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EMPLOYER FACTORS IN THE INCIDENCE
AND COST OF WORKERS' COMPENSATION CLAIMS

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I. Introduction

This paper examines the correlates of workers' compensation claims incidence and costs for a select sample of Michigan employers in 1988. The emphasis of the original study underlying this paper was to better understand what differentiated employers with "good" and "bad" workers' compensation experience under a single state legislatively mandated insurance system (Habeck, Leahy, and Hunt, 1988).

The motivation for Michigan employers to more effectively manage worker disabilities and their consequences has been keen. In the early 1980s, high workers' compensation costs became the number one business climate issue in Michigan (St. Antoine, 1985). Michigan had lost a significant number of jobs due to the recession, foreign competition (particularly in autos), and technological change which created an unfavorable business climate. As a result, workers' compensation reform and other legislative initiatives sought to alleviate the distress of Michigan employers as their workers' compensation costs reached levels one-third above the national average (Burton, Hunt, and Krueger, 1985). In particular, the Michigan workers' compensation system was "reformed" in 1981, 1982, and 1984 to address these competitive issues in the first half of the 1980s (Hunt, 1986). One of the elements of this "workers' compensation revolution" in Michigan was an enhanced interest in vocational rehabilitation of injured workers.

The rehabilitation cost of placing disabled employees with new employers has been on average twice that for returning them to their former employers (Schwartz and Carbine, 1987). During the period of the mid 1980s it became clear that the most likely solution to the economic and human resource costs associated with work-related disability was to maintain the employment status of the injured worker with his or her employer, using resources in an efficient and effective manner to return the person to work at the earliest appropriate time.

Despite the best intentions and actions of the employer, the outcomes of work-related disability are influenced by a myriad of forces and factors. As

Berkowitz (1985) reminds us, disability is a socioeconomic phenomenon that must be understood in the context of the person's total situation. He points out that persons with the same apparent medical condition will have very different disability outcomes that cannot be fully explained by their diagnosis. Rather, disability is influenced by a complex set of factors, including benefit levels, wages attainable, types of work available to the person, and the relationship between the mental and physical requirements of the given job and the residual capacities of the person. All of these factors potentially influence ability and incentive to work, and complete solutions will require policy action to achieve a fully rational disability system.

However, as Berkowitz (1985) goes on to point out, some factors do lie within the control of employers and can be addressed at the firm or plant level to deal with the disincentive problem. Employers can (1) prevent some disabilities from occurring, through safety and health measures and access to proper care for limitations that do occur; (2) provide early intervention to disabilities of gradual onset by noting patterns of absenteeism, benefit use and grievance rates; (3) know the mental and physical requirements of their jobs in order to appropriately place workers and assist health care and rehabilitation providers with accommodation or placement of impaired workers; and (4) address collective bargaining issues and create a transfer policy that allows temporary or modified work assignments with minimal disruption of productivity. Despite a lack of data to fully substantiate the impact of these efforts, rising disability costs have clearly increased the incentives for employers to develop their capacity to effectively manage disability factors that are within their control.

This study, therefore, is based on the following assumption:
that some significant portion of the variability in
workers' compensation experience among employers is
due to organizational factors and practices that are
within the control of the employer.

The purpose of this paper is to improve our understanding of the way in which organizational characteristics and policy variables differentiate among employers with different levels of WC claims incidence and WC costs. Ultimately, the purpose of the research is to provide guidance for employer initiated actions that may favorably impact their workers' compensation experience.

Review of Organization Factors

Although limited empirical information is available, a growing body of descriptive accounts has created an acknowledged set of principles to guide employer initiatives. These have appeared in safety literature, personnel management literature, and in the rehabilitation literature. Some of these factors were conceptualized and refined for this research effort on the basis of a three year study of disability management initiatives and outcomes among Michigan employers conducted by Michigan State University (Munrowd and Habeck, 1987). A review of the principles that guided this study are provided here.

Disability Management and Rehabilitation. The concept of disability management has evolved out of experiments among private and public employers and labor organizations. The concept entails a comprehensive, systematic, goal-oriented, employer based approach to managing the occurrence and outcomes of disability. The overall aim of disability management is to minimize the impact of disability on the individual worker and the workforce as a whole-- thus improving workers' quality of life, enhancing firm productivity, and reducing the costs of injury and illness for the company and for society. The goals of a cohesive system of policies and procedures for disability management include prevention of illness and injury in the workplace, early identification and intervention for health risks that could lead to incapacity, and the rehabilitation of injured or ill workers who do become disabled to restore working capacity and facilitate a timely return to work (Tate, Habeck, and Galvin, 1986).

Disability management programs must include the administrative mechanisms necessary for any management system--including organization, coordination, and evaluation. This requires regular and continuing access to data on the incidence, status, costs, and outcomes of all disability related indicators. Other essential steps that have been identified include the formulation of an organizational policy and statement of commitment to disability management and return to work; an educational program regarding the rationale and functional responsibilities for managers and employees at all levels; identification and control of critical decision points in medical care, benefit administration, and the return to work process; a comprehensive, coordinated, and monitored system of case management and rehabilitation services; a systematic process and supporting resources to accomplish return to work in an efficient and appropriate manner; and an evaluation system to monitor program outcomes and guide improvements in the system (Tate, Habeck, and Galvin, 1986).

In a recent survey of major corporations in the United States, the Institute for Rehabilitation and Disability Management (IRDM) identified elements associated with successful disability management, rehabilitation outcomes, and cost containment that include: (1) commitment and clear policy communicated from the management; (2) a team approach for case management and effective job placement; (3) early intervention in all types of disability cases; (4) regular review and individualized planning of all cases; (5) development of modified, light duty assignments; and (6) the inclusion of work incentives in the design of disability benefit plans (Schwartz, 1986).

However, according to the IRDM survey results, companies with specific return-to-work programs, financial incentives, and modified work arrangements are still a small minority. Most companies lack an integrated policy for disability management, rehabilitation and wellness. Few companies have designated one person with responsibility for coordinating and managing disability benefits, or employ full time rehabilitation professionals, for example. As a result of their national conference in 1987 on effective strategies for employer based management of disability, IRDM summarizes the key principles to guide employer initiatives as follows:

1. Initiatives must start from a clearly articulated human resource strategy;
2. Early intervention and return-to-work strategies are key cost control components; they can even reduce employer costs when the company is experiencing the same or an increasing level of claims;
3. Disability management initiatives can be centralized or decentralized depending upon the company's needs and operating philosophy, but the initiatives must be coordinated, integrated, and managed within the company;
4. Top management must be committed to and support the initiatives;
5. Unions must be actively involved from the program's inception;
6. A system must be created to effectively manage the disability claims function;
7. Strong medical provider relationships must be built and maintained;
8. Supervisors and line personnel must be kept well informed, with lines of communication established early and kept open; and
9. Wellness and health promotion programs should be used to prevent injuries and illnesses and, in partnership with disability management and rehabilitation strategies, help reduce disability costs.

(Schwartz and Carbine, 1987, p. 6.)

Evert (1982) outlined these concepts several years ago in examining the role of private enterprise in overcoming the disincentives and barriers of the disability system in order to minimize the impact of disability on the individual worker and the organization as a whole. He emphasized that these elements must be set within the context of the company's total operation and be rooted in a genuine management philosophy of commitment to employees. Thus, the relationship between the corporate culture, environment, and managerial philosophy and style of the organization is seen as another major factor in successful employer initiatives to manage disability.

Corporate Culture and Management Philosophy.

Characteristics of the culture and general environment of employing organizations are relevant to managing disability in at least two ways. First, adverse organizational factors can influence the occurrence of disability by fostering an unsafe work environment in which unsafe equipment, faulty job design, inadequate safety procedures and the like lead to a high incidence of disabling events and stress related chronic conditions, both physical and psychological. Second, organizational factors can influence the outcomes of disability cases. This is most obvious with the issue of return to work. Organizational factors largely determine whether injured/ill employees prefer the psychological and economic rewards of their work to the alternative rewards available to them if they remain on disability status.

