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E-mail address: Thomas.Leoni@wifo.ac.at
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Differences in sick leave between employed and unemployed workers: What do they tell us about the health dimension of unemployment?

Thomas Leoni*

Austrian Institute of Economic Research WIFO
P.O. Box 91
A-1103 Vienna (Austria)
Phone: + 43-1-798 26 01 – 215
E-mail: thomas.leoni@wifo.ac.at

Abstract:

Unemployed workers suffer from poor health conditions, a fact which is documented by a large number of studies covering objective health measures, satisfaction with health status and mortality. This paper contributes to the literature with an empirical analysis of sick leave micro-data from Austrian social insurance agencies. The data represent an interesting source of information because in Austria both employed and unemployed workers are entitled to sickness benefits and both groups are subject to almost identical sick pay regulations. Aggregate statistics show that the unemployed spend close to 9% of their time on sick leave, against an average of 3.4% for the employed. Further evidence indicates that they report much longer illness spells and a higher number of hospitalisations. Both selection and causation effects can help to understand this large gap in health outcomes. Workers who become unemployed had markedly higher absence rates in employment than fellow workers who stay in employment. This difference, which can be interpreted as an approximation for the selection effect, accounts for roughly half of the observed gap in sick leave rates between the employed and the unemployed. On the other hand there exists a positive albeit non-linear relationship between sick leave and unemployment duration, corroborating the view that unemployment impacts health negatively. In accordance with previous studies I find that the unemployed suffer very often from mental disorders. Although women have a higher incidence of mental disorders than men in both employment and unemployment, it is unemployed men who experience the sharpest increase in mental problems in the wake of unemployment.

JEL classification: J64 (Unemployment), I10 (Health)

Keywords: unemployment, sick leave, sickness, health, social insurance data

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Introduction

It is well-known that the unemployed as a group are characterised by a high concentration of health problems when compared to the rest of the working age population. In the social sciences, the link between health and unemployment has a research tradition dating back to the pathbreaking work by *Jahoda, Lazarsfeld* and *Zeisel* (1933) on the "Unemployed of Marienthal". Over the past three quarters of century a vast literature spawning the medical, psychological, sociological and economic disciplines has developed. The topic is still characterized by a high relevance for scientific community and policy-makers alike. This is particularly true in light of the sharp rise in unemployment across the world in the wake of the recent world economic crisis.

The health dimension of unemployment has been studied using a number of different indicators, including subjective health assessments, measures of life satisfaction and objective data on hospitalisations and mortality. The present paper aims to make a contribution to the existing literature by investigating the link between health and unemployment using Austrian micro-data on sick leave. In Austria social insurance institutions collect data on sick leave periods of unemployed persons, thus enabling to observe frequency, duration and medical cause of illness spells. Sickness absence statistics represent a precious source of information because in Austria both employed and unemployed workers are entitled to sick pay and both groups are subject to almost identical rules and regulations. Aggregate statistics published by the Austrian Federation of Social Insurance Agencies reveal that the unemployed spend much more time on sick leave than the employed (see section 1). Not only is the absence rate of the unemployed (i. e. their average number of sick leave days in the course of the year) more than twice as high as the absence rate of employed workers. It has also been increasing considerably over the course of the last two decades, whereas absenteeism due to sickness has been declining among the working population. The main objective of this paper is to investigate the high incidence of sickness in unemployment (and therefore the poor health status of the unemployed). In second place, also the question why sick leave in unemployment has markedly increased over the last decades shall be addressed.

With respect to the first question, two main hypotheses have emerged from the literature and will be discussed at some length in section 2 of the paper: On the one hand, the health gap between employed and unemployed persons can be ascribed to selection mechanisms, whereby persons with poor health (and high absence rates) face a higher risk of unemployment (selection hypothesis). At the same time, unemployment can have a negative

impact on health and be the cause of more frequent and longer illness spells (causation hypothesis). Structural and institutional aspects encompassing the labour market as well as social policy are of relevance to interpret changes in sick leave over time.

As the results of the empirical analysis presented in section 4 will show, the selection effect accounts for roughly half of the absence rate differential between employed and unemployed persons. The remaining fraction of this differential can at least in part be attributed to the existence of health deteriorating effects in unemployment. In particular, empirical results reveal a sharp increase in the incidence of mental disorders in the course of long-term unemployment spells. These findings carry important policy implications, because they highlight the necessity to intervene with preventive measures targeted at improving the health situation of workers long before these persons find themselves stuck in long-term unemployment.

1 Sick leave in unemployment – an overview of the Austrian situation

Statistical data provided by the Federation of Austrian Social Insurance Institutions (*Hauptverband der österreichischen Sozialversicherungsträger*) show that in 2008 the unemployed reported a total of 8.7 million days of sick leave. This figure is more than three times higher than in the year 1990, when the social insurance agencies counted 2.8 million sick leave days attributable to unemployed persons. It is important to point out that the definitions which underlie the collection of sick leave data are characterised by some peculiarities. Social insurance statistics data contain information on sick leave spells for all individuals who are entitled to receive sickness benefits and who do actually report illness episodes to their general practitioner (who then passes on the information to the social insurance agency).

