



PERGAMON

Social Science & Medicine 58 (2004) 1231–1245

SOCIAL  
SCIENCE  
&  
MEDICINE

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# Employee and union inputs into occupational health and safety measures in Chinese factories

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## Abstract

Few studies have addressed the impact of employees' inputs on the protection of their health and safety. The research presented in this paper focuses on Chinese factories and measures employees' evaluation of the effectiveness in OHS issues of their enterprise trade union and staff and workers' representative congress (SWRC). The data for the study draws upon a national survey of employees of enterprises in manufacturing industry conducted in 1997 by the All-China Federation of Trade Unions. The study finds that the input of the trade union and SWRC does have a significant impact on the protection of the workers' occupational health and safety.

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*Keywords:* Occupational health and safety; Trade union; Employee inputs; China

## Introduction

Since workers are directly involved in the labor process, they are the ones who are most affected by health and safety hazards. Especially in poor countries, there are apt to be potential conflicts of interest between the workers and management over occupational health and safety (OHS) because management tends to equate taking protective measures with increases in costs of production. In such a situation, management is unlikely to invest resources in OHS unless regulated by an effective state or pressured by employees.

In most of the published research on OHS, the employees are treated simply as passive victims (e.g., Everly, Feldman, & Associates, 1985; Weiss, Fielding, & Baum, 1991). Most discussions on the prevention of work-related disease and injury focus on technical measures such as the installation of engineering controls and devices, substitution of a non-hazardous substance for a hazardous one, job redesign, work organization

changes, protective equipment; education, advice and screening and surveillance of workers' health; and government regulations and enforcement (e.g., Wegman & Levy, 1995; Conway & Svenson, 1998; Herbert & Landrigan, 2000). Nevertheless, a handful of researchers note the importance of workers' inputs in the protection of workers' health and safety (Levenstein & Tuminaro, 1997; Loewenson, Laurell, & Hogstedt, 1999; Gardell, 1982; Wokutch, 1992; Noble, 1986; Robinson, 1991), and a few empirical studies (e.g., Weil, 1991, 1992) have noticed a significant role played by trade unions in the protection of workers' health and safety.

The research presented in this paper attempts to examine the relationship between the workforce's and enterprise-level union's input and OHS protection in Chinese factories. We shall first set the political and economic context—how the economic reforms launched in China since the early 1980s affected employees' health and safety problems. This is followed by a brief description and discussion of the historical developments of the two most relevant workplace institutions through which Chinese workers can have some input on OHS matters—the trade unions and the staff and workers' representative congress (SWRC, *zhigong dai-biao dahui*); and then it will be shown how structural

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factors—factory size, an enterprise's financial standing, and its ownership type—may influence the functions and performance of these two institutions vis-a-vis OHS.

### Market reform and its effects on employees' health and safety

Over the past two decades China has been undergoing a dramatic transformation from a socialist command system to a market economy. The industrial sector has been significantly restructured. Rural collective enterprises in villages and townships have flourished. Private enterprises and foreign-funded enterprises that were non-existent as of two decades ago have mushroomed. These have challenged the state-owned sector, which has shrunk due to the collapse of many state-owned enterprises. From a rigidly planned economic system China has been transformed into a decentralized economy. In line with this, oversight of OHS conditions have become decentralized and highly deregulated outside the state-owned industrial sector, and increasingly so within the state sector.

In recent years China has become notorious internationally for weak OHS protection, with many fatal accidents reported by its own media and the international press. Some western scholars have warned that China's rapid modernization drive is leading to an explosive growth of hazardous industries and unsafe workplaces and enormous challenges in occupational health problems (Christiani, 1984; Guidotti & Levister, 1995; Abrams, 1980). It was estimated that some 34 million people (about 30% of the industrial workforce in China) are engaged in hazardous occupations (*China Women's News*, 1996). In the 1990s there were, on average, 100,000 fatalities from industrial accidents each year (Xia et al., 2000); between January and July 2002, such fatalities stood at 65,350 (*China Daily*, August 8, 2002). 11,700 cases of serious occupational diseases were officially reported in 2000, a jump of 14.5% from 1999. Of these, pneumokoniosis was the most serious, accounting for 77.7% of the cases. This disease is a lung fibrosis caused by long-term inhalation of dusts including silica, asbestos, and coal dusts. It is prevalent and serious partly because there is, so far, no effective treatment. The estimated cumulative number of pneumokoniosis cases was slightly over half a million, and the death rate was 23.85% (Bureau of Legal System and Supervision in Health, 2001). The rates of industrial fatalities, injuries and contraction of OHS diseases were so alarming that the Chinese government awoke to the fact that immediate stopgap measures had to be instituted: two new laws—on the prevention and treatment of occupational diseases and on safe production—were promulgated in 2001.

The serious situation in occupational diseases and injuries was compounded by a restructuring of government bureaucracies at the national level at the end of the nineties, accompanied by a massive downsizing of personnel. In 1998 the Bureau of Labor Protection under the Ministry of Labor was disbanded and its staff laid off.<sup>1</sup> Nationwide there is no longer a special government institution in charge of OHS. Instead, the Bureau's functions were taken over by the State Economic and Trade Commission (Mei, 2002). The latter is China's bureaucracy in charge of economic development, and in the absence of an effective peak employers association in China this Commission has played that role.<sup>2</sup> As such, it has not been protective of labor.

When dramatic fatal accidents continued to be reported in the Chinese press, the Chinese government realized it was necessary to rebuild its OHS bureaucratic system. In 2001 the State Economic and Trade Commission established the National Safe Production Supervision Management Bureau, and to emphasise the government's seriousness in improving the country's OHS conditions, a Safe Production Committee was set up under the State Council (*Labor Protection Magazine*, 2001). Whether China's OHS record will improve in coming years with the re-emergence of these peak OHS bureaucracies still remains to be seen.