The link between organizational factors and disability management issues has not been adequately studied so far. More recently, however, increasing attention has been given to the impact of corporate culture and management style on job satisfaction, productivity, absenteeism, and turnover. For example, the relationship between psychological stress and physical health has been well established, and therefore many companies have become interested in the management of work stress. More and more corporations are turning to health promotion programs to protect the health of their workforce, and to cooperative worker-management programs to involve employees more meaningfully in their organizations, thus utilizing human resources more fully.

Safety and Prevention. The importance of safety to effective disability prevention and management is clear, both in terms of its impact on the prevention of disability and in the creation of an environment that communicates concern for the well-being of employees. Smith (1987) and his colleagues have studied the safety management factors that differentiate those companies that have been successful in preventing occupational accidents. Accident prevention is the key element in controlling occupational injuries. As they point out, this requires the establishment of an effective safety program that has the capacity to identify hazardous conditions, ensure proper design of facilities and machinery, train employees, ensure safe work practices and motivate employee safe behavior.

Company practices that have been associated with successful safety programs in national and state studies have been reviewed by Smith and can be summarized as follows:

- o involvement, support and modeling of safety by top management
- o screening for risk factors
- o training and orientation for new and transferred employees
- o designated safety coordinator with recognized authority
- o regular environmental inspection and maintenance
- o enforcement of safe work procedures
- o effective procedures for reporting and investigating accidents and near misses
- o regular attention to safety issues in board meetings
- o frequent informal interactions with employees and supervisors about safety
- o education and rewards to motivate safe behavior
- o organizational communication and publications about safety news, policies, rules

In reviewing a study of pairs of Michigan employers who had high or low accident rates, Smith (1987) points out that low accident companies had an older workforce, a greater proportion who were married, and with longer job tenure. These companies also had more favorable work environments and equipment, access to recreational facilities and a smaller span of supervisory control. In another comparison study cited, low injury companies were found to have similar workforce characteristics and to experience lower turnover and absenteeism.

Smith summarizes the views of management in firms leading in safety which emphasize the context in which effective safety must occur:

- o management commitment must be expressed in policy, financial support, involvement in program implementation and demonstrated concern for worker well-being;
- o effective controls, training and evaluation to anticipate and manage hazards rather than controlling them after they occur;
- o effective communication and involvement to motivate employees and supervisors to address safety in humanistic ways;
- o integration of the safety program in the larger management system to deal with safety as an intrinsic part of the company's operation.

In summary, the interwoven aspects of corporate culture, safety and prevention, and disability management and rehabilitation provide a comprehensive framework for the organizational context and practices necessary for effective control of workers' compensation claims incidence and the outcomes of those claims. These principles were used in the present study to specify behaviors that might characterize employers with more and less favorable workers' compensation experience. If common elements can be found in the behaviors that characterize employers with successful experience, these principles can be suggested with more assurance as ways to assist less successful employers to achieve more effective management of disability factors that may be within their control.

II. DATA SOURCES

The empirical effort on which this paper is based began with an analysis of the 76,895 workers' compensation claims closed in the state of Michigan in 1986. The reported claims were tabulated for each of the 19,250 identifiable employer units (sometimes firm level, sometimes establishment level) that closed at least one claim according to the database provided by the Bureau of Workers' Disability Compensation. (See Hunt, 1988 for a full description) These data were then matched to administrative data on employment levels (provided by the Michigan Employment Security Commission) and WC claims were compared to contemporaneous employment levels to yield a WC claims rate for 5,568 firms with more than 50 employees.¹

An aggregate analysis of these data indicated that industry, employment size, and geographical location explained about 25 percent of the overall variation in WC claim rate (Hunt, 1988). To provide further detail on

¹Approximately 80 to 90 percent of firms with WC claims were successfully matched across the two databases. It is difficult to be more precise because it is impossible to tell how many firms had zero claims. It was also impossible to match smaller employers because of the difficulty of determining whether a small firm had no claims (and hence did not appear in the BWDC data for 1986) or whether irregularities in the data prevented the match.

employer characteristics, including possible policy variations that might explain the differences in workers' compensation claim levels, a survey of individual establishments was conducted.

A. Selection of the Employer Survey Sample

Due to limited project resources, it was necessary to confine the employer survey to four industries. But since the maximum possible generality was also needed, four contrasting yet representative industries were desired, based on their average accident rate. It was also important to ensure that the industries studied were important in their own right, so that the employer sample would have face validity in representing the variety of employer situations in Michigan.

The industries selected for analysis were Food Production (SIC 20) with a reported claim rate (based on tabulations of WC claims provided by the Bureau of Safety and Regulation) of 5.4 per 100 employees, Fabricated Metals (SIC 34) with a reported claim rate of 4.2 per 100 employees, Transportation Equipment (SIC 37) with a reported claim rate of 2.2 per 100 employees, and Health Services (SIC 80) with a reported claim rate of 1.4 per 100 employees.² These industries thus were expected to provide approximately a three-fold variation in expected injury experience. There is also substantial variety among these four industries in product market; one is in nondurable manufacturing, one is in the service sector, and two are in durable manufacturing.

After the target industries were selected, the BWDC-MESC matched sample was analyzed to find the "closed claim rate" for 1986 for each firm in each of the four industries. All firms with at least one closed claim and more than 50 employees in the target industries were analyzed (100 employees for SIC 80), and a rank order distribution was formed for each industry. The highest 15 percent of firms in the claim rate distribution for each industry formed the high claims employer survey sample. The lowest 15 percent of firms in each industry formed the low claims employer survey sample.

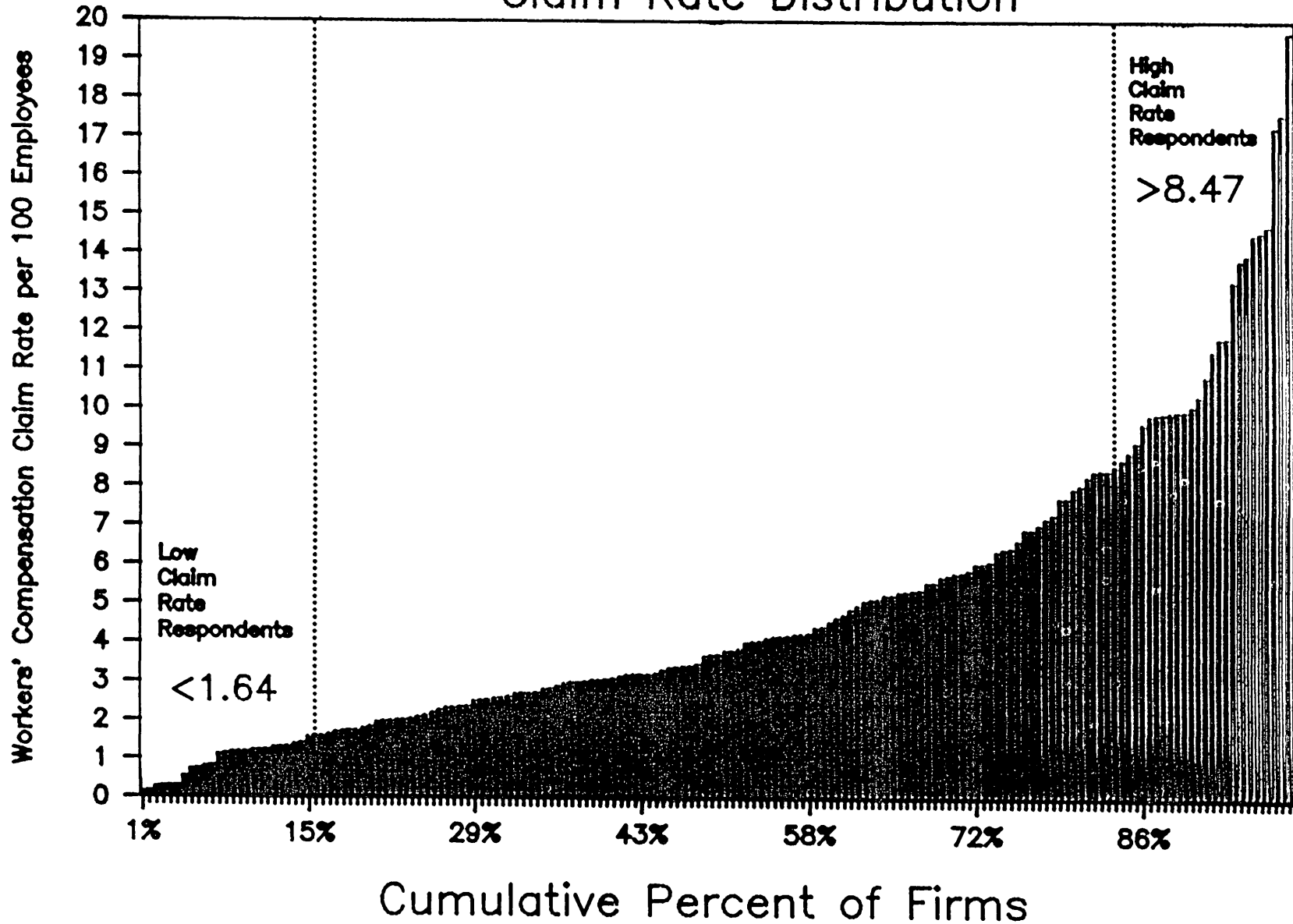
This sample selection process is illustrated graphically in figure 1 for the transportation equipment industry. The cumulative distribution of the 168 Michigan firms that qualified for analysis in this industry is arranged by the closed WC claim rate per 100 employees in 1986. The lowest 15 percent of firms in this industry all had closed claim rates lower than 1.64 claims per 100 in 1986. The highest 15 percent of firms in this industry all had closed claim rates greater than 8.47 claims per 100 in 1986. Similar analyses were conducted for each of the three other industries.

