FALLING UNION MEMBERSHIP
AND RISING WAGE INEQUALITY:
WHAT'S THE CONNECTION?


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## ABSTRACT

This paper presents new evidence on the effects of changing union membership on trends in wage dispersion in the U.S. labor market. I use data from the mid-1970s and early 1990s to compare union membership rates for workers in different deciles of the wage distribution, and to calculate the effects of shifting unionism on wage inequality. Among men, union rates have fallen for most groups, with larger declines among the lowest-wage workers. I estimate that the decline in unions explains 10-20 percent of the rise in male wage inequality over the past 25 years. Among women, union membership has fallen for low-wage workers but risen for high-wage workers, with little change overall. Shifting union patterns have therefore had little effect on female inequality, and may have actually accentuated the rise in inequality. Economy-wide trends in union membership mask a sharp divergence between the private sector, where unions have been declining, and the public sector, where union membership rates have actually risen for most groups. Calculations by sector suggest that unions have been a significant force in forestalling the rise in wage inequality among public sector workers of both genders.

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During the past 25 years the fraction of U.S. workers belonging to trade unions has fallen dramatically (see e.g. Farber, 1990; Riddell, 1992) while the level of wage inequality has risen (e.g. Blackburn, Bloom, and Freeman, 1990; Bound and Johnson, 1992). Since wage dispersion is generally lower among union workers than their nonunion counterparts (e.g. Freeman and Medoff, 1984) there is a presumption that the fall in unionization may have contributed to the rise in wage inequality. Indeed, a number of recent studies -- including Freeman (1993) and DiNardo, Fortin, and Lemieux (1996) -- estimate that the fall in union membership can account for about one-quarter of the rise in male wage inequality over the 1980s.[1]

This paper re-assesses the connection between changing unionization and wage dispersion for men and women over the period from 1973 to 1993. The methodology departs from the two-sector framework developed by Freeman (1980) for studying the equalizing effect of trade unionism in two important ways. First, explicit attention is paid to the fact that unionization rates vary systematically across the wage distribution. While union members were concentrated at the "middle" of the wage distribution in the 1970s, union densities have fallen most rapidly among the least-paid workers, and have actually risen among the most highly-paid. These trends have reduced the equalizing effect of unionism in the economy. Second, the methodology accounts for differences in the relative wage effect of unions for more- and less-skilled workers. Conventional estimates of the union wage gap for low-skilled workers are large and positive (over 30 percent) while estimates for highly-skilled men are significantly negative. Taken at face value these estimates imply a substantial equalizing effect of unions. Evidence presented in Card (1996), however, suggests that some part of the large positive

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[1]The effect of unions on female wage inequality is relatively under-studied. DiNardo, Fortin, and Lemieux (1996) estimate that changing patterns of unionization explain relatively little of the recent rise in female wage dispersion. Dinardo and Lemieux (1997) study the relative effect of unions on male wage inequality in the U.S. and Canada.

union-nonunion wage gap for low-skilled workers is attributable to the higher unobserved productivity characteristics of *union* workers with low observed skills, while the negative gap for high-skilled workers is attributable to the higher unobserved characteristics of *nonunion* workers with higher observed skills. Estimates of the equalizing effect of unions that these ignore differential selectivity biases (e.g. Freeman's two-sector method, or the re-weighting method used by Dinardo, Fortin and Lemieux) may therefore overstate the role of unions in compressing wage differences across the skill distribution.

At the same time as union membership has declined in the U.S. private sector it has actually risen in the public sector (Freeman 1986, 1988). In light of this divergence it is interesting to examine the effect of changing unionization on the growth of wage dispersion <u>within</u> the public and private sectors. An evaluation of the effect of unions on inequality in the public sector is particularly compelling because shifts in public sector unionism have occurred for largely exogenous reasons, associated with changes in legal barriers to unions in the public sector, rather than for potentially endogenous reasons, such as shifts in demand that may have also contributed to rising wage inequality. Moreover, an analysis of union wage effects in the public and private sectors presents an opportunity to ask whether unions act differently in the two sectors -- in particular, whether unions exert a greater "flattening" effect across skill groups in a non-competitive versus a competitive environment.

## I. Methods

In modelling the effects of unions on wage outcomes it is useful to begin by assuming that workers can be categorized into homogeneous skill categories.[2] Let $w_i^n(c)$ represent the log wage that individual i in skill category c would earn in the nonunion sector, and let $w_i^u(c)$ represent the log wage for the same individual if he or she worked in a unionized job. Assume that

$$w_i^n(c) = w^n(c) + \epsilon_i^n,$$

$$w_i^u(c) = w^u(c) + \epsilon_i^u,$$

where $w^n(c)$ and $w^u(c)$ are the mean nonunion and union wages for individuals in skill group c. Homogeneity within skill groups is reflected in the assumption that $E[\epsilon_i^n|nonunion] = E[\epsilon_i^u|union] = 0$. (In other words, all of the differences in pay between union and nonunion workers in a given skill group are attributable to the effect of unions). The union-nonunion wage gap for skill group c will be denoted by

$$\Delta_w(c) = w^u(c) - w^n(c).$$

In addition to affecting the mean level of wages, unions may also affect the dispersion of wages within skill category. Let

$$Var[\,\epsilon_i^n\,|\,c\,] = v^n(c)$$

and

$$Var[\,\epsilon_i^u\,|\,c\,] = v^u(c)$$

represent the variances of log wage outcomes for individuals in skill group c in the nonunion and union sectors, respectively. The union-nonunion variance gap for skill group c will be denoted by

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[2]The following presentation borrows from Lemieux (1992): see Card (1992) for a parallel development.

$$\Delta_v(c) = v^u(c) - v^n(c).$$

Finally, let u(c) denote the fraction of workers in group c who belong to trade unions.

The mean log wage of all workers in group c is

(1) $\quad w(c) = w^n(c) + u(c)\Delta_w(c).$

Note that the mean wage gain for workers in skill group c associated with the presence of unionism is the product of the union coverage rate and the union wage effect. The variance of log wage outcomes for workers in skill group c is

(2) $\quad v(c) = v^n(c) + u(c)\Delta_v(c) + u(c)(1-u(c))\Delta_w(c)^2.$

This equation shows that unions exert a "within-sector" effect associated with any lowering (or raising) of the dispersion of wage outcomes relative to those in the nonunion sector and a "between-sector" effect associated with the potential widening of mean wage outcomes between the union and nonunion sectors.

In the presence of unions the dispersion of wage outcomes in the overall labor market is

(3) $\quad v = \text{Var}\,[\,w(c)\,] + E\,[\,v(c)\,]$

$\quad\quad = \text{Var}\,[\,w^n(c) + u(c)\Delta_w(c)\,]$

$\quad\quad\quad + E\,[\,v^n(c) + u(c)\Delta_v(c) + u(c)(1-u(c))\Delta_w(c)^2\,]$

$\quad\quad = \text{Var}\,[\,w^n(c)\,] + \text{Var}\,[\,u(c)\Delta_w(c)\,] + 2\,\text{Cov}[\,w^n(c),\, u(c)\Delta_w(c)\,]$

$\quad\quad\quad + E\,[\,v^n(c)\,] + E[\,u(c)\Delta_v(c)\,] + E[\,u(c)(1-u(c))\Delta_w(c)^2\,],$

where expectations (denoted by E[ ]), variances (denoted by Var[ ]) and covariances (denoted by Cov[ ]) are taken over the skill categories. On the other hand, if all workers were paid according to the wage structure in the nonunion sector, the variance of wage outcomes would be

(4) $\quad v^n = \text{Var}\,[\,w^n(c)\,] + E\,[\,v^n(c)\,].$

Thus, the effect of unions on the variance of wage outcomes, relative to the variance that would occur if all workers were paid according to the structure in the nonunion sector[3] is:

$$(5) \quad v - v^n = \text{Var}[\, u(c)\Delta_w(c) \,] + 2\,\text{Cov}[\, w^n(c), u(c)\Delta_w(c) \,]$$

$$+ E[\, u(c)\Delta_v(c) \,] + E[\, u(c)(1-u(c))\Delta_w(c)^2 \,] .$$

To understand this equation it is useful to compare it to the simplified basis case in which union coverage rates, wage gaps, and variance gaps are all constant across skill groups (i.e., $u(c) = u$; $\Delta_w(c) = \Delta_w$; $\Delta_v(c) = \Delta_v$). In this situation the effect of unions on the variance of wages reduces to the two-sector formula presented by Freeman (1980):

$$(5') \quad v - v^n = u\,\Delta_v + u(1-u)\Delta_w^2 .$$

Relative to this basis case, variation in either the union coverage rate $u(c)$ or the union wage effect $\Delta_w(c)$ introduces two additional factors into the overall wage dispersion effect. The first is a necessarily positive variance component that arises if the union wage gain ( $u(c)\Delta_w(c)$ ) varies across groups. The second is a covariance term that may be positive or negative, depending on whether the union wage gain is larger or smaller for higher- or lower-wage workers.

Unobserved Heterogeneity

The preceding formulas have to be modified slightly if union and nonunion workers in a given skill category would earn different wages even in the absence of unions (i.e. if there is unobserved heterogeneity between union and nonunion workers in a given skill group). As before, assume that workers are classified into skill categories on the basis of *observable* characteristics, and suppose that

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[3]Of course in the absence of unions the wage structure in the nonunion sector might change, as Lewis (1986) and others have often pointed out.

$$w^n_i(c) = w^n(c) + \epsilon^n_i,$$

$$w^u_i(c) = w^u(c) + \theta(c) + \epsilon^u_i,$$

where $E[\epsilon^n_i|\text{nonunion}] = E[\epsilon^u_i|\text{union}] = 0$. The mean wage gap between union and nonunion workers in skill group c is then

$$\Delta_w(c) + \theta(c),$$

where the first term is the true union wage effect and the second is the difference in the mean of unobserved heterogeneity between union and nonunion workers in the group. The latter term introduces a component of variance that would exist <u>even in the absence of unions</u> between workers who are currently unionized and those who are not. Taking account of this component, the difference in the variance of wages in the presence of unions and in the counterfactual situation in which all workers are paid according to the nonunion wage structure is:

$$(6) \quad v - v^n = \text{Var}[\, u(c)\Delta_w(c) \,] + 2\,\text{Cov}[\, w^n(c), u(c)\Delta_w(c) \,]$$

$$+ E[\, u(c)\Delta_v(c) \,] + E[\, u(c)(1-u(c))\{ (\theta(c)+\Delta_w(c))^2 - \theta(c)^2 \} \,].$$

Only the last term of this equation, which reflects the gap in mean wages between union and nonunion workers with the same observed skills in the presence and absence of unions, differs from equation (5).[4]

The presence of unobserved heterogeneity between union and nonunion workers in the same skill category introduces another potentially important question: how to distinguish the true union wage effect $\Delta_w(c)$ from the heterogeneity component $\theta(c)$. A natural solution to this problem is to

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[4]In principle, the entire <u>distribution</u> of unobserved heterogeneity (and not just the mean) may vary between individuals in the union sector and those in the nonunion sector. This introduces a distinction between the observed gap in wage dispersion between union and nonunion workers, and the gap attributable to the union effect on pay structure. Consideration of this possibility is beyond the scope of the present paper.

use longitudinal data on union status changers, as in Card (1996) or Lemieux (1992). Both of these papers use longitudinal samples stratified into observable skill groups on the basis of predicted wages in the nonunion sector. My paper considers five "skill quintiles" whereas Lemieux considers three "skill tiers". The empirical results in these papers suggest two important conclusions. First, the true union wage effect is higher for less-skilled workers and lower for high-skilled workers. For example, the results in Card (1996) for U.S. men suggest that the union wage effect ranges from about 30 percent for men in the bottom 20 percent of the skill distribution to about 10 percent for men in the top 20 percent of the skill distribution.[5] Second, union workers with lower observed skills are positively selected, whereas those with higher observed skills are negatively selected. In other words, $\theta(c) > 0$ for low skill groups and $\theta(c) < 0$ for high skill groups. In the analysis below I use these findings to make rough adjustments to the observed union wage gaps for workers in different deciles of the predicted wage distribution.