The economic reforms have shaped an industrial structure that is difficult to monitor. Before the market reform, during the Maoist era, the state sector, followed by the urban collective sector, were dominant. There was no private sector, and the state-owned factories tended to be large, often employing some thousands of workers. They were therefore easier to monitor. In contrast, after the market reforms many tens of thousands of small private and rural collective factories sprang up, making monitoring of OHS protection a daunting task. In addition, there is a booming sector of foreign-invested enterprises managed by Hong Kong, Taiwanese and Korean firms, which are notorious in China for their lack of concern for workers' health and safety. In Guangdong province, where these Asian-invested enterprises are concentrated, local Chinese newspapers carry stories of disregard for human lives in the use of labor. Local governments eager to attract foreign

<sup>1</sup>Based on interviews conducted at the International Labor Organization (ILO) in Beijing in 1999 and the Safety Science and Technology Research Center of the State Economic and Trade Commission, in Beijing, in 2002.

<sup>2</sup>Information based on Anita Chan's field research in China in March–April 2002. The China Enterprise Management Association (CEMA) was set up by the Chinese government to be China's peak employers' association, but its membership remains small and weak.

investments tend to turn a blind eye to this (Chan, 2001a).

### *The legacy of state socialism*

Chinese employees have inherited from the Maoist era two institutions which, when activated, may help to soften the assault on workers' health and safety: the workplace trade union (TU) and the staff and workers' representative congress (SWRC). These two institutions are legally entrusted, at least on paper, with functions that allow employees an input into management practices, and by extension the protection of their own health and safety. With China's appalling OHS record and lack of genuine western-style labor rights due to restrictions on freedom of association and the freedom to collectively bargain, even to allude to the possibility that China has institutions that may serve workers' interests within factories seems ridiculous. But as we shall show in this paper, these two institutions hold out some hope for an improvement in OHS conditions in China.

The Chinese trade union is a quasi-governmental institution whose officials are appointed from above. It often serves essentially as a branch of management in factories, taking care of the company's welfare measures. But it is stipulated by China's trade union law and labor law that the enterprise-level trade union branch is entitled, at least theoretically, to "collective consultation"<sup>3</sup> on an equal basis with employers. One of the items that is supposed to be included here is labor health protection, and the regulations note that this should not be set lower than national OHS standards. The trade union has the power to monitor OHS conditions in factories. The lowest level at which the trade union can have an input in monitoring OHS is through the trade union small-group labor protection investigator on the shop floor. A worker in each factory workshop is supposed to fill such a role. According to the Trade Union Law, the union has the right to put forth proposals to remedy unsafe and hazardous conditions (Article 22), and if lives are endangered, it can propose that the workforce be withdrawn from the site (Article 24). The union also occasionally launches a "rational suggestions" campaign, in which workers are invited to give suggestions on anything related to the workplace, including OHS problems. Those that are serious may become resolutions to be voted on at the enterprise's staff and workers representative congress (SWRC). Our

field research in Chinese factories during recent years testifies to the existence of these mechanisms in some of the enterprises—although how well these mechanisms function varies greatly among enterprises.

The SWRC system was introduced in the 1950s but stopped functioning in the decade of the 1970s (Andors, 1974). When Deng Xiaoping came to power, the system was revived. The congress is supposed to convene about once or twice a year, and it has the right to examine and question the manager's report on various aspects of the enterprise. The representatives are supposed to have veto power or co-determination power over various matters such as the distribution of housing, wages, major strategic policies, a right to examine the manager's entertainment expenses, and even a right to suggest to government levels above the state-owned factory that the manager be dismissed. According to the regulations for the SWRC, OHS protection is one of the important areas that come within the consultative purview of the SWRC. We found from our field research in Chinese state-owned factories that a well-functioning SWRC and trade union can indeed exert an influence on an enterprise's OHS policy and practices.

SWRC representatives have the right to make suggestions on how to improve OHS conditions, and—at least on paper—an enterprise's major decisions on OHS facilities are supposed to be approved by the congress before they can be implemented. In between congresses the SWRC can set up a special labor protection monitoring or inspection committee. It is specified in the national regulations that leading cadres in the enterprise departments should not become members of this committee. In as much as the union is the workplace organization that convenes the SWRC and serves as its secretariat between congresses, the relationship between the trade union and the SWRC and its representatives are in practice intertwined. In fact, our visits to factories reveal that in some enterprises the two organs have been collapsed into one.

In this paper, we investigate three factors that may have a significant impact on the performance of the trade union and SWRC vis a vis OHS: the type of ownership of an enterprise; the enterprise's financial standing; and the size of the factory.

Like other institutions inherited from an earlier era, both the trade union and SWRC are experiencing changes as Chinese industry undertakes dramatic restructuring (Howell, 2000). Unlike the state-owned factories, the rural collectives and private enterprises that have burgeoned during the past decade and a half often have no trade union branches. The owners and managers, some of whom were peasants not so long ago, have little knowledge about the dangers of chemicals and little experience with the mechanisms for safeguarding machinery against injuries. Making matters worse, the machines used are sometimes dangerous

<sup>3</sup>Chinese "socialist" ideology does not accept that management and workers have separate interests and therefore their relationship by definition cannot be adversarial. The procedure in drawing up collective contracts can only be a process of "consultation", not "bargaining", a word that suggests a conflict of interests.

discards that they purchase second-hand in the market. Their understanding of the need to control OHS problems is minimal (Guidotti & Levister, 1995). As of the late 1990s, it was estimated that among the rural collective enterprises, 82% possessed significant occupational health and safety hazards and 62% of their workers who worked with toxic chemicals did not wear protective gear (Xu, 1998). The work conditions often are no better in the Taiwanese, Korean and Hong Kong-funded enterprises that operate in large numbers in the provinces of Guangdong and Fujian (Stevenson-Yang, 1994; Tan, 1994). For example, in the Shenzhen Special Economic Zone in Guangdong, reports of industrial accidents quadrupled from 1991 to 1992, a period when large numbers of Hong Kong and Taiwanese investors relocated their factories to China (Stevenson-Yang, 1994). By the end of the decade, 75% of the industrial toxic poisoning in Guangdong occurred in foreign-invested enterprises (Jia & King, 2000), even though these enterprises accounted for only 25% of all of the enterprises in the province (Guangdong Provincial Statistics Bureau, 1997).

The financial situation of an enterprise can also critically affect the resources available to protect workers' health and safety. As many state enterprises operate in the red, large numbers of them owe their workers back wages. In these financial straits, the OHS protection facilities are bound to suffer. Even the state enterprises whose financial situations are healthy are now under great pressure to compete energetically in the market, and management is tempted to skimp on OHS resources.

