Political Economy of US States and Rates of Fatal Occupational Injury

Dana Loomis, PhD, Michael D. Schulman, PhD, A. John Bailer, PhD, Kevin Stainback, PhD, Matthew Wheeler, MS, David B. Richardson, PhD, and Stephen W. Marshall, PhD

Objectives. We investigated the extent to which the political economy of US states, including the relative power of organized labor, predicts rates of fatal occupational injury.

Methods. We described states' political economies with 6 contextual variables measuring social and political conditions: ''right-to-work'' laws, union membership density, labor grievance rates, state government debt, unemployment rates, and social wage payments. We obtained data on fatal occupational injuries from the National Traumatic Occupational Fatality surveillance system and population data from the US national census. We used Poisson regression methods to analyze relationships for the years 1980 and 1995.

Results. States differed notably with respect to political–economic characteristics and occupational fatality rates, although these characteristics were more homogeneous within rather than between regions. Industry and workforce composition contributed significantly to differences in state injury rates, but political–economic characteristics of states were also significantly associated with injury rates, after adjustment accounting for those factors.

Conclusions. Higher rates of fatal occupational injury were associated with a state policy climate favoring business over labor, with distinct regional clustering of such state policies in the South and Northeast. (*Am J Public Health.* 2009; 99:1400–1408. doi:10.2105/AJPH.2007.131409)

Workers in the United States have experienced a sustained decline in the rate of fatal occupational injury over the past decades, yet there are marked differences in fatal injury rates and trends among regions and states.[1–5] In the final decades of the 20th century, for example, the average annual rate for all fatal occupational injuries ranged from 1.7 per 100 000 in Connecticut to 24.3 per 100 000 in Alaska; the average rate of decline varied from less than 1% per year in the Northeast to almost 5% per year in the West.[3,4] The causes of geographical diversity in occupational injury rates are largely unknown.

The spatial variation in natural resources, topography, and climate that condition the kinds of work available in a state or region offer one possible explanation for spatial differences in fatal occupational injury rates. Another explanation for this diversity derives from consideration of government policy on economic development and labor, which can influence where employers locate, how they operate, and the attention they give to worker safety.[6] Some factors common to areas with high rates of fatal occupational injury can be observed. Within the United States, it has been noted that higher fatal injury rates are concentrated in the Western and Southern regions, in rural areas, and in less wealthy states.[7,8]

The embeddedness of industries and jobs in local conditions implies that the local political–economic structure has an important effect on occupational injury rates. We reasoned that variation in the strength of labor unions, state welfare provisions, and unemployment levels influences the ability of labor to secure better-paying and safer jobs.[9] As jobs in traditional manufacturing decrease,[10,11] declining unionization rates, contracting social welfare programs, and increasing capital mobility change the balance of power between capital and labor.[12] In addition, states' capacity to monitor and regulate health and occupational safety depends on their fiscal health and their strategies for creating an economic climate conducive to capitalist development and growth.[13] The role of states has increased since the 1980s with the rise of the "New Federalism" in US government, which devolved functions once performed by the federal government to state and local jurisdictions.[14]

No formal analyses of these patterns have been conducted for a number of years,[15] and states' economic characteristics and policies have been neglected as potential determinants of geographic variation in occupational injury rates. We examined relationships between fatal occupational injury rates and political–economic characteristics of US states to learn whether fatal occupational injury rates are associated with state political economy after accounting for variation in economic structure and labor force composition. We expected that in states where the capacity of labor is stronger (higher union density), the rate of fatal occupational injury would be lower. We expected states with greater labor market deregulation (e.g., so-called right-to-work laws, which limit labor's ability to organize) to have a higher incidence of fatal injury because of the reduction in the relative power of labor. We also hypothesized that high state debt would be associated with a higher risk of occupational fatality, although one could argue that state debt may also accrue as a result of investment in public infrastructure or social services that reduce the risk of injury or increase the bargaining power of labor.

METHODS

We identified deaths from occupational injuries through the National Traumatic Occupational Fatalities (NTOF) surveillance system developed by the National Institute for Occupational Safety and Health by obtaining death certificates from the 50 states, New York City, and the District of Columbia. The NTOF database used in this study includes recorded

deaths in calendar years 1980–1996 of persons 16 years or older from injuries (codes E800-E999; *International Classification of Diseases, 9th revision*) that occurred on the job as indicated by the certifier.[16] We excluded deaths from medical misadventure, nonwork-related choking on food or other objects, nonoccupational poisoning by therapeutic drugs or alcoholic beverages, and suicide or with intentionality unknown. We tabulated eligible deaths by calendar year, state, and industry as well as by the decedent's gender, age, and race. The National Institute for Occupational Safety and Health coded the decedent's usual industry of employment with 3-digit 1990 US Census codes, which we collapsed into 48 major industrial categories.

