The Adverse Economic Impact From Repeal of the Prevailing Wage Law in West Virginia

Michael P. Kelsay, Ph.D.
University of Missouri – Kansas City
Department of Economics
5100 Rockhill Road
Kansas City, MO 64110
Research Associate and Instructor

A study funded by
Affiliated Construction Trades Foundation,
A Division of the WV State Building Trades.

January, 2015

The Adverse Economic Impact from Repeal of the Prevailing Wage Law in West Virginia

TABLE OF CONTENTS

Executive Summary **Page 6**

Chapter I. Introduction to the Study **Page 12**

Background on Prevailing Wage Law and the Davis-Bacon Act Page 15

History of Prevailing Wage Laws in U.S. States Page 18

Prevailing Wage Legislation - State of West Virginia Page 19

Review of Previous Studies Page 21

Chapter II. The Impact of Prevailing Wage Laws on Total Construction Costs: Maryland, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia, **Page 31**

Summary of Data, Models Used and Detailed Empirical Findings from Regression Analysis Page 33

The Impact of Prevailing Wage Laws on Total Construction Costs Page 36

Descriptive Findings Page 37

The Multiple Regression Model Page 42

Public Projects Vs Private Projects in Non Prevailing Wage States Page 43

Estimation of Prevailing Wage Effects Page 45

School Construction Costs in Prevailing and Non-Prevailing Wage States Page 48

Chapter III. The Economic Impact of the Prevailing Wage Statute on the State of West Virginia **Page 61**

Introduction Page 62

Input -Output Analysis Page 63

Construction Industry in the United States and West Virginia Page 67

Expected Loss of Earnings in Construction Due to Repeal of Prevailing Wage Laws Page 67

State and Regional Impact of Repeal of West Virginia Statute Page 70

General Overview of Construction in West Virginia Page 70

Cost and Benefits to the State of West Virginia Resulting from Repeal of Prevailing Wage Legislation Page 74

Multiplier Effects Page 77

Multiplier Effects for the State of West Virginia Page 78

Chapter IV. Impact of Prevailing Wage Laws: Upon Benefits, Training, Safety, and Productivity **Page 81**

Health Care and Pension Benefits Page 83

Skills Training and Apprenticeship Page 90

On the Job Safety - Injuries and Fatalities Page 93

Productivity in the Construction Sector Page 94

Chapter VI. Summary and Conclusions **Page 99**

References **Page 103**

Appendices **Page 110**

The Adverse Economic Impact from Repeal of the Prevailing Wage Law in West Virginia

TABLES

Section I **Introduction to the Study**

Table I.1	Prevailing Wage Status by State	Page 17

Section II **The Impact of Prevailing Wage Law on Total Construction Costs**

Table II.1	Regression Results - I	Page 43
Table II.2	Regression Results – II	Page 47
Table II.3	Regression Results – School Construction	Page 49
Tables II-A:II-I	Square Foot Costs of Construction by State	Pages 52-60

Section IV. **The Economic Impact of the Prevailing Wage Statute On The State of West Virginia**

Table III.1	Sample Input-Output Transaction Table	Page 64
Table III.2	Sample Technical or Direct Impact Coefficients	Page 65
Table III.3	Direct or Indirect Requirements Matrix	Page 66
Table III.4	Impact on Wages and Employment in Construction	Page 75

Section IV. **Impacts of Prevailing Wage Laws upon Benefits, Training, Safety, and Productivity**

Table IV.1	Comparison of Average Wages, Benefits, and Wage Benefit Mix	Page 88

The Adverse Economic Impact from Repeal of the Prevailing Wage Law in West Virginia

CHARTS

Section II: The Impact of Prevailing Wage Law on Total Construction Costs: North Central States Region

Chart II.1	Costs of Private Construction: 2006-2013	Page 39
Chart II.2	Costs of public Construction: 2006-2013	Page 39
Chart II.3	Costs of Public versus Private Construction in Non Prevailing Wage States	Page 40
Chart II.4	Costs of Public versus Private Construction in Prevailing Wage States	Page 40

Section III. The Economic Impact of the Prevailing Wage Statute on State of West Virginia

Chart III.1	Average Construction Income by Prevailing Wage Status	Page 68
Chart III.2	Average Construction Income by Prevailing Wage Status	Page 69
Chart III.3	State of West Virginia. Costs of Public and Private Construction. 13 Structure Types	Page 72
Chart III.4	State of West Virginia. Costs of Public and Private Construction. Schools, Libraries, and Labs	Page 73

Section V. Impacts of Prevailing Wage Laws upon Benefits, Training, Safety, and Productivity

Chart IV.1	Plot of Average Wage Rate and Average Cost per Mile: 1980-1993	Page 98
Chart IV.2	Plot of Average Wage Rate and Average Cost per Mile: 1994-2002	Page 98

Executive Summary

Attempts to repeal the prevailing wage law in West Virginia are based upon the claim that repeal will save dollars on total construction costs and will bolster state and local budgets. However, this study has shown that repeal of the prevailing wage statute in West Virginia would not save dollars on construction costs and would result in a negative economic impact on families in West Virginia, taxpayers in West Virginia, and the state and regional economies in West Virginia. This study has shown that the consequences of repeal in West Virginia would include:

- No cost savings on construction costs in the non-residential sector.
- No cost savings in construction costs of elementary, secondary, and university school construction.
- Lower wages for all construction workers in West Virginia (direct impact of repeal in West Virginia) and reduced incomes for other workers in industries located in West Virginia (the indirect, or induced, impact of repeal).
- Reduced health and pension benefits for construction workers in West Virginia (and, as a result, probability of eventual increased costs to state and local communities).
- Reduced sales tax revenues to the State of West Virginia and regional economies in West Virginia.
- Reduced income tax revenues to the State of West Virginia and regional economies in West Virginia.
- Weakened system of construction apprenticeship training in West Virginia.
- Increased occupational injuries and their associated costs in West Virginia.
- Lower productivity of the construction workforce.

Findings

Chapter II

Summary of Findings on School Construction (Elementary, Secondary, and University Structures) Based on Descriptive Statistics

- Total school construction projects from 2006-2013 were 7,691; of which 3,796 were in non-prevailing wage states (North Carolina, Ohio (elementary and secondary), and Virginia) and 3,895 were in prevailing wage states.[1]
- In non-prevailing wage states: dollar value of school construction was $28,491,432; total square feet of new construction was 86,497,000.
- In prevailing wage states: dollar value of new construction was $27,790,260; total square feet of new construction was 112,220,000.
- For elementary and secondary school construction, there is no statistical difference in the means square foot costs of construction in the State of West Virginia and the non-prevailing wage jurisdictions of North Carolina, Ohio, and Virginia.
- For elementary school construction, the mean square foot costs of construction is $6.10 per square foot **cheaper** in West Virginia than in the non-prevailing wage states of North Carolina, Ohio, and Virginia; for secondary school construction , the mean square foot costs of construction is $22.37 per square foot **cheaper** in West Virginia that in the non-prevailing wage states of North Carolina, Ohio, and Virginia
- For university school construction, the mean square foot costs of construction is $58.52 per square foot **cheaper** in West Virginia than in the non-prevailing wage states of North Carolina and Virginia and the difference is statistically significant.
- Conclusion: There is no statistical difference in mean square foot costs in elementary and secondary school construction for the period 2006-2013 between the State of West Virginia and the non-prevailing wage states of

North Carolina, Ohio, and Virginia; university school construction costs are $58.52 **cheaper** per square foot in West Virginia than in non-prevailing wage states and it is statistically significant.

Summary of Findings on Total Construction (School Construction and Other Non-Residential Structures) Based on Descriptive Statistics

- Total new construction projects from 2006-2013 were 81,168; of which 34,236 were in non-prevailing wage states (North Carolina and Virginia) and 46,932 were in prevailing wage states (Maryland, Ohio, Pennsylvania, and West Virginia).[2]
- Distribution of structure type (by percentage of projects) is essentially the same in prevailing wage states and non-prevailing wage states although there are slight variations in structure type.
- In non-prevailing wage states (North Carolina, Ohio (elementary and secondary school construction), and Virginia): dollar value of new construction was $110,556,184,000; total square feet of new construction was 590,887,000; and mean cost per square foot of new construction across all structure types expressed in constant 2014 dollars was $187.10
- In prevailing wage states (Maryland, Ohio (university school construction), Pennsylvania, and West Virginia): dollar value of new construction was $147,231,878,000; total square feet of new construction was 749,187,000; and mean cost per square foot of new construction across all structure types expressed in constant 2014 dollars was $196.52
- Conclusion: There is no statistical difference in mean square foot costs across all types of construction for the period 2006-2013 for prevailing wage states (Maryland, Ohio (except elementary and secondary school construction), Pennsylvania, and West Virginia) versus non-prevailing wage states (North Carolina, Ohio (elementary and secondary school construction) and Virginia).

[1] School construction for elementary and secondary schools is exempt from prevailing wage in Ohio and is included in non-prevailing wage states; university school construction is not exempt and is included in prevailing wage statistics.

[2] School construction at the elementary and secondary level is exempt from prevailing wage in Ohio and is included in non-prevailing wage states data; school construction at the university level is not exempt from prevailing wage and is included in prevailing wage data.

Chapter III - Summary of Empirical Findings

- Construction costs are higher for public construction versus private construction in *both* prevailing wage states and non-prevailing wage states.
- The presence of a prevailing wage statute did not result in any statistically significant difference in construction costs for the period 2006-2013.
- School construction costs in West Virginia were lower per square foot for elementary, secondary, and university school construction projects than in the non-prevailing wage states of North Carolina, Ohio (elementary and secondary school construction), and Virginia for the period 2006-2013.

Chapter III – Economic Impact of Repeal in West Virginia

Summary of Findings:

- This chapter uses an input-output approach to estimate the economic impact of repeal of West Virginia's prevailing wage laws.
- Direct and indirect losses to household income and to government revenues are calculated.
- Losses are estimated for the State of West Virginia.

Specific findings include:

- For the State of West Virginia, the major conclusions are:
  - The repeal of the prevailing wage law would cost the residents of West Virginia and their families between $51.30 million and $77.28 million annually in lost income.
  - The repeal of the prevailing wage law would cost the State of West Virginia between $1.43 million and $2.15 million in lost sales tax collections annually.
  - The repeal of the prevailing wage law would cost the State of West Virginia between $3.08 million and $4.64 million annually in lost income tax revenue.
  - The total economic loss due to repeal of the prevailing wage law in West Virginia in 2015 would be a loss of income and revenue between $55.81 million and $84.06 million annually.

Chapter IV – Other Impacts of Prevailing Wage Laws

- Prevailing wage laws promote better compensation packages for workers: average total compensation for states that have prevailing wages laws is higher than for those states that have repealed their prevailing wage laws or have never had a prevailing wage law.
- Prevailing wage laws have helped to prevent erosion of compensation for construction workers: Evidence suggests that there has been little, if any, change in real incomes of construction workers in prevailing wage states while there have been substantial decreases in real incomes for those states that have repealed their prevailing wage laws.
- Real average total benefits per construction worker have increased in prevailing wage states, while they have decreased in non-prevailing wage states.
- Real average pension benefits have increased modestly in prevailing wage states and have decreased substantially in states that have repealed their prevailing wage law.
- Real average health care benefits have increased in prevailing wage states while they have decreased in states that have repealed their prevailing wage laws.
- Repeal of prevailing wage laws or the absence of prevailing wage laws encourages small, inexperienced construction firms to enter the sector. These smaller and more inexperienced firms have poorer safety records than do large ones.
- Employee turnover increases in states that do not have prevailing wage statutes. Lower construction wages and benefits, lack of apprenticeship training, and other factors lead to a less skilled workforce that is more prone to injuries.
- Repeal of the state's prevailing wage laws would endanger West Virginia's safety record.
- For the period 2008-2010 in on-the-job training and apprenticeship programs in federal highway construction projects, the top ten states were

all prevailing wage states; no non-prevailing wage state was ranked in the top ten.

- For the period 2008-2010 in the growth of on-the-job training and apprenticeship programs in federal highway construction projects, seven of the top ten states were prevailing wage states; three were non-prevailing wage states.
- In terms of women participation in training program from 2008-2010, nine of the top ten states in terms of percentage in OJT and apprenticeship programs were prevailing wage states (West Virginia ranked 5th nationally).
- In terms of minority participation in training programs from 2008-2010, prevailing wage states dominated the top ten states. In terms of percentage increase in minorities in OJT and apprenticeships, nine of the top ten states were prevailing wage states.
- Union productivity effect in construction is between 17-38%.
- No correlation between average cost per mile and average wage rate in highway construction projects between 1980-1993 and 1994-2002.
- It is implausible that repeal of prevailing wage rate would reduce construction costs, given productivity effects in construction.
- The presence of a prevailing wage statute is good for West Virginia contractors, its citizens, and taxpayers as jobs and incomes are kept in West Virginia.

Introduction to the Study

In this chapter, I examine prevailing wage legislation in the United States, beginning with the statutes that apply at the federal level. I then turn to statutes legislating prevailing wages at the state and local government level, before turning specifically to West Virginia's legislation. Finally, I briefly summarize arguments for and against prevailing wage legislation, including a brief summary of the findings of previous studies.

Chapter II provides our contribution to the literature. This chapter examines the argument that prevailing wage regulations raise public construction costs. In this analysis, I use the F.W. Dodge Company data to examine whether the existence of a state prevailing wage law results in higher construction costs. In my analysis. I utilize the Dodge Analytics data for a six-state region for the period 2006-2013. The six state region is composed of four prevailing wage states (Maryland, Ohio, Pennsylvania, and West Virginia and two non-prevailing wage states (North Carolina and Virginia).[3]

I also devote a section of the analysis on the impact of prevailing wage legislation on school construction costs. The argument is frequently made that prevailing wage regulations raise wages and must, by default, increase construction costs. This argument makes the fatal assumption that, when wages increase, there is no impact on labor productivity. This assumption by the critics of prevailing wage is not supported by the facts. It is shown in this study that construction workers in prevailing wage states get more formal apprenticeship training and generate more value added per worker than those construction workers in non-prevailing wage states.

In a study conducted by Dr. Peter Phillips (2006), a preeminent scholar on prevailing wage issues, on school construction costs in Kentucky, Ohio, and Michigan over the period 1992-2000, he found no statistically significant difference in the average square foot costs associated with the repeal of prevailing wage regulations.[4] Dr. Phillips conducted a similar study of the costs of new school construction for the period 1991-

[3] Elementary and secondary school construction is exempt from prevailing wage in Ohio and, therefore, is included in non-prevailing wage data (university construction is not exempt).

[4] In 1996, (1) Kentucky went from *not* having a prevailing wage statute on schools to having a prevailing wage statute on schools. In 1997, Ohio had a prevailing wage statute and repealed the law on school construction. As a result of a court decision, Michigan's prevailing wage statue on schools was suspended in late 1994 and was reinstated in 1997.

1997 by examining the difference in average square foot costs among fifteen Great Plains States. In this study, there were nine prevailing wage states and six non-prevailing wage states. Dr. Phillips results again showed that there is no statistical difference in mean square foot costs of school construction. His results are consistent with much of the empirical literature on costs associated with prevailing wage regulation (Prus, 1996; Vincent, 1990, Phillips, et al., 1995; and Belman and Voos, 1995, Kelsay, 2011).

Chapter III quantifies the economic impact of the prevailing wage statute on the State of West Virginia. In an assessment of the economic impacts of the repeal or weakening of prevailing wage statutes, one must incorporate both the short-run and long-run economic impact. I refute a misconception that the prevailing wage statute subsidizes the union sector at the expense of the non-union sector, state residents, and state revenues. The economic impact of potential earnings losses to the state can be considerable, and include tax revenue losses to local, county, and state governments. Using RIMS II multipliers obtained from the Bureau of Economic Analysis for the State of West Virginia, I analyze the direct and induced impact from a hypothetical repeal of the prevailing law in West Virginia. These spillover effects are quantified in terms of lost earnings. I conclude that the prevailing wage statute has a positive and substantial impact on construction workers, their families, other industry participants and their families, and state, county, and local revenue streams.

Prevailing wage regulation reduces the incentive to bid on public construction projects by employing strategies that rely on cheap, inexperienced, untrained and uninformed labor. Prevailing wage regulations decrease the incentive to cheat on safety by emphasizing competition based upon skills training and management organization rather than unskilled and cheap labor. The work in many construction industry occupations is extremely dangerous. The use of such strategies may create an environment in which the least prepared labor does the most dangerous work. This can make construction work deadly.

Opponents of prevailing wage regulations state that by keeping wages low, the costs of construction can be decreased. However, the weakening or repeal of prevailing wage regulations often results in the elimination of health insurance and pension coverage, and the failure to pay payroll taxes that fund the unemployment system and the workers compensation system.

The lack of health coverage exacts a large toll on the uninsured in the United States leading to avoidable deaths, poorly managed chronic conditions, and underutilized life-saving medical procedures. The economic costs of being uninsured or under-insured are borne by individuals, employers, the health system, taxpayers, and the public at large. The taxpayers bear an economic cost when the uninsured and under-insured are forced to use public services. Federal, state and local governments support care of the uninsured through public health clinics, and payments to certain care facilities that care for the poor and uninsured. It is reported that the total medical care received by the uninsured was $121 billion in 2013.[5] Of this amount, $84.9 billion was uncompensated care, or care paid out-of-pocket by the public and private sector. These conclusions show that the uninsured in the employed population are exacting a high cost on those individuals as well as employers, the general health delivery system, and taxpayers and the public at large.

In 2013, the construction industry provided less insurance for workers than any sector in the economy: only 33.8% of private sector construction establishments offered health insurance for their employees compared to 62.5% in manufacturing, 52.8% in professional services, and 49.9% across all private sector establishments.[6] In the two non-prevailing wage states in the analysis (North Carolina and Virginia), the percent of private-sector establishments offering health insurance in the agriculture, forestry, and construction sectors was only 25.0% and 35.5%, respectively. In four prevailing wage states in the analysis, the percentage of private-sector establishments offering health insurance was significantly higher (Maryland 57.8%; Ohio, 47.1%, Pennsylvania, 39.7%; and West Virginia, 43.8%)

Workers compensation premiums and unemployment insurance premiums provide benefits for construction workers and their families. However, unscrupulous contractors sabotage the conditions for a fair and competitive marketplace. By misclassifying workers, unscrupulous contractors gain a pricing advantage over honest contractors which results in unfair competition in the marketplace. Firms that misclassify workers can bid for work without having to account for many of the normal payroll-related costs. If an employee is classified as an independent contractor, the "employer" is

[5] The Kaiser Commission on Medicaid and the Uninsured. Uncompensated Care for the Uninsured in 2013: A Detailed Examination. http://kff.org/uninsured/report/uncompensated-care-for-the-uninsured-in-2013-a-detailed-examination/

not required to pay and/or withhold a variety of payroll-related taxes, fees and benefits (e.g., Social Security and Medicare taxes, local, state and federal income taxes, unemployment insurance, workers compensation, pension and health benefits, etc.). This illegal practice can decrease payroll costs by as much as 10% to 20%.[7] Not only are these costs shifted to the individual worker, the "independent contractor" is also not fully protected by various employment laws (e.g., minimum wage and overtime requirements, workers compensation protection, the right to form a union and bargain collectively, etc.) and is not supported by unemployment compensation when laid off.

Thus, by requiring bidders on public works projects to include all costs in their bids, prevailing wage regulations provide benefits in simple construction costs comparisons, and they level the playing field for law-abiding contractors. This means that the construction worker living next to us can afford health insurance for his or her family, will receive a pension upon retirement, can buy rather than rent a home, can pay taxes, and becomes a member of the middle class. While the benefits of this are difficult to quantify, they are crucial and very visible components of healthy communities.

A. Background on the Prevailing Wage Law and the Davis-Bacon Act

Prevailing wage laws have been the focus of public policy debate in the United States at the federal and state levels since the turn of the 20th century. Prevailing wage laws require that construction workers on public projects be paid the wages and benefits that are found by the Department of Labor to be "prevailing" for similar work in or near the locality in which the construction project is to be performed.

Three federal laws affect prevailing wages in the United States. One of these, the Davis-Bacon Act of 1931, applies to the construction industry.[8] Two similar laws apply to other industries.[9] The general intent of a national prevailing wage law is to stabilize

[6] Agency for Healthcare Research and Quality. Center for Financing, Access and Cost Trends. 2013 Medical Expenditure panel Survey – Insurance Component. Table V.A.2 (2013)
[7] These avoided payroll-related taxes are (1) old age, survivors, and disability insurance [6.20%], (2) Medicare basic hospital insurance [1.45%], (3) unemployment insurance costs, (4) workers compensation costs, and (5) pension and medical insurance.
[8] The Davis-Bacon Act of 1931 was subsequently modified in 1935 and 1964.
[9] The Walsh-Healy Public Contracts Act of 1936 covers employees in manufacturing and supply industries, and the Service Contract Act of 1965 applies to suppliers of personal and business services.

local wages and industry standards by preventing unfair and/or unregulated bidding practices, etc.

Before passage of the federal Davis-Bacon Act, a number of states and cities had already acted to secure the economic benefits provided by prevailing wage statutes. Nine states had enacted laws covering state-funded projects. Within four years of the passage of Davis-Bacon, sixteen more states passed so-called "mini" Davis-Bacon acts). At one time or another, forty-two states and the District of Columbia have enacted prevailing wage law (Table I.1). Indeed, prevailing wage laws have consistently received strong support from both state and local business communities.

The fact that such laws tend to stabilize and support local economies and labor markets has earned for them bi-partisan support from legislators. A former banker, Congressman Robert L. Bacon (R-NY), introduced the first version of the eventual Davis-Bacon Act in the pre-Depression year of 1927. He obtained crucial support in 1930 from newly elected Senator James J. Davis (R-PA), a former US Secretary of Labor under three Republican administrations. The combined Davis-Bacon bill received strong backing from the Hoover administration and easily passed both houses of Congress. The law's sponsors saw it as a way to stabilize local construction markets and protect the government from cut-throat contractors and work. Prevailing wage laws have come to enjoy widespread support among contractors, subcontractors and employee groups within the U.S. construction industry.

Table II.1
Prevailing Wage Laws, by State

States Having Prevailing Wage Laws	Year Passed	States That Have Repealed Prevailing Wage Laws	Year Passed	Year of Repeal
Alaska	1931	Alabama	1941	1980
Arkansas	1955	Arizona[1]	1912	1984
California	1931	Colorado	1933	1985
Connecticut	1935	Florida	1933	1979
DC	1931	Idaho	1911	1985
Delaware	1962	Kansas	1891	1987
Hawaii	1955	Louisiana	1968	1988
Illinois	1931	New Hampshire	1941	1985
Indiana	1935	Utah	1933	1981
Kentucky	1940	Oklahoma[2]	1909	1995
Maine	1933			
Maryland	1945			
Massachusetts	1914	States Without Prevailing Wage Law		
Michigan	1965			
Minnesota	1973	Georgia		
Missouri	1957	Iowa		
Montana	1931	North Carolina		
Nebraska	1923	North Dakota		
Nevada	1937	South Carolina		
New Jersey	1913	South Dakota		
New Mexico	1937	Vermont		
New York	1894	Virginia		
Ohio	1931			
Oregon	1959			
Pennsylvania	1961			
Rhode Island	1935			
Tennessee	1953			
Texas	1933			
Washington	1945			
West Virginia	1933			
Wisconsin	1931			
Wyoming	1967			

[1] Invalidated by Court Decision in 1980 and repealed by referendum in 1984

[2] Invalidated by Court Decision in 1995.

The Davis-Bacon Act requires that private contractors pay construction workers the prevailing wage/benefit package on all contracts of more than $2,000 for construction, alteration, or repair of federal public buildings or public works. In 1935, President Roosevelt's Secretary of Labor established the original rules for determining the Davis-Bacon wage rate. It stated that the prevailing wage was to be the wage paid to the majority of workers, if it existed; if not, the 30% rule was applied. The 30% rule simply stated that if 30% of the workers in an area are paid the same rate, that rate becomes the prevailing wage in that locality. In practice, the 30% wage rate was, in many instances, the union wage rate. If the 30% rule did not apply because 30% of an area's workers in a particular occupation did not earn the same wage, then the average wage rate was to be paid to workers doing the same job. This rule applied to the prevailing wage statute until 1985.

Until 1985, if the modal wage accounted for more than 30% of all wages for that occupation, the Department of Labor used the modal wage to determine the prevailing wage for an occupation in a local labor market[10] If the modal wage rate accounted for less than 30% of all wages for a given occupation, the mean wage rate was declared the prevailing wage. Union wages tend to be the modal wage rate and they tend to be above the mean wage for an occupation. In 1985, President Reagan changed the 30% rule to the 50% rule. The impact of the 50% rule was to decrease the prevailing wage in areas where unions are relatively weak.

B. History of the Prevailing Wage Laws in U.S. States

Because the U.S. Constitution prohibits the federal government from dictating contract terms for the states in construction, the Davis-Bacon Act does not cover construction work funded entirely by state and local governments. State prevailing wage laws set a minimum pay for construction workers on state and local projects, and the terms of the respective prevailing wage statutes among the states differ substantially. The prevailing wage laws of some states are non-binding, while other states set wages for virtually all contracts at the collectively bargained wage rate. In addition, different states treat jointly financed projects (e.g. state/federal, local/federal, private/public) differently.

[10] There is an increasing prevalence of market-recovery agreements between unions and contractors, which provide for multiple union wage rates for a single occupation in a local labor market. Thus, although union wage rates may be more than 50%, there is not a single union wage rate that accounts for 50% of workers in the market. The result may be that the union wage rate does not apply.

Some states defer to the federal statute while other states set the prevailing wage at the higher of the state or federal prevailing wage. Certain states also specifically include or exclude specific types of projects (e.g. road construction) and/or workers, and/or projects above or below a given threshold.

Kansas passed the first prevailing wage law in 1891. The first prevailing wage statute stated:

> *"That not less than the current rate of per diem wages in the locality where the work is being performed shall be paid to laborers, workman, mechanics, and other persons so employed by or on behalf of the State of Kansas*[11]

In 1894 New York became the second state to pass a prevailing wage law. In other states similar laws were passed in the first part of the twentieth century: Oklahoma (1909), Idaho (1911), Massachusetts (1914), and New Jersey (1923). These laws provided the legal precedent for the creation of the federal Davis-Bacon prevailing wage law at the federal level. By 1969, 41 states had prevailing wage statutes (Table 1).

During the 1970's, many states began to suffer fiscal crisis. On the belief that they might save tax dollars, many state and local governments began to consider repeal of prevailing wage laws. In 1979 Florida, which had enacted a prevailing wage law in 1933, was the first to repeal its law. Alabama was the second state to repeal its prevailing wage statute, with repeal in 1980. Seven other states (Arizona, Colorado, Idaho, Kansas, Louisiana, New Hampshire, and Utah) repealed their prevailing wage statutes in the 1980s. The prevailing wage statute in Oklahoma was invalidated by a court decision in 1995. At the present time, 32 states and the District of Columbia still have prevailing wage statutes, 10 states have repealed their prevailing wage statutes, and 8 states have never enacted a prevailing wage statute.

