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## **Abstract**

There is continuing debate over whether and to what degree estimations of black-white wage convergence are biased because they leave labor market dropouts out of the picture. If a high proportion of blacks become discouraged and cease searching for jobs, and if those dropouts have, on average, poor job prospects, the average wage of black workers who remain in the labor market will be an upwardly biased estimate of the average wage across the population. This paper introduces a simple method of imputing wages to non-workers. When non-workers are accounted for in the calculations, real wage growth for prime age black men over the 1969–98 period is reduced approximately 40%, and black-white wage convergence is reduced by approximately one-third. The author finds that a source of bias as important as falling employment rates is the growing gap between wages of workers and potential wages of non-workers.

## LABOR MARKET DROPOUTS AND TRENDS IN THE WAGES OF BLACK AND WHITE MEN

CHINHUI JUHN\*

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There is continuing debate over whether and to what degree estimations of black-white wage convergence are biased because they leave labor market dropouts out of the picture. If a high proportion of blacks become discouraged and cease searching for jobs, and if those dropouts have, on average, poor job prospects, the average wage of black workers who remain in the labor market will be an upwardly biased estimate of the average wage across the population. This paper introduces a simple method of imputing wages to non-workers. When non-workers are accounted for in the calculations, real wage growth for prime age black men over the 1969–98 period is reduced approximately 40%, and black-white wage convergence is reduced by approximately one-third. The author finds that a source of bias as important as falling employment rates is the growing gap between wages of workers and potential wages of non-workers.

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**T**he question of whether observed wage changes reflect true changes in opportunities or are simply an artifact of changing composition of the work force has been much debated in the literature. Selection bias is an especially serious problem for black men. In 1967, approximately 13% of prime age black men were not employed in a typical week. In 1999, approximately 21% were not employed.<sup>1</sup> Given that the in-

crease in the number of labor market dropouts is far greater among black men than among white men, Butler and Heckman (1977) argued that a substantial portion of black-white wage convergence could be due to the changing composition of *working* blacks. Since it appears, based on all available evidence, that those men who drop out of work have the least attractive job opportunities, the average wage of workers will be an upwardly biased estimate of the average wage across the population.

While it is clear that such factors as civil rights legislation (Freeman 1973) and improvements in schooling quality (Smith and Welch 1986; Card and Krueger 1992) have played a real role in the improvement of black earnings, still in debate is the extent to which a failure to account for labor market dropouts has resulted in overstatement of that improvement. Selection bias may also be important in considering the more recent trends in black-white male wages. While progress appears to have

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A data appendix with additional results, and copies of the computer programs used to generate the results presented in the paper, are available from the author at Department of Economics, University of Houston, Houston, Texas 77204–5882.

<sup>1</sup>These numbers are based on calculations from the retrospective weeks worked questions in the March Current Population Surveys. In this paper, “prime age” men are defined as those with 1–30 years of potential experience.

resumed in the past decade, during the 1980s the convergence in black-white earnings slowed down and even, in fact, reversed (Juhn, Murphy, and Pierce 1991; Bound and Freeman 1992; Smith 1993). The slowdown was more pronounced for high school and college graduates than for high school dropouts, whose earnings continued to improve relative to those of their white counterparts. Since only two out of every three prime age black men in this less educated category were employed in 1979 and their employment rate continued to deteriorate throughout the 1980s, it is possible that accounting for labor market dropouts would either eliminate or greatly reduce the apparent continued wage convergence among this group.

Using the March Current Population Surveys for 1968–2000, this paper examines selection bias and black-white wage convergence in the 1980s and the 1990s as well as the earlier period. The paper also introduces a simple method of imputing wages to non-workers based on the retrospective weeks worked information reported in the March CPS. Wages of non-workers who did not work the entire year and thus have no reported earnings are imputed from wages of part-year workers. In the spirit of Brown (1984), the basic approach here is to impute wages for non-workers and to compare average wages with and without correcting for non-workers. However, rather than start with an assumption about the relative wage of non-workers (namely, that wage offers received by non-workers lie below the median wage), the approach here is to look for a comparable group of workers whose characteristics closely match those of the non-working population. The advantage of this method is that it allows us to examine aspects of the selection bias problem that have not been emphasized in the previous literature. Most previous works have focused on the role of declining employment. In this paper, I also examine how changes in the overall wage structure and the growing wage gap between the employed and the non-employed have contributed to the selection bias problem.

### Related Literature

Since Butler and Heckman (1977), a number of researchers have tried to quantify the importance of selection bias in assessments of black-white wage convergence. While one possible strategy is to model the selection and wage equations and to employ the selection bias corrections suggested by Heckman (1979), most researchers have not pursued this strategy due to the lack of suitable instruments that belong in the selection equation but could be plausibly excluded from the wage equation. Instead, researchers have typically begun by making some assumption about the unobserved wages of non-workers to see how the inclusion of non-workers affects summary measures such as the average or the median.

Using the assumption that potential earnings of non-participants lie below the median, Brown (1984) applied a correction factor to published black and white median earnings. He found that the correction reduced the post-1964 convergence in the black-white earnings ratio by about 40%. Welch (1990) used wages of labor market entrants and exiters from the matched March CPS samples to impute wages of non-workers. Based on these results and earlier results reported in Smith and Welch (1986), he concluded that the bias resulting from ignoring labor market dropouts accounts for only a negligible portion of the observed black-white wage convergence. Using CPS data matched to social security earnings data, Vroman (1990) estimated that about 14% of the observed increase in the black-white wage ratio can be attributed to ignoring labor market dropouts. Blau and Beller (1992) assumed that wages of non-workers are 60–80% of wages of workers, conditioning on observable characteristics such as education and potential experience. They found that wage gains for blacks over the 1970s, especially for young black men and women, may have been somewhat overstated. Neal and Johnson (1996) also examined the importance of non-participants in black-white wage differences. While their paper was not concerned with *changes* in black-white

wages, they found that the inclusion of labor market dropouts does make a difference in the ability of AFQT test scores to explain racial wage differences. Most recently, Chandra (2000) used Census data to show that selective withdrawal matters across different imputation methods.<sup>2</sup>

### Data

The analysis in this paper is based on data from the March Current Population Surveys. For a description of trends, I use all the years 1964–2000. To examine the impact of selection, I concentrate on changes from 1969 to 1979, 1979 to 1989, and finally 1989 to 1998 (the last change is over a shorter time-span due to the lack of availability of the latest data at the time of writing). The years 1969, 1979, 1989, and 1998 are comparable in that they coincide (or nearly coincide) with business cycle peaks; an added benefit is that the first three of these years also coincide with the retrospective questions data reported on the decennial censuses. The imputations of wages for non-workers require large samples, which are especially difficult to assemble for blacks. To attain larger sample sizes for blacks, I combine three years of data centered on the indicated year. I examine only white and black men with 1–30 years of potential labor market experience. All individuals who are currently enrolled in school or the military or worked part-year last year for those reasons are excluded.<sup>3</sup> Self-employed workers are included in the employment sample but excluded from the wage sample. Wages of self-employed workers are imputed using

wages of wage and salary workers in the same education, experience, and weeks worked category.

Annual earnings are deflated using the personal consumption expenditure deflator from the National Product and Income Accounts. Hourly wages are calculated by dividing annual earnings by the product of weeks worked last year and usual hours worked per week. Wage observations lower than \$1.00 (in 1982 dollars) are recoded to equal \$1.00.<sup>4</sup> Information on usual hours worked per week is not available before the 1976 survey. Using post-1976 data, I regressed weekly hours on hours worked during the survey week, weeks worked last year, part-time status, education, and experience and used the coefficients from the regression to predict weekly hours for years prior to 1976.

