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Estimating the Effect and Economic Impact of Absenteeism, Presenteeism, and Work Environment–Related Problems on Reductions in Productivity from a Managerial Perspective

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ABSTRACT

Objectives: The aim of this study was to propose wage multipliers that can be used to estimate the costs of productivity loss for employers in economic evaluations, using detailed information from managers. **Methods:** Data were collected in a survey panel of 758 managers from different sectors of the labor market. Based on assumed scenarios of a period of absenteeism due to sickness, presenteeism and work environment–related problem episodes, and specified job characteristics (i.e., explanatory variables), managers assessed their impact on group productivity and cost (i.e., the dependent variable). In an ordered probit model, the extent of productivity loss resulting from job characteristics is predicted. The predicted values are used to derive wage multipliers based on the cost of productivity estimates provided by the managers. **Results:** The results indicate that job characteristics (i.e., degree of time sensitivity of output, teamwork, or difficulty in replacing a worker) are linked to productivity loss as a result of health-related and work environment–related problems. The impact of impaired performance on productivity differs among various occupations. The mean wage multiplier is 1.97 for absenteeism, 1.70 for acute presenteeism, 1.54 for chronic presenteeism, and 1.72 for problems related to the work environment. This implies that the costs of health-related and work environment–related problems to organizations can exceed the worker's wage. **Conclusions:** The use of wage multipliers is recommended for calculating the cost of health-related and work environment–related productivity loss to properly account for actual costs.

Keywords: costs of absenteeism, job characteristics, presenteeism, productivity, wage multipliers, work environment.

Introduction

Reduced work performance, which can be a consequence of absenteeism or presenteeism (i.e., at work despite being sick), can contribute substantially to productivity costs for employers [1]. The economic impact of reduced performance as a result of absenteeism is relatively simple to estimate unlike that of presenteeism. Productivity losses resulting from presenteeism have been shown to be significantly higher than such losses resulting from absenteeism [2], yet these costs are not recognized by employers. As yet, there is no general reference that employers can use to measure or monetize the impact of impaired performance on their organization's productivity [3].

In previous research, productivity loss has been estimated by counting the number of days individuals are absent and the amount of reduction in performance as a result of health-related problems [4]. This reduction is then multiplied by a relevant value of production per time unit (e.g., hours), translated into productivity costs by using the minimum wage rate [3]. It has been suggested that productivity losses are underestimated when the minimum wage is used because of discrepancies between wage and marginal productivity [5,6]. This implies that the value of the worker's contribution is generally higher than the wage. However, this depends on, for example, whether it is possible to postpone the deadline without economic consequences and how easy it is to make substitutions, if needed. Another argument for productivity costs being underestimated when wages are used has been that a reduction in worker performance affects the performance not only of the specific worker in question but also of coworkers. These job-specific factors could make the value of productivity costs to employers significantly higher than the cost of wages. To deal with this challenge in estimating the cost of lost productivity and to show its relevance for the employer [7], the impact of certain job-specific characteristics, particularly the extent of loss in teamwork, has been studied in a number of occupations [5,8]. The cited studies have generated hypotheses about the impact of absenteeism and presenteeism on the degree of reduction in performance. Accordingly, Pauly et al. [5] have

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suggested the use of wage multipliers based on job-specific contexts to estimate actual productivity loss from the employer's perspective. The multiplier is the cost in excess of the wage caused by a reduction of the affected worker's performance resulting from absenteeism or presenteeism [5,8].

Productivity loss is not only a consequence of absenteeism or presenteeism, but it has also been shown that work environment–related problems are associated with productivity loss, and thus these problems need to be taken into account to estimate the total cost of productivity loss [9,10]. Earlier research has shown that work environment–related problems may not always be as prevalent as those related to presenteeism but that they have a greater impact on productivity compared with problems related to presenteeism [10]. As in the case of absenteeism and presenteeism, there is reason to believe that the cost of lost productivity resulting from work environment–related problems may be higher than the cost of wages. Therefore, wage multipliers that take into consideration the effect of work environment–related problems on the total cost of lost productivity can be of value. Findings from previous research on the cost of productivity loss are largely generalizable only to study-specific contexts (with differing economic systems, including the labor market and insurance regulations). It is therefore desirable to identify wage multipliers that can be applied to a variety of settings.