C. Prevailing Wage Legislation – State of West Virginia

Twenty-five states passed prevailing wage laws in the United States before West Virginia passed its prevailing wage law in 1933. The law was subsequently amended in 1961. The West Virginia prevailing wage law mandates, among other things:

1. It is a policy of the of the State of West Virginia that a wage of no less than the prevailing hourly wage of wages for work of a similar character in the locality in this state in which the construction is performed, shall be

[11] L. 1891 Ch. 114 pp.192-193.

paid to all workman employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.[12]

2. Any public body authorized to contract the construction of a public improvement shall, before advertising for bids or undertaking such construction, ascertain from the state commissioner of labor the fair minimum rate of wages, including fair minimum overtime and holiday pay, to be paid to the successful bidder to the laborers, workmen, or mechanics in the various branches or classes of the construction to be performed.[13]
3. The fair minimum rate of wages shall be the rate of wages paid in the locality in the state as defined to the majority of workmen, laborers, or mechanics in the same trade or occupation in the construction industry.[14]
4. The commissioner of labor or a member of his or her department shall assemble the data as to the fair minimum wage rates and shall file such wage rates.[15]
5. The department of labor shall investigate and determine the prevailing hourly rate of wages in the localities in the state. Determinations shall be made annually on January 1 of each year and shall remain in effect during the successive year.[16]
6. Any contractor or subcontractor who willfully and knowingly violates any provision of this article shall be fined not less than fifty nor more than two hundred and fifty dollars.[17]

[12] §21-5A-2. Policy declared.
[13] §21-5a-3 Fair minimum rate of wages; determination; filing, schedule of wages part of specifications.
[14] Ibid.
[15] Ibid.
[16] §21-5A-5 (1) Prevailing wages established at regular intervals; how determined; objections to determinations; hearing; final determination; appeals to board; judicial review.
[17] §sa-5a-9 Penalties for violation of article.

D. Review of Previous Studies

Proponents argue that the prevailing wage statutes among the various states encourage the employment of a more highly skilled labor force in construction, improve workplace safety, provide economic incentives for quality construction, increase apprenticeship training and provide career opportunities in construction. In addition, prevailing wage regulations are said by proponents to induce contractors to provide health insurance, pension benefits, and other voluntary benefits that would not be otherwise provided in construction.

Critics offer a number of arguments against prevailing wage regulations. The primary contention of critics is that the prevailing wage laws increase the costs of public construction due to the impact of higher wage rates on total construction costs. Critics have argued that the prevailing wage statutes increase overall public construction costs by 10 to 30%. A closer look at the data shows this to be impossible unless labor is going to donate their time for free. Analysis of the wage component in overall costs of construction shows that wage costs have only a moderate and relatively constant impact on the total costs. Indeed, labor costs account for far less than a third of total construction costs. According to the Census of Construction, labor costs, including voluntary and required fringe benefits were 25.5% of overall costs in 2002 and decreased slightly to 24.6% in 2007.

The National Alliance for Fair Contracting has conducted two time series analyses of wages, productivity, and highway construction costs in the United States. Utilizing data from the Federal Highway Administration, the National Heavy and Highway Alliance commissioned a study to analyze the costs of building a mile of highway in the United States over the period 1980-1993. They updated their study in 2004 over the period 1994-2002.[18] For the period 1980-1993, labor costs per mile were 20.7% of the total costs of highway construction; for the period 1994-2002, labor costs per mile were 20.0% of the total costs of highway construction.

With this data from the NAFC studies, further analysis can be made of wage costs and the impact of productivity measures with respect to prevailing and non-prevailing

[18] *Wages, Productivity and Highway Construction Costs.* Updated Analysis: 1994-2002. Prepared for Construction Industry Labor-Management Trust. By Construction Labor Research Council. March 2004.

wage states. Critics of prevailing wage statutes couch their analysis in terms of wage differentials in a static environment. They assume that a reduction of wages in the construction sector has no impact on the number of hours of labor to be employed and that the productivity of labor is constant. Efficiency wage theory focuses on the impact of wages on incentives and worker productivity and suggests that higher than market clearing wages increase productivity and increase profits. On the other hand, if employers pay lower wages, they will get employees that do a lower quality of work and have lower productivity. Therefore, the establishment of a wage rate that is "prevailing" in the market allows the public sector to attract workers of at least a 'prevailing productivity and training" to public projects. In addition, a wage premium decreases labor turnover costs, attracts a higher quality labor force, reduces shirking and absenteeism, and increases worker effort.

Furthermore, they ignore the "indirect" effects of wage reduction on spending and income generated in a state; hence, they ignore the effects on tax revenue collections. However, the evidence clearly demonstrates that the payment of higher wages attracts a more highly skilled labor force that is more productive. The increase in productivity can offset the higher wage rates being paid. In fact, some studies show the payment of higher wages will reduce overall costs of construction. For example, in a study by Steven Allen of the productivity of unionized workers, he showed that unionized labor productivity is 17-52% higher than that of non-union labor (Allen, 1984). Another study by Mike Walter (1992), found that construction worker productivity was 25% higher in states with a prevailing wage law than in states that did not have one.[19] In addition, the higher wage rates that prevail may induce contractors to substitute capital and other inputs for labor; this would further mitigate the effect of higher labor costs on total construction costs. Finally, higher incomes associated with prevailing wage legislation can generate more spending and more tax revenue for state and local governments.

In the study by the Construction Labor Research Council (1995), they examined productivity and costs for highway construction in the 50 states over a 13 year period from 1980-1993, there is an inverse relationship between higher hourly wage rates paid to labor and the cost of a mile of highway construction—higher wage rates result in lower

[19] Walter, Mike. *The Economic Impact of Prevailing Wage Requirements in Minnesota.* Industrial Relations Center of The University of Minnesota, January, 1992.

highway cost per mile (See Tables 2 & 3 for the 1980-1993 study and Tables 4 & 5 for the 1994-2002 study in the Appendix to this chapter).

In the NAFC's 2004 study, they examined high expenditure states (e.g. those states with more than $1 billion in highway expenditures over the nine year period.) For this group of states, the data showed that the labor hours to compete a mile of highway were 32% lower in the high wage states in spite of a 69% higher wage rate. They also examined those states with more than $100 million in annual highway expenditures, In this group of states, the hourly wage for the high wage states was 73% more than in the low wage state; yet, labor hours were 35% less and total costs per mile were 4% less.

Looking at the region of analysis in this study, the average wage rate in West Virginia (a prevailing wage state) over the time period 1994-2002 was $22.19 and the average cost per mile was $1,306,339; in Virginia (a non-prevailing wage state) the average wage rate was $16.73, while the average cost per mile was $1,581,271. The average wage rate in West Virginia over this time period was 32.7% higher than in Virginia while the average cost per mile in West Virginia over this time period was 17.3% lower compared with Virginia. In West Virginia, the labor costs per mile over the period 1994-2002 was $276,212 compared to the labor cost per mile in Virginia of $327,990. In West Virginia, the labor hours per mile was 12,446 while, in Virginia, the labor hours per mile was 19,603. Higher wages increase productivity, and thus lower the total cost per mile of highway by employing a more highly trained and more skilled work force taking less labor hours to complete a given mile of highway.

Based on these data, I conclude that any savings due to lower wages that might have been achieved in the absence of prevailing wage legislation were more than offset by lower productivity that accompanies payment of lower wages. Further, the claim made by critics of prevailing wage legislation that substantial cost savings can be achieved by repeal of the legislation is incorrect. Given the percentage of labor costs as a percentage of total construction costs over the past twenty years and empirical evidence of productivity increases in the construction sector in response to a higher wage rate, one should not accept the argument of critics that the repeal of the prevailing wage laws can reduce construction costs by an imaginary magnitude of 10% to 30%. Rather, the evidence suggests that the attraction of a more skilled workforce in higher wage states decreases overall costs of construction in the public sector.

Furthermore, it is necessary to conduct a more detailed and empirically rigorous analysis to control for factors such as productivity, employment effects, and other economic effects (such as effects on incomes, spending, and tax revenue). There are several studies that have purported to do this by presenting empirical evidence that prevailing wage rates increased total costs of construction, decreased employment levels in the state, decreased quality of life, resulted in out-migration from those states, and imposed substantial cost burdens on state taxpayers. However, these studies have major errors.

One of the first detailed studies that attempted to analyze the impact of prevailing wage legislation on actual total construction costs was the Fraundorf study (Fraundorf, 1983).[20] This study examined two hundred and fifteen new, non-residential construction projects that had been built in 1977-78. The study tried to control for differences in the type of structure, types of materials used, and project size in order to identify cost differences associated with labor cost differentials. The results of their study purportedly showed that the impact of prevailing wage laws was to raise total construction costs by a range of 26-35%. Yet, given that labor costs have averaged approximately 25% of total construction costs over time, it is not possible to achieve these cost reductions presented by the authors unless labor donates their time and effort. There are other serious problems with this study.

First, the estimated wage differential was less than the differential for total construction costs, a finding that is counterintuitive and that was not adequately explained. Second, given a small sample size (N=215), the authors grouped projects into relatively large geographic regions.[21] This could lead to biased results because construction costs in a low wage state were compared with total construction costs in a high wage state, with the resulting cost differential attributed to the prevailing wage law. In reality, the construction cost differences could have been attributable to a number of other factors (e.g. differentials in cost of living, material costs, and other factors).

Another problem with the study was that construction projects were placed into relatively large, heterogeneous structure types, with dissimilar structure types grouped

[20] Fraundorf, Martha and John Farrell and Robert Mason. *The Effects of the Davis-Bacon Act on Construction Costs in Rural Areas.* Volume 66 (February 1984): 142-146.

[21] The distribution of projects was put into four census regions: (1) Northeast, (2) North Central, (3) South, and (4) West. The South region accounted for 41.4 percent of the observations while the Northeast accounted for only 8.8 percent of the observations.

together.[22] Consequently, cost differentials between public and private buildings may have been the result of differentials in structure type rather than from the prevailing wage statute. The most serious deficiency of the Fraundorf study is that it failed to differentiate cost differences due to differences of ownership types (public versus private) and cost differences that may have resulted from prevailing wage laws or other factors. The comparison of costs of public projects with costs of private projects does not disentangle cost differences that are attributable to public versus private ownership from those due to the existence of prevailing wage law. As the empirical evidence shows in Chapter 3, public construction costs are higher than private construction costs in both prevailing and non-prevailing wage states, but there is no statistical difference in mean construction costs for public construction costs in prevailing and non-prevailing wage states.

In the Mackinac study (Mackinac Center for Public Policy, 1999)[23], anecdotal evidence is presented regarding the impact of repeal of the prevailing wage in Michigan over the time from December 1994 to June 1997 when the prevailing wage law in Michigan was ruled invalid. Summary conclusions of that study are that the prevailing wage law in Michigan (1) reduced construction employment, (2) increased the cost of government outlays by $275 million, (3) resulted in net out-migration of 2.5 million citizens from Michigan from 1990-1996, and (4) resulted in decreased worker productivity. However, no careful empirical analysis was conducted for this study. Rather, simple descriptive statistics were presented. The authors attribute the results in Michigan wholly to the impact of the prevailing wage law while claiming that their analysis controlled for other factors that may influence construction employment. They state that their analysis disentangles the effects of seasonal fluctuations in construction employment, unusual weather conditions, and the impact of the business cycle on the state.

However, their study does not account for the possible direct and indirect impacts of a more highly paid, highly trained workforce in the presence of prevailing wage legislation, and the spillover impacts of a more highly trained, higher paid workforce.

[22] The distribution of projects by type was (1) office –commercial, (2) industrial, (3) storage, (4) medical, (5) amusement, and (6) other. Office-commercial structures account for 56.7 percent of the total observations.

[23] Michigan's Prevailing Wage Law and Its Effect on Government Spending and Construction Employment. Richard Vedder, Ph.D. Mackinac Center for Public Policy. 1999.

Indeed, one of the more implausible results of the study is the claim that higher wage rates result in lower productivity. The authors state that there is no reliable evidence that labor productivity is materially different where prevailing wage laws exist. This is contradictory to accepted economic theory of labor productivity and to the empirical results presented earlier. In a rebuttal by Dr. Peter Phillips to the analysis of Dr. Vedder and the Mackinac Center, he (Phillips) shows that, applying the same methodology used by Dr. Vedder for the Michigan study to other states that changed the provisions of their prevailing wage law, the actual outcome with respect to construction employment is contrary to Dr. Vedder's prediction.[24] It is probable that the very short period of time during which the prevailing wage law was not applied in Michigan generated the spurious Mackinac results. When a state abandons its prevailing wage laws, it will probably take a few years before labor productivity falls significantly enough to begin raising construction costs. Hence, given the weakness of the methodology employed in the Mackinac study, as well as the results provided by the extension of that study by Dr. Phillips to other states that dropped prevailing wage rules, and given the short period of time during which Michigan operated without such legislation, I believe the claims made by Dr. Vedder are not supported by the empirical research.

In a report by Vince Vasquez, Dr. Dale Glaser, and W. Erik Bruvold (2011), they examined the relationship between PLAs and public school construction costs in California.[25] Their conclusion was that PLAs are associated with higher construction costs. They concluded that costs are 13-15% percent higher when school districts construct a school with a PLA. In their study, they cited Professor Dale Belman, a nationally recognized expert, who claims that the authors of the above study had misquoted his study on school construction costs in Massachusetts. [26] Dr. Belman states the following:

> "I have read your study carefully to better understand your data, model, and methods. I find that your study's conclusion is not supported by your research; that you have overlooked important

[24] *Four Biases and a Funeral*. Dr. Vedder's Faulty Experiment Linking Michigan's Prevailing Wage Law to Construction Employment. Peter Phillips. February 2001. Other states that Dr. Phillips used in his analysis were Oklahoma, Kentucky, Ohio, Louisiana, Kansas, New Hampshire, Colorado, and Idaho.
[25] Vasquez, Vince and Dr. Dale Glaser, and W. Erik Bruvold. *Measuring the Costs of Project Labor Agreements on School Construction in California.* National University System. Institute for Policy Research.
[26] Belman, Dale, and Russell Ormiston and Richard Kelso and William Schiver and Kenneth A. Frank. *Project Labor Agreements' Effect on School Construction Costs in Massachusetts.* Industrial Relations, Vol. 49, Number 1 (January, 2010): 44-60.

> factors that affect costs, and that you have misrepresented and drawn erroneous conclusions from my work; mistakes that I hope you will want to correct."

Professor Belman went on to further state the following:

> "Although your study has several serious statistical issues, at the end of the day, your results are basically consistent with those presented in my article on PLAs and Massachusetts school construction costs. The take-away from your results can be summarized as follows: When appropriate controls are included for differences in the characteristics of schools build including school type and location, building specifications, materials used, etc., there is no statistical difference that PLA schools are more costly compared to non PLA schools.

A project labor agreement (PLA) is a type of pre-hire agreement which is designed to facilitate complex construction projects. PLAs are negotiated to cover all the crafts on a single project. The term of a PLA is coincident with the duration of the project. PLAs provide job stability and prevent costly delays by: (1) providing a uniform contract expiration date so that the project is not affected by the expiration of various local union agreements while the PLA is in effect; (2) guaranteeing no-strikes and no-lockouts; (3) providing alternative dispute resolution procedures for a range of issues; 4) assuring that contractors get immediate access to a pool of well-trained and highly-skilled workers through union referral procedures during the hiring phases and throughout the life of the project. Because a PLA is pre-bid and tailored to a given PLA project, they provide project owners, building contractors and trade unions the opportunity to anticipate and avoid potential problems that might otherwise arise and possibly impede project progress. They maximize project stability, efficiency and productivity and minimize the risks and inconvenience to the public that often accompany public works projects.[27]

In a report by the Center for Government Research (2008), it is estimated that prevailing wage laws raised construction costs by 36% in New York's metro regions.[28] Once again, these cost savings on total projects costs are not possible given the labor component share of total construction costs. Secondly, this study did not empirically test whether or not the increase was even related to prevailing wage regulations; they made the erroneous assumption in their study that their wage differentials fully transferred to government costs. Once again, this study assumed that productivity was constant, material costs were constant, and the labor share of construction was constant.

[27] Kotler, Fred. B., JD. *Project Labor Agreements in New York State: In the Public Interest.* Cornell University. ILR School. March, 2009.

[28] *Prevailing Wages in New York State: The Impact on Project Costs and Competitiveness.* Prepared for the New York State Economic Development Council. Rochester N.Y: Center for Government Research. 2008.

Critics of prevailing wage laws have also cited the results of a study undertaken in Ohio.[29] Senate Bill 102 of the 122nd General Assembly created the Ohio School Facilities Commission which, among other things, exempted construction undertaken by school districts from Ohio's prevailing wage law. The Ohio Legislative Service Commission issued Staff Research Report #149 claiming $487.9 million in cost savings since S.B. 102 took effect in August 1997.

A statistical shortcoming of this report is that in the regression equations, which purportedly support this finding, cost savings account for a trivial amount of the differences in costs between projects undertaken by school districts. The study makes sweeping conclusions about the adverse impact of the prevailing wage law, yet the specified model has extremely low R^2 and adjusted R^2 values (in the range of 0.01 to 0.03). R^2 measures the percent of variation in a dependent variable (e.g. total construction costs) that is explained by variations in a set of independent variables that they have specified. According to the study's estimate, only 1%-3% of the variation in total construction costs of schools in Ohio is explained by the set of independent variables they have included in their model. In other words, their models do not explain 97-99 percent of the differences in project costs for new construction and additions. These extremely low R^2 values provide no statistical basis for estimating any cost savings, let alone the claimed $487.9 million. In addition, the regression results do not show that the presence of a prevailing wage requirement actually increased costs for new construction or additions. The model specifies a dummy variable (PW) to capture the impact of a prevailing wage requirement on project costs. It also specifies a dummy variable (PW-rural) to capture the potential impact of the wage importing effect of a prevailing wage requirement. In the regression results presented in Tables 20-22 of the report, however, the coefficients for both of these variables were statistically insignificant across all three models. In short, the results of this study are empirically meaningless.

In a study conducted by Sarah Dunn, John M. Quigley, and Larry A. Rosenthal (2005), they concluded that the expansion of the prevailing wage statute in California to cover low-cost housing would lead to a 9% to 37% increase in housing construction

[29] Ohio Legislative Service Commission. "The Effects of the Exemption of School Construction Projects from Ohio's Prevailing Wage Law." Staff Research Report #149. State House. Columbus, Ohio (May 20, 2002).

costs.[30] Given that they assume that the labor share of total construction costs ranged from 42.6% to 47.2%, the prevailing wage differential would have to be in excess of 60% to explain their high estimates. This is almost surely impossible.

There have also been a number of studies by proponents of prevailing wage laws that have empirically analyzed the impact of prevailing wage laws on total construction costs in general, and school construction costs in particular (for example, Prus – 1996; Vincent – 1990; Phillips, et al. – 1995; Bilginsoy and Phillips – 2000; Phillips, 1998; Belman and Voos, 1995; Phillips, 2006; Kelsay, 2004, 2011. The results of these studies have demonstrated uniformly three primary findings: (1) there are no statistically significant measurable cost differences between similar structures as a result of prevailing wage laws, (2) there are significant measurable wage differences between public and private projects of a similar nature, and (3) the economic impact of a higher wage and more skilled workforce can be substantial, offsetting any increase in wages in the construction sector that might result from prevailing wage legislation. Further, these studies consistently find that repeal of prevailing wage laws in various states results in a less skilled workforce with reduced productivity, a decrease in apprenticeship and training programs, increased injuries and deaths in the construction industry, decreased wages and benefits, as well as adverse economic impacts for the states and their taxpayers.

Other studies have empirically analyzed the economic impact that prevailing wage repeal would have on the construction industry and the taxpayers of that state (Phillips, 1998; Belman and Voos, 1995; Vincent, 1990; and Duncan, 2011). The results, shown in the NAFC study on highway construction costs presented earlier, find no correlation with wage rates and cost per mile of highway. A careful, rigorous empirical analysis is required to sort out the effects of prevailing wage laws on: (1) productivity-adjusted labor costs; (2) other construction labor working on projects not covered by prevailing wage laws; (3) wages paid to labor in other sectors of the economy, (4) spending, employment, and income in the region and in the state, and (5) tax revenue received by state and local government.

[30] Dunn, Sarah and John M. Quigley and Larry A. Rosenthal. *The Effects of Prevailing Wage Requirement on the Cost of Low-Income Housing.* Industrial & Labor Relations Review. Volume 50, Number 1, Article 8. 2006.

In October, 2006, a study was released on the evaluation of the weakening or repeal of the prevailing wage statute in Minnesota (2006).[31] The authors concluded that the repeal or weakening of the prevailing wage statute would reduce income in the state between $382 million and $1.8 billion annually. In addition, they concluded that the repeal or weakening of the prevailing wage statute in Minnesota would (1) weaken apprenticeship training programs, (2) increase injury rates, weaken the position of women and minorities in the construction industry, (3) increase project cost overruns, and (4) reduce construction wages.

At the time of the Minnesota, study, the Minnesota Chapter of the Associated Builders & Contractors (ABC) had argued that repealing prevailing wage requirements would save the state 10%-30%. In the Minnesota Report Dr. Mike Walter of the University of Minnesota empirically tested this claim by the ABC. Walter concluded that "the potential savings of repealing the statute would translate roughly into 6.6% of labor costs or 1.8% of total costs.

Professor Kevin C. Duncan at Colorado State University (2011), utilizing data from highway resurfacing projects in the State of Colorado, conducted an analysis of the Davis Bacon prevailing wage requirements on projects funded by the federal government.[32] The results of his study showed that requiring prevailing wage requirements on highway resurfacing projects in Colorado were not associated with statistically significant higher construction costs. This confirms what many other credible empirical studies have found; namely that there is a strong relationship between wages, labor productivity, and total costs in the construction industry.

A primary contribution of my present study is that I present both the direct and induced effects on the citizens of West Virginia as well as the impact on state revenues in West Virginia. I do this utilizing state and sub-state regional multipliers from the Bureau of Economic Analysis. As I will show in the next two chapters, it is possible to sort out the effects that prevailing wage laws have on workers and families in the State of West Virginia.

[31] Jordon, Lisa M., Lead Researcher. "An Evaluation of Prevailing Wage in Minnesota: Implementation, Comparability and Outcomes. October, 2006.

[32] Duncan, Keith C. *An Analysis of Davis-Bacon Prevailing Wage requirements. Evidence from Highway Resurfacing Projects in Colorado.* http://www.bctd.org/BCTD/media/Files/Duncan,-Kevin-DB-Study-Highways_1.pdf

Chapter II

The Impact of Prevailing Wage Laws on Total Construction Costs: Maryland, Ohio, Pennsylvania, West Virginia (Prevailing Wage Law States) and Virginia and North Carolina (Non-Prevailing Wage Law States)

Summary of Findings on School Construction (Elementary, Secondary, and University Structures) Based on Descriptive Statistics

- Total school construction projects from 2006-2013 were 7,691; of which 3,796 were in non-prevailing wage states (North Carolina, Ohio (elementary and secondary), and Virginia) and 3,895 were in prevailing wage states.[33]
- In non-prevailing wage states: dollar value of school construction was $28,491,432; total square feet of new construction was 86,497,000.
- In prevailing wage states: dollar value of new construction was $27,790,260; total square feet of new construction was 112,220,000.
- For elementary and secondary school construction, there is no statistical difference in the means square foot costs of construction in the State of West Virginia and the non-prevailing wage jurisdictions of North Carolina, Ohio, and Virginia.
- For elementary school construction, the mean square foot costs of construction is $6.10 per square foot **cheaper** in West Virginia than in the non-prevailing wage states of North Carolina, Ohio, and Virginia; for secondary school construction , the mean square foot costs of construction is $22.37 per square foot **cheaper** in West Virginia that in the non-prevailing wage states of North Carolina, Ohio, and Virginia
- For university school construction, the mean square foot costs of construction is $58.52 per square foot **cheaper** in West Virginia than in

[33] School construction for elementary and secondary schools is exempt from prevailing wage in Ohio and is included in non-prevailing wage states; university school construction is not exempt and is included in prevailing wage statistics.

the non-prevailing wage states of North Carolina and Virginia and the difference is statistically significant.

- Conclusion: There is no statistical difference in mean square foot costs in elementary and secondary school construction for the period 2006-2013 between the State of West Virginia and the non-prevailing wage states of North Carolina, Ohio, and Virginia; university school construction costs are $58.52 **cheaper** per square foot in West Virginia than in non-prevailing wage states and it is statistically significant.

Summary of Findings on Total Construction (School Construction and Other Non-Residential Structures) Based on Descriptive Statistics

- Total new construction projects from 2006-2013 were 81,168; of which 34,236 were in non-prevailing wage states (North Carolina and Virginia) and 46,932 were in prevailing wage states (Maryland, Ohio, Pennsylvania, and West Virginia).[34]
- Distribution of structure type (by percentage of projects) is essentially the same in prevailing wage states and non-prevailing wage states although there are slight variations in structure type.
- In non-prevailing wage states (North Carolina, Ohio (elementary and secondary school construction), and Virginia): dollar value of new construction was $110,556,184,000; total square feet of new construction was 590,887,000; and mean cost per square foot of new construction across all structure types expressed in constant 2014 dollars was $187.10
- In prevailing wage states (Maryland, Ohio (university school construction), Pennsylvania, and West Virginia): dollar value of new construction was $147,231,878,000; total square feet of new construction was 749,187,000; and mean cost per square foot of new construction across all structure types expressed in constant 2014 dollars was $196.52
- Conclusion: There is no statistical difference in mean square foot costs across all types of construction for the period 2006-2013 for prevailing

[34] School construction at the elementary and secondary level is exempt from prevailing wage in Ohio and is included in non-prevailing wage states data; school construction at the university level is not exempt from prevailing wage and is included in prevailing wage data.

wage states (Maryland, Ohio (except elementary and secondary school construction), Pennsylvania, and West Virginia) versus non-prevailing wage states (North Carolina, Ohio (elementary and secondary school construction) and Virginia).

Summary of Data, Models Used, and Detailed Empirical Findings from Regression Analysis

The F.W. Dodge database facilitates comparison of construction costs on similar projects in the private and public sectors for both prevailing and non-prevailing states in the region. Using regression analysis I test for the significance of prevailing wage legislation on construction costs.

Models 1A and 1B

- Model 1A estimates the cost differences between public and private construction in prevailing wage states, where construction costs are a function of scale of project, vector of dummy variables indicating structure type, vector of state dummy variables and dummy variable indicating whether the project was public or private.
  - Model IA allows us to capture cost differentials between public and private projects, but does not disentangle cost differentials resulting from ownership type versus cost differences due to prevailing wage laws or other factors.
  - Results of multiple regression analysis of Model 1A find that there are statistically significant differences in costs of public versus private projects in prevailing wage states.
  - However, this sheds no light on potential cost differences due to existence of prevailing wage legislation.
- Model 1B re-estimates the model using data on construction projects from states *without* prevailing wage laws.
  - As with Model 1A, public projects are significantly more expensive than comparable private projects.

1. Public sector may simply be a more exacting owner than the private sector, requiring higher construction standards.
2. Fact that construction costs for public projects is significantly higher in both prevailing and non-prevailing wage states provides statistical evidence that the higher costs of public projects may not be due to the presence of prevailing wage laws.

Model 2: Specification and Results

**Motivation*: Comparison of public projects versus private projects can provide evidence that the public sector is a more exacting owner than is the private sector, but cannot determine whether prevailing wage laws raise costs. I must separate cost differentials due to public versus private ownership and those due to existence of a prevailing wage law. This is done by separately determining costs for each of four possibilities:

a. Private projects where no prevailing law is in effect.
b. Public projects where no prevailing law exists.
c. Private projects in states where a prevailing law exists.
d. Public projects where prevailing wage laws exist – only this fourth category of construction projects is directly impacted by the presence of a prevailing wage law in a state.

