

A Flawed Evaluation of the Department of Workforce Development's Prevailing Wage Survey

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Key Findings

- Wisconsin Taxpayers Alliance asserts that the Wisconsin Department of Workforce Development's prevailing wage rates are inaccurately high based on the claim that only 25% of Wisconsin's blue-collar construction workers receive union wages and benefits.
- In fact, statewide union coverage of the Wisconsin blue-collar, nonresidential construction labor force is 57% and in larger Wisconsin counties, the share is higher.
- Proper adjustments for union share show the DWD surveys are accurate.
- The Taxpayers Alliance's claim that Wisconsin would have saved \$299 million if only the DWD's surveys had been accurate is false. This is because their claim that the DWD's survey is inaccurately finding wages that are too high, is, itself, false. The Taxpayers Alliance hoped-for savings is a mirage.

Nontechnical Summary

The Alliance's Argument

The Wisconsin Taxpayers Association says that the Wisconsin Department of Workforce Development (DWD) does a bad job in its prevailing wage survey. According to the Association, the DWD is finding too many union hours and not enough nonunion hours in blue-collar construction. As a consequence, the prevailing wages proclaimed for specific crafts in specific Wisconsin counties are too high reflecting too many union wages. If the DWD got it right, prevailing wages would be lower, and the state would save almost \$300 million on public construction.

The Alliance says it knows that the DWD is finding too many union hours and not enough nonunion hours because, for some crafts in some counties, the DWD finds more than 80% of the construction hours are union. According to the Alliance, union members are only 25% of all construction employees-- so if unions only account for 25% of the workers, how can the DWD's survey find 80% of the hours worked by union members?

What's Wrong with the Alliance's Analysis?

- The DWD surveys hours in each county for each blue-collar construction occupation. The Alliance uses just one number across all crafts and all counties in Wisconsin.
- The DWD surveys actual hours. The Alliance uses a headcount instead of hours, and then tries to translate that into hours.

- The DWD counts only blue-collar construction workers because prevailing wage regulations only apply to blue-collar workers. The Alliance includes architects, engineers, managers, clerical workers and other professional white-collar workers, none of whom are regulated by prevailing wages.
- The DWD's approach captures differences in the union-nonunion mix of hours separately for each craft. The Alliance does not have that kind of data and simply says well, sometimes union hours are maybe twice as much as what the Alliance finds.
- The DWD breaks out building from highway work. The Alliance does not.
- The DWD typically excludes residential construction which typically is not regulated by prevailing wages. The Alliance includes residential construction.

Bottom Line

When all is said and done, the Alliance's corrected headcount for the entire state shows a 57% union/43% nonunion headcount. In counties in Wisconsin's southeast, that split is more heavily union. When that headcount is adjusted for hours, it becomes even more heavily union.

So the 80% union hours found by the DWD is really pretty accurate. And the savings the Alliance thinks it has found is not really there. It's a mirage.

Introduction

The thrust of the Wisconsin Taxpayers Alliance report, "Evaluating Wisconsin's Approach to Determining Prevailing Wages," (March 2015) is that the Wisconsin Department of Workforce Development's survey yields prevailing wage rates that are too high. This conclusion is wrong because the Taxpayer Alliance Report's estimate of union coverage in Wisconsin blue-collar nonresidential construction industry is way too low.

- Their estimate is too low because they include white-collar employees in the construction industry and white-collar employees are not covered by prevailing wage regulations.
- Their estimate is too low because they improperly include residential construction workers when prevailing wages do not typically apply to home construction.
- Their estimate is too low, because they include union members and exclude workers covered by a union contract that are paid union wages, but who are not union members.
- Their estimate is also too low, because they do not adequately take into account that there are differences in union coverage rates both by county and by craft.
- Their estimate is also inappropriate because they use a headcount to calculate union coverage when the DWD's survey uses hours worked.