### Recent Trends in the Racial Wage Gap and Employment

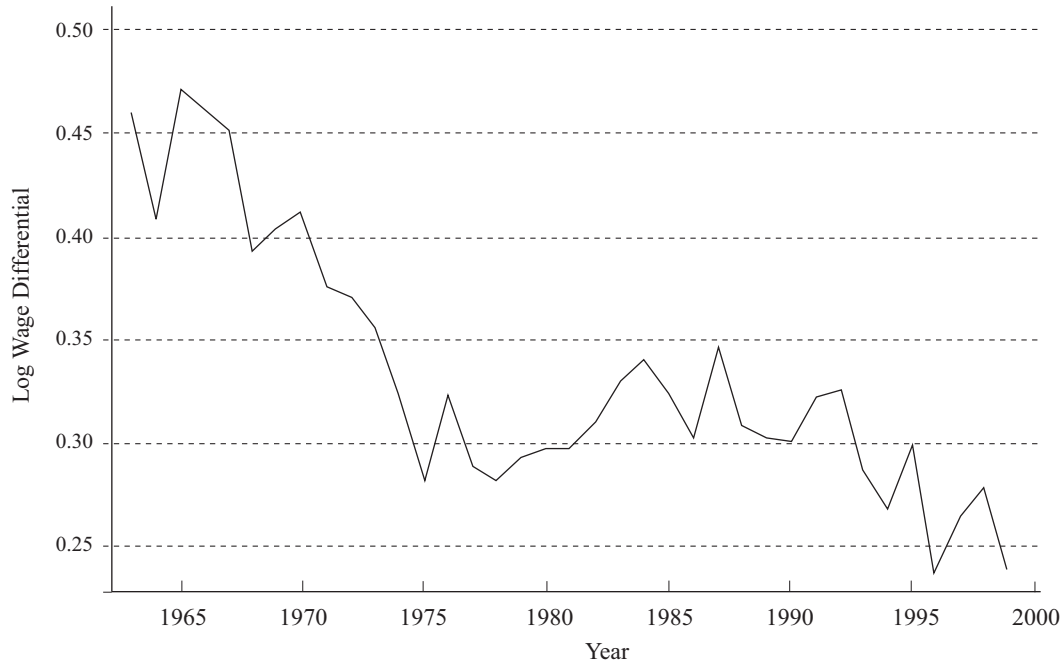
This section reviews the recent trends in observed wages and employment for black and white men that is the starting point for analysis. Figure 1 graphs the log hourly wage differential between white and black prime age male workers (expressed as average white wages minus average black wages) since the early 1960s. The log wage differential was .46 in 1963 and declined until 1975 at the rate of approximately 1.4 percentage points per year. From 1975 through the 1980s, the differential remained essentially unchanged before falling sharply again starting in 1992. The slowdown in black-white wage convergence during the 1980s has been noted by a number of observers, who have suggested that at least part of it can be explained by increases in education

<sup>2</sup>The non-parametric matching estimator in Chandra (2000) that matches non-workers to workers by age and education cell is similar to the method pursued here. However, this paper uses additional information on weeks worked last year.

<sup>3</sup>The resulting sample sizes are 67,167 observations for 1968–70, 91,320 observations for 1978–80, 89,057 observations for 1988–90, and 79,237 observations for 1997–99. Between 8% and 9% of the sample is black.

<sup>4</sup>Specifically, I used the personal consumption deflator reported in column (2), Table B7 of the *Economic Report of the President* (2001). I recoded hourly wages below \$1.00 in 1982 dollars (approximately \$1.58 in 1996 dollars). The alternative method of throwing out low wages produced qualitatively similar results, which are available from the author.

Figure 1. White-Black Log Hourly Wage Differential.



returns and skill prices during the 1980s (Juhn, Murphy, and Pierce 1991; Smith 1993; Card and Lemieux 1996).

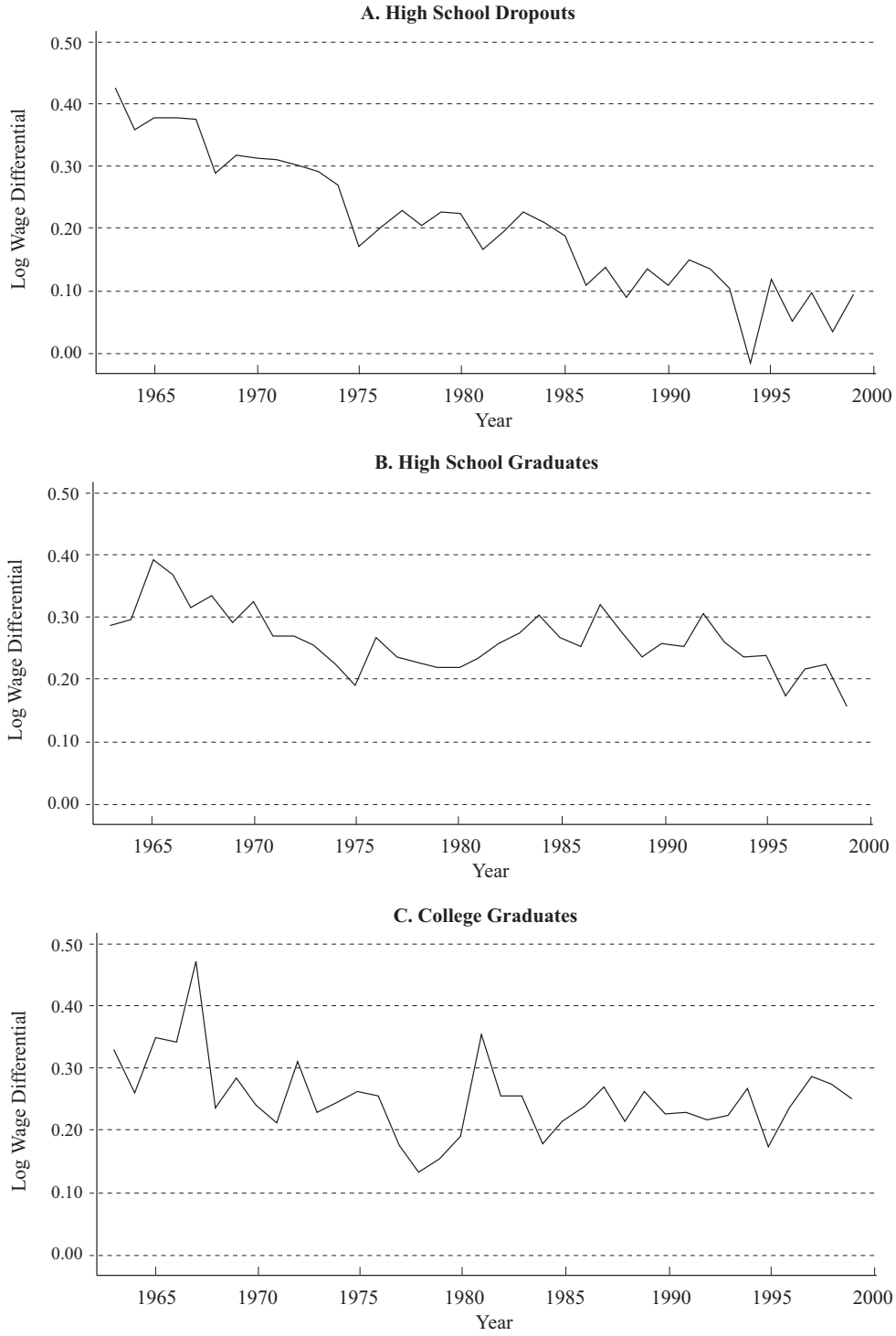
Figure 2 graphs the log hourly wage differential for the different education groups. This figure indicates that the racial wage gap continued to decline throughout the 1980s for high school dropouts while increasing for other more educated groups. Since the employment differential between black and white men is particularly large among high school dropouts, and continued to grow in the 1980s, a natural question is whether selection bias accounts for the varied pattern across education groups.

Declining employment among black men has been well documented in the literature. The declines were particularly sharp during the 1970s, leading researchers to coin the phrase "the black employment crisis" (see the 1986 volume edited by Freeman and Holzer). For the more recent period, a number of papers have documented the decline in black male employment rates relative to white male employ-

ment rates (Welch 1990; Juhn 1992; Jaynes 1992). While overall employment rates were stable during the 1980s and the 1990s, employment rates continued to decline among the less educated and the less skilled. Figures 3–4 summarize these findings.

