Lars-Gunnar Engström

Sickness Absence in Sweden

Its relation to Work, Health and Social Insurance Factors
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**DISSERTATION**

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Happy is he who gets to know the reasons for things

Virgil (70 - 19 BC)
Abstract

Background: The high levels of sickness absence and disability pensioning experienced during the 1990’s and 2000’s have become both socially as well as financially burdensome for society. Sickness absence implies a costly loss of production for society and large groups of individuals are at risk of becoming marginalized on the labor market. Sickness absence is both a public health and an economic problem. Thus from both a human approach as well as from an economic perspective it is urgent to increase knowledge about what influences individual behaviour when it comes to sickness absence and return to work.

Objectives: The overall aim of the thesis is to elucidate the decisive factors for explaining sickness absence. Three different aspects of sickness absence are considered, i.e. factors leading to sickness absence, factors preventing sickness absence and factors leading back to work ability and work when being sickness absent. This is done using a frame of reference involving broadly defined areas of work, health and social insurance related factors.

Material and methods: Study I analyzes the outcome of unemployed sick-listed individuals. A total of 280 individuals from the county of Värmland were followed through register data between the years 2000 to 2001. Linear and logistic regression models were used to analyze the occurrence of short and long term economic incentives. Study II has a longitudinal design and explores determinants of return to work. Sick-listed individuals with a stress-related psychiatric diagnosis from the county of Värmland were analyzed over a period of three years (2000-2003) using logistic regression. The data comprised 911 individuals. Study III is a cross-sectional study using questionnaire data from the county of Värmland from year 2004. A total of 3123 persons either working or being self employed were analyzed on determinants of work presence through logistic regression. Study IV had a cross-sectional design and used questionnaire data from five counties in central Sweden. The data, from 2004, comprised 10536 individuals being employed, i.e. not self-employed, and with self reported physical and mental medical conditions. Logistic regression was mainly used in the analysis and the focus was on risk factors for long term sickness absence. Study V comprises cross-sectional data retrieved at three separate occasions between 1991 and 1994. It includes 8839 individuals from five counties in western Sweden with sickness absence spells over 60 days. The data was analyzed through bi-variate probit regression with a focus on effects of vocational rehabilitation on return to work.
Results: The results from study I were interpreted as that both short and long term economic incentives matter for the outcome of sickness absence through the interaction of different insurance systems. The principal findings from study II was that age, gender and factors implying less favourable health characteristics and thereby lower work capacity, reduce probabilities of returning to work after long term sickness absence. Considering study III determinants of work presence were found to vary between gender and whether the determinants were counteracting long or short term sickness absence. Factors interpreted as job control counteracted short term absence. Sense of coherence was found to be an important determinant of work presence for women. In study IV long term sickness absence was found to be related to the level of ill-health. Moreover, it was concluded that work environment factors as job strain, job satisfaction, physical work environment were important factors for explaining sickness absence in a population with impaired health. The results from study V indicated that vocational rehabilitation is a potentially effective instrument for improving the individual's work ability and chances of return to work. That no signs of prioritizing selection of rehabilitation participants to those likely to return to work with or without rehabilitation measures, i.e. “managerial creaming”, were found was also considered as important results.

Conclusions: This thesis shows that we need different models and approaches to improve knowledge about the various aspects of sickness absence as entry into absence, return to work or into disability retirement. It also has the implications that sickness absence behaviour can be influenced. Largely depending on what long term path is chosen for welfare policy at the political level it should be acknowledged that other means, improving working conditions and promoting rehabilitation, rather than reducing benefit levels and narrowing the eligibility criteria for the insurance benefits are at hand.

Key words: Sickness absence, return to work, work ability, work related factors, psycho-social work environment, health related factors, social insurance system factors, vocational rehabilitation
Abbreviations

CI – Confidence interval
OR – Odds ratio
RTW – Return to work
LTSA – Long term sickness absence
SOC – Sense of Coherence
VR – Vocational rehabilitation
WHO – World Health Organization

Definitions

Sickness absence or sick leave – Used synonymously for temporary work absence due to reduced work capacity originating from illness, disease or injury.

Long-term sickness absence – No general definition on this concept exists. In this thesis absence spells exceeding 28 days are studied in study 1-4 and spells exceeding 60 days in study 5.

Sickness benefit – Sickness allowance or cash benefit granted as stipulated by the National Insurance Act when a person’s work capacity is reduced due to illness/disease or injury.

Disability pension – Temporary or permanent pension granted to a person with a prolonged reduction of work capacity.

Medicalization – The gradual process of non-medical factors being incorporated in what is considered to be legally and/or socially accepted reasons for work absence.

Work ability - Legal foundation for eligibility for sickness absence in Sweden is loss of work ability due to a medical condition. No absolute definition of the concept exists though. Here it is used synonymously with “work capacity”.

Work capacity – see work ability
**Managerial creaming** – When the selection of participants into labor market programmes is based on who is most likely to succeed rather than on who would actually benefit most from the activities. The risk for such selection is obviously greater if programme managers are evaluated on the basis of how many of their trainees who return to work. The term is derived from the concept of cream skimming, i.e. the process where the (high value) cream is separated from the raw milk. The term cream skimming is also sometimes used synonymously.

**Gatekeeper** – A professional function, here typically at a social insurance agency, with the power and obligation to decide whether or not individuals are entitled to benefits or services on the grounds of the legislation regulating this particular system.
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**Background**

Sickness absence in Sweden increased rapidly from 1997 to 2002 when absence volumes again started to decrease (Försäkringskassan 2007a). Seeking to explain the reasons behind sickness absence leading to long-term or possibly even permanent exit from the labor force, is not a new research topic related to the dramatic development of sickness absence in Sweden experienced during the turn of the century (Henrekson et al. 1992; Björklund 1991). Large variations in the volume of sickness absence and disability pensions are historically common and have thus occurred also earlier (Försäkringskassan 2005). *Figure 1* shows sickness absence fluctuations over a period of time between 1974 and 2006. These fluctuations and the reasons behind them have been studied from several scientific disciplines and with different theoretical approaches and presented in research papers as well as government and other official reports (Alexandersson & Norlund 2004b; Marklund et al. 2004; Marklund et al. 2005; Nyman et al. 2002; SOU 2002). Gaining greater knowledge about on one hand the factors influencing both short-term and long-term sickness absence and the relation between the two (Blank & Diderichsen 1995; Eriksen 1980), and on the other hand measures to influence the development, through for instance changes in regulation (Henrekson & Persson 2004; Voss et al. 2001a), organisational changes within the social insurance administration (Edlund 2001), work place intervention (Goine et al. 2004) and rehabilitation (Ahlgren et al. 2007; Marnetoft et al. 2001; Ahlgren et al. 2004), has in the light of these fluctuations become an urgent research area. From both a human approach as well as from an economic perspective it is important to enhance knowledge about what influences individual behaviour when it comes to sickness absence and return to work, RTW.

The high levels of sickness absence and disability pensioning experienced during the 1990’s and 2000’s in Sweden have become both socially as well as financially burdensome for society. The cost of sickness absence has increased and has been an important factor behind the more widespread questioning of the sustainability of the Swedish social insurance model (Försäkringskassan 2008a; Sundquist et al. 2007). In 2006, social insurance transfers relating to sickness absence and disability pensioning, amounted to approximately 4 % of GDP. Sweden had in 2006, together with Norway, the highest proportion of GDP redistributed through the sickness insurance in Western Europe (Försäkringskassan 2007b). Through a combination of both high absence rates...
and long average absence spells Sweden have had by far the highest average number of working days per year lost to sickness absence in the OECD countries, figure 2, (Rae 2005). From an economic perspective sickness absence also implies a loss of production with large societal costs (Ekman et al. 2005). From an individual horizon it is not acceptable that an increasing proportion of the labor force is left outside or risking a permanent exit from the labor market. Approximately one tenth of all individuals in Sweden under the age of 65 receive disability pension. Very few of these are likely to return to the work. Moreover, in 2002 over 8 % of all women in the labor force were on sick leave periods which had exceeded 30 days and over 4 % for the men in the labor force (Socialstyrelsen 2005). One study reported that close to 17 % of the Swedish population were outside the work force due to ill health and reduced work capacity in 2005 (Marnetoft et al. 2007).

Figure 1 Number of sickness absentees in Sweden with spells exceeding 60 days in december each year (source: Social Insurance Agency data Store (Försäkringskassan 2007a))

Long-term sickness absence has thus been described as both a serious public health as well as an economic problem (Henderson et al. 2005). These are some reasons why it is important to understand what causes and affects the variations
in ill-health and sickness absence. Moreover, it is important to increase understanding of why certain individuals with long term sickness absence, LTSA, become retired due to disability while others can deal with the situation differently and, with or without help, are able to return to the labor market.

One attempt to summarize the knowledge about the reasons behind the large increase in work absence due to ill-health (Marklund et al. 2005) concluded that the main reasons were likely to be found in changes in the working life with lower tolerance towards low work performance, the ageing population, individuals being on sick-leave instead of unemployment, and administrative shortcomings of the social insurance administration. Further knowledge is needed though and this thesis addresses several of the above mentioned areas of explanation.

Figure 2: Working days lost per full-time equivalent employee per year, 2004 (Source: OECD (Rae 2005))

The Swedish sickness insurance system

The Swedish sickness insurance is a part of a comprehensive and universal social insurance or welfare system. Trademarks of the Swedish welfare system are for instance both inter- and intragenerational distribution, generous benefit schemes, active labor market policies and public administration. Through the similarities with social insurance systems in other Scandinavian countries and its development closely tied to the social democratic regimes it is often referred to as the Scandinavian or Social democratic model (Esping-Andersen 1990).
The sickness benefit is earnings related with an 80% compensation level and entitlement is based on a qualifying income of 9,900 SEK (approximately 1,000 Euro in 2009) per year. You can receive sickness benefit for a maximum of 364 days during a 450 days period. The introduction of this upper duration limit for receiving sickness benefit in 2008 is a recent major change to the sickness insurance system (Försäkringskassan 2008b) and this upper limit does not apply for the studies included in this thesis. Previous to 2008 no clear limit to the duration was to be found in the sickness insurance. To receive sickness benefit you must have a reduced work capacity due to medical reasons. You can receive full or part time (25%, 50% or 75%) compensation depending on how much your work capacity is reduced. There is one waiting, or qualifying day in the insurance and actual sickness benefit is not paid out from the Social Insurance Agency until day 15 in the sickness spell. Day 2 to 14 is covered by the employer through Sick Pay. However for the unemployed sickness benefit is covered by the Social Insurance Agency from the second day.

A major and important focus on RTW was introduced in the sickness insurance through the incorporation of the so called “work line” or “work principle”, stressing active measures before mere receiving passive benefits, in the early 1990’s (Lindqvist & Grape 1999). It is also often mentioned as the rehabilitation reform of 1991/1992 and had its origin in a government report from 1988 (SOU 1988). An active approach which should be coordinated from the social insurance offices was applied to educate unemployed, work training of individuals back to their old or new jobs. Increased responsibility for RTW and rehabilitation was also put on the employer (Söderberg 2005).

During the 1990’s a relative change in the interpretation of the concept of work capacity in relation to the sickness insurance also took place. From 1995 the assessment of work capacity should exclude influences from non-medical criteria (Arrelöv et al. 2003) and from 1997 work capacity should be assessed not only to present or previous employment but to any job normally existing on the labor market (Ahlgren 2006).

