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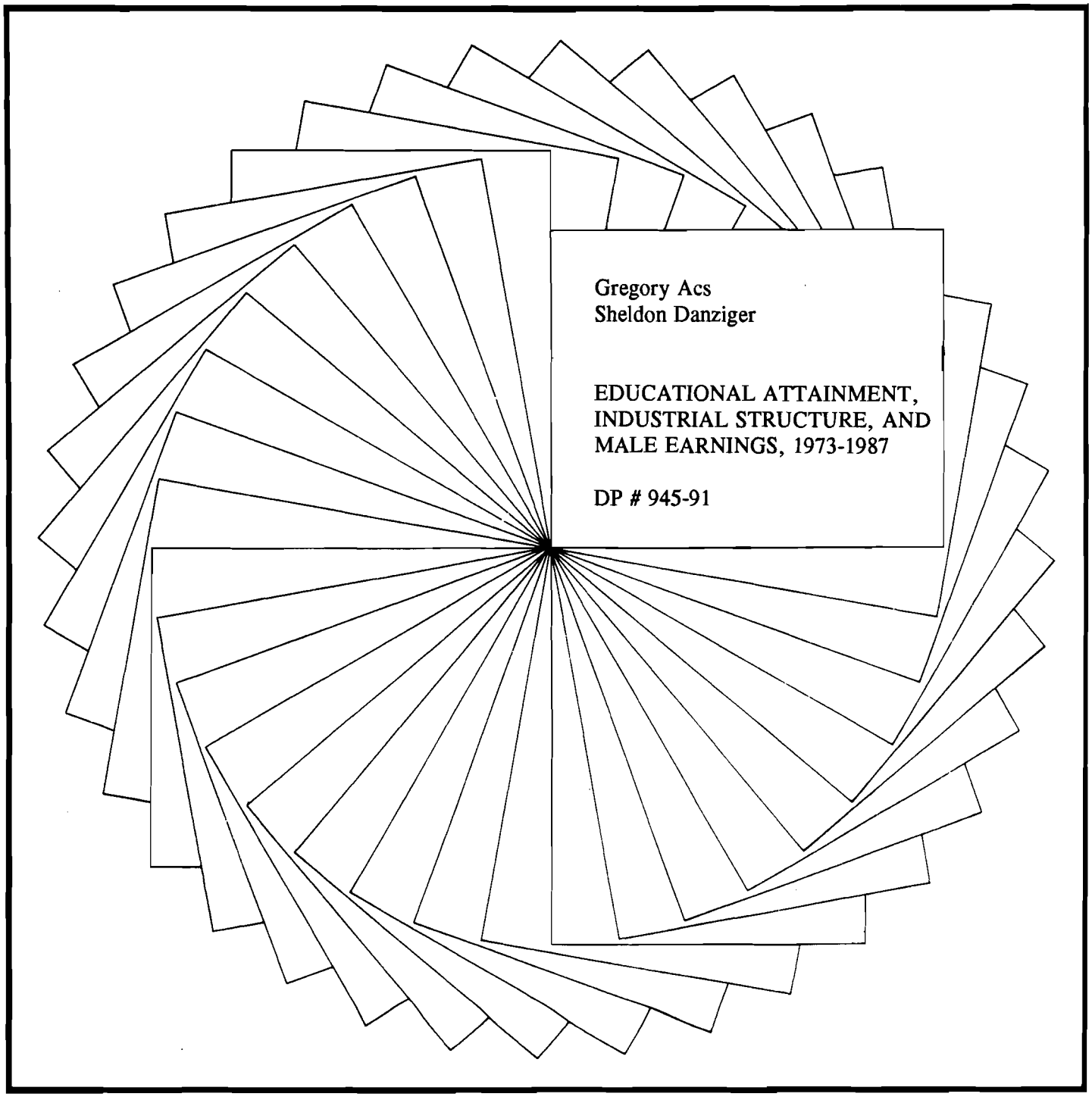

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Educational Attainment, Industrial Structure, and Male Earnings, 1973-1987

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Abstract

Between 1973 and 1987, men's average earnings declined and the percentage of men with low earnings (defined as annual earnings less than $12,000 a year) increased for whites, blacks, and Hispanics. We estimate regression models for the level and distribution of male earnings for each of these three groups using data from the 1974, 1980, and 1988 March Current Population Surveys. Much of the decline in mean earnings and the increased incidence of low earnings can be attributed to changes in the returns to education, experience, and industry of employment--changes that we attribute to demand-side factors, such as changes in technology. While a substantial portion of the increased incidence of low earnings can be attributed to similar demand-side changes, shifts in industrial employment patterns (such as the shift from durable manufacturing to service-sector jobs) had large effects only on the mean and probability of low earnings among blacks between 1973 and 1979. We also find that educational upgrading over the 15-year period between 1973 and 1987 kept mean wages from falling even further and helped to hold down the growth of low earnings, especially among blacks.

EDUCATIONAL ATTAINMENT, INDUSTRIAL STRUCTURE, AND MALE EARNINGS, 1973-1987

INTRODUCTION

Since 1973, mean earnings for men have grown little and the percentage of men with low earnings has increased. These trends represent a marked departure from those of the previous 25 years, when earnings grew rapidly and poverty declined steadily. For example, between 1949 and 1969 the percentage of high school graduates who earned below the poverty line for a family of four fell from 31.5 to 9.3 percent. Two decades later, however, this percentage reached 21 percent (Danziger, 1989). Furthermore, high school graduates and those with less education have fared much worse than college graduates.[1]

Several recent studies have examined these trends but have focused primarily on changes in mean earnings and have not emphasized the experience of low earners or differences among racial/ethnic groups.[2] In this paper we analyze changes in mean earnings and the increased incidence of low earnings for white, black, and Hispanic males between 1973 and 1987. We find that changes in the returns to education, experience, and industry of employment account for a significant portion of both the decline in mean earnings and the increased incidence of low earnings. However, shifts in the structure of employment across industries, such as the employment decline in manufacturing, only explain a sizeable portion of the increased incidence of low earnings and the declining mean earnings for black men between 1973 and 1979.

THE TREND IN MALE EARNINGS: A BRIEF REVIEW OF RECENT STUDIES

Explanations for the declining mean and increasing variance of male earnings can be grouped into three broad categories: (1) supply-side changes in the composition of the labor force, (2)

demand-side changes in domestic production, and (3) changes in the institutional bases for wage setting. Supply-side explanations emphasize reductions in the work effort and/or productivity of American workers. These are generally attributed to changes in the demographic composition of the work force--the increasing entry of women and young workers (baby boomers) into the work force has made low-skilled workers plentiful relative to high-skilled workers. Hence, average wages declined, and the skill premium rose. Another supply-side explanation centers on the alleged declining quality of public education--today's high school graduates have fewer skills and are less productive than similarly educated workers in previous cohorts.

Demand-side explanations emphasize changing patterns of international trade and changes in technology that are thought to have induced changes in output and profitability across industries. Low- and medium-skilled workers who had earned rents--unusually high wages--in some industries like durable manufacturing experienced wage and/or employment declines as markets became more global. And service-sector jobs, which have grown most rapidly, are, on average, less remunerative for less-educated workers than are industrial jobs. Another demand-side explanation suggests changes in production processes <u>within</u> industries. Rather than a shift in employment across industries, the skill premiums within industries increased as firms raised wages to attract and retain high-skilled workers.

Changes in the institutional bases for wage setting also offer plausible explanations for recent trends in the level and distribution of men's earnings. Union membership, for example, has declined over the past two decades. Since unions historically have secured higher wages for their members, declining unionization may explain part of the erosion of the average male worker's earnings. Similarly, the real value of the minimum wage declined throughout most of the 1980s. Consequently, workers with the fewest skills saw their standard of living decline.

Although many of these hypotheses have some merit, they also have very different policy implications. If, for example, changes in the structure of earnings primarily reflect changes in labor force composition, then as young, low-skilled workers acquire experience, their productivity, and hence their wages, will rise. Hence, no special policy is needed. However, if the observed lower earnings are caused by the declining quality of public schools, then productivity may not rise with experience, and policies that improve the education system may be required. On the demand side, if increased skills are required to use new production technologies, then what is taught in public schools might be changed, and more people might be encouraged to acquire specialized training or college degrees, perhaps through more generous financial aid programs. But if the increased inequality stems from shifting industrial employment patterns caused by changes in trade patterns or technology, policies that enhance worker mobility or retraining might be appropriate. If institutional changes prove important, increases in the minimum wage (as mandated in recent legislation) or changes in policies affecting unions might be considered.

Clearly, the appropriate responses to changes in the structure of earnings depend upon the root causes of those changes. Indeed, on a priori grounds one cannot distinguish whether these trends are symptoms of underlying instability or manifestations of a healthy economy undergoing transition. Sorting through the various explanations for the decline in mean earnings is no small task. Fortunately, we can rely on previous research to guide our investigation. And even though few studies have examined low earnings, this research on changes in the mean is quite relevant.

