The impact of prevention measures and organisational factors on occupational injuries

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Abstract

This paper analyses the impact of risk prevention practices and organisational factors on occupational injuries. These consist of occupational safety measures, as regards both the intensity and the orientation of risk prevention, the implementation of quality management tools, the enhancing of workers empowerment, and the use of flexible production technologies. To that end, we estimate a negative binomial regression based on a sample of 213 Spanish industrial establishments, defining a constant random parameter to account for non-observable heterogeneity. Our results show that the emphasis on the innovative dimensions of prevention activities, the intensive use of quality management tools, and the empowerment of workers are all factors contributing to reduce the number of injuries. By contrast, the implementation of flexible manufacturing processes is associated to higher accident rates.

Keywords: Occupational safety; Prevention management; Organisational factors

1. Introduction

The conventional approach to occupational health and safety was largely based on the study of the chemical, physical and biological risks to which people may be exposed in the workplace. Meanwhile, other areas, such as psychological and psychosocial risks, gradually attracted researchers’ attention. However, the real revolution in the field of health and safety at work was the expansion of the focus from the individual worker to the conditions of the establishment.

As Hale and Hovden (1998) explain, it was only in the 1980s that the conviction spread among those with responsibilities in the field of workplace health and safety that the traditional approach, centred on the relationship between the individual worker and technology, was not enough. These authors identified three stages in the evolution of workplace health and safety management. In the first, the sole objective was the search for technical measures to lower the risk of accidents. In the second, interest shifted to the individual, focusing on
behaviour and ergonomics with the goal of shaping the workplace to suit the person. The third stage is characterized by the consideration of organisational and management issues as fundamental factors for safety improvement.

In recent years, the authorities in the developed nations have paid considerable attention to the business organisation in looking for improving preventive practices. Nevertheless, the National Institute for Occupational Safety and Health in the USA recently stressed that research into the relationship between organisational factors and accident rates is still sparse and incomplete, and sketched the priorities for further study (NIOSH, 2002). The NIOSH report underlined that organisational change and the new management practices adopted by firms in recent years have potential implications for safety that have not received sufficient attention to date. In particular, it affirms that priority should be given to the following issues: (i) changes in workload and pressure; (ii) the effects of vertical decentralisation of jobs and job enrichment; (iii) appropriate organisation of prevention services and programmes; (iv) the impact of changes in work organisation on awareness of workplace risks, as well as on the preventive effort of both the employer and the worker; and (v) the effects that organisational changes have on the work/leisure balance.

Despite its unquestionable importance, the relationship between organisational parameters, the intensity and type of preventive measures implemented by firms and industrial accident rates is a line of research that has received comparatively little attention. Furthermore, the majority of papers in this field are descriptive reports that theorize about the impact of certain organisational practices on workplace risks. Empirical studies are rare, however, and are affected by significant methodological and data limitations.

This paper contributes to this literature in several ways. In the first place, we analyse the effect of various organisational parameters on injury rates. Thus, we consider three organisational dimensions, namely the technology and the organization of production, the application of quality management practices, and the empowerment of workers. Further, we construct a risk prevention index that quantifies the intensity of firm’s preventive effort, as well as a variable that identifies those firms adopting an innovative orientation of the occupational risk preventive management. The relationship between these indicators with the accident measures allows us to determine the nature of their impact on the workplace safety. Secondly, we test whether the combination of innovative preventive effort with the organisational factors helps to further reduce the number of injuries. In other words, we ask whether there are any synergies between this type of prevention and organisational factors. We analyse these issues for a sample of 213 industrial firms in Spain with over 30 employees by means of a negative binomial regression model with random parameters.

The paper is organised as follows. The following section discusses how prevention decisions and organisational factors relate with the accident rate, and establishes the hypotheses we shall test. Section 3 describes the econometric methodology. In Section 4, we present the applied study, the variables employed and the data obtained. Section 5 discusses the results of the econometric analysis, and the paper closes with our main conclusions.

2. Risk prevention and the role of organisational factors in reducing the accident rate: some hypotheses

2.1. The intensity and the orientation of risk prevention

Reducing the risk of accidents and occupational disease means undertaking what is generally known as prevention. For example, article 4 of the Spanish Workplace Risks Prevention Act (Law 31/November 8th 1995) defines prevention as “all the steps or measures taken or planned at all stages of work in the enterprise to prevent or reduce occupational risks”. The Act requires all entrepreneurs to take “all measures as may be necessary to protect the health and safety of their employees” (article 14). All of the measures established are by nature “minimum legal requirements”, which may be developed and enhanced in collective labour agreements (article 2.2).

If action is effective, we may expect that more intense risk prevention will result in lower accident rates. Thus, the accident rate in firms that take only the minimum preventive measures necessary to comply with the law will be significantly higher than rates in those firms that take a more proactive stance toward the development of a comprehensive workplace risk prevention system. This is confirmed by the available empirical evidence. Hunt and Habeck (1993) examined a sample of 220 firms in the US State of Michigan in order
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