Two Roads Diverge: Hidden Costs of the Low Wage Approach to Construction

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Misclassification and payroll fraud in US construction reduce income, property and payroll tax revenues. Construction activity emphasizing casual, low-skilled employment which extends layered subcontracting to small and sole-employee contractors, fosters payroll tax fraud and lowers income and property taxes paid by construction workers. Given their legal and economic vulnerability, we use undocumented construction workers as a proxy for both payroll fraud and misclassification. A 5 percentage point increase in the percent of undocumented workers—reduces income and property tax revenues by 17%. Because prevailing wage laws promote publically available payroll record keeping and government construction can account for 20% of all construction, we use the absence of prevailing wage laws as a facilitator of misclassification and tax avoidance. Controlling for other factors, in US construction, the absence of state prevailing wage regulations reduces income tax and property tax revenues from construction employment by 17%. The absence of state prevailing wage regulations reduces unemployment and worker compensation tax revenues by 9%. A doubling of the percent of all construction work subbed out, a proxy for layered subcontracting, results in a 12% drop in UI and worker comp tax revenues. Loss of income, property and payroll tax revenues hurts the public purse while reducing the construction industry's ability to manage unemployment and injury risks through workplace insurance.

Introduction

In the US, buffeted by turbulent demand, exposed to workplace dangers, pressured by casual and shapeup labor markets, populated by legally and economically vulnerable workers, undercut by noncompliant contractors engaging in worker misclassification and payroll fraud, yet needing substantial blue-collar human capital in order to build safely, correctly and on time, the construction industry develops along divergent paths with worker-attached, craft-oriented, well-remunerated jobs coexisting alongside casual, unskilled, and poorly paid work.

The prevalence of collective bargaining, prevailing wage regulations, and benefit-rich remuneration can encourage an emphasis on human-capital focused industry development and above ground business activity while the presence of unskilled, unorganized, and legally vulnerable workers, alongside overly extended levels of subcontracting, can foster the misclassification of workers as independent contractors, payroll tax avoidance and other forms of underground economic activity.

One result of underground competitive practices is a shortfall in income, property and payroll tax revenues. These shortfalls not only hurt the public purse, but also the construction industry, itself. Construction employment is both volatile and dangerous. Unemployment insurance (UI) and worker compensation insurance are key risk-management tools that help preserve both human capital and human beings in the construction industry. The loss of UI and worker compensation contributions makes it ever more difficult for the skill-emphasizing sector of construction to persist. The loss of human-capital-intensive construction, in turn, poses risks for other sectors of the economy which rely upon skilled and qualified construction workers and contractors to build their infrastructure.

In US construction, income and property tax revenues paid by blue collar workers and payroll taxes paid by contractors on their behalf vary based on whether construction is dominated by what is referred to

within the industry as high-road or low-road construction labor-management practices.[i] High-road practices emphasize human capital accumulation and worker attachment to the contractor or collective-bargaining contractor-group while low road practices emphasize a detailed division of labor with relatively more unskilled workers and more casual attachments between the contractor and most workers. Because high road contractors attempt to attach skilled and experienced workers to the firm or union-contractor group, these contractors often pay higher total remuneration packages with a greater proportion of remuneration in health and pension benefits relative to take-home pay. Because low road contractors tolerate casual labor attachments and a lesser skilled labor force, remuneration in this segment is lower with a greater portion of remuneration allocated to take-home pay. Within the low-road segment of US construction, some contractors also engage in misclassifying workers as independent contractors in order to avoid payroll taxes as well as other forms of payroll tax avoidance such as unreported cash payments. These practices are discouraged by the presence of collective bargaining and/or prevailing wage regulations. Collective bargaining and prevailing wage regulations require record keeping and provide oversight that discourage payroll tax fraud and other underground payment strategies.

Because low-road competitive strategies discourage human capital accumulation, workers in this construction sector earn less. Furthermore, to the extent that some of these relatively lower earnings come as unreported cash payments, lower income tax revenues from this segment can stem from both lower and less reported earnings. Thus, we expect to find both payroll and income tax revenues to be lower where low-road construction strategies dominate construction activity.

Payroll Tax Avoidance

Payroll taxes in construction are significant. Because construction work can be dangerous, worker compensation insurance premiums are high.[ii] Because construction is a volatile industry with an unemployment rate that typically is double the national average,[iii] unemployment insurance (UI) premiums also can be high.[iv] Consequently, in the US, payroll taxes are a substantial part of overall compensation in construction. Excluding social security and Medicare, in 2012, legally required benefits, primarily unemployment insurance and workplace injury insurance (Worker's compensation insurance) amounted to 5.6% of annual construction payroll. Including social security and Medicare, total payroll taxes in 2012, amounted to 13.3% of contractor direct payroll costs.[v] These tax costs create incentives for contractors to misclassify workers as independent contractors making them ineligible for unemployment or injury insurance and relieving the contractor from paying social security taxes.[vi]

Short-run competitive pressures to win construction bids, and the ever-present threat of a pyrrhic victory by inadvertently bidding under the true cost of the project, create before-bid and after-bid incentives to obtain profits or recoup looming losses through payroll tax avoidance.[vii] Business cycle pressures add to the tax avoidance pressures created by bid competition. Between 2007 and 2013 during the Great Recession, the number of construction contractors in the US fell by 17%.[viii] In the downturn of construction's turbulent business cycle, contractors facing insolvency due to inadequate demand adopt a range of survival tactics that may include payroll tax avoidance.

In regions or construction sectors where payroll tax avoidance becomes a common contractor strategy, competitive pressures may induce other contractors to adopt misclassification and cash payment tactics to remain competitive. These bid, business cycle and illegal-practice pressures can result in an

expanding informal sector of construction activity where collective bargaining, formal apprenticeship training and adherence to regulatory and tax requirements are uncommon.

