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ABSTRACT

Longitudinal data from the 1970 Census 1/1000 Sample are used to examine the occupational mobility of young white and black males as measured between 1965 and 1970. Occupational advancement is found to be positively related to formal schooling and formal vocational training for both racial groups. "Structural" factors represented by industry of employment and region of residence in 1965 have relatively small impacts on advancement. Finally, no evidence of a racial differential in the impacts of industry and geographic shifts on occupational mobility is indicated.

MALE OCCUPATIONAL MOBILITY BETWEEN 1965 AND 1970: EVIDENCE FROM THE 1970 CENSUS

I. Introduction

Jobs offering a "future" are commonly regarded as those presenting the opportunity for mobility up a job hierarchy that may involve increasing learning and skills and increasing responsibility. Economists' interest in the process of job upgrading stems to a considerable extent from Gary Becker's suggestion that differences in on-the-job training represent a significant factor in explaining observed variation in the steepness and concavity of lifetime earnings profiles.[1] The connection between on-the-job training and job upgrading has recently been formalized by Sherwin Rosen.[2] Rosen shows that maximization of lifetime wealth implies an optimal progression up a job hierarchy over the course of an individual's working lifetime. Job upgrading, in turn, is related to education, as schooling improves the capacity to learn in a particular job and thus increases the rate at which an individual can progress between jobs.

Job upgrading also plays an important role in the dual labor market hypothesis because opportunity for advancement constitutes a basic criterion distinguishing jobs in the primary and secondary sectors of the labor market.[3] A significant contribution of the dual hypothesis is its emphasis on differences across demographic groups in access to "career" jobs in the primary sector. In particular, most dualists agree that the most important barrier to primary sector employment is racial discrimination. Doeringer and Piore thus suggest

that the dual theory is most appropriate for analyzing the employment problems of racial minorities.[4]

This paper examines the determinants of job upgrading using a large sample of black males and white males from the 1/1000 Public Use Sample of the 1970 Census. Upgrading is measured by change between 1965 and 1970 in three-digit occupational title, where each title is ordered by two different ranking schemes to distinguish upgrading from downgrading and lateral movement. While movement up an occupational ladder clearly does not account for all job upgrading,[5] the extent of occupational mobility in the U.S. labor market is substantial. Over the 1965-1970 period, more than half of all employed males in the civilian labor forced aged 25-34 changed three-digit occupational title.[6] Among 35-year-old to 44-year-old males, more than one-third changed occupational status, and more than one-quarter of all employed men in the 45-64 age category experienced a change in occupational title. The empirical analysis reported in this paper focuses on the under-35 age bracket, in which occupational change among males is most prevalent.

The following research questions are addressed:

1. To what extent does formal training constitute an important determinant of occupational mobility, and is there any evidence of a racial difference in the returns to formal training in terms of occupational advancement?

2. How important are "structural" factors representing labor market segmentation in determining occupational mobility?

3. What is the impact of employer shifts on occupational advancement, and do differential returns to interfirm mobility exist by race?

II. Framework of the Analysis

To answer these questions, a simple model of occupational mobility is specified across individual male workers. The personal characteristics of individuals that may affect their occupational advancement include formal training, age, race, and marital status. Formal training is measured by education, ED, and formal vocational training, TRAIN. The impact of age is represented by stratifying the sample into age brackets, with men under the age of 35 in 1970 being examined here.[7]

Beyond such personal characteristics, the dual labor market literature places considerable emphasis on structural variables representing demand-side factors that distinguish labor markets with respect to earnings and advancement opportunities. It is asserted that intermarket differences in these measures of labor market success persist through time because of important barriers to mobility, particularly for racial minorities.[8] The structural variables examined are industry of employment, INDUS, and region of residence, REGION.

