Research Report

Precautionary actions within small and medium-sized enterprises

An empirical study into determinants of precautionary actions within SMEs

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Summary

Absenteeism results in considerable costs for individuals, firms and governments. Absence spells are due to sickness, accidents, or other reasons, and the attendance of employees depends on both their ability to attend and their motivation to attend.

The occurrence of absence due to sickness and accidents can be reduced if firms take precautionary actions to improve working conditions. Physical working conditions are known to impact absence levels. For mental working conditions, the relationship with absenteeism is, however, less clear. This study examines the decision of enterprises whether or not to take precautionary actions. Since more than half of all occupational accidents take place within establishments with less than 50 employees, the study focuses on small and medium-sized enterprises.

Firms will implement precautionary actions if the benefits of these actions are believed to outweigh the costs. The expected benefits of precautionary actions are related to the effect of those actions on actual absence levels. It is likely that the expected benefits are related to the opinion of the employer regarding the relation between working conditions and absence levels within the firm. The main hypothesis tested in this study is, therefore, that organizations that identify a relationship between working conditions and absenteeism, are more likely to take precautionary actions. Other hypotheses examine possible determinants of this opinion.

According to the empirical results, the probability of identifying a relationship between working conditions and absenteeism depends on the employer’s assessment of the physical and mental working conditions, on reported physical health complaints and stress complaints, on absence rates and on the number of employees. The main hypothesis of this study is rejected: whether or not such a relationship is identified, is not related to the probability that precautionary measures are taken. Instead, firms are more likely to take precautionary measures if they have more employees, if a larger share of their employees is performing physically demanding work, if physical complaints are made, and if a Risk Inventory and Evaluation has been performed.
1 Introduction

Absenteeism results in considerable costs for individuals, firms and governments. For the EU Member States, the total annual cost for medical care, daily allowances, and present and future compensation for cases of permanent disability and death is estimated at approximately 20 billion euro per year (Eurostat, 2000). For individual organizations, the main cost of absenteeism is due to production losses (and continued wage payments). For example, within the Dutch private sector, 5.5% of all working days in 2000 were lost due to absenteeism\(^1\).

Absence spells are usually classified in one of the following three categories: certificated sickness absence, absence due to accidents and absence for other reasons (non-certificated absences, strikes, etc.)\(^2\). Employees report absent either because they feel they are unable to work (due to sickness or accidents), or because they choose not to work (Brown and Sessions, 1996). Most economic studies focus on the latter explanation; absenteeism is treated as a labour supply adjustment by employees. This study looks into the first explanation: absence due to sickness or accidents.

Within the European Union, over 4.5 million accidents took place in 1996 that resulted in more than three days absence from work. A considerable number of these accidents was fatal: about 5,500 people were killed in workplace accidents (Eurostat, 2000). According to the European Commission, absence due to sickness and accidents can be reduced by precautionary actions that improve working conditions (European Agency for Safety and Health at Work, 2000b). This study focuses on the possibility for individual firms to reduce absence due to sickness or accidents, by taking precautionary actions to improve working conditions.

An increased attention for precautionary actions

Recently, policy makers started to pay attention to absenteeism due to sickness and (occupational) accidents. In the Netherlands, financial incentives have been introduced to stimulate enterprises to change their behaviour regarding prevention and reintegration of employees (Brouwers et al., 2000). The European Agency for Safety and Health at Work has started an information campaign aimed at reducing the number of work-related accidents (European Agency for Safety and Health at Work, 2000a). The focus of this campaign is on organizations with less than 50 employees. The reason for this focus is that the majority of all accidents\(^3\) take place within this size class. These firms account for more than half\(^4\) of total employment within the European Union (European Commission, 2000). Moreover, while the overall absenteeism rate is known to increase

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1 According to Statline, the on-site database from Statistics Netherlands, available at www.cbs.nl.

2 A fourth category that is sometimes distinguished is absence on a legal or contractual basis. This includes absence due to annual leave, maternity leave, or death in the family (Boon, 2000; Prins, 1990). This category is not related to the health status of employees, and usually ignored in studies on absenteeism.

3 Resulting in absence spells of more than 3 days.

4 53% in 1998.
with firm size (Boon, 2000), the individual risk of having an accident at work\(^1\) is higher for establishments with less than 50 employees (Eurostat, 2000).

\[\text{What causes firms to undertake precautionary actions?} \]

Individual enterprises may implement precautionary actions to reduce the probability that individual employees become absent. The main benefit of such actions is related to the reduction in actual absence rates. This can be compared with the cost of implementing precautionary actions. Often, firms are not aware of the actual benefits and costs, and will compare expected benefits and costs instead. These expected benefits and costs depend on many factors, including the actual absence level, current legislation and whether or not employers believe that working conditions within their firm are related to the absence level.

This study examines which factors determine whether Dutch enterprises take precautionary actions. We focus on Small and Medium-sized Enterprises (SMEs), since the majority of accidents takes place within this size class. In chapter two, we discuss various perspectives from which absenteeism may be studied, and the relation between absenteeism and precautionary actions. This information enables us to delineate the research question of this study. Chapter three presents some facts on absenteeism with SMEs. In chapter four, six hypotheses are derived that characterize an organisation’s decision whether or not to take precautionary actions. These hypotheses are tested empirically; chapter 5 presents the research method, and the results are given in chapter 6. The main conclusion, which is included in chapter seven, is somewhat surprising: whether or not employers believe that the working conditions within their firm are related to the absence level, has no impact on the actual decision of those employers regarding precautionary actions.

