Disability Insurance: Can Underwriting Criteria for the Self-Employed Be Based on Predictors Used for Disability Amongst Employees?

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Objectives.—This study aims to trace risk factors for disability amongst the self-employed. Knowledge about these risk factors can contribute to more evidence-based underwriting criteria for disability insurance.

Background.—The trend towards privatization of social disability services in certain insurance markets creates a need to consider the appropriateness of underwriting criteria in applications for individual private disability insurance.

Methods.—The authors performed a literature study and undertook a consultation amongst experts.

Results.—More than 350 articles were traced. Only one article precisely matches the field of research: risk factors in underwriting disability insurance for the self-employed. Risk factors and medical characteristics in long-term disability are not identical between the employed and self-employed populations. Relevant risk factors for the self-employed are gender, age, occupational class, socio-economic status, medical consumption, lifestyle, coping behavior, previous sick leave, replacement ratio and policy terms.

Conclusions.—The scarce amount of research on risk factors for disability amongst the self-employed forces insurers to rely on the limited statistical data available and pragmatic interpretation of this data. Underwriting criteria for the self-employed can partially be based on predictors for disability for employees. Whether the self-employed and employees are exposed to different risk factors or are basically different populations needs further research. The holistic approach of the International Classification of Functioning, Disability and Health model as a framework for developing a risk assessment model, with a strong focus on personal and environmental factors, will bring the current medical model at the underwriting stage more in line with the social model at claim stage.

The ongoing trend towards the privatization of compulsory social disability services in a number of Western societies raises questions on the appropriateness of underwriting criteria for an individual voluntary, private disability insurance application. In the Netherlands, for example, since August 2004, it is no longer compulsory for
the government to insure the self-employed against the risk of disability. To overcome a possible reduction in earnings in the event of a long-lasting health impairment, those in self-employment now have to apply for private disability insurance if they wish to protect themselves against the risks involved.

Establishing criteria to underwrite such applicants, and for determining the level of premiums, is complicated for several reasons:

• Literature about predictors of disability specific to the self-employed remains scarce, presumably due to the complexity of this area of research and a lack of usable data sets.
• It is uncertain whether the literature findings about predictors of disability for employees can be applied fully to the self-employed, since the two populations have different profiles, remuneration methods, working conditions and benefits.
• The underwriting of disability insurance largely uses the same tools as were primarily developed for life insurance underwriting. Predictors of death are, however, different from predictors of disability.
• There is an increasing awareness that the accepted, mostly medical, assessment model used in life insurance underwriting, and largely adopted in disability insurance underwriting, could benefit from review to ensure it is both effective and protective for insurance purposes.
• A substantial portion of disability claims can be attributed to vague and non-diagnosable complaints, particularly of the musculoskeletal and mental/nervous system.
• It is clear that a lengthy period of absenteeism due to sickness or disability in itself tends to diminish the possibility of a return to work, with resultant future long-term absence or disability.1,2

This article is based on literature research, which aims to trace determinants of disability for the self-employed population. Knowledge about such determinants may contribute to superior evidence-based underwriting criteria for disability insurance, thereby improving the scientific basis for insurers’ underwriting approach. On the one hand this could lead to fewer applicants being accepted on current criteria, but on the other, it could lead to the approval of applicants who may currently be declined. Our study has been guided by 2 questions:

1) Which risk factors for self-employed disability are described in the literature?
2) Which of these risk factors could be suitable as underwriting criteria?

It should be noted that all the authors are from the Netherlands, and this article should not be interpreted as a comment on the underwriting practices in any other market.