The major thrust of the empirical analysis is to determine the contribution of specific employer characteristics to workers' compensation

²These expected claim rates are based on analysis of BWDC Form 100 (Employer's First Report of Injury) by the Bureau of Safety and Regulation of the Michigan Department of Labor. See MIOSHA Information Division, "Compensable Occupational Injury and Illness Report, Michigan, 1986."

FIGURE 1

TRANSPORTATION EQUIPMENT (SIC 37) Claim Rate Distribution



claims experience in respondent firms. The workforce characteristics and employment policy differences were also of keen interest. The sampling design ensured that, even with a modest sample size, comparisons on these company dimensions could be made between high and low claims employers controlling for industry.³

B. The Employer Survey⁴

A comprehensive survey instrument was specifically developed for use in this study. This 11 page, 73-item self report questionnaire was utilized as the principal data collection instrument for investigating factors that contribute to differences in workers' compensation claims activity among Michigan employers.

The questionnaire includes four major sections with multiple subparts. Major sections include: (1) organizational summary (30 items) which includes items pertaining to characteristics of the organization and workforce, personnel and workers' compensation factors; (2) an organizational self assessment (30 items) including items related to safety and prevention, management climate and culture, disability management and prevention; (3) employer attitudes (10 items); and (4) policy issues (3 items).

The mail survey was conducted between February 5 and May 26, 1988. Two full mailings with telephone follow-up were conducted during this period. A total of 124 usable questionnaires were received for a response rate of 43.7 percent of the adjusted sample size of 284 firms.⁵

C. Representativeness of Sample

Table 1 compares the response rates to the employer survey for high and low claims experience firms. The response rate was better for low claim status firms; about 48 percent of low claim status firms responded, compared to about 39 percent of high claim status firms. However, as indicated in the table, this difference was not statistically significant.

Survey response rates were also found to be sensitive to industry, ranging from 32.4 percent for Food Production to 48.2 percent for Health Services, with Fabricated Metals and Transportation Equipment in between. However, a chi-square test on the response rates by industry indicated that these response rates were not significantly different. Response rates also

³However, the sampling design also ensured that there would be no firms in the middle. Thus the distribution of firms is unusual, as the average firms are missing.

⁴See Habeck, Leahy, and Hunt (1988) for a full description of sampling procedures and responses.

⁵A total of 10 firms were not reachable by mail. We are very thankful for the time and effort put forth by the respondent firms.

TABLE 1

CLAIM STATUS BY SURVEY RESPONSE STATUS

<u>Claim Status</u>	<u>Survey Response Status</u>				<u>Total</u>	
	<u>Respondent</u>		<u>Non-Respondent</u>		<u>#</u>	<u>%</u>
	<u>#</u>	<u>%</u>	<u>#</u>	<u>%</u>		
High	55	39.3	85	60.7	140	100.00
Low	69	47.9	75	52.1	144	100.00

$\chi^2 = 2.150$ with 1 degree of freedom

differed by employer size and location, with larger employers more likely to respond and more urban employers less likely.

Some response bias is apparent in table 2, which shows mean claim rate by response status. It is clear that respondents had significantly lower 1986 closed claim rates on the average than non-respondents, actually about 20 percent lower according to the table. This difference is not surprising, since employers could be expected to be more willing to describe positive experiences, however, the effect of this response bias on the results reported here is unknown.

D. Supplementary Data for Outcome Analysis

The data analyzed here on 1988 WC claims, indemnity costs, employment levels and wages paid by the sample firms were acquired subsequent to the completion of the survey. Data for these same 124 employers were requested for calendar year 1988 from the Bureau of Workers' Disability Compensation and the Michigan Employment Security Commission. These new data were then simply appended to the other file. Of the original 124 firms, a total of 97 (relatively) complete records were identified in the later year.

The major discrepancy between the 124 firms identified from 1986 WC data and the 97 analyzed here was due to 15 firms not appearing in the 1988 BWDC database. Presumably this reflects the fact that they had zero claims in 1988, but due to the uncertainty of the match procedures, it seems unwise to make that assumption.⁶ Another 6 firms could not be found in the 1988 MESC file, and 6 were deleted due to our inability to identify the plant conclusively in all the various data sources.⁷

It is this subset of 97 employers from the original employer sample of 124 that will be analyzed here when WC claims and cost data are examined. To repeat, the high and low claims firms were chosen on the basis of their experience in 1986, according to administrative data. The values reported for organizational characteristics in our employer survey, conducted in the first half of 1988, will be used to explain data from administrative sources on workers' compensation costs and employment for 1988.

⁶Ultimately, our intention is to analyze a three year period from 1986 through 1988, thus improving measurement of claims frequencies for smaller firms and others whose claims are infrequent.

⁷A basic problem is that the two administrative agencies use different systems to identify establishments. The BWDC uses the Federal Employer Identification Number (FEIN) while the MESC uses an ID number assigned by the unemployment insurance system. The MESC file includes the FEIN, however it is not an edited data field and is subject to an unknown error rate. When this complication is combined with the establishment turnover rate, different practices for identifying branch plants, and general noise in the data, the problem of matching these two databases is far from trivial.

TABLE 2

MEAN CLAIM RATE BY RESPONSE STATUS

	<u>Number</u>	<u>Mean</u>	<u>Standard Deviation</u>
Respondents	124	5.09	5.21
Non-Respondents	160	6.41	5.99

t statistic = 1.99*

III. BIVARIATE ANALYSIS OF RESULTS

The bivariate results from the employer survey will be presented as a series of tests of the hypothesis that there is no difference between the high claims employers and the low claims employers as a group. These hypotheses will be evaluated with a t test.⁸ Following the bivariate analysis, the results of the organizational self-assessment will be presented.

Table 3 displays the t-tests on differences in 1988 firm characteristics between low and high claims firms. The table shows that there is a significant difference in the employment level of low and high claims firms in the sample. Low claims firms are nearly twice as large on the average compared to high claims firms. They also pay significantly higher wages, about one-third more than high claims firms.

Overall, low claims firms experience only about half as many accidents as high claims firms, at least according to their self-reported Michigan OSHA (MIOSHA) log incident data. Table 3 indicates that the high claims employers experience about 36 MIOSHA reportable incidents per 100 workers per year, while low claims employers experience about 17 incidents per 100 workers per year. In addition, the incidence of WC claims closed in 1988 by firms in the low claims group is just over one-third that of the high claims group (3.5 versus 9.6 claims per 100 employees). Both these differences are very highly statistically significant.