II. Data

This paper uses Current Population Survey (CPS) data on wages from the May 1973 and 1974 surveys, and from the 12 monthly surveys in 1993. The May 1973 sample is the first CPS that contains both union status information and wage data for individuals' current jobs.[6] Thus, this sample forms the earliest benchmark against which to compare current levels of unionization and wage inequality. In view of the relatively small sample size of this survey, I elected to pool the May 1973

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[5]Lemieux's results for Canadian men and women are comparable, although the variation in the union wage effect across skill groups for women is smaller than for Canadian (or U.S.) men.

[6]The March 1971 CPS survey collected union status and earnings data for the previous calendar year.

and May 1974 data.[7] The 1993 CPS is the last survey prior to the introduction of a new computer-assisted survey instrument that substantially changed the nature of the earnings questions. I therefore use this sample to measure recent patterns of unionism and wage inequality.

Table 1 presents a descriptive overview of the changes in union membership that have occurred among U.S. male and female workers over the past two decades. The samples underlying this table (and all the subsequent tables in this paper) include individuals age 16-65 who were working in the survey week (excluding self-employed workers) and who reported an hourly or weekly wage for their main job.[8] Union status is measured by the individual's response to the question: "On this job (the main job) is _____ a member of a labor union or an employee association similar to a union?" Recent CPS surveys have also collected union coverage information for non-members of unions: however, this information was not collected in the 1973 or 1974 surveys. For comparability over time I therefore use union membership status in both 1973-4 and 1993.

The first row of Table 1 documents the well-known decline in union membership among male workers between 1973 and 1993, along with the fairly stable rate of union membership among women. Comparisons of membership patterns for different age and education groups show that within the male and female labor forces some groups have lost union membership while others have gained. Younger and less-educated men and women had the biggest drops in union membership, whereas union rates among college-educated men and women rose significantly. Membership rates

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[7]The wage data from the two surveys are deflated to a common basis using the CPI.

[8]In the 1993 sample wages are allocated to non-respondents. I have not deleted individuals with allocated earnings.

for men declined for all race groups and regions while the patterns by race and region for women were more variable.

Row 6 of Table 1 illustrates what is probably the most important fact about union membership in the U.S. labor market over the past 25 years: the dramatic decline in unionism in the private sector (for both men and women) and the fairly rapid rise in public sector unionization. These figures make clear that the relative stability in union membership of women has actually masked a major shift in the concentration of unionization from the private to the public sectors. In 1973-4, 29 percent of female union members worked in the public sector. By 1993 this ratio had risen to 57 percent. Among men, 16 percent of union members worked in the public sector in 1973-4 compared to 32 percent in 1993.

Table 2 compares the characteristics of union and nonunion workers in the early 1970s and the early 1990s. Unionized men are typically older, less educated, and more likely to be married than their nonunion counterparts. Interestingly, the mean gap in education has narrowed over the past two decades (from 0.9 years in 1973-4 to 0.3 years in 1993). This is consistent with the data in Table 1 showing that union densities fell most rapidly for less educated workers. In 1973-4 unionized women were also older and less educated than nonunion women, but by 1993 the education differential reversed, again consistent with the decline in union membership of less-educated women and the rise in union membership of more-educated women.

One way to summarize the shifts in union membership across different age, education, and race groups and illustrate the resulting changes in the distribution of "skills" among union and nonunion members is to define skill groups based on percentiles of predicted wages in the nonunion sector, and then compare union densities in the resulting skill groups. This method is illustrated in Figure 1, which shows union membership rate for predicted wage deciles. The prediction equation

is fit to nonunion workers only (by year and gender) using a very flexible functional form, and then used to assign union and nonunion workers into 10 equally-sized groups.[9] Panel A of Figure 1 shows that in 1973-4 male union membership rates followed an "inverted-U" pattern, with highest rates for workers in the middle of the skill distribution. The 1993 data show a similar pattern, with lower membership rates for all but the highest skill group. Among women, union rates were fairly constant across skill groups in 1973-4 and have "tilted" toward more highly-skilled workers over the past 25 years.

Rows 6 and 7 of the two panels in Table 2 show the mean log wages of union and nonunion workers and a set of adjusted union-nonunion wage gaps, estimated from simple OLS regression models with standard covariates.[10] In 1973-4, the unadjusted gaps in mean log wages between union and nonunion men and women were 0.196 and 0.230, compared to the adjusted wage gaps of 0.178 and 0.220. The similarity of the unadjusted and adjusted gaps suggests that the observed characteristics of union and nonunion workers were similar -- as would be expected given the distributions in Figure 1. In 1993, however, the unadjusted wage gaps -- 0.254 for men and 0.313 for women -- were higher than the corresponding adjusted gaps, suggesting that union workers had higher observed skills than nonunion workers. The large unadjusted gap for women in particular is a reflection of the rising union rate across the skill distribution illustrated in the lower panel of Figure 1.

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[9]The prediction equation includes education, nonwhite and hispanic indicators, a cubic in experience, interactions of indicators for three main levels of education with linear and quadratic experience, and interactions of nonwhite and hispanic dummies with education and linear and quadratic experience.

[10]These are education, a cubic in potential experience, dummies for nonwhite race, hispanic ethnicity, marital status, and region of residence.

Rows 8 and 9 of Table 2 present measures of the dispersion in wages within the union and nonunion sectors. The entry in row 8 is just the standard deviation of log wages, while the entry in row 9 is the residual standard deviation after adjusting for the effects of a standard set of covariates (allowing separate coefficients in the union and nonunion sectors). These simple measures of wage inequality illustrate three important facts. First, wages are less disperse in the union sector. Second, wages of women (in either union or nonunion jobs) have lower dispersion than wages of men. Third, wage dispersion in both the union and nonunion sectors rose between 1973-4 and 1993.

## III. Effects of Unions on Wage Inequality

### Naive Estimates

As a starting point for considering the effect of changing unionism on the inequality of wages, it is useful to begin with simple "two-sector" framework. Recall that if the union density u and the union relative wage effect $\Delta_w$ are both constant across skill groups, then the effect of unions on the variance of wages (relative to what would be observed if all workers were paid according to the existing nonunion wage structure) is

$$(5') \qquad v - v^n = u\Delta_v + u(1-u)\Delta_w^2 .$$

A comparison of the size of this differential over time provides an obvious measure of the changing effect of unionism on wage inequality. Table 3 illustrates the application of this formula to male and female wage inequality in 1973-4 and 1993: the underlying data are drawn from Table 2. Note that if the union density is constant across skill groups, and the union wage and variance effects are constant across skill groups, then it is legitimate to use the unadjusted union wage gap and union

variance gap in equation (5').[11] In fact, under these assumptions the adjusted union wage gap should equal the adjusted gap (since the union rate is orthogonal to individual characteristics) and the "raw" union variance gap should equal the gap in the adjusted variances of wage outcomes between the union and nonunion sectors.

Examination of Table 3 shows that ignoring differences in union coverage rates and union effects across groups, the decline in unionism between 1973-4 and 1993 would have been expected to cause the variance of male wages to rise by 0.020 and the variance of female wages to fall by 0.003. Virtually all of the difference for men is attributable to the change in average union density $(-.121 = 0.308 - 0.187)$ multiplied by the union variance gap $(\Delta_v \approx -0.18)$. For women, the union variance gap is smaller than for men, and the decline in union density is negligible, so the net contribution of unionism to widening inequality is trivial. As shown in the bottom rows of Table 3, between 1973-4 and 1993 the variance of wages rose by 0.067 for men and 0.074 for women. Thus, a naive calculation suggests that falling unionism can explains about 30 percent of the rise in male wage inequality but none of the rise in female inequality.

## Allowing for Differences Across Skill Groups

As noted earlier, there are several reasons to suspect that the naive calculations in Table 3 may overstate the role of unions in widening wage inequality. Using the framework developed in Section I it is possible to calculate union inequality effects within and across skill groups, allowing for

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[11]To see this, assume that the expected union wage in skill category c is $w^u(c)=w^n(c)+\Delta_w$, and the variance of union wages in group c is $v^u(c)=v^n(c)+\Delta_v$. Assuming that the union rate is constant across all skill groups the mean union wage is $E[w^u(c)] = E[w^n(c)] + \Delta_w$, and the variance of union wages is $E[v^u(c)] = E[v^n(c)] + \Delta_v$.

differences in union coverage and union effects by group. In this paper I apply the framework to the "skill deciles" used in Figure 1. Table 4 shows the distributions of union densities, (unadjusted) union wage gaps, and (unadjusted) union variance gaps across skill deciles for men and women in 1973-4 and 1993. Perhaps the most interesting feature of these data is the pattern of union wage gaps across skill groups. For men, these range from 30-40 percent for the lowest skill group to -10 percent for the highest skill group. For women, the union wage gaps at the bottom of the skill distribution are comparable to those for men, but the decline in the gap for higher skilled women is less dramatic. As earlier studies (Card, 1996; Lemieux, 1992) have noted, unions seem to "flatten" the wage structure across skill groups by raising wages more for less-skilled workers.

Figure 2 illustrates the differences in the union and nonunion wage structures across skill groups and over time. To construct these figures I first fit a series of flexible wage models by sector, gender and year. For each gender I then constructed mean predicted wages in the union and nonunion sectors in 1973-4 and 1993 for each of the 10 skill groups (using the populations of 1973-4 workers).[12] Finally, I plotted mean predicted wages in the union sector in 1973-4 and in the union and nonunion sectors in 1993 against mean predicted wages in the nonunion sector in 1973-4. For reference, the figures also show the 45 degree line, representing the counter-factual of equal wage structures in the union and nonunion sectors and over time.

The figures illustrate several interesting features of the union and nonunion wage structures. First, the rotation of the 1993 lines relative to the 45 degree line indicates that both union and

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[12]To account for changes in average wages over time the predicted wages for 1993 are scaled by a factor representing the growth in nonunion wages between 1973-4 and 1993.

nonunion wage outcomes have "widened" across skill groups in the past two decades.[13] This is

particularly true for women: the difference in predicted wages between the highest and lowest skill

groups rose by about 18 percentage points in the nonunion sector and about 13 percentage points in

the union sector from 1973-4 to 1993. Second, the flattening effect of unions on male wage

outcomes may have moderated over time. Third, unions exert a more modest flattening effect on the

female wage structure than the male structure.