When these mistakes are repaired, it turns out that the Wisconsin DWD prevailing wage surveys are accurate and the Taxpayers Alliance claim of having found a \$299 million savings¹ is a mirage.

The Alliance Report's Argument

In the Executive Summary of the Wisconsin Taxpayers Alliance Report, the author states that the problem with the Wisconsin survey is that:

The union/non-union split in hours reported in the survey does not reflect the overall construction industry. Approximately 25% of the industry is unionized in Wisconsin, but 87% of the hours reported are covered under union contracts. This tends to raise prevailing wage rates above market rates.ⁱⁱ

We will show below that, in fact, in nonresidential construction, (that part of construction where prevailing wage regulations apply), 57% of all blue-collar workers are covered by a union contract--not 25%.

We agree with the Alliance Report that unionization rates in some counties have union coverage ratios that are much higher than the state-wide average of 57%. We also agree with the Alliance Report that some crafts have higher unionization rates than others. However, the Alliance has not properly adjusted for these facts.

The Taxpayers Alliance mistakes matter because the Alliance's estimate of a 25% union coverage ratio is the basis for its conclusion that the Wisconsin Department of Workforce Development's prevailing wage survey generates inaccurately high wage rates.

We will show using the Alliance's own analysis and example for roofers, that the DWD wages are, if anything, too low, not too high. We will also show that in their second example for carpenters, the DWD survey results are basically accurate.

The Centrality of the Alliance's Mistake

The Taxpayers Alliance Report relies upon their mistaken underestimate of union coverage in multiple places in their Report including in a text box on page 6 stating:

More than 80% of reported survey hours are covered under a collective bargaining agreement, yet only 25% of Wisconsin construction workers are union members.ⁱⁱⁱ

If, as we will argue, the statewide average union coverage ratio is, in fact, 57% and if more of the DWD surveys come from more populous counties with higher union density, in those counties, and if union workers work on bigger jobs with more hours, any or all of these factors could raise the underlying relevant hours for the DWD survey to 80%, well above the 25% headcount the Alliance Report relies upon.

The Alliance again relies upon this assertion of a 25% union coverage ratio on page 9 stating:

From this discussion, it should be evident that data collected from Wisconsin's prevailing wage survey are likely not to represent the actual construction labor market. The union/nonunion mix

in the industry is approximately 25%/75%. In the building/heavy construction sector, union representation may be slightly higher, but not the 85% reflected in DWD survey responses.^{iv}

If the Alliance means to contrast "building/heavy construction" with residential construction, all industry observers agree that unionization rates in "building/heavy construction" are not slightly, but considerably higher, than in residential home building. The Alliance fails to adequately adjust for this fact.

The Alliance's research staff (there is no signed author of the report nor does the report provide the author(s) qualifications) applies their mistake to their key result on page 10. They state:

We do not have enough information to correct the shortcomings of Wisconsin's prevailing wage survey. However, the survey data can be weighted to estimate the magnitude of error in prevailing wages the DWD survey produces.

For the 10 largest counties, we calculate an average compensation package separately for reported union and non-union hours, using responses from the DWD survey. Those amounts are then weighted using the construction industry unionization rate (25% union, 75% non-union). Recognizing that unionization rates might be higher for some occupations and in some counties, we also apply 50%/50% weights to the data. These provide estimates of what average compensation might look like if all contractors had responded to the survey.

In general, weighting DWD data to better reflect the market produces results that differ significantly from an unweighted average. For example, in Milwaukee County, unaltered survey data for roofers returns an average wage of \$41.66. However, if the data were weighted to reflect a 25% unionization rate, the average would fall to \$27.87, a nearly 50% difference.^v

However, if, as we will show below, the correct statewide average union coverage ratio for nonresidential blue-collar construction workers in Wisconsin is 57% rather than 25%, then the Alliance Report supports the accuracy of DWD prevailing wage surveys. For instance, using the Alliance's 50/50 mix of union and nonunion wages, for roofers shown in the Alliance Report Table 3, by the Alliance's own calculations, the DWD missed high in three counties and low in five counties.