Of course, it is not surprising that there is a difference in the claims or accident experience between the high and low claims samples, since they were selected for their extreme positions relative to other firms in their industry. However, it is interesting that the difference between high and low claims firms in WC claims is greater than the difference in MIOSHA accident incidence. This indicates that something more than the simple frequency of accidents is driving WC claims; low claims firms are apparently more effective in preventing accidents from turning into claims as well.

This is also reflected in the last entry in table 3, indemnity cost per \$100 of payroll. Low claims firms have only about one-fourth the indemnity costs of high claims firms. High claims firms paid out \$2.33 in indemnity per \$100 of payroll in 1988, while low claims firms paid only \$0.62 per \$100. Firms with the poorest outcomes experience twice as many accidents, nearly three times as many workers' compensation claims, and nearly four times the indemnity costs as firms with the best outcomes in the same 2-digit industries. It would be interesting to discover what is causing these differences.

⁸This is not a trivial decision in the case of the qualitative scales used to collect the employer self-assessment items. The numbered response options were labelled as follows: (1) Never (0% of the time), (2) Occasionally (25% of the time), (3) Sometimes (50% of the time), (4) Usually (75% of the time), and (5) Always (100% of the time). Given the proportional guidance given for the response options, we feel that it is justifiable to treat responses as coming from a ratio scale.

TABLE 3
SUMMARY OF T TESTS ON SELECTED FIRM CHARACTERISTICS

Variables		n	mean	sd	T Value	Prob > T
Total Employment	(H)	44	230.2	192.9	- 2.52	0.014 *
	(L)	52	426.9	521.5		
Wage Rate	(H)	44	\$21,098	10,330	- 2.16	0.034 *
	(L)	52	\$28,108	20,512		
Injury Rate (MIOSHA)	(H)	38	36.0	24.5	4.22	0.001 ***
	(L)	48	17.0	14.5		
WC Claims (per 100 employees)	(H)	44	9.6	5.0	5.19	0.001 ***
	(L)	52	3.5	6.5		
Indemnity Cost (per \$100 payroll)	(H)	44	2.33	1.88	5.50	0.001 ***
	(L)	52	0.62	0.91		

Note: (H) = high claim status, (L) = low claim status. The T statistic tests the hypothesis of no significant difference between the mean for high and low claim status firms. The asterisks indicate significant differences between the mean values.

Table 4 demonstrates that there are no significant differences in the geographical location of high and low claims firms. While there is a slightly higher tendency for high claims firms to be located in rural areas, this difference is not statistically significant. In addition, the source of WC insurance does not differ systematically between high and low claims employers, about half of both groups are self-insured.

Another factor suspected of influencing a firm's workers' compensation environment is the presence of a union. Table 4 shows a strong association between claim status and union presence. Nearly 74 percent of high claims employers are unionized, compared to only 38 percent of low claims employers. These results do not prove that the presence of a union will cause an employer to have a high incidence of WC claims, because a substantial minority of low claims firms also are unionized. But the relationship appears to be important and the nature of the association between high claims and union presence should receive further study to determine the mechanisms that underlie it.

Workforce characteristics are frequently thought to be important in determining an employer's WC experience as well, and a number of these general characteristics that are thought to influence accident experience were examined. Table 5 summarizes these results, indicating a modest difference between the percent of workers with less than 2 years seniority and a substantial difference the proportion of the work force on rotating shift work between high and low claims employers. Both these factors are cited in the safety literature as correlating with accident frequency. However, due to the high variance in the sample, neither of these differences reach statistical significance. Table 5 also shows that there is no difference in the proportion female.

Table 6 presents the final set of characteristics to be tested; they represent the general environment or attitudinal climate of the firm. The turnover rate at a firm is frequently used to represent the overall desirability of the employment situation. High turnover indicates that people are leaving for what they regard as better jobs elsewhere. In our sample, the turnover rate of low claims firms was approximately one-third lower than that of high claims firms (16 percent versus 24 percent annually), although this difference was not quite significant at the 5 percent level.

Another hypothesis is that a high claims incidence is caused by excessive litigation. The employer community in Michigan believes that there are a lot of claims of "dubious validity" in the workers' compensation system. If an employer is receiving lots of claims by way of petitions for hearing, the number of closed claims could be inflated. However, table 6 indicates the percentage litigated does not differ between high and low claims firms, so the incidence of "nuisance" claims does not account for the dramatic difference in overall claims incidence.

We also looked at firm practice in charging wage loss costs back to the department level, as opposed to absorbing wage loss costs in the general personnel budget. This practice would provide more incentive for supervisors to return workers to the job, since they have to pay their salaries anyway.

TABLE 4

SUMMARY OF T TESTS ON SELECTED FIRM CHARACTERISTICS

Variables		n	mean	sd	T Value	Prob > T
Proportion Detroit	(H)	45	.33	.48	- 0.13	n.s.
	(L)	52	.35	.48		
Proportion Rural	(H)	45	.38	.49	1.13	n.s.
	(L)	52	.27	.45		
Proportion Self-Insured	(H)	45	.51	.51	- 0.09	n.s.
	(L)	48	.52	.50		
Proportion Union	(H)	43	.74	.44	3.75	0.001 ***
	(L)	52	.38	.49		

Note: (H) = high claim status, (L) = low claim status. The T statistic tests the hypothesis of no significant difference between the mean for high and low claim status firms. The asterisks indicate significant differences between the mean values.

TABLE 5

SUMMARY OF T TESTS ON SELECTED WORKFORCE CHARACTERISTICS

Variables		n	mean	sd	T Value	Prob > T
Percentage Under 2 Years Seniority	(H)	41	27.5	23.7	1.33	n.s.
	(L)	46	21.3	18.7		
Percentage on Rotating Shifts	(H)	42	9.8	26.6	1.28	n.s.
	(L)	50	4.1	11.5		
Proportion Female	(H)	44	47.4	33.1	0.29	n.s.
	(L)	50	45.4	33.5		

Note: (H) = high claim status, (L) = low claim status. The T statistic tests the hypothesis of no significant difference between the mean for high and low claim status firms. The asterisks indicate significant differences between the mean values.

TABLE 6

SUMMARY OF T TESTS ON SELECTED FIRM CHARACTERISTICS

Variables		n	mean	sd	T Value	Prob > T
Turnover Rate	(H)	41	24.1	23.8	1.83	n.s.
	(L)	48	16.1	16.2		
Percentage Litigated	(H)	45	22.0	17.8	0.04	n.s.
	(L)	52	22.8	27.8		
Chargeback Costs	(H)	42	.14	.35	- 0.31	n.s.
	(L)	48	.17	.38		

Note: (H) = high claim status, (L) = low claim status. The T statistic tests the hypothesis of no significant difference between the mean for high and low claim status firms. The asterisks indicate significant differences between the mean values.

We found no substantial difference in this aspect of accountability between high and low claims employers.

While this bivariate analysis has clearly been plagued by small sample size problems; nevertheless, some of the differences are very stimulating. The low claims firms appear to be "better" places to work overall. They pay better wages, they have lower turnover rates, and they have far lower accidents, WC claims, and indemnity payments. We turn now to the firm's self-assessment of their environment, to attempt to quantify these differences in policy and practice that distinguish low claims from high claims firms.

IV. ORGANIZATIONAL SELF ASSESSMENT

As a major focus of the study, respondents were asked to critically rate the extent to which their organizations utilized various policies and practices that were hypothesized as potentially contributing to effective disability management. These self assessment items constituted three clusters of behavior, including eight items related to safety and prevention of work-related accidents, five items regarding characteristics of the managerial style and culture of the organization, and 17 items associated with the prevention and management of disability from work-related incidents. Employers rated these organizational characteristics and practices according to frequency of occurrence on a five point Likert-type scale (1-5) including: (1) never (0 percent of the time); (2) occasionally (about 25 percent of the time); (3) sometimes (about half the time); (4) usually (about 75 percent of the time); and (5) always (100 percent of the time).⁹ Results will be reported for the full sample of 124 firms, since that was the basis for the selection of variables to be included in the regression analysis to be presented later.

