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The Union Threat Effect in Construction: An Illustration with Data from Plumber and Pipefitter Union Locals.

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Abstract

Data from plumbing and pipefitting union locals are used to measure the effect of union organizing strength on the wages of high-skilled and semi-skilled nonunion workers. We find that increases in union strength are associated with higher wages for nonunion journeymen. However, the wages of lower skilled, nonunion journeymen helpers are not related to our measures of union recruitment power. These results are consistent with the organizing tactic of labor stripping where skilled nonunion workers are convinced to leave their nonunion employers and join the union. Greater union strength is not associated with higher wages for union journeymen. Rather, these workers derive increased employment opportunities where the union is strong. Our results suggest that the union threat effect is different in the construction industry where unions develop unique strategies due to the nature of the industry.

Key words: union threat effect, union-nonunion wage gap, construction.

JEL codes: J51, J31

"It's a natural process, the ups and downs of the industry. Management reacts and standards improve when the union is stronger."
Kirk Smith, Director of Organizing, UA

INTRODUCTION

How do unions influence the wages of nonunion workers? Freeman and Medoff (1981) describe three possible union-induced supply and demand effects on the wages of nonunion workers. First, higher union wages may increase union unemployment that "spills over" into, and depresses wages in the nonunion sector. Or, higher wages and costs in the union sector may increase product demand, labor demand, and wages in the substitute nonunion sector. Finally, nonunion employers may offer higher wages to their workers to reduce the threat of unionization. The net effect of these influences is an empirical question and results have been mixed. For example, using the percent of employment in an industry that is unionized (union density) as a measure of the threat of unionization, Freeman and Medoff (1981) find that unionized manufacturing workers benefit the most from increases in density. The wages of nonunion production workers are either unaffected, or only slightly higher in highly unionized industries. They also report similar results for construction workers. However, Rosen (1969) finds that average wages of manufacturing workers (union and nonunion combined) rise with density. On the other hand, Neumark and Wachter (1995) report relatively lower wages for nonunion workers when union density in higher. While this finding is consistent with the spillover effect, further analysis of cross-occupational union effects suggests that complementarity between union and nonunion workers contributes to this empirical result. Using the level of the union wage as a measure of the union threat, Leicht (1989)

finds that union wages have no effect on the earnings of nonunion workers in unorganized manufacturing establishments, but nonunion wages do increase when unions are present within a plant. Finally, Farber (2005), using the predicted probability of union membership as the measure of the threat, fails to find a link between this threat and wages of nonunion workers, or the union-nonunion wage gap.

The goal of these studies is to measure the net effect of the supply and demand changes associated with a general threat of unionization. These studies do not address the impact of specific union organizing tactics on wages, or how tactics differ across unions. There are numerous union organizing strategies that are directed at nonunion establishments with differing expected impacts on nonunion wages. For example, unions may apply top down pressure on nonunion management by filing charges of unfair labor practices, or unsafe working conditions. However, this is not the kind of pressure that diminishes if nonunion wages increase. Bottom up tactics such as rank and file organizing efforts that lead to union certification elections may be offset by wage changes. Facing this type of threat, management may respond by increasing wages for all workers in a targeted unit. On the other hand, labor stripping, convincing workers to leave their nonunion employers and join the union, is usually directed at workers in highly skilled occupations. Confronted with the stripping tactic, the nonunion employer can retain skilled workers by paying these workers more, or by allowing organization of the workplace. This type of threat would not affect the wages of all workers in a targeted unit, only those who are in highly skilled positions. Additionally, organizing tactics differ between industrial and construction unions.[1] For example, NLRB certification elections are more suitable in industrial settings where employment is relatively stable,

employees are attached to particular employers, and efforts are directed at a single establishment (see Lewis and Mirand 1988). But, this tactic is less common in construction organizing because project time spans are relatively short, employment is intermittent, and workers are more attached to the industry than to a firm (see Grabelsky 1988 and Northrup 1989). Consequently, construction unions rely more on filing, stripping, and other tactics (see Lucas 1997). Furthermore, stripping and other efforts to recruit skilled, nonunion workers play important roles in construction where emphasis is placed on organizing workers instead of establishments (see Lewis and Mirand 1998). Consequently, we expect the specific threat and its expected outcome to differ in construction.