The aim of this study was to establish wage multipliers that can be used to estimate the costs of productivity loss for employers in economic evaluations by using detailed information from managers. The present study replicates and further advances discussions about the cost of impaired performance by raising the issue of problems related to the work environment in the labor market. To establish multipliers, the first step is to examine the effect of job characteristics on group productivity in relation to health and work environment–related problems.

Theoretical Framework

Production Model

According to economic theory, *productivity* is assessed as output, which is a function of capital and labor input. *Productivity loss* is associated with reduced labor input as a result of absenteeism and presenteeism [11]. To clarify, *absenteeism* refers to a short period of absence from work because of ill-health. *Presenteeism* refers to attending work despite illness (i.e., acute or chronic) which would normally justify absence. *Work environment–related productivity loss*, which is introduced into the model later, refers to any physical, psychological, or social problems that might arise in the work environment and impair work performance.

Let us assume that there is a competitive market where labor can be contracted for a wage in return for the output produced [5]. Let us also assume that different jobs require workers to carry out different tasks such that the output of organization i would be different from that of organization j. Let us adopt a production function similar to Pauly et al. [5], where organizations can combine capital (K) and labor (L) to produce output Q (K, L). Capital is held constant across organizations. Further, assume that if the available labor (L) is greater or equal to the labor requirement (L'), such that $L > L'$, then $Q > 0$ [5]. Suppose also that different jobs have different labor requirements. This implies that wages (W) in jobs with $L' = 1$ will be equal to the marginal product value of labor added by the work of that single person in the job, which is W(1).

At the same time, any job-specific characteristics, such as the amount of teamwork, the ease of substitution of workers, and time sensitivity of output, can implicitly affect how much productivity loss incurred by an organization [5].

Teamwork

Suppose that output is dependent on the extent of teamwork, then the labor requirement would be greater than unity, or $L' > 1$ such that $L \geq L'$ to achieve $Q > 0$. Thus, a reduction of labor by one unit below L', will immediately reduce the output to zero. Put simply, if one unit of output requires $L' = 2$, but instead, $L < 2$, then $Q = 0$. Thus, if the organization experiences health-related or work environment–related problems, productivity loss is expected to increase by the extent of team production.

Ease of Substitution of Workers

Suppose also that a worker was absent for a number of days because of illness, implying that $L < L'$ labor, then the marginal product of the team $Q' = 0$. If substitution is possible but imperfect, the marginal product of the team will be the difference between regular team production levels and the lower team production levels with a replacement. If the employer should find a replacement of similar quality for the absent worker (i.e., ease of substitution) then $L \geq L'$, and $Q > 0$. Hence, the health-related or work environment–related productivity loss is expected to increase in proportion to how difficult it is to replace a worker.

Time Sensitivity of Output

Time sensitivity of the organization's output relates to the entire production process and what consequences may be incurred should part of the process be postponed. Accordingly, it is assumed that output revenue is highest in a situation where the output is not delayed. The revenue falls when production is postponed to another period. The marginal effect of time sensitivity of output is the difference between the value of the period in which there are no delays in production and the period in which production is delayed. Thus, if the organization experiences health-related or work environment–related problems, productivity loss is expected to increase if the output is time sensitive.

Wage Multipliers

As a function of job-specific characteristics (i.e., the extent of teamwork [TW], the ease of substitution of workers [S] and time sensitivity [TS] of output), the wage multiplier can be generalized as, $m(W) = 1 + c$, where c represents the additional costs paid in excess of the wage (W) by a particular organization because of health-related or work environment–related problems. If one assumes that an organization hires a perfect substitute for an absent worker at the same wage, then the additional cost (c) paid in excess of the wage as a result of absenteeism is zero. In this case, the wage multiplier will be equal to 1. If it is difficult to find a perfect replacement for the absent worker at a wage (W), the multiplier may exceed unity, $m(W) = 1 + c$. For the multiplier to exceed unity, the absenteeism must cause one or a combination of the following: other team members will not be able to perform their work as expected; the organization will pay overtime to a coworker to cover the workload of the absent worker; and there will be delays in sales leading to losses.