**Sickness absence in the European perspective**

The high level of sickness absence in Sweden has received international attention (Barmby et al. 2002; Bloch & Priens 2001). The development following 1997 could however also be found in some other European
countries, i.e. Norway and the Netherlands. In other countries such as Denmark, Germany, Great Britain, the volume of sickness absence was considerably lower in this period (Försäkringskassan 2005; Nyman et al. 2002). Even though the differences in absence volumes have decreased between Sweden and other European countries, Sweden still displays internationally high levels of sickness absence. Notably is also the strong connection between the labor market development, unemployment rates, and sickness absence in Sweden. High unemployment rates imply lower levels of sickness absence and vice versa. This relation is also acknowledged in especially Norway and the Netherlands. Two main hypotheses about this negative relationship exist. The first suggests a disciplining effect on the employed due to the perception of less job security during recession. Avoiding sickness absence then becomes essential to, if possible, protect your employment. The other hypothesis has the reason for the relationship attributed to selection. Those with poor health are likely to be laid off first during rising unemployment, thus reducing the base for sickness absence (Bäckman 1998).

The Swedish sickness absence is furthermore related to the elder part of the population and to women to a higher extent than in other countries in Europe. This is likely to be explained by a high level of labor market participation among the elderly and among women (Jouhette & Romans 2006; Mastekaasa 2005). Yet another important difference between Sweden and other countries partly explaining the high sickness absence levels has been the absence of an upper limit to the length of sickness benefit periods. These conditions have as mentioned above been changed during 2008 and sickness absence can in the general case since then be received for a maximum period of 364 days (Försäkringskassan 2008b).

**Theoretical framework**

A number of models are to be found in the literature that aim to describe different aspects of ill-health, work incapacity, sickness absence, (early) labor market exit and possibly also return to work (Bäckman 1998; Aarts et al. 1996; Johansson 2007; Klosse et al. 1998; Steers & Rhodes 1984). In a Dutch report (Aarts et al. 1996) the authors describe five different paths between working life and old age retirement which are plausible solutions for individuals which due to some health issue have been work incapacitated.
1. Early retirement path (Premature entry into old-age pension system)
2. Work path (Return to work through rehabilitation measures or not)
3. Health path (Disability retirement)
4. Unemployment path
5. Welfare path

Different incentives, economic and others, will affect the choice of path(s) when health problems reduce the individual’s capacity of wage earning. The individual will compare the pros and cons of the paths facing the option of continuing along the chosen path or finding a new. Apart from the actual health state and individual preferences, there are also laws and regulations within the social insurance system that affect the choice. The state and development of the labor market is important as well. Furthermore, the employers are affected by these laws and regulation in the way they will act towards their (partly) work incapacitated employees. How employers work to prohibit sickness absence is for instance very likely to be influenced by whether or not they have to pay a part of the sickness benefit to their employees.

Central to this line of reasoning is the individual choice, alternatively formulated considering sickness absence as an action (Johansson 2007; Kristensen 1991). Sickness absence is a result not only caused by ill health but also a product of the environment and the individual making a choice given his or her situation. This view can also be referred to as sickness absence behaviour or the closely related disability behaviour (Aarts & de Jong 1992). In this thesis the use of the concept sickness absence behaviour refers to the various aspects of sickness absence that are studied, i.e. what factors are relevant for becoming sickness absent or not, retaining work ability and returning to work.

Two models with entirely different approaches to explaining sickness absence can be used as a starting point for the approach of this thesis. These two models, attraction model or pull model and the push model address entirely different factors to solve the sickness absence puzzle but at the same time the models do not necessarily rule each other out. The same can be said about the focus for this thesis. Different approaches and models are used to create a more complete picture about the causes and consequences of sickness absence. As for the attraction or pull model, it seeks to explain the absence behaviour as a result of the construction and inherent incentive structures of the income security systems, i.e. coverage and monetary rewards provided by the systems.
The push model on the other hand has the labor market development and structural changes as a driving force in pushing certain groups of individuals out from the work force (Marklund 1992).

*The “Push-model”*

The push-out concept could be described as certain groups of individuals being involuntarily pushed out from the labor market due to structural changes and competition (Lindqvist 2000). In these structural changes some industrial branches will expand while other with lower productivity will face increasing difficulties in competing. The development is often followed by technological development where the older part of the work force in their turn may face difficulties in keeping their competences up to date. Wikman (Wikman 2001) described the 1990's in Sweden as a period of great changes on the labor market with an orientation towards knowledge intensive production and a growing service sector which have put a great exposure (vulnerability) on such groups as low educated and immigrants. Also certain women groups were categorized as being in a vulnerable position on the changing labor market. A still highly gender separated labor market saw women to a much higher extent in low skill jobs than men making them more exposed to the changing demands. The increasing flexibility of the labor market can have similar effects on the work force for instance by inducing ill health (Hallsten & Isaksson 2000; Starrin & Janson 2006). Greater demand for flexibility means new and different competences. In such a labor market development there could be incentives both for employers as well as for employees to medicalize what is actually more a competence problem than a health problem. Thus the push approach deals with the individual’s health and his chances of remaining in the labor market, which in turn is linked to labor supply and demand (Guillemard & Rein 1993).

A Norwegian study (Kolberg 1991) has tried to empirically verify the push model for the Norwegian labor market during parts of the 1970’s and 1980’s. The study ascribed some value to the push model in explaining recruitment for disability retirement in Norway during these periods but was also careful to point out that there is reason for scepticism towards single component models of explanation.
The Pull model

The pull, or attraction, approach to labor market exit seeks to explain long term sickness absence and disability retirement in the construction of the welfare systems and the (economic) rational choice of individuals. Improvements in generosity, expansion of coverage and eligibility have made the decision to withdraw from work to “cost less” and to go on working as less attractive (Guillemard & Rein 1993; Kolberg 1991). The pull perspective is closely linked with an economical perspective and economic incentives are thus central for explaining sickness absence (Henrekson & Persson 2004; Broström et al. 2004; Johansson & Palme 1996). This can typically be exemplified by how the benefit levels in the social insurance schemes are considered as decisive factors as to why people “choose” to exit the labor market. Studies have shown that countries with high benefit levels also have more people on disability retirement (Stattein 2005). “Gatekeeper”-functions within the systems, i.e. administrative functions and legislation, are necessary consequences of this to limit the use of the systems. It is also acknowledged that the pull model has a major impact on policy making (Nygard Överland & Simon 2007).

It should be noted that a somewhat broader definition of the terms push and pull factors have been used in research typically on older individual’s retirement decision (Shultz et al. 1998). Push factors are then considered as for instance poor health or the dislike of one’s job giving incentives to withdraw from work. Pull factors could be leisure interests attracting older workers to retire.

Push and/or Pull

A true push perspective assumes that the reasons behind work absence stand beyond the control of the individual. The individual is forced out from the labor market through the structural changes rather than choosing this path. It is an unwanted transition from work to welfare. The push and pull perspective do not however rule each other out due to this theoretical constraint. Marginalisation on the labor market could be a result of push factors whereas the preference of relying on the welfare system rather than staying on an uncertain labor market with perhaps periods of unemployment could be a result of pull factors (Mykletun 2000). The sickness insurance, with sickness absence and in the longer run disability retirement, is thus one possible exit route out of the labor market.
It has also been argued that the degree of voluntary choice in withdrawal from labor market is in reality not easily decided. No single push or pull factor can explain withdrawal which is seen as a complex phenomenon which is rather explained by interactions between push and pull factors (Jensen & Kjeldegaard 2002). With this reasoning follows that the push and pull perspectives are better used as frames of reference than actual theories or models that claim to provide the final answers to absence behaviour. The models can further be used as important aids in the structuring of empirical observations.

Table 1: A compilation of push and pull factors (freely adapted from Stattin (Stattin 2005) )

<table>
<thead>
<tr>
<th>Push factor</th>
<th>Pull factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural change</td>
<td>Technological changes, increased competition creates circumstances where older/disabled people are forced from work.</td>
</tr>
<tr>
<td>Unemployment</td>
<td>Business cycles create fluctuations in the demand for individuals with lower work capacity for instance due to ill health.</td>
</tr>
<tr>
<td>Occupation</td>
<td>Certain skills and competences become obsolete in changing labor markets.</td>
</tr>
<tr>
<td>Work environment</td>
<td>Physical- and psycho social work environment are important determinants of ill health.</td>
</tr>
</tbody>
</table>
In a conceptual model presented later on in the thesis, illustrated in figure 4, it is not the “pure” forms of the theoretical models push and pull that are encompassed. Instead the push perspective is to some extent represented by the broader concept of work related factors. The same applies for the pull perspective which is a part of what is referred to as social insurance system factors. This broader approach to the push and pull perspectives could be summarized as in table 1 which is based on a variety of factors with the distinction on whether absence or disability withdrawal from labor market is dependent on individual choice (pull) or on structural and environmental factors (Statton 2005). Also Goine (Goine 2006) uses a similar broader categorization of factors presented with a partly different terminology, attraction and repulsion model.

The inclusion of work environment factors, and in particular psychosocial work environment, as part of the push perspective invites for including the, in sickness absence research, widely used (Allebeck & Mastekaasa 2004b) demand and control model (Karasek & Theorell 1990) into same conceptual discussion. Karasek and Theorell showed that a combination of high psychological demands and low control at work, i.e. “job strain”, could have negative effects on health. A third dimension is sometimes added to the demand control model, namely social support. Social support could work as a buffer against the ill health caused by job strain (Johnson & Hall 1988).

Sickness absence behaviour is not likely to be captured within a framework of a single theoretical approach such as the push or pull models. However not even combining the two models will yield a complete picture. Therefore the aim is for an even broader model of explanation. To end up in such a model there is a need to elaborate on yet a few concepts that are closely intertwined with sickness absence. These concepts are firstly “ill health” and “work ability”. This pair of concepts is also the legal foundation for sickness absence in Sweden. The fact that other factors than those that are medically and work ability related are considered as important in explaining sickness absence hints that also the concept of “medicalization” needs to be look up on. Medicalization is here defined as the gradual process of non-medical factors being incorporated in what is considered to be legally and/or socially accepted reasons for work absence.
Ill health, work ability, and medicalization

Being eligible for sickness absence in Sweden requires a loss of work ability of at least one fourth. Even though the concept of work ability is not clearly defined, The National Insurance Act requires a clear connection between the loss of work ability and disease/illness/injury (AFL). A general assumption is also that a majority of the sickness absence is caused by ill health (Johansson 2007). However both the concept of ill health and it’s relation to work ability and sickness absence are complex by nature.

Ill health

The concept of health has been discussed and defined in various ways over the years. WHO defined health in 1948 as “as state of complete physical, mental and social well-being” (WHO 1948). This definition, which has been criticized for its utopian aim, has later been changed to define health as a resource in daily life to achieve social, economic, and personal development (WHO 1986). Other definitions include for instance Boors bio-medical approach that basically defines health as the absence of disease, where disease is defined as a dysfunction within an organ or a system of the body (Boors 1981). The view that health is something more than the absence of disease, and not necessarily a dichotomy but with possible degrees of health, represents what could be described as a holistic perspective. Pörn and Nordenfeldt are often ascribed to this school of reasoning (Pörn 1984; Nordenfeldt 1987).