Within a particular age-race category, the determinants of occupational change may thus be specified as follows:

$$(1)\quad \Delta OCCUP = \beta_o + \beta_1 OCCUP(65) + \beta_2 ED + \beta_3 TRAIN + \beta_4 MARRY + \beta_5 INDUS(65) + \beta_6 REGION(65) + u$$

where $\Delta OCCUP = OCCUP(70) - OCCUP(65)$; OCCUP(70) and OCCUP(65) are occupational standing in 1970 and 1965, respectively; MARRY is marital status; and u is a random disturbance term. Occupational change is specified to depend on the level of initial occupational attainment because omission of OCCUP(65) would likely bias downward the measured

effects of the other explanatory variables.[9] It is anticipated that the coefficient on past occupation (β_1) would be negative because given a finite occupational hierarchy, advancement should be negatively related to initial occupational level, other things being equal. However, β_1 should have a lower bound of -1 since a value less than -1 would imply an unrealistic inverse relationship between present and past occupation.

III. Data and Empirical Variables

The 5 percent questionnaires of the 1970 Census contain information on respondents' occupation, industry, and state of residence in 1965 as well as in 1970. It is this longitudinal aspect of the 1970 Census that allows an analysis of occupational mobility. The particular subset of the 1/1000 Census sample examined here includes males under age 35 who (1) are either black or white; (2) report an occupation, industry, and state of residence in both 1965 and 1970; (3) are employed at least part-year in 1969 (26 weeks or more); and (4) do not receive substantial (more than half of total earnings) self-employment earnings in 1969. The second criterion restricts the sample to males at least 19 years of age in 1970 who were working at a job or business in 1965.[10]

The dependent variable OCCUP is measured by three-digit occupational titles ordered by two ranking schemes. The first is the Duncan socioeconomic status index (abbreviated SES), which is an ordinal prestige scale that assigns a score between 0 and 100 to each occupational title. The alternative ranking scheme (abbreviated MED) assigns to each title the 1969 median wage and salary earnings (in hundreds of dollars) of the male members of the occupation in the experienced labor force.

The remaining variables are categorical with a dummy specification used for each. ED is measured by years of schooling completed, specified as six discontinuous steps (see Table 1). Formal vocational training is defined to include training programs in high school, as an apprentice, in for-profit proprietory schools and institutes, or in an Armed Forces school. For respondents who completed a vocational training program, TRAIN is categorized as follows: (1) training in business and office work, (2) training in trades and crafts, (3) training in engineering or as a science technician or draftsman, and (4) training in some other field (including nursing or other health fields and agriculture and home economics).

The variable INDUS is represented by ten major industry categories including (1) agriculture, forestry, fisheries, and mining; (2) construction; (3) durable goods manufacturing; (4) nondurable goods manufacturing; (5) transportation, communications, and other public utilities; (6) wholesale and retail trade; (7) finance, insurance, and real estate; (8) business, repair, and personal services; (9) professional and related services, including entertainment; and (10) public administration. REGION is categorized according to the following Census regional designations: West, North Central, North East, and South. Finally, MARRY is represented by two categories--married with spouse present, and otherwise.

IV. Empirical Results

Estimates of the coefficients in equation (1) were obtained by ordinary least squares for both the SES and MED ranking schemes, allowing full interaction by race. For each categorical variable, the modal

category was selected to serve as the characteristic of the reference group. Reference group characteristics thus included twelve years of schooling, no vocational training, 1965 employment in durable goods manufacturing, 1965 residence in the South, and married with spouse present.

Impact of Formal Training

Tables 1 and 2 report coefficient estimates obtained for ED and TRAIN, respectively.[10] Also shown in the last two columns of Table 1 are reference group intercept (β_o) and slope (β_1) estimates. Regressions were run for three separate dependent variables. The first four rows of the two tables show the impact of ED and TRAIN, respectively, on the level of 1970 occupational attainment. These estimates may be interpreted as representing both an indirect and a direct effect of the explanatory variables on occupational attainment, where the indirect effect occurs via the determination of OCCUP(65) and the direct effect occurs via the determination of ΔOCCUP.