An important caveat to this conclusion is the potential role of unobserved heterogeneity. If

union workers in lower skill groups are positively selected and those in higher skill groups are

negatively selected, then the "flattening effect" observed in Figure 2 is exaggerated. Figure 3

compares the unadjusted union-nonunion wage gaps across skill groups in 1973-4 and 1993 with a

series of adjusted wage gaps based on the pattern of union wage effects across skill quintiles

estimated in Card (1996).[14] In the absence of longitudinal estimates of true union wage effects for

women I have simply assumed that the adjusted effects are the same for men and women. As it

happens, the unadjusted union wage gaps for women are fairly similar to the adjusted gaps. For men,

on the other hand, the differences are more noticeable. In particular, the raw wage gaps are negative

for the highest skill group whereas the adjusted gap is positive.

The calculations summarized in Table 5 use equation (6) together with the data in Table 4 to

re-estimate the contribution of changing unionism to rising wage inequality. I have computed the

effects two ways: using the unadjusted union-nonunion wage gaps presented in Table 4; and using

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[13]A similar point is made in Card and Lemieux (1996), which uses discrete age and education cells
rather than predicted wage cells.

[14]I formed these adjusted gaps by linearly interpolating the estimated union gaps in Table 7 of Card
(1996).

the adjusted wage gaps derived from my 1996 paper. For women, the results are quite similar to the results of the naive calculations in Table 3: changes in unionism have had a negligible effect on wage inequality. For men, the results are qualitatively similar to the naive calculations but the magnitude of the union effect is reduced: from about 30 percent of the overall rise in inequality under the naive calculation to 18 percent using the more sophisticated model with the unadjusted wage gaps to 12 percent using the adjusted gaps.

In principle, it is also possible to implement equation (6) using longitudinally-based estimates of the union variance effect ($\Delta_v$) rather than the simple differences in the variances of wages between the union and nonunion sectors shown in Table 4. Card (1992) and Lemieux (1992) both present estimates of the effect of unions on the variance of wages based on the wage outcomes of union status changers. The longitudinal variance gap estimates presented in Card (1992) are relatively noisy, and on average only slightly smaller in absolute value than the corresponding cross-sectional estimates. Lemieux's estimates are also noisy but tend to be noticeably smaller (in absolute value) than the cross-sectional estimates. If the cross-sectional variance gaps in Table 4 are viewed as bounding the likely effect of unions on wage dispersion, then the estimates in Table 5 should be interpreted as upper bound estimates of the contribution of changing unionization to rising wage inequality. Taken as whole, then, it appears that the effect of unions on widening wage inequality may be relatively modest.


IV. Unionization and Inequality in the Public and Private Sectors

In light of the diverging rates of union membership in the public and private sectors it is interesting to ask how much changing unionism has affected the inequality or wages with the two

sectors. Tables 6 and 7 present some simple comparisons of union rates across different subgroups of the two sectors, while Figures 4 and 5 show union rates by predicted skill decile within each sector in 1973-4 and 1993. Perusal of these tables and figures shows that public sector union rates have risen more-or-less across the board for both men and women. Within the public sector union densities have risen especially quickly in the education sector. Since education comprises such a large share of public sector employment (30 percent of men and 50-55 percent of women) the spread of unionism among teachers has been a key determinant of the growth of public sector unions, accounting for about 40 percent of the rise in union membership among public sector men between 1973 and 1993, and 70 percent of the rise for public sector women.

The institutional factors controlling the process of unionization in the public sector vary by level of government (federal, state, or local), and across states within the state and local levels of government. Some states prohibit collective bargaining for some groups of state or local employees while others have adopted more or less "pro-union" legislation (see e.g. the papers in the volume edited by Freeman and Ichniowski, 1988). This variation is reflected in Table 6 by the widely different levels of public sector unionization across regions. Despite the differences in levels, the rates of growth of union membership among public sector men between 1973 and 1993 are fairly similar across regions, although the rates of growth for women are more variable. It is also interesting to compare unionization rates between the federal, state, and local levels. Since the level of government was not collected in the 1973 or 1974 CPS surveys, this is not possible for the base period, but the data for 1993 show generally higher union rates at the local level, and fairly comparable densities at the federal and state levels.

In contrast to the pattern of increasing union membership in the public sector, the data in Table 7 and Figure 5 show uniformly decreasing private sector union rates. On average union rates fell by about 50 percent, with larger declines for younger and less educated workers, but fairly similar declines across regions and in most major industries.[15] The decreases in membership rates for men in construction, manufacturing, transportation, communications, and retail trade are noteworthy because although these industries have experienced somewhat different employment trends over the past 20 years, in each case the union density fell by 40-50 percent. It would be difficult to find support in these patterns for a theory of union decline linked to specific demand-side factors, such as trade or technology shocks, unless these factors happened to affect union rates in all industries equally.

How do unions affect the structure of wages in the public and private sectors? Figures 6 and 7 use the methods underlying Figure 2 to compare the structures of wages among union and nonunion workers in the public and private sectors, while Figures 8 and 9 plot the unadjusted union-nonunion wage gaps by predicted skill decile in the two sectors. Qualitatively, unions seem to exert the same effects on the public and private sector wage structures. The unadjusted union gaps for men in both sectors are largest for the least skilled, and are negative for the most highly-skilled. However, as suggested in the survey by Lewis (1988), the mean union wage gap is smaller for men in the public sector than the private sector.[16] Union wage gaps for women in the two sectors have similar levels

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[15]Union membership rates of women in some industries vary a lot, but some of these industries (e.g. construction and transportation) employ very small numbers of women.

[16]One caveat to this conclusion is the possibility that "spillovers" from the unionized public sector to the nonunionized public sector may be more important than similar spillovers in the private sector -- see Belman, Heywood, and Lund (1997), for example. If this is the case, then the presence of public sector unionism may have a relatively bigger effect than is estimated using the counterfactual

and very similar patterns across skill groups. (For reference, Appendix Table 1 reports a set of conventional union wage gaps by sector and gender in 1973-4 and 1993).

Examination of the unadjusted union-nonunion wage gaps in Figures 8 and 9 suggests that the effects of unions on wages in the public sector have changed relatively little over the past 20 years, while the union wage effects for the least skilled workers in the private sector may have declined slightly. In the absence of longitudinally-based estimates of the "true" union wage effects for the two years, however, these changes must be interpreted cautiously, since the processes of selection into the union sector may have also changed, leading to shifts in the magnitude of selection biases in the observed wage gaps.

Table 8 uses data by predicted skill decile for men and women in the public and private sectors to estimate the effects of unions on wage inequality in the two sectors in 1973-4 and 1993. As in Table 5 I have computed the effects of unions using equation (6) and two alternative sets of union wage gaps: the observed gaps (shown in Figures 8 and 9) and "adjusted" gaps based on the estimates in my 1996 paper.[17] The results for private sector men and women in Table 8 are fairly close to the results for all workers in Table 5: changes in unionism can account for 15-20 percent of the rise in wage inequality among private sector men, and virtually none of the rise in inequality for private sector women. The results for public sector workers suggest a more important role for unions. Changes in public sector unionism have apparently "held back" rising wage inequality to a significant degree. For men, the estimates suggest that the variance of wages would have risen an additional 30-

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of the current nonunion wage structure.

[17]In principle one might prefer to modify the adjusted gaps for the public and private sectors. I experimented with several alternatives and found that they gave results similar to the ones presented in Table 8.

40 percent in the absence of unions, while for women the variance of wages would have risen an additional 40 percent. Comparing the changes in wage inequality in the public and private sectors, differential trends in union membership can potentially account for 50-80 percent of the slower rise in wage inequality for men in the public sector, and 20-30 percent of the slower rise in wage inequality for women in the public sector.

V. Conclusions

The primary objective of this paper is to re-assesses the connection between declining unionization and widening wage inequality using data for men and women from the early 1970s and early 1990s. The evidence points to three main findings on this issue. First, since the fraction of women belonging to unions has been relatively stable over the past two decades, shifts in unionization explain virtually none of the rise in overall wage inequality among female workers. Second, the decline in union membership among men explains a modest share -- no more than 15-20 percent -- of the rise in overall male wage inequality. Third, within the public sector, rising unionism has been a significant force in forestalling rising wage inequality among both men and women. For men, the differences in trends in union membership between the public and private sectors can explain 50-80 percent of the slower growth in public sector wage inequality relative to the private sector. For women a similar calculation shows that differences in unionism can explain 20-30 percent of the difference in the growth of wage inequality between the sectors.

A secondary goal of the paper is to develop a deeper understanding of union membership patterns and union wage effects in the labor market as a whole and in the public and private sectors. As late as 1974, union membership in the U.S. economy was concentrated among men with average

or slightly below-average education working in the private sector. Today, the highest union membership rates occur for highly-educated women in the public sector. Despite this dramatic shift, an important characteristic of unions -- their tendency to raise wages more for workers with lower measured skills -- has persisted. Indeed, there has been remarkable stability in the structure of union-nonunion wage gaps across different skill groups over the past 25 years. A comparison of union relative wage structures in the public and private sectors suggests that unions exert about the same effect on different skill and gender groups in the two sectors, and that despite the shifts in union membership, the structure of union relative wage effects is about the same in the mid 1990s as in the mid 1970s.

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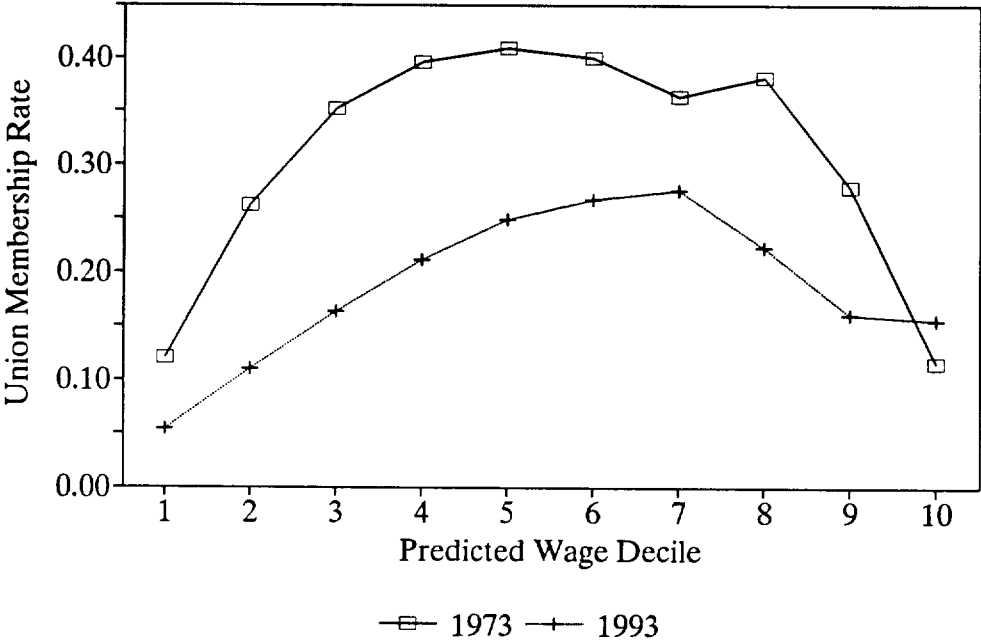
Figure 1: Union Membership Rates by Skill Group 1973-4 and 1993

