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SPATIAL MISMATCH AND THE COMMUTES, EMPLOYMENT, AND WAGES OF YOUNG PUERTO RICANS LIVING IN NEW YORK

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FOREWORD

The combination of job decentralization in metropolitan areas, the continued shift to a service economy, and the concentration of the poor in core urban areas has increased academic interest in the "spatial mismatch hypothesis." According to this thesis, the movement of low-skill jobs to the suburbs and discrimination in housing have led to a surplus of workers relative to jobs in inner-city neighborhoods. This has led to higher unemployment, lower wages, and higher commuting costs for poverty-level black families.

In this paper, Professor Keith Ihlanfeldt extends his research on this subject to young Puerto Ricans living in New York City. His empirical work is consistent with the spatial mismatch hypothesis, and with the results of analyses of black youth in other cities.

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Keith R. Ihlanfeldt

EXECUTIVE SUMMARY

In recent years, a growing awareness of the worsening problems within inner cities of poverty, unemployment, and declining earnings has rekindled interest in "the spatial mismatch hypothesis." According to this hypothesis, the suburbanization of low-skill jobs and involuntary housing market segregation have acted together to create a surplus of workers relative to the number of available jobs in those inner-city neighborhoods where blacks are concentrated.

In addition to blacks, there is another minority group whose impoverishment may be related to spatial mismatch, namely Puerto Ricans. Puerto Ricans are concentrated within central cities to an even greater extent than blacks, and evidence on discrimination in the housing market suggests that housing segregation may be as involuntary for Puerto Ricans as it is for blacks.

The purpose of this study is investigate the spatial mismatch hypothesis as it applies to Puerto Rican youth, aged 16 to 24 years old, living in the New York metropolitan area. Four issues are investigated: (1) Do Puerto Rican youth have worse access to jobs in comparison to non-Hispanic white youth? (2) Does poor job access reduce the employment probability of Puerto Rican youth? (3) To what extent do differences in job access between Puerto Rican and white youth explain the relatively low employment rates of Puerto Rican? (4) Do Puerto Ricans earn lower wage rates because of housing segregation?

The results indicate that job access has a strong effect on the employment rates of all New York youth, regardless of race/ethnicity. Since Puerto Ricans are found to have worse access to jobs than non-Hispanic whites, a portion of the employment rate gap between the two groups can

be attributed to differential job access. The results suggest that about 30 percent of the lower employment rate of Puerto Ricans is due to their inferior job accessibility. However, housing segregation is not found to cause Puerto Ricans to earn lower wage rates. Accounting for work location has virtually no effect on the observed wage rate difference between Puerto Rican and white youth. The apparent reason for this is that there is only a modest amount of spatial variation in wage rates within the New York MSA.

TABLE OF CONTENTS

I. INTRODUCTION

In recent years, a growing awareness of the worsening problems within inner cities of poverty, unemployment, and declining earnings, particularly among black youth, has rekindled interest in John Kain's (1968) spatial mismatch hypothesis (Wilson [1987]; Kasarda [1989]). According to this hypothesis, the suburbanization of low-skill jobs and involuntary housing market segregation have acted together to create a surplus of workers relative to the number of available jobs in those inner-city neighborhoods where blacks are concentrated. This surplus will result in unemployment if wage rates are downwardly inflexible. It is also possible that some blacks who cannot find jobs in or near the ghetto are able to commute to more distant jobs, but they nevertheless suffer a welfare loss by earning a lower wage net of commuting costs. If wages are perfectly flexible, the surplus will be eliminated by wage rates falling to their equilibrium level. If the flexibility in wages is less than perfect, unemployment, lower wages, and longer commutes may simultaneously result from spatial mismatch. Hence, job decentralization may reduce the economic welfare of blacks by (1) making it more difficult to find a job, (2) reducing wage rates in black relative to white areas, and (3) increasing commuting costs. Evidence has been provided which documents the existence of each of these effects and is therefore supportive of the spatial mismatch hypothesis (Ihlanfeldt and Sjoquist [1990]; Ihlanfeldt [1992a, 1992b]).

In addition to blacks, there is another minority group whose impoverishment may be related to spatial mismatch, namely Puerto Ricans. Puerto Ricans are concentrated within central cities to an even greater extent than blacks. According to the 1980 Census of Population and Housing, 71% of blacks living within metropolitan areas reside within central cities. The figure

for Puerto Ricans is 78%. In addition, a recent study on discrimination in the housing market sponsored by the U.S. Department of Housing and Urban Development found that Hispanics, regardless of national origin, encounter unfavorable treatment by housing suppliers about as frequently as blacks (Turner, et al. [1991]).[1] This evidence suggests that the segregation of Puerto Ricans may be the result of unlawful restrictions on their residential choice. That is, housing segregation may be involuntary for Puerto Ricans, just as it is for blacks.

The purpose of this study is to investigate the spatial mismatch hypothesis as it applies to the labor market problems of Puerto Rican youth, aged 16 to 24 years old. Specifically, microeconomic data from the U.S. Census Bureau for the New York Metropolitan Statistical Area are used to investigate four issues: (1) Do Puerto Rican youth have worse access to jobs, in the physical or geographic sense, in comparison to non-Hispanic youth? (2) Does poor job access reduce the employment probability of Puerto Rican youth? (3) To what extent do differences in job access between Puerto Rican and white youth explain the relatively low employment rates of Puerto Ricans? (4) Do Puerto Ricans earn lower wage rates than whites because they tend to work at those locations within the metropolitan area where there exists a surplus of resident labor? Results are also generated for black and non-Puerto Rican Hispanic youth so that the effects of spatial mismatch can be compared across all groups.

In the next section, evidence on the commuting behavior of whites, blacks, Puerto Ricans, and other Hispanics living in the New York MSA is presented. The employment and wage equations that were estimated are described in Sections III and IV, respectively. The final section of the paper gives the conclusions.