A common, within public health, approach to illustrate the various aspects of ill health is illustrated in figure 3 and uses the concepts of disease, illness and sickness. Disease refers to morbidity diagnosed by a physician or another medical expert. Illness is the subjective, self perceived symptoms. Sickness finally is the social role a person with disease or illness is given, or takes in society (Wikman et al. 2005). Sickness absence is represented by the smaller grey area indicating that not all cases of illness, sickness or disease results in sick leave. Sickness absence is part of the social role and generally also illness and/or disease in the sense that the sickness insurance should be applicable. The part of the sickness absence circle that extends outside the illness and disease circles could represent for instance insurance fraud (Alexandersson & Norlund 2004a).
When studying sickness absence in relation to health or ill health it could be valuable to also include the salutogenic perspective introduced by Antonovsky (Antonovsky 1987). The salutogenic perspective focuses on factors that promote health, or why certain people stay healthy in spite of experiences of stressful situations and hardship, in contrast to a pathogenic perspective that focus on the causes of disease. Antonovsky also argues that it is not only low levels of risk factors that induce health but perhaps equally important factors that instead in themselves promote health, or act as buffers against ill health, that bring people closer to the healthy side of the health-unhealth continuum. His theory of sense of coherence, SOC, is considered as a global orientation to view the world, and is constituted of the three components of comprehensibility, manageability, and meaningfulness (Eriksson & Lindström 2005).

**Work Ability**

Disease or illness does not by itself lead to or justify sickness absence. Only in those cases where this medical impairment leads to negative consequences for the work ability of the individual sickness absence can be in question. Thus work ability, or work capacity, should always be judged in relation to the demands at work (Alexandersson & Norlund 2004a).

Ilmarinen describes work ability as a process of human resources that he puts in relation to work (Ilmarinen 2001). He describes human resources as a set of items that, put together, resolves in individual work ability. These items are, 1)
health and functional capacities, 2) education and competence, 3) values and attitudes, 4) motivation, 5) work demands, 6) work community and management and, 7) work environment. The concept of work ability is naturally (and through legislation) closely related to sickness absence. Even through a clear and easily understood definition of the concept as the one above the interpretation and application of the concept in relation to sickness insurance is not as straightforward. The physician should according to the Swedish social insurance system evaluate the individual’s work ability in order for the Social Insurance Agency to determine the right to receive benefit or not. A difficult balancing act between the gate-keeper role and looking out for the needs of the insured/patient is often perceived by both the physician as well as the social insurance officers. Whereas many countries have developed instruments for measuring work ability in relation to the sickness insurance, for instance Great Britain, Norway, Finland and The Netherlands, in Sweden no such instrument is used (Gerner 2005).

Medicalization

The reasons for the increased levels of sickness absence and disability among the working age population are sometimes at least partly ascribed to medicalization of labor market or social issues rather than actual medical reasons. This is an internationally acknowledged development and can be illustrated by that the percentage of “inactive” people outside the labor market due to illness or disability within the European Union increased from 6,8 % in 1995 to 13,3 % in 2005 (OECD 2006). Another example of medicalization is when men with problems of often a multifactorial aetiology, not necessarily medical and thereby making employment difficult to obtain or keep, can be found supported by the sickness insurance with different psychiatric diagnosis (Upmark et al. 1999). The possibility of medicalization is also important to realize to find support for the multi-domain approach to sickness absence presented below. A model that centers on the individual decision to explain sickness absence must also accept the possibility of other factors than purely medical as reasons for absence. Medicalizing these non-medical factors, for instance social or economic reasons, could be a way for both the individual as well as society to rationalize the sickness absence. Part of medicalization is also that more and more “states” of everyday life is actually given a medical diagnosis which could then obviously have effects on sickness absence and disability retirement (Gerner 2005). The expansion of diagnoses in the
classification system DSM (Diagnostic and Statistical Manual of Mental Disorders) published by the American Psychiatric Association, from 106 in 1952 to 297 in the DSM-IV version from 1994, implies a gradual medicalization of psychiatric problems (Williams 2009). In turn this could be compared with the expansion of psychiatric diagnoses as the reason for sickness absence. In 1999 approximately 18 % of all sickness absence spells exceeding 60 days were due to a psychiatric diagnosis. In 2003 this share had increased to 30 %, where it stabilized and the same level was found in 2006 (Försäkringskassan 2007a).

In *table 1* medicalization is categorized as a pull factor in that the definition, or rather the broadening of the definition, of disability influences the individual decision to withdraw from labor market.

**Previous studies on risk factors for LTSA and determinants of RTW**

There is quite an extensive body of literature on risk factors on sickness absence. This is shown for instance in a literature review by Allebeck et al. (Allebeck & Mastekaasa 2004b). Sickness absence has been associated with health and other factors belonging to a number of areas of research. This confirms the multidimensional character of the problem. This thesis comprises studies that in one way or the other concern either risk factors for sickness absence or determinants of for instance work presence or return to work. Studies on RTW are naturally related to studies on risk factors for sickness absence. The terminology is somewhat different though. Instead of risk factors it is more relevant to talk about factors improving or counteracting RTW probabilities. In a review study (Andersson et al. 2003) an illustrative summary of such factors is presented focusing individual, work place and measures on a societal level.

Below some other studies relevant for this thesis and the risk factors of sickness absence or determinants of RTW brought forward are highlighted. The risk factors and determinants are categorised according to the model presented in *figure 4*.

**Social insurance system related risk factors**

On a social insurance system level, or what can also be compared to what has been described as a society or community level (Borg 2003), risk factors relating
to for instance institutions, organisation, design and application of the sickness insurance system can be found. This could be manifested for instance in economic incentives in form of benefit levels affecting sickness absence (Henrekson & Persson 2004; Larsson 2006). The introduction of a qualifying day into the sickness insurance has been found to affect absence behaviour (Voss et al. 2001a). Sickness absence has furthermore been associated with unemployment rates (Knutsson & Goine 1998) implying that the interaction between social insurance systems may also be of relevance when trying to explain sickness absence. Sick listing habits of physicians (Englund et al. 2000) affecting for instance the length of the absence spells is another typical example of a social insurance system related factor.

As for vocational rehabilitation and occupational health intervention at the work place level various effects on sickness absence and RTW have been noted. Multidisciplinary vocational rehabilitation programmes have been shown to improve work ability and RTW (Norendal Braathen et al. 2007). Workplace training as a VR-measure has been shown to be particularly effective with respect to labor market outcomes, i.e. RTW (Frölich et al. 2004). The effects from occupational health interventions are naturally largely dependent on the type of intervention in question. Both positive (Taimela et al. 2008) as well as no effects (Goine et al. 2004) on sickness absence and RTW have been reported.

Work related risk factors

Physical work environment in form of for instance uncomfortable working positions, heavy lifting have been shown to increase the risk of LTSA (Lund et al. 2006). The interaction of physical and psycho-social work environment factors was also in the same study considered as risk factors for women. Increased risk of LTSA due to heavy lifting has been shown also in other studies (Voss et al. 2001b), here together with complaints about monotonous movements in work.

Psychosocial work environment factors in form of low decision latitude at work has been associated with increased LTSA risks as goes for low social support (Melchior et al. 2003; Head et al. 2006). Physical and mental work demands higher than the own capacity were together with job strain found to be risk factors of LTSA (Vingård et al. 2005). Several other studied have also
associated job strain, i.e. high demands at work in combination with low control as risk factors for LTSA for both men and women (Kristensen 1991; Virtanen et al. 2007; Suominen et al. 2007). Job control related measures as adjustment latitude was found to increase both to part-time and full-time RTW (Johansson et al. 2006).

Low work satisfaction has been associated with LTSA (Eshoj et al. 2001). Perhaps more common are studies that found relationships between firstly shorter absence spells and work satisfaction (Marmot et al. 1995; Böckerman & Ilmakunnas 2008). Other work related risk factors for LTSA have been found in for instance overtime work (Voss et al. 2001b), gender dominated work places (Mastekaasa 2005; Evans & Steptoe 2002) or related segregated labor market (Hensing & Alexandersson 2004). Occupational or employer related risk factors in form of for instance vocational sector (Post et al. 2005), blue collar work (Bergström et al. 2007) and having a public employer (Labriola et al. 2006) are yet examples of risk factors for LTSA related work or the labor market. Strong predictors of RTW have been associated with vocation and vocational sector where for instance working in the educational sector (Post et al. 2005) and metal workers (Burdorf et al. 1998) have had negative impact on RTW.

Experience of workplace expansion as well as downsizing (Westerlund et al. 2004) have both been associated with increased sickness absence risks. Unemployment is also in several studies acknowledged as a risk factor for sickness absence (Knutsson & Goine 1998; Eshoj et al. 2001). Also work and family conflict resulting from a struggle to combine work and family matters have been shown to have clear relations with sickness absence (Jansen et al. 2006). This is a factor which could also have been placed under contextual factors below.

Ill health related risk factors

The relationship between ill-health and sickness absence is obvious. However ill-health can be manifested in a variety of ways. For instance previous and repeated sickness absence could be an example of reduced health and have been shown to predict further absence in several studies (Breaugh 1981; Dekkers-Sánchez et al. 2008; Koopmans et al. 2008). Also the longer a person is absent from work due to ill health, RTW probabilities diminish (Kivimaki et
Long absence spells, >90 days, are likewise associated with poor RTW chances (Borg et al. 2004).

Multiple or concurrent musculoskeletal problems as well as multiple health complaints in general could increase the risk of sickness absence (Nyman et al. 2007; Roelen et al. 2006). The association between different diagnosis or symptoms have also been examined in several studies. Often psychiatric and musculoskeletal problems are examined and found to be risk factors for LTSA (Sandanger et al. 2000; Savikko et al. 2001). Other examples of diagnosis/symptoms associated with LTSA are fatigue (Janssen et al. 2003), burnout (Borritz et al. 2006). In a study of patients with low back pain general health status showed to predict RTW (van der Giezen et al. 2000).

*Individual/Contextual risk factors*

Age and gender are often treated as confounders in studies on LTSA and RTW. Increasing age and female gender are generally associated with an increased risk of sickness absence (Labriola et al. 2006; Sandanger et al. 2000; Bratberg et al. 2002). Educational level or socio-economic belonging are individual factors often related to LTSA (North et al. 1993). Health behaviour as for instance smoking (Christensen et al. 2007) and related factors such as alcohol consumption (Marmot et al. 1993) and obesity (Vingård et al. 2005) are other examples of risk factors belonging to the individual sphere.

Contextual risk factors, i.e. a broad holistic approach, have been examined in several studies and associations with LTSA have been found for instance for family situation (Voss et al. 2008b) and early life determinants (Kristensen et al. 2007). Several studies have also reported a relationship between the concept of sense of coherence, SOC, and sickness absence where low SOC scores are associated to sickness absence and vice versa (Nasermoaddeli et al. 2003). A high level of life satisfaction and SOC have furthermore be shown to be predictive factors for RTW (Hansen et al. 2006).
Conceptual framework

A multi-domain approach to the sickness absence decision

The sickness absence situation in Sweden has been studied from a variety of academic disciplines as medicine, public health, economics, sociology and with different scientific approaches focusing the labor market, the individual, the work place, the social insurance systems etc. Alexandersson et al (Alexandersson & Norlund 2004b) describe a several of these studies in a number of review articles. This multi-faceted research area is likely to require a theoretical perspective integrating many explanatory approaches. Kristensen proposes requirements for an such integrated theory on sickness absence stating for instance that such a theory "...should be holistic, incorporating factors at all levels." and "...should consider the individual as a product of his or her environment and, at the same time, as a conscious actor who makes choices within a given social framework." (Kristensen 1991). Allebeck et al call for more theories on the medical aspects of the interplay between disease, work ability, and sickness absence. They mean that this is important since sickness absence by law requires that work ability is reduced due to disease or injury (Allebeck & Masteaasa 2004a). These statements incorporate to a large extent the intentions with the simple conceptual model of the “sickness absence process” that is introduced in figure 4 below.

