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**MARKET SHARE**

**A Statistical Examination of Past Policies to Reverse  
Declining Market Share in the Sheet Metal and  
Mechanical Industries of the Western United States**

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## **MARKET SHARE:**

### **A Statistical Examination of Past Policies to Reverse Declining Market Share in the Sheet Metal and Mechanical Industries of the Western United States**

#### **Introduction**

Unionized sheet metal and mechanical contractors have devoted much attention and concern to the issue of declining market share in the construction industry of the United States. Declining market share negatively affects both union members and union contractors alike within our industry sectors. Loss of market share creates unemployment, hampers mutual efforts to adequately fund health plans, pensions, depresses wages, and stresses the abilities of the union contractors to secure construction projects while remaining profitable. While the joint efforts of Labor and Management to seek solutions to this problem have been myriad, serious concern and debate persist between union leaders and union contractors regarding the cost and methodologies employed to combat declining market share. The implications of declining market share to both Labor and Management are serious. The survival of our organizations is potentially at stake.

Construction contractors employ estimators to bid projects to secure work for their firms. A competent estimator does not fail to return to a project after its completion to assess the accuracy of his or her original project bid pricing. The price of materials, labor, and

other project variables change over time. An estimator's tools can be sharpened only through a careful analysis of the original bid price compared to its ultimate costs. The practices and guidelines employed by union leaders and union contractors to gain market share should require no less a rigorous inspection.

Some macroeconomic conditions of market share are beyond the control of both Business and Labor, yet many other factors are not. This paper assesses past practices in the construction industry: specifically the sheet metal and mechanical sectors. Some of these past practices include: concessionary bargaining, adjusting journeyman-apprenticeship ratios (e.g. one apprentice would be allowed for every three journey-level employees to lower crew costs on a project), enhancing training programs, market recovery programs<sup>1</sup>, and efforts to build stronger unions and contractor organizations.

Many changes have occurred in both the sheet metal and mechanical industries; changes in technology, training of the workforce, the rise of non-union contracting, and changes in the nature of their individual construction market(s) combined to pose new challenges to profitability and market position. Business and Labor both derive benefit from efforts to achieve market share gains.

Business and Labor employ many tools to enhance their competitiveness in the marketplace; training, marketing, true labor-management partnering, exploring new

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<sup>1</sup> Market recovery programs use a small financial contribution from each union member's pay to subsidize union contractors' construction bid pricing. These amounts are voted on and approved by the union membership. Different unions also include many other efforts to gain market share under the umbrella of these programs.

market niche opportunities, project management training, effort(s) to enhance productivity, cost containment, new technologies, strategic planning and many others. As Business and Labor move forward together to seek solutions and sound policy regarding falling market share, they must take many opinions, facts, and figures into account.

This paper utilizes real-world data of past practices to focus on an in-depth analysis of seven main questions regarding past efforts at gains in market share:

1. What is the relationship between market share loss or gain and the difference between the union journeyman wage and the non-union journeyman wage?
2. How does the construction business cycle of boom and bust (as measured by unemployment levels in a local union) affect market share?
3. Does changing the union journeymen to apprentice ratio result in a gain in union market share?
4. Does enhancing a local training program have a concomitant effect on union market share?
5. Does building a stronger union have an effect on union market share?

6. Does building a stronger contractor organization have an effect on union market share?
  
7. Have union market recovery programs been effective?

In order to remove personal and professional bias from the process, a rigorous parametric statistical analysis is employed with the gracious assistance of Dr. Peter Philips Ph.D.<sup>2</sup> of the University of Utah Economics Department. Using established econometric practice and criteria, linear regression models are presented evaluating the results of the past methods used as Business and Labor sought solutions to declining market share.

The results of this paper can be used to enhance strategic efforts by union leaders and union contractors to organize new members and increase market share benefiting both contractors and their union employees.

#### A RECENT HISTORY OF CONSTRUCTION UNION DENSITY

One of the measures of market share is union density as identified in the Current Population Survey published by the U.S. Government. As illustrated in Table 1, since 1977 construction union density has slipped from about 60% overall to roughly 25% of

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<sup>2</sup> The author has been working with Dr. Philips for some time as a research assistant in matters of school construction and bidding practices in Utah's construction industry. During this period he has kindly provided me with education in econometric techniques. The econometrics in this paper were done collaboratively, while the text is that of the author.

the workforce by 2002. In the Western United States, it has slipped from about 48% to 23%.

For the two craft unions most represented in the data, market share has slipped as well. Sheet Metal Worker union density has slipped nationally from 56.8% to 38.8% and in the Western United States from 73.5% to 46.9%. For the plumbing and pipefitting industry: national union density has slipped from 47.3% to 27.6% and in the Western United States from 58.9% to 24.7%.

TABLE 1

Year	US National Data			West*		
	All Construction	Sheet Metal Workers	Plumbers & Pipefitters	All Construction	Sheet Metal Workers	Plumbers & Pipefitters
1977-1979	58.9	56.8	47.3	48.7	73.5	58.9
1980-1981**	40.2	67.8	36.6	51.8	90.7	40.2
1983-1985	42.7	49.2	35.7	34.8	58.5	42.7
1986-1988	36.4	38.2	31.6	28.9	50.4	36.4
1989-1990***	41.9	44.6	32.4	27.3	51.6	41.9
1991-1993	31.8	43.3	31.9	25.8	55.5	31.8
1994-1996	31.6	36.4	29.2	23.2	54.5	31.6
1997-1999	31.6	38.2	29.0	23.3	50.7	31.6
2000-2002	24.7	38.8	27.6	21.2	46.9	24.7

Source: May Current Population Survey 1977-1981, Outgoing Rotation Groups 1983-2002. \*West includes the states Montana, Idaho, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, California, Alaska and Hawaii. \*\*Data on union density is not available in any supplement to the Current Population Survey (CPS). \*\*\*Only two years were pooled for 1989 and 1990. Sample is limited to employed blue collar workers, age 16 to 64.

Market share has declined precipitously for many years. The unionized industry enjoyed near hegemony of the market at one time. This changed dramatically. Fewer union journeymen illustrate fewer union contractors performing work in our jurisdictions. A “chicken-and-egg” scenario emerges where gains in market share can be difficult to achieve. Must Labor reduce wages and benefits to the non-union levels to gain market share or must Business gain market share to be able to sustain or enhance the demands of Labor? Market conditions have made it difficult for both to achieve a desired result, yet fundamental practices which originally built the unionized industry’s dominance can be employed once again.

## LITERATURE REVIEW

Declining union density hurts all Americans; declining wages, working conditions, and benefits have affected every American worker whether union or not. “Over the past 20 years the labor markets of most industrialized countries have undergone a series of profound changes. These changes have been associated with significant changes in work processes, employment conditions, union density and industrial relations. . . these changes have been compounded by alterations to policies and laws dealing with industrial relations, labor markets, competitive tendering, privatization and social security” (Quinlan 1998).

Many forces combined to engage in a systematic and organized attack against collective bargaining in general, and specifically in the construction industry. The National

Association of Manufacturers, the Business Roundtable, the U.S. Chamber of Commerce, the media, the Nixon Administration, and others specifically targeted construction unions and their union contractors during the inflationary economy brought about by the Vietnam War in the 1960's. Then, and for many years thereafter, union contractors had enjoyed a largely "cost-plus" environment thereby assuring profitability while the supply of construction labor remained short and unions were the primary source of skilled manpower. Due partially to the success of unions at negotiating higher wages (that were for many employees only part-time work), union wage and benefit gains became a scapegoat for the larger economic inflationary trends brought on by an economic depression in the first part of the 1960's and the high costs of the Vietnam War as it continued to escalate.