To the extent that industrial unions rely on broadly directed threats such as certification elections, managements' response may involve increases in the wages of all workers within the targeted unit. This view is the basis of the empirical tests of the union threat studies that estimate the average wages of production workers (in particular) as a function of density (see Rosen and Leicht). An exception is the study by Freeman and Medoff (1981) who also report separate results for construction workers. But, these authors do not discuss how the threat may differ in the building industry, nor do they measure the threat effect on the wages of workers with different skill levels.[2] Since stripping is more widely used in this sector, this threat may only affect the wages of skilled workers. Therefore, a better test of the threat effect in construction would involve an examination of the wages of skilled and unskilled nonunion workers.

We use data from western state pipe and plumbing union locals to illustrate the threat of labor stripping on the wages of nonunion workers involved in construction.

Because of the overlap in the division of labor between the union and nonunion sectors in this industry, these data allow us to examine the impact of union density and recruitment resources on the wages of nonunion workers most qualified for union work (nonunion journeymen). Similarly, we can examine the impact of union strength and resources on the wages of those not qualified for the union sector (helpers of nonunion journeymen). The next section of this paper provides more detail on the locals used in our study and the organizational tactics used in construction. The data, model, and results are described in subsequent sections. The paper concludes with implications for further research.

UNION BACKGROUND AND ORGANIZING TACTICS

Our data were collected from union locals of the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada (UA). This is a multi-craft union of approximately 326,000 members (35,000 in Canada) who are engaged in the fabrication, installation, and service of piping systems. The UA is a member of the Building and Construction Trades Department of the AFL-CIO and the Canadian Federation of Labour. The organization bargains collectively with employing contractor groups such as the Mechanical Contractors Association of America (MCAA). Specifically, our data are obtained from a regional affiliate of the MCAA, the Western Mechanical Labor Management Conference (WMLMC), a nonprofit organization composed of employing contractors and members of the Western States Pipe Trades Council.

There are no public records regarding the specific tactics of the locals used in this study. However, an interview with a former UA state organizer reveals that a variety of methods were used over the time period of our study.[3] Beginning in the early 1980s this

organizer's emphasis shifted from recruiting contractors to members to finally a balanced approach. Tactics were tailored to a particular situation and all methods (top down and bottom up) were utilized. Over the period, this recruiter emphasized "workers for workers," or attempted to change the exclusionary attitudes of union members about expanding membership. This recruiter also embraced COMET (Construction Organizing Membership and Education Training).

Like other AFL-CIO affiliates over this time period, UA members adopted COMET as a means of changing member attitudes about, and tactics for, expanding membership (see Grabelsky, 1995). This two-stage technique was launched by the International Brotherhood of Electrical Workers (IBEW) in 1988. The first stage of this program, COMET I, seeks to increase membership by replacing restrictive practices and attitudes with an appreciation for new members. The second stage, COMET II, focuses on training rank-and-file graduates from COMET I in recruitment and activist techniques. This stage emphasizes the coordinated application of preexisting recruitment and conversion techniques into a 'whole market' approach. This strategy includes picketing, distributing handbills at nonunion work sites, filing charges for prevailing wage violations and other unfair and unsafe labor practices, as well as stripping and salting (the practice of union activists working for nonunion employers for the purpose of organizing). In a review of COMET programs, Grabelsky, Pagnucco and Rockafellow (1999) report that union members practicing COMET techniques report an increased use by locals of a narrow range of tactics including salting, stripping, and filing unfair labor practice charges. The adaption of COMET techniques by the locals used in our study may augment the general recruitment measures described above. That is, with the

application of coordinated COMET techniques the threat posed by a bigger union with more recruitment resources, may increase.

