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THE IMPACT OF REPEALING WEST VIRGINIA'S PREVAILING WAGE LAW

**Economic Effects on the
Construction Industry
and Fiscal Effects on
School Construction Costs**

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Michael Kelsay, PhD
University of Missouri – Kansas City

Frank Manzo IV, MPP
Midwest Economic Policy Institute

EXECUTIVE SUMMARY

In May 2016, West Virginia completely repealed its prevailing wage law. The purpose of this law had been to create a level playing field for construction contractors by ensuring that public expenditures reflected local market standards for compensation and craftsmanship. Many lawmakers were persuaded by a claim that the state could “build five new schools for the price of three” if the prevailing wage law was repealed.

However, economic data reveals that repeal of prevailing wage has had negative impacts for West Virginia’s construction workers, contractors, and communities while failing to deliver any meaningful cost savings:

1. Since repeal, inflation-adjusted hourly wages have fallen for carpenters, electricians, and operating engineers in West Virginia. Average wage growth for West Virginia’s construction trades has been between 1 percent and 8 percent *slower* than in neighboring states with prevailing wage laws.
2. Since repeal, the number of active registered apprentices has fallen by 28 percent in West Virginia, relative to neighboring states with prevailing wage laws.
3. Since repeal, the on-the-job construction worker injury rate increased by 26 percent in West Virginia.
4. An analysis of 107 winning prime contract bids finds that repeal has had no statistical impact on inflation-adjusted school construction costs.
5. West Virginia has seen cost overruns and more out-of-state firms may be getting subcontracted work.

These findings corroborate the conclusion from the School Building Authority of West Virginia that the state *“is not realizing an overall savings that would allow for the construction of ‘five new schools for the price of three’ as some have previously claimed.”* However, they differ from a University of Kentucky study which asserted that school construction costs per square foot have decreased since repeal. The primary reasons for this contrast are that the University of Kentucky researchers had a smaller sample size and failed to account for school type, school size, regional economic trends, apprenticeship training, safety outcomes, and actual wages paid in their report.

These post-repeal findings also align with previous economic research on state prevailing wage laws:

- Of the 20 studies that have been conducted in the past 20 years which use regression analyses, 19 find that prevailing wage laws have no impact on school construction costs (95 percent).
- Prior to repeal, construction costs for elementary and secondary schools were between \$6 per square foot and \$22 per square foot *cheaper* in West Virginia than in three neighboring states that did not have prevailing wage standards.
- According to the School Building Authority, the average school project cost has been about the same since repeal (\$255 per square foot) as it was before repeal (\$252 per square foot).

Repeal of prevailing wage has produced a race to the bottom. Construction worker wages have not kept pace with the rising cost-of-living, apprenticeship training has fallen significantly, and on-the-job injury rates have worsened. Above all, repeal has failed to provide any cost savings on school construction projects for taxpayers. Instead, repeal has had negative effects on construction workers, contractors, and communities in West Virginia.

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ABOUT THE AUTHORS

Michael Kelsay, PhD is a Professor of Economics at the University of Missouri – Kansas City (UMKC). He earned his Doctor of Philosophy in Economics from the University of Tennessee-Knoxville and his Master of Arts in Economics and his Bachelor of Arts in Economics from the University of Missouri – Kansas City. He can be contacted at kelsaym@umkc.edu.

Frank Manzo IV, MPP is the Policy Director of the Midwest Economic Policy Institute (MEPI). He earned a Master of Public Policy from the University of Chicago Harris School of Public Policy and a Bachelor of Arts in Economics and Political Science from the University of Illinois at Urbana-Champaign. He can be contacted at fmanzo@midwestepi.org.

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INTRODUCTION

Prevailing wage laws have been a focus of public policy debates across the United States for many years. These laws are designed to create a level playing field for construction contractors by ensuring that public expenditures reflect local market standards of compensation and craftsmanship (Duncan et al., 2017). The policies also support blue-collar construction workers by requiring that contractors pay no less than the “prevailing” wage and benefit rates for similar work in the local area where a taxpayer-funded construction project is to be completed.

Prevailing wage standards have been implemented at the federal, state, and local levels. Nationally, the Davis-Bacon Act ascertains and protects prevailing wage standards on federally-funded construction projects. However, before passage of the federal Davis-Bacon Act, nine states had prevailing wage policies on the books. Within four years of the Davis-Bacon Act’s passage, 16 additional states added state-level prevailing wage statutes. As of January 2019, 26 states plus the District of Columbia currently have prevailing wage laws.

Despite an emerging academic consensus which shows that prevailing wage laws lead to enhanced productivity, higher wages for construction workers, and better safety outcomes while having little to no discernible impact on total construction costs, West Virginia lawmakers completely repealed prevailing wage in May 2016. In the years leading up to repeal, there were efforts to weaken the prevailing wage law. From July 2015 through September 2015, state lawmakers suspended prevailing wage because they considered the ascertained wages and benefits to be “too high.” After Workforce West Virginia “modified” the rates, the prevailing wages were reinstated until May 2016. However, in February 2016, House Bill 4005 was passed, fully repealing prevailing wage in May 2016.

This report, conducted by researchers at the University of Missouri-Kansas City and the Midwest Economic Policy Institute, evaluates economic and school construction project data to assess the effects of repealing prevailing wage in West Virginia. In addition, case studies that have become publicly available are discussed in the context of the early consequences of full repeal. Finally, a review of 28 studies on the effects of prevailing wage laws on construction costs is provided before a concluding section recaps key findings.

COMPETING CLAIMS ON THE EFFECTS OF REPEALING PREVAILING WAGE

In the years prior to repeal, two notable economic studies were published on the effects of West Virginia’s prevailing wage law. To varying degrees, both studies provided economic forecasts on the impact of repealing the policy. Figure 1 summarizes the differences between the two studies across five construction market outcomes.

The first report was published in January 2009 by Andrea Dean at the Public Policy Foundation of West Virginia (Dean, 2009). In the report, Dean argued that West Virginia’s prevailing wage law inflated wages paid to construction workers by “at least 49 percent,” creating unemployment and negatively impacting the lowest-skilled workers. Dean claimed that the same quality of construction work could be performed at a lower cost (potentially by out-of-state workers), which would save money that could be spent on other public projects.

This type of argument– that cutting wages paid to workers would result in lower total costs– later led some policymakers to suggest that West Virginia could build “five new schools for the price of three” if prevailing wage was repealed ([Holdren, 2014](#); [SBA, 2017](#)).

Figure 1: Forecasts of Construction Market Outcomes in Two Pre-Repeal Studies on Prevailing Wage

Construction Outcome	University of Missouri – Kansas City: Michael Kelsay, PhD (2015)	The Public Policy Foundation of West Virginia: Andrea Dean (2009)
Construction wages	Repeal would result in “lower wages for all construction workers in West Virginia”	“Prevailing wage rates are nearly forty-nine percent higher than the true market wage rates”
Worker training	A consequence of repeal would be a “weakened system of construction apprenticeship training”	“As a result of the higher costs [of prevailing wage], employers might also have to cut ... workplace training programs,” implying that repeal could strengthen training programs
Safety and quality	“The absence of prevailing wage regulations tends to increase injuries in the construction sector”	“The same quality could be purchased at a lower cost without prevailing wage laws”
School construction costs	A consequence of repeal would be “no cost savings in construction costs of elementary, secondary, and university school construction”	“The state will save taxpayers’ money that can then be spent on other projects, such as... public school construction”
Out-of-state bidders	“Prevailing wage... level[s] the playing field for law-abiding contractors”	“In-state construction workers may initially lose work”

Source(s): [Kelsay \(2015\)](#); [Dean \(2009\)](#).

By contrast, a second study published in January 2015 by University of Missouri – Kansas City professor Michael Kelsay concluded that repeal of prevailing wage would result in negative outcomes ([Kelsay, 2015](#)). Kelsay found that repeal would lead to a host of consequences for West Virginia’s construction industry, including lower wages, a weakened system of apprenticeship training, more occupational injuries, and lower levels of productivity for blue-collar construction workers, with no cost savings for school construction projects. In fact, Kelsay found, elementary and secondary school construction costs were already between \$6 and \$22 cheaper per square foot in West Virginia with the prevailing wage law than they were in three neighboring states that did not have prevailing wage standards.

THE IMPACTS OF REPEALING PREVAILING WAGE ON FIVE MARKET OUTCOMES

Economic data is becoming available to test claims made by policy researchers in the years leading up to repeal. Does prevailing wage promote ladders into the middle class for blue-collar construction workers, boost worker skills, and provide value to taxpayers or does it inflate school construction costs and restrict contractor competition? The impacts of repeal on construction wages, registered apprenticeships, occupational injury rates, school construction costs and overruns, and bid competition are all assessed in this section.

Construction Wages

Previous research suggests that prevailing wage laws foster good, middle-class careers in construction. There is a significant difference in the wages paid to blue-collar construction workers in states with prevailing wage laws compared to those in states without prevailing wage ([Philips, 2014](#); [Manzo et al., 2016](#)). A recent peer-

reviewed analysis has found that repeal of prevailing wage laws results in a 2 percent to 4 percent decrease in blue-collar construction incomes and an 11 percent to 16 percent drop in fringe benefits (Fenn et al., 2018). In nearby Indiana, where prevailing wage was repealed one year earlier in 2015, economic research has found that construction worker wages have fallen by 8.5 percent, relative to neighboring states that maintained prevailing wage laws (Manzo & Duncan, 2018a).

