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The Effect of Prevailing Wage Repeals on Construction Income and Benefits

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Abstract

While considerable research has examined the effects of prevailing wage law repeals on construction wages, little has been done on the repeals effect on benefits. Based on state-level data from the quinquennial Economic Census for construction from 1972 to 2012, we find that depending on sample and model specification, statewide annual average construction blue-collar income fell by 1.9% to 4.2%. Statewide annual average legally required benefits (social security, workers injury-compensation insurance, and unemployment insurance contributions) for blue- and white-collar construction employees combined fell from 3.8% to 10.1%. Statewide annual average voluntary benefits (primarily health insurance, pension contributions, and apprenticeship training) for blue- and white-collar construction employees combined fell from 11.2% to 16.0%. Because prevailing wage laws govern only blue-collar construction remuneration, blue-collar benefits probably fell more than blue- and white-collar benefits taken together.

Keywords

prevailing wage, repeal, benefits, construction, public works policy

Introduction

The status of state and federal prevailing wage laws (PWLs) governing the payment of blue-collar wages and benefits on public works is in flux. In recent years, Tennessee, Indiana, West Virginia, and Arkansas repealed their PWLs while as of the fall of 2017,

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Wisconsin and Michigan were considering repeal whereas Missouri recently refrained from repealing their state PWL (Bologna, 2017; Jones, 2017; Lingo, 2017; Oosting, 2017; U.S. Department of Labor, 2017a). Legislation in Congress has been introduced to repeal the federal PWL, the Davis Bacon Act (Richardson, 2017).

Previous research has established that state PWL repeals lower blue-collar construction wages within a state (Clark, 2005; Harris, Mukhopadhyay, & Wiseman, 2016; Kessler & Katz, 2001; Manzo, Bruno, & Littlehale, 2014; Philips, Mangum, Waitzman, & Yeagle, 1995; Price, 2005). In this journal, Harris et al. (2016) emphasized that while their research focused on wage effects, the effect of prevailing wage repeals on blue-collar benefits may be equally or more important. Petersen (2000) found that PWLs particularly enhance pension benefits in construction.

Benefits are an important part of total compensation not only for blue-collar workers themselves but also for the construction industry. The provisioning of family-friendly health, pension, and in some cases, vacation and training benefits, helps create and retain industry-specific human capital in an otherwise turbulent construction labor market where human capital accumulation can prove difficult (Andrietti & Hildebrand, 2016; Dorsey, 1995; Gustman & Steinmeier, 1993; Kim & Philips, 2010).

Benefits are an important part of blue-collar construction remuneration, and an important part of prevailing wage and benefit determinations as well. Voluntary benefits (as opposed to payroll taxes) comprise not only primarily employer-provided health insurance and pension contributions, but also often include training contributions and sometimes vacation pay. In 2017, the average federal (Davis Bacon) mandated wage and benefit for carpenters working on nonresidential federal buildings were US$25.88 and US$12.05, respectively. The average Davis Bacon mandated wage and benefit for laborers on these same projects were US$19.44 and US$9.10, respectively[1] (Index Mundi United States, 2017; U.S. Department of Labor, 2017b). The role of benefits in total mandated remuneration was similar on federal highway projects (47% of the mean carpenter-wage mandate), but lower on federal residential projects such as barracks (31% of the mean carpenter-mandated wage).

The Davis Bacon Act governs only federal projects. Many states have their own PWLs and the magnitude of benefits in state remuneration mandates can vary. For instance, in 2016, the mandated hourly wage for a Southern California carpenter on state and local public works was US$40.40 with an additional mandate of separately specified health, pension, vacation, and training benefits amounting to US$17.42 (43% of the wage). A Southern Vermont carpenter in 2016 was paid in benefits a specified percentage (42.5%) of their mandated wage. This turned out to be US$9.00 in addition to the mandated wage of US$21.17. The Wyoming mandated carpenter's wage was similar to Vermont's (US$21.55), but only US$2.60 in benefits were required (12% of the wage; California Department of Industrial Relations, 2017; Vermont Labor Market Information Service, 2017; Wyoming Department of Transportation, 2017). Overall, benefits under prevailing wages can range up from zero to levels that are substantial percentages of the wage, itself. Because voluntary benefits can be substantial relative to the wage, they can have an independent influence on worker behavior including the choice to remain in the industry through the inevitable sharp downturns that characterize construction.

PWLs governing public works can influence overall construction practices because federal and state public constructions make up a significant percentage of overall construction. Public construction as a percent of the total value of construction varies over the business cycle, but on average, over the period 2002 to 2012, federal construction accounted for 5.2% of total construction whereas state-and-local public works accounted for 17.9% of total construction (U.S. Economic Census, 1972-2012). Not all states have PWLs. In 2012, 32 states and the District of Columbia had PWLs. In these states, public works accounted for 15.8% of all construction that year. In contrast, state and local public works in states without PWLs accounted for 4.7% of all U.S. construction in 2012. Federal work in states without PWLs, but nonetheless covered by the Davis Bacon Act, accounted to 1.7% of all construction in the United States. Public construction covered by PWLs creates a two-way relationship. Prevailing wage surveys of private sector construction help determine prevailing wage mandates, but in turn, prevailing wage mandates reinforce local private sector labor standards and practices.