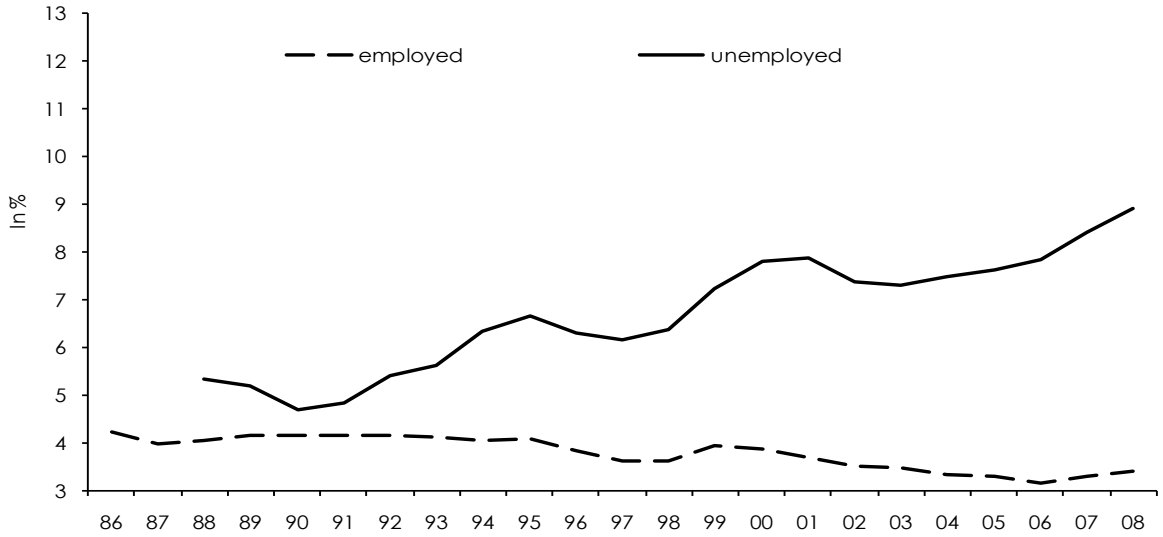
Clearly, all workers in regular employment fall within this category. With respect to persons who are out of employment, only those receiving a benefit paid by unemployment insurance are both entitled to and interested in reporting sickness spells. This comprises mainly jobseekers who perceive either unemployment benefits (*Arbeitslosengeld*), unemployment assistance (*Notstandshilfe*), a benefit related to an activation measure (such as training) or one of the transitory benefits paid to workers who have filed a pension claim or who are waiting to retire (*Pensionsvorschuss* and *Übergangsgeld*). This definition does not coincide with that used in official unemployment statistics. Jobseekers who do not have a benefit entitlement but do nevertheless register with the public employment services (e. g. youngsters without previous work experience) are most unlikely to report sick leave, whereas they do show up in

official unemployment statistics. On the other hand, persons in training and those who receive benefits connected to retirement do report sick leave although they are excluded from official unemployment statistics.

Using the abovementioned definition on a per-capita basis the number of sick leave days in unemployment has gone from 17.2 in 1990 to 28.5 in 2000 and 32.5 in 2008.[1] This corresponds to an absence rate of 8.9% for the last available year (against rates of 4.7% and 7.8% in 1990 and 2000, respectively). Thus the amount of time spent in sick leave has almost doubled over the last two decades, with roughly two thirds of this increase taking place in the 1990s. A look at figure 1 indicates that over the same period the absence rate of employed workers has followed a completely different path. Absenteeism fluctuated on a comparatively high level during the 1970s and reached its peak in 1980. The development which took place in the following decades can be interpreted as a long-term decline in absence rates (from 4.8% in 1980 to 4.2% in 1990 and 3.9% in 2000). In spite of cyclical fluctuations the absence rate followed a downward trend, with 2006 marking its lowest point. In the following two years, sickness absence statistics registered a slight increase in sick leave, with an absence rate of 3.4% in 2008. Accordingly, the differential in sick leave between employed and unemployed has been increasing significantly over time. In 2008 the unemployed spent on average 20 days more on sick leave than their employed counterparts, this corresponds to a gap in the absence rate of 5.5 percentage points. In other words, the unemployed were on sick leave over 2½ times more often than the employed.

[1] It is important to stress again that these per-capita figures are calculated by dividing the number of absence days by the total number of all persons who are registered at the Austrian public employment services (*Arbeitsmarktservice Österreich*, AMS) *and* who perceive a benefit from the unemployment insurance. This definition includes also persons who are participating in an activating labour market policy measure (such as training) as well as persons who perceive a transitory or advance pension payment (*Übergangsgeld* and *Pensionsvorschuss*). Persons who are simply registered at the AMS as well as those who are looking for a job without being registered are excluded from this definition because they are not entitled to sick leave benefits and therefore have no possibility or at least no incentive to report sickness episodes to the social insurance agency.