As inflation in all sectors of the economy grew out of control, the media increasingly portrayed unions as the sole causation. Industry also feared that the wage and other increases in working conditions enjoyed by the union construction industry would spread to other industries. In 1968 *Fortune* published an article entitled "The Unchecked Power of The Building Trades" wherein they claimed "the most powerful oligopoly in the American economy today is the loose confederation of craft unions known as the building trades." The magazine, only one of many producing inflammatory articles often fostered by the Business Roundtable itself, ignored both the inflationary impact of the Vietnam War and the fact that construction unions' power not only had been greater earlier in the century without triggering employer claims of outrageous wage increases,

but had actually decreased during the early economic depression of the 1960's.<sup>3</sup> From the 1960's forward, several factors took the union construction industry unawares; the rise of non-union contracting, wage and price controls during the Nixon Administration, a sustained effort to undermine collective bargaining, and undermine the labor law that had sustained it. By the time unions fully reacted, the slide was well underway. (Linder 2000)

The negative impacts created by the erosion of adequate labor laws protecting workers' rights cannot be understated. The seminal national law protecting a worker's right to organize is the National Labor Relations Act<sup>4</sup> (also known as the Wagner Act) passed in 1935. Unions were essentially illegal before this time. During the history of our country workers who engaged in organizing were prosecuted under anti-trust laws, conspiracy in restraint of trade, and many others until the passage of the Wagner Act.

The National Labor Relations Act clearly states: "It is declared to be the policy of the United States to eliminate the causes of certain substantial obstructions to the free flow of commerce and to mitigate and eliminate these obstructions when they have occurred by encouraging the practice and procedure of collective bargaining and by protecting the exercise by workers of full freedom of association, self-organization, and designation of representatives of their own choosing, for the purpose of negotiating the terms and conditions of their employment or other mutual aid or protection." (emphasis added)

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<sup>3</sup> Linder, Mark *Wars of Attrition, Vietnam, The Business Roundtable, and the Decline of Construction Unions*, Second Revised Edition, Fanpihua Press (2000) pp. 48-49

<sup>4</sup> 29 U.S.C. §§ 151-169 Title 29, Chapter 7, Subchapter II, United States Code

In December of 2003, the AFL-CIO<sup>5</sup> and Peter Hart Research reported that 53% of American non-managerial workers would join a union if they could. In the 1960's that figure was only about 30%. But while workers have the legal right to form unions to negotiate for better benefits, pay, safety standards and working conditions, non-union employers across the country routinely block their efforts with threats, coercion and intimidation. One-quarter of private sector employers fire at least one worker during a campaign to form a union, according to research conducted by Cornell University's Kate Bronfenbrenner, who also found that almost all private-sector employers—92 percent—force employees to attend closed-door meetings to hear anti-union propaganda<sup>6</sup>.

Unions still struggle today to have success in organizing, often working as hard as their forefathers: again due to the same lack of adequate protections under the law. Organizing outcome studies by Bronfenbrenner<sup>7</sup> et al show that employing techniques like employee committees and creating an activist employee base are much more likely to succeed despite the culture of fear and intimidation created by non-union employers. Another recent study shows that “unions representing workers in the industry must link sustained organizing drives to upsurges in local economies” (Weil 2003).

In the 1980's and 1990's; “Workers in the industry have experienced high unemployment and a 17 percent drop in real wages.... despite a sizable drop in the union-nonunion

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<sup>5</sup> Voice@Work *International Human Rights Day Program*, (December 10, 2003)

<sup>6</sup> <http://www.aflcio.org/aboutunions/voiceatwork/ns12102003a.cfm> March 17, 2004

<sup>7</sup> Bronfenbrenner, Kate; Friedman, Sheldon; Hurd, Richard W.; Oswald, Rudolph A.; Seeber, Ronald L., *Organizing to Win, New Research on Union Strategies*, Cornell University Press (1998)

differential in wages and a tremendous reduction in the number of strikes. The main reasons for the decline in union strength are the adoption of strategies by contractors and owners to control labor costs and changes in the interpretation of labor laws that have given contractors more flexibility in determining their collective bargaining status” (Allen 1994).

As construction union density and market share eroded, unemployment amongst union members, and pressure on union contractors increased. Opinions on solutions varied widely. Concessionary wage, working conditions, and benefit bargaining became pandemic. Many local unions adopted wage reductions or freezes in an effort to become more competitive. Unions and union contractors negotiated other contract concessions aimed at lowering overall crew costs; adjusting journeyman-apprenticeship ratios downward (e.g. more than the traditional one apprentice would be allowed for every three journeyman employees to lower crew costs on a project), the introduction of “helper” employees such as pre-apprentices or metal tradesmen, and changes in the nature of the allowed types of work performed by other non-journeyman classes of employees are but a few.

Union leaders and union contractors also employed other practices designed to boost productivity; enhanced training programs, initiated union market recovery programs, and built stronger unions and contractor organizations. Later, unions sought widespread local

efforts to renew traditional organizing: a return to the approach of the founders of their international unions whom originally created the unionized industry.

While both unions and union contractors can debate how this situation came to be, both will suffer if they cannot build together to reverse the decline. This paper assesses the impact of the traditional approaches used by both Business and Labor with an evaluation of the concessionary tactics used in the recent past in the Western United States.

## METHODOLOGY

Linear regression<sup>8</sup> is a statistical technique for measuring the strength of an algebraic linear relationship between a dependent variable (Y) and one or more independent variables ( $X_1, X_2, X_3 \dots X_n$ ). Linear regression measures the effect of independent variables effect(s) upon a dependent variable: thus independent variables are the cause of the effect.

This paper employs linear and multiple regressions which use ordinary least squares: a technique for calculating the regression equation that minimizes the sum of the squared error terms; that is, the differences between the *observed* values for the dependent variable and the *predicted* values for the dependent variable.

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<sup>8</sup> The explanation is a compilation from the econometric textbooks listed in the bibliography, <http://www.ats.ucla.edu/stat/default.htm> (March 2004) and [http://www.osc.edu/education/webed/Projects/model\\_and\\_statistics/overview.shtml](http://www.osc.edu/education/webed/Projects/model_and_statistics/overview.shtml) (March 2004). The examples were created by the author.

