elsewhere. The greater the differential in wage rates or opportunities the greater the incentive to commute. Thus, the weaker the opportunities are in one area, the farther the marginal worker will be traveling for work. This result is obvious, but very important methodologically. It suggests a way of measuring accessibility by observing the journey-to-work patterns of workers. Neighborhoods with low accessibility will tend to "export" workers. These workers will travel farther to work than their counterparts in other areas.

The model illustrates the appeal of a simple mismatch story. It can generate lower wages and skewed occupational distributions

without resorting to models of discrimination or heterogeneity of workers. Unlike discrimination models, this formulation of the mismatch story requires no non-competitive behavior. No large profits are foregone. The cost of operation is higher in the ghetto or land is scarce and ghetto residents suffer. Indeed, the two-sector formulation of the model used here is in most important respects similar to Becker's use of a one-sector model in his landmark book on discrimination.[17] That similar results are generated should be no surprise.

Of course, discrimination is not ruled out in this model. Indeed, housing market discrimination is crucial to its formulation. Discrimination in the labor market could serve to exacerbate the mismatch problems. Reluctance of capital to flow into the ghetto could reflect ill feelings towards blacks rather than high real costs. If firms in or out of the ghetto refuse to hire blacks "search costs" may be high indeed.

The appeal of the model, however, is part of the reason it is so hard to test. Low wages, skewed occupational distributions, and high unemployment can be generated by mismatch, by discrimination and by differences among workers. The difficult task is to separate these.

What is unique about the mismatch model is its emphasis on employment location. In theory, ghetto firms will pay less than non-ghetto firms. Those willing to commute out can command higher wages. The occupation mix of ghetto and non-ghetto firms will be different. But heterogeneity of firms and workers bedevils easy

empirical tests. The strongest result is perhaps the most obvious: Persons living in neighborhoods with weak local employment opportunities will tend to commute to other neighborhoods. If that commuting imposes heavy costs--either in initial job search or daily commutes, persons living in these areas will fare worse in the labor market.

The basic insight, then, is to observe the behavior of existing workers to determine the neighborhood's proximity to jobs. The methodology used here is to relate neighborhood employment rates to various measures of job proximity based on the behavior of existing workers. Even here we must be very careful. Worker commuting patterns differ for many reasons. We must be careful to understand them.

In the next section we explore the changing pattern of residential and industrial location in the Chicago SMSA and the impacts these patterns have on commuting behavior of workers. In the final section we look to see whether these patterns are related to labor market outcomes of youth.

An Overview of Worksites, Homesites, and Commuting in Chicago

Our theoretical models suggest that we ought to look at the differential locations of workers and workplaces and the commuting behavior these imply in our search for evidence for or against the mismatch hypothesis. We shall ultimately need to define a variety of proximity measures and to relate these to labor market outcomes in neighborhoods in and around Chicago. Before embarking on that task, it is extremely enlightening to briefly consider the broad employment,

residence, and commuting patterns observed in Chicago.

During the 1960s, the central city of Chicago experienced declines relative to the surrounding suburbs in both the number of jobs located there and in the number of workers living there. The city actually lost more jobs than working residents. In 1960 the city housed 59% of all workers in the Chicago Standard Metropolitan Statistical ARea (SMSA) and it held nearly 69% of all jobs. By 1970, the figures had fallen to 48% and 53% respectively. Thus by 1970, the image of a central city which held the jobs for bedroom suburbs no longer applied to Chicago. Jobs and workers had achieved rough parity.

Of course overall parity did not translate into identical patterns of work and home locations for all occupations. Table 1, drawn from Census data, reveals the changing workplace and residence patterns by occupation for 1960 and 1970. The table records both the percentage of all those employed in each occupation who live in the city (rather than the suburbs) and the percentage who work there. It also reports the ratio of these, labeled the import ratio. In effect the import ratio gives the ratio of jobs to workers in the city. If equal numbers of persons lived and worked there the ratio would equal 1. An import ratio of 1 does not of course indicate that there is no communiting, only that as many workers commute out of the city each day as commute into it. Since there are more professional jobs located in the city than there are professionals living there, on net the city imports professionals from the suburbs each day and the import ratio for that occupation exceeds one. By contrast there are actually fewer city jobs for laborers than there are resident laborers, so each day the city is a net exporter of these workers and the ratio falls below 1.

As we would expect the city is a major net importer of professional,

TABLE 1

WORKSITES AND RESIDENCES AND CENTRAL CITY IMPORT RATIOS FOR ALL EMPLOYED PERSONS BY OCCUPATION, 1960, 1970

1960

Occupation	% of All Persons Employed in Occupation Living in the City (1)	% of All Persons Employed in Occupation Working in the City (2)	Import Ratio (2)÷(1)
Managerial	44.9	68.8	1.53
Professional	48.7	64.6	1.33
Sales	51.8	68.2	1.32
Clerical	63.9	74.6	1.17
Craftsmen	54.1	64.3	1.19
Operatives	66.0	69.9	1.06
Laborers	67.6	67.9	1.01
Service Workers	66.3	66.5	1.01
Total	58.7	68.7	1.17

1970

Occupation	% Living in City	% Working in City	Import Ratio
Managerial	31.8	53.1	1.67
Professional	40.8	51.6	1.27
Sales	37.5	49.3	1.32
Clerical	52.7	58.3	1.11
Craftsmen	44.5	48.8	1.10
Operatives	58.1	56.2	.96
Laborers	57.9	52.0	.90
Service Workers	57.1	53.9	.94
Total	47.9	52.6	1.10

Source: 1960 and 1970 Census data.

managerial, and sales personnel. What is somewhat surprising is the fact that the city is actually a net exporter of all of lower skilled occupations. More operatives, laborers, and service workers actually live in the city than work there. Even more striking is the fact that the deterioration in these import ratios was greatest in these occupations between 1960 and 1970. So while declines came in all workplace and residence categories, it does appear the city's biggest losses were in the residences of high skill, well paid workers and in jobs for its low skilled residents.

One portion of the mismatch hypothesis does appear to be verified then in Chicago. Low skill jobs are leaving faster than low skilled workers and those remaining in the city could be disadvantaged. This is particularly plausible for blacks since roughly 90% of such persons do in fact live in the city and since the group is disproportionately low skilled. And indeed other data does show that commuting patterns are rather different for blacks and whites. And low skill blacks do indeed travel further to work than low skill whites.

Table 2 is based on a special survey conducted by the Chicago Area Transportation Study (CATS) in 1970.* In general urban theorists hypothesize that desires for land and other environmental amenities lead more wealthier persons to live further from the city (and their jobs) than those with more modest incomes. Thus we should expect to see higher paid professionals and managers commuting further than lower paid operatives and laborers. Interestingly enough that is exactly the pattern we do observe for whites in Chicago. White managers and professionals are slightly more likely to

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*The sample of some 20,000 workers in the metro area is unique in that it contains detailed information on residence and workplace location for individuals included in their sample. When we calculate import ratios for the city by profession, we find results very similar to those found on Table 1 which is based on census data.