Rows (5) - (8) of Tables 1 and 2 present the estimated impacts of ED and TRAIN on occupational change. The coefficients represent parallel shifts in the reference group relationship between ΔOCCUP and OCCUP(65). Finally, rows (9) - (12) display the results obtained by redefining ΔOCCUP as a dichotomous dependent variable that takes the value 1 if occupational upgrading occurred between 1965 and 1970 (that is, ΔOCCUP >0) and the value 0 otherwise. This specification converts equation (1) into a linear probability model in which the coefficients are interpreted as measuring the impacts of the explanatory variables on the conditional probability of upgrading.[11] In contrast, the dependent

Table 1

Regression Results for Education

Dependent Variable	Educational Attainment							
	<8 yrs.	8 yrs.	9-11 yrs.	12 yrs.	13-15 yrs.	16 + yrs.	Intercept	Slope
OCCUP(70)								
SES: Whites (1)	-13.56***	-10.71***	-7.84***	-	11.21***	32.19***	35.19***	
Blacks (2)	-7.44***	-9.12***	-5.37***	-	8.65***	31.68***	22.54***	
MED: Whites (3)	-14.39***	-10.39***	-7.46***	-	8.42***	27.95***	84.08***	
Blacks (4)	-7.80***	-6.33***	-4.69***	-	6.93***	23.55***	71.39***	
ΔOCCUP								
SES: Whites (5)	-7.25***	-6.22***	-4.60***	-	7.37***	17.92***	18.80***	-.47***
Blacks (6)	-3.67**	-4.71***	-3.32***	-	3.27**	12.47***	10.53***	-.34***
MED: Whites (7)	-9.19***	-6.76***	-4.35***	-	6.53***	17.49***	47.35***	-.55***
Blacks (8)	-5.01**	-3.92*	-3.31**	-	2.68	12.48***	35.33***	-.47***
Probability of upgrading								
SES: Whites (9)	-.180***	-.108***	-.087***	-	.165***	.283***	.623***	-.0093***
Blacks (10)	-.199***	-.130**	-.065**	-	.041	.174**	.479***	-.0087***
MED: Whites (11)	-.224***	-.141***	-.082***	-	.128***	.235***	1.078***	-.0089***
Blacks (12)	-.108**	-.084*	-.053*	-	.089*	.153*	.958***	-.0088***
Mean of ED:								
Whites	.04	.05	.17	.43	.17	.14		
Blacks	.10	.08	.32	.37	.10	.03		

***, **, and * denote significance at the .01, .05, and .10 levels, respectively, using a one-tail test.

Note: Other explanatory variables included in the regressions are TRAIN, INDUS(65), REGION(65), and MARRY.

Table 2

Regression Results for Vocational Training

Dependent Variable	Vocational Training Program			
	Business & Office	Trades & Crafts	Engineering/Sci. Tech.	Other Training
OCCUP(70)				
SES: Whites (1)	6.17***	0.22	13.92***	0.87
Blacks (2)	7.08**	-0.13	20.15***	2.23
MED: Whites (3)	3.21***	2.74***	12.07***	0.59
Blacks (4)	5.64	1.50	13.03**	-0.08
ΔOCCUP				
SES: Whites (5)	3.24***	0.12	8.30***	1.55*
Blacks (6)	1.48	-0.31	9.63***	1.31
MED: Whites (7)	1.84**	1.78***	8.37***	1.50
Blacks (8)	1.01	2.40	4.61	-0.49
Probability of upgrading				
SES: Whites (9)	.077***	.028**	.127***	.038*
Blacks (10)	.099	.104**	.251**	.036
MED: Whites (11)	.060***	.012	.104***	.020
Blacks (12)	.131*	.140***	.180*	.042
Mean of TRAIN:				
Whites	.04	.16	.03	.03
Blacks	.03	.11	.02	.03

***, **, and * denote significance at the .01, .05, and .10 levels, respectively, using a one-tail test.

Note: Other explanatory variables included in the regressions are ED, INDUS(65), REGION(65), and MARRY.

variable ΔOCCUP reflects both upgrading and downgrading. The final two rows of the tables show mean values of ED and TRAIN by racial group.