For each category defined by these variables, we estimated the size of the workforce at risk from US Census data. We derived estimates for 1995 via linear extrapolation from the censuses of 1980 and 1990.[17] Merging the death data with the workforce estimates required exclusion of observations with invalid or missing data. Because state policies were the subject of inquiry, we excluded the New York City and Washington, DC, reporting units.

Measures of State Political Economy

We examined several dimensions of state-level political economies to find how these indicators might affect occupational injury. (Descriptive data and sources for these indicators are listed in appendix 1, available as a supplement to the online version of this article at http://www.ajph.org.)

Organizational capacity of labor. Greater organization of labor may translate into a stronger bargaining position relative to capital. Where labor is stronger, employers may be forced to maintain greater standards of safety, regardless of a state's capacity to regulate industry. In addition, increases in the relative power of labor create uncertainty for firms. Firms respond to this by creating cooperative strategies that reduce uncertainty and conditions that might lead to grievances. Another mechanism is filing formal grievances with the National Labor Relations Board. High grievance rates may indicate a political–organizational environment in which union activity is used in response to poor working conditions to enhance workplace safety. For instance, research has shown that unionized workplaces tend to be more compliant with the Occupational Safety and Health Act regulations than are nonunionized workplaces.[18] The relative power of labor is also diminished during periods of high unemployment because spells of economic hardship may lead workers into dangerous work and because unemployment provides a reserve pool of labor that employers can use to break strikes.

Four variables represented the organizational capacity of labor in the analysis: union density, measured by the proportion of the nonagricultural workforce belonging to labor unions; the rate of labor grievances per 1000 union employees; the presence of right-to-work laws; and the percentage of the civilian labor force unemployed.

Fiscal capacity of states. The devolution of many responsibilities to states since the 1970s has led to fiscal crises for state and local governments across the nation. Outstanding state debt per capita in our study represented state fiscal capacity. Higher state debt may lead to a decrease in states' capacity to effectively monitor and regulate occupational health and safety. It may also increase a state's dependence on capital, which may in turn lead to lax regulation and enforcement in an attempt to appease capital and maintain the tax base. In states with high fiscal capacity, firms respond to regulatory uncertainty by reducing the conditions that would lead to sanctions.[19]

Social welfare policies. The responsibility for funding social welfare programs has shifted substantially from the federal government to the states. Social welfare may be seen as a form of wage support and income maintenance capable of affecting workers' decisions to enter dangerous jobs. Therefore, higher social welfare payments may lead to lower levels of injury because they provide alternatives to hazardous work. The average monthly payment for those receiving payments from Aid to Families With Dependent Children, which operated throughout the study period, quantified a state's level of social welfare for this study.

Data Analysis

We conducted descriptive analyses of the economic predictors among variables and across states and carried out analyses to assess relationships between rates of fatal occupational injury and state political economy. We conducted cross-sectional analyses separately for the years 1980 and 1995 with log-linear Poisson regression models[20] of the basic form:

$$(1)\quad \log(Y_i) = \alpha + \boldsymbol{\beta} X_i + \log(T_i),$$

where, for a given year, Y_i is the number of deaths in state i; $\mathbf{X}_i$ is a vector containing the political economy variables for that state; $\boldsymbol{\beta}$ is a vector of coefficients describing the relationship of those predictors to the injury rate; and T_i is the number of person-years accumulated by the employed population in that state. We entered the 6 indicators of political economy as a group because they do not occur in isolation. To account for differences in the composition of state economies and labor forces, we fit additional models that included indicator variables for industry category and worker age, gender, and race and estimated person-time in strata defined by those factors. In these adjusted models:

$$(2)\ \log(Y_{ijklm}) = \alpha + \boldsymbol{\beta} \boldsymbol{X}_i + \boldsymbol{\gamma} \boldsymbol{C}_{jklm} + \log(T_{ijklm}),$$

where Y_{ijklm} is the number of deaths in state i, industry j, age k, gender l, and race m and T_{ijklm} is the number of person-years accumulated in this state, industry, age, gender, race combination. In this formula, $\boldsymbol{\gamma}$ is a vector of coefficients associated with the industry, age, gender, and race variables that are coded and collected in the vector $\mathbf{C}_{jklm}$. We used these models in all reported analyses, which we carried out with the PROC GENMOD procedure in SAS version 9.1 for Windows (SAS Institute, Cary, NC).