The retrospective information available in the March CPS allows me to calculate alternative employment measures reflecting different degrees of attachment. One measure examines whether the individual had some incidence of employment during the previous year, that is, worked at least one week. The other measure examines the fraction of the year spent in employment, and is calculated by dividing the number of weeks worked by 52. The latter measure, when averaged over the population, can be thought of as the employment-population ratio averaged over 52 weeks. While employment-population ratios can also be calculated based on survey week data, the retrospective data reflect conditions over the entire year and have a closer correspondence to earnings and wage mea-

Figure 2. White-Black Log Hourly Wage Differential and Education Level.



asures used in this analysis, which are also based on the previous year. Figure 3 presents the two measures, the fraction of the population who worked at least one week, and the fraction employed in a typical week.

Figure 3 tells a now-familiar story of a growing employment differential between black and white men. As the figure shows, the employment differential using the incidence measure was approximately 2 percentage points in 1969. The differential grew rapidly during the 1970s to about 7 percentage points in 1979, and grew slightly more to about 8.6 percentage points in 1989 and 9.4 percentage points in 1999. The employment differential based on employment rates in a typical week, illustrated in the bottom panel, began at approximately 7 percentage points in 1969 and increased to about 12 percentage points by 1979. This employment differential widened slightly during the 1980s but had returned to approximately 12 percentage points in 1999. The story among the less educated is different in that the employment gap continued to increase in the 1980s and the 1990s.

Figure 4 presents both employment measures for high school dropouts. The increase in the black-white employment differential was indeed sharp during the 1970s, growing by 10 percentage points for both measures. Over the next two decades, the employment differential continued to widen for this least educated group, increasing by 12.6 percentage points as measured by the incidence measure and by 11.1 percentage points using employment rates in a typical week. To what extent this rising employment differential among black and white men affected average wages observed among the *working* population is examined in the next section.

### Imputation of Non-Worker Wages

As previously noted, this paper, following Brown (1984), imputes wages of non-workers and examines average wages with and without correcting for non-workers. In the following, I describe a simple framework to address the selection issue. Define

$W_t^*$  as the average wage across the population of both workers and non-workers.  $W_t^w$  is the average wage observed among workers, while  $W_t^{nw}$  is the underlying (unobserved) average of wage offers received by non-workers. The population average  $W_t^*$  is then a weighted average where the weights are the respective employment and non-employment rates,  $E_t$  and  $(1 - E_t)$ , in year  $t$ .

$$(1) \quad W_t^* = E_t \cdot W_t^w + (1 - E_t) \cdot W_t^{nw}$$

I will refer to the difference between the average wage observed over workers and the true underlying average wage of the population as the correction factor,  $C_t$ , where  $C_t = W_t^w - W_t^*$ . Substituting in (1) results in

$$(2) \quad \begin{aligned} C_t &= (1 - E_t) \cdot (W_t^w - W_t^{nw}) \\ &= (1 - E_t) \cdot \text{GAP}_t, \end{aligned}$$

where  $\text{GAP}_t$  refers to the average wage differential between workers and non-workers. The change in the correction factor,  $C_t - C_{t-1}$ , could hence be written as

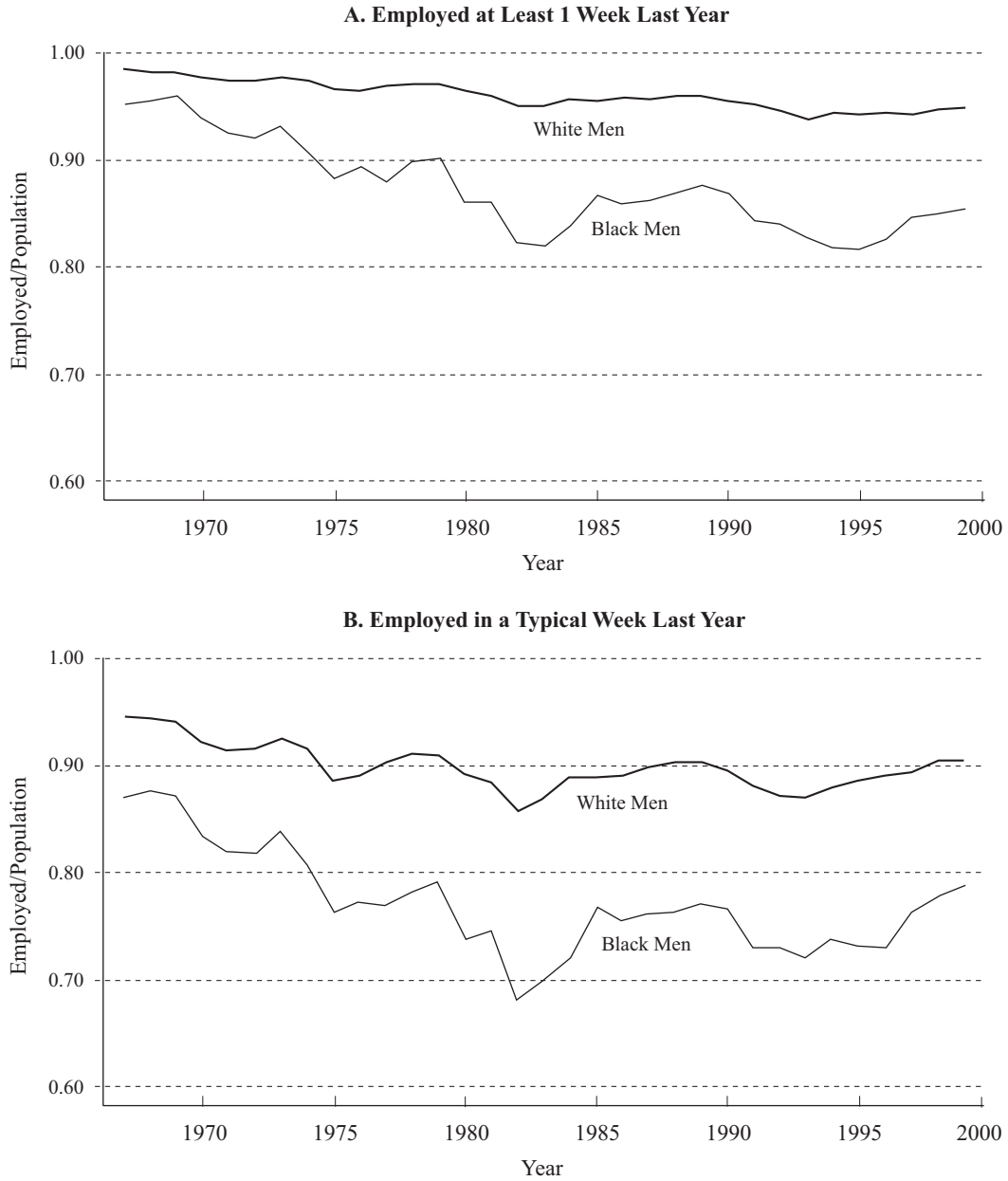
$$(3) \quad \begin{aligned} C_t - C_{t-1} &= \text{GAP}_t \cdot (E_{t-1} - E_t) \\ &+ (1 - E_{t-1}) \cdot (\text{GAP}_t - \text{GAP}_{t-1}). \end{aligned}$$

The first term to the right of the equal sign corresponds to changes in the selection correction term due to falling employment rates. This is the term that previous research has mostly focused on. For example, assuming a constant relative wage between workers and non-workers, Welch (1990) considered the impact of falling employment rates. It is important to note that, as is obvious from (3), the wage gap between workers and non-workers itself could also be an important source of selection bias. In other words, even with stable employment rates, observed average wage changes could be further biased by a rising wage gap between workers and non-workers. The contribution of each factor to overall changes in the selection correction term is investigated in Table 6. First, however, we must resolve the issue of imputing wages to non-workers for whom we do not have reported wages.