II. COMMUTING BEHAVIOR IN NEW YORK

The 1980 Public Use Micro Sample contains information on the one-way commuting times of workers and on the locations of homesites and worksites. These data were used to estimate mean one-way commuting times for workers residing within the New York MSA, broken down by occupational class and race/ethnic group. The data were also used to compute various import ratios for the city of New York. The import ratio gives the ratio of jobs to workers for the central city. If equal numbers of persons live and work there, the ratio is equal to one. This does not imply there is no commuting, but rather indicates that as many workers commute out of the city each day as commute into it. An import ratio greater than one indicates that on net the city imports workers from outside the city, while an import ratio less than one means that on net the city exports workers (i.e., more people reside in the city than work there, causing workers to be on net reverse commuters).

Note first the import ratios computed for all workers by occupation in Column (1) on Table 1. These ratios are larger than one for the higher-paid occupational groups and less than one for the lower-paid occupational groups. This indicates that the city is a net importer of white-collar workers but a net exporter of blue-collar (except crafts) and service workers. This evidence is consistent with the spatial mismatch hypothesis. As Kasarda (1987, 1989) has demonstrated, central cities continue to offer a concentration of information-processing jobs that are held by higher-paid workers. Many of these workers commute in from outside the city to satisfy their desire for land and other environmental amenities. In contrast, lower-paid jobs have decentralized faster than lower-paid workers, causing these workers on net to reverse commute.

Hence, for central city lower-skilled residents the city has become an increasingly disadvantaged base from which to search for work.

The second column of Table 1 reports import ratios for Bronx County, which contains the highest concentration of Puerto Ricans living in New York. Roughly 38% of the New York metropolitan area Puerto Rican population lives in the Bronx. Regardless of occupational class, the import ratios are less than one and smaller than those computed for the central city as a whole. The ratios tend to be particularly small for lower-skilled workers. For example, more than twice as many operatives and laborers live in the Bronx in comparison to the number who work there. These numbers suggest that job access among lower-skilled workers is particularly poor in Bronx County.

Columns (3) to (6) of Table 1 give central city import ratios for each of the four race/ethnic groups. Urban theorists hypothesize that higher-income people will choose to live farther from the Central Business District (and therefore their jobs) than people with more modest incomes in order to consume large amounts of housing space at lower prices. The import ratios for whites are consistent with this expectation. Import ratios for whites in the higher-paid occupational groups are larger than one, which indicates that they tend to commute into the city to work. For whites in the lower-paid occupational groups (operatives, laborers, and service workers), the import ratios are all close to one, which is consistent with the idea that these workers choose to live relatively close to where they work.

The pattern between the higher-paid and lower-paid occupational groups is markedly different for minorities than it is for whites. For all of the minority groups, import ratios are close to one for managers and professionals. In contrast, for the lower-paid occupational groups,

the ratios are generally much smaller than one. For example, for both operatives and laborers, import ratios are less than .80 across all three minority groups. These numbers show that, in contrast to their white counterparts, black, Puerto Rican, and other Hispanic lower-skilled workers earn their living by commuting on net out of the city to work. An explanation for the observed difference in the commuting behavior of white and minority workers is that whites are more able than minorities to move to the suburbs in response to job decentralization.[2]

The second half of Table 1 (Columns 7 - 10) reports the mean travel times to work. The white times confirm that higher-paid white workers live farther from where they work than lower-paid white workers. For example, white managers on average make a 39.6 minute commute, while white service workers travel only 31.2 minutes. However, for the three minority groups, mean travel times display no tendency to be lower for workers in lower-paid occupational groups. Among higher-paid workers, the travel times of minorities are somewhat higher than those of whites. White/minority time differences are much more pronounced for lower-paid workers. For example, the difference in the mean travel times of white and Puerto Rican managers is only 2 minutes, while the differences in the travel times of laborers and service workers are 10.1 minutes and 8.9 minutes, respectively.

The travel times and import ratios tell a consistent story. Namely, that lower-skilled minority workers live farther from jobs than their white counterparts. Among the minority groups, the ratios and times suggest that blacks have worse access to jobs than Puerto Ricans and that Puerto Ricans have worse access to jobs than other Hispanics. Regardless of occupation, import ratios are lowest (highest) and travel times are highest (lowest) for black (other Hispanic) workers.

In summary, the conclusion of this section is that lower-skilled Puerto Rican (and other minority) workers have worse access to jobs than whites. This is consistent with Ellwood's (1986) finding for blacks in Chicago. However, Ellwood also found that young workers are sufficiently "fluid" in their commuting patterns to overcome any problems arising from an absence of nearby jobs. In the next section, I investigate whether poor job access has an adverse effect on the employment probabilities of Puerto Rican and other minority youth living within the New York MSA. My results contrast sharply with those obtained by Ellwood.

III. THE ESTIMATION OF EMPLOYMENT EQUATIONS

Spatial accessibility to jobs can affect a youth's employment probability for two distinct reasons. First, assuming the youth possesses full information of the spatial distribution of job openings and the wage gradient is relative flat, then as the required commuting distance increases, the wage net of travel expense declines, which decreases the likelihood that the net wage will exceed the youth's reservation wage. In comparison to higher-wage workers, this effect may be particularly strong for the typical youth, since for any given distance, travel costs are a higher percentage of his earnings and his travel time is greater because he more frequently must rely on slower modes of transportation; for example, walking, bicycling, or buses. Second, as documented by Holzer (1987), to find a job youth most frequently check with friends and relatives and make direct applications to employers without referrals. The reliance on these informal methods of job search suggests that the youth's information on available job opportunities may decay rapidly with distance from home.

To construct measures of job accessibility, the thirteen residential zones identified by the Public Use Micro Sample (PUMS) for the New York MSA are employed. These zones include

the five counties forming the city of New York (Bronx, Kings, New York, Queens, and Richmond), two suburban counties in the state of New York (Westchester and Rockland), and six subcounty areas located in the state of New Jersey (the Hackensack, Lyndhurst, Fort Lee, Fair Lawn, Bergenfield, and Ridgewood areas). For reasons of confidentiality, each of the zones identified by the PUMS contains a minimum population of 100,000.