METHOD

An international literature study was performed, which aimed to identify the risk factors for disability for the self-employed. Key words that were used in several relevant search engines (PubMed, MEDLINE, International Bibliography of the Social Sciences, PSI Picarta) were: disability, work-incapacity, long-term sickness absenteeism, self-employed, risk factors, predictors, predicting, determinants and underwriting. With one exception,11 articles from the period 1989–2006 were included. Since we had indications that there was a fair degree of knowledge beyond that available in published literature, we also approached 4 experts in the field of research by e-mail, resulting in a small number of other reports worth considering. These experts included:

• Two experts in research on sickness and disability insurance claims
• An expert in screening methods to determine the risk of long-term incapacity to work
• An expert in risk analysis of sick leave amongst self-employed workers
Though more than 350 articles were traced, dealing with different combinations of the key words, only one article has its focus fully on our specific field of research. Additionally, one of the experts approached provided one other relevant report from the supplement of Acta Orthopaedica Scandinavia, which dealt with low back disability amongst self-employed professionals. Other reports we traced have their focus on more technical details of private disability insurance, such as moral hazards, the effects of loadings or exclusion clauses, and trends in and possible reasons for claiming. Contact with the above-mentioned experts confirmed our suspicion that literature on this topic is scarce, rather than that we had used inappropriate key words during search sessions.

We start our review of the literature by briefly presenting the relevant information we could gather, and then follow with a review of the risk factors identified for disability amongst employees and combined populations of both employees and the self-employed. The discussion seeks to respond to the questions raised in the introduction, recognizing the uncertainty involved in comparing the literature findings between the employed and self-employed given the lack of consistency between even the limited number of studies available.

In this article, risk factors for short-term and long-term sickness absence, as well as for disability, are used interchangeably, even though research has not proven that all determinants associated with short-term sickness absence can be applied to long-term sickness and disability, and vice versa. For example, risk factors concerning mental functioning are more linked to long-term sickness absence and disability than to short-term absence. Our approach was chosen for two important reasons. First, in the literature the duration of sickness absence remains mostly unspecified, and where it is specified there is no consistency among the 3 definitions. Short-term sickness absence, for example, can be specified as absence with a maximum duration of 7 weeks, 12 weeks or 6 months, depending on the country under consideration. Second, frequent short-term sickness absence can be regarded as a predictor for long-term sickness absence, while disability is usually preceded by a period of long-term sickness absence.

Above all, our approach is justified by the fact that, in underwriting disability, private insurers must take all risk factors for disability into account.

**RESULTS**

**Literature on Disability Amongst the Self-Employed**

Using a case control study design, Hamilton and Hall examined the information available at application stage for income protection insurance to determine if any factor was predictive for a disability claim. They studied data from a UK population of 959 pending claims and 1417 non-claimants, drawn from the 55,838 self-employed policyholders with an income protection policy in force in the year 2000. Significant associations with claims were found for age (positive), height (negative), gender (women have a higher claim ratio), current smoking (positive), current alcohol use (negative), recent medical consultation (positive), diastolic blood pressure (positive) and history of lower gastrointestinal disorder (positive). Body mass index, backache or mental disorders showed no association with claims, although the latter two conditions frequently result in exclusions should there be any recent history at the time of underwriting. Hamilton and Hall concluded that these results suggest exclusion clauses are successful in eliminating the extra risk assumed by the medical problem disclosed at application.

Donceel presented data from the 2003 annual report of the Belgian National Institution of Health and Disability Insurance (BNIH - Rijksinstituut voor Ziekte- en Invaliditeitsverzekering), which provides evidence that diagnoses classifying for disabil-
ity of the self-employed and employees are not identical. Based on data from a sample of 193,538 employees and 16,220 self-employed, mental disorders were shown to have a higher prevalence amongst employees (31% vs 18%), while cardiovascular diseases have a higher prevalence amongst the self-employed (17% vs 10%).

Data from the Dutch national institute for employee benefits reveals comparable data to the BNIH study. Hartman analyzed the prevalence, the duration and the identification of the main diagnoses of sick leave amongst Dutch self-employed farmers. Though sick leave differs from long-term disability, there is at least in the literature on employees a substantial overlap in the predicting factors for both reasons for absence from work. Age was shown to be a predictor for sick leave amongst farmers; older farmers showed higher sickness absence rates than their younger colleagues. Smoking was positively associated with sickness absence. A body mass index higher than 27 was also a risk factor. Frequent spine movements with a rotation over 30° also showed a positive association with sickness absence, along with “exposure to whole-body-vibration longer than 500 hours a year” and “frequent tractor driving.”

