NBER WORKING PAPERS SERIES

HOW MUCH HAS DE-UNIONISATION CONTRIBUTED TO THE RISE IN MALE EARNINGS INEQUALITY?

Richard B. Freeman

Working Paper No. 3826

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 1991

NBER Working Paper #3826
August 1991

HOW MUCH HAS DE-UNIONISATION CONTRIBUTED TO THE RISE IN MALE EARNINGS INEQUALITY?

ABSTRACT

This paper estimates the effect of changing union density on earnings differentials and inequality among male workers in the U.S. and on industry earnings differentials among OECD countries.

For the U.S. the evidence indicates that the fall in union density contributed to the 1980s increase in earnings inequality. Cross section-based estimates of union wage effects suggest that 40-50% of the rise in the white collar premium, 15-40% of the rise in the college premium, and 20% of the rise in the standard deviation of ln earnings for all men are attributable to the fall in union density. Longitudinal-based estimates of union wage effects suggest that deunionisation contributed less to the rise in differentials.

Still, the dispersion of earnings grew as much among organised workers as among otherwise comparable nonunion workers, so that overall dispersion would have risen substantially even if the entire work force had been organised. Deunionisation was thus a factor in the rise in inequality but not the factor.

The cross-country comparisons show that earnings distributions are more compact among union workers than among nonunion workers in OECD countries with different union densities, types of union movements, and with very different union/nonunion wage differentials, making the relation between unionism and dispersion a general outcome of unionism, not something specific to U.S. institutions.

In addition, they indicate that earnings differentials by industry are smaller and increased less in the 1980s in highly unionised countries than in less unionised countries, suggesting that strong national union movements can partially offset market pressures for rising inequality.

Richard B. Freeman
NBER
1050 Massachusetts Avenue
Cambridge, MA 02138

In the 1980s earnings inequality increased greatly among male workers in the United States. The differential between college graduates and the less educated, which had narrowed in the 1970s (Freeman, 1976), shot upwards, particularly among young men (Murphy and Welch; Katz and Revenga; Blackburn, Bloom, and Freeman). Professionals and managers had gains in real earnings while blue collar men suffered declines. Dispersion of earnings within demographic groups also rose (Murphy, Juhn, and Pierce). Total earnings inequality grew in the 1983-88 boom as well as in the 1981-82 recession.

Over the same period the proportion of workers in unions declined precipitously. Between 1978 and 1988 union density fell by 10 percentage points. Among traditionally highly unionised 25-34 year old blue collar men the fall was even larger -- 18 percentage points over the decade.[1] As unionism compresses the distribution of earnings among organised workers and reduces the differential between white collar and blue collar workers (Freeman, 1980, 1982) it is natural to suspect that the decline in union density contributed to the rise in inequality.

In this paper I follow this natural lead and estimate the effect of changing union density on earnings differentials and inequality among male workers. I begin by documenting the facts that motivate the analysis: the 1980s rise in inequality, the concordant decline in union density, and the inverse association between unionism and earnings dispersion that suggests a causal link between them. I contrast the earnings of union and nonunion

workers at the same point in time and the earnings of the same workers who change union status over time. I estimate the contribution of falling unionism to the increased white collar/blue collar and college/high school earnings differentials and to the rise in the overall variance of ln earnings. Finally, to allow for the possibility that unionism affects wage distributions through mechanisms beyond collective bargaining for members (say, by influencing the pay policies of nonunion employers or national economic policies) I examine differences and changes in industrial earnings inequality between more/less highly unionised developed OECD countries.

The empirical analysis yields three findings for the United States:

1) The fall in union density contributed to the 1980s increase in U.S. earnings inequality. Cross section-based estimates of union wage effects suggest that the white-collar/blue-collar pay differential would have been 4 to 5 percentage points lower and the college-high school differential 1 to 4 percentage points lower in 1988 than in fact they were had union density remained at its 1978 level over the 1980s. These figures imply that 40 to 50 percent of the rise in the white collar premium and 15 to 40 percent of the rise in the college premium are attributable to the fall in union density. Longitudinal-based estimates suggest that deunionisation may have contributed less to the rise in differentials.

2) Standard deviations of ln earnings are markedly lower

among union than nonunion workers within skill groups. In addition, standard deviations of ln earnings decline sharply when nonunion workers become union members. This implies that unions are a major determinant of within-group earnings inequality, and thus that the fall in density contributed to the 1980s rise in that inequality, accounting for about 20% of the overall increase in inequality in ln earnings among men.

3) The dispersion of earnings grew as much among organised workers as among otherwise comparable nonunion workers, so that overall dispersion would have risen substantially even if the entire work force had been organised. The market forces for greater inequality were too strong for unions to maintain the levels of dispersion among members that characterized earlier time periods. Thus deunionisation was a factor in the rise in inequality but not the factor behind the trend toward inequality.

The cross-country comparisons yield two additional supportive findings:

4) Earnings distributions are more compact among union workers than among nonunion workers in OECD countries despite differences in union densities, types of union movements, and union/nonunion wage differentials. This implies that the relation between unionism and dispersion is a general outcome of unionism, not something specific to U.S. institutions.

5) Differentials in earnings between high wage and low wage industries for all workers are smaller and increased less in the 1980s in highly unionised countries than in less unionised

countries, suggesting that strong national union movements can partially offset market pressures for rising inequality in the overall market.

Increasing Inequality and Declining Unionism in the 1980s

Although no one disputes that earnings inequality grew and union density fell in the 1980s it is useful to review at the outset the dimensions of the phenomena to be explained and the cause under investigation.

Rising Inequality

Table 1 uses household and establishment survey data to document the ubiquitous rise in ln earnings differentials by skill.[2] Lines 1-2 give college/high school differential for men aged 25-64 and 25-34 and the managers/professionals to operatives differentials for these same groups of men from the widely used March Current Population Survey (CPS) annual earnings files. While the increase in both measures of inequality is sizeable for 25-64 year olds it is even larger among 25-34 year olds, who are more likely to be on the 'active job market' than older male workers. Since these men represent the future of the labor market I distinguish them in ensuing analyses.

Line 3 records median usual weekly earnings differentials by occupation for all (female as well as male) full-time workers from a different CPS data file: the May/outgoing rotation group. It shows rises in the differential of managers over laborers and of professionals over service workers that reflect an overall widening in white collar/blue collar pay gaps.

Lines 4 - 6 report differentials from non-CPS based surveys. Line 4 records the increase in the differential of pay between specified groups of workers from the Bureau of Labor Statistics' (BLS) Employment Cost Index, which reports indices of earnings over time with a 1981 base period. The magnitude of increase in inequality is comparable to that in the CPS. Line 5 gives earnings differentials and changes in differentials between high wage and low wage industries from the BLS's regular establishment survey. It shows a rise in inequality by industry -- a pattern also found in the National Income and Products Account industry earnings figures (Bell and Freeman). Line 6 shows that the earnings of one narrowly defined group of highly educated/skilled workers, professors in public universities rose by 0.10 points relative to the income of year-round full-time male workers. Earnings figures for lawyers, doctors, or almost any other professional group would show a similar pattern.

The overall rise in earnings inequality among male workers in the 1980s was due not only to increased differentials between more and less highly skilled or educated workers but also to increases in inequality within specified skill groups (see Karoly, chapter 1 of this volume). The upper deciles of the distributions for college graduates and high school graduates had, for instance, greater increases in earnings than the lower deciles. As a result of the rise of differentials by group and of within-group inequality, the standard deviation of ln earnings rose from 0.49 to 0.52 from 1978 to 1988 for men aged 25-64 while

the standard deviation of ln earnings rose from 0.44 to 0.50 for men aged 25-34.[3] A complete explanation of the rise in inequality should account for changes in within-group income inequality as well as in across-group means.