The presence of undocumented immigrant workers increases worker vulnerability to misclassification and cash payments due to their lack of bargaining power, and the limited information and legal options undocumented workers may have.[ix]

Government construction is a significant sector of overall construction. Prevailing wage laws regulate the payment of wages and benefits on public works in jurisdictions that have these regulations. Federal construction is governed by the prevailing wage provisions of the Davis Bacon Act. State and local construction is governed by state prevailing wage laws in states that have adopted these regulations. Prevailing wage laws which govern federal construction and state construction where state prevailing wage laws exist, can influence tax compliance by promoting skill-using competitive strategies, collective bargaining and public payroll record-keeping on government projects. Over the years 1977 to 2012, the years for which we examine payroll taxes, 41 states plus the District of Columbia began with prevailing wage laws, 10 states eliminated their regulations over this period while one state enacted a prevailing wage.[x]

Prevailing wage laws promote human-capital intensive construction strategies by setting wages and benefits at levels that make using skilled workers a more effective competitive strategy on public construction while providing remuneration that makes remaining in construction and with a contractor or contractor-group more attractive. Skilled workers, due to their labor market bargaining power, are less susceptible to being misclassified as independent contractors when legitimately they are an employee. Skilled workers are also less susceptible to cash payment, failure-to-pay and failure-to-pay-overtime management strategies due to their relatively favorable labor market options. Both federal and all state prevailing wage laws require that on public works, contractors must maintain and make available payroll records that they certify to be correct. These prevailing wage requirements harmonize with the practice of also reporting worker incomes to tax authorities. Prevailing wage requirements on public works are potentially influential in promoting widespread legal contractor behavior because public construction in the US is a significant part of overall construction. Over the period 2002 to 2012, federal construction accounted for 5% to 7% of overall construction while state and local construction accounted from 17% to 23% of overall construction.[xi]

Income Tax Avoidance

Low-road contractor strategies directly reduce per capita income and property tax revenues by utilizing less-skilled, lower-paid workers. Indirectly, low-road strategies reduce per capita income tax revenues through misclassification of workers as independent contractors or unreported cash-pay. This, in turn, places the burden of reporting income on the worker while increasing the worker's direct burden for paying both the employer's and worker's share of social security and Medicare taxes. This creates incentives for workers not to report their income partially or entirely in order to avoid these taxes. Low-road strategies that entail unreported cash payments provides very strong incentives not to report this unrecorded income. While there are no direct measures of misclassification and unrecorded cash payments, the presence of vulnerable workers such as undocumented workers in construction make the likelihood greater that some contractors will exploit these vulnerabilities through misclassification and cash payments.

Literature Review

Weil argues that low wages, lack of benefits, failure to pay overtime, failure to pay at all, and exposure to a higher risk of job loss are labor market conditions that reflect and create vulnerable workers. Vulnerability stems, in part, from subcontracting, temporary employment, self-employment, third-party management and other forms of attenuating the worker-employer relationship. Vulnerability exposes workers to employer strategies aimed at avoiding payroll taxes while, in construction, prevailing wage laws, to some extent, offset these tendencies by mandating higher wages and more benefits on public construction. Immigrant and *a fortiori* undocumented-immigrant workers are especially vulnerable to payroll fraud.[xii]

Carre and Wilson, focusing just on misclassification in a study of Massachusetts construction, argued that competitive pressures put contractors that do not misclassify workers at a competitive disadvantage helping to proliferate the practice of misclassification. They also found that when contractors do misclassify, they do so for a significant segment of their construction crew, 40 percent on average. They discovered that both the prevalence (i.e. the number of contractors engaging in misclassification) and the severity (i.e. the percent of a contractor's labor force that were misclassified) increased over time in Massachusetts construction from the early 1990s to the early 2000s. As a consequence of misclassification, revenues from worker compensation, unemployment insurance and income taxes were all adversely reduced.[xiii]

Estimates of misclassification and off-the-books employment in US construction vary widely. For New York City, in 2005, the Fiscal Policy Institute estimated that 35% of residential construction employment and 24% of nonresidential construction employment were either misclassified or off-the-books.[xiv] In 2011, in California, it is estimated that 16% of all construction wage-workers were informally employed, that is, paid in cash or misclassified as an independent contractor. It is estimated that contractors were twice as likely to cash-pay and not report workers to tax authorities compared to inappropriately treating workers as bogus independent contractors.[xv] Other studies of the prevalence of misclassification in construction range from around 14%-15% for Maine, Massachusetts, Minnesota and New York to 30% in Virginia. Misclassification is estimated to cost from $2.6 million in lost state income taxes in Maine to $15 million in Illinois.[xvi]

The tax revenue loss from cash payments is less well studied because this form of noncompliance is difficult to measure. In 2012, it is estimated that the percent undocumented workers in construction ranged from less than 1% in Maine to 25% in Texas.[xvii] Roughly 50 percent of undocumented workers pay income taxes using social security or taxpayer identification numbers. Others not reporting directly to tax authorities may nonetheless have income taxes withheld from their paycheck.[xviii] This relatively low level of tax compliance suggests that the greater presence of undocumented workers in construction may indicate a more widespread use of unreported cash payments. While many states allow undocumented workers whose employers pay into the UI system to receive worker compensation benefits for injuries, unauthorized workers are not eligible to receive social security or any other means tested federal benefit including unemployment insurance benefits. This lack of eligibility may induce undocumented workers to accept cash payments allowing their contractors to avoid these payroll tax costs.[xix]

A 2013 study of the Texas construction industry estimated that 41 percent of all construction workers in Texas were either misclassified as independent contractors and/or these Texas workers were victims of

payroll fraud, and/or these workers were paid cash under-the-table. In addition, 22 percent of Texas construction workers interviewed reported, on occasion, being denied payment for their construction work while fifty percent reported not being paid overtime wage rates for overtime work. The study estimated that $7 billion in unreported construction wages occurred annually in Texas, and that the average under-the-table wage was $11.19.[xx] Dollar estimates of the tax loss from misclassification and cash payments in construction vary due to differences in the size of state construction industries, variation in the relative importance of misclassification versus cash payments, differences in state income and payroll taxes, and the inherent problems associated with measuring illegal behavior.

Prevailing Wage Laws and Construction Worker Vulnerability

High and low road construction exist side-by-side within any state's construction industry often with high-road construction dominating certain industry segments or areas within a state while low-road competitive strategies dominate in other segments or areas. Nonetheless, the predominance of high or low road construction can vary across states.

Table 1 shows selected an average of demographic characteristics of the construction labor markets over the period 2010 to 2014 in two sets of states—states without a state prevailing wage law and states with a state prevailing wage law during this period. (The federal prevailing wage law applies across all states on federal construction projects.) While blue-collar construction workers in prevailing wage law states were, on average, just 3 months older than construction workers in states without prevailing wage laws, the prevailing wage law states' construction workers were more likely to be married, less likely to be separated or divorced, more likely to own their home (with or without a mortgage), less likely to have failed to graduate from high school, more likely to have received at least some college education, more likely to receive a higher percentage of total compensation in voluntary benefits, more likely to have health insurance, more likely to receive that health insurance from their contractor, and less likely to have a physical or mental handicap, and less likely to be an undocumented worker or an independent contractor.[xxi] These divergences in family structure, home ownership, educational attainment, training, health status, pension/health benefits, and the extent of independent contractor activity and undocumented worker participation, all indicate divergent construction industry development and construction worker vulnerability across states. These divergences also indicate and reflect how US construction can differ in the relative importance of high-road and low-road construction contractor competitive strategies.