\(^1\) Resulting in an absence spell of more than 3 days.
2 Various perspectives on absenteeism

Absenteeism has been studied from various perspectives. This chapter presents relevant findings from previous studies, both conceptually and empirically. At the end of this chapter, these findings are used to delineate the research question.

2.1 A psychological and economic perspective on absenteeism

Within studies of determinants of absence behaviour, two main perspectives can be distinguished: the economic and the psychological perspective (Barmby et al., 1991).

Within the psychological literature, several explanatory models of absenteeism have been developed (Geurts, 1994). An influential model has been developed by Steers and Rhodes (1978). According to this model, attendance of employees is determined by the motivation to attend and the ability to attend. The ability to attend depends on the incidence of illness and accidents, family responsibilities and transportation problems. The motivation to attend has, however, received most attention from this line of research. Job motivation, employee satisfaction and employee participation are considered to be important determinants of absenteeism (Boselie et al., 2001; Brooke and Price, 1989; Deery et al., 1995; Havlovic, 1991).

The same emphasis on the motivation to attend can be found within economic literature. Absenteeism is commonly treated as a deliberate labour supply adjustment of workers dissatisfied with the number of contracted working hours (Brown and Sessions, 1996; Yaniv, 1995). The main difference with the psychological literature is the focus on financial arrangements to influence the motivation to attend. According to economic studies, absence levels can be partly explained by wage levels and sick pay schemes (Barmby et al., 1991; Barmby et al., 1994; Kenyon and Dawkins, 1989).

Recently, economists are paying attention to demand side factors also. Absenteeism may be more costly for some firms than for others, due to differences in production technologies and complementarities between workers. Consequently, firms for which absenteeism is more costly may offer higher wages. Coles and Treble (1996) establish an equilibrium framework in which firms who require better attendance rates at work pay higher wages, in order to reduce the absence level. Again, wages affect absenteeism levels, but in this framework firms take account of this behaviour and set their wages accordingly.

Both approaches only consider working conditions, insofar as these may influence the motivation to attend. In this article, we focus on precautionary measures, as a means to increase the ability to attend.

2.2 An employee’s perspective on sickness absence behaviour

In the case of sickness or accidents, the incidence and duration of absence spells depend upon both the ability and the motivation to attend. An employee is confronted with a sequence of events and health or work-related decisions he or she has to make.
This decision-making process has been examined by Prins (1990). His model of sickness absence behaviour consists of four different roles that employees can assume:

- **Healthy employee role.** The individual’s constitution, and health problems ranging from minor ailments to serious disease, may be seen as the major determinant of an individual’s general state of health. Three factors can be discerned which can influence the state of health: personal conditions, living conditions and working conditions (including occupational status, shift work, risk of accidents, social relations, and stress).
- **Sick role.** If the individual feels sick, he or she seeks and receives treatment to restore health or to stop the progression of the disease.
- **Dependent-patient role.** This role starts with reporting sick and is in some countries formalised by certification of the work incapacity through medical evaluation.
- **Permanent absence role.** Most spells of sickness absence are completed by resumption of the employee role. A minority of frequently or long-term sick may (be forced to) substitute the dependent-patient role for the permanent absence role: a status as a disabled, unemployed or retired person.

The decision to change from one role to another depends on specific thresholds:

- **The sickness tolerance threshold.** This standard defines whether and when the experience of symptoms makes the individual decide to assume the sick role with its role expectations (attempts to obtain diagnosis, treatment, and restoration of health).
- **The absence tolerance threshold.** This indicates when the individual (or his environment) considers himself released from the duty to attend work. If this is the case, the sick role will be exchanged for the dependent-patient role. If not, the individual accepts the health complaints and continues to attend to work.
- **The work resumption threshold.** This threshold indicates the conditions likely to terminate the dependent-patient role and allow resumption of work. Alternatively the employee role is terminated and another branch of social security may be entered.

### 2.3 Absenteeism and precautionary measures

Absenteeism is related to working conditions within organizations. Poor physical working conditions (such as an overexposure to heat, dust, gasses or noise, or unsafe working conditions) and ergonomic shortcomings are associated with higher absence rates (Geurts, 1994; Prins, 1990). The relationship between mental working conditions and absenteeism is less straightforward. On the one hand, Geurts (1994) and Huczynski and Fitzpatrick (1989) find that continuing high levels of job stress lead to an increase of absenteeism. On the other hand, a literature review by Houtman et al. (1999) reports mixed results on empirical research into stress and absenteeism. Jacobson et al. (1996) find that work stress is the most important source of high stress levels, but it is not related to actual levels of absence (while other sources of stress are).