Using a methodology similar to that of Juhn (1992) and Juhn, Murphy, and Topel



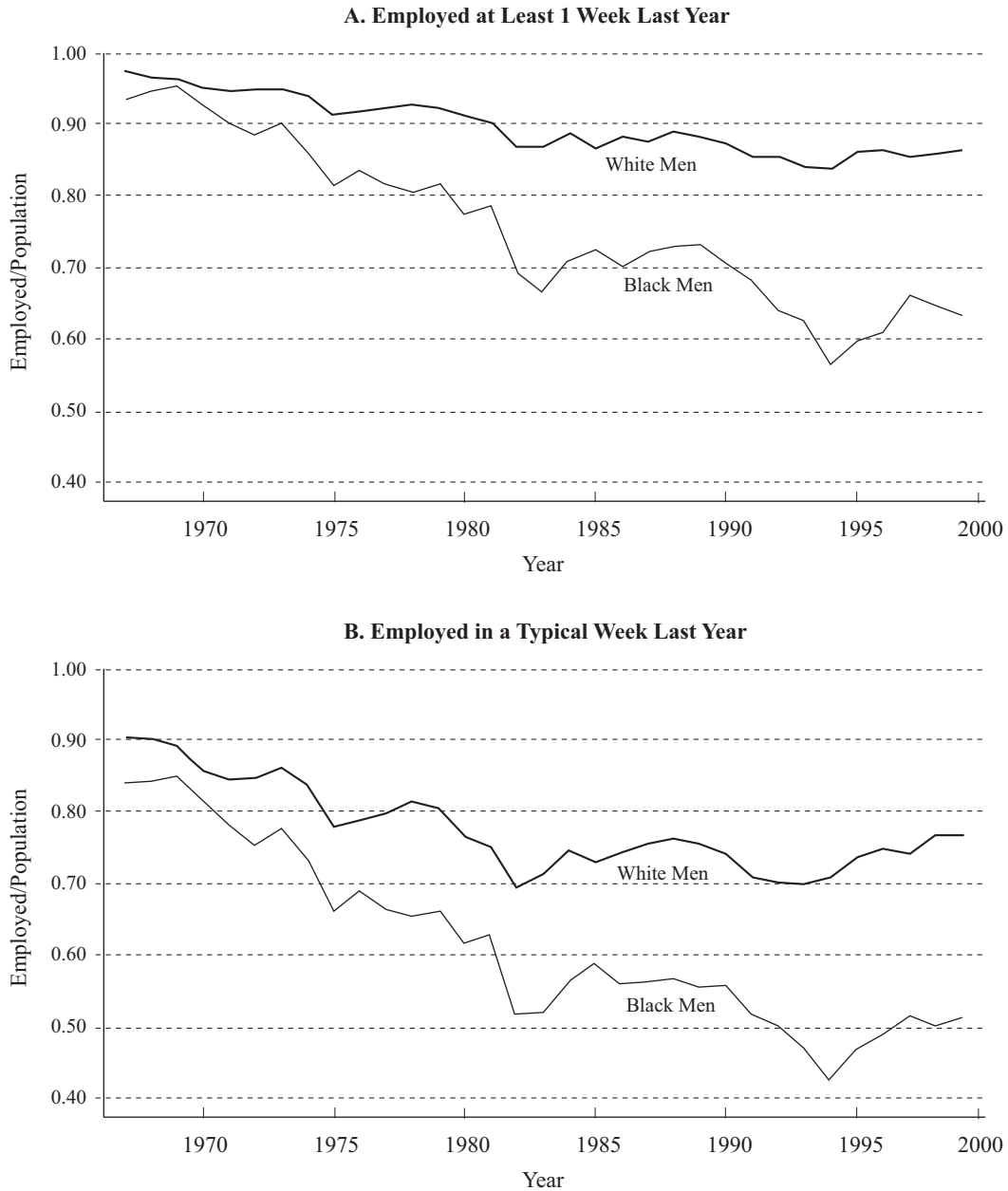
Figure 3. Employment Rates of Black and White Men.



(1991), I assume here that wages of non-workers who did not work the entire previous year are the same as those of a closely comparable population, individu-

als who worked part-year last year. More specifically, I assign to each individual who worked part-year (14–26 weeks) the weight  $\phi_{jt}$ , where

Figure 4. Employment Rates of Black and White Men: High School Dropouts Only.



$$(4) \quad \phi_{jt} = (N_{jt}^{0-13} + N_{jt}^{14-26}) / N_{jt}^{14-26}.$$

$N_{jt}^{0-13}$  is the total number of individuals who worked 0–13 weeks in group  $j$  and year  $t$ ,

and  $N_{jt}^{14-26}$  is the total number of individuals who worked 14–26 weeks in group  $j$  and year  $t$ . Thus every part-year worker who worked 14–26 weeks stands not only for

Table 1. Characteristics of White and Black Men in Different Weeks Worked Categories.

Weeks Worked	Relative Frequency (%)	Years of Schooling				Living Arrangement			Last Week's Wages Relative to Those of the Typical Worker
		<12	12	13–15	16+	Married, Living with Spouse	Single, Living with Family	Single, Living Alone	
<b>A. White Men</b>									
0	3.7	41.2	35.4	14.2	9.2	40.5	40.4	19.1	-0.250
1–13	1.8	38.6	38.9	13.9	8.6	41.8	38.7	19.5	-0.253
14–26	3.6	33.7	40.9	15.7	9.7	49.2	30.2	20.5	-0.212
27–39	4.6	29.7	41.9	16.7	11.8	58.2	21.8	20.0	-0.152
40–49	8.2	23.8	41.8	18.4	16.0	64.3	16.6	19.1	-0.092
50–52	78.0	13.9	36.7	21.2	28.2	74.7	11.1	14.3	0.025
<b>B. Black Men</b>									
0	11.4	47.3	38.5	10.8	3.4	22.5	56.2	21.3	-0.251
1–13	4.0	44.4	40.5	11.6	3.5	26.5	53.6	19.9	-0.206
14–26	5.9	37.1	42.6	14.7	5.6	36.0	41.3	22.7	-0.214
27–39	5.7	37.1	42.0	14.9	6.1	45.6	31.8	22.6	-0.110
40–49	8.1	34.5	41.3	16.3	8.0	54.5	23.9	21.6	-0.057
50–52	64.9	23.4	40.7	21.1	14.9	60.4	19.4	20.2	0.037

*Source:* Numbers are based on 1968–2000 surveys from the March Current Population Surveys. The sample includes men with 1–30 years of experience who were not in the military or school.

*Notes:* The last column is based on survey week wage data from wage and salary workers in the outgoing rotation samples in the 1984–2000 March CPS. Survey week wages were first regressed on a quartic in experience, and four education dummies by year and race and residuals were averaged by weeks worked last year. The regression was weighted by weeks worked last year so that the column reports wages relative to wages of those who were working in a typical week last year.

himself but also for some fraction of those who worked 0–13 weeks in the wage calculations, conditional on education and experience.<sup>5</sup> I use four education groups—high school dropouts, high school graduates, those with some college, and college graduates—and six five-year experience categories. To increase sample sizes, especially for blacks, I combine three years of data centered on the years 1969, 1979, 1989, and 1998. Since hourly wages are derived by dividing annual earnings by weeks worked and usual hours, measurement error in weeks leads to a spurious negative

relationship between wages and weeks worked. In particular, I find that in certain cells with relatively small numbers of observations, workers with the fewest weeks worked last year (1–13 weeks) at times have the highest wages. To reduce such effects of measurement error in weeks, I essentially treat those workers who reported that they worked 1–13 weeks as non-workers and impute their wages from those who worked 14–26 weeks. I also report results from the alternative method of treating those who worked 1–13 weeks as part-year workers in Appendix Tables A1 and A2.<sup>6</sup> Since wages imputed to non-workers are based on wages of *workers*, I suspect that this

<sup>5</sup>March supplemental weights are used in calculating all average wages. Since some annual non-participants may be in the self-employed category, I weight each annual non-participant by the ratio of total number of wage and salary workers divided by total number of workers, including the self-employed.

<sup>6</sup>The two methods produce very similar results for aggregate changes, but the size of the correction is reduced for high school dropouts.

will most likely result in an under-correction. The validity of the assumption that wages of non-workers are at least as low as wages of part-year workers is examined in Table 1.