Supply-Side Changes

During the decade prior to 1973, the ratio of the average earnings of college graduates to high school graduates declined steadily. In his book, The Overeducated American, Richard Freeman (1976) argued that this narrowing in the educational premium was due to the increasing educational

attainment of the baby boom cohort. The number of young college graduates increased dramatically and, hence, their mean earnings declined. Since the late 1970s this trend in the college premium has reversed itself, and one might wonder if the cause is an increased supply of less-educated relative to more-educated workers. This is not the case. In 1973, for example, 21 percent of white males between the ages of 25 and 64 who worked full-time, year-round, had college degrees, while 74 percent had high school degrees. By 1987, 32 percent had college degrees and 87 percent had completed high school (Blackburn, Bloom, and Freeman, 1990). The population became more educated; consequently, the demographic shift hypothesis fails to be persuasive.

Another supply-side argument, that public high schools no longer teach adequate labor market skills, also enjoys little support. If this argument were true, the earnings gap between younger cohorts of high school- and college-educated workers should be larger than the gap between older workers who left schools with better skills. Kevin Murphy and Finis Welch (1989) note that in 1985 men with college degrees and one to five years of experience earned on average 55 percent more than men with the same amount of experience but only high school educations. The analogous gap for men with 11 to 15 years of experience was 58 percent. They also note that the premium has increased for most cohorts over the past decade, a comparison that holds quality constant. Thus, at best, supply-side explanations can only explain a small portion of the recent changes in the structure of male earnings.

Changes in Wage-Setting Institutions

Blackburn, Bloom, and Freeman (1990) investigate the effects of changes in wage-setting institutions on men's earnings. Since less-educated and younger workers are more likely to hold minimum wage jobs, the eroding real value of the minimum wage in the 1980s may explain some portion of the rising college premium and the declining average earnings. The authors find that the

declining minimum wage accounts for a small portion of this trend. The effect is even smaller if potential disemployment effects of raising the minimum wage are considered. Horrigan and Mincy (1990) find that the declining real minimum wage explains almost none of the changes in the distribution of men's earnings.

Blackburn, Bloom, and Freeman find that declining unionization accounts for approximately 10 percent of the increase between 1979 and 1987 in the wage gap between college- and high school-educated workers. Freeman (1990) finds that changing union density explains 15 to 40 percent of the rise in the college to high school wage premium. Of course, the implications of these results are not clear. If unions raise worker productivity, then one might encourage unionization. On the other hand, unions may be effective primarily in industries that are imperfectly competitive and where unions capture a share of the firms' economic rents. When such firms cease earning rents, unions extract fewer wage concessions, and, as a result, membership may decline. In this case, declining unionization within industries is not the cause but rather a consequence of the declining relative wages of blue-collar workers.

In sum, the evidence supporting supply-side explanations for changes in the structure of men's earnings in the 1980s is weak. While changes in unionization have had some effect, most recent studies assign a primary role to demand factors. However, there is no consensus on the causes of the demand shifts.

Demand-Side Changes

In early work on the topic, Bluestone and Harrison (1986) attribute declining real wages to changes in employment across industries. They argue that in the past, many less-educated men found well-paying jobs in manufacturing. But as the economy shifted away from manufacturing toward services, these men lost "good" jobs in manufacturing and found "bad" jobs in the service sector.

Men with college educations were mostly insulated from these shifts. As a result, mean wages fell and the skill premium rose.

Blackburn, Bloom, and Freeman (1990) attribute 20 percent of the change in the college to high school wage premium to shifts in employment across industries. Bound and Johnson (1989) also conclude that the shift from "good" jobs to "bad" jobs explains only a small part of the changes in the structure of earnings.

Both research teams find that these changes are primarily attributed to changes in earnings within industries that are due to "technological changes." For example, the introduction of new technologies such as computerization has changed the relative demand for workers and raised the skill premiums within most industries. Firms now require fewer low- and medium-skilled production workers and more high-skilled workers and managers.

These studies all find that demand factors are the primary determinants of changes in the mean earnings of men. However, a different pattern of supply and demand effects may account for the increased incidence of low earnings. Also, these factors may disproportionately affect minority workers and workers living in areas with declining economies. Differences by ethnicity, race, and region have not been examined in recent studies.

In the following sections we first document the changes in educational attainment, industrial structure, and the level and distribution of male earnings between 1973 and 1987.[3] Next, we use a regression analysis to examine the effects of changes in educational attainment and employment by industry on the mean and incidence of low earnings.

TRENDS IN EARNINGS, EDUCATIONAL ATTAINMENT, AND INDUSTRIAL STRUCTURE: DESCRIPTIVE ANALYSES

As stated above, between 1973 and 1987 the real earnings of men declined and the percentage earning less than $12,000 a year increased.[4] Table 1 documents that real earnings for whites fell by 6 percent over the 15-year period, by 3.5 percent for blacks, and by 12 percent for Hispanics.[5] The timing of these declines, however, differs across the three racial groups. Almost all of the retrogression for whites took place between 1973 and 1979, while earnings of Hispanics fell more rapidly between 1979 and 1987. Black men's earnings eroded by a similar amount over each of the two periods.

At the same time that mean earnings for men declined, the percentage of men earning less than $12,000 a year, a sum approximately equal to the poverty line for a family of four, rose, far more dramatically among blacks and Hispanics than among whites. Between 1973 and 1979 the percentage of white men earning less than $12,000 a year grew from 19.6 to 21.3 percent. And while their average earnings stabilized between 1979 and 1987, the incidence of low earnings rose another 1.5 percentage points to 22.8 percent. By far the largest increase in the incidence of low earnings occurred among Hispanic men. Indeed, 43.4 percent of all employed Hispanics in 1987 earned less than $12,000; this represents a 14-point rise since 1973. While their average earnings eroded during each of the two subperiods, black men endured a much larger increase in their incidence of low earnings from 1979 to 1987 than they did from 1973 to 1979. Over the later period, the percentage of blacks classified as low earners rose by 5.3 points, compared to 0.6 points between 1973 and 1979.

This growth in the incidence of low earnings is larger than one would expect, given the observed declines in the means, if one assumes that the natural log of earnings follows a normal distribution with constant variance. Consider whites, for example. Their mean declined by 6 percent

Table 1

The Mean of the Natural Logarithm of Male Earnings
and the Percentage of Men with Low Earnings

	Whites	Blacks	Hispanics
1973	9.8571 19.6%	9.4010 35.8%	9.5253 29.4%
1979	9.8059 21.3%	9.3882 36.4%	9.4876 35.7%
1987	9.7994 22.8%	9.3666 41.7%	9.4100 43.4%

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Survey computer tapes.

Notes: The figures reported are the average log earnings of employed men and the percentage of employed men in each cell with earnings of less than $12,000/year. All figures are based on 1987 constant dollars. In all tables and in the text, "whites" and "blacks" refer to persons who are not of Hispanic origin.

over the 15-year period. If the distribution had held its shape and each man had earned 6 percent less, the proportion earning less than $12,000 would have increased by less than 2 percentage points. In fact, the proportion grew by 3.2 points. Not only are men's earnings falling, they are also becoming more unequal.

That men's earnings should have fallen over a 15-year period is a sharp break with the experience of the previous 25 years, during which real earnings approximately doubled. It is even more unusual because educational attainment increased for all three groups. For example, Table 2 shows that over 25 percent of all employed black men had less than a ninth-grade education in 1973. By 1987, only 7.2 percent had such low levels of educational attainment. The percentage of black college graduates and beyond jumped from 5.9 percent in 1973 to 11.9 percent in 1987.

Almost three-quarters of all employed white men had at least high school educations in 1973. Nearly 85 percent achieved this level by 1987. And the percentage of white men with a college degree and beyond rose from 18 to 26.5 percent over this period.

Hispanics continued to have the lowest levels of educational attainment; 44.9 percent had less than a high school education in 1987, although this represents more than a 10 percentage point decline from 1973. College completion also increased: 5.4 percent of Hispanics had at least 16 years of education in 1973, but 10.8 percent achieved this level by 1987.

In every year and for each of the three groups, those with high school educations were much less likely to have low earnings than those who dropped out, and those with college degrees were much less likely to have low earnings than those with high school educations. But over this period, even high school graduates became increasingly likely to be low earners. And among blacks and Hispanics the incidence of low earnings for college graduates increased. As Table 3 indicates, 13.7 percent of employed black college graduates earned less than $12,000 in 1973; 15 years later, 19.7

Table 2

The Educational Attainment of Employed Men

	Percentage Who Had Completed these Years of Schooling					
	0-8	9-11	12	13-15	16	17+
Whites						
1973	10.8	17.1	38.1	16.1	10.1	7.9
1979	6.7	14.7	37.9	18.7	12.3	9.8
1987	3.8	11.5	38.8	19.4	15.1	11.4
Blacks						
1973	25.1	26.0	32.7	10.3	4.0	1.9
1979	14.1	23.8	38.3	16.3	4.6	2.9
1987	7.2	17.8	44.1	19.0	7.3	4.6
Hispanics						
1973	36.8	19.8	26.1	12.0	3.4	2.0
1979	30.7	19.3	28.6	13.5	4.6	3.2
1987	27.4	17.5	30.5	13.8	6.8	4.0

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Table 3

The Percentage of Men with Low Earnings, by Education

	Years of Schooling Completed						
	0-8	9-11	12	13-15	16	17+	All Men
Whites							
1973	22.2	35.2	15.6	21.9	10.9	8.1	19.6
1979	29.1	43.6	18.1	21.5	10.2	7.8	21.3
1987	37.9	48.9	22.9	22.7	10.5	7.7	22.8
Blacks							
1973	45.5	44.4	27.7	29.1	13.7	11.6	35.8
1979	49.1	48.7	32.3	26.6	14.5	15.6	36.4
1987	56.9	56.0	44.0	32.6	19.7	14.0	41.7
Hispanics							
1973	33.9	42.5	22.2	17.1	10.0	17.9	29.4
1979	45.0	47.0	29.8	25.9	11.5	8.0	35.7
1987	56.4	55.6	38.2	33.2	21.0	13.9	43.4

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: The figures reported are the percentage of employed men in each cell with earnings of less than $12,000/year.

percent were low earners. The situation was even worse for Hispanics, for whom the percentage of low earners more than doubled from 10 to 21 percent. However, the percentage of white college graduate low earners in each year remained at roughly 10 percent over the same period.