Looking first at Table 1, the ED coefficient estimates are generally of the expected sign and relative magnitudes, and most of the coefficients are significant at standard levels for both racial groups. In row (1), for example, a white college graduate with all other reference group characteristics is predicted to be a member of an occupation assigned an SES score some 32 points higher than that assigned the occupation predicted for the reference group (about 35). Relative to the reference group category of schooling, the occupational level results indicate that the impacts of successive increments of education are somewhat smaller for blacks than for whites, although strong positive relationships between schooling and occupational level are suggested for both racial groups.[12] The racial differences in estimated intercepts indicate, moreover, that the entire structure of returns is higher for whites than for blacks.

An example may be useful in clarifying the interpretation of the occupational change and upgrading probability results shown in rows (5) - (12) of Table 1. Consider the position of a white man with less than eight years of schooling. Using the MED ranking scheme and evaluating OCCUP(65) at the sample mean for whites, the reference group means shown in Table 3 indicate that a white man with twelve years of schooling moved to a 1970 occupation in which 1969 median earnings were more than $600 higher than 1969 median earnings in the occupation he occupied in 1965. The entry -9.19 in line (7) of Table 1 means that expected occupational mobility of an individual with less than eight years of schooling is about $900 less in median earnings than that of an

Table 3

Sample Means and Predicted Reference Group Means for Alternative Dependent Variables

Dependent Variable	SES		MED	
	Whites	Blacks	Whites	Blacks
OCCUP(70)				
Sample mean	38.43	24.11	80.93	65.82
Reference group mean	35.19	22.54	84.08	71.39
ΔOCCUP				
Sample mean	3.93	2.25	6.44	4.74
Reference group mean[a]	2.64	3.18	6.28	6.51
Probability of upgrading				
Sample mean	.319	.265	.364	.312
Reference group mean[a]	.304	.290	.410	.421

[a]Calculated using mean values of OCCUP(65) by race.

individual with twelve years of schooling. Hence, expected occupational change for this individual is a loss in occupational standing measured by about $300 in median earnings (-9.19 + 6.28 = -2.91).

Similarly, a white man with all reference group characteristics and the white mean of OCCUP(65) has a probability of .41 of moving to a 1970 occupation in which 1969 median earnings are higher than 1969 median earnings in his 1965 occupation. For a comparable white with less than eight years of schooling, the entry -.224 in line (11) of Table 1 implies a conditional probability of upgrading of only .19 (-.224 + .410 = .186).

The estimates in rows (5) - (12) of Table 1 indicate positive relationships between education and both expected occupational change and conditional probability of upgrading. The structure of returns, however, is somewhat more compressed for blacks than for whites. The slope estimates for both racial groups are strongly negative, indicating, other things being equal, that occupational change has the expected inverse relationship with initial occupational standing. Moreover, the racial difference in estimated intercepts is sufficiently large that despite somewhat steeper slopes, whites with reference group characteristics enjoy greater occupational advancement than do comparable blacks for any value of OCCUP(65). Table 3 shows that observed racial differentials in mean value of ΔOCCUP and upgrading probability are largely eliminated by standardizing for education and other reference group characteristics. But this is the case only because the mean values of OCCUP(65) used in the calculations are much lower for blacks than for whites.[13]

Equation (1) was also estimated for two restricted samples: males between the ages of 25 and 34 and males in blue-collar and service occupations in 1965. Estimates for the first restricted sample were obtained

because the criteria imposed in selecting the sample do not necessarily eliminate students who were working part-time in 1965. An upward bias in the education relationships may therefore be present, since greater occupational advancement is expected for individuals completing their schooling and moving from part-time to full-time employment than for individuals holding full-time jobs in both 1965 and 1970. This assumes that workers with high school and post-high school education in 1970 were more likely to have been students in 1965 than were other workers. The second restricted sample is examined to provide a closer look at the occupational mobility of relatively low-wage workers.[14] For both subsamples, generally the same patterns of education coefficients were obtained as those reported in rows (5) - (12) of Table 1. That is, occupational advancement is positively related to length of schooling for both full-time workers and low-wage workers, with the strength of the education relationship being somewhat greater for whites than for blacks.