*Model Two reformulates the model with construction costs a function of scale of project, vector of dummy variables indicating structure type, vector of state dummy variables, dummy variable indicating whether the project was public or private, and interactive dummy variable for public construction and a prevailing wage state.

- The prevailing wage variable captures the impact of prevailing wage laws on construction projects independent of whether or not the projects are public or private.
- The interaction variable captures the direct impact of prevailing wage laws on public projects because it is equal to one in only those instances where there is a public project in a state that has a prevailing wage law.

- Result of multiple regression for Model 2 shows that public projects are significantly more expensive than private projects.
- However, a prevailing wage law does not have a statistically significant impact on the total costs of construction projects as indicated by insignificant coefficient on the prevailing wage variable.

Conclusions

- Construction costs in public sector are statistically more expensive than construction costs in the private sector.
- No statistically significant difference in total construction costs between similar structures because of a state having a prevailing wage statute.
- Repeal and/or modification of prevailing wage laws will not result in substantial cost savings as claimed by prevailing wage law critics.

The Impact of Prevailing Wage Laws on Total Construction Costs:

Maryland, Ohio, Pennsylvania, West Virginia (Prevailing Wage Law States) and Virginia and North Carolina (Non-Prevailing Wage Law States)[35]

The proponents of repeal or modification of prevailing wage laws argue that these laws increase the costs of public construction substantially due to the impact of higher wage rates on total construction costs. Further, repeal proponents argue that the increased costs to states amounts to 10-30% of construction costs (Fraundorf, 1983; Thiebolt, 1996; Mackinac Center for Public Policy, 1999). However, the method used in such studies is inadequate and in many cases flawed. This is because the factors that go into determining construction costs are complex. First, project types vary significantly in terms of square foot construction costs—hence, it is important to control for project type, something that few studies have been able to do. Second, it is important to control for regional cost differences—construction costs can be much higher on the east or west coasts than in the Midwest (for example), for a wide variety of reasons that have nothing to do with the existence of prevailing wage laws. Further, as I will show, construction costs vary considerably between private projects and public projects. Some of this variance *could* be due to existence of prevailing wage laws; however, it could also be due to more exacting construction standards in the public sector. Again, previous studies have not adequately separated out the various factors that go into determining construction costs. Hence, they provide no useful empirical information that would allow us to determine cost differentials due solely to the existence of prevailing wage legislation.

This chapter is divided into two sections. Section I presents "descriptive findings" based on descriptive analysis of the data. This allows us to calculate the number, square foot, and construction costs of projects in both prevailing wage states and non-prevailing wage states. I also am able to examine types of construction to determine whether projects vary between prevailing wage states and non-prevailing wage states. I

[35] For Ohio, elementary and secondary school construction is exempt from prevailing wage and those statistics are included in non-prevailing wage statistics; university school construction in Ohio is not exempt from prevailing wage and it is included in prevailing wage statistics.

also separate public projects from private projects. Finally, I am able to calculate cost per square foot for each project, and mean square foot cost by state, as well as by project type and by ownership (private versus public). This allows us to make a preliminary determination of any cost differential between prevailing wage states and non-prevailing wage states.

However, such descriptive statistics do not permit us to disentangle the complicated interactions among project type, ownership type, and existence of prevailing wage laws. Only multiple regression analysis is able to separate out the contribution to cost that result only from existence of prevailing wage legislation. In Section 2, I present the results from two increasingly refined regression models. Model 1 allows us to capture cost differentials between private and public projects—which is substantial. Indeed, this cost difference accounts for most of the cost difference found by proponents of repeal of prevailing wage legislation. However, as I will explain, this cost difference actually tells us nothing about the effect of prevailing wage legislation. Model 1B refines the analysis of Model 1A, demonstrating that the cost difference between public and private projects remains even if I was able to leave out any effects of prevailing wage legislation. Model 2 separates the effects of prevailing wage legislation from the cost differential due to project ownership (public versus private). This model provides the most robust estimate of the effects of prevailing wage laws on construction costs. I conclude that a properly specified model shows that a prevailing wage law does not have a significant impact on construction costs. Hence, there is no empirical justification for the claim that repeal of these laws will result in lower construction costs.

Section I: Descriptive Findings

In this section I use simple descriptive statistics to compare the square foot construction costs for thirteen types of construction projects: (1) amusements, (2) dormitories, (3) government services buildings, (4) hospitals and other health treatment facilities, (5) hotels and motels, (6) manufacturing plants, warehouse, and labs, (7) miscellaneous nonresidential buildings, (8) office and bank buildings, (9) parking garages and automotive services, (10) religious buildings, (11) schools, libraries, and labs, (12) stores and restaurants, and (13) warehouses, excluding manufacturer owned. I examine four states that have prevailing wage laws (Maryland, Ohio, Pennsylvania, and West Virginia) and two states that do not have a prevailing wage law (North Carolina and

Virginia).[36] The states selected for the analysis are believed to have reasonably similar conditions to those of the West Virginia. Finally, I separately analyze the data by project ownership; that is, according to whether the project is private or public.

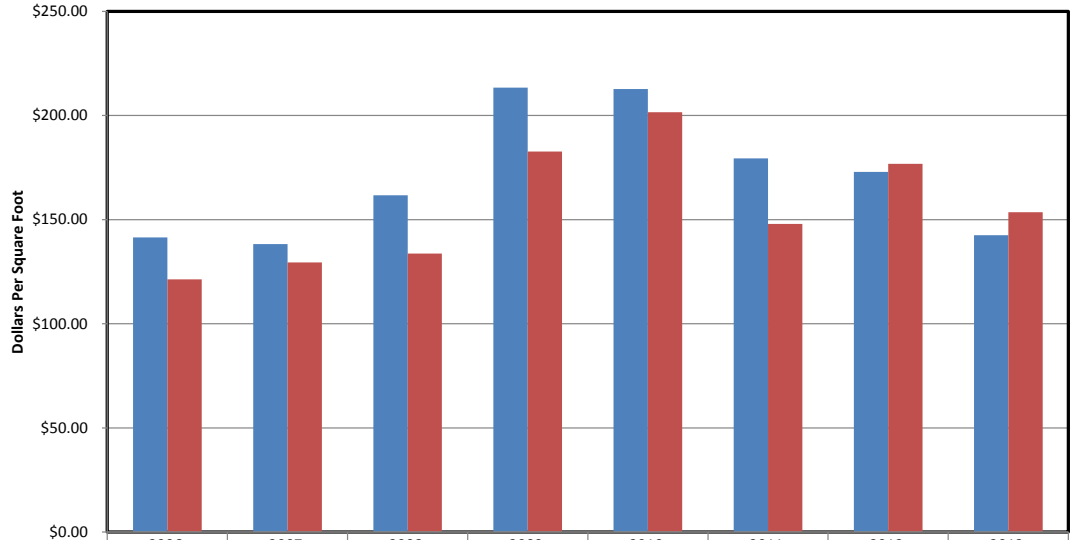
The primary data used were obtained from the F.W. Dodge Company, a company that collects and disseminates data on construction projects for the industry. The F.W. Dodge data provides information on the start or bid cost of construction projects by state, as well as providing data on 13 primary structure types, location of project, project scale, and other technical characteristics of the project. The Dodge data also distinguishes between public and private sector construction projects. Because the Dodge data provides information on a large number of construction projects, the analysis can be done on a regional basis for comparison. This section examines total construction costs for non-residential construction in these states for the period 2006-2013. All data has been adjusted for inflation to constant 2014 dollars.

Charts II.1-II.4 provides a preliminary overview of construction costs for the six state region in the analysis for the years 2006-2013. Chart II.1 shows real (inflation adjusted) construction cost per square foot for private projects, comparing the costs in prevailing wage states versus costs in non-prevailing wage states. There is no statistical difference in mean construction costs between prevailing wage states and non-prevailing wage states for private construction costs.

Chart II.2 makes the same type of comparison, but for public projects. Chart II.3 shows that the costs of public projects are considerably higher than costs of private projects in non-prevailing wage states; Chart II.4 finds the same result in prevailing wage states. Based on these four charts one would conclude that public projects are more expensive than private projects, but the results for the effects of prevailing wage legislation are unclear. However, because this simple analysis cannot account for different types of projects, these results are probably spurious. In other words, it could be the case that the public versus private construction cost differential arises because the public sector built hospitals while the private sector built inexpensive warehouses; similarly, the apparent prevailing wage affects could be due to differences of project type.

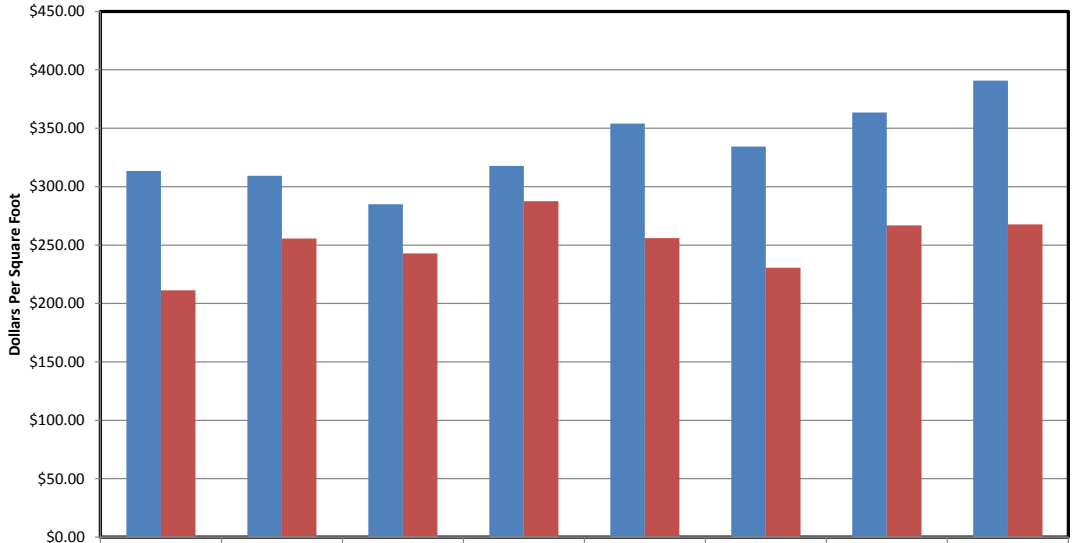
[36] The State of Ohio has exempted elementary and secondary school construction from their prevailing wage law.

Chart II.1
Cost of Private Construction
Prevailing versus Non-Prevailing Wage State
Real Costs Per Square Foot : 2006-2013
(2014 Prices)



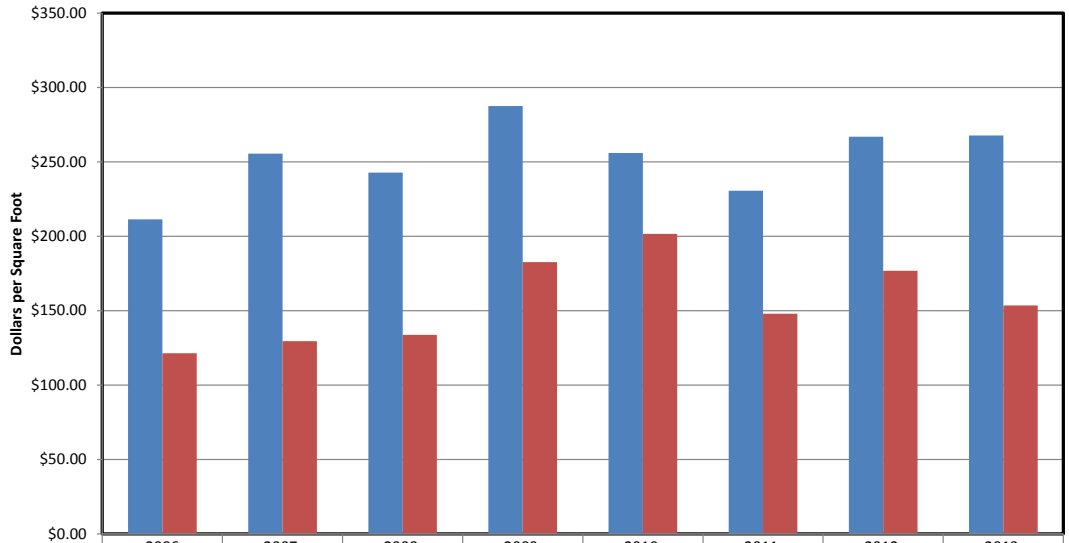
	2006	2007	2008	2009	2010	2011	2012	2013
Private PWL	$141.43	$138.28	$161.66	$213.40	$212.70	$179.38	$172.90	$142.55
Private Non-PWL	$121.34	$129.48	$133.67	$182.65	$201.53	$147.98	$176.79	$153.52

Chart II.2
Cost of Public Construction
Prevailing versus Non-Prevailing Wage State
Real Costs Per Square Foot : 2006-2013
(2014 Prices)



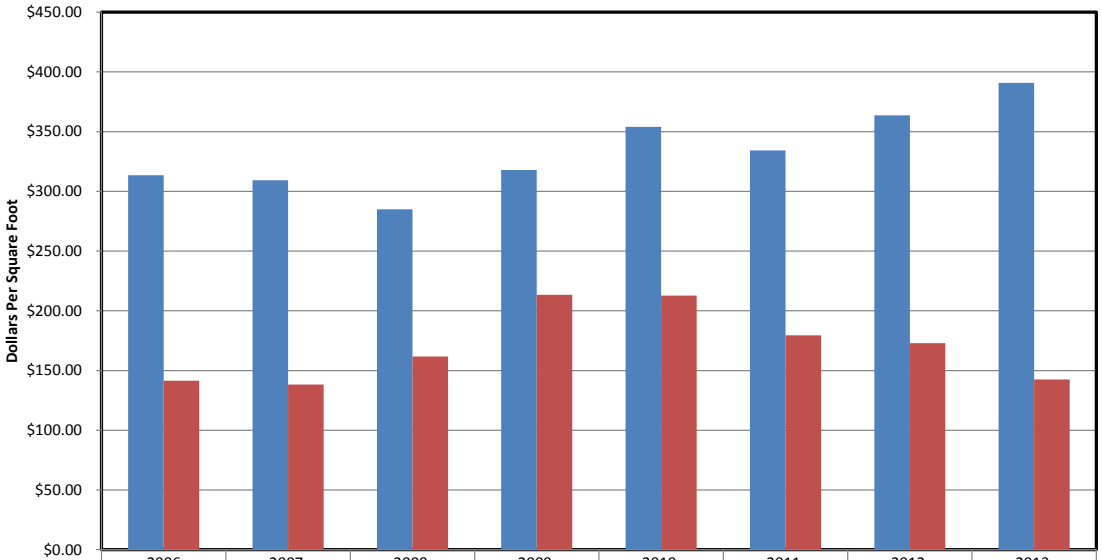
	2006	2007	2008	2009	2010	2011	2012	2013
Public PWL	$313.34	$309.32	$284.96	$317.82	$354.05	$334.23	$363.54	$390.82
Public Non-PWL	$211.32	$255.57	$242.76	$287.56	$255.89	$230.55	$266.88	$267.77

Chart II.3
Cost of Public Verus Private Construction
Non Prevailing Wage State
Real Cost per Square Foot: 2006-2013
(2014 Prices)



	2006	2007	2008	2009	2010	2011	2012	2013
Public Non-PWL	$211.32	$255.57	$242.76	$287.56	$255.89	$230.55	$266.88	$267.77
Private Non-PWL	$121.34	$129.48	$133.67	$182.65	$201.53	$147.98	$176.79	$153.52

Chart II.4
Cost of Public Verus Private Construction
Prevailing Wage State
Real Cost per Square Foot: 2006-2013
(2014 Prices)



	2006	2007	2008	2009	2010	2011	2012	2013
Public PWL	$313.55	$309.32	$284.96	$317.82	$354.05	$334.23	$363.54	$390.82
Private PWL	$141.43	$138.28	$161.66	$213.40	$212.70	$179.38	$172.90	$142.55

Table IIA presents the distribution of new construction spending by structure type for the entire region. There were 81,168 projects over the period 2006-2013. The largest number of projects in the region were office and bank buildings (22,604), followed by

stores and restaurants (19,531) schools, libraries and labs (10,508), and hospitals and other health treatment facilities (6,665). These four structure types accounted for 73.1% of all projects in the region. Table IIB presents the distribution of new construction spending separated by states with and without a prevailing wage law. The distribution of structure type is essentially the same in the two states that do not have prevailing wage laws compared with the four states that do have prevailing wage. The notable exceptions are (1) office and bank buildings and (2) schools, libraries, and labs (nonmfg). For non-prevailing wage states, office and bank buildings account for 30.4% of all projects while only 21.9% in the prevailing wage states; for non-prevailing wage states, schools, libraries, and labs accounted for 18.6% of all projects while only 12.0% in the prevailing wage states.

Table IIC presents the cost per square foot of new construction by type and prevailing wage status. For the period 2006-2013, the mean cost per square foot across all structures for non-prevailing wage states was $187.10; the mean cost per square foot across all structures for prevailing wage states was $196.52. A t-test for the equality of means shows that there is no statistically significant difference for the mean cost of construction between the prevailing and non-prevailing wage states at the 5 percent level of significance for the period 2006-2013. What this means is that based on these data, one cannot conclude that there is any difference in the mean square foot costs of construction in prevailing and non-prevailing wages states because the observed difference is not statistically significant.

A more rigorous analysis can be undertaken because the Dodge data allows a comparison of construction costs on similar projects in the private and public sectors for states in our region of analysis that have prevailing and non-prevailing wage laws. This is critical because it allows us to isolate cost differentials that are associated with prevailing wage laws, as opposed to cost differentials that are associated with public and private construction. In other words, the results presented in Table IIC might be spurious due to the fact, for example, there may be a different mix of public versus private construction between the prevailing wage and non-prevailing wage states. Hence, I develop a model that will allow me to control for project type while I separate out differentials due to the public versus private mix, and differentials due solely to the existence of prevailing wage legislation.

Section II: The Multiple Regression Model

A) Model 1A: Public versus Private Construction Costs in Prevailing Wage States

The model I have developed begins as and follows the specification of Prus (1999)

$$CC = \alpha + \beta_1 S + \beta_2 T + \beta_3 R + P\beta_4 + \varepsilon$$

where CC = bid costs[37]; S = the scale of the projects as measured by the square foot of the project, T = a vector of dummy variables that indicates detailed structure type across thirteen structure categories, R = a vector of dummy variables for states, and P = a dummy indicating whether the project was public or private. This model estimates the differences between public and private construction costs while holding constant other variables such as structure type and the state in which the project was undertaken. This will allow us to calculate a "normal" cost differential between public and private projects.

The projects used in this analysis are non-residential construction projects that are categorized as (1) amusements, social, and recreational buildings, (2) dormitories, (3) government services buildings, (4) hospitals and other health treatment facilities, (5) hotels and motels, (6) manufacturing plans, warehouse, and labs, (7) miscellaneous nonresidential buildings, (8) office and bank buildings, (9) parking garages and automotive services, (10) religious buildings, (11) schools, libraries, and labs, (12) stores and restaurants, and (13) warehouses, excluding manufacturer owned. Disaggregation of construction projects by these thirteen structure categories decreases the probability of comparing construction costs across much differentiated structures, a shortcoming of the Fraudorf, *et al.,* study. Further, the model allows us to differentiate each structure type by ownership type (public versus private).

For Model 1A, I use the equation above and data from the four prevailing wage states to estimate the construction cost difference between public and private projects.[38] The result of the multiple regression analysis using the natural log of real project bid costs as the dependent variable, controlling for relevant variables, in states that have prevailing wage laws is reported in the first column in Table II.1.

[37] The start costs from F.W. Dodge Company refer to the accepted bid price and do not include change orders, cost overruns, maintenance costs, scheduling problems, or other components of construction costs.

Table II.1 Regression Results		
Variable	**States with PWL Coefficients**	**States Without PWL Coefficients**
Intercept	4.576***	4.778***
Ln Square Feet	0.956***	0.907***
Pubcode	0.395***	0.350***
Amusements, Social and Recreational Buildings	1.114***	1.106***
Dormitories	0.889***	0.907***
Government Services Buildings	1.003***	1.039***
Hospital and Other health Treatment Facilities	1.495***	1.362***
Hotels and Motels	0.730***	0.837***
Manufacturing Plants, Warehouses, and labs	0.913***	0.705***
Miscellaneous Nonresidential buildings	1.033***	0.906***
Office and Bank Buildings	1.031***	1.130***
Parking Garages and Automotive Services	0.033	-0.048
Religious Buildings	0.636***	0.807***
Schools, Libraries, and Labs (nonmfg)	1.362***	1.288***
Stores and Restaurants	0.771***	1.047***
	Adjusted R-Squared = 0.924	Adjusted R-Squared =0.926
	N=683	N=399
	F=583.722	F = 344.530
NOTE: Dependent Variable is LN (real total costs) where total costs are bid costs reported in 2014 dollars		
*** coefficient is significant at .01 level		
The coefficients for the state dummy variables are not reported.		

These results show that there is a large and statistically significant cost differential between public and private projects. This is indicated by the coefficient 0.395 for "PubCode," which is the "P" variable in the equation above. As noted in the table, this coefficient is highly significant, at the 0.01 level. The adjusted R-Squared value for this model is 0.924, which means I have explained 92.4% of the variation in construction costs across projects in my model.

B) Model 1B: Public Project versus Private Project in Non-Prevailing Wage States

Model 1A analysis does not identify costs differences in construction projects that may result from the presence of prevailing wage laws. In order to capture this effect,

[38] Ohio exempts elementary and secondary school construction from prevailing wages. Therefore, the observations on elementary and secondary school construction costs are pooled with the observations from our non-prevailing wage states.

Model 1B uses data on construction projects from states without prevailing wage laws.[39] Similar controls were used in this model to ensure that public projects were being compared with similar private projects in the North Central States for states that have no prevailing wage law. I again use the following equation:

$$CC = \alpha + \beta_1 S + \beta_2 T + \beta_3 R + P\beta_4 + \varepsilon$$

The results of this regression are reported in the second column of Table II.1. As with the first regression, public projects are significantly more expensive than comparable private projects. The coefficient on PubCode is 0.355, which is again statistically significant at the 0.01 level. The adjusted R-Squared value for this model is 0.925 which means I have explained 92.5% of the variation in construction costs across projects in my model.

Given that the second equation examined the states in the region that do not have prevailing wage laws, the differential in construction costs between public and private projects cannot be attributable to the impact of prevailing wage statutes. Because construction costs for public projects (whether in prevailing or non-prevailing states) are higher, the public sector may simply be a more exacting owner than the private sector, requiring higher construction standards. For example, public owners may design structures that have longer expected lifetimes compared with structures built by private owners. Fittings and components used in public structures may be a higher standard. Additionally, quality and workmanship specifications for public structures may be higher. Fraundorf, *et al.*, admit this possibility in their study when they state that "If the government is a more exacting owner than private owners are in its quality standard, labor hours (and costs) and possibly material costs would be higher in government projects." Such higher costs are not caused by prevailing wage legislation. More importantly, the fact that construction costs for public projects is significantly higher in both prevailing and non-prevailing wage states provides evidence that the higher costs of public projects should not be attributed to the presence of prevailing wage laws.

[39] Ohio exempts school construction from prevailing wages. Therefore, the observations on school construction costs are pooled with the observations from our non-prevailing wage states.

C) Model 2: Estimation of Prevailing Wage Effects

There are two components of construction costs that need to be disentangled. On the one hand, the comparison of public projects versus private projects can provide evidence that the public sector is a more exacting owner than is the private sector. The other requirement of analysis is to determine whether a prevailing wage statute adds an additional cost differential to public projects (and, perhaps, to private projects in prevailing wage states).

I can disentangle these two impacts by examining four discrete outcomes. These four distinct outcomes are (1) private projects that are constructed where no prevailing law exists, (2) public projects that are constructed where no prevailing law exists, (3) private projects in jurisdictions where a where a prevailing law exists, and (4) public projects in jurisdictions where a prevailing laws exist. It is in this fourth category of construction projects (public projects in a prevailing wage jurisdiction) that is directly impacted by the present of a prevailing wage law. In order to isolate this impact of prevailing wage laws on construction costs this outcome must be isolated from the other three possible outcomes.

The model that can capture the impact, if any, of a prevailing wage law on construction costs is specified as follows:

$$CC = \alpha + \beta_1 S + \beta_2 T + \beta_3 R + \beta_4 PW + \beta_5 PC + \beta_6 I + \varepsilon$$

where CC = start costs; S = the scale of the projects as measured by the square foot of the project, T = a vector of dummy variables that indicates detailed structure type across thirteen structure categories, R = a vector of dummy variables (one for each state), PW = a dummy indicating the presence or absence of a prevailing wage law, PC = a dummy indicating whether or not a project was public or private, and I = (PW*PC), an interaction variable. The key variables in this regression are PC, PW, and I. These three variables allow us to estimate the impact of prevailing wage statutes separate from the impact of public ownership of a project. PC captures the cost differential between public and private projects in the region, independent of whether or not a state has a prevailing wage law. The PW variable captures the impact of prevailing wage laws on construction projects independent of whether or not the projects are public or private. The I-

interaction variable captures the direct impact of prevailing wage laws on public projects because it is equal to one in only those instances where there is a public project in a state that has a prevailing wage law. Table II.2 presents the results.

The variable of note in the regression is the interactive variable (PW *times* PC). The coefficient on this interaction variable (I), which captures the impact of prevailing wages on public project construction costs in prevailing wage states) is 0.015 and is statistically insignificant. I conclude that prevailing wage laws do not have a statistically significant impact on public construction projects in prevailing wage states. While public projects in the six-state region are significantly more expensive than private projects in both prevailing and non-prevailing wage states, as indicated by the statistically significant coefficient on the variable Pubcode, this is not due to existence of prevailing wage legislation. Previous studies that have claimed to find such an impact have likely confused the higher costs associated with public projects for a prevailing wage effect that does not exist.

Table II.2

Regression Results: Determinants of Construction Costs for All States

Variable	Coefficient
Intercept	4.563***
Ln Square Feet	0.941***
Pubcode	0.368***
Prevailing Wage	0.105**
Public Code * Prevailing Wage	0.015
Amusements, Social and Recreational Buildings	1.109***
Dormitories	0.893***
Government Services Buildings	1.014***
Hospital and Other health Treatment Facilities	1.442***
Hotels and Motels	0.757***
Manufacturing Plants, Warehouses, and labs	0.839***
Miscellaneous Nonresidential buildings	0.988***
Office and Bank Buildings	1.089***
Parking Garages and Automotive Services	(0.008)
Religious Buildings	0.700***
Schools, Libraries, and Labs (nonmfg)	1.307***
Stores and Restaurants	0.867***
	Adjusted R-Squared = 0.924
	N=1082
	F = 813.690

NOTE: Dependent Variable is LN (real total costs) where total costs are bid costs reported in 2014 dollars

*** coefficient is significant at .01 level

** coefficient is significant at .05 level

The coefficients for the state dummy variables are not reported.

C. School Construction Costs in Prevailing and Non-Prevailing Wage States

The primary data used to analyze school construction costs were obtained from the F.W. Dodge Company, a company that collects and disseminates data on construction projects for the industry. The Dodge data provide the bid costs of school construction projects by state. The Dodge data also provided the bid costs of construction costs for elementary schools, secondary schools and universities.

