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Structural Changes, Employment Outcomes, and Population Adjustments among Whites and Blacks: 1980–1990

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Abstract

Earnings and employment deteriorated the most for young, less-educated, and/or black males in the 1980s. The most severe deterioration for blacks occurred in the North-Central regions. The causes of such regional and demographic variation in outcomes include a greater severity of demand shifts away from these groups and areas, as well as the greater relative impacts of such shifts on the earnings and employment of these demographic groups.

Relative supply shifts across areas also contributed somewhat to the observed employment outcomes. There is some evidence of short-run population shifts across areas and groups that at least partially offset the negative demand changes described above. But younger and less-educated workers, especially among blacks, showed substantially lower population adjustments and migration in this time period in response to these demand shifts. The educational improvements of blacks during this decade also lagged behind. These limited supply responses apparently contributed somewhat to the severity of the demand effects on the employment and earnings of these groups during the 1980s.

The data used here are from the Public Use Samples of the 1980 and 1990 Censuses and the National Longitudinal Survey of Youth.

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I. INTRODUCTION

Economists have firmly established that the earnings and employment rates of less-educated Americans, and particularly those of minorities, declined during the 1980s in both relative and real terms. Furthermore, some consensus on the causes of the decline has begun to emerge in the research literature. Specifically, the demand for less-educated labor fell for a variety of reasons, while the growth in the supply of educated labor slowed (e.g., Bound and Johnson, 1992; Katz and Murphy, 1992; Bound and Freeman, 1992).[1]

Most economists agree that the decline in the demand for less-educated labor is in part attributable to the changing structure of employment in the American economy. The economy has shifted away from occupations (such as operatives and laborers) and industries (such as manufacturing and construction) that traditionally have employed the less-educated in large numbers and paid them better-than-average compensation.[2]

However, several aspects of these economic changes remain obscure. For instance, there remains no consensus on why some demographic groups, especially young blacks, suffered greater declines in employment and earnings than did young whites with comparable levels of education.[3]

Furthermore, there appears to be some major geographic variation in the extent of the structural changes and in the changes in labor market outcomes which they have caused for these different groups. In particular, Bound and Freeman (1992) have shown that the earnings gap between blacks and whites grew most rapidly in the North-Central region during the 1980s. Karoly and Klerman (1992) and Topel (1994) have also pointed to major regional variation in employment and earnings outcomes for less-educated workers.

There are at least three possible reasons why less-educated and minority workers might have done worse in particular labor markets: (1) The shift in labor demand away from these groups was higher in some areas, at least partly because of the industrial composition of these areas and/or the groups who work in these industries; (2) Exogenous supply shifts may have been more adverse in some regions, perhaps due to immigration; and (3) The supply adjustment process, in terms of out-migration from declining areas and in-migration to growing ones, may be slower for minorities or less-educated groups, thus leaving them to be particularly hard hit by declining demand in any area.

The migration story, in particular, has been analyzed in several recent studies of local labor markets. Topel (1986), Bartik (1991), and Blanchard and Katz (1992) have all analyzed changes in local populations in response to changes in local labor demand, and they generally find substantial mobility in response to demand shocks. The work of Blanchard and Katz suggests that the impact of these shocks (in terms of employment rates and wage levels) should be completely dissipated in less than a decade because of population adjustments (though Bartik's work suggests somewhat greater persistence).

These results raise major questions about the relative roles of demand shifts and supply adjustments in generating the demographic and geographic patterns in wages and employment changes that we have recently observed. In particular, we know very little about the population adjustments of less-educated workers and minorities in these areas, since the studies noted above used measures of the overall populations in the local areas as their measures of the adjustment process, without disaggregating by race or education.[4]

In this paper, we provide a fuller analysis of these issues for the 1980s. In particular, we present the following: (1) A more complete documentation of structural changes in employment across industries, regions, and metropolitan areas; (2) An analysis of how these changes affected the earnings and employment of white and black men and women, where effects are estimated separately by

educational and experience groups as well; and (3) Some evidence on how population growth across local areas adjusts in response to changes in employment outcomes and how migration rates vary across the demographic groups mentioned above.

Our ability to analyze labor market and population outcomes at the local level for such detailed demographic groups is made possible by our use of data from the Public Use Micro Samples (PUMS) of the Census of Population in 1980 and 1990. We use the 5% samples for each of these years, which give us vastly more individual observations with which to disaggregate outcomes by demographic group. Furthermore, the PUMS data enable us to analyze structural changes as well as outcomes at the metropolitan level, rather than at the much broader state or regional levels at which others have considered these issues when using data from the Current Population Survey (CPS).[5]

The Census of Population is not particularly well suited for the analyzing migration over the full decade, although some inferences on this issue can be made from relative population changes at the metropolitan level.[6] Therefore, to get more direct evidence on migration patterns in the 1980s, we also provide some summary data from the National Longitudinal Survey of Youth (NLSY) on differences in migration patterns across racial and demographic groups.

We can summarize our primary results to date as follows:

(1) Both wage and employment outcomes deteriorated most seriously for young, less-educated males and black males of all types, regardless of their age and education, in the 1980s. Employment declines for blacks occurred in virtually all regions of the country and in most MSA's; the declines were most severe in the North-Central region.

(2) Labor demand shifted away from less-educated workers nationwide. Declining manufacturing employment was most severe for black males, especially in the North-Central region. Furthermore, the impacts of any given shifts (both in overall local demand and in its structure) were largest on the wages and employment of the young and less-educated, especially for blacks.

(3) Relative supply shifts also contributed somewhat to the observed employment outcomes for different groups. Population adjustments in the short run did limit the extent to which employment and earnings were affected by demand shifts in the 1980s, with workers moving out of declining areas into growing ones (and into higher skill categories).

(4) *Less-educated workers and especially blacks in the youngest cohort had relatively low rates of migration in response to economic changes in the short term*. Educational improvements among blacks also seemed particularly low relative to those of whites. The limited adjustments in labor supply for these groups appear to have contributed to the large negative effects on their employment and earnings that were caused by structural changes in the economy, at least in the short run.

Thus, policies aimed at facilitating the supply adjustment process among the young and less-educated, especially young blacks, by helping them to achieve higher education levels or to relocate geographically, might well be in order.

II. CENSUS DATA AND METHODOLOGY

We have analyzed data for 132 metropolitan statistical areas (MSA's) from the 1980 and 1990 PUMS files of the Census. We defined metropolitan areas on the basis of the individual's county of residence; definitions across the two years were generally very consistent.[7]

For each MSA, we have computed the following indices of shifts in labor demand:

$$d_{ik} = \sum_j s_{ijk} E_{jk} \qquad (1)$$

where s represents the share of group i (usually defined by education and/or experience) employed in sector j in MSA k at the beginning of the decade, and E represents the change in the log of total hours of employment in the same sector and MSA over the decade. In both cases, employment was defined

on the basis of hours worked among those aged 16 and above in the civilian noninstitutionalized population, while sectors were defined on the basis of 47 industry cells.

A variety of somewhat different indices was calculated on this basis, and they were all highly correlated across MSA's.[8] Each index was also calculated separately using hours shares for those with less than or equal to 12 years of education (i.e., high school graduates and dropouts); those with 13–15 years; and those with 16 or more (i.e., college graduates).

The indices are weighted averages of employment growth during the 1980s in each MSA, where the weights represent the different distributions of employment across sectors in each MSA as of 1979. They thus measure the extent to which demand was shifting away from the occupations and industries in which the particular skill groups were employed there in 1979. The indices are also measures of *between*-sector demand shifts, and do not capture potentially important shifts between different categories of skill *within* such sectors. Such indices have been used at the national level in many previous studies (e.g., Bound and Freeman, 1992; Katz and Murphy, 1992) and at the local level in a few cases (Bound and Holzer, 1993).

An alternative measure of demand focuses exclusively on two industries where the less-educated have traditionally earned above-average wages—manufacturing and construction. We therefore have calculated the *shares* of employment of less-educated workers (i.e., those with high school degrees or less) that were accounted for by these two industries in 1979 and 1989. We used changes in this measure in place of the demand indices in some estimated equations below.

