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Union Relative Wage Effects:

New Evidence and A Survey of Their Implications for Wage Inflation

Orley Ashenfelter*
Princeton University

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The measurement of any excess of the wage rate of union workers over nonunion workers no longer stimulates much controversy in the U.S. The measurement methods have been standardized and there is now a broad consensus on how these union wage effects have moved over time and even how they differ as between black and white or male and female workers.^{1/} This end to controversy has undoubtedly resulted for a variety of reasons: For one thing, as George Johnson [6] has remarked, the mere existence of trade unions is no longer a serious question of public policy. In addition, the quality of the measurement devices and of the microeconomic data available to researchers has made it possible to eliminate some of the ambiguity of measurement present in the earliest studies.^{2/}

In this paper I take the opportunity provided by a new annual supplement to the U.S. Current Population Survey, which includes questions on hourly wage rates and union status, to present a short time-series of estimates of the effect of unionism on relative wages for several industry, occupational, and race-sex groups. These results are of considerable interest in themselves. On the one hand, the existence of differential wage rates for similar workers has important implications for the allocative efficiency of labor markets. Artificially expensive labor in some sectors of the economy relative to others may imply artificially expensive goods in some sectors of the economy relative to others and hence too little production and consumption of the former relative to the latter. On the other hand, it is important to know whether some classes of workers gain more from

^{1/}On the first question see the pioneering work by Lewis [8], who raises virtually every question in this field and even settles some. On the second question see Ashenfelter [1].

^{2/}Still, there are some open issues. See, for example, Ashenfelter and Johnson [2], and Schmidt and Strauss [9].

unionized labor markets than others. In this sense, belonging to a union is a special privilege and we should wonder whether blacks, women and other special groups receive a proportionate share of the privileges. Although some evidence is available in both of these areas, in the first section of this paper I concentrate on the replication of results from several microeconomic cross-sections and on the movements over time registered in them.

The second section of the paper takes up the controversial and still speculative issue of what these estimated union/nonunion wage differentials imply for the impact of trade unions on the wage inflation process. This section of the paper is in the form of a selective survey of the few previous efforts to seriously address this problem, even though they do not come close to resolving it. The importance of this issue for public policy is certainly obvious enough. For although public policy regarding the mere presence of trade unions is not a serious subject for discussion in any developed western economy, efforts to use selective incomes policies and other tools to stem what is believed to be the inflationary influence of trade unions are matters of constant discussion and the cause for considerable public turmoil.

The final section of the paper draws some tentative conclusions and indicates the large agenda for additional research.

I. Union Effects on Relative Wages

A. Methods and Data

Table 1 contains a general summary of the proportionate difference between the average union wage and the average nonunion wage for the three years 1967, 1973 and 1975. These estimates (and their estimated sampling errors) are derived from the estimated regression coefficients tabulated in Appendix B. The fitted regression equations include independent variables to account for differences between union and nonunion workers in education, experience, marital status, size of city or residence, region or residence, occupation, industry, and part-time worker status. The precise definitions of these standardizing variables are provided in Appendix A and their regression coefficients are listed in the tables of Appendix B. These regression equations are fitted separately by race (black and white) and sex for each of the three years. Subject to data limitations, identical specifications are used for each race-sex group and for each year. For 1973 and 1975 the data are nearly identical,^{3/} but in 1967 union status was not obtained for workers in the government sector and so these workers are deleted for that year. Apart from this deletion, the samples of data are restricted to those who were not self-employed and those who did not work on farms or in private households.

The natural logarithm of average hourly earnings is used as the dependent variable in these equations. Average hourly earnings is measured as the ratio of the respondent's normal weekly earnings to the respondent's normal weekly hours of work. As can be seen from Table 1, the estimated

^{3/} In 1973 it was determined whether a worker was a union member, whereas in 1975 it was determined whether a worker's current job was covered by a collective bargaining contract. I have been informed by William Bailey of the Bureau of Labor Statistics, to whom I am indebted for this information, that a later survey suggests about a ninety percent overlap in these designations.

Table 1

Proportionate^{a/} Union/Nonunion Wage Differentials by Race and Sex, 1967,
1973, 1975

(with Estimated Standard Errors in Parentheses)

	All Workers	Male Workers:		Female Workers:	
		White	Black	White	Black
1967	.116 ^{b/} (.001)	.096 (.013)	.215 (.013)	.144 (.024)	.056 (.022)
1973	.148 (.006)	.155 (.007)	.225 (.019)	.127 (.011)	.132 (.023)
1975	.168 (.006)	.163 (.007)	.225 (.019)	.166 (.011)	.171 (.022)

^{a/} If the proportionate union/nonunion wage differential is $M \equiv (W^u - W^n)/W^n$, where W^u and W^n are the union and nonunion wage rates, these are estimates of the natural logarithm of $1+M$. This estimate will be nearly identical to M when the latter is less than around .15.

^{b/} The special supplementation of black workers in the 1967 data required that estimates of the proportionate size of black and white total employment for that year be taken from the 1968 Handbook of Labor Statistics, Washington, D.C. These weights are implied by the respective sample sizes recorded in Appendix B for 1973 and 1975.

union/nonunion wage differentials are very precisely determined in the statistical sense of having small estimated standard errors. Except for the smallest demographic groups, the estimated wage effects are some ten to twenty times their estimated sampling errors. This results in part from the very large samples involved, being on the order of 20,000 and 13,000 for white males and females in the last two years and on the order of 7,000 and 4,000 in 1967, respectively. The samples of black workers are on the order of 2,000 to 3,000 in all three years. Given the high variance in hourly wages, statistical precision also results from the relatively high explained variance in the individual equations (with R^2 around .4 for most).

The separate occupational and industrial groups for which I have allowed there to be separate estimates of union/nonunion wage differentials were chosen primarily with an eye to the size of the sample within each cell and the intrinsic interest in an estimate for a particular occupation-industry combination. For the primarily white collar occupations union/nonunion wage effects were not estimated by industry groups. For the three largest blue collar occupations, however, separate union/nonunion wage effects are computed for six industry groups, one of which is the government sector. These union/nonunion wage effects are merely the regression coefficients of a dummy variable which is a product of a dummy variable indicating union status and another dummy variable indicating the occupation-industry group. Thus, potentially twenty-three union/nonunion wage differentials are estimated for each race-sex group in each year, although there are sometimes considerably fewer than this owing to

empty data cells. These basic estimates are all contained as the second panel of the appropriate table in Appendix B and the reader is free to draw inferences directly from these tables. The aggregated estimates are employment-weighted averages using the detailed employment distributions in Appendix C.

