THE EARNINGS OF WOMEN AND ETHNIC MINORITIES, 1959–1979

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Using 1980 Census data, the authors present estimates of annual earnings equations for twelve ethnic and racial groups, by gender, for 1979, and compare their results with an earlier study's estimates for 1959 and 1969. All minority men and women except Asian Indian and Japanese men earned less than white men in the years for which data were available. The earnings gap for most groups of men and women, however, declined over those years, and the portion of that gap that might be assignable to discrimination (the unexplained "residual") also declined. A notable exception was white women, whose mean earnings relative to white men's changed little between 1969 and 1979, even when corrected for differences in productive characteristics.

Did the gap in earnings between white women and white men, or that between white men and ethnic minorities, narrow in the 1970s? The fate of different groups in the labor market is a subject of continued concern. It is generally agreed that the annual earnings of black women improved relative to those of both black men and white women in the 1970s (Kaufman 1986:360) and that the earnings of all full-time female workers stayed constant (at about 62 percent) relative to those of men from 1973 to 1979 and then rose (to 70 percent) by 1986 (Pear 1987:1); but the research finding that the earnings of black men rose relative to those of white men in the 1960s has been greeted with skepticism (Butler and Heckman 1977; Freeman 1973, 1981; Smith 1984; and Smith and Welch 1986).

The evidence on racial/ethnic groups other than blacks (and, to a lesser extent, Hispanic Americans) is particularly scanty and open to debate. Because such groups vary greatly in important characteristics, evidence on one group cannot safely be generalized to other groups (Sowell 1981). Among the first researchers to examine the earnings of a large number of racial/ethnic groups were Gwartney and Long (1978). In this paper we analyze the annual earnings of twelve racial and ethnic groups in 1979 and compare our results to Gwartney and Long's similar estimates for 1959 and 1969. Because we replicate, as far as possible, the sampling procedure and method of analysis of the earlier study, we are able to examine historical changes in earnings (over ten to

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Industrial and Labor Relations Review, Vol. 41, No. 4 (July 1988).
0019-7939/88/4104 $01.00

twenty years) of more ethnic groups than have been included in any similar study of earnings differentials.[1]

Previous Studies

The earnings of Hispanic Americans have been studied more often than those of any other groups except white and black Americans.[2] Reimers (1983), using Survey of Income and Education (SIE) data for 1975, found that the geometric mean of wages of Mexican, Puerto Rican, Cuban, and non-Hispanic black men were 74, 80, 91, and 79 percent, respectively, of the wages of white men.[3] Corrected for productive characteristics and selection bias, the geometric mean wages were 94, 84, 106, and 87 percent of those of white men. McManus, Gould, and Welch (1983), who also used SIE data for 1975, estimated a wage equation that included variables to measure English language proficiency. They concluded that language skills accounted for virtually all of the unexplained residual in earnings for Hispanic Americans in 1975. (Grenier 1984 reaches a similar conclusion; see also McManus 1985.) They also found that the mean weekly earnings of Hispanic women were 78.3 percent of those of white women. Among Hispanics, Cuban women had the highest and Mexican women the lowest weekly earnings (McManus, Gould, and Welch 1983:106, 107). (See also Gould, McManus, and Welch 1982.) A smaller percentage of Hispanic women than of white women were in the work force.

Chiswick (1983) found, using 1969 Census data, that both Chinese and Japanese men born in the United States had more education and higher earnings than white men. Dummy variables in a pooled regression indicated that their weekly earnings were slightly lower than those of white men with similar characteristics, but only the dummy for Japanese men was statistically significant. Filipino men born in the United States earned 74 percent as much as white men, and an unexplained earnings gap of 16 percent remained when earnings were corrected for personal characteristics. Sandefur and Scott (1983), using 1975 SIE data, found that the geometric means of the wages of American Indian and black men were 82 and 77 percent of those of white men.

Gwartney and Long estimated a reduced-form earnings equation from Census data for nine separate ethnic/racial groups by gender and analyzed the earnings gap for each group using standard decomposition techniques. They found marked differences among groups in earnings and such productive characteristics as the average level of education. These productive characteristics explain over half of the earnings gap for most groups, but for Chinese, black, and Filipino men and American Indian women, "[more than half] of the earnings disadvantage must be attributed to such factors as employment discrimination and differences in family or class background" (Gwartney and Long 1978:346).

In comparing minority men to white men, Gwartney and Long found that "Japanese, Puerto Rican, and black males recorded large gains in relative earnings during the 1960s, but other minorities made little improvement" (1978:346). One comparison they did not make was that be-

[1] One reviewer of this paper correctly noted that Gwartney and Long's reduced form earnings equations did not exploit the full range of econometric possibilities. Although we agree, we believe it is appropriate to follow their methodology as closely as possible. An important part of our research is a comparison of the relative earnings of women and members of ethnic minorities in 1979 with their relative earnings in 1959 and 1969. Deviating from Gwartney and Long's estimated model, sample, or estimating techniques would make it difficult to compare our estimates with theirs. See Kaufman (1986:383) and Ehrenberg and Smith (1985:448) for a comparison of Gwartney and Long's findings with those of other studies. See Killingsworth (1983) for a detailed discussion of many of the econometric problems involved in estimating labor supply equations.

[2] In addition, some studies focus entirely on the experience of immigrants. See, for example, Borjas (1983) and Chiswick (1978).

[3] We have converted differences in the means of the natural logarithm of wages reported in Reimers (1983) to the geometric mean of Hispanic or black men as a percentage of those of white men to facilitate comparisons with Table 6. We also make this conversion for Sandefur and Scott's (1983) estimates of the wages of American Indian and black men in 1975 (cited in the next paragraph).

tween white men and white women. In this study we do make that comparison, both for 1979, using our estimates, and for 1969, using their estimates and unpublished data they provided. We also include in the analysis three ethnic groups for whom sufficient data were not available at the time of Gwartney and Long's study: Asian Indians, Vietnamese, and Koreans. We examine the relative earnings of minority men and all women relative to white men for 1979 and analyze the changes in earnings that occurred in the 1970s.