To control for overall shifts in labor supply by skill group, we have calculated S_{ik}, which stands for changes in the logs of potential workers (i.e., the nonenrolled in the civilian noninstitutionalized population) between 1979 and 1989 for educational group i in MSA k. Separate measures were also calculated for the nonenrolled with less than ten years of labor market experience, and for those individuals who had not immigrated to the United States during the course of the decade.[9]

Using these data, we have estimated equations of the following general form:

$$Y_{ik} = \alpha_i + \beta_i D_{ik} + \delta_i S_{ik} + \epsilon_{ik} \quad (2)$$

where the *Y* represents changes in the logs of hourly earnings and hours worked between 1979 and 1989 for the relevant demographic group. These equations were estimated across education-by-experience-by-MSA cells, using four experience categories and six educational categories for each of the 132 MSA's.[10] They were also estimated separately for black and white men and women, and also for certain educational and/or experience subgroups in some cases.[11]

These equations are thus reduced-form estimates of how labor supply and demand shifts affect wage and employment outcomes for the relevant group (e.g., Freeman, 1977). In such an approach, it is easy to show that the effects of demand shifts on wages will be smaller when labor supply elasticities are greater, while those on employment levels will be greater.[12]

On the other hand, effects of demand shifts on measures of employment rates (such as average hours or weeks worked per year) need not vary directly with supply elasticities; and the higher the long-run supply elasticity for a local area (reflecting the degree to which populations adjust in response to demand shifts), the lower the expected effect of demand shifts on wages and employment rates. Thus, *we would expect groups with limited (or slower) population mobility to show greater employment and wage deterioration when negative local demand shifts occur*, especially in the short run.

Various specifications of the wage and hours worked equations have been estimated, and some different ones are presented below. For instance, we chose to distinguish between changes in overall labor demand in an MSA and those for particular skill groups and/or industries, where the latter can be interpreted as changes in the structure of labor demand in the MSA as opposed to the overall level of demand.

The overall demand change is therefore represented by the demand index based on all workers in the MSA,[13] while the structural variables are differences in supply and in demand measures between those for college graduates and those with high school educations or less, respectively.

We also note that all equations are based on changes in logs between 1979 and 1989. Omitted fixed effects of MSA's were thus differenced away in these specifications. Furthermore, all coefficients can be interpreted as elasticities of outcomes with respect to underlying demand and supply shifts.

To analyze short-term population adjustments to these local economic changes, we have estimated equations using Census data of the following type:

$$POP_{ik} = \theta_i + \gamma_i Y_{ik} + \upsilon_{ik} \tag{3}$$

where *POP* represents the change in the log of population for the particular demographic group *i* and *Y* reflects wage or employment outcomes defined above. In some estimates, we substituted the underlying demand shifts in place of the wage and employment outcomes (as done by Bartik [1991] and by Blanchard and Katz [1992]).

Before proceeding to the results, we need to consider some potential biases in our estimated coefficients. Our estimates from the equations described above might be plagued by endogeneity (or simultaneity) from two potential sources.

One is the high correlation between employment and population measures across geographic areas. We used data based on the former to define our demand indices and the latter to define supply, although by definition these two sets of measures are quite similar; and the very high correlations between the two overall measures prevented us from including both in our estimated equations.[14] Thus, there will be biases in the estimated coefficient for the overall demand measure alone in Equation (2) or (3), which will likely be negative in the former case and positive in the latter.[15]

Following Bartik as well as Blanchard and Katz, we therefore created additional indices for demand based on *nationwide* employment growth in industries, weighted by the MSA-specific employment shares in those industries in 1979—i.e., $\sum_j s_{ijk}E_j$ rather than $\sum_j S_{ijk}E_{jk}$. These indices capture the city-specific industry mix while avoiding the endogeneity associated with local employment growth rates. We used the latter as instruments for the former in some equations that we will discuss below, although the results were not always convincing.[16]

The second source of potential endogeneity here is behavioral rather than definitional—i.e., the very tendency for labor supply to adjust in response to the measured outcomes that we were trying to estimate in Equation (3). These adjustments imply that the estimated coefficients on supply-shift variables in Equation (2) may be downward biased, as are estimates of population adjustments with respect to observed wage/employment outcomes from Equation (3). The problem is compounded here by the use of *contemporaneous* population adjustment only in the latter equation, since outcomes would likely be considered more exogenous with respect to lagged adjustments.[17]

To deal with this, we measured the population adjustments in Equation (3) as being specific to groups defined by race and gender as well as by experience and education in some cases, while the supply-shift variables used in Equation (2) were based on *all* workers in the MSA (including Hispanics and Asians) who were in the relevant educational category.

The much broader definition of the latter variable should allow for substitution across these groups in demand, as well as for limits in the endogeneity of this variable with respect to the market outcomes of the much more specific groups that appear as dependent variables. Indeed, the signs of the estimated coefficients on these broader supply variables in Equation (2) that we report below indicate that they are primarily capturing the effects of shifting supply.

Finally, after presenting our estimates of population adjustments from Equation (3), we will consider two more bits of evidence on this issue: a decomposition of adjustments in total hours worked

between population changes and average hours changes for various groups; and some summary data from the NLSY on observed migration rates of young workers. These will generally provide additional support for our interpretations of estimates from population adjustment equations.

III. ESTIMATED RESULTS FROM CENSUS DATA

A. Summary Results

Summary data on changes in logs of weekly wages, weeks worked, and population for the four race-by-sex groups over the 1980s appear in Table 1.[18] Separate estimates also appear for those young workers with less than ten years of labor market experience, and/or for workers with twelve years or less of education. All results are weighted by population size of the relevant group in the MSA as of 1980.

The results are generally consistent with those that have previously appeared in the literature on recent trends in earnings inequality (see endnote 1). Wage and employment changes are more positive for females than for males, and for whites than for blacks within each gender.

The results suggest that black males lost roughly 8 percentage points in annual earnings relative to white males over the 1980s, even though the latter group was losing ground in both real and relative terms as well.[19] Most of this relative loss for black males is observed in hours worked rather than wages, where the former declined substantially *within* experience and education groups. In contrast, the overall relative wage decline of blacks was caused by their higher concentration among less-educated workers and a decline in relative wages within the college-educated group only.

As is generally well known, changes in weekly wages and in weeks worked were substantially lower for those with high school degrees or less than for college graduates. Within all race-by-gender

TABLE 1
Wages, Weeks Worked, and Population Changes: 1979–1989
(Standard Deviations in Parentheses)

	White Males			Black Males		
	dlnW	dlnHrs	dlnPOP	dlnW	dlnHrs	dlnPOP
All	.455	-.025	-.001	.441	-.089	-.075
	(.128)	(.081)	(.450)	(.187)	(.211)	(.521)
≥ 16 Years Education	.540	.021	.270	.504	.048	.429
	(.098)	(.054)	(.320)	(.229)	(.163)	(.528)
≤ 12 Years Education	.416	-.054	-.242	.432	-.125	-.065
	(.129)	(.089)	(.360)	(.184)	(.218)	(.454)
Dropouts	.421	-.110	-.409	.449	-.185	-.205
	(.137)	(.111)	(.387)	(.197)	(.259)	(.511)
H.S. Graduates	.414	-.019	-.136	.414	-.050	-.109
	(.124)	(.043)	(.286)	(.167)	(.118)	(.287)
0–9 Years Exp.	.385	-.019	-.402	.395	-.083	-.181
& ≤ 12 Years Ed.	(.164)	(.092)	(.209)	(.205)	(.263)	(.315)
	White Females			Black Females		
	dlnW	dlnHrs	dlnPOP	dlnW	dlnHrs	dlnPOP
All	.548	.156	-.057	.522	.031	-.051
	(.112)	(.119)	(.490)	(.175)	(.232)	(.533)
≥ 16 Years Education	.622	.218	.425	.528	.143	.491
	(.103)	(.106)	(.387)	(.195)	(.154)	(.534)
≤ 12 Years Education	.517	.127	-.309	.516	.006	-.122
	(.107)	(.120)	(.322)	(.180)	(.251)	(.418)
Dropouts	.570	.077	-.461	.540	-.040	-.240
	(.129)	(.160)	(.365)	(.213)	(.295)	(.479)
H.S. Graduates	.520	.152	-.234	.498	.038	.002
	(.097)	(.085)	(.269)	(.148)	(.159)	(.295)
0–9 Years Exp.	.486	.077	-.547	.442	.017	-.277
& ≤ 12 Years Ed.	(.120)	(.160)	(.200)	(.182)	(.258)	(.230)

Notes: "W" refers to hourly earnings; "Hrs" to annual hours worked; and "POP" to population. "Experience" refers to Age minus (Completed Years of Education+5). Means are weighted by the relevant sample sizes for 1979. Wages and hours worked are based on 1979 and 1989. Wage figures reflect differences in the means of log wages, while weeks worked and population figures are differences in logs of means.

groups the latter enjoyed real wage growth over the decade, while the former were either holding constant (females) or losing ground (males) in real terms. The declines in earnings for the less-educated were greatest for the youngest workers, with real weekly wages declining roughly 13–14 percent over the decade for young and less-educated males and hours worked declining in addition for them.