B General Summary

Table 1 suggests two rather striking inferences about union/nonunion wage differentials. First, black and white female workers seem to obtain from union membership approximately the same proportionate wage advantage as white male workers. On the other hand, black male workers tend to obtain a significantly higher wage advantage from union membership than any of the other groups. This last effect is very stable through time and stands up to replication in all three of the samples, whereas the former result tends to vary from sample to sample. Unfortunately, these fluctuations in the wage effects for females may be a result of the considerably larger sampling error associated with these estimates. As I have suggested elsewhere,^{4/} it is necessary to examine the extent of union membership among these four race-sex groups before it is possible to infer the effect of the presence of unionism on aggregate race-sex wage differences.

Table 2 contains estimates of the proportion of each of these race-sex groups that belonged to unions in each of the three years. As can be seen from the table, although only about one-quarter of all workers are members of unions, this proportion varies considerably by race-sex group. In particular, black male workers are more highly unionized than any of the other groups, while female workers are considerably less highly unionized than male workers. Take together with the estimated union/nonunion

^{4/} See Ashenfelter [1].

wage differentials in Table 1, these results imply that unionization tended to narrow the black/white wage differential by perhaps 2.3 percent in 1975 but tended to widen the female/male wage differential by perhaps 2.9 percent in 1975.^{5/}

It is also clear from Table 1 that these union/nonunion wage differentials increased considerably between 1967 and 1973, and increased again from 1973 to 1975. Indeed, there is considerable historical evidence to suggest that the general economic conditions of 1967 were likely to produce this result. In particular, Lewis' [8] work suggests rather convincingly that although it is difficult to untangle their separate effects, periods of rapid unexpected inflation and/or low unemployment tend to have been associated with relatively lower aggregate union/nonunion wage differentials. Unemployment in 1967 stood at 3.8 percent of the labor force in the beginning of an expansion that lasted through 1969. On the other hand, unemployment had risen to 4.9 percent of the labor force in 1973 and to 8.5 percent in 1975. At the same time, there were considerable and presumably unexpected price changes between 1973 and 1975, with the consumer price index increasing some 21 percent. Although hardly conclusive, this suggests that it may be the sluggish response of union wage negotiations to slack labor markets relative to the greater responsiveness of nonunion wage determination that puts downward pressure on union/nonunion wage differentials in periods of considerable unemployment.

^{5/} See Ashenfelter [1] for the rationale and method of these calculations.

Table 2

The Fraction of Workers Unionized by Race and Sex, 1967, 1973, 1975
(With Estimated Sampling Errors in Parentheses)

	All Workers	Male Workers		Female Workers	
		White	Black	White	Black
1967 ^{a/}	.23	.31	.32	.12	.13
1973	.26 (.002)	.33 (.003)	.37 (.011)	.14 (.003)	.22 (.010)
1975	.25 (.002)	.31 (.003)	.37 (.011)	.14 (.003)	.22 (.010)

^{a/} Sampling errors are unavailable for these estimates because they are based on the unique sample design of the Survey of Economic Opportunity. The source for the 1967 data in line 1 is Ashenfelter [1]. Moreover, the data in line 1 are not comparable to those in lines 2 or 3 since government workers were not queried regarding union status in 1967 and are not included in these tabulations.

C. Estimates by Occupation and Industry

Table 3 contains more detail on proportionate union/nonunion wage differentials. In this table I have reproduced union wage effects from Appendix Table B-1 for white male blue collar workers in the more heavily unionized sectors of the economy. Three basic results stand out in this table. First, the union/nonunion wage differentials for construction workers are considerably higher than for any other unionized group. This comparison is especially noticeable when craftsmen in construction are compared with craftsmen in the other industry groups. In 1975 unionized craftsmen in construction earned some 49 percent more than comparable nonunion craftsmen in construction, while the comparable differentials for craftsmen in manufacturing were only 6 to 7 percent.^{6/} This finding stands up to replication in all three of the samples.

Second, in all of the non-construction industry groups the union wage effects are considerably larger for the less skilled occupation groups. Indeed, the union/nonunion wage differential for craftsmen in durable manufacturing was so low as to be negative in 1967, though this differential was not significantly different from zero. Taken together these results imply that unionism tended to narrow the proportionate skill differentials in the non-construction industry groups. Again, this result stands up to replication in all three samples.

^{6/} N.B., these estimates are the anti-logarithms minus unity of the appropriate estimates from Table 3. This large differential for craftsmen in construction calls for further explanation. In particular, it is possible that some uncontrolled difference between union and nonunion workers in this industry is the cause of this difference. One possibility is that the seasonality or hours of work offered these two groups differs considerably and that the hourly wage premium to union workers is a compensating differential due to this. Table 5 displays estimates of annual hours of work for 1967, the only year for which they are available, and for weekly hours of work for all three years. Although the table demonstrates shorter working hours for construction craftsmen, the differences between union and nonunion workers is very small.

Table 3

Proportionate^{a/} Union/Nonunion Wage Differentials for White Males in Selected Industry/Occupation Groups, 1967, 1973, 1975

Groups, 1967, 1973, 1975											
<u>Construction</u>				<u>Durable Manufacturing</u>		<u>Nondurable Manufacturing</u>		Transportation, Communications, Utilities			
	<u>Craftsmen</u>	<u>Operatives</u>	<u>Laborers</u>	<u>Craftsmen</u>	<u>Operatives</u>	<u>Laborers</u>	<u>Craftsmen</u>	<u>Operatives</u>	<u>Laborers</u>	<u>Craftsmen</u>	<u>Operatives</u>
											<u>Laborers</u>
1967	.30	.34	.40	-.01	.11	.16	.05	.12	.16	.02	.11
											.21
1973	.42	.49	.45	.04	.13	.14	.10	.14	.24	.09	.23
											.26
1975	.40	.51	.48	.06	.19	.22	.07	.16	.15	.08	.24
											.25

^{a/} See the note to Table 1.

Table 4

Proportionate^{a/} Union/Nonunion Wage Differentials for White Male Blue Collar Workers in Selected Industry Groups, 1967, 1973, 1975

	Construction	Durable Manufacturing	Nondurable Manufacturing	Transportation Communication Utilities
1967	.32	.02	.10	.08
1973	.43	.07	.14	.17
1975	.43	.09	.12	.16

^{a/} See the note to Table 1.

TABLE 5

Estimates of Annual and Weekly Hours Worked for White Males, Various Years

	Annual Hours (1967)		Weekly Hours		
	Estimate 1 ^{a/}	Estimate 2 ^{a/}	1967	1973	1975
Unionized Construction Craftsmen	1846.	1821.	37.1	40.0	40.0
Nonunion Construction Craftsmen	1875.	1892.	39.1	40.6	39.9
All Other Unionized Workers	2142.	2070.	42.1	41.4	41.0
All Other Nonunion Workers	2062.	2086.	42.8	40.6	40.4

^{a/} Estimate is obtained by dividing the previous year's annual earnings by the hourly wage during the survey week. Estimate 2 is the product of weeks worked in the preceding calendar year and reported weekly hours in the survey week.