The incidence of low earnings increased substantially for men in all three racial groups with high school educations or less. White high school graduates experienced a rise from 15.6 to 22.9 percent; blacks, from 27.7 to 44 percent. Indeed, a black high school graduate in 1987 was as likely to be a low earner as was a black high school dropout in 1973. In 1987, 38.2 percent of Hispanic high school graduates were low earners, up from 22.2 percent in 1973. And while about 40 percent of blacks and Hispanics with less than high school degrees had low earnings in 1973, well over half were low earners in 1987. Less-educated whites also experienced large increases in the incidence of low earnings.

Shifts in the industrial composition of the economy have also contributed to the increase in male low-earnings rates. Consider the employment patterns shown in Table 4. In 1973, 20.3 percent of whites, 22.2 percent of blacks, and 20.2 percent of Hispanics worked in durable manufacturing industries. By 1987, white employment in these industries slipped to 16.8 percent, and only 14.9 percent of employed Hispanics and 13.7 percent of blacks worked in durable manufacturing. Similar declines also occurred in nondurable manufacturing industries.

Not only have men moved out of higher paying industries, but the incidence of low earnings within most industries has also increased. Table 5 reports the percentage of men earning less than $12,000 a year in selected industries. By 1987, 31 percent of blacks and 33.6 percent of Hispanics working in durable manufacturing were low earners, up from 27.3 percent and 24.8 percent, respectively, in 1973. Whites in durable manufacturing experienced a small rise, from 11.1 to 13.2 percent.

Table 4

The Distribution of Men Across Major Industries

	Manufacturing		Wholesale/ Retail Trade	Finance, Insurance, Real Estate	Other[a]
	Durable	Nondurable			
Whites					
1973	20.3%	11.3%	18.8%	4.4%	45.1%
1979	19.8	10.1	18.8	4.4	47.2
1987	16.8	9.0	20.0	4.7	49.5
Blacks					
1973	22.2	11.8	13.9	2.9	49.2
1979	20.7	10.9	14.2	3.5	50.8
1987	13.7	9.8	17.5	3.7	55.4
Hispanics					
1973	20.2	13.7	20.2	2.9	43.1
1979	19.2	10.0	19.0	3.3	48.5
1987	14.9	10.1	20.5	4.0	50.6

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: Sums may not add exactly due to rounding.

[a]Professional, personal, and business services, mining, construction, transportation, entertainment, public administration, and agriculture.

Table 5

The Percentage of Men with
Low Earnings, Across Major Industries

	Manufacturing		Wholesale/ Retail	Finance, Insurance,	
	Durable	Nondurable	Trade	Real Estate	All Men
Whites					
1973	11.1	14.8	31.9	13.1	19.6
1979	11.8	15.4	35.8	13.7	21.3
1987	13.2	16.3	36.4	14.1	22.8
Blacks					
1973	27.3	35.6	46.2	35.7	35.8
1979	23.8	30.8	44.3	28.7	36.4
1987	31.0	39.2	57.9	30.2	41.7
Hispanics					
1973	24.8	13.6	40.6	14.5	29.4
1979	27.3	34.5	45.2	28.1	35.7
1987	33.6	34.8	56.6	31.6	43.4

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: The figures reported are the percentage of employed men in each cell with earnings of less than $12,000/year.

About 20 percent of whites and Hispanics worked in wholesale and retail trade over the 15 years, while the percentage of blacks in this industry rose from 13.9 to 17.5 percent (Table 4). Although many of the black and Hispanic men in sales-related jobs were low earners even in 1973, by 1987 well over half were low earners. While whites fared better, 36.4 percent in the industry also fell below the low-earnings benchmark.

CHANGES IN MEAN EARNINGS: REGRESSION RESULTS

In order to disentangle the effects of changes in the educational distribution and industrial mix in the economy from the returns to these two, we regress the log earnings of employed men on a set of control variables for experience (defined as age less education less six) and region and on 18 education dummies (one for each year with 0 omitted) and 12 industry dummies (agriculture omitted). We perform separate regressions for the three racial groups in each of the three years for a total of nine regressions. The results of these regressions are reported in Table 6. Variable definitions and means appear in Tables A1 and A2 in the appendix.

The regression coefficients reflect several trends with regard to earnings differentials by education, industry, and region. The benefit of a college degree relative to a high school degree increased for both whites and blacks. In 1973 the average employed white male college graduate earned 55 percent more than a similar white high school graduate.[6] By 1987 this "college premium" reached 66 percent. Similarly, the college premium for blacks rose from 56 to 75 percent, with most of the rise occurring before 1979. The college premium for Hispanics fell between 1973 and 1979 from 63 to 48 percent, but rebounded to 62 percent by 1987.

As shown in Table 6, the returns to working in durable manufacturing (DMAN) relative to wholesale and retail trade (SALES) have risen since 1973. If the average white man were to have left

Table 6

Estimated Coefficients for OLS Regressions on the Natural Logarithm of Male Earnings

Variable	Whites			Blacks			Hispanics		
	1973	1979	1987	1973	1979	1987	1973	1979	1987
INTERCEPT	7.1769*	6.7711*	6.3777*	7.062*	6.8422*	7.0878*	7.8146*	7.7027*	7.5456*
EXP	0.1087*	0.0993*	0.1006*	0.0901*	0.0920*	0.0907*	0.0975*	0.0918*	0.0820*
EXPSQ	-0.0018*	-0.0017*	-0.0017*	-0.0014*	-0.0014*	-0.0014*	-0.0016*	-0.0014*	-0.0013*
VET	-0.1161*	-0.0881*	-0.0348*	-0.1601*	-0.0753	0.0259	-0.0316	-0.0627	0.0312
CC1NE	0.0859*	-0.0180	0.1617*	0.2502*	0.0452	0.2593*	0.0460	-0.1215*	0.1234*
CC0NE	0.1372*	0.0578*	0.2339*	0.3470*	0.0700	0.4101*	0.1816	-0.1170	0.2231*
CC1NC	0.1377*	0.0766*	0.0611*	0.3029*	0.0720	0.0449	0.1212	0.0026	-0.0362
CC0NC	0.1967*	0.1649*	0.2035*	0.3035*	0.2328*	0.2828*	0.3043*	0.0853	0.1602
CC1S	0.1057*	0.0555*	0.0623*	0.2073*	0.0510	0.1572*	0.1116	-0.0608	-0.0201
CC0S	0.1457*	0.1015*	0.1318*	0.1541*	0.1090	0.2157*	0.0879	-0.0482	0.1292*
CC1W	0.0113	0.0405	0.1798*	0.2137*	0.0665	0.2281*	0.0550	0.0313	0.1915*
CC0W	0.1366	0.1347*	0.1775*	0.3924*	0.0116	0.2079*	0.1216	0.1253*	0.2523*
MIN	0.6951*	0.9585*	0.8217*	0.9316*	1.0323*	0.6096	0.6638*	0.8214*	0.4452*
CON	0.5962*	0.5601*	0.5975*	0.6859*	0.6318*	0.5324*	0.3372*	0.5285*	0.3652*
DMAN	0.6620*	0.6750*	0.7369*	0.9071*	0.9659*	0.8188*	0.3487*	0.5733*	0.5250*
NDMAN	0.5844*	0.6355*	0.6951*	0.8257*	0.8686*	0.7961*	0.3973*	0.4843*	0.4719*
TRAN	0.6603*	0.6867*	0.7199*	0.9062*	0.8440*	0.7885*	0.3615*	0.5931*	0.6017*
SALES	0.4031*	0.3737*	0.3972*	0.5549*	0.6797*	0.4331*	0.1186	0.2982*	0.2062*
FIRE	0.5121*	0.5304*	0.6445*	0.6771*	0.8017*	0.7523*	0.3906*	0.2679*	0.3601*
PERSERV	0.3817*	0.4555*	0.4521*	0.4246*	0.4114*	0.3621*	0.2316	0.2668*	0.3248*
BUSERV	-0.0564	0.1192*	-0.8606*	0.3050*	0.3774*	-0.2695*	-0.3447*	0.1752	-0.0248
ENT	-0.0695	-0.0497	0.1687*	0.3744	0.1609	0.3644	0.1934	-0.0446	-0.0984
PROSERV	0.3473*	0.3082*	0.3724*	0.4896*	0.5663	0.5565*	0.0309	0.1906*	0.2737*
PUBAD	0.5804*	0.5262*	0.6236*	0.9075*	0.8774*	0.8324*	0.2565*	0.4724*	0.5333*

(table continues)

