

The Future of Work and Employment Relations in China

The Nature of Industrial Relations and Its Impacts on Occupational Safety and Health in China

FANMIN KONG
JUNJING LU
Peking University

Abstract

There were 37.102 million employees working in various types of firms and organizations in China's nonrural areas in 2012. Of that number, 71,983 lost their lives in workplace accidents, and more than 100,000 were seriously injured or suffered work-related diseases that limited their ability to work full-time during the year of occurrence (National Bureau of Statistics of China 2013). This paper discusses, both theoretically and empirically, the nature and evolution of industrial relations in mainland China and its impact on occupational safety and health over the past three decades. Market-oriented economic reform, narrowly focused on GDP growth, favors elites in power but often overlooks the interests of rank-and-file workers. Even worse, the safety and health of ordinary workers is jeopardized when they are viewed merely as a means to maximize profits.

Introduction

The occupational safety and health situation in China has drawn much attention from researchers worldwide in the past decade (The Solidarity Center 2004; Guo 2008; Xiao 2010). Under the crackdown of the State Administration of Work Safety (SAWS), the government watchdog for occupational safety and health issues, together with efforts by companies and other stakeholders, significant progress has been made since 2006 (Kong, Cai, and Guo 2010). However, the worker safety record is still extremely poor compared with that of developed (and some developing) countries (Guo 2008).

Migrant workers suffer a large number of incurable lung diseases because they work in the most hazardous industries, such as mining, construction material processing, and electronics manufacturing. Occupational disease has surpassed workplace accidents as the biggest threat to the health and safety of Chinese employees, with 200 million workers in some 16 million enterprises potentially under threat (Chen 2011). The case of one particular worker (Jiang 2010) illustrates the difficulty faced by workers who have occupational diseases to receive fair treatment and compensation¹.

Why do Chinese employees suffer so much in the workplace? First, there are macroeconomic and institutional factors. During the rapid course of economic globalization since the 1980s, occupational safety in production and related jobs began to deteriorate around the world (Mogensen 2006). China is no exception. The well-being of these workers significantly decreased as China became more involved in the global economy—an economy in which minimizing labor-related costs is still a golden rule. Both before and after China joined the World Trade Organization in 2001, GDP growth, along with all measures to speed up GDP growth (attracting foreign investment, heavy investment in infrastructure, stimulating real estate development, etc.) has been the top priority of Chinese government officials. The political advancement of these officials is primarily determined by local economic development under their administration (Zhou 2008). Accordingly, they are more likely to accept whatever these investors, foreign or domestic, propose with respect to

Author's address: Fanmin Kong, 443 Guanghai School New Building, Peking University, Beijing 100871, China

industrial relations so long as the investments remain in their territory. Furthermore, these government officials offer many economic incentives to investors, such as big tax breaks and various subsidies, and they stand with investors and employers when labor relations become problematic (Yang et al. 2010).

Second, there are factors at the micro level that contribute to poor health and safety outcomes in the workplace. Again, take migrant workers as an example. The majority of the 262.61 million migrant workers do not have stable employment and regularly change jobs—a situation that employers easily take advantage of by offering short-term employment, often without a contract and insurance benefits. Because of a surplus labor force, many workers are grateful for any job, regardless of how hazardous it is and have, at best, a rudimentary knowledge of their rights. An official with the labor protection department under the All-China Federation of Trade Unions (ACFTU) visited a smelter in Qingxu in North China's Shanxi province two years ago. More than ten furnaces were in operation, and hundreds of men worked in an environment so full of dust that it was impossible to see more than a meter ahead (Chen 2011). These workers are seen by employers merely as a means to make profits. The situation in large, state-owned enterprises (SOEs) is not much better; measures to protect workers are most likely acknowledged on paper, in (largely symbolic) corporate social responsibility annual reports², but are not implemented.

What are the overall trends of occupational health and safety in the workplace in China? And how has industrial relations evolved during the past three decades? Why and how do these two issues connect? In this paper, we explore the connection and provide further empirical evidence related to these research questions.

Literature Review

Occupational health issues in China can be traced as far back as the establishment of the People's Republic of China. However, more scholarly research on the topic did not appear until mid-1980s, shortly after China opened up and economic reform policies were adopted. The issue of occupational health in China must be examined in light of three principal determinants: (1) China's level of development, along with its state of public health and medical care; (2) the objectives that China defines as critical; and (3) China's available resources.

Christiani (1984) noted that China's drive to modernize its economy would produce new occupational health problems even as it resolved previous ones. Because China was facing an increasing number of occupational diseases (lung disease, cancer, heavy metal poisoning, industrial chemical poisoning) and diseases related to the environment (noise and heat), Christiani suggested that Chinese occupational health experts should put more hazard control efforts into place. Unfortunately, control measures such as engineering controls, expansion of environmental and medical monitoring, worker safety education and professional activities were not effectively implemented during the rapid economic transition. Therefore, his prediction of a promising future has not been fulfilled. The important question is, of course, why these control measures were not taken and, more specifically, why management—the first line of defense for responsible occupational safety and health measures—failed to adopt them.