A. Men



─⊟─ 1973  ─+─ 1993

B. Women



─⊟─ 1973-4  ─+─ 1993

# Figure 2: Comparisons of the Union and Nonunion Wage Structures

## A. Men



- Union Structure, 1993
- Union Structure, 1973
- Nonunion Structure, 1993

Predicted Log Wage (y-axis)
Predicted Log Wage Nonunion Sector 1973 (x-axis)

## B. Women



- Union Structure, 1993
- Union Structure, 1973
- Nonunion Structure, 1993

Precicted Log Wage (y-axis)
Predicted Log Wage Nonunion Sector 1973 (x-axis)
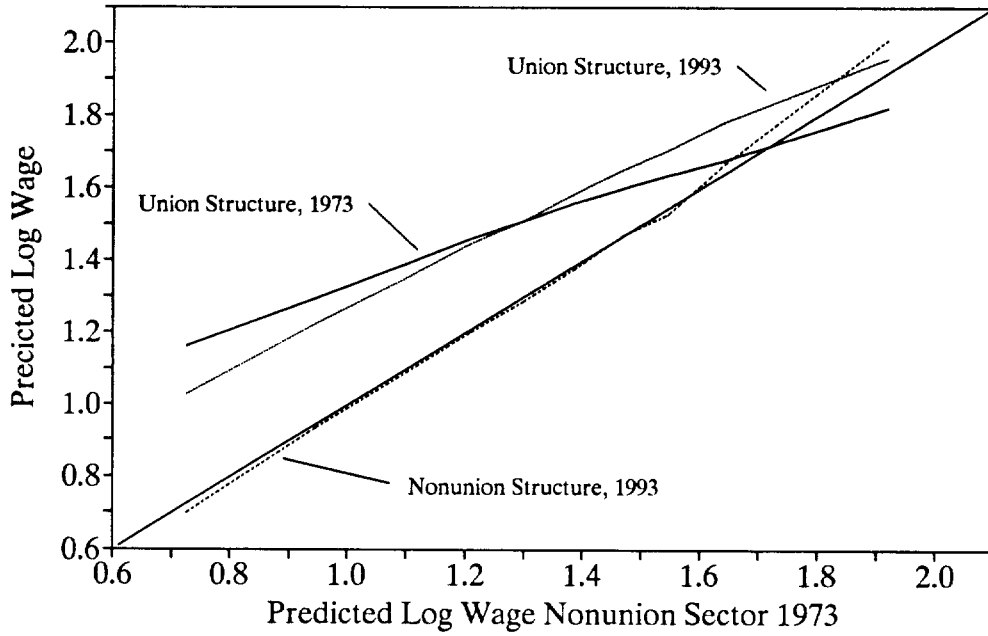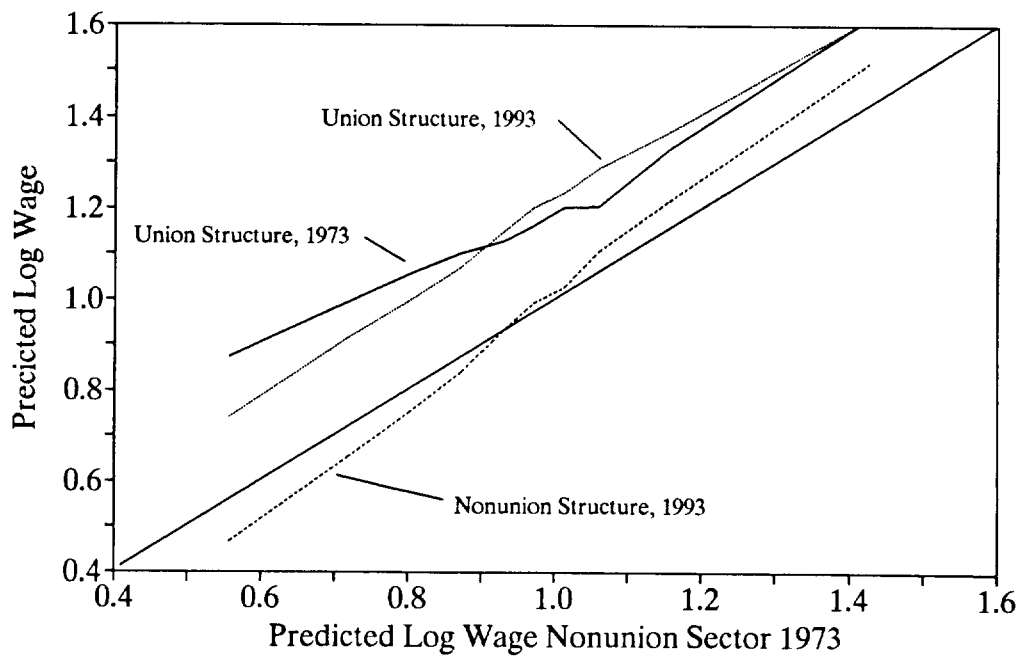
# Figure 3: Union Wage Gaps by Skill Group 1973-4 and 1993

## A. Men
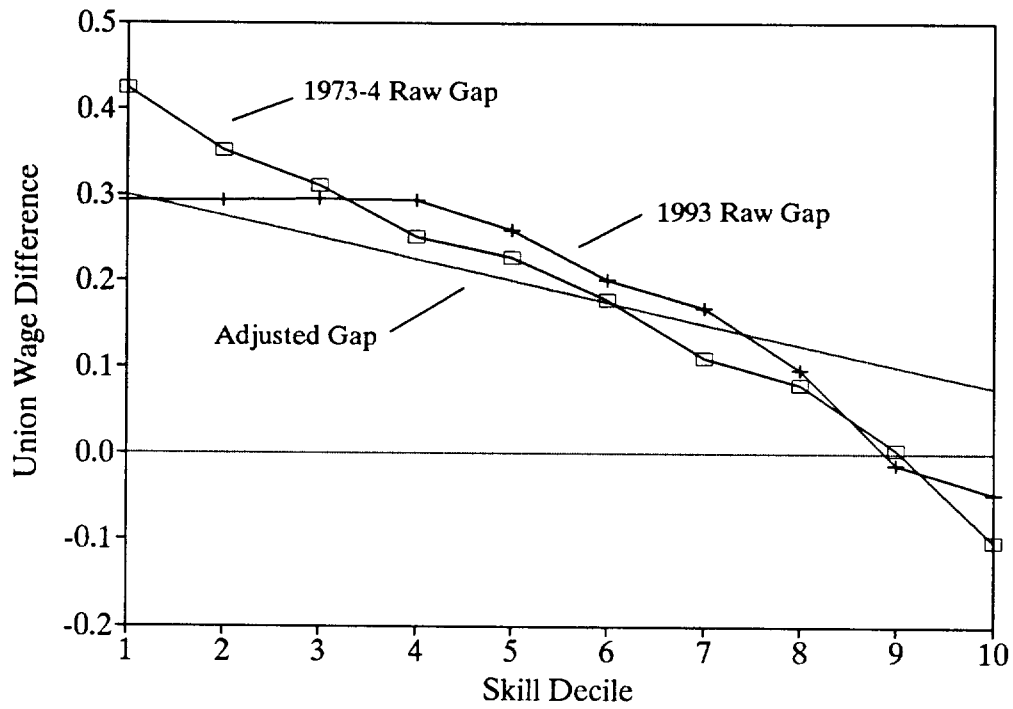


## B. Women
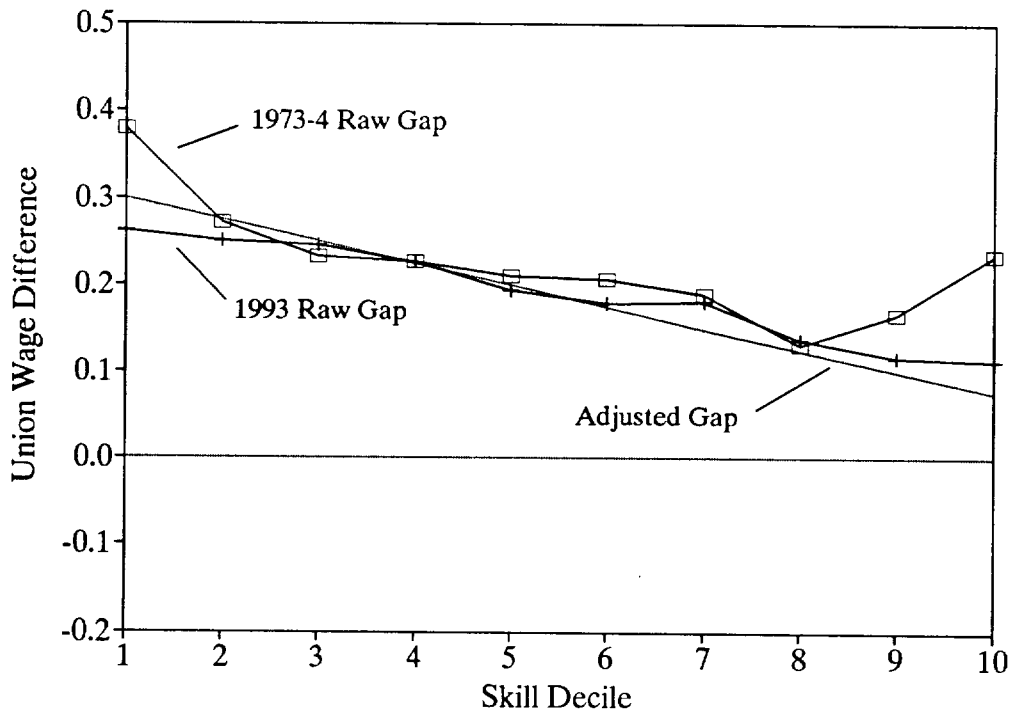
# Figure 4: Union Membership Rates in the Public Sector by Skill Group