Practices aimed at reducing absenteeism can be classified into monitoring, absenteeism support and precautionary measures. Monitoring and absenteeism support are primarily aimed at reducing the length of absenteeism spells, whilst precautionary measures aim at reducing the number of absence spells. Precautionary measures include adaptation of

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1 The labels ‘healthy employee role’ and ‘permanent absence role’ do not occur in the original study.
tasks or workplace, promotion of personal protective gear use, and instruction of employees to improve the tackling of in-company health hazards (Brouwers et al., 2000). Research on absenteeism and working conditions suggests that precautionary actions can reduce absenteeism due to occupational causes (Havlovic, 1991). Bertera (1990) finds that absence not due to occupational causes can also be reduced by specific company policies. Health promotion activities focusing on smoking cessation, fitness, weight control, lipid control, stress management, and healthy back result in a reduction of absenteeism levels (Bertera, 1990, page 1101).

2.4 The research question delineated

We are now able to delineate the context of this study. Absenteeism is determined by an employee’s motivation and ability to attend. An increased ability to attend will result in lower levels of absenteeism due to sickness and accidents. Organizations can stimulate the ability to attend, by taking precautionary actions to improve the health status of employees. The research question of this study is which factors determine whether SMEs take precautionary actions to improve the ability to attend.
3 Absenteeism with small and medium-sized enterprises

3.1 Overall absenteeism

On average, small firms have lower absence levels than large firms (Barmby and Stephan, 2000; Boon, 2000; Coles and Treble, 1996; Wilson and Peel, 1991). This may be explained by differences in the motivation to attend. Various authors argue that employees with smaller firms are more motivated, which increases the absence tolerance threshold and reduces the work resumption threshold. Some authors point towards the lack of bureaucracy and specialization as a source for this behavioural advantage of small firms (Nooteboom, 1993; Daft, 1998). Others argue that within smaller firms, the relationship between individual and organizational performance is clearer (Bacon et al., 1996; Storey, 1994).

These explanations focus on the relationship between firm size and employee behaviour. Other explanations are based on the behaviour of employers. Lower absence levels may be caused by lower monitoring costs for smaller firms (Barron, Black and Loewenstein, 1987), resulting in fewer possibilities for shirking. Alternatively, the equilibrium framework by Coles and Treble (1996) suggests that the equilibrium level of absenteeism may differ between small and large firms. Firms for which absenteeism is more costly will offer higher wages in order to limit the absence rates. In addition, they will hire reserve workers to guarantee a minimum amount of available labour. In this equilibrium framework, an increase in firm size requires a less than proportional increase in the number of reserve workers, because risks can be diversified among more workers (Barmby and Stephan, 2000; Coles and Treble, 1996). Consequently, larger firms can insure against (the consequences of) absenteeism at lower costs, and hence their equilibrium absence level is higher.

3.2 Occupational accidents

The overall level of absenteeism is positively correlated with firm size. For the specific category of occupational accidents, the relation is however opposite: the risk of having an occupational accident is higher within smaller establishments than in larger ones (Eurostat, 2000; Storey, 1994). According to Eurostat (2000), employees working in establishments with 10-49 employees are faced with an annual probability of having an accident (resulting in more than 3 days absence) of 5.2% (Eurostat, 2000). This is substantially higher than the 2.9% for employees working in establishments with at least 250 employees.

Also, the nature of accidents (resulting in major injuries) differs between size classes. Storey (1994) presents findings concerning the UK manufacturing industry in 1989. For establishments with 100 or more employees, the main category of accidents is slip, trip

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1 This implies that for absence due to other causes (i.e. sickness and non-health related causes), the correlation between absence rate and firm size is even more positive than for the overall absence rate (assuming that the average length of an absence spell due to an occupational accident is independent of firm size).
or fall (27% of all accidents). For establishments with less than 100 employees, this category contains 12% of all accidents. Accidents involving contact with moving machinery are the main category for this size class, accounting for almost 30% of all reported accidents. This would reflect ‘poor training, less experienced operators, and generally less well-guarded machinery in smaller establishments’ (Thomas, 1991, as cited by Storey, 1994).

3.3 Knowledge and attitudes on absenteeism

Between 1996 and 1999, changes in the Dutch social security legislation have introduced financial incentives to change enterprise behaviour regarding absenteeism. Brouwers et al. (2000) investigate to which extent this has lead to an increased focus on reducing absenteeism, amongst enterprises with less than 100 employees. Their findings first of all suggest that smaller firms have in general less knowledge on health-related topics than larger organizations. For example, smaller firms were less informed about the legislative changes than larger firms. In addition, smaller firms are less likely to believe they can exert any influence on absence levels: 32% of firms with 1-9 employees are of the opinion that they can exert no influence at all on absence rates, versus 8% of firms with 50-99 employees.

Secondly, the results of Brouwers et al. (2000) indicate that the identification of a relationship between working conditions and absenteeism may be a determinant of precautionary actions. Organizations that consider themselves to be able to influence their absence rates, are more likely to have increased their focus on reducing absenteeism\(^1\). In addition, 47% of the firms that increased their focus mentioned improved knowledge of in-company health hazards as an important reason for doing so\(^2\). Another determinant of precautionary actions is firm size: larger firms are more likely to have increased their focus on reducing absenteeism\(^3\).

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\(^1\) An increased focus on reducing absenteeism refers to various activities, such as adaptation of tasks or workplace, promotion of personal protective gear use, instruction of employees to improve the tackling of in-company health hazards and an improved coaching of ill employees.