In this article, we use data from the quinquennial Economic Census beginning in 1972 for wages and 1977 for benefits. These data are currently published every 5 years up to 2012. We test the effects on state-level construction wages and benefits from 10 state repeals of PWLs over this time period (U.S. Department of Labor, 2017a) using feasible generalized least squares (FGLS) regression models with fixed state and year effects. We begin by describing our data and model. Then we provide two sets of regression estimates focusing first on wages and then on benefits. We conclude with comments regarding the implication of prevailing wage repeals for the accumulation and retention of blue-collar human capital in construction.

Data

Our data on state-level construction income, benefits, and workplace organization come from the U.S. Economic Census, construction previously known as the Census of Construction (U.S. Economic Census, 1972-2012), an establishment census which begins publishing payroll data in 1972 and benefit data in 1977. We supplement these data with information on state-level unemployment rates for all industries published by the U.S. Bureau of Labor Statistics from the household Current Population Survey and the Local Area Unemployment Statistics supplemented by the Bureau of the Census, Statistical Abstract of the United States for years in the 1970s (Iowa State University, 2016; U.S. Census Bureau, 1976 and 1979). State-level construction unionization rates come from the Current Population Survey as published by Barry T. Hirsch and David A. Macpherson (Hirsch & Macpherson, 1983-2016; earlier years from author communication).

Income and benefits are analyzed in real terms using 1982 dollars. Income per blue-collar construction worker and white-collar construction worker is calculated by dividing total construction-worker payroll and total other-worker payroll by annual average construction-worker employment and other-worker employment.

Total benefits paid in the Economic Census for construction is broken into legally required benefits (social security, worker injury-compensation insurance, and unemployment insurance) and voluntary benefits (health insurance, pensions, etc.). Unlike

income, benefit payments are not broken out between blue-collar and white-collar workers. Thus, we calculate each benefit type per employee but not per construction worker. We deflate both income and benefits using the consumer price index–urban (U.S. Bureau of Labor Statistics, 1972-2012).

The percent of work subbed out to subcontractors or subbed in from contractors are calculated by dividing the total value of work subbed out or subbed in by the value of construction work done with subcontracted work subtracted from the total value of construction work (net value of construction). The percent white-collar of all employees is calculated by dividing annual average employees who are not construction workers by total employees. Construction percent of the value of total business is the value of construction divided by the value of construction plus nonconstruction work done by the establishment. The percent union is for the construction industry within a state whereas the state unemployment rate is for all industries within a state. Employment is the total number of blue- and white-collar employees working in the construction industry by state per year. Establishments are places of employment. All observations are state level.

In contrast to most research on the effects of PWLs on remuneration, our data (a) are census rather than survey data which eliminates sample weighting problems associated with widely divergent state construction employment size, (b) have actual benefits paid which permits the examination of a significant, and from a human resource management perspective, strategic part of total remuneration, and (c) span the period 1972 to 2012 in the case of income, and 1977 to 2012 in the case of benefits, which permits the inclusion of all but the most recent 2015 prevailing wage repeals in Indiana and West Virginia. However, our data also present two challenges not faced by research using household surveys providing hourly wage rates. First, we must control for confounding effects on income associated with variations in the business cycle. We do this through the use of state unemployment rates and year indicator dummy variables. Second, we must tease out the effect of repeals on blue-collar benefits when we only have total benefits per employee as a dependent variable. This second problem is mitigated by the fact that prevailing wage mandates only affect blue-collar workers due to the fact that blue-collar workers account for from 70% to 85% of all construction employees. So presumably, if prevailing wage repeals negatively affect benefits per employee in construction, the path of this effect is primarily through affecting benefits per blue-collar worker in construction.

Table 1 describes our data where the level of observation is a state (including the District of Columbia) in a year (ranging from 1972 to 2012 every 5 years in our income models and 1977 to 2012 in our benefits models). Our focus variable is state repeals of PWLs measured by a dummy variable which equals 1 subsequent to each repeal in the 10 states that either repealed or annulled their law. These repeals account for 32% of all observations in the all-states sample. In 1982 dollars, white-collar construction workers earned, on average, US$23,867 per year whereas blue-collar construction workers earned US$17,632. Total benefit contributions per employee (both white and blue-collar workers combined) averaged US$4,258 with legally required benefit contributions averaging US$2,622 and voluntary benefit contributions averaging US$1,544. On

Table 1. Descriptive Statistics.