TABLE 2

RESIDENCE AND WORKPLACE LOCATION PATTERNS, IMPORT RATIOS AND TRAVEL TIMES FOR WHITE AND BLACK WORKERS BY OCCUPATION, 1970

WHITES

Occupation	% Living in Central City	% Working in Central City	Import Ratio	Average Travel Time
Managerial	31.9	54.5	1.71	34.3
Professional	34.3	53.2	1.55	33.3
Sales	34.9	53.8	1.54	32.1
Clerical	45.7	57.6	1.26	31.1
Craftsmen	38.0	48.0	1.26	29.4
Operatives	47.9	49.3	1.03	26.6
Laborers	51.6	50.0	.97	26.2
Service Workers	50.6	52.9	1.05	25.0

BLACKS

Occupation	% Living in Central City	% Working in Central City	Import Ratio	Average Travel Time
Managerial	93.8	86.9	.93	32.0
Professional	86.9	82.5	.95	33.7
Sales	86.7	86.7	1.00	31.3
Clerical	91.9	90.2	.98	31.9
Craftsmen	87.3	65.8	.75	36.2
Operatives	86.0	73.7	.86	34.0
Laborers	79.7	64.6	.81	33.5
Service Workers	85.9	80.2	.93	34.2

Source: Calculated from Chicago Area Transportation Survey, 1970.

work in the city than are whites working in lesser skilled occupations. But they are much more likely to live in the suburbs. As a result they average 35 minute commutes whereas white laborers and service workers travel just 25 minutes on average. The bulk of the variation in travel times seems to be caused by differences in where the members of particular occupations live, rather than where they work.

By contrast most of the variation in journey to work times of blacks is almost entirely the result of differences in where they work. Roughly 90% of the workers in each occupation live in the city. But in the lower skill categories a sizable fraction work outside the city. As a result commuting times are actually slightly larger for these lower skill blacks. And they are considerably longer than the times for comparable whites. Low skill blacks spend as much time commuting as professional whites.

These findings are supported by yet another source: the 1975 Annual Housing Survey for Chicago. This survey is richer in demographic detail than CATS, but it is weaker on occupational information. Table 3 is drawn from that data. Once again we see that lower skilled whites travel shorter distances and have lower commuting times than higher skill whites. Perhaps most relevant for this study is the finding that white teenagers have very short commutes, averaging only 15 minutes. Once again the pattern for blacks is quite different. In the lowest skill categories, travel times and distances are much greater for blacks. Most dramatically black teenagers travel much further to work and spend much longer travelling according to this survey. Indeed black males have commutes which are more than double those of their white counterparts on average.

TABLE 3

JOURNEY-TO-WORK TRAVEL TIMES AND DISTANCES FOR WHITES IN CHICAGO 1975

Employed Males	Average Time		Average Distance	
	Whites	Non-whites	Whites	Non-whites
All Ages	27.4		10.8	
Household heads, Aged 30-39 with education:				
- less than 12 years	25.1	33.0	9.9	12.3
- 12 years	27.3	27.4	11.8	9.7
- over 12 years	31.8	33.1	13.5	12.8
Teenagers 16-19 - living at home	15.1	36.2	4.5	9.3
Employed Females				
All Ages	22.4	32.8	7.2	9.2
Household Heads	25.3	36.1	7.3	9.5
Wives	21.0	33.0	7.1	9.4
Teenagers 16-19 - living at home	16.2	28.7	4.7	6.5

Source: Annual Housing Survey 1975

We should also keep in mind that these are average and not marginal travel times. They represent the average experience of those who got jobs. This is not necessarily reflective of the commuting which would be required of the next potential worker. If nearby jobs are easier to find and are filled first, excess commuting times for the marginal black teenager could in fact be much greater. Even the average figures reported in the AHS imply that in a five day week, black teens spend 2 1/2 hours more in transit.

This glimpse at the general patterns helps illustrate why the mismatch hypothesis holds real appeal to those interested in the problems of minorities. In Chicago at least, low skill jobs really are moving out faster than low skill workers. Blacks do spend longer getting to work than comparable whites.[18] And the differences are most extreme just for the groups we might expect to have limited mobility and haphazard job search methods--the low skilled and the young. Obviously the hypothesis merits closer examination.

Nonetheless although black teens spend more than twice as long as whites getting to work, the differences need not have a sizable impact on labor market outcomes nor do they necessarily explain a large fraction of the racial differences in labor market outcomes. The extra travel time amounts to just 5% extra work time on an 8 hour day. Typically transportation economists report that commuting time is valued at roughly half the wage.[19] If so then even an absurdly high labor supply elasticity of say 2 would explain just 5 of 50% difference in employment rates of black and white teens.

Thus we need a model that suggests youth who live farther from jobs suffer greater disadvantages than those imposed by higher commuting costs. We need a model whereby initial job search or job acquisition is severely hampered by geographic separation from jobs. If job search costs rose say exponentially with distance because of initial transportation costs, more limited information, or fear and uncertainty about neighborhoods further from home, and if youth did not expect to stay in any particular job for an extended period much more significant negative impacts could result.

A slight modification of this notion derives from the work of Rees and Schultz in the early sixties.[20] They found that low skilled workers tended to find jobs primarily through the use of informal networks.[21] It does seem plausible that such networks would decay rapidly with distance from home. Thus these low skilled black workers might be disadvantaged in initial job search.

There is a second aspect of these results which cast doubt on the plausbility of the mismatch hypothesis. The mean distances and the variances around them are very large. A five mile journey brings any teenager well outside almost any conception of neighborhood. Typical walking speed is roughly 3 MPH, thus jobs even for white youth are over 1 hour's walk from home. It seems unlikely that youths would know most of the area within a five mile radius well. And the variances in travel times and distances are very large for all groups. It is not at all uncommon for the standard deviations to be 2/3s the size of the mean. Such a wide variance indicates a far more dynamic and wide ranging labor market than some mismatch models might suggest.

Nonetheless it remains plausible that accessibility differences are important. Thus we turn then to the question of whether or not the observed differences in accessibility to jobs do in fact explain difference in labor market outcomes of whites and blacks and of residents of different neighborhoods in Chicago.

Methodology

We are interested in two related issues. Does proximity to jobs seem to influence labor market outcomes? And if so, can differences inproximity explain an important part of the racial differential in the outcomes for youth--particularly employment? The natural methodological approach is to define one or several measures of accessibility and to examine their relationship to employment and earnings of blacks and whites in different areas of the city. Yet serious methodological problems arise when one seeks to estimate such models. The most serious problems surround the development of appropriate measures of accessibility. Even in simple models where workers and jobs are all identical the fact that wage rates, labor supply, and commuting patterns are all determined simultaneously makes it difficult to select a meaningful definition of accessibility ex post, particularly if we allow for rigidity in wages and for unemployment. When the theoretical problems are combined with a rather serious shortage of individual data that gives both detailed geographic information and provides the socio-economic data, the prospects for appropriate estimation are discouraging.

Faced with these problems, the approach taken in this paper is to use three different methods to examine the potential relationship between employment and proximity:

- Estimate census tract employment rate equations which include one of a many different measures of neighborhood job proximity
- Estimate census tract employment rate equations which allow for fixed neighborhood effects designed to capture the impact of all unobserved neighborhood differences including variations in job proximity
- Exploit natural experiments within the city by comparing the labor market outcomes of blacks who live in neighborhoods with vastly different accessibility to jobs and by comparing outcomes of blacks and whites who live in the same neighborhoods.