Methodology and Regression Results

The sample consists of persons aged eighteen or older in urban areas of twenty selected states who reported positive earnings in the year preceding the Census (1979) (part-time workers are included).[4] The racial/ethnic groups are American Indians, Asian Indians, blacks, Chinese, Cubans, Filipinos, Japanese, Koreans, Mexican Americans, Puerto Ricans, Vietnamese, and whites.[5] The 1980 Census included one question pertaining to the person's racial/ethnic background and one pertaining to Hispanic affiliation, making it possible to classify a respondent as belonging to any combination of racial and Hispanic groups. Consequently, there is some overlap among the three Hispanic groups and the other ethnic/racial groups.[6] The sample states together contain 60.2 percent of the nation's American Indians and over 70 percent of the total population of every other minority group in our study (U.S. Bureau of the Census 1983).

The dependent variable in our regression analysis is the natural logarithm of the reported annual earnings in 1979. The independent variables are years of education completed and its square (GRADE, GRADESQ), five dummy variables for age (AGE18–24, AGE25–34, AGE45–54, AGE55–64, and AGE65+; 35–44 is the omitted group), an estimate of the number of hours worked in 1979 (usual hours worked per week multiplied by the number of weeks worked in the preceding year) (HRSWRKD), dummy variables for whether the individual was married (MARRIED), was born abroad (FORBIRTH), or spoke a language other than English at home (NO ENGLISH), and three dummy variables for location of residence (DC [District of Columbia], HAWAII, and SOUTH).[7]

Summary of Regression Results

Tables 1 and 2 report the regression results for men and women. For every group the adjusted R-square is higher than for the corresponding 1969 equation, indicating that our estimated regression equations fit the observations more closely

[4] The 1980 data are from the Public Use Microdata C-Sample (1 percent). The states are Alabama, Alaska (outside the Anchorage SMSA), California, Delaware, District of Columbia, Florida, Georgia, Hawaii, Illinois, Louisiana, Maryland, Michigan, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, and Texas. Gwartney and Long did not use Maryland or Delaware, but in the Census sample we use, those two states could not be separated from Alaska and Hawaii. In no case did the number of observations in Maryland and Delaware exceed 6 percent of the total sample for the group. The proportion of observations in Alaska and Hawaii is less than 4 percent for every group except Japanese (approximately 40 percent), Filipinos (approximately 15 percent), and Chinese (approximately 8 percent). The bulk of the observations for these groups are in Hawaii (U.S. Census 1983). Readers interested in obtaining a copy of the tape containing our sample should write to Professor Leonard Carlson, Department of Economics, Emory University, Atlanta, Georgia 30322.

[5] Gwartney and Long used a subsample of whites and blacks in computing their estimates. We include 5 percent of the whites, 50 percent of the blacks, and all members of other ethnic groups in the Census sample in making our estimates. Three of the groups that we include are not included in Gwartney and Long's study: Asian Indians, Koreans, and Vietnamese. The 1980 racial/ethnic questions result in more Hispanics and American Indians in the 1980 Census than in the 1970 study. These differences may affect our results, and the reader should keep them in mind when comparing our results to Gwartney and Long's.

[6] Cubans are about 85 percent white and 10 percent Spanish; Mexican Americans and Puerto Ricans are about 53 percent white and 40 percent Spanish.

[7] Gwartney and Long include two dummy variables not available in 1979: whether a person's parents are foreign-born and whether a person lives in a metropolitan area.

Table 1. Effects of Various Factors on the Annual Earnings of Men of Twelve Racial/Ethnic Groups, 1979.
(standard errors in parentheses)

Variable	*American Indians*	*Blacks*	*Asian Indians*	*Chinese*	*Filipinos*	*Japanese*	*Koreans*	*Vietnamese*	*Cubans*	*Mexicans*	*Puerto Ricans*	*Whites*
Constant	7.480**	7.581**	7.761**	7.648*	8.178**	8.178**	8.270**	6.943**	7.900**	7.598**	7.692**	7.643**
	(0.155)	(0.051)	(0.273)	(0.122)	(0.171)	(0.241)	(0.424)	(0.335)	(0.131)	(0.036)	(0.094)	(0.066)
GRADE	0.022	−0.014*	−0.016	−0.023	−0.024	−0.048	−0.043	−0.027	−0.033*	0.021**	−0.011	0.025**
	(0.025)	(0.008)	(0.032)	(0.015)	(0.023)	(0.033)	(0.055)	(0.044)	(0.017)	(0.005)	(0.014)	(0.009)
GRADESQ	0.001	0.003**	0.003**	0.004**	0.002*	0.003**	0.004*	0.003*	0.003**	0.001**	0.003**	0.001**
	(0.001)	(0.0004)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.0018)	(0.0007)	(0.003)	(0.001)	(0.0004)
AGE18–24	−0.490**	−0.656**	−0.669**	−0.516**	−0.636**	−0.702**	−0.685**	−0.087	−0.452**	−0.479**	−0.551**	−0.635**
	(0.064)	(0.021)	(0.129)	(0.075)	(0.071)	(0.065)	(0.160)	(0.117)	(0.063)	(0.020)	(0.046)	(0.023)
AGE25–34	−0.030	−0.112**	−0.247**	−0.071	−0.260**	−0.161**	−0.130	−0.026	0.013	−0.094**	−0.122**	−0.192**
	(0.056)	(0.017)	(0.057)	(0.050)	(0.048)	(0.049)	(0.092)	(0.091)	(0.054)	(0.017)	(0.036)	(0.018)
AGE45–54	0.209**	0.094**	−0.009**	0.136*	0.104*	0.136**	0.003	−0.062	0.076	0.094**	0.137**	0.075**
	(0.071)	(0.021)	(0.091)	(0.058)	(0.061)	(0.055)	(0.104)	(0.130)	(0.048)	(0.022)	(0.045)	(0.021)
AGE55–64	0.001	0.074**	−0.233	0.149*	−0.181*	−0.030	−0.123	−0.122	−0.017	0.036	0.066	0.048**
	(0.086)	(0.024)	(0.173)	(0.069)	(0.078)	(0.058)	(0.166)	(0.201)	(0.056)	(0.027)	(0.060)	(0.022)
AGE65+	—	−0.314**	—	−0.207*	−0.705**	−0.609**	—	—	−0.447**	−0.182**	−0.328**	−0.403*
	—	(0.040)	—	(0.108)	(0.001)	0.001**	—	—	(0.084)	(0.0506)	(0.122)	(0.035)
HOURS WRKD	0.0007**	0.0007**	0.0006**	0.0006**	0.0005**	0.0006**	0.0006**	0.0010**	0.0005**	0.0006**	0.0006**	0.0006**
	(0.00003)	(0.00001)	(0.00004)	(0.00002)	(0.00003)	(0.00002)	(0.00004)	(0.00005)	(0.00002)	(0.00001)	(0.00002)	(0.00001)
MARRIED?	0.312**	0.228**	0.265**	0.280**	0.239**	0.367**	0.186	0.140*	0.354**	0.251**	0.215**	0.325**
	(0.046)	(0.014)	(0.075)	(0.046)	(0.050)	(0.041)	(0.120)	(0.081)	(0.044)	(0.015)	(0.031)	(0.016)
NOENGLISH	−0.188**	−0.047	−0.170*	−0.051	−0.032	−0.081*	−0.441*	0.082	—	−0.107**	−0.099*	−0.147*
	(0.0524)	(0.030)	(0.072)	(0.056)	(0.064)	(0.042)	(0.174)	(0.179)	—	(0.018)	(0.044)	(0.025)
FORBIRTH	—	−0.051*	0.049	−0.205**	−0.036	−0.030	0.093	—	0.013	−0.019	0.010	−0.026
	—	(0.028)	(0.137)	(0.051)	(0.069)	(0.050)	(0.189)	—	(0.062)	(0.014)	(0.035)	(0.027)
DC	—	0.140**	—	—	—	—	—	—	—	—	—	—
	—	(0.039)	—	—	—	—	—	—	—	—	—	—
HAWAII	—	—	—	−0.025	−0.014	−0.023	−0.228	−0.179	—	—	—	—
	—	—	—	(0.068)	(0.051)	(0.036)	(0.169)	(0.220)	—	—	—	—
SOUTH	−0.234**	−0.155**	−0.073	−0.172*	−0.215**	−0.349**	−0.002	−0.0603	−0.121**	−0.186**	−0.168**	−0.124**
	(0.047)	(0.013)	(0.072)	(0.076)	(0.081)	(0.116)	(0.115)	(0.096)	(0.035)	(0.037)	(0.044)	(0.027)
N	1511	18765	902	1971	1613	1761	546	349	2192	17097	3385	13421
Adjusted R^2	0.449	0.436	0.461	0.478	0.425	0.548	0.460	0.580	0.391	0.376	0.392	0.506

