BLACK/WHITE EARNINGS RATIOS SINCE THE CIVIL
RIGHTS ACT OF 1964: THE IMPORTANCE
OF LABOR MARKET DROP-OUTS

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Black/White Earnings Ratios since the Civil Rights Act of 1964:
The Importance of Labor Market Drop-outs

ABSTRACT

Previous analyses of postwar black/white earnings ratios have found a more rapid rate of increase in the period since 1964 than before. The reason for this acceleration is unresolved. One view is that federal equal-employment activities have increased the relative demand for black labor. An alternative view is that rising relative earnings reflects (1) reductions in relative supply and (2) the "statistical" effect of low earners raising median earnings by withdrawing from the labor market.

This study differs from previous work on the subject in two ways. First, the restrictions on the universe from which published median earnings data by race are calculated are discussed explicitly. The restriction most commonly addressed in previous work (having positive earnings in the year in question) is found to be less important than an undiscussed restriction (being employed as a wage and salary worker the following March). Second, data on the distribution of earnings are used to determine the effect of labor market dropouts on median earnings, instead of trying to estimate this effect (as well as demand and supply effects) from time series data. This permits comparison of "corrected" and "uncorrected" post-1964 trends.

For males, about half of the "uncorrected" trend remains after the relative earnings variable is corrected for labor market withdrawals. For females, between half and four fifths remains.

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Have the federal equal employment opportunity regulations which took effect in 1965[1] had the desired effect of raising relative minority earnings? While cross-section studies have given conflicting indications, time series studies have generally suggested an affirmative conclusion. Early studies (Freeman, 1973; Vroman, 1974 and 1975) found increases in relative black/white earnings in the post-1964 period after controlling for cyclical conditions, relative education, and previous trends. While the improved situation of the late 1960s was sometimes attributed instead to the unusually prolonged tight labor markets of the period (see the "Discussion" following Freeman's 1973 paper), rising relative earnings during the 1974-75 recession seriously eroded the credibility of this view (Butler-Heckman, 1977).

In two recent papers, Butler and Heckman (1977, 1978) have proposed an alternative interpretation of the time-series evidence on relative earnings of blacks and whites. While Freeman argued that rising black/ white earnings ratios since 1964 were evidence of the effectiveness of Federal anti-discrimination efforts in increasing the relative demand for blacks, Butler-Heckman argued that they are largely a reflection of supply-side forces which resulted from the expansion of transfer programs. Their interpretation actually encompasses two separate responses-- the economic response of the price of labor to changes in supply, and the effect of sample censoring on median earnings as low earners withdraw from the labor market and the median (which is based on those with earnings) rises. Not surprisingly, attempts to distinguish on the basis of time series data among three competing forces (anti-discrimination policies, supply shifts, and censoring effects), which are to some extent concentrated in the same (post-1964) period, have been inconclusive.

The purpose of this paper is to consider a different approach to disentangling these forces. The key is to attempt to correct for the censoring effect by using information on earnings distributions to assess its impact. After reviewing the earlier papers in greater detail (Section 1), the alternative approach to handling the truncation problem is outlined in Section 2. The impacts of demand- and supply-side forces on relative black/white earnings are then considered in Section 3. A closer look at those excluded from the universe on which published median earnings are based is presented in Section 4. Conclusions are offered in Section 5.

1. Summary of Previous Work

Freeman's finding of post-1964 improvements in the relative position of blacks was based on regressing the logarithm of the ratio of black/white median wage and salary earnings[2] on a measure of anti-discrimination policy (logarithm of per capita cumulative EEOC expenditures, or a post-1964 time trend) and other variables (such as a simple trend and a measure of cyclical factors). The finding of significant positive coefficients for the anti-discrimination policy variable is taken as evidence of the success of these policies.

Butler and Heckman (1977) challenged this conclusion. They noted that the creation of federal anti-discrimination programs coincided with the expansion of anti-poverty programs, especially transfer programs. Such programs would be expected to reduce labor-force participation among those who would otherwise receive low wages. Withdrawal from the labor market has two effects: (1) the supply of labor is reduced; (2) holding the distribution of offered wages constant, the withdrawal of low earners increases published median earnings, because those medians

are based on those with earnings. Given that on average blacks face lower offered wages than whites, increasing transfers would have a relatively larger effect on black labor market participation. This would lead to a reduction in the relative supply of black labor (and, assuming blacks and whites were not perfect substitutes, an increase in relative offered wages); relative median earnings would increase further due to the more severely censored distributions. Consequently, relative median earnings of blacks could have risen in the post-1964 period even in the absence of the demand-side factors emphasized by Freeman. While Butler and Heckman (1977, p. 267) concede that anti-discrimination policies may have improved the position of young blacks, they conclude that there is no evidence that blacks as a group have benefited from such policies, once the supply-side factors are properly taken into account.

Freeman observed that the relative supply of black males and females did not decline since 1964 -- falling relative labor force participation was just offset by the increasing black share of labor-force age population (1978, p. 9). A backward shift in the supply curve would have raised relative black earnings, but, unless the demand curve also shifted, relative employment would have fallen. Butler and Heckman (1978) re-emphasize the censoring issue, noting that this effect depends on the fraction of potential labor market participants who do not so, not on relative supplies per se.