The general form of the linear equation is:  $Y = a_x + b$

Where:

Y = the dependent variable

a = a coefficient equivalent to the slope of the line

b = the Y intercept of the line (the place where it crosses the Y axis)

x = a reference to a given independent variable

In the case of a multiple regression with three variables (more than three will be presented later):

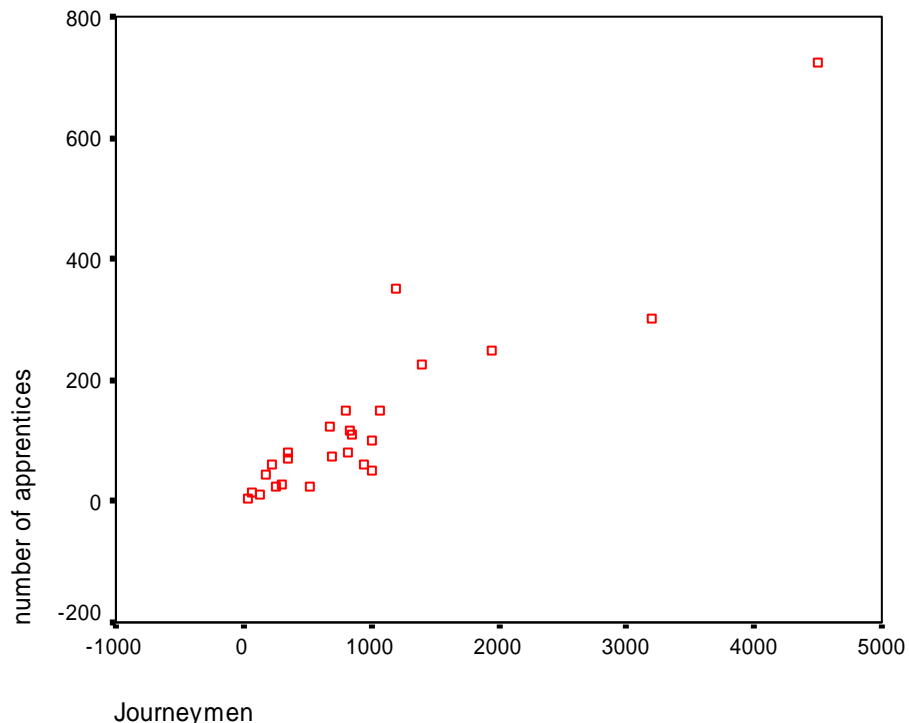
$$Y = a_1X_1 + a_2X_2 + a_3X_3 + b$$

The regression statistics measure the degree of fit between the line and the scatter of the plotted data points. The squared deviations are added to create a measure called the coefficient of determination or  $R^2$  statistic. This statistic measures the variance explained by the model where 0 represents no variance explained and 1.0 represents 100% of the variance explained. Because the  $R^2$  statistic gives us a measure of the total possible explained variation, it is useful in designing our regression model.

The model also returns values for the significance of the coefficients from a statistical point of view. The *t*-test is a commonly used method to evaluate the differences in means between two groups. For our purposes we want a *t*-statistic of close to two to be considered a statistically significant and reliable result.

For example: what is the statistical numerical relationship between apprentices and journeymen employees? Contained in this paper's dataset are the total averaged numbers of apprentices and journeymen reported from local unions in the Western United States (we will discuss the dataset in more detail shortly). Graph 1 is a scatterplot. It shows the relationship between apprentice numbers and journeyman numbers. Graph 1 clearly shows a positive relationship; as the number of journeymen goes up, so does the number of apprentices.

GRAPH 1



We can then test this relationship using the above described technique and statistical tests of linear regression. The following tables show the results of this regression with the pertinent information italicized.

In Table 2 the  $R^2$  statistic illustrates that 84.3 % of the possible variation in the number of apprentices is explained by the predictor (or independent variable) which is the number of journeymen.

TABLE 2

<i>Model Summary(b)</i>				
<b>Model</b>	<b>R</b>	<i><b>R Square</b></i>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
<b>1</b>	.918(a)	<i>.843</i>	.836	62.367
<i>a Predictors: (Constant), Journeymen</i>				
<i>b Dependent Variable: number of apprentices</i>				

Table 3 shows us two more pieces of information relevant to this discussion:

1. The coefficient shows us the magnitude of the relationship between apprentices and journeymen. For an increase of one apprentice we get an increase of .14 journeymen. This explains that for all local unions (both Sheet Metal Workers International Association and United Association in the Western United States) there are approximately eight journeymen for every apprentice reported in our data.
2. The t-statistic is very large: remember we needed a value approaching two in order to be considered a statistically significant and reliable result.

TABLE 3

Coefficients(a)						
		<i>Unstandardized Coefficients</i>		<i>Standardized Coefficients</i>		
Model		B	Std. Error	Beta	<i>t</i>	Sig.
1	(Constant)	-1.456	17.151		-.085	.933
	<i>Journeyman</i>	<i>.140</i>	<i>.013</i>	<i>.918</i>	<i>11.096</i>	<i>.000</i>

a Dependent Variable: number of apprentices

In the regressions to follow our dependent variable is named “shareall<sup>9</sup>.” As described in the following tables, this is the reported State-by State and local-by-local measure of the percent of the total construction market share over time; consisting of all construction sectors: commercial and industrial, housing (residential), light commercial and service.

Table 4 describes the reported union market share by State and percentage without differentiating by craft union, e.g. in Alaska, market was 80% in 1984 declining to 53% by 1997. Most States had a very steep drop such as Nevada: dropping from 60% in 1984 to 35% by 1997. Arizona has actually gained market share rising from the 1984 report of 10% to 1997’s 20% estimate. Periods (.) represented unreported data on the survey.

<sup>9</sup> See Graph 2 in the appendix for information concerning the frequency distribution for “shareall.”

TABLE 4

Year		AK	AZ	BC	CA	CO	HI	ID	NM	NV	OR	UT	WA
1984	Union Share of Overall Constructio	.80	.10	.	.	.	.	.	.68	.60	.	.	.
1985	Union Share of Overall Constructio	.65	.22	.	.63	.54	.73	.75	.49	.43	.80	.45	.50
1986	Union Share of Overall Constructio	.60	.25	.	.55	.52	.73	.80	.45	.45	.45	.40	.60
1987	Union Share of Overall Constructio	.60	.22	.	.58	.49	.65	.60	.40	.40	.35	.35	.50
1988	Union Share of Overall Constructio	.72	.19	.	.60	.55	.68	.25	.40	.35	.45	.73	.33
1989	Union Share of Overall Constructio	.71	.15	.	.59	.49	.70	.30	.25	.32	.50	.20	.33
1990	Union Share of Overall Constructio	.62	.15	.55	.61	.54	.75	.50	.28	.40	.60	.35	.45
1991	Union Share of Overall Constructio	.75	.13	.55	.58	.42	.75	.23	.20	.40	.60	.50	.45
1992	Union Share of Overall Constructio	.73	.11	.55	.60	.26	.68	.20	.26	.34	.70	.30	.40
1993	Union Share of Overall Constructio	.71	.08	.27	.56	.30	.75	.15	.35	.29	.	.20	.50
1994	Union Share of Overall Constructio	.69	.08	.60	.54	.37	.75	.15	.45	.29	.	.40	.50
1995	Union Share of Overall Constructio	.69	.10	.45	.54	.43	.75	.15	.50	.30	.70	.29	.50
1996	Union Share of Overall Constructio	.70	.09	.50	.55	.42	.70	.35	.48	.30	.70	.20	.45
1997	Union Share of Overall Constructio	.53	.20	.50	.51	.37	.70	.40	.35	.35	.75	.20	.45
1998	Union Share of Overall Constructio	.	.	.	.	.	.	.	.	.	.	.	.

Table 5 shows the details of union market share by craft union and *State*. Alaska shows their sheet metal contractors had a 76% market share while their mechanical contractors had a 62% market share. Periods (.) represented unreported data on the survey.

TABLE 5

		Type of Local	
		.00 Sheetmetal	1.00 Mechanical
AK	Union Share of Overall Construction	.76	.62
AZ	Union Share of Overall Construction	.15	.15
BC	Union Share of Overall Construction	.	.48
CA	Union Share of Overall Construction	.55	.58
CO	Union Share of Overall Construction	.32	.45
HI	Union Share of Overall Construction	.65	.73
ID	Union Share of Overall Construction	.38	.27
NM	Union Share of Overall Construction	.44	.35
NV	Union Share of Overall Construction	.31	.42
OR	Union Share of Overall Construction	.	.60
UT	Union Share of Overall Construction	.30	.40
WA	Union Share of Overall Construction	.	.45

Table 6 shows the reported market share by craft union affiliation and *year*.