Kristensen again categorizes studies on risk factors for sickness absence into five groups: [1] societal conditions (social insurance schemes, economic fluctuations, climate), [2] work place conditions (personnel policy, size, type of industry), [3] work environment (physical and chemical stressors, wage system, monotony of work etc.), [4] social conditions (marital status, social network etc) and [5] personal conditions (sex, age, personality type etc.) (Kristensen 1991). These five groups are similar to the different entities of the conceptual model in figure 4. This model constitutes a conceptual framework for the thesis and is presented as a means of linking the different approaches to studies on sickness absence behavior together. Similar illustrative models have been introduced by for instance Bäckman (Bäckman 1998), Labriola (Labriola 2006; Labriola 2008) and Steers and Rhodes in their Employee attendance process model (Steers & Rhodes 1984). The Steers and Rhodes model represents a broad scoped approach to explaining work absenteeism. It includes personal as well as work
characteristics, ability and motivation to attend work. Voluntary and involuntary absence are integrated into one model (Steel et al. 2007).

Having the individual decision between work and (sickness-) absence as its core, the model in figure 4 summarizes the factors and/or domains that influence this decision. How the individual perceives these factors related to different domains is central for forming the sickness absence decision. Describing ill-health and the complex sickness absence process through these broad domains is a deliberate simplification of reality. The relationship between the three domains and sickness absence is far more complex than what is captured by the model. The focus of the model is on work related factors, health related factors and social insurance factors. Left outside the “boxes” of the model but most likely directly or indirectly influential on the work vs. absence decision are what could be described as individual, collective and contextual factors.

These individual, collective and contextual factors are part of forming the individual response on the domains defined by the “boxes”. In the model in figure 4 they are referred to as individual settings. Individual factors that are relevant to sickness absence behavior could be exemplified by for instance demographic factors as age, gender but also factors as educational level.

Collective factors or values could be described as when your individual decision and behavior is not formed only by your own values but also on other people’s values and behavior or on the society as a whole. In this situation it applies to values and attitudes of people concerning for instance when or when not the sickness insurance can be used, and how the concepts of work capacity and sickness are formed and valued. The collective values are also formed by the environment (society) in which we are situated, i.e. the central parts of the model as labor market factors / work related factors and social insurance system factors.

Contextual factors represent the complete (complex) life situation of the individual. Increased or changed demands in working life as well as outside work could contribute to sickness absence (Jansen et al. 2006). A Norwegian study, (Bratberg et al. 2002), showed that the double burden for women with working life and family obligations could increase sickness absence, thus applying a gender perspective to explaining work absence due to ill health.
Contextual factors could also incorporate individual motivation, which is likely to be highly influential on the outcome of the absence decision unconditional on the source of the reduced work ability, being it work related, ill health-, or social insurance related. Individual motivation has for instance been shown to be significant for the outcome of the rehabilitation process (Thorstensson et al. 2008).

Social insurance factors are an important part of the model. These include primarily the construction of the social insurance system and inherent incentives for work or absence. The “attraction model” or pull-model has its natural belonging here. Social insurance system effects in form of organizational aspects could also be included here. How well interventions from social insurance institutions, for instance vocational rehabilitation or preventive work, perform in influencing the outcome in the sickness absence process is central to this part of the model. The administrative role of social insurance institutions could furthermore be described as a “gatekeeper” function (Söderberg & Alexandersson 2005) ensuring that only people eligible for compensation are the only ones who also receive the compensation. This gate keeping function can be performed by the social insurance agency as well as by physician. Selection into active measures as vocational rehabilitation is related to the gate keeping aspect.

Work related factors could in its turn be divided into several sub categories. Labor market factors which work at a more structural level, including for instance the push-perspective on labor market exit and possible effects from the level of unemployment. Occupational and work place related factors operate on a more individual level. Exposure to negative work environmental factors, employment conditions and forms are examples from this category. The influence on the sickness absence from work related factors on the decision is direct and also indirect through a possible influence on ill health.

Ill health or medical factors
The relation between ill-health and sickness absence is, or should be, obvious in that eligibility to sickness absence requires a medically certified reduction in work ability. Sickness absence has also increasingly been recognized as a measure of ill-health (Marmot et al. 1995; Kivimaki et al. 2003; Vahtera et al. 2004). However the relationship between ill-health, work ability and sickness absence is complex. Explanatory models based on medical factors are necessary not
only because ill-health generates sickness absence but also because sickness absence could contribute to and sustain disease (Allebeck & Mastekaasa 2004a).

**Overall perspective**

Thus building on knowledge on theoretical requirements and on the structure of previous research a plausible model of the sickness absence process could be as indicated in *figure 4*. The model provides an illustrative view of the overall perspective of the thesis. Three major “domains” of contributors, represented by the boxes, to the individual decision of work or absence are fitted into the model. In the studies that make up this thesis the contents of the boxes and their relation with each other and with the sickness absence decision are analyzed.

*Figure 4: A conceptual model over the sickness absence decision (model created by the author)*
The sickness absence process is described as being determined by several influencing domains, broadly defined as work-, health- and social insurance related factors. It should be realized that this process in itself has several dimensions. We consider three different aspects of sickness absence; factors leading to sickness absence, factors preventing sickness absence and factors leading back to work ability and work when being sickness absent. These three aspects are in the thesis referred to as sickness absence behaviour.
Aims of the thesis

The overall aim of the thesis is to elucidate decisive factors for explaining sickness absence and return to work.

The specific aims for the separate studies were as follows:

- To examine the long and short term economic incentives inherent in the sickness and unemployment insurances. In particular how the differences, in for instance benefit levels between the two systems, affect the duration and outcome of long term sickness for the unemployed. (Study I)

- To study factors influencing chances of returning to labor market after long term sickness absence with a stress related psychiatric diagnosis. Primary interest is on employer- and occupational categories as explanatory variables. (Study II)

- To examine the occurrence of predictors of work presence in general and in particular whether or not these predictors differ in relation to short and long term sickness absence (Study III)

- To analyze the importance of both medical factors as well as work related factors, physical and psychosocial, in the individual's sickness absence decision in a population of individuals with self-reported illness. (Study IV)

- To estimate the effects of vocational rehabilitation on the probability of improved work ability and the reintegration of program participants into the labor market. (Study V)
Materials and methods

The model laid out in figure 4 represents the conceptual framework for studying the questions raised through the aims of the thesis. The various aspects of sickness absence behaviour are studied primarily through the three domains of work, health and social insurance factors. Table 2 provides an overview on what aspects of sickness absence behaviour in relation to which domain that is discussed in each of the studies.

Table 2: How the studies relate to the conceptual framework in figure 4 and to the different aspects of sickness absence behaviour

<table>
<thead>
<tr>
<th>Domain</th>
<th>Aspect of sickness absence behaviour studied</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work related factors</td>
<td>Retained work ability</td>
<td>Study II</td>
</tr>
<tr>
<td></td>
<td>Preventing sickness absence</td>
<td>Study III</td>
</tr>
<tr>
<td></td>
<td>Leading to sickness absence</td>
<td>Study IV</td>
</tr>
<tr>
<td>Health related factors</td>
<td>Retained work ability</td>
<td>Study II</td>
</tr>
<tr>
<td></td>
<td>Leading to sickness absence</td>
<td>Study IV</td>
</tr>
<tr>
<td>Social insurance factors</td>
<td>Leading to sickness absence</td>
<td>Study I</td>
</tr>
<tr>
<td></td>
<td>RTW / Retained work ability</td>
<td>Study V</td>
</tr>
<tr>
<td>Individual settings</td>
<td>Preventing sickness absence</td>
<td>Study III</td>
</tr>
</tbody>
</table>

Study I

Data

The data of the study comprised a randomized sample of 280 individuals that were unemployed and had been sickness absent for more than 28 days at the time of the data collection. The data was collected during the period of February to June 2000 initially to be used in a regional research project on working life and ill health (Lundberg et al. 2002). This had the drawback that there were only a limited number of variables that were of use for the study.
The data consisted of 113 men (40%) and 167 women (60%). Information on age, diagnosis, sickness benefit amounts, unemployment benefit amounts the individual was entitled to and duration of unemployment prior to sickness absence was collected.

Information on the individual health state, being defined as whether or not the individual was still receiving compensation from the sickness insurance, was retrieved through register data for the actual state in September 2001. The possible outcome states were **Not sick registered, Still sick registered, Full disability pension, Partial disability pension, Old-age pension and deceased**. A total of four persons ended in old-age pension or being deceased. These observations were removed from the data.

**Method**

Two different regression models were used in the analysis with the same set of independent variables. First, a multivariate linear regression was performed on sickness absence duration as the dependent variable. The second multivariate analysis was a logistic regression with the outcome state in September 2001 as dependent variable. A non-healthy outcome was coded as 1 and a healthy outcome as 0 in the regression. A non-healthy outcome was defined as a person still being sick-listed or receiving full disability pension in September 2001. A healthy state was defined as no longer receiving sickness benefit or receiving partial disability pension. A healthy outcome also defined the end of the sickness absence spell used to calculate absence duration for the linear regression.

**Study II**

**Data**

The data set used in the study is retrieved from a larger data set consisting of all sick registered individuals in the county of Värmland, one November week in the year 2000. Inclusion in the data set required a sickness absence spell having a duration exceeding 28 days which at the time came to a total of 7,273 individuals. The data set was collected by the local social insurance office for original use in regional social insurance statistics (Lundberg & Matsson 2001). From this data all 911 individuals with stress related psychiatric disorders, based on primary diagnosis in the medical certificate, were selected for the study. The data consisted of 76.5% women and 23.5% men. The data was furthermore manually, through register data, supplemented with labor market data, previous
sickness absence history data and sickness insurance data as outcome statistics to the extent that was possible using the social insurance registers for the use in this study. Labor market data included for instance occupation, employer type and full or part time work.

The individual outcome status of the sickness absence, defined as receiving benefit from the sickness insurance or not, was followed up on an annual basis over a period of three years. On the third and final follow up a total of 18 individuals were either retired in an old-age pension or deceased. These individuals were removed from the data set.

Method
To analyze factors influencing the outcome of long term sickness a number of dichotomous outcome variables have been constructed. A logistic regression model was then applied to the data to explain the outcome variables. The outcome variables were constructed from the results of the outcome status variables at the second and third follow up occasion, i.e. approximately two and three years after the initial data gathering. The dichotomy healthy (coded as 1) and non-healthy (coded as 0) is then a result of whether or not the individual is still depending on the sickness- or disability insurance, not on the individual’s health in a strictly medical sense.

Logistic regression was carried out using two different models on both the second and third follow-up occasion. Interpreting partial disability as either a healthy or non-healthy outcome provides the two different models. Dependent variables were entered into the regressions in form of background data (age and gender), employer data, occupation type and medical information (previous sickness absence and multiple diagnosis).