Three observations about the censoring issue seem important:
(1) Censoring effects do depend on the fraction of the potential distri-
     bution which is non-participant, so they are worrisome even if relative
     supplies aren't shifting. Moreover, because (unlike relative supplies)

censoring appears to show the "right" time pattern (i.e., predict rising black/white earnings ratios since 1964), this is likely to be the more important half of the Butler-Heckman argument.

(2) Neither Butler-Heckman nor Freeman have discussed the "universe" for which the published median wage and salary earnings series is calculated, and the series they use to account for censoring are somewhat loosely related to that universe. Butler-Heckman correctly note that those who have no wage and salary earnings in year t are ignored in computing median earnings in year t. However, the published series include only those with wage and salary earnings in year t _who are employed as wage and salary workers in March_ (the survey month) _of the following year_.[3] The italicized restriction is considerably more important in practice than the positive wage-and-salary earnings condition. In 1968-79, 95 to 99 per cent of white and black males, and 94 to 96 per cent of white and black females employed as wage and salary workers in March had wage and salary earnings in the previous year. However, only 73 to 84 per cent of white and black males, and 70 to 79 per cent of white and black females who had wage and salary earnings during the year were employed as wage and salary workers the following March.[4] Since wage and salary employment in March of the following year is the key factor in determining whether an individual "appears" in the median earnings calculation, it is the correct series for dealing with censoring. Butler-Heckman and Freeman, in contrast, use annual averages of monthly employment or labor force participation data (for year t).

(3) With 25 or 30 time-series observations, one is unlikely to
be able to accurately estimate Freeman's demand-side effects <u>and</u>
the Butler-Heckman relative supply <u>and</u> censoring effects, especially
when a time trend is included as a "nuisance" variable.[5]
Consequently, it seems desirable to estimate the impact of one
of these factors with outside information, in order to estimate
the importance of the remaining influcences with greater
precision from the time series data.

2. Dealing with Censoring

The solution to the censoring problem outlined below accepts
median wage and salary earnings in the untruncated distributions as the
"correct" measure of labor market position, and attempts to adjust the
published medians to approximate the correct values based on knowledge
about the distribution of wage and salary earnings.

Define

y = logarithm of wage and salary earnings

$F(y)$ = cumulative distribution function for the uncensored.
distribution of y

x = fraction of potential workers who are employed as
wage and salary workers.

The "uncensored" distribution includes all those who would have had
positive earnings in the absence of the supply-side effects discussed above.
Median ln-earnings in this hypothetical distribution, y_M, is defined by
$F(y_M) = .50$. Now <u>assume</u> that <u>all</u> of the induced non-participation involves

individuals in the low-earning portion of this hypothetical distribution. Then the median of the observed distribution, y_0, is defined by

(1) $F(y_0) = (1-x) + (x/2) = .50 + (1-x)/2.$

Because median ln-earnings equals ln(median earnings), y_0 is simply the logarithm of the published median earnings value.

This is illustrated in Figure 1. The shaded area represents the 100 (1-x) per cent of potential earners who are not included in the wage and salary earnings distribution. The assumption that all of these non-earners would be in the lower tail of the distribution if they were included is reflected in the figure. The logarithm of the published median, y_0, divides the unshaded area into two equal portions, each representing 100 (x/2) per cent. Consequently, in terms of the untruncated distribution, $F(y_0)$ equals (1-x) + x/2 or .50 + (1-x)/2.

Figure 1
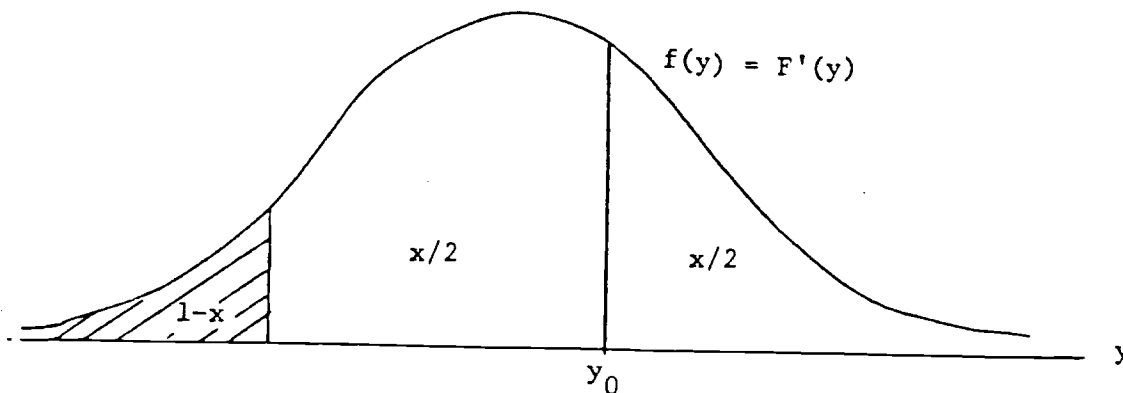
Figure 1 shows all $100(1-x)$ per cent of potential workers being assigned to the left-hand tail of the distribution. This is for diagrammatic convenience; any assignment to the left of y_M would produce the same result. It is clear from the figure that this assumption produces the largest possible correction in median ln-earnings, given x.[6] The correctness of this assumption is considered in Section 4.