Along with the rapid process of industrialization, in which more than 10,000 workers lost their lives and millions more work under the threat occupational disease, production safety issues have become the focus of many researchers. Meanwhile, safety indicators (casualties per million yuan of GDP production, fatal injury rate, injury severity per million tons of coal produced, etc.) have explicitly been addressed by government agencies as policy targets. Huang, Guo, and Liu (2009) examined Chinese literature in this period and classified the research into three categories:

1. Theoretical papers that establish a framework and analytical basis for Chinese scholars to conduct production safety research. These papers introduced major theories to the Chinese audience, such as Heinrich's domino model of accidents (Heinrich 1959), the human factor theory, the accident/incident theory, the epidemiological theory, and the unsafe personality theory, together with foreign safety management systems, production safety standards, and health management practices in benchmark organizations.

2. Analytical articles that focus on various reasons for high rates of production accidents in China. These authors investigated the relationship between safety performance and socioeconomic development. In addition, the effects of coal mining ownership, safety and health investments, worker compensation, total demand for coal production, regulatory frameworks, safety technology, internal management, and corporate culture are issues being researched.
3. Policy papers that primarily address the implication for a macro regulatory structure and a micro governance system pertaining to safety controls.

This line of research expanded the horizon of production safety literature in China and helped Chinese scholars tackle the issues in a broader yet more rigorous way. Nonetheless, these research findings have not always resulted in effective regulations and control measures in the workplace. One of the main reasons, argued Huang, Guo, and Liu (2009), is that these studies overlooked to a large extent the industrialization process and its dynamic connection with occupational safety and health in China. In general, the distribution of production accidents and occupational diseases differs throughout the various phases of the industrialization process, often demonstrating an inverse-U shape. Furthermore, industrialization in China occurs at its own pace and has characteristics that could have an effect on occupational safety and health. Huang, Guo, and Liu (2009) broke new ground with their research but did not examine the role of industrial relations. Almost all fatal accidents and occupational diseases caused by a chain of human errors, in which industrial relations may play key role.

The industrialization process in the 1980s and 1990s was accompanied by gradual privatization and rapid marketization in China. On the basis of his field work, Taylor (2002) examined the perceived impact of these transformations on the work, status, and attitudes of various industrial relations “actors” in seven companies in Guangdong and Shanghai in 1998 and 1999. He found that the primary impetus for tightening controls in the workplace has come from the development of markets. He also found that privatization has had an important but limited catalytic effect in this process. Increased discipline, increased pressure, and market pressures were occurring. Taylor also noticed that considerable internal and external pressures existed against privatization, resulting in more dramatic changes in industrial relations. But he could not predict what would happen if privatization continued.

As marketization continues, will managers at private sector companies, as well as those still working in SOEs, be able to make decisions to promote economic efficiency? And will the well-being of employees be sacrificed for efficiency concerns in the reform? As we have already seen, the answer is yes. In fact, these changes in industrial relations were well documented in literature. Ding and Warner (1999) discussed the impact of China’s reforms in the early 1990s on industrial relations at the company level and concluded that these reforms “re-invented” industrial relations systems and significantly influenced recruitment and selection, wage and reward systems, and social security programs. They also found that public sector employees were being squeezed out of their jobs, and some of them were leaving for employment in nonstate sectors, which were expanding at a much faster rate. Ding and Warner did not address the impact of “re-invented” industrial relations on occupational safety and health. Similar shortcomings were found by Helburn and Shearer (1984), Nelson and Reeder (1985), Chan (1995), Zhu (1995), Warner (1987, 1996), Warner and Hong (1998), Cooke (2002, 2005), and Wang (2008).

While most of these papers focused on general industrial relations issues about workers employed in SOEs or privatized industrial sectors, some scholars were interested in rural migrant workers—a dramatically increasing labor force in China—as well as the conditions they worked under. Meng and Zhang (2001) noted that rural migrant workers were treated differently than their urban counterparts in terms of occupational attainment and wages; however, not many of these disparities can be explained by productivity-related differences between the two groups. Similarly, Fan (2003) pointed to the subordination of peasants and women in China’s transition and tried to link this with Chinese sociocultural traditions that reinforce segregation and division of labor. In particular, male migrants concentrate on manual work such as construction, while female migrants are most highly represented in factory and domestic work. This segregation is related to institutional controls such as a labor system that channels migrant workers into

segregated low-skilled and low-paying jobs. Fan (2003) noted that these low-skilled and low-paying jobs are usually the ones with the largest number of occupational hazardous threats.

In sum, previous research has outlined the general scope and the changing trends in China's industrial relations over the past three decades. Likewise, occupational safety and health issues have been studied. However, there has been only limited research into the effects of industrial relations on occupational safety and health, a topic addressed in this paper³.

Theoretical Framework

Occupational safety and health, as one of the biggest labor issues, addresses the well-being of employees; thus, it forms one key dimension of the central dependent variables in the field of industrial relations (Kaufman 2010). However, unlike Kaufman, we do not treat employment relations as a central dependent variable; instead, we consider it a composite determinant for occupational safety and health performance⁴. By “employment relations,” we mean how labor is managed and organized in the workplace—the management practices and systems initiated by employers and their primary agents (i.e., top managers) as well as the labor's collective or individual responses to the management via certain mechanisms (i.e., unionization or representative organizations). Also, we treat labor legislation and regulations, along with social and cultural norms about labor–management relations, as integral factors of industrial/employment relations.