Conceptually, the ideal measure of job accessibility would be the minimum distance the individual marginal youth would be required to commute if a job was taken. Since distances are not provided by the data, various measures of the expected one-way commuting time to work are used as proxies. Mean travel times were computed for the following groups separately for each of the 13 residential zones: (1) all workers, (2) workers who travel by private motorized carrier (automobile, truck, or motorcycle), (3) workers who travel by private motorized carrier and who earn a low wage (wage rate $\leq$ \$5.00 per hour), and (4) workers who travel by private motorized carrier and who have less than a college education. To capture both intrazonal and interzonal differences in job access among ethnic groups, separate mean travel times for each zone were computed for each group. Job access is measured by assigning the youth the mean travel time of workers who are of the same ethnic group and live in the same residential zone as the youth. While travel time may not be the ideal measure of job access, it does have intuitive appeal, since if reflects actual worker behavior. If jobs are nearby, commuting time will be low. Conversely, if jobs cannot be found nearby, travel time will be high.

Among the various commuting times, the expectation is that those that control for the mix of transportation modes across zones and that define a job opportunity set that is more applicable to youth will provide the strongest predictors of youth employment rates. Hence, the times based

on low-wage or less-educated workers who use private motorized transportation to get to work are expected to perform the best.

One final point regarding the computation of the mean travel times deserves mention. It may seem preferable to restrict the samples used to compute the mean times to only young workers, since it is their employment that the estimated models described below attempt to explain. However, in many zones too few youth observations are available to compute a reliable estimate of expected commuting time. In addition, youth travel times in zones with poor job access may underestimate the required commute of the marginal youth interested in obtaining a job, if working youth are less able or less willing to commute to more distant jobs in comparison to adult workers.

The estimating equation that is used to relate intra-urban job access to the youth's probability of having a job can be expressed as:

$$P_i(E) = f(T_i, I_i, F_i) \qquad (1)$$

where $P_i(E)$ is the probability that the *i*th youth is employed, and the T_i, I_i, and F_i are commuting time, the individual's characteristics, and the characteristics of the youth's family. The I_i variables are age, sex, years of education, health status, whether the high school diploma has been obtained, marital status, whether the youth was born in a foreign country or outlying area of the U.S., whether the youth speaks poor English, school enrollment status, and whether the youth has borne a child, which is represented by a dummy variable that is equal to zero for males and females who have not given birth. The F_i variables are family income net of the youth's earnings, family income squared, and the following characteristics of the household head: sex,

educational level, occupational class, and employment status. Detailed definitions of all of the independent variables are provided in Table 2.

The data used to estimate Equation (1) come from Sample A of the 1980 PUMS for the New York Standard Metropolitan Area. Sample A is a 5-percent sample which includes over one-fourth of the households that received the census long-form questionnaire.

Separate equations for white, black, Puerto Rican, and other Hispanic youth were estimated for the following groups: (1) 16-24 year olds, living at home, who had less than a college education; (2) 16-24 year olds, living at home, who had less than a college education and were enrolled in school; (3) 16-24 year olds, living at home, who had less than a college education and were not enrolled in school; and (4) 16-24 year olds, not living at home, who had less than a college education and were not enrolled in school.

The emphasis in the above group definitions on youth still living at home is in response to possible simultaneity that may exist between employment status and residential location. While job access may affect employment, people with jobs may choose to reside in areas with poor proximity to jobs in order to consume more housing at a lower price. The latter is a prediction that can be deduced from the standard model of urban land use (Muth [1969]). If simultaneity between employment and residential location is ignored, the estimated effects of job access on employment will likely be biased toward zero. Since it is unlikely that the employment status of the youth has much of an influence on where his (her) parents choose to reside, simultaneity between the youth's job probability and the measure of job access should not be a problem for youth still living at home. For the group of youth not living at home, the absolute

value of the estimated effect of travel time on job probability should be properly interpreted as a lower bound.

Separate equations were estimated for youth in and out of school, since job access may have less of an effect on youth not in school. These youth may be more willing and more able to overcome an absence of nearby jobs by making a longer commute.

Estimates of (1) were obtained with ordinary least squares (i.e., a linear probability model), a dichotomous logit model, and an error components model that allows for the possibility that residuals are correlated within residential zones.[3] Since the results from the alternative models are very similar, only the linear probability model estimates are reported below. The four alternative travel time variables yielded similar results. Qualitatively, the conclusions reached below apply equally to each of these variables. The times based on workers who travel by private motorized carrier and who have less than a college education, however, consistently provided somewhat better fits. The results reported in Table 3 and discussed below are those obtained with this variable.

The first two columns of Table 3 report the estimated travel time coefficients and their associated t - statistics, respectively. In all 16 estimated equations, travel time has the anticipated negative sign and is statistically significant at the 5% level or higher by a one-tail test. For youth at home, there is little difference in the estimated coefficients across race/ethnic groups. The coefficients are also essentially the same between youth in and out of school.

The magnitudes of the estimated travel time coefficients indicate that job access has an economically important impact on the youth's job probability. For example, consider the effect of a 5-minute reduction in travel time, which is an improvement in job access that would not be

an unreasonable policy objective. A 5-minute savings in the expected commute (by auto) would increase the job probability of Puerto Rican youth by .061. At the mean employment rate for this group (.273), this would be a percentage increase of 22%. For the other two minority groups, the hypothetical improvement in job access would result in a 17% increase in the employment of blacks, and a 14% increase in the employment of other Hispanics.

The absolute values of the estimated time coefficients for youth not living at home are smaller than those estimated for youth at home. There results are consistent with the expectation that the estimates for youth not at home are biased toward zero because of simultaneity between employment status and the measure of job access. For whites, blacks, and other Hispanics, the coefficients for youth not at home are roughly half as large as the coefficients for youth at home. For Puerto Ricans, however, the coefficients are much more similar (-.012 versus -.010). These results suggest that employed Puerto Ricans are less willing, or less able to trade job access for lower housing costs in comparison to other groups. The data do not allow an investigation of this hypothesis.