If $F'(y)$ is relatively constant in the range between y_0 and y_M, we can use the first-order Taylor series approximation.

$$(2) \quad F(y_0) \approx F(y_M) + (y_0 - y_M) \cdot F'(y_M)$$

Substituting $F(y_0) = .50 + (1-x)/2$ and $F(y_M) = .50$, and solving for y_M gives

$$(3) \quad y_M = y_0 - (1-x)/[2\ F'(y_M)]$$

Given plausible earnings distributions, the assumption that F' is nearly constant between y_0 and y_M (so that a first-order approximation will be accurate) is quite reasonable.[7] It will also be assumed that $F'(y_M)$ is constant over time for each group. (Previous studies, which estimated truncation effects from a time-invariant regression coefficient, have implicitly made this assumption.) Letting c^W and c^B equal $1/[2F'(y_M)]$ for whites and blacks, respectively, we can write the "corrected" log-earnings ratio in terms of the published data as

$$(4) \quad y_M^B - y_M^W = y_0^B - y_0^W - [c^B(1-x^B) - c^W(1-x^W)]$$

In the calculations below, x_t is measured by the fraction of the population employed as wage and salary workers in March of year t+1, relative to the year in which that fraction was highest. If r_t is the wage and salary employment/population ratio in year t+1, and r* the highest value of r_t over the sample period, then $x_t = r_t/r*$. Because wage and salary employment by race and sex are available (from unpublished BLS tabulations of CPS data) for 1954-79, x_t can be calculated for 1953-78. Over this period, x_t ranged from a maximum of 1.0 for each race-sex group to a minimum of .92 for white males, .80 for black males, .63 for white females, and .80 for black females. For white males, the series displays no overall or post-1964 trend, while a post-1964 decline is evident for black males. Rising female labor force participation is reflected in an upward overall trend for white and black females; white (but not black) females also show a positive post-1964 trend. Thus, a comparison of relative participation (as measured by this series) for blacks and whites of either sex reveals the pattern described by Butler-Heckman in the post-1964 period.

Unpublished distributions from which the published wage-and-salary earnings medians were calculated are available for 1966-78. If p is the relative frequency for the censored distribution in the interval y_a to y_b which includes both y_M and y_0, then xp is the corresponding frequency in the uncensored distribution. F' can then be calculated as $xp/(y_b-y_a)$. The resulting values of F' were used to calculate values of the correction factor C, which is shown in Table 1. On average, C is larger for black males than for white males, while white female and black female values are quite similar.

Table 1

Values of c, the Truncation Correction Factor

Year	White Males	Black Males	White Females	Black Females
1966	.576	1.000	1.399	1.675
1967	.609	.904	1.372	1.245
1968	.549	.905	1.274	1.124
1969	.620	.891	1.419	1.453
1970	.646	.995	1.360	1.215
1971	.689	1.018	1.232	1.245
1972	.758	1.058	1.320	1.125
1973	.837	1.069	1.392	1.187
1974	.714	1.141	1.259	1.366
1975	.806	1.224	1.229	1.167
1976	.795	1.260	1.116	.996
1977	.786	1.183	1.157	.981
1978	.884	1.271	.974	.873
Mean, 1966-78	.713	1.071	1.269	1.204

Source: see text.

3. Trends in Corrected Median Earnings Ratios

The mean values of c in Table 1 and the wage and salary employment series x_t described above were used to calculate the logarithm of the corrected median earnings ratios, based on equation (4). These corrected ratios were then used to estimate time series equations similar to those used by Freeman and Butler-Heckman (Table 2). Odd-numbered lines present results with "uncorrected" dependent variables, and even-numbered lines use the corrected earnings ratios.

Columns 1 and 3 update Freeman's original (1973, 1977) regressions, which controlled for trend, cyclical effects, and (in line 3) relative median years of schooling. DGNP is the cyclical variable, defined as the deviation of the logarithm of real GNP from trend. In column 1, black earnings rise by an additional 1.6 percentage points per year for males, and 2.2 percentage points for females, in the post-1964 period. In column 2, where the dependent variable is corrected for censoring, this post-1964 trend falls to 1.0 point for males, and 1.1 points for females. Thus, 60% of the male post-1964 trend and half of the corresponding trend for females survives correction for censoring. The estimated importance of cyclical fluctuations also increases when censoring is accounted for, especially for males. This is expected, since black employment is more cyclically sensitive, and we assigned those not employed (in March, t+1) to the lower tail of the distribution.