Source: U.S. Census (1980), Public Use Micro-Data C-Sample (1 percent).
* Significant at the 0.10 level; ** significant at the .01 level (two-tailed tests).

Table 2. Effects of Various Factors on the Annual Earnings of Women of Twelve Racial/Ethnic Groups, 1979. (standard errors in parentheses)

Variable	*American Indians*	*Blacks*	*Asian Indians*	*Chinese*	*Filipinos*	*Japanese*	*Koreans*	*Vietnamese*	*Cubans*	*Mexicans*	*Puerto Ricans*	*Whites*
Constant	7.096**	7.057**	7.175**	7.031**	7.645**	7.192*	8.251**	7.369**	7.378**	6.811**	7.169**	6.670**
	(0.235)	(0.062)	(0.319)	(0.134)	(0.171)	(0.223)	(0.330)	(0.353)	(0.142)	(0.046)	(0.119)	(0.087)
GRADE	−0.050	−0.040**	0.004	0.009	−0.106**	−0.027	−0.128**	−0.017	−0.018	−0.016*	−0.034*	−0.013
	(0.037)	(0.010)	(0.040)	(0.017)	(0.024)	(0.033)	(0.043)	(0.052)	(0.019)	(0.007)	(0.019)	(0.013)
GRADESQ	0.004**	0.005**	0.002	0.002**	0.007**	0.003**	0.008**	0.002	0.003**	0.003**	0.004**	0.003**
	(0.002)	(0.0004)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.0004)	(0.001)	(0.001)
AGE18–24	−0.447**	−0.493**	−0.447**	−0.365**	−0.292**	−0.339**	−0.355**	−0.107	−0.362**	−0.232**	−0.443**	−0.255**
	(0.077)	(0.020)	(0.141)	(0.076)	(0.062)	(0.064)	(0.119)	(0.143)	(0.058)	(0.023)	(0.052)	(0.024)
AGE25–34	−0.122*	−0.037*	−0.170*	0.066*	−0.113**	−0.075	−0.034	0.098	0.048	−0.010	−0.026	−0.017
	(0.068)	(0.017)	(0.088)	(0.055)	(0.044)	(0.052)	(0.086)	(0.112)	(0.053)	(0.020)	(0.044)	(0.022)
AGE45–54	0.175*	0.037*	−0.016	0.217**	−0.031	0.106*	0.109	0.386*	−0.071	0.037	0.042	0.086**
	(0.089)	(0.020)	(0.164)	(0.071)	(0.059)	(0.054)	(0.114)	(0.202)	(0.051)	(0.027)	(0.055)	(0.025)
AGE55–64	−0.064	−0.008	0.038	0.027	−0.128	0.019	−0.405*	0.237	−0.103*	0.051	0.023	0.164**
	(0.106)	(0.025)	(0.215)	(0.083)	(0.091)	(0.064)	(0.191)	(0.337)	(0.057)	(0.037)	(0.078)	(0.027)
AGE65+	−0.534*	−0.341**	−0.266	−0.050	−0.178	—	—	—	−0.115	—	−0.080	−0.084*
	(0.215)	(0.042)	(0.262)	(0.154)	(0.205)	—	—	—	(0.102)	—	(0.154)	(0.042)
HOURS WRKD	0.0010**	0.0009**	0.0009**	0.0009**	0.0009**	0.0009**	0.0008**	0.0008**	0.0008**	0.0010**	0.0010**	0.0011**
	(0.00003)	(0.00001)	(0.00005)	(0.00003)	(0.00003)	(0.00003)	(0.0001)	(0.0001)	(0.00002)	(0.00001)	(0.00002)	(0.00001)
MARRIED	0.0003	0.043**	−0.065	−0.013	0.076*	−0.057	−0.073	−0.106	0.060	0.053**	−0.014	−0.035*
	(0.0510)	(0.0123)	(0.106)	(0.048)	(0.040)	(0.041)	(0.085)	(0.102)	(0.037)	(0.016)	(0.033)	(0.016)
NOENGLISH	−0.098	0.024	−0.143	−0.083	−0.004	−0.096*	−0.007	−0.05912	−0.145	−0.068**	0.001	−0.003
	(0.064)	(0.033)	(0.104)	(0.063)	(0.063)	(0.044)	(0.120)	(0.194)	(0.090)	(0.021)	(0.052)	(0.028)
FORBIRTH	—	−0.004	0.041	−0.184**	−0.134*	−0.116*	−0.432*	—	0.093	0.041**	−0.102**	0.040
	—	(0.028)	(0.143)	(0.055)	(0.071)	(0.049)	(0.198)	—	(0.077)	(0.018)	(0.039)	(0.032)
DC	—	0.289**	—	—	—	—	—	—	—	—	—	—
	—	(0.038)	—	—	—	—	—	—	—	—	—	—
HAWAII	—	—	—	−0.064	−0.101*	−0.009	−0.069	−0.298	—	—	—	—
	—	—	—	(0.083)	(0.055)	(0.038)	(0.132)	(0.251)	—	—	—	—
SOUTH	−0.197**	−0.179**	−0.298**	−0.270**	−0.186*	−0.099	−0.175*	0.075	−0.144**	−0.053	−0.054	−0.072**
	(0.057)	(0.013)	(0.102)	(0.089)	(0.075)	(0.105)	(0.098)	(0.121)	(0.036)	(0.048)	(0.055)	(0.017)
N	1201	18675	546	1537	1695	1586	570	233	1790	10982	2264	10245
Adjusted R^2	0.518	0.468	0.459	0.490	.525	0.518	0.466	0.439	0.429	0.491	0.486	0.576