The mean values of the job access measure (i.e., expected commuting time) for each race/ethnic group are reported in Column (3) of Table 3. In all cases, the minority groups are found to have worse access to jobs than whites and the white/minority group mean travel time differences are statistically significant. For example, among youth living at home, on average Puerto Ricans must travel 6.2 minutes longer by automobile than whites in order to secure a job. Column (4) lists the employment rates of each of the groups. The white employment rates are well above those of the minority groups. For example, for the full sample of youth living at home, the Puerto Rican and white employment rates are .273 and .525, respectively. The fact

that mean travel times are higher for Puerto Ricans (and the other minority groups) in comparison to whites implies that a portion of the white/minority group differences in employment rates can be attributed to differential job access. To determine the magnitude of this portion for Puerto Ricans, the probability of having a job was predicted for a Puerto Rican youth with Puerto Rican mean values of all characteristics, represented by $\bar{X}$, but with the same accessibility to jobs as the average white youth:

$$\hat{P}_{PR} = \hat{a}_{PR} + \hat{b}_{PR}\bar{X}_{PR} + \hat{c}_{PR}\bar{T}_{W} \qquad (2)$$

where W and PR refer to the white and Puerto Rican samples, respectively. The difference between $\hat{P}_{PR}$ and the actual employment rate for white youth (P_w) yields an estimate of the difference in employment rates that would exist if Puerto Ricans and whites had identical job access. This hypothetical difference in employment rates is subtracted from the actual difference in employment rates, $(P_W - P_{PR}) - (P_W - \hat{P}_{PR}) = \hat{P}_{PR} - P_{PR}$, and expressed as a percentage of the actual difference.

This methodology places Puerto Rican youth in the "white world" with respect to job access. An alternative approach is to place the white youth in the "Puerto Rican world" with respect to job access. The results from both approaches are reported in Table 3, Column 5. Since the estimated travel time coefficients are similar between white and Puerto Rican youth, the two approaches yield similar estimates of the percentage of the white/Puerto Rican employment rate difference that can be attributed to job access. Only the estimates based on Equation (2) are therefore discussed below.

For the full sample of youth living at home, 30% of the difference in employment rates between white and Puerto Rican youth can be attributed to the fact that Puerto Rican youth have

worse access to jobs. When the at-home sample is stratified by school enrollment status, 34% and 23% of the employment rate gap is explained by job access for in-school and out-of-school youth, respectively. For youth not at home, at least 13% of the employment rate difference between whites and Puerto Ricans is due to job access.

Also reported in Column 5 are the portions of the white/black and white/other Hispanic employment rate gaps that are explained by differential job access. The percentages for blacks are similar to those obtained for Puerto Ricans. The percentages for other Hispanics, however, are larger. For example, for the full sample of youth living at home, job access explains 42% of the difference in employment rates between whites and non-Puerto Rican Hispanics.

The estimated coefficients on the control variables (i.e., the individual and family background variables) are reported in the Appendix. Generally, the coefficients have plausible signs and they are of reasonable magnitude. In most cases, the variables had similar effects on the job probabilities of the various groups. However, there are a few differences in the results across race/ethnic groups that are worth mentioning. Not being born on the U.S. mainland increases the job probabilities of black youth, but reduces the job probabilities of white and Puerto Rican youth. The educational level of the head of the household has no effect on the employment of black and Puerto Rican youth, but has a negative effect on the employment of white youth. An explanation for the latter result is that well-educated white parents may discourage their children from taking a job so that more time can be spent studying. Finally, if the youth lives in a family headed by a female, this increases the employment of white youth, reduces the employment of black youth, and has no effect on the employment of Puerto Rican youth.

The key results reported in this section can be summarized as follows: (1) job access has an important effect on the employment of all New York youth, regardless of their enrollment status, race/ethnicity, or whether they live with their parents or on their own; (2) Puerto Rican and other minority youth have worse access to jobs than white youth; (3) these job access differentials explain a nontrivial portion of the employment rate gaps that exist between white and Puerto Rican youth and between whites and the other minority groups; and (4) it is clear from the results that poor job access is not the only reason Puerto Ricans have relatively low employment rates. Even after accounting for differences in job access, Puerto Rican youth have substantially lower employment rates than whites.

In addition to causing joblessness, the existence of a spatial mismatch between the location of jobs and the residential locations of Puerto Ricans living in New York may cause employed Puerto Ricans to earn lower wage rates. This will be true if wage rates are flexible in a downward direction and if Puerto Ricans tend to work at those locations where there exist surpluses of resident labor. It is this issue that is taken up in the next section.

IV. THE ESTIMATION OF WAGE EQUATIONS

To determine whether Puerto Ricans and other minority groups suffer a wage penalty from housing segregation, wage equations were estimated, that included dummy variables for each of the minority groups. The methodology involves comparing the estimated coefficients on these dummy variables between equations that exclude and include a set of work location dummy variables. The purpose of this comparison is to determine how the difference in wage rates between white and Puerto Rican workers with similar characteristics is affected by the inclusion of the work location variables. The spatial mismatch hypothesis suggests that the white/Puerto

Rican wage gap may partially result from Puerto Ricans more frequently working at locations where there exists a surplus of resident labor and therefore lower wage rates. The expectation, therefore, is that the estimated wage difference between whites and Puerto Ricans will decline as the result of adding the work location variables.[4]

The sample is restricted to workers who are 16 to 24 years old, not in school, without a college degree, and who are working for pay in the private sector. These are two reasons for these restrictions. First, the hourly wage rate is calculated by dividing annual labor earnings by annual weeks worked times usual hours worked per week. By restricting the sample to full time workers who are not self-employed, the measurement error in the calculated wage rate should be less of a problem. Second, the group whose wages are most likely to be affected by spatial mismatch are less-educated private sector workers.