Figure 2 provides *Occupational Employment Statistics* data compiled by the Bureau of Labor Statistics (BLS) at the U.S. Department of Labor.¹ Because the data released every year cover the month of May, it is possible to assess wage growth in West Virginia's construction occupations since repeal of prevailing wage. The wage statistics are adjusted for inflation using the Consumer Price Index (CPI-U) and contrasted with aggregate data for Ohio, Pennsylvania, and Maryland—three states with prevailing wage laws—over the same timeframe.

Figure 2: Inflation-Adjusted Hourly Wage After Repeal in West Virginia vs. Neighboring States, 2016-2018

Inflation-Adjusted Average Hourly Wage by Occupation	West Virginia			Ohio, Pennsylvania, Maryland			WV – PWL Difference
	May 2016	May 2018	Wage Growth (%)	May 2016	May 2018	Wage Growth (%)	
Construction & Extraction	\$23.12	\$23.31	+0.8%	\$24.52	\$24.82	+1.2%	-0.4%
Carpenters	\$21.36	\$20.95	-1.9%	\$24.15	\$24.38	+0.9%	-2.9%
Construction Laborers	\$17.25	\$17.52	+1.6%	\$19.15	\$19.67	+2.7%	-1.2%
Operating Engineers	\$23.03	\$21.77	-5.5%	\$25.35	\$26.02	+2.6%	-8.1%
Electricians	\$26.03	\$25.69	-1.3%	\$27.90	\$28.15	+0.9%	-2.2%
<i>All Occupations</i>	\$20.27	\$20.37	+0.5%	\$24.45	\$24.52	+0.3%	+0.2%

Source (s): Authors' analysis of May Occupational Employment Statistics (BLS, 2019a) adjusted for inflation by the Consumer Price Index. According to the Bureau of Labor Statistics, \$100.00 in May 2016 had the same buying power at \$104.73 in May 2018 (BLS, 2019b).

The data shows that, after repeal of prevailing wage, the average hourly wages of blue-collar construction workers grew *slower* in West Virginia than they did in neighboring states with prevailing wage laws (Figure 2). In May 2016, the average inflation-adjusted wage for West Virginia workers employed in construction and extraction occupations was \$23.12 per hour. By May 2018, the average wage was \$23.31 per hour, which was a real growth of 0.8 percent in the two years since repeal. However, over this time, the average inflation-adjusted hourly wage for construction and extraction workers in Ohio, Pennsylvania, and Maryland grew from \$24.52 to \$24.82, an increase of 1.2 percent. As a result, construction and extraction worker wage growth has been 0.4 percent slower since the state repealed prevailing wage.

An important caveat is that “construction and extraction occupations” combine blue-collar construction workers with mining workers, an important industry in West Virginia. National policies have slightly increased coal production and employment, which may have marginally raised wages for extraction workers. Accordingly, Figure 2 also includes evaluations of specific construction occupations. In 2016, the four construction occupations with the most workers in West Virginia were carpenters, laborers, operating engineers, and electricians (BLS, 2016). These blue-collar trades were directly affected by prevailing wage standards.

¹ Although *Occupational Employment Statistics* data compiled by the Bureau of Labor Statistics (BLS) are not suitable for ascertaining prevailing wage rates (Duncan et al., 2017), they provide researchers with the timeliest data to examine the impact of repeal on overall changes in wages.

Since repeal of prevailing wage, real wages have fallen for three of the four largest blue-collar construction trades in West Virginia (Figure 2). Compared with their counterparts in three neighboring states that maintained their prevailing wage laws, average hourly wages have grown 2.9 percent slower for West Virginia's carpenters, 1.2 percent slower for West Virginia's laborers, and 2.2 percent slower for West Virginia's electricians. After adjusting for inflation, average hourly wages actually fell for three of these construction trades in West Virginia, while they increased for all four construction trades in the three neighboring states with prevailing wage laws. The largest decrease in real wages was a drop from \$23.03 per hour to \$21.77 per hour for West Virginia's operating engineers while hourly earnings increased for their counterparts in Ohio, Pennsylvania, and Maryland. As a result, skilled construction workers employed as operating engineers have seen an 8.1 percent drop in hourly pay since repeal of prevailing wage, relative to their counterparts in the three neighboring states that maintained their prevailing wage laws.

Worker Training

Construction is the most volatile major industry in West Virginia. Between 2009 and 2018, the average monthly employment low for the year was 2 percent below the average monthly employment high for all nonfarm workers in West Virginia. By contrast, in West Virginia's construction industry, the trough for average monthly employment low was 12 percent below the peak for average monthly employment, indicating that construction is more seasonally volatile. Construction is also more cyclically volatile, with the industry losing about 20 percent of its total jobs during the Great Recession between 2008 and 2010 compared to just a 4 percent drop in employment for West Virginia overall (BLS, 2019c).

In addition, because construction workers are constantly moving from one project to another and from one contractor to another, there is a disincentive for employers to invest in skills training. Instead, contractors are incentivized to focus only on the short run since it will take multiple years to train a new skilled construction worker. Thus, an optimal short-run solution if an employer has a shortage in a particular craft is to hire a skilled worker away from someone else. The result is a "market failure" in which long-term investments in worker training are not made at adequate levels. A prevailing wage law helps correct this "market failure" by reflecting local market-based standards for wages and training contributions in the community where a project is being built. The law ensures that the next generation of workers is trained and productive.

Economic research shows that prevailing wage laws increase apprenticeship training in construction (Duncan & Ormiston, 2017). The apprenticeship share of the construction workers is between 6 percentage points and 8 percentage points higher in states with prevailing wage laws (Bilginsoy, 2003; Bilginsoy, 2017). Moreover, research has found that the top ten states in terms of on-the-job training programs and apprenticeship programs for women and people of color in the federal highway construction industry are all states with prevailing wage laws (Harmon et al., 2011). Non-prevailing wage states are neither as efficient nor as equitable in producing certified skilled workers. Similarly, studies conducted after the repeal of prevailing wage laws have shown a strong correlation with a decrease in worker training (Azari-Rad et al., 1993; Philips, 2014). In an analysis of 9 states that repealed their prevailing wage laws from 1979 to 1988, researchers found that repeal was associated with a 40 percent decrease in training (Philips et al., 1995).

Figure 3 displays data on the number of active apprentices in registered apprenticeship programs, released by the Department of Labor Employment and Training Administration (DOLETA). Apprenticeship data for West

Virginia in fiscal years 2016, 2017, and 2018 are compared with aggregated data for neighboring Ohio, Pennsylvania, and Maryland. Note that the fiscal year runs from October through September, so most of fiscal year 2016 occurred prior to full repeal of West Virginia’s prevailing wage law.

The number of active registered apprentices has fallen in West Virginia following repeal of prevailing wage (Figure 3). In fiscal year 2016, West Virginia had over 5,400 active apprentices. This number was relatively unchanged in fiscal year 2017, after repeal had gone into effect. By fiscal year 2018, however, the investment in worker training had decreased dramatically, and West Virginia had fewer than 4,400 active apprentices.² In the years since repeal, West Virginia has seen a 19.5 percent drop in registered apprenticeship enrollment. Concurrently, West Virginia Governor Jim Justice reports that the state is now facing a skilled worker shortage for public construction projects (Davis, 2019).

Figure 3: Active Registered Apprentices After Repeal in West Virginia and Neighboring States, 2016-2018

Fiscal Year	Dates Covered	West Virginia	Ohio, Pennsylvania, Maryland
2016	10/1/2015 to 9/30/2016	5,413	42,168
2017	10/1/2016 to 9/30/2017	5,487	44,087
2018	10/1/2017 to 9/30/2018	4,358	45,596
Numerical Change: 2016-2018		-1,055	+3,428
Percent Change: 2016-2018		-19.5%	+8.1%
Difference-in-Differences		-27.6%	

Source(s): Authors’ analysis of “Data and Statistics: Registered Apprenticeship National Results” (DOLETA, 2019). The data includes both construction and non-construction occupations.

By contrast, in the three neighboring states with prevailing wage laws, enrollment in registered apprenticeship programs increased from nearly 42,200 in fiscal year 2016 to nearly 44,100 in fiscal year 2017. Enrollment increased again in fiscal year 2018 to nearly 45,600 active apprentices. Ohio, Pennsylvania, and Maryland have cumulatively experienced an 8.1 percent increase in registered apprenticeship enrollment since 2016. As a result, apprenticeship training has fallen by 27.6 percent in West Virginia since repeal, relative to three neighboring states that maintained their prevailing wage laws.³ The elimination of prevailing wage standards has increased the incentive for contractors to compete based on the use of cheap, unskilled labor. Accordingly, if repeal has led to an environment where contractors cut more corners and workers are less trained, the work performed by construction workers may be of lower quality while becoming even more dangerous.

Safety and Quality

Repeal of prevailing wage has limited the wage growth of blue-collar construction workers and reduced worker training in West Virginia. The lack of sufficient wage growth on par with neighboring states and the decrease

² Note that the publicly-available DOLETA data includes construction apprentices (approximately 34 percent) and West Virginia Division of Highways apprentices (approximately 55 percent), as well as child care and other apprentices (approximately 11 percent).

³ Apprenticeship programs are either “joint” or “employer-only.” Joint labor-management programs are sponsored by employers and workers, and usually specify a set amount of training contributions per hour of work invested in training. Employer-only apprenticeship programs are funded unilaterally by employers, and often on a voluntary basis— creating a short-term incentive to forgo these investments to win project bids.

in long-term apprenticeship investments both make it more difficult for contractors to attract, hire, train, and retain skilled workers. An unintended consequence of repealing prevailing wage may thus be a higher injury rate on construction jobsites, as less-skilled workers are more prone to making preventable mistakes. In fact, in 9 states that repealed their prevailing wage laws from 1979 to 1988, on-the-job injuries increased by 15 percent post-repeal (Philips et al., 1995). Higher injury rates result in more time away from work, which increases the cost of construction projects. In fact, the average cost per injury in construction has been estimated at \$27,000 (Waehrer et al., 2007).