	M	Exp(*M*)	*SD*	Minimum	Maximum
Repeal = 1	0.32		0.50	0	1
Log of white-collar income	10.08	US$23,867	0.14	9.57	10.69
Log of blue-collar income	9.78	US$17,632	0.17	9.4	10.73
Log of benefits per employee	8.36	US$4,258	0.31	7.6	9.17
Log of legally required benefits per employee	7.87	US$2,622	0.21	7.29	8.63
Log of voluntary benefits per employee	7.34	US$1,544	0.54	6.29	8.66
Log of percent white-collar	3.09	22	0.22	2.27	3.55
Log construction percent of total business	4.58	97.6	0.02	4.46	4.60
Log of construction employment	11.09	65,608	1.03	8.70	13.68
Log of number of construction establishments	8.93	7,530	0.99	5.74	11.19
Log of percent subbed out	3.46	31.8	0.25	2.63	4.83
Log of percent subbed in	3.48	32.5	0.27	0.38	4.17
Log of state unemployment rate	1.79	6	0.34	0.85	2.73
Log of construction union rate	2.56	12.9	0.61	−0.11	3.64
Each state's percent of all observations		12.5			
Years in income regressions				1972	2012
Years in benefit regressions				1977	2012

Note. Income and benefits in 1982 dollars.

average, 22% of all employees were white-collar. On average, 97.6% of all the business done by construction establishments was construction work. On average, contractors subbed out 31.8% of their work and subbed in 32.5%. Average state construction employment was 65,608 and the average number of construction establishments was 7,530. The state overall unemployment rate across all industries averaged 6% whereas the average unionization rate in construction was almost 13%. This panel data was well balanced across both states and years.

Model

Our data are a long panel data set. In this context, it is helpful to use FGLS estimation which allows the use of first order autoregressive processes and permits the error terms in the model to be heteroscedastic. More specifically, this method produces panel and cross-section corrected standard errors specifying the error terms to be independent with a variance of $E(u_{it}^2) = \sigma_i^2$ that can be different for each state over time (Cameron & Trivedi, 2010). As error terms are possibly correlated and

observations could very well depend on previous periods in a longitudinal data, the use of FGLS estimations with heteroscedastic disturbances will address these distributional issues of cross-sectional correlations and variances as well as time series autocorrelations.

The equation for the FGLS is as follows:

$$Y_{it} = \alpha + B_1 X_{it}^1 + \cdots + B_k X_{it}^k + u_{it},$$

where heteroscedasticity and correlation across panels as well as autocorrelation within panels are allowed in the estimations. Hence, the equation for the error terms and the variance matrix of the heteroscedastic error terms take the following shape:

$$u_{it} = \rho_i u_{it-1} + e_{it},$$

$$\Omega = \begin{pmatrix} \sigma_1\Omega_{11} & 0 & \cdots & 0 \\ 0 & \sigma_2\Omega_{22} & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & \sigma_n\Omega_{nn} \end{pmatrix}.$$

In our analysis, the impact of repeal is focused on incomes and benefits of construction employees and thus, we have the following equations/models for the each dependent variable where income model could be applied to either blue- or white-collar incomes whereas legal and voluntary benefits have also been considered along with the total benefits under the benefits model:

$$\begin{aligned} \text{Log of Income}_{it} = {} & \text{Constant} + B_1 \text{Whether the state repealed the law or not}_{it} \\ & + B_2 \text{Log of White- or Blue-collar income}_{it} \\ & + B_3 \text{Log of percent white-collar workers}_{it} \\ & + B_4 \text{Log of construction percent of total business}_{it} \\ & + B_5 \text{Log of construction industry employment}_{it} \\ & + B_6 \text{Log of number of construction establishments}_{it} \\ & + B_7 \text{Log of percent subbed out}_{it} \\ & + B_8 \text{Log of state unemployment rate}_{it} \\ & + B_9 \text{Log of union rate}_{it} \\ & + B_{10} \text{Year dummy variables}_{it}, \\ & + B_{11} \text{State dummy variables}_{it} + \text{Error Term}. \end{aligned}$$

$$\begin{aligned}\text{Log of Benefits}_{it} = {} & \text{Constant} + B_1 \text{Whether the state repealed the law or not}_{it} \\ & + B_2 \text{Log of percent white-collar workers}_{it} \\ & + B_3 \text{Log of construction percent of total business}_{it} \\ & + B_4 \text{Log of construction industry employment}_{it} \\ & + B_5 \text{Log of number of construction establishments}_{it} \\ & + B_6 \text{Log of percent subbed out}_{it} \\ & + B_7 \text{Log of state unemployment rate}_{it} \\ & + B_8 \text{Log of union rate}_{it} \\ & + B_9 \text{Year dummy variables}_{it} \\ & + B_{10} \text{State dummy variables}_{it} \\ & + \text{Error Term.}\end{aligned}$$

Following the literature on the effect of prevailing wage repeals on blue-collar construction worker income, we include state dummy variables to capture relevant differences in state construction industries that are unchanging across the 1972 to 2012 period of analysis. However, these state dummies will be collinear with our focus repeal variable for all states that did not repeal or did not have a PWL over the period. It may be that the other state-level construction-related variables in the models are sufficient to capture the relevant differences between state construction industries without state dummy variables. So we repeat our models excluding the state dummies and provide corresponding results in Tables 2 through 7. This allows for a range of repeal estimates based on the inclusion or exclusion of these state dummy variables.