We conducted further analyses to predict the injury rate in 1995 using variables observed in 1980. Here, we predicted the state-specific occupational injury rate for 1995 with the state political economy variables from 1980 as well as the given state's injury rate in 1980. This model is identical to the previous one except that the vector $\mathbf{X}_i$ contained political economy variables for 1980 and an additional variable representing the total occupational fatality rate for the given state in that year.

We dichotomized the quantitative political economy variables to provide a common scale for the regression coefficients and to reduce

collinearity. To accomplish this, we first ranked states according to each indicator on a continuous scale and separated them into 2 groups such that the 10 states with policies hypothesized to be least favorable to labor (the "lowest" 20% of states) were coded 1 and the remaining 40 were coded 0. The presence of right-to-work laws is inherently dichotomous, so no further categorization was necessary. With this coding scheme, e^{β} from the preceding models provides an estimate of the increase in the rate of fatal occupational injury among the 10 least favorable states. We also performed analyses with the political economy variables entered in continuous form, but the results were substantially similar and are not reported here.

RESULTS

Complete data were available for 90% of the eligible occupational injury deaths in the NTOF database. Our study included 85 590 deaths for the full 1980–1996 period, of which 6173 deaths occurred in 1980 and 4664 in 1995. Excess deaths resulting from the bombing of a federal office building in Oklahoma City, Oklahoma, in 1995 affected some fatal occupational injury rates for 1995. We repeated the analysis after excluding deaths in Oklahoma County on the date of the bombing. Omission of these deaths resulted in negligible changes in standard errors and small changes in the coefficients for most predictors except for unemployment and right-to-work laws, which differed by factors of 2.16 and 1.27, respectively; we report results for 1995 that omit the Oklahoma bombing deaths.

Tables 1 and 2, respectively, show dichotomized political economy variables for each state in 1980 and 1995, with the 10 states with the least favorable economies and the presence of right-to-work laws indicated. From these tables, it is evident that injury rates have declined from 1980 to 1995 and that both regions and states within regions are heterogeneous with respect to injury rates. The Central and Southern regions have the highest rates of injury and the Northeast has the lowest. Variability within regions is illustrated in the West, where the injury rate for Alaska was 11.7 per 100 000 in 1980 (14.0 in 1995) but Arizona's rate was 5.7 per 100 000 in 1980 (2.7 in 1995).

The South tends to have the highest concentration of socioeconomic variables hypothesized to be associated with higher injury rates, and the Northeast has the lowest. Right-to-work laws exist in all Southern states except Kentucky, but not in any Northeast or Midwest states except Iowa, suggesting distinct political–economic regions.

In cross-sectional analyses with 1980 data, we observed lower rates of fatal occupational injury adjusted for workforce age, race, and gender in the West, Midwest, and Northeast and higher rates in the South and Central regions (Table 1). Adding variables for industry improved the fit of the Poisson regression model (see appendix 2, available as a supplement to the online version of the article at http://www.ajph.org) and enhanced the separation of low rates in the West and Northeast states relative to higher rates in the Central and the South states (Figure 1a).

Somewhat different geographic patterns emerged from analyses of data for 1995. State rates adjusted for workforce composition were lowest in the Northeast and northern Central states and higher across the southern section of the country (Table 2). Adjustment for industry improved the fit of the model and resulted in geographic patterns broadly like those observed in 1980, with lower rates clustered in the Northeast, upper Midwest, and West, and higher rates in the Central states (Figure 1b).

Adding the 6 indicators of state political economy further improved the fit of the models for both 1980 and 1995 (appendix 2, available as a supplement to the online version of the article). Adjustment for political economy did not markedly change the geographic distribution of state occupational fatality rates: in both 1980 and 1995, lower rates of fatal injury remained concentrated in the Northeast, Midwest, and West, but higher rates prevailed in the South and Central areas (Figure 1c–d).

After adjusting for workforce demographics and industry, the effects of most 1980 indicators of state political economy were consistent with the directions hypothesized: higher fatal injury rates were associated with low union density, low labor grievance rates, low social wages, high unemployment, and right-to-work laws (Table 3). The magnitude of these associations was modest, however, with rate ratios (RRs) ranging from 1.09 to 1.20; 95% confidence intervals (CIs) excluded 1.0 (indicating statistical significance) for all but labor grievance rates and social wages. High state debt was associated with lower fatal injury rates (RR=0.57; 95% CI=0.52, 0.63).

Analyses of data for 1995 yielded RRs in the hypothesized direction for low social wages, high unemployment, and right-to-work laws, all with 95% CIs that excluded 1.0 (Table 3). RRs for high state debt, low union density, and low grievance rates were in the opposite direction, although the 95% CI for union density included 1.0.