Employer Comparisons on Specific Practices

The items on which high and low employers differ significantly are believed to provide a guide to specific behaviors that are likely to be associated with reduced incidence of work-related claims. Tables 7-9 report the mean score comparisons for the two employer groups on each item. Items are numbered consecutively from one to 30 throughout the three tables to preserve comparability with the original instrument. The specific frequencies and proportions of ratings for each item for both employer groups are presented by clusters in Appendix tables A-C as well.

Safety and Prevention

On the average, low claims employers report more frequent achievement of all the safety and prevention items and differ significantly from high employers in the following behaviors: monitoring and correcting unsafe behaviors on a systematic basis (SAFETY2); the occurrence of safety training

⁹See Habeck, Leahy and Hunt (1988) Section II.B for an overview of the design of the survey instrument.

TABLE 7

MEAN ITEM RESPONSE WITHIN SAFETY AND PREVENTION CLUSTER BY CLAIM STATUS

Item		n	m	sd	T Value	Prob > T
1. Top management takes an active role in safety audits and inspections.	(H)	55	3.45	1.32	- 0.9262	0.3563
	(L)	69	3.56	1.30		
2. Unsafe behaviors of employees are monitored and corrected on a systematic basis.	(H)	55	3.30	1.14	- 2.6176	0.0100 *
	(L)	69	3.84	1.11		
3. The safety committee has authority to make decisions independently for the company on behalf of management.	(H)	54	2.44	1.51	- 0.9698	0.3342
	(L)	65	2.72	1.61		
4. Safety training occurs as a regular part of orientation for new and transferred employees.	(H)	55	3.38	1.43	- 3.4141	0.0009 *
	(L)	69	4.19	1.13		
5. Company leaders model and pay attention to safe behaviors.	(H)	55	3.51	1.19	- 2.4867	0.0144 *
	(L)	69	4.01	1.02		
6. First level employees (e.g., production, direct service) are involved in developing safety policies and procedures.	(H)	55	2.60	1.30	- 1.3413	0.1824
	(L)	69	2.91	1.28		
7. Safety issues are on the agenda of executive meetings.	(H)	55	2.89	1.34	- 1.9443	0.0544
	(L)	66	3.35	1.22		
8. Employees receive bonuses, awards, or recognition when a specified safety level has been attained.	(H)	55	1.65	1.34	- 1.4402	0.1524
	(L)	68	2.01	1.43		

* = alpha ≤ .05

(H) = high claim status, (L) = low claim status

TABLE 8

MEAN ITEM RESPONSE WITHIN MANAGEMENT CLIMATE AND CULTURE CLUSTER BY CLAIMS STATUS

Item		n	m	sd	T Value	Prob > T
9. Information and communication travels both from the top down and from the bottom up within the organization.	(H)	55	3.47	1.01	- 2.2090	0.0293 *
	(L)	69	3.85	0.88		
10. Employees participate in problemsolving and decisionmaking as a regular part of company operations.	(H)	55	2.62	1.03	- 2.9377	0.0040 *
	(L)	69	3.16	1.01		
11. The development of human relation skills is included in supervisor training and monitored in performance evaluation.	(H)	54	3.07	1.19	- 1.4035	0.1632
	(L)	69	3.38	1.18		
12. Strategic and long range planning occurs throughout the organization on a basis.	(H)	55	3.14	1.27	- 1.0035	0.3177
	(L)	69	3.37	1.28		
13. A profit sharing or gain sharing program is used to stimulate and reward productivity of employees at all levels.	(H)	55	1.78	1.40	- 2.8360	0.0054 *
	(L)	68	2.60	1.81		

* = alpha ≤ .05

(H) = high claim status, (L) = low claim status

TABLE 9

MEAN ITEM RESPONSE WITHIN DISABILITY PREVENTION AND MANAGEMENT CLUSTER BY CLAIMS STATUS

Item		n	m	sd	T Value	Prob > T
14. Specific procedures are used to identify and monitor an absence that lasts more than one week.	(H)	55	3.96	1.25	0.1606	0.8727
	(L)	69	4.00	1.26		
15. Light duty assignments and/or modified work are used to help restricted workers come back to work.	(H)	55	3.16	1.52	- 3.0699	0.0027 *
	(L)	68	3.95	1.29		
16. Efforts to return an injured employee to work are coordinated among departments (e.g., production, maintenance, office, medical, personnel, workers' compensation).	(H)	55	3.62	1.50	- 1.7034	0.0917
	(L)	68	4.03	1.09		
17. Vocational rehabilitation services are used to reduce costs and accelerate the employees' return to work in this company.	(H)	55	3.04	1.37	1.1398	0.2567
	(L)	67	2.75	1.43		
18. An employee assistance program is used to help employees who are showing signs of problems that may interfere with work (e.g., alcoholism, stress, and personal problems).	(H)	54	2.44	1.44	- 2.2706	0.0250 *
	(L)	67	3.06	1.54		
19. Professional fee schedules are used as a guide for purchasing services from community health care providers.	(H)	54	2.13	1.30	- 0.5594	0.5770
	(L)	63	2.27	1.40		
20. Employees are contacted shortly after injury to determine their status and maintain communication.	(H)	55	3.96	1.12	- 1.7146	0.0896
	(L)	60	4.27	0.84		
21. Progress of disability claims is reviewed regularly to determine the need for rehabilitation services.	(H)	54	3.68	1.37	- 0.1715	0.8642
	(L)	66	3.72	1.29		
22. The number of claims and their costs are monitored for the various benefit programs (e.g., workers' compensation, sickness and health, long term disability) at this location.	(H)	54	3.59	1.30	- 1.8826	0.0624
	(L)	65	4.03	1.22		

TABLE 9 Continued

Item		n	m	sd	T Value	Prob > T
23. Second opinions are used for surgery and other major medical procedures.	(H)	54	3.57	1.25	- 0.5731	0.5677
	(L)	67	3.70	1.17		
24. A system of individual case management is used to coordinate and monitor health care services and return to work.	(H)	54	3.50	1.37	0.3283	0.7433
	(L)	65	3.41	1.43		
25. Vendors who provide services to the company for ill or injured workers are evaluated on a regular basis.	(H)	54	3.05	1.35	- 0.3388	0.7354
	(L)	64	3.14	1.37		
26. Procedures are used to monitor and encourage individual supervisors to assist the return of injured workers to their departments (e.g., incidence and costs of claims are assigned to departments).	(H)	55	2.05	1.28	- 3.6422	0.0004 *
	(L)	65	2.97	1.47		
27. The company provides wellness programs and fitness resources to promote employee health.	(H)	55	1.53	0.86	- 4.3193	0.0001 *
	(L)	66	2.45	1.47		
28. Applicants are screened for job related health or disability risks.	(H)	55	4.38	1.16	- 0.2195	0.8267
	(L)	68	4.43	1.07		
29. Applicants are screened for eligibility for vocational handicap certification (e.g., back injury, epilepsy, diabetes, cardiac condition).	(H)	55	3.89	1.59	- 0.7339	0.4646
	(L)	67	4.09	1.34		
30. Employees are screened for job related health or disability risks on a continuing basis.	(H)	55	2.30	1.49	- 2.5568	0.0119 *
	(L)	68	2.98	1.42		

* = alpha \leq .05

** = alpha \leq .01

(H) = high claim status, (L) = low claim status

for new and transferred employees (SAFETY4); modeling and attending to safe behaviors on the part of company leaders (SAFETY5). The behaviors most frequently attained by low employers are the provision of safety training for new/transferred employees and company leaders modeling and attending to safe behaviors; both occur, according to the mean rating, more than 75 percent of the time.