TABLE 6

			Type of Local	
			.00 Sheetmetal	1.00 Mechanical
Year	1984	Union Share of Overall Construction	.60	.
	1985	Union Share of Overall Construction	.54	.54
	1986	Union Share of Overall Construction	.53	.52
	1987	Union Share of Overall Construction	.49	.50
	1988	Union Share of Overall Construction	.46	.55
	1989	Union Share of Overall Construction	.52	.47
	1990	Union Share of Overall Construction	.41	.53
	1991	Union Share of Overall Construction	.46	.49
	1992	Union Share of Overall Construction	.38	.47
	1993	Union Share of Overall Construction	.35	.43
	1994	Union Share of Overall Construction	.35	.48
	1995	Union Share of Overall Construction	.32	.48
	1996	Union Share of Overall Construction	.36	.48
	1997	Union Share of Overall Construction	.23	.48
	1998	Union Share of Overall Construction	.	.

The independent variables<sup>10</sup> that will be measured for their influence on “shareall” (total union market share) are named as follows:

- “unemp” the percentage of the membership unemployed in a given local union for each year as a measure of the construction business cycle.
- “year” a measure of the year-to-year change in market share from 1984 to 1998.
- “ratioja” a measure of the journeyman to apprentice ratio. Often 3-1: meaning three journeymen for each apprentice on a given jobsite.
- “pertrain” the training fund contribution as a percent of the area union wage.
- “wagegap1” the difference between the union journeyman and the non-union journeyman wage.
- “perdues” a measure of dues in the local union as a percentage of the area union wage.
- “perind” a measure of the industry fund contribution as a percentage of the area union wage.
- “perrecov” the market recovery fund contribution as a percentage of the area union wage.

Table 7 illustrates the statistical values of the independent variables and the number of observations for each independent variable. Every time any survey respondent reports a value on the survey form for a given survey question we obtain one “observation.” “N”

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<sup>10</sup> See appendix for additional tables detailing the independent variables

represents the total number of observations over time for each variable (N=number of observations). If a respondent failed to fill in the appropriate question relative to these independent variables it is shown as a “missing value.”

Example: for the survey years of 1984 through 1998 for “Unemployment in Local,” we had 471 observations and 134 unreported values for our analysis. The average unemployment in a local was 22.21% where 0% unemployment was the lowest value reported and 90% was the highest unemployment reported in the time frame for all locals.

TABLE 7

Statistics

		Union Share of Overall Construction	Unemployment in Local	Year	Journeyman-Apprentice Ratio	Apprentice Contribution as % of Wage	% of Nonunion Journeyman Wage	Dues as % of Wage	Industry contributions as % of wage	Market Recovery as % of Wage
N	Valid	464	471	604	496	528	489	383	527	485
	Missing	141	134	1	109	77	116	222	78	120
Mean		.4782	22.21	1991.17	3.2020	.0139	33.7699	.0212	.0053	.0030
Median		.5000	20.00	1991.00	3.0000	.0128	28.5185	.0200	.0053	.0000
Mode		.40	0	1989 <sup>a</sup>	3.00	.01	24.22	.00	.00	.00
Minimum		.05	0	1984	.20	.00	-38.74	.00	.00	.00
Maximum		.95	90	1998	11.00	.03	149.44	.07	.02	.06

a. Multiple modes exist. The smallest value is shown

In order to hold our results reliable, the structural model for our regression must be properly constructed and tested with regression diagnostics. The model presented here is a cross-sectional time series: a set of observations for which there are a variety of variables measured over time.

Regression diagnostics check for statistical and mathematical reliability considering detrimental conditions which can skew the results and their statistical tests including: heteroskedasticity, homoscedasticity, omitted variable bias, perfect colinearity, bounded dependent variables, and influential data.

Each of the results presented in this paper were tested under several different models and statistical techniques which sought to expose any deleterious effects of the aforementioned hazards. As the results were not materially affected, a fixed effects linear regression model is presented to simplify the explanation of the results and techniques employed. The fixed effects model is employed to enhance the explanation of variation in market share *over time* as opposed to market share variations *between* local unions.

While simple regressions can be done in Microsoft Excel, the professional statistical package Stata 8.0 was used due to its advanced tools and capabilities for the fixed effects modeling and SPSS 11.0 was used to generate tables and graphs.

## THE DATA

The Western Mechanical Labor Management Conference (WMLMC) was founded in 1958. As stated in the literature for these conferences, “The primary purpose of the Conference is to keep the membership informed of current events and changes. To this end, topics and issues related to organized labor, in addition to solutions, act as a voice in representing views and positions by members, and therefore, discuss recommendations in order to bring about equality in labor-management bargaining.<sup>11</sup>” The WMLMC covers a geographical jurisdiction that includes Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Utah, Washington, British Columbia and Wyoming for the United Association (UA), and the Sheet Metal Workers International Association (SMWIA).

Each year the Conference was held, the WMLMC gathered real world information for assessment through informational surveys. Since the inception of the WMLMC in 1958, surveys were collected either at the Conference itself, mailed in, or completed on the WMLMC website. These surveys were completed by Mechanical Contractors Association (MCA) Chapter Executive Directors and Sheet Metal and Air Conditioning National Contractors Association (SMACNA) Chapter Executive Directors for their individual jurisdictional geographic areas.

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<sup>11</sup> <http://www.westernmechanical.org/history.shtml> January 25, 2004

The questionnaire assessed information related to collective bargaining agreements and includes:

- Current number of signatory contractors (broken out by mechanical, sheet metal or combination)
- Number of contractors five years ago
- Right-To-Work Status
- Types of agreements (commercial, residential, light commercial, etc.)
- Length of contract
- Number of journeymen, classified or any “sub-journeymen” classifications
- Professionally licensed or not? (contractor, journeymen by state or local)
- Percentage of local union unemployed (at time of annual conference)
- Wage and fringe packages, (complete for all funds and classifications)
- Health and welfare plan deductibles and description of plan
- Preferential hiring procedures (A or B list etc.) and other hiring hall provisions
- Supervisory structures (foremen, general foremen pay and ratios)
- Union and non-union crew costs
- Non-union wages for each local jurisdiction (average)
- Number of apprentices (including wage percentages)
- Journeymen to apprentice ratios
- Free travel zone limitations (before travel pay is a factor)
- Other working conditions (show-up pay, subsistence pay, etc.)
- Number of organizers employed
- Marketing techniques if any, non-union wages and crew costs
- Estimated market share for service, residential, light commercial and commercial-industrial (as assessed by MCA or SMACNA Chapter official).

Most contractors and local unions saw the most dramatic changes in their market share in about the last twenty years. In keeping with this, data were assessed from these surveys

during the period 1984 to 1998: the most relevant period for which data was available in a digitized format that would lend itself to statistical analysis.

Table 8 highlights the number of journeymen by type of craft union reported in the survey by State. Example: Alaska reported 128 sheet metal workers and 330 in the mechanical trades. Periods (.) represented unreported data on the survey.

TABLE 8

		Type of Local	
		.00 Sheetmetal	1.00 Mechanical
AK	Number of Journeymen	128	330
AZ	Number of Journeymen	297	922
BC	Number of Journeymen	.	2161
CA	Number of Journeymen	121	1490
CO	Number of Journeymen	866	375
HI	Number of Journeymen	429	748
ID	Number of Journeymen	119	233
NM	Number of Journeymen	274	902
NV	Number of Journeymen	475	668
OR	Number of Journeymen	.	2189
UT	Number of Journeymen	530	994
WA	Number of Journeymen	.	768

Table 9 describes the number and type of contractors by craft union by State. Example:  
 Colorado reported 58 sheet metal contractors and 37 mechanical contractors.