Overall, the generally positive correlations between changes in wages and changes in weeks worked across race, gender, education, and experience groups suggest a primary role for relative labor demand shifts in generating these outcomes. These data also suggest positive labor supply elasticities for less-educated males, especially among blacks.[20]

Population changes also exhibit some interesting relative patterns. We generally find declining relative population growth for the less-educated, especially among the young, within each race-by-gender group. This seems to reflect the demographic effects of the "Baby Bust" and of generally rising school enrollment rates over time. These trends seem particularly strong among females, for whom the declines in population among the young and less-educated are much sharper than they are for males.

Among the less-educated, population growth of blacks exceeds that of comparable whites by larger amounts than it does among the more-educated, especially among females. This implies a particular slowdown in relative educational improvement for young blacks during this decade, which likely contributed to their labor market difficulties during that time.[21]

In Table 2, we find summary measures of the labor demand and supply-shift measures that we have calculated for each MSA. Separate demand shifts for the least- and most-educated groups appear here, while the supply shifts are defined for these groups as well as for those with the least experience. Separate supply shifts are also calculated for the non-immigrant population.

TABLE 2
Labor Supply and Demand Shifts, 1979–1989

	Supply	Demand
All Workers	.096	.221
	(.129)	(.131)
Non-Immigrants	.068	-
	(.123)	
0–9 Years Experience	-.110	-
	(.156)	
0–9 Years Experience & Non-Immigrants	-.161	-
	(.140)	
≤ 12 Years Education		
All	-.132	.190
	(.135)	(.137)
Non-Immigrants	-.170	-
	(.123)	
0–9 Years Experience	-.313	-
	(.178)	
0–9 Years Experience & Non-Immigrants	-.386	-
	(.142)	
≥ 16 Years Education		
All	.370	.285
	(.129)	(.126)
Non-Immigrants	.348	-
	(.129)	
0–9 Years Experience	.079	-
	(.190)	
0–9 Years Experience & Non-Immigrants	.041	-
	(.183)	
≥ 16 - ≤ 12 Years Education, All	.502	.095
	(.105)	(.040)
Construction and Manufacturing	-	-.057
		(.026)

Notes: Supply and demand shift variables are defined in the text. All means are weighted by overall MSA employment in 1980.

The results show relative shifts in both labor demand and supply towards those with more education.[22] We find a roughly 50-percentage point shift from less- to more-educated labor in supply (smaller among the youngest cohort), with only a 10-point shift in demand. But this likely occurs because only part of the demand shift is measured here—the part that occurs *between* sectors rather than within them.

The data also indicate that labor supply among immigrants is growing faster than that among non-immigrants. Overall labor supply is raised by roughly 3 percentage points because of immigration. Furthermore, the differentials between labor supply shifts for all and for non-immigrant workers are somewhat larger among younger and less-educated groups—e.g., the labor supply of the young and less-educated is raised by about 7 percentage points due to immigration. These overall supply numbers are also particularly high for specific MSA's, such as Los Angeles and Miami (as can be seen in the Appendix).

On the other hand, (size-weighted) correlations between non-immigrant and total supply growth across the MSA's are .9 or higher, even when measured for the young and less-educated. This indicates that *immigration has little effect on overall patterns of labor supply growth across MSA's*, and likely little effect on the variation in wage and employment outcomes observed in these areas.

The final row of Table 2 indicates that the share of employment in construction and manufacturing fell roughly 5 percentage points over the 1980s, from .30 to .25, with virtually all of the decline occurring in manufacturing. Furthermore, other Census data (not presented here) indicate that these declines were substantially larger for black males than for any of the other groups—their employment in these sectors fell by roughly 9 percentage points (from .40 to .31) over the decade.[23]

Some additional evidence on the geographic variance in employment outcomes (for white and black males with high school or college degrees) and in supply/demand shifts appears in Table 3,

TABLE 3

Employment Outcomes and Their Determinants, by Census Division

	White Males				Black Males			
	Ed = 12		Ed >= 16		Ed = 12		Ed >= 16	
	dlnW	dlnHrs	dlnW	dlnHRS	dlnW	dlnHrs	dlnW	dlnHRS
Northeast								
New England	.603	-.021	.625	.024	.541	-.035	.603	.001
Mid Atlantic	.488	-.016	.582	.028	.506	-.022	.561	.025
North Central								
E. North Central	.335	-.025	.492	.011	.265	-.098	.416	.020
W. North Central	.345	-.037	.480	.005	.341	-.075	.421	.035
South								
E.S. Central	.367	-.019	.554	.024	.374	-.025	.514	.055
W.S. Central	.295	-.051	.503	.007	.317	-.136	.538	.048
S. Atlantic	.446	.000	.475	.006	.474	.011	.439	.041
West								
Mountain	.315	-.018	.470	.023	.312	-.082	.452	.083
Pacific	.441	-.005	.570	.033	.512	-.070	.555	.059

(table continues)

TABLE 3 (continued)

	Supply Change College-HS		Demand Change		
	All	Non-Imms	Overall	C-HS	Cons./Mfg.
Northeast					
New England	.613	.630	.192	.109	-.071
Mid Atlantic	.550	.562	.182	.097	-.066
North Central					
E. North Central	.546	.547	.125	.108	-.073
W. North Central	.565	.563	.130	.116	-.046
South					
E.S. Central	.480	.475	.174	.104	-.044
W.S. Central	.395	.408	.203	.121	-.055
S. Atlantic	.497	.505	.325	.082	-.034
West					
Mountain	.451	.465	.331	.078	-.029
Pacific	.423	.481	.311	.070	-.024

which presents summary data for the nine Census divisions, and in the Appendix, which presents them for nineteen of the nation's largest MSA's.

These data show that there is substantial variation in employment outcomes and in their determinants both across and within the Census divisions. Wage growth for the less-educated was strongest in New England, while it was weakest in the North-Central (especially for blacks), West South Central, and Mountain divisions. Wage growth for the college-educated showed parallel trends but with less variance across regions; thus wage growth for the less-educated was inversely related to the growth of inequality across regions. Hours worked for the less-educated declined in most areas, and were more negative for blacks than for whites in all regions but one.

The data suggest that regional differences both in supply and demand shifts may partially account for the pattern of outcomes observed here. In particular, the growth in the relative supply of college graduates is strongest in New England and weakest in the West South Central area, perhaps contributing to the relative patterns of wage growth for the less-educated across these areas. Furthermore, overall demand growth was weakest in the North Central areas; and shifts away from less-educated workers there were relatively strong, especially for black males.[24] Large shifts away from less-educated workers in the West South Central region also appear to have contributed to low wages and employment there.

Across the largest individual MSA's, we find that both wage and hours growth among the college-educated exceeded that among high school graduates for blacks and whites in virtually each MSA, and that wage growth among white college graduates exceeded that among black college graduates in virtually all cases as well. We find relatively strong wage growth for the less-educated in such diverse areas as Boston, Los Angeles, New York, and San Francisco, while it was weakest in traditional industrial areas such as Cleveland and Pittsburgh. Less-educated black males did

particularly poorly in Chicago and Detroit as well. Again, one can find support for both demand and supply explanations of these trends across individual MSA's.

B. Regression Results: Effects on Wages and Weeks Worked

Equations of the form of (2) appear in Tables 4 and 5 below, with estimates for all four race-by-gender groups appearing in the first of these tables and for more specific groups of black and white males appearing in the second.

All equations are weighted by the size of the relevant population group in the MSA in 1979.[25] In Table 4, two specifications appear for each equation: one including only an index for overall demand (or overall employment growth) in the MSA; and the other adding relative demand and supply indices for the differences between college graduates and those with high school educations or less in the MSA. Table 5 also includes estimates using changes in the shares of employment for the less-educated that are accounted for by construction and manufacturing employment in place of the relative demand indices.

In Table 4, we pool more- and less-educated groups, and interact the key independent variables with a dummy for having college (or higher) degrees. The coefficients on the base terms thus measure the effects for the less-educated, while those on the interaction terms measure the *differences* between estimates for more- and less-educated groups. The less-educated are disaggregated into high school graduates and dropouts (overall and for the youngest cohort) in Table 5. Separate estimates appear for all experience groups and for the least-experienced group in both tables.