DATA

The data for the study were collected from the annual wage survey of the Western Mechanical Labor Management Conference.[4] The purpose of the annual conference is to keep members appraised of current industry conditions. Consequently, the organization conducts an annual labor and management survey that is a rich source of data regarding local characteristics. We have data on union compensation packages and measures of organizational resources. Also, the business manager of each local provides data on the level of the nonunion journeymen wage and the average wage for nonunion journeymen helpers within the local's jurisdiction. These data are available from 1984 to 1997. The manager also provides the percentage of work done by union contractors in the local as well as the wage rate for the basic union journeymen.[5] A few locals did not report information, but we have representatives from each of the states within the WMLMC. Therefore, our data represent an unbalanced panel that we use to estimate the following two-way fixed effects model.

BASIC WAGE MODEL

$$\text{Ln WAGE}_{it} = \beta_0 + \beta_1 \text{MKT SHARE}_{it} + \beta_2 \text{DUES}_{it} + \beta_3 \text{MKT RECOV}_{it} + \beta_4 \text{UNEMP}_{it} + \beta_5 \text{UA LOCAL}_i + \beta_6 \text{PERIOD}_t + \mu_{it}$$

We use the basic wage model to estimate, separately, the wages of nonunion journeymen, the average wages of nonunion journeymen helpers, the basic union journeymen hourly rate, as well as the ratios between these wage rates. The results of these six wage estimates are reported in Tables 2 and 3. Because we only have benefit

information for union workers, we use hourly wage rates for both sectors. MKT SHARE is the percent of the work in the area that is performed by union contractors. The usual measure of union dominance in a market is union density, or the percentage of workers in an industry that are unionized. However, either measure indicates union strength. Neumark and Wachter (1995) suggest the union density and wages may be simultaneously determined. Similarly, union and nonunion wage rates may be determined (and determine) union market share. We use the Hausman specification test to determine if union local market share is simultaneously determined with the union or nonunion wage rates. The results of these tests are discussed below. DUES equal the real union dues in each local. MKT RECOV is a dummy variable equal to one if the union local has a market recovery fund, else zero. Some locals, seeking to increase market share, have chosen to include recovery funds as part of the union package. This package generally includes the hourly wage, benefits, and dues. Recovery funds are available to union contractors who need assistance to be awarded a job. Generally, a union signatory contractor can apply for a grant from the local business manager, or market recovery committee, when facing competition from a nonunion contractor. These funds are used by other construction unions (see Cement Mason and Plasterers Local 528, 2007). Locals with recovery policies are more likely to be aware of, and sensitive to, recruitment issues as well. In this way we use MKT RECOV as a proxy for increased recruitment efforts at the level of the local. UNEMP is the rate of unemployment for the local's state.

UA LOCAL represents a dummy variable for each union local, the ith observation, in our sample. These local dummy variables measure unobserved and fixed characteristics that may be correlated with union and nonunion wages and to the other

independent variables. These fixed effects either do not change over time, or are slow to change and include characteristics of the local including worker productivity and education, demographics, attitudes about unionization, as well as the management style, priorities, and the recruitment practices of the local. Neumark and Wachter (1995) point out that city-level dummy variables also correct for possible omission bias if unions target high-wage cities. The reference category for this dummy variable is Local #3 in Denver, Colorado. PERIOD is a set of dummy variables for each year (time period t). PERIOD captures changes over time such as long run trends in the industry, or changes in construction technology. The reference year is 1984. All dollar measures have been adjusted for inflation with the annual Consumer Price Index. The error term is μ.

The percent of the area market share that is held by the local union (MKT SHARE) is our measure of union density. Others argue that more dominant unions have more power and greater ability to organize (see Freeman and Medoff). However, Farber offers criticism of this measure and suggests that the probability of unionization is a better indicator of the threat posed by a union. We do not possess the data to estimate the probability of unionization, but we do possess other measures of union organization resources. For example, higher union dues fund more organizers and organizing activity. Market recovery funds proxy awareness and efforts to address not only market concerns, but organizing issues as well. If labor stripping is a viable union threat, we would expect the wages of nonunion journeymen to rise with higher union dues, or higher union market share, or in locals with market recovery funds. However, since the nonunion helper is not a target of stripping, we would not expect the wages of these workers to rise as the measures of union strength increase.