Management Climate and Culture

All items related to the corporate characteristics and management practices were also more frequently attained by the low claims employer group. Low claims employers differ significantly from high claims employers in the following areas: using a profit or gain sharing program to stimulate and reward productivity of employees at all levels (MGMT13); employee participation in problem solving and decision making as a regular part of company operations (MGMT10); and information and communication traveling from both the top down and from the bottom up of the organization (MGMT9). Neither employer group, according to their mean score, uses profit or gain sharing as much as half the time, but both groups achieve information and communications flow throughout the organization well over half the time according to the scale.

Disability Prevention and Management

Ratings of low and high claims employers were similar on some of these practices in their organizations. Both groups screen applicants for health or disability risks (PREV28) well over 75 percent of the time according to mean ratings. Both groups also achieve high frequency in contacting employees shortly after injury (PREV20), using specific procedures to monitor absences that last more than one week (PREV14), and, screening applicants for vocational handicap certification (PREV29).

On the other hand, both employer groups report the use of professional fee schedules with health care providers (PREV19) as occurring, in general, only on an occasional basis. Moderate but similar frequencies were reported by both sets of employers for evaluating vendors who provide services to the company for ill or injured workers (PREV25) and for using vocational rehabilitation services to reduce costs and accelerate employees return to work (PREV17).

In contrast, low claims employers reported significantly greater attainment of the following practices as compared to high employers: providing wellness programs and fitness resources to promote employee health (PREV27), using light duty assignments and/or modified work to help restricted workers come back to work (PREV14), using procedures to assure that supervisors assist injured workers to return to their departments (PREV26), providing employee assistance programs to assist individuals with early signs of problems that might interfere with work (PREV18), and screening employees on a continuing basis for job related health and disability risks (PREV30).

While these self-assessment items are of questionable meaning, the fact that employers spread their responses across the categories and did not simply

give the "socially acceptable" answer gives us some confidence that we may be measuring some real behavioral and attitudinal differences. Thus, we conclude that organizations with low claims incidence do probably achieve significantly higher performance on some safety measures, in some aspects of corporate climate and managerial culture, and in utilizing some specific disability management practices.

Discussion

In regard to safety and prevention activities, the importance of two aspects - diligence and leadership - stand out. For low claims employers, safety training for employees new to the environment occurs in more than 75 percent of those cases. This is particularly important, given the conventional wisdom that a greater proportion of injuries occur for new employees (with less experience on the job). Diligence requires that training occur promptly in relation to date of hire or as part of orientation, not only on a pre-established schedule applicable for all employees. Diligence also requires that attention to safety go beyond training to the actual assessment and correction of unsafe behavior. Low claims employers more frequently report achieving this activity also. Leadership for safety results also requires company leaders to model and attend to safe behavior, which occurs in low claims companies about 75 percent of the time.

The results of the managerial process and corporate culture assessment suggest that companies who treat employees as stakeholders and valuable participants in the organization's well-being are more likely to be among the employers who experience low WC claims incidence. The low incidence companies report that they more frequently provide tangible incentives for employee productivity and provide for employee participation in decision making, and in communication that occurs within the organization. These characteristics seem to reflect specific attitudes toward human resources that are embedded in the managerial process of the organization, and more frequently realized in low incidence companies.

The results of the disability prevention and management cluster are more challenging to interpret. Only five of the 17 individual items had significantly different mean scores. Since the original high and low claims samples were selected on the basis of the number of claims, the lack of differentiation may be attributable to the fact that many of these practices are directed at controlling costs, limiting the disability effects of work-related conditions, and promoting timely return to work, rather than being directed at the prevention of the occurrence of the claim. However, it is even more compelling to find that companies reporting greater achievement of practices to prevent and manage disability when work-related incidents do occur, are those who also experience a lower incidence of WC claims in the first place.

In examining the specific disability prevention and management items on which the high and low claims employers report significantly different levels of achievement, it is possible to identify a theme of long term human resource investment in these practices. That is, low claims employers more frequently provide wellness/fitness resources, they more frequently use employee

assistance programs to address early signs of personal behavioral problems, and they are more likely to continue to screen employees for health and disability issues after they are hired. A second theme that differentiates low and high rated employer practices relates again to the issue of diligence in carrying out and monitoring their performance. Low claims employers report more frequent use of light duty assignments and modified work to accomplish the return to work objective, and they more frequently report using procedures to involve supervisors in returning injured workers to work as well.

In conclusion, these results suggest that low claims employers are more successful in demonstrating and carrying out their commitment to employee well-being, productivity, participation, and accountability; and that in some as yet undetermined way, these behaviors are related to lower costs and lower incidence of workers' compensation claims.

V. Multivariate Analysis

Estimated linear regression equations will be presented for two of the major variables in the study; the number of claims per 100 employees and the amount of indemnity (wage-loss) benefits paid per \$100 of payroll. In both cases, the data are for 1988.

Claim Incidence

Table 10 presents the OLS regression analysis of the closed WC claim rate for sample firms in 1988. The dependent variable was developed from administrative data provided by the Bureau of Workers' Disability Compensation and the Michigan Employment Security Commission. There is a substantial missing value problem, as indicated by the fact that the original 96 observations have here declined to 68.¹⁰ The mean closed claim rate from the observations in the regression is 5.99 claims/100 employees (n = 68) as compared to 6.27 claims/100 employees in 1988 for the full subsample (n = 96). For comparison, it is worth noting that the mean claim rate was 5.09 claims/100 employees in 1986 (n = 124) for the entire sample when it was initially selected.¹¹ As indicated at the bottom of the table, the overall estimated equation was statistically significant (at the 5 percent alpha level), and about 42 percent of the variance in claim rate was explained by the equation.

The variables included in the regression are designed to control for the expected determinants of claim rates at the firm level. They include dummy variables to control for industry (SIC 37 - Transportation Equipment is the omitted category) and location (Detroit and Rural, with other MSA as the

¹⁰Ten observations were missing on workforce seniority, eight were missing on turnover rate, and seven were missing on the wage loss benefit charge back variable, for example.

¹¹It appears that workers' compensation experiences have worsened significantly in Michigan between 1986 and 1988.

Table 10

REGRESSION ANALYSIS OF WC CLOSED CLAIM RATE FOR 1988

Dependent variable:

Closed Claims per 100 Employees in 1988 $\bar{X} = 5.99$

\bar{X}	<u>Independent variables</u>	$\hat{\beta}$	<u>se</u>	<u>t</u>
		<u>Location</u>		
.072	SIC 20	0.02	2.65	0.01
.423	SIC 34	2.27	1.41	1.61
.268	SIC 80	-3.20	2.44	-1.31
.340	DETROIT	0.70	1.43	0.49
.320	RURAL	0.94	1.34	0.70
3.37	EMP88 (HUNDREDS)	-0.10	0.15	-0.70
24.90	WAGE RATE	-0.09	0.08	-1.02
.547	UNION	2.34	1.15	2.03 *
46.33	FEMALE	0.00	0.03	0.15
24.22	UNDER 2 YEARS SENIORITY	0.03	0.03	0.98
6.72	ROTATING SHIFTS	0.03	0.03	1.12
25.41	INJURY RATE	0.12	0.02	4.98 **
3.52	SAFETY1	0.59	0.60	0.98
3.53	SAFETY2	-0.64	0.66	-0.97
2.53	SAFETY3	0.53	0.39	1.36
3.74	SAFETY4	0.74	0.53	1.40
3.76	SAFETY5	-0.88	0.75	-1.19
2.84	SAFETY6	-0.25	0.45	-0.56
3.12	SAFETY7	0.40	0.51	0.79
1.84	SAFETY8	-0.42	0.39	-1.07
	CONSTANT	1.77	3.63	0.49

n = 68

F (20, 48) = 3.48**

Adjusted R² = .42

* Significant at 5 percent level

** Significant at 1 percent level

omitted category). While none of these coefficients are statistically different from zero by conventional standards, they are important control variables to prevent assigning variability to other covariant measures.

Also included in the analysis are the employment level (in hundreds), the average earnings rate (in \$ thousands), and a union dummy variable. The first of these variables represents the general size level of the firm, which presumably is a proxy for the ability to provide safety resources and other organizational responses to disability challenges. Wages probably serve as a proxy for the occupational mix and the general quality of jobs in the firm. Union status was shown earlier to be associated with high claims levels, so it is also an important control variable. However, of this group, only the union variable was statistically significant in the estimated relationship. The presence of a union is associated with about 2.3 extra claims per 100 employees in 1988 (39 percent).