Missing high three times and low five times is not evidence that DWD is coming in with wages that are too high. Rather, this suggests the DWD wages are conservative and accurate.

But a closer look at the allegedly too-high wages for roofers in Table 3 of the Report shows that the Alliance methodology is flawed.

The Alliance readily admits that "unionization rates might be higher for some occupations and in some counties."^{vi} Nonetheless, the Alliance uses statewide union coverage ratios for its three, putatively too-high, roofer misses. These misses are found in Milwaukee, Waukesha and Racine counties. Milwaukee, Waukesha and Racine are exactly the counties where we would expect county unionization rates to be

higher than the statewide average. If the Alliance had made the proper adjustment, their "high misses" for roofers would all disappear and there would be nothing to fault the DWD survey.

But Table 3 also considers the carpenters wage. The Alliance Report states:

The carpenter data is dominated by union hours. There, the average of unweighted data can be as much as 75% higher (Kenosha) than weighted data.^{vii}

But Kenosha, the Wisconsin county closest to Chicago, is right where we would expect county unionization rates to be well above the statewide union coverage rate.

And we would expect carpenters to have a unionization rate higher than that of roofers.

Using the Alliance's own numbers, adjusting the union coverage ratio from 25% to 50% drops the claimed overestimate for carpenters in Kenosha from 75% to 39%. But the statewide coverage ratio is not 50%--its 57%. And the Kenosha coverage ratio is easily much higher than the statewide rate. And the carpenter's rate may be even higher than that in Kenosha.

In addition, the DWD wage rates are based on hours worked. Because union contractors, especially in more urbanized or industrialized areas, will tend to have a higher share of larger jobs with more hours, union workers in these areas will tend to work more hours than their nonunion counterparts on smaller, nonunion jobs.

The Alliance benchmark for judging the DWD surveys is not the mix of union and nonunion hours, but rather a headcount of union and nonunion members. If during the DWD survey, union members and those nonunion members working under a union contract--say a nonunion contractor on a project labor agreement--worked more hours than their nonunion counterparts, the DWD survey would capture this fact and the Alliance's headcount adjustment would miss this fact.

So the bottom line is simple: the Alliance Report failed to provide an accurate estimate of union wage coverage rates by county, craft and hours. But the underlying DWD is, in fact, sensitive to just exactly these factors. The Alliance's conclusion that the DWD surveys are inaccurate and generate wage rates that are too high is, itself, an inaccurate and unreliable conclusion.

The remainder of this review explains why the Alliance Report misunderstood the data it was using in generating its mistake that 25% of Wisconsin blue-collar nonresidential construction workers' hours were covered by union wages and 75% were not.

Appendix: The Taxpayer Alliance's Arithmetic

We will show that in more heavily unionized counties, union coverage rates for building/heavy construction of 85% are entirely reasonable. With a statewide average for nonresidential construction of 57% across all blue-collar occupations, surveys for more heavily unionized occupations done in more heavily unionized counties could easily be 85% or above. But first, where did the Alliance Report get its data?

It is generally accepted practice when writing an academic or statistical report to cite where you get your data. This is especially important if the data you are relying upon is the basis for your analysis. But the Alliance does not do this. Nowhere in the Taxpayer Alliance Report does it state where the author obtained the data that served as the basis for the claim that the union/nonunion blue-collar construction mix was approximately 25%/75% union/nonunion in Wisconsin.¹

However, scholars familiar with the construction labor market know that the Alliance most likely got their data from one of two sources: either they went to the underlying individual-level data from the outgoing rotational group of the Current Population Survey published by the U.S. Census and Bureau of Labor Statistics;^{viii} or, more likely, they relied upon spreadsheet compilations from the underlying CPS data provided by Barry T. Hirsch and David A. Macpherson.^{ix}