\(^2\) Other often mentioned reasons include financial motives (69%) and an increased importance attached to staff health (56%).

\(^3\) Controlling, amongst others, for the extent to which organizations believe they can exert influence on absence levels, and for sectoral differences.
4 Determinants of precautionary actions

What are the determinants of precautionary actions? Not much is known about which factors influence the decision of individual firms to implement precautionary actions. The study by Brouwers et al. (2000) suggests, that the available knowledge on this topic may be an influential factor. This suggestion is elaborated in the current study. We focus on the opinion of employers, whether or not working conditions are related to the absence level within their firm. On the one hand, we examine the effect of this opinion: to which extent does it influence the implementation of precautionary actions. On the other hand, we look at possible explanations for this opinion.

4.1 Implementing precautionary measures

When will firms decide to take precautionary actions? A standard neoclassical approach to this problem would be to assume a rational acting firm, which performs a cost/benefit analysis. This firm is completely and correctly informed of all relevant costs and benefits. The firm would take precautionary actions only if the benefits of precautionary actions exceed the costs.

In this study, we use another framework to analyse the decision-making process of an individual firm. We assume that firms behave in a bounded rational manner. Employers are willing to make a rational decision, but their knowledge of alternatives and consequences is prey to cognitive limitations, and they often lack the motivation to conduct the necessary information searches (Legge, 1995). In addition, small firms have a more limited capacity for the acquisition of relevant knowledge than larger firms. Consequently, rationality is more bounded for these firms (Nooteboom, 1993). Employers may have certain expectations regarding costs and benefits of precautionary actions, but there is no guarantee that these expectations are anywhere near the actual costs and benefits.

The expected benefits of precautionary measures will depend strongly on the expected effect of these measures on the level of absenteeism within the organization. In general, improving the working conditions within organizations will lower the absence levels. However, if measures are not implemented well, or if absenteeism levels are already low, it may be difficult for individual firms to recognise this relation. Thus, we may expect that some employers are aware of this relationship, while others see no relationship between the working conditions and the (current and future) levels of absenteeism within their company. We expect that if employers don’t identify this relationship, they are less likely to take precautionary actions to improve working conditions. This is formalised in the first hypothesis:

H1: Organizations that identify a relationship between working conditions and absenteeism, are more likely to take precautionary measures.

In addition, we hypothesise that small firms are less likely to take precautionary measures, even if they assume that working conditions and absenteeism are related:

H2: Larger organizations are more likely to take precautionary measures.
The rationale behind this second hypothesis is that precautionary actions may be (relatively) more costly for smaller firms. This may be due to a lack of knowledge and/or manpower to implement certain practices. In addition, certain practices may generate considerable fixed costs, which increase the costs per employee for smaller firms.

4.2 Identifying a relationship between working conditions and absenteeism

According to hypothesis H1, the probability of taking precautionary measures depends upon the identification of a relationship between working conditions and absenteeism. This identification will in turn depend on other factors. Some of these factors will be related to characteristics of the employer, for example educational level, experience, and knowledge on absenteeism (and human resource management related topics in general). We hypothesise that, in addition, the opinion of the employer is related to the employer’s assessment of the working conditions:

**H3:** Organizations that assume that working conditions are demanding for a larger share of employees, are more likely to identify a relationship between working conditions and absenteeism.

If employers consider working conditions to be demanding for a larger share of employees, they are more likely to consider those working conditions as one of the determinants of absenteeism.

The share of employees for whom working conditions are thought to be demanding can, in turn, depend upon reported health problems by employees. This implies an indirect relation between reported health problems and the identification of a relationship between working conditions and absenteeism. Reported health problems may also have a direct effect upon the identification of this relationship: if (virtually) no health problems are reported, it is likely that such a relationship will not be identified, irrespective of the share of employees for whom the tasks are considered to be demanding.

Indicators for reported health problems include health complaints by employees and the absence level. The role of reported health problems is captured by the following two hypotheses:

**H4:** Organizations with more health complaints by employees, are more likely to identify a relationship between working conditions and absenteeism.

**H5:** Organizations with higher absence rates, are more likely to identify a relationship between working conditions and absenteeism.

Reported health problems (both health complaints by employees and absence rates) thus are assumed to have an indirect effect on the probability that precautionary actions are taken. If health problems are reported, but not associated with an identification of the relationship between working conditions and absenteeism, they are supposed to have no effect on the probability that precautionary actions are implemented.

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1. If precautionary actions are taken, these are supposed to reduce the absence level. This implies a dynamic interaction between absence levels and precautionary actions. It is beyond the scope of this study to examine this interaction. Precautionary actions are treated as a dependent variable only.
Finally, we hypothesise that the probability of identifying a relationship between working conditions and absenteeism increases with firm size (controlling for differences in an employer’s assessment of working conditions and reported health problems):

H6: Larger organizations are more likely to identify a relationship between working conditions and absenteeism than smaller organizations.

This hypothesis is based on the assumption that small firms may be more bounded in their rationality than large firms, due to a more limited capacity for the acquisition and processing of relevant knowledge (Nootenboom, 1993). Consequently, small-firm employers may ceteris paribus be less likely to identify a relationship between working conditions and absenteeism than employers with larger firms.
5 Research method

The hypotheses derived in the previous chapter will be tested empirically. Logistic regressions will be used to estimate the probabilities of taking precautionary actions, and of identifying a relationship between working conditions and absenteeism. The regression results are presented in the next chapter. In this chapter, we discuss sample and data collection, and the variables used in the regressions.