Figure 4 uses workplace injury data from the Bureau of Labor Statistics (BLS) and finds that the occupational injury rate for construction and extraction workers increased following repeal of prevailing wage. In 2016, West Virginia’s construction and extraction workers had a lower rate of injuries and illnesses (180.5 per 10,000 full-time workers) than the state-level average for Ohio, Pennsylvania, and Maryland (184.5 per 10,000 full-time workers).⁴ Workplace injury rates decreased for both West Virginia and the three neighboring states in 2016. However, the construction and extraction worker injury rate fell further in 2016 in Ohio, Pennsylvania, and Maryland– which maintained their prevailing wage laws– than it did in West Virginia– where repeal was effective for approximately 8 months.

Then, in the first full year without prevailing wage, the on-the-job injury rate escalated for construction and extraction workers in West Virginia. From 2016 to 2017, the construction and extraction worker injury rate went from 172.3 per 10,000 full-time workers to 201.5 per 10,000 full-time workers in West Virginia, a 16.9 percent increase. At the same time, the construction and extraction worker injury rate in Ohio, Pennsylvania, and Maryland continued to decline, from 164.4 per 10,000 full-time workers to 148.8 per 10,000 full-time workers– a 9.5 percent drop. Relative to the regional trend, the construction worker injury rate increased by 26.4 percent in West Virginia following repeal of prevailing wage.

Figure 4: On-the-Job Injury Rates After Repeal in West Virginia and Neighboring States, 2015-2017

Injury and Illness Rate Per 10,000 Full-Time Workers	West Virginia	Ohio, Pennsylvania, Maryland (Unweighted Average of State Rates)
2015	180.5	184.5
2016	172.3	164.4
2017	201.5	148.8
Change: 2016-2017	+16.9%	-9.5%
<i>Difference-in-Differences</i>	+26.4%	

Source(s): Authors’ analysis of “Databases, Tables & Calculators by Subject: Workplace Injuries” (BLS, 2019c).

School Construction Costs

Public school construction has been a key focus of economic researchers in analyzing the effect of prevailing wage standards. Public school construction is more homogenous than other types of public works projects, which makes it easier to isolate the potential cost impact of prevailing wage. A literature review of the economic research on the cost impact of prevailing wage laws on school construction projects is presented later in this report.

⁴ Estimates for Ohio, Pennsylvania, and Maryland are the unweighted average based on state-level information.

This section provides a data-driven analysis of 107 prime contract bids on 29 K-12 school construction projects bid between July 1, 2015 and June 13, 2018, and valued at over \$500,000. Most of the projects were built using grant funding from the School Building Authority of West Virginia (SBA). Some projects had multiple prime contracts. Grants fund the major capital improvement projects built using taxpayer dollars from the SBA's General Construction Fund. The database includes 7 projects built with suspended or modified prevailing wage prior to full repeal of prevailing wage and 22 schools built following repeal.⁵ The database includes 16 elementary schools, 5 junior high schools, 6 high schools, and 2 joint middle-high schools. Fully 12 of the projects were for new school construction while 17 were for renovations or additions.

New school construction projects were utilized to analyze the potential impact of repealing prevailing wage on total costs per square foot.⁶ While there were only a limited number of observations on school construction costs in the dataset, there were many multi-prime bids. In addition, a stratified random sample of school construction costs from the pre-repeal stage was included using bid and price data from Dodge Data & Analytics. The full dataset includes 107 winning bids on these projects.

Regression results are reported in Figure 5. A "regression" is a statistical technique that allows researchers to parse out the actual and unique impact that a certain variable— such as repeal of prevailing wage— has on market outcomes, after accounting for other important factors. For example, in Figure 5, the analysis accounts for the size of the project and the type of school being built. Of these variables, the size of the project is statistically significant, with a 10 percent increase in square footage corresponding to a 9.1 percent increase in total cost, on average. Whether the school is an elementary school or a secondary school had no impact on the total construction cost per square foot.

The regression indicates that repeal of West Virginia's prevailing wage law has had no statistically significant effect on school construction costs. A statistically insignificant result implies that any measured cost difference is due to chance and that repeal did not have a causal impact. Thus, the cost of building schools in West Virginia was not affected by repeal and there is no evidence to support those who claimed that "we could build five schools for the price of three if prevailing wage was repealed."

A 2017 report by the School Building Authority of West Virginia reached the same conclusion (SBA, 2017). In a bid analysis of recent school projects, the author found that the average construction cost per square foot was \$252 from early 2011 through spring of 2015 and \$255 after repeal of prevailing wage, meaning that school construction projects were 1.4 percent cheaper prior to repeal. The School Building Authority concluded:

"Based on the information available to the School Building Authority at this time, it appears that the certified payroll documents indicate a savings in wages paid to the worker. However, the overall cost of school construction does not reflect a reduction in overall construction costs on SBA projects at this time. At this time the SBA is not realizing an overall savings that would allow for the construction of 'five new schools for the price of three' as some have previously claimed."

⁵ Of the 7 projects built prior to full repeal, 4 were during the "suspended" phase and 3 were during the "modified" stage. For more, see the table on SBA-funded projects in the Appendix at the conclusion of this report.

⁶ The square footage of the project could be determined for 10 new construction projects, eight of which were awarded to nonunion contractors and two of which were awarded to union contractors. The average cost was \$197.21 per square foot for union contractors and \$223.80 per square foot for nonunion contractors.

Figure 5: Regression Results on the Impact of Repeal on the Cost of School Construction Projects, 2015-2018

Regression Results: Determinants of West Virginia School Construction Costs		
Variable	Coefficient	Statistically Significant?
Prevailing Wage Repeal	-0.227	No
Size: Ln(Square Feet)	0.913***	Yes
Type: Elementary School	0.129	No
Intercept	5.645***	Yes
Observations (n=)	107	
Adjusted R ²	0.97	
NOTE: The dependent variable is the natural log of <i>real</i> total costs, where total costs are bid costs reported in constant 2018 dollars. ***p< 0.01 ; **p< 0.05 ; *p< 0.10 .		

Source(s): Authors’ analysis of bid price data from Dodge Data & Analytics (2019).

These findings also corroborate previous research pertaining to public school construction costs in West Virginia. A 2015 investigation on the cost of school construction in West Virginia, which had a prevailing wage law at the time, versus the non-prevailing wage states of North Carolina, Virginia, and Ohio (for elementary and secondary school construction) found that West Virginia’s prevailing wage law did not have a statistically significant impact on total costs. In fact, from 2006 to 2013, school construction costs in West Virginia were \$6 cheaper per square foot for elementary schools and \$22 cheaper per square foot for secondary schools than in the three neighboring states that did not have prevailing wage standards. While there are significant cost differences between public school and private school construction projects, these differences could not statistically be attributed to prevailing wage legislation (Kelsay, 2015).

Out-of-State Bidders

The impact of prevailing wage laws on bid competition is often a point of contention. Many economists note that prevailing wage laws level the playing field and encourage competition by taking labor costs out of the equation in the bid process so that contractors compete on the basis of quality, skills training, management organization, and materials costs (Duncan & Ormiston, 2017; Kelsay, 2015; Philips, 2014). On the other hand, critics of prevailing wage say that it limits competition and that out-of-state contractors could do taxpayer-funded construction work for at a lower cost (Sherk, 2015; Leef, 2010; Dean, 2009).

In the past decade, three empirical studies have analyzed bid behavior in relation to prevailing wage laws. All three reports conclude that prevailing wage standards do not reduce the number of bidders on public projects. In an examination of 565 bids on public works projects in five northern California cities, Professors Kim, Kuo-Liang, and Philips found that the presence of prevailing wage standards neither discouraged the number of bidders nor altered the bidding behavior of contractors (Kim et al., 2012). Evaluating 497 bids on highway construction projects in Colorado, Professor Kevin Duncan found that the level of bid competition did not differ between federally-funded projects, which required the payment of prevailing wages, and state-funded projects, which were not subject to prevailing wage (Duncan, 2015). Finally, a 2017 study on Ohio’s prevailing wage law revealed that prevailing wage standards may actually be associated with *increased* bid competition, based on 669 bids on school construction projects in the state (Onsarigo et al., 2017).

Figure 6: Contractors and Subcontractors, by Resident Status, on Post-Repeal School Projects in West Virginia

Winning Contractor	Number of School Projects	Known Subcontractors	Out-of-State Subcontractors	Share of Subcontractors from Out-of-State
Union Contractor	7	12	1	8.3%
Nonunion Contractor	15	38	7	18.4%

Source(s): Authors’ analysis of proprietary data on 22 post-repeal school construction projects (ACT, 2019).

Further research should be conducted to determine whether repeal of prevailing wage has increased or decreased the number of bidders on public construction projects. However, evidence may suggest that repeal has led to more out-of-state subcontractors securing work paid for by West Virginia taxpayers (Figure 6). For the 22 school construction projects completed in West Virginia following repeal of prevailing wage, detailed information on subcontractors was provided. After repeal, 7 of the school construction projects using state funding were awarded to union contractors and 15 were awarded to nonunion contractors. Of the known subcontractors on each of these projects, only 1 out of 12 subcontractors on the union projects were from another state (8.3 percent). In comparison, 7 of the 38 subcontractors on nonunion projects were from out of state (18.4 percent). If repeal of prevailing wage increased nonunion contractors’ market share, a consequence is that a larger share of out-of-state firms are coming into West Virginia, performing work on taxpayer-funded school projects, and taking their earnings back with them to their home states upon project completion. These findings align with a recent study in Minnesota, in which researchers found that local contractors accounted for a 10 percent higher market share when prevailing wages were included on public school construction projects (Manzo & Duncan, 2018b).