The first is simply an attempt to operationalize the difficult model described previously. We define a large number of neighborhood proximity measures drawn from several different data sources and use them as independent variables in regression models which use the youth employment rate in a very small area of the city of Chicago as the dependent variable.

The second uses the same dependent variable but allows instead for separate intercepts for each of over 100 neighborhoods. In essence this method controls for all neighborhood differences regardless of their origin. Thus the fixed effects capture the impact not only of proximity differences, but also of differences in local schools, in the attitudes and tastes of local residents, and anything else which varies over space.

The final approach is quite different. There are two ghettos in Chicago. One is on the city's South Side; the other is on the West Side. By every conceivable measure, blacks living on the West Side live much closer to jobs than those on the South. Just after the 1970 Census was completed, the Census Bureau conducted a series of Census Employment Surveys(CES) in low income areas across the U.S. in which they collected detailed labor information on relatively large samples of individuals. And quite fortuitously, two surveys were conducted in Chicago--one in each of the ghettos. Thus we can exploit the natural experiment and compare persons in these two areas in some detail and thus explore the effects

of job proximity on young blacks.

And we can also use these same CES data for another natural experiment. The West Side is actually a collection of several low income neighborhoods, some black and some white. Thus we can compare the labor market outcomes of blacks and whites living very close to each other. This second natural experiment thus allows us to examine the extent to which differential black/white outcomes can be explained by differences in proximity. If they can, blacks and whites will fare much more similarly in areas where they live close to each other.

The results of all these tests are remarkably strong and consistent. At best proximity has a marginal impact on labor market outcomes--about as much as we might expect from the reduced real wage which results from commuting slightly farther to jobs. There is little evidence that spatial differences in job accessibility are a major explanation of the poor labor market outcomes of young blacks.

We begin then with a discussion of the methods used to examine the impact of various job proximity measures on employment rates.

Proximity and Employment

We might have considered the impact of accessibility on a wide variety of labor market outcomes. These include employment status, wage rates, occupational attainment, and school enrollment. Ideally, we might like to use individual data using accessibility and other neighborhood variables in labor supply, unemployment, wages, or schooling equations. Unfortunately, individual data with both detailed spatial identification and high quality labor market performance measures do not exist. But using 1970 Census Tract Data, it is feasible to relate employment rates for out of school youth in each tract to our measures of accessibility.

There are some 1600 census tracts in Chicago. A series of weighted OLS regressions were estimated. In all of the models the employment rate for out of school youth aged 16 to 21 living in the tract--labeled EMRATE--served as the dependent variable. This variable along with the bulk of the independent variables was culled from 1970 census tract data. The youth employment rate is available for both males and females. Regression results reported here are for both sexes to reduce measurement error of the dependent variable. All have also been run separately by sex with essentially similar results by sex except where noted in the text.

The most critical independent variables were those designed to capture the proximity of jobs to the tract and the measure of racial composition there. We are looking for two types of results. First a strong performance of accessibility measures would offer support for the mismatch hypothesis. And if the inclusion of proximity measures reduces the measured coefficient on race, we will have explained a portion of the racial differential.

The proximity measures are drawn from several different sources and are discussed below. The remaining independent variables were derived from Census data. PBLACK indicates the percent of the population which is black. PSPANISH Provides the comparable figure for those who are Spanish speaking. In addition to the racial composition variables, a variety of human capital and socio-economic variables were included. PSCHOOL is the proportion of persons aged 16-21 who are in school and thus is a measure of the schooling level of the out of school group. The greater the value PSCHOOL, the later people leave school, then the out of school persons are older and better educated. Two measures of economic well-being in the tract are included. FAMINC, average family income,

and PPOOR, the proportion of families below the federal poverty level. The inclusion of two income measures obviously complicates the interpretation of each one separately. PUNDER25 indicates the percentage of the tract's residents who are under 25 and is designed to capture any demographic impacts. PSING is the percentage of children living in single parent families.

Sample sizes do vary by tract. As a result, heteroskedasticity is created in the data. Ordinary least squares estimates are unbiased by inefficient. Thus, all regressions were run weighted (by the square root of the sample size) and unweighted. Both procedures yielded virtually identical results, though weighting often did improve precision. Weighted results are presented here. All statistical test (including the Fischer test described below) have been appropriately adjusted to account for the weighting.

We turn now to the problem of specifying the various accessibility measures.

Measuring Job Proximity

Even the most casual local observer would recognize that there is enormous variability in job accessibility across the city and SMSA. We shall see for example that by every conceivable measure there is a concentration of jobs in and around the city's West Side and there is a comparable void on the South Side. Yet finding meaningful ways to quantify those differences is a mean task.

Both practical and theoretical reasons suggest that accessibility ought not to be measured separately for each census tract. Tracts are just too small to serve as reasonable representations of neighborhood job

markets. And our limited data make it impossible to create different measuresfor each tract anyway. Instead accessibility will be defined over "neighborhoods"--the geographic concept that everyone understands but no one can define. In the 1940s, Chicago planners nonetheless accepted the task of defining zones which corresponded roughly to existing neighborhoods and they created 76 "community areas" (or community zones). Since that time these have been used as a basic geographic unit for collecting and reporting data (and delivering services). Chicago census tracts have been chose to be simple subdivisions of these community areas; thus tracts can be easily aggregated to the larger zones.

These community zones seemed the logical and easiest definition of neighborhoods within the city. In the remainder of the SMSA no such convenient zones have been designated. Still census tracts or groups of tracts often conform to municipal boundaries which often have real significance. In the areas outside the city, census tracts were combined in such a way as to create another 40 zones. The 116 zones in and out of the city were used as neighborhoods.

Obviously no one measure of accessibility can capture all notions of proximity. Thus a variety are developed and considered here. Each captures a slightly different conception of accessibility. And each offers peculiar advantages and disadvantages. The three primary measures considered here are:

- The number of jobs within a 30 minute public transit commute from the neighborhood--either for all jobs or for particular types of jobs
- The neighborhood import ratio, that is the ratio of jobs to workers in the neighborhood--either for all occupations or for a selected subset

- Average journey to work travel for workers living in the neighborhood--again either for all workers or for a particular subset.

All of these rely heavily on the CATS data. That survey provides detailed geographical information on where each worker surveyed lives and works and the mode of transit he or she uses. In addition the CATS group developed a "SKIMTREE" which indicates the length of time a commuter can expect to spend in getting between any two points in the SMSA if an automobile isused or if public transit is used. We now consider each measure in turn.

Number of Nearby Jobs

An obvious measure of accessibility is simply the number of jobs nearby. Zones closer to more jobs would be more accessible. The time it takes to traverse a particular distance varies widely between any two points in the city. So a count of jobs within 30 or 45 minutes commute seems most appropriate. With SKIMTREE data on travel times for mass transit or automobile between any two points in the SMSA it is feasible to combine the tree with data on workplace location to generate measures of the number of jobs within say a 30 minute rapid transit commute of any neighborhood.

One serious problem with this sort of measure is that it counts only jobs and takes no account of the number of people who may be competing for them. If jobs are plentiful nearby, but people are also, these jobs are not so available. Suburban areas fare poorly in this measure. Low job densities and weak mass transit place suburban residents far from most jobs. If we allow auto transit in our measure, we do no better.