Finally, in Table 4 I have summarized the results in Table 3 by industry group. It is clear from the former table that the union wage effects increased for each group from 1967 to 1973, but remained generally stable between 1973 and 1975. This increase is especially noticeable in the construction industry, where the percentage union wage advantage increased from 38 percent in 1967 to 54 percent in 1973, since which it has remained constant.

II. Union Effects on Wage Inflation

Since the weight of the evidence so clearly establishes the existence of a wage premium for comparable unionized workers, it is natural to inquire as to what this implies for general movements in the aggregate wage level. At a popular level it seems widely believed that these positive wage effects imply that unions "cause" inflation. After all, the reasoning goes, to gain a wage advantage trade unions must force up the money wage and it is these extra costs of production that cause prices to increase. A slightly more sophisticated view, often held by economists, is that this popular view is a misconception of the difference between the level and the change in the level of wages. By this view wage inflation is an increase in wages and surely trade unions cause inflation only if their power to affect wages is increased. Hence, trade unions cause wage inflation only to the extent that they widen the union/nonunion wage differential or increase the fraction of the work force that is unionized.

Still more sophisticated perhaps is the rejoinder to this argument based on the notion that union wage increases "spill over" into the nonunion sector. By this view, wage increases in the union sector are emulated in the nonunion sector. What trade unionists started off thinking was a respectable wage advantage over nonunion workers is thus eroded and the process is started over. This process presumably causes a continuous inflationary process that is validated by the monetary authorities or by other government policies.

All of these arguments, and some others, have been casually discussed in the popular literature on trade unions and wage inflation. Nevertheless, there is a curious reluctance by economists to take them up in formal models and this makes it difficult to sort out the assumptions implicit in the various views or just how one would go about discriminating among them empirically. In what follows I shall distinguish four basic views of this problem in a highly schematic way. None of these ideas can be said to be fully worked out and it remains to be seen whether any or all of them is capable of empirical refutation. I begin with a discussion of the simple "limited cost push" model that many economists seem to espouse in casual conversation, and then turn to two extreme cases where unions do not affect wage inflation at all, even though in one of these two cases they cause unemployment. The final case is a simple model of wage inflation with spillovers between the union and nonunion sectors.

A. The Union Effect on Wage Inflation Is Always Limited

To make things concrete, it is useful to recognize at the outset that the logarithm of the aggregate wage, W , may be thought of as a geometric weighted average of the (average) union wage, W^u , and the (average) nonunion

wage, W^n , so that in the t^{th} period

$$\begin{aligned} (1) \quad W_t &\equiv W_t^n(1-T_t) + W_t^u T_t \\ &\equiv W_t^n + (W_t^u - W_t^n) T_t \\ &\equiv W_t^n + D_t T_t, \end{aligned}$$

where T is the fraction of workers unionized and $D \equiv \ln(1+M)$ is the logarithm of unity plus the proportionate union/nonunion wage differential. The proportionate change in the aggregate wage level from period $t-1$ to period t is then identically

$$(2) \quad W_t = \Delta W_t^n + (\Delta D_t) T_{t-1} + D_{t-1} (\Delta T_t) + \Delta D_t \Delta T_t.$$

Suppose now that the rate of change of money wages in the nonunion sector is determined exogenously. In this case the rate of change of the aggregate wage will differ from this exogenous rate only if the union/nonunion wage differential changes or if the fraction of workers unionized changes. This difference is often called the effect of unions on inflation, but, of course, this effect is always limited. For T can never become larger than 1.0, the case of complete unionization, and the union/nonunion wage differential surely cannot grow indefinitely.

With this framework it is a simple matter to use equation (2) and the results in Table 1 to compute the union contribution to wage inflation over the period 1967 to 1973. From this table we have $D_{t-1} = .116$, $T_{t-1} = .23$, $\Delta D_t = .032$, and $\Delta T_t = .03$, so that $\Delta W - \Delta W^n = .012$. By these calculations unionism accounted for a 1.2 percent increase in the aggregate wage between 1967 and 1973 over what would otherwise have been the case. Since the

aggregate wage increased by nearly 44 percent over this 1967 to 1973 period, in this framework the effect of unionism on wage inflation during this period must be judged very small. Similar computations for the period 1973 to 1975 lead to similar results.^{7/}

There are two obvious problems with this view of the role of trade unions in the money wage inflation process. First, although many economists apparently do not recognize it, this framework does imply non-competitive wage determination in nonunion labor markets. After all, why don't the workers released from the unionized sectors by the decline in employment that results from the union wage increase drive down the wage in the nonunion sector by their competition for nonunion employment? If the nonunion labor market is fully competitive, then it is simply not permissible to assume that the average nonunion wage is determined independently of the average union wage.

A second problem with this approach is that it implies that in some periods unions are responsible for deflation. For example, in periods when the union/nonunion wage differential declines and the extent of unionization remains constant, as was almost surely the case in the 1960's, the effect of unions on wage inflation will be negative.

The apparent popularity of this view of the role of unions in the wage inflation process is probably a result of two widely shared empirical views. First, it seems widely believed that nonunion wages are rigid downward, both in absolute terms and relative to some (presumably exogenous) indicator

^{7/} Some early calculations for the 1950's using this framework were made by Throop [10]. It is remarkable that even while performing these calculations, Throop explicitly rejects the assumption of non-competitive behavior in the nonunion sector.

of labor market tightness. Second, it seems widely believed that union/nonunion wage differentials narrow during expansions and widen during contractions. Together, these assumptions imply that unionism does decrease inflation relative to what would otherwise be the case during expansions and vice versa during contractions.^{8/}

B. Inflation Is Always a Monetary Phenomenon

An alternative framework for viewing the influence of unionism on wage inflation starts from the presumption that price inflation (ΔP_t) is always a monetary phenomenon. If we also suppose that real wages are generally determined by productivity growth, ΔX_t , as must surely be the case over any but the shortest time period, then

$$(3) \quad \Delta P_t + \Delta X_t = \Delta W_t \approx \Delta W_t^n + (\Delta D_t)T_{t-1},$$

where I have made the convenient assumption $\Delta T_t \approx 0$, as is true over the postwar period in the U.S.