The estimated equations can be specified as follows:

$$W_i = \exp\ (a + bP_i + cB_i + dPR_i + eH_i + fL_i + \varepsilon_i) \qquad (3)$$

where W_i is the wage rate of the ith worker and P_i is a vector of productivity characteristics. The B_i, PR_i, and H_i are dummy variables that indicate whether the worker is black, Puerto Rican, or other Hispanic, respectively. The reference category is non-Hispanic whites. The L_i is a set of dummies representing work location.

The P_i vector consists of dummy variables indicating whether the youth (1) has a health problem that limits the type of work, (2) is married with spouse present, (3) has a high school diploma but no college, (4) has a high school diploma plus some college, (5) was born some place other than on the mainland United States, and (6) speaks English poorly. Also included

among the P_i variables is potential labor market experience (= age minus highest grade completed minus 5).

The L_i variables indicate the work zone within which the worker's job is located. The work zones are identical to the residential zones described in Section III, except that New York County and Kings County are each divided into two parts: the CBD and the rest of the county. There are, therefore, a total of 15 different work zones, which are represented by 14 dummy variables. Bronx County serves as the reference category.

The data again come from Sample A of the PUMS for the New York MSA. The data do differ, however, from those employed in the estimation of the employment equations. As a cost-saving measure the Census Bureau only recorded work location for one-half of the respondents. Hence, the sample used to estimate the wage equations is only a 2.5% rather than 5% sample. Observations including work location constitute random subsamples of the total files.

Wage equations are estimated separately for males and females, since occupational segregation by gender may generate a different spatial pattern in the wage rates paid to males in comparison to those paid to females.

The results of the estimation are presented in Table 4. For males, the equation which excludes the work location dummies indicates that Puerto Ricans earn 12% less than whites with similar characteristics. The corresponding percentages for blacks and other Hispanics are 16% and 9.5%, respectively. The addition of the work location variables has essentially *no effect* on these percentages. This indicates that the wage gap between whites and Puerto Ricans (or the

other minority groups) cannot be attributed to Puerto Ricans (or the other minority groups) more frequently working at those locations where wage rates are lower.

An F-test of the joint significance of the work location dummy variables indicates significance at the 1% level. However, only three of the individual dummies are significantly different from zero at the conventional 5% level. These results indicate that, in comparison to Bronx County, wage rates for males are roughly 16% higher in that portion of the CBD that is within New York County, and also 16% higher in the Hackensack and Lyndhurst areas of New Jersey.

The results for females from the equation that excludes the work location variables indicate that Puerto Ricans earn 11% less than whites with similar characteristics. The corresponding percentages for blacks and other Hispanics are 9.5% and 5%, respectively. As was true for males, the inclusion of the work location variables has little effect on these percentages. Hence, it does not appear that any minority group living in New York suffers a wage penalty from housing segregation.

In the equation estimated for females, the work location variables are once again jointly significant. But only two of the location dummy variables are statistically significant. Female workers are found to earn 15% more if they work in that portion of the CBD that is within New York County, and 8% more in New York County outside of the CBD, than they would if they worked in the Bronx.

For both males and females, the P_i variables are consistently significant. Generally, the effects of these variables are invariant with respect to gender. Good health, potential work experience, and more education are found to increase earnings; while being born outside the U.S.

mainland and poor English are found to decrease earnings. The only noticeable difference between males and females is that the presence of a spouse increases the earnings of only the former group.

In summary, the results of this section suggest that spatial mismatch does not affect the wage rates that Puerto Ricans and other minorities earn. The apparent reason for this is that there is only a modest amount of spatial variation in wage rates within the New York MSA.

V. CONCLUSIONS

In the introduction to this paper, I promised answers to four questions that relate to the spatial mismatch hypothesis as it applies to young Puerto Ricans living in New York. The first question was: Do Puerto Ricans have worse access to jobs than non-Hispanic whites? My answer to this question is "yes," based upon the evidence provided on import ratios and commuting times.

The second question was: Does job access affect the probability that the Puerto Rican youth will have a job? Again, the evidence suggests that this is true. A 5-minute savings in the expected commute (by automobile) was found to cause a 22% increase in the employment rate. By almost any criterion, this is a substantial effect.

The third question was: Do differences in job access between whites and Puerto Ricans help explain the relatively low employment rates of Puerto Rican youth? This also was found to be true, with roughly 30% of the employment rate gap attributable to job access.

The final question was: Does spatial mismatch play a role in our understanding of the wage gap that exists between white and Puerto Rican youth? In contrast to the previous three

questions, here the evidence suggests that the correct answer is "no." Puerto Ricans do not suffer a wage penalty from housing segregation.

The employment and wage results are not inconsistent. As noted in Section I, if wage rates are downwardly inflexible, job decentralization will reduce the economic welfare of minorities by making it more difficult to find a job and increasing commuting costs.

NOTES

1. Hispanics and blacks were found to encounter discriminatory treatment 40% of the time they visited rental or sales agents. The study was based on fair housing audits, which involved sending blacks, whites, and Hispanics to those agents that advertised vacancies in metropolitan newspapers.

2. Evidence in support of this hypothesis has been provided by Ihlanfeldt and Sjoquist (1989). Their results indicate that lower-skilled white workers, but not lower skilled black workers, living in central cities move in response to a loss in earnings caused by job decentralization.

3. Both OLS and logit models were estimated because I have no *a priori* expectation regarding which functional form is more nearly correct. Although logit is used with increasing frequency for estimating equations with dichotomous dependent variables, Stoker (1986) has shown that OLS may be more appropriate in a broad variety of circumstances.

The error components model was estimated in response to Moulton's (1990) concern that standard errors on aggregate variables in microdata models may be understated if the disturbance is correlated within the groups used to define the aggregate variables.

4. This methodology represents an improvement over previous attempts to investigate the effects of spatial mismatch on the relative wages of minority workers because it focuses on work location and not residential location. The standard approach has been to compare the wages of central city and suburban residents (Harrison [1972]; Bell [1974]; Vrooman and Greenfield [1980]; Price and Mills [1985]; Reid [1985]). The problem with this approach is that the residential location of the individual worker is treated as exogenous. The evidence is overwhelming that the worker's earnings affect his choice of location. Hence, while a suburban residential location may increase earnings by providing better access to higher-paying jobs, it is also true that people with higher earnings are more likely to self-select a suburban residence. Hence, the problem of simultaneity bias exists.