As such, our theoretical framework pertaining to the relationship between industrial relations and occupational safety and health is straightforward. Given the core principle that labor is embodied in humans and is not a commodity, we can examine the relationships from the perspectives of various actors in industrial relations and determine positions on this core principle. Then, we can determine the effects of specific labor safety and health measures. The results are a product of many factors, some of which are not related to industrial relations, or at least not directly linked to it.

First and foremost, how a company views its labor force is related to the essential well-being of employees in terms of safety and health. Indeed, today it is rare (and politically incorrect) for an employer to claim that labor is a commodity that can be used in whatever capacity the company wishes. In practice, however, many employers and their primary agents do in fact treat labor as a commodity—merely a means for maximizing profits as a benefit to owners and other stakeholders. This belief explains a phenomenon that we frequently have observed in employers: saving on labor-related costs by investing less in safety control measures, using temporary workers or outsourcing, and evading financial and moral responsibilities to employees who suffer illness, injury, or death from occupational hazards.

The strategic human resources perspective and corporate culture model make a counterargument to this reasoning. In fact, a company that adopts an innovative human resource practice—a high-performance work system (HPWS), for instance—might take worker safety into consideration, thus decreasing the rates of injury and occupational disease to some extent (Zacharatos 2001; Zacharatos, Barling, and Iverson 2005). Nevertheless, use of this type of employment relations system (i.e., one “with a human face”) does not change the logic of employers as it relates to efficiency (Kaufman and Miller 2011). In any case, under the high pressure of HPWS standards and the invisible yet strong influence of corporate culture, it is questionable whether employee well-being can actually be improved (Brown 2009; Cañibano 2013).

Second, employee organizations that truly advocate for workers' safety do make a difference, and unionization usually brings about a substantial and statistically significant decline in traumatic injuries and fatalities (Morantz 2013). The problem is whether labor unions or other forms of worker representation can fulfill their independent role in protecting member safety and health via collective action. This is especially vital in China because trade unions under the ACFTU umbrella have an ambiguous relationship with management and government agencies, both of which must accept the leadership of Communist Party committees (Child 1994; Chan 1995).

With the increasing importance of private sectors in the national economy and workers' increasing awareness of their organizing rights, there might be considerable variation within ACFTU in terms of local union organizing strategies (Liu 2010). However, the basic structure and the nature of Chinese official unions have not fundamentally changed. More specifically, either local trade unions or union units in a company can

do very little to protect worker well-being in terms of occupational safety and health vis-à-vis a company's efficiency goal. In addition, Chinese authorities require all organized laborers to comply with the Trade Union Law of the People's Republic of China (adopted in 1992 and amended in 2001) or to affiliate with ACFU. Given the current situation in which social inequality is growing and social trust is deteriorating, any effort to organize independent trade unions is very likely regarded by the authorities as deviation from "maintaining society stability," and therefore will probably be cracked down upon.

Third, macroeconomic policies that emphasize GDP give government officials a strong signal, and an economic growth-oriented political promotion scheme will further push them to encourage extensive development. In turn, they will do whatever they can to compete for capital and provide investors and employers various incentives in the labor market. This is why there are construction sites on nearly every corner, as well as economic development zones and high-tech science parks in every county and metro area of China. The investment-driven pattern of economic development will certainly require more energy and material inputs, given current production technologies. Therefore, a growing labor force, rural migrants in particular, has been pumped into sectors such as mining, construction, and material processing, as well as lower-end manufacturing industries, and will have to accept the miserable working conditions of those industries.

Fortunately, top Chinese leaders recently realized that rapid economic growth was gained at a very high price in terms of environmental damage, workplace casualties and occupational diseases and therefore cannot be sustained. Those who benefit most from this system have no incentive to change and may take countermeasures to secure their interests. One has no reason to be optimistic if this group happens to be the same people who are able to influence macroeconomic policies.

Fourth, labor legislation and regulations are important, but even more important are how these laws and regulations are enforced. The past three decades have seen an increasing number of labor disputes and conflicts (Yang 2010). Employers were ruled against in less than 50% of these labor dispute cases. Zhang Haichao's case illustrates vividly how individual or a group of employees are often treated in such cases. To some extent, Zhang Haichao and four co-workers infected silicosis were fortunate: they received compensation thanks to enormous public pressure. And yet a larger number of labor disputes did not go through arbitration or any other legal procedure, so the legal system can do little about it. It should be noted that labor law enforcement officials in China, judges and procurators in particular, have their own Communist Party committees and are generally required to cooperate with, but not be independent of, party and administrative leadership.

In sum, since the 1980s, the nature of industrial relations has barely evolved during China's transition. The philosophy and unilateral orientation of management practices, the ambiguous role of trade unions, extensive economic development policies, and weak enforcement of labor laws and regulations continue to point to deteriorating safety and health outcomes in the workplace.