Table 4 shows results of the analysis with data from 1980 to predict injury rates in 1995. We predicted states with higher rates of injury in 1980 would have relatively higher injury rates in 1995 (RR=2.26; 95% CI=1.99, 2.57). RRs for state political–economic characteristics were smaller in magnitude, but states with low union density, low labor grievance rates, and high unemployment in 1980 also tended to have higher injury rates in 1995, whereas states with high levels of debt in 1980 tended to have reduced injury rates in 1995. Neither the presence of right-to-work laws nor low social wages in 1980 was associated with increased injury rates in 1995.

DISCUSSION

Our analysis of fatal occupational injury data for the United States in the 1980s and 1990s showed that political–economic characteristics of states, including state government debt, union density, labor grievance rates, social welfare payments, unemployment, and right-to-work laws, were significant predictors of fatal occupational injury rates. These factors explain additional variation in states' fatal injury rates after accounting for industry and workforce composition.

The political–economic characteristics can be seen as indicators of the relative power of labor and of the role of the state in creating a pro-business economic development climate. States whose political–economic climates favored industry over labor tended to have higher rates of fatal occupational injury, particularly in 1980 at the beginning of the study period. However, high state debt was associated with lower fatal injury rates. The association of lower injury rates with high

TABLE 1—State Political Economy Indicators and Rates of Fatal Occupational Injury: United States, 1980

	High State Debt	Low Union Density	Low Labor Grievance Rate	Low Social Wage	High Unemployment	Has a Right-to-Work Law	State Rate of Fatal Occupational Injury[a]	Regional Rate of Fatal Occupational Injury[a]
South								8.14
Alabama	. . .	. . .	. . .	Lowest 20%	Lowest 20%	Yes	8.36	
Arkansas	. . .	. . .	. . .	Lowest 20%	. . .	Yes	8.07	
Florida	. . .	Lowest 20%	. . .	. . .	. . .	Yes	7.42	
Georgia	. . .	Lowest 20%	. . .	Lowest 20%	. . .	Yes	10.00	
Kentucky	. . .	. . .	. . .	. . .	Lowest 20%	No	9.96	
Louisiana	. . .	. . .	. . .	Lowest 20%	. . .	Yes	8.84	
Mississippi	. . .	. . .	. . .	Lowest 20%	. . .	Yes	12.98	
North Carolina	. . .	Lowest 20%	. . .	Lowest 20%	. . .	Yes	7.01	
South Carolina	. . .	Lowest 20%	. . .	Lowest 20%	. . .	Yes	6.22	
Tennessee	. . .	. . .	. . .	Lowest 20%	. . .	Yes	6.09	
Virginia	. . .	Lowest 20%	. . .	. . .	. . .	Yes	7.98	
Northeast								2.80
Connecticut	Lowest 20%	. . .	. . .	. . .	. . .	No	1.01	
Delaware	Lowest 20%	. . .	. . .	. . .	. . .	No	3.73	
Maine	. . .	. . .	. . .	. . .	. . .	No	7.04	
Maryland	Lowest 20%	. . .	. . .	. . .	. . .	No	3.39	
Massachusetts	Lowest 20%	. . .	. . .	. . .	. . .	No	1.83	
New Hampshire	. . .	. . .	. . .	. . .	. . .	No	3.45	
New Jersey	. . .	. . .	. . .	. . .	. . .	No	1.24	
New York	Lowest 20%	. . .	. . .	. . .	. . .	No	1.67	
Pennsylvania	. . .	. . .	. . .	. . .	. . .	No	5.78	
Rhode Island	. . .	. . .	. . .	. . .	. . .	No	3.00	
Vermont	Lowest 20%	. . .	. . .	. . .	. . .	No	4.01	
Midwest								5.34
Illinois	. . .	. . .	. . .	. . .	Lowest 20%	No	5.39	
Indiana	. . .	. . .	Lowest 20%	. . .	Lowest 20%	No	5.65	
Iowa	. . .	. . .	. . .	. . .	. . .	Yes	8.22	
Michigan	. . .	. . .	. . .	. . .	Lowest 20%	No	4.11	
Minnesota	. . .	. . .	. . .	. . .	. . .	No	4.67	
Missouri	. . .	. . .	Lowest 20%	. . .	. . .	No	4.85	
Ohio	. . .	. . .	. . .	. . .	Lowest 20%	No	4.62	
West Virginia	Lowest 20%	. . .	. . .	. . .	Lowest 20%	No	10.43	
Wisconsin	. . .	. . .	. . .	. . .	. . .	No	6.29	
Central								10.45
Colorado	. . .	. . .	Lowest 20%	. . .	. . .	No	7.40	
Idaho	. . .	. . .	. . .	. . .	. . .	No	14.56	
Kansas	. . .	Lowest 20%	. . .	. . .	. . .	Yes	7.97	
Montana	. . .	. . .	. . .	. . .	. . .	No	11.97	
Nebraska	. . .	. . .	. . .	. . .	. . .	Yes	10.28	
New Mexico	. . .	. . .	. . .	. . .	. . .	No	8.00	
North Dakota	. . .	. . .	. . .	. . .	. . .	Yes	9.90	
Oklahoma	. . .	Lowest 20%	. . .	. . .	. . .	No	6.68	
South Dakota	. . .	Lowest 20%	. . .	. . .	. . .	Yes	11.62	
Texas	. . .	Lowest 20%	. . .	Lowest 20%	. . .	Yes	11.04	
Wyoming	. . .	. . .	. . .	. . .	. . .	Yes	19.29	