Data

Income and Property Tax Revenue

Data on income and property tax revenue are available from the Current Population Survey, as published by IPUMS. Included in the CPS is data on tax liabilities from federal and state income tax as well as any property tax liability. The values recorded for income and property tax are not based on direct survey responses but rather imputed by the Census Bureau. The Bureau uses a model which estimates the filing status of the individual using marital status and other demographic information available in the CPS. Income data, again from the CPS, is then combined with data from the Statistics of Income dataset published by the IRS using statistical matching to estimate the remaining information on capital gains, non-wage income, etc. needed to estimate federal and then state income tax. These data are then placed directly into the CPS dataset available from IPUMS.

Data on percent undocumented workers in the construction labor force is taken from the Pew Hispanic Center.[xxii] The data was published only in 2012, and is estimated using the CPS. While the Pew Hispanic Center's data are the most complete, other studies using actual surveys of the construction industry have reported significantly higher levels of undocumented workers in certain states. These surveys have not been conducted in every state nor is there any clear reason to think that these are more reliable than using CPS data and thus the Pew Hispanic Center's data is used in this paper.

Payroll Tax Revenue

Data on payroll tax revenue are available from an employer survey, the US Economic Census, Construction, for every 5 years from 1977 to 2012.[xxiii] This census reports information on the total value of business done, the amount of business subcontracted out, the amount of legally required benefits paid (i.e. payroll taxes), the amount of voluntary benefits paid (primarily pension and health care benefits but also including vacation, holiday pay and other minor benefits) as well as data on employment and wages. However, for our purposes in examining payroll fraud, employment and wage information are unreliable to the extent that contractors engaging in payroll fraud fail to report to the Census wage payments or employment not reported to the tax authorities. However, we assume that contractor reporting to the Census of the value of business done and the value of business subcontracted are not significantly under-reported due to fraudulent business strategies. Alternatively, we may simply assume that under-reporting business activity is not as common as under-reporting employment and wages. We further assume that actually paid payroll taxes are accurate, and also that actually paid voluntary benefits are accurate. We are unaware of incentives to under-report actually paid benefits.

We combine these with Census data information regarding unionization rates and the percent Hispanic among all construction workers from the Current Population Survey. The percent Hispanic is a proxy for the percent undocumented among construction workers; this being the only available proxy spanning the entirety of our time period.

Findings

Income and Property Tax Revenues

Table 2 describes the sample data used in analyzing income and property tax revenues from construction blue-collar workers in relation to variation in high and low road construction activity across states over the period 2007 to 2011 controlling for income and property tax revenues paid by others outside of construction.

In this sample 1) 63% of the states were governed by prevailing wage regulations, 2) 32% of all construction contractors were contractors with no employees, and 3) 8.4% of the construction blue-collar labor force including the self-employed was undocumented. The mean annual construction employment within a state was 219,000 which includes both employees and the self-employed, full and part-time workers.

Per capita data are not shown in Table 2. However, the mean per capita annual tax burden including federal and state income taxes as well as property taxes for blue collar construction workers was $5,694 compared to $9,092 for all other blue and white collar workers outside of construction. On average, the construction worker's tax burden was divided 56% to federal income taxes, 17% to state income taxes

and 27% to property taxes. The division of tax burden for all others was 62% federal, 17% state and 21% property taxes. The average construction worker wage rate was 111% of the average hourly wage rate within the state.

Table 3 shows four random effects linear regression models predicting income and/or property tax revenues. In models 1 and 2 for total income and property tax revenues and federal income tax revenues, both the Hausman and Mundlak tests permit the use of random effects models. However, results from the Hausman and Mundlak tests do not permit random effects for models 3 and 4—models for state income and property tax revenues. We nonetheless report the results of these models for two reasons: first, the alternative fixed effects model cannot include prevailing wage law effects because no state changes in state prevailing wage regulation occurred during the period under study. Consequently, any prevailing wage effect gets subsumed with all other time invariant effects in the year indicator variables. Second, regardless of the issues of consistency and efficiency addressed with the Hausman and Mundlak tests, the estimated coefficients for property taxes in model 4 are essentially consistent with the findings in models 1 and 2. We therefore include this result to show that consistency and include the state income tax model 3 for completeness. In assessing our results, we emphasize models 1 and 2 where the Hausman and Mundlak tests permit random effects modeling.

In Model 1 of Table 3, the dependent variable is the log of total federal and state income taxes plus property taxes paid by blue collar construction workers. Total taxes paid by others within a state are placed in the model as a control variable along with the lowest state income tax rate for each state. Seven states did not have state income taxes during the period of this study. Year indicator variables are placed in the model to control for nation-wide annual changes in tax payments most notably the effects of the Great Recession which dominated the period of our analysis after 2008 relative to our start year of 2007. The Great Recession's largest impact on tax revenues was a reduction of almost 22% in 2009 compared to 2007.[1]

Our focus variables are designed to measure variations in high-road and low-road construction practices across state and time periods. The two focus variables measuring low-road construction activity are 1) the percent of all construction establishments that are independent contractors—namely contractors without employees—and 2) the percent of all blue collar construction workers within a state who are undocumented.

Data on contractors without employees are derived from annual or quarterly business income tax returns for construction firms without employees.[xxiv] These data will include both legitimate and bogus independent contractors for all independent contractors whose income is reported. The prevalence of both legitimate and bogus independent contractors in construction captures two aspects of the low-road economy—misclassification and highly layered subcontracting. Misclassification and articulated subcontracting exploit the presence of and promote the use of unskilled, and thus lower-paid workers while creating and corresponding to circumstances where fewer business records are carefully kept and unreported cash payments are more common.

Model 1 in Table 3 shows that a doubling of the percent of all workers who are independent contractors leads to a 43% decline in total income and property tax revenues from the construction industry. This is

[1] The formula for interpreting 0-1 indicator variables where the dependent variable is a log is (EXP(coefficient)-1)*100

due both to lower incomes going to independent contractors and less income reported to tax authorities.

Data on the percent of undocumented workers within a state's construction labor market is a measure of lower incomes due to both skill and legal limitations, and lower reported incomes due to worker vulnerabilities to contractor underground economy payment strategies, and also perhaps to a willingness of unauthorized workers to accept unreported cash payments given their ineligibility for most payroll tax benefits. Model 1 in Table 3 indicates that a one percentage point increase in the percent undocumented among all construction workers leads to a 3.5% drop in total tax revenues. In our sample, the percent undocumented within a state construction labor market ranges from 0 to 25 percent with the 25th percentile at 2 percent and the 50th percentile at 7 percent and the 75th percentile at 14 percent. Model 1 in Table 3 indicates that as the percent undocumented moves from the 25th to the 50th, total income and property tax revenues fall by 17%, and as the percent undocumented rises from the 50th to the 75th percentile, total income and property tax revenues fall by another 24%. These substantial declines in income and property tax revenues derived from construction activity reflect both lower incomes and lower reported incomes common to the low road segment of construction

In contrast, high road construction promotes income and property tax revenues both through high construction worker incomes and greater compliance with record keeping and income reporting to tax authorities. Model 1 in Table 3 indicates that the presence of prevailing wage regulations is associated with a 16.8% increase in total income and property tax revenues from the construction workforce.