Empirical Analysis

Because workplace health and safety is a highly sensitive issue, many employers were reluctant to provide detailed information. Consequently, our empirical analysis relies heavily on public data resources such as accident reports and summaries by SAWS, regional administrations of work safety, the State Administration of Coal Mining Safety and its local branches, and national or regional aggregate numbers from China's National Bureau of Statistics and related government agencies such as centers for disease control (CDCs) and prevention, and sometimes even media reports. In this paper, we use two empirical studies based on public databases to research micro- and macrodeterminant factors for occupational disease and fatalities for Chinese industrial workers.

Study 1: The Determinants of Occupational Diseases (1994–2008)

This study was partially based on a study by Kong and Xiao (2010) and Xiao (2010).

Sample

We collected occupational disease data, primarily the number of employees who suffered from various diseases in different occupations, from 12 Chinese provinces from 1994 through 2008. According to the laws on prevention and control of occupational diseases, regional CDCs are in charge of occupational disease confirmation, usually diagnosed by certified hospitals whose license is issued and renewed by local public health administrations. The latter are regional branches of the Ministry of Public Health (MPH), which publishes several professional journals such as *Occupations & Health*, *China Journal of Labor Health and Occupational Disease*, and *Industrial Health and Occupational Disease*, our major data sources. In addition, we collected economic, labor market, and firm information from annual national and regional statistics. The variables and their descriptive statistics are presented in Table 1.

TABLE 1
Descriptive Statistics

Variable Name	Obs.	Min.	Max.	Mean	s.d.
Number	180	7.00	1645.00	447.80	352.36
GDP (100 million yuan)	180	134.00	35696.00	5075.98	5517.64
Employees (in 10,000s)					
Metallurgy	180	1.70	188.00	17.49	18.45
Chemical	180	0.70	34.70	9.63	6.61
Coal mining	180	0.00	42.40	9.09	11.39
Manufacturing	180	6.50	780.90	163.96	159.31
Construction	180	2.40	269.90	38.39	40.43
Males (%)	180	51.40	61.30	54.38	1.77
Education (%)					
Elementary	180	11.50	59.10	40.69	8.48
High school	180	4.30	36.10	13.93	5.35
College	180	0.30	29.30	6.63	4.99
Employment (in 10,000s)					
SOEs	180	14.8	692.60	231.51	171.85
Private firms	180	1.50	1154.10	140.25	194.55
Foreign investment firms	180	0.00	369.60	35.18	63.13
Total	180	19.64	1058.11	433.58	264.95
Occupational training (%)	180	0.00	26.24	0.20	1.95
Average wage (yuan)	180	3546	56565	13571.37	8896.91

Regression Results

We applied a simple fixed-effect technique and examined the effects of economic development, industry characteristics, and employment attributes on occupational disease cases. The estimation results are provided in Table 2.

TABLE 2
Determinants of Occupational Disease (1994–2008): Fixed-Effect Model

Independent Variable	B (s.e.)
Log (GDP)	−138.47 (144.38)
Log (metallurgy industry employees)	394.03** (72.89)
Log (chemical industry employees)	150.56 (114.46)
Log (coal industry employees)	−68.91 (41.94)
Log (manufacturing industry employees)	−290.63** (104.98)
Log (construction industry employees)	373.31** (80.94)
Male	−28.99 (20.06)
College	30.66 (9.45)
High school	20.14* (11.39)
Elementary	15.56* (8.00)
Log (SOE employees)	−361.74** (99.82)
Log (private sector employees)	−8.30 (58.64)
Log (total employees)	−26.15 (68.43)
Training	10.45 (7.65)
Average wage	−0.01 (0.01)
Intercept	3107.70* (1823.36)

N = 165, adjusted R² = 0.54, F(15, 139) = 10.89, Prob. > F = 0.00

*p < 0.1, **p < 0.01

In a large country such as China, regional economic development has long been unbalanced, with coastal areas experiencing quicker development. However, we did not detect a significant connection between local economic development and occupational disease at the regional level. Presumably, the faster the local economic development, the more workers are employed. When growth is the dominant goal, the likelihood is increased that more occupational diseases will occur. On the other hand, rapid economic development may, at some stage, afford more resources for prevention and control of occupational diseases. The GDP parameter might reveal such a trend, although it is statistically insignificant.

Among the industries with the most hazardous working environments, metallurgy and construction have a significantly high rate of occupational diseases (Sun, Tang, and Liu 2009; Huang, Zhu, and Chen 2006). Compared with numerous private firms and foreign investment enterprises, the working conditions were much healthier in SOEs. This might be due to close supervision and regulation from the top. Employees with less education faced a higher risk of occupational disease because their lower socioeconomic status and lack of knowledge about production safety and, most important, lack other employment opportunities. Finally, we found no evidence that male workers were more vulnerable than female workers to occupational diseases, nor did employee occupational training matter. However, this finding seems to contradict the information found in most incidents reports.

In a transitory developing economy such as China, which is plagued by large-scale unemployment, employees with few skills, low levels of investment, and ineffective institutional intervention, occupational safety and health problems are even more acute, and their adverse impact on workers and eventually on society may be even more severe (Cooke 2002). Obviously, our analysis is just a start, and more detailed investigations should be undertaken.

Study 2: The Determinants of Occupational Deaths (1978–2012)

We collected national-level annual data on industrial worker deaths from 1978 (when China adopted its policies of reform and opening up) through 2012, from the China Safety Production Yearbook.