Table 6, Continued

Variable	Whites			Blacks			Hispanics		
	1973	1979	1987	1973	1979	1987	1973	1979	1987
ED1	0.0521	0.5579*	1.0940*	0.1096	0.2146	-0.2545	-0.0786	0.21382	-0.1114
ED2	0.3485*	1.1546*	1.4790*	0.0660	-0.1712	-0.1080	-0.3421	-0.1459	-0.0314
ED3	0.3488*	0.8237*	1.1927*	-0.0591	0.2323	0.2979	-0.0626	-0.0568	-0.0224
ED4	0.6217*	0.9699*	1.0754*	0.0753	0.2020	0.2401	-0.0545	0.0365	0.1723
ED5	0.5171*	1.1234	1.2961*	-0.0830	0.3748	0.3704	-0.0402	0.0793	0.0312
ED6	0.5947*	0.9335*	1.1733*	0.1445	0.3777	0.3070	0.1385	0.1015	0.1488
ED7	0.6243*	0.9310*	1.2870*	0.1180	0.3302	-0.2215	0.1952	0.0847	0.2117
ED8	0.7014*	1.1082*	1.2297*	0.1989	0.4980	0.0055	0.3061*	0.2008	0.2261
ED9	0.6362*	0.9390*	1.0384*	0.1769	0.4354	-0.0568	0.0303	0.1226	0.0627
ED10	0.6024*	0.9920*	1.0990*	0.0777	0.5151*	0.1039	0.1378	0.2197*	0.3471*
ED11	0.6851*	1.0744*	1.2219*	0.4732*	0.3769	0.1794	0.3828*	0.3498*	0.3681*
ED12	1.0787*	1.5636*	1.7096*	0.7767*	0.9493*	0.5882*	0.5653*	0.6807*	0.6673*
ED13	1.1401*	1.6150*	1.7568*	0.6935*	1.1037*	0.7224*	0.7168*	0.6974*	0.8671*
ED14	1.2363*	1.7120*	1.9089*	0.9348*	1.2265*	0.8208*	0.9121*	0.8230*	0.9071*
ED15	1.1905*	1.6664*	1.8158*	0.9784*	1.2196*	0.8477*	0.9453*	0.8661*	0.8615*
ED16	1.5189*	1.9675*	2.2160*	1.2245*	1.4919*	1.1475*	1.0552*	1.0754*	1.1520
ED17	1.6484*	2.0227*	2.2167*	1.0693*	1.3029*	1.0544*	1.0117*	1.2293*	1.2989*
ED18	1.7177*	2.1855*	2.4282*	1.6110*	1.8796*	1.4717*	1.3805*	1.3908*	1.3946*
R-squared	0.433	0.403	0.368	0.3437	0.350	0.368	0.374	0.358	0.312
N	24,680	32,950	27,582	2,415	2,906	2,664	1,417	3,590	3,646

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

*Indicates significance at the 5% level.

a job in the sales sector for one in the manufacturing sector in 1973, his earnings would have increased by 30 percent. In 1987 such a switch would bring about a 41 percent rise. The manufacturing/sales premium also rose for blacks and Hispanics by 1987, reaching 47 percent for blacks and 38 percent for Hispanics.

There were also large shifts in the returns to residential location. The earnings gap between men living in central cities and suburbs in the northeastern and north-central regions widened. This may reflect the fact that more affluent individuals increasingly chose the amenities available in the suburbs (green space, public services, etc.). However, it is also consistent with the notion that employers have left the inner cities (Wilson, 1987).

The earnings of employed men have changed between 1973 and 1987 because both their characteristics and the returns to those characteristics have changed. In order to separate out these two effects, we use the estimated coefficients from the three years to generate predicted earnings for men with specific characteristics. This allows us to examine the importance of changes in the education and industry coefficients, holding personal attributes constant. Our representative agents are assigned five years of experience, live in a northeastern central city, are employed in durable manufacturing and wholesale/retail trade, and have completed nine, 12, and 16 years of schooling. The results appear in Table 7.

Between 1973 and 1979 white and black men working in durable manufacturing experienced earnings declines regardless of their schooling. Whites with only nine years of schooling and black high school graduates saw their earnings drop by over 20 percent. College graduates in each of the three groups experienced declines of approximately 10 percent.

Black men's earnings continued to decline for all three schooling groups between 1979 and 1987. The predicted earnings in manufacturing for the least-educated blacks dropped by 20 percent between 1979 and 1987. High school- and college-educated blacks experienced declines of 5 percent

Table 7

Predicted Natural Logarithms of Male Earnings, by Education and Industry

Years of Education	Whites			Blacks			Hispanics		
	1973	1979	1987	1973	1979	1987	1973	1979	1987
	Durable Manufacturing								
9	9.059	8.823	8.775	8.813	8.715	8.528	8.688	8.700	8.636
12	9.501	9.447	9.446	9.413	9.228	9.174	9.223	9.258	9.240
16	9.941	9.851	9.953	9.861	9.771	9.733	9.713	9.653	9.725
	Wholesale/Retail Trade								
9	8.800	8.521	8.435	8.461	8.428	8.143	8.458	8.425	8.317
12	9.242	9.146	9.106	9.061	8.942	8.788	8.993	8.983	8.921
16	9.682	9.550	9.613	9.508	9.485	9.347	9.483	9.378	9.406

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: The figures reported are based on the regression coefficients from Table 6 and are for men in northeastern central cities with five years of experience who are not veterans.

and 4 percent, respectively. Earnings for white high school graduates were about the same in 1987 as in 1979. And the earnings of white college graduates in durable manufacturing rose by 10 percent between 1979 and 1987.

Less-educated Hispanic men working in manufacturing had predicted earnings that were 2 to 3 percent higher in 1979 than in 1973. The earnings of Hispanic college graduates declined by 6 percent over this interval. The small gains for Hispanics with nine years of schooling, however, were more than offset by the 7 percent decline between 1979 and 1987. Hispanic high school graduates in manufacturing lost little ground over the later period, and those with college degrees enjoyed a 7 percent rise in their predicted earnings.

Over the entire 15-year period, earnings declined for less-educated workers in durable manufacturing, regardless of race or ethnicity. The regression results suggest that white and Hispanic workers with high school degrees were affected much less than similar blacks. White and Hispanic college graduates had relatively constant earnings, but black college graduates lost a substantial amount over the period.

The predicted earnings of less-educated men employed in wholesale/retail trade declined dramatically between 1973 and 1987. Among workers with nine years of schooling, white men's earnings declined by 43.9 percent, those of blacks by 37.4 percent, and those of Hispanics by 15.1 percent.

Neither a high school nor a college education offered substantial protection to black men employed in wholesale/retail trade. Black high school graduates experienced a 31.4 percent drop in earnings, while college graduates lost 17.5 percent. Hispanic losses were smaller, about 8 percent for high school and college graduates. For whites the losses were 14.6 percent for high school graduates and 7.3 percent for college graduates.

The earnings gap between high school and college graduates working in wholesale/retail trade grew for both whites and blacks, but not for Hispanics. In 1973 the college/high school premium for whites was 55.3 percent, while the comparable figure for blacks was 56.4 percent. By 1987 this premium had increased to 65.9 percent for whites and 74.9 percent for blacks. Throughout the period, the premium for Hispanics was about 63 percent.

Table 7 shows how changes in the returns to education and industry affected a representative man in each group. In order to summarize the effects of changing educational attainment, changing industrial mix, changing regional and experience profiles, and changing returns to all these factors, we use all the estimated regression coefficients and population means for all characteristics to exhaustively decompose the change in the natural logarithm of earnings.

In these decompositions, shown in Table 8, we use the two periods 1973-1979 and 1979-1987 and focus on the later year in any pair. First, we use all the coefficients and all the variable means for the later year to generate the mean log earnings of the racial group in question. Then we replace the later year industry means with those from the earlier year. The difference between the mean log earnings in the later year and this simulated mean is attributed to changes in employment across industries.[7] Next, we substitute in the early year means for both industry and education. The difference between this simulation and the prior one is attributable to the changing educational distribution. Finally, we combine the later year coefficients with the early year means. The difference between this simulated mean and the prior one reflects changes in the other control variables (region, veteran status, etc.) and experience. Any differences between this last simulation and the early year means are caused by changes in the returns to all the explanatory variables. While we cannot parcel out the effects of returns to specific regression coefficients, such as education and industry, we can test whether they changed over time.[8]

Table 8

Decomposition of the Change in the Natural Logarithm of Male Earnings

	Whites	Blacks	Hispanics
A. 1973-1979			
Total change	-0.0512	-0.0128	-0.0377
Change due to changing means of all explanatory variables	+0.0071	+0.0436	+0.0260
Change due to changing estimated coefficients on all explanatory variables, including the intercept	-0.0583	-0.0564	-0.0637
Change due to changing means of variables for:			
Industrial employment	-0.0104	-0.0269	+0.0008
Education (net of industry effect)	+0.0599	+0.1054	+0.0582
Experience, veteran status, and geographic distribution (net of industry and education effects)	-0.0424	-0.0349	-0.0330
B. 1979-1987			
Total change	-0.0065	-0.0216	-0.0776
Change due to changing means of all explanatory variables	+0.1416	+0.1144	+0.0679
Change due to changing estimated coefficients on all explanatory variables, including the intercept	-0.1481	-0.1360	-0.1455
Change due to changing means of variables for:			
Industrial employment	+0.0042	-0.0093	-0.0094
Education (net of industry effect)	+0.0608	+0.0977	+0.0438
Experience, veteran status, and geographic distribution (net of industry and education effects)	+0.0766	+0.0260	+0.0335

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

During the 1973-1979 period the real average earnings of men in all three racial groups, shown in the top row of panel A, declined. For whites, the decline was about 5 percent. We find, as did Blackburn, Bloom, and Freeman, that changing patterns of industrial employment were responsible for about 1 percentage point, or about 20 percent of this drop. The average predicted earnings of blacks fell by only 1.28 percent over the period but were more sensitive to shifts in industrial employment: had there been no countervailing changes, the movement of black workers across industries would have caused their earnings to decline by almost 3 percent. Hispanics' earnings dropped by about 4 percent over the interval, but they were unaffected by changing employment patterns.