Table 1 compares schooling level, living arrangements, and wages upon re-entry into the labor market for black and white men who reported different numbers of weeks worked last year. The point of these tables is to show that non-workers (those who worked 0–13 weeks last year, whose wages I impute) look much more like part-year workers (those who worked 14–26 weeks) than like the average worker or full-year workers (those who worked 50–52 weeks). Another point is that part-year workers look somewhat better in terms of their earnings capacity than non-workers do, suggesting that we will most likely overstate the potential wages of non-workers. The first four columns of the table show that relative to full-year workers, non-workers and part-year workers had significantly fewer years of schooling. Among whites, approximately 41% of those who did not work at all last year and 39% of those who worked 1–13 weeks were high school dropouts. Among those who worked 14–26 weeks, 33.7% were high school dropouts. For blacks (shown in Panel B of Table 1), the results are similar.<sup>7</sup>

Table 1 also examines other characteristics, marital status and living arrangement, which are correlated with wages. The sample is divided into three categories, married and living with a spouse, not married and living with family, and not married and living alone, and the distribution across these categories is presented in the middle three columns of Table 1. As expected, full-year workers were *most* likely to be married and living with a spouse. Conditional on not being married, non-workers were much more likely than full-year workers to live with other family members. Again the

distributions across living arrangement categories are similar for those who did not work at all and those who worked 1–13 weeks. For example, among whites, the fraction of men married and living with a spouse was 40.5% for those who did not work at all and 41.8% for those who worked 1–13 weeks. Based on marital status and living arrangements, those who worked 14–26 weeks again look somewhat better.

Finally, the last column of Table 1 examines survey week wages relative to the average wage of workers in a typical week, stratified by the previous year's weeks worked category.<sup>8</sup> Those who worked zero weeks last year and reported survey week wages are therefore re-entrants into the labor market after a long non-employment spell. Among white men, those who worked 0–13 weeks the previous year re-entered the labor market with wages about 25% below the wage of a typical worker in the same education, experience, and race category. Part-year workers who worked 14–26 weeks had wages about 21% below. Again, these tabulations suggest that wages of part-year workers overstate the opportunities available to non-workers. In addition, since the re-entrants in Table 1 are themselves a selected group with presumably the best available labor market opportunities among non-workers, wages of non-workers will be overstated to an even greater extent.

While the primary purpose of Table 1 was to show that wages of part-year workers

<sup>7</sup>A table similar to Table 1 appears in Juhn, Murphy, and Topel (1991). The tables here disaggregate by race to show that the assumptions made are valid for blacks as well as whites.

<sup>8</sup>Survey week wages are wages received on the main job during the survey week. Individuals who are paid on an hourly basis report their hourly earnings directly. For those who are paid on a weekly basis, hourly wages are calculated by dividing earnings by hours worked during the survey week. Survey week wages are available in theory for outgoing rotation groups on the March CPS beginning in 1980. However, prior to 1984, only wages of workers who were paid on an hourly basis are available, so the data are comparable only over the period 1984–98. Survey week wages were first regressed on a quartic in experience by year, race, and education category, and average residuals are reported. The regression was weighted by weeks worked last year so that the column reports wages relative to those of the same cohort who were working in a typical week last year.

most likely overstate the wages of non-workers, the table is also useful in illustrating another point—that there is considerable information in the weeks worked data. Table 1 shows that wages vary greatly by weeks worked, with higher wages being associated with a greater number of weeks worked. Several papers have noted the increasing correlation between weeks worked and wages in the cross-section (see Juhn, Murphy, and Topel 1991; and, most recently, Welch 1997).

Table 2 examines how the relationship between weeks worked and wages changed over the time period under study, 1969–98. Unlike Table 1, Table 2 examines average hourly wages based on annual earnings last year, again measured relative to workers in a typical week. Since these wage measures are based on annual earnings last year, we do not observe wages for annual non-participants who reported zero weeks worked last year. In 1969, white men who worked 14–26 weeks had wages approximately 5% below those of the typical worker in the same race, education, and experience category. Afterward, the relative wage of part-year workers fell significantly, to 19.2%, 20.6%, and 17.5% below in 1979, 1989, and 1998, respectively. Meanwhile, the wage *premium* paid to full-year workers (those who worked 50–52 weeks last year) increased. In 1998, full-year workers had average wages 1.8% above the average worker. The results in Table 2 suggest that employment became increasingly selected on wages for black as well as for white men. In 1969, black men who worked 14–26 weeks had wages 2.8% below workers in a typical week. In 1998, their wages averaged 20.3% below. Table 2 also gives a preliminary indication that the rising wage gap between the working and the non-working populations is a major factor contributing to increases in selection bias.

### The Racial Wage Differential Correcting for Labor Market Dropouts

The results of the corrections are presented in Table 3. Table 3 reports changes in average wages of white and black men as

Table 2. Log Wages Relative to Wages of Workers in a Typical Week.

Weeks Worked	Year			
	1968–70	1978–80	1988–90	1997–99
<b>A. White Men</b>				
1–13	–0.034	–0.217	–0.242	–0.024
14–26	–0.051	–0.192	–0.206	–0.175
27–39	–0.025	–0.077	–0.120	–0.140
40–49	–0.015	–0.056	–0.091	–0.090
50–52	0.005	0.026	0.029	0.018
<b>B. Black Men</b>				
1–13	0.168	–0.122	–0.149	–0.073
14–26	–0.028	–0.133	–0.189	–0.203
27–39	0.042	–0.182	–0.154	–0.145
40–49	–0.045	–0.060	–0.123	–0.124
50–52	0.000	0.040	0.052	0.031

*Source:* The sample includes wage and salary workers with 1–30 years of experience.

*Notes:* Log hourly wages were calculated as the logarithm of annual earnings divided by hours worked last year. Log hourly wages were first regressed on a quartic in experience and four education dummies by year and race, and average residuals are reported by weeks worked category. The regression was weighted by weeks worked last year so that the table reports wages relative to wages of those working in a typical week last year.

well as changes in the racial wage gap, defined as the average log wage of whites minus the average log wage of blacks. Column (1) reports average wage changes for the full sample, including those who worked 0–13 weeks, whose wages are imputed from wages of part-year workers. Column (2) reports wage changes among part-year and full-year workers, that is, those who worked 14 weeks or greater last year. These are the wage changes one obtains by simply averaging over all observations in the wage sample. Column (3) reports changes in average wages of workers in a typical week. In contrast to column (2), which treats each wage observation equally in calculating the average, wage observations are weighted by their reported weeks worked in column (3). Weighting each wage observation by weeks worked is analogous to using survey week wage data from the May CPS or the outgoing rotation group samples. Since this sample of workers is also most compa-

Table 3. Changes in the Average Log Hourly Wage and Log Wage Differential between White and Black Men.

Description	Full Sample		<i>Employed 14 Weeks or More</i>		<i>Employed in a Typical Week</i>	
<i>Average Log Wage—Whites</i>						
1969–79	0.010	(0.003)	0.021	(0.003)	0.031	(0.003)
1979–89	-0.037	(0.003)	-0.032	(0.003)	-0.032	(0.003)
1989–98	0.029	(0.004)	0.031	(0.004)	0.028	(0.004)
1969–98	0.002	(0.004)	0.020	(0.004)	0.027	(0.004)
<i>Average Log Wage—Blacks</i>						
1969–79	0.105	(0.011)	0.143	(0.011)	0.161	(0.011)
1979–89	-0.052	(0.012)	-0.042	(0.011)	-0.043	(0.011)
1989–98	0.057	(0.013)	0.074	(0.012)	0.068	(0.012)
1969–98	0.110	(0.012)	0.175	(0.011)	0.186	(0.011)
<i>Log Wage Differential (White – Black)</i>						
1969–79	-0.095	(0.012)	-0.122	(0.011)	-0.130	(0.011)
1979–89	0.015	(0.013)	0.010	(0.012)	0.009	(0.012)
1989–98	-0.028	(0.013)	-0.043	(0.012)	-0.040	(0.012)
1969–98	-0.108	(0.013)	-0.155	(0.012)	-0.161	(0.012)

*Source:* Reported changes are based on three-year averages of the 1968–70, 1978–80, 1988–90, and 1997–99 data from the March Current Population Surveys.