My analysis of the F.W. Dodge data across all types of structures showed that (1) the public costs of construction are higher than the private costs of construction in both prevailing and non-prevailing wage jurisdictions and (2) the coefficient on my interaction variable, which captured the impact of prevailing wages on public project construction is was statistically insignificant. I can conclude that the interactive variable which captures the impact of prevailing wages on school construction is statistically insignificant at the 5% level. The model that can capture the impact, if any, of a prevailing wage law on school construction costs is specified as follows:

$$CC = \alpha + \beta_1 S + \beta_2 T + \beta_3 R + \beta_4 PW + \beta_5 PC + \beta_6 I + \varepsilon$$

where CC = start costs; S = the scale of the projects as measured by the square foot of the project, T = a vector of dummy variables that indicates whether the school construction project is elementary, secondary, or university, R = a vector of dummy variables (one for each state), PW = a dummy indicating the presence or absence of a prevailing wage law, PC = a dummy indicating whether or not a project was public or private, and I = (PW*PC), an interaction variable. The key variables in this regression are PC, PW, and I. These three variables allow us to estimate the impact of prevailing wage statutes separate from the impact of public ownership of a project. PC captures the cost differential between public and private projects in the region, independent of whether or not a state has a prevailing wage law. The PW variable captures the impact of prevailing wage laws on construction projects independent of whether or not the projects are public or private. The I-interaction variable captures the direct impact of prevailing wage laws on public projects because it is equal to one in only those instances where there is a public project in a state that has a prevailing wage law. Table II.3 presents the results.

Table II.3 Regression Results: Determinants of School Construction Costs	
Variable	**Coefficient**
Intercept	7.103***
Ln Square Feet	0.796***
Pubcode	0.541***
Prevailing Wage	-0.360**
Public Code * Prevailing Wage	0.033
Elementary	(0.671)***
Secondary	(0.390)***
	Adjusted R-Squared = 0.930
	N=266
	F = 573.391
NOTE: Dependent Variable is LN (real total costs) where total costs are bid costs reported in 2014 dollars	
*** coefficient is significant at .01 level	
** coefficient is significant at .05 level	
The coefficients for the state dummy variables are not reported.	

The variable of note in the regression is the interactive variable (PW *times* PC). The coefficient on this interaction variable (I), which captures the impact of prevailing wages on public project construction costs in prevailing wage states) is 0.033 and is statistically insignificant. I conclude that prevailing wage laws do not have a statistically significant impact on school projects in prevailing wage states. While public projects in the six-state region are significantly more expensive than private projects in both prevailing and non-prevailing wage states, as indicated by the statistically significant coefficient on the variable Pubcode, this is not due to existence of prevailing wage legislation. Previous studies that have claimed to find such an impact have likely confused the higher costs associated with public projects for a prevailing wage effect that does not exist. I conclude that prevailing wage laws do not have a statistically significant impact on school construction projects in prevailing wage states.

In addition to the empirical analysis conducted above that shows that prevailing wage laws do not have a statistically significant impact on school construction costs, I have also examined school construction costs at the elementary, secondary, and university level in West Virginia compared to the non-prevailing wage states of North Carolina, Ohio (elementary and secondary levels) and Virginia. At the elementary level, construction costs on a square foot basis for the period 2006-2013 (expressed in 2014 dollars) in West Virginia was $209.03 per square foot. In the non-prevailing wage states of North Carolina, Ohio (elementary), and Virginia, construction costs on a square foot basis for the period 2006-2013 (expressed in 2014 dollars) was $215.13. School construction costs for elementary schools in West Virginia is **$6.11 cheaper** than in the non-prevailing wage states of North Carolina, Ohio (elementary), and Virginia on a square foot basis over the period 2006-2013.

At the secondary level, construction costs on a square foot basis for the period 2006-2013 (expressed in 2014 dollars) in West Virginia was $205.90 per square foot. In the non-prevailing wage states of North Carolina, Ohio (secondary), and Virginia, construction costs on a square foot basis for the period 2006-2013 (expressed in 2014 dollars) was $228.26. School construction costs for secondary schools in West Virginia is **$22.37 cheaper** than in the non-prevailing wage states of North Carolina, Ohio (secondary), and Virginia on a square foot basis over the period 2006-2013.

At the university level, construction costs on a square foot basis for the period 2006-2013 (expressed in 2014 dollars) in West Virginia was $344.11 per square foot. In the non-prevailing wage states of North Carolina and Virginia, construction costs on a square foot basis for the period 2006-2013 (expressed in 2014 dollars) was $402.64. School construction costs for university construction in West Virginia is **$58.52 cheaper** than in the non-prevailing wage states of North Carolina and Virginia on a square foot basis over the period 2006-2013.

Conclusions

The results of this analysis of school construction costs in West Virginia indicate that the costs of construction of elementary, secondary, and university schools is lower per square foot in West Virginia than in the prevailing wage states of North Carolina, Ohio (elementary and secondary), and Virginia. Therefore, the repeal or modification of

prevailing wage laws will not result in costs savings as alleged by proponents of repeal or modification of prevailing wage law as the costs are higher in those states that have no prevailing wage law. The results show that there are significant cost differences between public and private school construction projects; however, these differences cannot be attributed to prevailing wage legislation.

Table IIA Distribution of New Construction Spending by Type 2006-2013		
PWS and Non-PWS	**Count**	**%**
Amusement, Social and Recreational Bldgs	**4,525**	5.6%
Dormitories	**785**	1.0%
Government Service Buildings	**2,880**	3.5%
Hospitals and Other Health Treatment	**6,665**	8.2%
Hotels and Motels	**1,065**	1.3%
Manufacturing Plants, Warehouses, Labs	**2,061**	2.5%
Miscellaneous Nonresidential Buildings	**1,854**	2.3%
Office and Bank Buildings	**22,604**	27.8%
Parking Garages and Automotive Services	**2,689**	3.3%
Religious Buildings	**2,343**	2.9%
Schools, Libraries, and Labs (nonmfg)	**10,508**	12.9%
Stores and Restaurants	**19,531**	24.1%
Warehouses (excl. manufacturer owned)	**3,658**	4.5%
Total	**81,168**	**100.0%**

Table IIB Distribution of New Construction Spending by Type and Prevailing Wage Status 2006-2013	Non-PWS		PWS	
	Count	**%**	Count	%
Amusement, Social and Recreational Bldgs	1,658	4.8%	2,867	5.8%
Dormitories	353	1.0%	432	0.6%
Government Service Buildings	1,195	3.5%	1,685	3.5%
Hospitals and Other Health Treatment	2,132	6.2%	4,533	8.2%
Hotels and Motels	435	1.3%	630	1.3%
Manufacturing Plants, Warehouses, Labs	491	1.4%	1,570	8.9%
Miscellaneous Nonresidential Buildings	656	1.9%	1,198	2.5%
Office and Bank Buildings	10,410	30.4%	12,194	21.9%
Parking Garages and Automotive Services	918	2.7%	1,771	4.7%
Religious Buildings	1,042	3.0%	1,301	4.5%
Schools, Libraries, and Labs (nonmfg)	6,364	18.6%	4,144	12.0%
Stores and Restaurants	7,371	21.5%	12,160	19.1%
Warehouses (excl. manufacturer owned)	1,211	3.5%	2,447	7.0%
Total	**34,236**	**100.0%**	**46,932**	**100.0%**

Table IIC			
Real Cost Per Square Foot of New Construction by Type and Prevailing Wage Status			
2006-2013			
Non-PWS	Cost/Sq Ft.	**PWS**	Cost/Sq Ft.
Amusement, Social & Recreational Bldgs	$226.14	Amusement, Social & Recreational Bldgs	$298.29
Dormitories	$226.49	Dormitories	$236.21
Government Service Buildings	$313.50	Government Service Buildings	$334.66
Hospitals and Other Health Treatment	$276.48	Hospitals and Other Health Treatment	$312.16
Hotels and Motels	$148.47	Hotels and Motels	$179.28
Manufacturing Plants, Warehouses, Labs	$181.55	Manufacturing Plants, Warehouses, Labs	$212.07
Miscellaneous Nonresidential Buildings	$236.58	Miscellaneous Nonresidential Buildings	$291.41
Office and Bank Buildings	$211.36	Office and Bank Buildings	$207.50
Parking Garages & Automotive Services	$65.99	Parking Garages & Automotive Services	$79.93
Religious Buildings	$145.43	Religious Buildings	$169.02
Schools, Libraries, and Labs (nonmfg)	$254.71	Schools, Libraries, and Labs (nonmfg)	$366.74
Stores and Restaurants	$115.59	Stores and Restaurants	$123.60
Warehouses (excl. manufacturer owned)	$71.29	Warehouses (excl. manufacturer owned)	$64.64
Non PWS - Mean Cost Per Square Foot	**$187.10**	**PWS - Mean Cost Per Square Foot**	**$196.52**
Total Dollar Value of New Construction	$110,556,184,200	Total Dollar Value of New Construction	$147,231,877,600
Total Square Feet of New Construction	590,887,300	Total Square Feet of New Construction	749,187,000

Table IID							
Square Foot Construction Costs by Structure Type							
2006-2013							
Maryland				Count	Mean	Minimum	Maximum
Amusement, Social and Recreational Bldgs				488	$347.25	$104.31	$865.69
Dormitories				67	$377.19	$140.73	$645.39
Government Service Buildings				246	$329.84	$100.82	$683.20
Hospitals and Other Health Treatment				558	$393.40	$155.64	$1,073.00
Hotels and Motels				115	$227.70	$78.08	$775.66
Manufacturing Plants, Warehouses, Labs				119	$186.94	$71.99	$433.71
Miscellaneous Nonresidential Buildings				182	$421.36	$93.86	$1,115.04
Office and Bank Buildings				3,366	$289.55	$119.01	$972.54
Parking Garages and Automotive Services				387	$83.50	$56.56	$154.04
Religious Buildings				257	$175.73	$99.56	$285.98
Schools, Libraries, and Labs (nonmfg)				1,175	$381.13	$246.80	$461.97
Stores and Restaurants				1,987	$228.95	$113.29	$1,137.31
Warehouses (excl. manufacturer owned)				536	$130.54	$53.71	$269.34

Table IIE							
Square Foot Construction Costs by Structure Type							
2006-2013							
Ohio				Count	Mean	Minimum	Maximum
Amusement, Social and Recreational Bldgs				1,396	$330.32	$172.81	$735.80
Dormitories				209	$247.15	$113.86	$403.00
Government Service Buildings				750	$278.21	$101.18	$686.83
Hospitals and Other Health Treatment				2,667	$465.94	$190.36	$1,341.58
Hotels and Motels				239	$166.44	$129.69	$233.77
Manufacturing Plants, Warehouses, Labs				1,071	$275.99	$97.96	$998.00
Miscellaneous Nonresidential Buildings				569	$230.85	$89.91	$419.39
Office and Bank Buildings				6,273	$373.33	$140.43	$1,198.58
Parking Garages and Automotive Services				949	$122.86	$64.39	$469.79
Religious Buildings				679	$129.03	$84.12	$160.64
Schools, Libraries, and Labs (nonmfg)				3,247	$278.19	$204.65	$407.51
Stores and Restaurants				6,756	$290.11	$95.07	$656.55
Warehouses (excl. manufacturer owned)				1,258	$92.45	$49.88	$165.69

Table IIF Square Foot Construction Costs by Structure Type 2006-2013			
Pennsylvania	**Count**	**Mean**	**Minimum**	**Maximum**
Amusement, Social and Recreational Bldgs	878	$353.70	$207.62	$827.38
Dormitories	145	$225.29	$110.23	$557.15
Government Service Buildings	567	$311.83	$165.40	$763.65
Hospitals and Other Health Treatment	1,198	$584.90	$207.64	$1,889.84
Hotels and Motels	241	$182.90	$141.12	$319.57
Manufacturing Plants, Warehouses, Labs	368	$362.82	$133.42	$1,078.38
Miscellaneous Nonresidential Buildings	398	$519.87	$202.96	$1,312.58
Office and Bank Buildings	2,401	$279.65	$178.65	$591.36
Parking Garages and Automotive Services	399	$104.72	$58.31	$189.36
Religious Buildings	342	$240.49	$74.89	$551.60
Schools, Libraries, and Labs (nonmfg)	2,358	$406.81	$271.01	$568.48
Stores and Restaurants	3,069	$239.38	$88.14	$612.30
Warehouses (excl. manufacturer owned)	622	$92.90	$47.06	$231.71

Table IIG Square Foot Construction Costs by Structure Type 2006-2013			
West Virginia	**Count**	**Mean**	**Minimum**	**Maximum**
Amusement, Social and Recreational Bldgs	105	$211.93	$89.51	$456.30
Dormitories	11	$170.76	$63.44	$324.92
Government Service Buildings	122	$300.75	$77.91	$440.23
Hospitals and Other Health Treatment	110	$529.59	$137.73	$1,723.89
Hotels and Motels	35	$159.56	$86.48	$247.64
Manufacturing Plants, Warehouses, Labs	12	$246.82	$67.41	$507.92
Miscellaneous Nonresidential Buildings	49	$200.25	$54.03	$513.88
Office and Bank Buildings	154	$276.34	$47.03	$665.59
Parking Garages and Automotive Services	36	$120.63	$48.73	$643.34
Religious Buildings	23	$163.27	$96.83	$389.86
Schools, Libraries, and Labs (nonmfg)	409	$291.31	$108.34	$589.38
Stores and Restaurants	348	$233.50	$42.65	$922.66
Warehouses (excl. manufacturer owned)	31	$95.43	$30.46	$268.54

Table IIH Square Foot Construction Costs by Structure Type 2006-2013							
North Carolina				Count	Mean	Minimum	Maximum
Amusement, Social and Recreational Bldgs				945	$245.34	$132.03	$397.10
Dormitories				186	$184.45	$86.47	$298.25
Government Service Buildings				641	$207.22	$122.57	$352.13
Hospitals and Other Health Treatment				1,357	$290.58	$168.96	$476.70
Hotels and Motels				203	$155.95	$112.73	$258.78
Manufacturing Plants, Warehouses, Labs				317	$279.50	$43.06	$773.69
Miscellaneous Nonresidential Buildings				360	$211.20	$49.85	$591.36
Office and Bank Buildings				5,417	$228.10	$135.68	$398.37
Parking Garages and Automotive Services				435	$69.25	$43.88	$106.56
Religious Buildings				565	$190.02	$110.30	$592.47
Schools, Libraries, and Labs (nonmfg)				1,846	$227.21	$168.04	$278.91
Stores and Restaurants				3,990	$258.84	$89.13	$913.34
Warehouses (excl. manufacturer owned)				653	$85.40	$54.04	$145.76

Table III I			
Square Foot Construction Costs by Structure Type			
2006-2013			
Virginia	**Count**	**Mean**	**Minimum**	**Maximum**
Amusement, Social and Recreational Bldgs	713	$270.55	$113.36	$659.03
Dormitories	167	$244.23	$151.20	$360.19
Government Service Buildings	554	$302.92	$113.44	$459.64
Hospitals and Other Health Treatment	775	$328.54	$178.80	$544.62
Hotels and Motels	232	$160.40	$97.65	$291.48
Manufacturing Plants, Warehouses, Labs	174	$218.48	$37.60	$580.93
Miscellaneous Nonresidential Buildings	296	$432.14	$72.02	$1,739.15
Office and Bank Buildings	4,993	$358.11	$134.84	$999.93
Parking Garages and Automotive Services	483	$72.96	$32.08	$170.98
Religious Buildings	477	$257.19	$131.33	$1,227.34
Schools, Libraries, and Labs (nonmfg)	1,473	$288.93	$190.79	$361.23
Stores and Restaurants	3,381	$374.56	$96.10	$1,328.51
Warehouses (excl. manufacturer owned)	558	$83.74	$51.27	$161.41

Chapter III
The Economic Impact of the Prevailing Wage Statute On the State of West Virginia

Summary of Findings:

- This chapter uses an input-output approach to estimate the economic impact of repeal of West Virginia's prevailing wage laws.
- Direct and indirect losses to household income and to government revenues are calculated.
- Losses are estimated for the State of West Virginia.

Specific findings include:

- For the state as a whole, the major conclusions are:
  - The repeal of the prevailing wage law would cost the residents of West Virginia and their families between $51.30 million and $77.28 million annually in lost income.
  - The repeal of the prevailing wage law would cost the State of West Virginia between $1.43 million and $2.15 million in lost sales tax collections annually.
  - The repeal of the prevailing wage law would cost the State of West Virginia between $3.08 million and $4.64 million annually in lost income tax revenue.
  - The total economic loss due to repeal of the prevailing wage law in West Virginia in 2014 would be a loss of income and revenue between $55.81 million and $84.06 million annually.

Section I Introduction

There are a number of methodologies that have been developed for regional economic impact analysis. The three most common types are econometric models, economic base models, and input-output models.[40] An input-output model is used in this study to estimate the economic impact of the prevailing wage statute and the construction sector on the State of West Virginia. The three most accepted methodological approaches for using input-output analysis are the REMI, IMPLAN, and the RIMS II multipliers. The decision to use the RIMS II multipliers for this study was made after comparison of the benefits and costs of the three methodological approaches. RIMS II is widely used in the public and private sector for analysis of regional economic impacts. Empirical tests have shown that estimates based upon the RIMS II modeling system and estimates from other regional impact models are similar in magnitude.

An input-output model quantifies the interdependence among industries in a regional or state economy so that one can reach a conclusion with respect to the impact of a change in incomes or expenditures in one industry might have upon the total regional economy. Therefore, regional input-output models provide a valuable tool for regional economic impact analysis.

In the mid-1970's, the United States Department of Commerce, Bureau of Economic Analysis (BEA), completed the development of a method of estimating regional input-output multipliers known as RIMS (Regional Industrial Multipliers System).[41] In the mid-1980s, BEA completed an enhancement of RIMS knows as RIMS II. In 1986, industry multipliers for 39 industry aggregates for each of the states were published.

Using RIMS II, multipliers can be estimated for any region composed of one or more counties and for any industry in the national input-output table. This allows for consistent analysis of economic impacts for different industries in a regional economy,

[40]For an excellent review of economic base and input-output methodologies, see Henry Richardson. 'Input-Output and Economic Base Multipliers: Looking Backward and Forward." *Journal of Regional Science.* Volume 25, No. 4 (1985): 607-661.

[41]Cartwright, Joseph V. and Richard M. Beemiller and Richard D. Goshely, Regional Input-Output Modeling Systems: Estimation, Evaluation and Application of a Disaggregated Regional Impact Model.

including the construction industry. The multipliers provide a means for assessing the impact of a sector or industry on the regional economy as a result of a change in a fundamental variable such as output or income.

The RIMS II multipliers used in this study were first released in June 2003. The output, earnings, and employment multipliers used in this study are based upon the 2010 annual input-output accounts for the U.S. economy and 2010 regional data. The multipliers for the State of West Virginia for output, earnings, and employments are provided by detailed industry and industry aggregation.

Section II Input-Output Analysis

This section provides a brief overview of how economic modeling using input-output analysis is constructed. In general, input-output modeling is a method to quantify business relationships between industries in a geographic area. In other words, by using a set of assumptions about how various types of business sectors operate in a region, state, or nation, input-output modeling can take the arduous task of surveying countless numbers of firms, regarding their supply chain and sales relationships, and simplify the task by estimating these results.

This accomplishes three things. First, it provides a tool for economic and social policy which can help facilitate timely and effective planning for public and private sector projects. Secondly, and related to the latter, input-output modeling serves as a descriptive framework, displaying interrelationships between industries and industrial sectors, as well as quantifying the corresponding supply chains and finished good markets, including households and the public sector. Lastly, at a macro perspective, such as at a regional, state or national level, input-output modeling can estimate, and hence quantify, the employment, income, and tax revenue effects of an economic or social policy which would have a direct effect upon an industry or industrial sectors operations.

Section II.A Input-Output Model Transaction Table

Input-output modeling relies on information about how business sectors interact, in other words, information regarding the purchases of final goods from other sectors which are then used by the industry in question to produce its final goods. The various linkages in a regional economy between households, business, and government establish

---

U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division, April 1981.

the interdependencies between sectors. An input-output model quantifies these relationships in such a way that conclusions regarding economic variables such as employment, household or business income, or tax revenue can be reached.

To construct an input-output model a transaction table must be developed. The idea behind a transaction table is simple in nature but is the foundation for the input-output model. The general notion behind the transaction table relates to all the components purchased to form a final good. For example if an industrial sector wants to produce a specified amount of output in dollar terms, it might need to purchase some dollar amount from its same sector, some dollar amount from two other sectors, and finally some purchase of labor to build the product. In this example then I have three industrial sectors and a labor sector all producing or providing goods or services which will be used to construct a final good for our initial sector in question. By looking at what goods or services are purchased to produce a good in one industrial sector, I can then conclude a monetary value for the total inputs needed to produce a final good in one sector. If I followed this approach for our other two industrial sectors and our labor pool, as well as the rest of our economy, I can then determine a value for final output of a particular industrial sector.

Following the above, Table III.1 provides a visual aid and the paragraph below explains.

Table III.1
Sample Input-Output Transaction Table
Purchasing Sector

From / To	Purchasing Sector			Final Demand	Total Output
	#1	#2	#3		
#1	4	5	2	9	20
#2	7	8	3	17	35
#3	3	5	7	7	20
Payment Sector (Value Added)	6	17	10	3	36
Total Inputs	20	35	20	36	111

To clarify, the column entries reflect the purchases made by a particular sector. For example, for purchasing sector #1 to produce $20 in output, sector #1 would require (1) $4 in inputs from regional firms in the same industry, (2) $7 and $3 of inputs, respectively from Sectors #2 and #3, and (3) $6 in labor inputs from households. The row entries indicate the sales of that row sector to a particular column sector. For example, as shown above, Sector #1 sells $4 to sector #1, $5 to Sector #2, $2 to Sector #3, and $9 to

final demand which sums to $20 of total sales. Notice that total inputs equal total output, in other words, for each sector or industry, inputs equal outputs; this is just like saying there is no surplus or shortage in the economy.

Section II.B Sample Direct Requirements Matrix

To simplify and make the information found in a transaction table more useful a direct requirements matrix is formed. At first glance this sounds complicated, but in fact it is rather a quick process of computing a ratio of individual sector inputs, to the total input needed to produce a specified industrial output. The ratio computed is called a technical coefficient and is used to describe the interrelationship among industries in a particular region. Recall that our transaction table essentially described what dollar amounts of inputs were needed to produce a certain amount of dollar output. Hence our technical coefficients represent the ratio of inputs to output to produce a particular industrial good. Thus, these ratios (or technical coefficients) can be viewed as estimates of the dollar change in output, for each additional output produced. Take for example the direct requirements matrix associated with our previous example and data found in Table III.1; this will be found below in Table III.2

.

Table III.2
Sample Technical or Direct Impact Coefficients
($A = a_{ij} = X_{ij} / X_j$)*

	Sector #1	Sector #2	Sector #3	Final Demand
Sector #1	.2000	.1429	.1000	.2500
Sector #2	.3500	.2286	.1500	.4722
Sector #3	.1500	.1429	.2500	.1944
Payment Sector (Value Added)	.3000	.4857	.5000	.0834
Total	1.00	1.00	1.00	1.00

*$A = a_{ij} = X_{ij} / X_j$) where X_{ij} is the dollar requirement of impacts from sector "i" required to produce $1.00 of output from sector "j"; X_j represents the total product in industry "j" or the column total.

Looking at Table III.2 and with reference to Sector #1, I can conclude from these estimates that a dollar increase of Sector #1's output will generate $.20 of additional production in Sector #1, $.35 in Sector #2, and so on. Generally put, our direct requirements matrix can be utilized to show how specified dollar changes in output will affect not only the industry in question but also the industry's supply chain. It must also be understood that these are direct impacts, meaning that an injection or leakage of

dollars from our regional economy has a multiplicative effect; simply put, a dollar increase in output of one industry will impact a whole scope of other industries which are all connected in producing goods which end up being a part of the output of the industry in question. I call these effects indirect.

Section II.C Sample Direct and Indirect Requirements Matrix

It is particularly useful to have an estimate of how dollar changes in one sector would affect all other sectors in a particular geographic agglomeration. These estimates can be found in a direct and indirect requirements matrix. Although the procedure to construct this matrix is difficult, it can be found in any mathematical economics textbook (see Chiang, 1984). Nonetheless, its general understanding is not difficult to comprehend, when output is increased in one industrial sector, there are economic affects in a multitude of other sectors in a specified economic region. This is simply suggesting, for example, that if output is increased in one industrial sector, the inputs used to produce the goods needed to increase that output must also increase. Table III.3 shows a constructed direct and indirect requirements matrix from my example above.

Table III.3
Direct and Indirect Requirements Matrix
(Inverse of [I-A] or $[I-A]^{-1}$)

	Sector #1	Sector #2	Sector #3
Sector #1	1.4346	0.1014	0.3108
Sector #2	0.3128	1.5062	0.5335
Sector #3	0.2536	0.3991	1.4601
Total	2.0010	2.0067	2.3044

In the above table, the column entries represent the output changes by the column sector as a result of a one-dollar change in output-demand. The summation of all column entries indicates the change, of all sectors given a dollar change in demand by one of the column entries. For example, as shown above with respect to Sector #1, if demand for output of sector #1 falls by $1.00, direct and indirect changes in this model would decrease total output (of all sectors) by $2.0010. This means that there is a multiplier effect of dollars spent or in this case taken away. Hence, the output multiplier is defined as the summation of the column entries in the direct and indirect requirements matrix. To be absolutely clear, the reason the effect is "multiplied" is because the decreased demand for Sector #1's output leads to a decline in demand for output of those sectors that supply

input to sector one. (For example, a decline of the demand for new homes will also cause a reduction in the forestry industry.)

These multipliers provide a means for assessing the impact of a sector or industry on the regional economy as a result of a change in a fundamental variable such as output or income. As a final note, this type of multiplier is referred to as a Type-I multiplier because it is calculated from the direct and indirect requirements matrix which does not consider the indirect effects of the final payments sector, or in other words, our labor sector.

Section III Construction Industry in the United States and West Virginia

The construction industry is one of the most important sectors in our national and regional economy. According to the United States Census Bureau, the construction industry employed 5.26 million people in 2012, or 4.54% of the workforce.[42] The payroll of the construction industry in 2012 represented 4.48% of total payroll in the United States. In the State of West Virginia, the construction sector plays a similar role. In West Virginia, the construction industry employed 25,464 people in 2012, representing 4.39% of the workforce in West Virginia. The total payroll of the construction industry in West Virginia was 5.39% of the state's payroll. The construction sector in West Virginia is comprised of small firms. In 2012, the total number of construction establishments reported by the U.S. Census Bureau was 3,353. Of that, 2,176 establishments (64.9%) had an employment size of 1-4 workers; the number of establishments that had an employment-size of 5-9 workers was 581 establishments, or 17.33%. In West Virginia, 82.22% of construction firms had an employment-size of 9 or less employees.