RESULTS

Summary statistics of the variables used in the wage estimates are reported in Table 1. Our data set contains information from the 46 locals that participated in the WMLMC wage survey (conducted between 1984 and 1997). Excluding missing values, we have 331 observations reporting wages for nonunion journeymen, 308 for the nonunion helper and 345 for the basic union journeymen. Nonunion journeymen earn 77.3 percent of the wage of basic union journeymen while the average nonunion helper earns 55.0 percent. Nonunion journeymen earn 140.5 percent of the wage rate of the average nonunion helper. Averages for the other variables do not vary significantly between the union-nonunion wage categories. Averages for the locals with 331 observations are reported. Real union dues for journeymen average $0.34 per hour, but range from 0.0 to $1.08 (nominally). Approximately 12 percent of the locals in our sample collect market recovery funds as part of the journeymen package. Recovery funds range from $0.02 to $1.29 per hour with an average of $0.40 (all nominal measures). The average union market share in a local is 47 percent, but ranges from 5 to 90 percent. The average rate of unemployment is 6.5 percent, but some locals are in states with rates as low as 2.4 percent, or as high as 11.0 percent.

Results of the wage estimates for nonunion journeymen, the nonunion helper, and union journeymen are reported in Table 2 (under models 1 through 3, respectively). We use the variant of the Hausman specification test suggested by Pindyck and Rubenfeld (1991) to test for simultaneity between union local market share and union and nonunion wages. Results of this test indicate that there is no simultaneity problem present with respect to market share and union and nonunion wage rates.[6] Our indicators of union

strength and recruitment resources (dues, recovery funds, and market share) are all associated with higher hourly wages for nonunion journeymen. Specifically, if union dues increase by one real dollar, the real wages of nonunion journeymen increase by 21.5%. Nonunion journeymen earn 9 percent more per hour if they work in an area where locals collect recovery funds. If union market share increases by one percent, wages of these nonunion workers increase by approximately two-tenths of a percent. While the effects of these union strength measures vary in magnitude, all are statistically significant at the 0.05 level or less. However, these measures of union strength do not have the same effect on the earnings of the average nonunion helper, or the wages of union journeymen. None of the coefficients for dues, recovery funds, or market share achieve conventional levels of statistical significance in models 2 and 3.

Results reported from models 1 and 2 support our hypothesis regarding the outcome of labor stripping in construction. This threat only affects the wages of targeted, skilled nonunion workers. While nonunion journeymen benefit from increases in union strength (measured by union market share, dues, and recovery funds), the same does not appear to be the case for their union counterparts. To further examine how union journeymen benefit from greater union strength, we estimated the fixed effects models with the local level of union journeymen employment and the rate of unemployment for union journeymen as dependent variables. The same independent variables reported in Models 3 were used in these estimates. Results from the estimate of the log of employment indicate that increases in dues and in market share positively and significantly increase jobs for union journeymen. Results from the estimate of the unemployment rate indicate that the percentage of jobless union journeymen decreases, in

a statistically significant way, when market share expands.[7] The effect of market recovery funds was not statistically related to either the employment level, nor the unemployment rate for union journeymen.[8] Taken together, these results suggest that union members derive employment benefits, as opposed to direct hourly wage benefits, from a stronger union presence.

Other results reported in Table 2 indicate that the hourly wages of all nonunion workers decrease as the state unemployment rate increases. Vroman (1990) argues that sector differences in the use of efficiency wages contributes to the downward flexibility of nonunion wages. For example, unions offer built-in employee monitoring systems to employers while nonunion employers rely more on efficiency wages to avoid monitoring costs. However, the increased length and cost of job search during a recession provides sufficient incentive for nonunion workers to remain productive. So, the need to offer high efficiency wages during recessions is reduced and nonunion wages decrease. Resutls from models 1 and 2 support Vroman's explanation.