The Suspect: Declining Union Density

So much for the phenomenon. What about falling union density? As can be seen in figure 1, the union share of nonagricultural workers, which had been trending downward modestly since the mid 1950s, plummetted in the 1980s by about one percentage point a year -- a magnitude without precedent in American economic history. In 1969 29% of the nonagricultural work force was organised; in 1978, 25% was organised; but in 1989 just 16% of the work force were union members. The decline was endemic to the entire private sector: density fell in nearly all 2-digit and 3-digit SIC code industries, and in all major blue collar occupational groups; reducing union membership to a bare 12% of private sector workers in 1989 -- a level comparable to that in the 1920s![4] As the college-high school differential rose in the 1980s and as overall inequality increased rapidly in the 1980s as well (see figure 1), the time series evidence puts the fall in density at the "scene of crime" of rising inequality, and thus suggests the value of a more detailed look at the linkage between unionism and inequality, to which we now turn.

Unionism, Earnings Differentials, and Earnings Dispersion

What unions do to earnings inequality has long been an issue of controversy. Some analysts, like Milton Friedman (1962), have

criticized unions for producing horizontal inequality by increasing the wages of organised workers relative to those of otherwise comparable nonunion workers. Other analysts have stressed that union standard wage policies reduce inequality within the organised sector (Webb and Webb, 1897). As unions create differentials among observably identical workers, reduce inequality among organized workers, and raise the earnings of blue collar workers relative to higher paid white collar workers, determining what unions do to inequality overall is an empirical question, dependent on the relative magnitude of the inequality increasing and inequality decreasing routes of impact. In Unionism and Relative Wages, H. Gregg Lewis expressed the belief that the inequality-increasing effects of unionism dominated the inequality-reducing effects. Using micro data unavailable to Lewis, I estimated the magnitude of all three routes (Freeman, 1980, 1982) and found the opposite: the union-induced reductions in dispersion among organised workers and in the white collar/blue collar differential had a greater effect on overall inequality than the increase in dispersion due to the wage differential between organised and unorganised workers. Other studies of dispersion in the U.S. have yielded comparable results (see the summary in Freeman, 1984), producing a general concensus that unionism is associated with lower rather than greater wage inequality (In his 1986 book Lewis reversed his assessment as a result of the newer evidence). The question for this study, thus, relates not to the net direction of the union effects but

to whether they are sufficiently sizeable, in conjunction with declining density, to contribute to the massive increase in earnings differentials.

To estimate the magnitude of union effects on skill differentials and dispersion of earnings in the United States, I analyse data on usual hourly earnings (hourly pay for those who report hourly pay and usual weekly earnings/usual hours worked for those who do not)[5] of men in the 1988 Annual Merged CPS file and in the 1978 May CPS file (the last May survey to contain earnings information on all respondents). I limit my sample to 25-64 year old wage and salary earners who report earnings and who are employed outside agriculture and private household services, though analyses for female workers and males and females together yield similar results. The 1988 Merged Annual CPS file yields samples of 67,967 25-64 year olds and 25,466 25-34 year olds -- sufficiently large numbers from which to infer the shape of earnings distributions as well as to estimate union effects on skill differentials. The May 1978 file contains data on 18,304 men aged 25-64 and 7,249 aged 25-34.

To test whether cross section differences in earnings and earnings distributions between union and nonunion workers are potentially causal rather than spuriously resulting from the selectivity of workers into unionised jobs, I further analyse longitudinal data from the outgoing rotation groups of a matched file of the 1987 and 1988 Merged Annual CPS tapes. Because respondents in the CPS are in the sample for 4 months, then out

of the sample for 8 months, before returning for an additional four months, each respondent is in an outgoing rotation group twice, providing information on earnings and union status at two points in time. By matching the 1987 and 1988 files, I have information on 26,757 male workers aged 25-64, of whom 2456 or 9.2 percent changed union status and on 9006 male workers aged 25-34, of whom 872 or 9.7 percent changed union status. I compare the earnings of the same workers before and after a change in union status to control for possible differing fixed characteristics of union and nonunion workers. As this longitudinal analysis of unionism is subject to serious problems of measurement error due to miscoding (Freeman, 1984), I view the longitudinal estimates not as better than the cross section estimates, but as an alternative to help interpret the data and determine the bounds of the union causal effect.

Skill Differentials: Cross Section Evidence

To see how much of the fall in union density may have contributed to the rise in the "collar" and education differentials, I use two related statistical techniques. My first technique is a shift-share analysis in which I combine estimates of a base period union earnings premia and of changes in density to calculate the effect of the changes on earnings differentials:

(1) $dSKILL = (DIFF)_1\, dUN_1 - (DIFF)_b\, dUN_b$,

where d is the difference operator, SKILL is the skill differential, DIFF is the base period union premum, UN is the

proportion of workers unionised. Subscripts relate to lower paid (l) and higher paid (h) workers.

I estimate the union differential for the base period May 1978 CPS by regressing ln earnings on a union dummy variable and a set of "control" variables: dummies for age, race, one-digit industry; and dummy variables either for education (in the occupation group regressions) or occupation (education regressions). For consistency, I use the same controls in ensuing regressions as well. The estimated union differentials, shown in column 1 of table 2, are consistent with estimates of union wage differentials in previous work (see Lewis, 1986). Large premia are found for blue collar workers and for high school graduates compared to insignificant premia for white collar workers and college graduates. Comparable estimates of union wage premia in the 1988 Merged File suggest that the CPS-based union differential was roughly constant over the period.

The next three columns of table 2 record estimates of union density in 1978 and 1988 and changes in density between those years. Density fell sharply among less educated and blue collar men, with drops of 0.14 points for 25-64 year old blue collar workers compared to 0.05 points for 25-64 year old white collar workers; and by a massive 0.18 points among 25-34 year old blue collar workers compared to 0.06 points among 25-34 year old white collar workers.[6] Multiplying the change in density by the estimated union earnings differentials gives the effect of deunionisation on the earnings of each group in the column

labelled "effect on earnings". Finally, the figures in the lines labelled Skill Diff give the estimated effects of the changes in density on the earnings differential between specified groups. For instance, the .035 for workers 25-64 indicates that the drop in density raised the earnings differential between white collar and blue collar workers by 3.5 percent. Altogether, these numbers show that deunionisation widened differentials more for younger workers and for workers differentiated by occupation than for older workers and workers differentiated by education.

The next set of columns in Table 2 present estimates of the actual white collar-blue collar or college-high school premia in 978 and 1988 and of the change in these premia. These estimates are obtained from a multivariate regression of ln earnings on the relevant collar of occupation or education dummy variable with controls for race, industry, and age, as in column 1, but not for union status. Consistent with the Table 1 calculations, they show rises in white collar and college premia by 7 and 6 percentage points for all men from 1978 to 1988, and by 11 percentage points among younger men. Finally, to obtain the percentage contribution of the fall in density to the rise in earnings differentials, I divide the estimated effect of deunionisation on the differentials with the estimated changes in the differentials. These statistics, given in the final column, show that deunionisation accounts for 44-49 percent of the increase in the collar differential and from 25 to 36 percent of the increase in the college/high school differential.