*Notes:* Standard errors are reported in parentheses. The full sample includes men with 1–30 years of experience who were not in the military or school. The wage sample includes wage and salary workers who worked 14 weeks or more last year. Hourly wages less than \$1 (in 1982 dollars) were recoded to equal \$1. Wages of self-employed workers and those who worked 0–13 weeks last year were imputed and included in the average wage changes reported in column (1). For details of the imputation procedure, see text. Column (2) reports changes in average wages of individuals in the wage sample. Column (3) reports changes based on weeks-weighted averages of wage observations in the wage sample.

rable to the sample from which published median wage and salary earnings are calculated, my comparison will focus mainly on columns (1) and (3).<sup>9</sup>

Table 3 shows that over the whole period, wages grew approximately 2.7% among white men employed in a typical week (column 3). When we take non-workers into account, real wages were essentially unchanged. Among blacks, the bias resulting from looking at only workers is even larger. Blacks who worked in a typical week

gained approximately 16.1% in real wages from 1969 to 1979. Once we take non-workers into account, wage growth for blacks over the 1970s is reduced to about 10.5%. Over the whole period 1969–98, prime-age black men, including non-workers, gained approximately 11.0% in real wages, which is approximately 40% less than the 18.6% gain observed among workers in a typical week. Table 3 indicates that depending on which sample of blacks one chooses to follow, dramatically different conclusions will be reached about their current economic position relative to their position in the late 1960s.

Finally, the bottom rows of Table 3 document changes in the log wage differential between white and black men for the full and working populations. In particular, the rate of convergence during the 1970s is

<sup>9</sup>As noted by Brown (1984), however, the published numbers are based on an even more selected sample who had wage and salary earnings last year and were employed as wage and salary workers during the survey week.

significantly reduced when we take labor market dropouts into account. From 1969 to 1979, the log wage differential between white and black men fell 13.0 percentage points for workers in a typical week. When non-workers are taken into account, the wage differential fell 9.5 percentage points, reducing the convergence by approximately 30%. This result is smaller than the raw differences between the published and “corrected” numbers reported by Brown (1984) and somewhat smaller than the 40% reduction he found using a regression framework. However, while Brown suggested that his method most likely overstated the importance of selection bias, a comparison of non-worker and part-year worker characteristics in Table 1 suggests that the results reported here most likely *understate* the impact of selection bias. Over the entire period 1969–98, the log wage differential fell approximately 16.1 percentage points among workers in a typical week. Including non-workers reduces the convergence by about one-third, to 10.8 percentage points.

Table 4 presents changes in average wages and the racial wage differential disaggregated by education class. Among the high school dropouts (Panel A), who experienced the most severe declines in employment, we observe larger corrections once we take non-workers into account. Over the whole period from 1969 to 1998, black male high school dropouts working in a typical week lost approximately 7.7% in real wages. Once we consider the whole sample including non-workers, real wages for this group fell approximately 23.7%. This suggests that by ignoring non-workers we may be understating the wage decline for black high school dropouts by as much as 16 percentage points.

The convergence in black and white wages for high school dropouts is significantly muted when we correct for selection bias. Over the entire period, the log wage differential between white and black high school dropouts fell by about 25.2 percentage points among workers in a typical week. Once we take non-workers into account, the differential declined by 11.7 percentage points. In other words, roughly one-

half of the observed convergence can be attributed to selection bias. Correcting for non-workers significantly reduces the size of the continued convergence in wages among high school dropouts during the 1980s. However, the table also indicates that correcting for non-workers makes a significant difference in the 1990s and that the racial wage gap among this less educated group again started to increase. In future work, it would be interesting to see whether a similar pattern of divergence can be found in a larger dataset, such as the 2000 Census.

For comparison, Table 4 also presents results for high school graduates and college graduates. Among male high school graduates, the rate of convergence is reduced by approximately one-fourth, from 13.6 percentage points to 10.2 percentage points, when non-workers are taken into account. For college graduates (presented in Panel C), there is no statistically significant difference between the full sample and workers in a typical week.

#### Sensitivity Analysis Using Census Data

While the March CPS data allow us to examine a longer time period, including the 1990s, the smaller sample sizes of black men raise concerns regarding robustness. For the changes over the 1970s and the 1980s, it is possible to compare the results to census data. In the following section, I use the 1% sample of the 1970 Census and the 5% samples of the 1980 and the 1990 Censuses. One clear advantage of the census data is their considerably larger size. For example, the same sample selection criteria resulted in 29,785 observations for black men in 1969, 202,122 in 1979, and 208,077 in 1989. The format and the questions asked on the census are very similar to those in the March CPS, so I can follow identical sample selection criteria and imputation methods. I report the results for all men in Table 5 and report the disaggregated results by education category in the appendix.

Compared to the CPS data, the results in Table 5 indicate more rapid black-white



Table 4. Changes in the Average Log Hourly Wage and Log Wage Differential between White and Black Men, by Education Level.

<i>Description</i>	<i>Full Sample</i>		<i>Employed 14 Weeks or More</i>		<i>Employed in a Typical Week</i>	
<b>A. High School Dropouts</b>						
<i>Average Log Wage—Whites</i>						
1969–79	–0.090	(0.007)	–0.071	(0.007)	–0.058	(0.007)
1979–89	–0.189	(0.009)	–0.189	(0.008)	–0.188	(0.008)
1989–98	–0.074	(0.010)	–0.075	(0.010)	–0.083	(0.010)
1969–98	–0.353	(0.009)	–0.335	(0.008)	–0.329	(0.008)
<i>Average Log Wage—Blacks</i>						
1969–79	0.007	(0.019)	0.038	(0.018)	0.055	(0.017)
1979–89	–0.136	(0.027)	–0.106	(0.025)	–0.102	(0.025)
1989–98	–0.108	(0.035)	–0.037	(0.033)	–0.030	(0.032)
1969–98	–0.237	(0.029)	–0.105	(0.027)	–0.077	(0.027)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.097	(0.020)	–0.109	(0.019)	–0.113	(0.018)
1979–89	–0.053	(0.029)	–0.082	(0.027)	–0.086	(0.026)
1989–98	0.034	(0.037)	–0.038	(0.034)	–0.053	(0.033)
1969–98	–0.117	(0.030)	–0.229	(0.029)	–0.252	(0.028)
<b>B. High School Graduates</b>						
<i>Average Log Wage—Whites</i>						
1969–79	–0.019	(0.004)	–0.014	(0.004)	–0.005	(0.004)
1979–89	–0.116	(0.005)	–0.110	(0.005)	–0.109	(0.005)
1989–98	–0.023	(0.006)	–0.021	(0.005)	–0.022	(0.005)
1969–98	–0.158	(0.005)	–0.145	(0.005)	–0.136	(0.005)
<i>Average Log Wage—Blacks</i>						
1969–79	0.052	(0.018)	0.083	(0.017)	0.099	(0.016)
1979–89	–0.132	(0.017)	–0.137	(0.016)	–0.137	(0.016)
1989–98	0.025	(0.018)	0.040	(0.017)	0.036	(0.017)
1969–98	–0.055	(0.019)	–0.014	(0.018)	–0.002	(0.017)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.071	(0.018)	–0.097	(0.017)	–0.104	(0.017)
1979–89	0.017	(0.017)	0.027	(0.017)	0.027	(0.016)
1989–98	–0.048	(0.019)	–0.061	(0.018)	–0.059	(0.018)
1969–98	–0.102	(0.020)	–0.131	(0.018)	–0.136	(0.018)
<b>C. College Graduates</b>						
<i>Average Log Wage—Whites</i>						
1969–79	–0.014	(0.007)	–0.009	(0.007)	–0.004	(0.007)
1979–89	0.049	(0.006)	0.049	(0.006)	0.047	(0.006)
1989–98	0.082	(0.007)	0.084	(0.007)	0.083	(0.007)
1969–98	0.117	(0.007)	0.124	(0.007)	0.126	(0.007)
<i>Average Log Wage—Blacks</i>						
1969–79	0.084	(0.035)	0.091	(0.035)	0.103	(0.035)
1979–89	–0.042	(0.030)	–0.026	(0.030)	–0.020	(0.029)
1989–98	0.080	(0.028)	0.052	(0.027)	0.041	(0.026)
1969–98	0.122	(0.033)	0.117	(0.033)	0.124	(0.033)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.098	(0.036)	–0.100	(0.036)	–0.107	(0.036)
1979–89	0.091	(0.031)	0.075	(0.030)	0.067	(0.030)
1989–98	0.002	(0.028)	0.031	(0.028)	0.043	(0.027)
1969–98	–0.005	(0.034)	0.006	(0.034)	0.003	(0.034)

Notes: See notes to Table 3.



Table 5. Changes in the Average Log Hourly Wage and Log Wage Differential between White and Black Men: All Men.