In a retrospective study of private disability insurance claims, Van Doorn analyzed the prevalence of low back disability amongst self-employed dentists, veterinarians, physicians and physical therapists. Low back problems prior to underwriting and the presence of psychosocial problems at the beginning of the period of disability were significantly associated with the duration of low back disability. The study also demonstrated the effect of the following insurance-related factors on the incidence and the duration of low back disability, and on the relapse rate of disability:

- A deferment period of 14 days or more decreased the risk of claiming, while a deferment period of 30 days or more protected against relapses of claims for low back disability.

**Literature on Disability Insurance**

In addition to the Van Doorn study, the literature on disability insurance shows that other insurance factors have a substantial influence on disability claims.

Wildhagen et al demonstrate that holders of private disability insurance policies with an exclusion clause are, on average, less healthy than policyholders without such a clause, leading to more claims than expected amongst insureds with an exclusion clause. Their study confirms the findings of Hamilton and Hall that exclusion clauses are effective against claims for the originally disclosed condition. However, the insured person with an exclusion clause will have more frequent recourse to disability insurance for health problems other than the condition that was excluded. Wildhagen et al state that the claim rate would probably be even higher without the use of exclusion clauses, leading them to conclude that exclusion clauses are partially effective.

Reinsurance companies, such as Swiss Re and Munich Re, have reported a number of factors that influence claim behavior. A disproportionately large sum assured can be regarded as an important cause of so-called “subjective” or “motivated” disability, as the insured has no reason to fear the financial consequences of disablement. A statistical study on the association between claims frequency and the replacement ratio, along with a report by Swiss Re, confirm this finding.

Other factors influencing claim behavior discussed in the Munich Re report are:

- Loss of income through reasons other than disability, combined with difficulties in finding work to which the insured is accustomed.
- Situations in which governments have political reasons for transforming unemployment into disability
- Irregular career history with frequent job changes, suggesting a negative work attitude
- Secondary gain, aimed to protect not so much against disability as against loss of income. This sort of manipulation can especially be seen in times of economic crisis.
- The definition of “disability.” This definition can differ widely between various countries, even within individual insurance markets in the same country.
- The occupation of the insured (increased accident or sickness occupational hazard, monotonous repetitive routine work, etc).
- The deferment period between the notification of the disability claim and the payment of benefits, enabling the insured’s state of health to be determined more exactly and preventing him or her from applying for disability benefits for relatively minor health impairments.

These factors indicate that disability not only depends on the insured’s physical or mental impairment but on a combination of factors, including insurance-related issues, psychological and personal factors, and on external circumstances. The influence of psychological factors can be illustrated by the fact that disability amongst the self-employed is affected by the insured’s own assessment of his ability to work and above all by his desire to work. This desire to work (“motivation”) is largely dependent on the insured’s subjective interests, which leads the report’s authors to speak of “subjective disability.”

Literature on Disability Amongst Employees

There is an abundance of literature about risk factors for disability amongst employed workers. The following paragraphs cover the most important risk factors in these 5 categories:

1) Socio-demographic
2) Working conditions
3) Economic and procedural/conditional (such as political, legal and administration-related factors)
4) Medical
5) Lifestyle and personal environment

Socio-demographic Factors

Age

Age has been described as an important predicting factor of sickness absenteeism and disability. Several authors found that the length of the period of absenteeism is associated with age: the higher a person’s age, the longer this period will be. Klein Hesselink states that the health and work perception of employees can be regarded as risk factors for disability. The authors go on to state that, since older employees have a more negative perception about work, they have a higher risk of becoming disabled. The findings of these authors are in contrast with those of Kristensen, who reports a decreasing sickness absence with increasing age. In his study amongst Danish slaughterhouse workers, he has postulated that, particularly in highly “Taylored” workplaces (ie, monotonous work such as a factory production line where workers undertake repetitive tasks that are part of a larger process – named after time and motion expert Frederick Winslow Taylor), sickness absence can be regarded as coping behavior, to which older employees are less apt to resort. The Dutch National Institution for Social Insurances found higher age to be a risk factor for long-term disability for men in particular, and to a much less extent for women.