TABLE 9

		Type of Local	
		.00 Sheetmetal	1.00 Mechanical
AK	Number of Contractors	14	29
AZ	Number of Contractors	17	67
BC	Number of Contractors	.	187
CA	Number of Contractors	9	217
CO	Number of Contractors	58	37
HI	Number of Contractors	49	74
ID	Number of Contractors	9	12
NM	Number of Contractors	38	60
NV	Number of Contractors	39	32
OR	Number of Contractors	.	281
UT	Number of Contractors	49	51
WA	Number of Contractors	.	63

## RESULTS

### REGRESSION 1

The first factors examined for their effects on market share considered are:

- “unemp” the percentage of the membership unemployed in a given local union by year as a measure of the construction business cycle.
- “year” a measure of the year-to-year change in market share from 1984 to 1998.
- “ratioja” a measure of the journeyman to apprentice ratio. Often 3-1: meaning three journeymen for each apprentice on a given jobsite.

```

Fixed-effects (within) regression
Group variable (i): localn
Number of obs = 418
Number of groups = 45

R-sq:  within = 0.1215
        between = 0.0245
        overall = 0.0586

Obs per group:  min = 1
                avg = 9.3
                max = 13

F(3,370) = 17.06
Prob > F = 0.0000
    
```

<i>shareall</i>	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
<i>unemp</i> /	<i>-.001297</i>	.000365	<i>-3.55</i>	0.000	-.0020148	-.0005792
<i>year</i> /	<i>-.0091548</i>	.0015933	<i>-5.75</i>	0.000	-.0122879	-.0060218
<i>ratioja</i> /	<i>-.0187114</i>	.0068056	<i>-2.75</i>	0.006	-.0320939	-.005329
_cons	18.79181	3.171655	5.92	0.000	12.55508	25.02854

In assessing 418 valid observations over time the following results are observed:

1. Unemployment has a *negative* effect on market share and is statistically significant. As unemployment increases, market share decreases.

2. The time trend of “year” is *negative* and statistically significant. As time increases market share decreases.
3. “ratioja” is *negative* and statistically significant. As the journeyman to apprentice ratio increases market share goes down; e.g. 4 journeymen to one apprentice creates a negative relationship to market share.

## REGRESSION 2

The next multiple regression considers the effect of building a stronger training program given the negative effects of time, unemployment and higher journeyman to apprenticeship ratios. The independent variable “pertrain” (a measure of the training contribution as a percent of the area union wage) is introduced to the model.

```
Fixed-effects (within) regression      Number of obs      =      418
Group variable (i): localn           Number of groups    =       45

R-sq:  within = 0.1328                Obs per group:  min =       1
      between = 0.0491                  avg =      9.3
      overall = 0.0962                  max =     13

corr(u_i, Xb) = 0.0799                F(4,369)           =     14.13
                                      Prob > F           =     0.0000
```

<i>shareall</i>	Coef.	Std. Err.	<i>t</i>	P> t	[95% Conf. Interval]
unemp	-.0012866	.0003632	-3.54	0.000	-.0020008 - .0005724
year	-.0116012	.0019384	-5.98	0.000	-.015413 - .0077894
ratioja	-.0152057	.006957	-2.19	0.029	-.0288861 - .0015253
<b>pertrain</b>	<b>3.202655</b>	1.460646	<b>2.19</b>	0.029	.3304203 6.07489
_cons	23.60733	3.844523	6.14	0.000	16.04741 31.16726

Still assessing 418 valid observations over time the following results are observed:

- The effect of having a substantial training program contribution is *strongly positive* and statistically significant.

### REGRESSION 3

The next independent variable (“wagegap1”) considers the effect of the wage gap between the union journeyman wage and the non-union journeyman wage.

```
Fixed-effects (within) regression
Group variable (i): localn
R-sq:  within = 0.1507
        between = 0.0655
        overall = 0.1193
corr(u_i, Xb) = 0.1073
Number of obs = 398
Number of groups = 45
Obs per group: min = 1
                avg = 8.8
                max = 13
F(5,348) = 12.35
Prob > F = 0.0000
```

<i>shareall</i>	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
unemp	-.0016317	.0003633	-4.49	0.000	-.0023462 - .0009172
year	-.0116698	.00191	-6.11	0.000	-.0154263 - .0079133
ratioja	-.0091731	.006846	-1.34	0.181	-.0226378 .0042915
pertrain	2.918408	1.439735	2.03	0.043	.0867307 5.750084
<i>wagegap1</i>	<i>-.0006641</i>	.0002684	<i>-2.47</i>	0.014	-.0011919 - .0001362
_cons	23.76071	3.789107	6.27	0.000	16.30828 31.21314

Assessing 398 valid observations the results are:

- “wagegap1” has a *negative* relationship with market share and is statistically significant.

### REGRESSION 4

The next independent variables considered are:

- “perdues” a measure of dues in the local union as a percentage of the area union wage.

- “perrecov” the market recovery fund contribution as a percentage of the area union wage.

```

Fixed-effects (within) regression
Group variable (i): localn
Number of obs = 268
Number of groups = 42
R-sq: within = 0.1610
      between = 0.2038
      overall = 0.2422
Obs per group: min = 1
               avg = 6.4
               max = 12
F(7,219) = 6.00
Prob > F = 0.0000
corr(u_i, Xb) = 0.2238

```

<i>shareall</i>	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
unemp	-.0020555	.0004753	-4.32	0.000	-.0029921	-.0011188
year	-.0113293	.0027111	-4.18	0.000	-.0166724	-.0059862
ratioja	-.0070631	.0080915	-0.87	0.384	-.0230103	.0088841
pertrain	4.711242	1.91047	2.47	0.014	.9459831	8.476502
wagegap1	-.0002685	.0003395	-0.79	0.430	-.0009376	.0004007
<i>perdues</i> /	<i>1.825256</i>	.8586895	<i>2.13</i>	0.035	.132903	3.517609
<i>perrecov</i> /	<i>-1.006886</i>	.9884169	<i>-1.02</i>	0.309	-2.954913	.9411405
_cons	23.00599	5.375848	4.28	0.000	12.41097	33.601

The result for “perdues” is:

- *Positive* and statistically significant.

It is notable that the number of observations has dropped with inconclusive results for the market recovery independent variable and an unexpected *negative* sign. In order to explore this anomaly two more time-lagged independent variables are computed:

1. “perrec1” the effect of the market recovery variable “perrec” after one year.
2. “perrec2” the effect of the market recovery variable “perrec” after two years.

## REGRESSION 5

In this regression we examine the effects of the market recovery program after one year (“perrec1”) and after two years (“perrec2”) to explore the results encountered under Regression 4. In an effort to exclude spurious effects the data observations will also be limited to only those locals employing market recovery programs in the observed time frame of 1984-1998.