Source: Same as Table 1.

* Significant at the .10 level; ** significant at the .01 level (two-tailed tests).

than did the earlier study. Our estimated coefficients for 1979 generally agree with Gwartney and Long's for 1969 in sign, size, and statistical significance.

We can derive the implied rates of return to education by evaluating the partial derivative of education for a given level of education.[8] The rates of return for an additional year of education when a person has twelve years of schooling range from three to seven percent for men and from four to eight percent for women. The rates of return to one more year of education following sixteen years of schooling range from four percent to nearly eleven percent for men and from four percent to more than twelve percent for women. Measured at 16 years of education (college graduates), Chinese men had the highest rate of return to education for men, and black women had the highest rate for women. The rates of return to education we derive are broadly consistent with Gwartney and Long's results (1978:342).

Following Gwartney and Long, we include the age variables in the regression as a proxy for potential work experience.[9] For most groups, the estimated log earnings-age profile has the usual inverted-U shape. The coefficients are more likely to be statistically significant for the youngest and oldest age groups than for intermediate age groups.

For both men and women, the estimated coefficients of the number of hours worked per year are positive and statistically significant. An increase of two hours per week over the course of a year (100 hours total) would increase wages by five to ten percent.

Our estimates show that married men earned 14 percent to 37 percent more than single men, a difference that is statistically significant for all groups except Koreans. For women, being married is associated with higher earnings in some cases and lower earnings in others, and the effect is statistically significant in only four cases.

Speaking a language other than English at home generally had a negative impact on earnings. This effect is statistically significant for only some groups of men, however, and for even fewer groups of women. The estimated coefficients for FORBIRTH are of mixed signs and are not significant in most cases.

Dummy variables for geographic location of residence indicate higher earnings in the District of Columbia and lower earnings in Hawaii and the South. Some of the coefficients on these variables are significant.

Comparison of Earnings Across Groups

Following Gwartney and Long (1978) and most similar studies, we measure the difference in annual earnings between groups (the earnings gap) as the difference in the mean of the log of earnings for each group. We analyze the gap by separating it into the portion attributable to differences in the average characteristics of the two groups (education, age, marital status, and so on) and the portion attributable to differences in treatment in the labor market.[10]

The part of the earnings gap attributable to differences in personal characteristics, which we refer to as the "explained portion" of the gap, is an average of the intergroup differences in the means of the independent variables, weighted by either the whites' coefficients or the minority's coefficients. The "unexplained portion" of the gap, which is the difference between the total gap and the explained portion, is a weighted average of the difference in the coefficients of the estimated earnings

[8] A table similar to Gwartney and Long's, showing implied rates of return to one more year of school for 8, 12, and 16 years of education, is available from the authors on request.

[9] For women, who may have had more interruptions in their labor-force participation, this variable is not as good a proxy for work experience as it is for men. When comparing relative earnings of minority groups of the same gender, the problem seems less substantial if work experience patterns remain similar for each group (Gwartney and Long 1978:337).

[10] The algebra for decomposing the earnings gap has been developed elsewhere. See Oaxaca (1973), Gwartney and Long (1978), and Kaufman (1985).

equations, using either the means of the minority's (or white women's) independent variables or the means of the reference group (white men in Tables 3 and 5 and white women in Table 4) as weights.

Gwartney and Long use only minority means as weights, because "the earnings functions of most minorities, in the absence of discrimination, are most likely to be closer to the white one, rather than vice versa" (1978:339). But we report results for both white and minority means to test the sensitivity of our results to the weights used. We report only the total gap and the unexplained gap because the explained portion can be found by subtracting the unexplained portion of the gap from the total gap.[11]

The unexplained portion of the earnings gap (the residual) reflects the variation in earnings associated with gender or ethnicity when all other factors included in the earnings equation are held constant, and it often finds use as a measure of the impact of discrimination on earnings. The residual may overstate the impact of discrimination on earnings if factors omitted from the earnings equation are correlated with gender or ethnicity when other included factors are held constant. It is also possible, however, that the residual *under*states the impact of discrimination, because discrimination may discourage labor-force participation, the acquisition of on-the-job training, and other forms of human capital investment (Kaufman 1986:383–84).