5.1 Sample and data collection

The data for this study was collected by means of telephonic interviews amongst Dutch establishments with less than 200 employees. The interviews were held in 1995, before the most recent changes in Dutch legislation (discussed in Brouwers et al., 2000). A stratified sample plan was used to ensure that all relevant sectors and size classes were adequately represented in the sample. The stratification plan distinguished six sectors (manufacturing, construction, trade and catering, transport, financial and business services and other services) and five size classes (1-9 employees, 10-19, 20-49, 50-99 and 100-199). 900 establishments were called, asking for the manager in charge. 609 interviews were completed, 579 of which by establishments with less than 200 employees (a response rate of 64%). 41% of these interviews had been held with the owner and/or manager in charge, 28% with a personnel officer. The majority of the participating establishments were independent organizations, 174 establishments were part of a larger organization.

5.2 Variables of interest

5.2.1 Dependent variables

Two dependent variables are distinguished. The first dependent variable is ‘measures’, which records whether or not precautionary measures have been taken (in 1994) to improve physical and mental working conditions. The second dependent variable is ‘identification’. This variable represents the opinion of the respondent regarding the relationship between working conditions and actual absence levels. It contains the answer to the question whether or not the physical and mental working conditions within the establishment are believed to partly determine short- and long-term absenteeism and/or outflow of employees. Besides being a dependent variable (see hypotheses H3-H6), ‘identification’ is also an explanatory variable of ‘measures’ (see hypothesis H1).

Average scores of these variables are presented in table 1, both overall and by size class. As expected, larger establishments are more likely to identify a relationship between working conditions and absenteeism, and to have taken precautionary measures. The results from table 1 show that identification is not a necessary condition for taking precautionary measures. While 37% of all enterprises have taken precautionary measures, only 18% have identified a relationship between working conditions and absenteeism. This might be explained by the obligatory status of many precautionary meas-

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1 The complete questionnaire (in Dutch) is included in Bosch and De Kok (1997).
ures (for example, wearing safety helmets on construction sites). Another explanation could be that many respondents think no connection exists between current working conditions and current absenteeism, because of precautionary measures taken in the past.

### Table 1 Inquiry results by size class

<table>
<thead>
<tr>
<th>Establishments (by number of employees)</th>
<th>1-9</th>
<th>10-49</th>
<th>50-199</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working conditions determine absenteeism and/or turnover (identification)</td>
<td>9</td>
<td>19</td>
<td>48</td>
<td>18</td>
</tr>
<tr>
<td>Precautionary measures taken (measures)</td>
<td>28</td>
<td>46</td>
<td>72</td>
<td>37</td>
</tr>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees with physically demanding work</td>
<td>47</td>
<td>48</td>
<td>49</td>
<td>47</td>
</tr>
<tr>
<td>Employees with mentally demanding work</td>
<td>38</td>
<td>31</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Employees reporting physical complaints</td>
<td>13</td>
<td>27</td>
<td>53</td>
<td>17</td>
</tr>
<tr>
<td>Employees reporting stress</td>
<td>4</td>
<td>9</td>
<td>31</td>
<td>6</td>
</tr>
</tbody>
</table>

a: % of establishments.  
b: % of employees.  
c: Weighted average, representing average per establishment.

#### 5.2.2 Independent variables

An important explanatory variable for both dependent variables is establishment size, which is represented by the natural log of the number of employees. Other explanatory variables include indicators of:

- The employer’s opinion as to which extent the working conditions are demanding for employees
- Health complaints by employees
- Absenteeism within the establishment.

The first two items are measured by two variables each. The variables ‘physically demanding work’ and ‘mentally demanding work’ represent the share of employees for whom respondents consider the work to be physically or mentally demanding. Next, the variables ‘physical complaints’ and ‘stress’ indicate whether or not employees (i.e. more than 1) have reported to experience physical complaints or stress. Average scores for these variables are presented in table 1.

The assessment of the share of employees for whom working conditions are demanding does not vary much with establishment size. On average, respondents report that 47% of the employees within their establishment have physically demanding work, while 36% have mentally demanding work. In contrast, the share of employers who receive health complaints is strongly correlated with firm size. For example, employees have reported stress within 4% of establishments with 1-9 employees, and within 31% of establishments with 50-199 employees.
This difference is partially caused by the measurement scales. ‘Physically demanding work’ and ‘mentally demanding work’ report percentages of employees (within establishments), while the variables on health problems are dichotomous. Even if the probability that individual employees report health problems is the same for small and large establishments, the probability that more than one employee within an establishment would report such problems increases with firm size.

Reported health problems are positively correlated with firm size. This is true not only for reported health complaints, but also for reported absence levels (table 2). Two out of every three establishments with less than 200 employees claim their absence rate (including maternity leave) is below 2%. On the other hand, 5% of all establishments report that more than 10% of all working days are lost due to absenteeism.