Gender

Gender has been presented as a risk factor for sickness absence and disability in a substantial quantity of publications. The majority of these reports higher absence and disability rates amongst women. The
differences in absence rates between genders become more marked as age increases. Several explanations are given for these different rates, such as women may have more mental problems, are more often confronted with intimidation, suffer more from gender-related complaints, and have to deal with a heavier workload, having a greater responsibility for taking care of children in addition to their jobs. The literature is not consistent, however, since the results of the Dutch National Institution for Social Insurances research contradict these latter findings. In the Institution’s research, no indications were found that women have higher absence rates as a consequence of the twin workload of raising children and working.

Not all of the research makes a link between female gender and higher rates of absenteeism and disability. In an article about the transition from short-term absence to long-term incapacity, Shields et al report that men have higher sickness absence and disability rates than women. Other gender-specific research shows that a lack of social support is associated with higher absence rates, but these results are applicable only in men. Finally, Brage found that substantially more men than women in the second-highest income bracket were absent from work for longer periods of time. In all other income brackets, women showed more sickness absence.

Socio-economic Status

In the literature, socio-economic status has been consistently presented as a relevant factor for absence and disability. Several authors found that lower education and socio-economic class is related to higher absence and disability rates. The Netherlands National Institute for Social Insurance (LISV) found that the risk for long-term disability is 7 times higher for employees with lower vocational education than for employees with higher vocational education or an academic degree. Employees in a low socio-economic class are especially at greater risk for mental disorders and low back complaints.

Marital Status

Three authors note a relationship between marital status and sickness absence. Stansfeld reports higher rates of sickness absence amongst widows and widowers, as well as divorced women. Missing a partner (due to bereavement or divorce) was found to be associated with disability for both men and women. Jansen et al report, however, that married women are at higher risk of becoming disabled than unmarried women, especially in the older age groups.

Working Conditions

Content of Work

Blank and Diderichsen found that the psychological demands that have to be met at work have a higher impact on women, which was a reason for more sickness reporting. Another risk factor they report, with respect to the content of work, is the extent to which employees are allowed to arrange and control their own work. A lack of such control is related to higher absence rates, but according to Blank et al this affects men only. Other intrinsic working factors that can be associated with higher absence rates include:

- High level of job stress
- High degree of "Tayloring" of the work
- High workload on the back
- Low "role clarity" amongst white-collar workers
- Low "fairness" of work distribution (especially amongst blue-collar workers)
- Poor organizational climate (especially amongst blue-collar workers)
- Unpleasant work atmosphere
- Physical workload
- Lack of career prospects
- Noise pollution in the workplace
Mismatch of education and work experience with content of work.\textsuperscript{17}

History of previous frequent and/or long-term sickness absence from work\textsuperscript{2,10,31}

Apart from the above mentioned factors, which can be regarded as risk factors, the literature also discusses factors that protect against sickness absence and disability. Blank et al found that part-time work was protective for short-term sickness absence amongst both men and women.\textsuperscript{18} In the same research, part-time work appeared to be a risk factor for long-term sickness absence, but only amongst men. Ownership of shares as well as profit-sharing were both associated with a reduction of sickness absence.\textsuperscript{32} Work performed behind a computer monitor appeared to be associated with a 3 times lower disability risk.\textsuperscript{17}

**Economic and Procedural/Conditional Factors**

The occurrence of an economic boom appears to be associated with higher levels of sickness absence, while the occurrence of an economic recession, the threat of losing one’s job and a restrictive absence policy on the part of government or local authorities are related to lower levels.\textsuperscript{10,24,33} A high level of unemployment in an employee’s residential neighborhood is associated with lower levels of sick leave and disability, confirming that a person’s fear of losing his or her job is greater in a situation where opportunities to find alternative work are limited.\textsuperscript{13}

In the population of employees, the level of the replacement ratio also appears to be a relevant risk factor. Raising benefit payments by 1% correlates with a 2.5% increase in the incidence of long-term disability.\textsuperscript{33,34}

A long period of job protection, as exists in the Netherlands, may also have adverse effects: because return to work is guaranteed during the first 2 years of sick leave, periods of absenteeism may last longer than in countries that do not provide such a guarantee.\textsuperscript{35} Finally, the question of whether a sickness certificate from a medical doctor is required by the employer has an impact on the level of absence. In some countries, as in Finland, such a certificate is not required for short-term absenteeism, thus leaving employees with the opportunity to report being sick without consequences in the short run.\textsuperscript{36}