Suburban residents still live close to fewer jobs. The low population densities in suburban areas mean that even though there are fewer jobs nearby, they may be more readily available. Thus, an import ratio which compares jobs to workers in an area seems like a more appealing measure.

Neighborhood Import Ratio

In a previous section we compared the number of jobs in the central city to the number of workers living there for various occupations. The ratio of jobs to working residents was labeled the import ratio. We found ratios far in excess of one for white collar occupations indicating that these workers descend en masse on the city from the suburbs each day. By contrast, the import ratio for blue collar and service workers fell below one. These workers were commuting out of the city for work. It seems logical to use the same concept on a smaller scale to measure neighborhood accessibility. We can calculate import ratios for various types of jobs for each community area using the CATS data. Neighborhoods with more jobs than workers will import labor and show up with an import ratio greater than one. Those with fewer jobs than workers will be the reverse.

Since our focus is on teenagers, we ought to concentrate on the relative proximity of jobs most likely to be available to them. In principle with sufficient data, we could calculate import ratios for each neighborhood based only on teenage jobs and workers. In practice, CATS data is too limited to allow such disaggregation with much precision. Import ratios have also been calculated for two other types of jobs and workers. First for all occupations, then just for blue collar and service.

The problem with the import ratio is that it compares two stocks--workers and jobs--in a neighborhood. Yet nearby jobs need not be available to local workers. If jobs in an area are not growing it might be argued that existing matches between employees and employers might have been established in the past and that teenagers cannot get the local jobs. High turnover rates in manufacturing make this scenario very unlikely, but it deserves attention. We can (and do) use job growth as a measure of accessibility as we shall discuss in a moment. But an even more appealing measure examines the journey to work behavior of existing workers' average travel time.

Average Travel Time

Ultimately, we seek information on the "distance" the marginal worker in any area must travel to find a particular job. We can't calculate it for the marginal worker, but we can for the average one. And if turnover is high, the distinction between average and marginal may not be too serious.

The travel time measure is particularly appealing because it reflects actual worker behavior. If jobs are found nearby, journey to work travel will be short. If jobs for particular workers can't be found in the neighborhood, travel will be long. The biggest problems reflect the heterogeneity of the labor force. Permanently attached workers from some firms may move far from their jobs in a search for neighborhood amenities. Their long travel times will be included in the average, even though alternate jobs could be found close by. Their travel behavior may not say much about marginal accessibility. If we confine our attention to blue

collar and service occupations or even to youth, where turnover is common, averages are likely to be more accurate measures of accessibility.

Other Measures

There are a plethora of other accessibility measures. Probably the strongest candidates capture job growth or decline. I believe emphasizing job growth alone as a measure of job avilability is inappropriate. Most jobs for teenagers are not "new" jobs. Turnover and promotion create most openings. There is also a more serious concern about simultaneity with a job growth/decline measure. The disamenities associated with ghettos may slowly induce firms to leave. Job declines may be associated with poverty ratherthan vice versa. Even when substantial employment remains, ghettos will likely perform most on these measures.

Nonetheless a variety of job change variables was also tested. None performed well at all. Thus the actual measures used and the results are not reported here. The measures we did use are shown below. All of them are defined for community zones and are derived using 1970 CATS data on journey to work origins and distributions, in combination with a SKIMTREE indicating travel time by transit mode between all points in the area. In our regressions these are labeled:

JOBSNEAR (All) - The proportion of all jobs in the SMSA which can be found within 30 minutes public transit from the zone

JOBSNEAR (BCS) - The proportion of all blue collar and service jobs which can be found within 30 minutes public transit from the zone

IMPORTRATIO (ALL) - The ratio of all jobs to all workers residing in the zone

IMPORTRATIO (BCS) - The ratio of blue collar and service jobs to blue collar and service workers residing in the zone.

AVTIME (All) - The average journey to work travel time for all workers living in the zone

AVTIME (BCS) - The average journey to work travel time for blue collar and service workers living in the zone

AVTIME (Teen) - The average journey to work travel time for teenage workers living in the zone.

The measures based on teenagers are included in spite of the fact that the limited sample sizes make them subject to considerable measurement error.

We turn now to the empirical results.

The Empirical Results--Tract Employment Rates

Table 5 displays weighted regression results first without any accessibility measure, and then with several entered individually. These particular measures are based strictly on blue collar and service workers. Generally, the coefficients on other independent variables are quite sensible. In Equation (1) no proximity control appears. Every variable performs exactly as we would expect. The big three, schooling, race and income show very strongly. If we increase the proportion of youngsters in school in an area from 30% to 60% holding fixed all other variables, the employment rate for out of school youth will rise four to five percentage points because on average they will have more education. Poverty also shows a powerful effect. A tract where half of the families are poor suffers employment rates almost ten points lower than one where no poverty is found. If such tracts also have $10,000 lower average family income, the difference rises to nearly 15 points. Yet even controlling for schooling, income, family composition, age composition, race is the key variable. Tracts that are entirely black suffer employment rates 18 percent lower

TABLE 4

MEANS AND STANDARD DEVIATIONS FOR
VARIABLES USED IN REGRESSIONS

Variable	Mean	Standard Deviation
1970 Census Tract Data		
EMRATE	0.650	0.157
FAMINC	12082	3704
PBLACK	0.222	0.380
PPOOR	0.126	0.169
PSCHOOL	0.557	0.141
PSING	0.166	0.131
PSPANISH	0.065	0.125
PUNDER25	0.542	0.089
1970 Cats Data		
AVTIME(ALL)	31.12	5.78
AVTIME(BCS)	29.58	6.3
AVTIME(TEEN)	30.60	13.9
IMPORTRATIO(ALL)	0.886	0.924
IMPORTRATIO(BCS)	1.024	1.26
IMPORTRATIO(TEEN)	0.959	1.25
JOBSNEAR(ALL)	0.048	0.043
JOBSNEAR(BCS)	0.050	0.056
1960, 1970 Where Workers Work		
IMPORTRATIO(ALL)	0.639	0.56
ΔIMPORTRATIO	0.054	0.166
ΔJOBS/WORKER	-0.004	0.146
%ΔJOBS	0.213	1.45

TABLE 5

REGRESSION RESULTS FROM 1970 CENSUS TRACT DATA

Independent Variable	Dependent Variable: EMRATE (1)	(2)	(3)	(4)
PSCHOOL	.14 (.03)	.13 (.03)	.13 (.03)	.14 (.03)
FAMINC	$.003 \times 10^{-3}$ $(.001 \times 10^{-3})$	$.003 \times 10^{-3}$ $(.001 \times 10^{-3})$	$.001 \times 10^{-3}$ $(.001 \times 10^{-3})$	$.003 \times 10^{-3}$ $(.001 \times 10^{-3})$
PPOOR	-.16 (.04)	-.16 (.04)	-.17 (.04)	-.16 (.04)
PUNDER25	.09 (.05)	.10 (.05)	.10 (.05)	.10 (.05)
PSING	-.14 (.06)	-.14 (.06)	-.14 (.06)	-.14 (.06)
PBLACK	-.18 (.01)	-.18 (.01)	-.18 (.01)	-.18 (.01)
PSPANISH	-.13 (.03)	-.12 (.03)	-.13 (.03)	-.13 (.03)
INTERCEPT	.58 (.03)	.58 (.03)	.58 (.03)	.61 (.03)
JOSBNEAR(BCS)		-.03 (.07)		
IMPORTRATIO(BCS)			.0049 (.0024)	
AVTIME(BCS)				-.0011 (.0005)
N	1132	1132	1132	1132
SEE	.094	.094	.094	.094
R^2	.642	.642	.644	.644

than ones which are all white, all else the same. The coefficient on PBLACK is 18 times it standard error. Race remained a powerful predictor of employment status in Chicago in 1970. The black/white differential to be explained was sizable.