## A. Public Sector Men
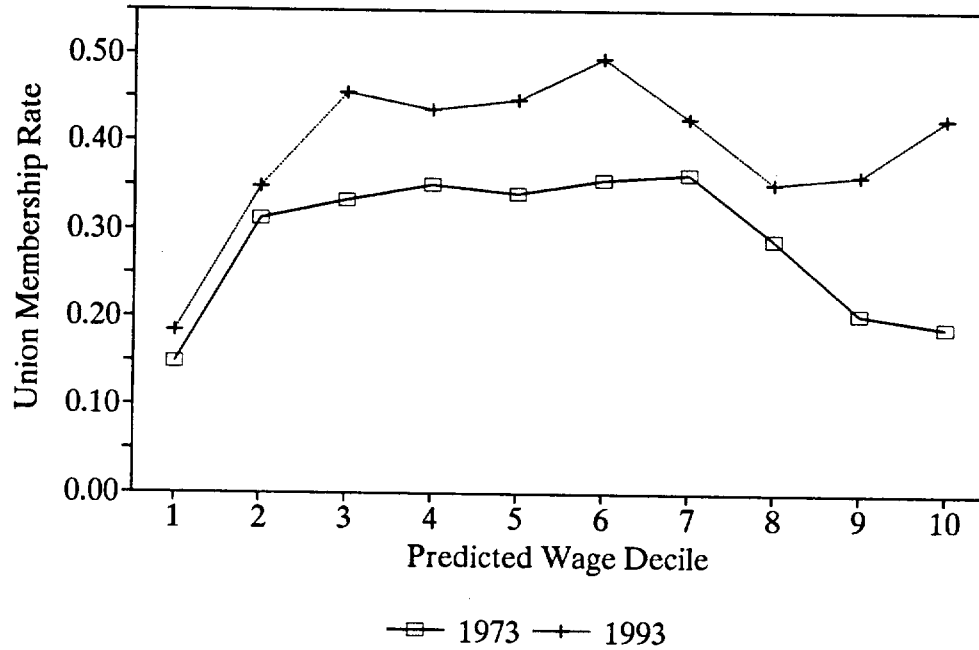


## B. Public Sector Women
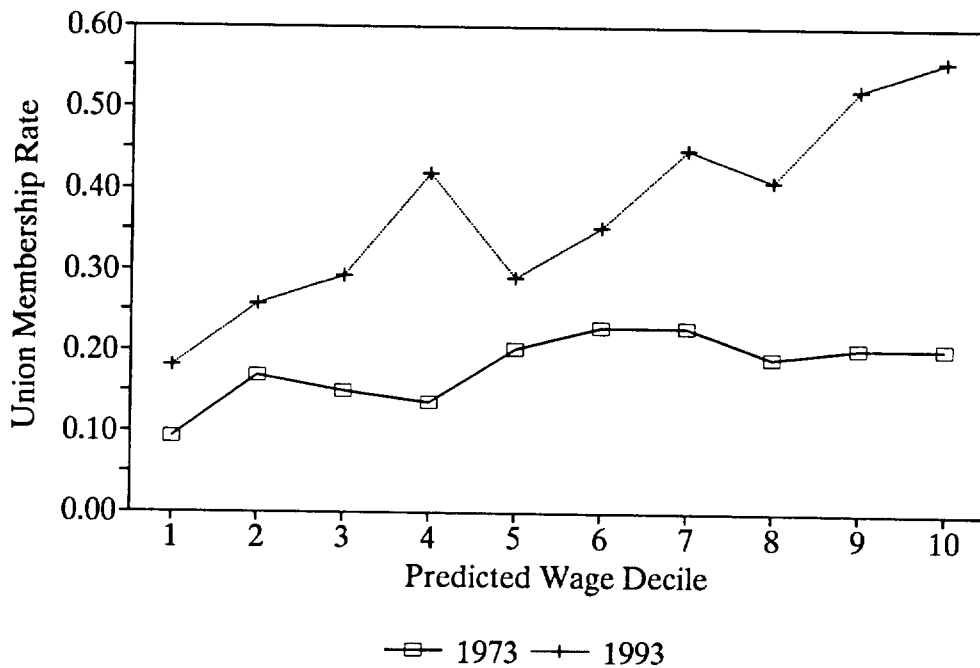
# Figure 5: Union Membership Rates in the Private Sector by Skill Group

## A. Private Sector Men



**Predicted Wage Decile**

—□— 1973  —+— 1993

## B. Private Sector Women



**Predicted Wage Decile**

—□— 1973  —+— 1993
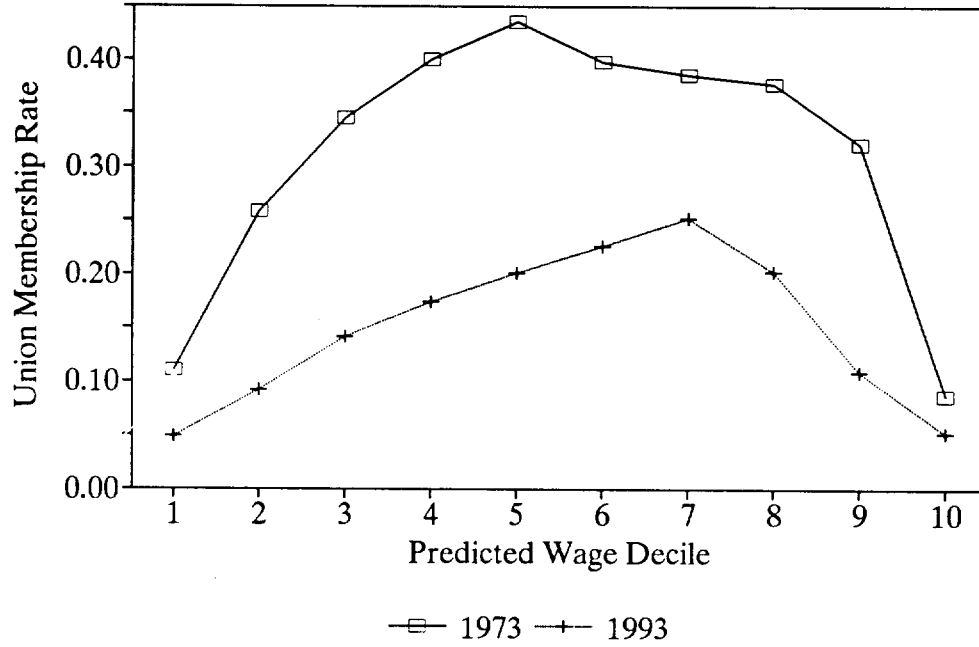
Figure 6: Union and Nonunion Wage Structures in the Public Sector

A. Men



Union Structure, 1993

Union Structure, 1973

Nonunion Structure, 1993

Predicted Log Wage Nonunion Sector 1973

B. Women



Union Structure, 1973

Union Structure, 1993

Nonunion Structure, 1993

Predicted Log Wage Nonunion Sector 1973
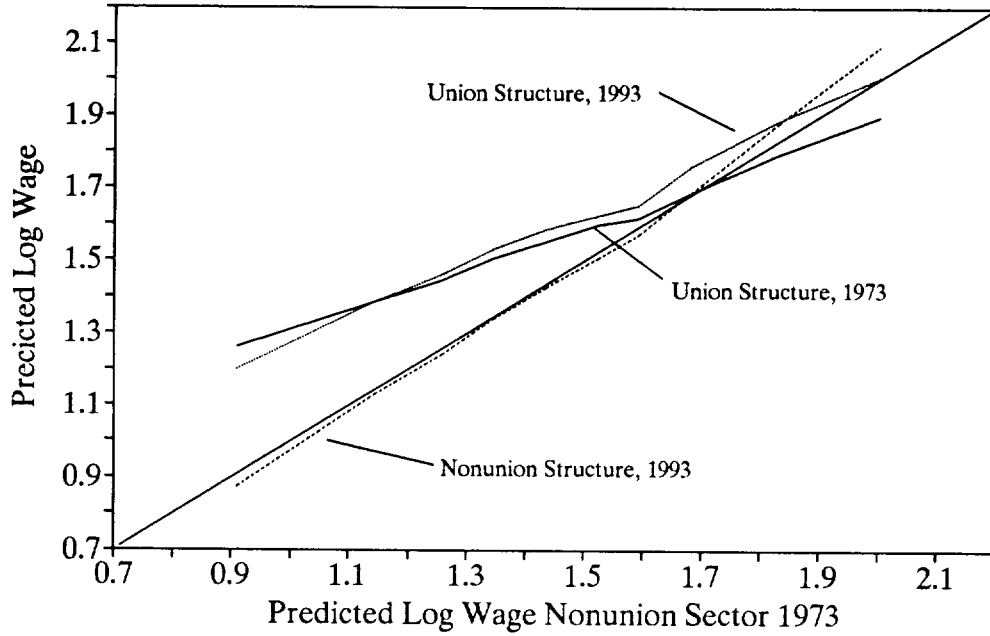
# Figure 7: Union and Nonunion Wage Structures in the Private Sector