In either case, the Taxpayer Alliance Report does not understand the data they have relied upon. Because of this, the Alliance makes five misleading errors in their calculation. The five mistakes are:

- First, the Report's author wants to know, and needs to know, who is covered by a union contract, getting paid union wages, and who is not. This number will be used to judge the DWD survey.
 - But instead of using the available data for who is *covered* by a union contract, an estimated 30,774 blue-collar construction workers, the author uses a lower number for those who are union members, 29,579. Choosing the lower number is a statistical misdemeanor, not a felony. The numbers do not move around much. But it suggests that the author did not understand the data the author was using. It is also possible, but less likely, that the author had an unconscious bias leading to picking the lower number. Whichever the case, both misunderstanding data or unconscious biases can result in misleading conclusions.
- Second, and more importantly, the Alliance author forgets, or did not know, that contractors employ both blue and white-collar workers.
 - The fact is that in Wisconsin, white-collar workers constitute 28% of all construction contractors employees.^x Construction contractor white-collar workers include accountants, estimators, engineers, architects, managers, clerical workers, security guards, lawyers and all sorts of other white-collar workers not covered by prevailing wage regulations.
 - Hirsch--if that is the author's source--divides the number of blue-collar construction workers covered by a union contract by the number of blue-**and**-white-collar employees contractors employ to obtain the 26.4% of all contractor employees covered by a union

¹ There is no reference to the Current Population Survey (CPS) from which data like this can come. Nor is there a reference to any compilation of CPS data such as that available from Hirsch and MacPherson (see endnotes). The four appendices in the Report do not discuss the Report's union coverage data. Many authors are cited in the bibliography including the author of this critique (4 times). None of these bibliographical references, however, can account for their assertion because their datum is for 2014 and the most recent publication date cited in the bibliography is 2008.

contract. Hirsch does this because he is trying to use a consistent approach across all industries and is not interested in the specific fact for construction, that it is blue-collar workers who are in unions.

- When white-collar construction employees are removed from the calculation, the percent workers covered by a union contract in Wisconsin rises to 37%.
- Third, residential blue-collar construction workers are also included in the Taxpayer Alliance's calculation.
 - Prevailing wages rarely apply to new home building or home repairs.
 - When residential construction workers are removed from the calculation, the percent nonresidential blue-collar construction workers covered by a union contract is accurately calculated at 57% of all nonresidential blue-collar construction workers in Wisconsin.²
- Fourth, while the Alliance report recognizes that specific counties and crafts can have much higher union coverage ratios than the 57% statewide average, in Table 3, they fail to adequately account for this.
 - They think they have accounted for differential union density by craft and county by providing a 50% coverage ratio which appears to them to be quite high because it is double their mistaken 25% statewide average.
 - But because the statewide average is actually, 57%, they have, in fact, made no adjustment at all for higher union density in some counties and some crafts compared to the statewide average.
- Fifth--the DWD survey is based on hours of work. Union contractors tend to work larger jobs which will typically have more hours of work. The Alliance attempts to adjust the DWD data based on union coverage data that are head-counts, not hours of work. So if union contractors have bigger jobs with more hours, that fact will show up in the DWD data counting hours. When the Alliance says--based on our headcount of union and nonunion workers, there are too many union hours, part of their mistake can easily be that the union workers, in an area where the jobs are big, are getting more hours.
- In addition to these mistakes, the Alliance report plays hide-the-ball by not citing where they got their data.
 - We cannot know whether this was an oversight or on purpose.
 - But because key mistakes were made in using data, which they did not source, sloppiness becomes a telltale dimension of their analysis.

Calculating the Correct Statewide Average Union Wage Coverage Ratio

Table 1 shows how we calculate that blue-collar non-residential construction workers covered by a union contract account for a 57% share of all nonresidential construction workers in Wisconsin.

² The details of these calculations are provided below.