Indeed, changes in the returns to education, experience, and industry, as well as changes in the average experience levels and the geographic distribution of workers, account for the lion's share of the decline in real average earnings for all three racial groups. Only educational upgrading protected men from very large losses.

Blacks benefited the most from their increased average schooling. While educational upgrading alone would have increased the average earnings of whites and Hispanics by about 6 percent, it raised black men's earnings by over 10 percent.

During the 1979 to 1987 period, shown in panel B, the earnings of Hispanics fell by 8 percent, blacks by about 2 percent, and whites by less than 1 percent. Men in all three racial groups, especially blacks, again benefited substantially from continued educational upgrading. Shifts in industrial employment had modest negative effects on the earnings of black and Hispanic men; whites were no longer affected by them. But the magnitudes of these effects were small. Again, the major negative effect was due to the changing returns to factors, and the magnitude of this effect was about 14 to 15 percent for each of the groups. The effects of experience and the other central variables, which were negative for all three groups in the earlier period, were positive in the later period.

Because most of the decline in mean earnings can be attributed to changes in the returns to education and industrial employment, we use an F-test to determine if the coefficients on the education and industry dummies changed over time. The description of the tests, the critical values, and the F-statistics appear in the appendix. In all cases, we can reject the temporal stability of the education and industry coefficients.

CHANGES IN THE PERCENTAGE OF MEN WHO ARE LOW EARNERS: REGRESSION RESULTS

The effects of changes in characteristics and coefficients on mean earnings may differ from their effects on the lower tail of the earnings distribution. In particular, we are interested in discovering whether less-skilled, less-educated workers were disproportionately harmed by changes in patterns of industrial employment, even though the effects of those changes on the mean were not large. Consequently, we ran logit regressions for three racial groups for 1973, 1979, and 1987. The dependent variable in the logits takes on the value of 1 if the individual earns less than $12,000 a year, and 0 otherwise. The explanatory variables are almost identical to those in the ordinary least squares regressions, except that the dummy variables for one to eight years of education are omitted. Table 9 contains the estimated coefficients for all nine racial-year groups.[9]

In the logit model, the probability that a worker of given characteristics is a low earner is given by:

$$Pr[Y=1] = \frac{e^{\beta X}}{1+e^{\beta X}}$$

where β represents the set of estimated coefficients for a given group and X captures an individual's characteristics. We use our estimates of β to predict the probabilities of low earnings for archetypical

Table 9

Estimated Coefficients for Logit Regressions on Low Earnings, for Men

	Whites			Blacks			Hispanics		
	1973	1979	1987	1973	1979	1987	1973	1979	1987
CONSTANT	4.5907*	3.7883*	3.5784*	5.1052*	5.0332*	4.1472*	3.2424*	3.4103*	3.5878*
EXP	-0.3307*	-0.3123*	-0.2587*	-0.2116*	-0.2162*	-0.1904*	-0.2244*	-0.225*	-0.1637*
EXPSQ	0.0056*	0.0051*	0.0047*	0.0031*	0.0033*	0.003*	0.0037*	0.0035*	0.0023*
VET	0.0824	0.4227*	0.0424	0.3034*	-0.0121	-0.0958	-0.4295	-0.0058	-0.1084
CC1NE	-0.1373	0.1236	-0.1738	-1.236*	-0.6603*	-0.6363*	-0.4338	0.0228	-0.5141*
CC0NE	-0.3028	-0.1508	-0.5927	-1.19*	-1.0343*	-0.9028*	-0.8472*	0.2404	-0.5309*
CC1NC	-0.7722*	-0.1947	-0.1524	-1.269*	-0.7103*	-0.1146	-0.7053*	-0.1639	-0.0724
CC0NC	-0.6068*	-0.6939*	-0.3629*	-0.985*	-1.1664*	-0.6941*	-0.3181	-0.6478	-0.2241
CC1S	-0.1282	0.0155	0.0991	-0.7565*	-0.5394*	-0.3788*	-0.3421	0.3219*	0.1776
CC0S	-0.5161*	0.0384	-0.4962*	-0.772*	-0.5704*	-0.3868*	-0.3968	0.3815*	-0.2183
CC1W	-0.1154	-0.0317	0.0254	-0.9015*	-0.5142*	-0.3991	-0.3508	0.1701	-0.2662*
CC0W	-0.4863	-0.2561	0.0695	-1.4011*	-0.33	-0.6849*	-0.4898*	-0.319*	-0.5638*
MIN	-2.713*	-2.4489*	-1.957*	-3.2597*	-3.1616*	-1.8553*	-2.9029*	-2.03*	-1.3055
CON	-2.0944*	-1.0717*	-1.4555*	-1.7971*	-1.6516*	-0.9623*	-1.0736*	-1.0871*	-0.9208
DMAN	-2.3268*	-1.7914*	-1.9239*	-2.2443*	-2.5256*	-1.602*	-0.9648*	-1.224*	-1.4052
NDMAN	-2.0495*	-1.6126*	-2.1533*	-2.1274*	-2.2502*	-1.5558*	-1.8359*	-0.9396*	-1.2769
TRAN	-1.8154*	-1.9721*	-2.1947*	-2.2108*	-2.0508*	-1.7328*	-1.232*	-1.4*	-1.6517
SALES	-1.9454*	-0.6904*	-0.9598*	-1.4155*	-1.7134*	-0.8862*	-0.4042	-0.573*	-0.5532
FIRE	-2.6859*	-1.4314*	-1.5435*	-1.4271*	-1.7271*	-1.5021*	-1.7606*	-0.8297*	-1.1956
PERSERV	-1.4502*	-0.8413*	-1.3292*	-1.0349*	-1.2771*	-0.5028	-0.5268	-0.3679	-0.7454*
BUSERV	-0.643	-0.2252	-1.2027	-0.7704	-1.355*	1.0258	-0.1958	-0.1563	-0.2233
ENT	-0.9315	0.4908	-0.2247	-1.049	-0.6948	-0.6657	-2.4696	0.2137	-0.398
PROSERV	-1.6174*	-0.6112*	-0.7919*	-1.4138*	-1.4902*	-1.0309*	-0.2914	-0.3153	-0.6825*
PUBAD	-2.4842*	-1.168*	-2.1757*	-2.6794*	-2.4599*	-2.0331*	-1.4539*	-1.5345*	-1.9066*

(table continues)

Table 9, Continued

	Whites			Blacks			Hispanics		
	1973	1979	1987	1973	1979	1987	1973	1979	1987
ED9	-0.2703	-0.1268	-0.0543	-0.6683*	-0.0552	-0.2437	-0.0774	-0.4589*	-0.331
ED10	-0.4164	-0.6254*	-0.1738	-0.3134	-0.8853*	-0.5847*	-0.176	-0.7491*	-0.6578*
ED11	-0.3609	-0.3467	-0.7838*	-0.9433*	-0.6588*	-0.615*	-0.6588*	-0.9435*	-0.8506*
ED12	-1.6801*	-1.6587*	-0.8712*	-1.7934*	-1.4849*	-1.1272*	-1.408*	-1.7147*	-1.3932*
ED13	-1.4999*	-1.7893*	-0.81*	-1.6165*	-1.7009*	-1.5975*	-1.7026*	-1.8145*	-1.8201*
ED14	-1.6526*	-1.8851*	-1.4958*	-2.2369*	-2.2062*	-1.8263*	-2.5946*	-2.1913*	-1.7083*
ED15	-1.3998*	-1.7427*	-1.5296*	-2.4018*	-2.0199*	-1.5611*	-2.3077*	-1.9049*	-1.6369*
ED16	-2.6098*	-2.7806*	-2.0707*	-3.1279*	-2.9269*	-2.6364*	-2.5218*	-2.7608*	-2.4412*
ED17	-3.4917*	-2.4539*	-2.7544*	-2.811*	-1.659*	-1.7365*	-0.7005	-3.8028*	-2.3532*
ED18	-2.861*	-2.8358*	-2.8662*	-4.2092*	-4.0513*	-3.5884*	-2.9099*	-3.7494*	-3.3235*
pr(y=1)	0.192	0.212	0.225	0.344	0.361	0.393	0.295	0.351	0.412
N	2,468	3,295	2,757	2,415	2,906	2,664	1,417	3,590	3,646
-2 Log likelihood	1,521	2,192	2,100	2,309	2,833	2,780	1,314	3,570	3,963

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

*Indicates significance at the 5% level.

men working in specific industries with varying levels of education. As in Table 7, the representative agents are assigned five years of experience and live in a northeastern central city. They work in one of three industries: durable manufacturing, wholesale/retail trade, or finance, insurance, and real estate. And they have nine, 12, or 16 years of schooling. Three races, three years, three industries, and three levels of education generate the 81 probabilities presented in Table 10.