Relative median education is added in columns 3 and 4. While the additional variable has the anticipated positive effect, it has little effect on the estimated post-1964 trend for males. The post-1964 trend increases to 6.4 points for females in the uncorrected equation, and to 5.0 points when censoring is taken into account. The "overall" trend

Table 2

Trends in Black/White Earnings Ratios: 1953-78

	Males								Females							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Earnings Ratio "Corrected"?	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Constant	-.557 (30.8)	-.564 (30.4)	-.280 (1.88)	-.369 (2.31)	-2.133 (1.22)	-2.146 (1.23)	-1.493 (.88)	-1.698 (.95)	-.873 (25.8)	-.622 (19.3)	.192 (.65)	.360 (1.25)	-5.730 (2.60)	-5.373 (2.51)	-1.919 (.80)	-2.004 (.85)
Time Trend (1953 = 1)	.002 (.72)	-.001 (.67)	-.009 (1.50)	-.009 (1.39)	.004 (1.13)	.001 (.31)	-.006 (.87)	-.006 (.79)	.027 (6.72)	.022 (5.84)	-.038 (2.09)	-.038 (2.13)	.023 (5.10)	.018 (4.21)	-.029 (1.35)	-.027 (1.29)
Post-1964 Time Trend	.016 (4.84)	.010 (2.94)	.015 (4.59)	.009 (2.64)	.016 (4.32)	.009 (2.62)	.015 (4.18)	.008 (2.40)	.022 (3.48)	.011 (1.90)	.064 (5.05)	.050 (4.07)	.021 (3.36)	.011 (1.75)	.057 (3.67)	.042 (2.76)
DGNP	.356 (1.72)	.810 (3.81)	.075 (.31)	.612 (2.32)	.630 (1.69)	1.085 (2.90)	.301 (.74)	.859 (2.01)	.936 (2.42)	1.169 (3.17)	.274 (.76)	.559 (1.59)	.823 (2.11)	1.058 (2.79)	.341 (.91)	.634 (1.71)
ln (Relative Schooling)			.627 (1.87)	.441 (1.23)			.588 (1.65)	.399 (1.07)			2.556 (3.62)	2.354 (3.43)			2.123 (2.44)	1.870 (2.18)
Predicted ln (Rel. Employment)					-.687 (.90)	-.689 (.90)	-.521 (.72)	-.571 (.75)					-2.518 (2.20)	-2.464 (2.22)	-1.001 (.88)	-1.121 (1.00)
R^2	.91	.69	.92	.71	.90	.69	.91	.71	.97	.95	.98	.97	.97	.95	.98	.97
Std. Error	.031	.032	.029	.031	.033	.033	.031	.032	.058	.055	.047	.045	.058	.056	.048	.047
Durbin-Watson	1.22	1.98	1.37	2.00	1.39	2.08	1.48	2.07	1.12	1.23	2.20	2.08	1.37	1.33	2.01	1.80

T-statistics appear in parentheses below coefficients.

in relative earnings for females swings from positive to negative when relative education is added.

Columns 1-4 do not include relative employment as an explanatory variable. Following Freeman, predicted values of relative employment[8] (from an auxilary reduced form equation) are added as an explanatory variable. The auxilary equation uses the logarithm of relative population, real ADFC benefits per family, and real weekly unemployment benefits, in addition to the independent variables in Table 2, as explanatory variables. These are the same variables used by Butler-Heckman and Freeman.

The effect of relative employment on relative earnings is consistently negative and sometimes "significant." However, comparing columns 5-8 with columns 1-4 makes it clear that the addition of relative employment as an explanatory variable does not significantly alter previous findings. The post-1964 trend estimate for males remains at about 1.5 percentage points in uncorrected equations, and at about 1.0 point in corrected versions. The female relative-earnings equations which exclude relative education are essentially unaffected by adding relative employment (compare columns 5-6 with 1-2), while the post-1964 trend is reduced slightly in both corrected and uncorrected equations which include relative education. The main effect of adding relative employment is to increase the importance of the cyclical variable, DGNP.

The reduced-form equation for relative employment is itself of interest, in light of Butler-Heckman's assertion that transfer programs were responsible for declining relative employment. For males, while relative population is, as expected, a significant positive determinant of relative employment, neither transfer variable is significant, and the AFDC variable is positive.

For females, both transfer variables were negative, though only the Unemployment Insurance variable was significant (and then only when relative education was omitted). (The elasticity of relative employment of females with respect to relative population was only 0.3, and was not significant.) Thus, the instrumental variables suggested by Butler-Heckman are not very strong, which is in turn reflected in the relatively large standard errors for the relative employment variable in Table 2.

Three further experiments, not reported in Table 2, were also considered. First, examination of Table 1 suggested that the correction factors themselves might be trended, especially for males. To deal with this possibility, the correction factor C for each race-sex group was regressed on a linear time trend and DGNP, using the 13 available observations (1966-78). The fitted values of the correction factors (for the entire 1953-78 period) were then used to correct the published earnings ratios. The post-1965 trends estimated with these corrected dependent variables were somewhat reduced for males (.007 and .006, for the equations comparable with columns 2 and 4 in Table 2), but were virtually unaffected for females.

A second experiment was based on the realization that relative median education is a less than ideal summary measure of the relative schooling levels of blacks and whites. Because high school graduation is so common a completed schooling level, median years of education "moves" very little once it is "trapped" in the 12-year interval. Differences in average schooling levels, and the logarithm of the ratio of average years of schooling, were therefore considered as alternative measures of relative schooling. They produced marginally larger post-1965

trends for males, 60 per cent of which survived when the dependent was corrected. Estimated post-1965 trends were .03 for females based on an uncorrected dependent variable, and slightly less than half of this level with the corrected version. The average schooling variables consistently fit the data less well than Freeman's original log-median form.