TABLES

TABLE 1

Import Ratios and Travel Times by Occupation and Ethnic Group

	Central City Import Ratios						Average One-Way Travel Time to Work			
	Overall (1)	Bronx County (2)	White (3)	Black (4)	Puerto Rican (5)	Other Hispanics (6)	White (7)	Black (8)	Puerto Rican (9)	Other Hispanics (10)
Occupation										
Manager	1.29	.63	1.37	.99	1.04	1.05	39.6	42.9	41.6	41.2
Professional	1.08	.95	1.13	.94	.87	.95	34.7	40.9	41.0	41.4
Sales	1.07	.57	1.14	.87	.83	.86	33.5	42.1	37.9	37.5
Clerical	1.01	.35	1.08	.87	.91	1.00	38.8	47.2	44.6	42.8
Crafts	1.06	.58	1.19	.79	.89	.91	35.1	42.9	42.2	39.9
Operative	.87	.42	1.01	.73	.77	.79	33.5	44.2	41.1	40.8
Laborer	.85	.45	.98	.72	.75	.78	32.1	45.3	47.2	39.6
Service	.92	.54	1.05	.82	.85	.90	31.2	43.9	40.1	40.8

TABLE 2

Definitions of Independent Variables
Included in the Employment Equations

Job Accessibility Measure

(1) Mean one-way travel time of workers who travel to work by private motorized carrier, who have less than a college education, who are of the same race/ethnic group as the youth, and who live in the same residential zone as the youth.

Personal Characteristics

(1) Age of youth in years.
(2) Years of school completed.
(3) High school diploma (yes = 1).
(4) Spouse of youth present in household (yes = 1).
(5) Youth has no mental or physical problems limiting the type of work (yes = 1).
(6) Youth has borne a child (yes = 1).
(7) Place of birth a foreign country or outlying area of U.S. (yes = 1).
(8) Speaks English poorly (yes = 1).
(9) Enrolled in School (yes = 1).
(10) Female (yes = 1).

Family Background

(1) Residence in one-parent/female-headed family (yes = 1).
(2) Completed years of education of head of household.
(3) Annual family income of 1979 minus the youth's earnings.
(4) Annual family income squared.

Occupation of household head (reference category = head without a job)

(5) Manager or professional (yes = 1).
(6) Technical, sales, or administrative support (yes = 1).
(7) Service worker (yes = 1).
(8) Precision production, craft, or repair (yes = 1).
(9) Operator, fabricator, or laborer (yes = 1).

TABLE 3

Estimated Effects of Travel Time on Job Probability

	Estimated Time Co-efficient	t-statistic	Mean Travel Time	Employment Rate	Percentage of Racial Differences Explained[a]	Sample Size
At Home, Full Sample						
White	-.0101	16.58	27.0	.525		24342
Black	-.0091	9.69	35.38	.271	29.7(33.0)	11473
Puerto Rican	-.0122	4.39	33.26	.273	30.0(24.8)	4962
Other Hispanic	-.0109	6.03	32.55	.383	42.2(39.1)	3462
At Home, Enrolled						
White	-.0120	14.42	26.9	.357		14136
Black	-.0089	8.49	35.38	.171	40.2(54.2)	6943
Puerto Rican	-.0106	3.40	33.26	.160	33.9(38.4)	2700
Other Hispanic	-.0120	5.59	32.35	.237	54.0(54.0)	2066
At Home, Not Enrolled						
White	-.0076	8.59	27.2	.757		10205
Black	-.0094	5.30	35.48	.424	23.1(18.7)	4529
Puerto Rican	-.0132	2.63	33.36	.408	23.1(13.3)	2261
Other Hispanic	-.0099	3.07	32.85	.599	35.1(26.9)	1395
Not At Home, Not Enrolled						
White	-.0052	5.45	28.9	.748		6477
Black	-.0046	2.22	35.46	.491	11.6(13.2)	2653
Puerto Rican	-.0101	2.79	33.14	.426	13.2(6.8)	2338
Other Hispanic	-.0057	1.80	33.04	.541	11.3(10.3)	1183

[a] The first number is obtained by assigning the minority group the mean travel time of whites and using the estimated travel time partial derivative from the minority equation. The number in parentheses is obtained by assigning whites the mean travel time of the minority group and using the estimated partial derivative from the white equation.

TABLE 4

Results from the Estimation of Wage Equations
(t-statistics in parentheses)

	Males		Females	
	Without Work Location	With Work Location	Without Work Location	With Work Location
Good Health	.104 (1.45)	.102 (1.42)	.220 (2.51)	.215 (2.47)
Spouse Present	.114 (4.96)	.116 (5.09)	.016 (.87)	.023 (1.24)
Work Experience	.019 (4.32)	.020 (4.50)	.027 (7.24)	.026 (7.11)
High School Diploma	.083 (2.59)	.073 (2.27)	.144 (5.56)	.130 (5.06)
Some College	.260 (11.17)	.240 (10.12)	.224 (12.20)	.206 (11.28)
Foreign Born	-.112 (4.18)	-.117 (4.37)	-.102 (3.87)	-.109 (4.17)
English Poor	-.141 (2.84)	-.138 (2.79)	-.268 (5.27)	-.227 (4.49)
Black	-.157 (5.63)	-.161 (5.67)	-.095 (3.65)	-.109 (4.19)
Puerto Rican	-.120 (3.75)	-.122 (3.78)	-.113 (3.75)	-.133 (4.40)
Other Hispanic	-.095 (2.49)	-.103 (2.69)	-.053 (1.36)	-.067 (1.72)
Work Location Dummies (reference category = Bronx County)				
Kings County (CBD)		.130 (1.16)		.121 (1.28)
Rest of Kings County		.037 (0.83)		.011 (0.22)
New York County (CBD)		.158 (3.53)		.147 (3.32)
Rest of New York County		.073 (1.79)		.081 (1.89)
Queens County		.037 (0.83)		.018 (0.35)