The size of an enterprise may affect the allocation of resources. A large enterprise may be in a better position than a small one to hire full-time specialist OHS personnel and to establish an ongoing system to monitor OHS. We shall explore how these three main structural factors affect OHS protections.

#### *The data set*

The data for our study derives from a national survey carried out by the All-China Federation of Trade Unions (ACFTU) in 1997. We have been able to secure the raw data from this survey on computer disk, and have performed our own statistical analyses of this raw data. Survey data were gathered at both the individual and work unit levels. The survey used a stratified proportional—multistage and clustered—sampling method.<sup>4</sup> First, 15 provinces were selected that were

representative of various levels of economic development.<sup>5</sup> Counties and cities were sampled from each of these provinces, with the selection probability proportional to the number of workers in each of these provinces. The sampled enterprises were selected only from among those that have workplace unions in the selected counties or cities, once again with the selection probability proportional to the number of workers in selected counties and cities. These enterprises were selected from each of the 16 industrial, service, and agricultural sectors (such as manufacturing, commerce, education, agriculture and fisheries) in accordance with China's conventional way of breaking down national statistics. Lastly, about 20 randomly selected workers and staff from each of the sampled enterprises were requested to fill in questionnaires by the survey takers. The total number of respondents comprised 53,561 employees at 2335 enterprises.

It should be noted again that the sample was drawn only from enterprises that have workplace unions. Almost all state enterprises have workplace unions, and the joint ventures between large state enterprises and western companies and the Chinese shareholding companies that previously were state-run enterprises also tend to have union branches. These are either carry-overs or are newly established branches of the unions of the parent state enterprise. On the other hand, only about a third of the Asian-funded foreign enterprises contained unions as of 1999, and these were usually set up to fulfil the ACFTU's top-down quota to set up workplace unions. Most of these unions exist in name only (Chan, 1997). In the domestic private industrial sector the unionization rate is even lower. Only about one in six of such workers are union members, and one in seven in rural collectives (*China Daily*, August 12, 2002). It should be stressed that non-unionized enterprises are not represented in the sample, and as a result, the sample under-represents non-state enterprises due to their low unionization rate and over-represents state enterprises due to their near-universal unionization rate.

Because it is difficult to compare OHS problems among so many occupational sectors we only have drawn our data from manufacturing industry. The survey data we are working with in this paper encompasses 201 enterprises and 4198 white-collar staff and workers. Table 1 shows the distribution of these enterprises by ownership types, size, financial standing, and the absence or existence of an SWRC.

#### *Variables*

Three questionnaires were administered in the ACF-TU survey: one for employees, one for a union cadre,

<sup>4</sup>On the sampling methodology of the ACFTU's 1997 survey, see Quanguo zong gonghui yanjiu shi (Office of Policy Research, ACFTU), 1997 *Zhongguo zhigong zhuangkuang diaocha zhonghe zhuan* (1997 Survey on the Staff and Workers of China, Main Report), Beijing: Xiyuan chubanshe (Xiyuan Publishers), 1998, p. 60.

<sup>5</sup>These include the provinces of Inner Mongolia, Liaoning, Jiangsu, Shandong, Hubei, Guangdong, Sichuan, Yunnan, Shanxi, Gansu, Jilin, Fujian, Henan, Beijing and Shanghai.

Table 1  
The distribution of the sampled manufacturing enterprises by ownership type, size, financial standing and existence of an SWRC

Enterprise conditions	Number	%
<i>Ownership</i>		
State enterprises	92	45.77
Collective enterprises	53	26.37
Private enterprises	6	2.99
Joint ventures & shareholding corporations	22	10.95
Foreign investment	19	9.45
Overseas Chinese investment	9	4.48
Total	201	100.00
<i>Enterprise size</i>		
< 201	37	18.88
201–500	41	20.92
501–2000	52	26.53
2001–5000	34	17.35
> 5000	32	16.33
Total	196 <sup>a</sup>	100.00
<i>Financial standing</i>		
Facing bankruptcy	33	18.75
Facing losses	41	23.30
Breaking even or modest profits	48	27.27
Quite profitable	48	27.27
Highly profitable	6	3.41
Total	176 <sup>a</sup>	100.00
<i>Whether there is an SWRC</i>		
Yes	164	84.97
No	24	12.44
Being processed	5	2.59
Total	193 <sup>a</sup>	100.00

<sup>a</sup>Total numbers do not add up to 201 because of missing values.

and one for the enterprise manager. All of the variables analyzed in this research are drawn from the employee questionnaire except for the four enterprise-level variables, for which we have used the managers' and union cadres' questionnaires. We have drawn from the managers' questionnaire information regarding the enterprise's financial standing, ownership type, and size, and have drawn from the union cadres' information regarding the existence of an SWRC.<sup>6</sup>

The variables on the protection of workers' health and safety are based on employees' assessment of the effectiveness of their factory's OHS system. Workers were asked to evaluate five dimensions of the system on a Likert scale, from very good to very bad or from

higher than the standard set by the state to not meeting the state standard at all. The questions concerned: (1) the design of the OHS system; (2) its implementation; (3) whether the OHS facilities meet state standards; (4) whether their own working conditions meet state standards; and (5) whether special protection for female workers is carried out well.

The employees were also asked to evaluate the enterprise trade union branch and SWRC. The evaluation of the trade union included five aspects: (1) its effectiveness in helping out with workers' personal financial difficulties at times of illness, etc.; (2) the enterprise-level union's overall performance; (3) its effectiveness in protecting workers' interests; (4) its effectiveness in carrying out consultation and signing a collective contract; and (5) its effectiveness in participating in settling shopfloor labor disputes (see Table 3 for detailed categories). The survey also asked employees to evaluate seven aspects of the SWRC's performance: (1) in hearing and assessing the manager's annual report on important issues; (2) examining, approving, or disapproving the plans drawn up for wages and bonuses; (3) examining and deciding on the use of welfare funds, the distribution of housing and other things related to welfare; (4) evaluating and monitoring leading cadres at all levels and making suggestions to reward, punish, or dismiss them; (5) assessing the manager's report on entertainment expenditures; (6) electing or recommending administrative personnel; and (7) overseeing the enforcement of the decisions (see Table 5 for detailed categories).