Fixed-effects (within) regression	<b>Number of obs</b>	=	<b>54</b>
Group variable (i): localn	Number of groups	=	15
R-sq: within = 0.4257	Obs per group: min =		1
between = 0.1328	avg =		3.6
overall = 0.3388	max =		11
corr(u_i, Xb) = 0.2752	F(5,34)	=	5.04
	Prob > F	=	0.0015

<i>shareall</i>	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
unemp	-.0020993	.0007486	-2.80	0.008	-.0036206 -.0005779
year	-.0282555	.0071624	-3.94	0.000	-.0428113 -.0136997
<i>perrecov</i> /	<b>-.0169443</b>	1.748018	<b>-0.01</b>	0.992	-3.569343 3.535455
<i>perrec_1</i> /	<b>2.583536</b>	1.285155	<b>2.01</b>	0.052	-.0282128 5.195285
<i>perrec_2</i> /	<b>2.074152</b>	1.399256	<b>1.48</b>	0.147	-.7694786 4.917783
_cons	56.76295	14.26675	3.98	0.000	27.76943 85.75648

While the regression shows a *positive* and statistically significant result after one year, most results are statistically insignificant and unreliable. There are insufficient observations in this dataset to conclusively evaluate the effects of a market recovery program on market share. Results may also be due to the fact that most local unions only implemented market recovery programs while experiencing a dramatic decrease in market share, hence the positive effects are not shown for some time.

## REGRESSION 6

The final independent variable considered is “perind.” This measure represents the industry fund contribution as a percent of the area wage.

```

Fixed-effects (within) regression
Group variable (i): localn
Number of obs = 268
Number of groups = 42
Obs per group: min = 1
                  avg = 6.4
                  max = 12
R-sq:  within = 0.1708
        between = 0.1235
        overall = 0.1819
corr(u_i, Xb) = 0.1416
F(8,218) = 5.61
Prob > F = 0.0000

```

<i>shareall</i>	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
unemp	-.0020742	.0004737	-4.38	0.000	-.0030078 -.0011406
year	-.0103051	.0027756	-3.71	0.000	-.0157756 -.0048346
<i>ratioja</i>	-.0088013	.0081349	<b>-1.08</b>	0.280	-.0248343 .0072318
pertrain	4.00534	1.953722	2.05	0.042	.1547383 7.855941
<i>wagegap1</i>	-.0002297	.0003392	<b>-0.68</b>	0.499	-.0008982 .0004388
perdues	1.74871	.8569385	2.04	0.042	.059765 3.437655
<i>perind</i>	<b>5.570655</b>	3.469169	<b>1.61</b>	0.110	-1.266748 12.40806
perrecov	-.8149718	.9920992	-0.82	0.412	-2.770306 1.140362
_cons	20.95006	5.507469	3.80	0.000	10.09536 31.80476

The regression shows a *positive* relationship with a marginal (at the 5% level) yet significant t-statistic given the number of observations. Statistical significance (reliability) has been lost for *ratioja* and *wagegap1* now that these independent variable effects are considered in their entirety.

Table 10 shows the results of the regression ranked for their effect on market share after all the effects of the independent variables are taken into account. Note the strongest positive effects on market share are achieved through the effects of the training fund contribution, the percent dues contribution and the percent industry fund contribution.

TABLE 10

VARIABLE	Amount of Effect	T-Statistic	STATISTICALLY VALID ?	MARKET SHARE IMPACT
% Training Contribution	For each 1% increase (compared to wage) = 4% gain in market share	2.05	Yes	1
% Dues Contribution	For each 1% increase compared to wage = 1.74% increase in market share	2.04	Yes	2
% Industry Fund Contribution	1% increase in industry fund contribution (compared to wage) = 5.5% increase in market share	1.61	Marginally (at the 5% Level)	3
Year to Year Trend	For each additional year (correcting for all other independent variables) = 1% decrease in market share	-3.71	Yes	4
% Unemployment in Local	1% rise in local unemployment = 2/10ths of 1% decrease in market share	-4.38	Yes	5
Journeyman to Apprentice Ratio	For an increase of one (going from 3 to 4 journeyman before an apprentice can be added to the crew) = 8/10ths of 1% decrease in market share	1.08	No (Unreliable)	6
% Market Recovery Contribution	1% increase in market recovery fund (compared to wage) = 8/10th of 1% reduction in market share	-0.82	No (unreliable)	7
Union to Non-Union Journeyman Gap	For each increase of 1% in wage gap = 2/100ths of one% decrease in market share	-0.68	No (Unreliable)	8

## CONCLUSIONS AND RECOMMENDATIONS

Concessionary bargaining has only the smallest of effects on market share. There are some conditions that negatively affect a given area's market share. The market share has been declining over time and unemployment brought on by the economic cycle of boom and bust in the construction industry is no help, yet notable trends emerge from this paper that can be used as instruments of policy that have a positive effect on market share:

The concessionary bargaining tactic most often employed during negotiations in this time period (and of the most impact to the union membership) was wage concessions in an effort to regain market share. This paper analyzed the effect on market share between the union journeyman wage and the non-union journeyman wage and found it had no impact on market share. Regression 3 showed only a 6/100ths of 1% decrease in market share for a 1% increase in this wage gap. Even that miniscule effect disappears when the other factors are taken into account. The results show that overall, a superior wage for union journeymen does not affect market share, and a gap in wages between the union and non-union journeymen is statistically insignificant.

A possible solution for local unions and union contractors seeking to lower crew costs and retain skilled employees through the practice of sustaining union journeyman wages would be to narrow the gap by *increasing* the non-union wage through organizing efforts and the acceptance of non-union employees to limit the available skilled manpower to their competition. This also suggests the unionized contracting industry benefits through

market share gains by actively supporting union organizing efforts. Contractors would also benefit from organizing gains through the creation of a level playing field for competition between union contractors and the non-union open shop. Union contractors further benefit from a reliable pool of skilled craftsmen which frees the contractors to grow in their respective construction market: a luxury the non-union contractor does not have.

Another tactic of concessionary bargaining was to decrease the journeyman to apprentice ratio. The results on market share are statistically insignificant and suggest no real advantage to a union or union contractor employing this strategy to reduce crew costs.

The evidence clearly and strongly showed that local unions with a substantial investment in their training program produced some of the strongest results in building market share. The enhanced productivity brought about through extensive and detailed training has long been known to be an asset in general. The statistical analysis provided herein shows a concomitant effect on market share as well. It may also be a sign that larger well equipped training facilities are more attractive to potential union contractors. Either way, effective training programs geared for their local construction markets are always a winner.

Building a stronger union organization has a strong and significant effect on building market share second only to a strong training program. In the author's experience of twenty years in the Labor Movement and with ten of those spent as a full-time organizer,

building a stronger union organization includes both strong organizational dynamics and traditional organizing:

- Membership education about the principles of the Labor Movement.
- New member orientations.
- Strategic planning.
- Internal and external organizing campaigns.
- Designing collective empowerment strategies using both National Labor Relations Board (NLRB) and non-board organizing.
- Building community coalitions.
- Working more effectively with media.
- Mobilizing workers and community partners for actions and meetings.
- Maintaining accurate worksite tracking.
- Developing systems to track worker and employer data.
- Identifying relevant regulatory, legal, legislative, community, and political issues.
- Investigating and maintaining an equal application of building codes, standards, bidding practices, and other construction and employment law.
- Educating local construction consumers and decision makers of the advantages to them brought by the unionized industry.
- Servicing the existing membership.

Building a strong union organization requires leadership, a strategic plan, and the will to overcome negative market conditions through the education and empowerment of their membership. Building a strong union also requires a financial investment to provide the

many services engendered under a successful organizational model that includes leadership development. The data results are clear evidence that the unionized contracting industry *actually benefits* through market share gains when partnered with strong union organizations.