CASE STUDIES OF THREE PROBLEMATIC PROJECTS FOLLOWING REPEAL

In addition to the statistical evidence on construction worker wages, active registered apprentices, on-the-job injury rates, school construction costs per square foot, and out-of-state bidders, there is ample anecdotal evidence on the consequences of repealing West Virginia’s prevailing wage law. Since May 2016, numerous projects have been characterized by shoddy craftsmanship and cost overruns. This section uses information from public bid tabulations, certified payroll records, safety audit reports, change orders, and school board minutes to expose just three problematic post-repeal projects.

These three school construction projects awarded after repeal of the state’s prevailing wage law have had significant change orders costing taxpayers hundreds of thousands of dollars more than the original bid, delays in construction, and cost overruns. These three case studies serve as examples in understanding the downside risks associated with repeal of a state prevailing wage law.

Shady Springs High School

Shady Springs High School was let on November 30, 2016. Only one contractor bid on the new construction project. The contractor was awarded the project at an original bid price of \$7.97 million. However, on this project, there were 45 change orders for the general contractor and 39 change orders for subcontractors.

These 84 cumulative change orders amounted to \$755,944 in back-end expenditures, a 9.5 percent increase in total construction costs.

Williamstown Elementary School

Williamstown Elementary School was a new construction project that was let on March 15, 2018. Five contractors submitted bids on the project, and the winning bid was awarded for \$12.91 million. The second-lowest bidder was a union contractor who submitted a \$13.15 million proposal, approximately 3.1 percent higher than the lowest bidder. However, after the nonunion general contractor was awarded the project, two large change orders were submitted totaling \$806,699, a 6.3 percent increase in total construction costs. With the project still ongoing, the number of change orders may increase the duration of the project.

Chapmanville Intermediate School

By far, the post-repeal project with the most difficulties was the Chapmanville Intermediate School in Logan County, West Virginia. Chapmanville Intermediate School was a new construction project bid on April 4, 2017. The contract was awarded to multiple prime contractors with a general trades company bidding \$5.47 million for the project and additional contracts bringing the total construction costs to approximately \$9 million. However, the project was plagued with shoddy workmanship and delays in construction that resulted in the building failing to open on the first day of school. In fact, the project was completed six months after the original contract time allowed in part due to poor quality and safety violations.

Included in the documents reviewed on this school construction project were weekly Clerk of the Works reports from December 23, 2017 through March 24, 2018. These Clerk of the Works reports contained pictures recording safety and performance issues, demonstrating a general lack of control at the site. The following issues were highlighted in selected Clerk of the Works reports.

- **February 3, 2018:** “Repair inside ICF walls for sheet rock to be installed correctly,” “cold weather protection for masonry,” “lower hydro scaffolding and stabilize with limestone and new matts,” and “general contractor to be in charge or in control of their subs.”⁷
- **February 10, 2018:** “‘Personal Protective Equipment’ ... some use it, some don’t. No hard hats or safety glasses,” “ladders are not tied off correctly,” and “placement of propane hoses to the inside heaters... could fill the building with propane gas.”⁸
- **March 3, 2018:** “Maintain quality control over face brick being installed,” bulges in the walls throughout the building, and “the perimeter of the whole site [is] nothing but mud.”⁹

A letter dated April 23, 2018 summarized 18 construction issues identified for this project. Among these problems were voids discovered in ICF walls with steel columns, brick haunches, and brick anchors incorrectly installed. Stairwell walls were in the wrong dimensions and propane hoses were placed in unsafe areas.

⁷ Clerk of the Works Weekly Report: Week Ending February 3, 2018.

⁸ Clerk of the Works Weekly Report: Week Ending February 10, 2018.

⁹ Clerk of the Works Weekly Report: Week Ending February 10, 2018.

Mountaineer Safety Consulting, LLC also conducted a safety audit of the Chapmanville project, which found 9 discrepancies with respect to state and federal OSHA violations.

The Chapmanville Intermediate School project was a disaster for the local school district, for the taxpayers, and for the children of Logan County. The project experienced significant safety violations, shoddy workmanship, and delays in construction. As a result, the building did not open on the first day of school. Instead, it opened at the end of November, almost six months behind schedule.

Anecdotal Evidence on Changes in Worker Wages

It is likely that a movement towards lower-wage, less-skilled labor following repeal of the prevailing wage contributed to these cost overruns, inferior quality of work, and safety and OSHA violations. While union contractors and subcontractors continue to pay wages and fringe benefits comparable to pre-repeal levels, nonunion firms typically pay much less. Reviewing certified payroll records on post-repeal projects, one nonunion subcontractor paid laborers \$10.00 per hour with no fringe benefits. They also paid no federal payroll tax or West Virginia income tax withholding. Another subcontractor from Maryland paid laborers just \$16.50 per hour on this project. Prior to repeal, the wage and benefits package for a laborer was more than \$35.00 per hour in total compensation, so these types of workers saw significant decreases in their hourly earnings due to repeal.

A similar reduction in wages paid to blue-collar construction workers employed by subcontractors is rampant in the records reviewed. Another project had an out-of-state subcontractor pay an out-of-state carpenter \$16.00 per hour with no fringe benefits when the wage and benefits package prior to repeal of prevailing wage was slightly more than \$40.00 per hour in total compensation. A third subcontractor paid a laborer \$23.00 per hour with no fringe benefits and a mason \$25.00 per hour with no fringe benefits, both more than \$20.00 per hour below what they would have earned prior to repeal of prevailing wage. If paid to resident workers, these lower wages will likely result in an increasing number of West Virginia construction workers living below the poverty line and working without health insurance. Because there is no statistical difference in the costs of construction in the pre-repeal years and the post-repeal years, the net impact of prevailing wage repeal is a shift in income from skilled West Virginia construction workers to proprietors of construction firms and to untrained, less productive workers from out-of-state.

DISCUSSION OF PRE-REPEAL CLAIMS AND ACTUAL POST-REPEAL DATA

Data has become available to begin testing claims made by policy researchers in the years leading up to repeal. While Dean (2009) said that West Virginia's prevailing wage law increased labor costs by "at least 49 percent" and that taxpayers could save money from repealing prevailing wage, Kelsay (2015) predicted negative consequences for West Virginia's construction industry.

To date, the data suggest that Kelsay's forecasts have been borne out. Hourly wage growth has been between 1 percent and 8 percent *slower* for construction laborers, carpenters, electricians, and operating engineers in West Virginia compared to their counterparts in neighboring states. Apprenticeship training has also fallen by 28 percent in West Virginia since repeal of the state's prevailing wage law, relative to three neighboring states

that maintained their prevailing wage laws. Safety has also become an issue, with the construction worker injury rate increasing by 26 percent since repeal. Costs associated with worksite injuries and an overall decrease in worker productivity have offset any savings from lower labor costs, resulting in public school construction costs that are not statistically different since prevailing wage was repealed, even after adjusting for inflation.

While Dean (2009) was right that repeal of prevailing wage would result in lower relative earnings for blue-collar construction workers and might cause cheaper, out-of-state firms to win bids on taxpayer-funded projects, she was mistaken on worker training, construction quality, and school construction costs. Why? A closer investigation into her report reveals statistical problems. In particular, the author purports to capture the relationship between the prevailing wage rate and the so-called market rate, but four of the independent variables are intuitively of the wrong sign, without explanation. Second, she does not identify which wage rate—the entry wage or the mean wage or a certain percentile wage—that she considers the “true market wage.” However, the primary issue with her report is that her results account for a trivial 2 percent of the difference between the prevailing wage and the so-called market rate, meaning that the regression does not fit the data.

It is worth noting that another August 2018 study by Clark and Tester of the Gatton College of Business and Economics at the University of Kentucky analyzed how repeal of prevailing wage affects the cost of public school construction (Clark & Tester, 2018). While the authors conclude that “costs per square foot decreased by 7.3 percent since the removal of the wage requirement,” there are significant data limitations and is a lack of statistical analysis in the reports. The authors note that “differences in project specifications can affect the comparison,” and yet they make no attempt to account for school type, project type, project size, project complexity, or economic trends in their analysis. In addition, the authors only evaluated a few projects without prevailing wage standards. Finally, the authors do not account for changes in productivity, training, or safety outcomes that may have occurred due to repeal of prevailing wage. Given these issues, the only conclusion that can be made from the Clark and Tester report is that it suffers from an incomplete understanding of the construction industry grounded in assumptions that are at odds with peer-reviewed economic research.

REVIEW OF THE RESEARCH ASSESSING THE IMPACT ON SCHOOL CONSTRUCTION

The preponderance of peer-reviewed research has concluded that prevailing wage laws have no impact on total construction costs (Duncan & Ormiston, 2017; Mahalia, 2008). Why don't prevailing wage laws increase construction costs? To begin, labor costs are a low and historically declining percentage of total costs in the construction industry—approximately 23 percent of all building costs in the United States (Manzo & Duncan, 2018b). Next, peer-reviewed research indicates that, when wages rise in construction, contractors respond by utilizing more capital equipment and by hiring skilled workers in place of their less-productive counterparts (Balistreri et al., 2003; Blankenau & Cassou, 2011). Finally, recent evidence reveals that contractors also respond to higher wages by reducing expenditures on materials, fuels, and rental equipment (Duncan & Lantsberg, 2015). Since labor costs represent a small portion of overall costs, only minor changes are needed to offset the effect of prevailing wage laws.