The results in Table 4 show several clear patterns. Overall employment growth within the MSA generally has significant positive effects on both wage and hours growth over the decade. These effects are generally larger for blacks than for whites, larger for younger than for older workers, and larger for less-educated than for more-educated workers.[26]

TABLE 4
Supply and Demand Effects on Wage and Weeks Worked Changes
(Standard Errors in Parentheses)

	White Males				Black Males			
	dlnW		dlnHrs		dlnW		dlnHrs	
	1	2	1	2	1	2	1	2
1. All Experience Groups								
≤ 12 Years Education								
Total Employment Change	.258 (.019)	.218 (.020)	.146 (.010)	.133 (.011)	.450 (.031)	.412 (.034)	.402 (.034)	.312 (.037)
Demand Change, ≥ College - ≤ HS	-	-.353 (.067)	-	-.131 (.036)	-	-.352 (.107)	-	-.674 (.118)
Supply Change, ≥ College - ≤ HS	-	.210 (.025)	-	.045 (.014)	-	.001 (.040)	-	.188 (.044)
Interaction Terms: ≥ 16 Years Education								
Total Employment Change	-.094 (.036)	-.054 (.038)	-.076 (.020)	-.073 (.021)	-.152 (.097)	-.101 (.107)	-.319 (.117)	-.239 (.128)
Demand Change, ≥ College - ≤ HS	-	.322 (.212)	-	.032 (.068)	-	.434 (.311)	-	.609 (.372)
Supply Change, ≥ College - ≤ HS	-	-.095 (.046)	-	-.026 (.025)	-	-.001 (.122)	-	-.242 (.145)
$\overline{R}^2$	.334	.357	.530	.534	.196	.200	.252	.268
2. 0–9 Years Experience								
≤ 12 Years Education								
Total Employment Change	.418 (.047)	.357 (.049)	.099 (.023)	.075 (.024)	.626 (.069)	.582 (.073)	.451 (.083)	.332 (.088)
Demand Change, ≥ College - ≤ HS	-	-.561 (.168)	-	-.193 (.083)	-	-.617 (.235)	-	-.850 (.285)
Supply Change, ≥ College - ≤ HS	-	.253 (.063)	-	.161 (.031)	-	-.149 (.089)	-	.362 (.106)
Interaction Terms: ≥ 16 Years Education								
Total Employment Change	-.231 (.084)	-.181 (.087)	-.045 (.042)	-.036 (.044)	-.211 (.182)	-.205 (.198)	-.269 (.245)	-.222 (.265)
Demand Change, ≥ College - ≤ HS	-	.442 (.278)	-	.054 (.139)	-	.363 (.573)	-	.380 (.770)
Supply Change, ≥ College - ≤ HS	-	-.116 (.107)	-	-.112 (.053)	-	.173 (.229)	-	-.254 (.305)
$\overline{R}^2$	.393	.416	.385	.414	.200	.217	.204	.232

(table continues)

TABLE 4 (continued)

	White Females				Black Females			
	dlnW		dlnHrs		dlnW		dlnHrs	
	1	2	1	2	1	2	1	2
1. All Experience Groups								
≤ 12 Years Education								
Total Employment Change	.225 (.016)	.193 (.017)	.057 (.015)	.034 (.016)	.269 (.031)	.274 (.034)	.285 (.140)	.239 (.154)
Demand Change, ≥ College - ≤ HS	-	-.307 (.056)	-	-.213 (.054)	-	.006 (.105)	-	.147 (.147)
Supply Change, ≥ College - ≤ HS	-	.138 (.022)	-	.174 (.020)	-	-.044 (.041)	-	.233 (.055)
Interaction Terms: ≥ 16 Years Education								
Total Employment Change	-.031 (.037)	-.020 (.038)	-.050 (.038)	-.035 (.040)	-.039 (.086)	-.038 (.095)	-.308 (.140)	-.278 (.154)
Demand Change, ≥ College - ≤ HS	-	.113 (.119)	-	.133 (.123)	-	.077 (.277)	-	.156 (.452)
Supply Change, ≥ College - ≤ HS	-	-.036 (.047)	-	-.159 (.048)	-	.108 (.110)	-	-.163 (.177)
$\overline{R}^2$								
.270	.289	.413	.431	.157	.157	.130	.138	
2. 0–9 Years Experience								
≤ 12 Years Education								
Total Employment Change	.271 (.037)	.226 (.038)	.007 (.032)	-.029 (.033)	.462 (.064)	.431 (.068)	.253 (.101)	.108 (.107)
Demand Change, ≥ College - ≤ HS	-	-.449 (.130)	-	-.329 (.115)	-	-.387 (.212)	-	-.957 (.347)
Supply Change, ≥ College - ≤ HS	-	.172 (.050)	-	.198 (.043)	-	-.064 (.085)	-	.508 (.131)
Interaction Terms ≥ 16 Years Education								
Total Employment Change	-.068 (.068)	-.042 (.071)	-.042 (.064)	-.011 (.066)	-.141 (.139)	-.127 (.153)	-.248 (.267)	-.134 (.289)
Demand Change, ≥ College - ≤ HS	-	.275 (.223)	-	.286 (.208)	-	.337 (.450)	-	.879 (.859)
Supply Change, ≥ College - ≤ HS	-	-.084 (.088)	-	-.153 (.081)	-	.169 (.180)	-	-.311 (.338)
$\overline{R}^2$	.371	.392	.226	.256	.155	.162	.038	.076

Note: All equations in this and subsequent tables are weighted by population size of the relevant group in the MSA as of 1979. Equations also include constant terms and dummy variables for experience and/or education when groups are pooled.

TABLE 5

Supply and Demand Effects: Detailed Groups of Males and Industry Employment Measures

	White Males				Black Males			
	dlnW		dlnHrs		dlnW		dlnHrs	
	1	2	1	2	1	2	1	2
1. All Experience Groups								
Dropouts								
Total Emp. Change	.230	.202	.178	.099	.369	.275	.360	.210
	(.042)	(.049)	(.022)	(.026)	(.067)	(.029)	(.072)	(.085)
Demand Change, C-HS	-.285	-	-.120	-	-.395	-	-.760	-
	(.142)		(.077)		(.215)		(.234)	
Supply Change, C-HS	.257	.289	.049	.124	.055	.134	.194	.325
	(.054)	(.059)	(.029)	(.031)	(.082)	(.087)	(.087)	(.093)
Construction &	-	.510	-	.848	-	1.184	-	1.970
Manufacturing Change		(.275)		(.143)		(.419)		(.450)
$\overline{R}^2$	.116	.115	.138	.189	.089	.098	.109	.124
HS Graduates								
Total Emp. Change	.223	.197	.088	.066	.420	.324	.219	.080
	(.040)	(.047)	(.014)	(.016)	(.060)	(.071)	(.043)	(.049)
Demand Change, C-HS	-.426	-	-.124	-	-.460	-	-.348	-
	(.136)		(.048)		(.190)		(.136)	
Supply Change, C-HS	.210	.241	.023	.044	-.042	.024	.162	.253
	(.051)	(.056)	(.018)	(.019)	(.072)	(.076)	(.051)	(.052)
Construction &	-	.609	-	.309	-	1.189	-	1.457
Manufacturing Change		(.250)		(.087)		(.360)		(.251)
$\overline{R}^2$	.124	.117	.111	.121	.134	.143	.110	.156
2. 0–9 Years Experience								
Dropouts								
Total Emp. Change	.361	.315	.127	.074	.376	.217	.419	.351
	(.094)	(.109)	(.053)	(.060)	(.145)	(.169)	(.171)	(.208)
Demand Change, C-HS	-.460	-	-.242	-	-.339	-	-1.370	-
	(.326)		(.187)		(.471)		(.566)	
Supply Change, C-HS	.277	.275	.211	.301	-.090	.040	.248	.340
	(.122)	(.134)	(.070)	(.074)	(.179)	(.190)	(.209)	(.230)
Construction &	-	.864	-	1.134	-	1.964	-	1.783
Manufacturing Change		(.627)		(.348)		(.926)		(1.133)
$\overline{R}^2$	.166	.165	.128	.185	.086	.109	.136	.112

(table continues)

TABLE 5 (continued)

	White Males				Black Males			
	dlnW		dlnHrs		dlnW		dlnHrs	
	1	2	1	2	1	2	1	2
HS Graduates, 0–9 Years Experience								
Total Emp. Change	.372	.326	.028	.028	.664	.446	.209	.035
	(.098)	(.115)	(.027)	(.032)	(.118)	(.133)	(.092)	(.105)
Demand Change, C-HS	-.588	-	-.212	-	-.679	-	-.647	-
	(.334)		(.092)		(.377)		(.298)	
Supply Change, C-HS	.250	.300	.137	.142	-.179	-.021	.325	.451
	(.125)	(.136)	(.034)	(.038)	(.144)	(.146)	(.111)	(.114)
Construction & Manufacturing Change	-	.933	-	.188	-	2.584	-	2.093
		(.613)		(.170)		(.698)		(.551)
$\overline{R}^2$	.182	.177	.154	.127	.280	.335	.167	.226

It is particularly the effects on hours that are larger for blacks, while those on wages are particularly larger for the young. The overall pattern of results also generally holds for females as well as for males.