In these results, neighborhoods with a large proportion of Spanish-speaking residents also fare poorly. The coefficient reported here is 78% of the black one. Quite interestingly this is one of two coefficients which is very different in all male employment rate equation. (The results in Table 5 are for both sexes.) The estimated coefficient drops from .13 in these regressions to .07 when we consider employment for males only. One other value changes dramatically; that for PSING, the percentage of children in single parent families. This coefficient also fades in significance for males only. Presumably some women are not in the work force because of marriage or family responsibilities or because it is considered inappropriate for a young woman to work. It seems plausible that on these two coefficients our equations for all young people are capturing both differences in labor market opportunities in the tract and differences in other factors influencing labor force participants.

Table 5 also plots the performance of our accessibility variables. Three variables are displayed. JOBSNEAR (BCS) is the first. If the proportion of all blue collar and service jobs within 30 minutes commute captures job proximity, the expected sign is positive. Instead we see a negative one and the variable is completely insignificant. The failure of this measure was not unexpected since it showed better proximity in the city than outside it.

IMPORTRATIO offers several appealing qualities as a measure of neighborhood job availability. It compares jobs and workers. And it

shows better accessibility for many suburban zones than most central city ones. We would expect a positive sign. More jobs per worker should yield higher levels of employment. And in fact we do get a positive coefficient, which is just significant at traditional levels. But the coefficient is extremely small. If we could transform a neighborhood from having two workers per job to one where there are two jobs per worker, the employment ratio would rise just one percentage point according to these regressions!

The average travel time for blue collar residents of the neighborhood also was correctly signed and significant. Zones where workers spend longer getting to work have lower rates of employment of young people. But here again the measured effects are very small. Reducing average travel time by two standard deviations (12 minutes) boosts employment just one point again.

The small coefficients we do observe are consistent with a model where extra commuting time lowers the real wage somewhat and that reduction causes a fall in labor supply. Suppose the labor supply elasticity were 1.0 and travel time was valued at 1/2 the wage. A 1 minute extra commute each way then would reduce the real wage by roughly 0.2% in an 8 hour day (2/480 x 50%). A 0.2% reduction in EMRATE with a mean of .65 translates into a fall of .0013. This is remarkably close to the coefficient estimate of .0011 on the average blue collar time variable. Obviously the result is not consistent with a model where the likelihood of finding a job is sharply reduced when jobs are not located very nearby.

Perhaps even more important is the coefficient on PBLACK. With or without the inclusion of accessibility variables, the coefficient is .18. None of the measures affect it in the slightest. These results show no evidence at all that black and white differences originate in job proximity.

Table 6 summarizes the results of all CATS based measures of accessibility. The measures based on the number of jobs nearby fall flat. But the import ratio and average travel time measures are always of correct sign and often significant. The best single measure appears to be the import ratio for all workers. Sadly though the coefficients are all very small. Pushing up employment rates just one point requires massive changes in the accessibility indices. These pale in comparison to the .18 point edge enjoyed by whites over blacks. Moreover, these proximity measures are uniformly impotent with respect to the PBLACK coefficient. None causes it to even flinch.

Accessibility shows some minor effects here. But even these results may overstate the power of our variables. These coefficients are highly unstable. Many more are insignificant in the male only regressions. Other regressions using job change data also failed to show any impact of accessibility. And unweighted estimates are rarely significant. It is simply impossible to find strong effects with these variables.

It seems plausible that accessibility is a far more important factor for black and white households. Informal jobs' networks may provide whites with access to jobs over a large geographic area. Blacks are not blessed with such extensive networks and may be more at the whims of the neighborhood job situation.

Table 7 provides results using tracts with greater than 50 percent blacks only. Several intriguing results appear. The one of the most immediate concern is the recurrent failure of proximity. Signs are often reversed, none of the coefficients is significant. Average travel time performs best here but once again there are only small effects. Our entire arsenal of CATS based variables are meek. Proximity as we have

TABLE 6

REGRESSION RESULTS:
SHOWING PERFORMANCE OF VARIOUS ACCESSIBILITY MEASURES
FOR 1970 CENSUS TRACT DATA

Neighborhood Accessibility Measure	Coefficient on Percent Black (Standard Error)	Coefficient on Accessibility Measure (Standard Error)	R^2 (Standard Error of Estimate)
NONE	-.18 (.01)		.642 (.094)
% of All Jobs Within 30 Minutes Transit	-.18 (.01)	-.12 (.08)	.643 (.094)
% of Blue Collar & Service Jobs Within 30 Minutes Transit	-.18 (.01)	-.03 (.06)	.642 (.094)
Import Ratio for All Workers	-.18 (.01)	.009 (.003)	.645 (.094)
Import Ratio for Blue Collar and Service Workers	-.18 (.01)	.0049 (.0024)	.642 (.094)
Import Ratio for Teenagers	-.18 (.01)	.008 (.002)	.646 (.094)
Average Travel Time for All Workers	-.18 (.01)	-.0009 (.0005)	.643 (.094)
Average Travel Time for Blue Collar and Service Workers	-.18 (.01)	-.0011 (.0005)	.644 (.094)
Average Travel Time for Teenagers	-.18 (.01)	.0000 (.0002)	.642 (.094)

Source: 1970 Census Tract Data and 1970 Chicago Area Transportation Survey.

(Other variables include percent Spanish-speaking, percent high school graduates, percent of persons in tract over age 25, average family income, percent of persons in poor families, percent of children in single parent families.)

TABLE 7

REGRESSION RESULTS:
IN TRACTS WITH 50% OR MORE BLACKS

Neighborhood Accessibility Measure	Coefficient on Percent Black (Standard Error)	Coefficient on Accessibility Measure (Standard Error)	R^2 (Standard Error of Estimate)
NONE	-.15 (.07)		.488 (.100)
% of All Jobs Within 30 Minutes Transit	-.15 (.07)	-.001 (.196)	.488 (.100)
% of Blue Collar & Service Jobs Within 30 Minutes Transit	-.15 (.07)	.073 (.146)	.489 (.100)
Import Ratio for All Workers	-.15 (.07)	-.003 (.008)	.488 (.100)
Import Ratio for Blue Collar and Service Workers	-.15 (.07)	-.0002 (.0044)	.488 (.100)
Import Ratio for Teenagers	-.15 (.07)	.0048 (.0040)	.491 (.095)
Average Travel Time for All Workers	-.14 (.07)	-.0017 (.0013)	.492 (.099)
Average Travel Time for Blue Collar and Service Workers	-.13 (.07)	-.0017 (.0013)	.492 (.099)
Average Travel Time for Teenagers	-.15 (.07)	-.0010 (.0006)	.496 (.099)

Source: 1970 Census Tract Data and 1970 Chicago Area Transportation Survey.