- To show this, we begin with the same total employment figure used by the Taxpayers Alliance³-- 116,485 construction-contractor blue-and-white-collar employees in Wisconsin in 2014.^{xi}
- Based on data from the U.S. Economic Census, Construction, Geographic Series, for Wisconsin, blue-collar construction workers are 72% of this total or 83,869 blue-collar workers.^{xii}
- Based on current national average residential and nonresidential shares of construction by value, non-residential blue-collar workers are 64% (or 54,012) of all construction blue-collar workers (83,869).^{xiii}
- Of these 54,012 nonresidential blue-collar construction workers, we and the Taxpayer's Alliance both use the same number for blue-collar workers covered by a union contract, 30,774.^{xiv}
- Thus, $(30,774)/(54,012)=57\%$ of all nonresidential blue-collar workers in Wisconsin in 2014 were, in fact, covered by a union contract.

Table 1: Signatory Contractors' Share of the Nonresidential Construction Market in Wisconsin, 2014

| Wisconsin Construction: Union Contractors Share of Nonresidential Market, 2014 | | | | |
|--|--|--|---------------------------|---|
| All Employees (both blue-collar and white-collar) | Blue-collar Construction Workers (72% of all contractors' employees) | Nonresidential Blue-collar Employees (64% of all blue-collar construction workers) | Covered by Union Contract | Union Contractors' Share of Nonresidential Construction |
| 116,485 | 83,869 | 54,012 | 30,774 | 57% |

Recap:

- Total white and blue-collar construction workers in Wisconsin in 2014 = 116,485
- 72% of this total were blue-collar construction workers = 83,869
- 64% of these blue-collar construction workers worked outside of residential construction =54,012
- 30,774 of these non-residential blue-collar construction workers were covered by a union contract = 57%

This number will be higher in more urban counties such as the ten largest counties in Wisconsin shown in Table 3 of the Alliance Report. Yet instead of a percentage higher than 57%, the Report focuses on a

³ This assumes that they have either compiled the CPS data themselves or relied upon Hirsch and MacPherson. This, of course, cannot be known for sure because they do not cite their data source.

mistaken 25% and uses a 50% high end for the most densely populated and highly unionized crafts and counties.

The Alliance's criticism of the DWD prevailing wage survey is simple. They say the DWD is capturing too many union wages because union coverage is only 25% and the DWD can get wages for some occupations and counties of more than 80%. But if you start with a baseline of 57%, 80%, 85% and 80%, union wages are not unreasonable in highly unionized counties or for highly unionized crafts. And furthermore, the CPS data that is the basis for 57% is a head count--not a count of hours. The DWD data counts hours. So if union contractors have bigger jobs with more hours, that will show up in the DWD data and not in the Alliance's misguided efforts to readjust their data.

Biography

Peter Philips (PhD Stanford, 1980) is a Professor of Economics at the University of Utah. He has published widely on a variety of issues concerning the construction labor market including issues of training, safety, bidding and regulation. Philips is a nationally recognized expert on the construction labor market. He served as the only economist on the National Academies panel evaluating construction safety research at NIOSH. Philips served as an expert in the U.S. Court of Federal Claims on construction labor shortages, and he has served as an expert on the Davis Bacon Act (the federal prevailing wage law) for the U.S. Justice Department. Philips has published multiple articles and books on prevailing wage laws. The Alliance Report cites four of Philips' older prevailing wage papers:

1. (1995) Philips, P.; Mangum, G.; Waitzman, N.; and Yeagle, A. "Losing Ground: Lessons from the Repeal of Nine 'Little Davis-Bacon Acts.'" Department of Economics, University of Utah.
2. (2001) Philips, P. "A Comparison of Public School Construction Costs In Three Midwestern States that Have Changed Their Prevailing Wage Laws in the 1990s: Kentucky, Ohio and Michigan." Department of Economics, University of Utah.
3. (2002) Azari-Rad, H; Philips, P.; and Prus, M. "Making Hay When it Rains: The Effect Prevailing Wage Regulations, Scale Economies, Seasonal, Cyclical and Local Business Patterns Have on School Construction Costs." *Journal of Education Finance*. Vol. 23, pp. 997-1012.
4. (2003) Azari-Rad, H; Philips, P.; and Prus, M. "State Prevailing Wage Laws and School Construction Costs." *Industrial Relations* Vol. 42, No.3, pp. 445-47.