#### Statistical analyses

We used Chi-square tests for bivariate analyses between each of the OHS variables and each of the variables regarding the trade union, the SWRC, and an enterprise's financial standing. To identify the variables relating to the trade union, SWRC, and enterprise conditions that have a significant independent impact on the effectiveness of the OHS system, we used an ordered logit analysis for the five OHS-system-related Likert-scale dependent variables. The unit of the statistical analyses in this research is the worker.

To be sure, this methodology has some limitations. First, our data was gathered at only one point of time. Second, variables on the effectiveness of the trade union, SWRC, and OHS system are all derived from the subjective responses of employees. And third, as our sample includes only those enterprises with workplace unions, our results cannot be generalized to all enterprises in China. Nonetheless, the data-set provides by far the best evidence available for China, and we feel confident that we have properly taken its limitations into account when analyzing the survey findings.

<sup>6</sup>To reduce the number of missing values, if data was missing in the managers' questionnaire, we filled these in by using the answer to similar questions in the union questionnaire, and vice versa.

**Results**

*Workers' assessment of their occupational health and safety (OHS) systems and facilities, trade unions, and SWRCs*

Only 10.1–28.5% of the employees at each enterprise negatively assessed various aspects of their OHS system; most of them thought it either okay or effective (Table 2). Most employees were also positive in their assessment of some aspects of their trade unions and SWRC. Greater proportions were dissatisfied with two aspects of their trade unions: in protecting workers' interests (41.9%) and carrying out consultation or signing collective contracts (45.7%).

In the following, we will describe the results of our bivariate and ordered logit analyses, addressing various research questions:

(1) *Are the employees from enterprises with less effective trade unions more likely to report poor OHS systems and facilities?* The answer to this question is positive: in Table 3, we show the bivariate relationships between one of the dimensions of the trade union—the effectiveness of the trade union in helping a worker who faces personal hardships—and all dimensions of the OHS system and facilities. These relationships are strongly significant ( $p < 0.001$ ). For example, employees in enterprises with unions that are completely ineffective in helping with workers' personal financial difficulties are about 18 times (51.4% vs. 2.8%) more likely to report poor OHS system designs than those with unions that are very effective in handling personal financial difficulties. We also examined other aspects of the workers' assessment of the trade union—union's performance and its effectiveness in protecting workers' interests, carrying out equal consultation or sign collective contract, and participating in settling labor disputes (data not shown on table). The bivariate analyses results are highly significant ( $p < 0.001$ ) and their patterns of relationships are similar to those shown in Table 3.

(2) *Are the employees from enterprises without an SWRC more likely to report poor OHS systems and facilities?* The bivariate analyses in Table 4 yields less consistent results than those of Table 3: out of five Chi-square tests, two are insignificant. Further, the patterns of the three significant relationships are inconsistent: employees from the enterprises where an SWRC is in the midst of being processed, in comparison with those with or without an SWRC, are more likely to report that their OHS facilities do not meet state standards (34.3%) and that their enterprises do not provide safe conditions (48%). Employees from the enterprises without an SWRC are more likely (22.9%) to report that their enterprises' special protective measures for female workers are poorly carried out (Table 4). But overall,

Table 2  
Percentage of workers with a negative assessment of the effectiveness of the OHS system, trade union, and SWRC

OHS system	Poor OHS system design	System poorly carried out	Current facilities below state standards	Safe work conditions not provided or only partially provided	Special protection for female workers poorly carried out or not carried out at all
%	13.8	10.1	20.5	28.5	11.8
Trade Union ineffective in	Solving workers' personal financial difficulties	Overall performance	Protecting workers' interests	Carrying out consultation or signing collective contract	Participating in settling shop/floor labor disputes
%	9.2	9.2	41.9	45.7	20
SWRC ineffective in	Hearing and assessing manager's annual reports	Examining, approving, or disapproving plans for wages and bonus distributions	Evaluating and monitoring leading cadres	Making manager report to SWRC on entertainment expenditures	Overseeing the enforcement of the SWRC decisions
%	7.8	13.8	20.5	21.3	17.2
		19.8		21.7	

Table 3

Percentages of workers with negative evaluations of the OHS system and facilities, correlated with workers' assessments of the trade unions' effectiveness in helping a worker who faces personal hardships

Helping workers with hardships	OHS system/facilities				
	Poor OHS system design	OHS system poorly implemented	OHS facilities below state standard	Safe conditions not provided	Special protection for female workers poorly carried out
Very effective	2.8	3.0	7.7	12.1	1.9
Effective	7.3	5.0	14.7	17.9	4.5
O.K.	12.6	8.4	18.6	30.3	10.3
Not that effective	29.0	22.1	37.8	50.5	27.4
Not effective at all	51.4	39.0	55.2	69.0	50.2
$p$ for $\chi^2$ test	<0.001	<0.001	<0.001	<0.001	<0.001

Table 4

Percentage of workers with negative evaluations of the OHS system and facilities, correlated with the existence of an SWRC

Existence of SWRC	OHS system/facilities				
	Poor OHS system design	OHS system poorly implemented	OHS facilities below state standard	Safe conditions not provided	Special protection for female workers poorly carried out
Yes	13.9	10.2	21.1	28.3	10.7
No	14.7	10.3	15.8	29.8	22.9
Being processed	12.1	7.1	34.3	48.0	11.1
$p$ for $\chi^2$ test	>0.05	>0.05	<0.001	<0.001	<0.001

Table 5

Percentage of workers with negative evaluations of the OHS system and facilities, correlated with employees' assessment of the performance of SWRC in hearing and assessing manager's report

SWRC hears and assesses manager's report	OHS system/facilities				
	Poor OHS system design	OHS system poorly implemented	OHS facilities below state standard	Safe conditions not provided	Special protection for female workers poorly carried out
Very well	2.2	1.3	4.4	8.9	1.3
Well	4.2	4.7	9.8	15.0	4.8
O.K.	15.8	10.7	25.1	34.0	11.4
Poorly	44.7	33.1	53.6	58.3	25.3
Very poorly	55.1	45.6	60.8	68.4	47.4
$p$ for $\chi^2$ test	<0.001	<0.001	<0.001	<0.001	<0.001

our statistical analysis indicates that the existence of an SWRC does not necessarily mean better OHS facilities.