The coefficient for the state unemployment rate in the estimate of the union journeymen wage is positive and statistically significant. While this effect is small, a one percent increase in the unemployment rate is associated with an increase in the real union wage of 6 tenths of a percent, it is significant at the 0.05 level. The sign of this coefficient may be explained by relative union wage stickiness. According to Hendricks and Kahn (1983) multi-year bargaining agreements that include cost-of-living adjustments (COLA's) can maintain, or even inflate real wage growth. In our estimate of the real union wage, the ratio of the nominal union journeymen wage rate to the CPI, the nominal union wage may fall, or more likely, continue to increase due to COLA's,

relative to the price index as the unemployment rate increases. When we estimate the model with the log of the nominal union journeymen wage as an additional independent variable (i.e. no more COLA's), the sign of the coefficient for the unemployment rate becomes negative. Or, holding the nominal union wage constant, a one-percent increase in the rate of unemployment is associated with a decrease in the real union journeymen wage of 4 tenths of a percent (t-value = -6.01). This finding supports the view that the positive effect of the unemployment rate on the real union wage reported in Model 3 is due to a nominal wage that is sticky downward, or increases relative to the price index, during recession.

Dummy variables for each local in the respective samples capture the fixed effects. We limit our reporting of the local dummy variables for space considerations. The reported group effect indicates that only the wages of union journeymen are significantly lower in Salt Lake City relative to the reference category (UA Local #3 in Denver, Colorado). The trend in the year dummy variables mirrors the national decline in real construction earnings. For example, data from the Bureau of Labor Statistics indicate that average real hourly earnings in construction fell from $11.13 in 1984 to $9.76 in 1997, a 14% decrease. Our results indicate that the real earnings of nonunion journeymen, the average nonunion helper, and the union journeymen decreased by 15, 17, and 25 percent, respectively (all else equal).

Estimates of wage ratios are reported in Table 3. Results for Model 4 indicate that the ratio of nonunion journeymen to nonunion helper hourly wages increases with higher union dues and market share. The effects are statistically significant at the 0.10 and 0.05 levels, respectively. The positive effect of recovery funds is significant at the

0.06 level, for a one-tailed test. Results for Model 5 indicate that increases in all of the measures of union power and recruitment resources are associated with an increase in the nonunion journeymen wage, relative to the union rate for this grade of worker. Results for models 4 and 5 (from Table 3) are consistent with results from models 1 and 2 (from Table 2). Both suggest that a stronger union presence is associated with higher wages, and higher relative wages for nonunion journeymen.

Other results reported in Table 3 indicate that higher rates of unemployment at the state level are associated with significantly lower nonunion wages, relative to the union wage rate (models 5 and 6). This finding is consistent with others who report countercyclical union-nonunion wage differentials (see Wunnava and Honney 1991). The wage ratio between nonunion journeymen and the nonunion journeymen helper is unrelated to changes in the state unemployment rate. Taken together, these results suggest that the wages of nonunion journeymen and the nonunion journeymen helper are flexible downward. The selected group effect result indicates that only the wage ratio between journeymen is significantly higher (at the 0.01 level) in the Salt Lake City local. The period effects indicate that there was no statistically significant change in any of the relative wage ratios over the period.

CONCLUSION

We find that union strength is associated with higher earnings for nonunion journeymen who are most qualified for work in the union sector. On the other hand, our results suggest that nonunion construction employers do not react to the union threat by increasing the wages of lower skilled workers. These results are consistent with the union organizing practice of labor stripping. While our example indicates that

organizational efforts are associated with higher earnings for some nonunion workers, union workers derive expanded employment opportunities from stronger locals. Our results suggest that the union threat effect and its consequences are different for the construction industry where unions develop unique strategies due to the nature of the industry.