(Other variables include percent Spanish, percent high school graduates, percent of persons in tract over age 25, average family income, percent of persons in poor households, percent of children in single parent families.)

been able to capture it here explains little in predominantely black tracts.

There is another perhaps even more telling finding, however. PBLACK was included because a few of these tracts had small white populations. Typically, these are tracts which span ghetto boundaries. The intriguing feature of Table 7 is that the coefficient on PBLACK is almost as large as it was for all tracts. The only whites in this sample live in the ghettos or at its borders, yet tracts with more whites have better employment rates. This could be an accident, but it raises the possibility that black/white differentials within neighborhoods are almost as high a differential for blacks and whites living across town after we control for income, schooling and the like. If so, neighborhood differences cannot really explain the relatively poor performances of young blacks. We shall return to the issue momentarily.

We have tried a wide array of accessibility variables. Most have performed poorly. While they usually had the correct sign, magnitudes were typically very small and many were insignificant. At best the magnitude seems consistent with a model which suggests that extra commuting time reduces the real wage and thus reduces labor supply. Not a single one of these explained anything of the black/white differences. Surely this performance has offered little support for the hypotheses that a major reason that blacks perform poorly in Chicago is their isolation in neighborhoods with low proximity. We are always confronted with the nagging problem, however, that we may simply have miseed the true differences in accessibility across neighborhoods. It seems appropriate, therefore, to turn our focus to a more fundamental level. We ought to explore just how big neighborhood effects of whatever origin are, once we have controlled for a few basic socio-economic variables.

Fixed Effects Models

When employment rates by census tract are displayed on a map, we observe sizable differences across neighborhoods. If we knew only a youngster's neighborhood, it would help us greatly in making predictions about his or her likely employment status. But it would also aid us in predicting his race, his education and his family's income. We would like to know whether significant neighborhood differences remain after we control for our usual list of socio-economic variables. Indeed, we really would like to know whether the strength of such socio-economic variables such as race or income can actually be traced to neighborhood effects which are correlated with these variables.

We can explicitly allow for fixed neighborhood effects by providing each community zone with its own intercept. These intercepts will control for all the differences between zones, the only information which remains comes from differences in outcomes within community zones. When we examine the regression results for a fixed effects' model, we are exploring only the effects of particular independent variables within neighborhoods.

The results of this experiment really are astonishing. The coefficient on PBLACK does not fall; it actually rises to .22. There is only one possible inference: blacks and whites in the same community zone fare as differently as blacks and whites across town from each other. Remember we have 76 community zones in the city alone. In these small areas we have a larger racial differential. No wonder proximity measures failed to influence the PBLACK coefficient. Perhaps the result should not have been a surprise. After all we saw that even where we looked at predominantly black tracts, race seemed just as important as before as an explanatory

variable. We can infer that no measure of accessibility, however conceived, which is defined by community area will account for black/white differences.

Perhaps the most stunning result of all comes from the traditional Fischer Test for equality of coefficients. We can test whether the hypothesis of no neighborhood effects (equality of intercepts) is rejected by the data. The restriction of a uniform intercept is not rejected. The result seems extraordinary. There are so many reasons to expect neighborhoods to differ quite apart from accessibility on the measured independent variable that we certainly would have expected to fail this test. We find small neighborhood effects from whatever origin.

It's important not to overrepresent the power of the finding. The definition of neighborhood used here--community areas defined in the 1940s--may not conform well to current realities. The fact that these neighborhoods don't jointly yield significant effects does not mean some other configuration would not. Nor does the result imply that none of the individual neighborhood effects are significant--they are only jointly impotent. Still, the total lack of impact on PBLACK and the visual and statistical failure of neighborhood effects using the city's own designations of neighborhoods casts serious doubts on the significance of the mismatch story.

We can restate the findings in another way. If we not know a youngster's level of schooling, his family income or his race, then knowing his or her neighborhood will help us predict how he will fare in the job market. But if we do not know these basic socio-economic facts, knowing the location of his neighborhood will not tell us very much.

The 1970 employment rate regressions are not at all supportive of a hypothesis blaming weak labor market performance of blacks on their

segregation into neighborhoods with weak labor demand. No accessibility measures work well. Even allowing for a great many fixed neighborhood effects, we were unable to reduce the PBLACK coefficient once schooling and income are controlled for. This tract data casts serious doubts in the mismatch story. Individual data from the Census Employment Survey (CES) wounds it even more seriously.

Comparisons of South and West Side Labor Market Outcomes

According to the Northeastern Illinois Planning Commission, in 1970 the 11 community areas within the city which lie south of the loop provided less than 5% of the city's jobs. The three community areas in the West Side ghetto had more than three times as many. And every single measure of proximity we defined shows that the West Side has much better proximity to jobs than the South Side does. Indeed the West Side typically offers among the best accessibility and the South Side the worst in the entire SMSA.

A drive through the West Side and South Side black ghettos is just as revealing. From almost any block in the West Side, large smoke stacks can be seen. These inevitably are industrial structures. (Not all are still in operation.) Right in the center of the West Side, the international headquarters of Sears could be found in 1970. The complex occupied several city blocks. The company conducted both office and warehousing and sales functions right there. Sears moved its headquarters to the Sears Tower in 1972, but even today Sears maintains the area as a warehouse and distribution center. On the eastern half of the ghetto is a large complex of hospitals, which are traditionally a source of low skill jobs for service workers (cleaning, food preparation and distribution, orderly

services, etc.). On several borders and extending into the ghetto are old industrial parks. Brocks Candy, Westinghouse, General Electric all have manufacturing plants in and around the area. The only smoke stacks on the South Side are from schools and churches. The South offers only two sources of employment, small commercial establishments along a few streets and the University of Chicago.

In short, we have been blessed by a marvellous natural experiment. In many ways, the Census Employment Survey is ideal for our purposes. It was conducted right after the 1970 Census. Separate surveys were done on the West and South Sides of Chicago. Blacks and whites sere surveyed in low income neighborhoods and it was a survey particularly designed to gain labor market information.

We have already seen that measures of accessibility explained little of the variation in employment rates for young people in entirely black census tracts. Since much of the variation in accessibility is between the West and South Sides, we have already implicitly exploited the natural experiment and found little support. The CES data allow a much more explicit test. They offer a marvelous window to view the effects of economic history.

West and South side data were drawn from low income census tracts. Thus the sampling technique already corrects for the single biggest explanatory variable besides race. Considerable mileage can be gotten by making simple comparisons of the average labor market outcomes in each area. Since we have excellent individual information, we can compare not only employment rates, but unemployment patterns, school enrollment, occupational mix, wage rates, enen journey to work times betwen the two zones.

Table 8 shows unemployment rates, employment rates, educational attainment, and travel time for blacks in each ghetto area. The similarity in outcomes is remarkable. Half of the out of school youngsters in each ghetto had jobs in 1970. Two-fifths of those without a high school degree work in either zone. The West Sides does edge out the South ever so slightly. But these figures are based on roughly 100 observations in each zone. Standard errors for the employment and unemployment rates are roughly five percentage points. In these figures, the employment and unemployment rates never differ by more than three percentage points. And we would expect the reduced real wage on the South Side to induce small differences in labor supply.