Analysis of Differences in Earnings, 1979

Tables 3 and 4 report the comparison of minority earnings to white earnings for men and women, respectively. Table 5 compares the earnings of women with those of white men. Three features of Tables 3–5 should be noted. First, a negative earnings gap indicates that a group has a larger geometric mean of observed earnings than the group to which it is compared (white men or white women). Second, if the unexplained portion is greater than 100 percent of the earnings gap, then the group has more productive characteristics (education, experience, and so forth), on average, than do whites. Finally, if the unexplained portion of the gap is negative, then the minority's earnings equation yields higher earnings for a given set of attributes than the earnings equation of whites.[12]

Minority Men Compared to White Men

Asian Indian and Japanese men earned more than white men in 1979. As shown by the positive sign in column six of Table 3 (the unexplained portion), however, if Asian Indians had been paid according to the earnings equation of white men, their earnings would have increased. As the negative sign in column six indicates, Japanese men would have earned slightly less than they actually did if they had been paid according to the earnings equation of white men. Two characteristics of Asian Indian men (not shown in Table 3) that help explain their higher earnings are their higher education (a mean of 16.4 years versus 13.0 for white men) and smaller percentages in the younger age groups. Japanese Americans also had more education than did white Americans (a mean of 13.9 years). These advantages

[11] We also estimated wage equations for each of the groups in our study. The results for men did not substantially alter our conclusions. For women, the hourly earnings were closer to those of white men than either the actual or corrected total earnings reported in Tables 6 and 7. These results are available from the authors on request.

[12] The decomposition of earnings uses point estimates of the earnings functions, implicitly assuming that the earnings functions are different for the various groups. Chow tests show that the earnings functions of minority men and white men (except Cubans and Asian Indians), of minority women and white women, and of all women and white men are statistically different at the 5 percent level. Two tests were performed for each comparison. The first null hypothesis was that the slopes and intercepts are the same. The second hypothesis was that the slopes were the same and the intercepts different. (See Johnston 1985:207–19 for a description of the Chow test.)

Table 3. Annual Earnings of Minority Men Compared to Annual Earnings of White Men, 1979.

Group	$\overline{Y}$	Relative Earnings (Percent)	$\overline{\ln Ym}$	Earnings Gap ($\ln Yw - \ln Ym$)	Minority Mean Weights		White Mean Weights	
					Unexplained Portion	Percent of Gap	Unexplained Portion	Percent of Gap
American Indian	$12,607	73.6	9.037	0.338	0.101	30.0	0.120	35.5
Black	$11,485	67.0	8.945	0.430	0.169	39.2	0.147	34.3
Asian Indian	$19,416	113.3	9.515	−0.140	0.023	−16.4	0.154	−110.1
Chinese	$15,203	88.8	9.181	0.194	0.121	62.3	0.130	66.9
Filipino	$13,585	79.3	9.177	0.198	0.103	52.0	0.179	90.4
Japanese	$17,901	104.5	9.428	−0.053	−0.006	11.4	0.002	−3.4
Korean	$15,311	89.4	9.167	0.208	0.199	95.7	0.047	22.7
Vietnamese	$10,881	63.5	8.952	0.423	0.021	4.9	0.208	49.1
Cuban	$13,586	79.3	9.161	0.214	0.041	19.3	0.140	65.2
Mexican	$11,310	66.0	8.987	0.388	0.023	6.0	0.100	26.7
Puerto Rican	$10,866	63.4	8.954	0.421	0.054	12.9	0.111	26.3
Whites	$17,130	100.0	9.375					

Source: Same as Table 1.

$\overline{Y}$ = Mean earnings.

Relative Earnings: Mean annual earnings as a percentage of mean annual earnings of white men.

$\overline{\ln Y}$: Mean of the natural logarithm of annual earnings.

Earnings gap: Mean of the natural logarithm of the earnings of the group minus mean of the natural logarithm of the earnings of white men.

For Minority Mean Weights, the Unexplained Portion equals the mean of the natural logarithm of earnings minus the mean of the natural logarithm of earnings if group members were paid according to the earnings equation for white men.

For White Mean Weights, the Unexplained Portion equals the mean of the natural logarithm of earnings of white men minus the mean of the natural logarithm of earnings of white men if they were paid according to the earnings equation for members of that group.

appear to have offset the handicap suffered by both groups of having substantial numbers of persons who did not speak English at home.

All other male minority groups earned less than white men, and in all cases these groups would have earned more than they did if they had been paid according to the earnings equation of white men.[13] Less than 20 percent of the observed gap would have remained for Vietnamese, Cubans, Mexicans, and Puerto Ricans if they had been paid like white men; more than 50 percent of the gap would have remained for Chinese, Filipinos, and Koreans.

Three factors (not shown in Table 3) that largely account for the explained portion of the gap for Mexican Americans and Puerto Ricans are lower education, a higher proportion of people who do not speak English at home, and fewer hours worked. For Cubans the pattern is the same except that their hours worked are similar to the figure for white men and explain little of the gap. The unexplained portion of the earnings gap is relatively small for all three groups.[14]

Lower levels of education and fewer hours worked also account for a substantial share of the explained portion of the gap for blacks and American Indians. Chinese and Koreans have more education than do white men (with means of 13.7 and 14.5 years, respectively). Fewer hours worked and a higher proportion of persons who do not speak English at home than for white men accounts in large measure for the explained portion of the earnings gap for Chinese, Koreans, Filipinos, and Vietnamese.

The use of the means of the independent variables of white men as weights to decompose the earnings gap yields results similar to those just discussed. The only important difference is that the resulting unexplained portion of the gap is larger for every group except Koreans and blacks than it is when we use minority means as weights.

Minority Women Compared to White Women

Table 4 compares the earnings of minority women with those of white women. Relative earnings range from 77 percent to 123 percent of the white women's average earnings. As measured by a negative earnings gap, six groups of minority women—Asian Indians, Chinese, Filipinos, Japanese, Koreans, and Cubans—earned more than did white women.[15] Factors not shown in Table 4 that account for these groups' higher earnings are differences in education, hours worked, and the proportion foreign-born. The absolute value of the earnings gap is greater than 0.15 for American Indian, Filipino, Japanese, and Mexican women. Filipino and Japanese women earned more than did white women both because they enjoy more productive characteristics and because their earnings equation paid them more than if they had been paid according to the earnings equation of white women. As indicated by the negative sign in column six of Table 4, paying these women according to white women's earnings equation would have decreased their earnings and narrowed the earnings gap.