Results

Tables 2 through 7 present six results for models predicting income and benefits across three samples—all states, always-had-law and repeal states, and never-had-law and repeal states. The income models predict separately blue-collar income and white-collar income each time providing two specifications, one without state dummy variables and one with state dummy variables. The benefit models predict total benefits per capita, legal benefits, and voluntary benefits, each time providing two specifications, one without and one with state dummy variables. All models are FGLS panel data models predicting log of real per capita income or benefits using 1982 dollars. The dependent variables are logged values as are all the continuous independent control variables. Table 8 provides a summary of estimated coefficients for the focus variable, state PWL repeals.

We hypothesize that our focus variable, state repeals, will be negatively correlated with both blue-collar income and blue- and white-collar benefits (we cannot separate benefits by worker classification). Because prevailing wage mandates apply to blue-collar workers on construction sites but not the white-collar employees of construction

Table 2. FGLS Panel Data Models Predicting Log of Real Income Per Blue- and White-Collar Construction Worker (1982 Dollars).

	(1)	(2)	(3)	(4)
	BC income	WC income	BC income	WC income
Repeal	−0.0427***	−0.0000614	−0.0193**	−0.0150
	(–4.39)	(–0.01)	(–2.09)	(–1.25)
Log white-collar income	0.578***		0.429***	
	(15.36)		(12.13)	
Log blue-collar income		0.506***		0.490***
		(14.81)		(11.63)
Log percent white-collar	0.309***	−0.0714**	0.321***	−0.164***
	(9.43)	(–2.04)	(10.44)	(–4.44)
Log construction percent of total business	0.200	0.475	0.551**	−0.0593
	(0.67)	(1.56)	(2.26)	(–0.21)
Log construction industry employment	0.0316*	0.137***	0.176***	0.0323
	(1.90)	(8.52)	(6.93)	(1.13)
Log number of construction establishments	−0.0452**	−0.104***	−0.184***	0.0419
	(–2.57)	(–5.93)	(–6.79)	(1.34)
Log percent subbed out of net value construction	−0.0602***	0.0734***	0.000188	0.0114
	(–3.55)	(4.35)	(0.01)	(0.57)
Log state unemployment rate	0.00761	−0.0607***	0.00316	−0.0374**
	(0.60)	(–4.92)	(0.24)	(–2.55)
Log union	0.0762***	0.0128	−0.00344	−0.00566
	(9.53)	(1.63)	(–0.46)	(–0.68)
Constant	2.243	2.452*	1.660	5.418***
	(1.61)	(1.73)	(1.39)	(3.83)
State and Year dummies	Year	Year	Both	Both
n	407	407	407	407

Note. Data are for every 5 years from 1972 to 2012. Number of establishments and union rate are missing in 1972. Nebraska is missing in 1992 and Montana voluntary benefits are missing in 1977. State and year indicator variables included in the models are omitted from table. FGLS = feasible generalized least squares; BC = blue-collar construction workers; WC = white-collar construction workers.
*$p < .1$. **$p < .05$. ***$p < .01$.

contractors, we hypothesize that a repeal of PWLs will affect blue-collar construction worker incomes but not white-collar incomes. Consistent with this, we expect that the estimate of the repeal effect on total per capita benefits will be an underestimate because PWL repeals apply directly only to blue-collar workers.

Unlike other research on prevailing wage regulations which focus on repeal effects on hourly wage rates, due to the limitations of our data, we analyze repeal effects on annual income. To isolate repeal effects on income from business cycle effects, in all four models, we include year dummy variables which capture economy-wide differences in the business cycle over time and state unemployment rates (for all industries)

Table 3. FGLS Panel Data Models Predicting Log of Real Benefits Per Employee (1982 Dollars).

	(1)	(2)	(3)	(4)	(5)	(6)
	All benefits	Legal	Voluntary	All benefits	Legal	Voluntary
Repeal	−0.119***	−0.106***	−0.174***	−0.0486***	−0.0571***	−0.119***
	(–7.09)	(–7.73)	(–6.34)	(–2.90)	(–3.82)	(–4.22)
Log percent white-collar	0.521***	0.266***	0.922***	0.273***	0.113**	0.610***
	(8.13)	(5.13)	(8.59)	(4.72)	(2.42)	(6.16)
Log construction percent of total business	−0.852	−0.625	−1.045	−1.613***	−0.892**	−3.363***
	(–1.59)	(–1.43)	(–1.18)	(–3.60)	(–2.28)	(–4.59)
Log construction industry employment	0.130***	0.0843***	0.161***	0.185***	0.0622*	0.367***
	(4.83)	(3.46)	(3.79)	(3.91)	(1.68)	(4.64)
Log number of construction establishments	−0.116***	−0.0765***	−0.130***	−0.283***	−0.115***	−0.442***
	(–4.02)	(–2.86)	(–2.95)	(–5.49)	(–2.75)	(–5.25)
Log percent subbed out of net value construction	−0.000998	0.00176	−0.0227	0.0438	0.0154	0.0292
	(–0.03)	(0.07)	(–0.46)	(1.43)	(0.60)	(0.60)
Log state unemployment rate	−0.0133	−0.0399**	−0.0351	−0.0311	−0.0615***	0.00931
	(–0.55)	(–2.13)	(–0.86)	(–1.28)	(–3.16)	(0.23)
Log union	0.241***	0.135***	0.381***	0.0447***	0.0182*	0.0476*
	(15.59)	(11.98)	(14.42)	(3.07)	(1.70)	(1.67)
Constant	9.594***	9.222***	7.928*	14.82***	11.64***	20.26***
	(3.88)	(4.58)	(1.94)	(7.02)	(6.30)	(5.84)
State and Year dummies	Year	Year	Year	Both	Both	Both
n	407	407	406	407	407	406