Building a stronger and more competitive contractor organization through industry fund investment also produces measurable gains in market share. Ranked third in these results because of a marginal t-statistic, a strong contractor organization still has clear effects on market share gain. In a telephone interview with Dennis Bradshaw, Executive Director of Member Services for National SMACNA, strong contractor chapter qualities include:

- Strong labor management relations programs that seek true partnering.
- Development of new technical standards.
- Enhanced training efforts tailored by the area's construction market's priorities.
- Professional marketing research and programs to educate construction consumers.
- Outreach programs to construction industry decision makers.
- Promotion of new technologies such as the internet to enhance market presence.
- Best value contracting policy promotion.
- Market sector councils that discuss and educate members concerning industry best practices.

Mr. Bradshaw emphasized that, in conjunction with sound national-level programs, local chapter programs can be the most efficient because they are specifically tailored to an individual construction market.

Similar qualities in MCA Chapter operations were recognized by Robert Bergman,

Executive Director of the Utah Mechanical Contractors Association:

- Organization must be financially stable with reserves of 12 to 18 month operating budget.
- Organization must be adequately staffed to provide a multitude of services.
- Organization must have strong board leadership with active participation from membership in the committee process.
- Organization must have a strong commitment to cooperative Labor-Management relations.
- Organization should have a active role in governmental affairs.
- Organization must be diversified and offer additional services beyond labor-relations that add "value" to membership.
- Organization should be active in regional/national MCA activities to see what is happening around them in different markets.

While St Louis Missouri is not in the Western United States, it is a large and well respected MCA Chapter. John Siscel, Ed. D., CAE, Executive Vice President of the MCA of Eastern Missouri added comments through email stating:

“A successful organization must focus on involvement of its members. This does not mean, however, that all members will be involved in the same way, at the same time, in the same depth or with the same commitment but, without exception, involved. There are "dues paying" involved members. There are "information seeking" involved members.

There are "name dropping" involved members and there are "social" members. These are on top of the "active" members. All, however, regardless of category need to be serviced. Bob's (Bergman of the Utah MCA) list accurately mentions board leadership. This is very crucial. It is the role of the Chief Staff Executive to make certain that the leadership succession tree has enough fertilizer, etc. to bear the "right fruit". One of the most important functions I have is looking to the successive leadership. I am proud to say our leadership is KNOWINGLY 7 years identified for the future until 2012, barring any unforeseen problems. This is a big positive, in my book. Also, I have found that, without question, two other items do make a real difference. The first is Strategic Planning. Since I have been here [1/90] we have, every three years, had a facilitated strategic planning session which has proven invaluable in its contribution to our association. The other is to take, as I do, our incoming President to the ASAE Chief Executives Symposium every other year. It, likewise, has been of inestimable value.”

A clear syllogistic argument emerges from this real-world data analysis: market share can be best regained by strong efforts of both labor and management working together to organize their industry. There are many common themes in the qualities of both an effective union, and an effective contractor organization reinforcing the need for the development of a common agenda promoting organizing, education, and marketing.

## LIMITATIONS

Data on market share assessments were most often assessed by MCA or SMACNA Chapter Executive Directors which could be construed as arbitrary, yet consistent in their ability to assess market share over time. Statistical techniques were used to compensate for these effects including weighting the results and the use of statistical dummies to compensate for changes in personnel over time.

The Western Mechanical Labor Management Conference data was comprised of more mechanical contractors than sheet metal contractors. In statistics, more observations in the dataset always produce clearer results. Participation by a given area also varied by year i.e. some areas participated throughout the entire time period while others attended sporadically.

Given a longer time frame in which to complete this paper many additional factors could be examined for their influence on market share:

- A statistical interaction term could be computed to further demonstrate the effects on market share when both factors of strong unions and strong contracting industry chapters were combined.
- What is the actual cost to the union wage package for each percent of lost market share in inflation adjusted dollars?
- Other aspects of concessionary bargaining could be assessed statistically. Wages were considered the primary consideration for the purposes of this paper.

- How do the hiring practices of an apprenticeship program affect market share?
- Does adding apprentices during a market upturn add to market share?
- Does the cessation of apprentice hiring during market downturns protect the existing union membership?
- Can an optimal level of apprenticeship hiring be established based on the economic cycle?

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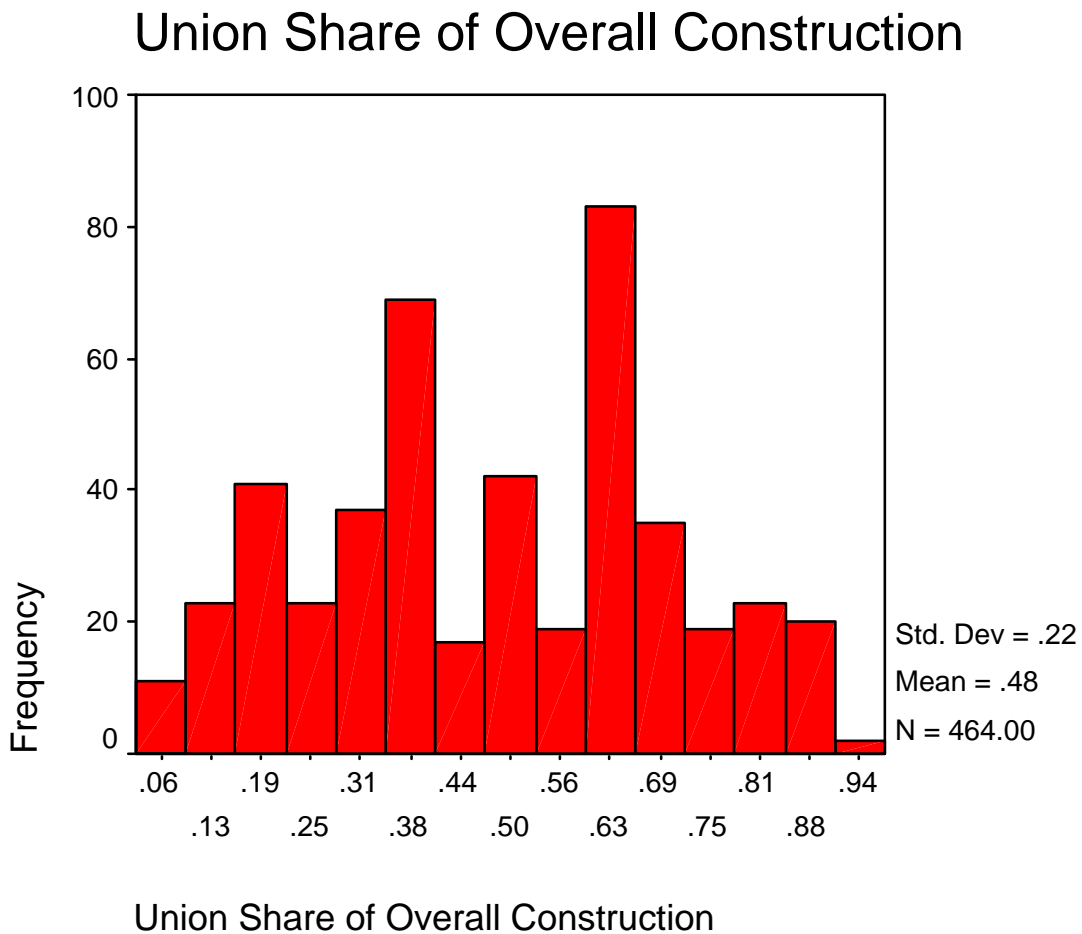
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## APPENDIX

Graph 2 is a frequency graph denoting the distribution of the data for our dependent variable. If the dependent variable is not normally distributed (as a normal Bell curve would be) results could become unreliable. During the construction of our statistical model statistical testing was employed using various techniques to ensure the consistency of this paper's results. Abnormal distribution of independent variables will not affect this paper's statistical results.