More recent articles on prevailing wages by Professor Philips include;

5. (2005) Hamid Azari-Rad, Philips, Peter and Prus, Mark, *The Economics of Prevailing Wage Laws*, Ashgate Publishers, Burlington, VT, 2005, 262 pp. index.
6. (2006) Duncan, Kevin, Philips, Peter and Prus, Mark, "Prevailing Wage Legislation and Public School Construction Efficiency: a Stochastic Frontier Approach," *Construction Management and Economics*, Vol. 24 pp. 625-634.
7. (2008) Duncan, Kevin, Philips, Peter and Prus, Mark, "Prevailing Wage Laws, Productivity and Construction Efficiency?" *Construction Management and Economics Conference. Proceedings of the Inaugural Construction Management and Economics, "Past, Present, and Future."* Edited by Will Hughes. First Published 2008, pp 1411-1418. ISBN 978-0-415-46059-0 (3 vols).
8. (2009) Duncan, Kevin, Philips, Peter and Prus, Mark, "The Effects of Prevailing Wage Regulations on Construction Efficiency in British Columbia," *International Journal of Construction Education and Research*, 1550-3984, Volume 5, Issue 2, , Pages 63 – 78.
9. (2012) JaeWhan Kim, Kuo-Liang Chang and Peter Philips, "The Effect of Prevailing Wage Regulations on Contractor Bid Participation and Behavior: A Comparison of Palo Alto, California with Four Nearby Prevailing Wage Municipalities" *Industrial Relations*, Vol. 51, Issue 4, pp. 874-891,.
10. (2012) Kevin Duncan, Peter Philips and Mark Prus, "Using Stochastic Frontier Regression to Estimate the Construction Cost Inefficiency of Prevailing Wage Laws," *Engineering, Construction and Architectural Management*, Vol. 19 Iss: 3, pp.320 - 334.

11. (2014) Kevin Duncan, Peter Philips and Mark Prus, "Prevailing Wage Regulations and School Construction Costs: Cumulative Evidence from British Columbia," *Industrial Relations*, Vol. 53, No. 4

Philips overall research including 75 academic papers, books and monographs may be found on his University of Utah faculty web page:

https://faculty.utah.edu/u0035312-PETER_W_PHILIPS,_Labor_Economist/bibliography/index.html

Philips has won a number of awards for his teaching and research including the University of Utah, Presidential Teaching Scholar Award, and the University of Utah, Graduate Student and Postdoctoral Scholar Distinguished Mentor Award. In the summer time, Philips is a back country volunteer ranger in the Grand Tetons National Park.

Endnotes and Sources:

ⁱ Todd A. Berry, President, Wisconsin Taxpayers Alliance, letter attached to Wisconsin Taxpayers Alliance Report, "Evaluating Wisconsin's Approach to Determining Prevailing Wages" (March 2015)

ⁱⁱ Wisconsin Taxpayers Alliance Report, "Evaluating Wisconsin's Approach to Determining Prevailing Wages" (March 2015) p. i.

ⁱⁱⁱ Wisconsin Taxpayers Alliance Report, "Evaluating Wisconsin's Approach to Determining Prevailing Wages" (March 2015) p. 6.

^{iv} Wisconsin Taxpayers Alliance Report, "Evaluating Wisconsin's Approach to Determining Prevailing Wages" (March 2015) p. 6.

^v Wisconsin Taxpayers Alliance Report, "Evaluating Wisconsin's Approach to Determining Prevailing Wages" (March 2015) p. 10.