	Males		Females	
	Without Work Location	With Work Location	Without Work Location	With Work Location
Richmond County		.018 (0.24)		.031 (0.40)
Westchester County		.076 (1.63)		-.024 (0.50)
Rockland County		.004 (0.07)		.016 (0.21)
Hackensack		.154 (2.08)		-.015 (0.21)
Lyndhurst		.182 (2.69)		-.069 (0.97)
Fort Lee		.010 (0.10)		-.105 (1.10)
Fair Lawn		.002 (0.03)		-.115 (1.89)
Bergenfield		.003 (0.04)		-.042 (0.69)
Ridgewood		-.055 (0.60)		.025 (0.30)
Intercept	1.314 (17.67)	1.252 (15.33)	1.15 (12.76)	1.11 (11.30)
R-Square	.102	.105	.101	.128
Observations	2510	2510	2800	2800

APPENDIX

TABLE A.1

Employment Probability Equations for White Youth
(absolute value of t-statistic in parentheses)

	Youth at home, full sample	Youth at home, in school	Youth at home, not in school	Youth not at home, not in school
Travel Time	-.0101 (16.58)	-.0120 (14.42)	-.0076 (8.59)	-.0052 (5.45)
Age of Youth	.0408 (21.81)	.0498 (13.84)	.0349 (15.92)	.0189 (6.42)
Years of School	.0238 (8.97)	.0217 (4.64)	.0228 (6.94)	.0093 (3.15)
High School Diploma	-.0175 (1.79)	-.0268 (4.64)	-.0271 (2.08)	.0359 (2.63)
Spouse Present	-.0827 (3.24)	-.0599 (1.06)	-.0781 (2.87)	.0208 (1.66)
Good Health	.1005 (4.03)	-.0118 (0.29)	.1794 (5.91)	.0618 (1.77)
Female	.0432 (7.62)	.0343 (4.44)	.0554 (6.73)	-.0205 (2.09)
Foreign Born	-.0462 (3.96)	-.0528 (3.31)	-.0434 (2.57)	-.0510 (3.53)
English Poor	.0015 (0.05)	-.0504 (1.01)	.0312 (0.82)	-.0593 (1.95)
Enrolled in School	-.2947 (37.8)			
Borne a Child	-.3407 (10.59)	-.0917 (1.19)	-.4031 (11.9)	-.5786 (44.6)
Female Head	.0314 (3.57)	.0306 (2.45)	.0323 (2.67)	
Head's Years of School	-.0039 (4.05)	-.0037 (2.84)	-.0030 (2.11)	
Family Income	.0078 (12.62)	.0078 (9.22)	.0076 (8.14)	-.0037 (7.25)
Family Income Squared	-.98E-4 (12.48)	-.99E-4 (9.70)	-.89E-4 (6.96)	.15E-5 (1.21)

	Youth at home, full sample	Youth at home, in school	Youth at home, not in school	Youth not at home, not in school
Occupation of Household Head (reference category = head without a job)				
Manager, Professional	.0227 (2.16)	.0184 (1.26)	.0036 (2.24)	
Technical, Sales, Clerical	.0507 (5.19)	.0519 (3.71)	.0507 (3.79)	
Service	.0640 (5.41)	.0757 (4.47)	.0519 (3.20)	
Craftsman	.0655 (6.06)	.0665 (4.29)	.0654 (4.42)	
Laborer	.0562 (5.00)	.0656 (3.96)	.0475 (3.18)	
Intercept	-.3519 (6.56)	-.6048 (7.86)	-.3786 (5.34)	.3893 (4.73)
R-Square	.233	.094	.096	.366
Observations	24342	14136	10205	6477

TABLE A.2

Employment Probability Equations for Puerto Rican Youth
(absolute value of t-statistic in parentheses)

	Youth at home, full sample	Youth at home, in school	Youth at home, not in school	Youth not at home, not in school
Travel Time	-.0122 (4.39)	-.0106 (3.40)	-.0132 (2.63)	-.0101 (2.79)
Age of Youth	.0454 (13.68)	.0491 (8.95)	.0465 (10.3)	.0203 (4.67)
Years of School	.0164 (4.33)	.0069 (1.13)	.0178 (3.42)	.0212 (4.81)
High School Diploma	.0237 (1.15)	.0002 (0.09)	.1239 (3.41)	.1041 (3.65)
Spouse Present	.0360 (1.16)	.0469 (0.70)	.0319 (0.83)	.1131 (5.88)
Good Health	.0375 (1.03)	-.0023 (0.05)	.0649 (1.22)	.0709 (1.40)
Female	.0076 (0.69)	.0051 (0.37)	.0084 (0.40)	-.1726 (6.92)
Foreign Born	-.0194 (1.47)	-.0347 (2.14)	-.0077 (0.36)	-.0661 (3.76)
English Poor	.0084 (0.38)	.0382 (1.28)	-.0088 (0.27)	-.0758 (2.97)
Enrolled in School	-.1780 (12.04)			
Borne a Child	-.2072 (7.93)	-.1345 (2.86)	-.2209 (6.33)	-.3263 (13.75)
Female Head	-.0132 (0.93)	-.0038 (0.22)	-.0289 (1.26)	
Head's Years of School	-.0007 (0.49)	-.0022 (1.17)	.0010 (0.40)	
Family Income	.0045 (3.18)	.0045 (2.72)	.0044 (1.80)	-.0105 (6.32)
Family Income Squared	-.45E-4 (1.79)	-.36E-4 (1.26)	-.54E-4 (1.21)	.26E-3 (5.15)