Higher hourly wage rates in construction relative to other industries within a state and year is an index of the prevalence of high road construction within a state. Model 1 in Table 3 finds a positive relationship between the log of the ratio of construction wages to all other wages but this result is not statistically significant. Indeed, in the subsequent models 2 through 4, this variable is never statistically significant and in the case of property taxes, it has an unexpected negative estimated relationship. We nonetheless include this variable in the model to control for the possibility that variations in income and property tax revenues in construction controlling for the revenues stemming from other sectors within a state's economy may be due to variations in construction wages relative to other wages within a state.

In Models 2 through 4 in Table 3, we disaggregate tax revenues by type—federal income tax revenues, state income tax revenues and state property tax revenues, our findings are similar to Model 1's total tax revenues for federal income and state property tax revenues. However, our findings for state income tax revenues differ for two focus variables: the negative effect of undocumented workers is much stronger on state income taxes while estimate for the presence of prevailing wage laws is statistically insignificant. We attribute these surprising results to the fact that within our sample, 7 states did not have state income taxes and the observations for these states were therefore dropped from this model. We are encouraged in this interpretation that Model 4 reporting results for state property tax revenue where we have all 50 states included generates results similar to the aggregate and federal tax revenue models 1 and 2.

Payroll Tax Revenues

Table 4 describes the sample data used in analyzing payroll tax revenues in relation to variation in high and low road construction activity across states. Over the period of analysis, 1977 to 2012, across states, 1) 68% of the states were governed by prevailing wage regulations, 2) 36% of construction work

was subbed out, 3) 15% of all construction employees (blue and white collar together) were unionized, and 4) 10.5% of the construction blue collar labor force was Hispanic.

In Model 1 of Table 5, the dependent variable is the log of total payroll tax revenues by state and year. We assume that the payroll taxes reported to the Census correspond to the payroll taxes actually paid by contractors. We are encouraged in this assumption by the fact that the Census asks for the employer identification number that the contractor uses in reporting to the Internal Revenue Service.[xxv] This does not mean that there is no payroll tax fraud or misclassification. This assumption simply means that, in terms of what the contractor reported to the Census corresponds to what the contactor actually paid to the tax authorities.

In the models in Table 5, fixed effects control for differences among states that are invariant across the years of our analysis while year indicator variables control for factors common to all states that vary from period to period. In Model 1, as the volume of state construction contractor business doubles, total payroll tax revenues rise by 81%. This elasticity suggests that factors other than business activity alone influence variation in payroll taxes paid.

Model 2 in Table 5 restricts tax revenues to unemployment and worker compensation insurance contributions. The Economic Census for Construction does not itself, disaggregate legally required payroll taxes into its components. However, by multiplying total payroll times the federally set employer's social security and Medicare tax rates, we calculate the amount of total contractor payroll taxes allocated to social security and Medicare. The residual is the amount allocated jointly to unemployment and worker compensation insurance premiums. This procedure assumes that the payroll reported to the Census corresponds to the payroll reported to tax authorities and on which, payroll taxes were paid.

Misclassifying subcontractors weakens construction risk management

Model 1 indicates that a doubling of the percent of construction subbed out within a state leads to a 13.5% decline in total payroll taxes. Model 2 indicates that a doubling of the percent of construction subbed out within a state leads to a 11% decline in UI and worker compensation insurance tax payments. Thus, increased subcontracting is associated with a loss of payroll taxes and a loss of investment in risk management for the construction industry. Construction is a volatile and dangerous industry. Some subcontracting is designed to mitigate these risks by assigning work to specialist subcontractors better able to handle them. But extending subcontracting tof layers of illegitimate independent contractors harms two important risk-management systems in construction—worker compensation and unemployment insurance funds.

Subcontract layering can eliminate payroll taxes by eliminating wage work, itself. To the extent that subcontracting is extended into transforming actual wage workers into illegitimate independent contractors, this will reduce payroll taxes directly by eliminating unemployment and worker compensation coverage for these newly designated independent contractors. Typically, this payroll tax loss is not offset by independent contractors purchasing their own unemployment or injury insurance.

In most states, independent contractors can purchase unemployment insurance if they have incorporated and declared themselves the sole employee of their corporation. They then contribute to an unemployment insurance fund on their own behalf.[xxvi] Legitimate long-time independent contractors

in construction may do this. However, when it is the contractor who decides on a particular job that a construction worker is an independent contractor, that worker is unlikely to have previously gone through the procedures to incorporate. In these cases, insurance against the risk of unemployment disappears.

Independent contractors can also purchase worker compensation insurance.[xxvii] However, this is also unlikely when it is the contractor's decision to make the worker an independent contractor. Construction workers who find their status switching from worker to independent contractor and back to worker again at the behest of various employers are not likely to purchase worker compensation insurance intermittently. Thus, as a practical matter, when ad hoc wage workers are illegitimately transformed into independent contractors, the volatile and dangerous construction industry loses the risk management investment represented by the loss of UI and worker compensation payroll tax contributions.

Layered subcontracting can induce payroll fraud

Subcontract layering can also induce cash-payment, failure-to-pay and other forms of payroll fraud. To the extent that subcontracting assigns more work to smaller contractors, it may shift work from larger, high-road contractors better positioned to attach workers to the firm or collective-bargaining group to contactors with smaller and more casually attached work crews. Casual attachment can tempt contractors to illegal payment strategies including failure-to-pay, failure-to-pay overtime and unreported cash-payments. Contractors that attempt to attach construction workers tend to pay wages and benefits designed to induce attachment. Contractors that tolerate casual attachment are more likely to engage in wage fraud as circumstances require.

Labor attachment strategies promote compliance with payroll tax requirements

Model 1 indicates that (controlling for the amount of business activity) a doubling of value of voluntary benefits within the construction industry of a state leads to a 13% increase in total payroll tax revenues. Model 2 indicates that a doubling of voluntary benefits leads to a 14% increase in UI and worker compensation insurance tax payments. Thus, increased voluntary benefits is associated with a gain in payroll tax revenues.

Contractors choosing to pay voluntary benefits either as an independent calculation or in compliance with a collectively bargained agreement are engaging in an effort to attach workers to the firm or collective-bargaining group. Attachment promotes the accumulation of human capital through both training and experience which in turn, promotes labor and contractor productivity. Employer provided health insurance and pension contributions help lock workers to the firm or group of firms. Portability of benefits across contractors through the agency of a collectively bargained contract attaches workers even more strongly within that group.[xxviii] Engaging in payroll fraud or misclassification runs counter to this attachment strategy and risks losing the value to the contractor of paying voluntary benefits in the first place. Thus, high-road contractors emphasizing human capital within their construction crews are less motivated to rob themselves or the public purse by robbing their workers through payroll fraud or misclassification.