Finally, as a check on the correcting procedure, the correction term from equation (4), $c^B(1-x^B) - c^W(1-x^W)$ was included as an explanatory variable (using the t+1 values of DGNP and of the logarithms of relative population, real AFDC, and unemployment benefits as instruments) in equations (1) and (3) in Table 2. If the correction is appropriate, the coefficient of the correction term should be 1.0, or at least not significantly different from this value. In fact, it was always within one standard error of the hypothesized value, the point estimates being .69 and .47 (males) and 1.92 and 1.17 (females), respectively. The post-1965 trends differed little from those in the corresponding "corrected" equations (columns 2 and 4 of Table 2), except for the female equation when relative education is not included (where it fell to .002 as its standard error more than doubled).

4. A Closer Look at Those Who Are Not Wage and Salary Workers

As noted in Section 2, black and white wage and salary worker/ population ratios have exhibited rather different trends. Relative to whites of the same sex, black males and females' ratios declined in the post-1964 period. The reasons for this difference are important, both to check the correctness of the assumption that changes in this ratio

are concentrated in the lower tail of the (uncensored) earnings distribution
and, more generally, for their implications for the relative labor
market position of blacks and whites.

Ratios of individuals in various labor market statuses to population,
by race and sex, are presented in Table 3, for March 1954, 1964, and 1979.
The wage and salary worker/population ratios in the first three lines
display the patterns noted above.[9] The relative importance of other
labor market statuses is traced in the next nine lines. For males, the
most significant trends are declines in "other" employment (self-
employment and unpaid family work), largely due to the declining importance
of agriculture,[10] and an offsetting (for blacks, more than offsetting)
increase in nonparticipation. For females of both races, the dominant
trend is declining nonparticipation.

The remaining lines of Table 3 explore the relative importance of
different reasons for nonparticipation. (Unfortunately, these are not
available back to 1954.) In the post-1964 period, the small increase
in white male nonparticipation is attributable to increases in the "other"
reasons for nonparticipation, three fourths of which (for white males)
is retirements.[11] For black males, school enrollment, disability, and
other reasons (again, mostly retirements) make roughly equal contributions.
For females, the well-known decline in keeping house dominates, though it
is to a limited extent offset by increasing "other" nonparticipation
(less than half of which, for females, is due to retirements). The
"other" category, incidentally, includes those who are nonparticipants due
to inability to find a job, but they are a relatively small fraction
of that category.

Table 3. Labor Force Status, by Race and Sex: 1954, 1964, and 1979
(Persons 14 and older)

	White Males	Black Males	White Females	Black Females
Wage & Salary Employment/Population				
1954	.61	.62	.27	.36
1964	.60	.61	.30	.36
1979	.63	.56	.43	.43
Other Employment/Population				
1954	.17	.09	.04	.02
1964	.12	.06	.04	.02
1979	.08	.03	.03	.01
Unemployment/Population				
1954	.04	.09	.02	.04
1964	.04	.07	.02	.05
1979	.04	.08	.03	.06
Not in Labor Force (NILF)/Population				
1954	.17	.20	.67	.58
1964	.23	.26	.64	.57
1979	.25	.33	.51	.50
NILF, Keeping House/ Population				
1964	.00	.00	.52	.41
1979	.00	.01	.37	.29
NILF, In School/ Population				
1964	.10	.13	.10	.12
1979	.09	.15	.08	.13
NILF, Unable to Work/ Population				
1964	.02	.02	.01	.01
1979	.02	.04	.01	.03
NILF, Other Reasons/ Population				
1964	.11	.10	.01	.02
1979	.13	.13	.05	.05

All data refer to civilians in March of each year

Table 3 provides only hints on the validity of the assumption that change in wage and salary worker/population ratios, x_t, are attributable to those in the below-median portion of the uncensored earnings distribution. The movement out of (mostly agricultural) "other" employment for males plausibly would have enlarged the lower tail of the wage and salary earnings distribution, and increasing nonparticipation due to school attendance and (self-reported) disability probably did reduce it. The "other" nonparticipant category is less clearcut: older workers who work earn above-median sums, but whether retirees would have done so (had they worked) is less clear. For females, the dominant trend is the increase in participation by those who used to be keeping house; there is some evidence (at least for white females) that the newcomers were less educated and less experienced than the others (Fuchs, 1974). The evidence in Table 3 is thus consistent with the idea that changes in x_t are primarily drawn from the below-median portion of the potential earnings distribution.

We can investigate this assumption directly for one subset of those excluded from the universe from which the published medians are calculated: those who have wage and salary earnings in year t but are not employed as wage and salary workers in the following March. In 1973, roughly one eighth of these excluded individuals in each race-sex group had wage and salary earnings which exceeded the published median. A similar statement holds for 1966, the first year for which the comparison could be made.[12] These workers (and others in the excluded group with earnings between the published median and the "true" median)[13] are misclassified by our assumption which assigns them to the below-median portion of the uncensored distribution.