Workforce characteristics such as proportion female, proportion with under 2 years seniority, and proportion working rotating shifts were also included in the regression, to test the influence of these variables in a multivariate framework. None of them were close to statistical significance in the estimated equation. Only the injury rate (derived from employer self-reports of MIOSHA injury log statistics) was significant; on the average there were about 12 closed workers' comp claims for every 100 MIOSHA log "incidents" among this sample of employers. In other words, there are about 8 accidents for each workers' compensation claim.¹²

The group of safety self-assessment items were entered in the regression to determine whether they performed more adequately in the multivariate than in the bivariate analysis presented earlier. In fact, the performance here is not very impressive either, with none of the safety items achieving statistical significance at the five percent alpha level. Safety items 2, 4, and 5 which were significantly different between high and low claims employers in the bivariate analysis did not perform well in this multivariate analysis.

Indemnity Cost Levels

Table 11 presents the regression analysis of the overall indemnity payment rate in 1988 for our sample firms. This figure would include all wage loss benefit payments made over their entire duration to cases that were closed in 1988. Note that this does not include medical costs, vocational rehabilitation costs, or administrative costs. The mean of the indemnity pay rate was \$1.41 per \$100 of payroll in 1988. This analysis included 76 observations and explained approximately 50 percent of the variation in the dependent variable.

The first group of variables includes the employment level, WC claim rate, and estimated annual earnings for the firm. The employment level is not

¹²Michigan has a 7 day waiting period before wage loss benefits become payable, so it would be expected that only a minority of accidents would be compensable.

Table 11

REGRESSION ANALYSIS OF INDEMNITY PAY RATE FOR 1988

Dependent variable:

Indemnity Payments per \$100 Payroll in 1988

 \bar{X} = \$1.41

\bar{X}	Independent variables	$\hat{\beta}$	se	t
3.37	EM88 (HUNDREDS)	-0.014	0.038	-0.38
6.27	CLMRATE	0.119	0.025	4.76**
24.90	WAGERATE (THOUSANDS)	-0.076	0.032	-2.39*
---	WAGESQRD	0.0004	0.0002	1.95
0.52	SELFINS	-0.456	0.307	-1.49
0.22	LITRATE	2.245	0.627	3.58**
19.76	TURNOVER	0.016	0.009	1.68
0.16	CHARGEWL	0.420	0.442	0.95
3.53	SAFETY2	-0.278	0.184	-1.51
3.74	SAFETY4	0.107	0.149	0.72
3.76	SAFETY5	-0.357	0.183	-1.95
3.68	MGMT9	-0.016	0.169	-0.10
2.89	MGMT10	0.134	0.170	0.79
2.30	MGMT13	0.079	0.097	0.82
3.62	PREV15	-0.196	0.105	-1.88
2.78	PREV18	-0.010	0.102	-0.10
2.48	PREV26	0.216	0.127	1.70
2.00	PREV27	-0.047	0.127	-0.37
2.73	PREV30	0.004	0.124	0.03
	CONSTANT	3.239	0.886	3.66**

n = 76

F (19, 57) = 5.07**

Adjusted R² = .50

* Significant at 5 percent level

** Significant at 1 percent level

significantly related to indemnity payments in this regression, so it appears that earlier indications of correlation with the claims rate may not hold true for a multivariate analysis of WC costs by size of firm. The claim rate is significantly related to indemnity payments, with about \$.12 in indemnity payments per \$100 payroll for each additional claim per 100 employees.

The earnings level of the firm's employees was entered in a quadratic specification since the workers' compensation benefit formula is capped, and a linear specification might not provide a sufficient fit. The estimated equation implies a minimum firm "replacement" ratio (indemnity/wage ratio) at an average wage level of about \$19,000 per annum. From this level, the ratio of the indemnity costs to the wage level rises despite the capping of the weekly benefit amount.¹³

The second group of variables represents some of the environmental characteristics perceived to be important differentiators of sample firms in a disability compensation sense. Self-insured status is not statistically significant, but it does appear to be negatively related to indemnity costs. Relating the estimated coefficient (-0.456) to the mean of the entire sample (1.41), self-insured firms enjoy a very substantial estimated advantage of over one-third in reduced WC indemnity costs.

The litigation rate for workers' compensation claims is also revealed to be a very significant variable in this analysis. Table 11 indicates that average indemnity payments increase about \$2.25 for every increase of 1 percent in the litigation rate. Of course, this equation cannot tell us whether the indemnity costs would be even higher for some employers in the absence of litigation, but it is apparent that elevated litigation activity and high indemnity costs are very strongly linked. Turnover rates at the sample firms are also indicated as an important (but not quite statistically significant) correlate of indemnity costs. By contrast, the practice of charging wage loss costs back to the operating department is not significantly associated with indemnity costs.

A selective strategy was used for the inclusion of the self-assessment items for this regression. All those items that showed statistically significant differences in the bivariate analysis are included here. Logically, safety factors, corporate culture factors, and disability management factors should all influence the level of indemnity payments at the firm level. So if these questionnaire items have measured significant areas of variation in these important policy dimensions, the estimated equation should reflect this.

None of these variables is strictly statistically significant in the estimated equation (at 5 percent alpha level). However, two of the safety items are near significance. Each scale-step for the statement that "Unsafe behaviors of employees are monitored and corrected on a systematic basis" (SAFETY2) was associated with a reduction of about \$.28 in indemnity costs

¹³Recall that indemnity payments are the product of weekly compensation rates and disability durations.

(about 20 percent evaluated at the mean). "Company leaders model and pay attention to safe behavior" (SAFETY5) had an even larger payoff, about \$.36 per scale-step. These are large coefficients for such indirectly measured items, and this would seem to suggest that there is something important going on here. It certainly is deserving of further research.

Among the disability prevention and management variables, the performance was very uneven. "Light duty assignments and/or modified work are used to help restricted workers come back to work" (PREV15) was nearly significant and was of nearly the same magnitude as the safety variables above. Each scale-step on this variable was associated with a reduction of about \$.20 in average indemnity costs per \$100 payroll. Unfortunately the related variable that measured the encouragement of individual supervisors to assist with return to work techniques (PREV26) was also nearly significant, but had the wrong sign. There is no easy way to explain both these near significant results. In addition, none of the management culture variables performed well in the regression.

VI. CONCLUSIONS

This analysis must be regarded as preliminary in nature. The sample is small, and the measurements are crude. The research effort has sought to determine the impact of subtle behavioral differences among employers using aggregate output measures that are inherently highly variable, such as the number of WC claims and the indemnity cost rate for the firm. Some relationships appear to be strong enough to overcome this difficult research environment; it seems clear that firm characteristics and firm behaviors have been shown to affect workers' compensation experience among employers in Michigan. Some of the causal relationships explored here seem credible, others need additional confirmation. We are continuing this research effort, both through acquiring and analyzing additional data, and by designing a new field intervention strategy to improve our understanding of what determines disability incidence and outcomes.