Now in this framework ΔP_t is determined by monetary phenomenon and is thus exogenous to the wage inflation process. Productivity growth is likewise exogenous to this process, so that any increase in the money wage rate in the unionized sector is fully offset by a compensating decrease in the money wage rate of the nonunion sector. Indeed, with $\Delta P + \Delta X$ fixed the rate of compensation is simply $d\Delta W^n/d\Delta W^u = -T/1-T \approx -1/3$, using the data in Table 2. In this setup an autonomous increase in the union wage results in a decline in the nonunion wage of one-third the size of the autonomous increase.

^{8/} As Michael Wachter [11, p. 524] remarks, in a recent commentary on the wage inflation process, "Because of lags, labor, which often appears to be the hero during expansions, will appear to be the villain again in the next contraction."

One facile objection to this view of the wage inflation process is the empirical observation that nonunion wages do not fall when the union/nonunion wage differential increases, which is what this framework implies. Actually, nonunion wages need merely rise less rapidly than would otherwise be the case, and only when $\Delta P_t + \Delta X_t = 0$ would this require nonunion wages to fall absolutely. Moreover, for the empirically observed changes in D_t in recent years the effect on the nonunion wage would be nearly imperceptible. For example, from equation (3) $d\Delta W^n/d\Delta D = -T \sim -.25$ using the data from Table 2. From Table 1 $\Delta D_t = .032$ from 1967 to 1973, so that the nonunion wage would have to rise by .8 percent less than would otherwise have been the case over this period. With nonunion wages rising by over 40 percent in this period, so small an effect on the nonunion wage would presumably be imperceptible. Similar calculations apply for the period 1973 to 1975.

C. Union Wage Effects Cause Unemployment

In the simple monetary view of the wage inflation process unionism has no effect on aggregate wage inflation even though it may result in union/nonunion wage differentials. Since all resources remain fully employed, any efficiency loss from the existence of this wage differential is the result solely of excess production and consumption of the goods produced in the nonunion sector relative to the union sector. Recently Hall [4] has expanded on a model suggested by Harris and Todaro [5] for less developed countries to suggest that union/nonunion wage differentials may result in lost production through unemployment as well.

In particular, with a wage differential for comparable workers between the union and nonunion sectors, workers will presumably be willing to search longer for a job in the union sector. To be indifferent between the two sectors a worker must expect to obtain the same wage in both sectors after taking the time required to locate a job into account. Suppose that $1-U^n$ is the probability of finding a job in the nonunion sector, so that U^n is the unemployment rate in the nonunion sector. Likewise $1-U^u$ is the probability of finding a job in the union sector. For the expected wages to be equal in the two sectors the product of the probability of employment and the wage rate must also be equal in the two sectors, and this implies that

$$(4) \quad \ln W_t^u - \ln W_t^n \equiv D_t = \ln[(1-U_t^n)/(1-U_t^u)]$$

$$\approx U_t^u - U_t^n.$$

Now aggregate unemployment, U , is a weighted average of unemployment in the union and nonunion sectors, so that

$$(5) \quad U_t = U_t^n(1-T_t) + U_t^u T_t$$

$$= U_t^n + (U_t^u - U_t^n)T_t$$

$$\approx U_t^n + D_t T_t,$$

where the last line follows from the substitution of (4). If we suppose that the unemployment level in the nonunion sector remains at some frictional level U^n , then the presence of unionism raises the aggregate frictional level of unemployment by the product of the union/nonunion wage differential

and the extent of unionization. For example, from Tables 1 and 2 $D_t = .168$ and $T_t = .25$ in 1975. In this framework this implies that the aggregate unemployment rate was 4.2 percentage points higher in 1975 than would have been the case in the absence of unionism. Likewise, with $\Delta D_t = .032$ from 1967 to 1973 it implies that this widening of the union/nonunion wage differential increased the aggregate frictional level of unemployment by perhaps .8 percentage points in this period, which is nearly seventy percent of the actual increase of 1.1 percentage points over this period. On the other hand, $\Delta D_t = .02$ from 1973 to 1975, which would imply an increase of only .5 percentage points in the unemployment rate, and this latter figure is only a small fraction of the actual 3.6 percentage point increase in the unemployment rate that took place over this period.

In this framework the finding that union/nonunion wage differentials are lowest in periods of low unemployment is essentially stood on its head. Instead of the low union/nonunion wage differential being a result of tight labor markets it has become a cause of it. The obvious implication is that reducing union/nonunion wage differentials will reduce frictional unemployment.

The most obvious objection that can be made to this view of the role of unionism is that it implies a rather special assumption about the definition of unemployment. In particular, it implies that workers must invest a considerable amount of unproductive and unemployed time in the search process in the unionized sector. To the extent that this job search process can be carried on as a peripheral activity, as in simply listing one's name in a queue at an employment office, it is simply incorrect to identify the probabilities of employment $1-U^u$ and $1-U^n$ with employment rates.

Even though it does bring out the potential for unproductive job search behavior that may result from sizeable artificial wage differentials, whether this problem is important at an empirical level thus remains an open issue.

D. Spillover Models of Wage Inflation

As is clear from the previous discussion, the critical component of any model of the role of unions in the wage inflation process is the implicit or explicit assumption implied for the behavior of the nonunion wage in response to an exogenous shift in the union wage. Spillover models incorporate the explicit assumption that an additional set of economic agents tie the nonunion wage to the union wage in much the way that it is assumed that union workers take the nonunion wage into account in the negotiation of union wage settlements.

To make things concrete, suppose that the (logarithm of the) target wage in the union sector from the point of view of union workers is W_{*t}^u , and that it is taken to be higher by the proportion ϕ than the previously observed nonunion wage.^{9/} In this case

$$(6) \quad W_{*t}^u = \phi_t + W_{t-1}^n,$$

and ϕ is the desired proportionate union/nonunion wage differential in the union sector. The size of this differential presumably depends on a large number of internal union political tradeoffs and it is convenient to assume merely that ϕ is determined by some unspecified latent variables. The critical part of the spillover model offers the additional hypothesis

^{9/} This discussion follows the form of the argument in Ashenfelter, Johnson, and Pencavel [3], which, along with the related paper by Johnson [7] that I discuss below, is just about the only moderately formal discussion of a spillover model that I can find.

that the target wage in the nonunion sector from the point of view of nonunion employers, W_{*t}^n , is (presumably) lower by the proportion ψ than the previously observed union wage. This is usually rationalized by the existence of threats of unionization to the nonunion sector. In this case

$$(7) \quad W_{*t}^n = \psi_t + W_{t-1}^u.$$

Now suppose that the actual change in both the union and nonunion wages from period $t-1$ to period t is some fraction of the discrepancy between the desired wage in period t and the actual wage in the previous period so that in the union sector

$$(8) \quad \begin{aligned} \Delta W_t^u &= \alpha[W_{*t}^u - W_{t-1}^u] \\ &= \alpha\phi_t - \alpha D_{t-1}, \end{aligned}$$

while in the nonunion sector

$$(9) \quad \begin{aligned} \Delta W_t^n &= \beta[W_{*t}^n - W_{t-1}^n] \\ &= \beta\psi_t + \beta D_{t-1}. \end{aligned}$$