These results are generally consistent with others in the literature to date, and indicate that falling overall labor demand contributes to higher inequality in the labor market.[27] Furthermore, the relatively large effects of demand on wages for whites and/or younger workers indicate either a greater flexibility of real and relative wages or more inelastic labor supplies for these groups than for older and/or black workers.

The large and positive estimated coefficients on overall employment growth for both wages and weeks worked in every demographic group also raise our confidence that these measures primarily reflect exogenous shifts in local labor demand. But when we estimated the same equations using the instrumented versions of these variables described above, most coefficients rose in magnitude for virtually every group, and sometimes substantially.[28] Thus, at least some part of the local employment growth measures seem to reflect endogenous population adjustments, which we will discuss in greater detail below.

Turning now to changes in the structure of local labor demand, we find that relative demands for and supplies of the college-educated as opposed to those with high school educations or less also have significant effects on the wages and hours worked of many groups considered here. Since both sets of variables are defined as effects for workers with college minus those for workers with high school, we expect negative coefficients on relative demand and positive coefficients on relative supply for the less-educated, with the opposite signs for the more-educated.

Indeed, we generally find the correct signs and significant coefficients on both relative supply and demand variables among the less-educated. The relative demand effects are generally larger in magnitude than the supply effects, especially among blacks; however, the exact interpretation of this is

unclear.[29] Still, finding significant effects of local labor demand (both its overall level and its structure) distinguishes us from Topel (1994), who found only relative supply effects in cross-area work at the census division level.[30]

On the interaction terms for the more educated, we generally find the opposite signs, although not always large enough in magnitude to generate the correct sign when added to the non-interacted coefficient. One interpretation of this is that labor markets for the latter clear at the national level, and thus local fluctuations in such demand and supply matter relatively less for this group.[31] Nevertheless, finding the correct signs for the less-educated and on the interaction terms relieves at least some of our concerns about the simultaneity of these measures.

We also find here that the effects of shifting demand towards the more educated on hours worked are larger for blacks than for whites (though this is often not true for wages). Changes in both relative demand and supply across educational groups also have larger effects for the younger cohorts in most cases.

In Table 5 we consider effects for high school dropouts and graduates separately among white and black males. These results generally show that the effects of labor demand (both overall and its structure) on hours worked are larger for high school dropouts than for graduates (though this is generally not true for effects on wages). However, the effects of demand measures on both the wages and employment of blacks are relatively larger than for whites. Indeed, estimated effects for black high school graduates are generally even larger than those for white high school dropouts, once again underscoring the critical importance of demand effects on blacks.

Furthermore, we find significant effects on the wages and hours worked by less-educated black and white males when the structure of labor demand is measured by changes in shares of employment accounted for by construction and manufacturing. Effects are generally larger for blacks than for whites, for dropouts than for high school graduates, and for younger than for older workers.

The relative magnitudes of these effects parallel those that we found in our earlier work (Bound and Holzer, 1993) and also in Juhn (1994).[32] Indeed, coefficients on these employment shares for blacks generally exceed one for both wages and hours. Part of the reason for this, as noted above, is the substantially higher decline in manufacturing employment among black males than among comparable whites over the previous decade.[33]

To summarize the estimated effects of supply and demand shifts on the wage and employment outcomes of less-educated white and black males, Table 6 presents the effects of single standard-deviation changes in each independent variable on each of these outcomes. The calculations use one set of coefficients from Table 4 (Col. 1 here) and one set from Table 5 (Col. 2 here), although the samples are slightly different between the two (the former include high school dropouts while the latter do not). The effects are then summed and can be compared to observed standard deviations in the relevant outcomes measures (from Table 1).

The results confirm that both supply and demand shifts contribute to the observed variation in wage and employment changes among less-educated males. Supply shifts have larger relative effects on the wages of white males than on the hours worked of black males. Combining the two types of demand effects (i.e., those from overall employment changes and those from shifts between college-educated and high school–educated workers) leads to fairly large effects here on outcomes, especially among blacks.

Overall, the estimated effects of variation in supply and demand shifts can account for roughly 36–56 percent of the variation across MSA's in hourly wages for less-educated males, and for up to 100 percent of the variation in hours worked by white and black males (when using the construction and manufacturing measure of structural demand shift).

TABLE 6

Effects of Standard Deviation Changes in Supply and Demand on Wages and Hours of Less-Educated White and Black Males

	White Males				Black Males			
	dlnW		dlnHrs		dlnW		dlnHrs	
	1	2	3	4	1	2	3	4
Total Emp. Change	.029	.026	.017	.013	.054	.036	.041	.027
Demand, C-HS	.014	--	.005	--	.014	--	.027	--
Supply, C-HS	.022	.030	.005	.013	.000	.014	.020	.033
Const. and Mfg. Change	--	.013	--	.022	--	.031	--	.051
Sum of Above Effects	.065	.064	.027	.048	.068	.081	.088	.111
Standard Dev. of Outcome	.129	.124	.089	.043	.184	.167	.218	.116

Notes: The first column in each case above uses coefficients from Col. 2 of Table 4, while the second uses coefficients from Col. 2 of Table 5. Standard deviations are taken from the relevant variables in Tables 1 and 2.

C. Regression Results: Effects on Population Changes

If changes in the level and structure of demand in MSA's have fairly large effects on the wages and employment of black and/or less-educated workers, how do these individuals respond to such demand shifts? Supply adjustments can occur along several dimensions—e.g., people can get more education in the longer run, and they can migrate to areas with growing demand. Indeed, Blanchard and Katz (1992) have argued that the latter mechanism leads to a full dissipation of local demand shift effects on employment and wages over the medium to long run.

To evaluate the extent to which such population adjustments occur in the short run, we estimated equations for the changes in the logs of population for various demographic groups. These generally take the form of equation (3) above, in which the independent variables can either be demand shift measures or the observed outcomes (i.e., changes in weekly wages or weeks worked) for the specific group on which the sample is based.

Estimates from these equations appear in Tables 7 and 8, with equations for all four race-by-gender groups as functions of demand shift measures in the first table and equations for black and white males as functions of observed outcomes in the second. As above, all equations are weighted by population size. Interaction terms for those with at least a college degree are once again used to distinguish effects between the more- and less-educated.

The results of Table 7 show significant positive relationships between overall labor demand measures and population changes for virtually all groups. The effects are significantly larger among the more-educated. When all experience groups are pooled, there appears to be little difference in the magnitudes of effects between less-educated whites and blacks. If anything, coefficients on the interaction terms for more-educated blacks are often higher than those for whites.