Figure 1: Absence rate of Austrian employed and unemployed workers



Source: *Leoni* (2010); Federation of Austrian Social Insurance Institutions.

2 Theoretical background

2.1 General considerations

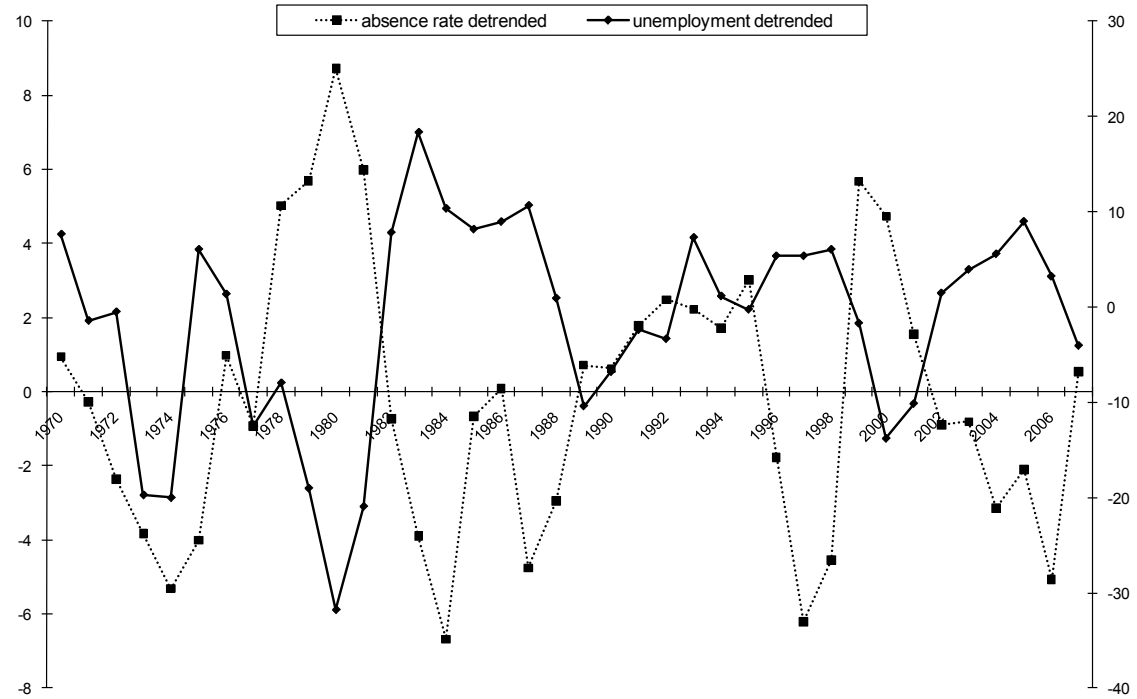
The theoretical approach to understanding the health dimension of unemployment is dominated by two main hypotheses:

- According to the "selection hypothesis" there exists a strong correlation between health status and employment status. On the one hand, it can be assumed that persons with poor health are *ceteris paribus* more likely than others to find themselves unemployed. A corollary of this hypothesis is that persons with health problems will also find it more difficult than other unemployed persons to find a new job and return to active employment. Both effects could help to explain why the unemployed as a group are less healthy than the working population.
- In addition, it has often been observed that unemployment can by itself represent a health risk factor and therefore be a cause of poor health. Several psychological, medical and sociological approaches, which have their most prominent antecedent in the study of unemployment by *Jahoda et al.* (1933), have tried to identify those characterizing factors of unemployment which are causally responsible for health status deteriorations in unemployment.

Empirical investigations of health in unemployment are confronted with the difficulty to establish a clear identifying strategy in order to test these two hypotheses. The selection

hypothesis can be studied from two different perspectives, namely from the viewpoint of workers who remain employed and from the viewpoint of those workers who lose their job. In fact, if the selection effect is real, it is of relevance not only for explaining the health status of the unemployed, but also for explaining why sickness absenteeism tends to be pro-cyclical with respect to the business cycle. There is abundant evidence for the existence of an inverse relationship between sickness absence and changes in the unemployment rate, coming from both older and more recent studies and covering a broad range of countries (see for instance *Kenyon and Dawkins*, 1989; *Schnabel and Stephan*, 1993; *Audas and Goddard*, 2001; *Fahr – Frick*, 2007). Austria is not an exception to this empirical regularity (*Biffl*, 2002). Figure 2, which charts de-trended changes in yearly unemployment and in sickness absence rates between 1970 and 2008, provides updated evidence on this issue.[2] The cyclical components of unemployment and absenteeism display a clear and statistically highly significant negative correlation over the period 1970-2008; the negative correlation becomes much stronger when we look at the period 1980-2008.[3]

Figure 2: The cyclical components of sickness absence and unemployment (1970-2006)



Source: own calculations; Federation of Austrian Social Insurance Institutions.