^{vi} Wisconsin Taxpayers Alliance Report, "Evaluating Wisconsin's Approach to Determining Prevailing Wages" (March 2015) p. 10.

^{vii} Wisconsin Taxpayers Alliance Report, "Evaluating Wisconsin's Approach to Determining Prevailing Wages" (March 2015) p. 10.

^{viii} <http://www.census.gov/cps/>

^{ix} Barry T. Hirsch and David A. Macpherson, Union Membership and Coverage Database from the CPS, <http://www.unionstats.com/> (The specific spreadsheet would be found under "II. State: Union Membership, Coverage, Density, and Employment by State and Sector, 1983-2014," select the year 2014 and for Wisconsin, private construction you will find the data:

| State | Sector | Obs | Employment | Members | Covered | %Mem | %Cov |
|-----------|--------------------|-----|------------|---------|---------|------|------|
| Wisconsin | Priv. Construction | 150 | 116,485 | 29,579 | 30,774 | 25.4 | 26.4 |

- Where Obs refers to the sample size for private construction in Wisconsin in 2014,
- Employment refers to the projected construction employment based on the sample weights,
- Members refers to union members,
- Covered refers to those covered by a union contract where union members or not,
- And %mem and %cov are union members as a percent of all construction employees and covered by a union contract as a percent of all construction employees respectively.
- The key points are two: 1) prevailing wage regulations apply only to blue-collar construction workers, and 2) "Employment" includes both white-collar employees such as estimators, architects, engineers, clerical workers, accountants, lawyers as well as blue-collar workers.

^x Census Bureau, Economic Census; Construction: Geographic Area Series: Detailed Statistics for Establishments: 2007; EC0723A1; ECN_2007_US_23A1_with_ann.csv [a Microsoft Office Excel Comma Separated Values File (.csv)] <http://factfinder.census.gov/>

(Latest available data: white-collar employment has been rising as a percent of total construction employment since the 1970s when these data were first collected. Thus, when the 2012 Construction Census, Geographic Area Series is released, this percent for white-collar may be larger.)

^{xi} <http://www.unionstats.com/> (The specific spreadsheet would be found under "II. State: Union Membership, Coverage, Density, and Employment by State and Sector, 1983-2014", select the year 2014 and for Wisconsin, private construction you will find the data:

| State | Sector | Obs | Employment | Members | Covered | %Mem | %Cov |
|-----------|--------------------|-----|------------|---------|---------|------|------|
| Wisconsin | Priv. Construction | 150 | 116,485 | 29,579 | 30,774 | 25.4 | 26.4 |

^{xii} Census Bureau, Economic Census; Construction: Geographic Area Series: Detailed Statistics for Establishments: 2007; EC0723A1; ECN_2007_US_23A1_with_ann.csv [a Microsoft Office Excel Comma Separated Values File (.csv)] <http://factfinder.census.gov/>

^{xiii} This is based on national data on the relative value of residential and nonresidential construction as follows:

- The value of private construction put in place in December 2014 on an annualized basis was \$982,089 millions of dollars.
- The value of private residential construction put in place in December 2014 on an annualized basis was \$349,564 million. $\$349,564/\$982,089=36\%$; Thus, the percent nonresidential construction is $100\%-36\%=64\%$.
- Source: Census.gov, US Census Bureau, Business & Industry, Construction, Construction Spending, Total Construction Spending "Value of Construction Put in Place at a Glance," December, 2014, <https://www.census.gov/construction/c30/c30index.html>
- While the North American Industry Classification System (NAICS) directly breaks out employment for residential general contractors, this is an underestimate of true residential employment because it does not include residential specialty contractors such as plumbing or electrical contractors. Thus, we use residential building value rather than residential general contractor employment.

^{xiv} <http://www.unionstats.com/> (this again assumes that the Alliance Report author used the CPS or the Hirsch and MacPherson compilation from the CPS.)