**Medical Factors**

**Severity of a Disease**

Literature findings about any effect related to the severity of a disease, in terms of limitations or quality of life, are controversial. Klein Hesselink et al report that the severity of a disease is positively related with work incapacity.\textsuperscript{10} Boot claims, however, that amongst asthma and COPD patients perception of an illness and a person’s adaptation to the restrictions imposed by an illness are better predictors of sickness absenteeism and work incapacity than the severity of the illness itself.\textsuperscript{37} Boonen et al report similar findings and suggest that the severity of ankylosing spondylitis and its comorbidity are relevant, but less so than coping behavior and adaptation.\textsuperscript{38}

**Type of Disorder or Disease**

The type of disorder or disease has been described as a predictor for sickness absence. Fatigue, for example, is a predictor of both short- and long-term sickness absence.\textsuperscript{9,39} Roskes et al report that chronically ill employees show 2 or 3 times higher absence rates than healthy employees.\textsuperscript{40} Mental disorders like depression and phobia, as well as dysthymia, are associated with higher sickness absence rates.\textsuperscript{14,20} Mental disorders account for about one third of the people who became classified as newly disabled in the Netherlands, while illnesses of the locomotor apparatus account for another third.\textsuperscript{41} One piece of research, however, indicates that psycho-pathology cannot be used as a predictor of absence amongst patients with chronic pain.\textsuperscript{42}
Characteristics of the Healthcare System

Besides the medical factors related to the severity and type of disease, specific characteristics of the healthcare system are described in the literature as predictors for sick leave. Long waiting periods for medical treatment or admission to a hospital are associated with disability. Prolonged medical investigations are associated with longer absence rates, apparently for their delaying effects on the treatment and, as a consequence, return to work.

The consumption of medical services, such as the frequency of consultations with a doctor, medicine prescriptions and treatment by a medical specialist are also described as determinants of sick leave and disability.

Lifestyle and Personal Environment

The literature also describes a multitude of factors associated with an individual’s personal situation, as well as lifestyle, as predictors of sick leave and disability. Literature findings about social support and related factors, such as social deprivation, appear to be controversial. Niedhammer found that a lack of social support raises both the absence frequency and number of days with absence. Shields et al confirmed his findings by reporting that social deprivation is associated with higher absence rates. Kivimäki, however, could not find any influence of social support on sick leave. Rael et al report that a safe and secure private environment and a large emotional commitment on the part of a person’s partner are related to higher rather than lower levels of sick leave.

Several authors found that alcohol abuse and smoking are associated with higher absence rates. Klein Hesselink et al stress that alcohol abuse and smoking are especially related to short-term sick leave. The same applies to a lack of physical activity, combined with health status and past history of work absence, could be effectively used as a predictor of future sick leave, through the use of questionnaires. Drug use has also been proved to be positively related to sickness absence. Finally, in a Belgian study, obesity and abdominal fat are positively associated with sick leave.

DISCUSSION

In the introduction to this article, 2 questions were posed that guided our study:

1) Which risk factors for self-employed disability are described in the literature?
2) Which of these risk factors could be suitable as underwriting criteria?

Although very little literature about risk factors for disability specific to the self-employed could be found, we can base some opinions on literature findings about risk factors amongst employees or combined populations. The question arises as to what extent these findings are applicable to the self-employed and can be used, therefore, for the establishment of criteria for disability insurance underwriting of this population. From the scant literature about the self-employed, some evidence could be found that risk factors for disability of the self-employed are not identical to those for employees. Apart from differences in the medical characteristics of long-term disability in the two populations, there are also disparities that stem from the specific nature of private insurance. In particular, risk assessment plays a more important role in private than in public insurance. In addition, factors that are related to the status of self-support, compared with being supported by an employer, can be associated with the risk of getting disabled and with the duration of the disability.