Note. Benefits missing in 1972, NE is missing in 1992, and MT voluntary benefits are missing in 1977; number of establishments and union rate are missing in 1972. State indicator variables included in the models are omitted from table. Legal = all legal benefits; Voluntary = all voluntary benefits; FGLS = feasible generalized least squares.
*$p < .1$. **$p < .05$. ***$p < .01$.

Table 4. FGLS Panel Data Models Predicting Log of Real Income Per Blue- and White-Collar Construction Worker: Always Had Law and Repeal States Only (1982 Dollars).

	(1)	(2)	(3)	(4)
	BC income	WC income	BC income	WC income
Repeal	−0.0266**	0.00103	−0.00788	−0.00372
	(–2.38)	(0.10)	(–0.80)	(–0.29)
Log white-collar income	0.634***		0.522***	
	(16.67)		(14.26)	
Log blue-collar income		0.570***		0.594***
		(15.66)		(12.87)
Log percent white-collar	0.300***	−0.0751**	0.294***	−0.162***
	(9.06)	(–2.09)	(8.75)	(–4.08)
Log construction percent of total business	0.211	0.608**	0.283	0.268
	(0.78)	(2.02)	(1.10)	(0.91)
Log construction industry employment	0.00728	0.133***	0.0979***	0.0479
	(0.42)	(7.77)	(3.72)	(1.62)
Log number of construction establishments	−0.0202	−0.103***	−0.136***	0.0394
	(–1.11)	(–5.58)	(–4.85)	(1.20)
Log percent subbed out of net value construction	−0.0539***	0.0782***	−0.0170	0.0288
	(–3.21)	(4.48)	(–0.95)	(1.40)
Log state unemployment rate	0.0160	−0.0625***	0.000495	−0.0305**
	(1.24)	(–4.82)	(0.04)	(–2.05)
Log union	0.0725***	0.00803	0.00143	0.00315
	(8.44)	(0.95)	(0.18)	(0.33)
Constant	1.682	1.275	2.517**	2.645*
	(1.32)	(0.92)	(2.00)	(1.78)
State and Year dummies	Year	Year	Both	Both
n	335	335	335	335

Note. Data are for every 5 years from 1972 to 2012. Number of establishments and union rate are missing in 1972. NE is missing in 1992 and MT voluntary benefits are missing in 1977. State and year indicator variables included in the models are omitted from table. FGLS = feasible generalized least squares; BC = blue-collar construction workers; WC = white-collar construction workers.
*$p < .1$. **$p < .05$. ***$p < .01$.

which capture differences in regional business conditions across states within years. For simplicity of presentation, the state dummies (when applied) and year dummies (all models) results are omitted from the tables.

To further capture construction-specific economic conditions that may affect construction income, in models where we predict blue-collar construction income, we use

Table 5. FGLS Panel Data Models Predicting Log of Real Benefits Per Employee: Always Had Law and Repeal States Only (1982 Dollars).

	(1)	(2)	(3)	(4)	(5)	(6)
	All benefits	Legal	Voluntary	All benefits	Legal	Voluntary
Repeal	−0.0873***	−0.0686***	−0.158***	−0.0478**	−0.0389**	−0.132***
	(–4.33)	(–4.20)	(–4.89)	(–2.45)	(–2.28)	(–4.01)
Log percent white-collar	0.619***	0.329***	1.056***	0.288***	0.0917*	0.817***
	(9.02)	(5.85)	(9.72)	(4.31)	(1.68)	(7.36)
Log construction percent of total business	−0.495	−0.518	−0.387	−1.098**	−0.777*	−1.568**
	(–0.85)	(–1.08)	(–0.43)	(–2.27)	(–1.75)	(–2.16)
Log construction industry employment	0.105***	0.0600**	0.149***	0.102**	−0.0169	0.301***
	(3.69)	(2.39)	(3.55)	(1.99)	(–0.42)	(3.59)
Log number of construction establishments	−0.0912***	−0.0536**	−0.119***	−0.195***	−0.0604	−0.325***
	(–3.00)	(–1.97)	(–2.68)	(–3.41)	(–1.31)	(–3.55)
Log percent subbed out of net value construction	−0.00847	0.00475	−0.0107	0.0559*	0.0164	0.0655
	(–0.28)	(0.18)	(–0.22)	(1.74)	(0.57)	(1.36)
Log state unemployment rate	−0.0240	−0.0440**	−0.0553	−0.0305	−0.0791***	0.00446
	(–0.93)	(–2.23)	(–1.33)	(–1.20)	(–3.85)	(0.11)
Log union	0.268***	0.157***	0.405***	0.0489***	0.0276**	0.0661**
	(14.60)	(11.77)	(13.25)	(2.97)	(2.23)	(2.23)
Constant	7.737***	8.562***	4.544	12.55***	11.57***	11.09***
	(2.89)	(3.87)	(1.09)	(5.44)	(5.48)	(3.18)
State and Year dummies	Year	Year	Year	Both	Both	Both
n	335	335	334	335	335	334