My second technique for assessing the effect of changes in unionisation on skill differentials is based on adding a union dummy variable to ln earnings equation that include a collar or education dummy variable. If, as hypothesized, the decline in unionisation contributed to the rise in skill differentials, inclusion of the union dummy should lower the estimated changes in skill differentials. Formally, let X be a set of explanatory factors, D be a dummy variable for the relevant skill group; and UN be a dummy for unionism. Then, the equations I estimate are:

(2) $\ln W_t = a_t + b_t D_t + c_t X^t + v^t$

(2)' $\ln Wt = a.t + b'_t D_t + c'_t X_t + d'_t UN_t + v'_t$

Since unionism reduces skill differentials, the coefficient on the skill dummy variable in the equation controlling for union status (b_t.) should be larger than the coefficient in the equation without a union variable (b_t). Changes in the estimated skill differential in equation (2) between the 1988 and 1978 regressions give the estimated trend in skill differentials in table 2. Moreover, insofar the falling proportion of the work force receiving the union premium contributed to the rise in differentials, the change in b' coefficients between 1988 and 1978 will be smaller than the change in b coefficients over the same period. The vs in the equations are error terms with the usual properties.

Table 3 summarises the results of this analysis. The first column reports the estimated 1978-1988 change in differentials when unionism is excluded as an explanatory variable. The second

column reports the change in differentials when the union dummy variable is included in the regressions. The third column gives the differences between the numbers in the first and second columns that measures the effect of declining unionisation on the trend in differentials. For workers differentiated by collar, these estimates are similar to those in the table 2 decompositions, suggesting that 4 to 5 percentage points or roughly forty percent of the growth in the collar earnings gap is associated with the fall in union density. For workers differentiated by education, the estimated effect of deunionisation in table 3 is smaller than in the table 2 decompositions: it accounts for 16 to 18 percent of the increase in differentials in this table.

Dispersion of Earnings: Cross-Section Evidence

If there are no differences in the distribution of jobs held or abilities of union and nonunion workers after controlling for measured characteristics, the differences in the shapes of cross section earnings distributions between the two groups can be used to infer the effect of union wage policies on inequality (Freeman, 1980, 1982). As the major difference between union and nonunion workers is that unionists are concentrated in blue collar jobs, I control for differing characteristics by limiting my analysis of the effect of unionism on the shape of earnings distributions to blue collar men.[7] Comparisons of distributions for white collar workers and for women workers yield a similar picture to that given for blue collar men.

Figure 2, which shows earnings distributions in 1978 and 1988, confirms previous research findings that unionised workers have a less dispersed distribution of earnings than nonunion workers. In each panel of the figure the distribution for union workers is more peaked and has a smaller range. Figure 3 shows two summary measures of the differing shapes of the distributions: the variance of ln earnings and the gap between ln earnings in the top and bottom deciles of the distributions. Both statistics show that the difference in distributions by union status are large: in 1988, for example, the variance of ln earnings is 0.09 points smaller among union than among nonunion 25-64 year old workers and 0.08 points smaller among union than among nonunion 25-34 year old workers; while the difference in ln earnings between the top and bottom deciles differ by 0.29 points (25-64 year olds) and 0.24 points (25-34 year olds).

The figure 3 statistics show further that union-nonunion differences in variances in 1978 are virtually identical to those in 1988 and that the union-nonunion differences in decile differences are also remarkably similar in the two time periods. The similarity in the union-nonunion difference in variances and decile differences in a period of declining density suggests that selectivity is unlikely to be a major cause of the observed differences,[8] and thus supports my using base period differences in variances to assess the effect of changing density. At the same time, however, the stability of the union-nonunion differences over time implies that inequality of earnings rose

roughly as rapidly among union as among nonunion workers. For instance, the variance of earnings went up by 0.02 points among 25-64 year old blue collar union workers and nonunion workers between 1978 and 1988 and by 0.03 points among both groups of 25-34 year old workers. The implication is that unions were unable to slow the trend toward increased dispersion among members -- a fact that should come as no surprise given the breakdown of pattern bargaining and the wage concessions that characterized 1980s collective negotiations.

The increase in earnings inequality among unionists notwithstanding, the difference in dispersion between union and nonunion workers was sufficiently large for the decline in union density to have contributed significantly to the rise in overall dispersion. A ten percent decline in the share of the work force in a group having a variance in ln earnings 0.09 points smaller than that of other workers would, for instance, reduce overall variance by .009 points -- or nearly half the within-group rise in variances for union and nonunion 25-64 year old blue collar workers shown in figure 3.

Longitudinal Evidence

Matched CPS annual files that provide information on workers at two points in time can be used to test the oft-mentioned possibility that cross section union/nonunion differentials are spurious due to selectivity of workers into unions. Longitudinal analyses of union effects are, however, subject to considerable problems due to measurement error in the union variable (Freeman,

1984).[9] On the basis of these considerations, I view longitudinal estimates as providing a lower bound to true union causal effects and cross-section estimates as providing an upper bound.

The results of longitudinal estimates of union effects on earnings using the matched CPS files are given in table 4. The table distinguishes four groups of workers: those who were nonunion in both years (NN), those who were union in both periods (UU), those who became union (NU), and those who left unions (UN). There are two potential ways to measure the effect of unions on earnings in a longitudinal design. The first comparison shows what happens when workers become union by contrasting the changes for NU and NN. The second shows what happens when workers lose union status by contrasting UN and UU. The table records statistics for both groups.

The upper two panels of the table present calculations for full-time workers who were either blue collar or white collar in both 1987 and 1988. The lower panels treat all men who were high school or college graduates, based on their reported schooling in 1988.

The basic result of the longitudinal analysis is clear. It yields lower estimated effects of unionism on wages for blue collar workers than does the comparable cross section analysis while confirming the seemingly insignificant effect of unionism on white collar wages. On average, the effects in table 4 for blue collar workers are roughly a third as large as those in

table 2.

Does this mean that that the cross section calculations in tables 2 or 3 significantly overstate the percentage contribution of declining density to the trends in differentials? No, it does not. This is because it is erroneous to divide estimated union effects based on longitudinal analysis with estimated trends in differentials based on cross section comparisons of earnings. The correct analysis is to compare union effects estimated from the longitudinal changes with trends in "collar" differentials estimated from longitudinal changes. The 1987-88 matched file contains enough workers who change from blue collar to white collar jobs to permit such an analysis. Among men 25-64, nonunion workers who shifted from blue collar to white collar jobs from 1987 to 1988 gained 10 percentage points in earnings relative to nonunion workers who remained in blue collar jobs. This is roughly one third as large as the cross section based collar differentials in table 2. Thus, comparing likes to likes (longitudinally-based estimates of union differentials by longitudinally-based estimates of collar differentials) yields estimates of the effect of unionism on the collar differential that is of comparable percentage magnitude to that in cross-section data. The implication is that the percentage contribution of the drop in density from consistent longitudinal calculations would be considerably higher than that obtained by comparing the table 4 union wage effects with the table 2 trends in differentials. The same considerations apply to the

contribution of the change in density to the trend in the college-high school differential. Hence, while I interpret the longitudinal calculations as indicating that there is a real (but smaller) effect of unionism on differentials than in cross sections, I use the cross-section calculations to infer the percentage effect of changes in union density on changes in wage differentials. This is valid as long as the "biases" inherent in the cross-section analyses are roughly constant over time.

Table 5 turns to longitudinal estimates of the effects of unionism on the standard deviation of the logarithm of weekly earnings, the most widely used indicator of overalll earnings inequality. Each line shows the standard deviation for a given group defined by its union status in 1987 and 1988, and the change in standard deviation. The numbers under full-time blue collar workers NN show, for example, that the standard deviation in ln earnings for workers who were nonunion in both periods were 0.53 in 1987 and 0.54 in 1988, for a 0.01 point gain. Consistent with the claim that unionism reduces dispersion of earnings, workers who shifted from nonunion to union status (NU) had, by contrast, a 0.09 point drop in inequality. The implication is that unionism lowered dispersion by 0.10 points. Comparing union workers who become nonunion (UN) with workers who remain union (UU), the table shows a smaller 0.04 increase in dispersion, again implying that unionisation reduces dispersion. Throughout the table, the same pattern is observed: workers who become union experience a drop in dispersion compared to those who remain

nonunion while those who become nonunion experience an increase in dispersion compared to those who remain union. Similarly, the magnitude of the differences is almost always larger for the NU versus NN group than for the UN versus UU group.