Study III
Data
Survey data from the questionnaire, Liv och Hälsa (Life and Health) 2004 for the county of Värmland was used in the study. The survey had a response rate of 64.6 %. Taking a sub-sample from the data meaning removing individuals over the age of 65 or currently not working either as employed or self employed and individuals with missing data on sickness absence we were left with a total of 3 123 persons. In this material 58.8 % had no self reported sickness absence periods at all and 88.4 % had no sickness absence periods exceeding 28 days
during the preceding 12 month period. Sickness absence data was based on self reported absence in the questionnaire. The respondents reported how many days, if at all, they were absent from work due to sickness during the 12 months prior to the questionnaire. The options were 1-28 days, 29-59 days, 60-89 days and 90 days or more. They also responded to whether or not they had a consecutive absence spell exceeding 28 days.

**Method**

Multivariate logistic regressions using “positive odds ratios” (Ejlertsson et al. 2002) were applied in the analysis. This means that to the extent possible the explanatory variables were defined so that an odds ratio larger than one would be associated with a positive outcome of not being sickness absent in the dependent variable. Two logistic regression models with different definitions of the dependent variable were used. The difference between the models was based on the use of different control groups. In both analysis determinants of work presence was studied. The concept of work presence was operationalized as having no self reported work absence due to sickness during the preceding 12-month period. In the first regression this was compared to a control group of individuals who had sickness absence periods shorter than or equal to 28 days. The second regression had a control group with individuals with absence periods longer than 28 days during the same 12 month period. Predictors of work presence were examined mainly using individual background data such as gender, age and education, a number of primarily work related variables and an index of sense of coherence.

**Study IV**

**Data**

The 2004 Life and Health study was used. This is a health questionnaire distributed to approximately 68 000 individuals from five counties in central Sweden. The response rate was 64 %. From this material a subsample consisting of employed, i.e. not self- or unemployed, individuals in the ages of 18-64, i.e. normal Swedish working age, was drawn. This resulted in a population of 17 928 individuals.

Inclusion criterion for the actual study population was based on the occurrence of self reported illness in the questionnaire. Ill health and thereby the criterion for inclusion in the study was based on the questionnaire answers and scores on two different scales, the General Health Questionnaire (GHQ12) (Goldberg &
Williams 1988; Goldberg et al. 1997) and the Euroqol Quality of Life Scale (EQ5-D) (EuroQol Group 1990). Ill health was operationalized as individuals who at the time for the survey reported occurrence of minor psychiatric morbidity (GHQ12-score of 2 or higher) and/or diminished general health (EQ-5D less than 1). This meant finally ending up with a study population consisting of 10 536 individuals with both self reported physical and mental medical conditions.

**Study V**

*Data*

The data used in the study consist of information collected from five counties and a total of 67 social insurance offices located in western Sweden. The data is a sub-sample from the Riks-LS study carried out by the National Social Insurance Board (RFV). The complete material covered the entire country and included about 75 000 randomly selected cases of long-term sickness absence with an absence period of at least 60 consecutive days, observed during 1991-1994. The sample used in the study comprised 8 839 observations.

The dependent variables were defined on the basis of 1) VR-program participation and 2) outcome status at the end of the sickness absence period. VR participation was conditioned upon participating in work training or educational rehabilitation measures. The outcome status was modelled with two different variables depending on either a healthy recovery (no new sickness absence period exceeding 30 days within a six month period or not receiving full or partial disability pension) or return to work. Return to work was also conditional on a healthy recovery.

The rest of the data represent a wide variety of variables relating to for instance individual, socioeconomic and demographic factors, sickness absence records, labor market participation and actions taken by the social insurance office during sickness.

*Method*

A bi-variate probit model containing two simultaneous equations is used in the analysis of the data. In the first equation vocational rehabilitation program participation is estimated and in the other equation the outcome of the sickness absence spell is estimated. This method is applied to try to estimate possible VR-program effects on the likelihood of return to work and at the same time
controlling for the possibility of selectivity into the program. Case managers selecting program participants or self selection by participants on unobservable characteristics as for instance motivation are sources of such selectivity which could result in biased estimates of the program effects.

**Summarized information about the studies**

Table 3 contains summarized information about the studies. It is an overview of the characteristics of the population, outcome measures, how data was retrieved and later on analyzed.
Table 3: Characteristics of the data and methods used in papers I-V

<table>
<thead>
<tr>
<th>Paper</th>
<th>N</th>
<th>Age Study population</th>
<th>Diagnosis</th>
<th>Geographical area</th>
<th>Methods of data collection</th>
<th>Methods of data analysis</th>
<th>Outcome measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>280</td>
<td>18-64 Unemployed Sickness absence &gt; 28 days</td>
<td>All</td>
<td>County of Värmland</td>
<td>Register data</td>
<td>Multiple linear + logistic regression</td>
<td>Sickness absence duration, Healthy or non-healthy outcome</td>
</tr>
<tr>
<td>II</td>
<td>911</td>
<td>16-64 Sickness absence &gt; 28 days</td>
<td>Stress-related</td>
<td>County of Värmland</td>
<td>Register data</td>
<td>Multiple logistic regression</td>
<td>Work capacity</td>
</tr>
<tr>
<td>III</td>
<td>3123</td>
<td>18-64 Employed</td>
<td>All</td>
<td>County of Värmland</td>
<td>Questionnaire</td>
<td>Multiple logistic regression</td>
<td>Work presence</td>
</tr>
<tr>
<td>IV</td>
<td>10536</td>
<td>18-64 Employed, self reported illness</td>
<td>All</td>
<td>Five counties in Central Sweden</td>
<td>Questionnaire</td>
<td>Multiple logistic regression</td>
<td>Long term sickness absence</td>
</tr>
<tr>
<td>V</td>
<td>8839</td>
<td>18-64 Sickness absence &gt; 60 days</td>
<td>All</td>
<td>Five counties in Western Sweden</td>
<td>Register data</td>
<td>Bivariate probit analysis</td>
<td>RTW, Work capacity, VR program effects</td>
</tr>
</tbody>
</table>
Results

Study I
Can differences in benefit levels explain duration and outcome of sickness absence?

The objective of the study was to examine the long- and short term economic incentives within the sickness- and unemployment insurances. Linear and logistic regressions were carried out on regional sample of sick-listed and unemployed individuals.

The results point to that economic incentives, measured as differences in benefit levels, help in explaining the duration of sickness absence. When the difference in benefit level, generally in favor of the sickness insurance, is high this seems to create an incentive towards longer sickness absence periods. The results also suggest a preference for a long term economic stability using the sickness insurance, including the disability insurance, for income security in a situation where re-entry into the labor market is problematic. This was concluded through establishing that unemployment duration prior to sickness absence had a major impact on the outcome of the absence spell. The implication being that being further away from the labor market would induce a search for income stability through the sickness insurance. Short term economic incentives in form of higher benefits from sickness insurance was not believed to be the reason but rather the fact that the sickness insurance, including the disability insurance, did not have a duration limit for receiving the benefit.

Study II
Stress related sickness absence and return to labour market in Sweden

The purpose of study 2 was to analyze factors influencing return to work after long term sickness absence with a stress related diagnosis. Return to work was followed up on three yearly occasions. Logistic regression models were applied on register data for the county of Värmland, Sweden.

Age, unemployment, having multiple diagnosis and previous sickness absence display the strongest effects on return to work in the analysis. Employer and occupational categories seem to have no or only minor effects on return to
work for the study population. The time factor is found to be an important factor for the possibilities of returning to work after long term sickness absence. When the sickness absence exceed one year chances of returning to work diminish.

The study shows that age, gender and factors implying less favourable health characteristics and thereby lower work capacity reduce probabilities of returning to work after LTSA. This could support a labor market oriented model in push-perspective tradition to explaining sickness absence. However the predictors of a healthy outcome were not primarily related to employer or occupational category (indicating different sectors in the economy), which would be an important feature of the push-model. It is rather the individual factors discussed above that imply a marginalized position on the labor market which is in line with the push-model.

In accordance with the results from study I unemployment is strongly associated with a non-healthy outcome of sickness absence, thus a reduced chance of returning to the labor market.

**Study III**
**Predictors of Work Presence**

The objective of study 3 was to identify determinants of work presence, i.e. factors that counteract short and/or long term sickness absence. Determinants were identified using logistic regression analyzes on Swedish regional survey data. Analyzes were made for both men and women combined and in gender separate regressions.

The determinants of work presence varied between sexes and whether it was in relation to factors counteracting long or short term sickness absence.

Factors associated with counteracting short term sickness absence were, being in the higher age categories (45-54 and 55-64 years), being self employed, having a mobile non-physically strenuous work. Working overtime was associated with a higher propensity for sickness absence. Gender specific factors were observed in managerial position being a determinant of work presence for men, and a shorter (less than two years) post high school education being a predictor of sickness absence for women.
Factors counteracting long term sickness absence were instead found for the youngest age category (18-24 years), privately employed, individuals with full time work situation and with a high degree of work satisfaction. Moreover, a post high school education over 2 years was found to be a predictor of work presence for men and a low degree of sense of coherence (SOC) was a predictor of sickness absence for women.

Some common factors, i.e. factors counteracting both short as well as long term sickness absence were found for being of male gender and having a stationary non-physically strenuous work. Temporary employment and a high degree of SOC were found to be predictors of work presence for women.

Study IV
Illness and work as predictors of sickness absence in a population of individuals with impaired health

The purpose of this study was to analyze the importance of medical as well as work related factors, physical and psychosocial, in the individual's sickness absence decision in a population with self-reported illness. Cross-tabulations and multivariate logistic regression were used to capture the associations between ill-health, work related factors and sickness absence. The analysis was performed on Swedish regional survey data and was made in gender separate regressions.

Long term sickness absence was found to be related to the "level" of ill-health. A broad spectrum of work related factors were also found to be associated with sickness absence. The results were found to be very similar for both men and women. It was concluded that work environment factors in the form of for instance job strain, job satisfaction and physical work environment seem to be of utmost importance to explaining long term sickness absence within a population of individuals with impaired health. Thus even though it could be assumed that non-favourable working conditions in themselves could induce poor health, the working environment is also highly relevant for discriminating between individuals in risk of LTSA or not when ill health is already present.
Study V
Estimating the effects of vocational rehabilitation programs in Sweden

The study estimates the effects of vocational rehabilitation (VR) on the probability of improved health status and the reintegration of program participants into the labor market. Bi-variate probit regression models were used to study selection into VR-programs and outcome status for a sample of long term sick listed individuals from Western Sweden. Both the likelihood of restored work capacity, estimated in form of exit from sickness insurance, as well as return to work was found to be improved for VR-program participants in comparison to the control group of non-participants. The corresponding marginal effects, i.e. how much the likelihood was improved, were calculated to 12 % (work capacity) and 18 % (RTW) respectively. No evidence of “managerial creaming” aimed at increasing the rate of successful return to work, and as a result of selecting the right participants rather than due to the efficiency of the VR-program, was found in the study. Instead a selection of participants with presumably non-favourable characteristics for RTW such as low education, extensive sick leave and repeated sick leave was found.

The results indicate that vocational rehabilitation should be considered as a potentially effective instrument for improving the individual’s work capacity and thereby improving possibilities for returning to work after a sickness absence spell.
Table 4: Research questions, focus of the analysis and general results from the five studies.