## A. Men



## B. Women
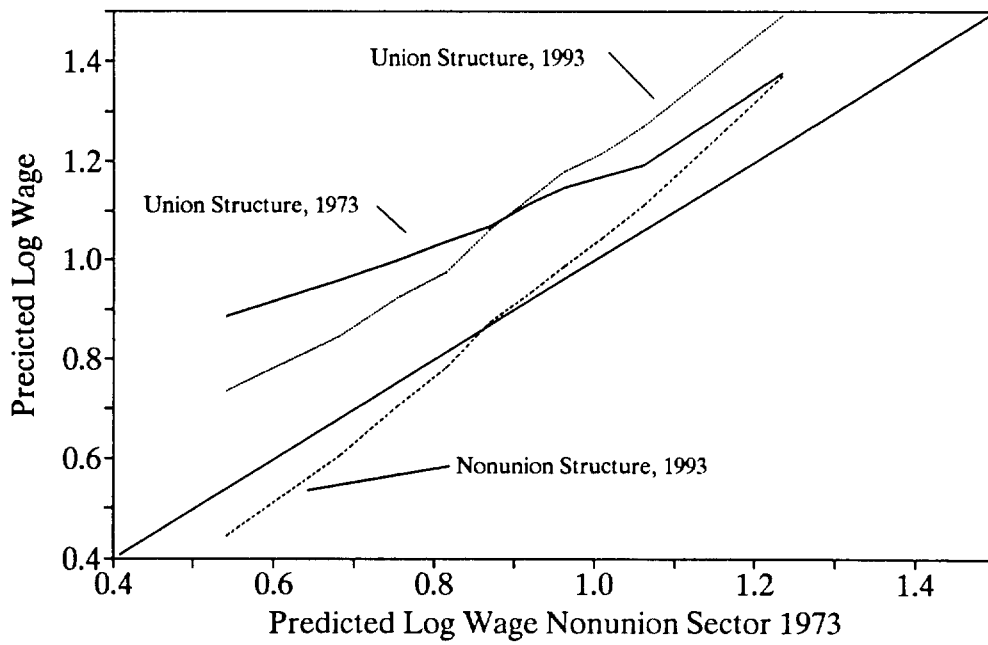
# Figure 8: Union Wage Gaps by Skill Group in the Public Sector

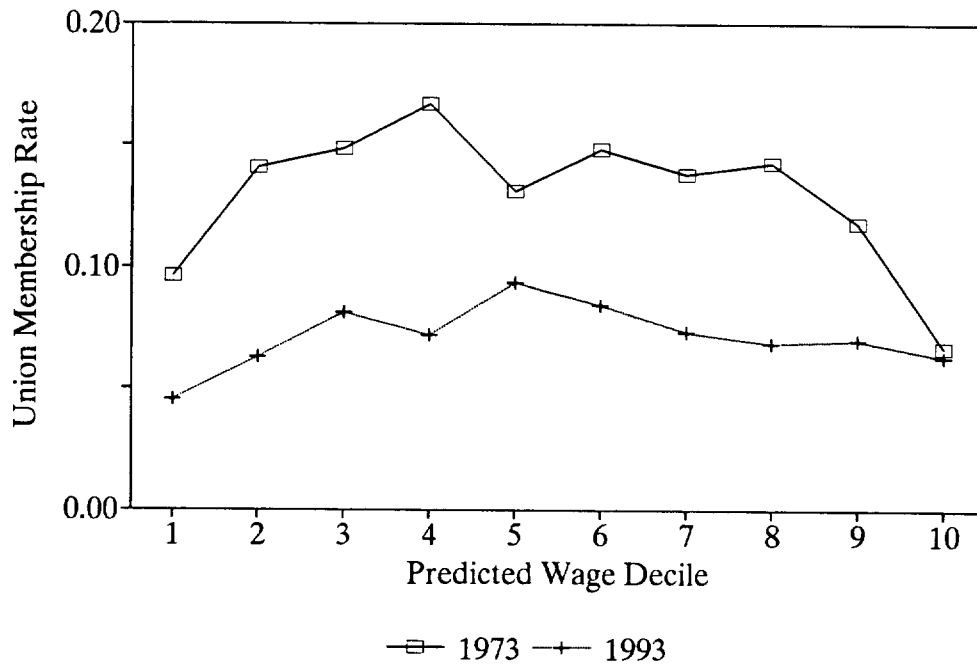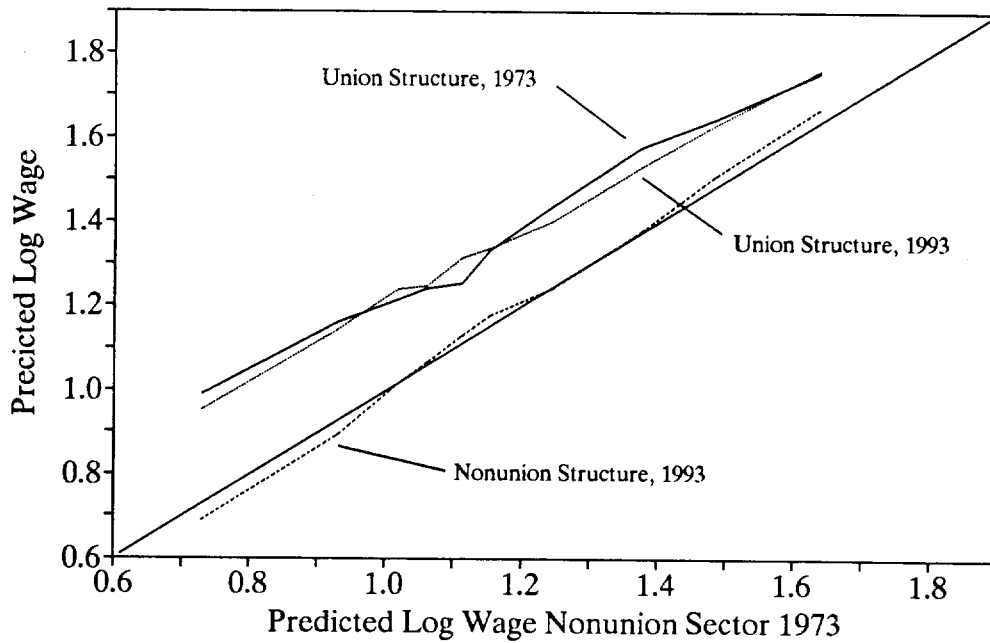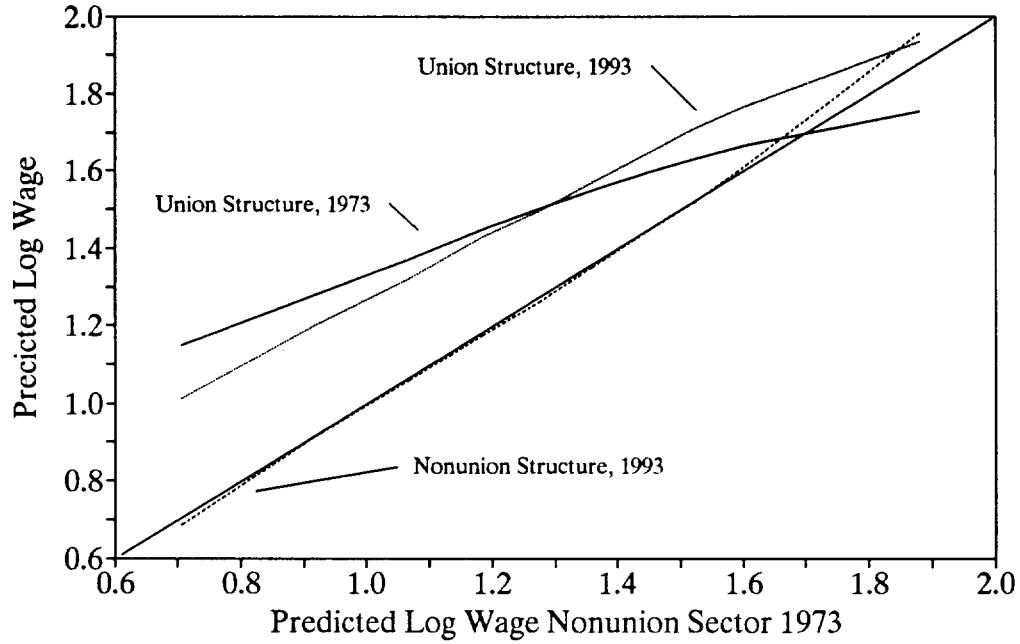## A. Public Sector Men
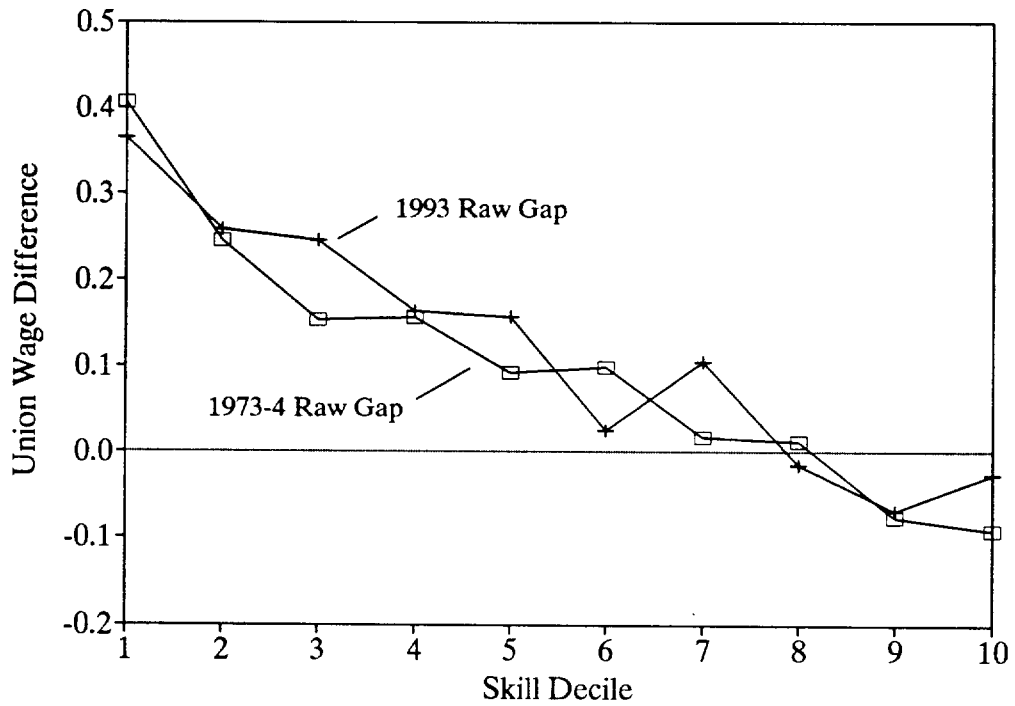


## B. Public Sector Women
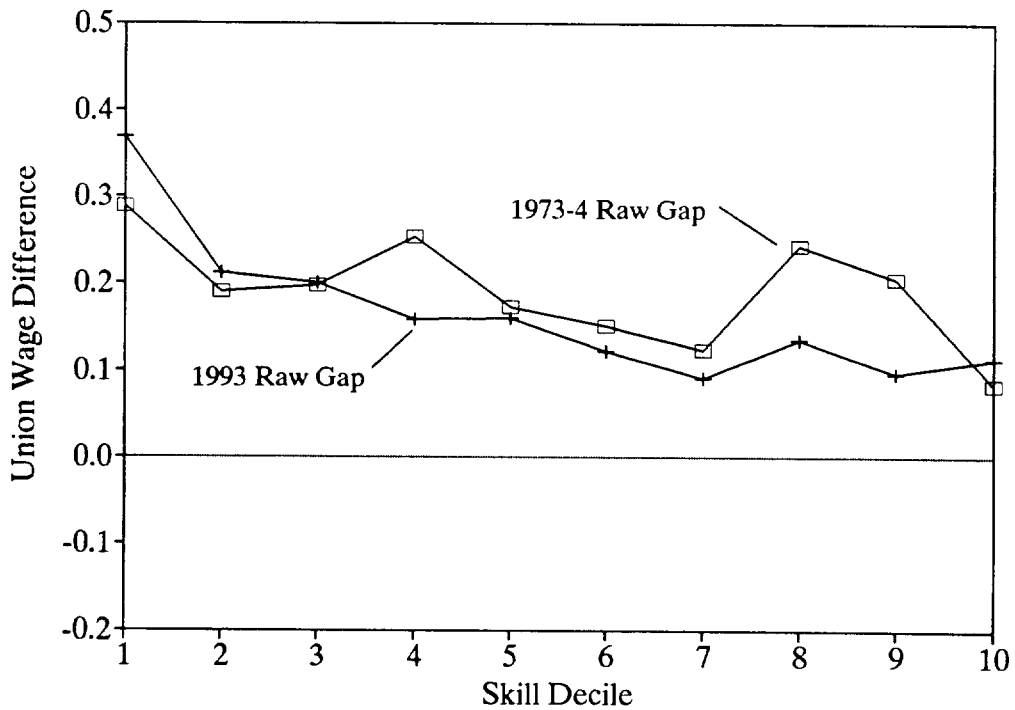
# Figure 9: Union Wage Gaps by Skill Group in the Private Sector