Comparing the results of the table 5 longitudinal comparisons with those given in the comparable cross section contrasts in figure 2, or, alternatively, to the difference between the variances for the UU and NN groups in table 5 itself, we see that the longitudinally based estimates of the reduction in the variance of ln earnings due to unionism are roughly half as large as the cross-section-based estimates. The implication is that the estimated effect of unionism on the dispersion of ln earnings is more robust to measurement error/selectivity factors than estimated effects of unionism on mean earnings. For this reason, the reader may find ensuing estimates of the quantitative contribution of declining density to the upward trend in the standard deviation of ln earnings more reliable than estimates of the contribution of declining density to the trend in skill differentials.

Declining Unionism and Overall Dispersion

Thus far I have analysed separately the effect of unionism on earnings differentials and on within-group dispersions of earnings. To bring the two sets of calculations together and assess the effect of unionism on the overall dispersion of earnings I use the variance (V) of ln earnings as my measure of dispersion and exploit the decomposition detailed in the

Appendix. This decomposition decomposes the change in the variance of ln earnings associated with a change in union density into three terms: (1) the dispersion-reducing effect of unionism on the variance of ln earnings among blue collar union workers; (2) the dispersion-increasing effect of unionism on the earnings of blue collar workers due to the union differential; (3) the dispersion-reducing effect of unionism due to the union-induced reduction in the collar differential. Table 6 presents the results of my decomposition analysis for male workers divided by collar of work. In the table I transform the standard deviations of the ln earnings on which I have focused thus far (because they are the usual metric for measures of dispersion) into the variances that enter the decomposition equation (see appendix equation (8) and (8)') and then transform the statistics back into standard deviations. To be conservative, I exclude the effect of declining density of white collar workers on the variance in earnings of white collar workers; this has little effect on the calculations. I limit my analysis to cross-section based estimates of union effects.

Line 1 of the table records the standard deviations of ln earnings in 1978 and 1988 and the change in standard deviations that represents the phenomenon to be explained. Line 2 transforms the standard deviations into variances and also gives the change in the variances. The next three lines record the estimated contribution of the fall in density on the overall variance of ln earnings due to: the difference in the variance

between union and nonunion blue collar workers; the effect of the union wage differential on the earnings of otherwise similar blue and white collar workers; and the effect of the union wage differential on the white-collar/blue-collar earnings differential. Line 6 gives the sum of these figures: the estimated change in variance due to the three sets of factors. Note that the largest component is due to the lower variance of ln earnings from line 3, which was the estimate least affected by the longitudinal calculations.

The next three lines present the final results. Line 7 adds the estimated change in variance to the observed variance in 1978 from line 2 to obtain a predicted variance for 1988 had union density remained constant. Line 8 transforms this into a predicted standard deviation. Line 9 gives the percentage of the change in the standard deviation of ln earnings attributable to the fall in union density; it is simply the difference between the 1978 standard deviation from line 1 and the predicted 1988 standard deviation from line 8 divided by the actual change in standard deviations. As best I can tell, roughly 20% of the rise in the standard deviation of ln earnings among men is attributable to the fall in density.

Unionism and Earnings Inequality Across OECD countries

A complementary way to study how unionism affected inequality in the 1980s is to contrast earnings differentials and dispersion within and across countries with differing union densities and types of union movements. In this section I show

that unions reduce dispersion in other countries as well as in the U.S. and that in fact differentials are less and rose less in countries with greater union densities.

Unionism and Dispersion in Other OECD Countries

To estimate how unionism affects the dispersion of earnings in OECD countries beyond the United States, I make use of micro data files available from the International Social Survey Program (ISSP). These files contain information on union status and earnings for 500 to 2000 workers in each of five foreign OECD countries[10] and the United States. The surveys are comparable to the General Social Survey conducted by the National Opinion Research Center of the University of Chicago. I tabulated coefficients of variation of earnings of union and nonunion workers in total, and for manual and nonmanual workers where possible from the ISSP files.[11] The results, given in table 7, show that compression of earnings among union members is not unique to U.S. unionism. In each country in the ISSP the variation in earnings is markedly lower among unionists. The difference is greatest among all workers, because the data mix manual and nonmanual workers, but are still substantial among manual and nonmanual workers taken separately. Perhaps most strikingly, the union-nonunion differences in variation are about the same magnitude in the other OECD countries (save for Australian manual workers) as in the United States, despite differences in the nature of union movements. Given that union density averages some 26 percentage points higher in the other

five countries than in the U.S. in the ISSP (see Blanchflower and Freeman), this implies that the dispersion-reducing effect of unionism on organised workers holds over a wide range of density, and does not diminish as the heterogeneity of organised labor increases due to greater density.

Dispersion of Industrial Earnings Among Countries

I examine next the relation between unionism and the most readily available statistic on earnings inequality among countries -- the dispersion of average earnings by industry. I calculated variances in the logarithm of earnings among industries from three sources: the ILO's Yearbook of Labor Statistics, which contains hourly earnings for approximately 20 2-digit and 3-digit manufacturing and mining industries; the reports on wages overseas of the Bureau of Labor Statistics' Office of International Affairs, which gives hourly earnings in manufacturing industries from countries that compete with the U.S. on world markets; the United Nations' Yearbook of Industrial Statistics, which reports labor compensation and numbers of employees that can be used to estimate earnings per worker in a wider set of industries but lacks data on hours and neglects the service sector. As there is no reason to prefer one of these sources to another (they cover different industries and have their own serious data problems), I use them all, in the hope that each will serve as a check on one another.[12]

Table 8 presents the measures of dispersion of industry earnings from the three sources by country ordered by union

density. There is a strong pattern in the data, with highly unionised Sweden having the lowest dispersion and the least unionised U.S. having the highest dispersion. The correlation coefficients between the densities in column 1 and the variances in columns 2, 3, and 4, given at the bottom of the table, are all significant negative, implying that higher degrees of union organisation are indeed associated with a narrower industry wage structure.

Finally, I turn to related question of whether more highly unionised countries had a less rapid increase in earnings inequality, as reflected in industry wage differentials, than less unionised countries. The evidence that dispersion is lower in unionised countries, while consistent with such a relation, does not give the answer, for unions overseas like those in the U.S. lcould ower the level of dispersion but fail to slow the market trend toward inequality.

Table 9 presents data from the ILO Yearbook of Labour Statistics that indicates that the movement toward increased inequality in the industry wage structure was in fact less pronounced in the more unionised countries. The table measures inequality by the ratio of the average earnings in the three top paying industries in a country (roughly the upper decile or quintile in the data) to the average earnings in the three lowest paying industries in that country (roughly the lowest decile or quintile).[13] The particular industries in the top or bottom three can change across the years, and the number of industries

varies by country. There are other ways to organise these data but they are unlikely to change the basic pattern shown in the table -- that the increase in industrial earnings inequality is inversely associated with unionisation. The greatest increases in the ratio of earnings of high to low paying industries occurs in the United States, Japan, and Canada -- all countries with relatively low (and for the U.S. and Japan, declining) union density. The smallest increases are in Sweden, Denmark, and Belgium. While the table does not prove that unionism is responsible for the more modest increase in inequality in those countries (they may have simply faced different market pressures for inequality), the fact that the increase in inequality was less where unions are strongest clearly supports the main theme of this study -- that declines in unionisation contribute to increases in inequality.