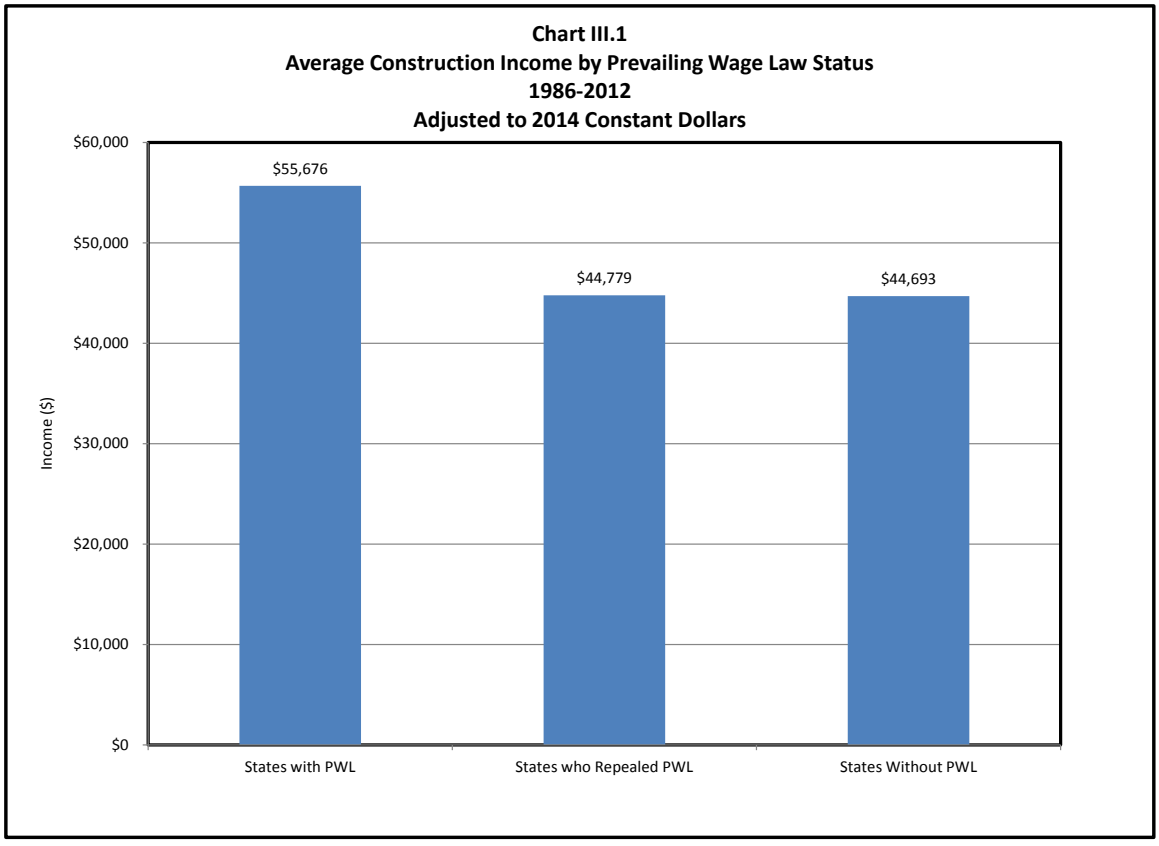
Section IV. Expected Loss of Earnings in Construction due to Repeal of Prevailing Wage Laws

In order to adequately assess any cost savings in overall construction expenditures from repeal of a prevailing wage statute, the purported cost savings to be realized has to be offset against the loss of incomes and revenues by other residents in West Virginia and by the public sector. The lower paid wages in the construction sector expected to follow from repeal of prevailing wage laws has a multiplier effect, not only impacting the

[42] U.S. Census Bureau. 2012 County Business Patterns (NAICS). United States. Major Industry.

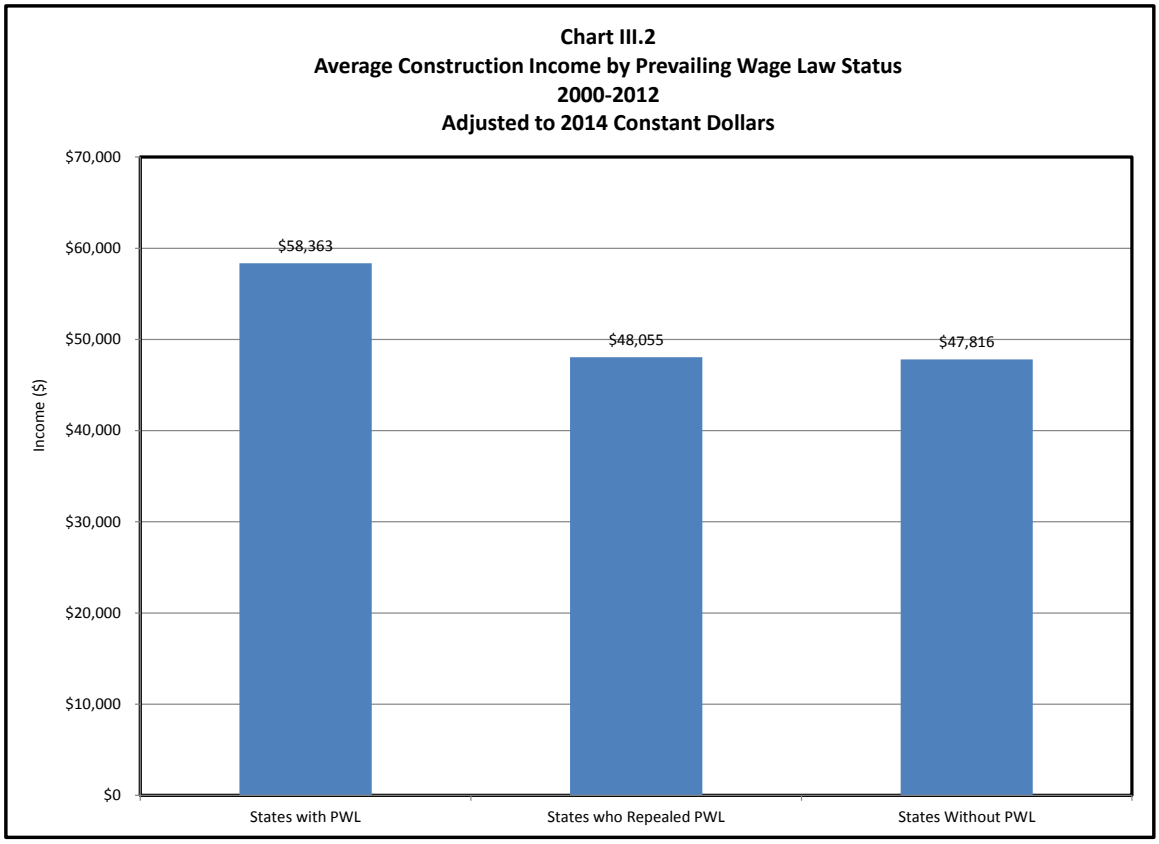
construction sector, but other industries and their families as well as tax revenue bases in West Virginia.

Construction workers in states that have a prevailing wage law have a higher average annual income than do construction workers in states that have never had a prevailing wage law or states that have repealed their prevailing wage law. Chart III.1 categorizes the states into these three groups.[43] The first bar shows the average annual income for construction workers in states that had a prevailing wage law for this period of time. For the period 1986-2014, the average annual earnings for this group were 1986-2012 was $55,676 annually.[44] The second bar shows the average annual income for construction workers in states that have repealed their prevailing wage law during this time period. For the period 1986-2012, the average annual earnings for this group were $44,779. The third bar shows the average annual income for construction workers in states that have never had a prevailing wage law. For the period 1986-2012, the average annual income was $44,693.



[43]U.S. Census Bureau, County Business Patterns, 1986-2012. Earnings data have been adjusted to 2014 real dollars using a BLS PPI for construction inputs and materials.
[44]All figures have been adjusted to 2014 real dollars using a BLS PPI for construction inputs and materials for this analysis.

For the period 1986-2012, the average annual earnings for construction workers in states that that have a prevailing wage law is 24.33% higher than in states that have repealed their prevailing wage law; it is 24.57% higher in prevailing wage states than those states that have never had a prevailing wage law. Chart III.2 shows this same analysis for the period 2000-2012. The results are similar, with the average income of construction workers in prevailing wage states higher by 21.45% and 22.06%, respectively, versus those states that have repealed their prevailing wage law or have never had a prevailing wage law. This analysis provides evidence that repealing or never having a prevailing wage law reduces construction income not only on public projects but also across all sectors of the construction industry.



Although this provides preliminary evidence of lower construction income across all public and private construction, the reason for the differential may be a combination

of factors other than the presence of a prevailing wage law. For example, it could be the case that states with higher construction wages have higher living costs for reasons not associated with prevailing wage laws.

Section V. State and Regional Impact of Repeal of West Virginia's Statute

In order to capture differential regional impacts of the repeal of the prevailing wage law in West Virginia on the construction industry, other industries, and the residents and public sector in West Virginia, I obtained RIMS II economic multipliers for the State of West Virginia from the Bureau of Economic Analysis. The economic multipliers obtained from the Bureau of Economic Analysis provide coverage for the State of West Virginia.

Section V.I: General Overview of Construction in West Virginia

For the period 2006-2013, the value of construction for thirteen non-residential construction projects provided by the F.W. Dodge Company for West Virginia was $6.37 billion.[45] Of the total inflation-adjusted costs of construction during that period, private sector construction was $2.78 billion and public sector construction was $3.59 billion. Private sector construction costs accounted for 43.7% of construction activity in the State of West Virginia; public sector construction accounted for 56.3% of non-residential construction activity in West Virginia.

The total amount of square foot of non-residential construction in West Virginia from 2006-2013 was 30,863,700 square feet. Of the total square feet of non-residential construction from 2006-2013, private construction accounted for 16,325,300 square feet, or 52.9%; public construction accounted for 14,538,400 square feet or 47.1% of total non-residential construction activity in West Virginia during this period.

For private construction in West Virginia over the period 2006-2013, hospitals and other health treatment facilities, manufacturing plants, warehouses, labs, and warehouses (excl. manufacturer owned) accounted for $1.48 billion of the inflation-adjusted costs of non-residential construction, or 53.1% of private non-residential construction activity. For private non-residential construction in West Virginia, hospitals and other health treatment facilities, manufacturing plants, warehouses, labs, and

[45]For construction value in West Virginia for the period 2006-2013, I have expressed all years in 2014 prices. United States Bureau of Labor Statistics. Series ID: PCUBCON—BCON--

warehouses (excl. manufacturer owned) accounted for 6,708,000 square feet or 41.1% percent of total private non-residential construction activity from 2006-2013.

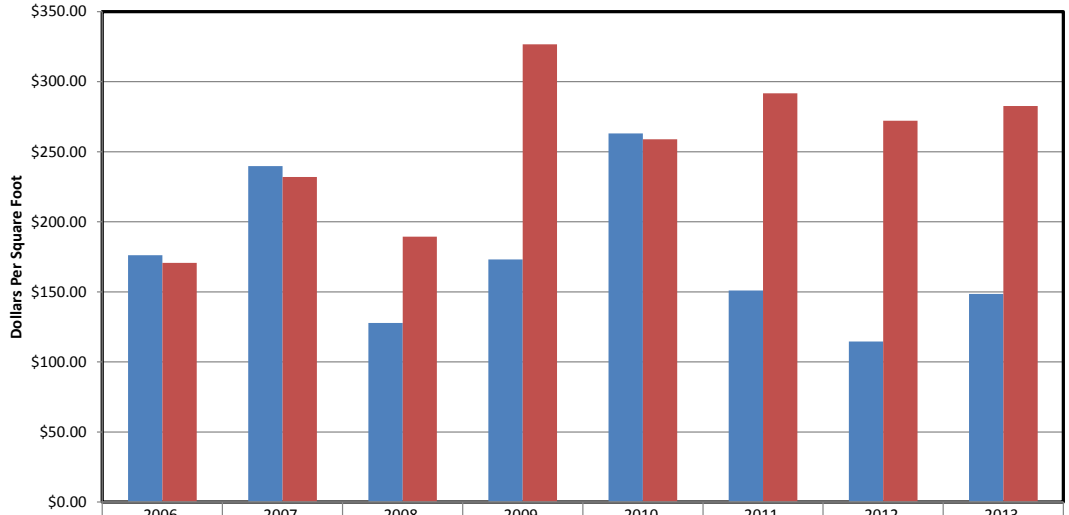
For public non-residential construction in West Virginia over the period 2006-2013, schools, libraries, and labs (non-manufacturing) and government service buildings for $2.71 billion of the inflation-adjusted costs of non-residential construction, or 75.5% of public construction activity. For public non-residential in West Virginia, schools, libraries, and labs (non-manufacturing) and government service buildings accounted for 10,279,000 square feet, or 70.7% of total public non-residential construction activity from 2006-2013.

For public construction in West Virginia from 2006-2013, schools, libraries and labs (non-manufacturing) accounted for $1.82 billion of the inflation-adjusted costs of construction, or 50.6% of public construction activity. School, libraries, and labs (non-manufacturing) accounted for 7,354,400 square feet, or 50.6% of total public non-residential construction activity from 2006-2013.

Charts III.3-III.4 present findings on the level of private and public sector activity and the real costs of construction for the State of West Virginia across (1) 13 types of construction and (2) school, libraries, and labs (non-manufacturing) construction only, respectively. Chart III.3 shows the costs of public construction versus private construction in West Virginia. These findings are derived from the non-residential construction cost data base from F.W. Dodge. Chart III.3 shows that public construction costs per square foot across all 13 construction categories are more than private construction costs per square foot. This result is obtained for all six states in the analysis region, irrespective of whether or not it is a prevailing wage state or a non-prevailing wage state. One reason why public sector construction costs are high is certain facilities extract more demanding standards of construction than does most non-residential private sector construction activity.[46]

[46]See Appendix for Detail Structure List from F.W. Dodge, which explains components of each structure type.

Chart III.3
State of West Virginia
Cost of Private and Private Construction
All Structure Types
Constant Costs Per Square Foot(2014 Dollars)
(2006-2013)

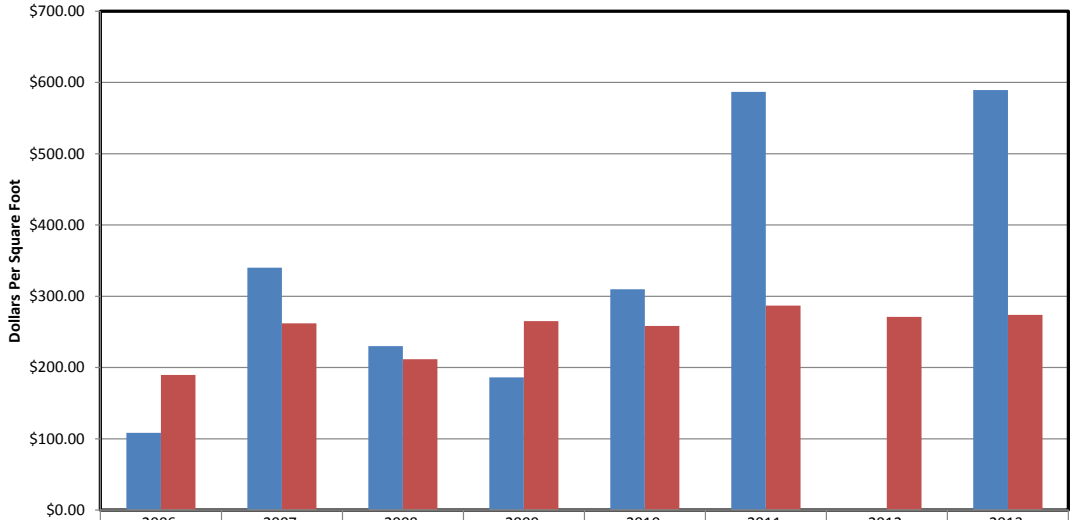


	2006	2007	2008	2009	2010	2011	2012	2013
Private	$176.11	$239.71	$127.86	$173.12	$262.99	$150.94	$114.50	$148.57
Public	$170.65	$232.03	$189.36	$326.68	$258.88	$291.70	$272.06	$282.61

The argument is often made that prevailing wage statutes increases the costs of construction in the school sector (e.g. "we could build four schools for the price of three schools if we could exempt prevailing wage").

However, close analysis of the F.W. Dodge data for the period 2006-2013 reveals that the costs of construction per square foot in the schools, libraries, and labs category, expressed in 2014 dollars, was $266.83 per square foot for private construction, while only $246.97 for public construction (See Chart III.4) Private construction of schools, libraries, and labs was 8.04% higher than public construction of schools, libraries, and labs. I found a similar result in my analysis of school construction costs in Missouri (Kelsay, 2004, 2011).

Chart III.4
State of West Virginia
Costs of Public and Private Construction
Schools, Libraries and labs
Constant Sqaure Foot Costs (2014 Dollars)
2006-2013



	2006	2007	2008	2009	2010	2011	2012	2013
Private	$108.34	$340.14	$230.08	$186.13	$309.86	$586.86	$0.00	$589.38
Public	$189.71	$262.09	$211.63	$265.13	$258.48	$286.84	$271.08	$273.98

Section V.2: Costs and Benefits to the State of West Virginia Resulting from Repeal of Prevailing Wage Legislation

Numerous studies have presented evidence that wages should be expected to fall after repeal of the West Virginia's prevailing wage statute. Phillips (1995) showed that the estimate of repeal of prevailing wage laws results in a 5.1% decrease in earnings.[47] Kessler and Katz (1999) showed there was a 4.7% relative fall in construction workers wages in states that repealed their prevailing wage law and those states that did not.[48] Kelsay and Pinkham (2004, 2011) found that real construction wages decreased by 3.4%. I present a range of estimates based upon these percentage decreases in construction wages. The range of estimates for a decrease in construction wages is based upon the research cited above: (1) 3.4% [Kelsay, et al.], (2) 4.7% [Katz, et al, 1999], and (3) 5.1% [Phillips, et al.1999]. Table III.5 provides the estimates of economic loss in the construction sector.

This loss in annual construction worker income represents the direct or first order impact of the repeal of the prevailing wage statute in West Virginia. Based upon construction employment in West Virginia of 25,464 workers in 2012, this direct or first order economic loss to construction workers incomes is between $38.89 million and $58.33 million annually across the three ranges of estimates (Table III.4). This loss in construction worker income does not take account of the indirect or secondary affects, as it ignores multiplier effects (e.g. induced or secondary effects) on other workers and their families in West Virginia. It also ignores impacts on tax revenue bases in West Virginia that are a function of the general level of income and economic activity in West Virginia.

As an offset to the reduction in construction income (direct impacts) and to the reduction in other industry incomes (indirect impacts), there could be an increase in employment in the construction sector as a result of the lower wages paid. For example, employment might increase in the construction sector because the payment of lower wages induces firms to hire less productive workers, so that it would take more workers to complete any given task. (See Chapter 1 above for exploration of this issue, with

[47] Phillips, Peter, Garth Magnum, Norm Waitzman, and Anne Yeagle. *Losing Ground: Lessons from the Repeal of Nine "Little Davis Bacon" Acts.* Working Paper. Economics Department. University of Utah. February, 1995. Page 24.

[48] Kessler, Daniel P. and Lawrence Katz. *Prevailing Wage Laws and Construction Labor Markets.* NBER Working Paper Series. Working Paper 7454. December, 1999. Table 2.

Table III.4 Economic Impact on Wages and Employment in West Virginia 2012 Data			
	Kelsay, et al.	Kessler, et al.	Phillips, et al.
	(3.40%)	(4.70%)	(5.1%)
2009 Average Wage [1]	$44,918	$44,918	$44,918
Decrease in Wage [2]	$1,527	$2,111	$2,291
New Annual Wage	$43,391	$42,807	$42,627
Number of Workers [1]	25,464	25,464	25,464
Loss in Earnings in Construction Sector [3]	$38,888,926	$53,758,222	$58,333,390
Increase in Employment from Lower Wage [4]	173	239	260
Increase in Income from Lower Wage [5]	$7,513,341	$10,246,317	$11,071,677
Net Earnings Loss in Income in Construction Sector [6]	$31,375,586	$43,511,905	$47,261,712
[1] United States Census Bureau. County Business Patterns. West Virginia 2012.			
[2] 2012 Annual Wages multiplied by loss estimates of employment.			
[3] Decrease in Wages *multiplied* by number of workers.			
[4] Increase in Employment is derived from labor elasticity estimate of -0.20 (Kelsay (2004, 2011)			
[5] New wage multiplied by increase in employment.			
[6] Loss in Earnings in Construction *minus* Increase in Income.			

evidence demonstrating that worker productivity is lower, and construction costs higher, in low wage states.) In addition, it is conceivable that lower wages might encourage more projects, although I have demonstrated in an earlier section that lower wages do not result in lower construction costs. In any case, I assume that the elasticity of labor demand to a fall of wages is 0.20 - in other words, if wages fall, there is a slight increase in employment. A number of labor studies report these elasticity estimates (Kniesner, 1987; Michl, 1986, Freeman and Medoff, 1981, and Belman, 1988).[49]

According to the data from the U.S. Department of Commerce, County Business Patterns, the 2012 average wage in West Virginia for construction workers was $44,918. Utilizing the calculation that the loss in per worker income was $1,527 (Kelsay, et al., 2004, 2011) and the labor elasticity estimate is 0.2, a 3.52% reduction in wages would generate about 173 additional construction jobs. Assuming that these less productive workers earn $43,391, on average, this would generate an additional $7.51 million in additional construction sector income in West Virginia. This direct impact of $7.51 million in additional construction income would partially offset the $38.88 million in direct lost construction income. Hence, the net loss in direct income to construction workers and their families in the State of West Virginia under the estimate that per worker income decreased by $1,527 per worker is $31.38 million annually.

[49] The elasticities of demand for labor reviewed range between –0.07 and -0.44. Labor demand is less elastic for skilled labor than for unskilled labor. Given the skill craftsmen working in the construction sector, the elasticity will tend to lower estimates. I have used –0.20 for our estimates in this section.

Utilizing the calculation that the loss in per worker income was $2,111 (Kessler, et al., 1999) and the labor elasticity estimate is 0.2, a 4.93% reduction in wages would generate about 239 additional construction jobs. Assuming that these less productive workers earn $42,807, on average, this would generate an additional $10.25 million in additional construction sector income in West Virginia. This direct impact of $10.25 million in additional construction income would partially offset the $53.76 million in direct lost construction income. Hence, the net loss in direct income to construction workers and their families in the State of West Virginia under the estimate that per worker income decreased by $2,111 per worker is $43.51 million annually.

Utilizing the calculation that the loss in per worker income was $2,291 (Phillips, et al., 1999) and the labor elasticity estimate is 0.2, a 5.37% percent reduction in wages would generate about 260 additional construction jobs. Assuming that these less productive workers earn $42,627, on average, this would generate an additional $11.07 million in additional construction sector income in West Virginia. This additional construction income would have induced or secondary effects as well. This direct impact of $11.07 million in additional construction income would partially offset the $58.33 million in direct lost construction income. Hence, the net loss in direct income to construction workers and their families in the State of West Virginia under the estimate that per worker income decreased by $2,291 per worker is $47.26 million annually.

This accounts for the direct impacts of repeal on the construction industry only. I also need to account for the economic impact of the induced and secondary effects of the repeal of prevailing wage that is associated with lower construction incomes throughout the West Virginia economy.

Section V.3: Multiplier Effects

In order to assess the secondary or induced effects, I have obtained economic multipliers from the Bureau of Economic Analysis, called RIMS II, for State of West Virginia. The application of the earnings multipliers will allow us to quantitatively assess the secondary and induced effects on other sectors and their families in West Virginia as well as on public sector revenue streams. The earnings multiplier for the construction sector for the State of West Virginia is 1.6351.[50]

This can be interpreted as follows: In West Virginia, for every $1 increase (decrease) of earnings in the construction sector, the region's earnings increase (decrease) by $1.46. For the state as a whole, for every $1 increase (decrease) of earnings in the construction sector, the state's earnings increase (decrease) by 1.6351. The size of the multiplier depends upon several factors. One of the more important factors is the size of the geographic size of the region under analysis. A given sub-region in West Virginia would have a smaller multiplier compared to the entire state. This is because a higher percent of spending will "leak out" of a small region through purchases of products and services from other regions.

Another important factor in determining the size of the multiplier is the number and diversity of firms in the selected region. If a region is large and diverse, the larger will be the multiplier; again the leakages from the selected area will be smaller. It is important to remember that income would not be the only loss for the State of West Virginia as a result of the repeal of its prevailing wage statute. Job safety would suffer as a result of repeal. For example, it was shown in Utah that serious occupational injuries in the construction industry increased by 15 percent after repeal (Phillips, 1995). This increase in injuries imposes indirect costs on the public sector. As a result of an increase in injuries in the construction sector associated with repeal of a prevailing wage statute, workers compensation costs for the public sector would increase.

It is also predicted that quality would suffer from repeal. With a prevailing wage statute, contractors have the incentive to use skilled journeymen and well-supervised apprentices. This skilled construction workforce is more efficient in insuring that work is done correctly and according to specification. In addition, the repeal of prevailing wage laws increases the long-run costs of maintenance of public sector construction. Under

[50]The earnings multiplier measures the dollar change in earnings of households in that region that results from a $1 change in earnings paid directly to households in the construction sector.

billing, high rates of failure in the construction industry, lower wages received, increased labor force turnover, less experience and decreased quality of workmanship lead to increased maintenance costs in the long run.

In order to assess the total impact of the prevailing wage in West Virginia, I present estimates for the State of West Virginia, using multipliers obtained from the Bureau of Economic Analysis so that both the direct and secondary impacts of repeal are quantified.

V.4: Multiplier Effects for State of West Virginia

In the previous section, I have calculated that repeal of prevailing wage laws in West Virginia would result in a net direct loss of construction income in West Virginia between $31.38 million to $47.26 million annually in net direct earnings losses in the State of West Virginia (See Table III.5). This loss figures incorporates the additional jobs that would be obtained via a lower wage. In addition to the direct effects on construction income in West Virginia, I need to incorporate the indirect and induced effect.

For the State of West Virginia, the earnings multiplier provided by the Bureau of Economic Analysis is 1.6351. The earning multiplier measures the dollar change in income received by all households in West Virginia across all industries that results from a $1 change in earnings paid to households in the construction sector. I utilize the earnings multiplier, which measures the direct and induced/indirect impacts of a reduction in earnings in the construction sector on the West Virginia economy. Based upon a direct economic loss of $31.38 million to $47.26 million annually in the construction sector, the total loss due to the repeal of West Virginia's prevailing wage statute should be expected to range between $51.30 million and $77.28 million annually.

Previous studies have shown that the repeal of prevailing wage laws has decreased tax revenues in other states. Given the decline in wages reported, construction workers and other workers in the state will buy fewer goods and services, decreasing sales taxes that are collected by the states. In addition, the reduction in wages paid to people in West Virginia will result in lower taxable income; this will decrease the revenue derived by the State of West Virginia from income taxes.

The current sales or use tax rate in West Virginia is 6.0%. Cities, counties, and certain districts may impose local sales taxes as well, so the amount of sales tax paid will

be a function of the combined state and local rates at the location of the seller. It is reported that the average local sales tax rate is an additional tax of 0.07%.[51] For the projected state and local sales tax revenue projected to be lost, I have used the overall average sales tax rate of 6.07%. Not all sales at the retail level are subject to West Virginia sales tax. According to a study by Bruce and Fox (2000), they estimated that the taxable sales tax base in West Virginia is 45.8%.[52] Based upon data from the Department of Labor, consumer units that report income in the range of the average wages of construction workers report a propensity to consume of 100 percent.[53] I can use these estimates to calculate the expected tax revenue loss resulting from repeal of prevailing wage laws.

If income would decrease by $51.30 million to $77.28 million after repeal and given that the estimated sales tax coverage is 45.8%, I have estimated that sales tax revenue would decrease in West Virginia by $1.43 million to $2.15 million annually.