Proxies and Hypotheses

National Economic and Social Factors. There are macro indicators representing national-level social and economic circumstances. Annual national GDP and GDP per capita represent the level of economic development. The national unemployment rate represents the overall employment situation of the focal year, and a high unemployment rate indicates an employment level that favors employers. The urban–rural dual structure is reflected by the ratio between Engel’s coefficient for rural households and for urban households. The higher this coefficient, the larger the gap between the quality of life of urban and rural residents. The proportion of added-value provided by secondary industries to the total GDP reflects the development level of the nation’s mining, manufacturing, construction, and energy industries, in which most of the front-line jobs—which present the greatest risk of occupational diseases, injuries, and death—are occupied by migrant workers. The national annual outputs of steel, coal, electricity, and cement producers are another set of indicators relating to the level of industrial development.

Our hypothesis therefore is that the national economic development level, employment factors beneficial to employers, the quality-of-life gap between urban and rural workers, and the level of industrialization are all positively related to the number of occupational deaths.

Enterprise Practices. The indicator that reflects treatment of workers has a proxy. The ratio between the average yearly wage increase for employees of other ownership structures [i.e., ownership structures other than state-owned and collective-owned enterprises (COEs)] and that of the state-owned ones indicates how well workers are treated because workers in state-owned enterprises commonly enjoy better working conditions and work protection measures. The higher the ratio, the better the workers in nonstate- or noncollective-owned companies are treated.

In this respect, therefore, our hypothesis is that the better the workers are treated at nonstate- or noncollective-owned companies, the fewer occupational deaths.

Union Efforts. The indicators reflecting substantive union status and union labor protection efforts were also calculated. The substantive condition of trade unions is the number of trade unions per 10,000 workers in economic entities except for state- and collective-owned companies, and those with foreign investment. We excluded these three entities because the labor conditions at them are relatively better than at other types of companies. The union penetration rates at state- and collective-owned enterprises are more a result of political machinations than of union substantive efforts and therefore do not reflect the labor conditions in these entities. Companies with foreign investment have better work conditions because of technical advantages, mother country labor protection traditions, and international standards, thus the union penetration rates of these firms also has little connection to the labor conditions in these firms. The union labor protection effort is represented by the total number of union safety inspectors.

Our hypothesis for this parameter is that the higher the trade union penetration in economic entities (excluding state-owned and collective-owned enterprises and those with foreign investment) and the larger the number of union safety inspectors, the fewer occupational deaths.

Results

Table 3 shows the yearly value of the indicators and the dependent variable.

TABLE
3 Value of the Indicators and the Dependent Variable for Each Year (1978–2012)

Year	Deaths	GDP (100M yuan)	GDP per capita (10K yuan)	Proportion of secondary industry	Steel (10K tons)	Coal (100 M tons)	Electricity (100 M kwh)	Cement (100 M tons)	Unemployment rate	Ratio of Engel's coefficient	Ratio of average wage increase	Trade union penetration (non-SOE, COE, FDI*)	Union safety inspectors
1978		3645.2	0.037869	47.9	2208	6.18	2565.5	0.6524	5.3	1.177391			
1979	13054	4062.6	0.04165	47.1	2497	6.35	2819.5	0.739	5.4				
1980	11582	4545.6	0.046052	48.2	2716	6.2	3006	0.7986	4.9	1.086116			
1981	10393	4891.6	0.048881	46.1	2670	6.2	3093	0.84	3.8	1.054674			
1982	9867	5323.4	0.052368	44.8	2902	6.66	3277	0.952	3.2	1.03413		3.5	
1983	8994	5962.7	0.057886	44.4	3072	7.15	3514	1.0825	2.3	1.003378		2.686047	
1984	9088	7208.1	0.069072	43.1	3371	7.72	3746	1.2108	1.9	1.022414		1.834146	
1985	9847	9016	0.085176	42.9	3679	8.5	4073	1.4246	1.8	1.10728	1.16939		
1986	8982	10275.2	0.095577	43.7	4054	8.7	4455	1.6156	2.0	1.078244	0.972318	1.046693	
1987	8658	12058.6	0.110326	43.6	4391	9.2	4960	1.8	2.0	1.042991	1.055402	0.695228	
1988	8908	15042.8	0.135489	43.8	4698	9.7	5430	2.03	2.0	1.050584	1.058032	0.561573	
1989	8657	17000.9	0.150846	42.8	4865	10.4	5820	2.07	2.6	1.005505	1.024568	0.44161	
1990	7759	18718.3	0.163717	41.3	5121	10.8	6180	2.03	2.5	1.084871	0.992734	6.265379	3050654
1991	7855	21826.2	0.188444	41.8	5547	10.9	6750	2.48	2.3	1.070632	1.070698	5.100106	3028335
1992	7994	26937.3	0.229897	43.5	6534	11.1	7470	3.05	2.3	1.086792	0.984375	3.878458	2979588
1993	19820	35260	0.29751	46.6	7600	11.41	8200	3.6	2.6	1.15507	1.020542	1.634001	2917344
1994	20315	48108.5	0.401406	46.6	8003.6	12.1	9200	4.05	2.8	1.178	0.933976	1.601615	2608319
1995	20005	59810.5	0.493808	47.2	8000	12.98	10000	4.5	2.9	1.14902	1.009458	1.714215	2605566
1996	19457	70142.5	0.573111	47.5	8611	13.8	10750	4.9	3.0	1.153689	0.991863	1.642532	2358700
1997	17558	78060.9	0.631428	47.5					3.1	1.182403	0.990602	0.997184	2028789
1998	14660	83024.3	0.665467	46.2					3.1	1.194631	0.920076	0.099193	2236762
1999		88479.2	0.703411	45.8					3.1	1.249406	0.983696	0.092925	1964424
2000	11681	98000.5	0.773222	45.9	19218	13.8	16540	7.25	3.1	1.246193	1	0.045746	1939072
2001	12554	108068.2	0.84675	45.2					3.6	1.248691	0.943966	0.024262	
2002	14386	119095.7	0.927154	44.8	19218	13.8	16540	7.25	4.0	1.225464	1.212064	0.022064	1014145
2003	14693	134977	1.044495	46	24119.35	16.67	19107.6	8.62	4.3	1.229111	0.973286	0.051428	
2004	16497	159453.6	1.226679	46.2	29723.12	19.56	21870	9.7	4.2	1.251989	0.97188	0.045184	1431019
2005	15868	183617.4	1.404275	47.4	39692	21.9	24747	10.6	4.2	1.239782	0.972028	0.017463	1545316
2006	14412	215904.4	1.642508	47.9	47339.6	23.8	28344	12.4	4.1	1.201117	0.993833	0.036721	
2007	13886	266422	2.016378	47.3	56894.4	25.36	32777.2	13.6	4.0	1.187328	0.962312	0.033087	
2008	19483	316030.3	2.37971	47.4	58488.1	27.93	34668.8	14	4.2	1.153034	1.012987	0.029298	1863552
2009	17602	340320	2.550169	46.2	69626.3	30.5	37146.5	16.5	4.3	1.123288	0.974038	0.028594	1964424
2010	10616	399759.5	2.981255	46.7	79775.5	32.4	42065.4	18.8	4.1	1.151261	1.016158	0.02747	2043719
2011	9704	472115	3.504026	46.6	88258.2	35.2	47000.7	20.9	4.1	1.112948	1.017794	0.01688	
2012		519322	3.835352	45.3	95317.6	36.5	49377.7	22.1					