Continued

TABLE 1—*Continued*

West							7.1
Alaska		...		...	Lowest 20%	No	11.74
Arizona	...	...	Lowest 20%	Lowest 20%	...	Yes	5.72
California	...	...	...	...	...	No	6.68
Hawaii	Lowest 20%	...	...	...	...	No	5.90
Nevada	...	Lowest 20%	Lowest 20%	...	...	Yes	11.80
Oregon	Lowest 20%	...	...	...	Lowest 20%	No	8.33
Utah	...	...	...	...	...	Yes	8.64
Washington	...	...	...	...	...	No	7.75

Note. State debt, union density, labor grievance rate, and unemployment rate were dichotomized at the 20th percentile to identify the 10 states least favorable to labor.
[a]Per 100 000 worker-years, adjusted for age, race, and gender.

levels of state debt may be a result of investments that increase safety but may also indicate local economic downturns leading to reduced levels of business activity and consequently to lower injury rates.

The relationships of some political economy indicators with injury rates were inconsistent in different types of analyses. A comparison of the findings suggests that the characteristics associated with high injury rates one year may not be the same ones that predict high rates in later years. It is also possible that subsequent effects are more evident on a shorter time scale than the 15-year window we used here.

Empirical research investigating the effects of local social and economic conditions on occupational injury rates is rare. Robinson examined the relationship of occupational injury rates to employment cycles, reporting that periods of high unemployment coincided with increasing occupational injury rates in manufacturing industries in the United States during the years 1948 through 1985.[21] Robinson suggested that this effect may be caused by labor's decreased bargaining power in times of high unemployment.[21]

Wilson et al. studied the effect of international labor agreements on fatal occupational injury rates with cross-sectional data in a study of member states of the International Labor Organization.[22] They found that the number of ratified organization health and safety conventions, length of organization membership, and per capita income were associated with reduced fatal injury rates at the national level. Barth et al. examined the temporal relationship of injury rates and national income in a study with data from Austria.[23] The rate of injury declined as gross domestic product increased over the 50-year period from 1955 to 2004, and Barth et al. concluded that economic development leads to improvements in occupational safety.[23]

Most research on the impact of public policy on occupational injury rates in the United States has been directed toward policies that attempt to create incentives for employers to improve safety through regulation and enforcement or by adjusting insurance costs. Although there is evidence that such policies are capable of influencing occupational injury rates, the effectiveness of firm-level citations and penalties are supported most strongly.[24–25] Although some authors have suggested regulation as a possible cause of declining occupational injury rates,[26] there is little direct evidence concerning the effect of state occupational safety policies on long-term trends or on geographic variation in occupational injury rates. Approximately one third of states established occupational safety and health regulatory agencies during our study period, and the remainder continued under federal oversight.[27] However, state programs are required only to be "as effective as" those of the federal Occupational Safety and Health Administration, so there is no reason to expect workplaces to be notably safer in states that operate regulatory agencies.

We characterized the relationship of fatal occupational injury rates to state political economy with national data containing sufficient detail to account for industry and the gender, age, and race composition of the working population. The data we used nevertheless impose several limitations. We confined our analysis to 1980 and 1995, years when injury and political economy data were available, so the findings necessarily reflect conditions during those years. The NTOF system was the only comprehensive national surveillance system for fatal occupational injuries before 1992, when the Bureau of Labor Statistics initiated the Census of Fatal Occupational Injuries. Comparisons of data from NTOF and the Census of Fatal Occupational Injuries show that both systems identify similar epidemiological patterns.[28] Other limitations of the NTOF system have been discussed elsewhere.[3] Our estimate of the working population in 1995 was obtained by extrapolating from censuses in 1980 and 1990, but we have shown previously that the approach we used to estimate populations in noncensus years produces negligible bias in most situations.[29,30]