[13] Chiswick (1983) found that in 1969 Chinese men born in the United States earned more than white men. The lower earnings of Chinese men in our estimates for 1979 and Gwartney and Long's for 1969 may be due to the presence of foreign-born men in both our sample and that of Gwartney and Long.

[14] Using estimates of wage equations rather than earnings equations, Reimers (1983:577) found larger unexplained gaps for Mexican and Puerto Rican men in 1975 than we do for 1979 and a negative unexplained gap for Cuban men, which means that Cuban men earned more than white men with identical productive characteristics.

[15] Our results for Cuban women are mixed. In Table 4 the mean earnings of Cuban women are lower than those for white women (column three), but the geometric mean of earnings is higher (as indicated by the negative sign in column five) than the earnings of white women. Since the mean of the earnings (and its logarithm) is different from the mean of the logarithm of earnings, this result is not inconsistent. The antilog of the earnings gap is the geometric mean.

Table 4. Annual Earnings of Minority Women Compared to Annual Earnings of White Women, 1979.

Group	$\overline{Y}$	*Relative Earnings (Percent)*	$\overline{\ln Ym}$	*Earnings Gap* ($\ln Yw - \ln Ym$)	*Minority Mean Weights*		*White Mean Weights*	
					Unexplained Portion	*Percent of Gap*	*Unexplained Portion*	*Percent of Gap*
American Indian	$7,188	89.1	8.374	0.179	0.090	50.2	0.089	50.2
Black	$7,889	97.8	8.538	0.015	0.002	16.3	−0.018	−120.1
Asian Indian	$9,126	113.2	8.644	−0.091	0.089	−98.2	−0.002	2.6
Chinese	$8,741	108.4	8.629	−0.076	0.035	−46.1	−0.123	161.3
Filipino	$9,904	122.8	8.821	−0.268	−0.008	3.2	−0.084	31.2
Japanese	$9,197	114.0	8.769	−0.216	−0.068	31.5	−0.099	46.0
Korean	$8,114	100.6	8.555	−0.002	0.051	−2525.2	−0.297	14,838.8
Vietnamese	$7,095	88.0	8.540	0.013	−0.029	−224.5	−0.125	−959.2
Cuban	$7,792	96.6	8.622	−0.069	0.016	−22.6	−0.118	170.9
Mexican	$6,237	77.3	8.314	0.239	0.044	18.5	0.028	11.6
Puerto Rican	$7,143	88.6	8.489	0.064	−0.031	−47.7	−0.091	−142.8
Whites	$8,065	100.0	8.553					

Source: Same as Table 1.

$\overline{Y}$ = Mean earnings.

Relative Earnings: Mean annual earnings as a percentage of mean annual earnings of white women.

$\overline{\ln Y}$: Mean of the natural logarithm of annual earnings.

Earnings gap: Mean of the natural logarithm of the earnings of the group i minus mean of the natural logarithm of the earnings of white women.

For Minority Mean Weights, the Unexplained Portion equals the mean of the natural logarithm of earnings minus the mean of the natural logarithm of earnings if group members were paid according to the earnings equation for white women.

For White Mean Weights, the Unexplained Portion equals the mean of the natural logarithm of earnings of white women minus the mean of the natural logarithm of earnings of white women if they were paid according to the earnings equation for members of that group.

Asian Indian, Chinese, and Korean women earned more than did white women because of their productive characteristics; had they been paid like white women, both their earnings and the earnings gap would have been greater. The gap for Koreans is small. Although not reported in Table 4, two important reasons that American Indian, Mexican, and Puerto Rican women earned less than did white women are that they had less education and worked fewer hours in 1979. The mean earnings of Cuban, Mexican, and Puerto Rican women as a percentage of white women's earnings reported in Table 4 are slightly higher than their weekly relative wages in 1975 as found by McManus, Gould, and Welch (1983:106, 107).

The earnings gap for black women and Vietnamese women is small and positive. Both groups had less education than did white women, a difference that was largely offset for black women by their greater hours worked and for Vietnamese women by the greater proportion of foreign-born among them. American Indian, black, and Mexican women would have earned more if they had been paid like white women; Vietnamese and Puerto Rican women would have earned less.

These decompositions are sensitive to the choice of weights. When white women's means are used to weight the decompositions, the sign of the unexplained portion of the gap changes from positive to negative for blacks, Asian Indians, Chinese, Koreans, and Cubans. Thus, whereas minority women in each of these groups would have earned more if paid like white women, white women also would have earned more if they had been paid like members of any of these four minority groups.

Women Compared to White Men

As Table 5 shows, the mean earnings of women were 36 percent to 58 percent of the mean earnings of white men. The earnings gap is large for all groups, ranging from 0.6 to 1.1. Because our sample includes part-time workers, comparisons between women and white men may be more subject to measurement errors than comparisons between minority men and white men. Jones and Long (1979), for example, found that part-time workers and their employers have less reason to invest in on-the-job training than do full-time workers. Since women are more likely than men to be part-time workers, the unexplained portion of the earnings gap for women relative to white men may partly reflect this unmeasured factor.

In all cases, women's productive characteristics fell short of white men's, and their earnings function was less sensitive to their productive characteristics than was the case for white men. If Chinese, Korean, Vietnamese, Cuban, Mexican, and Puerto Rican women had been paid according to the white men's earnings function, less than one-half the observed earnings gap would have remained. For all other groups of women, differences in the earnings functions account for more than one-half the earnings gap.

Differences between men and women in the average hours worked (not reported in Table 5) account for a large share of the explained portion of the earnings gap. For most groups, differences in education, use of the English language, and marital status are also important.

When the means for white men are used as weights, the unexplained portion of the earnings gap declines absolutely and as a percentage of the total gap for all groups of women except Vietnamese and Puerto Rican women.

Relative Earnings Compared to White Men, 1959–1979

Table 6 reports actual and corrected relative earnings for minority men compared to white men for 1959, 1969, and

[16] The term "corrected earnings" is taken from Samuelson and Nordhaus (1985:628), who report actual and corrected earnings for men in 1969 based on Gwartney and Long's (1978) results. Gwartney and Stroup (1987:53) present similar calculations for 1979 based on our results.