Summary and Interpretation

This study has presented three different types of evidence that unionism reduces inequality of earnings and that the changing level of union density played a role in the increases in inequality that characterized the 1980s: micro data comparisons of organised and unorganised workers; longitudinal comparisons of workers who changed union status; and comparisons of the level and changes in the spread of industry wage structures between more and less unionised countries. That unionism was inversely related to levels and changes in dispersion in all of these data suggests that reduction in dispersion should be taken as one of

the primary outcomes of unionism, on a par with union induced increases in wages that dominated much historical discussion of what unions do.

In terms of explaining the 1980s rise in earnings inequality, the statistical calculations indicate that had U.S. union density been stable, inequality would have risen less than it did, though it still would have increased substantially. The fall in density in the U.S. contributed to the rise in inequality on par with most other measurable factors such as changes in the industrial mix of employment (see Blackburn, Bloom, and Freeman) save possibly for the deceleration in the growth of relative supplies of skilled labor (Blackburn, Bloom, and Freeman; Katz and Revange; Katz and Murphy).[14] Overall, declining unionisation was a supporting player in the story of the increase in inequality -- not the villain (or protagonist) -- Rosencranz or Guldenstern, not Hamlet. For the future, continued decline in U.S. union density is likely to place additional downward pressure on the relative wages of blue-collar and less educated workers and thus make it more difficult for the nation to reverse the trend toward greater inequality.

Appendix

The basic equation I use to add together the effects of unionism on the variance of ln earnings and on skill differentials is:

(3) $V(\ln W) = a\,V(\ln W_b) + (1-a)\,V(\ln W_w) + a(1-a)\,(CD)^2$

where W refers to the earnings of all workers; W_b to the earnings of blue collar workers; W_w to the earnings of white collar worker; CD is the mean of the differential in log earnings between white collar and blue collar workers; and a is the proportion of workers who are blue collar.

If u percent of blue collar workers are unionised, the mean earnings of those workers can be written as:

(4) $\overline{\ln W_b} = u\overline{\ln W_u} + (1-u)\overline{\ln W_n} = \overline{\ln W_n} + u\,UD,$

where W_u refers to the earnings of union blue-collar workers; W_n to the earnings of nonunion blue-collar workers; and UD is the traditional union ln earnings differential. Bars above variables are means.

Let CD_n be the white collar-blue collar differential among nonunion workers. Then, assuming no spillovers of union wage gains to white collar workers in union settings, the effect of the union differential on the collar differential is:

(5) $CD = \overline{\ln W_w} - \overline{\ln W_n} - u\,UD = CD_n - u\,UD$

Turning to the effect of unionism on the dispersion of wages among blue collar workers, I decompose $V(\ln W_b)$ as follows:

(6) $V(\ln W_b) = u\,V(\ln W_u) + (1-u)\,V(\ln W_n) + u(1-u)\,(UD)^2$

Holding other differences between union and nonunion workers[15], $V(\ln W_u) - V(\ln W_n)$ will measure the union-induced compression of earnings within the organised group.

Finally, substituting equations (4), (5), and (6) into equation (3) yields an identity linking the three union effects on dispersion to the variance of ln earnings for all workers:

(7) $V(\ln W) = au[V(\ln W_u) - V(\ln W_n)] + a(1-a)[CD - uUD]^2 + au(1-u)(UD)^2 + aV(\ln W_n) + (1-a)\,V(\ln W_w)$

Here au $[V(\ln W_u)-V(\ln W_n)]$ is the union-induced reduction in the variance of ln earnings among union members; $a(1-a)[CD_n - uUD]^2$ is the contribution to the variance of the union-altered white collar-blue collar differential; $au(1-u)[UD]^2$ is the increase in variance due to the traditional union wage differential; and the remaining terms refer to the variance of earnings among nonunion white collar and blue collar workers.

Differentiating (7) with respect to u shows the effect of small changes in union density on overall dispersion yields:

(8) $dV(\ln W)/du = a[V(\ln W_u)-V(\ln W_n) + (1-2u)(UD)2 - (1-a)2(CD)UD]$

When, as in the period under study, union density undergoes large changes, say from u to u', the differentials in (8) must be replaced with differences, yielding the following expression:

(8)' $a(u'-u)[V(\ln W_u) - V(\ln W_w)] + a[u'(1-u')-u(1-u)](UD)^2 -$

$$a(1-a)[(CD_n-u'UD)^2 - (CD_n-uUD)^2]$$

Summing the last two terms in (8), and plugging in reasonable values of parameters shows why unionism on net reduces dispersion: in the 1970s both the union share of blue collar male workers and the white collar share of the male work force were on the order of 1/2; hence the sum of the last two terms is negative when the union differential is less than twice the collar differential, which is empirically true.

Equations (8) and (8)' are, it should be stressed, more than accounting identities. This is because in taking derivatives (differences) I assumed that changes in density have no effect on underlying wage differences or variances. This rules out potential "second order effects" of declining density on the union premium, the dispersion of union wages, the dispersion of nonunion wages, and the nonunion collar differential[16]. The cross-country comparisons given later can be viewed as a way of examining the relation between unionism and dispersion that allows for such broader effects of changing density.

Table 1: Earnings Differentials and Changes in Differentials Between Higher and Lower Paid Groups of Workers in the 1980s[a]

Source and Groups	1979	1988	Change
1) March CPS, Annual Earnings (males)			
College to High School Graduates, 25-64	.40	.49	.09
College to High School Graduates, 25-34	.15	.33	.18
2) March CPS, Annual Earnings (males)			
Managers/Professionals to Operatives, 25-64	.35	.48	.13
Managers/Professionals to Operatives, 25-34	.23	.39	.16
3) May/Annual CPS, Usual Weekly Earnings			
Managers/laborers	.52	.65	.13
Professionals/service workers	.67	.79	.12
4) Employment Cost Index (1981=100)			
White Collar/Blue Collar	--	.10	.10
Professionals/Operatives	--	.12	.12
Managers/laborers	--	.16	.16
5) BLS Establishment Survey			
Mfg/Retail Trade	.39	.48	.09
Petroleum/Apparel	.79	.90	.11
6) American Association of University Professors			
Salary of Professors, Public/Income of			
Yr-Round Full-Time Male Workers	.43	.53	.10

---

a Differentials are measured in ln points. For small numbers, they are approximately the same as percentage changes.

Source: lines 1 and 2, Blackburn, Bloom, and Freeman
line 3, Statistical Abstract, 1982-83, p 404 and Employment and Earnings, January 1988
line 4, Monthly Labor Review, January 1988
line 5, Monthly Labor Review, January 1980 and 1989
line 6, Statistical Abstract, 1989, tables 263 and 727 and Statistical Abstract, 1981 table 741,

Table 2: Effect of Deunionisation on Earnings and Earnings Differentials by Education and Occupation, Male Workers, 1978-1988

	(1) Union Diff 1978	(2) Union Density 1978	(3) Union Density 1988	(4) Union Density Chnge	(5) Effect on Earnings	(6) Earnings 1978	(7) Earnings 1988	(8) Diff Chnge	(9) % Chng Explained
Workers Aged 25-64									
WC	.01	.18	.13	-.05	-.001	--	--	--	--
BC	.26	.47	.33	-.14	-.036	--	--	--	--
WC-BC Diff	--	--	--	--	.035	.29	.36	.07	49%
CG	-.02	.17	.14	-.03	.001	--	--	--	--
HS	.16	.42	.30	-.12	-.014	--	--	--	--
CG-HS Diff	--	--	--	--	.015	.32	.38	.06	25%
Workers Aged 25-34									
WC	.03	.16	.10	-.06	-.002	--	--	--	--
BC	.28	.43	.25	-.18	-.050	--	--	--	--
WC-BC Diff	--	--	--	--	.048	.21	.32	.11	44%
CG	.01	.18	.10	-.08	-.001	--	--	--	--
HS	.24	.40	.23	-.17	-.041	--	--	--	--
CG-HS Diff	--	--	--	--	.040	.24	.35	.11	36%

Source: Column 1, estimated by regression of ln earnings on age dummy variables, one digit industry dummy variables, and a race dummy variable for the relevant groups in May 1978 CPS file.