Note. Benefits missing in 1972, NE is missing in 1992, and MT voluntary benefits are missing in 1977; number of establishments and union rate are missing in 1972. State indicator variables included in the models are omitted from table. Legal = all legal benefits; Voluntary = all voluntary benefits; FGLS = feasible generalized least squares.

*$p < .1$. **$p < .05$. ***$p < .01$.

Table 6. FGLS Panel Data Models Predicting Log of Real Income Per Blue- and White-Collar Construction Worker: Never Had Law and Repeal States Only (1982 Dollars).

	(1)	(2)	(3)	(4)
	BC income	WC income	BC income	WC income
Repeal	−0.0408**	−0.0126	−0.0288**	−0.0142
	(–2.51)	(–0.75)	(–2.34)	(–0.93)
Log white-collar income	0.390***		0.276***	
	(5.37)		(4.29)	
Log blue-collar income		0.350***		0.308***
		(4.90)		(3.69)
Log percent white-collar	0.310***	−0.140**	0.347***	−0.102
	(5.96)	(–2.17)	(7.33)	(–1.51)
Log construction percent of total business	1.281***	−0.942*	1.177***	−0.931*
	(2.76)	(–1.70)	(2.96)	(–1.70)
Log construction industry employment	0.188***	0.0998***	0.389***	0.0316
	(6.23)	(2.70)	(8.77)	(0.50)
Log number of construction establishments	−0.262***	−0.0330	−0.383***	0.0726
	(–7.60)	(–0.75)	(–8.93)	(1.16)
Log percent subbed out of net value construction	0.000712	0.00371	0.0386	−0.0338
	(0.03)	(0.12)	(1.22)	(–0.82)
Log state unemployment rate	−0.0536**	−0.0596**	−0.0000198	−0.0530*
	(–2.36)	(–2.52)	(–0.00)	(–1.82)
Log union	0.0462***	0.0364**	−0.00951	0.00952
	(2.81)	(2.40)	(–0.56)	(0.54)
Constant	−0.626	10.59***	−0.440	10.88***
	(–0.26)	(4.07)	(–0.21)	(4.19)
State and Year dummies	Year	Year	Both	Both
n	144	144	144	144

Note. Data are for every 5 years from 1972 to 2012. Number of establishments and union rate are missing in 1972. NE is missing in 1992 and MT voluntary benefits are missing in 1977. State and year indicator variables included in the models are omitted from table. FGLS = feasible generalized least squares; BC = blue-collar construction workers; WC = white-collar construction workers.
*$p < .1$. **$p < .05$. ***$p < .01$.

white-collar construction income as one explanatory variable. Conversely, in models where we predict white-collar construction income, we use blue-collar construction income as one explanatory variable. We expect that blue- and white-collar incomes are positively correlated with each other because there will be construction-specific economic factors within states and years such as construction product market conditions or yearly hours worked that will influence both blue- and white-collar incomes in the same direction.

We expect that blue-collar income will be positively correlated with the percent of all employees who are white-collar employees because white-collar employment

Table 7. FGLS Panel Data Models Predicting Log of Real Benefits Per Employee: Never Had Law and Repeal States Only (1982 Dollars).