When limiting the sample to the least-experienced groups, we generally find greater mobility in response to demand shifts than among older cohorts. But the *estimated effects are substantially*

TABLE 7

Effects on Population Changes
(Standard Errors in Parentheses)

	White Males		Black Males		White Females		Black Females	
	1	2	1	2	1	2	1	2
1. All Experience Groups								
≤ 12 Years Education								
Total Emp. Change	.658	.715	.619	.691	.596	.659	.584	.678
	(.029)	(.028)	(.044)	(.047)	(.026)	(.027)	(.040)	(.042)
Demand Change, C-HS	--	.626	--	.666	--	.688	--	.878
	(.095)		(.153)		(.092)		(.138)	
Interaction Terms:								
≥ 16 Years Education								
Total Emp. Change	.170	.191	.385	.344	.157	.173	.320	.186
	(.053)	(.056)	(.153)	(.166)	(.066)	(.069)	(.133)	(.144)
Demand Change, C-HS	--	.073	--	-.460	--	.020	--	-1.165
		(.177)		(.480)		(.212)		(.424)
$\overline{R}^2$	.858	.862	.737	.739	.867	.866	.770	.774
2. 0–9 Years Experience								
≤ 12 Years Education								
Total Emp. Change	.873	.921	.614	.590	.812	.857	.580	.584
	(.052)	(.054)	(.090)	(.095)	(.048)	(.051)	(.073)	(.078)
Demand Change, C-HS	-	.525	-	-.247	-	.516	-	.525
	(.185)		(.310)		(.174)		(.255)	
Interaction Terms:								
≥ 16 Years Education								
Total Emp. Change	.148	.105	.768	.675	.042	.017	.808	.793
	(.094)	(.099)	(.264)	(.288)	(.097)	(.101)	(.194)	(.211)
Demand Change, C-HS	-	-.475	-	-.573	-	-.316	-	-.118
		(.314)		(.837)		(.317)		(.632)
$\overline{R}^2$	.706	.710	.445	.447	.854	.856	.487	.489

larger for whites than for blacks among the less-educated. Indeed, younger and less-educated blacks are no more mobile in response to demand shifts than are their older counterparts. Once again, the opposite is true among the most-educated in these groups, with highly educated young blacks showing particular mobility in response to demand shifts.[34]

As for the effects of shifts in demand between high school and college workers on population changes, these coefficients often have incorrect signs but are frequently not significant.

Of course, these demand shift variables can account for only relatively small fractions of the overall variations in labor market outcomes to which workers should be adjusting. Therefore in Table 8 we use the wage and hours outcomes themselves as independent variables, as well as overall labor demand (in the first column).

The generally positive effects here of wage and hours outcomes on population growth confirm that hours outcomes primarily measure exogenous demand-based shifts to which worker supplies are responding in various degrees. The contrast between these positive coefficients and the mostly negative ones estimated on the broader supply shift variables used for Equation (2) also confirm that the latter are indeed more exogenous with respect to wage and employment outcomes than are the former.

These results also confirm most of those found in the previous table. We generally find greater sensitivity of population growth to labor market outcomes among white males than black males in the youngest cohort, among high school graduates than dropouts, and among younger than older workers.

It is striking that, with the exception of the young, *the groups showing less labor supply adjustment in response to demand shifts and employment outcomes are the same ones whose employment outcomes are most strongly affected by labor demand shifts*. Thus, the more limited adjustments in supply by blacks and less-educated workers to the demand shifts that they faced in

TABLE 8

Employment and Wage Effects on Population Changes for Detailed Groups of Males

	White Males			Black Males		
	1	2	3	1	2	3
1. All Experience Groups						
Dropouts						
Total Emp. Change	.734	--	--	.549	--	--
	(.091)			(.102)		
lnWage Change	--	-.153	--	--	.148	--
		(.099)			(.071)	
lnHrs Change	--	--	.987	--	--	.006
			(.177)			(.067)
$\overline{R}^2$	.112	.0050	.054	.055	.009	-.002
HS Graduates						
Total Emp. Change	.650	--	--	.658	--	--
	(.087)			(.099)		
lnWage Change	--	.216	--	--	.466	--
		(.100)			(.073)	
lnHRS Change	--	--	-.279	--	--	.265
			(.287)		(.110)	
$\overline{R}^2$	.095	.009	.000	.081	.075	.009
2. 0–9 Years Experience						
Dropouts						
Total Emp. Change	.775	--	--	.367	--	--
	(.090)			(.131)		
lnWage Change	--	.428	--	--	.129	--
		(.094)			(.084)	
lnHRS Change	--	--	.494	--	--	.013
			(.177)			(.071)
$\overline{R}^2$	.365	.138	.049	.060	.019	-.008
HS Graduates						
Total Emp. Change	.904	--	--	.705	--	--
	(.080)			(.134)		
lnWage Change	--	.668	--	--	.502	--
		(.081)			(.091)	
lnHRS Change	--	--	1.326	--	--	.591
			(.344)			(.132)
$\overline{R}^2$	.496	.301	.096	.182	.196	.132

particularly hard-hit labor markets have contributed to the negative outcomes which we observed for these groups during the 1980s.[35]

Furthermore, the magnitudes of estimated coefficients in Tables 7 and 8, along with differences within groups but across MSA's in wages or hours from Table 1 and the Appendix, suggest that the effects of such limited mobility on the employment and earnings of young blacks and other less-educated workers in the short run are not necessarily small.[36]

Although the migration effects may ultimately be large enough to fully offset observed demand shifts over longer periods of time (as Blanchard and Katz argue), within this time period this clearly does not occur; and it is not clear whether this occurs even in the longer run for all of the demographic groups analyzed here.

A somewhat different approach to evaluating the extent to which different groups adjust to demand shifts with population movements is to decompose the change in total hours worked by any given group in an area into changes in the group's population in that area and into changes in average hours worked. To do so, we simply regress each of the two latter measures on the former for various demographic groups. This tells us the extent to which a given change in total employment in an area is borne (or caused) by those who remain in an area as opposed to those who enter or leave (i.e., in-migrants or out-migrants).[37]

The results of these exercises appear in Table 9. For virtually every demographic group, the fraction of total hours variation associated with population changes is larger for whites than for blacks. The fraction associated with population changes also rises with education levels.

Thus, local population mobility plays a relatively greater role in employment changes or adjustments for whites and/or the more-educated, while employment changes among non-migrants plays a relatively greater role for blacks and the less-educated. This lends even more support to

TABLE 9

Decomposition of Changes in Total Hours Worked

	All Experience Groups		0–9 Years Experience	
	d Pop	d Ave.Hrs	d Pop	d Ave.Hrs
White Males				
HS Dropouts	.861	.139	.722	.278
HS Graduates	.984	.016	.888	.112
College Grads +	.997	.003	.955	.045
Black Males				
HS Dropouts	.752	.248	.513	.487
HS Graduates	.836	.164	.661	.339
College Grads +	.918	.082	.879	.121
White Females				
HS Dropouts	.779	.221	.604	.396
HS Graduates	.826	.174	.886	.124
College Grads +	.906	.094	.955	.045
Black Females				
HS Dropouts	.681	.319	.652	.348
HS Graduates	.727	.273	.568	.432
College Grads +	.921	.079	.891	.109

Notes: Decompositions are based on regressions of population changes and average hours changes on total hours changes, weighted by population size.

evidence from above that the latter groups have more limited short-run population adjustments in response to negative labor demand shifts at the local level.

IV. EVIDENCE FROM THE NLSY

Using the PUMS data, we can make some inferences about net migration rates indirectly from the data on population growth in different MSA's. But any such evidence is also confounded by possible differences across metropolitan areas in fertility rates, educational attainment, and the like.

We therefore look to the NLSY for some more direct evidence on differences in the propensity to migrate across groups. These data measure gross migration rates at the micro level, which we will analyze separately by racial and educational group.[38] The sample was limited to whites and blacks who in 1979 (the first year of the survey) were residents of the MSA's that we used in our Census analysis, where we define these MSA's as we did with our Census data (on the basis of county composition).[39] To be included, individuals had to remain NLSY respondents through 1988 (the most recent year for which we had access to geographic data).

An individual is considered to have migrated if he or she records a different location of residence in 1979 than in 1988—i.e., if he/she no longer lived in the MSA as we defined it in 1979.[40]

We present results on these measures of migration by race, gender, and educational attainment in Table 10.[41] The results show that rates of migration for whites are substantially higher than for blacks—in fact, they are roughly two-thirds higher for the former group when averaged over males and females.

Migration rates also rise with educational attainment. While the relationship between migration and education is essentially monotonic, the biggest differences occur when we compare college graduates to everyone else.

TABLE 10

NLSY Intermetropolitan Migration Rates, by Race, Gender, and Education

	White Males	Black Males
All	.268	.151
By Education:		
HS Dropouts	.133	.092
HS Graduates	.196	.130
Some College	.304	.167
College Grads	.480	.414
	White Females	**Black Females**
All	.251	.158
By Education:		
HS Dropouts	.189	.083
HS Graduates	.210	.130
Some College	.153	.169
College Grads	.404	.381

Notes: Migration is defined as living in 1988 outside of the metropolitan area in which the individual resided in 1979.

Finally, we note that part of the overall black-white difference in migration rates reflects the higher educational attainment of whites. But within virtually each educational category, migration rates are higher for whites as well.[42]

These results are at least broadly consistent with what we found using the Census data above. The tendency for less-educated and especially black workers to migrate less frequently implies that they adjust less easily to negative labor demand shifts at the local level, thereby causing those demand shifts to have more negative effects on their employment and/or earnings.[43]

While we have no clear evidence to date on why these differences in adjustment rates exist, their implications for employment and earnings differences among different demographic groups appear to be substantial.