State income taxes for West Virginia would decrease as well. Wes Virginia has a graduated marginal income tax rate. The bottom rate is 3% of taxable income on less than $10,000 to a top rate of 6.5% on incomes of $60,000 or more.[54] Based upon the average income of construction workers in West Virginia in 2012, I have used a marginal tax rate of 6% for projecting tax revenue losses to the state. Based upon average construction incomes in the State of West Virginia and the marginal tax rate of 6% on incomes, I have estimated the economic loss in state income tax revenue is between $3.08 million to $4.64 million annually.

In summary,

- The repeal of the prevailing wage law would cost the residents and their families in West Virginia between $51.30 million and $77.28 million annually in lost income.
- The repeal of the prevailing wage law would cost the State of West Virginia between $1.43 million and $2.15 million in lost sales tax collections annually at the state and local level.

[51] The facts on West Virginia's Tax Climate. West Virginia Sales and Excise Taxes. Tax Foundation. http://taxfoundation.org/state-tax-climate/west-virginia.
[52]The sales tax base is calculated as the percentage of personal income. Donald Bruce and William F. Fox. National Tax Journal. Volume 53, No.4, Part 3. (December 2000): 1373-1390.
[53]Consumer Expenditures in 2012. United States Department of Labor. Bureau of Labor Statistics. Table 2301 ftp://ftp.bls.gov/pub/special.requests/ce/standard/2012/higherincome.txt.
[54] West Virginia Personal Income Tax, Forms and Instructions, 2014, page 38.

- The repeal of the prevailing wage law would cost the State of West Virginia between $3.08 million and $4.64 million annually in lost income tax revenue.
- The total economic impact of repeal of the prevailing wage law in West Virginia in 2015 would be a loss of incomes and tax revenues between $55.81 million and $84.06 million annually.

This analysis has shown that the annual economic loss to the citizens of West Virginia and the public sector resulting from repeal of the prevailing wage law would be between $55.81 million and $84.06 million annually—many times greater than any hypothetical cost savings by opponents of the prevailing wage law. It is economically impossible for repeal of prevailing wage legislation to result in construction cost savings sufficient to offset the economic losses that are likely to be suffered due to multiplier effects on income and tax revenue.

Given that labor costs are a small and decreasing component of total construction costs, given that construction costs for public construction of schools, libraries, and labs in West Virginia is lower per square foot than private construction of schools, libraries, and labs in the three non-prevailing wage law states for school construction of North Carolina, Ohio, and Virginia, and given the negative multiplier effects of wage cuts, the result hoped for by those opposing prevailing wage statutes is not possible under any plausible assumptions.

Chapter IV

Impacts of Prevailing Wage Laws: Upon Benefits, Training, Safety, and Productivity

CHAPTER SUMMARY:

- Prevailing wage laws promote better compensation packages for workers: average total compensation for states that have prevailing wages laws is higher than for those states that have repealed their prevailing wage laws or have never had a prevailing wage law.
- Prevailing wage laws have helped to prevent erosion of compensation for construction workers: Evidence suggests that there has been little, if any change in real incomes of construction in prevailing wage states while there have been substantially decreases in real incomes for those states that have repealed their prevailing wage laws.
- Real average total benefits per construction worker have increased in prevailing wage states, while they have decreased in non-prevailing wage states.
- Real average pension benefits have increased modestly in prevailing wage states and have decreased substantially in states that have repealed their prevailing wage law.
- Real average health care benefits have increased prevailing wage states while they have decreased in states that have repealed their prevailing wage laws.
- Repeal of prevailing wage laws or the absence of prevailing wage laws encourages small, inexperienced construction firms to enter the sector. These smaller and more inexperienced firms have poorer safety records than do large ones.
- Employee turnover increases in states that do not have prevailing wage statutes. Lower construction wages and benefits, lack of apprenticeship training, and other factors lead to a less skilled workforce that is more prone to injuries.

- Repeal of the state's prevailing wage laws would endanger West Virginia's safety record.
- For the period 2008-2010 in on-the-job training and apprenticeship programs in federal highway construction projects, the top ten states were all prevailing wage states; no non-prevailing wage state was ranked in the stop ten.
- For the period 2008-2010 in the growth of on-the-job training and apprenticeship programs in federal highway construction projects, seven of the top ten states were prevailing wage states.
- In terms of women participation in training program from 2008-2010, seven of the top ten states in terms of percentage increase in OJT and apprenticeship programs were prevailing wage states.
- In terms of women participation in training program from 2008-2010, nine of the top ten states in terms of percentage in OJT and apprenticeship programs were prevailing wage states (West Virginia ranked 5th nationally).
- In terms of minority participation in training program from 2008-2010, prevailing wage states dominated the top ten states. In terms of percentage increase in minorities in OJT and apprenticeships, nine of the top ten states were prevailing wage states.
- Union productivity effect in construction is between 17-38%.
- No correlation between average cost per mile and average wage rate in highway construction projects between 1980-1993 and 1994-2002.
- Implausible that repeal of prevailing wage rate would reduce construction costs, given productivity effects in construction.

A. Health Care and Pension Benefits

The provision of fringe benefits (e.g., health and pension benefits) is substantially lower in the construction sector. The primary reasons for this lack of fringe benefit provision in the construction sector include the smaller size of firms and the transitory nature of construction employment. Estimates of the rate of health insurance and pension coverage for construction workers show relatively low coverage compared with that of the rest of the population.

According to the United States Census Bureau, the percentage of the population covered by health insurance through their own employer or another person's employer had decreased to 53.9% of the employed population by 2013.[55] The number and percentage of employers that offer health insurance varies dramatically among industry groups, as does the likelihood that an employee will be covered by the employer's health insurance plan. In 2013, the construction industry provided less insurance for workers than any sector in the economy; only 33.8% of private sector construction establishments offered health insurance for their employees compared to 62.5% in manufacturing, 52.8% in professional services, and 53.8% across all private sector establishments.[56] In the four prevailing wage states in the analysis (Maryland, Ohio, Pennsylvania, and West Virginia), the average number of private sector establishments in the construction sector offering health insurance was 47.1% (Maryland, 57.8%; Ohio, 47.1%; Pennsylvania, 39.7%; and West Virginia, 43.8%). In the two non-prevailing wage states in the analysis (North Carolina, Virginia), there were only 30.3% of construction establishments paying health insurance (North Carolina, 25% and Virginia 35.5%)

With respect to pensions, Petersen (2000) reports that pension coverage for construction workers is about 30%, while the pension rate coverage for the rest of the employed population is approximately 50%.[57] These very low coverage rates are related to the specific nature of construction employment.

---

[55] U.S. Census Bureau. Employment-Based Health Insurance: 2013. http://www.census.gov/content/dam/Census/library/publications/2014/demo/p60-250.pdf

[56] Agency for Healthcare Research and Quality. Center for Financing, Access and Cost Trends. 2013 Medical Expenditure Panel Survey – Insurance Component. Table V.A.2 (2013)

[57] Jeffrey S. Petersen. *Health Care and Pension Benefits for Construction Benefits: The Role of Prevailing Wage Laws*. Industrial Relations, Volume 39, No. 2 (April, 2000): 246-264.

The construction industry is primarily composed of small employers that employ a work force that is transitory in nature.

According to the United States Census Bureau in their County Business Patterns for 2012, there were 652,902 construction firms in the United States. There were 443,105 that had 4 or fewer employees. This represents 67.8% of all construction firms. The total number of construction firms with 9 or fewer employees is 83.3% of the total construction workforce. The percentage of small firms in the construction sector in West Virginia is similar. The costs of provision of fringe benefits for smaller size firms is higher than for larger size firms that have a larger pool of employees over which to spread the costs of coverage.

In addition, it is not uncommon for a construction worker to work for a large number of different employers during his career. As a result of this short-term relationship, certain costs are created in the construction labor market. These costs that are associated with the transitory nature of the construction workforce decrease the incentive for firms to provide benefits to their workforce. Because the construction labor market is relatively unstable and short term in nature, employees have an incentive to demand compensation weighted more heavily toward current wage compensation and less to the longer-term value of deferred benefits. This is also consistent with the incentives of construction employers.

Although low offer rates of health insurance are concentrated in smaller sized firms (the vast majority of construction firms are small), there is increasing empirical evidence that the uninsured rate is increasing in larger firms. Empirical research has shown four factors that have contributed to this change in the labor market: (1) increase in low income workers, (2) decreases in unionization rates, (3) a shift away from manufacturing jobs to more service oriented jobs, and (4) an increase in the number of small entities within a larger company.

The lack of health coverage exacts a large toll on the uninsured in our country – avoidable deaths, poorly managed chronic conditions, and underutilized life-savings medical procedures. In addition to the direct toll the lack of health coverage takes on the uninsured, there are other substantial economic consequences as well. The economic costs of being uninsured or under-insured are borne by individuals, employers, the health system, taxpayers, and the public at large. The costs borne by the uninsured include a greater probability of death, reduced preventive care, and a smaller likelihood of early

detection of medical problems.[58] Employers also bear a portion of the burden of uninsured workers; when employees miss work, leave their job, or retire early for health reasons, the employers bear an economic cost.[59] The health system also bears an economic cost as well. The health system also bears an economic cost as well. It is reported that the total cost of medical care received by the uninsured in 2013 was $121.0 billion.[60] Of this amount, $84.9 billion was uncompensated care, or care paid out-of-pocket by the public and private sector. In addition to these direct costs to the health system, there are indirect costs through inefficient use of the health care system (e.g. costs of emergency room visits that are not needed). One report states that 33 percent of emergency room visits were for health reasons that did not require emergency room care and could have been provided a lower cost alternative. These conclusions show that the uninsured in the employed population are exacting a high cost on those individuals as well as employers, the general health delivery system and taxpayers and the public at large.

It has been reported that benefit payments to union construction workers are substantially higher than to non-union workers (Petersen, 2000). Petersen reported that in 1992, health, welfare and pension plans in the construction industry paid $13.2 billion in benefits to active construction workers and retirees, of which the vast majority was paid to union members. Peterson further reports that the benefits paid per worker for union construction was $12,798, while the benefits paid per worker for nonunion construction was $434.[61] Petersen reports that although unionized construction workers account for only 20% of the workforce in the construction sector, unionized benefit programs account for 88% of all benefits in the industry. It is clear that union membership is a primary determinant of the probability of receiving benefits in the construction sector.

With respect to production workers in the construction sector, union members are much more likely to have employer or union-provided health insurance than are non-

[58] The Commonwealth Fund reports that the lack of health insurance leads to 18,000 deaths per year. The Commonwealth Fund. The Costs and Consequences of Being Uninsured. Commonwealth Fund Publication #663.

[59] In a survey by The Commonwealth Fund, they reported that 16% of uninsured workers missed work because of a dental problem, while only 8% of those who had health insurance reported missing work.

[60] The Kaiser Commission on Medicaid and the Uninsured. Uncompensated Care for the Uninsured in 2013: A Detailed Examination. http://kff.org/uninsured/report/uncompensated-care-for-the-uninsured-in-2013-a-detailed-examination/

[61] Petersen derived these calculations from Form 5500 series of the Internal Revenue Service. He calculated the benefits paid for union construction was $11.6 billion for 906,191 workers. The total benefits paid for nonunion construction was $1.6 billion for 3,623,582 workers.

union workers. In 2000, it is reported by the Center to Protect Workers Rights (CPWR) that only 46% of wage and salary construction workers were eligible for an employer or union-provided pension plan, while 39% of the workers participated in such plans.

In 2000, 82% of union members had health insurance provided by their employer or union; only 46% of non-union members had insurance provided by employer.[62] The percentage of construction workers that have employer provided health insurance plans varies substantially among selected occupations within the construction sector. For sheet metal workers, 77% of employees are covered by health insurance plans by their employer or by their union, while roofers and painters coverage is only 28% and 26%, respectively.

Empirical analysis has shown that the decline in unionization rates was the single most important contributing factor to the decrease in the insured across all firm size categories (The Commonwealth Fund, 2002; Buchmueller, DiNardo, and Valletta, 2001). For large firms, the two primary factors contributing to the increase in the uninsured rate over the period 1987-2001 was unionization decline and manufacturing decline; a decline in unionization contributed 38% of the increase in the numbers of uninsured while manufacturing's decline contributed 18% to the increase in the numbers of uninsured over this period.[63] Buchmueller, et al (2001) shows that declining unionization between 1983-1997 explains 20-35% of the decline in employee health coverage.[64]

In addition, their study found that the union effect on retiree coverage increased substantially between 1988-1993. They report that union employees are about twice as likely as non-union employees to be eligible for a retirement health plan for which their employers pay the full costs. With respect to pension coverage, Petersen (2000) reports that pension coverage for construction workers is about 30%, while the pension rate coverage for the rest of the employed population is approximately 50%.[65] In the 2000 report by CPWR, it is reported that pension participation among union members is 76%, while pension participation among non-union workers is only 28%. Once again, the participation level in employer or union-provided pension plans differed substantially

[62] The Center to Protect Workers Rights. The Construction Chart Book. Third Edition, 2002

[63] The Commonwealth Fund. The Growing Share of Uninsured Workers Employed by Large Firms. October 2003.

[64] Thomas C. Buchmueller, John DiNardo, and Robert G. Valletta. Union Effects on Health Insurance Provision and Coverage in the United States. Working Paper 8238. National Bureau of Economic Research. April 2001.

[65] Jeffrey S. Petersen. *Health Care and Pension Benefits for Construction Benefits: The Role of Prevailing Wage Laws*. Industrial Relations, Volume 39, No. 2 (April, 2000): 246-264.

among the various trades in construction. Sheet metal workers have 68% of their workers enrolled in company provided or union provided pension plans, while painters and roofers have only 13% and 10%, respectively, enrolled in their pension plans.

In a 2007 study, it has been found that "union workers are more likely than non-union workers to have health benefits" (Fronstin 2007). This study reports that:

> "Between 2003 and 2007, there was a 3 percentage point decline in the likelihood that a union worker had coverage through his or her own job. A similar decline was not experienced among nonunion workers. Specifically, in 2007, 82.7 percent of union workers had coverage from their own job down from 86 percent in 2003. Most of the decline in coverage from a union worker's own job was offset by an increase in the percentage of workers covered as a dependent on someone else's employment-based health plan. Between 2003 and 2007, the percentage of union workers with coverage as a dependent increased from 9.4 percent to 11.5 percent. There was no comparable change for nonunion workers."

With respect to the construction industry, this study found that there existed a 59% difference between union and nonunion workers in the construction, extraction, and maintenance occupations. This study found that more than 83% of all union workers had health benefits through their own job, compared with 58% of nonunion workers.[66]

In an analysis of pension plan participation in the union and non-union sector, the Bureau of Labor Statistics confirms the evidence that union workers have higher rates of access and participation in pension plans.[67]In 2011, the Bureau of Labor Statistics reported that 93% of civilian union workers have access to pension plans while non-union workers have only 64%.[68] They also found that participation in pension plans for civilian union workers was 88% percent, while it was only 49% with nonunion workers. The Bureau of labor statistics study confirms prior evidence that, since 2008, civilian union workers have had greater access and participation in pension plans than do the civilian nonunion workers.[69]

Petersen (2000) conducts an empirical analysis of the effect of prevailing wage laws on compensation paid to construction workers. He first compares income and benefits with states that never had a prevailing wage law in those states that kept their prevailing wage law during the period 1982-1992. Secondly, he compares construction income and benefits in states that have a prevailing wage law with those that repealed

[66] Paul Fronstin. *The Relationship between Union Status and Employment Based Health Benefits*. EBRI. Org Notes, Volume 30, No. 10 (October 2009): 15-29.
[67] Includes defined benefit pension plans and defined contribution retirement plans. Workers are considered as having access or as participating if they have access to or participating in at least one of these plan types.
[68] Includes workers in the private nonfarm economy except those in private households, and workers in the public sector, except the federal government.
[69] See Bureau of Labor Statistics, National Compensation Survey

their prevailing wage law. [70] In the Petersen analysis, Florida, Utah and Alabama were excluded from the study because they repealed their PWL prior to 1982. Alaska, Kentucky, Montana, Wyoming, Iowa, and the District of Columbia were excluded due to missing values for wage and benefit data. The remaining states were 28 with PWL, 8 that never had a law, and 6 that repealed their law.

Table V.1 replicates the results presented by Petersen in his analysis. There are several significant findings from the Petersen analysis for the current prevailing wage debate. Note, this data is reported in constant 1994 dollars.

Table IV.1
Comparison of Average Wages, Benefits, and Wage/Benefit Mix in States With and Without Prevailing Wage Laws, 1982-1992

	States that Kept PWL			States That Never Had PWL			States That Repealed PWL		
	1982-83	1991-92	% change	1982-83	1991-92	% change	1982-83	1991-92	% change
Average Total Compensation	$35,180	$35,238	0.0%	$27,533	$30,435	10.5%	$35,156	$29,326	-16.6%
Average Wages	$33,092	$32,474	-1.9%	$27,180	$29,971	10.3%	$33,900	$28,741	-15.2%
Average Total Benefits	$2,087	$2,763	32.4%	$353	$465	31.7%	$1,255	$584	-53.5%
Average Pension Benefits	$1,105	$1,160	5.0%	$208	$174	-16.3%	$672	$224	-66.7%
Average Health Care Benefits	$1,072	$1,602	49.4%	$145	$289	99.3%	$583	$360	-38.2%
Percent of Compensation in Wages	94.1%	92.2%	-1.9%	98.7%	98.5%	-0.2%	96.4%	98.0%	1.6%

SOURCE: Reprinted from Jeffrey S. Peterson. *Health Care and Pension Benefits for Construction Workers: The Role of Prevailing Wage Laws.* Industrial Relations, Volume 39, No. 2 (April, 2000)

- For the period 1982-83, average total compensation for states that kept PWLs was 0.2% higher than for those states that repealed their prevailing wage law; by the period 1991-92, average total compensation for states that kept PWLs was 20.2% higher than for those states that repealed their laws over the intervening period.
- There was no change in real average total compensation for states that kept prevailing laws over this period, increasing from $35,180 in 1982-83 to $35,238 in 1991-92; however, there was a 16.6% decline in real average total compensation in states that repealed their PWL, decreasing from $35,156 in 1982-83 to $29,326 in 1991-92.

[70] In the Petersen analysis, Florida, Utah and Alabama were excluded from the study because they repealed their PWL prior to 1982. Alaska, Kentucky, Montana, Wyoming, Iowa, and the District of Columbia were excluded due to missing vales for wage and benefit data. The remaining states were 28 with PWL, 8 that never had a law, and 6 that repealed their law.

- Real average total benefits per construction worker increased 32.4% from 1982-83 to 1991-92 in prevailing wage states, increasing from $2,087 per construction worker in 1982-83 to $2,763 per construction worker in 1991-92; for states that repealed their prevailing wage law, real average total benefits decreased 53.5% from 1982-83 to 1991-92, decreasing from $1,255 per construction worker in 1982-83 to $584 per construction worker in 1991-92. Real average total benefits per worker in prevailing wage states was 373.1% higher than those states that repealed their PWL.
- Real average pension benefits increased 5.0% from 1982-83 to 1991-92 in prevailing wage states, increasing from $1,105 per construction worker in 1982-83 to $1,160 per construction worker in 1991-92; for states that repealed their prevailing wage law, real average pension benefits decreased 66.6% between 1982-83 and 1991-92, decreasing from $672 per construction worker in 1982-83 to $224 per construction worker by 1991-92. By 1991-2, real average pension benefits per worker in prevailing wage states was 417.9% higher than in those states that repealed their PWL.
- Real average health care benefits increased 49.4% from 1982-83 to 1991-92 in prevailing wage states, rising from $1,072 per construction worker in 1982-83 to $1,602 per construction worker in 1991-92; for states that repealed their prevailing wage law, real average health care benefits decreased 38.2% between 1982-83 and 1991-92, decreasing from $583 per construction worker in 1982-83 to $360 per construction worker in 1991-92. By 1991-2, real average health care benefits per worker in prevailing wage states was 345.0% higher than in those states that repealed their PWL.

As expected, the mix of wages and benefits shifted toward benefits in states that had prevailing wage laws. The results of the Petersen study show that the wage-benefit mix for construction workers in prevailing wage states decreased from 94.1% to 92.2% over the time period from 1982-1992. For states that repealed prevailing wage laws, the wage-benefit mix for construction workers increased from 96.4% to 98.0% in favor of wages over the same time period

The voluntary benefits paid in prevailing wage states are substantially higher compared with benefits paid in non-prevailing wage states, verifying the results of the

Petersen study.[71] In 1982, the percentage of voluntary benefits to total benefits paid in prevailing wage states versus non-prevailing wage states were similar, with prevailing wage states paying 25.9% of total benefits in the form of voluntary benefits. In non-prevailing wage states, this percentage was 24.8%. In each of the subsequent reporting periods, this differential has widened substantially. In 1997, prevailing wage states paid 40.7% of all fringe benefits in the form of voluntary benefits, while non-prevailing wage states paid only 28.9% of total benefits in the form of voluntary benefits. In 2007, prevailing wage states paid 58.0% in the form of voluntary fringe benefits, while non-prevailing wage states paid on 51.1% of total benefits in the form of voluntary fringe benefits.

B. Skills Training and Apprenticeship.

A U.S. Census Bureau analysis of projected nonfarm wage and salary employment by major industry division for the period 2008-2018 shows that the growth in overall employment is projected to increase 10.6%, or an annual rate of increase of 1.0%; in construction, the growth in employment is projected to increase 18.5%, or an annual rate of increase of 1.7%.[72] Projected to reach an employment level of 8.8 million in 2013, the construction industry is also one of the economy's top-10 largest sources of employment growth. Real output in the construction sector is projected to increase to $1.14 trillion by 2018. Coupled with this projected growth in the construction sector over the next decade is the industry's critical shortage of a skilled labor force. For the past decade, there have been predicted and realized shortages of skilled workers in the construction industry.

In the late 1990s, The Business Roundtable surveyed its member companies to validate these concerns of shortages of the skilled workforce in the construction industry.[73] In their survey, over 60% of survey respondents indicated a shortage of

[71] The Census of Construction reports three categories of benefits. The first reported category is fringe benefits. This represents expenditures made by the employer during the reporting period for legally required and voluntary fringe benefits programs for employees. The second category is legally required benefits. This includes social security contributions, unemployment compensation, workman's compensation, and State temporary disability payments. The third category is voluntary payments. This includes life insurance premiums, pension plans, insurance premiums for hospital and medical plans, welfare plans, and union negotiated benefits.

[72] Bureau of Labor Statistics. "The Employment Projections for 2008-2018." *Monthly Labor Review*. November, 2009. Pages 3-10.

[73] The Business Roundtable. Confronting the Skilled Construction Workforce Shortage. A Blueprint for the Future. October 1997.

skilled craft workers and 75% reported that the skilled shortage trend was becoming worse. Although craft shortages were reported to be particularly acute for electricians, pipe fitters, and welders, all crafts identified in the survey reported some level of shortages. In a study conducted by the National Center for Construction Education and Research, they found that 92% of national construction firms reported shortages of skilled labor and over 85% said their workforce is not as skilled as it should be in today's market. One of the primary causes of this skilled craftsmen shortage was the push toward more open shop agreements. The general shift of workers out of unions, where training was available, and into the open labor market decreased the availability of a skilled labor pool.

In addition, a major influence on the age composition of the labor force has been the baby-boom generation born between 1946 and 1964. This group has accounted for a large portion of the construction workforce and they are beginning to retire. As a result, a large number of workers will be needed to replace jobs vacated by retirees and jobs created by growth in the construction industry.

A central debate concerning the need for cooperation between unions and management in skills training is the potential for market failure. Because employees in the construction sector are constantly moving from one job to another and from one contractor to another, there is a lack of incentive on the part of employers to invest in skills training. Because of the unique short-run structure of employment in the construction sector, employers in this sector have the incentive to focus only on the short-run. For example, if a particular employer has a shortage in some skilled craft, the optimal short run solution for the employer is to simply hire that skilled worker away from someone else. It may take three to five years to train a skilled craftsman; the unique short-term nature of employment in the construction sector means that jobs requiring the skilled craftsmen could be gone by the time the training is complete. Therefore, certain institutional structures have been developed in the United States to address this market failure.

In the United States, joint apprenticeship programs have been developed in which contractors contribute a pre-determined amount into a training fund per hour of labor employed.[74] The contractors provide the training, while trainees accept apprenticeship

[74] As a result of these costs contributed per hour of labor employed, the costs of apprenticeship programs are factored into the bid costs of those participating contractors.

wages. This approach solves the market failure problem, because all employers share the cost of that training. The apprenticeship programs are either jointly sponsored by unions and contractors according to collective bargaining agreements or by contractors themselves. The Bureau of Apprenticeship Training refers to these types of programs as "joint" and "non-joint," respectively. The thirty-six states that participate in the Department of Labor database of union apprenticeships account for the majority of all apprenticeships in the construction industry.

For the twelve year period ending in 2001, the total number of new apprenticeships register was 467,980. Of that amount, 71.6% of all apprenticeship registrations were union apprenticeship programs.

In an analysis by Cihan Bilginsoy (2003), it is shown that, controlling for the size of the trade, the supply of apprenticeship training is higher in prevailing wage states than in non-prevailing wage states.[75] In addition, he showed that apprentices complete graduation requirements at a slower rate in states without prevailing wage laws. The cancellation hazard is also higher in non-prevailing wage states. This result indicates that non-prevailing wage states are not as efficient in producing certified skilled workers. A final result of his study was that prevailing wage laws do not tend to lead to exclusion of minorities from training for the skilled trades.

Cihan Bilginsoy (2005) examined the relationship between prevailing wage regulations and apprenticeship training in the United States. The data clearly show that prevailing wages states have the highest percentage of apprentices (72%) and the highest percentage of apprentices in joint programs as well (74%). In a regression analysis on this data, Dr. Bilginsoy reported that the prevailing wage law had a strong and statistically significant impact on apprenticeship registrations.

In a 2011 report by the Transportation Equity Network, they examined data from all 50 states and the District of Columbia on the use of on-the-job training programs and apprenticeship programs for women and minorities in the federal highway construction industry.[76] In an analysis of the data at the state level, they examined three indicators of success: (1) total number of trainees during that period; (2) percentage change in trainees from 2008-2010; and (3) what percentage of federally funded highway construction jobs

[75] Cihan Bilginsoy, Wage Regulation and Training: The Impact of State Prevailing Wage Laws on Apprenticeship. Working Paper No. 2003-08. May 2003.
[76] Transportation Equity Network. The Road to Good Jobs: Making Training Work. Boosting Construction Job Access through training and Apprenticeship Programs. October 2011.

were filled by trainees. For the total number of trainees during 2008-2010, the top 10 states were all prevailing wage states. For the biggest increase in on-the-job training from 2008-2010, seven of the top ten states were prevailing wage states; and, for 2008-2010, the top ten states by percentage of federally funded construction jobs filled by OJT trainees and apprenticeships were all prevailing wage states.

In terms of women participation in training programs, they found that seven of the top ten states in terms of percentage increase in OJT and apprenticeship programs from 2008-2010 were prevailing wage states. In terms of percentage of women as OJT and apprenticeships from 2008-2010, nine of the top ten states were prevailing wage states (West Virginia was 5th nationally).

In terms of minority participation in training programs, they found that, once again, they found that prevailing wage states dominated the top ten rankings. In terms of percentage increase in minorities in OJT and apprenticeships from 2008-2010, nine of the top ten states were prevailing wage states.