Underground economy reduces payroll taxes but our measure of this effect is not statistically significant

Underground economic activity is difficult to measure directly. In both models, percent Hispanic is used as a proxy for the underground economy. Underground construction activity will thrive where workers are economically and/or legally vulnerable due to lack of skills or legal status. Better proxies would include the percent undocumented or the percent foreign born workers in construction. Unfortunately, the Current Population Survey we use only consistently records Hispanic origin back to the beginning of our analysis in 1977. Model 1 indicates that a 1 percentage point increase in the percent Hispanic within a state construction workforce leads to a 0.1% decrease in total payroll taxes. Model 2 indicates that a 1 percentage point increase in the percent Hispanic within a state construction workforce leads to a 0.2% decrease in worker comp and unemployment insurance tax revenues. While the direction of these effects are as expected, neither estimate is statistically significant and the magnitude of these effects is smaller than expected. We attribute this lack of statistical significance to the fact that percent Hispanic in construction is an admittedly rough proxy for the extent of the underground construction economy.

Collective bargaining encourages tax compliance

Model 1 indicates that a doubling of the percent union among all construction workers within a state leads to a 1% increase in total payroll tax revenues. Model 2 indicates that a doubling of unionization leads to a 3% increase in UI and worker compensation insurance tax payments. Only the union effect on unemployment insurance and worker comp premiums is statistically significant.

We expect that the practice of collective bargaining in US construction will increase payroll tax revenues for two reasons. First, collective bargaining encourages and facilitates the use of skilled labor by promoting apprenticeship training and providing wages and portable benefits that help retain trained workers. Engaging in payroll fraud and misclassification nullifies many of the contractor benefits embedded in collectively bargained labor-management practices.

Second, collective bargaining puts in place systems to monitor the payment of remuneration including not only local union officials that provide avenues of redress, but also health and pension fund officials who track participating worker hours and contributions while monitoring contractor compliance with commitments to these benefit funds. Furthermore, union hiring halls dispatch workers to contractors providing an additional mechanism for tracking worker activity and pay.

Prevailing wage regulations increase payroll tax revenues

Model 1 indicates that the presence of prevailing wage regulations for public construction within a state leads to a 4.8% increase in total payroll tax revenues. Model 2 indicates that these regulations lead to an 8.6% increase in UI and worker compensation insurance tax payments.

Prevailing wage laws inoculate public construction from underground construction activity by setting wages and benefits on public works, and providing record keeping requirements with oversight and compliance mechanisms. Thus, similar to collective bargained contracts, but applying to both union and nonunion contractors on public works, the public procurement contract signed by the winning contractor and applicable to that winning contractor's subcontractors sets remuneration practices that discourage payroll fraud. One such deterrent is the common knowledge among workers of what the prevailing wage is which they can compare to what they are actually paid. A second deterrent derives from the role of prevailing wage regulations in fostering skilled construction crew strategies through uniform and often relatively high wage standards. This then tends to populate public construction crews

with skilled workers who have sufficient labor market options to allow them to resist underground tactics such as failure to pay or failure to pay overtime.

Limitations

Studies examining illegal behavior in labor markets necessarily face measurement problems. We faced two. First, how can we effectively use business data to predict variation in taxes paid when efforts to avoid those taxes may include a falsification of business records? Second, how can we measure the prevalence of underground economic activity that by its nature is illegal? We sought to solve the first dilemma by not using business payroll and employment data, instead focusing on business revenues and voluntary benefits data. We theorized that contractors are less likely to falsify their business revenue data and unlikely to falsify benefit expenses they voluntarily paid. We sought to address the second dilemma of the presence of exploitive, underground, labor-remuneration strategies by measuring the presence of vulnerable undocumented workers presuming that they are the most likely to be exposed to such activity. While in our view, these are reasonable proxies, future research may provide more accurate measures of illegal contractor practices in construction.

While this study focused on the effects of low-road construction activities on tax revenues, there remains the question of the relationship between high-road vs. low-road construction and the payment of welfare benefits to construction workers and their families. Future research is needed to explore this issue.

Conclusions

Construction payroll fraud, including misclassification and cash payments, reduces tax revenues and handcuffs the construction industry's efforts to manage and mitigate the risks of injury and unemployment endemic to construction. By omitting these costs, payroll fraud and cash practices also interfere with the efficient allocation of construction services by failing to internalize the true costs of construction into the cost of bids. Additionally, payroll fraud in its many forms promotes low road construction activity which, in turn, undercuts human capital formation in construction by promoting casual labor attachment to the industry and by reducing incentives for either workers or contractors to invest in industry specific training. Payroll fraud has a substantial negative effect on tax revenues. WE use the presence of undocumented workers, independent contractors and the absence of prevailing wage regulations as measures of low-road construction environments that tolerate and promote payroll fraud. Regulating public construction with prevailing wage laws by both encouraging above ground construction activity and the use of skilled workers increases income tax and property tax revenues by 17%. In contrast, a 5 percentage point increase in the percent of undocumented workers reduces income and property tax revenues by 17%. The absence of state prevailing wage regulations reduces unemployment and worker compensation tax revenues by 9% while a doubling of the percent of all construction work subbed out results in a 12% drop in UI and worker comp tax revenues. Among other benefits, promoting high road construction practices results in greater tax compliance, treat compliant taxpayers fairly, supports government budgets, and leads to more efficient allocation of construction services.

Table 1: Selected characteristics of construction labor markets in states with and without prevailing wage laws[xxix]

	no law	PW law	reflection ratio
age	42.21	42.51	1.01
ownership of home	64.4	68.0	1.06
married spouse present	52.6	55.4	1.05
separated or divorced	15.3	13.1	0.86
<high school	22.2	19.2	0.86
high school	53.4	54.6	1.02
>high school	24.3	26.2	1.08
any health insurance	62.1	71.6	1.15
voluntary benefits as a percent of wages paid*	13.2	16.6	1.26
apprenticeship assets per worker**	182	550	3.02
health insurance from employer	41.5	51.3	1.24
cognitive difficulty	2.1	1.8	0.86
ambulatory difficulty	2.6	1.9	0.73
independent living difficulty	1	0.8	0.80
self-care difficulty	0.500	0.500	1.00
vision or hearing difficulty	4.2	3.6	0.86
vision difficulty	1.6	1.2	0.75
hearing difficulty	3	2.7	0.90
percent undocumented	8.8	8.2	0.93
percent undocumented*** [1]	9.3	7.7	0.83
percent independent contractor	33.3	32.3	0.97
percent independent contractor**** [1]	35.6	30.2	0.85
training assets per worker in construction	$182	$548	3.01