V. CONCLUSION

In this paper we explored the effects of changes in the economy's geographic, industrial, and occupational structure on the earnings and employment of white and black men and women during the 1980s. We also explored how population adjustments (primarily through migration across metropolitan areas) varied across these groups in response to these economic changes. We used the Public Use Microdata Samples (PUMS) of the 1980 and 1990 Censuses of Population, as well as the National Longitudinal Survey of Youth, to analyze these issues.

The results show that earnings and employment deteriorated the most for young, less-educated males and black males in the 1980s. These effects occurred in almost all MSA's nationwide, although the effects on blacks were most severe in the North-Central region. Furthermore, the causes of this variation in labor market outcomes across regions and MSA's included the greater severity of demand shifts in these regions (both overall and away from less-educated groups) and the greater relative impacts of these shifts on the groups noted above.

We also found evidence of supply effects on local labor market outcomes, and of population adjustments in response to shifts in labor demand. However, black and less-educated young workers made the most limited short-run labor supply adjustments to these demand shifts in terms of intermetropolitan migration. Educational improvements also seemed to lag behind for blacks during the 1980s. These limited adjustments appeared to contribute to the severity of demand effects on the employment and earnings of these groups during the 1980s.

We must note several caveats in presenting these findings. For one thing, there are some potential endogeneities in many of the estimates presented here, along with high correlations across key variables that result in some imprecise estimates as well. Our confidence in the exact magnitudes we present is thus somewhat limited.

Given the nature of our data, we could only analyze the part of labor demand shifts that are *between* sectors (defined by occupations and industries) rather than within them.

Given that we analyzed data on population adjustments for a period that was contemporaneous with the one in which we observed demand shifts, we were limited to studying fairly short-run supply adjustments. More complete adjustments for these groups may have occurred over the medium to longer term, even if their initial adjustments were smaller. Finally, our ability to reproduce our Census analysis in the NLSY was also limited by noncomparabilities in timing, sample sizes, etc.

Nevertheless, some broad patterns emerge here that add up to a coherent picture of the causes of labor market problems for blacks and less-educated workers in recent years. The results suggest that policies which aim to facilitate the supply adjustment process for these workers, by helping them to obtain better skills (through higher levels of education, higher quality of education, and more job training) or to relocate and find jobs in more rapidly growing areas, might well be in order.

Further research on why these adjustment mechanisms are used more or less frequently by different groups (i.e., whether the differences are caused by information or a lack thereof, financial costs, etc.) should clearly be high on our agendas as well.

APPENDIX

Employment Outcomes and Their Determinants: Largest MSA's

	White Males				Black Males				Supply Change		Demand Change		
	Ed = 12		Ed>=16		Ed = 12		Ed>=16		College-HS				
	dlnW	dlnHRS	dlnW	dlnHRS	dlnW	dlnHRS	dlnW	dlnHRS	All	Non-Imms	Overall	C-HS	Cons./Mfg.
Atlanta	.477	-.011	.599	.022	.496	.024	.543	.051	.604	.602	.416	.094	-.050
Baltimore	.474	.009	.562	.034	.405	-.006	.565	.045	.640	.635	.282	.051	-.048
Boston-Brockton Lawr.-Lowell-Salem	.612	-.031	.622	.026	.541	-.001	.639	-.048	.654	.674	.216	.085	-.055
Chicago-Gary-Lake County	.369	-.025	.520	.020	.277	-.124	.415	.073	.589	.607	.121	.111	-.076
Cleveland-Akron-Lorain	.311	-.039	.485	-.008	.295	-.091	.464	-.021	.473	.468	.031	.137	-.086
Dallas-Ft. Worth	.351	-.041	.521	.017	.392	-.086	.465	.046	.498	.519	.354	.172	-.063
Detroit-Ann Arbor	.316	-.015	.461	.020	.221	-.039	.379	-.026	.585	.574	.103	.078	-.072
Houston-Galveston-Brazonia	.246	-.051	.449	.005	.317	-.173	.412	.032	.327	.348	.201	.091	-.069
Los Angeles-Anaheim-Riverside	.502	-.010	.609	.003	.564	-.079	.582	.071	.358	.446	.323	.059	-.036
Miami-Ft. Lauderdale	.437	.002	.601	.034	.462	.001	.474	.079	.294	.335	.244	.104	-.030
Minneapolis-St. Paul-St. Cloud	.376	-.028	.476	.009	.521	-.103	.379	.035	.554	.553	.245	.094	-.036
New York-N.J.-L.I.	.600	-.001	.612	.043	.563	-.017	.599	.030	.544	.571	.196	.090	-.057
Philadelphia-Wilm.-Trenton	.495	.013	.584	.025	.456	.032	.488	.034	.589	.586	.206	.098	-.063
Pittsburgh-Beaver Valley	.227	-.081	.435	-.016	.233	-.249	.379	-.088	.617	.610	.072	.104	-.120
St. Louis	.358	-.017	.503	.003	.331	-.064	.435	.038	.596	.589	.125	.096	-.047
San Diego	.448	.035	.564	.049	.427	-.002	.482	.109	.503	.562	.452	.065	-.015
San Francisco-Oakland-San Jose	.481	-.021	.597	.044	.475	-.082	.558	.048	.531	.573	.271	.065	-.022
Seattle-Tacoma	.350	.019	.480	.017	.354	-.066	.326	.009	.593	.597	.313	.073	-.022
Washington D.C.	.486	.027	.521	.029	.487	.026.	.457	.060	.511	.537	.342	-.001	.008

Endnotes

[1]Levy and Murnane (1992) nicely summarize the literature. They note that earnings inequality has widened between highly educated and poorly educated workers, between workers with a lot of experience and those with little, and between whites and nonwhites; inequality has widened *within* these groups as well. Declining demand for less-educated labor appears to have been caused by technological change and international trade, among other factors. Further causes of these changes, in addition to changing supply and demand for different educational groups, has been the decline in unionization and in real minimum wages. However, much of the growing inequality within groups remains poorly understood to date.

[2]The effects of declining manufacturing employment on the earnings and/or employment of black males have been analyzed by Kasarda (1989), Acs and Danziger (1993), Bluestone et al. (1992), Bound and Freeman (1992), Bound and Holzer (1993), Holzer and Vroman (1992), and Johnson and Oliver (1992). Juhn (1994) focuses on the effects of industrial structure on less-educated males more generally. These studies have been based primarily on Census data from 1970 and 1980 or CPS data from the 1970s and 1980s. Evidence of positive wage premia for less-educated workers in specific industries, such as manufacturing and construction, appears in Krueger and Summers (1987) and Dickens and Katz (1987).

[3]For instance, Juhn et al. (1991) argue that the greater relative decline in earnings for blacks reflects returns to unobservable skills within educational groups. But Card and Lemieux (1994) contend that this cannot fully account for the widening gap in earnings between whites and blacks during this time period.

[4]The work of Schwartz (1973) and Long (1988) suggests somewhat lower geographic mobility among the less-educated in earlier time periods.

[5]We abstract here from *intra*metropolitan differences in the location of employment or

population, of the type that has been emphasized in the literature on "spatial mismatch" (e.g., Holzer, 1991). We do consider *inter*metropolitan differences in the geographic structure of demand from the aggregate point of view.

[6]There are migration questions in the Census dealing with the previous five-year period (i.e., 1985–1990 in the 1990 Census), but these do not capture migration responses to demand shifts that might have occurred earlier in the decade.

[7]We have used the 1980 definitions of which counties comprise metropolitan areas in order to be consistent over time. But in a few cases, the available data did not allow us to distinguish between counties added since then and those included earlier. Since relatively less-densely populated counties were being added in these cases, the net changes in population rarely accounted for more than a few percentage points of the original population.

[8]For instance, we calculated indices based on occupation-by-industry cells. We chose, however, to use the indices based only on industry, since the geographic variation in this measure was more likely to be exogenous. Results between the two measures were usually very similar. Another approach was to use *income* rather than employment shares for the beginning of the decade for each demographic group and to calculate changes in *effective* hours, weighting the income shares by wage levels (see Katz and Murphy, 1992). Correlations across the four different measures were generally .9 or higher. To minimize the possibility of measurement error while giving us the greater amount of variation across sectors, we used the index described in the text in all estimates described below.