Table 5. Annual Earnings of Women Compared to Annual Earnings of White Men, 1979.

Group	$\overline{Y}$	*Relative Earnings (Percent)*	$\overline{\ln Ym}$	*Earnings Gap* ($\ln Yw - \ln Ym$)	*Minority Mean Weights*		*White Mean Weights*	
					Unexplained Portion	*Percent of Gap*	*Unexplained Portion*	*Percent of Gap*
American Indian	$7,188	42.0	8.374	1.001	0.535	53.4	0.416	41.6
Black	$7,889	46.1	8.538	0.837	0.433	51.7	0.345	41.2
Asian Indian	$9,126	53.3	8.644	0.731	0.472	64.6	0.408	55.7
Chinese	$8,741	51.0	8.629	0.746	0.371	49.7	0.275	36.8
Filipino	$9,904	57.8	8.821	0.554	0.312	56.3	0.281	50.7
Japanese	$9,197	53.7	8.769	0.606	0.400	66.0	0.275	36.8
Korean	$8,114	47.4	8.555	0.820	0.394	48.0	0.127	15.5
Vietnamese	$7,095	41.4	8.540	0.835	0.290	34.7	0.331	39.6
Cuban	$7,792	45.5	8.622	0.753	0.282	37.5	0.309	41.0
Mexican	$6,237	36.4	8.314	1.061	0.409	38.5	0.370	34.9
Puerto Rican	$7,143	41.7	8.489	0.886	0.286	32.3	0.262	29.6
Whites	$8,065	47.1	8.553	0.822	0.465	56.6	0.301	36.6

Source: Same as Table 1. See Table 3 for an explanation of column headings.
$\overline{Y}$ for white males = $17,130.
$\overline{\ln Y}$ for white males = 9.37.

1979, based on our estimates and those of Gwartney and Long. In Table 6 a value of 100 for corrected earnings would indicate that a group's actual earnings were equal to what they would have earned if they had been paid according to the earnings equation of white men of identical attributes. The further below 100 the value of corrected earnings, the larger the impact of unexplained factors, including discrimination, on a group's earnings.

Men

Between 1959 and 1969, actual relative earnings increased for all groups except American Indians; between 1969 and 1979, actual relative earnings increased for all groups except Mexicans. In all cases, actual relative earnings were higher in 1979 than in 1959.

Blacks, Cubans, Mexicans, and Puerto Ricans show consistent increases between 1959 and 1979 in their corrected relative earnings. Corrected relative earnings for American Indians, Chinese, Filipinos, and Japanese diminished between 1959 and 1969 and then increased between 1969 and 1979. In all cases, the level of corrected earnings in 1979 is greater than the level in 1959.

In 1979 all groups of minority men except Japanese would have earned more if they had been paid according to white men's earnings function. The gain would have been small, however, for Asian Indians, Vietnamese, Mexicans, and Puerto Ricans.

There has been wide discussion of the meaning of the measured improvement in black men's relative earnings. Butler and Heckman (1977) argued that the improvement in black men's earnings in the 1960s reflects a selection bias attributable to a decrease in labor force participation by less productive black men. Other scholars have concluded that the improvement was a real one but have disagreed about its origins. Freeman (1973,1981) argued that the improvement was a result of the Civil Rights Act of 1964 and other federal programs. Smith (1984) and Smith and Welch (1986) concluded that the improvement in relative earnings and the decline in the unexplained portion of the gap were due to improvements in the quality of schooling that more recent cohorts of black workers have received. Duncan and Hoffman (1983) found that roughly half of the improvement in black men's earnings in the 1970s was attributable to gains by the cohort that entered the labor market in that decade and the other half to gains by workers already in the labor market. They concluded that it is unlikely that all of this gain can be explained by improved schooling and that their results may offer indirect support for the hypothesis that federal policy had a positive impact on black earnings in the 1970s.

Although there was a substantial decline in the labor force participation rate for black men in the 1960s, the decline from 1969 to 1979 does not seem large enough to account for most of the improvement in the corrected earnings of black men.[16] Thus, the increase in black men's corrected earnings in the 1970s appears to indicate a real improvement in relative earnings. Our conclusions are based on inference, of course, since we do not control directly for selection bias.

For the other groups for which we have data for 1969 as well as 1979 (American Indians, Chinese, Filipinos, Mexicans, and Puerto Ricans), labor force participation rates changed little in the 1970s, again suggesting that selection bias does not account for the improvement in earnings (U.S. Census 1973a, b, c, d, e, and 1983).

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[16] The labor-force participation rates of black men aged 16 and over decreased from 75.7 percent in 1959, to 69.8 percent in 1969, to 66.7 percent in 1979. Simple algebra shows that if the average corrected relative earnings of black men who left the labor force had been one-half that (39.25 percent) of the average black male worker in 1969, a 3.1 percent fall in black participation rates would have led, *ceteris paribus,* to a 1.3 percent increase in the corrected relative earnings of black men. As Table 6 shows, the corrected relative earnings of black men rose by 5.8 percent from 1969 to 1979. (We thank an anonymous reviewer for the suggestion to use simple algebra to make this point.) White male participation rates from 1959 to 1979 also declined—from 80.9 percent in 1959, to 77.4 in 1969, to 76.1 percent in 1979 (U.S. Census 1987:376).

The improved relative earnings of most groups of minority men in the 1970s suggest that there may have been a broad-based change that favorably affected their treatment in the labor market.

Women

The experience of women in the 1970s was mixed. As Table 6 shows, the actual and corrected earnings of women, with the notable exceptions of white and Puerto Rican women, rose relative to the earnings of white men during the 1970s. Corrected earnings for women range in value from 58.6 to 75.4 percent of those of white men in 1979.

Our finding that the earnings of white women relative to those of white men, corrected for hours worked and other factors, remained roughly stable at about 60 percent of white men's earnings is comparable to Smith and Ward's (1984) finding for full-time workers in the 1970s (see also O'Neil 1985). They attribute this finding to the continued growth in labor force participation rates of white women. According to this hypothesis, the entry of

Table 6. Actual and Corrected Relative Annual Earnings for Men and Women (Geometric Means).