This section reviews 28 research papers that analyze the cost impact of prevailing wage laws on school construction projects in particular. Of the 28 papers reviewed, 19 found no statistical impact on total project

costs (68 percent). However, 8 of these studies used an outdated “wage differential” approach that is plagued with statistical problems. Of the 20 studies that used either regression analyses or other econometric techniques, 19 found no discernible effect of prevailing wage standards on school construction costs (95 percent). The following literature review categorizes these 28 reports into four groups based on the credibility of their methodologies.

The Good: Twenty Studies that Use Regression Analyses or Econometrics

Fully 20 studies have been conducted over the past 20 years that have used regression analyses to assess the impact of prevailing wage on the costs of school construction projects. Of these studies, 12 were *peer-reviewed* and 8 were not. Peer review is the process of establishing credibility by submitting research to a group of anonymous, independent experts who critically evaluate the methodologies and conclusion before a report can be accepted for publication.

Of the 12 peer-reviewed academic studies that used regressions, 11 found no statistically significant evidence that prevailing wage laws increase the costs of school construction (92 percent). In the first of these studies conducted over the past two decades, Bilginsoy and Philips (2000) analyzed the relationship between the wage policy and school construction costs in British Columbia, Canada between 1989 and 1996. After accounting for the business cycle, number of competitors, type of school, a time trend, and other factors, the authors’ before-and-after analysis concluded that prevailing wage does not affect construction costs.

Philips (2001a) later examined public school construction costs in Michigan, Ohio, and Kentucky built between 1991 and 2001. Using bid data on 391 public schools constructed during that period— when these states changed their prevailing wage standards to either exempt or cover school construction projects— Philips controlled for seasonality, urban and rural factors, and the size of the project. He found prevailing wage marginally increased school construction costs by 1 percent, but the results were statistically insignificant.

After obtaining data from F.W. Dodge Corporation on 4,974 public and private schools built in the 1990s in states with and without prevailing wage laws, Azari-Rad, Philips, and Prus (2002) controlled for school size, type, season, local market conditions, and a vector of variables to isolate the impact of state prevailing wage laws. A follow up study by Azari-Rad, Philips, and Prus (2003) used similar data on 4,653 final bid prices for all 50 states on public and private school construction projects costing \$750,000 or more. Both of these studies— which had improved statistical confidence by for the first time evaluating thousands of projects— found no impact of state prevailing laws on school construction costs.

Duncan, Philips, and Prus used British Columbia data to examine the effect of prevailing wage laws on productivity and efficiency. They found that public school projects were between 16 percent and 19 percent smaller than comparable private structures before prevailing wage was introduced. This size differential did not change after the policy was in effect (Duncan et al., 2006). These results suggest that prevailing wage standards did not alter labor or input utilization in a way that significantly affected project costs. The authors further found that the policy, which implemented new apprenticeship training requirements, increased the average efficiency of public projects after 17 months, from 94.6 percent to 99.8 percent (Duncan et al., 2009). This improvement in overall construction efficiency is also consistent with stable total costs.

In two studies conducted in 2013, Professor Atalah introduced a new approach to test the hypothesis that prevailing wages increase school construction costs. Based on the examination of 8,093 bids on 1,496 school projects in Ohio, the studies compared bids of contractors who are signatories to collective bargaining agreements and pay union wage and benefit rates to those submitted by nonunion contractors who typically pay lower rates. While schools are exempt from Ohio's prevailing wage law, union rates prevail for other construction funded by the state— meaning that the union-nonunion comparison offers an indirect test of the impact of prevailing wage in Ohio. A comparison of average bid costs per square foot indicated that there was no statistically significant difference between union and nonunion contractors across the state; this was the case when evaluating all bids or just winning bids (Atalah, 2013a). When analyzing bids submitted by different trades, the average bid cost per square foot was not higher for 15 of the 18 trades (83 percent) that paid union rates (Atalah, 2013b). Professor Atalah's studies largely found that the payment of union wage rates is not associated with increased construction costs.

In 2014, Duncan, Philips, and Prus re-analyzed the relationship between school construction costs and the Skill Development and Fair Wage Policy that was enacted in British Columbia in 1992 (Duncan et al., 2014). The authors analyzed the costs of 77 private schools and 421 public schools that were built between 1989 and 1995. They controlled for school size, number of stories, location in Vancouver, and a control variable for school construction before and after passage of the wage policy. Using a difference-in-difference approach, the authors once again found no statistically significant change in the cost of private and public school construction before and after implementation of the prevailing wage standards.

Kaboub and Kelsay (2014) examined 3,120 projects built between 1993 and 2002 in 12 Midwest states in the "North Central Region" of the United States. The bid cost data were obtained from Dodge Data & Analytics. Factors examined included project size, 13 different non-residential projects, and whether or not the project was privately-funded or publicly-funded. While the authors found that public projects were more expensive than private projects, this was true even in states that did not have prevailing wage laws. The prevailing wage coefficient was statistically insignificant.

Duncan (2018) also examined side-by-side bids for school construction costs in Maryland, where contractors were asked to submit two bids for the same project— one with prevailing wage rates and one without prevailing wage rates. Results from a fixed effects regression of an unbalanced panel of nonunion roofing contractors indicate that the gap between the two bids decreased as the level of bid competition and accumulated contractor experience increased. The bid gap is also influenced by a contractor's eagerness to win a project. Duncan found that the apparent 10 percent cost inflation associated with prevailing wage rates disappeared entirely when bid behaviors and factors were accounted for.

The only peer-reviewed study that used regression analyses and found that state prevailing wage laws increased school construction costs was conducted by Vincent and Monkkonen (2010). The authors analyzed final bid costs for 2,645 public schools built between 1995 and 2004 using Dodge data. They controlled for size, number of stories, type of school, and local conditions and estimated that state prevailing wage laws increased school construction costs by between 8 percent and 13 percent, an effect that was statistically significant. This finding contrasts with other studies that have used similar data from Dodge Data & Analytics. However, the authors note that the possibility that prevailing wage "increases skilled workmanship and decreases change orders," which is a limitation associated with their exclusive focus on front-end bid prices.

Figure 7: Research on the Cost Impact of Prevailing Wage for School Projects: Using Regression Analysis

Study	Authors	Year	Number of Projects	Geography	Effect
<i>Peer-Reviewed</i>					
1	Kevin Duncan	2018	75	Maryland	No Effect
2	Kevin Duncan; Peter Phillips; Mark Prus	2014	498	British Columbia	No Effect
3	Fadhal Kaboub; Michael Kelsay	2014	3,120	12 North Central States	No Effect
4	Alan Atalah	2013	1,496	Ohio	No Effect
5	Alan Atalah	2013	1,496	Ohio	No Effect
6	Jeffrey Vincent; Paavo Monkkonen	2010	2,645	United States	8%-13%
7	Kevin Duncan; Peter Phillips; Mark Prus	2009	438	British Columbia	No Effect
8	Kevin Duncan; Peter Phillips; Mark Prus	2006	528	British Columbia	No Effect
9	Hamid Azari-Rad; Peter Phillips	2003	4,653	United States	No Effect
10	Hamid Azari-Rad; Peter Phillips	2002	4,974	United States	No Effect
11	Peter Phillips	2001	391	Kentucky, Ohio, Michigan	No Effect
12	Cihan Bilginsoy; Peter Phillips	2000	54	United States	No Effect
<i>Not Peer-Reviewed</i>					
13	Manzo IV; Kevin Duncan	2018	640	Minnesota	No Effect
14	Manzo IV; Kevin Duncan	2018	335	Indiana	No Effect
15	Lameck Onsarigo; Alan Atalah; Frank Manzo IV; Kevin Duncan	2017	110	Ohio	No Effect
16	Michael Kelsay	2016	16,200	12 North Central States	No Effect
17	Michael Kelsay	2016	1,325	Sedgwick & Wyandotte County, Kansas	No Effect
18	Michael Kelsay	2015	81,168	6 Midwest and Mid-Atlantic States	No Effect
19	Ohio Legislative Service Commission	2002	1,126	Ohio	No Effect
20	Mark Prus	1999	460	Maryland	No Effect

In addition, over the past 20 years, 8 studies that were not peer reviewed have used regressions or other econometric techniques to evaluate the impact of prevailing wage standards on school construction project costs. While lawmakers and the public should be cautious about studies that have not undergone peer review—as they *could* suffer from methodological defects or reach misleading conclusions— all 8 of these studies were authored by at least one Ph.D.-level academic researcher and employed advanced statistical methods that are widely accepted in economics and social sciences. All 8 of these studies (100 percent) find that state prevailing wage laws have no discernible impact on school construction costs.

Two decades ago, Prus (1999) examined state prevailing laws and the cost of construction in Delaware, Maryland, North Carolina, Pennsylvania, Virginia, and West Virginia from 1991 to 1997. Using a regression that accounted for other important variables, Prus estimated that building a public school cost 3 percent more in states with prevailing wage laws, but the result was not statistically significant.

More recently, as discussed in previous sections of this report, Kelsay (2015) conducted an analysis on the potential adverse impacts of repealing prevailing wage in West Virginia. Utilizing Dodge Data & Analytics, the author obtained data on 81,168 bids for new construction projects across 13 different non-residential structures from 2006 to 2013. The data covered 6 states. There were 34,236 observations from North Carolina and Virginia, two states without prevailing wage laws, and 46,932 observations from Maryland, Ohio, Pennsylvania, and West Virginia, four states with prevailing wage laws— except for some school construction projects in Ohio.¹⁰ Kelsay found that the prevailing wage did not result in any statistically significant difference in construction costs. In particular, he analyzed the impact of West Virginia's prevailing wage law relative to the three states that did not have prevailing wage standards on school construction projects, finding that the mean square foot cost in West Virginia was not higher than the non-prevailing wage states. In fact, average costs per square foot were \$6 cheaper on elementary school construction projects and \$22 cheaper on secondary school construction projects in West Virginia than they were in North Carolina, Ohio, and Virginia.