*Foreign directly invested.

For the test of hypotheses, we calculated the one-tailed correlation coefficients among the variables. The correlation coefficients between the indicators and the national annual death rate for industrial workers confirmed our hypotheses (Table 4).

TABLE 4
Correlations Among Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. GDP (N = 35)												
2. GDP per capita (N = 35)	1.00***											
3. Proportion of secondary industry (N = 35)	.34**	.35**										
4. Steel (N = 31)	.99***	.99***	.36**									
5. Coal (N = 31)	.985***	.98***	.34**	.98***								
6. Electricity (N = 31)	.99***	.99***	.38**	.99***	.99***							
7. Cement (N = 31)	.99***	.99***	.38**	.98***	.99***	.99***						
8. Unemployment rate (N = 34)	.44***	.44***	.73***	.44***	.38**	.43***	.43***					
9. Ratio of Engel's coefficient (N = 33)	.36**	.37**	.56***	.39**	.45***	.48***	.50***	.52***				
10. Ratio of wage increase (N = 33)	-.14	-.15	-.39**	-.21	-.27	-.23	-.23	-.23	-.26			
11. Trade union penetration (non-SOE, COE, FDI†) (N = 29)	-.51***	-.52***	-.63***	-.54***	-.54***	-.57***	-.58***	-.56***	-.52***	.06		
12. Union safety inspectors (N = 17)	-.51**	-.52**	-.46**	-.50**	-.51**	-.59**	-.60**	-.85***	-.77***	-.29	.80***	
Deaths (N = 32)	.26*	.27*	.72***	.33**	.24*	.31**	.32**	.37**	.62***	-.28*	-.38**	-.26

† Foreign directly invested.

*p < 0.1, **p < 0.05, *** p < 0.01

Conclusion

In this paper, we outlined a straightforward framework for the influence of industrial relations on occupational safety and health. The very nature of industrial relations in China during the past three decades and its evolution present a discouraging picture for the well-being of the labor force. Our empirical studies pointed to some positive progress, but there were many negative results that will be difficult to change in the near future, especially those related macroeconomic policies and labor organizations. We found inadequate management practices are closely associated with bad records in production safety and occupational health. However, the positive relationship between systematic human resource practices and occupational safety is supported by a field study of two coal mines.

Theoretical Implications

This study examined the nature of industrial relations in China during its industrialization process since the early 1980s. Without a critical evaluation of its nature and changing context, it is difficult to understand why China has the highest rates of occupational casualties and diseases. We must investigate the determinants of occupational safety and health results from an institutional perspective and return core principles of industrial relations to the workplace.