In this framework it is interesting first to consider the implied time path of the actual union/nonunion wage differential when the desired union/nonunion wage differentials from the point of view of both sectors are constant, say at $\psi_t = \psi$ and $\phi_t = \phi$. In this case ΔD_t is merely the difference between (8) and (9), and leads to a difference equation with solution

$$(10) \quad D_t = D^e [1 - (1-\alpha-\beta)^t] + D_0 (1-\alpha-\beta)^t.$$

This equation is stable and D_t eventually takes on the long run equilibrium

value of $D^e = (\alpha + \beta)^{-1}(\alpha\phi - \beta\psi)$ so long as the absolute value of $1 - \alpha - \beta$ is less than unity. From an empirical point of view this means that the observed union/nonunion wage differential does not continuously widen even if ϕ does not equal $-\psi$ and the two sectors are not in agreement on the desired union/nonunion wage differential.

In a period when the extent of unionization is not changing and the union/nonunion wage differential has settled at its long run equilibrium value the aggregate wage change is

$$(11) \quad \Delta W = (1-T)\beta(\psi + D^e) + T\alpha(\phi - D^e).$$

As expected, this implies steady inflation in the money wage level if either the union or nonunion sector is unhappy with the equilibrium union/nonunion wage differential.

The empirical validity of this type of spillover model is subject to considerable question, but its implications are very difficult to test without extensive time-series data on average union and nonunion wage rates. In a recent paper George Johnson [7] has provided a clever suggestion for estimating equations (8) and (9) using pooled time-series and cross-section data for the postwar years. He reports an estimate of $\alpha = .513$ that is significantly different from zero, but an estimate of $\beta = .066$ that is not significantly different from zero. If taken at face value, these results imply that, for the period considered, there is not much empirical support for the spillover model. For with $\beta = 0$ the wage rate in the nonunion sector is determined independently of the wage rate in the union sector and the rate of steady inflation given by equation (11) is zero.

There are also serious conceptual problems with this type of spillover model. For one thing, it is difficult to see how in the absence of very passive monetary and fiscal authorities the desired union/nonunion wage differentials would not ultimately be forced to equalize by the presence of increasing unemployment. Moreover, to observers of the U.S. economy it is difficult to see the existence of a tight connection between the employer determination of nonunion wages in explicit recognition of what is happening in the union sector. Still, this sort of view of the wage inflation process does point up a potential inflationary bias in economies with well developed unionized sectors and it does not seem inconsistent with the experience of some western economies in recent years.

III. Conclusions

A number of substantive conclusions about the structure of the proportionate differentials between average union and nonunion wage rates seem warranted: First, the overall proportionate wage advantage for comparable union and nonunion workers was approximately 12 percent in 1967. This wage differential increased to 15 percent in 1973 and increased again to 17 percent in 1975. Second, the proportionate wage advantage of black male union workers relative to black male nonunion workers was approximately 22 percent in 1967, 1973, and 1975 and was considerably larger than for either white males or for black or white females. Taken together with the fact that black workers are considerably more likely to belong to unions than white workers, this implies that unionism tended to narrow the black/white wage differential by perhaps 2.3 percent. On the other hand, because women are less likely to belong to unions than men, but obtain roughly the same wage advantage from union status as white males, unionism tends to widen the male/female wage differential by perhaps 3 percent. Third, there are considerable differences among industries in the proportionate union/nonunion wage differentials. The differential was highest for construction workers and lowest for blue collar workers in durable manufacturing. Moreover, although the union/nonunion wage differential had increased in virtually every industry group from 1967 to 1975, this increase was approximately 13 percentage points in the construction industry and larger than for any other industry group. Finally, within industries union/nonunion wage differentials are larger for less skilled than for more skilled workers. This implies that unionism tends to narrow skill differentials among blue collar workers.

Although the empirical conclusions about the size and structure of

union/nonunion wage differentials are well founded, it is unclear what the presence of these differentials or movements in them imply for the course of aggregate wage inflation. Alternative models of the role of unions in the wage inflation process are in a rudimentary state and only additional careful conceptual and empirical work will make it possible to distinguish among them.

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APPENDIX A

Appendix A

Definitions of Variables Used in the Regressions Reported in Appendix B

Measured as Continuous Variables:

1. Hourly wage: normal weekly earnings/normal weekly hours
2. Education: years of schooling completed
3. Education squared: $(\text{education})^2/10$
4. Experience: age-education-6
5. Experience squared: $(\text{experience})^2/10$

Measured as Dummy Variables with a Unity for the Indicated Category:

6. Spouse present: married, spouse present or absent for military duty

Spouse absent: married, spouse absent; divorced, separated or widowed

(base group: single, never married)
7. SMSA large: residence in SMSA with population $\geq 750,000$

SMSA medium: residence in SMSA with population $\geq 250,000$ but $< 750,000$

(base group: residence in SMSA with population $< 250,000$ or outside of an SMSA)
8. Northeast, Northcentral, West: as defined for the U.S. Census

(base group: South)
9. Professional, Managerial, Craft, Operative, Laborer, Service, Clerical: major occupation categories as defined by U.S. Census

(base group: sales workers)
10. Part-time worker: normal weekly hours < 35
11. Construction, Durable manufacturing, Non-durable manufacturing, Transportation-communication-utilities: major industry categories as defined by the U.S. Census with government workers eliminated

Government: government workers as defined by U.S. Census "class of worker"

(base group: all other industries)

