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Appendix B: Comparative Empirical Results

This appendix provides the reader with two comparative results designed to help in evaluating the sensitivity of the text results to the specific definitions of variables and the coverage of the populations studied.

APPENDIX B-1: EFFECT OF INCLUDING NONWHITES ON INTRASTATE AND INTERSTATE PARAMETERS

The regression results for white adult males for the states in which nonwhites are at least 8 per cent of the relevant population appear in Table A-2. Comparing the parameters for the seventeen states, with nonwhites included (Table A-1) or excluded (Table A-2), reveals that the exclusion of nonwhites generally results in small reductions in the rate of return, the variances of income, education, and the residual, and the adjusted coefficient of determination. The intercept, the estimated income of those with zero education, and average levels of income and schooling are increased. Not surprisingly, the changes are smaller, the smaller the proportion of nonwhites in a state. Since the proportion of nonwhites is greater at lower levels of education, and since for any given level of education nonwhites tend to have lower incomes than whites, their exclusion reduces the estimated slope of the regression line and raises the intercept.

TABLE B-1

Matrix of Correlation Coefficients for the Fifty-one States, with Seventeen Excluding Nonwhites

	Var(ln$Y$) (1)	$\hat{r}_1$ (2)	ln$Y_{0,1}$ (3)	$\overline{R}^2$ (4)	Var(S) (5)	Var(U) (6)	$\hat{r}^2$ (7)	$\hat{r}^2$ Var(S) (8)	Av(Y) (9)
$\hat{r}_1$	.83								
ln$Y_{0,1}$	-.77	-.93							
$\overline{R}^2$	.66	.78	-.63						
Var(S)	.49	.32	-.17	.77					
Var(U)	.92	.65	-.65	.32	.24				
$\hat{r}^2$	.84	1.00	-.93	.78	.31	.65			
$\hat{r}^2$ Var(S)	.85	.87	-.75	.95	.71	.58	.88		
Av(Y)	-.34	-.52	.67	-.31	-.02	-.27	-.51	-.36	
Av(S)	-.16	-.37	.42	-.42	-.21	.01	-.35	-.35	.81

Note: The critical values for the correlation coefficient (R), under alternative type I errors (α), are $R(\alpha = .05) = .23$, $R(.025) = .27$, $R(.01) = .32$. The critical values are based on 50 degrees of freedom. See note to Table 4-3.

Source: Tables A-1 and A-2.

Correlation coefficients are presented in Table 4-3, with nonwhites included in all states, and in Table B-1, where they are excluded from seventeen. A comparison reveals that the qualitative relationships are the same. The inequalities of income, schooling, and residual income, as well as the education component, the adjusted rate of return, and the adjusted coefficient of determination, are all positively correlated with one another. The states with a high proportion of nonwhites tend to have higher than average values for these parameters when only whites are analyzed. Thus, the inclusion of nonwhites tends to exaggerate the interstate differences for white males.

The adjustment of the data for nonwhites slightly reduces the average explanatory power of schooling within states, from 18.4 per cent to 17.4 per cent. The interstate explanatory power is reduced by almost one-third (see Table 4-5). When nonwhites are included, schooling, the residual, and their covariation explain approximately one-third each of the differences in income inequality. When nonwhites are excluded from seventeen states, education explains 22.3 per cent, the residual, 43.2 per cent, and their covariation, 34.5 per cent of interstate differences in the variance of the natural log of income. Although the intrastate and interstate explanatory powers are reduced, schooling is still an important explanatory variable at both levels.

APPENDIX B-2: EFFECT OF INCLUDING THE AGED AND PROPERTY INCOME ON THE U.S. PARAMETERS

Due to data limitations, the state analyses are performed for males twenty-five years of age and older, with the log of income as the dependent variable. To determine whether the results based on these data are due primarily to the effects of nonlabor income and the inclusion of the aged, calculations were made for the South and non-South using the same coverage as for the states.

As indicated in Table B-2, using total income rather than earnings and including aged males increases the variances of income, education, and the residual, the rate of return, and the coefficient

TABLE B-2

Results from Regressing the Natural Log of Earnings and Income in 1959 on Schooling for Males in the United States

	Non-South Earnings (25 to 64)	South Earnings (25 to 64)	Non-South Income (25+)	South Income (25+)
SD($\ln Y$)	.65	.76	.86	.98
SD(S)	3.41	4.03	3.74	4.35
Av($\ln Y$)	1.63	1.32	1.44	1.09
Av(S)	10.67	9.42	10.13	8.95
$\ln Y_{0,1}$	.94	.47	.49	.05
	(.23)	(.20)	(.14)	(.20)
$\hat{r}_1$	.06	.09	.09	.12
	(.02)	(.02)	(.01)	(.02)
$\mathrm{Var}(U)_1$	.38	.45	.62	.71
$\overline{R}_1^2$	.10	.22	.16	.26
$\ln Y_{0,3}$	1.09	.66	.49	.04
		(.50)	(.23)	(.30)
r_E	.05	.07	.09	.12
	(.09)	(.08)	(.03)	(.05)
r_S	.06	.09	.11	.13
	(.06)	(.07)	(.03)	(.07)
r_H	.08	.09	.08	.09
	(.06)	(.06)	(.04)	(.08)
$\mathrm{Var}(U)_3$	.39	.46	.62	.73
$\overline{R}_3^2$	.07	.16	.16	.24

Note: For definition of variables, see notes to Table 4-1.

Sources: U.S. Census of Population: 1960, Subject Reports, Occupation by Earnings and Education, Tables 2 and 3, and *U.S. Census of Population: 1960, Subject Reports, Educational Attainment*, Table 6, Washington, D.C.

of determination. The rise in the estimated rate of return may be related to the positive correlation between schooling and nonhuman capital.[1] The aged have lower average schooling than adult males and, for each level of schooling, a lower level of income. This, too, tends to bias the regression estimate of the rate of return upward.

The ranking for the two regions of the parameters studied are not altered by the new definitions. The inclusion of property income and aged males in the state data will alter the magnitude of the parameters, but it seems unlikely that the qualitative relationships would change significantly.

1. Let $P_i = E_{T,i}/E_{S,i}$, where E_S is the earnings after S years of schooling and E_T is total personal income. The natural log of P may be expressed as a linear function of schooling, $\ln P_i = m + nS_i + v_i$.

Then, using equation (3-12),

$$\ln E_{T,i} = \ln E_{S,i} + \ln P_i = (\ln E_0 + m) + (\bar{r}^* + n)\, S_i + (U_i + v_i).$$

With income rather than earnings as the dependent variable, the slope coefficient would be biased upward or downward depending on whether n is positive or negative. n is positive if the proportion of total income from sources other than earnings rises with level of schooling.