Table 2  Annual absence rates 1994, including maternity leave, by size class

<table>
<thead>
<tr>
<th>Absence rate (% of working hours lost due to absence)</th>
<th>Establishments (by number of employees)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-9</td>
<td>10-49</td>
</tr>
<tr>
<td>0-1</td>
<td>76%</td>
<td>33%</td>
</tr>
<tr>
<td>2-4</td>
<td>15%</td>
<td>39%</td>
</tr>
<tr>
<td>5-6</td>
<td>3%</td>
<td>12%</td>
</tr>
<tr>
<td>7-8</td>
<td>0%</td>
<td>8%</td>
</tr>
<tr>
<td>9-10</td>
<td>1%</td>
<td>4%</td>
</tr>
<tr>
<td>≥ 11</td>
<td>6%</td>
<td>5%</td>
</tr>
</tbody>
</table>

a. Due to rounding errors, column totals may not add to 100%.
b: Weighted average, representing average per establishment.

The self-reported rates presented in table 2 may be compared with average absence rates reported in Statline, the on-line electronic databank from Statistics Netherlands (www.cbs.nl). For 1994, Statline reports average absence rates (including maternity leave) of 3.9% for enterprises with 1-9 employees, 4.5% for enterprises with 10-99 employees and 6.5% for enterprises with 100 or more employees. The Statline statistics differ from table 2 both in the distinguished size classes and in the unit of observation (enterprises versus establishments). Still, the information from Statline suggests that the establishments in our sample underestimate or underreport their absence levels¹.

The absence rate is positively correlated with the proportion of workers for whom the physical working conditions are considered to be demanding. The correlation between absence rate and the variable ‘mentally demanding work’ does not differ significantly from zero².

In the regression analyses, the seven categories presented in table 2 are reduced to three categories (0-1%, 2-6% and ≥ 7%). This has been done to increase the number of observations within each category (in addition, it increases the parsimony of the equations to be estimated). Several additional variables are included in the analysis, to

¹ Alternatively, our sample may not be representative for the Dutch private sector.
² At a 5% significance level.
control for systematic variance that cannot be attributed to the variables of interest in this study. These include indicators for the independence of the establishment, whether or not risks within the company have been inventoried and evaluated (RI&E), whether the establishment falls under a collective labour agreement, whether the establishment is member of a trade organization, the presence of a workers council, whether the respondent is the employer or not (where employer is defined as being owner or manager in charge), the financial position of the establishment, and the fraction of employees aged 45 years or above. The correlation between firm size and having a workers council is .56; otherwise, correlations between the variables discussed in this chapter do not exceed .5.

1 Since 1994, Dutch companies are obliged to make an inventory of occupational risks for their employees, develop a programme to reduce these risks, and evaluate this programme. This process is known as the RI&E. Although the RI&E was mandatory at the time of the inquiry, only 56% of the respondents were aware of this obligation.
6 Results

In chapter 4, we derived six hypotheses that are assumed to characterise the decision making process of small and medium-sized enterprises. In this chapter, logistic regressions are used to test these hypotheses. Notice that the hypotheses are tested on data from establishments rather than independent organizations. We shall refer to this problem in the second part of this chapter, where we discuss the results. First, we turn to the regressions.

6.1 Determinants of precautionary actions

We start with an examination of the probability that establishments identify a relationship between working conditions and absenteeism within their firm. Results of a logistic regression (reported in table 3) are used to test hypotheses H3 to H6. None of these hypotheses is rejected. The probability of identifying a relationship between working conditions and absenteeism depends on the employer's assessment of the working conditions, on health complaints, on absence rates and on the number of employees.

Table 3 Results of logistic regression on probability that establishment identifies relationship between working conditions and absenteeism

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>.43 (.00)</td>
</tr>
<tr>
<td>Physically demanding work</td>
<td>.89 (.02)</td>
</tr>
<tr>
<td>Mentally demanding work</td>
<td>.98 (.01)</td>
</tr>
<tr>
<td>Physical complaints</td>
<td>1.28 (.00)</td>
</tr>
<tr>
<td>Stress</td>
<td>.90 (.00)</td>
</tr>
<tr>
<td>Working days lost due to absenteeism (ref: 0-1%):</td>
<td></td>
</tr>
<tr>
<td>2-6%</td>
<td>1.04 (.02)</td>
</tr>
<tr>
<td>≥ 7%</td>
<td>2.16 (.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.05 (.00)</td>
</tr>
</tbody>
</table>

Goodness of fit measures

- % predicted correctly\(^a\): 79.4
- R\(^2\) (Nagelkerke): .432
- chi\(^2\) test for model fit\(^b\): 162.6 (.00)
- Number of valid observations: 447

\(a\): The reference value is 70%: the (unweighted) share of establishments in the sample for which 'recognition' is zero.

\(b\): Test for hypothesis that all model parameters (except constant) are equal to zero.

\(c\): Reported significance levels (between parentheses) are based on Wald statistics. Significance levels according to Likelihood Ratio test statistics are almost identical and lead to the same conclusions.
The estimated equation has been extended with several control variables, none of which have a significant impact. Amongst others, this implies that the probability of identification does not differ between sectors. Nor is it dependent on the share of elderly employees (aged 45 or above), on the independency of the establishment, or on whether or not the (obligatory) Risk Inventory and Evaluation (RI&E) has been performed.