The predicted incidence of low earnings increases over time for most men in most industries at all levels of educational attainment. As expected, more educated workers in all industries are less likely to be low earners, and in each education category, men working in durable manufacturing have lower predicted probabilities than those in wholesale/retail trade.

In 1973 blacks did fairly well in manufacturing relative to whites and Hispanics. At each educational level, blacks were less likely to be low earners. Indeed, only 7.7 percent of black college graduates earned less than $12,000, compared to 12 percent of similar whites and 15.3 percent of similar Hispanics. By 1987, however, both whites and Hispanics with nine and 12 years of schooling had lower expected incidences of low earnings than did blacks. While 47.6 percent of black high school graduates were low earners, the rates were 36.2 percent for whites and 38.1 percent for Hispanics.

Men in wholesale and retail trade had a higher probability of low earnings than men in manufacturing in 1973, at each schooling level. And this disadvantage generally widened by 1987. By 1987 about one-third of college graduates and about 60 percent of high school graduates were predicted to have low earnings.

In 1973 about 20 percent of white and Hispanic men with high school educations working in either finance, insurance, or real estate fell below the low-earnings threshold, while over 40 percent of similar black men were low earners. Between 1973 and 1987, however, the incidence of low

Table 10

Predicted Probabilities of Low Earnings, for Men:
Selected Industries and Education Levels

	Years of Schooling		
	9	12	16
	Durable Manufacturing		
Whites			
1973	58.5%	25.6%	12.0%
1979	63.6	27.4	11.0
1987	56.2	36.2	14.6
Blacks			
1973	49.4	24.1	7.7
1979	68.9	34.6	11.1
1987	68.7	47.6	16.7
Hispanics			
1973	67.6	35.6	15.3
1979	67.1	36.7	16.9
1987	64.0	38.1	17.7
	Wholesale/Retail Trade		
Whites			
1973	67.4	33.5	16.6
1979	84.0	53.2	27.0
1987	77.1	59.8	31.0
Blacks			
1973	69.1	42.1	16.0
1979	83.3	54.4	22.0
1987	81.8	65.0	29.1
Hispanics			
1973	78.5	49.2	24.1
1979	79.6	52.7	28.1
1987	80.7	59.0	33.6

(table continues)

Table 10, Continued

	Years of Schooling		
	9	12	16
	Finance, Insurance, Real Estate		
Whites			
1973	49.6	19.4	8.7
1979	71.5	35.2	15.0
1987	65.3	45.4	20.0
Blacks			
1973	68.9	41.8	15.9
1979	81.1	54.0	21.8
1987	70.8	50.1	18.2
Hispanics			
1973	48.5	19.9	7.6
1979	75.2	46.3	23.2
1987	68.7	43.1	21.0

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: Predictions are based on logit regression coefficients for individuals with five years experience living in a northeastern central city who are not veterans.

earnings rose more rapidly for whites and Hispanics than for blacks with 12 or 16 years of schooling. Indeed, by 1987, black college graduates working in either finance, insurance, or real estate were slightly less likely to be low earners than were whites and Hispanics.

Table 11 shows these percentage point changes in the predicted low-earnings probabilities between 1973 and 1987. Positive numbers indicate growth in the probability of low earnings. Low earnings rose for all races in all three industries. Within most industries, the probability of low earnings rose more dramatically for high school than for college graduates. A striking result is the erosion of black high school graduates' economic position, particularly in manufacturing and in sales.

Black college graduates in durable manufacturing experienced a greater rise in the likelihood of low earnings than did whites and Hispanics. In the finance, insurance, and real estate industries, however, black high school and college graduates fared better than the others.

In addition to changes within industries, changes in earnings across industries have exacerbated the position of men in the lower tail of the earnings distribution. Recall that between 1973 and 1987 the proportion of all men working in manufacturing jobs declined while the proportion working in sales and finance, insurance, and real estate increased modestly. The movement between manufacturing and sales was most pronounced for black men. But during this time, the expected incidence of low earnings grew faster in sales than in manufacturing.

Table 12 shows the percentage point difference in predicted low-earnings probabilities between high school graduates in manufacturing and their counterparts in sales and finance, insurance, and real estate.[10] Again, positive numbers indicate how much higher the probability of low earnings is in wholesale/retail trade. The predicted effect of such changes in industry were greatest for whites. Their probability of low earnings in 1973 was 7.9 percentage points higher in sales than in manufacturing. In 1987 the gap had grown to 23.6 percentage points. Thus, the gap grew by 15.7 points, about twice that for blacks and Hispanics.

Table 11

Change in the Predicted Probability of Low Earnings, for Men

	Durable Manufacturing	Wholesale/ Retail Trade	Finance, Insurance, Real Estate
Whites			
College graduates	2.6	14.4	11.3
High school graduates	10.6	26.3	26.0
Blacks			
College graduates	9.0	13.1	2.3
High school graduates	23.5	22.9	8.3
Hispanics			
College graduates	2.4	9.5	13.4
High school graduates	2.5	9.8	23.2

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Notes: Numbers are percentage point change between 1973 and 1987, as shown in Table 10. Predictions are based on a man with five years experience living in a northeastern central city.

Table 12

Difference in the Predicted Probability of
Low Earnings Between Manufacturing and Wholesale/Retail Trade
Workers and Manufacturing and Finance, Insurance, and Real Estate Workers, for
Male High School Graduates

	Wholesale/Retail Trade	Finance, Insurance, Real Estate
Whites		
1973	+7.9	-6.2
1987	+23.6	+9.2
Change	+15.7	+15.4
Blacks		
1973	+9.4	+17.7
1987	+17.4	+2.5
Change	+8.0	-15.2
Hispanics		
1973	+13.6	-15.7
1987	+20.9	+5.0
Change	+7.3	+20.7

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: Numbers are percentage point differences. Predictions are based on a high school graduate with five years of experience in a northeastern central city.

Table 8 documented that shifts in the distribution of workers across industries explained very little of the declines in mean earnings between 1973 and 1987. But based on changes in the probability of low earnings between the benchmark cases in these three industries, it appears that the shift in employment out of manufacturing might explain a larger share of changes in the incidence of low earnings. To summarize the effects of changing patterns of industrial employment on the lower tail of the earnings distribution, we perform the same sort of decomposition using the means and logit coefficients as we did for the ordinary least squares results.

For the logits, we begin by obtaining the predicted probability of low earnings for someone with mean characteristics in a given year. This establishes our baselines. Then we take the coefficients for one year, say 1979, and evaluate the predicted probability of low earnings using education and experience means from 1979 and the industry means from an earlier year, 1973. We interpret the difference between this and the prediction based entirely on 1979 data and coefficients as the change in low earnings due to changing industrial employment. We proceed, just as we had with the OLS regressions, to sequentially parcel out the effects of changing education and experience means, attributing any residual to changes in the coefficients. Unlike the changes at the mean decomposed using the OLS results, the changes in probability using logits are not exactly decomposable.[11] As such, the results of this decomposition should be viewed as suggestive.[12]

Table 13 contains the results of our logit decompositions for the increases in low earnings for each of the three groups in each of the two subperiods. We find that changes in the coefficients, which measure returns to experience, education, and industry, were by far the largest and most consistent factor contributing to the rising incidence of low earnings. Over both the 1973-1979 and 1979-1987 periods, changing coefficients alone would have driven low-earnings rates up by substantially more than the actual rise.

Table 13

Decomposition of the Change in Probability of Low Earnings, for Men

	Whites	Blacks	Hispanics
A. 1973-1979			
Total change	+0.026	+0.024	+0.068
Change due to changing means of all explanatory variables	-0.000	-0.018	-0.014
Change due to changing estimated coefficients on all explanatory variables, including the intercept	+0.026	+0.042	+0.082
Change due to changing means of variables for:			
Industrial employment	+0.004	+0.013	-0.002
Education (net of industry effect)	-0.016	-0.057	-0.035
Experience, veteran status, and geographic distribution (net of industry and education effects)	+0.012	+0.027	+0.024
B. 1979-1987			
Total change	+0.036	+0.042	+0.082
Change due to changing means of all explanatory variables	-0.039	-0.063	-0.031
Change due to changing estimated coefficients on all explanatory variables, including the intercept	+0.075	+0.105	+0.113
Change due to changing means of variables for:			
Industrial employment	+0.005	+0.002	+0.009
Education (net of industry effect)	-0.015	-0.050	-0.024
Experience, veteran status, and geographic distribution (net of industry and education effects)	-0.028	-0.015	-0.015

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: Sums may not add exactly due to rounding.

Increasing educational attainment partially offset this. While educational upgrading alone would have reduced the incidence of low earnings among whites and Hispanics by 1.5 to 3.5 percentage points, it would have reduced black low-earnings rates by at least 5 percentage points in each period.

Changes in average experience levels and the distribution of workers across geographic areas increased low earnings over the first interval but decreased low earnings over the second. And changes in the distribution of workers across industries had small adverse effects from 1979 to 1987 for all racial groups. Over the earlier period, shifting patterns of industrial employment also had modest effects on whites and Hispanics, but more substantial effects on blacks. Indeed, 1.3 of the 2.4 point rise in the predicted low-earnings rate for blacks between 1973 and 1979 was accounted for by changes in their distribution across industries.