(3) *Among the enterprises possessing an SWRC, are employees from those with less effective SWRCs more likely to report poor OHS systems and facilities?* The answer to this question is positive: this relationship is statistically strongly significant and consistent across all

dimensions of OHS systems and all functions of an SWRC. As an example of this relationship, in Table 5, we show the bivariate analyses between all dimensions of the OHS systems and facilities and one of the functions of an SWRC—hearing and assessing the manager's report. This table demonstrates, for example, that employees from the enterprises whose SWRC

performs very poorly in hearing and assessing their manager's report, as opposed to those whose SWRC does very well in this function, are about 25 times more likely (55.1% vs. 2.2%) to report a poorly-designed OHS system (see Table 5).

(4) *Are employees from enterprises in financial difficulty more likely to report poor OHS systems and facilities?* The bivariate analyses and Chi-square results in Table 6 again give positive results. These relationships are also very consistent and statistically strong ( $p < 0.001$  or 0.01). For example, employees from enterprises facing bankruptcy are about 4 times more likely (i.e., 30.0% vs. 7.5%) to report a poorly designed OHS system as compared to those in enterprises having a very good financial standing.

(5) *Are employees from the enterprises with financial difficulties more likely to report less effective trade unions and SWRCs?* The patterns of the relationships presented in Tables 7 and 8 are similar to those of Table 6, and the

answer to this question is again positive. In addition, the relationships are statistically significant and consistent for all dimensions of the functions of the trade union (Table 7) and SWRC (Table 8). For example, employees in enterprises facing bankruptcy, as opposed to those that are highly profitable, are, on average, 15 times more likely (18.0% vs. 1.2%) to report that their SWRCs are ineffective in hearing and assessing their manager's report (see Table 8). Note that the relationship between an enterprise's financial standing and the effectiveness of its trade union and SWRC may be reciprocal; enterprises with ineffective unions may be less productive and conversely the enterprises' financial difficulties may undermine the effectiveness of their trade unions.

(6) *Do the variables regarding the performance of the trade union and SWRC have significant and independent effects on the effectiveness of the enterprise's OHS system?* The tables and analyses presented above are either univariate or bivariate analyses. We now turn to

Table 6

Percentage of workers with negative evaluations of the OHS system and facilities, correlated with enterprise's financial standing

Financial standing	OHS system				
	Poor OHS system design	OHS system poorly implemented	OHS facilities below state standard	Safe work conditions not provided	Special protection for female workers poorly implemented
Facing bankruptcy	30.0	22.8	38.1	51.3	20.9
Small losses	15.5	11.6	24.9	35.7	16.2
Break even or small profit	11.4	8.5	19.1	26.4	9.7
Quite profitable	8.1	5.7	13.8	19.2	7.3
Highly profitable	7.5	4.6	5.6	10.4	11.5
$p$ for $\chi^2$ test	<0.001	<0.001	<0.001	<0.001	<0.001

Table 7

Percentage of workers reporting ineffective trade union, correlated with enterprise's financial standing

Financial standing	Union performance				
	Ineffective in solving workers' personal financial difficulties	Poor overall performance	Union does not protect worker's interests	Union does not or does not effectively carry out consultation or sign collective contracts	Ineffective participation in settling labor disputes
Facing bankruptcy	29.4	14.7	50.9	42.6	30.9
Small losses	19.8	10.2	43.6	24.2	18.8
Break even or small profit	15.8	8.8	40.9	19.2	16.8
Quite profitable	15.5	6.7	40.5	20.6	19.1
Highly profitable	17.9	8.7	38.2	9.1	18.3
$p$ for $\chi^2$ test	<0.001	<0.001	<0.001	<0.001	<0.001

Table 8  
Percentage of workers reporting an ineffective SWRC, correlated with enterprise's financial standing

Financial standing	SWRC ineffective in						
	Hearing and assessing manager's report	Evaluating or rejecting plans regarding wage and bonus distributions	Assessing housing distribution and other welfare matters	Monitoring cadres and proposing penalty and hiring/firing systems	Hearing manager's report on entertainment expenditures	Electing or recommending adm. personnel	Overseeing the implementation of resolutions
Facing bankruptcy	18.0	27.0	32.9	35.2	33.7	35.4	32.5
Small losses	7.2	16.4	23.1	24.7	25.5	25.2	20.4
Break even or small profit	5.7	9.5	14.6	14.2	16.5	14.7	12.4
Quite profitable	5.0	10.5	14.0	17.1	18.5	18.7	11.9
Highly profitable	1.2	5.9	10.6	9.4	8.4	11.9	8.3
<i>p</i> for $\chi^2$ test	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

the analyses of multiple independent variables, with the covariance between these variables taken into account. We have hypothesized that the effectiveness of the OHS system is affected by the performance of the trade union and SWRC, which in turn is influenced by the enterprise's ownership type, size, and financial standing. In Table 9, we investigate these hypothesized relationships by using the ordered logit model to regress in model 1 each of the five OHS variables on the trade union variables, and then do the same with the SWRC variables added to model 2, and finally do so in model 3 by adding the variables of enterprise conditions—their financial standing, ownership type, and size. The step-by-step introduction of these variables helps reveal the dynamics of their impacts on OHS systems.

The analyses in Table 4 showed that the mere existence of an SWRC does not affect the OHS system. However, it is likely that the degree of the accountability of management to the SWRC is what matters, not whether it merely exists (Table 5). In Table 9 we examine only those enterprises that have SWRCs and investigate whether, among them, the SWRCs that are reported to perform ineffectively have a statistically significant negative impact on the five dimensions of the OHS system. We will discuss the results of the regressions for all five OHS-system-related dependent variables together so that we can compare the differences and similarities of the relationships.