On the Job Safety – Injuries and Fatalities

On-job accidents have a costly impact on the construction industry in the United States. Work related injuries and illnesses, including fatalities, in the construction sector occur at a rate higher than the rate for all industries, making the construction sector one of the most hazardous sectors in the United States. These costs of injury are borne not only by the construction workers and their families, but also by their employers and society in general. Some of these costs are borne directly in the form of wage replacement and medical payments. However, many of these costs of injury and illness in the construction sector are not compensated directly.[77] Published estimates of the total direct and indirect costs of nonfatal injuries in all industries in the United States are estimated at $155 billion or 3% of gross domestic product.

There are a number of reasons why prevailing wage regulations are positively correlated with apprenticeship training and higher wages and why the absence of prevailing wage regulations tends to increase injuries in the construction sector.

- Repeal of prevailing wage laws or the absence of prevailing wage laws induce small, inexperienced construction firm entrants into the sector.

[77] Some of the more important indirect costs of an injury on a construction site are (1) loss of productivity, (2) production delays, (3) damaged equipment and the costs of replacing or repairing the equipment, (4) lawsuits, (5) increased workers compensation claims, and (6) other indirect costs.

These smaller and more inexperienced firms simply have poorer safety records than large ones.

- Employee turnover increases in states that do not have prevailing wage statutes. Lower construction wages and benefits, lack of apprenticeship training, and other factors lead to a less skilled workforce that is more prone to injuries.

D. Productivity in the Construction Sector

Labor productivity is a critical component to the long run economic health of the United States. Given the size of the construction industry in the United States, productivity changes within the construction sector have large direct impacts on the national productivity and economic wellbeing of the United States. In 2014, new construction put in place accounted for a 6.0% of the Real Gross Domestic Product in the United States.[78]

Real wages in construction have decreased over the past 30 years more rapidly than have the wages for most Americans. There are a number of reasons for this downward trend in real wages in the construction sector. One of the most important reasons for the decline is the dramatic decrease in the union labor force and an increasing percent of open and merit shop work. From the 1970s to the 1990s, union labor has decreased from approximately thirty-two percent of the construction workforce to less than twenty percent. In 2000, 17.5% of the construction workforce was members of unions; it has decreased to 11.3% of the construction workforce in 2014. [79] These lower real wages paid in the construction sector may, in fact, this may be understated due to the transitory and seasonal nature of employment in the construction industry. In addition, older craftsmen have retired, and younger entrants entering the labor pool have chosen careers other than construction due to the lower real wages being paid, creating a skill shortage of craftsmen in the industry that was discussed earlier in this section.

Critics offer a number of arguments against prevailing wage regulations. As stated in Section I, a crucial assumption of the critics of prevailing wage regulations is that prevailing wage laws increase the costs of public construction due the impact of higher wage rates on total construction costs. Implicit in that assumption is that

[78] St. Louis Federal Reserve Bank**.** http://www.stlouisfed.org/ and United States Census Bureau. Construction Spending. Total value put in Place, 2014. http://www.census.gov/const/www/totpage.html
[79] Union Affiliation of Employed Wage and Salary Workers by Selected Characteristics. United States Bureau of Labor Statistics. http://www.bls.gov/news.release/union2.t01.htm

productivity remains constant with lower wage payments to construction workers. Yet, close examination of the wage component in overall costs of construction has shown that wage costs have had a decreasing impact on the total costs of construction. Labor costs account for far less than a third of total construction costs and that percent has been decreasing over time. According to the Census of Construction, labor costs including voluntary benefits and required fringe benefits paid to all employees in the construction sector were 26.2% of total costs in 1987, 25.5% in 2002, and 24.6% in 2007.

The Construction Labor Research Council has conducted two studies on wages, productivity and highway construction costs in the 50 states.[80] The first study was an analysis of highway construction costs for the period 1980-1993 for all fifty states. The updated analysis was conducted for the period 1994-2002. In their first study, they found that only 20.7% of highway construction costs were labor costs; that had decreased to 20.0% for the period 1994-2002. Critics of prevailing wage legislation assume that a reduction in wages in the construction sector has no impact on the number of hours of labor to be employed and that the productivity of labor is constant. However, empirical evidence, such as the two studies by the Construction labor Research Council, clearly indicate that the payment of higher wages attracts a more highly skilled labor force that is more productive. The increase in productivity more than offsets the higher wage rates being paid. With increases in the wage rate, a more highly skilled labor force is utilized that in fact decreases costs of construction.

In a study by Steven Allen of the productivity of unionized workers, he showed that unionized labor productivity is 17-52% higher than non-union labor (Allen, 1984). In addition, the higher wage rates that prevail may induce contractors to substitute capital and other inputs for labor; this would further mitigate the effect of higher labor costs on total construction costs. In an analysis of declining productivity in construction, Allen (1986) stated that the biggest factor in the decline in productivity was a decrease in the skilled workforce in the construction industry. The decline in union membership was also a contributing factor to the decline in productivity in the construction sector. In a study by Dale Belman (1992), the union productivity effect was between 17-38%.

[80]Construction Labor Research Council. *Wages Productivity and Highway Construction Costs: 1980-1993. Prepared for Construction Industry Labor-Management Trust, February, 1995 and* Construction Labor Research Council. *Wages Productivity and Highway Construction Costs: Updated 1994-2002.*

In a report by Dr. Peter Phillips on the effect of prevailing wage regulation on the construction sector in Iowa, it was shown that with a higher-wage worker, productivity is higher. Additionally, he also showed that states that have a prevailing wage law have 13-15% higher value added per worker. In my analysis of 12 states in the North Central States region, I found that the eight states that have a prevailing wage law have 16.2% higher value added per worker than do the four non prevailing wage states (Kelsay, 2011)

Additionally, I discussed earlier in this section that prevailing wage states pay substantially more in benefits to workers. These benefit plans offered by firms in prevailing wage states enhance productivity as well. Labor market literature suggests that there is an empirical relationship between pension plans and productivity. In a paper by Cornwell and Dorsey (June, 2000), they showed an empirical relationship between defined benefits plans and productivity. The authors showed that reduced turnover and early retirement from defined benefit plans enhance productivity.

In the two studies conducted by the Construction Labor Research Council by alluded to earlier, they examined productivity and costs for highway construction in the 50 states over a thirteen year period from 1980-1993 and over a nine year period from 1994-2002. Their report showed that higher wage rates resulted in lower highway costs per mile. For example, in the study over the period 1980-1993, the study showed that the total cost per mile in high-wage-states was 11% lower than the per mile cost in low-wage states despite the fact that the wage rate in high-wage-states was more than double the wage rate in the lower wage states ($18.39 versus $8.16). The study further showed that labor-hours per mile were 42% less in high-wage states despite the substantially higher wage rate.[81] In an analysis of average annual construction for states doing more than $175,000,000 construction work annually from 1980-1993, high wage states saved taxpayers an average of $136,360 per mile in construction costs.

In an examination of high expenditure states, they found that per mile costs of highway construction in the high wage states was 3.8% lower than the low wage states, despite the fact that the wage rate in high-wage-states was 67% higher in those states[82]. The study concluded that, although the hourly wage rate in the high was states was 73%

[81] The low wage rate states were Alabama, Florida, Georgia, Texas, and Virginia. The high wage rate states were California, Illinois, Missouri, New York, Ohio, and Pennsylvania. All of the low wage states, except Texas, never had a prevailing wage statute or repealed the statute prior to the data collection period from 1980 to 1993. All of the high-wage-states have a prevailing wage statute.

[82] They defined high expenditure states as those states that had more than $1 billion dollars in reported highway spending for the nine year period.

more than the low wage states, labor hours were 35% less and the total cost per mile was 4% less. The study shows that productivity in the construction sector is not a constant but that productivity gains resulting from a more highly trained and paid workforce is a critical component in the reduction of overall construction costs to the public sector. Based on these data, I conclude that for the thirteen-year period 1980-93 and the nine-year period 1994-2002, any savings due to lower wages that might have been achieved in the absence of prevailing wage legislation were more than offset by lower productivity that accompanies payment of lower wages. Charts IV.1 and IV.2 shows a plot of cost per mile ($) and average wage rate ($) among the 50 states in highway construction for the period 1980-1993 and 1994-2002 respectively. The coefficient of correlation is a measure of the degree of association between two variables (e.g. average wage rate and average cost per mile). The correlation coefficient of 0.08 for the period 1980-1993 and 0.18 tells us that there is little, if any, correlation between these two variables.

The claim made by critics of prevailing wage legislation - that substantial cost savings can be achieved by repeal of the legislation is incorrect. The critics reach such conclusions only because they conduct static analyses, and overstate the contribution made by labor costs to overall construction costs. Decreasing labor costs as a component of overall construction costs, increases in productivity from the payment of higher wages for a more skilled workforce, and the dynamics of the construction industry make the assumptions underlying analysis of construction costs based solely on these static wage differentials implausible. Given the decreasing percentage of labor costs as a percentage of total construction costs over the past 20 years and empirical evidence of productivity increases in the construction sector in response to a higher wage rate, it is implausible to accept the argument of critics that the repeal of the prevailing wage can reduce construction costs by a magnitude of 10-30%. Rather, empirical evidence suggests that the attraction of a more skilled workforce decreases overall costs of construction in the public sector.

Chart IV.1
Plot of Average Wage Rate and Average Cost Per Mile
1980-1993

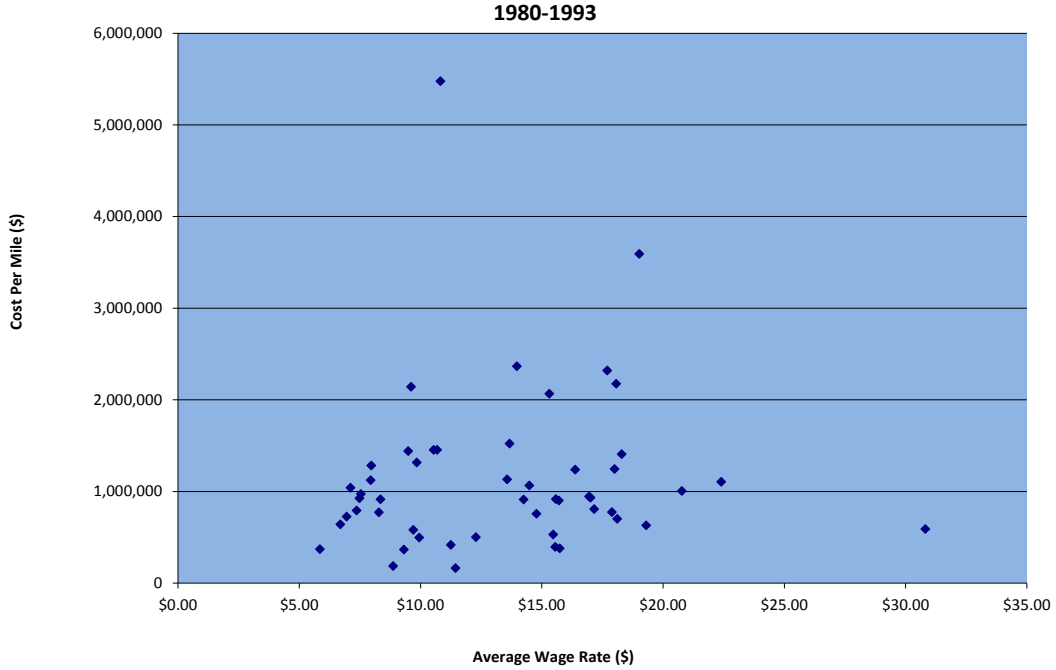
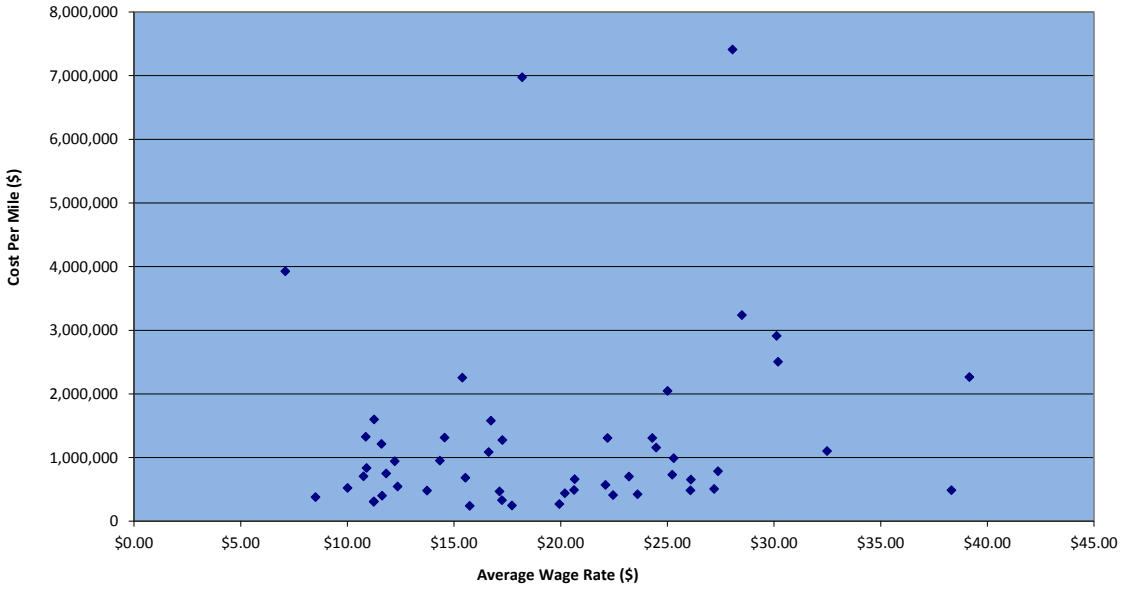


Chart IV.2
Plot of Average Wage Rate and Average Cost Per Mile
1994-2002



Chapter V Summary and Conclusions

In this study, I have examined the impact of the prevailing wage law in West Virginia in two different and fundamentally important ways. First, using data obtained from the F.W. Dodge Company on construction costs in six states (Maryland, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia over the period 2006-2013, I have empirically examined the argument of opponents of prevailing wage laws that large construction cost savings can be realized from repeal of the prevailing wage law in West Virginia. Secondly, using RIMS II multipliers obtained from the Bureau of Economic Analysis has allowed me to empirically analyze the direct and induced impacts of repeal as a result of the lower wage incomes in the construction sector in West Virginia. With them, I have examined the economic impact of repeal of West Virginia's prevailing wage law on the construction industry and their families, other industries and their families, and taxpayers and beneficiaries in the State of West Virginia. The results of this study are clear and indicate the following:

- The prevailing wage law in West Virginia is beneficial to construction workers and their families, other workers and their families, taxpayers, and beneficiaries of those state and local tax streams in the State of West Virginia.
- The mean cost per square foot of non-residential construction in prevailing wage states from 2006-2013 was $196.52 (constant 2014 prices). The mean square cost per foot of non-residential construction in non-prevailing wage states from 2006-2013 was $187.10 (constant 2014 prices). There were no statistically significant differences in mean square foot costs across all types of non-residential construction for prevailing wage states versus non-prevailing wage states.
- There were statistically significant cost differentials between public and private construction projects in both prevailing and non-prevailing wage states.
- There were *no* statistically significant differences in construction costs across thirteen different structure types in the states under analysis as a result of a state having a prevailing wage statute for the period 2006-2013.
- For elementary school construction, the mean square foot costs are $6.10 per square foot ***cheaper*** in West Virginia than in the non-prevailing wage states of North Carolina, Ohio, and Virginia.

- For secondary school construction, the mean square foot costs are $22.37 per square foot ***cheaper*** in West Virginia than in the non-prevailing wage states of North Carolina, Ohio, and Virginia.
- For university school construction, the mean square foot costs are $58.52 per square foot ***cheaper*** in West Virginia than in the non-prevailing wage states of North Carolina and Virginia.
- School construction costs are cheaper on a square foot basis in West Virginia than in the non-prevailing wage states in the analysis at all three levels of construction (elementary, secondary, and university)
- Using an input-output approach that utilized the RIMS II earnings multipliers from the Bureau of Economic Analysis, I have calculated the direct and induced economic losses to household income and to governmental revenues for the State of West Virginia.
- The elimination of the prevailing wage in West Virginia would cost the State of West Virginia substantially more in lost income and lost tax revenues than it would save in reduced, if any, construction costs in the State.
- The repeal of the prevailing law in West Virginia would cost the State of West Virginia and the residents of West Virginia between $51.30 million and $77.28 million annually in lost income.
- The repeal of the prevailing law in West Virginia would cost the State of West Virginia and the residents of West Virginia between $1.43 million and $2.15 million annually in lost sales tax collections.
- The repeal of the prevailing law in West Virginia would cost the State of West Virginia and the residents of West Virginia between $3.08 million and $4.64 million annually in lost sales tax collections.
- The total economic loss due to repeal of the prevailing wage law in West Virginia would be a loss of income and revenue between $55.81 million and $84.06 million annually, dwarfing any hypothetical gain offered by opponents of prevailing wage laws with respect to total construction costs.
- Prevailing wage standards are economically productive. As shown, construction costs have a minimal and decreasing impact on total construction costs. Further, I have shown that productivity gains, as a result of higher wage payments to construction workers, result in lower overall costs. A fatal flaw of the argument

of opponents is that productivity is a constant. There is simply no empirical evidence of this statement with respect to the construction industry or other industries in the economy.

- Total benefits compensation (e.g. health, pension) per construction worker in prevailing wage states is substantially higher in prevailing wage states than in non-prevailing wage states. These voluntary benefits paid to construction workers in prevailing wage states will reduce current and long-term costs to the taxpayers in the State of West Virginia.
- Prevailing wage statutes support the system of apprenticeship training, which is critical to meet the predicted shortage of skilled craftsmen in the industry over the next decade. The long run impact of a decreasing apprenticeship program is the creation of a labor force that is less skilled than its predecessors. The result of a less skilled labor force will be a construction industry that is less and less safe.
- Prevailing wage laws encourage a more skilled and trained workforce that promotes safety in the industry. The absence of a skilled workforce imposes significant costs on the worker, their families, and the citizens of West Virginia. Diminished benefit packages and decreased incentives for skills training will result in more serious injuries, increases in workman compensation costs, and increased publicly financed health services as a result of the repeal of the prevailing wage law in West Virginia.
- Prevailing wage states have shown a much stronger commitment in on-the-job training and apprenticeship programs for minorities and women than have non prevailing wage states.
- A construction worker that has health and pension benefits is less likely to become an economic burden to his family or the taxpayers in the State of West Virginia.

In summary, the prevailing wage law in West Virginia, as well as in other states, creates a system of employment that is in the interest not only of the construction worker and his or her family, but of all citizens and state and local governments in West Virginia. This study has shown that the *benefits of repeal* (lower construction costs) are simply not there. This study has shown the *costs of repeal* are real and substantial and will have a short term and long-term negative impact on the State of

West Virginia. In addition, this study has shown that a movement to RTW status is a race to the bottom.

References

1. Agency for Healthcare Research and Quality. Percent of Private-Sector Establishments that offer health care by industry groupings and states – United States, 2013**.** http://meps.ahrq.gov/mepsweb/data_stats/summ_tables insr/state/series_5/2013/tva2.pdf**.**
2. Allen, Steven. "Unionized Construction Workers Are More Productive. *Quarterly Journal of Economics.* 9 (May 1984): 251-274.
3. Azari-Rad, Hamid and Peter Phillips and Mark J. Prus, Editors. *The Economics of Prevailing Wage Laws. Ashgate Publishing Limited, 2005.*
4. Azari-Rad, Hamid and Peter Philips and Mark Prus. "The Economics of Prevailing Wages." Aldershot, Burlington, Singapore and Sydney: Ashgate. 2004.
5. Bachman, Paul and Darlene Chisholm and Jonathan Haughton and David Tuerck. "Project Labor Agreements and the Cost of School Construction in Massachusetts." Policy Study. *Beacon Hill Institute* (September 2003).
6. Balistreri, Edward J. and Christine A. McDaniel and Eina V. Wong. "An Estimation of Industry-Level Capital-Labor Substitution Elasticities for U.S. Production: A Futile Econometric Exercise?" November 2001.
7. Belman, Dale. "Concentration. Unionism. and Labor Earnings: A Sample Selection Approach." *The Review of Economics and Statistics.* 70 (August 1988): 391-397.
8. Belman, Dale and Russell Ormiston, Richard Kelso and William Schriver and Kenneth A. Frank. *Project Labor Agreements' Effect on School Construction Costs in Massachusetts.* Industrial Relations, Vol. 49, Number 1 (January, 2010): 44-60.
9. Belman, Dale and Paula Voos. "Prevailing Wage Laws in Construction: The Costs of Repeal to Wisconsin." *The Institute for Wisconsin's Future.* (October 1995).
10. _____ "Prevailing Wage Laws in Construction: The Costs of Repeal to Wisconsin." *The Institute for Wisconsin's Future.* (January 1996, revised).
11. Berman, Eli and John Bound and Zvi Griliches. "Changes in the Demand for Skilled Labor Within U.S. Manufacturing: Evidence from the Annual Survey of Manufactures." *Quarterly Journal of Economics* (May 1994): 367-397.
12. Bilginsoy, Cihan. "Wage Regulation and Training: The Impact of State Prevailing Wage Laws on Apprenticeship." *University of Utah Department of Economics.* Working Paper # 2003-08 (May 2003).
13. _____"Apprenticeship Training in the U.S. Construction Industry." University of Utah Department of Economics. September 1998.

14. Bloch, Farrell. "Minority Employment in the Construction Industry." *Journal of Labor Research.* 14 (Spring 2003): 271-191.

15. Boal, William M. and John Pencavel. "The Effects of Labor Unions on Employment, Wages, and Days of Operation: Coal Mining in West Virginia." *Quarterly Journal of Economics* (February 1994): 268-298.

16. Brucker, Sharon and Steven Hastings and William Latham III. "The Variations of the Estimated Impacts from Five Regional Input-Output Models." *International Regional Science Review.* 13 (1990): 119-139.

17. Bradley, David and Stephen Herzenberg. "Construction Apprenticeship and Training in Pennsylvania." Prepared for the Capital Area Labor-Management Council. Inc. Construction Partnership Coordination Project.

18. Bruce, Donald and William J. Fox. "E-Commerce in the Context of Declining State Sales Tax Bases." *National Tax Journal*. 53 (Volume 4, Part 3. December 2000): 1373-1390.

19. Building & Construction Trades Department. AFL-CIO "A Preliminary Report on Associated Builders and Contractors Apprenticeship Training: Flawed and Failing Initiatives." October 2003.

20. Bureau of Economic Analysis. "Regional Input-Output Modeling System (RIMS II)."

21. _____ "RIMS II Attachment – Definition of Region(s)."

22. _____"RIMS II Multipliers for State of West Virginia. Bureau of Economic Analysis. December, 2014.

23. Construction Labor Research Council. *Wages, Productivity, and Highway Construction Costs.* February 9, 1995.

24. Construction Labor Research Council. *Wages, Productivity, and Highway Construction Costs.* Updated Analysis. 1994-2002. Prepared for Construction Industry Labor-Management Council. March, 2004.

25. Cartwright, Joseph and Richard M. Beemiller and Richard D. Goshely. "Regional Input-Output Modelling Systems. Estimation, Evaluation and Application of a Disaggregated Regional Impact Model." U.S. department of Commerce, Bureau of Economic Analysis, Regional Economic Analysis Division. April, 1981.

26. Chang, Alpha C. Fundamental Methods of Mathematical Economics. 3rd Edition. 1984.

27. Chini, Abdol R. and Brisbane H. Brown and Eric G. Drummond. "Causes of the Construction Skilled Labor Shortage and Proposed Solution." ASC Proceedings of the 35th Annual Conference. Californian Polytechnic State University – San Luis Obispo. California (April 7 – 10, 1999).

28. Construction Labor Research Council. “Wages, Productivity, and Highway Construction Costs”. Updates Analysis 1994-2002. Prepared for Construction Industry Labor Management Trust. March 2004.

29. Cornwell, Christopher and Stuart Dorsey. “Are Pension-Providing Firms More Productive?” Working Paper (June 2000).

30. Davis, Karen. “The Costs and Consequences of Being Uninsured.” Commonwealth Fund. Publication # 663 (July 2003).

31. Duncan, Keith C. “An Analysis of Davis-Bacon Prevailing Wage Requirements: Evidence from Highway resurfacing Projects in Colorado” Submitted to Gus Bieber, Engineering Estimates and Market Analysis Unit of Contracts and Market Analysis Branch, Colorado Department of Transportation and John Soper, Colorado State Representative District 34. June 2011.

32. Dunn, Sara and John M. Quigley and Larry A. Rosenthal. “The Effects of Prevailing Wage Requirements on the Cost of Low Income Housing”. *Industrial and Labor Relations Review*. Vol. 59, No. 1. Oct. 2005, pgs. 141-157.

33. Etherton, Sara and Stephen Cook and Robert Massey, Jr. “Building Trades Apprentice Training in West Virginia: A Comparison of Union and Non-Union Building Trades Programs in the 1990s.” *Institute for Labor Studies and Research*. West Virginia University (May 2002).

34. Fisher, Peter and Michael Sheehan. "Economic Impacts of a PWL for Iowa State Construction Projects." Prepared For: The Iowa State Building and Construction Trades Council. Des Moines. Iowa (February 27, 1985).

35. Fraundorf, Martha and John Farrel and Robert Mason. "The Effects of the Davis-Bacon Act on Construction Costs in Rural Areas.” *Review of Economics and Statistics.* 66 (February 1984): 142-146.

36. Garnick, Daniel H. “Differential Regional Multiplier Models.” *Journal of Regional Science*. 10 (1970): 35 – 43.

37. Glied, Sherry and Jeanne M. Lambrew and Sarah Little. “The Growing Share of Uninsured Workers Employed by Large Firms.” *Commonwealth Fund.* Publication # 672 (October 2003).

38. Haas, Carl T and John D. Borcherding and Eric Allmon and Paul M. Goodrum. “U.S. Construction Labor Productivity Trends. 1970-1988. Center for Construction Industry Series. Report No. 7. (March 1999).

39. Henry J. Kaiser Foundation. *Uncompensated Care for the Uninsured in 2013: A Detailed Examination. h*ttp://kff.org/uninsured/report/uncompensated-care-for-the-uninsured-in-2013-a-detailed-examination/.

40. Hirsch, Barry T. and Albert N. Link. “Unions, Productivity, and Growth”. *Journal of Labor Research*. Vol. 5, No. 1. Winter 1984. pgs. 29-37.

41. J.J. White Inc. “Some Sobering Statistics from the National Safety Council Concerning the Construction Trades.” White Paper. (July 1, 2002).

42. Jordan, Lisa M. and Robert Bruno and Phil Schrader and Tony Sindone. "An Evaluation of Prevailing Wage in Minnesota: Implementation, Comparability, and Outcomes" Study Funded by the Quality Construction Coalition. October 2006.

43. Kelsay, Michael. "Economic Impact Analysis of the Adams Center Facility of Chemical Waste Management of Indiana. Inc." Prepared for Chemical Waste Management of Indiana. Inc. (January 1996).

44. Kelsay, Michael P. and L Randall Wray and Kelly D. Pinkham. *The Adverse Economic Impact from Repeal of the Prevailing Wage Law in Missouri.* January, 2004, 2011.

45. Kessler, Daniel P. and Lawrence Katz. "Prevailing Wage Laws and Construction Labor Markets." *National Bureau of Economic Research*. Working Paper # 7454 (December 1999). www.nber.org/papers/w7454.