In sum, the decompositions at the mean and at the lower tail of the earnings distribution yield consistent results: (1) changes in returns play the greatest role in the rising low-earnings rates and the declining average earnings of men, (2) educational upgrading protected men (especially blacks) from even greater losses, and (3) changing patterns of industrial employment harmed blacks between 1973 and 1979.

SUMMARY

Between 1973 and 1987 the average earnings of employed white, black, and Hispanic men fell, and the proportion earning less than $12,000 a year rose. Most of the decline at the mean and some of the increase in the incidence of low earnings reflect economy-wide changes in the returns to personal characteristics, changes that seem to be due to technological change. Changing patterns of industrial employment had significant effects only on the well-being of black men between 1973 and 1979.

The rise in the number of men earning less than $12,000 a year aggravates several serious social problems. Men with low earnings cannot adequately support a family with children. While spousal earnings and other sources of income have kept many such families out of poverty as officially measured, they remain economically vulnerable. Furthermore, low earnings among men may inhibit the formation of stable, two-parent families, leaving children with limited financial and parenting resources and adding to the number of unmarried mothers needing government support (Wilson, 1987). And finally, men faced with poor earnings prospects are more likely to participate in the underground economy and illegal activities.

While our results are consistent with demand-side explanations, they do not identify the causes of the changing returns. If employers are no longer willing or able to pay high, above-poverty-level wages to medium- and low-skilled workers, then wage supplementation policies such as the Earned Income Tax Credit might be expanded.

Finally, there are also supply-side solutions to demand-side problems. Continued educational upgrading has raised mean earnings and reduced the incidence of low earnings, especially for blacks and Hispanics. College graduates have fared much better than high school graduates. Therefore, antipoverty programs might emphasize not only high school completion, but also access to specialized training or higher education through expanded student loans and grants to students from needy families.

Table A1

Definitions of Variables Used in OLS Regressions on the Natural Logarithm of Male Earnings

Variable	Definition
EXP	Experience (age - education - 6)
EXPSQ	Experience squared
VET	Veteran status (1 = yes)
CC1NE	Northeastern central city
CC0NE	Northeastern non-central city SMSA
CC1NC	North-central central city
CC0NC	North-central non-central city SMSA
CC1S	Southern central city
CC0S	Southern non-central city SMSA
CC1W	Western central city
CC0W	Western non-central city SMSA
MIN	Mining
CON	Construction
DMAN	Durable manufacturing
NDMAN	Nondurable manufacturing
TRAN	Transportation
SALES	Wholesale/retail trade
FIRE	Finance, insurance, and real estate
PERSERV	Personal services
BUSERV	Business and repair services
ENT	Entertainment
PROSERV	Professional services
PUBAD	Public administration
ED1-ED18	Education dummies for highest grade completed

Notes: All dummy variables equal 1 in the affirmative. The omitted regional category includes men living in nonmetropolitan areas in any region and men for whom the Census Bureau suppresses metropolitan area status to ensure confidentiality of respondents.

Table A2

Means of Variables Used in OLS Regressions on the Natural Logarithm of Male Earnings

Variable	Whites			Blacks			Hispanics		
	1973	1979	1987	1973	1979	1987	1973	1979	1987
EXP	19.1375	17.4754	17.8917	20.3122	18.3995	17.8544	19.0642	17.7526	17.8387
EXPSQ	563.0957	484.7105	470.8274	634.2186	529.7285	473.3191	543.4143	487.6212	478.1541
VET	0.3678	0.2718	0.1800	0.2356	0.1924	0.1498	0.1553	0.1259	0.0656
CC1NE	0.0622	0.0418	0.0414	0.1213	0.1036	0.0886	0.1454	0.0850	0.1059
CC0NE	0.1299	0.0931	0.1109	0.0422	0.0368	0.0469	0.0466	0.0329	0.0455
CC1NC	0.0730	0.0483	0.0402	0.1615	0.1198	0.1299	0.0600	0.0454	0.0340
CC0NC	0.1321	0.1043	0.1069	0.0393	0.0341	0.0263	0.0289	0.0139	0.0263
CC1S	0.0644	0.0481	0.0476	0.2182	0.2419	0.2365	0.1355	0.1270	0.1210
CC0S	0.1027	0.0749	0.0897	0.0899	0.0895	0.0908	0.0861	0.0802	0.0941
CC1W	0.0462	0.0412	0.0472	0.0600	0.0447	0.0428	0.1510	0.1429	0.1698
CC0W	0.0818	0.0596	0.0634	0.0265	0.0248	0.0330	0.1891	0.1655	0.1722
MIN	0.0136	0.0227	0.0139	0.0046	0.0055	0.0030	0.0092	0.0192	0.0099
CON	0.1024	0.1005	0.1027	0.0919	0.0936	0.0875	0.0854	0.1228	0.1039
DMAN	0.2045	0.1822	0.1610	0.2232	0.1951	0.1351	0.2018	0.1733	0.1465
NDMAN	0.1136	0.0971	0.0901	0.1180	0.1094	0.0987	0.1362	0.0930	0.1037
TRAN	0.0909	0.0927	0.0985	0.1056	0.0936	0.1269	0.0734	0.0777	0.0784
SALES	0.1869	0.1870	0.1992	0.1387	0.1500	0.1678	0.2032	0.1889	0.2041
FIRE	0.0446	0.0385	0.0475	0.0290	0.0327	0.0368	0.0289	0.0279	0.0431
PERSERV	0.0330	0.0365	0.0545	0.0335	0.0368	0.0511	0.0353	0.0412	0.0686
BUSERV	0.0118	0.0148	0.0013	0.0232	0.0262	0.0064	0.0183	0.0265	0.0025
ENT	0.0088	0.0116	0.0116	0.0099	0.0151	0.0128	0.0078	0.0128	0.0167
PROSERV	0.0958	0.1097	0.1244	0.1085	0.1132	0.1411	0.0579	0.0752	0.0883
PUBAD	0.0635	0.0682	0.0555	0.0787	0.0802	0.0706	0.0480	0.0616	0.0420

(table continues)

Table A2, Continued

Variable	Whites			Blacks			Hispanics		
	1973	1979	1987	1973	1979	1987	1973	1979	1987
ED1	0.0004	0.0003	0.0004	0.0041	0.0034	0.0004	0.0099	0.0095	0.0058
ED2	0.0011	0.0007	0.0012	0.0099	0.0058	0.0019	0.0191	0.0148	0.0129
ED3	0.0026	0.0011	0.0009	0.0236	0.0114	0.0030	0.0360	0.0262	0.0200
ED4	0.0033	0.0020	0.0010	0.0248	0.0138	0.0045	0.0353	0.0251	0.0167
ED5	0.0057	0.0030	0.0020	0.0174	0.0117	0.0064	0.0402	0.0253	0.0241
ED6	0.0117	0.0059	0.0034	0.0385	0.0224	0.0105	0.0762	0.0738	0.0826
ED7	0.0170	0.0114	0.0063	0.0460	0.0255	0.0158	0.0339	0.0295	0.0222
ED8	0.0645	0.0429	0.0220	0.0865	0.0492	0.0300	0.0847	0.0716	0.0570
ED9	0.0464	0.0358	0.0266	0.0733	0.0499	0.0368	0.0607	0.0618	0.0612
ED10	0.0675	0.0558	0.0434	0.0977	0.0908	0.0755	0.0741	0.0719	0.0560
ED11	0.0581	0.0535	0.0434	0.0865	0.0939	0.0676	0.0677	0.0635	0.0590
ED12	0.3797	0.3793	0.3902	0.3205	0.3765	0.4264	0.2618	0.2944	0.3182
ED13	0.0607	0.0702	0.0676	0.0431	0.0599	0.0627	0.0487	0.0518	0.0524
ED14	0.0714	0.0861	0.0934	0.0435	0.0681	0.0890	0.0501	0.0565	0.0592
ED15	0.0278	0.0317	0.0328	0.0166	0.0323	0.0375	0.0212	0.0220	0.0222
ED16	0.1015	0.1208	0.1492	0.0414	0.0482	0.0773	0.0353	0.0462	0.0658
ED17	0.0257	0.0282	0.0273	0.0083	0.0120	0.0128	0.0078	0.0100	0.0148
ED18	0.0530	0.0702	0.0876	0.0112	0.0210	0.0368	0.0120	0.0256	0.0310
LWYS	9.8571	9.8059	9.7994	9.401	9.3882	9.3666	9.5253	9.4876	9.41
N	24,680	32,950	27,582	2,415	2,906	2,664	1,417	3,590	3,646

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

APPENDIX F-TEST, OLS REGRESSIONS

For each year pair, we first restrict the education and then the industry coefficients to equal their estimated values for the earlier year. This generates four restricted regressions (2 year-pairs x 2 sets of dummies) for each of the three races. Then we generate F-statistics from the R-squareds of the restricted and unrestricted regressions:

$$\frac{R_u^2 - R_r^2}{1 - R_u^2} \sim F_{k,n-Q}$$

where n is the sample size, Q represents the number of regressors in the unrestricted regression, and k captures the number of restricted coefficients. In all 12 cases, the F-statistic far exceeds its critical value. Hence the hypotheses that the returns to industry and education remained constant can be rejected for all races and all year pairs. The F-statistics and the critical values can be found in Table A3.