<table>
<thead>
<tr>
<th>Paper</th>
<th>Research questions</th>
<th>Focus in the analysis</th>
<th>Results in general</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Long and short term economic incentives interacting between the sickness and the unemployment insurances. Push and Pull perspective.</td>
<td>Sickness absence duration, Healthy or non-healthy outcome after LTSA.</td>
<td>Difference in benefit levels between the insurances and duration of unemployment prior to sickness absence affect duration and outcome of LTSA respectively.</td>
</tr>
<tr>
<td>II</td>
<td>To study the influence of primarily work related factors on chances of retained work capacity/return to labor market. Empirical support of the Push-model.</td>
<td>Return to labor market. The data comprised individuals with LTSA due to stress-related diagnosis.</td>
<td>The studied work related variables had less influence on return to labor market than expected. Some support to a push-oriented model through variables suggesting a marginalized position on the labor market has negative effects on return to labor market.</td>
</tr>
<tr>
<td>III</td>
<td>Applying a salutogenic perspective on explaining LTSA.</td>
<td>Determinants of Work presence.</td>
<td>Factors preventing short term absence were interpreted as factors implying &quot;job control&quot;. Male gender, high education, work satisfaction, flexible employment, full-time work and working overtime prevented LTSA. High SOC prevented sickness absence for women.</td>
</tr>
<tr>
<td>IV</td>
<td>Why do some individuals with ill-health become LTSA while others manage to maintain their work ability.</td>
<td>Risk factors, in particular work related, for LTSA in a population with ill health.</td>
<td>The occurrence of LTSA is related to the &quot;level&quot; of ill-health. Psycho-social factors in form of job strain, work satisfaction, unsecure employment as well as physical work environment explained LTSA for the population.</td>
</tr>
<tr>
<td>V</td>
<td>How can the effects of VR be measured and the risk of sample selection bias be accounted for.</td>
<td>RTW, Work capacity, VR-effects.</td>
<td>VR is an important measure in as well restoring work capacity as promoting RTW. No evidence of managerial creaming is found in the process of selecting participants to VR-programs.</td>
</tr>
</tbody>
</table>
Discussion

General discussion

The primary aim of this thesis has been to study and investigate various aspects of sickness absence. Using a simple conceptual model as a frame of reference, figure 4, the influence of work-, medical-, and social insurance system related factors are examined and discussed in the five studies included. The studies confirm, to the most part, the influence of the different elements of this model on sickness absence behaviour. It is however not possible to single out one area or domain, with an accompanying set of risk factors, that would account for and explain sickness absence at large. The overall impression of the results rather reinforces the picture of the very complex and multidimensional nature of sickness absence and return to work. Rather than finding support for that any of the domains described in the model would have a dominating position in explaining absence behaviour it is the influence of many domains and possibly the interaction between them that contributes mostly to the understanding of sickness absence behaviour. This complex picture can also be illustrated by shortage of developed screening instruments for identifying individuals with high risks of becoming LTSA and in the longer run even risking a permanent exit from the labor market. Such instruments would be of potential use for both case managers at social insurance agencies for determining what actions and measures to be taken as well as for instance for employers. Some attempts to develop such instruments and predictive models have been made but with varying success (Taimela et al. 2008; Duijts et al. 2006; Flach et al. 2008).

Overall findings

The results of the studies can be summarized as presented in table 4. The table provides an overview on what domains that were analyzed in each of the studies and furthermore what risk factors or determinants that were associated, and statistically significant, with the outcome measure in question in form of sickness absence, work presence, work ability or RTW. Finally the directions, positive or negative (+/−), of these associations are presented.

The results summarized in table 5 show that a multiple model approach is necessary to better understand the nature of sickness absence behavior. In the five studies different theoretical approaches have been used. The analyzed
populations have varied both in terms of size as well as regarding the characteristics of the individuals included in each study. Different aspects of sickness absence have been studied; what determines entry into sickness absence, the length of the absence spells, work presence, return to work, recovery of work ability, effects of active measures from the social insurance agency. In sum it could be stated that different aspects of entry into and exit from the sickness insurance have been studied. The proposition that each of these domains would actually influence sickness absence behavior is verified by table 5. Risk factors for sickness absence and determinants of RTW are found for each of the domains and for each aspect of entry and exit from the labor market.
Table 5: Summary of results, risk factors for LTSA, determinants of RTW and work presence and direction of association (+/- representing positive or negative associations)

<table>
<thead>
<tr>
<th>Study</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome measures</strong></td>
<td>Absence duration, Non-healthy outcome</td>
<td>Retained work ability</td>
<td>Work presence</td>
<td>LTSA risk factors</td>
<td>RTW, retained work ability</td>
</tr>
<tr>
<td><strong>Work related</strong></td>
<td>Un-employment (+)</td>
<td>Un-employment (-), Employer (+/-)</td>
<td>Temp emple, self emple, private emple, full-time emple, management, work satisfaction, non-physically strenuous work (+) overtime work (+/-)</td>
<td>Job strain, Fear of losing job, low work satisfaction, public emple (+) Full time emple (-), Heavy lifting and noisy work environment (+)</td>
<td>Un-employment (-) Occupation (+/-)</td>
</tr>
<tr>
<td><strong>Ill Health</strong></td>
<td>Mental or musculo-skeletal diagnosis (+)</td>
<td>Previous absence (-), Multiple diagnosis (-), Sickness absence duration (-)</td>
<td>Psychiatric morbidity, Reduced general health, Symptoms (+)</td>
<td>Previous absence (-), Sickness absence duration (-)</td>
<td></td>
</tr>
<tr>
<td><strong>Social Insurance factors</strong></td>
<td>Benefit differences (+) Un-employment duration (+)</td>
<td>Voc. Rehab (+)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Individual settings</strong></td>
<td>Age (+)</td>
<td>Age (-), Male gender (+)</td>
<td>Age (+/-), Male gender (+), Education (+), SOC (+)</td>
<td>Age (+/-), Male gender (+), High socioec. status (+)</td>
<td></td>
</tr>
</tbody>
</table>
Some general conclusions can be drawn from the variety of studies and results. The results both confirm previous studies on risk factors for sickness absence and return to work as well as present some new findings. They also strengthen some aspects of sickness absence behavior where previous studies have not been altogether conclusive as to the effects of different factors. The effects from unemployment and ill health on sickness absence behavior are largely in line with previous results in that being unemployed does not provide any incentives in direction towards termination of the sickness absence spells. The same applies for that economic incentives matter for the absence decision. Furthermore, the effects of adverse working conditions also mostly confirm previous research.

Studies on Karasek and Theorell’s demand and control model and its relation to sickness absence are common when examining psychosocial work environment but the effect from job-strain, i.e. the combination of high demands and low control, on sickness absence only have limited support (Allebeck & Mastekaasa 2004b). Study IV strengthens the support for those studies proposing that job strain is yielding LTSA. The study population included only people with self reported health problems which is not the general case but similar results have been found in a population with psychologic distress (Virtanen et al. 2007). The case for associations between job satisfaction and LTSA is furthermore strengthened by the results from the thesis. Job (dis)satisfaction has often been mentioned in relation to primarily short term sickness absence.

Results pointing in other directions than previous research have mainly to do with gender and age. Gender and age are so commonly associated to sickness absence behavior that they are often treated as confounders in studies (Allebeck & Mastekaasa 2004b). Higher risk for sickness absence and less possibility for successful RTW is generally associated with female gender and increasing age. In study V retained work ability, defined in such a way as that work ability is assumed to have been retained when you are no longer receiving sickness benefit, is negatively associated with increasing age as expected. However when actual RTW is studied, the association with higher age is found to be positive. The reason behind this is only to be speculated about. Unemployed individuals are included in the study and unemployment was both higher and increased very rapidly during the period of the study (1991-1993) in the younger age categories (Starrin et al. 2000). This is a possible indication of stronger ties to
the labor market among older age-groups. A generally stronger tie to the labor market among older age groups could also imply stronger loyalty towards both employer and colleagues creating incentives for RTW. Also study III reveals some noteworthy results related to age. The focus of study III is determinants of work presence as a contrast to either short term or long term sickness absence. High age predicts work presence when set in relation to short term absence for both men and women. A similar reasoning as above including loyalty aspects and a stronger attachment to the labor market are possible explanations. The same pattern does however not apply for work presence in relation to LTSA. When (ill-) health issues become severe enough for it to render in LTSA, loyalty is probably not a strong enough reason to continue to go to work.

Study IV reported risk factors for LTSA for individuals with impaired health. Separate regressions were performed for men and women. The absence of gender specific results was noted. With the exception of some effects on LTSA from employer type (being employed by the state) for women the factors determining LTSA were very similar between gender. Thus when medical condition is controlled for, in this case by excluding the part of the population who had not reported any health issues, gender differences in risk factors for LTSA seem to be reduced. Other studies confirm this assumption in having shown a change in gender patterns for sickness absence concerning for instance prevalence of absence for a given health problem (Sandanger et al. 2000) and that the female excess in sickness absence is explained to a higher extent by a heavier burden of ill-health than from adverse working conditions (Laaksonen et al. 2008). The differences in sickness absence patterns between men and women are often ascribed to labor market conditions and in particular to the gender segregated labor market. The division of gender between vocational sectors has women more often working in sectors related to education, health care and other caring occupations. This could expose women to risk factors for LTSA as for instance attendance requirements, emotional engagement in work relations and constant threats of downsizing (Hammarström & Hensing 2008). Also being in a minority when entering a male dominated work place could increase adverse exposure to for instance discrimination and feeling of loneliness (Lidwall & Marklund 2006).

Even though not specifically addressing the gender issues, this thesis could still contribute some to the understanding of the gender differences in work related
sickness absence. Differences in risk factors between men and women seem to be primarily related to ill health and not an indication of that men and women would respond differently to ill-health in terms of work absence. Also study III points to some noteworthy gender differences. Of most interest is perhaps that a high level of sense of coherence is an indicator of work presence, preventing sickness absence, primarily for women. The absence of a relation between SOC and sickness absence for men but for women has been observed previously (Kivimäki et al. 2000). Where women and men have their support networks have been used as an attempt to discuss gender differences as to the influence of SOC on disability pensioning (Kaiser et al. 2006). If women have their support network to a higher extent in private life than in working life compared to men this could certainly act as a disincentive for work. Gender differences in SOC in relation to sickness absence is however an area that needs to be further studied.

Some aspects of the social insurance related factors have been studied, primarily in study I and V. The results point to that significant effects on sickness absence behavior can be found through this approach or model. It is important to realize that only a very small fraction of all possible models of explanations fitting into the “social insurance system model” have been examined here. Here we address mainly the interaction between different transfer systems, economic incentives and the effects of vocational rehabilitation. Vocational rehabilitation is in itself a vast research area where different types of programs (Marnetoft et al. 2001; Frölich et al. 2004), responsibility of initiating rehabilitation and early intervention or not is highly relevant to successful RTW or not (Marnetoft & Selander 2002). We have not either looked into the welfare policy level where the legislation on social and sickness insurance is formed. Insurance elements as waiting days before payment of benefits have been introduced and changed. Measures to privatize, or semi-privatize, parts of the sickness insurance have been made through making the employer responsible for compensating income loss due to sickness, i.e. sick pay, during the initial period of the sickness absence (Johansson 2004). The regulations on sick pay have also been altered back and forth. The background for making these welfare policy changes has essentially been to reduce work absence due to ill health, and it is also likely that the changes have had a major influence on sickness absence behavior depending on for instance economic incentives. In spite of giving the social insurance system model relatively little attention in this multi-domain approach it must therefore not be dismissed as less interesting or
important in explaining sickness absence behavior. However the results that
give rise to the strongest statements to be made about sickness absence
behavior stem from the health- and work related models of explanation.