Estimates calculated for the four categories of vocational training described previously are displayed in Table 2. The coefficients are generally positive as expected. Training programs in business and office work and in engineering/science technician skills are seen, in particular, to offer statistically significant returns in terms of both occupational level and occupational change. For both categories of training, the coefficients obtained in the black regressions often exceed the comparable coefficients for whites.

Restricting the sample to blue-collar and service workers resulted in occupational change and upgrading probability estimates that are generally larger than those shown in rows (5) - (12) of Table 2. Especially noteworthy are the significant coefficients obtained for

training programs in trades and crafts. The larger coefficients calculated for the restricted sample than for the entire sample are probably due to larger proportions of individuals working in the areas of their training in the subsample.[15] Again, no evidence of a racial differential in the impact of vocational training is apparent for blue-collar and service workers.

Sources of Racial Differentials in Occupational Mobility

Coefficient estimates may be combined with mean values of the explanatory variables to investigate the relative importance of formal training and of structural variables in explaining observed racial differentials in occupational mobility (see Table 3). The approach taken is to decompose the white-black differential in estimated mean values of occupational mobility into two parts: (1) racial differences in endowments measured by the means of the explanatory variables, and (2) racial differences in estimated coefficients that measure the "prices" blacks and whites receive for given characteristics.[16] Table 4 presents the results of a decomposition analysis using coefficients from the MED regressions on the dependent variable ΔOCCUP.

Column (1) of Table 4 shows the contribution of each explanatory variable to black occupational mobility, where contribution is measured by the variable's coefficient times its mean value. Summation yields an estimate of the mean of ΔOCCUP for blacks. Column (2) reports a similar analysis for whites.

In column (3), the contribution of each explanatory variable is shown for a hypothetical case in which blacks enjoy the same prices received by whites for given characteristics. That is, each black mean

Table 4

Decomposition of Racial Differential in Estimated Means of Occupational Change

Independent Variable	(1) Black Regr., Black Means	(2) White Regr., White Means	(3) White Regr., Black Means	(4) Effect of Different Endowments (2) -(3)	(5) Effect of Different Prices (3) - (1)
Intercept	35.33	47.35	47.35	0	12.02
OCCUP(65)	-28.82	-40.78	-33.41	-7.37	-4.59
ED	-1.23	2.11	-1.68	3.79	-0.45
TRAIN	0.37	0.65	0.48	0.17	0.11
INDUS(65)	-0.23	-1.01	-1.63	0.62	-1.40
REGION(65)	0.45	-0.80	-0.44	-0.36	-0.89
MARRY	-1.11	-1.02	-1.50	0.48	-0.39
Total	4.76	6.50	9.17	-2.67	4.41

Note: Estimates are calculated using MED regression estimates.

is multiplied by the corresponding white coefficient. The sum exceeds the total of column (2) primarily because, given the larger white intercept, the much smaller black mean of OCCUP(65) results in past occupational standing having a less negative impact on ΔOCCUP for blacks than for whites. Finally, column (4) measures the impact of differences in endowments weighted by white coefficients, while column (5) shows the impact of differences in prices weighted by black means. Entries in column (5) are nonzero only to the extent that the market differently evaluates identical traits if these traits are possessed by members of different racial groups.

The total of column (4) indicates that differences in endowments actually have a net negative effect on the size of the estimated differential largely because, as already noted, blacks start from a lower initial occupational level. Of the remaining variables, ED has by far the largest impact, with the greater educational endowments of whites (see Table 1) serving to increase the racial differential. Also contributing slightly to a positive differential are the facts that whites tend to have more vocational training, are more frequently married, and have a preferred 1965 industry distribution. The relatively heavy concentration of blacks in the South in 1965 serves to reduce the differential, because northern residence tends to have a small negative impact for whites.