Columns 2 and 3, calculated as the proportion who are union members in the relevant surveys.

Column 4, the difference between columns 2 and 3

Column 5, the first two lines under each grouping are obtained by multiplying line 1 by line 4. The next line is the difference between the statistics for the more and less skilled group.

Columns 6 and 7, estimated by regression of ln earnings on age dummy variables, one digit industry dummy variables, a race dummy variable, and either education or collar dummy variables, with no union control.

Column 8, the difference between columns 6 and 7

Column 9, the ratio of column 5 to column 8

Table 3 Effect of Including Union Dummy Variables on Earnings Differentials, Male Workers, 1978-1988

Workers	Change in Differentials from Regressions Without Union Dummy	With Union Dummies	Change Due to Fall in Union Density abs	pctage
Ages 25-64				
WC to BC	.07	.04	.03	48%
CG to HS	.06	.05	.01	16%
Ages 25-34				
WC to BC	.11	.06	.05	45%
CG to HS	.10	.08	.02	18%

Source: Column 1, calculated by regression of ln earnings on age dummy variables, dummies for the occupation or education group, race, and one-digit industry dummy variables, for 1978 and 1988, and taking the difference in the estimated coefficients on the skill groups.

Column 2, calculated by adding a union dummy to the regressions in column 1, for 1978 and 1988 and taking the difference in the estimated coefficients on the skill groups

Column 3, the difference between columns 1 and 2

Column 4, the ratio of column 3 to column 1

Table 4: Estimates of ln Weekly Earnings and Changes in ln Weekly Earnings, by Change in Union Status, 1987-88

group	Men Aged 25-64			Men Aged 25-34		
(# obs 25-64; 25-45)	1987	1988	Change	1987	1988	Change
Full-Time Blue Collar Workers						
NN (6916;2529)	5.80	5.85	.05	5.82	5.88	.06
UU (3987;937)	6.17	6.22	.05	6.13	6.19	.06
NU (644;231)	5.94	6.05	.11	5.89	6.02	.13
UN (599;207)	6.02	5.98	-.04	6.01	5.99	-.02
NU-NN	.14	.20	.06	.07	.14	.07
UU-UN	.15	.24	.09	.12	.20	.08
Full-Time White Collar Workers						
NN (9231,2672)	6.31	6.36	.05	6.18	6.25	.07
UU (1303,205)	6.30	6.35	.05	6.18	6.24	.06
NU (399,86)	6.25	6.32	.07	6.04	6.16	.12
UN (343, 74)	6.29	6.32	.03	6.11	6.12	.01
NU-NN	-.06	-.04	.02	-.14	-.09	.05
UU-UN	.01	.03	.02	.17	.12	-.05
High School Graduates						
NN (5998,2501)	5.91	5.95	.04	5.79	5.85	.06
UU (2682,703)	6.17	6.21	.04	6.04	6.15	.09
NU (515,210)	5.98	6.07	.09	5.86	5.99	.13
UN (460,187)	6.06	6.00	-.06	5.95	5.93	-.02
NU-NN	.07	.12	.05	.07	.14	.07
UU-UN	.11	.21	.10	.09	.18	.09
College Graduates						
NN (6008,1968)	6.38	6.44	.06	6.16	6.26	.10
UU (900,162)	6.33	6.40	.07	6.19	6.26	.07
NU (309,82)	6.25	6.38	.13	6.00	6.14	.14
UN (301,92)	6.32	6.39	.07	6.11	6.22	.11
NU-NN	-.13	-.06	.07	-.16	-.12	.04
UU-UN	.01	.01	.00	.08	.04	-.04

Source: Tabulated from a matched file of the Annual Merged files of the Current Population Surveys for 1987 and 1988. Blue collar and white collar workers are those who are in the same collar class in both years; education based on 1988 reported education. Sample sizes as in table 4

Table 5: Estimates of the Standard Deviation of Ln Weekly Earnings and Changes in the Standard Deviations, by Change in Union Status, 1987-88

group	Men Aged 25-64 1987	1988	Change	Men Aged 25-34 1987	1988	Change
Full-time Blue Collar Workers						
NN	.53	.54	.01	.42	.42	.00
UU	.36	.35	-.01	.36	.34	-.02
NU	.50	.41	-.09	.41	.36	-.05
UN	.45	.48	.03	.39	.42	.03
NU-NN	-.03	-.13	-.10	-.01	-.06	-.05
UU-UN	-.09	-.13	-.04	-.03	-.08	-.05
Full-time White Collar Workers						
NN	.52	.51	-.01	.44	.43	-.01
UU	.35	.34	-.01	.31	.30	-.01
NU	.50	.39	-.11	.39	.35	-.04
UN	.44	.50	.06	.38	.49	.11
NU-NN	-.02	-.12	-.10	-.05	-.08	-.03
UU-UN	-.09	-.16	-.07	-.07	-.49	-.12
High School Graduates						
NN	.53	.52	-.01	.51	.49	-.02
UU	.33	.34	.01	.35	.34	-.01
NU	.52	.39	-.13	.52	.35	-.17
UN	.41	.47	.06	.41	.46	.05
NU-NN	-.01	-.13	-.12	.01	-.14	-.15
UU-UN	-.08	-.13	-.05	-.06	-.12	-.06
College Graduates						
NN	.52	.50	-.02	.56	.54	-.02
UU	.38	.35	-.03	.41	.36	-.05
NU	.55	.40	-.15	.55	.44	-.11
UN	.41	.51	.10	.49	.48	-.08
NU-NN	.03	-.10	.13	-.01	-.10	-.09
UU-UN	-.03	-.16	-.13	-.08	-.12	-.04

Source: Tabulated from a matched file of Annual Merged Current Population Surveys for 1987 and 1988. Blue collar and white collar workers are those in the same collar class in both years; education based on 1988 education. Sample sizes as in table 4

Table 6 -- Sources of Change Estimates of the Effect of Declining Union Density on Male Earnings Inequality in the CPS, 1978-1988

Item	Ages 25-64	Ages 25-34
1 Standard Deviations in ln earnings		
1978	.485	.438
1988	.519	.498
change	.034	.060
2 Variances of ln earnings		
1978	.235	.191
1988	.269	.248
change	.034	.057
3 Change due to decline in density and lower variance of wages among blue collar unionists	.005	.008
4 Change due to decline in density and wage differential between union and nonunion blue collar workers	-.000	-.001
5 Change due to decline in density and union-induced reduction in white collar-blue collar differential	.002	.004
6 Total Change in variance due to decline in union density	.007	.011
7 Predicted Variance, at 1978 blue collar union density	.262	.237
8 Predicted Standard Deviation, at 1978 blue collar union density	.512	.487
9 Percentage of Change in Standard deviation of ln earnings due to decline in union density	21%	21%

Source: Calculated using formulae described in text from data in the May 1978 and Annual Merged 1988 CPS files.

Table 7: Coefficients of Variation in Earnings Union and Non-union Manual and Non-manual Workers by Country

	All Workers			Manual Workers			Non-manual Workers		
	Union	Non	Diff	Union	Non	Diff	Union	Non	Diff
U.S.	58	81	-23	52	69	-17	63	83	-19
U.K.	53	74	-21	51	77	-16	52	71	-19
W. Germany	43	64	-21	38	52	-14	47	66	-19
Austria	43	60	-17	31	46	-15	47	68	-21
Australia	56	65	-9	44	50	- 6	48	63	-15
Switzerland	46	85	-39	--	--		--	--	

Source: Calculated from ISSP Data Set.
See Blanchflower and Freeman (1990) for details.