[1] limited to states with average or strong prevailing wage laws vs. weak or no laws[xxx]
All data from the American Communities Survey 2010-2014 except
*from 2012 Economic Census, Construction
** from IRS form 990s
*** from PEW Hispanic Trust
**** from Nonemployer Statistics

SEE C:\Users\Lenovo2016\Dropbox\Public\Dave\Peter April 19 regression table and descriptive statistics

LINES 37-92 and

C:\Users\Lenovo2016\Dropbox\Public\Dave\Peter April 17 regression table and descriptive statistics

LINES 27 – 108 also excel file acs DESCRIPTIVE STATS HIGH ROAD LOW ROAD in same directory

Table 2: Describing sample data for the analysis of income and property per capita tax revenues

Descriptive Statistics

	count	mean	sd	min	max
pw law*	255	0.63	0.48	0.00	1.00
log(WAGEcon/WAGEst)	245	0.10	0.11	-0.32	0.42
con-wage/overall wage	245	1.11	0.12	0.73	1.53
log(pct independent contractors)	255	3.43	0.34	2.04	4.19
pct independent contractors	255	32.64	10.40	7.70	66.03
pct undocumented	255	8.39	6.86	0.00	25.00
log construction employment	255	11.80	1.03	9.13	14.21
construction employment	255	219326	250591	9195	1482976
log total con-all-taxes	255	19.76	1.10	16.66	22.15
total con-all-taxes	255	6.63e+08	7.45e+08	17220240	4.17e+09
log federal con income tax	255	19.17	1.09	16.02	21.59
federal con income tax	255	3.64e+08	4.05e+08	9056989	2.39e+09
log state con income tax	218	17.95	1.52	10.32	20.64
state con income tax	255	1.07e+08	1.43e+08	0.00	9.20e+08
log property con-tax	255	18.33	1.26	15.10	20.97
property con-tax	255	1.92e+08	2.53e+08	3614232.	1.27e+09
log tot nonC all taxes	255	23.23	1.10	20.92	25.81
total nonC all taxes	255	2.19e+10	2.70e+10	1.21e+09	1.62e+11
log total nonC federal tax	255	22.75	1.08	20.71	25.31
total nonC federal tax	255	1.34e+10	1.61e+10	9.88e+08	9.83e+10
log total nonC state tax	219	21.44	1.35	16.33	24.19
total nonC state tax	255	3.50e+09	5.32e+09	0.00	3.21e+10
log total nonC property tax	255	21.61	1.20	19.02	24.24
total nonC property tax	255	4.98e+09	6.67e+09	1.81e+08	3.37e+10
lowest tax rate	254	2.18	1.71	0.00	6.00

*Tennessee's weak prevailing wage law coded as no-law. AK FL NV SD TX WA and WY did not have state income tax. “nonC” means non-construction; “con” means construction

Table 3: Linear Regression Models of Log of Income and Property Tax Revenues per Construction Worker

Predicting Log of Total Construction Tax Revenues

	(1) Total Tax Revenues	(2) Federal Income Tax	(3) State Income Tax	(4) Property Tax
pw law*	0.155**	0.152**	-0.0759	0.138*
	(2.37)	(2.43)	(-0.65)	(1.71)
log(WAGEcon/WAGEst)	0.162	0.494	0.789	-0.416
	(0.45)	(1.38)	(1.08)	(-0.98)
log(% independent contractors)	-0.429***	-0.384***	-0.735***	-0.456***
	(-4.79)	(-4.06)	(-4.40)	(-4.28)
pct undocumented	-0.0341***	-0.0275***	-0.0471***	-0.0320***
	(-5.20)	(-4.22)	(-3.26)	(-4.04)
log construction employment	0.604***	0.740***	0.0596	0.350***
	(6.85)	(7.84)	(0.72)	(4.52)
log tot nonC all taxes	0.471***			
	(5.37)			
log tot nonC federal tax		0.306***		
		(3.26)		
log tot nonC state tax			1.050***	
			(16.35)	
log tot nonC property tax				0.752***
				(11.36)
low tax rate	0.00764		0.00990	
	(0.44)		(0.30)	
2007.year	0	0	0	0
	(.)	(.)	(.)	(.)
2008.year	-0.0575	-0.102	-0.0601	0.0506
	(-1.08)	(-1.48)	(-0.66)	(0.81)
2009.year	-0.198***	-0.318***	-0.267***	-0.00314
	(-3.72)	(-4.65)	(-2.94)	(-0.05)
2010.year	-0.114**	-0.177**	-0.153*	-0.0246
	(-2.08)	(-2.55)	(-1.70)	(-0.37)
2011.year	-0.0358	-0.0776	-0.0627	0.0260
	(-0.64)	(-1.10)	(-0.69)	(0.39)
_cons	3.414***	5.034***	-2.287**	-0.259
	(3.20)	(4.41)	(-2.10)	(-0.32)
N	244	245	213	245

note: panel data by state and year 2007 to 2011; random effects models *Tennessee's very weak law in 2012 is coded as no-law. AK FL NV SD TX WA and WY did not have state income tax.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ *t* statistics in parentheses

Table 4: Describing sample data for the analysis of payroll tax revenues

Descriptive Statistics

	count	mean	sd	min	max
log payroll taxes	407	12.37	1.23	9.12	15.57
payroll taxes ($1000)	407	474860	657675	9127	5751971
log UI-worker comp taxes	407	11.65	1.23	8.41	14.72
UI-worker comp taxes ($1k)	407	228618	316339	4477	2469244
law	407	0.68	0.47	0.00	1.00
log voluntary benefits	406	11.85	1.46	8.11	15.64
voluntary benefits ($1000)	407	372150	638904	0.00	6185737
log unionization rate	407	2.56	0.61	-0.11	3.64
union rate	407	15.12	7.68	0.90	38.20
log pct work subbed	407	3.56	0.25	2.73	5.08
pct work subbed out	407	36.40	11.43	15.35	160.86
pct Hispanic	408	10.52	14.38	0.00	65.15
log value of business done	407	15.90	1.25	12.76	19.19
business done ($1000)	407	16615959	24042894	346649	2.16e+08
year	408	1994.50	11.47	1977	2012

Table 5: Predicting Log of Total Payroll and UI-Worker Compensation Tax Revenues

P Predicting Log of Total Payroll Tax and UI-Worker Comp Tax Revenues

	(1) total payroll tax revenues	(2) ui-comp tax revenues
law	0.0464**	0.0829**
	(2.31)	(2.40)
log voluntary benefits	0.130***	0.137***
	(5.62)	(3.45)
log unionization rate	0.00857	0.0324
	(0.59)	(1.31)
log pct work subbed	-0.135***	-0.110**
	(-4.84)	(-2.30)
pct Hispanic	-0.00126*	-0.00233*
	(-1.66)	(-1.78)
log value of business done	0.805***	0.749***
	(26.56)	(14.37)
year=1977	0	0
	(.)	(.)
year=1982	0.324***	0.473***
	(17.97)	(15.25)
year=1987	0.316***	0.515***
	(14.22)	(13.48)
year=1992	0.376***	0.579***
	(16.22)	(14.52)
year=1997	0.277***	0.436***
	(8.84)	(8.11)
year=2002	0.249***	0.344***
	(6.74)	(5.42)
year=2007	0.0713	0.138*
	(1.55)	(1.74)
year=2012	0.124***	0.423***
	(2.92)	(5.79)
Constant	-1.731***	-1.965***
	(-5.31)	(-3.50)
Observations	406	406