<i>Description</i>	<i>Full Sample</i>		<i>Employed 14 Weeks or More</i>		<i>Employed in a Typical Week</i>	
<i>Average Log Wage—Whites</i>						
1969–79	0.036	(0.002)	0.040	(0.002)	0.047	(0.002)
1979–89	–0.022	(0.002)	–0.014	(0.002)	–0.013	(0.002)
1969–1989	0.014	(0.002)	0.026	(0.002)	0.034	(0.002)
<i>Average Log Wage—Blacks</i>						
1969–79	0.166	(0.005)	0.188	(0.004)	0.192	(0.004)
1979–89	–0.069	(0.003)	–0.036	(0.002)	–0.024	(0.002)
1969–1989	0.097	(0.004)	0.151	(0.004)	0.168	(0.004)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.130	(0.005)	–0.148	(0.005)	–0.146	(0.005)
1979–89	0.046	(0.003)	0.022	(0.003)	0.012	(0.003)
1969–1989	–0.083	(0.005)	–0.125	(0.005)	–0.134	(0.004)

Source: Numbers are based on 1970 (1%), 1980 (5%), and 1990 (5%) Public Use Micro Samples (PUMS).

Notes: See notes to Table 3.

wage convergence during the 1970s and a larger divergence during the 1980s. For example, the log wage differential, correcting for non-workers, fell 13.0 percentage points from 1969 to 1979, but the differential increased substantially from 1979 to 1989, by 4.6 percentage points. Over the two decades 1969–1989, the two datasets yield quite similar results. The estimation using the CPS indicates that the log wage differential decreased 12.1 percentage points among workers in a typical week and 8.0 percentage points among the full sample including non-workers, suggesting that roughly one-third of the convergence may be due to the bias. The estimation based on census data indicates that the log differential fell 13.4 percentage points among workers in a typical week, and by 8.3 percentage points for the full sample, leaving an estimate of the bias that is slightly less than 40%. The difference in the convergence results between the CPS and the census may be one reason why the size of the bias estimated in this paper is larger than that reported by Welch (1990), who used census data but examined changes up to 1980. The results here indicate that some of the rapid convergence observed during the 1970s reversed course during the 1980s.

Turning to the disaggregated results reported in the appendix, correcting for non-workers significantly reduces the continued wage convergence between black and white high school dropouts during the 1980s. However, even the census data indicate that less educated black men did better relative to their white counterparts than the more educated black men during the 1980s, and this disparity does not entirely disappear once we correct for labor market dropouts.<sup>10</sup>

<sup>10</sup>A number of potential explanations for the differential rates of convergence across educational groups are not investigated in this paper. There may be changes in the age composition as well as changes in the fraction who are foreign-born. Deleting immigrants from the sample leads to a smaller decline in the log wage differential among high school dropouts of 2.9 percentage points from 1979 to 1989. Correcting for non-workers among this sample of non-immigrant high school dropouts results in an actual divergence of black-white wages of 0.5 percentage points in the 1980s. Since the major focus of this paper is the comparison of wage trends with and without labor market dropouts, further work on the more general question of how immigrants affect the racial wage gap is left for future research.

### The Rising Wage Gap between Workers and Non-Workers

In this section I investigate the relative importance of falling employment rates and the rising wage gap between the working and the nonworking populations. More specifically, I decompose the changes in the correction factor,  $C_t - C_{t-1}$ , as specified in (3). The first term in the decomposition holds constant the relative wage differential between workers and non-workers and allows non-employment rates to vary through time. Essentially, this term investigates to what extent increasing the number of labor market dropouts matters if one assumes that the marginal dropout receives the same wage offer as the average labor market dropout. The second term holds the non-employment rate fixed and allows the average wage gap between workers and non-workers to change. This term investigates the impact of increasing selectivity of employment. In the decomposition presented in Table 6, I concentrate on the difference in average wages between weekly participants (workers in a typical week) and the full population. This is simply the difference between columns (1) and (3) in Table 3 and is reported in column (1) of Table 6. Column (2) presents the change in the correction factor due to falling weekly participation rates. Column (3) presents the changes in the correction factor due to the rising wage gap between the working and the non-working populations.

Table 6 indicates that increasing selectivity of employment and falling employment rates were about equally important during the 1970s but the growing wage gap between workers and non-workers played a larger role during the 1980s and the 1990s. For average wages of white men, presented in the top panel of Table 6, falling employment rates and a rising wage gap contributed about equally to the 2.1 percentage point increase in the selection bias term from 1969 to 1979. After that period, the additional increase in selection bias was small and mostly due to an increase in selectivity.

For average wages of black men, shown in the middle panel, changes in the wage gap between workers and non-workers again contributed approximately half (.029/.055) to the increase in the selection bias term over the 1969–79 period. As with white men, the increasing wage gap between working and nonworking populations was more important in the 1980s and the 1990s.

The final panel of Table 6 decomposes changes in the correction factor for the black-white wage differential,  $(C_t^W - C_{t-1}^W) - (C_t^B - C_{t-1}^B)$ . Over the period 1969–79, the decline in the black-white wage differential is overstated by 3.5 percentage points due to selection bias. Of this total, 1.6 percentage points are due to changes in employment rates and 1.9 percentage points are due to the rising wage gap. Over the 1980s and the 1990s, when employment rates did not change much, the entire rise in the bias term is due to increases in the wage gap between the working and the nonworking populations.

### Conclusion

Labor market inactivity among prime age black men has reached extraordinary proportions. In 1999, over 14% of prime age black men did not work the entire year, and more than 21% were not working during a typical week. Among black male high school dropouts, nearly one-half were not working in a typical week. Given these numbers, one must consider seriously Butler and Heckman's (1977) original contention that discussions of black economic progress and black-white wage convergence are at best incomplete without consideration of employment and selection issues.

Researchers who have worried about selection bias in the past have almost exclusively focused on declining employment rates. I find in this paper that an equally important source of selection bias is the changing gap between the wages of workers and the potential wages of non-workers. This was particularly true starting in the 1980s, when wages and incomes became polarized across skilled and less skilled groups. The wage gap between full-year

and part-year workers increased dramatically. There is every indication that wages of workers and the wage opportunities available to non-workers diverged in a similar fashion.

The basic underlying assumption in this paper is that potential wages of non-workers (which we do not observe) are at least as low as the wages of part-year workers (which we do observe in the March CPS data). Based on all available evidence, this appears to be a conservative assumption. That is, we are most likely overstating the wage opportunities available to non-workers. Despite its being a lower-bound estimate, the bias resulting from looking at selected samples of workers is, I find, an important component of observed wage growth among prime age black men and a substantial component of the observed decline in the black-white wage differential. Over the period 1969–98, correcting for non-workers reduces the estimated real wage growth for black men by approximately 40% and reduces black-white wage convergence by approximately one-third. Selection bias corrections do not entirely erase the continued convergence in black-white wages observed among high school dropouts during the 1980s. However, incorporating non-workers into the picture results in a substantially smaller decline of the racial wage gap.

This paper has examined men only. Issues regarding female labor supply and selection bias are most certainly equally interesting but, unfortunately, also considerably more complex. The strategy followed here of imputing wages of non-workers based on wages of part-year workers is likely to be less valid in the case of women. Children, husband’s earnings, and work attitudes all figure prominently in married women’s decision to work. Imputing wages

Table 6. Decomposition of Changes in the Selection Correction Factor.

Description	Total Change in Correction Factor (1)	Amount Due to Falling Employment (2)	Amount Due to Rising Wage Gap (3)
<i>Average Log Wage—Whites<sup>a</sup></i>			
1969–79	0.021	0.012	0.009
1979–89	0.005	0.001	0.004
1989–98	-0.001	0.000	-0.001
<i>Average Log Wage—Blacks</i>			
1969–79	0.055	0.027	0.029
1979–89	0.011	0.000	0.011
1989–98	0.011	-0.004	0.015
<i>Log Wage Differential (White – Black)<sup>b</sup></i>			
1969–79	-0.035	-0.016	-0.019
1979–89	-0.007	0.001	-0.008
1989–98	-0.012	0.003	-0.015

Source: Reported changes are based on three-year averages of the 1968–70, 1978–80, 1988–90, and 1997–99 data from the March Current Population Surveys.