[2] To obtain de-trended time series for the absence and unemployment rates a Hodrick-Prescott filter was applied to the time series of both rates. The cyclical component, which measures the deviation from the trend, was then set in relation to the trend and expressed in percentage.

[3] The correlation between the two time series is -0.550 for 1970-2008 and -0.775 for 1980-2008. In both cases the correlation coefficient is highly statistically significant.

This positive correlation between absence rates and the business cycle can be explained with a "healthy-worker" effect and thus with changes in the composition of the workforce. It can however also be related to changes in the individual costs of absence when unemployment increases (i.e. a "moral hazard" effect). An unfavourable labour market situation increases job insecurity and the search costs associated with a job change (*Barmby et al.*, 1994). Not only are workers less likely to shirk in the presence of high unemployment, they are also more prone to go to work in spite of being ill, a phenomenon referred to as presenteeism. There exist only a limited number of studies which have attempted to disentangle these two effects. Their findings provide support for the view that selection effects play a comparatively minor role to explain cyclical fluctuations in workforce absence rates. Both *Arai - Thoursie* (2005) and *Askildsen et al.* (2005) as well as *Fahr - Frick* (2007) come to the conclusion that "selection effects are of minor importance when compared to incentive effects". Accordingly, unemployment works as a "disciplining device" which influences the absence behaviour of employed workers.[4] The robustness of these results can be challenged on the ground of data restrictions casting shadows on the identification strategies implemented by the authors. For instance, *Askildsen et al.* (2005) use a Norwegian panel of individual-level register data covering only sick leave spells that lasted longer than 14 days. It can be questioned whether a focus which is restricted to long sick leave spells is sufficient to provide robust evidence on the existence of selection effects.[5]

More to the point however, these studies do not falsify the hypothesis that selection effects might play a decisive role for the explanation of the health gap between employed and unemployed persons. Even if selection effects play a minor role for absence rate fluctuations of the whole workforce they can be still of paramount importance to explain high absence rates in unemployment. The number of persons who become unemployed in a downturn is low if compared to the total workforce. In addition, even the selection of only marginally sicker workers in unemployment might be sufficient to create lock-in effects and high duration dependence. In last analysis, selection and health effects of unemployment might

[4] Another factor which is probably of relevance in this respect, but which has received little attention in the economic literature on absenteeism so far, refers differences in work intensity along the business cycle. In an upswing, employees work more hours, take less holiday and work with tighter deadlines than in a business downturn. This might cause more work-related health problems and be therefore provide a further explanation for the positive relationship between absence rates and the business cycle.

[5] In the case of *Arai - Thoursie* (2005) the identification strategy relies on the assumption that the percentage of workers on temporary contracts is a valid proxy for the presence of marginal workers in the labour market. Moreover, as in the case of *Askildsen et al.* (2005) data are available for a few years covering at most one full business cycle. *Fahr - Frick* (2007) cover a longer time horizon, however one problem with their data used is that they observe aggregate absence rates without being able to distinguish between employed and unemployed workers.

represent intertwined and mutually reinforcing factors which lead to a large health status gap between employed and unemployed persons. *Bockerman - Ilmakunnas* (2009), who investigate subjective health indicators of Finnish workers and unemployed, reach conclusions which point in this direction. Using longitudinal data the authors find that the event of unemployment does not influence self-assessed health strongly. In most cases, persons with a poor health perception are selected for the pool of the unemployed. Among the unemployed, those who find back to employment reveal a good health status. At the same time, negative health effects of unemployment become more likely when long-term unemployment is used as measure of the unemployment experience.

The increased availability of longitudinal data sets and the implementation of improved econometric techniques led to a number of recent contributions investigating whether unemployment impacts health negatively. Results are not univocal and they are sensitive to details defining the research design. The literature reaches different conclusions depending on whether the focus rests on short- or long-term consequences of job loss or unemployment and on whether the duration of unemployment spells is taken into consideration in the analysis. In order to come to terms with the identification problem associated with the health-unemployment issue (i. e. the question to what extent health is by itself a determinant of unemployment), recent studies attempt to isolate job-loss causes which are exogenous to the workers' health situation. *Salm* (2009) looks at business closures interpreting them as a natural experiment to test for a causal relationship from job loss on health. Using US data from the "Health and Retirement Study" he reaches the conclusion that job loss due to business closure does not show up in a significant way during a follow-up period of four years.

Similar evidence comes also from *Kuhn et al.* (2009) on the basis of data from the Austrian social insurance data very similar to those which are used for the present analysis. *Kuhn et al.* (2009) address the problem of reverse causality by focusing on the effects on public health care costs of job loss following plant closure. In their conclusions, the authors state that "job loss following a plant closure does not cause a significant increase in public health costs associated with take-up of health provisions. Public health costs due to hospitalisations, doctor visits, and medical drugs' prescriptions do not increase significantly". In the one-year follow-up period to the plant closure that they observe, sickness absence increases only marginally and not statistically significantly for women, whereas it remains broadly constant for male workers who lost their job. *Browning et al.* (2006) cover yet another dimension of

this issue by looking at stress-related hospitalisations following plant closures in Denmark. Here too "exogenously" determined job losses do not lead to a higher utilization of the health system.