The political economy indicators we used have other limitations. Unemployment statistics do not measure underemployment and other labor market conditions (for example, informal employment) that may weaken the bargaining position of labor. Aid to Families With Dependent Children was a family-based benefit that was available only to workers living with their children, so state-to-state variation in the proportion of childless workers may lead to misclassification. The welfare reforms of the Clinton administration also produced a drastic change in social wage programs after 1996. Furthermore, we do not have measures of health insurance

TABLE 2—State Political Economy Indicators and Rates of Fatal Occupational Injury: United States, 1995

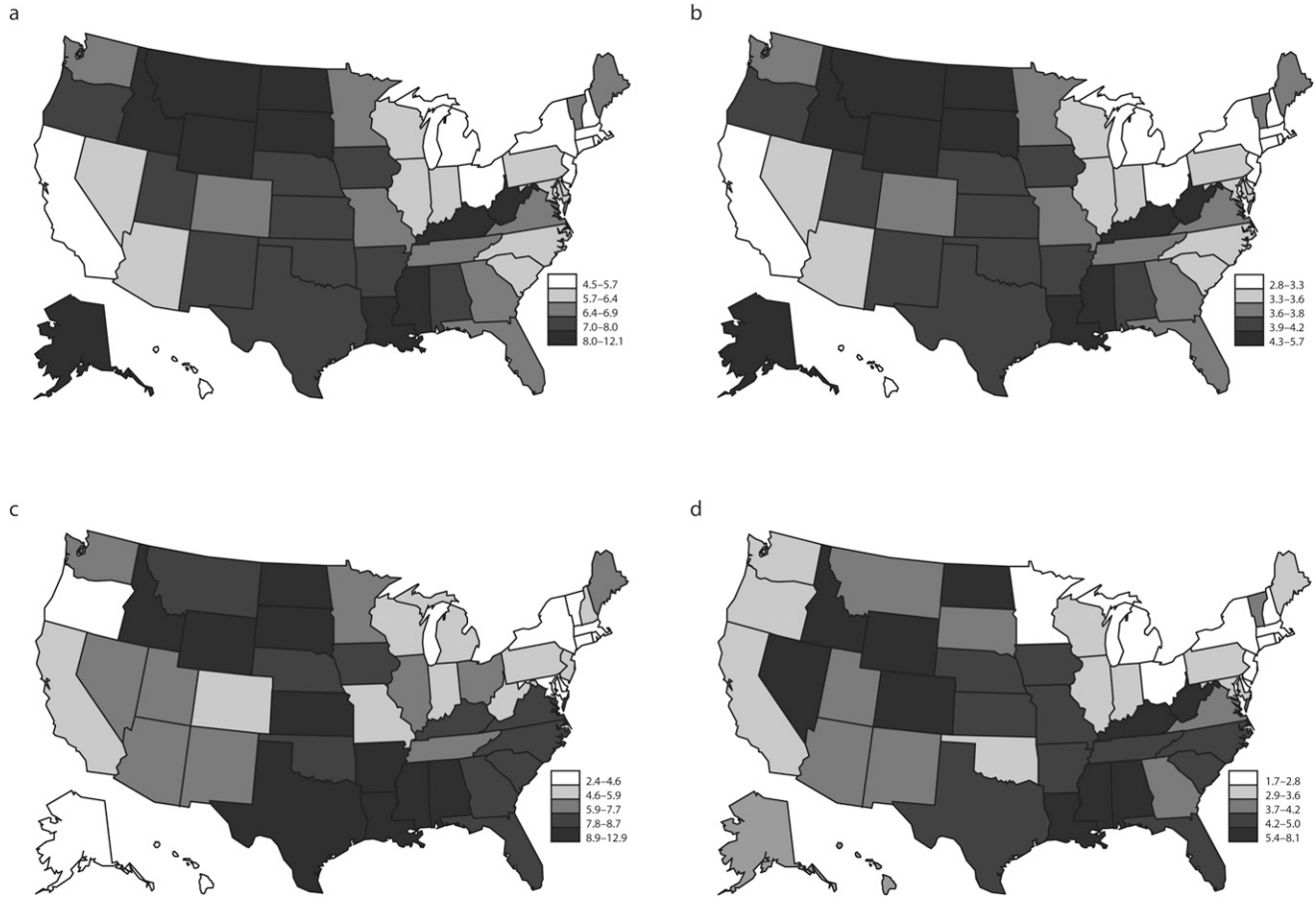
	High State Debt	Low Union Density	Low Labor Grievance Rate	Low Social Wage	High Unemployment	Has a Right-to-Work Law	State Rate of Fatal Occupational Injury[a]	Regional Rate of Fatal Occupational Injury[a]
South								4.91
Alabama	. . .	. . .	. . .	Lowest 20%	Lowest 20%	Yes	5.40	
Arkansas	. . .	Lowest 20%	. . .	Lowest 20%	. . .	Yes	6.15	
Florida	. . .	. . .	. . .	. . .	. . .	Yes	4.67	
Georgia	. . .	Lowest 20%	. . .	. . .	. . .	Yes	5.61	
Kentucky	. . .	. . .	Lowest 20%	Lowest 20%	. . .	No	6.36	
Louisiana	. . .	Lowest 20%	Lowest 20%	Lowest 20%	. . .	Yes	7.37	
Mississippi	. . .	Lowest 20%	Lowest 20%	Lowest 20%	. . .	Yes	8.74	
North Carolina	. . .	Lowest 20%	. . .	Lowest 20%	. . .	Yes	4.08	
South Carolina	. . .	Lowest 20%	. . .	Lowest 20%	Lowest 20%	Yes	4.70	
Tennessee	. . .	. . .	. . .	Lowest 20%	. . .	Yes	4.07	
Virginia	. . .	Lowest 20%	. . .	. . .	. . .	Yes	2.53	