In the ordered logit model 1, all five trade union variables are consistently significant predictors of all five dimensions of the OHS system (see Table 9 for these variables' significant odds ratios in model 1). Further, in model 2, after the seven SWRC variables are entered, most of the odds ratios of the trade union variables remain significant but become smaller in their magnitudes, and some (e.g., the odds ratio for "union's overall performance" in the regression of the variable—poor OHS system design) become insignificant. Meanwhile, the odds ratios for quite a few of the newly entered variables concerning the performance of SWRCs are statistically significant. Apparently, some of the impact of trade unions in improving OHS are realized through the effective functioning of those factories' SWRCs. But the SWRCs' effectiveness in improving OHS is seen to be far greater for some of the variables than others, and even these enhance some but not all aspects of the OHS system. For example, an SWRC's worse performance in assessing the manager's reports significantly increases the odds of the enterprises having a poor design and implementation of the OHS system. But this impact is insignificant vis-a-vis other aspects of the OHS system.

In model 3, with variables for enterprise conditions controlled, most of the trade union variables' odds ratios remain significant and many of the SWRC variables' odds ratios are also still significant. This

Table 9  
Odds ratios from ordered logit regressions of the ineffectiveness of the OHS system on the performance of the trade union and SWRC, and enterprise conditions

Independent variable	Poor OHS system design			OHS system poorly implemented			OHS facilities below state standard			Safe conditions not provided			Special protection for female workers poorly carried out		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
<i>Workers' assessment of the performance of trade union</i>															
Solving workers' personal financial difficulties															
O.K. vs. effective	1.23	1.16	1.00	1.07	1.04	1.00	1.00	0.98	0.80	1.32*	1.24	0.97	1.60***	1.52**	1.26
Not effective vs. effective	2.02***	1.91**	1.70*	1.73**	1.45	1.49	1.64**	1.56*	1.45	2.63***	2.37***	2.15**	2.53***	1.88**	1.45
Union's overall performance															
O.K. vs. good	1.42**	0.94	0.93	2.20***	1.54**	1.50**	1.27*	1.02	1.08	1.31*	0.93	0.94	1.58***	1.08	1.18
Bad vs. good	2.52***	1.22	1.07	3.91***	2.49**	2.11*	2.29***	1.52	1.19	2.32***	1.31	0.95	3.56***	2.28**	1.83
Protection of employees' interests															
Basically can vs. can protect	2.87***	2.85***	2.93***	2.52***	2.07***	2.42***	2.64***	2.32***	2.47***	2.22***	1.97***	2.01***	2.05***	1.78***	1.91***
Cannot vs. can protect	2.96***	2.58***	3.04***	2.50***	1.69**	2.24***	2.90***	2.13***	2.42***	2.00***	1.46*	1.66**	2.17***	1.81***	2.16***
Carrying out consultation or signing collective contract															
O.K. vs. effective	1.61***	1.38*	1.60**	1.94***	1.51**	1.56**	1.64***	1.17	1.09	1.53***	1.12	1.00	1.21	0.94	1.04
Not effective vs. effective	1.91***	1.49*	1.23	2.63***	1.99***	1.53*	1.90***	1.29	1.03	2.07***	1.45*	1.07	1.80***	1.49*	1.34
Participating in settling labor disputes															
O.K. vs. effective	1.39**	1.41*	1.37*	1.20	1.01	0.89	1.29*	1.27	1.33	1.33*	1.30*	1.32	1.53***	1.38*	1.34*
Not effective vs. effective	2.36***	1.69*	1.90**	1.59*	1.14	1.31	1.98***	1.59*	2.03**	1.82**	1.53*	2.11**	1.84**	1.44	1.68*
<i>Worker's assessment of the performance of SWRC</i>															
In hearing and assessing manager's report															
O.K. vs. good	–	1.55**	1.45*	–	1.78***	1.78***	–	1.10	1.04	–	1.13	1.06	–	1.29	1.20
Bad vs. good	–	2.68***	1.47**	–	2.56***	2.35**	–	1.08	0.98	–	1.21	1.14	–	1.51	1.50
In evaluating or rejecting plans re wage and bonus distributions															
O.K. vs. good	–	0.94	0.89	–	1.47*	1.42	–	1.07	1.15	–	1.11	1.27	–	1.35	1.45*
Bad vs. good	–	0.75	0.74	–	1.52	1.44	–	1.38	1.54	–	1.19	1.33	–	1.19	1.12
Assessing the use of welfare funds & distrib. of housing															
O.K. vs. good	–	1.14	1.04	–	0.95	0.87	–	1.15	1.08	–	1.48*	1.44*	–	1.48**	1.45*
Bad vs. good	–	1.72*	1.68*	–	1.49	1.45	–	1.58*	1.40	–	2.41***	2.35***	–	2.46***	2.46***
Monitoring cadres and proposing penalties and hiring/firing															
O.K. vs. good	–	1.09	1.14	–	1.13	1.09	–	1.24	1.38	–	1.33	1.45*	–	0.95	0.92
Bad vs. good	–	1.40	1.49	–	1.42	1.58	–	1.82*	2.19**	–	1.50	1.75*	–	0.90	0.93

Making managers to report on entertainment expenditures															
O.K. vs. good	-	1.28	1.22	-	1.15	1.11	-	1.05	0.93	-	1.39*	1.34	-	1.16	1.20
Bad vs. good	-	1.91**	1.65*	-	1.74**	1.52	-	1.58*	1.25	-	2.13***	1.94**	-	1.50*	1.54*
Electing or recommending adm. personnel															
O.K. vs. good	-	1.54**	1.46*	-	1.45*	1.36	-	1.82***	1.81**	-	1.11	1.10	-	1.30	1.27
Bad vs. good	-	1.29	1.37	-	1.24	1.20	-	1.57*	1.58	-	1.06	1.16	-	0.95	1.05
Overseeing the implementation of resolutions															
O.K. vs. good	-	1.01	1.07	-	1.28	1.21	-	1.09	1.04	-	0.98	0.87	-	1.18	1.03
Bad vs. good	-	1.91**	1.90*	-	1.55	1.41	-	1.78*	1.66	-	1.44	1.12	-	1.86**	1.37
<i>Enterprise condition</i>															
Financial standing															
Facing bankruptcy vs. highly profitable	-	-	5.86***	-	-	7.64***	-	-	6.22***	-	-	7.41***	-	-	5.36***
Small losses vs. highly profitable	-	-	3.13***	-	-	3.86***	-	-	3.99***	-	-	3.66***	-	-	3.21***
Breaking even or small profit vs. highly profitable	-	-	3.25***	-	-	4.26***	-	-	4.26***	-	-	3.90***	-	-	3.07***
Quite profitable vs. highly profitable	-	-	2.60**	-	-	2.29**	-	-	2.80**	-	-	2.95**	-	-	2.08*
Ownership type															
Collective vs. state owned	-	-	0.94	-	-	0.84	-	-	1.02	-	-	0.98	-	-	1.16
Private vs. state owned	-	-	0.84	-	-	0.76	-	-	0.42*	-	-	0.66	-	-	0.95
Joint venture vs. state owned	-	-	1.23	-	-	1.55	-	-	0.78	-	-	1.91	-	-	2.54**
Shareholding vs. state owned	-	-	1.15	-	-	0.90	-	-	0.68*	-	-	0.65*	-	-	0.97
Foreign investment vs. state owned	-	-	0.58*	-	-	0.66	-	-	0.34***	-	-	0.41***	-	-	1.13
Overseas Chinese owned vs. state owned	-	-	0.77	-	-	0.98	-	-	1.48	-	-	1.78	-	-	1.12
Enterprise size (ln) <sup>a</sup>	-	-	0.91*	-	-	0.93	-	-	0.96	-	-	0.90**	-	-	0.92*