	(1)	(2)	(3)	(4)	(5)	(6)
	All benefits	Legal	Voluntary	All benefits	Legal	Voluntary
Repeal	−0.123***	−0.0953***	−0.152***	−0.0705***	−0.0494**	−0.114***
	(–4.28)	(–3.95)	(–3.09)	(–3.17)	(–2.57)	(–3.00)
Log percent white-collar	0.305***	0.324***	0.392**	0.254***	0.303***	0.272**
	(3.48)	(4.54)	(2.26)	(3.39)	(4.69)	(1.99)
Log construction percent of total business	−2.265***	−1.372**	−3.261**	−2.202***	−0.814	−4.702***
	(–3.19)	(–2.52)	(–2.25)	(–3.54)	(–1.59)	(–4.25)
Log construction industry employment	0.214***	0.180***	0.245***	0.348***	0.265***	0.513***
	(4.41)	(4.29)	(2.79)	(5.29)	(4.59)	(4.37)
Log number of construction establishments	−0.286***	−0.251***	−0.316***	−0.472***	−0.311***	−0.734***
	(–4.93)	(–5.07)	(–2.98)	(–7.01)	(–5.30)	(–6.11)
Log percent subbed out of net value construction	−0.00697	0.0171	0.0456	−0.0216	0.0869**	−0.156*
	(–0.15)	(0.47)	(0.54)	(–0.45)	(2.16)	(–1.75)
Log state unemployment rate	−0.0288	−0.0396	−0.100	−0.0167	−0.00300	0.0145
	(–0.81)	(–1.37)	(–1.44)	(–0.41)	(–0.09)	(0.20)
Log union	0.104***	0.0745***	0.171***	0.0330	0.0307	−0.0116
	(4.25)	(3.90)	(3.94)	(1.22)	(1.44)	(–0.24)
Constant	17.50***	13.04***	20.40***	17.61***	9.838***	28.93***
	(5.25)	(5.10)	(3.00)	(6.04)	(4.10)	(5.58)
State and Year dummies	Year	Year	Year	Both	Both	Both
n	144	144	144	144	144	144

Note. Benefits missing in 1972, NE is missing in 1992, and MT voluntary benefits are missing in 1977; number of establishments and union rate are missing in 1972. State indicator variables included in the models are omitted from table. Legal = all legal benefits; Voluntary = all voluntary benefits; FGLS = feasible generalized least squares.
*$p < .1$. **$p < .05$. ***$p < .01$.

Table 8. Summary of the Percent Effect of State Prevailing Wage Repeals on Income and Benefits.

		(1)	(2)	(3)	(4)
		BC income	WC income	BC income	WC income
Sample size	State dummies	No	No	Yes	Yes
407	All states	**–4.18**	−0.01	**–1.91**	−1.49
335	Always had law and repeal states	**–2.62**	0.10	–0.78	−0.37
144	Never had law and repeal states	**–4.00**	−1.25	**–2.84**	−1.41

		(1)	(2)	(3)	(4)	(5)	(6)
		All benefits	Legal	Voluntary	All benefits	Legal	Voluntary
Sample size	State dummies	No	No	No	Yes	Yes	Yes
407	All states	**–11.22**	**–10.06**	**–15.97**	**–4.74**	**–5.55**	**–11.22**
335	Always had law and repeal states	**–8.36**	**–6.63**	**–14.62**	**–4.67**	**–3.82**	**–12.37**
144	Never had law and repeal states	**–11.57**	**–9.09**	**–14.10**	**–6.81**	**–4.82**	**–10.77**

Note. Statistically significant underlying coefficient estimates indicated by bolded percentages. The repeal variable takes the values 0 for no repeal and 1 for repeal. Given that the dependent variable is logged, the estimated coefficient for repeal is approximately a percentage divided by 100. The precise estimated percentage effect is (exp[coefficient] – 1) × 100. BC = blue-collar construction workers; WC = white-collar construction workers.

complements blue-collar productivity. In construction, white-collar employees include engineers, architects, project managers, and other construction professionals as well as clerical, legal, and accounting employees. We hypothesize that the greater relative presence of white-collar workers leads to higher value added blue-collar work and consequently, higher blue-collar income. At the outset, we were agnostic regarding the effect of the relative presence of white-collar workers on white-collar income; subsequent results suggest that there may be diminishing marginal productivity associated with increases in the percentage of white-collar workers within the overall construction contractor workforce.

In our benefit models, we cannot separate out blue-collar benefits from white-collar benefits. We expect that an increased white-collar percentage of all construction employees will lead to higher average benefits reflecting the need to retain white-collar workers through benefit incentives and the greater ease of paying benefits to white-collar workers who are more likely to be attached to the contractor's business.

We expect that the value of construction work as a percent of the contractor's entire business income will be positively correlated with construction blue-collar per capita income. The more central blue-collar work is to a contractor's business, the more likely will this workforce have accumulated human capital through training and experience. Controlling for the percent white-collar among a contractor's workforce, we expect that the greater the value of nonconstruction work is as a percentage of a contractor's total business, the lower will be benefits per capita for all employees, reflecting the presence of non-white-collar, nonconstruction workers within the contractor's labor force who may receive lower benefits relative to blue-collar construction workers.

We expect that greater average state construction employment will be positively correlated with both blue- and white-collar annual per capita income and benefits reflecting more urbanized and industrialized construction activity requiring greater skills while we expect that the state unemployment rate will be negatively correlated with both blue- and white-collar annual per capita income and benefits, reflecting available hours of work.

We expect that the percent union among all construction workers will be positively correlated with both income and benefits per capita for blue-collar workers. Although unionization in construction is a blue-collar phenomenon, unionization rates may positively affect white-collar income and/or benefits as contractors seek to maintain remuneration differentials within the firm.