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APPENDIX A

ITEM FREQUENCIES WITHIN SAFETY AND PREVENTION CLUSTER BY CLAIMS STATUS

Item		Response									
		Never		Occasionally		Sometimes		Usually		Always	
		#	%	#	%	#	%	#	%	#	%
1. Top management takes an active role in safety audits and inspections.	(H)	5	9.09	13	23.64	8	14.55	16	29.09	13	23.64
	(L)	5	7.25	13	18.84	10	14.49	20	28.99	21	30.43
2. Unsafe behaviors of employees are monitored and corrected on a systematic basis.	(H)	2	3.64	14	25.45	13	23.64	17	30.91	9	16.36
	(L)	2	2.90	8	11.59	12	17.39	24	34.78	23	33.33
3. The safety committee has authority to make decisions independently for the company on behalf of management.	(H)	23	42.59	8	14.81	6	11.11	10	18.52	7	12.96
	(L)	25	38.46	7	10.77	7	10.77	13	20.00	13	20.00
4. Safety training occurs as a regular part of orientation for new and transferred employees.	(H)	6	10.91	13	23.64	8	14.55	10	18.18	18	32.73 *
	(L)	2	2.90	7	10.14	5	7.25	17	24.64	38	55.07
5. Company leaders model and pay attention to safe behaviors.	(H)	4	7.27	9	16.36	8	14.55	23	41.82	11	20.00
	(L)	2	2.90	5	7.25	8	11.59	29	42.03	25	36.23
6. First level employees (e.g., production, direct service) are involved in developing safety policies and procedures.	(H)	13	23.64	16	29.09	12	21.82	8	14.55	6	10.91
	(L)	10	14.49	20	28.99	14	20.29	16	23.19	9	13.04
7. Safety issues are on the agenda of executive meetings.	(H)	9	16.36	16	29.09	11	20.00	10	18.18	9	16.36
	(L)	4	6.06	16	24.24	12	18.18	21	31.82	13	19.70
8. Employees receive bonuses, awards, or recognition when a specified safety level has been attained.	(H)	42	76.36	3	5.45	3	5.45	1	1.82	6	10.91
	(L)	39	57.35	10	14.71	6	8.82	5	7.35	8	11.76

* = χ^2 with 4 degrees of freedom, $p \leq .05$

(H) = high claim status, (L) = low claim status

APPENDIX B

ITEM FREQUENCIES WITHIN MANAGEMENT CLIMATE AND CULTURE CLUSTER BY CLAIMS STATUS

Item		Response									
		Never		Occasionally		Sometimes		Usually		Always	
		#	%	#	%	#	%	#	%	#	%
9. Information and communication travels both from the top down and from the bottom up within the organization.	(H)	1	1.82	10	18.18	14	25.45	22	40.00	8	14.55
	(L)	0	0.00	6	8.70	14	20.29	33	26.61	16	23.19
10. Employees participate in problemsolving and decisionmaking as a regular part of company operations.	(H)	7	12.73	22	40.00	11	20.00	15	27.27	0	0.00 *
	(L)	2	2.90	17	24.64	25	36.23	18	26.09	7	10.14
11. The development of human relation skills is included in supervisor training and monitored in performance evaluation.	(H)	4	7.41	17	31.48	11	20.37	15	27.78	7	12.96
	(L)	4	5.80	14	20.29	16	23.19	22	31.88	13	18.44
12. Strategic and long range planning occurs throughout the organization on a routine basis.	(H)	6	10.91	13	23.64	12	21.82	15	27.27	9	16.36
	(L)	6	8.70	15	21.74	10	14.49	23	33.33	15	21.74
13. A profit sharing or gain sharing program is used to stimulate and reward productivity of employees at all levels.	(H)	38	69.09	7	12.73	0	0.00	4	7.27	6	10.91 *
	(L)	34	50.00	6	8.82	2	2.94	5	7.35	21	30.88

* = χ^2 with 4 degrees of freedom, $p \leq .05$
(H) = high claim status, (L) = low claim status

APPENDIX C

ITEM FREQUENCIES WITHIN DISABILITY PREVENTION AND MANAGEMENT CLUSTER BY CLAIMS STATUS

Item		Response									
		Never		Occasionally		Sometimes		Usually		Always	
		#	%	#	%	#	%	#	%	#	%
14. Specific procedures are used to identify and monitor an absence that lasts more than one week.	(H)	3	5.45	7	12.73	4	7.27	16	29.09	25	45.45
	(L)	5	7.25	4	5.80	12	17.39	13	18.84	35	50.72
15. Light duty assignments and/or modified work are used to help restricted workers come back to work.	(H)	13	23.64	7	12.73	6	10.91	16	29.09	13	23.64 *
	(L)	5	7.35	7	10.29	6	8.82	18	26.47	32	47.06
16. Efforts to return an injured employee to work are coordinated among departments (e.g., production, maintenance, office, medical, personnel, workers' compensation).	(H)	7	12.73	9	16.36	6	10.91	9	16.36	24	43.64
	(L)	1	1.47	8	11.76	9	13.24	20	29.41	30	44.12
17. Vocational rehabilitation services are used to reduce costs and accelerate the employees' return to work in this company.	(H)	9	16.36	11	20.00	16	29.09	7	12.73	12	21.82
	(L)	19	28.36	11	16.42	15	22.39	12	17.91	10	14.93
18. An employee assistance program is used to help employees who are showing signs of problems that may interfere with work (e.g., alcoholism, stress, and personal problems).	(H)	19	35.19	14	25.93	6	11.11	8	14.81	7	12.96
	(L)	15	22.39	13	19.40	10	14.93	11	16.42	18	26.87
19. Professional fee schedules are used as a guide for purchasing services from community health care providers.	(H)	26	48.15	8	14.81	10	18.52	7	12.96	3	5.56
	(L)	27	42.86	13	20.63	9	14.29	7	11.11	7	11.11
20. Employees are contacted shortly after injury to determine their status and maintain communication.	(H)	2	3.64	6	10.91	5	9.09	21	38.18	21	38.18
	(L)	0	0.00	2	2.90	11	15.94	22	31.88	34	49.28
21. Progress of disability claims is reviewed regularly to determine the need for rehabilitation services.	(H)	6	11.11	5	9.26	10	18.52	12	22.22	21	38.89
	(L)	6	9.09	7	10.61	9	13.64	21	31.82	23	34.85
22. The number of claims and their costs are monitored for the various benefit programs (e.g., workers' compensation, sickness and health, long term disability) at this location.	(H)	4	7.41	9	16.67	9	16.67	15	27.28	17	31.48
	(L)	3	4.62	6	9.23	11	16.92	11	16.92	34	52.31

APPENDIX C Continued

Item		Response									
		Never		Occasionally		Sometimes		Usually		Always	
		#	%	#	%	#	%	#	%	#	%
23. Second opinions are used for surgery and other major medical procedures.	(H)	4	7.41	8	14.81	10	18.52	17	31.48	15	27.78
	(L)	3	4.48	7	10.45	19	28.36	16	23.88	22	32.84
24. A system of individual case management is used to coordinate and monitor health care services and return to work.	(H)	6	11.11	8	14.81	10	18.52	13	24.07	17	31.48
	(L)	11	16.92	5	7.69	15	23.08	14	21.54	20	30.77
25. Vendors who provide services to the company for ill or injured workers are evaluated on a regular basis.	(H)	9	16.67	11	20.37	11	20.37	14	25.93	9	16.67
	(L)	8	12.50	17	26.56	11	17.19	14	21.88	14	21.88
26. Procedures are used to monitor and encourage individual supervisors to assist the return of injured workers to their departments (e.g., incidence and costs of claims are assigned to departments).	(H)	28	50.91	8	14.55	10	18.18	6	10.91	3	5.45 *
	(L)	16	24.62	9	13.85	14	21.54	13	20.00	13	20.00
27. The company provides wellness programs and fitness resources to promote employee health.	(H)	35	63.64	14	25.45	4	7.27	1	1.82	1	1.82 *
	(L)	25	37.88	13	19.70	11	16.67	7	10.61	10	15.15
28. Applicants are screened for job related health or disability risks.	(H)	4	7.27	0	0.00	6	10.91	6	10.91	39	70.91
	(L)	2	2.94	4	5.88	6	8.82	7	10.29	49	72.06
29. Applicants are screened for eligibility for vocational handicap certification (e.g., back injury, epilepsy, diabetes, cardiac conditions).	(H)	10	18.18	3	5.45	3	5.45	6	10.91	33	60.00
	(L)	7	10.45	2	2.99	9	13.43	9	13.43	40	59.70
30. Employees are screened for job related health or disability risks on a continuing basis.	(H)	24	43.60	11	20.00	8	14.55	3	5.45	9	16.36 *
	(L)	13	19.12	15	22.06	14	20.59	12	17.65	14	20.59

* = χ^2 with 4 degrees of freedom, $p \leq .05$
(H) = high claim status, (L) = low claim status