Previous analysis of labor stripping combines this tactic with the practice of salting with the latter receiving more attention due to its controversial nature (see Hess 1987 and Lucas 1987). Our results suggest that nonunion employers also view stripping as a viable threat. Salting and stripping tend to be used together (see IBEW 2000 and 2003). But, each tactic has a different expected impact on the wages of nonunion workers. The union salt performs top down and bottom up functions. For example, the union salt is in a position to address the needs and problems of a nonunion contractor. Or the salt can collect information on unfair, or unsafe labor practices to be used in top down pressure on nonunion contractors. Another role of a salt is to inform their nonunion coworkers of the benefits of unionization. Management response to this type of bottom up recruitment threat might be to increase the wages of all workers (journeymen and their helpers) in the establishment. However, we fail to find evidence of this type of reaction in our sample of plumbing and pipe fitting locals. This may indicate that management does not respond to salting efforts aimed at recruiting, or that salting was directed toward other, top down activities.

While we have examined the consequences of stripping on wages, the ultimate goal of this tactic is to pressure nonunion contractors into becoming union signatories. Future research should evaluate the effect of stripping on this outcome. While we find

evidence of the wage effects of stripping in the plumbing sector, future research will determine if this threat effect in present in other construction occupations.

NOTES

1. See Bux and Tolar (2007) for an explanation of unique organizing strategies of service unions.

2. In their estimate of individual-level wage equations, Freeman and Medoff include controls (4) for occupation. But, these controls do not provide information on how the threat is different between occupations. An interaction of occupation and density would provide such information, but this estimate is not discussed.

3. Phone interview with Kirk Smith, former Utah State Organizer and current Director of Organizing, UA. Interview on January 5, 2008.

4. Our data include WMLMC locals from Alaska, Arizona, California, Colorado, Hawaii, Idaho, New Mexico, Nevada, Utah, and Washington. Locals in British Columbia and Alberta, Canada became members in 1994, but have insufficient data to be included in our study.

5. This type of internal documentation from a local has been used in other studies (see Condit, et al, 1998). Business managers of locals use this information as part of the day-to-day process of operating a local. Nonunion wages are gathered for negotiating and recruitment purposes. Market share is closely watched to determine the success of new and ongoing recruitment tactics. Since these data are reported directly to the WMLMC, there is no need, benefit, or motivation to inflate, or deflate any data.

6. We use the variant of the Hausman specification test suggested by Pindyck and Rubenfeld (1991) to test for simultaneity between union local market share (MKT SHARE) and union and nonunion wages. The market share variable is regressed on the reduced-form residuals obtained from an estimate of the wage equations. Low t-values from these estimates indicate the absence of a simultaneity problem. Our results yielded the following t-values: union journeymen wage estimate, t-value = -0.348, nonunion journeymen wage estimate, t-value = -0.005, nonunion average wage estimate, t-value = -0.686.

7. For the estimate of the log of journeymen employment, the coefficients for market share and for real dues are 0.003 and 0.346, respectively. Both are statistically significant at the 3 percent level. From the estimate of the rate of unemployment, the market share variable has a coefficient of -0.0007 and is significant at the 8 percent level. Both of these estimates indicate that a large increase in market share is required to increase the employment of journeymen marginally.

8. This result is based on an estimate of the relation between recovery funds and employment levels, holding market share constant. Since the purpose of recovery funds is to increase market share, a better test may be to estimate this relation with market share varying. However, the results from either specification were similar with respect to the absence of a statistically significant recovery fund effect.

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Table 1
Summary Statistics for Western Mechanical Union Locals

Variable	Mean	Log	Sample Size
Nonunion Journeymen Real Hourly Wage	$12.348 (3.63)	2.471 (0.295)	[331]
Nonunion Journeymen Helper Real Hourly Wage	$8.788 (2.28)	2.141 (0.252)	[308]
Union Journeymen Real Hourly Wage	$15.975 (3.86)	2.742 (0.243)	[345]
Real Dues	0.343 (0.25)		[331]
Market Recovery Fund	0.118 (0.32)		[331]
Market Share	0.470 (0.22)		[331]
State Unemployment	0.65 (0.02)		[331]

Parentheses contain standard deviations. Brackets contain sample sizes for each wage category. Source: Western Mechanical Labor Management Conference Wage Survey, 1984-1997.

Table 2
Fixed Effects Regression Estimates of Nonunion and Union Hourly Wages.
Dependent Variables: Model 1 = Log (Real Nonunion Journeymen Hourly Wage), Model 2 = Log (Real Nonunion Journeymen Helper Hourly Wage), Model 3 = Log (Real Union Journeymen Hourly Wage).