Northeast								2.11
Connecticut	Lowest 20%	. . .	. . .	. . .	. . .	No	1.19	
Delaware	Lowest 20%	. . .	. . .	. . .	. . .	No	2.06	
Maine	. . .	. . .	. . .	. . .	Lowest 20%	No	1.06	
Maryland	. . .	. . .	. . .	. . .	. . .	No	1.98	
Massachusetts	Lowest 20%	. . .	. . .	. . .	. . .	No	1.50	
New Hampshire	Lowest 20%	. . .	. . .	. . .	. . .	No	0.76	
New Jersey	Lowest 20%	. . .	. . .	. . .	. . .	No	1.97	
New York	Lowest 20%	. . .	. . .	. . .	Lowest 20%	No	2.16	
Pennsylvania	. . .	. . .	. . .	. . .	. . .	No	3.06	
Rhode Island	Lowest 20%	. . .	. . .	. . .	Lowest 20%	No	1.85	
Vermont	. . .	. . .	Lowest 20%	. . .	. . .	No	3.41	
Midwest								3.15
Illinois	. . .	. . .	. . .	. . .	. . .	No	3.23	
Indiana	. . .	. . .	. . .	Lowest 20%	. . .	No	3.64	
Iowa	. . .	. . .	. . .	. . .	. . .	Yes	3.62	
Michigan	. . .	. . .	. . .	. . .	. . .	No	2.62	
Minnesota	. . .	. . .	. . .	. . .	. . .	No	2.82	
Missouri	. . .	. . .	Lowest 20%	. . .	. . .	No	4.05	
Ohio	. . .	. . .	. . .	. . .	. . .	No	2.15	
West Virginia	. . .	. . .	Lowest 20%	. . .	Lowest 20%	No	7.67	
Wisconsin	. . .	. . .	. . .	. . .	. . .	No	3.36	
Central								4.97
Colorado	. . .	. . .	Lowest 20%	. . .	. . .	Yes	4.74	
Idaho	. . .	. . .	. . .	. . .	. . .	Yes	8.92	
Kansas	. . .	. . .	. . .	. . .	. . .	Yes	4.51	
Montana	. . .	. . .	. . .	. . .	. . .	No	4.22	
Nebraska	. . .	. . .	. . .	. . .	. . .	Yes	4.81	
New Mexico	. . .	. . .	. . .	. . .	Lowest 20%	No	6.13	
North Dakota	. . .	. . .	. . .	. . .	. . .	Yes	5.37	
Oklahoma	. . .	. . .	. . .	. . .	. . .	No	5.65	
South Dakota	. . .	Lowest 20%	. . .	. . .	. . .	Yes	7.09	
Texas	. . .	Lowest 20%	. . .	Lowest 20%	. . .	Yes	4.47	
Wyoming	. . .	. . .	. . .	. . .	. . .	Yes	9.22	