Table 8 -- The Relation Between Union Density and Dispersion of Earnings Across Industries Among OECD Countries

Country, by union density,	Density 1979	Variance of Ln Earnings (X100) in 1980s by source UN	ILO	BLS
1 Sweden	89	13	9	10
2 Denmark	86	14	12	10
3 Finland	84	15	14	—
4 Belgium	77	24	16	20
5 Norway	60	25	12	—
6 Austria	59	27	22	25
7 Australia	58	24	—	—
8 UK	58	27	17	19
9 Italy	51	19	10	13
10 Ireland	49	21	22	20
11 New Zealand	46	21	20	—
12 Netherlands	43	—	14	16
13 Germany	42	—	14	19
14 Canada	36	25	26	26
15 Switzerland	34	—	—	17
16 Japan	32	26	25	29
17 France	28?	—	14	14
18 USA	25	28	26	28

Correlations With Union Density:
UN measure of dispersion, -.73
ILO measure of dispersion, -.59
BLS measure of dispersion, -.80

Source: Basic data are from Freeman, 1989. Percent union based on US Department of Labor figures; Variance of earnings from UN, based on earnings estimated by dividing labor compensation by employment; Variance of earnings from ILO, based on published hourly earnings figures.

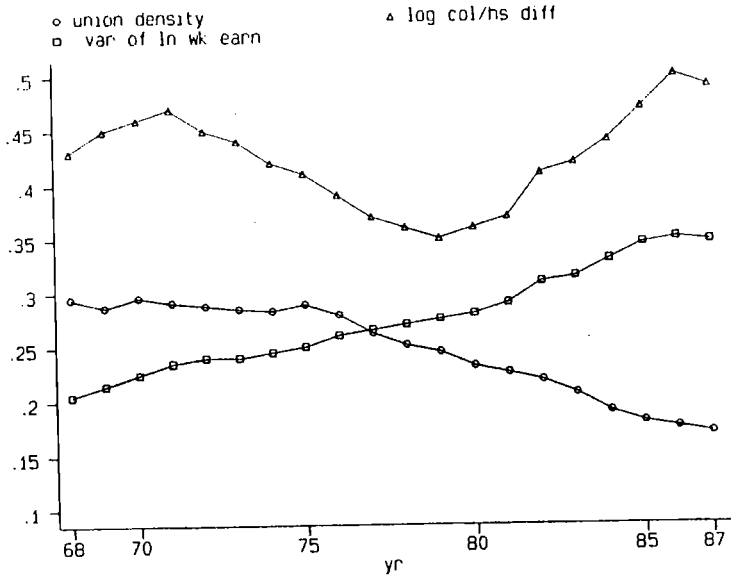
Table 9 — Earnings Ratios and Changes in Earnings Ratios Between High Paying/Low Paying Industries Across Countries, by union density

Country, by union density,	Ratios of Earnings Top 3/Bottom 3 Industries 1978	1987	Change
1 Sweden	1.31	1.40	.09
2 Denmark	1.37	1.40	.03
3 Finland	1.44	1.47	.03
4 Belgium	1.84	1.73	-.10
5 Norway	1.39	1.52	.13
6 Austria	1.78	1.87	.09
7 UK	1.33	1.53	.20
8 Italy	—	—	—
9 Ireland	1.77	1.98	.22
10 New Zealand	1.52	—	—
11 Netherlands			.12
12 Germany	1.63	1.70	.07
13 Canada	2.01	2.16	.15
14 Switzerland	1.26	1.35	.09
15 Japan	1.96	2.08	.12
16 France	1.46	1.69	.23
17 USA	2.26	2.50	.24

Correlations With Union Density:
Change in Ratio of Top 3 to Bottom 3 paying industries, -0.65

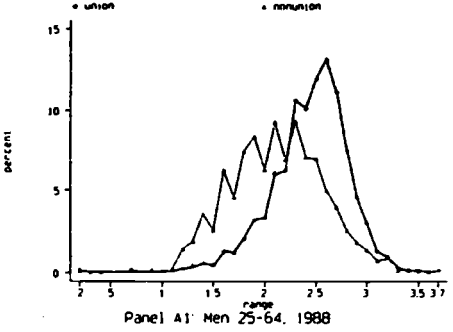
Source: For union density used in correlations, see table 7. Ratio of earnings in 3 highest and 3 lowest paying industries, from ILO, Yearbook of Labour Statistics 1979 and 1988.

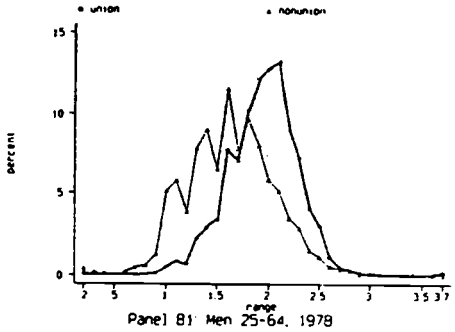
Figure 1: Union Density, Log College-High School Earnings Differential and the Variances of Ln Weekly Earnings among men, 1968-1987

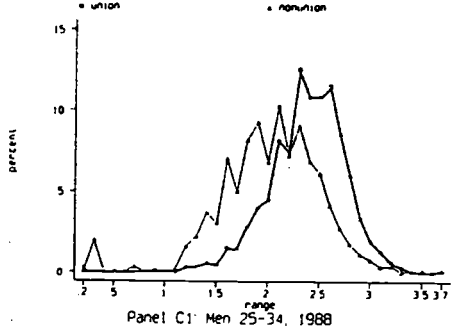


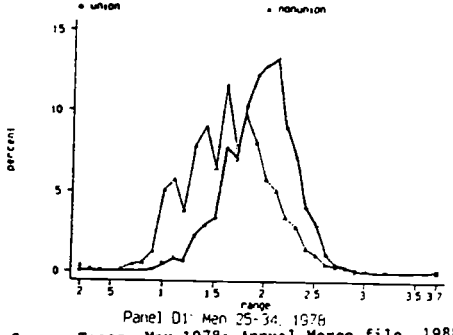
Source: Unionisation data, Troy & Shefren and BLS "Employment and Earnings" January edition; variance of earnings, Juhn, Murphy and Pierce; earnings differentials, Katz and Murphy.

Figure 2: Earnings Distrubutions of Blue Collar Male Workers, by union status, 1978 and 1988