	Men			*Women*		
Group	*Year*	*Actual Relative Earnings*	*Corrected Relative Earnings*	*Year*	*Actual Relative Earnings*	*Corrected Relative Earnings*
American Indian	1979	71.3%	90.3%	1979	36.8%	58.6%
	1969	60.1	80.9	1969	29.5	44.9
	1959	64.7	82.9			
Blacks	1979	65.1	84.5	1979	43.3	64.9
	1969	63.4	78.7	1969	33.2	50.7
	1959	54.7	74.8			
Asian Indian	1979	115.0	97.7	1979	65.5	62.3
Chinese	1979	82.4	88.6	1979	47.4	69.0
	1969	79.1	83.2	1969	40.0	57.1
	1959	74.8	84.1			
Filipino	1979	82.0	90.2	1979	57.5	73.2
	1969	69.5	79.7	1969	50.6	55.7
	1959	68.7	93.4			
Japanese	1979	105.4	100.6	1979	54.5	67.0
	1969	99.4	88.7	1969	49.7	55.6
	1959	87.0	89.0			
Korean	1979	81.2	81.9	1979	44.0	67.4
Vietnamese	1979	65.5	97.9	1979	43.4	74.8
Cuban	1979	80.7	95.9	1979	47.1	75.4
	1969	71.0	85.1	1969	39.5	62.4
Mexican	1979	67.8	97.7	1979	34.6	66.4
	1969	68.3	91.2	1969	31.1	55.0
	1959	61.8	81.3			
Puerto Rican	1979	65.6	94.7	1979	41.2	75.1
	1969	65.2	87.5	1969	45.4	75.7
	1959	61.2	71.5			
Whites	1979	100.0	100.0	1979	44.0	62.8
	1969	100.0	100.0	1969	44.6	63.2
	1959	100.0	100.0			

Sources: U.S. Census (1980), Public Use Micro-Data C-Sample (1 percent); Gwartney and Long (1978); and unpublished data provided by James Gwartney and James Long.

Actual Relative Earnings: The geometric mean of earnings (the antilog of the mean of the natural logarithm of earnings) of each group as a percentage of the geometric mean of earnings of white men.

Corrected Relative Earnings: The geometric mean of earnings of each group as a percentage of the amount they would have earned had they been paid according to the earnings equation for white men.

new women into the work force has kept the average level of experience low for women. They predict that as the average experience level of white women rises and their average education increases relative to that of white men, the aggregate average earnings of women will continue to rise relative to white men's, as they did from 1980 to 1983 (Smith and Ward 1984:iii–xiv, 77–78).

White women's labor force participation rates rose dramatically in the 1960s and 1970s, from 34.8 percent for white women over 16 in 1960 to 40.6 percent in 1970 and 49.4 percent in 1980 (U.S. Census 1987:376). Thus, the poor showing of white women in our study may reflect, in part, the continued entry of women with little prior experience into the labor force, as Smith and Ward suggest.

All other groups of women for whom we have data on participation rates and incomes for 1969 (American Indian, black, Chinese, Filipino, Japanese, Mexican, Puerto Rican, and Cuban women) enjoyed increased earnings relative to white men in 1979 in spite of increased participation rates, giving us further confidence that these increases represent genuine improvements. (U.S. Census 1973a, b, c, d, e, and 1983.)

Conclusions

Our estimates indicate that during the 1970s the earnings of all groups of minority men rose relative to those of white men. The experience of minority men in the previous decade, 1959 to 1969, was more mixed, improving for some groups and worsening for others. But between 1959 and 1979, all groups of minority men improved their lot: their relative earnings increased and the unexplained residuals decreased. These results suggest that factors such as discrimination and variations in quality of schooling have become less important over time in their effect on the earnings of minority men.

Much of the variation in earnings among groups is attributable to group differences in human capital and other attributes, such as hours worked. For example, Japanese men earned more than white men because they had more education; Asian Indian men because they had more education and were older. The lowest earnings for men in our sample are for Puerto Ricans, Mexicans, and blacks. Differences in language skills, education, and hours worked account for much of the earnings gap for these groups. Unexplained residuals (using the means of minority groups as weights) remain largest for Koreans, Chinese, blacks, and Filipinos.

A comparison of minority women with white women shows that Asian Indians, Chinese, Filipinos, Japanese, and Koreans earned more than the white women in our sample, whereas other groups of minority women earned up to 23 percent less. The differences in earnings among women largely reflect differences in productive characteristics and hours worked. For all minority groups, the unexplained part of the gap between their earnings and the earnings of white women was smaller in 1979 than it was in 1969, suggesting an increasingly homogeneous experience in the labor market for women of different races and ethnic backgrounds.

Women's earnings relative to those of white men present a mixed picture. On the one hand, all but two groups of women (white and Puerto Rican women) experienced gains in their earnings relative to white men's earnings between 1969 and 1979. On the other hand, in all three years studied, all groups of women earned substantially less not only than white men but than the corresponding groups of minority men. Moreover, in all groups, unmeasured influences on earnings, including discrimination, affected women more than men: although much of the gap between the earnings of all groups of women and those of white men is explainable in terms of such factors as hours worked per year (women worked many fewer hours than men, probably because of greater household responsibilities), even with controls for such factors the ratio of all women's earnings relative to white men's is further from unity than the

similar corrected ratio for corresponding groups of men.

It is also notable that one of the two groups of women who failed to gain relative to white men is white women, whose actual earnings and earnings corrected for productive characteristics were roughly the same percentage of those of white men in 1979 as in 1969 (a result consistent with Pear 1987). The reason for this apparent stagnation is unclear. We have mentioned as one possible cause the dramatic increase in the rate of labor market participation of white women in the 1970s, which kept white women's average work experience lower than that of white men. But without an examination of specific labor market participation data for different groups of women, this explanation cannot be accepted as satisfactory, since all but one of the eleven groups of minority women we studied gained in earnings relative to white men *despite* their having also increased their labor market participation.

Apart from the intriguing finding concerning white women, our results offer some encouragement to those desirous of a reduction in earnings discrimination. Specifically, our findings that the relative earnings of 14 of the 16 groups of minorities (eight of men, eight of women) for which we have observations for 1969 rose, and that corrected earnings rose for 15 of the16 groups, are consistent with the hypothesis that the 1970s did witness a decline in discrimination against minorities.

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