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ .

<sup>a</sup> Logarithm of the number of workers in the enterprise.

means that, even after taking into account the differences in the enterprises' financial standing, ownership, and size, the unions' and SWRC's impacts on the effectiveness of the OHS system are still significant. In particular, the question of whether the trade union protects employees' interests has a consistently significant independent impact on all five dimensions of the OHS system, with statistically significant odds ratios across all dependent variables through models 1–3. For example, the odds of employees reporting a poorly designed OHS system, poor implementation of the system, low-quality OHS facilities, unsafe working conditions, and the lack of special OHS protection for female workers are about 2–3 times greater (with the odds ratios ranging from 1.66 to 3.03) in enterprises where the union cannot protect workers' interests compared to those where the union is reported to do so.

However, some of the odds ratios of the trade union and SWRC variables become insignificant after the enterprise's financial standing, ownership type, and size are controlled in model 3. Some examples here are when the trade union variables on "solving workers' personal financial difficulties", "the union's overall performance", and "carrying out consultation and signing of a collective contract" are regressed vis-a-vis special protections for female workers; and when the SWRC variables of "evaluating or rejecting plans and regulations regarding wage and bonus distributions", "making managers report on entertainment expenditures," and "electing and recommending administrative personnel" are regressed vis-a-vis the implementation of an OHS system. The disappearance of the statistical significance of the odds ratios of these variables suggests that some enterprises' conditions, particularly dire financial standing (with very large odds ratios; see discussion below), lessens the effectiveness of their trade unions and SWRCs and consequently nullifies their impact on the effectiveness of the OHS system.

Ordered logit model 3 demonstrates for all of the regression models in Table 9 that the financial standing variable is clearly an extremely important factor in influencing the effectiveness of the OHS system. When all of the other characteristics concerning trade unions and enterprise conditions are considered, employees in enterprises facing bankruptcy are about 5 to 8 times more likely (odds ratios ranging from 5.36 to 7.64) to report an ineffective OHS system and facilities compared to those in very good financial standing.

The variable about ownership type also has a significant effect on some aspects of the OHS system. For example, the odds of employees in the foreign-invested enterprises reporting ineffective implementation of the OHS system, or low-quality OHS facilities, or unsafe and unhealthy working conditions are about 40–60% less than in state enterprises (odds ratios

of 0.58, 0.34, and 0.41, respectively). In addition, the odds of employees in the formerly state-owned shareholding enterprises reporting low-standard OHS facilities and work conditions are about 30% less (odds ratios of 0.68 and 0.65, respectively) than in state enterprises.

Finally, factory size has a significant independent impact in model 3 on some dimensions of the OHS system. The odds of smaller enterprises having poor OHS system designs, unsafe working conditions, and poor provision of special protection for female workers are greater, with odds ratios of 0.91, 0.90, and 0.92 (with the *p*-level less than 0.05).

## Discussion

The results of the bivariate and multivariate analyses presented in the previous sections confirm that, indeed, the enterprise-level trade union and SWRC do have a significant impact on the protection of employees' health and safety. In general, bivariate analyses show that employees in enterprises with ineffective trade unions and SWRCs are much more likely to report ineffectiveness or poor quality in the design, facilities, and implementation of their factory's OHS system. In addition, multivariate analyses show that the performance of the trade union and SWRC has statistically significant and independent effects on the OHS system, and these effects are strong and consistent even after ownership type, enterprise size, and financial standing are taken into account.

In fact, it should be reiterated that the survey sample only includes enterprises *with* unions, and we believe that the above relationships would have been stronger had the sample also included enterprises *without* unions. This is because the majority of private enterprises, collective enterprises and overseas Chinese-owned enterprises, all under-represented in our sample, either do not have unions or only have formalistic ones totally under management control. As pointed out formerly, previous studies indicate that these enterprises tend to have less adequate OHS systems and more serious OHS problems.

Another revealing finding concerns the interaction between the impacts of the trade union and SWRC. As earlier noted, while the SWRC is supposed to hold a veto or co-determination power that the union does not have, it is convened only once or twice per year, and sometimes less frequently than that. The union is the organization that convenes the SWRC and executes the resolutions passed by the SWRC. The union provides daily services and promotes other activities for workers in between congresses. Therefore, an effective union is vital to an active SWRC. The union on the other hand needs the veto and co-determination

powers of the SWRC to realize its legal functions, such as protecting workers against persistent OHS hazards. Our findings statistically demonstrate this interactive relationship. The union's strong and consistent independent impact on the effectiveness and quality of the OHS system is well demonstrated, but some of the union's impact is also shown to be realized through an effective SWRC. Nevertheless, our analyses show that the mere existence of an SWRC is inadequate in ensuring a better OHS system. The surveyed employees have to report that the enterprise's SWRC is effective in its operations for the statistical evidence to show a positive effect.