## A. Private Sector Men
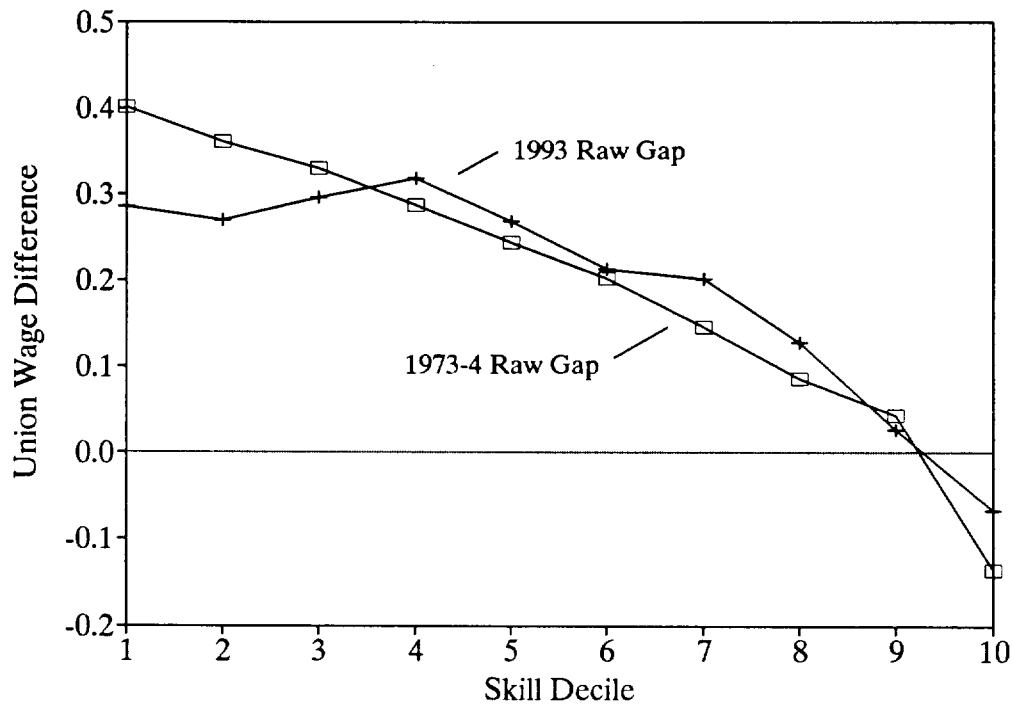


## B. Private Sector Women
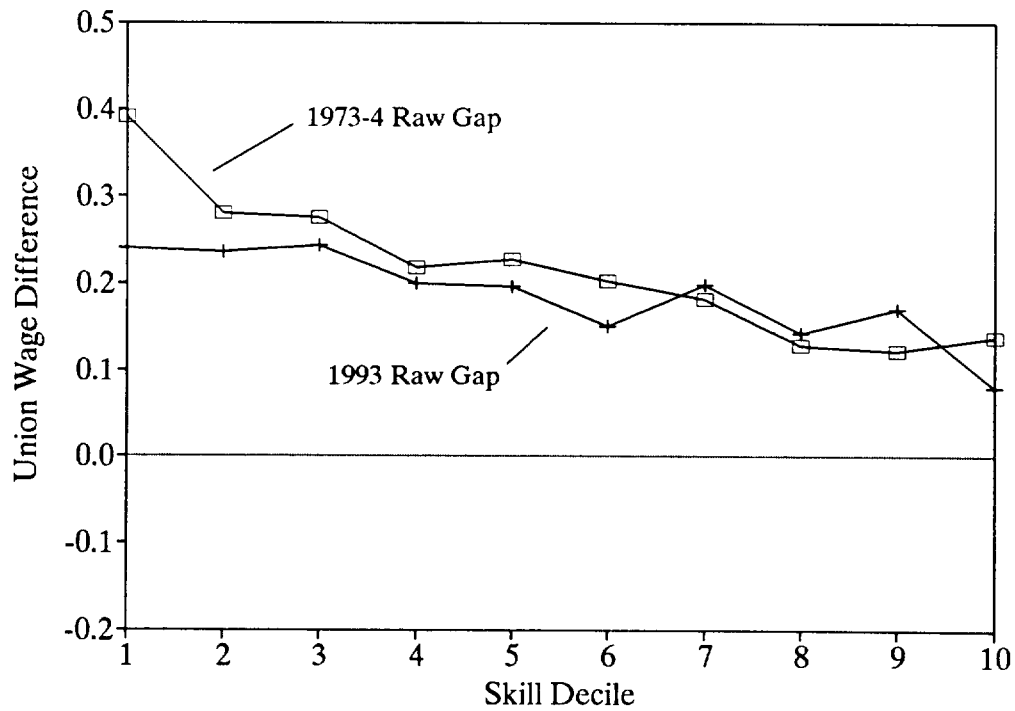
Table 1: Union Membership Rates for Men and Women, 1973-74 versus 1993

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | 1973-4 | 1993 | Ratio 1993/1973-4 | 1973-4 | 1993 | Ratio 1993/1973 |
| 1. All | 30.8 | 18.7 | 0.61 | 14.1 | 13.3 | 0.94 |
| 2. By Education: | | | | | | |
| < High School | 35.1 | 14.3 | 0.41 | 17.4 | 9.8 | 0.56 |
| High School | 39.3 | 24.5 | 0.62 | 13.5 | 11.8 | 0.87 |
| Some College | 22.7 | 19.5 | 0.86 | 9.0 | 10.5 | 1.17 |
| College or more | 10.7 | 12.4 | 1.16 | 14.8 | 20.4 | 1.38 |
| 3. By Age: | | | | | | |
| 16-30 | 24.9 | 10.4 | 0.42 | 11.5 | 7.3 | 0.63 |
| 31-45 | 32.6 | 20.7 | 0.63 | 15.5 | 15.0 | 0.97 |
| 46-65 | 37.3 | 26.5 | 0.71 | 16.7 | 18.0 | 1.08 |
| 4. By Race: | | | | | | |
| White | 30.2 | 18.3 | 0.61 | 13.5 | 12.4 | 0.92 |
| Black | 37.5 | 23.4 | 0.62 | 18.6 | 19.2 | 1.03 |
| Other | 28.3 | 14.8 | 0.52 | 18.8 | 14.6 | 0.78 |
| 5. By Region: | | | | | | |
| Northeast | 36.8 | 25.4 | 0.69 | 21.2 | 19.1 | 0.90 |
| Midwest | 38.2 | 23.9 | 0.63 | 17.2 | 14.9 | 0.87 |
| South | 19.5 | 10.9 | 0.56 | 6.8 | 7.4 | 1.09 |
| West | 31.3 | 18.7 | 0.60 | 13.8 | 15.4 | 1.12 |
| 6. By Sector: | | | | | | |
| Private | 31.1 | 14.9 | 0.48 | 13.0 | 7.1 | 0.55 |
| Public | 28.9 | 39.3 | 1.36 | 18.0 | 37.3 | 2.07 |
| 7. Number of Observations | 43,189 | 86,270 | -- | 30,500 | 82,624 | -- |

Notes: Based on samples derived from the May 1973/74 CPS and 1993 merged out-going rotation group files. Samples include individuals age 16-65 who are not self-employed, and whose reported or constructed hourly wage is between $2.01 and $90.00 per hour in 1989 dollars.

Table 2: Characteristics of Union and Nonunion Workers in
         1973-4 and 1993

|  | Men | | Women | |
|---|---|---|---|---|
|  | Nonunion | Union | Nonunion | Union |
| **1973-4:** | | | | |
| 1. Education (years) | 12.3 | 11.2 | 12.1 | 11.7 |
| 2. Experience (years) | 16.9 | 21.5 | 17.6 | 20.8 |
| 3. Nonwhite (percent) | 9.1 | 11.7 | 11.8 | 16.4 |
| 4. Married (percent) | 71.1 | 81.4 | 59.5 | 63.1 |
| 5. Public Sector (percent) | 16.9 | 15.5 | 21.4 | 28.6 |
| 6. Mean Log Wage | 1.323 | 1.519 | 0.947 | 1.177 |
| 7. Adjusted Union Wage Gap | -- | 0.178 | -- | 0.220 |
| 8. Std. Dev. Log Wages | 0.553 | 0.354 | 0.442 | 0.383 |
| 9. Residual Std. Dev. Log Wage | 0.416 | 0.324 | 0.372 | 0.328 |
| **1993:** | | | | |
| 1. Education (years) | 13.1 | 12.8 | 13.1 | 13.9 |
| 2. Experience (years) | 16.8 | 22.1 | 17.5 | 21.2 |
| 3. Nonwhite (percent) | 13.6 | 15.8 | 14.9 | 21.5 |
| 4. Married (percent) | 58.6 | 70.8 | 53.8 | 60.1 |
| 5. Public Sector (percent) | 11.4 | 32.2 | 14.7 | 57.3 |
| 6. Mean Log Wage | 2.359 | 2.613 | 2.153 | 2.466 |
| 7. Adjusted Union Wage Gap | -- | 0.168 | -- | 0.166 |
| 8. Std. Dev. Log Wages | 0.590 | 0.415 | 0.515 | 0.456 |
| 9. Residual Std. Dev. Log Wage | 0.446 | 0.363 | 0.423 | 0.379 |

Notes: See note to Table 1 for sample description. Education categories in
       1993 CPS are re-coded to earlier basis. Adjusted union wage gap is
       union coefficient from a regression model that also includes
       education, a cubic in potential experience, and indicators for nonwhite
       race, hispanic ethnicity, marrital status, and 3 regions. Residual
       standard deviaiton of log wages is residual standard error from a
       similar regression fit separately to the union and non-union samples.

Table 3: Naive Estimates of the Contribution of Unions to
         Rising Wage Inequality, 1973-4 to 1993

|  | Men | Women |
|---|---|---|
| **1973-4:** | | |
| 1. Union rate (U) | 0.308 | 0.141 |
| 2. Union Wage Gap ($\Delta_w$) | 0.178 | 0.220 |
| 3. Union Variance Gap ($\Delta_v$) | -0.180 | -0.049 |
| 4. Between-sector effect | 0.007 | 0.006 |
| 5. Within-sector effect | -0.056 | -0.007 |
| 6. Total effect | -0.049 | -0.001 |
| **1993:** | | |
| 1. Union rate (U) | 0.187 | 0.133 |
| 2. Union Wage Gap ($\Delta_w$) | 0.168 | 0.166 |
| 3. Union Variance Gap ($\Delta_v$) | -0.176 | -0.057 |
| 4. Between-sector effect | 0.004 | 0.003 |
| 5. Within-sector effect | -0.033 | -0.008 |
| 6. Total effect | -0.029 | -0.004 |
| **Changes from 1973-4 to 1993:** | | |
| Change in Total Effect of Unions | 0.020 | -0.003 |
| Change in Variance of Wages | 0.067 | 0.074 |
| Share Attributable to Unions | 0.304 | -0.046 |

Notes: See text for formulas and Tables 1 and 2 for underlying data.

Table 4: Distribution of Union Membership and Union Effects Across Skill Deciles

| | 1973-4 | | | | 1993 | | | |
|---|---|---|---|---|---|---|---|---|
| | Percent Union | Decile Share of Union(%) | Raw Union Gaps: | | Percent Union | Decile Share of Union(%) | Raw Union Gaps: | |
| | | | Wage | Variance | | | Wage | Variance |

A. Men

Decile:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 12.1 | 3.9 | 0.42 | 0.02 | 5.3 | 2.9 | 0.29 | 0.05 |
| 2 | 26.2 | 8.5 | 0.35 | -0.01 | 11.0 | 5.9 | 0.29 | 0.02 |
| 3 | 35.2 | 11.4 | 0.31 | -0.03 | 16.3 | 8.7 | 0.29 | -0.02 |
| 4 | 39.5 | 12.8 | 0.25 | -0.08 | 21.1 | 11.3 | 0.29 | -0.05 |
| 5 | 40.9 | 13.3 | 0.23 | -0.06 | 24.8 | 13.3 | 0.26 | -0.07 |
| 6 | 39.9 | 13.0 | 0.18 | -0.07 | 26.7 | 14.3 | 0.20 | -0.11 |
| 7 | 36.3 | 11.8 | 0.11 | -0.10 | 27.6 | 14.8 | 0.17 | -0.11 |
| 8 | 38.1 | 12.4 | 0.08 | -0.09 | 22.2 | 11.9 | 0.10 | -0.11 |
| 9 | 27.8 | 9.1 | 0.00 | -0.09 | 15.9 | 8.5 | -0.01 | -0.11 |
| 10 | 11.6 | 3.8 | -0.10 | -0.10 | 15.5 | 8.3 | -0.05 | -0.09 |

B. Women

Decile:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 9.9 | 7.0 | 0.38 | -0.01 | 5.0 | 3.7 | 0.26 | 0.03 |
| 2 | 15.1 | 10.7 | 0.27 | -0.02 | 7.6 | 5.7 | 0.25 | 0.00 |
| 3 | 15.9 | 11.2 | 0.23 | -0.03 | 10.5 | 7.9 | 0.25 | -0.01 |
| 4 | 14.6 | 10.4 | 0.23 | 0.01 | 10.8 | 8.2 | 0.23 | -0.05 |
| 5 | 13.9 | 9.8 | 0.21 | -0.04 | 13.2 | 9.9 | 0.19 | -0.04 |
| 6 | 14.1 | 10.0 | 0.21 | -0.06 | 14.7 | 11.1 | 0.18 | -0.04 |
| 7 | 14.4 | 10.2 | 0.19 | -0.03 | 11.6 | 8.7 | 0.18 | -0.05 |
| 8 | 15.7 | 11.1 | 0.13 | -0.05 | 13.5 | 10.2 | 0.14 | -0.07 |
| 9 | 13.2 | 9.4 | 0.17 | -0.03 | 17.9 | 13.5 | 0.12 | -0.07 |
| 10 | 14.4 | 10.2 | 0.23 | -0.06 | 27.8 | 20.9 | 0.11 | -0.10 |

Notes: Skill deciles are based on predicted wage in the nonunion sector. Decile share of union represents the percentage of all union workers in the skill decile. Wage gap is difference in mean log wages between union and nonunion workers in the skill decile. Variance gap is difference in variance of log wages between union and nonunion workers in the skill decile. See Table 1 for sample definition, and text for description of wage prediction models.