Continued

TABLE 2—*Continued*

West							3.42
Alaska	Lowest 20%	. . .	. . .	. . .	Lowest 20%	No	14.00
Arizona	. . .	. . .	. . .	. . .	. . .	Yes	2.65
California	. . .	. . .	. . .	. . .	Lowest 20%	No	3.20
Hawaii	. . .	. . .	. . .	. . .	. . .	No	1.85
Nevada	. . .	. . .	Lowest 20%	. . .	. . .	Yes	6.04
Oregon	. . .	. . .	. . .	. . .	. . .	No	3.55
Utah	. . .	. . .	. . .	. . .	. . .	Yes	4.17
Washington	. . .	. . .	. . .	. . .	Lowest 20%	No	3.38

Note. State debt, union density, labor grievance rate, and unemployment rate were dichotomized at the 20th percentile to identify the 10 states least favorable to labor.
[a]Per 100 000 worker-years, adjusted for age, race, and gender.



Note. Category shading corresponding to injury rate categories differs among the 4 maps.

FIGURE 1—Fatal occupational injury rates per 100 000 workers, by state, modeled with Poisson regression for (a) 1980 rates adjusted for industry and for worker age, gender, and race; (b) 1995 rates adjusted for industry and for worker age, gender, and race; (c) 1980 rates adjusted for 6 political economy indicators, industry, worker age, gender, and race; and (d) 1995 rates adjusted for 6 political economy indicators, industry, and worker age.

TABLE 3—Relationship of State Political Economy Indicators and Rate of Fatal Occupational Injury, Adjusted for Industry and for Worker Age, Gender, and Race: United States, 1980 and 1995

	1980, RR (95% CI)	1995,[a] RR (95% CI)
High state debt	0.57 (0.52, 0.63)	0.72 (0.65, 0.80)
Low union density	1.16 (1.08, 1.25)	0.93 (0.84, 1.02)
Low labor grievance rate	1.09 (0.97, 1.17)	0.69 (0.78, 0.75)
Low social wage	1.09 (1.00, 1.18)	1.12 (1.04, 1.22)
High unemployment	1.12 (1.05, 1.20)	1.10 (1.02, 1.18)
Right-to-work law	1.20 (1.10, 1.32)	1.36 (1.25, 1.48)

Note. RR = rate ratio; CI = confidence interval.
[a]Omits deaths in Oklahoma County, Oklahoma, on the date of the federal building bombing.

coverage, an important component of the social wage. Measures of the fiscal capacity of states may not accurately gauge the regulatory environment of occupational safety and health. Our measure of state debt does not take into account the sources of debt (infrastructure vs social welfare programs) that may influence state capacity.

Our findings demonstrate regional clustering of state political economies—with the South and Northeast emerging as distinct clusters—and suggest that higher rates of fatal occupational injury are associated with a state policy climate favoring business over labor. Further research is needed to explore other effects of public policy on occupational health and safety and to more deeply examine the effects of specific measures. ■

TABLE 4—Prediction of State-Specific Fatal Occupational Injury Rates in 1995 From State-Specific Injury Rates and State Political Economy Indicators Measured in 1980: United States

Predictor in 1980	RR[a] (95% CI)
Fatal injury rate	2.26 (1.99, 2.57)
High state debt	0.90 (0.82, 0.99)
Low union density	1.09 (0.99, 1.20)
Low labor grievance rate	1.19 (1.10, 1.29)
Low social wage	1.03 (0.94, 1.14)
High unemployment	1.08 (0.99, 1.17)
Right-to-work law	0.91 (0.81, 1.02)

Note. RR = rate ratio; CI = confidence interval. All variables shown were included in the model with simultaneous adjustment for industry and for worker age, gender, and race.
[a]Relative rate was the relative increase in the 1995 occupational fatality rate per absolute increase in the state-specific 1980 fatality rate of 1 per 100 000.

About the Authors

At the time of the study, Dana Loomis was with the School of Public Health, University of Nevada, Reno, and the Department of Epidemiology, University of North Carolina, Chapel Hill. Michael D. Schulman was with the Department of Sociology and Anthropology, North Carolina State University, Raleigh, and the Department of Health Behavior and Health Education, University of North Carolina, Chapel Hill. A. John Bailer was with the Department of Mathematics and Statistics, Miami University, Oxford, OH. Kevin Stainback was with the Department of Sociology, Virginia Polytechnic Institute and State University, Blacksburg. Matthew Wheeler was with the Risk Evaluation Branch, National Institute for Occupational Safety and Health, Cincinnati, OH. David B. Richardson was with the Department of Epidemiology, University of North Carolina, Chapel Hill. Stephen W. Marshall was with the Departments of Epidemiology and Orthopaedics, University of North Carolina, Chapel Hill.

Correspondence should be sent to Dana Loomis, School of Public Health, MS–274, University of Nevada, Reno, NV 89557–0274 (e-mail: dploomis@unr.edu). Reprints can be ordered at http://www.ajph.org by clicking on the "Reprints/Eprints" link.

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Contributors

D. Loomis conceptualized the study, supervised its implementation, and led the writing. M. D. Schulman, A. J. Bailer, K. Stainback, D. B. Richardson, and S. W. Marshall contributed to designing, conducting, and interpreting the study and to drafting and revising the article. A. J. Bailer also provided statistical consultation. M. Wheeler conducted the analyses and contributed to writing and revisions.

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