Practical Implications

Based on our observations, the eventual solution to occupational safety and health problems lies in the hands of both the management and the policy makers. Of course, labor organizations must remain independent in terms of protecting worker interests via collective action. However, this is not viable if the legal and political systems do not change. From a practical perspective, our paper presents important implications for enterprise managers and supervision institutes. In terms of management practices, private firms should transform from the traditional personnel management paradigm to a modern employment relations system in which humans are the soul of management. In particular, top managers should make job applicants' safety qualifications as top selection criteria, attract sufficient talent for job positions that safeguard health, and allocate safety personnel more efficiently. Managers should also increase the amount of safety training and use incentives to improve training outcomes.

Worker compensation should be integrated into safety management, and competitive wages should be paid to workers. In particular, managers should reward safety performance and impose penalties for accidents and violations. Trade unions should actively participate in resolving labor-management conflicts. In addition, more safety inputs should be implemented in the workplace to create and maintain safe working conditions for all.

Limitations and Directions for Future Research

For future research, we should put more effort into company-level analysis, taking institutional variables into consideration. For example, we should examine whether and why there are differences in the safety performance between various categories of companies in terms of ownership structure, company size, labor force characteristics, and industrial and regional attributes.

Endnotes

¹ Meanwhile, similar cases continue to be reported by the media. In November 2009, 125 former construction workers with the same disease petitioned authorities for compensation. The Shenzhen Labor Bureau denied compensation because the workers could not prove that they had a labor contract. Because these were informal and casual daily laborers, it was difficult for them to gather the necessary evidence, which dated back to 1996 (Jiang 2010).

² Arguably, employees in some monopolized industries such as banking, telecommunications, petrochemical, and postal, are well paid and enjoy better benefits compared with those employed in other sectors. However, employee well-being is not factored into the controller's objective function (Lin 2012; Guan 2013).

³ A number of research works examine the relationship of human resources practices to occupational safety and health (e.g., Butler and Park 2005; Lauver 2004, 2007). However, there is controversy about this relationship. Relatively few studies have explored the mechanism by which management practices impact safety and health (Zacharatos 2001; Zacharatos, Barling, and Iverson 2005). There has been an increasing number of research works in recent years about coal mining safety issues in China, but those studies are primarily qualitative (Chen 2006; Guo 2007).

⁴ In this paper, we define industrial relations in its traditional and broad sense, using it interchangeably with employment relations and labor relations. See Kaufman (2001) and Budd (2004).

References

- Brown, M. 2009. *The Cultural Work of Corporations*. New York: Palgrave MacMillan.
- Budd, J. 2004. *Employment with a Human Face: Balancing Efficiency, Equity, and Voice*. Ithaca, NY: Cornell University Press.
- Butler, R., and Y.-S. Park. 2005. "Human Resource Management and Safety: Technical Efficiency And Economic Incentives." In *Safety Practices, Firm Culture, and Workplace Injuries*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, pp. 1–12.
- Cañibano, A. 2013. "Implementing Innovative HRM: Trade-Off Effects on Employee Well-Being." *Management Decision* 51(3):643–660.
- Chan, A. 1995. "The Emerging Patterns of Industrial Relations in China and the Rise of Two New Labor Movements." *China Information* 9(4):36–59.
- Chen, H. 2006. *Unsafe Behaviors Within Severe Accidents in China Coal Mining Industry*. Beijing: Science Press.
- Chen, X. 2011 (Apr. 12). "200m in danger of workplace disease." *China Daily*.
- Child, J. 1994. *Management in China During the Age of Reform*. Cambridge: Cambridge University Press.
- Christiani, D. 1984. "Occupational Health in the People's Republic of China." *American Journal of Public Health* 74(1):58–64.
- Cooke, F. 2002. "Ownership Change and Reshaping of Employment Relations in China: A Study of Two Manufacturing Companies." *Journal of Industrial Relations* 44(1):19–39.
- Cooke, F. 2005. "Employment Relations in Small Commercial Business in China." *Industrial Relations Journal* 36(1):19–37.
- Ding, D., and M. Warner. 1999. "'Re-Inventing' China's Industrial Relations at Enterprise-Level: An Empirical Field-Study in Four Major Cities." *Industrial Relations Journal* 30(3):243–260.
- Fan, C. 2003. "Rural–Urban Migration and Gender Division of Labor in Transitional China." *International Journal of Urban and Regional Research* 27(1):24–47.
- Guan, S. 2013. *The Determinants of Employee Caring in the Firm: A Corporate Social Responsibility Perspective*. Master's degree thesis, Peking University.
- Guo, C. 2008. *Research on China Coal Mine Enterprise Safety Development*. Haidian, Beijing: Economy & Management Publishing House.
- Guo, K. 2007. *The Effect of State Regulations on Occupational Safety in Coal Mining Firms—A Content Analysis Study*. Master's degree thesis, Peking University.
- Heinrich, H. 1959. *Industrial Accident Prevention: A Scientific Approach*. New York: McGraw-Hill.
- Helburn, I., and J. Shearer. 1984. "Human Resources and Industrial Relations in China: A Time of Ferment." *Industrial and Labor Relations Review* 38(1):3–15.
- Huang, Y., W. Zhu, and G. Chen. 2006. "An Analysis on Occupational Diseases in Shanghai Pudong New Economic Zone." *Shanghai Prevention Medical* 18(6).
- Huang, Q., C. Guo, and X. Liu. 2009. *Industrialization Process and Production Safety in China*. Beijing: China Financial & Economic Publishing House.
- Jiang, T. 2010 (Jul. 28). "The System Needs Open Chest Surgery: What Zhang Haichao's Case Shows in China's Legal System for Occupational Disease." Asia Monitor Resource Center. <http://www.amrc.org.hk/node/980>.
- Kaufman, B. 2001. "Human Resources and Industrial Relations: Commonalities and Differences." *Human Resource Management Review* 11:339–374.
- Kaufman, B. 2010. "The Theoretical Foundation of Industrial Relations and Its Implications for Labor Economics and Human Resource Management." *Industrial and Labor Relations Review* 64(1):74–108.