If most but not all of the changes in x_t are drawn from the lower

tail of the distribution, the correction to the published medians goes

in the right direction, but overstates the "true" correction. If the

fraction of changes in x_t which are drawn from above the median is

constant over time, our correction procedure overstates the portion of the

post-1965 improvement in relative earnings that is due to censoring,

and understates the true improvement. If one eighth of the changes in

x_t are drawn from above the median, then our correction is one <u>fourth</u> too

large. It is, however, possible, that the "censoring rules" differ

significantly by race or over time; in this case, the direction of the

errors from our assumed censoring rule is uncertain.

5. Conclusions

Attempting to simultaneously estimate demand, supply, and censoring

effects on black/white relative earnings places an extreme burden on postwar

time-series data. The approach taken in this paper is to "correct" the

published median wage and salary earnings figures for censoring,

and then estimate demand and supply effects much as earlier studies have done.

The corrected estimates support the view that while censoring has

exaggerated the relative improvement in black male and female earnings, it

has not singlehandedly produced the improvement. For males, about

half of the post-1964 trend as conventionally measured remains after

correcting for censoring. For females, the results are more sensitive

to the specification of the relative earnings equation: between half and

four fifths of the conventionally estimated post-1964 trend survives.

The correction for censoring makes the fairly strong assumption

that all of the changes in wage and salary employment to population ratios

has occurred in the lower tail of the distribution. It seems likely that

this assumption would overstate the importance of the censoring correction,

so the conclusion that the relative earnings improvement is "real" seems secure.

TABLE A1
Median Wage and Salary Earnings of Wage and Salary Workers

Year	WM	BM	WF	BF
1953	3760	2233	2049	994
1954	3754	2131	2046	914
1955	3986	2342	2065	894
1956	4260	2396	2179	970
1957	4396	2436	2240	1019
1958	4569	2652	2364	1055
1959	4902	2844	2422	1289
1960	5137	3075	2537	1276
1961	5287	3015	2538	1302
1962	5462	3023	2630	1396
1963	5663	3217	2723	1443
1964	5853	3426	2841	1652
1965	6188	3563	2994	1722
1966	6510	3864	3079	1981
1967	6833	4369	3254	2288
1968	7291	4839	3465	2497
1969	7859	5237	3640	2884
1970	8254	5485	3870	3285
1971	8550	5754	4046	3480
1972	9190	6261	4218	3944
1973	9969	6927	4441	3978
1974	10745	7617	4863	4751
1975	11296	8296	5204	5062
1976	12126	8434	5604	5684
1977	12829	9048	5979	6033
1978	14032	10030	6571	6639

TABLE A2

Civilian Employment, 14 and Older (Annual Averages of Monthly Data)

Year	WM	BM	WF	BF
1953	39389	4146	16436	2405
1954	38317	3847	16302	2420
1955	39183	3972	17321	2470
1956	39918	4080	18147	2558
1957	39909	4080	18381	2641
1958	39150	3891	18300	2624
1959	40047	4041	18804	2689
1960	40265	4220	19376	2821
1961	40185	4133	19675	2803
1962	40672	4220	20077	2878
1963	41037	4293	20538	2941
1964	41710	4429	21167	3052
1965	42466	4568	21966	3179
1966	42983	4655	23113	3313
1967	43506	4715	23988	3401
1968	44109	4773	24832	3494
1969	44770	4836	25970	3644
1970	44875	4868	26565	3680
1971	45248	4805	26758	3690
1972	46525	4921	27869	3801
1973	47618	5186	29054	4028
1974	48122	5239	29877	4172
1975	47014	4997	30005	4156
1976	47988	5155	31315	4386
1977	49339	5335	32786	4559
1978	50635	5659	34587	4971

TABLE A3

Civilian Population, 14 and Older (Annual Averages of Monthly Data)

Year	WM	BM	WF	BF
1953	48466	5225	52735	5903
1954	48484	5222	53189	5974
1955	49146	5326	53800	6069
1956	49796	5422	54493	6163
1957	50529	5510	55328	6270
1958	51322	5611	56067	6374
1959	51834	5714	56756	6478
1960	52567	5951	57610	6726
1961	53528	6079	58781	6890
1962	54233	6207	59721	7094
1963	55122	6335	60659	7272
1964	55918	6439	61611	7437
1965	56761	6576	62574	7609
1966	57231	6704	63561	7784
1967	57876	6799	64651	7935
1968	58790	6937	65762	8197
1969	59778	7093	66881	8465
1970	60974	7334	67991	8678
1971	62302	7546	69121	8927
1972	63832	7834	70608	9330
1973	64829	8141	71566	9714
1974	65945	8419	72559	10085
1975	67030	8668	73615	10400
1976	68050	8938	74630	10712
1977	69038	9146	75535	10999
1978	69951	9375	76466	11300