Turning to column (5), a net positive impact of racial differences in prices is observed first because of the difference in estimated intercepts. Whites with reference group characteristics enjoy substantially greater upward mobility than do comparable blacks for every value of

OCCUP(65). The size of the differential is reduced, because the relationship between ΔOCCUP and OCCUP(65) is more steeply sloped for whites. A negative impact is also calculated for ED due to the relative compactness of the structure of returns to education for blacks. Racial differences in ED coefficients are negative for categories below twelve years of schooling and positive for those above twelve years. Since the negative differences are relatively heavily weighted by black means, the net effect of ED is to reduce the differential in ΔOCCUP. In other words, low levels of educational attainment reduce advancement opportunities less for blacks than for whites. A similar explanation accounts for the negative signs obtained for INDUS(65) and MARRY. TRAIN receives a positive entry reflecting a small positive price differential in favor of whites in the MED regressions. Finally, a negative entry for REGION(65) is recorded because, as noted, northern residence tends to have a negative impact for whites but not necessarily for blacks.[17]

The small size of the entries for INDUS(65) and REGION(65) in columns (1) and (2) reflects the small and often insignificant coefficients obtained for the individual categories of the variables, particularly for black men. Apparently, there is sufficient mobility between industries and geographic regions to make the impacts of initial industry and region on occupational advancement relatively small. This suggests that since the return to interfirm movement is likely to be associated with the personal characteristics of workers, the importance of industry structure in earnings functions estimated from cross-section data probably reflects an indirect effect of education and other personal characteristics.[18] That is, the mobility process tends to

result in the "best" workers, in the sense of potential productivity, moving to jobs in those industries offering the greatest earnings opportunities.

Impact of Industry and Geographic Shifts

To examine more closely the impact of interfirm shifts on occupational advancement, equation (1) was modified by the addition of two dummy explanatory variables. The first, ΔINDUS, measures movement from one to another of the ten major previously defined industry categories between 1965 and 1970. The second, ΔSTATE, represents change in state of residence over the 1965-1970 period. ΔINDUS is interacted with INDUS(65) since the impact of an industry shift is expected to depend on the occupational distribution of the industry moved from. More than one-third of blacks and whites in the sample changed industries, and about 10 percent moved between states. With the addition of ΔINDUS and ΔSTATE, reference group characteristics include twelve years of schooling, no vocational training, 1965 employment in durable goods manufacturing, 1965 residence in the South, being married with spouse present, no change in industry between 1965 and 1970, and no change in state of residence.[19]

Table 5 presents estimates of occupational change and conditional probability of upgrading by industry-change status and 1965 industry. The estimates are calculated from coefficient estimates obtained for INDUS(65), ΔINDUS, and corresponding interactions using MED regressions for blacks and whites. Reference group characteristics are assumed, and OCCUP(65) is evaluated at the sample mean for each racial group. The addition of ΔINDUS has the impact of increasing the

Table 5

Estimates of Occupational Change and Upgrading Probability for Individuals with Reference Group Characteristics, by Industry-Change Status and 1965 Industry

Industry-Change Status	1965 Industry: Ag./ Forestry	Con- struction	Durable Mfg.	Nondur. Mfg.	Public Utilities	Trade	Finance	Bus. Services	Prof. Services	Public Admin.
					Occupational Change					
Movers: Whites	14.2	2.3	6.3	5.3	5.4	12.9	6.5	6.2	10.6	2.3
Blacks	19.6	5.1	0.9	5.2	6.8	11.3	-4.0	12.0	9.0	4.7
Stayers: Whites	-6.0	6.8	7.6	7.3	7.0	3.2	9.6	3.0	1.3	6.6
Blacks	-8.1	5.7	7.0	2.0	5.1	3.5	8.1	1.3	-1.4	7.9
					Upgrading Probability					
Movers: Whites	.61	.49	.59	.59	.55	.61	.54	.56	.53	.50
Blacks	.71	.59	.52	.51	.56	.59	.48	.53	.56	.44
Stayers: Whites	.03	.24	.36	.35	.27	.32	.32	.19	.24	.22
Blacks	(-)	.17	.32	.12	.18	.19	.22	.06	.00	.23
Mean of INDUS(65):										
Whites	.04	.10	.21	.13	.08	.21	.04	.06	.09	.04
Blacks	.08	.09	.19	.16	.07	.19	.02	.06	.10	.04

Note: Estimates are calculated using MED regression estimates and mean values of OCCUP(65) by race.

magnitude of the coefficients on the individual past industry categories, and roughly one-half of the interaction terms are significantly different from zero.