<sup>a</sup>“Correction factor” refers to the difference in average wages between the full population and workers in a typical week in Table 3. Column (2) corresponds to the change in the correction factor due to falling employment,  $GAP_t * (E_{t-1} - E_t)$ . Column (3) corresponds to the change due to the rising wage gap between workers and nonworkers,  $(1 - E_{t-1}) * (GAP_t - GAP_{t-1})$ .

<sup>b</sup>Column (2) corresponds to the change in the correction factor for the black-white wage differential due to falling employment rates,  $GAP_t^W * [(E_{t-1}^W - E_t^W)] - GAP_t^B * [(E_{t-1}^B - E_t^B)]$ . Column (3) corresponds to the change due to the rising wage gaps,  $[(GAP_t^W - GAP_{t-1}^W) * (1 - E_{t-1}^W) - [(GAP_t^B - GAP_{t-1}^B) * (1 - E_{t-1}^B)]]$ .

of women who are out of the labor force would most probably demand more careful modeling of such factors and require working with a data set that is richer in details on actual labor market experience, employment spells, and fertility decisions of women.

**Appendix Table A1**  
**Changes in the Average Log Hourly Wage and Log Wage Differential between White and Black Men**  
**(Wages of Those Working 1–13 Weeks Not Imputed)**

<i>Description</i>	<i>Full Sample</i>		<i>Employed 14 Weeks or More</i>		<i>Employed in a Typical Week</i>	
<i>Average Log Wage—Whites</i>						
1969–79	0.007	(0.003)	0.016	(0.003)	0.030	(0.003)
1979–89	–0.037	(0.003)	–0.032	(0.003)	–0.032	(0.003)
1989–98	0.034	(0.004)	0.034	(0.004)	0.029	(0.004)
1969–98	0.004	(0.004)	0.018	(0.004)	0.027	(0.004)
<i>Average Log Wage—Blacks</i>						
1969–79	0.099	(0.012)	0.128	(0.011)	0.158	(0.010)
1979–89	–0.053	(0.012)	–0.045	(0.012)	–0.041	(0.011)
1989–98	0.069	(0.013)	0.079	(0.012)	0.069	(0.011)
1969–98	0.115	(0.012)	0.162	(0.012)	0.186	(0.011)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.092	(0.012)	–0.113	(0.012)	–0.128	(0.011)
1979–89	0.016	(0.013)	0.013	(0.012)	0.009	(0.011)
1989–98	–0.035	(0.014)	–0.044	(0.013)	–0.040	(0.012)
1969–98	–0.111	(0.013)	–0.144	(0.012)	–0.159	(0.012)

*Source:* Reported changes are based on three-year averages of the 1968–70, 1988–90, and 1997–99 data from the March Current Population Surveys.

*Notes:* Standard errors are reported in parentheses. The full sample includes men with 1–30 years of experience who were not in the military or school. The wage sample includes wage and salary workers who worked 14 weeks or more last year. Hourly wages less than \$1 (in 1982 dollars) were recoded to equal \$1. Wages of self-employed workers and those who worked 0 weeks last year were imputed and included in the average wage changes reported in column (1). For details of the imputation procedure, see text. Column (2) reports changes in average wages of individuals in the wage sample. Column (3) reports changes based on weeks-weighted averages of wage observations in the wage sample.

**Appendix Table A2**  
**Changes in the Average Log Hourly Wage and Log Wage**  
**Differential between White and Black Men: High School Dropouts**  
**(Wages of Those Working 1–13 Weeks Not Imputed)**

<i>Description</i>	<i>Full Sample</i>		<i>Employed 14 Weeks or More</i>		<i>Employed in a Typical Week</i>	
<i>Average Log Wage—Whites</i>						
1969–79	–0.093	(0.007)	–0.079	(0.007)	–0.060	(0.007)
1979–89	–0.189	(0.009)	–0.189	(0.008)	–0.188	(0.008)
1989–98	–0.060	(0.010)	–0.064	(0.010)	–0.081	(0.009)
1969–98	–0.342	(0.009)	–0.332	(0.009)	–0.329	(0.008)
<i>Average Log Wage—Blacks</i>						
1969–79	–0.029	(0.019)	0.008	(0.018)	0.049	(0.017)
1979–89	–0.070	(0.029)	–0.084	(0.026)	–0.100	(0.024)
1989–98	–0.050	(0.037)	–0.028	(0.034)	–0.028	(0.031)
1969–98	–0.149	(0.030)	–0.104	(0.028)	–0.079	(0.025)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.063	(0.020)	–0.087	(0.019)	–0.108	(0.018)
1979–89	–0.120	(0.030)	–0.106	(0.027)	–0.088	(0.025)
1989–98	–0.010	(0.039)	–0.035	(0.035)	–0.053	(0.032)
1969–98	–0.193	(0.032)	–0.228	(0.029)	–0.249	(0.027)

See notes to Appendix Table A1.

**Appendix Table A3**  
**Changes in the Average Log Hourly Wage and Log Wage**  
**Differential between White and Black Men, by Education**  
**(Census Data)**

<i>Description</i>	<i>Full Sample</i>		<i>Employed 14 Weeks or More</i>		<i>Employed in a Typical Week</i>	
<b>A. High School Dropouts</b>						
<i>Average Log Wage—Whites</i>						
1969–79	–0.058	(0.004)	–0.051	(0.004)	–0.043	(0.004)
1979–89	–0.171	(0.005)	–0.154	(0.005)	–0.149	(0.004)
1969–89	–0.230	(0.004)	–0.205	(0.004)	–0.192	(0.004)
<i>Average Log Wage—Blacks</i>						
1969–79	0.092	(0.007)	0.112	(0.006)	0.115	(0.006)
1979–89	–0.163	(0.006)	–0.122	(0.005)	–0.107	(0.005)
1969–89	–0.071	(0.007)	–0.009	(0.007)	0.007	(0.006)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.151	(0.008)	–0.163	(0.007)	–0.158	(0.007)
1979–89	–0.008	(0.008)	–0.033	(0.007)	–0.042	(0.007)
1969–89	–0.159	(0.008)	–0.196	(0.008)	–0.200	(0.008)
<b>B. High School Graduates</b>						
<i>Average Log Wage—Whites</i>						
1969–79	0.016	(0.002)	0.016	(0.002)	0.020	(0.002)
1979–89	–0.125	(0.002)	–0.119	(0.002)	–0.116	(0.002)
1969–89	–0.109	(0.002)	–0.102	(0.002)	–0.096	(0.002)
<i>Average Log Wage—Blacks</i>						
1969–79	0.119	(0.007)	0.127	(0.007)	0.128	(0.007)
1979–89	–0.163	(0.004)	–0.134	(0.004)	–0.123	(0.003)
1969–89	–0.044	(0.007)	–0.007	(0.007)	0.005	(0.007)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.103	(0.008)	–0.111	(0.007)	–0.107	(0.007)
1979–89	0.038	(0.005)	0.016	(0.004)	0.006	(0.004)
1969–89	–0.065	(0.008)	–0.095	(0.007)	–0.101	(0.007)
<b>C. College Graduates</b>						
<i>Average Log Wage—Whites</i>						
1969–79	–0.054	(0.004)	–0.052	(0.004)	–0.048	(0.004)
1979–89	0.076	(0.003)	0.074	(0.003)	0.072	(0.003)
1969–89	0.022	(0.004)	0.022	(0.004)	0.023	(0.004)
<i>Average Log Wage—Blacks</i>						
1969–79	0.055	(0.017)	0.054	(0.017)	0.056	(0.017)
1979–89	0.031	(0.007)	0.035	(0.007)	0.040	(0.006)
1969–89	0.086	(0.017)	0.089	(0.017)	0.096	(0.017)
<i>Log Wage Differential (White – Black)</i>						
1969–79	–0.109	(0.017)	–0.106	(0.017)	–0.105	(0.017)
1979–89	0.044	(0.008)	0.038	(0.007)	0.032	(0.007)
1969–89	–0.065	(0.017)	–0.067	(0.017)	–0.072	(0.017)

*Source:* Numbers are based on 1970 (1%), 1980 (5%), and 1990 Public Use Micro Samples (PUMS).

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