Next, we present the estimation results of two models on the probability that establishments actually took precautionary actions during the preceding year (table 4). These models test hypotheses H1 and H2. Model 2 represents a restricted equation, where the implementation of precautionary measures is explained by establishment size and identification (and control variables – these will be discussed later on in this paragraph). The estimation results are in support of both hypotheses. Larger establishments are more likely to take precautionary actions (ceteris paribus) than smaller ones. If a relationship between working conditions and absenteeism is identified, the probability of taking precautionary actions increases. The acceptance of both H1 and H2 is in accordance with Brouwers et al. (2000).

Further analysis, however, indicates that H1 should be rejected. In model 3, the equation on precautionary measures is extended to include the explanatory variables of identification (of a relationship between working conditions and absenteeism). According to the estimation results, identification has no impact anymore on the probability that precautionary measures are taken. Instead, this probability increases with the assumed share of employees for whom the working conditions are physically demanding, and is higher for establishments that have recorded physical complaints. Not all explanatory variables of identification are also determinants of the probability that precautionary actions are taken: mentally demanding working conditions and reported stress have no impact on this probability, and neither does the absence rate.

Two of the control variables have a significant impact on the probability of taking precautionary measures. Establishments that are part of a larger organization are more likely to take precautionary actions, as are establishments that perform an RI&E. These results are not surprising. First of all, according to models 2 and 3, both larger establishments and establishments that are part of a larger organization are more likely to take precautionary actions. This supports the hypothesis that the probability of taking precautionary actions increases with the size of organizations (instead of establishments). Secondly, an RI&E includes that certain precautionary measures should be taken. Our results indicate that this does indeed take place.

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1 Model 1 has been reestimated including the control variables discussed in chapter 4. None of these control variables has a significant impact, which is confirmed by a chi² test for the joint hypothesis that none of these variables has a significant impact.

2 An alternative interpretation is that starting an RI&E is in itself seen as a precautionary measure, irrespective of whether the RI&E resulted in additional precautionary actions.
Other control variables have no impact. These include the sector of the establishment, whether the establishment falls under a collective labour agreement, and the financial position of the establishment\(^1\).

Table 4  Results of logistic regression on probability that establishment has taken measures to reduce physical working conditions and stress in the past year (1994)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>.36 (.00)</td>
<td>.25 (.03)</td>
</tr>
<tr>
<td>Identification</td>
<td>.73 (.00)</td>
<td>-.00 (.99)</td>
</tr>
<tr>
<td>Physically demanding work</td>
<td>1.00 (.00)</td>
<td></td>
</tr>
<tr>
<td>Mentally demanding work</td>
<td>.48 (.16)</td>
<td></td>
</tr>
<tr>
<td>Physical complaints</td>
<td>1.07 (.00)</td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td>.44 (.20)</td>
<td></td>
</tr>
<tr>
<td>Working days lost due to absenteeism (ref: 0-1%):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 7%</td>
<td>.30 (.31)</td>
<td>.54 (.16)</td>
</tr>
<tr>
<td>Not independent</td>
<td>.57 (.02)</td>
<td>.63 (.02)</td>
</tr>
<tr>
<td>RI&amp;E performed</td>
<td>.87 (.00)</td>
<td>.91 (.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.98 (.00)</td>
<td>-2.78 (.00)</td>
</tr>
</tbody>
</table>

Goodness of fit measures

| % predicted correctly \(a\)                     | 70.1     | 72.8     |
| R\(^2\) (Nagelkerke)                           | .228     | .324     |
| \(\chi^2\) test for model improvement \(b\)   |          | 39.9 (.00) |
| \(\chi^2\) test for model fit \(c\)           | 82.0 (.00) | 121.9 (.00) |

Number of valid observations 438

\(a\): The reference value is 51.6%: the (unweighted) share of establishments in the sample that have taken precautionary measures.

\(b\): Test for hypothesis that additional parameters (compared to previous model) are equal to zero.

\(c\): Test for hypothesis that all model parameters (except constant) are equal to zero.

\(d\): Reported significance levels (between parentheses) are based on Wald statistics. Significance levels according to Likelihood Ratio test statistics are almost identical and lead to the same conclusions.

\(^1\) Models 2 and 3 have been reestimated including the control variables discussed in chapter 4 (excluding whether the establishment is independent, and whether an RI&E has taken place). For model 2, sectoral differences were found to be significant at a 5% significance level. For both model 2 and 3, a \(\chi^2\) test cannot reject, however, the joint hypotheses that none of these variables has a significant impact.
6.2 Discussion

The regressions have been performed on establishment level data. The estimation results suggest that we may generalise the results to an organizational level. For model 1, independency of the establishment is found insignificant, implying that the estimated relations are the same for independent organizations and dependent establishments. For models 2 and 3, a significant difference is found between dependent and independent establishments (given the positive effect of establishment size). We interpret this as support for the positive impact of organizational size (instead of just establishment size). In addition, the results do not depend on whether the questionnaire was answered by the employer or not.

Of the six hypotheses, five have not been rejected by our estimations. Hypothesis H1, which is at the core of the assumed decision making process, is however rejected by model 3. We shall therefore discuss the rejection of this hypothesis, the interpretation of this rejection, and possible explanations in more detail.