We expect that contractor self-performance measured by subcontracting out as a percent of the value of construction netting out the value of subcontracting will have opposite effects on blue-collar compared with white-collar income. We expect that where a high percentage of all work is subcontracted out, competitive pressures created by multi-layered subcontracting will drive down blue-collar wages. Conversely, the demands of coordinating articulated systems of multi-layered subcontracting will require higher-paid white-collar workers to assemble and deploy this system of work. Extended subcontracting in construction is a special case of the extension of a detailed division of labor common in manufacturing which divides mental from manual work and increases the wages of mental workers while decreasing the wages of manual workers. Results for all these aforementioned control variables meant to capture construction-specific economic conditions that may affect construction income and/or benefits that are consistent with our expectations.

Table 8 derived from the estimated coefficients for our focus repeal variable in Tables 2 through 7 presents a summary of the repeal effects on income and benefit across the two specifications, three samples, and two models in the case of income and three models in the case of benefits. The repeal variable takes the values 0 for no repeal and 1 for repeal. Given that the dependent variable is logged, the estimated percentage effect is obtained with the following calculation: $(\exp[\text{coefficient}] - 1) \times 100$.

We expected and we find that prevailing wage repeals affect blue-collar incomes but not white-collar income. Although insignificant, nonetheless, in most cases, repeal effects on white-collar income are estimated to be negative. This may reflect a spillover effect on white-collar income associated with contractors maintaining income

differentials across occupations within the firm. In one instance (the always had plus repeal states subsample with state dummies), the blue-collar effect is negative but statistically insignificant. More generally, our estimates of repeal effects on income tend to be lower than what others find when examining repeal effects on wage rates. It may be that the wage rate effect is offset to some extent through contractors adapting to regulatory changes by substituting less skilled labor and employing them for longer hours. Our findings when statistically significant show a negative repeal effect on income ranging from 4.2% for the full sample and no state dummies to 1.9% for the full sample with state dummies.

The repeal effects on benefits are larger than the repeal effects on income. Table 8 shows a negative repeal effect on benefits in the full sample with no state dummies of 10% for legally required benefits and 16% for voluntary benefits. When state dummies are included, the legal benefit estimate is a negative 5.5% whereas the voluntary benefit effect is a negative 11%. The subsample estimates are similar.

The basic conclusions from these results are (a) both blue-collar income and overall benefits per capita are negatively affected by state PWL repeals; (b) white-collar income is much less affected by the repeal of this law that applies directly to blue-collar workers but there may be some spillover effect associated with effects to maintain traditional income differentials between blue- and white-collar construction workers; (c) in percentage terms, benefits are substantially more negatively affected by PWL repeals than is income; (d) voluntary benefits are more negatively affected by repeals compared with legally required benefits. Repeal-induced lower wage rates found in other research will tend to lower legally required benefits (social security, workers' compensation, and unemployment insurance) in a formulaic fashion. In contrast, voluntary benefits may be eliminated as well as reduced. The greater estimated effect of repeals on voluntary benefits may reflect, at least in some cases, the full elimination of health insurance, pensions, and apprenticeship training rather than the reduced contributions found in legally required benefits; and (e) the inclusion of state dummies fixed across the entire time period under study reduces the estimated effects of repeals by about half in the case of legally required benefits and by a bit less than a third in the case of voluntary benefits. Thus, the state dummy models are the more conservative estimates. However, prevailing wage repeals directly affect blue-collar workers and only indirectly and perhaps weakly affect white-collar worker benefits. Thus, the unavoidable aggregation of blue- and white-collar benefits in our data may lead to an underestimation of the true effect of repeals on blue-collar benefits. Thus, the more aggressive models that exclude state-fixed effects may, nonetheless, be the more accurate when balancing control variables for state differences in construction industry conditions against the aggregating of blue- and white-collar benefits together.

Conclusion

This research finds that subsequent to state-level PWL repeals, annual average voluntary benefit contributions paid by contractors—primarily for health insurance, pensions, and apprenticeship training contributions—on behalf of blue- and white-collar

construction employees combined, fell substantially—11% to 15% based on sample and specification. Because PWLs govern blue-collar workers only, it is probable that blue-collar voluntary benefits fell further. Previous research has shown that in construction, the provision of nonunion, nonportable health insurance increased the probability that a blue-collar construction worker would remain in construction over a 4-year period by 13% to 18% relative to a construction worker without health insurance. The provision of union health insurance portable across participating contractors increased worker retention within construction by 30% to 41% (Kim & Philips, 2010). Our findings here that the repeal of PWLs leads to a 12% decline in voluntary benefits—primarily health and pension benefits—suggest that a key implication of prevailing wage repeal may be a loss of human capital due to less retention of experienced workers. Future research may show that while lower remuneration due to repeals implies a loss incurred by blue-collar construction workers, the related loss of experienced workers may also pose a problem for contractors and owners.

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Note

1. Federal prevailing wage determinations are set by county and craft occupation. To calculate these averages, the carpenter and common laborer mandated wage and benefit for the largest and one medium-sized county in each state were selected. Thus, these are not averages weighted by the number of carpenters and laborers actually working on federal projects in early 2017.

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