GRAPH 2



## INDEPENDENT VARIABLE TABLES

Table 11 shows the unemployment as an averaged percentage of local union membership by State. It shows how the average unemployment varied in the Western United States over time for the sheet metal and mechanical industries. Unemployment went down in the economic boom times of the 1990's. . Independent variable is "unemp."

TABLE 11

Year	Unemployment in Local	
1984	Unemployment in Local	26
1985	Unemployment in Local	25
1986	Unemployment in Local	24
1987	Unemployment in Local	27
1988	Unemployment in Local	30
1989	Unemployment in Local	29
1990	Unemployment in Local	24
1991	Unemployment in Local	22
1992	Unemployment in Local	24
1993	Unemployment in Local	22
1994	Unemployment in Local	19
1995	Unemployment in Local	15
1996	Unemployment in Local	12
1997	Unemployment in Local	15
1998	Unemployment in Local	.

Table 12 shows the averaged journeyman to apprentice ratio by year combined for both sheet metal and mechanical local unions. It demonstrates how the journeyman to apprentice ratio varied over time. Independent variable is “ratioja.”

TABLE 12

Year	1984	Journeyman-Apprentice Ratio	3.20
	1985	Journeyman-Apprentice Ratio	2.92
	1986	Journeyman-Apprentice Ratio	2.96
	1987	Journeyman-Apprentice Ratio	2.80
	1988	Journeyman-Apprentice Ratio	3.09
	1989	Journeyman-Apprentice Ratio	3.38
	1990	Journeyman-Apprentice Ratio	3.05
	1991	Journeyman-Apprentice Ratio	3.00
	1992	Journeyman-Apprentice Ratio	3.08
	1993	Journeyman-Apprentice Ratio	3.22
	1994	Journeyman-Apprentice Ratio	3.46
	1995	Journeyman-Apprentice Ratio	3.41
	1996	Journeyman-Apprentice Ratio	3.44
	1997	Journeyman-Apprentice Ratio	3.57
	1998	Journeyman-Apprentice Ratio	3.44

Table 13 shows the averaged apprentice contribution as a percentage of the wage combined for both sheet metal and mechanical local unions. It demonstrates how the contribution varied over time. Independent variable is “pertrain.”

TABLE 13

Year	Apprentice Contribution as % of Wage	
1984	Apprentice Contribution as % of Wage	.01
1985	Apprentice Contribution as % of Wage	.01
1986	Apprentice Contribution as % of Wage	.01
1987	Apprentice Contribution as % of Wage	.01
1988	Apprentice Contribution as % of Wage	.01
1989	Apprentice Contribution as % of Wage	.01
1990	Apprentice Contribution as % of Wage	.01
1991	Apprentice Contribution as % of Wage	.01
1992	Apprentice Contribution as % of Wage	.01
1993	Apprentice Contribution as % of Wage	.01
1994	Apprentice Contribution as % of Wage	.02
1995	Apprentice Contribution as % of Wage	.02
1996	Apprentice Contribution as % of Wage	.02
1997	Apprentice Contribution as % of Wage	.02
1998	Apprentice Contribution as % of Wage	.02

Table 14 shows the percentage relationship between the union journeyman wage and the non-union journeyman wage by year. Example: in 1984 the non-union journeyman wage was 59% of the union journeyman wage. It demonstrates how the gap between union and non-union journeyman wages narrowed over time. Independent variable is “wagegap1.”

TABLE 14

Year	1984	% of Nonunion Journeyman Wage	59.08
	1985	% of Nonunion Journeyman Wage	41.83
	1986	% of Nonunion Journeyman Wage	41.76
	1987	% of Nonunion Journeyman Wage	35.79
	1988	% of Nonunion Journeyman Wage	35.58
	1989	% of Nonunion Journeyman Wage	34.48
	1990	% of Nonunion Journeyman Wage	26.87
	1991	% of Nonunion Journeyman Wage	34.57
	1992	% of Nonunion Journeyman Wage	35.64
	1993	% of Nonunion Journeyman Wage	32.15
	1994	% of Nonunion Journeyman Wage	34.94
	1995	% of Nonunion Journeyman Wage	35.38
	1996	% of Nonunion Journeyman Wage	28.79
	1997	% of Nonunion Journeyman Wage	21.87
	1998	% of Nonunion Journeyman Wage	29.40

Table 15 shows the percentage relationship between dues and the wage by year. Example: in 1984 dues was 1% of the wage. It demonstrates how the dues increased over time. Independent variable is “perdues.”

TABLE 15

Year	1984	Dues as % of Wage	.01
	1985	Dues as % of Wage	.01
	1986	Dues as % of Wage	.02
	1987	Dues as % of Wage	.02
	1988	Dues as % of Wage	.02
	1989	Dues as % of Wage	.02
	1990	Dues as % of Wage	.02
	1991	Dues as % of Wage	.02
	1992	Dues as % of Wage	.02
	1993	Dues as % of Wage	.02
	1994	Dues as % of Wage	.02
	1995	Dues as % of Wage	.03
	1996	Dues as % of Wage	.03
	1997	Dues as % of Wage	.03
	1998	Dues as % of Wage	.

Table 16 shows the percentage relationship between the industry fund contribution and the wage by year. Example: in 1984 the industry fund contribution was less than 1% of wage. It demonstrates how the industry fund contribution varied over time. Independent variable is “perind.”

TABLE 16

Year	Industry contributions as % of wage	
1984	Industry contributions as % of wage	.00
1985	Industry contributions as % of wage	.00
1986	Industry contributions as % of wage	.01
1987	Industry contributions as % of wage	.01
1988	Industry contributions as % of wage	.01
1989	Industry contributions as % of wage	.01
1990	Industry contributions as % of wage	.01
1991	Industry contributions as % of wage	.01
1992	Industry contributions as % of wage	.01
1993	Industry contributions as % of wage	.01
1994	Industry contributions as % of wage	.01
1995	Industry contributions as % of wage	.01
1996	Industry contributions as % of wage	.00
1997	Industry contributions as % of wage	.01
1998	Industry contributions as % of wage	.00

Table 17 shows the percentage relationship between the market recovery fund and the wage by year. Example: in 1984 the market recovery fund contribution was less than 1% of the wage. It demonstrates how the market recovery fund wages varied over time. Independent variable is “perrecov.” It will be explained in the results how few observations of market recovery fund contributions were available in this time period. (See also Table 7 and Regression 5)

TABLE 17

Year	1984	Market Recovery as % of Wage	.00
	1985	Market Recovery as % of Wage	.00
	1986	Market Recovery as % of Wage	.00
	1987	Market Recovery as % of Wage	.00
	1988	Market Recovery as % of Wage	.00
	1989	Market Recovery as % of Wage	.00
	1990	Market Recovery as % of Wage	.00
	1991	Market Recovery as % of Wage	.00
	1992	Market Recovery as % of Wage	.00
	1993	Market Recovery as % of Wage	.00
	1994	Market Recovery as % of Wage	.01
	1995	Market Recovery as % of Wage	.01
	1996	Market Recovery as % of Wage	.01
	1997	Market Recovery as % of Wage	.01
	1998	Market Recovery as % of Wage	.00