- Kaufman, B., and B. Miller. 2011. "The Firm's Choice of HRM Practices: Economics Meets Strategic Human Resource Management." *Industrial and Labor Relations Review* 64(3):526–557.
- Kong, F., Y. Cai, and K. Guo. 2010. "Government Regulation Effect on Occupational Safety—A Content Analysis Study in China's Coal Industry." Paper presented at the Academy of Management 2010 Annual Meeting, August 6–10, Montréal.
- Kong, F., and B. Xiao. 2010. "Prevention of Occupational Disease: A Prerequisite for Building a Harmonious Society." *Enterprise Decision* 5:61–64.
- Lauver, K. 2004. "HR Safety Practices and Organizational Safety Outcomes." *Academy of Management Proceedings* J1–J6.
- Lauver, K. 2007. "Human Resource Safety Practices and Employee Injuries." *Journal of Managerial Issues* 19(3):397–413.
- Lin, Y. 2012. "Economics of Social Wealth Leaking Out." *China Financial Think-tank* [in Chinese]. <http://www.zgjrzk.com/news/2012/0827/134603452064185.html>.
- Liu, M. 2010. "Union Organization in China: Still a Monolithic Labor Movement?" *Industrial and Labor Relations Review* 64(1):30–52.
- Meng, X., and J. Zhang. 2001. "The Two-Tier Labor Market in Urban China: Occupational Segregation and Wage Differentials Between Urban Residents and Rural Migrants in Shanghai." *Journal of Comparative Economics* 29:485–504.
- Mogensen, V. (ed.) 2006. *Worker Safety Under Siege: Labor, Capital, and the Politics of Workplace Safety in a Deregulated World*. Armonk, NY: M.E. Sharpe.
- Morantz, A. 2013. "Coal Mine Safety: Do Unions Make a Difference?" *Industrial and Labor Relations Review* 66(1):88–116.
- National Bureau of Statistics of China. 2013 (Feb. 22). *Statistical Report on National Economy and Social Development in 2012*. Beijing: National Bureau of Statistics of China.
- Nelson J., and J. Reeder. 1985. "Labor Relations in China." *California Management Review* 27:13–32.
- Solidarity Center, the American Center for International Labor Solidarity. 2004. *Justice for All: The Struggle for Worker Rights in China—A Report by the Solidarity Center*. Washington, DC: The Solidarity Center.
- Sun, J., H. Tang, and S. Liu. 2009. "Statistical Analysis on Occupational Disease Supervision Information: 2003–2006." *China Journal of Labor Health and Occupational Diseases* 27(2).
- Taylor, B. 2002. "Privatization, Markets and Industrial Relations in China." *British Journal of Industrial Relations* 40(2):249–272.
- Wang, K. 2008. "A Changing Arena of Industrial Relations in China: What Is Happening After 1978?" *Employee Relations* 30(2):190–216.
- Warner, M. 1987. "Industrial Relations in the Chinese Factory." *Journal of Industrial Relations* 29(2):217–232.
- Warner, M. 1996. "Economic Reforms, Industrial Relations and Human Resources in the People's Republic of China: An Overview." *Industrial Relations Journal* 27(3):195–210.
- Warner, M., and N. Hong. 1998. "The Ongoing Evolution of Chinese Industrial Relations: the Negotiation of 'Collective Contracts' in the Shenzhen Special Economic Zone." *China Information* 12(4):1–20.
- Xiao, B. 2010. *Analyzing the Factors of Occupational Hazards in Domestic Employees: Panel Data of 1994 to 2008's Empirical Based Results*. Master's degree thesis, Peking University.
- Yang, L., G. Cai, D. Liu, Y. Peng, K. Xiang, C. Ye, C., and X. Zhu. 2010. "The Pain of Transition in Labor Relations." *Outlook Weekly*, 25.
- Yang, W. 2010 (Sep. 14). "The Supreme People's Court Explains the Reasons for Big Jump of Labor Disputes." Xinhua Net report, Beijing.
- Zacharatos, A. 2001. *An Organization and Employee Level Investigation of the relationship Between High Performance Work Systems and Workplace Safety*. Ph.D. dissertation, Queen's University, Canada.

- Zacharatos, A., J. Barling, and R. Iverson. 2005. "High-Performance Work Systems and Occupational Safety." *Journal of Applied Psychology* 90(1):77–93.
- Zhou, L. 2008. *Local Governments in Transition: The Incentives and Governance for Officials*. Shanghai: Gezhi Publishing House and Shanghai People Press.
- Zhu, Y. 1995. "Major Changes Under Way in China's Industrial Relations." *International Labour Review* 134(1):37–49.