One of the key features of the secondary sector in the dual labor hypothesis is a high rate of labor turnover. Market returns to job changing, however, are alleged to be low or nonexistent due to the barriers preventing access to primary sector employment. Since blacks are disproportionately confined to the secondary market, the impact of interindustry shifts would be expected to be lower for blacks than for whites with comparable personal characteristics. In contrast, Table 5 shows that industry shifters of both races gain substantially relative to industry stayers in terms of probability of upgrading, irrespective of initial industry. Gains in terms of expected occupational change are less striking because the greater risk of downgrading faced by industry shifters is ignored in the conditional probability estimates. However, movement from the agriculture/forestry, trade, and services sectors is seen to offer particularly high returns to blacks in terms of ΔOCCUP. Thus, the evidence does not indicate that blacks face more severe restrictions in achieving occupational advancement through interindustry mobility than do whites.[20] If an industry shift is accompanied by a change in state of residence, moreover, the relatively large positive estimates obtained in the black regressions for ΔSTATE suggest that blacks would tend to enjoy greater returns to mobility than would whites.[21]

Among the industry stayers shown in Table 5, whites generally enjoy a higher probability of upgrading than do blacks across industries,

after controlling for education and other explanatory variables. The estimates of expected occupational change are similar for blacks and whites, but a small advantage for whites is indicated for most industries. These findings for industry stayers are not inconsistent with the hypothesis of racially segregated seniority ladders in many industries.

V. Summary

The findings of this study can be summarized briefly.

1. Both young white men and young black men substantially improved their occupational standing during the 1965-1970 period. Occupational advancement was found to be strongly related to formal schooling and formal vocational training, with some racial differential indicated in the strength of the schooling relationship. In contrast, vocational training programs had comparable impacts on advancement for both blacks and whites.

2. Structural variables represented by initial industry and region had little or no effect in explaining occupational advancement or in accounting for the racial differential in average advancement. A more important factor in explaining the differential was the white-black difference in endowment of education.

3. Both young blacks and young whites enjoyed substantial occupational advancement as a result of interfirm shifts, as measured by change in major industry or state of residence. There is no evidence to support the market segmentation hypothesis that black turnover fails to result in upgrading because racial minorities are disproportionately confined to secondary sector jobs.

Notes

[1]Gary S. Becker, Human Capital (New York: National Bureau for Economic Research, 1964). The other pioneering study is J. Mincer, "On-the-Job Training: Costs, Returns, and Some Implications," Journal of Political Economy 70, no. 5, part 2 (October 1962): 50-79.

[2]Sherwin Rosen, "Learning and Experience in the Labor Market," Journal of Human Resources 7, no. 3, (Summer 1972): 326-42.

[3]See Peter B. Doeringer and Michael J. Piore, Internal Labor Markets and Manpower Analysis (Lexington, Mass.: D. C. Heath, 1971), p. 165.

[4]Ibid., p. 183.

[5]Results reported by Andrew Kohen for middle-aged men indicate that individuals who moved up the occupational ladder enjoyed a significantly larger increase in hourly earnings than did the occupationally immobile or the downwardly mobile. No evidence of a racial differential in this relationship is indicated. [See Kohen, "Occupational Mobility Among Middle-Aged Men." The Pre-Retirement Years, vol. 4 (Columbus, Ohio: Center for Human Resource Research, Ohio State University, 1974), pp. 115-51.].