The picture here is one of equal depression on both sides of the loop. Fully half of the out of school dropouts in both areas report themselves as interested in work, but unable to find it. School attainment differs slightly in the two areas (the differences are not statistically significant) but roughly two-thirds of the out of school 16-21 year olds are droputs in both places. (This does not imply the dropout rate is 67%). The problems look severe, and they look equally severe in each area.

Indeed, the only variable on Table 8 which shows a marked difference is the two areas on travel time. Youngsters on the South Side spend 25% longer getting to work. The differences are especially pronounced for dropouts. West Side dropouts spend 25 minutes getting to their jobs; their South Side counterparts need 10 extra minutes to reach theirs. The earlier description of job proximity is confirmed again here. South Side residents must travel much farther to their jobs. They really do live further away.

TABLE 8

COMPARISON OF EMPLOYMENT, UNEMPLOYMENT RATES, EDUCATIONAL ATTAINMENT, AND TRAVEL TIMES FOR OUT-OF-SCHOOL BLACK MALES AGED 16-21 IN VERY LOW-INCOME NEIGHBORHOODS ON THE SOUTH AND WEST SIDES OF CHICAGO

	Ghetto Location	
	South Side	West Side
Unemployment Rate		
All	.38	.35
High School Dropouts	.50	.48
Employment Rate		
All	.51	.54
High School Dropouts	.38	.41
Educational Attainment		
Proportion High School Dropouts	.61	.66
Travel Time		
All	36 minutes	29 minutes
High School Dropouts	35 minutes	25 minutes

Source: Census Employment Survey.

Occupational patterns in the two areas also look uncannily common. (See Table 9.) Even though sample sizes are quite small, nearly equal proportions of young people are found working as managerial and professional workers, as craftsmen, as operators, as transport workers, and as laborers. Only clerical and service occupations show some divergence. South Side workers are more commonly found in clerical positions. A chi-squared test comes nowhere nearrejecting the hypothesis that the areas are identical. Finally, there is the matter of wage rates. South Side residents look better rather than worse jobs by this yardstick.

The differences in labor market outcomes are very small. Whether you travel south or west from the loop, you will find similar employment problems. Considering the fact that simple journey to work costs vary between the areas, it's all the more surprising that we don't find at least some differences. Actually, we do see small effects. If we accept the point estimates, South Side residents do work a bit less (3 percentage points or 6%), go to school a little longer, and demand or command a slightly higher wage. The differences in proximity are slightly higher than what we would have expected based on the real wage effect of a 10 minute longer commute for South Side residents. However, the results do not suggest a massive impact of proximity on employment about the modest effect of transportation costs on the real wage.

We can perform more sophisticated comparisons. I have specified human capital type wage equations, traditional schooling equations, labor supply and unemployment models and run them separately for each area. Sample sizes are small, so coefficients tend to be somewhat unstable, but Fischer tests are rarely failed. When pooled regressions are run but a

TABLE 9

COMPARISON OF OCCUPATIONAL MIX AND WAGE RATES FOR PERSONS 16-21 IN LOW-INCOME NEIGHBORHOODS ON THE SOUTH AND WEST SIDES OF CHICAGO

	Ghetto Location	
Occupation	South Side	West Side
Managerial and Professional	3.9%	3.5%
Craftsmen	9.8%	8.6%
Operatives	33.3%	35.3%
Transport Workers	5.9%	4.3%
Laborer	15.7%	17.2%
Clerical	17.6%	11.2%
Service Workers	13.7%	18.1%
Other	0.0%	1.8%
Average Wage Rate:	$2.92	$2.75

Source: Census Employment Survey, 1970.

West Side dummy is used, it is almost always insignificant, though it occasionally shows a slight edge for the West Side. After controlling for the traditional labor market variables, outcomes remain remarkably similar.

We have once again turned up virtually no evidence in support of the mismatch story. We had what appeared to be the purest of natural experiments; measurably identical populations in measurably different job settings. The labor market results were not measurably different.

Comparisons of Labor Market Outcomes for Black and Whites Living in the Same Neighborhood

There is one natural experiment which offers even more compelling evidence. Fundamentally, the mismatch story is an attempt to explain racial patterns of employment by their residential locations. The cleanest experiment of all then is to compare employment patterns for different racial groups who live in the same location. The CES once again provides the opportunity.

Poor neighborhoods in the South Side are almost entirely black. But in the West and Near-Northwest, we find both blacks and whites. The West Side survey captured both whites and blacks living in close proximity.

Table 10 shows employment and unemployment rates for out of school males living in the surveyed low income area. Once again, the data are quite startling. In each age group, considerably more whites have found work than the blacks. For young people the differences are particularly extreme. Nearly 80% of the out of school whites are working; just over 50% of comparable blacks are. In this area of the city we see black youth unemployment rates of 35%, while whites suffer only 11% unemployment.

TABLE 10

UNEMPLOYMENT AND EMPLOYMENT RATES FOR WHITE AND BLACK OUT-OF-SCHOOL MALES LIVING IN POOR NEIGHBORHOODS ON CHICAGO'S WEST SIDE BY AGE

	Age			
Unemployment Rates	16-21	22-29	30-39	40-65
White	11.0%	7.6%	3.9%	4.3%
Black	35.1%	21.3%	11.5%	6.7%
Employment Rates				
White	79.4%	88.8%	91.2%	77.1%
Black	54.3%	73.3%	78.9%	72.3%
Percent High School Graduates				
White	29.4%	42.1%	33.3%	29.9%
Black	33.7%	57.0%	31.3%	20.9%

Source: 1970 Census Employment Survey

The table also reveals that differences cannot be attributed to level of education. In the younger cohorts, there are a greater proportion of black high school graduates than whites. This result may reflect greater out migration by better educated whites. If so, the results are all the more compelling. Those whites who remain behind are likely the ones least effect in job search.

I have run regressions comparable to the census tract employment rate equations for individuals in the CES. A simple OLS regression was run on a dichotomous employment status variable (1 = employed). The coefficient on race (1 = black) was -.20. Controlling for everything we can, being black dampened employment prospects by 20 percentage points over whites in the same area. The -.20 coefficient is virtually identical to the 0.18 we found for black compared to white tracts across the SMSA. The problem isn't space. It's race.

And this result is verified by yet another source. A very recent survey conducted by Jon D. Miller for Chicago United, a socially-oriented group of major businessmen. The survey was limited to a few low income areas within the city. Teenagers, black or white, were surveyed in each area. The results were quite startling. Using the BLS methodology, Miller found astounding unemployment rates of 65% for black youth, 29% for Hispanics, and 13% for whites all living in low income areas. While the figures for blacks are surely higher than we would expect on a standard BLS administered survey, the differences between low income black youth and white youth in these neighborhoods is dramatic.

Perhaps the single strongest bit of evidence that racial mix not neighborhood location explains unemployment comes from turning to a map of employment rates. Map 1 plots on a map of employment rates for out of school males aged 16-21. Outlined on the map are all of the tracts in the city where PBLACK exceeds 50 percent.