Kelsay (2016a) also analyzed Dodge data to understand the impact of prevailing wage in Missouri from 2011 through 2015. In this study, Kelsay forecasted the impact of potentially repealing Missouri's prevailing wage law by focusing on the 12-state region of Nebraska, South Dakota, North Dakota, Kansas, Missouri, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Michigan, and Ohio. Kelsay found that there was no statistically significant difference in the mean square foot costs of public construction between prevailing wage states and non-prevailing wage states. There was also no statistical difference in elementary school construction costs, secondary school construction costs, and library construction costs between Missouri and neighboring states that did not have prevailing wage laws. In fact, for university school construction, average square foot costs were cheaper in Missouri than in neighboring states that did not have prevailing wage laws.

In April 2013, Kansas Governor Sam Brownback signed a bill into law that prohibited cities and counties from passing prevailing wage ordinances for locally-funded public works projects. At the time of passage, both Sedgwick County and Wyandotte County, the two largest counties in Kansas, had local prevailing wage policies. These were voided by the legislation, creating a natural experiment that Kelsay studied in 2016. Again using Dodge bid cost data, Kelsay (2016b) investigated non-residential construction projects and school construction projects in the two counties between 2005 and 2016, including 162 new school construction project in the pre-repeal period and 39 in the post-repeal period. While proponents argued that the statewide ban on local prevailing wage standards would lower the costs of public projects, Kelsay found no statistically significant difference in the average cost per square foot for both non-residential construction projects and school construction projects in the two counties pre-repeal and post-repeal.

Onsarigo, Atalah, Manzo, and Duncan evaluated the economic, fiscal, and social effects of Ohio's prevailing wage law in 2017 (Onsarigo et al., 2017). As part of their analyses, the authors used data from the Ohio Facilities

¹⁰ School construction at the elementary and secondary level is exempt from prevailing wage in Ohio and is included in non-prevailing wage states data.

Construction Commission (OFCC) on 110 projects— including elementary, secondary, and state-supported university and community college projects— from August 2013 through October 2016. The authors found that the application of prevailing wage standards on school construction projects did not have an impact on total construction costs, but that they did statistically increase bid competition by approximately 0.3 bids per project, on average.

In 2018, Manzo and Duncan conducted two studies pertaining to prevailing wage and school construction costs. The first report was an assessment of the impacts of Indiana repealing its prevailing wage law, called common construction wage, in 2015. The authors found that repeal had a negative impact on blue-collar construction workers in the state but did not have a meaningful impact on public school construction costs over 335 projects in northern Indiana between 2014 and 2017 ([Manzo & Duncan, 2018a](#)). The second report was an exhaustive study on Minnesota's prevailing wage law, which included an examination of 640 subcontractor low bids in the Minneapolis-St. Paul metro region between 2015 and 2017. They found that winning bids based on the payment of prevailing wages were no more costly than bids that did not require prevailing wages ([Manzo & Duncan, 2018b](#)).

Finally, one study conducted by the Ohio Legislative Service Commission (LSC) used regression analysis, but offered conflicting results ([Ohio LSC, 2002](#)). The study examined school construction costs in Ohio from 1997 through 2001, when lawmakers exempted school construction projects from Ohio's prevailing wage law. The report estimated that repeal of prevailing wage on school construction projects resulted in 10.7 percent lower school construction costs, translating into \$488 million in savings during the period of analysis. However, a closer look at the regression reveals that this Ohio LSC estimate was *not* statistically significant. In fact, the study authors wrote that “evidence was not available as to the portion of the estimated savings, if any, that could be directly and conclusively attributed to the prevailing wage exemption.” The conclusions were also based on models with low explanatory power (R^2 values) that could explain only 1 to 3 percent of the variation in total construction costs in Ohio, rendering them empirically meaningless because the regressions did not fit the data. An accurate assessment of the Ohio LSC study reveals that prevailing wage had no effect on school construction costs.

The Bad: Eight Studies that Use the Wage Differential Approach

Rigorous empirical research over the past decade has shown that the “wage differential” approach produces biased estimates ([Duncan & Ormiston, 2017](#)). The wage differential method simply compares the prevailing wage to an arbitrary lower rate, such as the average wage for all construction workers in a state— which includes residential construction workers who tend to be less skilled and earn less. The wage differential approach rests on the assumption that prevailing wage laws *must* increase construction costs, which leads researchers who employ the method to overstate the possible savings— if any— from repeal of state prevailing wage laws ([Minnesota OLA, 2007](#)).

The fatal flaw in the wage differential approach is that it considers no other factors. It assumes that wages are independent of— and have no relationship to— the productivity, skill level, and safety of construction workers, despite economic evidence demonstrating that workers in prevailing wage states tend to be more productive, have a higher probability of completing a registered apprenticeship program, and suffer from fewer on-the-job injuries and fatalities ([Duncan & Ormiston, 2017](#)). The wage differential approach also fails to consider other

channels of adjustment. For example, Duncan and Lantsberg (2015) have found that contractor profits, materials costs, and fuel costs are all lower in states with prevailing wage laws. Ultimately, the wage differential method is a simplistic approach based on an incomplete understanding of construction markets which result in misleading conclusions.

Goldfard and Morrall (1981) published the first wage differential study that analyzed the impact of prevailing wage legislation on public construction costs in the United States. The authors estimated that repeal of prevailing wage would result in a cost savings of between \$222 million and \$571 million, arguing that “the use of an average (mean) wage rate rather than union rates would reduce average wage rates on government projects and therefore reduce costs on these projects.” Even before modern econometrics, research discredited this assumption only a few years later when Allen found that union productivity was 30 percent higher for office building construction, up to 20 percent higher in school projects, and between 44 percent and 52 percent higher as measured by value added per worker— suggesting that switching from union workers to nonunion employees would not necessarily lead to a net improvement in efficiency (Allen, 1984; Allen, 1986).

Fraundorf, Farrell, and Mason (1984) examined 215 non-residential construction projects built in 1977 and 1978. The study controlled 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. However, the authors attributed the cost differential between public construction projects and private construction projects entirely to prevailing wage laws, purportedly concluding that the wage differential increased construction costs by a range of 26 percent to 35 percent. Yet labor costs accounted for just 25 percent of total construction costs, on average, over this time, meaning that it would be virtually impossible for projects to save that much money unless workers who earned the prevailing wage suddenly worked for free without the policy in place. The construction cost differences observed in this study were likely attributable to a number of other factors such as cost-of-living differences and materials costs. Moreover, as discussed previously, more sophisticated research in later years found that public projects cost more than private projects regardless of whether the state has a prevailing wage law. Several recent studies conclude that there is no statistical difference in public construction costs between states with and without prevailing wage laws (Kelsay, 2016a).

In 2001, Keller and Hartman authored the last wage differential article to be published in a peer-reviewed journal (Keller & Hartman, 2001). The authors focused on school construction costs in Pennsylvania, calculating that the mean hourly rate was \$17.00 for school projects that paid prevailing wages and \$14.13 for private sector projects. They estimated that prevailing wage increased the cost of school construction projects by 2 percent. However, this study only conducted a hypothetical wage differential analysis for 25 arbitrary projects. More convincing academic research conducted both before and after this peer-reviewed article has used actual project and bid data to statistically assess the impact of prevailing wage laws on school construction projects.

The least credible studies alleging to measure the effect of prevailing wage laws on construction costs are those which use the outdated “wage differential” approach but have not been peer reviewed. This is especially true over the past two decades, given that no respected academic journal has peer-reviewed and published a study employing the wage differential technique since 2001.

A non-peer-reviewed study by the Mackinac Center for Public Policy has often been cited by critics of prevailing wage laws (Vedder, 1999). The author presented anecdotal evidence regarding the impact of repeal of

prevailing wage in Michigan from December 1994 to June 1997, a period in which the law was ruled invalid in the state. Summary conclusions of that study are that prevailing wage reduced construction employment, increased costs by \$275 million, and caused a net out-migration of 2.5 million citizens from Michigan between 1990 and 1996. However, despite claims by Vedder that he disentangled the effects of seasonal fluctuations, unusual weather conditions, and the business cycle from the impact of prevailing wage, no empirical analysis was conducted for this study. The author also failed to account for the possible direct and indirect impacts of a more highly trained workforce that is associated with prevailing wage legislation. In a rebuttal to the analysis, Philips (2001b) showed that, if the methodology was applied to real-world examples of other states that changed provisions of their prevailing wage laws, the actual data are contrary to Vedder's predictions, calling the results of the entire study into question.

In 2008, Gardner and Ruffer reported that prevailing wage laws raised construction costs by 36 percent in New York's metro regions (Gardner & Ruffer, 2008). It is first worth noting that these predicted savings on projects are not possible given that labor's share of total construction costs are much smaller than 36 percent. Second, the authors did not control for the difference between building an entirely new school and a simple renovation or addition. Finally, the authors also did not seek to understand changes in productivity and materials costs.

The Beacon Hill Institute utilized a wage differential approach in concluding that Davis-Bacon prevailing wage rates were 13 percent higher than market rates, based on BLS data (Glassman et al., 2008). They subsequently used this differential, applied it to federal budget outlays, and concluded that federal prevailing wage rates increased construction costs by 10 percent. Yet again, they did not account for other factors, such as materials costs, productivity levels, planning costs, or architectural costs. It is highly unlikely that this report would have made it through a peer review process into an academic journal.

