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SHORT REPORT

Does 'right to work' imperil the right to health? The effect of labour unions on workplace fatalities

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ABSTRACT

Objective Economic policies can have unintended consequences on population health. In recent years, many states in the USA have passed 'right to work' (RTW) laws which weaken labour unions. The effect of these laws on occupational health remains unexplored. This study fills this gap by analysing the effect of RTW on occupational fatalities through its effect on unionisation.

Methods Two-way fixed effects regression models are used to estimate the effect of unionisation on occupational mortality per 100 000 workers, controlling for state policy liberalism and workforce composition over the period 1992–2016. In the final specification, RTW laws are used as an instrument for unionisation to recover causal effects.

Results The Local Average Treatment Effect of a 1% decline in unionisation attributable to RTW is about a 5% increase in the rate of occupational fatalities. In total, RTW laws have led to a 14.2% increase in occupational mortality through decreased unionisation.

Conclusion These findings illustrate and quantify the protective effect of unions on workers' safety. Policymakers should consider the potentially deleterious effects of anti-union legislation on occupational health.

Key messages

What is already known about this subject?

- Previous scholarship indicates that unions in the USA provide numerous workplace hazards protections through collective bargaining with employers, such as shift restrictions and safety equipment provision, along with other benefits to health such as medical insurance.

What are the new findings?

- The paper demonstrates that the protective effect of unions on workplace safety at the micro level translates into large scale reductions in occupational fatalities.
- I find that diminished union membership due to 'right to work' legislation has led to a 14.2% increase in workplace mortality.

How might this impact on policy or clinical practice in the foreseeable future?

- In light of these findings, policymakers should consider the potential effects of declining unionisation and anti-union legislation on occupational health.

INTRODUCTION

Though workplace fatalities have declined substantially since the 1990s in the USA, improvement has stalled in recent years. In 2016, 5190 US workers died on the job, marking the third consecutive year of increasing occupational mortality, and reaching the highest number of workplace fatalities since 2008.[1] This reversal has coincided with a recent uptick in the adoption of anti-union legislation by state legislatures. Since 2000, seven states—Oklahoma (2001), Michigan (2012), Indiana (2012), Wisconsin (2015), West Virginia (2016), Kentucky (2017) and Missouri (2017)—have enacted 'right to work' (RTW) laws, which prohibit contracts requiring union membership as a condition of employment. In total, 28 states have adopted RTW legislation (with 21 states doing so before 2000), while many other states are considering its adoption.[2]

Some scholars have argued that unions form an important part of the 'social machinery' that ensures public health, so their recent decline may be concerning.[3 4] I analyse the effect of unionisation rates on occupational mortality, an important, if sometimes overlooked, topic in public health.[5] To gain leverage on this question, I exploit variation within states over time in their union density and occupational mortality. Specifically, I use econometric two-ways 'fixed effects' regression modelling to account for pre-existing differences between states and trends common to all states. I successively control for two plausible time-varying confounds—a state's general predisposition for economically regulatory policies and the proportion of each state's workers in high-fatality industries. Finally, I employ an instrumental variables framework using adoption of RTW legislation as a shock to union membership. Across all specifications, I find that unionisation has a protective effect on workplace fatalities.

METHODS AND DATA

All workplace fatalities from 1992 to 2016 were compiled, by state, from the federal government's Bureau of Labor Statistics' Census of Occupational Fatalities. This yields a reasonably large, balanced panel of 1250 units, comprising 50 states across 25 years. To generate fatality rates, each state-year fatality count was divided by the state's employed population, retrieved from the Bureau of Labor Statistics, to create a fatality rate per 100 000 full-time equivalent workers. Finally, the natural logarithm of this rate was calculated to reduce the influence of outliers and improve the interpretability of results. With a logged dependent variable,

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the coefficients in a regression model can be interpreted as approximately per cent changes; here, that means the percentage change in a state's occupational fatality rate for a one-unit increase in the explanatory variable. Unionisation rates for each state over this period are drawn from the Union Membership and Coverage Database.[6]