A P P E N D I X B

Table B-1

Regression Results for White Males

Independent Variables	1967		1973		1975	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Constant	.0619	.0521	.5539	.0397	.5742	.0412
Education	.0080	.0073	.0111	.0048	.0350	.0050
Education Squared	.0154	.0033	.0141	.0021	.0052	.0021
Experience	.0235	.0013	.0290	.0008	.0286	.0008
Experience Squared	-.0039	.0002	-.0050	.0001	-.0049	.0002
Spouse:						
Present	.2471	.0173	.1967	.0091	.1760	.0090
Absent	.1301	.0281	.1058	.0150	.1176	.0144
SMSA:						
Large	.1564	.0126	.1573	.0066	.1475	.0066
Medium	.0887	.0152	.0726	.0076	.0780	.0075
Region:						
Northeast	.0732	.0146	.0501	.0081	.0410	.0079
Northcentral	.0733	.0143	.0553	.0077	.0479	.0075
West	.1231	.0162	.0362	.0087	.0684	.0086
Occupation:						
Professional	.0501	.0807	.0262	-.0658	.0267	-.0464
Managerial	.1830	.0252	.0081	.0266	.0143	.0263
Craft	-.0304	.0253	-.1796	.0267	-.1637	.0266
Operative	-.1988	.0252	-.3446	.0271	-.3497	.0270
Laborer	-.2800	.0359	-.3746	.0287	-.3762	.0283
Service	-.3097	.0334	-.3766	.0279	-.3789	.0277
Clerical	-.0848	.0287	-.2489	.0281	-.2295	.0279
Part-time Worker	.0619	.0164	.0328	.0108	-.0075	.0106
Industry:						
Construction	.1791	.0266	.2395	.0137	.1881	.0142
Durable Manufacturing	.2237	.0161	.2279	.0099	.1927	.0098
Non-Durable Manufacturing	.1700	.0185	.1824	.0119	.1736	.0117
Transportation						
Communication Utilities	.2188	.0234	.2575	.0149	.2285	.0142
Government	---	---	.1536	.0096	.1256	.0093

Table B-1 Continued

Independent Variables	1967		1973		1975	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Union Effect for Occupation:						
Professional	.1133	.0476	.0025	.0224	.0690	.0214
Managerial	-.0680	.0508	.0392	.0279	.0368	.0300
Clerical	-.0034	.0434	.1075	.0222	.0863	.0216
Sales	-.0647	.0668	.1392	.0972	.0127	.1057
Service	.1329	.0531	.1330	.0227	.1425	.0225
Union Effect for Crafts-Worker in:						
Construction	.3048	.0377	.4207	.0212	.4037	.0215
Durable Manufacturing	-.0052	.0309	.0425	.0189	.0563	.0190
Nondurable Manufacturing	.0509	.0421	.1047	.0276	.0711	.0280
Transportation						
Communication Utilities	.0151	.0441	.0922	.0256	.0817	.0262
Government	---	---	.1532	.0355	.1602	.0328
Other	.1945	.0519	.3238	.0309	.3100	.0297
Union Effect for Operative in:						
Construction	.3440	.0883	.4896	.0455	.5088	.0506
Durable Manufacturing	.1147	.0264	.1315	.0162	.1871	.0167
Nondurable Manufacturing	.1200	.0344	.1409	.0220	.1577	.0227
Transportation						
Communication, Utilities	.1069	.0445	.2271	.0281	.2376	.0285
Government	---	---	.2020	.0537	.2123	.0502
Other	.3391	.0447	.4245	.0259	.4421	.0282
Union Effect for Laborer in:						
Construction	.3989	.0779	.4496	.0402	.4756	.0452
Durable Manufacturing	.1636	.0713	.1410	.0370	.2177	.0366
Nondurable Manufacturing	.1632	.0818	.2421	.0528	.1544	.0529
Transportation						
Communication, Utilities	.2119	.0755	.2572	.0451	.2529	.0512
Government	---	---	.1578	.0608	.1341	.0533
Other	.3072	.0884	.3181	.0344	.2946	.0335
R ²	.398		.446		.468	
Number of Observations	6,593		20,069		19,070	

Table B-2

Regression Results for White Females

Independent Variables	1967		1973		1975	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Constant	-.1722	.0793	.5634	.0577	.7034	.0569
Education	.0115	.0129	.0023	.0074	.0035	.0074
Education Squared	.0064	.0061	.0148	.0031	.0144	.0030
Experience	.0117	.0016	.0159	.0008	.0150	.0008
Experience Squared	-.0022	.0003	-.0028	.0002	-.0025	.0002
Spouse:						
Present	.0784	.0195	.0417	.0099	.0253	.0094
Absent	.0873	.0243	.0363	.0126	.0448	.0117
SMSA:						
Large	.1678	.0167	.1786	.0081	.1595	.0076
Medium	.0603	.0204	.0582	.0092	.0847	.0087
Region:						
Northeast	.0977	.0195	.0819	.0917	.0097	.0617
Northcentral	.0803	.0193	.0399	.0091	.0224	.0086
West	.1455	.0219	.0669	.0106	.0554	.0099
Occupation:						
Professional	.3871	.0368	.0669	.0348	.1242	.0325
Managerial	.3531	.0414	-.0205	.0366	.0390	.0345
Craft	.0884	.0741	-.1698	.0440	-.1780	.0423
Operative	.0241	.0351	-.3096	.0356	-.2950	.0336
Laborer	-.0125	.1216	-.2789	.0500	-.2498	.0451
Service	-.0571	.0309	-.3513	.0338	-.3159	.0319
Clerical	.2525	.0272	-.1347	.0333	-.1164	.0313
Part-time Worker	.0367	.0155	-.0530	.0083	-.0621	.0077
Industry:						
Construction	.1546	.0624	.1728	.0365	.1399	.0416
Durable Manufacturing	.1911	.0265	.1639	.0150	.1508	.0146
Nondurable Manufacturing	.1579	.0253	.0804	.0149	.1220	.0141
Transportation						
Communication, Utilities	.2215	.0345	.2425	.0199	.2463	.0182
Government	---	---	.1181	.0095	.0819	.0089

Table B-2 Continued

Independent Variables	1967		1973		1975	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Union Effect for Occupation:						
Professional	.5278	.1216	.1088	.0260	.1126	.0209
Managerial	-.0690	.1590	.0911	.0720	.0539	.0707
Clerical	.0363	.0372	.0904	.0186	.1794	.0178
Sales	.0693	.0779	---	---	.0505	.2165
Service	.2903	.0636	.1856	.0277	.1915	.0266
Union Effect for Crafts-Worker in:						
Construction	---	---	.9770	.3927	---	---
Durable Manufacturing	.2612	.2994	.1019	.0924	.1928	.0976
Nondurable Manufacturing	.3168	.2993	.2305	.0886	.1325	.0863
Transportation						
Communication, Utilities	---	---	.3297	.2779	.3035	.1551
Government	---	---	-.4943	.3912	-.0244	.3722
Other	.1378	.1971	.2197	.1770	.0309	.1684
Union Effect for Operative in:						
Construction	---	---	.4260	.3919	---	---
Durable Manufacturing	.2159	.0445	.2243	.0256	.2666	.0266
Nondurable Manufacturing	.1239	.0383	.1622	.0241	.1441	.0245
Transportation						
Communication, Utilities	-.2194	.4135	-.4819	.2767	.6240	.3715
Government	---	---	.2418	.1187	.3190	.1081
Other	.2259	.0834	.1975	.0627	.2176	.0583
Union Effect for Laborer in:						
Construction	---	---	---	---	.3904	.2676
Durable Manufacturing	.2839	.4284	.1794	.1359	.2226	.1286
Nondurable Manufacturing	.1354	.4285	.1482	.1789	.1624	.0990
Transportation						
Communication, Utilities	---	---	---	---	---	---
Government	---	---	---	---	.3061	.2645
Other	.1804	.2659	.1189	.1354	.2235	.0913
R ²	.258		.336		.366	
Number of Observations	3,757		13,318		13,400	