Here at last we can see quite plainly why our statistical tests fail. Areas with low teenage employment rates and those with predominantly black residents are almost perfectly collinear. Look for example at the West Side. The area to the north of the eastern half of the West Side is poor white and Hispanic. Yet there are large areas along the northern border where moving from a black tract across the street to white one moves the employment rate from below 30% to over 60% across the street. The same pattern appears at almost every border of the black areas. There is a black ribbon running from the West Side to an area just south of the loop, and there is an identical ribbon of low teenage employment. The teenage employment rates are not based on very large samples, so we can expect considerable variability. That the employment rates and racial composition should be so closely matched is, therefore, all the more surprising. Blacks and whites in similar economic circumstances in very similar locations fare very differently.

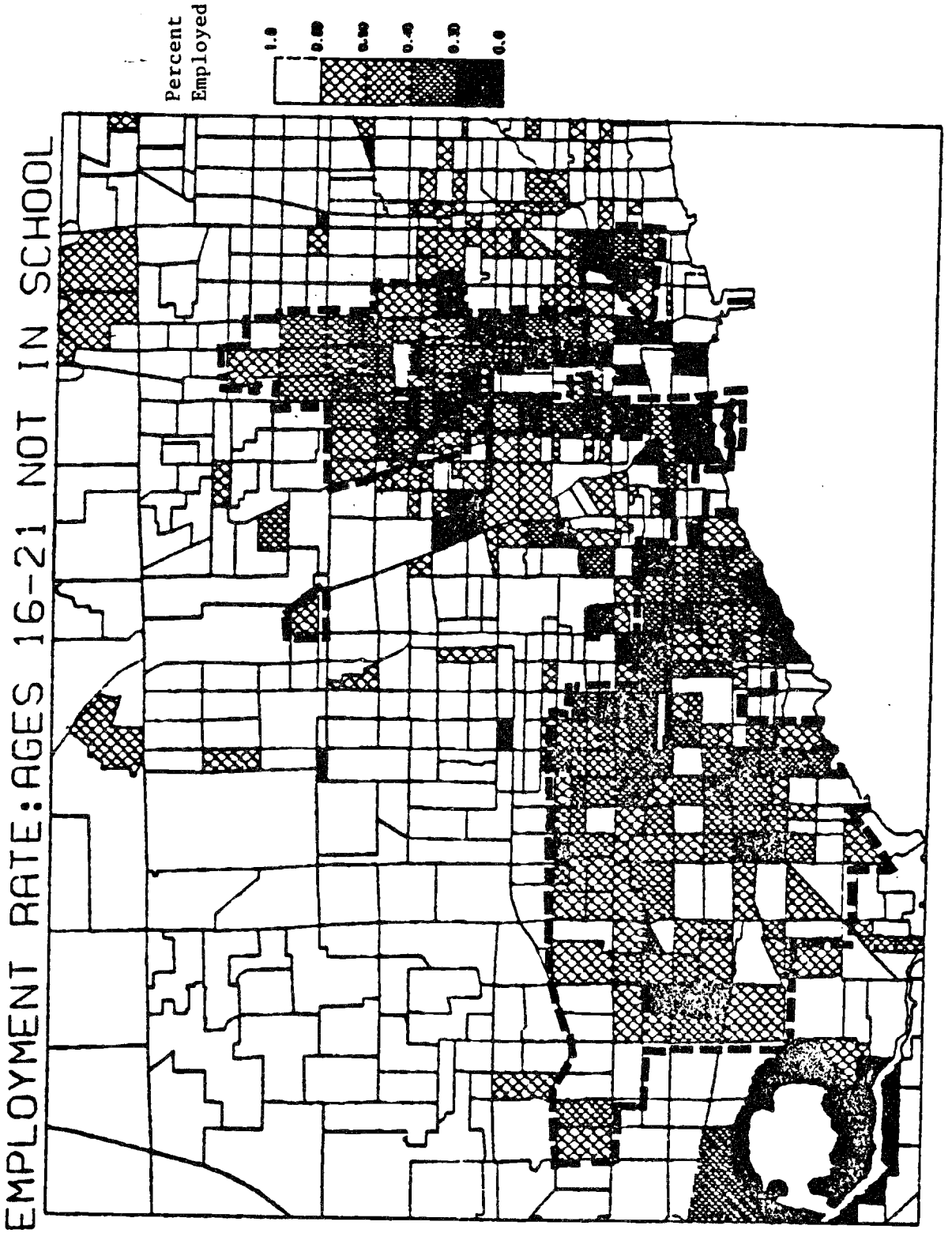
No wonder models with accessibility measures and even fixed effects failed to budge the PBLACK coefficient. Where blacks live employment rates are low. Across the street where whites reside, they are high. No variable, however clever, is going to make that result vanish.

Conclusion

We have explored in detail the spatial dimensions of one labor market. In Chicago low skill jobs are suburbanizing faster than low skill workers.

Map 1

EMPLOYMENT RATE FOR OUT-OF-SCHOOL YOUTH AGE 16-21 BY CENSUS TRACT, 1970:
Window 1 and Tracts with More than 50% Blacks Outlined



Young blacks do spend longer getting to work than young whites do, considerably more. Yet all of our attempts to find a substantial impact of job accessibility on labor market outcomes lead to the same consistent conclusion: accessibility matters only slightly--about as much as would be expected from s slightly lower real wage due to extra commuting time. We found no evidence that any important part of the black/white employment rate differential could be traced to differential geographic proximity to jobs. Black and white teenagers with comparable measured characteristics do just as differently when they live next to each other as when they live far apart.

Based on these results it is possible to understand both the appeal of the mismatch story and its failure. Blacks really are being gradually disadvantaged by the movement of jobs--at least in Chicago. But the labor market is large enough geographically and fluid enough that these outward movements of jobs do not appear to cause substantial disadvantages to those who remain behind--except that they must commute further to work on average.

The results here are only for one city of course, though preliminary results from other cities suggest the results apply elsewhere. And data from Chicago has been used by mismatch supporters in the past. Chicago has all the symptoms of the mismatch disease. The disease just doesn't seem to be the cause of the many labor market pains of teenagers.

FOOTNOTES

1. Kain (1968a).

2. Offner and Saks (1971).

3. Mooney (1969).

4. Masters (1974), see also Offner and Saks (1971).

5. See especially Harrison (1972) and Harrison (1974).

6. Kalachic and Goering (1970).

7. Danziger and Weinstein (1976).

8. Strazheim (1980).

9. Ellwood (1981).

10. See Alonso (1964) and Kain (1962).

11. See, for example, Kain (1980) and Berry (1976).

12. The theorem also requires production functions be homogeneous of degree one and that the same sector will always be more labor intensive than the other regardless of the wage-land rent ratio. For more than two sectors, the conditions are considerably more complicated.

13. Noll (1970).

14. Hamer (1972).

15. Kain (1968a).

16. There is considerable debate surrounding the issue of a possible inner-city land shortage. For some discussion, see Harrison (1974).

17. Becker (1957).

18. Longer travel times for blacks have been found by many authors. In every category where results for blacks are reported, Rees and Schultz (1970) show far greater travel distances for black than for white workers in Chicago. Theirs is a non-random sample of firms, however. Deskins (1972) finds longer travel times for blacks in Detroit. Meyer, Kain, and Wohl (1965) show racial differences in Chicago and Detroit. Greytak (1974) argues that blacks and whites behave very differently.

19. See, for example, Beesley (1973) and Hensher (1976).

20. Rees and Schultz (1970).

21. See also Stevens (1978), Youthwork (1980), and Rosenfield (1977).

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