Figure 8: Research on the Cost Impact of Prevailing Wage for School Projects: Wage Differential Approach

Study	Authors	Year	Number of Projects	Geography	Effect	Critique
1	Edward Keller; William Hartman	2001	25	Pennsylvania	2.25%	No econometric work
2	Martha Fraundorf; John Farrell; Robert Mason	1984	215	United States	26-35%	Specification problems and omitted variable bias
3	Robert Goldfarb; John Morrall III	1981	N/A	United States	\$221-\$571 million	No statistical analysis
4	Alex Rosaen; Traci Taylor	2015	N/A	Michigan	6.1%	Simple t-test for wage differential
5	Alex Rosaen	2013	N/A	Michigan	7.5%	Back-of-the-envelope calculations
6	Kent Gardner; Rochelle Ruffer	2008	N/A	New York	36%	No statistical analysis
7	Sarah Glassman; Michael Head; David Tuerck; Paul Bachman	2008	N/A	United States	9.9%	No statistical analysis
8	Richard Vedder	1999	N/A	Michigan	\$275 million	No statistical analysis

In November 2013, an Anderson Economic Group consultant named Alex Rosaen estimated that Michigan could save \$225 million per year in K-12 and higher education capital outlays by repealing the state's prevailing wage law (Rosaen, 2013). The estimate was based on a wage differential finding that prevailing wage rates were inflated by 25 percent and an assumption that labor costs were 30 percent of total construction costs. Thus, by multiplying the wage differential by the labor cost share, he estimated that repeal of prevailing wage would reduce total costs by 7.5 percent. As Philips (2013) points out in an uncompromising critique, Rosaen simply used a hypothetical, back-of-the-envelope calculation that did not consider impacts on the quality of construction, the skill level of the workforce due to a compression of wages, the impact on productivity, long-term maintenance costs, injury rates, or workers comp.

In a 2015 update, Rosaen and Taylor once again used back-of-the-envelope figures that assumed the wage premium associated with prevailing wages was 25 percent and that the percentage of construction costs attributable to wages and benefits was 24 percent (Rosaen & Taylor, 2015). The product is a 6 percent increase in school construction costs amounting to \$127 million per year, according to the authors. Despite briefly acknowledging Philips' previous concerns, Rosaen and Taylor did not seek to address and resolve any of them in this update. Because peer review involves submitting manuscripts and then correcting mistakes in the methodological approach that have been pointed out by academic colleagues, it is clear that this 2015 updated study would not have survived the process and would not have been accepted by a respected academic journal.

CONCLUSION

Repeal of prevailing wage has had negative consequences for West Virginia's construction workforce, contractors, and communities— without generating any meaningful savings for taxpayers. Blue-collar construction worker wages have grown slower than neighboring states and apprenticeship training has fallen significantly. This has caused an increase in the on-the-job injury rate for construction workers in West Virginia at a time when the industry has become even safer in neighboring states. The changes in worker skill levels and workplace safety outcomes have offset any savings from lower labor costs, resulting in no change in public school construction costs following repeal. In addition, the level playing field for all contractors was eliminated following repeal of prevailing wage, which may have given more out-of-state contractors a foothold in the market. The findings align with the preponderance of peer-reviewed academic studies, which conclude that prevailing wage laws have no effect on school construction project costs. Ultimately, the repeal of prevailing wage has not saved taxpayers any money and, in fact, has had negative effects on construction market outcomes in West Virginia.

APPENDIX

Table 1: Sample of School Construction Projects Awarded in West Virginia, 2015-2018

School Construction Summary- Suspended Stage				
#	School	Category	Bid Date	Bid Amount
1	Suncrest Elementary School	New	7/7/2015	\$8,647,831
2	Potomack Intermediate School Classroom	Reno/Add	7/8/2015	\$986,000
3	Ceredo Kenova Elementary School	New	8/18/2015	\$12,400,000
4	Ritchie Elementary Renovations	Reno/Add	9/3/2015	\$7,087,000
School Construction Summary- Modified Stage				
#	School	Category	Bid Date	Bid Amount
5	Crum PK - 8 School	New	11/1/2015	\$11,116,500
6	Wirt County Schools Roof & HVAC Replacement	Reno/Add	3/8/2016	\$1,993,300
7	Brooke Middle School	New	5/2/2016	\$14,970,000
School Construction Summary- Repeal Stage				
#	School	Category	Bid Date	Bid Amount
8	John Marshall HS Fine Arts Building	Reno/Add	5/17/2016	\$6,031,000
9	Tucker Co High School HVAC Reno	Reno/Add	5/19/2016	\$1,994,425
10	Spencer Elementary School Phys Ed Addition	Reno/Add	6/21/2016	\$1,128,000
11	Andrews Heights Elementary School	Reno/Add	9/15/2016	\$3,614,870
12	Brookhaven Elem School Add/Reno	Reno/Add	10/17/2016	\$9,254,500
13	Shady Spring HS	New	11/30/2016	\$7,969,000
14	Ridgeview Elementary	New	3/8/2017	\$5,977,000
15	Chapmanville Intermediate School	New	4/4/2017	\$5,469,500
16	Johnson Elementary School	New	5/3/2017	\$16,989,000
17	Mountain Valley Elementary	New	5/3/2017	\$8,200,000
18	Ravenswood HS/MS Add/Reno	Reno/Add	5/10/2017	\$6,870,000
19	Princeton Middle School HVAC	Reno/Add	5/11/2017	\$2,756,000
20	Oak Hill High School Addition & Renovations	Reno/Add	10/17/2017	\$1,561,805
21	Rupert Elementary	Reno/Add	10/25/2017	\$3,362,000
22	Collins Middle School	New	2/8/2018	\$7,183,000
23	Williamstown Elementary School	New	3/13/2018	\$12,760,000
24	Oak Hill K-2	New	3/29/2018	\$6,420,000
25	Gilbert Middle School PK -8	Reno/Add	4/26/2018	\$1,224,000
26	Beverly & George Ward Elementary Schools	Reno/Add	5/4/2018	\$4,300,000
27	Morgantown High School Phase 1	Reno/Add	5/7/2018	\$2,148,412
28	Ritchie County Middle/High Safe School Entrance	Reno/Add	5/24/2018	\$1,399,000
29	Morgantown High School Phase 2	Reno/Add	6/13/2018	\$4,174,000

Source(s): Authors' analysis of proprietary data on 29 school construction projects (ACT, 2019).

SOURCES

- Affiliated Construction Trades (ACT). (2019). West Virginia State Building & Construction Trades Council.
- Allen, Steven. (1986). *Unionization and Productivity in Office Building and Elementary and Secondary Schools*. NBER Working Paper
- Allen, Steven. (1984). "Unionized Construction Workers are More Productive," *The Quarterly Journal of Economics*, 99(2): 251-274.
- Atalah, Alan. (2013) (a). "Comparison of Union and Nonunion Bids on Ohio School Facilities Commission Construction Projects," *International Journal of Economics and Management Engineering*, 3(1): 29-35.
- Atalah, Alan. (2013) (b). "Impact of Prevailing Wages on the Cost among the Various Construction Trades," *Journal of Civil Engineering and Architecture*, 7(4): 670-676.
- Azari-Rad, Hamid; Peter Philips; and Mark Prus. (2003). "State Prevailing Wage Laws and School Construction Costs," *Industrial Relations*, 42(3): 445-457.
- Azari-Rad, Hamid; Peter Philips; and Mark Prus. (2002). "Making Hay When It Rains: The Effect Prevailing Wage Regulations, Scale Economies, Seasonal, Cyclical and Local Business Patterns Have On School Construction Costs," *Journal of Education Finance*, 27: 997-1012.
- Azari-Rad, Hamid; Anne Yeagle; and Peter Philips. (1993). *The Effects of the Repeal of Utah's Prevailing Wage Law on the Construction Labor Market and Apprenticeship Training*. University of Utah.
- Balistreri, Edward; Christine McDaniel; and Eina Vivian Wong. (2003). "An Estimation of U.S. Industry-Level Capital-Labor Substitution Elasticities: Support for Cobb-Douglas," *The North American Journal of Economics and Finance*, 14: 343-356.
- Belman, Dale and Paula Voos (1995). *Prevailing Wage Laws in Construction: The Costs of Repeal to Wisconsin*. The Institute for Wisconsin's Future.
- Bilginsoy, Cihan. (2017). *The Performance of ABC-Sponsored Registered Apprenticeship Programs in Michigan: 2000-2016*. University of Utah.
- Bilginsoy, Cihan. (2003). *Wage Regulation and Training: The Impact of State Prevailing Wage Laws on Apprenticeship Training*. University of Utah.
- Bilginsoy, Cihan and Peter Philips. (2000). "Prevailing Wage Regulations and School Construction Costs: Evidence from British Columbia," *Journal of Education Finance*, 24: 415-432.
- Blankenau, William and Steven Cassou. (2011). "Industry Differences in the Elasticity of Substitution and Rate of Biased Technological Change between Skilled and Unskilled Labor," *Applied Economics*, 43: 3129-3142.
- Bureau of Labor Statistics (BLS). (2019) (a). "OES Data." U.S. Department of Labor.
- Bureau of Labor Statistics (BLS). (2019) (b). "Databases, Tables & Calculators by Subject: CPI Inflation Calculator." U.S. Department of Labor.
- Bureau of Labor Statistics (BLS). (2019) (c). "Databases, Tables & Calculators by Subject: Workplace Injuries." U.S. Department of Labor.