Main findings
In short it can be stated that risk factors and determinants associated to the
health domain appear to be among the most relevant for explaining absence
behavior whatever approach chosen. Secondly concerning the work related
model of explanation it appears that various aspects of employment conditions
influence sickness absence mostly. Both health and employment related factors
could accordingly be an indication of the strength of an individual’s attachment
or position on the labor market. Sickness absence behavior is thereby largely
determined by both health and work related factors and the interaction between
the two.

Discussed more explicitly and starting from the health related domain, multiple
diagnoses were found to be negative for the chances of retained work ability.
Mental and psychiatric diagnoses were also strongly associated with sickness
absence duration and a non-healthy outcome and the degree of self reported ill-
health was found to be related to the occurrence of LTSA. Moreover, both the
occurrence of previous LTSA as well as sickness absence duration had negative
effects for both RTW and retained work ability. In this we have elements from
all three aspects of ill health earlier discussed and described in figure 3. A
medically certified diagnosis representing the Disease-dimension, self-reported
ill-health representing Illness, and finally the sickness absence history
representing Sickness.

Thus many examples from this thesis can be found suggesting that health
related explanatory factors should be treated as highly significant in explaining
LTSA and chances of RTW. One could however also suspect that the results
referring to the health domain and the impact of health related factors originate
in medicalization of actually non-medical factors. Even though illness and
sickness are measures of people’s perceived health situation, in the theoretical
framework it is possible that the health situation originates in non-medical
push- and pull factors and the possibility of medicalization even when it comes
to actual certified diagnosis has also been discussed.
This allows for some wider interpretation where medical issues could also favor a labor market oriented model of explanation. Such an interpretation was also discussed in paper II where the results pointing in the direction of a health based model of explanation were discussed in relation with the push-model. The sickness role adopted by the individual manifested in the sickness absence history, and strengthened by the perceived ill-health, has the effect of separating the individual from the labor market for longer periods of time through LTSA. In the worst case this has the potential to place the individual in a marginalized position on the labor market. A mismatch of, the changing and higher, labor market demands and the work supply offered is a possible result. This is then quite in line with the theories behind the push-model. A far going reduced work capacity is established through ill health, often through both repeated and long sickness absence spells and multiple problems. The, gradual, loss of connection or attachment to the market in general or to the work place, and thereby with changes taking place as for instance organizational or technological, enhances the vulnerability and marginalization of the group. The fact that unemployment consistently, in three of the studies (I, II and V) is found to discourage retained work ability and RTW support this interpretation. Having a marginalized position on the labor market does not create incentives out of the sickness insurance. It rather pushes individuals into benefit dependency due to the mismatch of supply and demand.

A “true” push perspective, as discussed earlier takes its theoretical departure in the structural changes on the labor market and centers on industrial branches. It could therefore be expected that different occupations or occupational categories together with different employer types should be of relevance in our findings. However the effects on sickness absence behavior from these types of explanatory variables are not that straightforward and significant. Instead variables related to the employment situation provide a clearer picture. Again the results from for instance studies III and IV can be interpreted in such a manner that the individual's labor market position is crucial for sickness absence behavior. Work satisfaction, being in a managerial position, full time employment, high educational level and even self employment suggest a relatively strong attachment to the labor market, and hence enhance work presence. Perceived adverse working conditions (physical or psycho-social), low work satisfaction and fear of loosing job are indications of a non-preferable job situation and risk factors for LTSA. Either directly or through having negative health effects this could result in a weakened labor market position.
Policy implications

In more or less all of the domains, work, health and the social insurance domain, risk factors for sickness absence or factors relevant for return to work were found that also have the implication that it is possible to influence these parameters. However, how we choose to apply these and other research results are to a high extent dependent on which path is chosen for the future of Swedish welfare policy. The Swedish sickness insurance is an important and substantial part of a comprehensive social insurance system. The high levels of sickness absence are posing a threat to the welfare state. Changes in regulations and stricter application of the rules are relatively simple and effective ways of reducing sickness absence. Finding other ways of reducing sickness absence is essential if preserving the Swedish welfare system is on the agenda.

Changes in regulation with the purpose of affecting incentive structures in favor of work seem to be a path that is efficient for reducing sickness absence and disability retirement. This path could however have at least two serious side effects. First, this can be seen as a step in dismounting the social welfare system. Second, a risk of only moving individuals to other forms of support within the system exists, for instance the unemployment insurance and/or social welfare. This is a phenomenon that has sometimes been described as communicating vessels. There is also some empirical evidence to the existence of communicating vessels within the social protection systems in Sweden (Goine 2006). The interaction between the different parts of the social insurance system could in some cases also be related to the previously described gatekeeper function of the welfare institutions. This is an illustration of almost the opposite of communicating vessels. Individuals have been found not to fit into eligibility criteria of any relevant system, i.e. sickness or unemployment due to strict gate keeping and/or discrepancies on how to interpret regulation (Eriksson et al. 2008a). The financial support of these individuals becomes problematic and in the longer run even increased poverty among certain exposed groups could be at risk. This is a recognized problem and measures to counteract marginalization of individuals have been taken in form of strengthening possibilities of interorganizational integration and financial coordination between authorities. The performance in terms of bringing people closer to the labor market after implementing these organizational opportunities has yet to be further evaluated. However some studies have shown that both from an organizational perspective (Wihlman 2009) and when
looking at effects (Hultberg et al. 2006) it has not been unproblematic to effectively co-ordinate the work from different authorities.

Vocational rehabilitation, i.e. improving return to work possibilities, and preventive work would be the alternative way to proceed when the objective is to maintain or develop social insurance rather than dismounting. This pathway is linked to both the domain of work related factors as well as social insurance system related factors. It has been shown in this thesis that vocational rehabilitation measures could be an effective way of improving people’s work ability and bringing them back to work. Producing reliable results on the effects of VR-programs, and labor market programs as such, is and will however probably always be afflicted with great methodological difficulties.

Both exposures to physical as well as psychosocial work environment factors seem to have influence on sickness absence. Providing opportunities for employers to improve working conditions and promoting work satisfaction would be yet another way of trying to reduce work absence due to ill health without reforms posing threats to the social insurance system.

The risk factors not represented by any of the domains in the model in figure 4, the individual settings, are also of interest for policy implications drawn from the studies. Especially factors related to home/family and gender issues. However the need for future research is necessary. To what extent, if at all, and how would increasing gender equality in working and home life (and social insurance system) reduce work absence due to ill health? A significant portion of women’s absence could most likely be ascribed to inequality reasons.

Methodological considerations

The methods applied in the studies are discussed in the separate papers and are not repeated here. However some more general aspects of methodology could be elaborated on. One such general area is the use of significance levels in studies I, II and V but in particular the implications they have in study I. The choice of significance levels in quantitative research is associated with the risk you are willing to take of drawing conclusions about statistical relations between variables when in reality there are no such relations, i.e. type I errors. Traditionally three different levels of significance are used in most quantitative studies, p< 0.05; p< 0.01 and p< 0.001. P< 0.05 represents the highest risk of
making a wrong decision you are willing to take, where \( p < 0.05 \) states that the risk is less than 5 \% etc. In studies I, II and V \( p < 0.1 \) is used as the highest risk or lowest level of significance which may seem somewhat unorthodox however not unique especially in economic literature. Some studies from research areas related to this thesis using \( p < 0.1 \), or 10 \% significance level for determining if a parameter estimate is significant or not could be found both from the field of economics as well as for instance sociology (Böckerman & Ilmakunnas 2008; Osterkamp & Röhn 2007; Hogelund & Holm 2006; Furuåker & Blomsterberg 2003; Hesselius 2007; Aakvik 2001).

In study I major conclusions were drawn on parameter estimates significant only at the 10 \% level. For study II and V higher significance was achieved for factors contributing to the main findings. Thus the relatively low significance of the parameter estimates should be considered when interpreting the results from especially study I and comparing them to the results from other studies.

*The measurement of sickness absence and RTW*

There are no standard definitions of short and long term sickness absence. Variations in “cut-off point” between the two range in different studies from 3-7 days (Head et al. 2006; North et al. 1993; Nasermoaddeli et al. 2003; Roelen et al. 2007) to 28-30 days (Vingård et al. 2005; Alexandersson et al. 2005) and even up to approximately 60-90 days (Lund et al. 2006; Eshoj et al. 2001; Westerlund et al. 2004). This of course means that also the risk factors for LTSA may vary according to what definition is used. This must be kept in mind in the general discussion and comparison between results. Much due to the Swedish legislation, for instance requirements of a special doctor's certificate from day 29 (Socialdepartementet 2003), absence spells exceeding somewhere from 28-30 days have become if not a formal definition at least a commonly used cut-off point for LTSA within Swedish research. This contributes to making comparisons between studies easier and more relevant.

Part time sickness absence also constitutes a methodological problem. The difference between being on sick-leave 25, 50, 75 or 100 \% of ordinary working hours needs to be considered when summing up the length of absence spells (Hensing et al. 1998). A similar problem relates to how sickness absence periods are ended. In some cases a partial return work in combination with a continued partial sickness absence or partial disability pension is possible. This
problem is relevant for the studies in this thesis that addresses RTW issues, i.e. studies II and V. In study II, whether or not the absence spell was ended in a partial disability pension or not was considered. It did not turn out to have a major influence on the results.

Other measurement problems related to sickness absence is the possibility of sickness presenteeism. This has been discussed in study III where factors determining work presence were analyzed. Not being able to control for individuals who are present at work despite being ill, due to for instance loyalty to employer or colleagues, we will not be able to get unbiased estimates of predictors of healthy work presence.

Operationalization and definition of RTW and retained work ability has other methodological problems than how to treat and value partial recovery. Despite the vast amount of studies on RTW there is no consensus as of the definition (Pransky et al. 2005). For instance what could turn out to be a premature RTW is possibly included as successful RTW in many studies. Premature RTW could be because of for instance fear of losing job or financial strain of being sickness absent (Labriola 2008). Some consideration to this problem has been taken in study V of this thesis where RTW and retained work ability is only evaluated after a period of six months with no new cases of LTSA.