The abovementioned studies provide strong evidence that business closures have little impact on the health situation of the concerned workers. The picture changes considerably however if we look at the health implications of job loss in a longer time-horizon. *Gerdtham - Johannesson* (2003) use Swedish data to establish whether there exist differences in life expectation between employed and unemployed persons. They account for selection into unemployment with a two-step procedure, reaching the conclusion that in a follow-up period that varies between 10 to 17 years, persons with unemployment experiences face a 50% higher mortality risk than those who stay continuously in employment. This increase in mortality is due partly to a higher suicide rate and partly to higher morbidity rates across numerous disorders (with the notable exceptions of cancer and circulatory diseases). Differences in mortality rates of employed and unemployed persons have been found also by numerous older and also more recent studies (z. B. *Iversen et al.*, 1987; *Dooley et al.*, 1996; *Mathers - Schofield*, 1999; *Sullivan - von Wachter*, 2009). *Sullivan - von Wachter* (2009) is of particular interest because it relies on the same identification strategy as *Salm* (2009) and *Kuhn et al.* (2009), focusing on persons who lost their job following a business closure. The authors employ a longitudinal dataset for the US and calculate that for high-seniority male workers mortality rates in the year after displacement are 50% – 100% higher than would otherwise have been expected: "The effect on mortality hazards declines sharply over time, but even twenty years after displacement, we estimate a 10% – 15% increase in annual death hazards." Job displacement at age 40 leads, according to their calculations, to a reduction in life experience of 1 to 1½ years.

Studies on job loss due to plant closure or to firm-level downsizing are useful to identify causal effects between displacement and health. At the same time, displaced workers are not representative for the unemployed population as a whole. Arguably only a fraction of these workers actually experiences a significant amount of unemployment. For this reason, studies which aim at identifying the effects of unemployment on health have to focus directly on workers who experience longer periods out of employment. Research in this field tends to support the view that unemployment is by itself associated with declining health status. *Bockerman - Ilmakunnas* (2009), who find significant selection effects of less healthy individuals into unemployment, highlight also the negative effects of long-term

unemployment on health status development. Long unemployment spells tend also to be associated with significant drops in life satisfaction and in satisfaction with health conditions. *Gordo* (2006) investigates the relationship between satisfaction and unemployment duration with an emphasis on gender differences. Results, which are based on an analysis of the German socio-economic panel (GSOEP), reveal a strong gender gap in the short-time effects of unemployment: whereas short-term unemployment has no traceable influence on female health satisfaction indicators, it affects the satisfaction of male workers negatively. A few months in unemployment seem to leave a mark on the satisfaction level expressed by men, a finding which can be linked to the traditionally high importance placed by men on work as a source of self-esteem and individual well-being. The loss of income can explain only a small fraction of this effect. Long-term unemployment is on the contrary associated with a sizeable drop in perceived health status for both men and women. This insight is corroborated by *Hollederer et al.,* (2006), who look at objective health indicators. The authors find that persons who are unemployed for a period of two years are twice as likely to be affected by a major health problem if compared to those individuals who have been unemployed for one month only (32% against 16%). This rate is significantly higher for men (38%) than for women (26%). *Hollederer et al.* (2006) find that the health status deteriorates significantly around three months in unemployment, with a further drop taking place after one year in unemployment. The methodology employed in this study cannot account for selection effects of already sick persons into unemployment, it could therefore be argued that the unemployment experience is unrelated to the observed deterioration in health conditions. However, it is well-documented that health status differences associated with unemployment spells of different duration are mainly driven by mental disorders. This can in turn be interpreted as evidence for the fact that unemployment is a strong psychological and psycho-social health stressor.

Countless studies support the notion that the negative effects of unemployment on health are reflected in form of high incidence rates of mental disorders. In a meta-analysis on this topic *Paul et al.* (2006) come to the conclusion that the link between unemployment and poor mental health is not a local phenomenon, but an empirical regularity which can be observed across the entire Western world.[6] *Jahoda's* (1981) well-known "deprivation theory", which maintains that mental ill-health among the unemployed is caused by a loss of latent benefits

[6] "…[dass] der Zusammenhang von Arbeitslosigkeit und eingeschränkter psychischer Gesundheit kein lokal beschränktes, sondern ein in der ganzen westlichen Welt identifizierbares Phänomen ist" (*Paul et al.*, 2006).

associated with employment which are vital for mental well-being (i. e. time structure, social contact, collective purpose, social identity and regular activity), is not the only theoretical explanation for this empirical regularity.[7] The "vitamin model" developed by *Warr* (1987) builds upon *Jahoda*'s approach, but it is less strict in its distinction between latent and manifests benefits of employment and between the situations of employment and unemployment. The vitamin model holds that mental health is affected by environmental psychological features (such as social contacts, control over individual life circumstances and social identity) in a way that is analogous to the non-linear effects that vitamins are supposed to have on our physical health (*de Jonge – Schaufelin*, 1998). Accordingly this theoretical approach can be used to investigate the negative consequences on mental health which can arise in the context of unfavorable employment conditions as well as from unemployment.