46. Londrigan, William and William Wise III. "Apprentice Training in Kentucky: A Comparison of Union and Non-Union Programs in the Building Trades." Prepared for Building Trades Apprenticeship Coordinators/Directors Association of Kentucky. Inc. and Greater Louisville Building and Construction Trades Council (March 1997).

47. Mahalia, Nooshin. "Prevailing Wages and Government Contracting Costs: A Review of the Research". *Economic Policy Institute*. EPI Briefing Paper No. 215. June 8, 2008. epi.org/publications/entry/bp215.

48. McGraw Hill Construction. F.W Dodge Company. Computer File of Historical Construction Bid Costs in the States of Maryland, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia: 2006-2013.

49. Michl, Thomas. "The Productivity Slowdown and the Elasticity of Demand for Labor." *Review of Economics and Statistics*. 68 (August 1986): 532-536.

50. West Virginia State Tax Department. Personal Income Taxes 2014. http://www.wva.state.wv.us/wvtax/PersonalIncomeTaxes2014.aspx.

51. West Virginia State Tax Department. Local Sales and Use Tax. http://www.wva.state.wv.us/wvtax/LocalSalesAndUseTax.aspx

52. Tax Foundation. The Facts on West Virginia's Tax Climate. http://taxfoundation.org/state-tax-climate/west-virginia.

53. Office of Apprenticeship Training. "The National Apprenticeship System Programs and Apprentices Fiscal Year 2000." Employer and Labor Services. Bureau of Apprenticeship and Training.

54. _____"The National Registered Apprenticeship System Programs and Apprentices. Fiscal Year 2002." Employer and Labor Services. Bureau of Apprenticeship and Training.

55. Ohio Legislative Service Commission. "The Effects of the Exemption of School Construction Projects from Ohio's Prevailing Wage Law." Staff Research Report # 149. State House. Columbus, OH (May 20, 2002).

56. Pencavel, John. “A Cohort Analysis of the Association Between Work Hours and Wages Among Men.” Discussion Paper # 00-09. *Stanford Institute for Economic Policy Research* (November 2000).

57. Petersen, Jeffrey. “Health Care and Pension Benefits for Construction Workers: The Role of Prevailing Wage Laws.” *Industrial Relations*. 39 (April 2000): 246 – 264.

58. Philips, Peter. “Square Foot Construction Costs for Newly Constructed State and Local Schools. Offices and Warehouses in Nine Southwestern and Intermountain States 1992-1994.” Prepared for the Legislative Education Study Committee of the New Mexico State Legislature (September 6, 1996).

59. _____"Kansas and Prevailing Wage Legislation." Prepared for the Kansas Senate Labor and Industries Committee (February 20, 1998).

60. _____"Kentucky's Prevailing Wage Law: Its’ History. Purpose and Effect." University of Utah Department of Economics (October, 1999).

61. _____“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. University of Utah Department of Economics (February 2001).

62. _____“Four Biases and a Funeral: Dr. Vedder’s Faulty Experiment Linking Michigan’s Prevailing Wage Law to Construction Employment.” University of Utah Department of Economics (February 2001).

63. _____“Report on the Prevailing Wage Law of Nevada: Its History. Costs and Effects.” http://www.bctd.org/political/davisbacon/pdfs/nevada_phillips.pdf

64. _____ “Quality Construction- Strong Communities: The Effect of Prevailing Wage Regulation on the Construction Industry in Iowa”. 2006.

65. Philips, Peter; and Cihan Bilginsoy. “Prevailing Wage Regulations and School Construction Costs: Evidence from British Columbia.” *Journal of Regional Science* 24 (Winter 2000).

66. Philips, Peter and Garth Mangum and Norm Waitzman and Anne Yeagle. "Losing Ground: Lessons from the Repeal of Nine "Little Davis-Bacon" Acts." Working Paper. *University of Utah Economic Department* (February 1995).

67. Pollack, Earl S. and Risana T. Chowdhury. “Trends in Work-Related Death and Injury Rates Among U.S. Construction Workers. 1992-98.” *Center to Protect Workers’ Rights* (April 2001).

68. Prus, Mark J. “Prevailing Wage Laws and School Construction Costs: An Analysis of Public School Construction in Maryland and the Mid Atlantic States.” Working Paper. Department of Economics. SUNY. Cortland (January 1999).

69. _____“The Effect of State Prevailing Wage Laws on Total Construction Costs.” Working Paper. Department of Economics. SUNY. Cortland (January 1996).

70. Richardson, Henry. "Input-output and Economic base Multipliers: Looking Forward and backward." *Journal of Regional Science*. Volume 25, No. 4(1985): 607-661.

71. Rickman, Dan and Keith Schwer. "Comparisons of the Multipliers of IMPLAN and REMI and RIMS II: Benchmarking Ready-Made Models for Comparison." *Annals of Regional Science*. 29 (May 1995): 363-374.

72. Rickman, D.S. and R.C. Schwer. "Multiplier Comparisons of the IMPLAN and REMI Models Across Versions: Illuminating Black Boxes." *Environment and Planning*. 27 (1995): 143-151.

73. Sheehan, Michael. "Little Davis-Bacon: An Economic Critique of Attacks on State Prevailing Wage Legislation." Paper Presented at the Association for Institutional Thought (April 1996).

74. Thiebolt, A. J. "A New Evaluation of Impacts of Prevailing Wage Law Repeal." *Journal of Labor Research.* 17 (Spring 1996): 298 –322.

75. _____"Prevailing Wage Laws and Black Employment in the Construction Industry." *Journal of Labor Research.* 20 (January, 1999): 155 – 159.

76. Treyz, George I. "Policy Analysis Applications of REMI. Economic Forecasting and Simulation Models." *International Journal of Public Administration*. 18 (January 1995): 13-42.

77. United States Bureau of the Census. United States Bureau of the Census. County Business Patterns. Various States and Years.

78. United States Bureau of the Census. United States Department of Commerce. "Census of Construction Industries. Geographic Area Series. United States Summary; Establishments with and Without Payroll." CC97-A-10. CC92-A-10. CC87-A-10. and CC82-A-10.

79. United States Bureau of the Census. Health Insurance Coverage in the United States: 2013. Current Population Reports. September, 2014. P60-250

80. United States Department of Labor. "Producer Price Index – Inputs to Construction Industries." (1986-2014). Series ID PCUBCON--BCON--

81. United States Bureau of Labor Statistics. Union Affiliation of Employed Wage and Salary Workers by Selected Characteristics. http://www.bls.gov /news.release/union2.t01.htm

82. United States Department of Transportation. Federal Highway Administration. "Contribution of Highway Capital at the Industry Level." www.fhwa.dot.gov/policy/gro98ch7.htm

83. Vasquez, Vince and Dr. Dale Glaser and W Erik Bruvold. *Measuring the Costs of Project Labor Agreements on School Construction In California.* National University System. Institute for Policy Research. 2011.

84. Vedder, Richard. “Prevailing Wages and Construction Costs.” *Mackinac Center for Public Policy* (September 2. 1999).

85. _____“Michigan’s Prevailing Wage Law and Its Effects on Government Spending and Construction Employment”. *Mackinac Center for Public Policy* (September 1999).

86. Vincent, Jeff. "Indiana's PWL: A Preliminary Evaluation of its Impact on State Construction Industry.” *Labor Studies Journal.* (Fall 1990): 17-31.

87. Waitzman, Norman J. and Peter Philips. “Worker Beware: The Relationship Between The Strength of State Prevailing Wage Laws and Injuries in Construction. 1976-1991.” University of Utah Department of Economics.

88. Weisberg, Herbert. “Analysis of Regression and Surveys in Ohio LSC Report on S.B. 102 on Claimed Cost Savings from Exempting School Construction from Prevailing Wage Requirements.” Working Paper. Ohio State University (July 8, 2002).

APPENDIX TO CHAPTER 1: Tables 2 thru 5
Table 2
Prevailing Versus Non Prevailing Wage States
Average Wage Rate and Labor Costs Per Mile: 1980-1993

ALL STATES **Shaded = Non PWL**	Average Wage Rate	Average Cost Per Mile	Labor Cost Per Mile	Man Hours Per Mile
Alaska	$30.81	590,496	151,752	4,888
Alabama	$7.54	972,285	139,107	18,777
Arkansas	$7.48	926,420	147,041	20,124
Arizona	$15.58	916,772	187,085	11,628
California	$22.40	1,105,537	283,107	12,759
Colorado	$14.48	1,066,334	215,868	15,353
Connecticut	$15.31	2,066,538	484,077	30,004
DC	$10.82	5,477,094	1,142,849	81,272
Delaware	$10.68	1,453,920	235,268	21,894
Florida	$7.97	1,282,553	230,866	29,046
Georgia	$7.36	792,559	149,224	18,726
Hawaii	$19.02	3,592,539	828,041	47,718
Iowa	$11.25	417,553	70,381	6,264
Idaho	$15.47	531,494	106,839	6,156
Illinois	$18.00	1,245,858	282,810	16,530
Indiana	$15.70	901,438	196,404	12,594
Kansas	$13.57	1,131,871	242,771	17,420
Kentucky	$13.67	1,522,727	316,993	26,246
Louisiana	$9.84	1,317,243	241,658	24,270
Massachusetts	$17.70	2,321,025	384,457	25,868
Maryland	$9.49	1,440,871	271,271	27,444
Maine	$5.85	369,975	65,246	8,846
Michigan	$17.89	775,423	174,320	9,522
Minnesota	$14.78	756,899	154,603	10,430
Missouri	$17.16	807,021	183,754	11,116
Mississippi	$6.69	641,238	95,329	13,524
Montana	$15.74	378,470	82,025	5,331
North Carolina	$7.11	1,041,242	187,693	27,413
North Dakota	$11.44	163,354	26,849	2,330
Nebraska	$9.94	498,076	85,548	8,468
New Hampshire	$10.54	1,454,935	303,514	29,016
New Jersey	$18.07	2,175,605	573,429	30,152
New Mexico	$9.70	582,122	99,380	10,305
Nevada	$20.77	1,005,393	275,267	13,698
New York	$18.29	1,407,513	357,886	22,467
Ohio	$18.11	701,079	165,902	9,268
Oklahoma	$8.28	773,085	121,686	14,477
Oregon	$17.01	933,013	195,532	11,322
Pennsylvania	$16.38	1,239,013	300,972	17,223
Rhode Island	$14.25	912,502	157,452	11,122
South Carolina	$6.95	725,898	122,166	17,319
South Dakota	$8.87	186,017	29,269	3,436
Tennessee	$7.94	1,123,781	157,098	19,940
Texas	$8.35	914,160	180,306	21,290
Utah	$16.95	945,800	214,566	12,814
Virginia	$9.61	2,141,942	397,919	40,721
Vermont	$9.31	365,470	58,528	6,096
Washington	$19.30	631,222	159,766	8,370
Wisconsin	$15.55	394,405	78,083	5,104
West Virginia	$13.97	2,365,849	599,176	51,131
Wyoming	$12.28	501,477	104,645	8,501

SOURCE: *Wages, Productivity, and Highway Construction Costs.* Construction Labor Research Council. February, 1995

Table 3
Prevailing Versus Non Prevailing Wage States
Average Annual Construction Statistics: 1994-2002

ALL STATES **Shaded = Non PWL**	Construction Dollars	Construction Miles	Labor Hours	Cost Per Labor Hour Dollars
Alaska	55,628,303	942.06	460,525	$30.81
Alabama	175,379,043	1803.78	3,387,023	$7.54
Arkansas	70,673,617	762.87	1,535,177	$7.48
Arizona	114,338,874	1247.19	1,450,225	$15.58
California	192,011,569	1736.82	2,215,955	$22.40
Colorado	123,725,306	11603.29	1,781,420	$14.48
Connecticut	75,991,779	367.73	110,334	$15.31
DC	15,270,530	27.88	226,592	$10.82
Delaware	30,640,211	210.74	461,389	$10.68
Florida	298,568,951	2327.93	6,761,623	$7.97
Georgia	235,575,227	2972.34	5,566,049	$7.36
Hawaii	39,049,871	108.7	518,685	$19.02
Iowa	108,948,848	2609.22	1,634,461	$11.25
Idaho	40,610,294	764.08	470,330	$15.47
Illinois	349,744,990	2807.26	4,640,521	$18.00
Indiana	132,207,631	1466.63	1,847,091	$15.70
Kansas	96,735,537	845.82	1,473,398	$13.57
Kentucky	87,184,949	572.56	1,502,714	$13.67
Louisiana	133,507,552	1013.54	2,459,866	$9.84
Massachusetts	67,191,846	289.49	748,870	$17.70
Maryland	44,681,412	310.1	851,046	$9.49
Maine	10,951,723	296.01	261,862	$5.85
Michigan	168,269,513	2170.03	2,066,361	$17.89
Minnesota	131,787,000	1741.14	1,816,043	$14.78
Missouri	176,113,031	2182.26	2,425,707	$17.16
Mississippi	104,214,382	1625.21	2,197,914	$6.69
Montana	77,931,148	2059.11	1,097,779	$15.74
North Carolina	136,605,543	1311.95	3,596,412	$7.11
North Dakota	49,817,054	3049.63	710,535	$11.44
Nebraska	69,116,984	1387.68	1,175,119	$9.94
New Hampshire	29,018,368	199.45	578,716	$10.54
New Jersey	124,085,304	570.35	1,719,740	$18.07
New Mexico	87,188,327	1497.77	1,543,494	$9.70
Nevada	52,820,614	525.37	719,668	$20.77
New York	241,657,581	1716.91	3,857,435	$18.29
Ohio	208,766,721	2977.79	2,759,917	$18.11
Oklahoma	94,430,105	1221.47	1,768,357	$8.28
Oregon	99,555,381	1067.03	1,208,087	$17.01
Pennsylvania	295,317,834	2383.49	4,105,129	$16.38
Rhode Island	13,699,849	150.14	166,984	$14.25
South Carolina	68,862,645	948.66	1,642,946	$6.95
South Dakota	47,314,657	2543.57	873,897	$8.87
Tennessee	159,584,427	1420.07	2,831,677	$7.94
Texas	543,368,573	5943.91	12,654,732	$8.35
Utah	89,372,270	944.94	1,210,853	$16.95
Virginia	224,902,845	1050	4,275,686	$9.61
Vermont	17,489,685	478.55	291,743	$9.31
Washington	116,782,297	1850.1	1,548,506	$19.30
Wisconsin	103,121,564	2614.61	1,334,490	$15.55
West Virginia	151,379,021	639.85	3,271,589	$13.97
Wyoming	47,005,404	937.34	796,865	$12.28

SOURCE: *Wages, Productivity, and Highway Construction Costs.* Construction Labor Research Council. March, 2004

Table 4
Prevailing Versus Non Prevailing Wage States
Average Wage Rate and Labor Cost Per Mile: 1980-1993

ALL STATES Shaded = Non PWL	Average Wage Rate	Average Cost Per Mile	Labor Cost Per Mile	Man Hours Per Mile
Alaska	$38.31	488,591	112,326	2,932
Alabama	$10.90	838,222	119,726	10,980
Arkansas	$14.56	1,315,838	224,720	15,439
Arizona	$20.19	441,091	88,492	4,383
California	$28.49	3,238,739	752,580	26,412
Colorado	$22.10	570,600	115,069	5,206
Connecticut	$25.01	2,048,671	464,094	18,559
DC	$18.19	6,975,652	1,487,903	81,788
Delaware	$17.25	330,989	53,967	3,129
Florida	$12.22	941,743	187,248	15,329
Georgia	$11.63	402,505	72,029	6,191
Hawaii	$28.05	7,411,562	1,649,456	58,800
Iowa	$17.13	469,916	85,961	5,018
Idaho	$22.45	412,593	76,743	3,418
Illinois	$26.10	653,459	153,883	5,897
Indiana	$24.47	1,155,822	265,128	10,835
Kansas	$16.62	1,087,248	211,789	12,746
Kentucky	$17.26	1,276,881	258,062	14,953
Louisiana	$11.60	1,215,282	218,696	18,848
Massachusetts	$30.12	2,913,489	508,242	16,871
Maryland	$15.39	2,256,687	474,625	30,033
Maine	$11.24	313,056	55,471	4,936
Michigan	$27.37	787,477	150,013	5,811
Minnesota	$20.62	492,933	103,222	5,005
Missouri	$25.23	730,918	146,200	5,796
Mississippi	$10.01	524,071	74,588	7,448
Montana	$19.94	270,730	55,120	2,764
North Carolina	$10.86	1,325,502	167,199	19,828
North Dakota	$17.71	248,070	44,667	2,522
Nebraska	$15.53	683,629	118,120	7,608
New Hampshire	$14.34	952,227	167,199	11,663
New Jersey	$30.19	2,506,508	555,135	18,387
New Mexico	$12.35	544,577	87,057	7,049
Nevada	$32.48	1,103,701	249,177	7,672
New York	$39.16	2,265,404	779,314	19,899
Ohio	$25.30	992,446	210,632	8,326
Oklahoma	$10.76	705,158	110,888	10,308
Oregon	$27.18	508,775	109,558	4,031
Pennsylvania	$24.29	1,306,979	291,247	11,989
Rhode Island	$20.65	662,104	119,366	5,780
South Carolina	$8.51	378,202	49,688	5,837
South Dakota	$15.73	242,213	36,925	2,348
Tennessee	$11.25	1,598,158	229,332	20,386
Texas	$11.82	749,485	116,973	9,893
Utah	$23.20	703,747	151,904	6,549
Virginia	$16.73	1,581,271	327,990	19,603
Vermont	$11.23	306,615	52,282	4,655
Washington	$26.08	484,292	118,309	4,537
Wisconsin	$23.60	422,873	88,078	3,732
West Virginia	$22.19	1,306,339	276,212	12,446
Wyoming	$13.73	480,435	85,166	6,201

SOURCE: *Wages, Productivity, and Highway Construction Costs.* Construction Labor Research Council. February, 1995

Table 5
Prevailing Versus Non Prevailing Wage States
Average Annual Construction Statistics: 1994-2002

ALL STATES Shaded = Non PWL	Construction Dollars	Construction Miles	Labor Hours	Cost Per Labor Hour Dollars
Alaska	383,062,996	784.016	2,298,850	$38.31
Alabama	501,987,824	598.872	6,575,387	$10.90
Arkansas	503,559,280	382.691	1,611,901	$14.56
Arizona	162,229,829	367.792	1,996,512	$20.19
California	244,819,517	75.591	10,794,552	$28.49
Colorado	1,183,024,215	2073.298	14,804,349	$22.10
Connecticut	1,634,198,030	797.687	1,539,822	$25.01
DC	131,330,599	18.827	219,776	$18.19
Delaware	23,248,033	70.238	27,700,492	$17.25
Florida	1,702,107,252	1807.401	12,889,590	$12.22
Georgia	837,986,747	2081.927	4,609,510	$11.63
Hawaii	581,014,617	78.393	13,297,402	$28.05
Iowa	1,245,365,637	265.019	3,348,914	$17.13
Idaho	404,212,825	979.688	26,674,460	$22.45
Illinois	2,955,975,696	452.358	26,674,460	$26.10
Indiana	1,599,974,694	1384.274	14,998,913	$24.47
Kansas	726,026,388	667.765	8,511,398	$16.62
Kentucky	186,533,194	146.085	2,184,480	$17.26
Louisiana	950,999,239	782.534	14,749,013	$11.60
Massachusetts	993,598,897	341.034	5,753,729	$30.12
Maryland	1,450,670,445	642.832	19,820,663	$15.39
Maine	210,347,014	671.914	3,316,410	$11.24
Michigan	1,166,067,267	1480.764	8,604,408	$27.37
Minnesota	788,426,215	1599.459	8,005,413	$20.62
Missouri	1,778,975,541	2433.892	14,105,837	$25.23
Mississippi	885,644,546	1689.931	12,586,541	$10.01
Montana	578,690,309	2137.521	5,907,380	$19.94
North Carolina	792,899,325	598.188	11,860,922	$10.86
North Dakota	559,515,081	2255.475	5,689,302	$17.71
Nebraska	409,861,713	599.538	4,561,228	$15.53
New Hampshire	269,590,771	283.116	3,302,073	$14.34
New Jersey	1,266,661,305	505.349	9,291,640	$30.19
New Mexico	229,124,135	420.738	2,965,927	$12.35
Nevada	747,512,668	677.278	5,196,318	$32.48
New York	541,642,321	239.093	4,757,618	$39.16
Ohio	835,415,502	841.774	7,008,877	$25.30
Oklahoma	613,676,355	870.268	8,970,860	$10.76
Oregon	922,418,363	1813.017	7,307,951	$27.18
Pennsylvania	2,661,299,480	2036.222	24,412,923	$24.29
Rhode Island	361,867,764	546.542	3,158,867	$20.65
South Carolina	48,760,463	128.927	752,602	$8.51
South Dakota	806,845,613	3331.138	7,821,730	$15.73
Tennessee	609,219,247	381.201	7,771,113	$11.25
Texas	7,796,997,501	10403.144	102,919,862	$11.82
Utah	747,871,964	10.627	6,959,414	$23.20
Virginia	510,706,413	322.972	6,331,187	$16.73
Vermont	51,825,218	169.024	786,853	$11.23
Washington	1,062,266,994	2193.441	9,952,151	$26.08
Wisconsin	666,845,923	1576.943	5,884,513	$23.60
West Virginia	1,094,206,879	837.613	10,425,193	$22.19
Wyoming	246,318,596	512.699	3,179,487	$13.73

SOURCE: *Wages, Productivity, and Highway Construction Costs.* Construction Labor Research Council. March, 2004

McGraw-Hill Construction
Detail Structure List

Stores and Restaurants
Stores
Food/Beverage Service
Stores and Other Mercantile Buildings

Warehouses (excl. manufacturer owned)
Warehouses (Non-Refrigerated)
Refrigerated Warehouses

Parking Garages and Automotive Services
Auto Service
Parking Garages

Manufacturing Plants, Warehouses, Labs
Mfg Plants: Chemical
Mfg Plants: Food and Kindred (Non Ref)
Mfg Plants: Paper and Allied Products
Mfg Plants: Petroleum Refineries
Mfg Plants: Printing, Pub and Allied
Mfg Plants: Stone, Clay, and Glass
Mfg Plants: Rubber Products
Mfg Plants: Textile Mill Products
Mfg Plants: Food and Kindred (Ref)
Mfg Plants: Leather
Mfg Plants: Tobacco
Mfg Plants: Primary Ferrous Metals
Mfg Plants: Primary Non-Ferrous Metals
Mfg Plants: Fabricated Metal Products
Mfg Plants: Machinery except Electrical
Mfg Plants: Electrical Machinery
Mfg Plants: Lumber and Wood ex Furniture
Mfg Plants: Ordnance and Acc
Mfg Plants: Petroleum and Coal Prod
Mfg Plants: Furniture and Fixtures
Mfg Plants: Motor Vehicles and Equip.
Mfg Plants: Aircraft and Parts
Mfg Plants: Ship and Boat Building
Mfg Plants: Railroad Equipment
Mfg Plants: Industrial Service
Mfg Plants: Precision Goods
Mfg Plants: Miscellaneous Manufacturing

Mfg Plants: Mfg Plants (Reg 8 and 9)
Mfg Plants: Other Transportation N.E.C.
Mfg Plants: Plastic Plants
Mfg Plants: Chemical (Outdoors)
Mfg Plants: Industry Unknown
Mfg Labs: Chemical Plants (Enclosed)
Mfg Labs: Food and Kindred Products
Mfg Labs: Paper and Allied Products
Mfg Labs: Petroleum Refineries
Mfg Labs: Prints, Publishing
Mfg Labs: Stone, Clay, and Glass
Mfg Labs: Rubber Products
Mfg Labs: Textile Mill Products
Mfg Labs: Leather Products
Mfg Labs: Tobacco Products
Mfg Labs: Primary Ferrous Metals
Mfg Labs: Primary Non-Ferrous Metals
Mfg Labs: Fabricated Metal Products
Mfg Labs: Machinery except Electrical
Mfg Labs: Electrical Machinery
Mfg Labs: Lumber and Wood ex Furniture
Mfg Labs: Ordnance and Accessories
Mfg Labs: Petroleum and Coal Products
Mfg Labs: Furniture and Fixtures
Mfg Labs: Motor Vehicles and Equipment
Mfg Labs: Aircraft and Parts
Mfg Labs: Ship and Boat Building
Mfg Labs: Railroad Equipment
Mfg Labs: Industrial Service Plants
Mfg Labs: Precision Goods
Mfg Labs: Miscellaneous Manufacturing
Mfg Labs: Other Transportation N.E.C.
Mfg Labs: Plastic Plants
Mfg Labs: Classification Unknown
Mfg War: Chemical Plants
Mfg War: Food and Kindred Products
Mfg War: Paper and Allied Products
Mfg War: Petroleum Refineries
Mfg War: Printing, Publishing
Mfg War: Stone, Clay and Glass
Mfg War: Rubber Products
Mfg War: Textile Mill Products
Mfg War: Leather and Leather Products
Mfg War: Tobacco Products
Mfg War: Primary Ferrous Metal
Mfg War: Primary Non-Ferrous Metal

Mfg War: Fabricated Metal Products
Mfg War: Machinery, Ex Electrical
Mfg War: Electrical Machinery
Mfg War: Lumber and Wood ex Furniture
Mfg War: Ordnance and Accessories
Mfg War: Petroleum and Coal Products
Mfg War: Furniture and Fixtures
Mfg War: Motor Vehicles and Equipment
Mfg War: Aircraft and Parts
Mfg War: Ship and Boat Building
Mfg War: Railroad Equipment
Mfg War: Industrial Service Plants
Mfg War: Precision Goods
Mfg War: Miscellaneous Manufacturing
Mfg War: Other Transportation N.E.C.
Mfg War: Plastic Plants
Mfg War: Classification Unknown

Schools, Libraries, and Labs (nonmfg)
Primary Schools
Junior High Schools
Senior High Schools
Vocational Schools
Community Schools
Colleges/Universities Except STC 46
Special Schools
Schools-Educational and Science Buildings
Laboratories/Testing/R and D
Libraries
Museums

Hospitals and Other Health Treatment
Hospitals
Clinics/Nursing Convalescent Facilities
Hospitals and Other Health Treatment

Government Service Buildings
Detention Facilities
Post Offices
Police/Fire Stations
Capitols/Court Houses/City Halls
Armories

Religious Buildings
Houses of Worship, Other Religious Buildings
Funeral/Internment Facilities

Religious Buildings
Sunday Schools
Amusement, Social, and Recreational Buildings
Auditoriums (School and College Owned)
Arenas/Coliseums (School/College Owned)
Clubs and Lodges
Theaters
Communications Buildings
Bowling Alleys
Gyms/Field Alleys (School/College Owned)
Exhibition Halls
Miscellaneous Amusement/Recreational Amusement, Recreational (Reg 8 and 9)
YMCA/YWCA
Auditoriums (Non-School/College Owned)
Arenas/Coliseums (Non-School/College)
Gyms/Field Houses (Non-School/College)

Miscellaneous Non-Residential Buildings
Railroad Terminals
Bus Terminals
Airline Terminals
Miscellaneous Non-Residential Buildings
Freight Terminals, Railroad
Freight Terminals, Trucks
Freight Terminals, Air
Freight Terminals, Marine
Railroad Service
Bus Service
Truck Service
Aircraft Service
Animal/Fish/Plant Facilities

Hotels and Motels
Hotels/Motels (Stories Unknown)
Hotels/Motels 4+ Stories
Hotels/Motels 1-3 Stories

Dormitories
Dormitories