[6]U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, Occupation and Residence in 1965, Final Report PC(2) - 7E (Washington, D.C.: Government Printing Office, 1973), Table 13.

[7]The occupational mobility of men aged 35-44 and 45-64 is analyzed in Duane E. Leigh, "An Analysis of the Determinants of Occupational Upgrading," a report prepared for the U.S. Department of Labor, 1975.

[8]Howard M. Wachtel and Charles Betsey, "Employment at Low Wages," Review of Economics and Statistics 54, no. 2 (May 1972): 121-29.

[9]For example, if ED and OCCUP(65) are positively correlated and OCCUP(65) and ΔOCCUP are negatively correlated, the assumption $\beta_1=0$ would result in a coefficient estimate for ED that understates the true impact of education on ΔOCCUP. The magnitude of the downward bias depends directly on the size of the two correlation coefficients.

[10]Approximately 7800 whites and 700 blacks are included in the under-35 sample. The sample size varies slightly by ranking scheme since SES and MED scores could not be obtained for every three-digit occupational title. Complete regression results are included in an appendix available from the author upon request.

[11]The primary problem in estimating and predicting from a linear probability model is that the predicted value of the dependent variable is unbounded even though its interpretation as a probability requires that it lie in the unit interval. Lansing and Morgan suggest that the interpretation of the calculated value of a dummy dependent variable as a conditional probability is safest if the proportion of the sample assigned the value 1 on the dependent variable is between .20 and .80 for most subgroups. This is the case for the under-35 age cohort. [See J. B. Lansing and James N. Morgan, Economic Survey Methods (Ann Arbor: Institute for Social Research, The University of Michigan, 1971), p. 296.]

[12]As an ordinal index, comparisons of differences in SES scores have no meaning except for differences of opposite sign. Comparisons of differences discussed in the text are thus based on estimates from the MED regressions.

[13]Mean values of OCCUP(65) are 34.39 and 21.81, respectively, for whites and blacks using SES scores; and for MED scores, means are 74.68 and 61.19, respectively.

[14]Separate analysis of this subsample also allows for the possibility that advancement within white-collar occupations may be disproportionately understated by occupational change measured at the three-digit level.

[15]See Richard B. Freeman, "Occupational Training in Proprietary Schools and Technical Institutes," Review of Economics and Statistics 56 (August 1974): 310-18.

[16]Using βj and $\bar{X}j$ to denote the coefficient and mean, respectively, of the jth independent variable, what is essentially involved is decomposing the estimated racial differential as follows:

$$\Sigma_j \beta_j^w \bar{X}_j^w - \Sigma_j \beta_j^b \bar{X}_j^b = \Sigma_j \beta_j^w (\bar{X}_j^w - \bar{X}_j^b) + \Sigma_j \bar{X}_j^b (\beta_j^w - \beta_j^b)$$

where the superscripts w and b represent whites and blacks, respectively. For a more complete description of this approach see Alan S. Blinder, "Wage Discrimination: Reduced Form and Structural Estimates," Journal of Human Resources 8 (Fall 1973): 436-55.

[17]An alternative decomposition approach involves weighting racial differences in means by black coefficients and weighting racial differences in coefficients by white means. This approach was carried out with the analysis yielding the same conclusions as those drawn from Table 4.

[18]For example, Wachtel and Betsey conclude from their cross-section analysis that structural variables dominate personal characteristics in explaining variation in wages. (Wachtel and Betsey, "Employment at Low Wages.") Similarly small and frequently insignificant estimates for INDUS(65) and REGION(65) were obtained for the subsample of blue-collar and service workers.

[19]Also included in the regressions is an urban-rural 1970 residence dummy.

[20]The results of further analysis of the imapct of interfirm and interindustry shifts on occupational advancement are reported in Duane E. Leigh, "Occupational Advancement in the Late 1960s: An Indirect Test of the Dual Labor Market Hypothesis," Journal of Human Resources, forthcoming.

[21]Using MED regression estimates, a change in state of residence increases predicted ΔOCCUP by about 2 for whites but by 5.4 for blacks.