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[i] Andrew Dainty and martin Loosemore, Human Resource management in Construction, Critical Perspectives, Routledge, 2012, Second Edition, New York, NY; Owners need to help get training moving, Engineering News-Record, February 5, 1996, SECTION: EDITORIALS; Vol. 236, No. 5; Pg. 58; Mark Coles, Take the High Road On Construction in Baltimore, AFRO, September 21, 2016 http://www.afro.com/take-the-high-road-on-construction-in-baltimore/ (accessed November 5, 2016)

[ii] For instance, in Washington State, the 2016 base rates for the building and construction trades was $2.75 per hour—the highest of any industry group. Washington State Department of Labor and Industries, 2016 Rates for Workers' Compensation, http://www.lni.wa.gov/claimsins/insurance/ratesrisk/check/rateshistory/ (accessed April 18, 2016)

[iii] Center for Construction Research and Training, *The Construction Chart Book*, Fifth Edition, April, 2013, Fatal and Nonfatal Injuries, Table 21F, "Monthly Unemployment Rate, Construction vs. All Nonfarm, 2001-2011 (Not seasonally adjusted: private wage and salary workers)," http://www.cpwr.com/publications/chart-book-employment-and-income

[iv] For example, new contractors often pay a higher entry level UI rate compared to the rate applied to new businesses in other industries. In Kentucky in 2014, a new entrant in construction pays a 10% UI tax compared to 2.7% in other industries. In Massachusetts it is 9.49% for new construction contractors compared to 2.83% basic new entrant rate. US Department of Labor, Employment and Training Administration, Office of Unemployment Insurance, "Significant Provisions of State Unemployment Insurance Laws, Effective January, 2014" ; Ernst & Young LLP's, Guide to unemployment insurance in 2014, May 15, 2014 http://www.ey.com/Publication/vwLUAssets/EY-guide-to-unemployment-insurance-2014/$FILE/EY-guide-to-unemployment-insurance-in-2014.pdf (access April 18, 2016) CO DC IL IA KS KY MD MI NE ND OH PA SD TN TX UT VT WA WI WV

[v] US Census Bureau, Economic Census, Industry Series, Construction: Summary Series: General Summary: Detailed Statistics by Subsectors and Industries for U.S., Regions, and States: 2012 http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t (accessed October 24, 2016)

[vi] A catalogue of misclassification cases and findings since 2010 may be found at US Department of Labor, Wage and Hour Division, "Press Releases: Employee Misclassfication as Independent Contractors," https://www.dol.gov/whd/workers/Misclassification/pressrelease.htm (access May 9, 2016)

[vii] Douglas Dyer and John H. Kagel, "Bidding in Common Value Auctions: How the Commercial Construction Industry Corrects for the Winner's Curse," Management Science 1996 42:10 , 1463-1475

[viii] US Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Number of Establishments, Series Id: ENUUS0002051012 http://www.bls.gov/cew/data.htm (accessed October 24, 2016)

[ix] US Immigration and Custom Enforcement, Illegal Pay Schemes - Operation Paycheck, May 29, 2012 https://www.ice.gov/factsheets/paycheck (accessed October 24, 2016) Juravich, Tom Ablavsky, Essie Williams, Jake , The Epidemic of Wage Theft in Residential Construction in Massachusetts , May 11, 2015 University Of Massachusetts, Amherst, Labor Center, Working Paper Series http://cdnassets.hw.net/9c/2f/28d597ee403fb15a94d613f7d6ba/wage-theft-report-by-tom-juravich-essie-ablavsky-and-jake-williams.pdf (Accessed October 24, 2016)

[x] US Department of Labor, Wage and Hour Division (WHD), Dollar Threshold Amount for Contract Coverage Under State Prevailing Wage Laws, January 1, 2016 https://www.dol.gov/whd/state/dollar.htm (accessed October 24, 2016) Losing Ground: Lessons from the Repeal of Nine "Little Davis-Bacon" Acts Peter Philips, Garth Mangum Norm Waitzman, and Anne Yeagle, Working Paper, Economics Department, University of Utah, February 1995 http://content.csbs.utah.edu/~philips/soccer2/Publications/Prevailing%20Wages/History/Losing%20Ground.pdf (accessed November 4, 2016)

[xi] US Census Bureau, Economic Census, Geographic Area Series, Construction (NAICS Sector 23): Detailed statistics for establishments (Table 1), 2002, 2007 and 2012 http://www.census.gov/econ/census/data/historical_data.html http://www.census.gov/econ/census/help/sector/gas.html (accessed March 31, 2016) Data reported in the text are averages for these census years. The ranges reported are based on two denominators for overall construction activity—total value of construction (the lower range) and net value of construction (the higher range). Net value of construction eliminates double counting associated with subcontracting out. The census does not explicitly handle subcontracting out when reporting the value of government construction.

[xii] David Weil, "Rethinking the Regulation of Vulnerable Work in the USA: A Sector-based Approach," *Journal of Industrial Relations*, June 2009 vol. 51 no. 3 pp. 411-430

[xiii] Françoise Carré and Randall Wilson, 'The Social and Economic Costs of Employee Misclassification in Construction', Construction Policy Research Center, Labor and Worklife Program, Harvard Law School and Harvard School of Public Health, December 17, 2004

[xiv] Fiscal Policy Institute, "Building Up New York, Tearing Down Job Quality: Taxpayer Impact of Worsening Employment Practices in New York City's Construction Industry," A Fiscal Policy Institute Report www.fiscalpolicy.org December 5, 2007 http://www.fiscalpolicy.org/publications2007/FPI_BuildingUpNY_TearingDownJobQuality.pdf (accessed October 9, 2016)

[xv] Yvonne Yen Liu, Daniel Flaming, Patrick Burns , "Sinking Underground: The Growing Informal Economy In California Construction," Economic Roundtable, A Public Benefit Research Organization, pp. 1-2 http://economicrt.org/publication/sinking-underground/ (accessed April 18, 2016)

[xvi] This fact sheet summarizes a range of state studies: National Employment Law Project, "Independent Contractor Misclassification Imposes Huge Costs on Workers and Federal and State Treasuries, Fact Sheet, July 2015, nelp.3cdn.net/6093f2fd91b73da01c_pam6b5lzi.pdf (accessed April 18, 2016) http://50.87.169.168/OJS/ojs-2.4.4-1/index.php/LERAMR/article/view/1786