THE IMPACT OF REPEALING WEST VIRGINIA'S PREVAILING WAGE LAW

- Bureau of Labor Statistics (BLS). (2016). "May 2016 State Occupational Employment and Wage Estimates: West Virginia." U.S. Department of Labor.
- Clark, Mike and Kenneth Tester. (2018). *An Evaluation of How Repealing West Virginia's Prevailing Wage Law Affected the Cost of Public Construction*. University of Kentucky.
- Davis, Pete. (2019). "Ahead of Summer Construction Season, DOH, Parkways Authority Still Plagued by Chronic Labor Shortage." *MetroNews*.
- Dean, Andrea. (2009). *An Economic Examination of West Virginia's Prevailing Wage Law*. The Public Policy Foundation of West Virginia.
- Department of Labor Employment and Training Administration (DOLETA). (2019). "Data and Statistics: Registered Apprenticeship National Results." U.S. Department of Labor.
- Dodge Data and Analytics. (2019). www.construction.com.
- Duncan, Kevin. (2018). "Prevailing Wages, Side-By-Side Bids, and School Construction Costs," *Labor Studies Journal*, 43(1).
- Duncan, Kevin. (2015). "The Effect of Federal Davis-Bacon and Disadvantaged Business Enterprise Regulations on Highway Maintenance Costs," *Industrial and Labor Relations Review*, 68(1): 212-237.
- Duncan, Kevin and Alex Lantsberg. (2015). *How Weakening Wisconsin's Prevailing Wage Policy Would Affect Public Construction Costs and Economic Activity*. Colorado State University-Pueblo and Smart Cities Prevail.
- Duncan, Kevin and Russell Ormiston. (2017). *Prevailing Wage Laws: What Do We Know?* Institute for Construction Economics Research (ICERES).
- Duncan, Kevin; Peter Philips; and Frank Manzo IV. (2017). *Building America with Prevailing Wage: The Davis-Bacon Act Delivers Good Middle-Class Jobs, a Stronger Economy, and the Best Value for U.S. Taxpayers*. Colorado State University-Pueblo; University of Utah; Illinois Economic Policy Institute.
- Duncan, Kevin; Peter Philips; and Mark Prus. (2014). "Prevailing Wage Regulations and School Construction Costs: Cumulative Evidence from British Columbia," *Industrial Relations*, 53(4): 593-616.
- Duncan, Kevin; Peter Philips; and Mark Prus. (2009). "The Effects of Prevailing Wage Regulations on Construction Efficiency in British Columbia," *International Journal of Construction Education and Research*, 5(2): 63-78.
- Duncan, Kevin; Peter Philips; and Mark Prus. (2006). "Prevailing Wage Legislation and Public School Construction Efficiency: A Stochastic Frontier Approach," *Construction Management and Economics*, 6: 625-634.
- Fenn, Ari; Zhi Li; Gabriel Pleites; Chimedkham Zorigtbaatar; and Peter Philips. (2018). "The Effect of Prevailing Wage Repeals on Construction Income and Benefits," *Public Works Management & Policy*, 1-19.
- Fraundorf, Martha; John Farrell; and Robert Mason. (1984). "The Effect of the Davis-Bacon Act on Construction Costs in Rural Areas," *The Review of Economics and Statistics*, 66(1): 142-146
- Gardner, Kent and Rochelle Ruffer. (2008). *Prevailing Wage in New York State*. Center for Governmental Research.
- Glassman, Sarah; Michael Head; David Tuerck; and Paul Bachman. (2008). *The Federal Davis-Bacon Act: The Prevailing Mismeasure of Wages*. The Beacon Hill Institute.
- Goldfard, Robert and John Morrall III. (1981). "The Davis-Bacon Act: An Appraisal of Recent Studies," *Industrial and Labor Relations Review*, 34(2): 191-206.

THE IMPACT OF REPEALING WEST VIRGINIA'S PREVAILING WAGE LAW

- Harmon, Kim; Laura Barrett; Cynthia Jarrold; Karen Kelsey; and Stephen Boykewich. (2011). *The Road to Good Jobs: Making Training Work*. Transportation Equity Network.
- Holdren, Wendy. (2014). "Officials Weigh in on Prevailing Wage Laws." *The Register-Herald*. Citation of State Senator Bill Cole, R-Mercer.
- Kaboub, Fadhel, and Kelsay, Michael. (2014). "Do Prevailing Wage Laws Increase Total Construction Costs?" *Review of Keynesian Economics*, 2(2): 189-206.
- Keller, Edward and William Hartman (2001). "Prevailing Wage Rates: The Effects on School Construction Costs, Levels of Taxation, and State Reimbursements," *Journal of Education Finance*, 27(2): 713-728.
- Kelsay, Michael. (2016). (a). *The Adverse Economic Impact from Repeal of the Prevailing Wage Law in Missouri*. University of Missouri– Kansas City.
- Kelsay, Michael. (2016) (b). *An Economic Analysis of the Impact of Kansas Repeal of Prevailing Wage Statutes in Sedgwick County, Kansas and Wyandotte County, Kansas*. University of Missouri– Kansas City.
- Kelsay, Michael. (2015). *The Adverse Economic Impact from Repeal of the Prevailing Wage Law in West Virginia*. University of Missouri– Kansas City.
- Kim, Jaewhan; Chang Kuo-Liang; and Peter Philips. (2012). "The Effect of Prevailing Wage Regulations on Contractor Bid Participation and Behavior: A Comparison of Palo Alto, California with Four Nearby Prevailing Wage Municipalities," *Industrial Relations*, 51(4): 874-891.
- Leef, George. (2010). "Prevailing Wage Laws: Public Interest or Special Interest Legislation?" *Cato Journal*, 30(1).
- Mahalia, Nooshin. (2008). *Prevailing Wages and Government Contracting Costs*. Economic Policy Institute.
- Manzo IV, Frank and Kevin Duncan. (2018) (a). *The Effects of Repealing Common Construction Wage in Indiana: Impacts on Ten Construction Market Outcomes*. Midwest Economic Policy Institute; Colorado State University-Pueblo.
- Manzo IV, Frank and Kevin Duncan. (2018) (b). *Examination of Minnesota's Prevailing Wage Law: Effects on Costs, Training, and Economic Development*. Midwest Economic Policy Institute; Colorado State University-Pueblo.
- Manzo IV, Frank; Alex Lantsberg; and Kevin Duncan. (2016). *The Economic, Fiscal, and Social Impacts of State Prevailing Wage Laws: Choosing Between the High Road and the Low Road in the Construction Industry*. Illinois Economic Policy Institute; Smart Cities Prevail; Colorado State University-Pueblo.
- Minnesota Office of the Legislative Auditor (OLA). (2007). *Evaluation Report: Prevailing Wages*. Program Evaluation Division.
- Ohio Legislative Service Commission (LSC). (2002). *S.B. 102 Report: The Effects of the Exemption of School Construction Projects from Ohio's Prevailing Wage Law*. Staff Research Report No. 149.
- Onsarigo, Lameck; Alan Atalah; Frank Manzo IV; and Kevin Duncan. (2017). *The Economic, Fiscal, and Social Effects of Ohio's Prevailing Wage Law*. Kent State University; Bowling Green State University; Midwest Economic Policy Institute; Colorado State University-Pueblo.
- Philips, Peter. (2014). *Kentucky's Prevailing Wage Law: An Economic Impact Analysis*. University of Utah.
- Philips, Peter. (2013). *Mr. Rosaen's Magical Thinking: A Short Evaluation of Alex Rosaen's 2013 Prevailing Wage Methodology*. University of Utah.

THE IMPACT OF REPEALING WEST VIRGINIA'S PREVAILING WAGE LAW

- Philips, Peter. (2001) (a). *A Comparison of Public School Construction Costs: In Three Midwestern States that Have Changed Their Prevailing Wage Laws in the 1990s*. University of Utah.
- Philips, Peter. (2001) (b). *Four Biases and a Funeral: Dr. Vedder's Faulty Experiment Linking Michigan's Prevailing Wage Law to Construction Employment*. University of Utah.
- Philips, Peter; Garth Mangum; Norm Waitzman; and Anne Yeagle. (1995). *Losing Ground: Lessons from the Repeal of Nine 'Little Davis-Bacon' Acts*. University of Utah.
- Prus, Mark. (1999). *Prevailing Wage Laws and School Construction Costs: An Analysis of Public School Construction in Maryland and the Mid Atlantic States*. State University of New York– Cortland.
- Richard, Vedder. (1999). *Michigan's Prevailing Wage Law and Its Effects on Government Spending and Construction Employment*. Mackinac Center for Public Policy.
- Rosaen, Alex. (2013). *The Impact of Michigan's Prevailing Wage Law on Education Construction Expenditures*. Anderson Economic Group.
- Rosaen, Alex and Traci Taylor. (2015). *The Impact of Michigan's Prevailing Wage Law on Education Construction Expenditures: 2015 Update*. Anderson Economic Group.
- School Building Authority of West Virginia (SBA). (2017). *Analysis of Project Costs and Wage Rates Pre and Post Prevailing Wage Repeal*. March 2017.
- Sherk, James. (2015). *How the Common Construction Wage Affects the Cost and Quality of Construction Projects*. The Heritage Foundation.
- Vincent, Jeffrey and Paavo Monkkonen. (2010). "The Impact of State Regulations on the Costs of Public School Construction," *Journal of Education Finance*, 35(4): 313-330.
- Waehrer, Geetha; Xiuwen Dong; Ted Miller; Elizabeth Haile; and Yurong Men. (2007). "Costs of Occupational Injuries in Construction in the United States," *Accident Analysis & Prevention*, 39(6): 1258-1266.