A two-ways fixed effects (state and year) regression strategy was used to estimate the effect of unionisation rates on workplace fatalities. This approach assesses the effect of unionisation by looking only at the variation within each state across time, reducing bias attributable to pre-existing differences between states that could affect both occupational fatalities and unionisation.[7] In the final specification, an instrumental variables approach exploits only the temporal variation in unionisation rates attributable to states adopting RTW legislation in different years, or not at all. The advantage of this approach is that the year in which anti-union legislation takes effect is unlikely to be correlated with state-specific trends in occupational fatalities. Across all model specifications, the size of the employed population is used as an inverse-variance weight (sometimes called an analytic weight) since the dependent variable fatality rate is a 'group mean' which is more stable in more populous states.

I employ four model specifications to estimate the relationship between unionisation rates and occupational mortality rate. Model 1 estimates this relationship with no additional controls. Since the unit fixed effects absorb time-invariant differences between states, and the time-fixed effects absorb changes that affect all units (eg, constant technological progress), the remaining threat to inference comes from potential time-varying omitted variables that are correlated with both unionisation and workplace fatalities.[7] To mitigate this possibility, time-varying control variables and an instrumental variables strategy are employed. Two sets of time-varying controls are used. In model 2, an annual measure of each state's 'policy liberalism' was used to hold constant potential time-varying differences between states in their propensity for economic regulation, which could affect occupational fatalities through workplace safety regulations. This annual measure, taken from the political science literature,[8] comes from analysing 148 distinct policies created by American states over an 80-year period (1936–2014) and using a latent-scoring technique to recover a common factor underlying adoption of these policies. Larger values indicate more 'liberal' (in the US context, meaning left-wing) policies. Because estimates for this measure end 2 years before the occupational fatalities data, I use a 2-year lag, though extrapolation of the last two years from state trends yields essentially identical results. In model 3, I incorporate the annual proportions of workers employed in three industry sectors with elevated workplace fatalities, obtained from the Bureau of Labor Statistics, since industry sector employment could confound the relationship between state unionisation and workplace fatalities.[i] These sectors are (1) trade, transport, utilities; (2) mining, logging, construction; and (3) manufacturing.

Finally, in model 4, an instrumental variables approach exploits the variation across states over time in implementation of RTW legislation, which prohibits requiring union membership as a condition of employment, to gain additional causal leverage. An instrumental variables approach proceeds in two stages. In the first stage, a statistical model estimates the amount of variation in a potentially endogenous treatment variable explained by a quasi-random 'instrument' after controlling for other factors. Then, in the second stage, the effect of the treatment on the outcome of interest is estimated with a regression model including control variables and the fitted values for the treatment estimated in the first stage. In other words, only the predicted variation in the treatment variable explained by the quasi-random instrument is substituted for the observed treatment in the second stage. Here, I use the varied implementation of RTW laws as an instrument for changes in unionisation rate. I argue that RTW laws serve as an exogenous (ie, quasi-random) shock to unionisation since they lower unionisation rates and are plausibly unrelated to workplace fatalities except through their effect on unions. By examining the effect of the change in unionisation attributable to RTW legislation on occupational fatalities, model 4a provides a consistent estimate of what's called the Local Average Treatment Effect, a causal, though not necessarily generalisable, effect of unionisation on occupational fatalities that is robust to omitted variables or other sources of endogeneity if the instrument is high quality.[9] For clarity of presentation, I also include in model 4b what is called the 'reduced form' regression of the instrumental variables specification. In the reduced form, the instrument is substituted for the treatment variable in a regression model. The coefficient for the instrument in the reduced form regression is exactly equal to multiplying the first-stage coefficient of the instrument on the treatment by the second-stage coefficient of the fitted values of the treatment on the outcome.

RESULTS

Table 1 shows the parameter estimates for each of these four regression models with SEs, clustered by state, in parenthesis. Each column is a separate statistical model. Because the dependent variable is the natural logarithm of the occupational fatality rate, coefficients in the table can be interpreted as approximately percentage changes. For example, in model 1, the coefficient of −0.028 for union indicates that a one percentage point increase in the unionisation rate is associated with approximately a 2.8% decline in occupational fatalities (or, conversely, a one percentage point decrease in unionisation is associated with a 2.8% increase in fatalities).