With his "agency restriction theory" *Fryer* (1986) has proposed an alternative model which emphasizes the importance of manifest benefits of employment, i. e. that people work to earn a living and that employment enables them to plan and organize personally satisfying leisure activities. Agency theory stresses the notion that "people are fundamentally proactive and independent" and criticizes deprivation theory for describing them as "fundamentally reactive and dependent" (*Winefield*, 2002). It is less the social context than individual security and latitude which represent the focus of analysis in this approach. *Fryer* argues that unemployment is damaging to mental health because it leads to restrictions of the individual pursuit of self-realization and that the role of poverty has been underemphasised in contemporary unemployment research.

All three abovementioned theoretical approaches can be linked to the wide range of mental problems which have been observed in association with unemployment, including depression, anxiety, apathy, psychosomatic disorders, loss of self-esteem and decreasing life satisfaction. Especially longitudinal studies provide "reasonably convincing evidence that unemployment has a direct effect on health over and above the effects of socioeconomic status, poverty, risk factors, or prior ill-health" (*Mathers et al.*, 1998).

2.2 Structural and institutional aspects

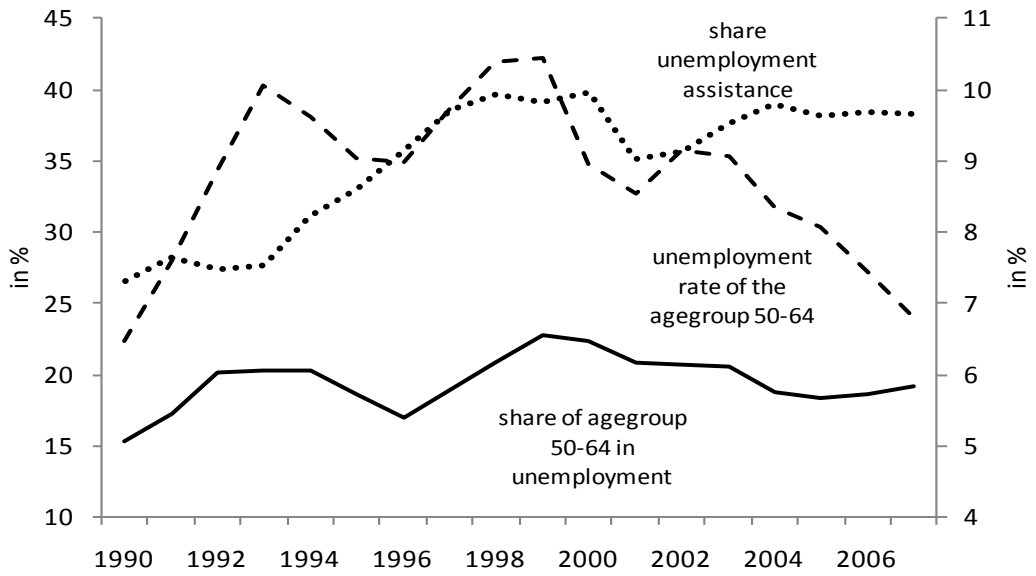
The sickness level of the unemployed as it is documented by social insurance records is susceptible to a number of structural and institutional factors. These factors are particularly important if we want to account for changes in sickness absenteeism over time, as they

[7] For a synthetic overview of the literature see among others *Winefield*, 2002 and *Paul et al.*, 2006.

influence both the composition of the unemployed population as well as individual behaviour with respect to sick leave reporting. As discussed in the introductory section, in Austria the sickness absence rate in unemployment has been increasing steadily over the course of the last two decades. Although this long-term period is not the focus of the present analysis (not least because the data on which the analysis is based cover only a much shorter time horizon), it is worthwhile to discuss the elements which might have contributed to this increase.

On the one hand, the Austrian labour market has undergone a considerable amount of change, with momentous consequences for the composition and typology of unemployment. As discussed in detail by *Bock-Schappelwein* (2005), developments which can be broadly related to economic internationalization and technological change have led to structural shifts on the labour market. Three aspects are of particular relevance with respect to the health status of unemployed persons. First, there has been an inflow in unemployment of workers coming from industries characterized by hazardous working conditions and above-average absence rates.[8] Large-scale restructuring and rationalization processes led to down-sizing and job cuts in the secondary sector of the economy. Male workers with low and middle qualification levels in manufacturing and construction were hit more than proportionally by this change. Secondly, there has been an asymmetric increase in unemployment rates across age groups, with older workers being most severely hit by economic transformations.

Figure 3: Structural changes in unemployment (1990-2007)



Source: own calculations; Public Employment Services Austria, WIFO.

[8] For a description of inter-industry differentials in absenteeism see *Leoni – Biffl – Guger* (2008).