It therefore makes sense that at the national level the national trade-union body, the All-China Federation of Trade Unions (ACFTU), has been advocating the provision of greater powers to the SWRC and has been promoting the establishment of SWRCs in enterprises that are reluctant to organize one. The ACFTU chair, Wei Jianxing (who also sat in the Chinese Communist Party Politburo until his retirement in late 2002), had recently emphasized the importance of the SWRC in his public statements (Chan, 2001b). In view of the symbiotic relationship between the union and SWRC, this is a strategic move taken by the ACFTU leadership. The ACFTU is making an effort to regain some of the influence at the workplace that it had enjoyed in the 1980s. But as of today, the national union has been rapidly losing membership and status due to ownership changes and the rapid development of the market economy.

In examining the variables of ownership type, enterprise size, and financial standing, and their impacts on the protection of workers' health and safety, the most salient impact is that of an enterprise's financial situation. Clearly, the enterprises that are facing bankruptcy or are operating at a loss tend to have less effective unions and SWRCs, and in turn less effective and poorer quality OHS systems. It is hard to expect enterprises that cannot pay workers regularly to support a good OHS system.

Based on our field observations in various types of enterprises and the findings of our previous studies (Chen & Chan, 1999; Chan, 2001a) we had expected to find significantly worse OHS problems in the private, collectively-owned, and overseas Chinese-owned enterprises. However, these enterprises are under-represented in this sample, and perhaps because of the small number of such enterprises, these problems do not show up in the statistical analyses. The most consistent results concerning the impact of ownership type are that foreign-invested enterprises have better OHS systems and conditions. Here it is important to note that "foreign-invested enterprises", in Chinese statistics, do not include those owned by overseas Chinese from Hong Kong or Taiwan. In light of this, those that appear in

our survey sample are most likely capital-intensive enterprises owned by Europeans, North Americans and Japanese, and their OHS systems are generally known to be better.

Our statistical analyses also show that larger enterprises tend to have better OHS systems. In China, the larger enterprises are likely to be state-owned, and as such are the most likely to contain what their employees deem to be an effective union and SWRC. As these enterprises upgraded their facilities and technologies over the past decade, OHS conditions were improved in tandem.

In sum, the survey confirms our hypothesized relationships: some sort of check on management through the closely integrated institutions of the trade union and SWRC can make a noticeable impact in the protection of workers' health and safety at the workplace. To a certain extent, this positive finding about these two institutions shows that though the Chinese trade union is widely criticized for being "useless," this is not necessarily the case. A modest percentage of workplace unions, and by extension SWRCs, do have an impact.

In the Introduction, we pointed out China's high rates of occupational disease and injuries and discussed the great challenges in OHS that China is facing under the economic reforms. The rapid transformation of ownership from state to private exacerbates the problem. The elimination of a nationwide bureaucratic OHS institution provided the macro-climate for a deregulated workplace, consigning Chinese workers' health and safety conditions to increased vulnerability. In this context, an enterprise-level channel through the union and SWRC can be effective in containing management's unchallenged power.

We do not intend, though, to paint an unrealistically rosy picture that the union and the SWRC can do wonders. During August–September of 2002 we participated in an in-depth case study of two manufacturing enterprises in Beijing, and the situations there are mixed. Both were originally state enterprises established during the 1950s. One manufactures printing machines, and the other vehicles. Both went through restructuring in the past two decades: one formed a joint venture with a North American auto company in the 1980s and the other became a shareholding enterprise in the early 1990s, with the state owning more than half of the shares. Both inherited from their parent enterprises a union system, with a few full- and part-time union cadres, carrying out the union functions discussed earlier in the paper. The shareholding enterprise also inherited an SWRC, but not so the joint venture with the Americans, because, according to its union chairperson who also serves on the board of directors representing employees, "the state law concerning the establishment of an SWRC does not apply to

joint ventures.”<sup>7</sup> Instead, it has “a union representative congress” that does not have the same legal veto or co-determination powers as the SWRC. In both of these enterprises the numbers of both full-time union cadres and OHS personnel have decreased greatly since the enterprises’ restructuring. The veto or co-determination power of the shareholding company’s SWRC has also declined, limited now to unimportant issues such as recreational activities. It was clear from interviews with managers of this company that their major concern today is profits and competition and “getting better connected with the market”. Workers whom we interviewed complained about how useless the union and SWRC are nowadays in contrast with the 1980s. Nevertheless, the picture is by no means bleak. Even though the number of OHS personnel has decreased greatly, so far the OHS systems in both enterprises continue to function well, and the congresses of both enterprises—one of congress representatives, the other of trade union representatives—discuss OHS issues. Union cadres at both plants also reported to us that they are involved in monitoring the design and implementation of the OHS systems.

As noted at the start of this paper, the study of OHS in the West has been dominated by health professionals (Levenstein & Tuminaro, 1997; Noble, 1986), and in most published articles employees are tacitly assumed to be passive recipients of OHS remedies with little say in OHS matters. We also noted that some researchers have, however, demonstrated the importance of employees’ input in the protection of their own health and safety. Similar to the findings of the latter researchers’ studies in the West, our research on Chinese enterprises shows that the protection there of workers’ health and safety does not operate effectively unless enterprise-level unions and/or other organs that are supposed to represent employees are able to have inputs in an institutionalized manner. It is to be hoped that similar research is conducted elsewhere in the world, to help build a fuller picture of the circumstances in which OHS programs are well implemented in factories.

### Acknowledgements

We thank Chen Wei of the Demography Department at the Australian National University for his assistance

<sup>7</sup>This enterprise’s trade union chair is probably wrong on this. The Chinese labor law that applies to enterprises of all ownership types does not specify that SWRCs cannot be set up in joint ventures. The ACFTU is now launching a campaign to go beyond its focus of setting up SWRCs in state enterprises, to set up SWRCs in all kinds of enterprises. The problem it faces is that many enterprises in the non-state sectors do not have unions, and the existence of a union is a precondition for the existence of the SWRC.

in data processing and analysis and Jonathan Unger at the same university’s Contemporary China Centre for his helpful comments. Part of the research for this paper is supported by the National Science Council in Taiwan with a research grant (NSC 90-2412-H-006-001) awarded to the first author, and by an Australian Research Council Large Grant to the second author.

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