ANALYSIS OF PERSISTENCE IN EMPLOYER INJURY RATES

Upjohn Institute Technical Report N. 93-002

Final Report

Submitted to

Office of Statistics
Occupational Safety and Health Administration
U.S. Department of Labor
under Purchase Order B9F24231

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March, 1993

EXECUTIVE SUMMARY

This report seeks an empirical answer to a very specific question, "Do injury and disability incidence rates at the establishment level persistent through time?" The answer should help to answer a more operational question, "Would OSHA inspection strategy benefit from knowledge of past injury rates at the establishment level?" This report will bring new evidence to bear through the analysis of two Michigan databases. A review of earlier research literature is offered as background for the analysis. Generally speaking, previous studies have shown that there is a good deal of persistence in the frequency of lost workday cases over time. For example, an unpublished study by Ruser (1992) shows that establishments that had worse than average injury records in 1979 were still worse than average five years later.

The current study uses administrative data on Michigan workers' compensation claims from 1986 through 1988 to investigate consistency of firm performance over time. Simple correlation analysis of the incidence of workers' compensation claims for approximately 25,000 Michigan firms show that the degree of correlation varies with the employment level of the firm. Firms with less than 100 employees generally do not have sufficient exposure to develop consistent claim rates and therefore actually show negative correlation between claim rates in adjacent years. However, for firms with more than 100 employees, the analysis shows that average correlations of .70 for claim rates in adjacent years characterize Michigan firms. This means that about 49 percent of the variation in workers' compensation claim rates in a given year is predictable based on past experience.

A special random sample of 220 Michigan establishments developed for the Safety, Education and Training Division (SET) of the Michigan Department of Labor was also analyzed for correlations, both across performance measures and over time. The SET sample demonstrated a significant level of correlation among different performance measures for the same year, ranging from .35 to .66 for various combinations of MIOSHA recordables, MIOSHA lost workday cases, total MIOSHA lost workdays, and workers' compensation claims. Comparison of adjacent year rates of recordable injuries and lost workday cases revealed correlations of approximately .80 across the 1986-1989 period. The conclusion is that there is substantial consistency of performance through time at the establishment level, with nearly 65 percent of the variation being predictable based on past performance.

A more sophisticated multi variate analysis of the SET database offers even greater insight into the value of knowing past performance levels. Negative binomial regression models were estimated for the number of recordables, the number of lost workday cases, and the total number of lost workdays. A set of characteristics of the establishments, including industry, employment level, multi plant firm status, percent low tenure workers, and union status. Hourly wage, and self-insured status, are used to explain the level of performance on the three performance measures in 1989. The previous year's level of performance is included as an explanatory variable in the regression function to determine the contribution it could make. Results show that knowing last year's performance level substantially improves prediction results: increasing the percent of variance explained (predicably) form 40 to 60 percent for total lost workdays and from 39 to 70 percent for lost workday cases.

Even more impressive, an analysis of the marginal contribution of past performance levels in explaining current performance was performed. Adding last year's performance level to a model that included only industry and employment levels triples the explanatory power of the model for lost workday cases and total workdays. Adding additional establishment specific variables to the model increases the explanatory power by another 6 to 16 percent. Thus, the past performance level is the single most powerful predictor available of current injury and disability performance.

The conclusion is that there is a substantial degree of persistence in injury and disability performance across time at the establishment level. Further, based on theses analyses, it is obvious that OSHA would benefit from access to establishment level data in targeting inspections, or other interventions designed to improve occupational safety and health performance.