Support for hypothesis H1 is provided by Brouwers et al. (2000). Their result may, however, be due to a missing variable bias. The missing variables in question are the establishment’s judgement of the working conditions and reported health problems. The study by Brouwers et al. (2000) lacks information on these variables. The logistic regression presented in their study is, therefore, similar to our model 2, which also doesn’t reject hypothesis H1. The results of model 3 suggest that model 2 suffers from a missing variable bias, and the same bias may apply to the analysis by Brouwers et al. (2000). We therefore conclude that the results by Brouwers et al. (2000) do not conflict with our rejection of hypothesis H1.

What are the consequences of the rejection of hypothesis H1 for the decision making process? Generally speaking, only half of the establishments that take precautionary actions have identified a relationship between working conditions and absenteeism. For establishments with less than 10 employees, this fraction is even down to one third (table 1). Identification of such a relationship is clearly not necessary for taking precautionary actions. The rejection of hypothesis H1 suggests that identification does not even raise the probability of taking precautionary actions. Furthermore, reported health problems (health complaints and absence rate) were hypothesised to have an indirect effect on the probability of taking precautionary measures. Instead, two of the three indicators of health problems have no effect at all. The third indicator, whether employees had made physical complaints, directly increases the probability that precautionary actions are implemented.

How can we explain these findings? First of all, why do firms that assume no relationship between working conditions and absenteeism, take actions to improve those conditions? Several explanations are possible. Certain precautionary measures may be required by law, or expected by external stakeholders. These requirements may differ between firms of different sizes, thus partially explaining the firm size effect. More importantly, our hypotheses are based on the assumption that precautionary actions are

1 Bosch and De Kok (1997) also report that identification of a relationship between working conditions and absenteeism has a positive impact on the likeliness that precautionary actions are taken. However, the variable that represents ‘identification’ is defined as a combination of the identification of such a relation and the variables ‘physical complaints’ and ‘stress’. It is, therefore, impossible to separate the effects of these variables on the implementation of precautionary actions. In addition, this study also suffers from missing variable bias.
taken to improve the ability to attend. Organizations may also use precautionary actions as a means to improve the motivation to attend. This is especially relevant if employees have ample opportunities to find work elsewhere. This argument is supported by Veerman et al. (2000). They find that recent increases in the efforts of Dutch firms to reduce the inflow into disability are mainly the result of a tightening of the labour market.

Secondly, why are firms that do identify a relationship between working conditions and absenteeism not more likely to take precautionary actions? Especially for smaller establishments, this may be due to a lack of knowledge on where and how to start, or a lack of manpower to take the necessary initiatives. Another argument is the relatively low absence level with smaller establishments. Low absence rates imply that expected benefits of precautionary actions are also limited. Finally, we have not explicitly looked at the costs of implementing precautionary measures. A combination of limited financial resources and implementation costs that are relatively high for small firms may result in the lack of a relationship between identification and taking actions. The latter two arguments seem however less relevant, given that the financial position of the establishments has no effect on the probability that precautionary actions are taken. This suggests that the costs of precautionary actions do not play a dominant role in the decision making process.

A limitation of the current study is that the question on identification (of a relationship between working conditions and absenteeism) was limited to the actual situation. Respondents were not asked for an assessment of occupational risks, but whether the working conditions partly determined absenteeism. If the actual absence level was very low, respondents could only answer ‘no’ to this question. So, while we were in fact interested in the relationship between working conditions and the perceived probability of employees falling ill, having an accident, or being absent for other reasons, we asked for a relationship between working conditions and actual absence levels. Future studies should examine the perceived risk by employers instead of the realization of absence levels.
7 Conclusions

Absenteeism results in considerable costs. Absence levels may be reduced by implementing precautionary actions, to improve the working conditions within organizations. In this study, we have formulated six hypotheses that describe the decision making process of employers whether or not to take precautionary actions. Five of the six hypotheses are accepted. We find that the probability of taking precautionary actions increases with firm size. The probability of identifying a relationship between working conditions and absenteeism depends on the employer’s assessment of the working conditions, on health complaints, on absence rates and on the number of employees. Identification of such a relationship has, however, no impact on the probability that precautionary measures are taken. Absence rates and complaints about stress have no effect on this probability; only physical complaints and the assumed proportion of employees whose tasks are physically demanding have a (direct) positive effect on this probability.

Our study suggests that most small firms do not have a deliberate policy of reducing absence rates by improving the working conditions. Given the low absence rates, and the limited time of small-firm employers, this is not a surprising result. The majority of small firms take actions without identifying a relationship between working conditions and absenteeism. Instead, precautionary actions may be taken because of legal requirements, or to improve employee motivation. The financial position of the organization also does not seem to be related to the likelihood of taking precautionary actions. Once it is decided that precautionary actions will be taken, the financial position may well determine the nature of these actions.

Large firms are more likely to take precautionary actions than smaller organizations, irrespective of differences in absence levels and in the probability of identifying a relationship between working conditions and absenteeism. This firm size effect may be due to increased attention from external stakeholders for precautionary actions, differences in legislations, or simply the availability of know-how and manpower to implement certain practices. The reported firm size differences may, however, also reflect differences in respondents’ perception of precautionary measures.
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