Model 2 adds state policy liberalism to the regression, with more liberal state policies associated with fewer fatalities, but this difference was not statistically different from zero after controlling for unionisation rates. Model 3 includes the annual proportion of workers in a state employed in industries with elevated workplace fatalities. The percentage of workers employed in the mining, logging and construction centres was associated with a higher fatality rate ($\beta=0.05$, $p<0.001$), with a one percentage point increase corresponding to about a 5% increase in fatality rate. In contrast, the per cent of workers employed in the manufacturing sector and in trade, transport, in utilities did not have an effect that was statistically distinguishable from zero. Finally, across all specifications, unionisation was associated with significantly lower fatality rates. In models 1–3, a one percentage point increase in the unionisation rate was associated with about a 2.7%–2.8% reduction in fatality rate (respectively $p<0.05$, $p<0.01$, $p<0.01$). Model 4a reports the results of the second stage of the instrumental variables specification (two-stage least squares), with the introduction of RTW legislation as an instrument provided as a shock to a state's unionisation rate. The coefficient for unionisation for model 4a suggests that the Local Average Treatment Effect of a one percentage point

[i] The BLS did not report the number of workers in Florida employed in mining, logging and construction for the years 1992–2001. The number of employed workers in these sectors for 2002 was used to calculate the per cent of workers in this sector for these years.

Table 1 Parameter estimates for models 1–4

Independent variable	(1) OLS	(2) OLS	(3) OLS	(4a) 2SLS	(4b) OLS
% union	−0.028* (0.01)	−0.028** (0.01)	−0.027** (0.01)	−0.049**(0.01)	
Policy liberalism		−0.019 (0.06)	−0.049 (0.06)	−0.036 (0.05)	−0.049 (0.70)
% trade, transport, utilities			−0.035 (0.02)	−0.028 (0.02)	−0.041 (0.03)
% mining, logging, construction			0.054*** (0.01)	0.053*** (0.01)	0.053*** (0.01)
% manufacturing			−0.002 (0.01)	0.001 (0.01)	−0.006 (0.01)
Right to work					0.142* (0.06)
State fixed effects	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓
Population weights	✓	✓	✓	✓	✓
Observations	1250	1250	1250	1250	1250
Root mean square error	0.1424	0.1424	0.1389	0.1371	0.1422

Cluster-robust SEs in parentheses.
*p < 0.05, **p < 0.01, ***p < 0.001.
2SLS, Two-Stage Least Squares; OLS, Ordinary Least Squares.

increase in the unionised workforce is a 4.9% decrease in the fatality rate (p<0.001). In the first stage, omitted from table 1 for space, RTW was associated with a 2.85 percentage point decline in unionisation (F ≈ 10.90; p<0.01); combining these two results yields the total estimated effect of RTW on the fatality rate. Thus, RTW legislation, through its negative effect on unionisation, leads to a 14.2% increase (2.855 * 4.963) in workplace mortality. This is shown by the 0.142 coefficient for RTW laws in model 4b, the reduced form regression.

DISCUSSION

These findings illustrate and quantify the protective effect of unions on workers' safety identified by other scholars. In the USA, collective bargaining agreements secured by unions have been documented to provide numerous workplace hazards protections, such as shift restrictions (to prevent fatigue) and safety equipment provision, along with other potential benefits to health such as more generous employer-provided medical insurance.[10] Studies suggest that unionised workplaces receive more health and safety inspections from the federal agency OSHA, and the threat of union organising may impel employers to improve workplace safety.[11 12]

Though worker fatalities have declined in the last two decades in the USA, this decline has been steeper in states with higher levels of unionisation. Moreover, this study shows that RTW legislation, under consideration in many state legislatures and nationwide, may lead to greater workplace mortality through decreasing the percentage of unionised workers. Indeed, worker fatalities have climbed somewhat since 2008, a reversal from previous years, during the same period that several states adopted RTW. In light of these findings, policymakers in the USA and other countries might consider how declining unionisation rates may impact worker safety.

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