Table A3

F-Statistics for Change in Education and Industry Coefficients over Time

	Whites	Blacks	Hispanics	Critical F
1973-79				
Education (18 degrees of freedom)	232.8	14.1	15.1	1.94
Industry (12 degrees of freedom)	163.1	23.1	20.3	2.18
1979-87				
Education (18 degrees of freedom)	241.3	17.8	20.9	1.94
Industry (12 degrees of freedom)	118.7	18.6	16.5	2.18

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: Critical values are 5 percent level of significance with an infinite number of degrees of freedom due to the large number of observations.

Table A4

Decomposition of the Change in Probability
of Low Earnings, for Men--Linear Probability Model

	Whites	Blacks	Hispanics
A. 1973-1979			
Total change	+0.023	+0.017	+0.056
Change due to changing means of all explanatory variables	-0.002	-0.012	-0.009
Change due to changing estimated coefficients on all explanatory variables, including the intercept	+0.024	+0.029	+0.065
Change due to changing means of variables for:			
Industrial employment	+0.004	+0.011	-0.001
Education (net of industry effect)	-0.017	-0.041	-0.025
Experience, veteran status, and geographic distribution (net of industry and education effects)	+0.012	+0.019	+0.017
B. 1979-1987			
Total change	+0.009	+0.032	+0.061
Change due to changing means of all explanatory variables	-0.045	-0.046	-0.025
Change due to changing estimated coefficients on all explanatory variables, including the intercept	+0.054	+0.079	+0.086
Change due to changing means of variables for:			
Industrial employment	+0.001	+0.002	+0.006
Education (net of industry effect)	-0.167	-0.036	-0.018
Experience, veteran status, and geographic distribution (net of industry and education effects)	-0.029	-0.012	-0.013

Source: Tabulations by authors from the 1974, 1980, and 1988 March Current Population Surveys.

Note: Sums may not add exactly due to rounding.

Notes

1. Danziger's sample included men 25 to 54 years of age. The poverty line for a family of four in 1969 was $3,714; adjusted for inflation, it was $11,611 in 1987.

2. Numerous authors have evaluated trends in the mean. See, for example, Blackburn, Bloom, and Freeman (1990); Levy and Michel (1988); Katz and Ravegna (1989); Kosters (1989); Levy (1988); and Murphy and Welch (1989).

3. We use the March Current Population Survey (CPS) computer tapes for 1974, 1980, and 1988, which provide information for the years 1973, 1979, and 1987, respectively. The 1974 tape is the first one that allows us to categorize our sample into three racial/ethnic groups: white non-Hispanics, black non-Hispanics, and Hispanics. Men who are neither white nor black and are classified by the Census Bureau as others (e.g. American Indians, Asian Americans, etc.) are excluded.

The unemployment rates for these three years were 4.9, 5.8, and 6.2 percent. The first two years were business cycle peaks; 1987 was the latest year for which data were available when we began our analysis.

Because we are focusing on the earnings distribution, we include only men between the ages of 16 and 65. We exclude men who either have zero sampling weights, are self-employed, work without pay, or report zero weeks of work or no family income during the year. Sample sizes for white non-Hispanics for the three years were 24,680, 32,950, and 27,582; for black non-Hispanics, 2,415, 2,906, and 2,664; for Hispanics, 1,417, 3,590, and 3,646.

Some of the very young workers in the sample may have low annual earnings because they were in school part of the year; similarly, some of the older workers may be low earners because they are partially retired. To check the sensitivity of our results to the composition of our sample, we repeat our

analyses on a sample of prime-age males (men 25 to 54 years old). While low earnings levels are lower for prime-age men, the observed trends in low earnings are identical in the two groups. Also, when we compare our regression-based analyses on the sample of 16- to 64-year-old black men to a sample of prime-age black men, we obtain similar results. The results are available from the authors.

4. We use $12,000 in annual earnings as our cutoff for low earnings because it is approximately the poverty line for a family of four. A man falling below this threshold will not necessarily be counted as poor under the official poverty definition because (a) there may be fewer than four people in his family and/or (b) the family has other sources of income, such as a spouse's earnings. In 1973, median earnings were about $20,000 and fell to $18,000 by 1987. Consequently, our low-earnings cutoff rose from about 60 to 67 percent of median earnings over the period.

Levy and Michel (1988) document an increase between 1973 and 1987 in the incidence of men with low earnings, using a cutoff of $20,000 per year in 1987 constant dollars. Thus, our results are not likely to be sensitive to our choice of a $12,000 cutoff.

5. We use the CPI-X, which reflects the cost of rentals, rather than the CPI, which reflects the cost of home purchases, as our price deflator. The CPI-X procedures were incorporated in the CPI after 1982. Had we chosen the CPI, the declines would have been 10 percentage points larger.

6. The 1973 premium can be found by exponentiating the difference between the college and the high school coefficients in Column 1 of Table 6--$e^{(1.5189 - 1.0787)}$; for 1987, in Column 3, it is $e^{(2.2160 - 1.7096)}$.

7. Changes in earnings within industries could also be caused by employment shifts. As low-skilled workers leave manufacturing and go to services, they increase the pool of low-skilled workers available to expanding industries, and hence may increase the wage differential within those industries. The reverse should hold for the premium in the declining sector. We find that wage differentials, as measured

by the variance of the natural logarithm of earnings, increased within almost all industries, including declining sectors like manufacturing (data not shown).

8. This is essentially equivalent to a Oaxaca/Blinder decomposition for black/white or male/female wage gaps. Here, we simply compare across two years:

$$\bar{Y}_2-\bar{Y}_1 = \hat{\beta}_2\bar{X}_2-\hat{\beta}_1\bar{X}_1 = \hat{\beta}_2[\bar{X}_2-\bar{X}_1]+\bar{X}_1[\hat{\beta}_2-\hat{\beta}_1]$$

The first term, $\hat{\beta}_2[\bar{X}_2 - \bar{X}_1]$, represents the portion of the change in mean earnings attributable to changes in the average characteristics of the sample, i.e., $[\bar{X}_2 - \bar{X}_1]$. The second term represents the remaining portion of the change. Note that the changes in the means are weighted by the regression coefficients from the later of the two years. An alternative procedure would use the coefficients from the earlier year as the weights. We get qualitatively similar results when we use this alternative (data not shown). However, since we pose the question, "What would average earnings have been in 1979 if the characteristics of the men remained as they were in 1973?," we believe the later year coefficients are more appropriate.

These decompositions are primarily descriptive. Changes in the mean values of the sample characteristics, for example, the increased educational attainment, may reflect behavioral responses to the increased returns to education. Thus, some of the change in men's earnings which we attribute to increased educational attainment may actually reflect the increased returns. On the other hand, changes in the returns to characteristics may themselves represent a response to an exogenous change in the characteristics. For example, the returns to high school may have declined because of the increased supply of high school graduates. Consequently, the decomposition results should be considered as approximations of the true effects to changes in the means and changes in the coefficients.

While we parcel out the separate effects of changes in average educational attainment, industrial mix, and regional and experience profiles separately, we do not do so with changes in the coefficients on these variables. Most of our variables are dummy variables, and their estimated coefficients change relative to the omitted categories. While it is possible to compare relative changes in the value of two coefficients over time--the returns to 16 rather than 12 years of schooling, for example--comparing the change in any one coefficient across two time periods can be misleading. For further discussion of this decomposition technique, see Gunderson (1989).

9. For blacks and Hispanics, the logits and the OLS regressions were performed on identical samples. Due to the large number of whites, the logits were run on random 10 percent samples from the data used in the OLS regressions.

10. In the OLS simulations, the interindustry earnings differentials remain constant over all the education categories because industry and education enter the linear model additively. In the logits, the interindustry gaps will differ between various industries simply because of the nonlinearity of the logit model. Since they represent the single largest educational group, we use workers with 12 years of schooling as our benchmark. The interindustry earnings differentials will be smaller among more educated workers because they are in the upper tail (inelastic portion) of the earnings distribution.

11. Evaluating a linear model at the means of the explanatory variables yields the mean of the dependent variable, $\bar{Y}=\hat{\beta}\bar{X}$. Consequently, one can decompose differences in the means of the dependent variable for different groups of people into differences between the means of the explanatory variables. In nonlinear models, the probability evaluated at the means does not, in general, equal the average probability in the sample. However, in the logit model, the two are roughly equal if the predicted probabilities in the sample are in the central, approximately linear, part of the distribution. As such, our results lack precision.

To check this assumption, we ran the microdata for blacks in 1979 through the estimated logit coefficients for blacks in 1989 and calculated the average probability of low earnings. By comparing this to 1979 and 1987 baselines, we could decompose changes in the low earnings rate into two parts: means and coefficients. However, we cannot parcel out the separate effects of education, industry, and the other independent variables. We find that out of a total change of 5.3 percentage points, changing characteristics would have reduced the incidence of low earnings by 4.5 points, while changing returns would have increased low earnings by 9.8 points. These are quite similar to the results from the logit decomposition reported in Table 13.

12. To check the results of the logit decompositions, we also estimated linear probability models. This simply entails applying ordinary least squares to equations with 0/1 dependent variables. Such models are exactly decomposable but they do not respect conventional probability boundaries--that is, they can yield predicted probabilities less than 0 and/or greater than 1. The logit decompositions appear in Table 13, while those based on the linear probability model are reported in Table A4. Both decompositions yield similar results.

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