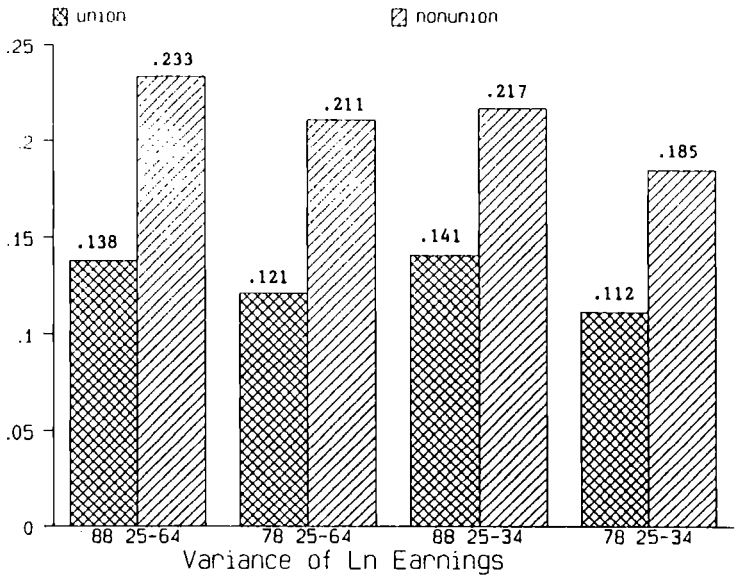


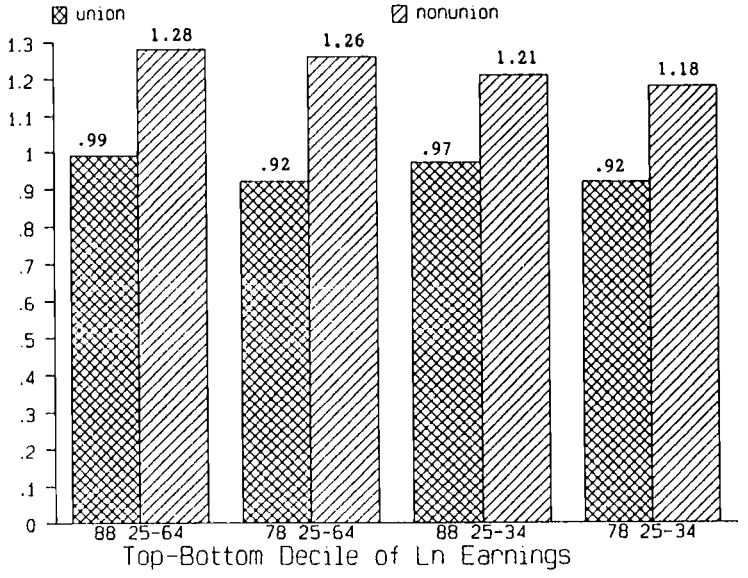




Source: Tabulated by author from Current Populations Survey Tapes, May 1978; Annual Merge file, 1988

Figure 3 : Variances of Ln Earnings and Decile Differences in Ln Earnings; by union status, 1978 and 1988





Source: Tabulated by author from Current Population Survey Tapes, May 1978; Annual Merged File, 1988.

Endnotes

1. These figures are based on tabulations of the 1978 and 1988 Current Population Survey files.

2. It is important to contrast CPS-based changes in differentials and inequality with changes in other data sets because the CPS does not always give the same picture as these other data sets. In particular, CPS-based trends in union wage differentials in the 1980s do not agree with establisment-based trends given in the Employment Cost Index. See Freeman, 1984 for a failed effort to reconcile these figures.

3. These figures are my tabulations from the CPS files. See table 6.

4. The ubiquity of the decline belies simple stories of deunionisation due to changes in the composition of employment by industry or occupation and directs attention to the failure of unions to organize workers in National Labor Relations Board representation elections as a result of adamant employer opposition (Freeman, Goldfield, Farber), and to the slow growth of employment in existing union workplaces (Bronars and Deere).

5. The results are similar for tabulations in which I use usual weekly earnings/usual weekly hours for all workers.

6. If within group inequality increased more among blue collar and less educated workers than among white collar and more educated workers, this would lend additional support for the role of changes in unionisation in the rise in inequality. However, the evidence on the trend in within-group inequality is mixed.

7. It is possible to get a better fix on "otherwise similar" workers, say by comparing distributions for more narrowly defined groups (at the cost of fewer observations) or comparing residuals from earnings equations (at the cost of specifying functional form). The gross comparisons in the figure suffice to demonstrate the effect of unionism on within-group dispersion in the 1980s.

8. Basic selectivity considerations would, after all, predict changes in the shapes of distributions as the proportion unionised changed, that are highly likely to alter the difference in variances or in the ratio of deciles.

9. An error in which, say, 3 percent of workers in a sample had their union status misclassified that would have essentially no effect on cross section estimates of union earnings effects will substantially bias downward longitudinal estimates if, say, only 5 percent of a sample truly changed status. This is because some 38 percent of observed changes in status 3/(5+3) would be mismeasured. In addition, longitudinal analysis does not fully eliminate selectivity issues, as workers who join/leave unions are likely to differ from others, arguably in ways that would also bias downward estimated union effects (Freeman, 1984).

10. I include Switzerland in this analysis and refer to it as an ISSP country although it is not one of those countries actually participating in the survey. The Sociologisches Institut der Universitat Zurich conducted a separate survey using the 1987 ISSP module, and it is the source of the data for Switzerland.

11. Coefficients of variation are equal to variances of log earnings when earnings are lognormally distributed.

12. While dispersion of earnings across industries reflects some of the same factors as earnings differentials between skill groups -- it will change as skill differentials change as long as the skill mix within industries is roughly constant -- it also reflects factors like product market conditions that are unlikely to affect skill differentials -- and may change differently from those differentials or from overall inequality.

13. The results are similar when one looks at the same industries in each country, though the presence of some industries or data for those industries in some countries but not in others limits the number of comparisons.

14. Declining union density helps explain the increase in skill differentials and inequality in the 1980s, but by itself cannot tell us why differentials rose in the 1980s compared to the 1970s. This is because union density fell in 1970s as well as in the 1980s, albeit more slowly. On the other hand, the decline in density may help account for the longer run increase in inequality within skill groups that occurred in both the 1970s and 1980s as density fell.

15. Freeman, 1980 presents variance-covariance formulae from a log earnings equation that provides the appropriate calculation to compare variances controlling for the variance of characteristics among groups of workers.

16. In addition, we ignored the possible union effects on employment. Union-induced reductions in employment that raise joblessness could, for instance be viewed as adding a group of workers with zero wages, thus contributing to inequality.

Bibliography

Blanchflower, D. and R. Freeman "Going Different Ways: Unionism in the U.S. and Other Advanced OECD Countries" NBER Working Paper 3342

Blackburn, K. Bloom, D. and R. Freeman "The Declining Economic Position of Less Skilled American Men" in G. Burtless (ed) A Future of Lousy Jobs Brookings 1990

Bronars S. and Deere, D. "Union Organizing Activity and Union Coverage 1973-1988" NBER Conference on Labor, November 1989

Burtless, Gary "Earnings Inequality over the Business and Demographic Cycles" in G. Burtless (ed) A Future of Lousy Jobs Brookings 1990

Farber, H. "The Decline in Unionisation in the United States: What Can Be Learned from Recent Experience?" Journal of Labor Economics, Jan 1990

Friedman, M. Capitalism and Freedom

Freeman, R. "Unionism and the Dispersion of Wages" Industrial and Labor Relations Review, Oct 1980

------ "Union Wage Practices and Dispersion Within Establishments", Industrial and Labor Relations Review October 1982

------ Labour Market Institutions and Economic Performance" Economic Policy, April 1988

------"Why are Unions Faring Poorly in NLRB Representation Elections? in T. Kochan (ed) Challenges and Choices Facing American Labor (MIT Press, 1985)

Freeman, R. The Overeducated American (Academic Press 1976)

Freeman, R and Medoff, J. What Do Unions Do? (Basic Books, 1984)

Goldfield, M. The Decline of Organized Labor in the United States (University of Chicago Press 1987

Juhn, C. Murphy, K. and Pierce, B. "Wage Inequality and the Rise in the Returns to Skill", NBER Conference on Labor, Oct 1989

Katz, L. and Revanga, A "Changes in the Structure of Wages: the United States vs Japan" Journal of the Japanese and International Economies, 3, 1989

Katz, L and Murphy, K "Changes in Relative Wages, 1963-1987: Supply and Demand Factors", April 1990 mimeo

Lewis, H.G. Unionism and Relative Wages in the United States University of Chicago 1963

Lewis, H.G. Union Relative Wage Effects: A Survey University of Chicago Press 1986

Murphy, K. and Welch, F. "Wage Differentials in the 1980s: the role of international trade" Economic Inquiry, forthcoming 1990

Troy, L. and N. Shefrin, Union Sourcebook (IRDIS, N.J. 1985)

Webb, S. and Webb, B. Industrial Democracy