Table B-3

Regression Results for Black Males

Independent Variables	1967		1973		1975	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Constant	.1551	.0768	.2012	.1563	.1845	.1574
Education	-.0318	.0078	.0367	.0124	-.0239	.0129
Education Squared	.0286	.0044	.0026	.0060	.0275	.0060
Experience	.0135	.0017	.0141	.0023	.0169	.0023
Experience Squared	-.0025	.0003	-.0021	.0004	-.0029	.0004
Spouse:						
Present	.1576	.0209	.2353	.0272	.1330	.0260
Absent	.0734	.0271	.1758	.0375	.0570	.0352
SMSA:						
Large	.1620	.0181	.2511	.0248	.1590	.0245
Medium	.0851	.0237	.1160	.0267	.1280	.0259
Region:						
Northeast	.1290	.0197	.0984	.0302	.1156	.0283
Northcentral	.1511	.0179	.0470	.0269	.1378	.0272
West	.2544	.0235	.0386	.0295	.1598	.0277
Occupation:						
Professional	.2094	.0783	-.0118	.1434	.6502	.1412
Managerial	.1429	.0864	.1314	.1472	.5865	.1444
Craft	.0566	.0682	-.0294	.1427	.5027	.1430
Operative	-.0677	.0662	-.2168	.1413	.3510	.1419
Laborer	-.1298	.0673	-.2445	.1422	.3385	.1425
Service	-.1659	.0662	-.2933	.1414	.3179	.1412
Clerical	.0857	.0714	-.1181	.1442	.4397	.1443
Part-time Worker	.0657	.0176	.2359	.0306	.0386	.0308
Industry:						
Construction	.1956	.0284	.2650	.0451	.2501	.0449
Durable Manufacturing	.1999	.0266	.2168	.0348	.1996	.0338
Nondurable Manufacturing	.1858	.0247	.1827	.0391	.2122	.0392
Transportation						
Communication Utilities	.2434	.0326	.1365	.0502	.1887	.0477
Government	---	---	.1600	.0292	.2105	.0275

Table B-3 Continued

Independent Variables	1967		1973		1975	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Union Effect for Occupation:						
Professional	.2493	.1244	.2428	.0849	.1478	.0744
Managerial	-.1472	.1161	.0257	.1554	.2554	.1318
Clerical	.0299	.0536	.1561	.0634	.2061	.0611
Sales	.1926	.1156	---	---	---	---
Service	.1855	.0384	.2442	.0509	.1512	.0479
Union Effect for Crafts-Worker in:						
Construction	.4112	.0572	.4539	.0957	.2151	.0830
Durable Manufacturing	.1341	.0462	.0526	.0723	.1511	.0680
Nondurable Manufacturing	.1788	.0899	-.0975	.1055	.0664	.0998
Transportation						
Communication Utilities	.0778	.0947	.2588	.1002	.2945	.1134
Government	---	---	.3119	.1057	.1535	.1024
Other	.1385	.0714	.0746	.1071	.2187	.1139
Union Effect for Operative in:						
Construction	.2835	.0947	.3520	.1339	.4155	.2003
Durable Manufacturing	.2491	.0329	.2266	.0492	.2745	.0494
Nondurable Manufacturing	.1567	.0435	.1149	.0631	.2175	.0652
Transportation						
Communication Utilities	-.0017	.0567	.3013	.1054	.2116	.0948
Government	---	---	.2958	.0988	.2647	.0906
Other	.3029	.0481	.5637	.1022	.4610	.1084
Union Effect for Laborer in:						
Construction	.3703	.0499	.2787	.0788	.5105	.0903
Durable Manufacturing	.2801	.0498	.1746	.0841	.2543	.0816
Nondurable Manufacturing	.1622	.0699	.0964	.1271	.1279	.1012
Transportation						
Communication Utilities	.3149	.0571	.4087	.0964	.4676	.1235
Government	---	---	.2494	.1098	.1129	.0905
Other	.3205	.0661	.1908	.1091	.2775	.0909
R ²	.443		.404		.445	
Number of Observations	2,977		2,095		1,987	

Table B-4

Regression Results for Black Females

Independent Variables	1967		1973		1975	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Constant	-.0814	.0943	.3700	.1067	.9505	.1533
Education	-.0280	.0156	-.0152	.0168	-.0611	.0168
Education Squared	.0289	.0082	.0262	.0075	.0402	.0073
Experience	.0062	.0022	.0151	.0024	.0188	.0024
Experience Squared	-.0012	.0004	-.0027	.0005	-.0039	.0005
Spouse:						
Present	.0640	.0241	.0517	.0257	.0531	.0247
Absent	.0204	.0269	.0367	.0301	.0396	.0275
SMSA:						
Large	.1864	.0252	.2330	.0249	.1721	.0235
Medium	-.0033	.0330	.1075	.0267	.0892	.0252
Region:						
Northeast	.1489	.0242	.1309	.0286	.1280	.0264
Northcentral	.1473	.0225	.1178	.0267	.1325	.0260
West	.2584	.0295	.0829	.0283	.1006	.0272
Occupation:						
Professional	.5318	.0669	.2255	.0374	.1465	.1170
Managerial	.3222	.1043	.0926	.0704	.2209	.1280
Craft	.1614	.0943	-.0759	.0087	-.0282	.1426
Operative	.0360	.0539	-.1445	.0419	-.2228	.1188
Laborer	-.1083	.1159	-.0294	.0910	-.2021	.1607
Service	-.0054	.0498	-.1880	.0291	-.2466	.1149
Clerical	.1895	.0529	---	---	-.0578	.1150
Part-time Worker	.0701	.0200	.0198	.0236	.0177	.0224
Industry:						
Construction	-.0660	.1924	-.2687	.1836	-.2502	.2078
Durable Manufacturing	.1634	.0438	.0944	.0478	.1516	.0448
Nondurable Manufacturing	.1658	.0343	.0881	.0434	.0685	.0386
Transportation						
Communication Utilities	.3106	.0590	.0943	.0545	.2344	.0548
Government	---	---	.1331	.0229	.1062	.0219