Variable	Coefficients		
	Model 1	**Model 2**	**Model 3**
Real Dues	0.215***	0.050	0.025
	(0.077)	(0.077)	(0.023)
Market Recovery	0.090***	0.006	0.016
Fund	(0.033)	(0.034)	(0.010)
Market Share	0.199**	-0.069	0.015
	(0.083)	(0.083)	(0.023)
State Unemployment	-2.386**	-1.842*	0.606**
	(0.934)	(0.988)	(0.284)
Group Effects:	0.094	-0.056	-0.150***
Salt Lake City, Local #19	(0.079)	(0.077)	(0.023)
Period Effects:			
1985	-0.028	-0.074	-0.054**
1986	0.013	-0.104	-0.069***
1987	-0.014	-0.090	-0.089***
1988	-0.116	-0.172**	-0.125***
1989	-0.136	-0.204***	-0.154***
1990	-0.143*	-0.171**	-0.192***
1991	-0.160**	-0.244***	-0.210***
1992	-0.206**	-0.156**	-0.229***
1993	-0.201**	-0.209***	-0.241***
1994	-0.220***	-0.180**	-0.249***
1995	-0.222***	-0.169**	-0.257***
1996	-0.172**	-0.189**	-0.261***
1997	-0.146*	-0.172**	-0.252***
Constant	2.349***	2.362***	2.710***
	(0.116)	(0.110)	(0.033)
R^2 (adj) =	0.760	0.695	0.967
F =	20.03	14.21	186.04
N =	331	308	345

Parentheses contain standard deviations, year dummy variable not reported. Source: Annual survey, Western Mechanical Labor Management Conference Wage Survey, 1984-1997.
*** significant at 1 percent level, two-tailed test
** significant at 5 percent level, two-tailed test
* significant at 10 percent level, two-tailed test

Table 3
Fixed Effects Regression Results: Nonunion to Union Hourly Wage Ratios
Dependent Variables: Model 4= Log (Real Ratio Nonunion Journeymen to Nonunion Journeymen Helper Hourly Wage), Model 5= Log (Real Ratio Nonunion to Union Journeymen Hourly Wage), Model 6 = Log (Real Ratio Nonunion Journeymen Helper Hourly Wage to Union Journeymen Hourly Wage).

Variable	Coefficients		
	Model 4	Model 5	Model 6
Real Dues	0.160*	0.192**	0.040
	(0.086)	(0.079)	(0.080)
Market Recovery	0.058	0.076**	-0.006
Fund	(0.038)	(0.034)	(0.034)
Market Share	0.267***	0.191**	-0.086
	(0.093)	(0.085)	(0.086)
State Unemployment	-1.351	-3.012***	-2.240**
	(1.096)	(0.960)	(1.024)
Group Effects:	0.180	0.246***	0.097
Salt Lake City, Local #19	(0.113)	(0.081)	(0.080)
Period Effects			
1985	0.045	0.029	-0.020
1986	0.110	0.086	-0.038
1987	0.079	0.074	-0.003
1988	0.060	0.008	-0.050
1989	0.062	0.016	-0.049
1990	0.027	0.047	0.022
1991	0.082	0.048	-0.036
1992	-0.046	0.022	0.070
1993	0.024	0.039	0.031
1994	-0.028	0.028	0.072
1995	-0.036	0.034	0.091
1996	0.033	0.088	0.077
1997	0.038	0.106	0.086
Constant	0.024	-0.363***	-0.366***
	(0.128)	(0.119)	(0.114)
R^2 (adj) =	0.413	0.585	0.500
F =	5.00	9.45	6.78
N =	302	331	308

Parentheses contain standard deviations, year dummy variable not reported. Source: Annual survey, Western Mechanical Labor Management Conference Wage Survey, 1984-1997.
*** significant at 1 percent level, two-tailed test
** significant at 5 percent level, two-tailed test
* significant at 10 percent level, two-tailed test