TABLE A4

Median Years of Schooling Completed, Civilian Labor Force

Year	WM	BM	WF	BF
1953	11.0	7.4	12.1	8.3
1954	11.1	7.5	12.1	8.5
1955	11.3	7.7	12.1	8.7
1956	11.4	7.8	12.2	8.8
1957	11.6	8.0	12.2	9.0
1958	11.7	8.1	12.2	9.2
1959	11.9	8.3	12.2	9.4
1960	12.0	8.5	12.2	9.8
1961	12.0	8.8	12.3	10.1
1962	12.1	9.0	12.3	10.5
1963	12.2	9.4	12.3	10.7
1964	12.2	9.7	12.3	10.8
1965	12.2	10.0	12.3	11.1
1966	12.3	10.0	12.4	11.2
1967	12.3	10.2	12.4	11.5
1968	12.3	10.7	12.4	11.7
1969	12.4	10.8	12.4	11.9
1970	12.4	11.1	12.5	12.1
1971	12.5	11.4	12.5	12.1
1972	12.5	11.6	12.5	12.2
1973	12.5	11.9	12.5	12.2
1974	12.5	12.1	12.5	12.3
1975	12.6	12.1	12.5	12.3
1976	12.6	12.2	12.6	12.4
1977	12.6	12.2	12.6	12.4
1978	12.6	12.3	12.6	12.4

TABLE A5

Transfer Payments and Business Cycle Variables

Year	AFDC	UI	CPI	GNP
1953	82.30	23.58	80.1	621.8
1954	83.70	24.93	80.5	613.7
1955	85.50	25.04	80.2	654.8
1956	91.50	27.02	81.4	668.8
1957	95.15	28.21	84.3	680.9
1958	100.40	30.58	86.6	679.5
1959	103.70	30.41	87.3	720.4
1960	108.35	32.87	88.7	736.8
1961	114.65	33.80	89.6	755.3
1962	119.10	34.56	90.6	799.1
1963	122.40	35.27	91.7	830.7
1964	131.30	35.92	92.9	874.4
1965	136.95	37.19	94.5	925.9
1966	150.10	39.75	97.2	981.0
1967	161.70	41.25	100.0	1007.7
1968	179.05	43.43	104.2	1051.8
1969	176.05	46.17	109.8	1078.8
1970	190.40	50.34	116.3	1075.3
1971	190.90	54.02	121.3	1107.5
1972	191.75	56.75	125.3	1171.1
1973	195.20	59.00	133.1	1235.0
1974	214.83	64.25	147.7	1217.8
1975	228.94	70.23	161.2	1202.3
1976	241.75	75.16	170.5	1273.0
1977	250.48	78.79	181.5	1340.5
1978	255.53	83.67	195.3	1399.2

TABLE A6
Number of Wage and Salary Workers, 14 and Older (in Following March)

Year	WM	BM	WF	BF
1953	29484	3206	14433	2119
1954	29657	3349	14541	2092
1955	30913	3527	15439	2239
1956	31175	3596	15944	2322
1957	30164	3310	16095	2290
1958	31120	3455	16255	2360
1959	31563	3487	16742	2361
1960	31305	3523	17228	2515
1961	32084	3670	17594	2548
1962	32844	3739	18181	2613
1963	33498	3923	18673	2676
1964	34420	4006	19234	2836
1965	35284	4153	20285	3022
1966	36712	4197	21417	3149
1967	37216	4320	22544	3268
1968	38098	4380	23495	3402
1969	38565	4473	24470	3511
1970	38299	4427	24372	3503
1971	39672	4437	25430	3591
1972	40841	4757	26371	3843
1973	41581	4826	27540	3963
1974	40198	4505	27448	3915
1975	41075	4652	28723	4260
1976	42119	4855	29881	4297
1977	43251	5121	31410	4675
1978	44395	5332	33078	4982

Table A7
Alternative Wage and Salary Universes

Year	N_{12}/N_1				N_{12}/N_2			
	WM	BM	WF	BF	WM	BM	WF	BF
1967	.822	.796	.722	.699	.974	.965	.942	.942
1968	.825	.800	.725	.699	.973	.968	.938	.932
1969	.823	.790	.732	.707	.984	.973	.945	.946
1970	.806	.784	.723	.718	.983	.971	.951	.958
1971	.817	.779	.743	.731	.982	.963	.944	.952
1972	.830	.818	.752	.753	.976	.965	.941	.940
1973	.823	.779	.744	.737	.978	.972	.943	.946
1974	.795	.729	.737	.718	.986	.966	.961	.957
1975	.812		.760		.985	.948	.956	.951
1976	.816		.761		.982	.973	.957	.954
1977	.826		.776		.983	.964	.956	.955
1978	.840	.788	.783	.787	.980	.971	.960	.955

N_1 = Number with wage and salary earnings in year t.

N_2 = Number of wage and salary workers in March of year t + 1.

N_{12} = Number of wage and salary workers (in March of year t + 1) with wage and salary earnings in year t.

Table A8. Labor Force Status in 1954, 1964, and 1979

	WM	BM	WF	BF
Population				
1954	48358	5186	53041	5936
1964	55664	6406	61321	7386
1979	70547	9541	77123	11515
Wage and Salary Employment				
1954	29484	3206	14423	2119
1964	33498	3923	18673	2676
1979	44395	5332	33078	4982
Other Employment				
1954	8329	489	1922	123
1964	6943	368	2270	169
1979	5920	305	2484	159
Unemployment				
1954	2092	460	934	239
1964	2210	470	1253	359
1979	2607	756	2249	638
Not in Labor Force				
1954	8456	1032	35752	3456
1964	13013	1645	39125	4182
1979	17625	3148	39312	5736
NILF, Keeping House				
1964	120	11	31819	3061
1979	244	74	28337	3317
NILF, In School				
1964	5957	821	5884	890
1979	6350	1431	6096	1491
NILF, Unable to Work				
1964	940	148	603	97
1979	1536	388	984	304
NILF, Other Reasons				
1964	5996	665	819	134
1979	9495	1254	3894	623

Notes on Appendix Tables

A1:   Source: <u>Current Population Reports</u>, Series P-60: No. 69 (1953-68), and annual "Personal Income" number for later years.