Table B-4 Continued

Independent Variables	1967		1973		1976	
	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Union Effect for Occupation:						
Professional	-.3324	.1340	.0058	.0564	.1499	.0536
Managerial	---	---	.2415	.1940	.1908	.2598
Clerical	-.0394	.0514	.1636	.0470	.1658	.0407
Sales	.0822	.1560	---	---	---	---
Service	.1064	.0402	.1605	.0436	.1905	.0444
Union Effect for Crafts-Worker in:						
Construction	---	---	---	---	---	---
Durable Manufacturing	.0446	.2511	.8855	.3756	-.0377	.2003
Nondurable Manufacturing	.1439	.1603	.1619	.3749	.3049	.2676
Transportation						
Communication Utilities	---	---	---	---	---	---
Government	---	---	.1112	.2719	---	---
Other	.1191	.1848	.0733	.3740	---	---
Union Effect for Operative in:						
Construction	---	---	---	---	---	---
Durable Manufacturing	.1906	.0593	.2306	.0700	.2005	.0661
Nondurable Manufacturing	.0649	.0453	.0397	.0589	.1676	.0595
Transportation						
Communication Utilities	---	---	---	---	.0344	.3627
Government	---	---	.3738	.2145	.4387	.3602
Other	.0304	.0516	.1966	.1019	.1179	.1096
Union Effect for Laborer in:						
Construction	---	---	---	---	---	---
Durable Manufacturing	.5048	.2224	-.0783	.1773	.0146	.2798
Nondurable Manufacturing	.1526	.3500	-.0993	.2740	---	---
Transportation						
Communication Utilities	.6454	.2255	---	---	.3964	.2791
Government	---	---	-.0647	.2728	---	---
Other	-.1016	.3487	.0244	.3743	.0403	.2773
R ²	.388		.447		.445	
Number of Observations	1,629		1,649		1,726	

APPENDIX C

Table C-1

The Proportionate Employment Distribution of White Male Workers by Union
Wage Effect Categories

Category:	<u>1967</u>	<u>Year</u> <u>1973</u>	<u>1975</u>
Professionals	.121	.147	.157
Managers	.112	.118	.123
Clericals	.077	.077	.079
Salesworkers	.075	.014	.013
Service Workers	.049	.087	.090
Craftworkers in:			
Construction	.057	.059	.055
Durable Manufacturing	.076	.062	.061
Nondurable Manufacturing	.036	.029	.029
Transportation Commu- cation Utilities	.029	.027	.025
Government	0	.020	.022
Other	.049	.052	.052
Operatives in:			
Construction	.007	.008	.007
Durable Manufacturing	.107	.089	.080
Nondurable Manufacturing	.062	.045	.040
Transportation Commu- cation Utilities	.029	.023	.022
Government	0	.009	.009
Other	.056	.052	.050
Laborers in:			
Construction	.012	.016	.014
Durable Manufacturing	.010	.012	.012
Nondurable Manufacturing	.007	.006	.006
Transportation Commu- cation Utilities	.008	.007	.006
Government	0	.008	.012
Other	.020	.033	.036

Table C-2

The Proportionate Distribution of White Female Workers by Union Wage
Effect Categories

Category:	Year		
	<u>1967</u>	<u>1973</u>	<u>1975</u>
Professionals	.087	.166	.179
Managers	.043	.047	.046
Clericals	.412	.404	.401
Salesworkers	.088	.011	.011
Service Workers	.136	.182	.190
Craftworkers in:			
Construction	0.0	.000	.000
Durable Manufacturing	.003	.005	.004
Nondurable Manufacturing	.005	.006	.006
Transportation Commu- cation Utilities	0.0	.000	.001
Government	0.0	.001	.001
Other	.004	.006	.005
Operatives in:			
Construction	0.0	.000	.000
Durable Manufacturing	.075	.060	.050
Nondurable Manufacturing	.111	.079	.067
Transportation Commu- cation Utilities	.002	.002	.002
Government	0.0	.005	.005
Other	.030	.018	.019
Laborers in:			
Construction	0.0	0.0	.000
Durable Manufacturing	.001	.002	.001
Nondurable Manufacturing	.001	.001	.003
Transportation Commu- cation Utilities	0.0	.000	0.0
Government	0.0	.001	.001
Other	.002	.006	.008

Table C-3

The Proportionate Distribution of Black Male Workers by Union Wage
Effect Categories

Category:	Year		
	<u>1967</u>	<u>1973</u>	<u>1975</u>
Professionals	.025	.082	.104
Managers	.016	.037	.045
Clericals	.063	.087	.084
Salesworkers	.014	.004	.004
Service Workers	.162	.164	.180
Craftworkers in:			
Construction	.046	.034	.035
Durable Manufacturing	.047	.040	.043
Nondurable Manufacturing	.012	.018	.019
Transportation Commu- nication Utilities	.009	.015	.014
Government	0.0	.018	.019
Other	.046	.036	.028
Operatives in:			
Construction	.015	.012	.008
Durable Manufacturing	.135	.108	.103
Nondurable Manufacturing	.073	.060	.059
Transportation Commu- nication Utilities	.036	.022	.022
Government	0.0	.027	.019
Other	.095	.056	.046
Laborers in:			
Construction	.057	.045	.035
Durable Manufacturing	.033	.030	.029
Nondurable Manufacturing	.023	.019	.020
Transportation Commu- nication Utilities	.031	.016	.010
Government	0.0	.023	.029
Other	.063	.047	.049

Table C-4

The Proportionate Distribution of Black Female Workers by Union Wage
Effect Categories

Category:	Year		
	<u>1967</u>	<u>1973</u>	<u>1975</u>
Professionals	.036	.151	.161
Managers	.008	.021	.023
Clericals	.171	.271	.285
Salesworkers	.033	.001	.006
Service Workers	.416	.316	.311
Craftswomen in:			
Construction	0.0	0.0	0.0
Durable Manufacturing	.003	.002	.005
Nondurable Manufacturing	.006	.005	.005
Transportation Commu- cation Utilities	0.0	0.0	0.0
Government	0.0	.001	.001
other	.009	.006	.003
Operatives in:			
Construction	0.0	0.0	0.0
Durable Manufacturing	.065	.061	.059
Nondurable Manufacturing	.120	.102	.093
Transportation Commu- cation Utilities	.001	.001	.001
Government	0.0	.008	.006
Other	.120	.037	.034
Laborers in:			
Construction	0.0	0.0	0.0
Durable Manufacturing	.002	.005	.001
Nondurable Manufacturing	.001	.002	.002
Transportation Commu- cation Utilities	.002	.001	.001
Government	0.0	.003	.001
Other	.005	.005	.004