The lack of research on risk factors for disability amongst the self-employed means that disability insurers must rely on the
limited statistical data available and pragmatic interpretation of this data. It is to be expected that the following risk factors will have a different association with sickness absence and disability in a self-employed vs the employed context:

- Job control
- Job stress
- “Tayloring” of work
- Role clarity
- Fairness of work distribution
- Lack of career prospects

Literature reveals age and gender to be risk factors for both employees and self-employed, though socio-economic status, and age and gender on their own, may act as confounding factors.

Lifestyle factors, such as substance abuse, overweight, lack of physical activity and previous sick leave, appear to be relevant risk factors in both populations. Insurance-related risk factors, such as replacement ratio and policy wording for private insurance are in line with comparable factors in social security.

Although medical characteristics of long-term disability differ in both populations, medical consumption and fatigue appear to be common risk factors. The chronic state and severity of a disease, however, are not unequivocal risk factors for disability, since co-morbidity and coping behavior act as confounders.

Economic factors may influence employees and the self-employed in an opposite way. This is illustrated by the fact that recession is more related to lower levels of sick leave amongst employees, due to factors such as decreased workload or the threat of job loss and restrictive measures imposed by the state. Whereas, amongst the self-employed it may lead to a higher claims rate based on “secondary gain.” Insurance experience, however, tends to indicate that recession is associated with increased claims and especially longer-than-expected claims, which may be an indicator of the financial motivation behind some cases of disability, with even state disability benefits usually paying more than unemployment benefits.

Data regarding the personal environment of employees are too controversial to extrapolate them to the self-employed.

This leaves the second question: which risk factors are suitable for the determination of underwriting criteria? These criteria should, ideally, be objective and measurable. Risk factors that are not modifiable, such as gender and age, are determined by the basic premium rates; subject to legal restrictions in some private insurance markets; and less relevant in terms of risk assessments between one individual and another – but must still be considered in the overall holistic assessment of risk factors. By contrast, risk factors that need to be fully considered are those regarding lifestyle and, to some extent, coping behavior, socio-economic status and a possible mismatch between education and occupation – none of which are found in the medical assessment model. Further factors that affect the claim ratio relate to the terms and conditions of an insurance policy, such as the replacement ratio and the application of exclusion clauses. These are, therefore, valuable instruments for private disability insurers at the underwriting stage.

Medical consumption, severity and the chronic state of a disease or disorder, with a strong link to coping behavior, are plausible variables for assessing risk and would supplement more traditional diagnosis-linked underwriting. In this context, previous sick leave is an especially valuable parameter in risk assessment during the underwriting process.

An underwriting decision is often based on medical diagnosis and may fail to adequately address the many other risk factors, which may influence an occurrence of disability. At claim stage, the claimant will predominantly act in a way that more closely matches the International Classification of Functioning, Disability and Health (ICF) model. Since environmental and personal
factors, in addition to the medical data, affect functioning and participation (the key-parameters of the ICF framework), it will, therefore, affect claim behavior. Underwriting is likely to be more predictive and protective if it were also to incorporate these factors.

The gap between underwriting and claim handling in disability is likely linked to the discrepancy between the predominantly medical model at underwriting stage and the social model at claim stage. Until now, the ICF model has not yet been completely transferred into the underwriting process. Underwriting disability requires a more holistic approach, covering all relevant risk factors, including those affecting the basic premium rates and those for the individual being assessed – a model that goes beyond the medical model. Under a more holistic approach, the main point of underwriting disability insurance would be better focused on predisposing risk factors for the self-employed, rather than concentrating solely on the medical causal risk factors and perhaps on the risk factors that influence the duration of claims. These various risk factors will overlap, but predisposing factors such as lifestyle and coping behavior require a closer look at the underwriting stage.

Whether the self-employed and employed populations differ from one another and, if so, to what extent and in what way, are important questions that need to be answered. Profit-sharing is associated with a reduction in sick leave, and this is a good indicator of the need to consider behavior and financial incentives in disability insurance.

**CONCLUSIONS**

There is very little literature about risk factors for disability amongst the self-employed. Underwriting criteria for the self-employed can partially be based on predictors for disability for employees. However, despite these apparent similarities, the extent to which self-employed and employ-

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