[9]A variety of supply shift measures was also calculated. Some were based on hours worked rather than numbers of potential workers, while others used "effective" hours or potential workers, where each was weighted by the share of various demographic groups in overall income for the MSA. (See Katz and Murphy [1992] for explanations of these effective measures.) All of these measures were very highly correlated with each other as well (i.e., above .9). We chose to use the measure for

potential workers rather than hours since the latter could be viewed as being more demand-determined than the former.

[10]The experience categories were 0–9, 10–19, 20–29, and 30 or more years respectively. The education categories were 0–8, 9–11, 12, 13–15, 16, and 17 or more years respectively.

[11]All equations contained dummies for education and/or experience when these groups were pooled, to focus on *between*-area variation in determinants and outcomes. All equations were also weighted by cell size, given the small number of observations on which some cells were calculated.

[12]If wages are set at their equilibrium levels, the elasticities of wages with respect to demand shifts can be written as $1/(\eta+\xi)$, where the denominator represents the sum of labor demand and supply elasticities; the elasticity of employment will be $\xi/\eta+\xi$ (Freeman, 1977). To the extent that there are wage rigidities present, the wage effects will be smaller while the employment effects are greater, *ceteris paribus*.

[13]A measure of the sum of changes in the log of hours in each industry weighted by the shares of all workers in each industry reduces to the change in the log of overall hours worked in the MSA, which we interpret as a measure of change in overall labor demand.

[14]Our overall demand and supply indices correlated with each other at .9 or higher. In contrast, the measures for *relative* supply and demand (which reflect differences between college graduates and those with high school educations or less in each case) correlated at about .15.

[15]The coefficient on overall demand in the equations for wage or weeks worked outcomes will likely be biased downwards because the employment measure will likely capture supply as well as demand shift effects, with the latter exerting negative rather than positive effects on labor market outcomes. But in an equation for population growth, designed to measure supply responses to demand shifts, these supply components in the demand measure are likely to bias estimates upwards.

[16]The strictly cross-sectional nature of our analysis of changes might have made such an

instrument less useful for us than for the other authors, who were pooling time-series and cross-section data. Unlike the others, we were also trying to distinguish the effects of changes in overall demand from changes in its structure, and we could not use these instruments for both in a single equation (due to their very high correlations with each other, which were reinforced in this case by our use of national instead of local employment growth rates).

[17]Of course, lagged adjustments to the 1990 Census data outcomes cannot yet be observed. If demand shifts occurred mostly early in the decade of the 1980s while population adjustments occurred later, some lagged adjustments might be captured here.

[18]The summary data for hourly wages reflect means of the logs of such wages, while for hours worked they are logs of means.

[19]The inflation rate, as measured by the CPI-U-X1, was roughly 67.5 percent between 1979 and 1989. The log of this change in the average price level is .52.

[20]Declines in weeks worked are generally smaller than those in real wages for white males, implying labor supply elasticities less than one. In contrast, declines in weeks worked for blacks are comparable in magnitude to those in real wages (and are even larger among dropouts), implying elasticities roughly equal to (or greater than) one.

[21]See Hauser (1993) and Kane (1994) for more evidence on this topic. Kane, in particular, attributes at least some of this development to a rise in the cost of education facing low-income people, especially as Pell grants and other forms of aid became less available in the early 1980s.

[22]The overall increase in labor demand exceeds that in supply in the top row of the table because the measures used here are based on *potential* rather than actual workers for supply. Increases in labor force participation, especially among women, are not captured in this population-based measure. The supply measure that we calculated based on hours rather than potential workers showed an increase comparable in magnitude to that observed in demand.

[23]Declines for white males, white females, and black females were approximately .04, .04, and .06.

[24]Manufacturing employment fell by roughly 12 percentage points for less-educated black males in the combined North Central regions, as compared to just 5 percentage points for comparable white males.

[25]Estimates from unweighted equations were qualitatively similar to the weighted estimates in almost all cases, although the latter were generally larger in magnitude and more precise.

[26]Many, though not all, of these differences are statistically significant. The formula for the standard error of the difference between two estimates that are from independent samples is the square root of the sum of the squared individual standard errors.

[27]Local demand effects on employment for blacks and/or the less-educated appear larger than for whites and/or the more-educated in Freeman (1982; 1991), Bartik (1992), and Bound and Holzer (1993).

[28]For example, the estimated coefficient of wages on overall employment change for less-educated white males rose from .258 to .663 (with a standard error of .049) when using the instrumented version of the latter. The weeks worked coefficient rose from .146 to .229 (standard error of .025). Comparable results for blacks were 1.080 (.086) and .878 (.096).

[29]The larger coefficients on demand shifts between college-educated and high school–educated workers at least partly reflect the smaller means and standard deviations on these variables, relative to those for supply. But if the unmeasured within-sector demand shifts are highly correlated with the measured between-sector components, at least part of the estimated coefficients on the latter may also be capturing effects of the former.

[30]When we aggregate up to the division level, we find somewhat stronger effects of supply changes than we do at the MSA level. More details on these estimates are available from the authors.

[31]A greater endogeneity among the college-educated than among high school–educated

workers in the relative supply of labor with respect to local conditions might also be responsible for the reversed sign on this coefficient. Evidence on this possibility is provided below. However, elastic labor supplies should only lower the coefficient on demand shifts towards zero rather than to a negative sign.

[32]Juhn generally finds somewhat larger negative effects of changing industrial structure on the demand for high school dropouts than for high school graduates among men in the 1980s. But she finds that the demand for the latter group has declined much more severely since the 1940s and 1950s.

[33]An alternative interpretation of these large coefficients is that they are capturing correlations of declines in high-wage employment with other unobserved changes in these MSA's, such as crime rates.

[34]Using our instrumented versions of the employment growth index reduced the magnitudes of the coefficients for whites, which is consistent with the notion that there is an endogenous component of population growth in these local employment measures. However, coefficients for blacks generally rose quite substantially with these instruments. This is an anomaly for which we have no obvious explanation at this time. However, this incorrect sign on the change, and the relatively low R-squared on the first stage equations (roughly .10–.20), both tend to reduce our confidence in the usefulness of the instrument.

[35]Since the young appear to have higher migration rates but also higher sensitivity to demand shifts than do their older counterparts, the higher sensitivity can only be attributed to factors such as the more marginal status of these workers in the labor market.

[36]Differences in coefficient estimates from Table 8 on wages or hours between young whites and blacks range from .1–.3, while those between high school graduates and high school dropouts range from .2–.3 within each racial group. Differences in estimates from Table 7 between those with and without college educations are of similar magnitudes. Thus, for single standard deviation changes in

demand shifts (equal to .13) or in wage and hour outcomes across MSA's (in the range of .1 to .2 for most groups), the predicted effects of these mobility differences on *wage* differences between *each* pair of groups in the relevant areas range from .01–.06; comparisons between combined categories (e.g., young black high school graduates v. young white college graduates) would clearly be higher. Comparable magnitudes would emerge for *hours* differences as well between these groups.

[37]Whether the change in total hours is caused by demand or supply shifts, and whether the population changes cause or follow the total hours changes, is not specified here. Thus this procedure differs in its assumptions from those of Equation (3).

[38]Differences in net migration and population changes are actually most relevant for labor market outcomes, since these net effects determine the relevant local supplies of different kinds of labor. The gross migration decisions at the individual level give us some insight as to why the net differences across groups emerge.

[39]Military enlistees were excluded from the analysis, but enrolled individuals were included, since the latter group constituted a large majority of the sample (aged 14 through 21) in 1979. Poor whites who had been oversampled in the NLSY were also excluded, to avoid our having to use sample weights in any regression analysis. The samples are thus random within racial groups.

[40]A migrant therefore could reside in 1988 in any different MSA from the original one (whether or not the latter one was part of the 132 in the 1979 sample), in a rural area, or even in a part of the original MSA that was not included in our definition. All results are robust to whether or not individuals in the last group are counted as migrants.

[41]Educational attainment is defined by status as of 1988.

[42]The only exception is the slightly higher migration rate of black relative to white females with some college.

[43]A more complete analysis would have included regression equations to measure the

responsiveness of migration to changes in local demand and to local employment outcomes. However, our attempts to estimate such regressions led to very weak results that were also inconsistent with our Census results. Apparently, the small sample sizes available for many of our MSA's in the NLSY, differences in the timing of migration (with many individuals migrating relatively early in the decade in the NLSY, before observed demand shifts had been completed), and our inability to consider in-migration as well as out-migration at the micro level (and with a fixed sample from 1979) all contributed to these difficulties.

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