Between 1990 and 2000, the unemployment rate in the age group 50-64 increased from 6.5% to 9.0%, with a peak of 10.4% in the biennium 1998-1999 (see figure 3). In the following years, the rate fell gradually back to the levels of the early 1990s. The share of older workers on total unemployment underwent a level shift over this period, increasing from 15.4% in 1990 to 19.2% in 2007 (with the highest value of 22.8% in 1999). It has to be stressed that these statistics are likely to underestimate the role played by older cohorts in unemployment, because they are based on the official unemployment definition. Persons who perceive a benefit related to retirement and paid out of unemployment insurance (*Pensionsvorschuss*, *Übergangsgeld)* are not counted as unemployed according to this definition. But these groups are very relevant for sick leave statistics and their number has increased considerably, from 6,450 in 1990 to 15,500 in 2000 and 26,800 in 2007.

This development can be partly explained by a "generational squeeze", with workers from the baby boom generation crowding out older workers in a context of rising unemployment. The difficulties faced by older workers with low to middle qualification level in finding an occupation is mirrored in a third important trend, namely a consolidation of unemployment and an increase in the share of long-term unemployment. This trend can best be described by a look at statistics for unemployment benefits.[9] As shown in figure 3, the share of unemployed workers receiving unemployment assistance (*Notstandshilfe)* has been increasing considerably in the decade between 1990 and 2000. This increase has been briefly reversed in the following years, only to rise again after 2003. In 1990 26.6% of all unemployed registered with the public employment services were receiving unemployment assistance, the highest value was reached in 2000 with a share of almost 40%. In 2007 slightly more than 38% of the jobseekers in official statistics were on unemployment assistance.

To sum up, in the 1990s there has been an inflow in unemployment of categories of workers (old, low-middle skilled, with an occupational background in the secondary sector) associated with above-average levels of health problems and therefore sickness absence. Increasing unemployment duration (at least for a sub-segment of the unemployed population) has probably contributed to further acerbate health problems and can therefore also help to explain why we witnessed an increase in sickness figures of the unemployed. These structural, economic shifts have been superposed by policy changes which might also have contributed to drive upwards sickness absence figures in unemployment. One case in point is represented

[9] Long-term unemployed is difficult to measure because numerous events, such as participation in an activating labour market program is statistically recorded as an interruption of the unemployment episode. This leads to a strong downwards bias in the statistical description of long-term unemployment.

by changes in social policy legislation, particularly reforms in the pension system which have taken place in 2000 and 2003. These reforms led *inter alia* to the abolition of early retirement due to prolonged unemployment (*vorzeitige Alterspension bei Arbeitslosigkeit*). This change concerned above all unemployed women who did not qualify for unemployment benefits (due to a lack in contribution periods) and were therefore given access to early retirement after a certain period in unemployment. At the same time the reforms introduced a new form of transitory social transfer (*Übergangsgeld*) paid out of unemployment insurance funds and accessible to the same group of persons (i. e. older workers in unemployment) up to the time when they qualify for old age retirement (*Alterspension*). This reform has contributed to increase the number of older workers in unemployment. Figure 4 indicates that the share of unemployed perceiving pension-related benefits has increased steadily over the course of the last twenty years, and particularly since the turn of the last decade. These persons are not counted in the official unemployment statistics, but they are entitled to sickness benefits and do report sick leave (not least because a significant share of them applies for disability pension).

The increasing number of older workers with few employment perspectives is not the only major change with repercussions on the health dimension of unemployment. In reaction to increasing levels of mass unemployment there has also been a paradigmatic change in Austrian labour market policy. The importance of active labour market policy (ALMP) has clearly been on the rise since the mid-1990s, with a strong focus on formal training programs. Arguably this shift in the assistance of unemployed workers has meant an intensification of jobseeker supervision on the part of public employment services. This might in turn have had an impact on sickness reporting practices. In the past the unemployed received passive assistance (i. e. income replacement) and were not obliged to take part in labour market programs or to contact regularly the public employment services. Under those circumstances there might have been a lack of incentives to report all illness episodes to the general practitioner, with the consequence of underreporting of sickness in official statistics. This hypothesis cannot be falsified using administrative social insurance data. Indirect evidence does however follow from a comparison of sickness absence levels in employment and unemployment over the long term. In 1990 sickness absence statistics recorded on average 15.2 (calendar) absence days for employed workers against 17.2 days for unemployed workers. Against the backdrop of the vast literature documenting substantial differences in health between employed and unemployed persons, this difference of 13% appears to be

rather small, casting the doubt that at that time not all cases of illness were duly reported to the social insurance agency.