	Youth at home, full sample	Youth at home, in school	Youth at home, not in school	Youth not at home, not in school
Occupation of Household Head (reference category = head without a job)				
Manager, Professional	.0427 (1.52)	-.0019 (0.06)	.1033 (2.18)	
Technical, Sales, Clerical	.0627 (2.89)	.0283 (1.13)	.1066 (2.83)	
Service	.0422 (2.10)	.0197 (0.83)	.0706 (2.11)	
Craftsman	.0927 (3.73)	.0417 (1.44)	.1607 (3.79)	
Laborer	.0672 (3.59)	.0153 (0.68)	.1279 (4.17)	
Intercept	-.3670 (2.96)	-.4722 (3.14)	-.4428 (2.15)	.2724 (1.62)
R-Square	.193	.107	.158	.372
Observations	4962	2700	2261	2338

TABLE A.3

Employment Probability Equations for Black Youth
(absolute value of t-statistic in parentheses)

	Youth at home, full sample	Youth at home, in school	Youth at home, not in school	Youth not at home, not in school
Travel Time	-.0091 (9.69)	-.0089 (8.49)	-.0094 (5.30)	-.0046 (2.22)
Age of Youth	.0388 (16.86)	.0345 (10.32)	.0424 (12.23)	.0295 (5.86)
Years of School	.0162 (5.56)	.0174 (3.98)	.0155 (3.67)	.0138 (2.88)
High School Diploma	.0393 (3.02)	.0305 (1.87)	.0721 (3.19)	.1420 (5.66)
Spouse Present	.0313 (1.24)	-.0009 (0.02)	.0347 (1.03)	.1599 (7.86)
Good Health	.0323 (1.18)	-.0567 (1.41)	.0897 (2.30)	.0339 (0.58)
Female	-.0165 (2.05)	-.0130 (1.49)	-.0207 (1.31)	-.0602 (2.53)
Foreign Born	.0291 (2.99)	.0182 (1.70)	.0614 (3.25)	.1511 (6.97)
English Poor	-.0698 (1.54)	-.0781 (1.56)	-.0452 (0.52)	.1124 (0.89)
Enrolled in School	-.1954 (19.35)			
Borne a Child	-.1334 (9.25)	-.0276 (1.27)	-.1784 (8.32)	-.2530 (11.20)
Female Head	.0010 (0.10)	.0146 (1.37)	-.0230 (1.38)	
Head's Years of School	-.0013 (1.01)	-.0011 (0.76)	-.0011 (0.46)	
Family Income	.0042 (4.69)	.0016 (1.56)	.0083 (5.04)	-.0131 (9.89)
Family Income Squared	-.43E-4 (2.90)	-.71E-4 (0.43)	-.0001 (3.56)	.35E-3 (7.26)

	Youth at home, full sample	Youth at home, in school	Youth at home, not in school	Youth not at home, not in school
Occupation of Household Head (reference category = head without a job)				
Manager, Professional	.0438 (2.81)	.0457 (2.04)	.0356 (1.19)	
Technical, Sales, Clerical	.0368 (3.03)	.0234 (1.70)	.0553 (2.48)	
Service	.0291 (2.51)	.0307 (2.30)	.0251 (1.21)	
Craftsman	.0182 (1.10)	.0287 (1.52)	-.0085 (0.28)	
Laborer	.0195 (1.48)	0.130 (0.86)	.0305 (1.27)	
Intercept	-.3165 (4.60)	-.3492 (4.15)	-.4644 (4.06)	-.1536 (0.99)
R-Square	.173	.101	.119	.260
Observations	11473	6943	4529	2653

TABLE A.4

Employment Probability Equations for non-Puerto Rican Hispanic Youth
(absolute value of t-statistic in parentheses)

	Youth at home, full sample	Youth at home, in school	Youth at home, not in school	Youth not at home, not in school
Travel Time	-.0109 (6.03)	-0.120 (5.59)	-.0099 (3.07)	-.0057 (1.80)
Age of Youth	.0502 (11.67)	.0416 (6.01)	.0529 (8.72)	.0194 (2.83)
Years of School	.0086 (1.96)	.0273 (3.17)	.0057 (1.02)	-.0015 (0.32)
High School Diploma	.0304 (1.29)	-.0170 (0.53)	.0749 (1.90)	.1159 (3.03)
Spouse Present	.0389 (1.18)	.0149 (0.23)	.0402 (0.99)	.1115 (3.96)
Good Health	.0388 (0.60)	.0462 (0.45)	.0389 (0.45)	-.1944 (2.14)
Female	-.0172 (1.13)	-.0216 (1.19)	-.0106 (0.39)	-.0658 (1.97)
Foreign Born	-.0150 (0.86)	-.0319 (1.58)	.0251 (0.80)	.0251 (0.76)
English Poor	.0114 (0.54)	.0130 (0.46)	.0070 (0.22)	-.0359 (1.24)
Enrolled in School	-.2650 (13.49)			
Borne a Child	-.1761 (4.57)	-.0187 (0.27)	-.2236 (4.48)	-.4294 (13.18)
Female Head	.0028 (0.16)	-.0239 (1.07)	.0384 (1.32)	
Head's Years of School	.0005 (0.25)	.0049 (2.10)	-.0065 (1.93)	
Family Income	.0024 (1.38)	-.0017 (0.80)	.0079 (2.60)	-.0096 (4.53)
Family Income Squared	-.13E-4 (0.43)	.34E-4 (0.99)	-.78E-4 (1.43)	.14E-3 (2.17)

	Youth at home, full sample	Youth at home, in school	Youth at home, not in school	Youth not at home, not in school
Occupation of Household Head (reference category = head without a job)				
Manager, Professional	.0050 (0.15)	-.0420 (1.11)	.0917 (1.53)	
Technical, Sales, Clerical	.0227 (0.82)	.0316 (0.93)	.0107 (0.23)	
Service	.0231 (0.97)	.0417 (1.41)	-.0037 (0.09)	
Craftsman	.0225 (0.80)	-.0169 (0.50)	.0967 (1.97)	
Laborer	.0494 (2.23)	.0039 (0.14)	.0965 (2.71)	
Intercept	-.2600 (1.98)	-.5296 (2.98)	-.3703 (1.88)	.6713 (3.22)
R-Square	.220	.107	.122	.302
Observations	3462	2066	1395	1183

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