Table 5: Estimates of the Contribution of Unions to Rising Wage
         Inequality, 1973-4 to 1993

|  | 1973-4 | 1993 | Change |
|---|---|---|---|
| **A. Male Workers** | | | |
| Variance in Log Wages | 0.258 | 0.325 | 0.067 |
| Effect of Unions Using Raw Union Wage Differentials | -0.027 | -0.015 | 0.012 |
| Effect of Unions Using Adjusted Differentials | -0.019 | -0.011 | 0.008 |
| **B. Female Workers** | | | |
| Variance in Log Wages | 0.195 | 0.269 | 0.074 |
| Effect of Unions Using Raw Union Wage Differentials | 0.000 | -0.002 | -0.002 |
| Effect of Unions Using Adjusted Differentials | -0.002 | -0.004 | -0.002 |

Notes: See text for methods. Raw union wage differentials are actual
differences in mean log wages between union and nonunion workers in
each skill decile. Adjusted union wage differentials assume that
true union wage effect declines linearly from 0.30 for the lowest skill
decile to 0.075 for the highest skill decile.

Table 6: Union Membership Rates in Public Sector for Men and Women, 1973-74
versus 1993

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | 1973-4 | 1993 | Ratio 1993/1973-4 | 1973-4 | 1993 | Ratio 1993/1973 |
| 1. All | 28.9 | 39.3 | 1.36 | 18.0 | 37.3 | 2.07 |
| 2. By Education: | | | | | | |
| < High School | 30.2 | 29.0 | 0.96 | 17.6 | 24.1 | 1.37 |
| High School | 40.5 | 46.0 | 1.14 | 17.0 | 32.9 | 1.94 |
| Some College | 25.8 | 42.7 | 1.66 | 14.2 | 29.6 | 2.08 |
| College or more | 19.5 | 34.2 | 1.75 | 20.6 | 46.1 | 2.24 |
| 3. By Age: | | | | | | |
| 16-30 | 24.9 | 28.8 | 1.16 | 16.4 | 27.0 | 1.65 |
| 31-45 | 29.7 | 42.9 | 1.44 | 18.6 | 38.5 | 2.07 |
| 56-65 | 31.7 | 40.8 | 1.29 | 19.2 | 41.5 | 2.16 |
| 4. By Race: | | | | | | |
| White | 27.8 | 39.7 | 1.43 | 16.9 | 37.5 | 2.22 |
| Black | 37.0 | 39.8 | 1.08 | 23.9 | 36.9 | 1.54 |
| Other | 35.2 | 29.5 | 0.84 | 24.2 | 35.1 | 1.45 |
| 5. By Region: | | | | | | |
| Northeast | 48.2 | 65.3 | 1.35 | 35.1 | 61.5 | 1.75 |
| Midwest | 31.9 | 44.1 | 1.38 | 20.9 | 41.7 | 2.00 |
| South | 14.7 | 21.0 | 1.43 | 6.0 | 19.9 | 3.32 |
| West | 28.0 | 41.2 | 1.47 | 17.5 | 42.7 | 2.44 |
| 6. By Industry: | | | | | | |
| Education | 24.1 | 40.2 | 1.67 | 17.9 | 44.9 | 2.51 |
| Health/Hospital | 23.8 | 31.2 | 1.31 | 20.1 | 28.6 | 1.42 |
| Public Admin | 32.8 | 36.7 | 1.12 | 17.2 | 28.1 | 1.63 |
| Other | 28.9 | 43.1 | 1.49 | 17.6 | 31.7 | 1.80 |
| 7. By Level of Government: | | | | | | |
| Federal | -- | 33.8 | -- | -- | 26.4 | -- |
| State | -- | 32.0 | -- | -- | 30.6 | -- |
| Local | -- | 46.0 | -- | -- | 42.8 | -- |
| 8. Number of Observations | 7,081 | 13,583 | -- | 6,814 | 17,117 | -- |

Notes: Based on samples derived from the May 1973/74 CPS and 1993 merged out-
going rotation group files. Samples include individuals age 16-65 who
are not self-employed, and whose reported or constructed hourly wage
is between $2.01 and $90.00 per hour in 1989 dollars.

Table 7: Union Membership Rates in Private Sector for Men and Women, 1973-74 versus 1993

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | 1973-4 | 1993 | Ratio 1993/1973-4 | 1973-4 | 1993 | Ratio 1993/1973 |
| 1. All | 31.1 | 14.9 | 0.48 | 13.0 | 7.1 | 0.55 |
| 2. By Education: | | | | | | |
| < High School | 35.7 | 13.3 | 0.37 | 17.4 | 8.4 | 0.48 |
| High School | 39.1 | 21.7 | 0.55 | 12.8 | 8.2 | 0.64 |
| Some College | 22.0 | 15.0 | 0.68 | 7.5 | 6.3 | 0.84 |
| College or more | 5.9 | 5.2 | 0.88 | 5.2 | 5.5 | 1.06 |
| 3. By Age: | | | | | | |
| 16-30 | 24.9 | 8.5 | 0.34 | 10.3 | 4.6 | 0.45 |
| 31-45 | 33.2 | 16.4 | 0.49 | 14.4 | 8.0 | 0.56 |
| 56-65 | 38.7 | 22.6 | 0.58 | 15.9 | 9.4 | 0.59 |
| 4. By Race: | | | | | | |
| White | 30.6 | 14.6 | 0.48 | 12.5 | 6.3 | 0.50 |
| Black | 37.6 | 19.0 | 0.51 | 16.4 | 12.5 | 0.76 |
| Other | 26.7 | 11.8 | 0.44 | 17.0 | 9.4 | 0.55 |
| 5. By Region: | | | | | | |
| Northeast | 34.7 | 18.3 | 0.53 | 17.8 | 9.8 | 0.55 |
| Midwest | 39.2 | 20.8 | 0.53 | 16.2 | 8.7 | 0.54 |
| South | 20.5 | 9.0 | 0.44 | 7.0 | 3.8 | 0.54 |
| West | 32.1 | 14.3 | 0.45 | 12.6 | 7.8 | 0.62 |
| 6. By Industry: | | | | | | |
| Construction | 40.9 | 21.6 | 0.53 | 2.0 | 3.3 | 1.65 |
| Durable Mfg | 45.3 | 22.9 | 0.51 | 28.6 | 14.9 | 0.52 |
| Nondurable Mfg | 37.7 | 21.2 | 0.56 | 27.4 | 11.6 | 0.42 |
| Transportation | 59.8 | 31.7 | 0.53 | 20.7 | 21.2 | 1.02 |
| Communication | 54.3 | 30.6 | 0.56 | 53.9 | 36.2 | 0.67 |
| Public Utilities | 45.8 | 36.6 | 0.80 | 19.7 | 20.8 | 1.06 |
| Retail Trade | 13.3 | 7.2 | 0.54 | 9.5 | 5.5 | 0.58 |
| 7. Number of Observations | 36,108 | 72,687 | -- | 23,686 | 65,507 | -- |

Notes: Based on samples derived from the May 1973/74 CPS and 1993 merged outgoing rotation group files. Samples include individuals age 16-65 who are not self-employed, and whose reported or constructed hourly wage is between $2.01 and $90.00 per hour in 1989 dollars.

Table 8: Estimates of the Contribution of Unions to Rising Wage
Inequality, in the Public and Private Sectors 1973-4 to 1993

|  | 1973-4 | 1993 | Change |
|---|---|---|---|
| **A. Public Sector Male Workers** | | | |
| Variance in Log Wages | 0.233 | 0.266 | 0.033 |
| Effect of Unions Using Raw Union Wage Differentials | -0.029 | -0.043 | -0.014 |
| Effect of Unions Using Adjusted Differentials | -0.024 | -0.033 | -0.009 |
| **B. Public Sector Female Workers** | | | |
| Variance in Log Wages | 0.204 | 0.237 | 0.033 |
| Effect of Unions Using Raw Union Wage Differentials | 0.001 | -0.013 | -0.014 |
| Effect of Unions Using Adjusted Differentials | -0.003 | -0.016 | -0.013 |
| **C. Private Sector Male Workers** | | | |
| Variance in Log Wages | 0.260 | 0.328 | 0.068 |
| Effect of Unions Using Raw Union Wage Differentials | -0.024 | -0.009 | 0.015 |
| Effect of Unions Using Adjusted Differentials | -0.018 | -0.008 | 0.010 |
| **D. Private Sector Female Workers** | | | |
| Variance in Log Wages | 0.173 | 0.264 | 0.091 |
| Effect of Unions Using Raw Union Wage Differentials | -0.002 | 0.000 | 0.002 |
| Effect of Unions Using Adjusted Differentials | -0.002 | -0.001 | 0.001 |

Notes: See text for methods. Raw union wage differentials are actual
differences in mean log wages between union and nonunion workers in
each skill decile. Adjusted union wage differentials assume that
true union wage effect declines linearly from 0.30 for the lowest skill
decile to 0.075 for the highest skill decile.

Appendix Table 1: Conventional Union Wage Gaps By Sector

|        | Men | | Women | |
|--------|-----------|-----------|-----------|-----------|
|        | Public | Private | Public | Private |
| 1973-4 | 0.095 | 0.194 | 0.182 | 0.213 |
|        | (0.011) | (0.005) | (0.020) | (0.007) |
| 1993   | 0.096 | 0.194 | 0.142 | 0.183 |
|        | (0.008) | (0.005) | (0.007) | (0.007) |

Notes: Entries are estimated union coefficients from OLS regression
models that include education, a cubic in experience, dummies for
marital status, nonwhite race, hispanic ethnicity, and 3 region
dummies.  Standard errors in parentheses.