A2:   Data are in thousands. Source: <u>Employment and Training Report of the President, 1979</u>, Table A-15 (1954-78); data for 1953 calculated from unemployment and labor participation rates in <u>Manpower Report of the President, 1964</u>, Tables A-3 and A-10, and population from table A-3.

A3:   Data are in thousands. Source: <u>Employment and Training Report of the President, 1979</u>, Tables A-3 and A-12 (1954-78); data for 1953 are interpolated from 1950 Census data (from <u>U.S. Census of Population</u> Vol. IV, part 5, Chapter B, Table 9) and 1954 values.

A4:   Source: <u>Employment and Training Report of the President, 1976</u>, Tables B9 (1952, 1959, 1962, and 1964-75); <u>ibid, 1979</u>, Table B9 (1976); <u>Special Labor Force Report</u> No. 209, Table 4 (1977); <u>ibid</u>, No. 225, Tables 1 and A9 (1978). Medians for nonwhites in 1978 calculated from published "total" and "white" distributions.

A5:   AFDC: Average benefit per family Aid to Families with Dependent Children December of each year. Source: <u>Social Security Bulletin, Statistical Supplement</u>, 1975, Table 175 (1953-73); <u>ibid.</u>, July 1978, Table M-32 (1974-77); <u>ibid</u>, August 1980, Table M-28 (1978) . UI: Average weekly benefit under state Unemployment Insurance Programs. Source: <u>Historical Statistics of the United States</u>, Series H309 (1953-70), <u>Social Security Bulletin</u>, August 1980, Table M-37. CPI: Consumer Price Index, (1967=100). Source: <u>Historical Statistics of the United States</u>, Series E135 (1953-70); <u>Monthly Labor Review</u>, September 1979, Table 22 (1971-78).
GNP: Gross National Product in billions of 1972 dollars. Source: <u>Employment and Training Report of the President, 1979</u>, Table G3 (1953-75; Council of Economics Advisors, <u>Economic Indicators</u>, August 1980, p. 2 (1976-78).

A6:   Data are in thousands. Source: Unpublished BLS tables.

A7:   Source: See text, footnote 3.

A8:   Data are in Thousands. Source: <u>Current Population Reports</u>, Series P57, No. 141 (1954); <u>Employment and Earnings</u>, April 1964 and April 1979.

Footnotes

1. These regulations included the Civil Rights Act of 1964, which applied
    to all firms hiring 25 or more workers, and Executive Order 11246,
    which applied to federal contractors.

2. Following other authors, "black" is used where "non-white" would be
    more precise. In 1978, 85 per cent of the "nonwhites" who appear
    in the median earnings series used below were "black".

3. The table in question is headed ". . . Median Wage or Salary Income
    [in year t] of Wage and Salary Workers." A head note indicated that
    "figures are restricted to persons who were wage and salary workers at
    the time of the survey" from 1958-62. From 1967-78 (except 1975),
    the head note indicates that the table "excludes those with no wage
    or salary income in [year t]." However, appendix notes make it clear
    that both restrictions apply. For example, the 1974 volume states
    "medians for wage and salary income ... are based on the distribution
    of persons ... having [this] type of income ... . The data on ... class
    of worker ... in [the median wage and salary income table] refers to
    the job held during the survey week."

4. The number of wage and salary workers with wage and salary earnings in
    the previous year by race and sex are from unpublished Census Bureau
    tabulations. The numbers of wage and salary workers by race and sex
    are from unpublished Bureau of Labor Statistics tabulations. Numbers of
    persons with wage and salary earnings are taken from published Current
    Population Survey tables. These and other data appear in the Appendix
    to this paper.

5. See Butler-Heckman, 1978, pp. 33-34 and 45; Freeman, 1978, pp. 16 and 19.

6. Levy (forthcoming) and Darity and Myers (forthcoming) make a similar assumption when they recompute medians (Levy) or means (Darity-Myers) counting zero earnings as "true" zeros.

7. If y has a normal distribution, $F'(y)$ varies only from .399 to .386 between the 40th and 50th percentiles.

8. The employment variable used here is the annual average of monthly values in year t.

9. The exception is the pre-1964 trend for black females, which is not visible in the simple end-year comparisons.

10. From 1954-79, male "other" employment in agriculture declined by nearly two thirds, while male "other" nonagricultural employment remained constant.

11. The decomposition of the "other" category is based on annual averages for those 16 and over, available since 1968. The "other reasons" are subdivided into retirements, inability to find work, and "other".

12. More precisely, the proportions were .13 (white males), .17 (black males), .12 (white females), and .11 (black females) in 1978, and .14, .18, .11, and .19 in 1966.

13. Since the purpose of this discussion is to assess the correctness of our procedure to estimate y_M, it is inappropriate to use our estimated y_M's for calculating the number of such individuals.

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