William Canak and Randall Adams, "Misclassified Construction Employees in Tennessee," January 15, 2010

[xvii] Jeffrey S. Passel, D'Vera CohnPew, "Share of Unauthorized Immigrant Workers in Production, Construction Jobs Falls Since 2007," Pew Research Center , March 26, 2015, Table A4, Industries with Highest Shares of Unauthorized Immigrant Workers, by State, 2012," p. 22 http://www.pewhispanic.org/2015/03/26/share-of-unauthorized-immigrant-workers-in-production-construction-jobs-falls-since-2007/ (accessed March 30, 2016). Not all states were reported for construction in this table. Additional data was obtained via email January 22, 2016 to David Blatter from the author, Jeffrey S. Passel as follows:

Rhode Island	3%
Pennsylvania	3%
Ohio	2%
Michigan	2%
Wisconsin	2%
Minnesota	2%
Missouri	2%

Alaska	1%
Hawaii	2%
Maine	1%
Vermont	1%
North Dakota	1%
South Dakota	1%
West Virginia	1%
Montana	1%
Wyoming	1%

[xviii] Lisa Christensen Gee, Matthew Gardner, Meg White, "Undocumented Immigrants' State & Local Tax Contributions," Institute on Taxation & Economic Policy, p. 8, Updated February 2016, http://www.itep.org/pdf/immigration2016.pdf (accessed May 9, 2016)

[xix] Michelle Ye Hee Lee, Trump's false claim that undocumented immigrants collect Social Security benefits, Washington Post, August 20, 2016 https://www.washingtonpost.com/news/fact-checker/wp/2016/08/20/trumps-false-claim-that-undocumented-immigrants-collect-social-security-benefits/ (accessed November 7, 2016); National Employment law Project, Immigrants' Eligibility for Unemployment Compensation, April, 2002 http://www.nelp.org/content/uploads/Immigrants-Eligibility-for-Unemployment-Compensation.pdf (accessed November 7, 2016); Le Trinh , Can Undocumented Immigrants Get Workers' Comp? FindLaw, June 11, 2015 http://blogs.findlaw.com/injured/2015/06/can-undocumented-immigrants-get-workers-compensation.html (accessed November 7, 2016)

[xx] Workers Defense Project, "Build a Better Texas, Construction Working Conditions in the Lone Star State," January, 2013, pp. 31 and 57 http://www.workersdefense.org/Build%20a%20Better%20Texas_FINAL.pdf (accessed October 26, 2015) (accessed April 18, 2016)

[xxi] While these contrasts in state means are generally statistically significant ($p<.05$), in the cases of independent contractors and undocumented workers, these differences in means become statistically significant only when states with average or strong prevailing wage laws are compared to states with weak or no laws. States without prevailing wage laws in 2012 were AL, AZ, CO, FL, GA, IA, ID, IN, KS, LA, MS, NC, ND, NH, OK, SC, SD, UT and VA. States with weak laws were MD ME NE TN and VT. The remaining states had average or strong prevailing wage laws. Our classification of law strength is discussed below.

[xxii] Jeffrey S. Passel, D'Vera CohnPew, "Share of Unauthorized Immigrant Workers in Production, Construction Jobs Falls Since 2007," Pew Research Center , March 26, 2015, Table A4, Industries with Highest Shares of Unauthorized Immigrant Workers, by State, 2012"

[xxiii] The Economic Census is digitally available on the web for the years 2002 through 2012. Previous census data were hand-copied from printed economic census for construction also web available. US Census Bureau, Economic Census, Geographic Area Series, Construction (NAICS Sector 23): Detailed statistics for establishments (Table 1), 2002, 2007 and 2012 http://www.census.gov/econ/census/data/historical_data.html http://www.census.gov/econ/census/help/sector/gas.html ; printed versions http://www.census.gov/prod/www/economic_census.html (accessed December 6, 2016)

[xxiv] US Census Bureau, Nonemployer Statistics, https://www.census.gov/econ/nonemployer/index.html (accessed November 5, 2016)

[xxv] US Census, 2012 Economic Census, Forms & Instructions, Construction (Sector 23) https://bhs.econ.census.gov/ec12/cc-23/cc-23_form_default.html (accessed November 4, 2016) FindLaw, Workers' Compensation for the Self-Employed, http://injury.findlaw.com/workers-compensation/workers-compensation-for-the-self-employed.html (accessed November 5, 2016)

[xxvi]Brock Andersen, Unemployment Benefits for Self-Employed: There Is a Way, NerdWallet, June 29, 2015 https://www.nerdwallet.com/blog/small-business/unemployment-benefits-selfemployed/ (accessed November 5, 2016)

[xxvii] California Department of Industrial Relations, Division of Workers' Compensation (DWC), Answers to frequently asked questions about workers' compensation for employers, http://www.dir.ca.gov/dwc/faqs.html (accessed November 5, 2016)

[xxviii] Kim, JaeWhan and Philips, Peter, Health Insurance and Worker Retention in the Construction Industry, Journal of Labor Research, March 2010 , Volume 31, Issue 1, pp 20–38; Kim, JaeWhan and Philips, Peter, Effect of

Multiemployer Collective Bargaining on Employer-Provided Health Insurance in the Construction Industry, Journal of Labor Research, December 2010 , Volume 31, Issue 4, pp 322–331

[xxix] Steven Ruggles, Katie Genadek, Ronald Goeken, Josiah Grover, and Matthew Sobek. American Community Survey 5 year PUMS 2010-14 Integrated Public Use Microdata Series: Version 6.0 [Machine-readable database]. Minneapolis: University of Minnesota, 2015; US Census, Nonemployer Statistics, 2010-2014, https://www.census.gov/econ/nonemployer/download.htm ; Internal Revenue Service, Exempt Organizations Business Master File Extract (EO BMF) https://www.irs.gov/charities-non-profits/exempt-organizations-business-master-file-extract-eo-bmf (accessed October 20, 2015) ; Jeffrey S. Passel, D'Vera CohnPew, "Share of Unauthorized Immigrant Workers in Production, Construction Jobs Falls Since 2007," Pew Research Center , March 26, 2015, Table A4, Industries with Highest Shares of Unauthorized Immigrant Workers, by State, 2012," p. 22 http://www.pewhispanic.org/2015/03/26/share-of-unauthorized-immigrant-workers-in-production-construction-jobs-falls-since-2007/ (accessed March 30, 2016).

[xxx] To identify state laws that are average or strong, we use Thieblot's point system for states with 5 points or higher. Thieblot, Armand J. 1995. State Prevailing Wage Laws: An Assessment at the Start of 1995. Rosslyn, VA: Associated Builders and Contractors.