Data

The regional/local character of the data used in three of the studies opens up a question on whether or not it is possible to generalize from the results obtained. Studies I, II and III use data that is collected for the county of Värmland alone. The existence of regional differences in sickness absence patterns in Sweden has been established and the reasons as to these differences are believed to originate from a variety of factors such as age and gender distribution, labor market opportunities and people’s attitude towards work and sickness insurance (Marnetoft et al. 2007). There is therefore some risk involved with drawing general conclusions about risk factors for LTSA and determinants of RTW on the basis of regional or local data. Study IV and V use data stemming from larger geographical areas. Also in study V geographical differences are controlled for in the analyzes. The interpretation of the results from study V in comparison to the remaining studies give no indications on that the results based on local data should give rise to wrongful conclusions.
Both studies III and IV take the use of self reported data on health, sickness absence and work related factors in the analysis. Various forms of bias in the data could arise from self reported data. As for sickness absence and self-reported data, memory- and recall bias could possibly lower the quality of the data, in comparison to register data, in that dates and durations of the absence spells could be remembered incorrectly. Both studies on international and Swedish data show however that there generally is a good agreement between self-reported and register data on sickness absence (Ferrie et al. 2005; Voss et al. 2008a). Also in relation to work environment factors and sickness absence, self reported data could be potentially problematic. A risk of over-reporting poor work environment, physical and psycho-social, could be associated to ill-health and sickness absence. The reason possibly being to justify the state of health or being sickness absent. Opinions on the magnitude of this risk of over-estimating are not uniform neither being it in relation to physical nor to psycho-social work environment (Aittomäki et al. 2008; Waldenström et al. 2003).

Validity of psychiatric diagnoses

Some attention should be given to the validity of the diagnoses examined in study II and the possible consequences for the interpretation of the results due to validity issues. Two remarks could be made regarding the definition of the population as LTSA with a stress-related diagnosis. The first remark addresses the definition of stress-related diagnosis and whether or not this is well specified enough. The second remark is in relation to only using the primary diagnosis in the medical certificate as an inclusion criterion for the study population. The study was based on secondary data. The design of the data collection, including how diagnosis subgroups were defined, was thereby decided outside the scope of the study. Even though, the validity aspect of the diagnoses deserves to be discussed.

The study was carried out in a time of strong expansion of sickness absence due to psychiatric disorders. Stress related disorders and burnout were increasingly associated to sickness absence (Eriksson et al. 2008b). An increasing interest in being able to separately analyze this diagnosis subgroup arose within the social insurance administration and a data gathering for this purpose was initiated in the county of Värmland in the late 1990’s (Lundberg & Mattsson 2001). This is the origin of the data material used in study II. The study included diagnoses related to stress, burnout and fatigue (exhaustion); those being the key-words searched for in the medical certificates. Although not explicitly stated this
implies that beside those with a specific burnout diagnosis those with a
diagnosis from the F43 section (Reactions to severe stress, and adjustment
disorders) in ICD-10 (International Classification of Diseases) were included in
the study. Thus the population is in that sense relatively well defined even
though a stricter definition would have enhanced comparability to other
studies.

The explanations for the expansion of sickness absence due to psychiatric
disorders have varied. The reasons have been attributed to for instance
increased knowledge about psychiatric disorders (Stansfeld et al. 1995), changes
in attitudes towards psychiatric disorders implying less stigmatization (Hensing
et al. 2006). Thus this was a time of changing diagnosis patterns. It is possible
that the study would have improved from including stress related diagnoses also
when occurring in secondary diagnoses in the medical certificate. Alternatively,
since a longitudinal design was used, indication of stress in a secondary
diagnosis at baseline could be followed over time to see if it later in the absence
spell appeared in the primary diagnosis. Both these options would possibly have
increased the sensitivity of the diagnosis.

_Causality_

Discussing causal relations in studies with a cross-sectional design is
problematic. The use of longitudinal designs makes the possibility of drawing
conclusions on causal relationship more feasible. However a longitudinal design
does not automatically allow for drawing causal conclusions (Taris & Kompier
2003). Two studies in this thesis, II and V, have a longitudinal dimension to the
data. An illustration of the problem of cross-sectional design and causality
assumptions can be made in reference to for instance study IV where the
relationships between ill health, LTSA and work environmental factors were
examined. We found strong indications of such associations but it is not really
possible to draw any conclusions as to what initiates which process, i.e. what is
cause and what is effect. Ill health can cause sickness absence but it is also
possible to assume that LTSA can cause ill health (Ferrie et al. 2009). We found
associations between LTSA and the work environment for individuals with self
reported ill health. Possibly the ill health and later LTSA was induced by poor
work environment. However since there is also a possibility of LTSA
generating ill health caution about making statements on causal relationship
between LTSA and work environment must thus be exercised.
The order of succession of the studies

Study V, even though placed last in the sequence of studies included in the thesis, was actually carried out first. The study concludes that vocational rehabilitation is a potentially effective measure of restoring the work capacity of individuals. The primary focus of the study included to explore the possibilities of actually capturing possible VR-effects considering the methodological difficulties of such an endeavour. In retrospect several aspects of the results from the other four studies would have been interesting to include in a continued study on VR-effects. To proceed with the VR-study including interaction effects between VR participation, different VR programs, and different characteristics of the participants would have been natural. In this way we could explore not only if there are positive VR-effects but also what individuals that would gain mostly from participation. Aspects that have turned out to be important factors in understanding sickness absence behaviour such as job stress, sense of coherence, levels of physical and psycho-social ill health could be studied in relation to vocational rehabilitation. To improve knowledge about what would be the most efficient measures/interventions for individuals under different conditions would have been valuable to improve the active labor market policy.
Conclusions

When summarizing the findings of the studies in the thesis we can conclude that economic incentives both in the form of benefit levels and long term economic security are important determinants to the outcome of the sickness absence decision. This indicates that changing the incentive structures within the welfare systems is likely to be an effective policy tool for influencing absence behaviour. Further we see that being in a marginalized position on the labor market, being it due to adverse health conditions or being distanced from work through long absence spells or unemployment, does not in any way promote RTW. On the other hand we also find that participation in VR-programs have positive effects on both work ability and RTW. This suggests that a welfare policy such as supporting and improving active measures in contrast to merely changing the incentive structure of the sickness insurance system or implementing “gate-keeping” reforms such as narrowing eligibility criteria etc, is also an accessible way to influence sickness absence behaviour. The studies furthermore indicate that supporting preventive work in the form of work environment improvements, physical and psycho-social, and health promotion at the work place level should also be potentially effective in reducing work absence due to ill-health.

This thesis shows that we need different models and approaches to improve knowledge about the various aspects of sickness absence as entry into absence, return to work, or into disability retirement. Simply stated it could be described as a multiple complex of problems will not surrender to simple solutions. The results have the implications that sickness absence behaviour can be influenced. Largely depending on what long term path is chosen for welfare policy at the political level it should be acknowledged that other means than reduction of benefit levels and narrowing the eligibility criteria for the insurance benefits are at hand.
**Future research**

In the light of major changes to the sickness insurance system, especially regarding eligibility criteria, the levels of sickness absence have been reduced in Sweden. The long term effects on labor supply is however yet to be seen. Drawing on the results and conclusions from this thesis the possibilities of preserving the traditionally high levels of social protection in the Swedish welfare state is dependent on not too extensively dismounting today's levels. To find alternative solutions to this ongoing development future both basic as well as applied research should focus:

- Further evaluation of the effects to be able to improve rehabilitation measures and inter-organizational co-ordination.
- Further identifying physical and psycho-social work environment risk factors for ill health and sickness absence, and how to promote a development to improve work environment.
- What constitutes jobs for individuals with reduced work capacity and how can they be created in today’s labor market.
- Reducing the possibilities of financial support through the sickness insurance could increase the usage of other benefit systems. Further studies on benefit systems acting as communicating vessels should be encouraged.
Sammanfattning


Syfte: Det övergripande syftet är att belysa möjliga avgörande faktorer för att förklara orsakerna till sjukfrånvaro. Tre olika aspekter av sjukskrivning behandlas, faktorer som leder till sjukskrivning, faktorer som motverkar sjukskrivning och faktorer som leder till att arbetsförmågan återfås och sedan återgång i arbete. Detta görs utifrån en referensram innefattande relativt breda definitioner av områdena arbets-, medicinsk- och socialförsäkringsrelaterade faktorer.

variat probitregression med fokus på den arbetslivsnriktade rehabiliteringens effekter på återgång i arbete.

**Resultat:** Resultaten från studie I tolkades som att såväl kortsiktiga som långsiktiga ekonomiska incitant har betydelse för utfallet av en sjukskrivning genom interaktion mellan olika socialförsäkringsystem. De huvudsakliga fynden från studie II är att ålder, kön och faktorer vilka implicerar mindre fördelaktiga hälsoförutsättningar och därigenom lägre arbetsförmåga försämrar möjligheterna till återgång i arbete efter långtidssjukskrivning. I studie III befanns bestämningsfaktorer för arbetsnärvart variera mellan kön o och beroende på om arbetsnärvarto sågs i förhållande till lång- eller korttidssjukskrivningar. Faktorer vilka tolkades som jobb-kontroll motverkade korttidssfrånvaro. Känsla av sammanhang befanns vara en bestämningsfaktor för arbetsnärvarto för kvinnor. I studie IV hittades samband mellan sjukskrivning och nivån av ohälsa. Därutöver fastställdes att arbetsmiljöfaktorer som spända arbetssituationer, arbetstillfredsställelse och fysisk arbetsmiljö var viktiga faktorer för att förklara sjukfrånvaro i en population med nedsatt hälsa. Resultaten från studie V indikerar att arbetslivsnriktad rehabilitering är ett potentiellt effektivt instrument för att förbättra individens arbetsförmåga och möjligheter för återgång i arbete. Ett viktigt resultat var också att det inte fanns några tecken på att selektering av rehabiliteringsdeltagare skett av dem som troligen haft goda möjligheter att återgå i arbete med eller utan rehabiliteringsåtgärder.

**Slutsatser:** Denna avhandling påvisar att vi behöver olika förklaringsmodeller för att öka kunskapen om de olika aspekterna av sjukskrivning såsom vägen in i sjukfrånvaro, återgång i arbete eller till sjukersättning. Den visar också på att sjukfrånvarobeteende kan påverkas. I mycket beroende på vilken långsiktig väg som väljs för välfärdspolitiken så bör det uppmärksammas att det finns andra medel än att sänka ersättningsnivåer och skapa svårare berättigandekriterier för ersättningsämna till hands, exempelvis verka för såväl förbättringar av arbetsmiljö och som för rehabiliteringsåtgärder.

**Nyckelord:** Sjukskrivningar, återgång i arbete, arbetsförmåga, arbetsrelaterade faktorer, psyko-social arbetsmiljö, hälsorelaterade faktorer, socialförsäkringsrelaterade faktorer
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Sickness Absence in Sweden

The high levels of sickness absence and disability pensioning experienced during the 1990’s and 2000’s have become both socially as well as financially burdensome for society. Sickness absence implies a costly loss of production and many individuals are at risk of becoming marginalized on the labor market. Sickness absence is both a public health and an economic problem and it is urgent to increase knowledge about what influences individual behaviour related to sickness absence and return to work.

The aim of the thesis is to elucidate the decisive factors for explaining sickness absence. Three different aspects of sickness absence are considered; factors leading to sickness absence, preventing sickness absence and leading back to work. A frame of reference involving broadly defined areas of work, health and social insurance related factors is used.

The studies included cover, how economic incentives matter for the outcome of sickness absence, what determines return to work for individuals with a stress related diagnosis, determinants of work presence, risk factors for long term sickness absence for individuals with impaired health, and the effects of vocational rehabilitation on return to work.

The thesis shows that we need different models and approaches to improve knowledge about aspects of sickness absence as entry into absence, return to work or into disability retirement. It has the implication that sickness absence behaviour can be influenced. Largely depending on what long term path is chosen for welfare policy, it should be acknowledged that other means, improving working conditions and promoting rehabilitation, rather than reducing benefit levels and narrowing the eligibility criteria for the insurance benefits are at hand.