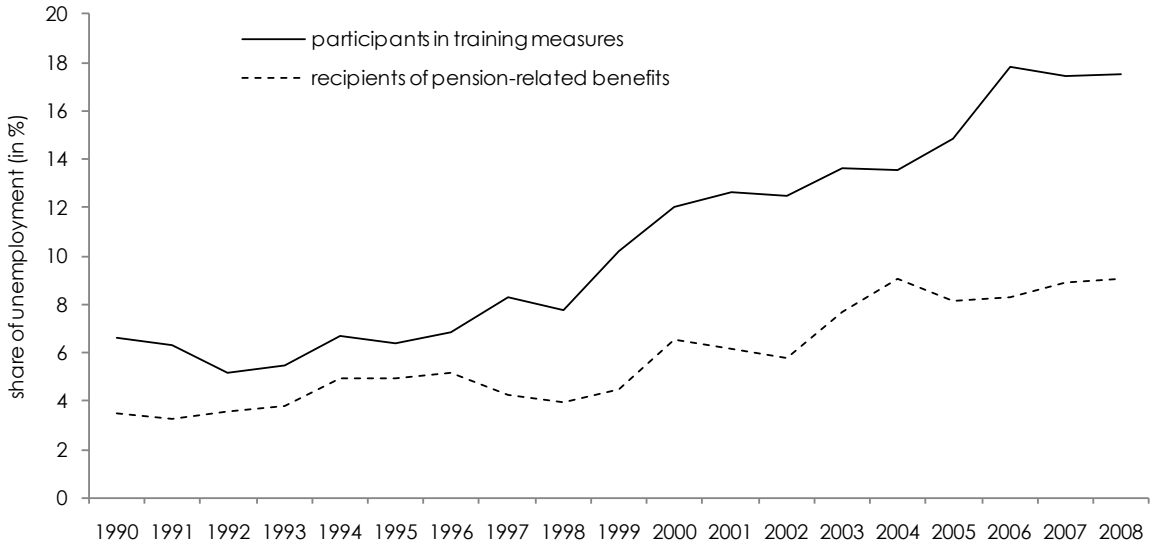
Presently the incentives for unemployed persons to document sickness spells might be larger than in the past, as it is necessary to provide justification for absences from activating labour market programs. In fact, it might even be argued that intensified assistance through ALMP might have led to an increase in the number of cases of "strategic" sickness reporting.[10] In their review of Austrian labour market policy, *Hofer – Weber* (2005) reach the conclusion that, "this change in the strategy stresses the incentive component over the training component of active labor market policy by enforcing stricter monitoring of search effort and search efficiency of the unemployed." As can be seen from figure 4, the share of the unemployed undergoing formal training has increased considerably in the course of time.

A further institutional aspect which is worth to be mentioned, concerns the regulation affecting the overlap between sick pay and unemployment benefits. In Austria, sick pay leads to an interruption and postponement of unemployment benefit payment, with the effect of extending the duration of benefit entitlement. Arguably this regulation might provide an incentive for workers on unemployment benefit to report sick for strategic reasons, so as to extend the duration of their benefit entitlement. Although it cannot be excluded that some instances of abuse might occur, the fact that unemployed workers have to see a general practitioner on their first day of illness represents a serious obstacle to such strategic behaviour. Moreover, since there has been no change in regulation over the past decades, this institutional aspect is unlikely to play a role for the long-term increase in absence rate observed in unemployment.

Although it is difficult to quantify the contribution of each of the abovementioned factors, it is likely that the sharp increase in sickness absence figures of persons in unemployment is the outcome of both compositional and institutional effects.

[10] The individual has a certain amount of discretionary leeway with respect to the decision to report sick. Even though the unemployed have to see a doctor on their first day of illness, a certain degree of moral hazard remains: Depending on the type of health disorder, symptoms can be of a subjective type and not liable of objective validation.

Figure 4: Unemployed workers in ALMP and recipients of pension-related benefits



Source: *Leoni* (2010); BALIweb, AMS. Please note: In order to be consistent with the rest of the analysis, here unemployment is defined as the total of persons perceiving benefits through unemployment insurance.

3 Data

The empirical analysis is based on the Austrian social security database (ASSD) and on a dataset with sickness absence spells provided by Upper Austria's social security agency (*Gebietskrankenkasse Oberösterreich*, GKKOÖ). The ASSD contains detailed information on individual employment and earnings histories, social security contributions and benefits as well as basic employer information since 1972. The administrative records are very precise and collected on a daily basis, all firms and employees are identified through a unique and anonymized identifier (a firm is defined as a centre of production in one location). Since its main purpose is to verify claims for pensions and other social security benefits, the ASSD contains the universe of all Austrian workers (with the exception of self-employed, public servants and marginal workers). Exhaustive information on employment spells and earnings enables to infer employer characteristics such as firm size, workforce composition and wage structure. Since the social security agencies record all forms of transfers and benefits paid out to the insured, it is also possible to observe individuals in unemployment. The ASSD have been widely used in economic research, for instance by *Lalive - Zweimüller* (2004), *Card et al.* (2007) and *Del Bono – Weber* (2008), a detailed description of the data can be found in *Zweimüller et al.* (2009).

These data were matched via the worker's individual identifier (anonymous social security number) with individual records on sickness absence for the years 2004-2007 from the GKKOÖ. The GKKOÖ dataset contains all absence spells reported by private sector workers and unemployed persons in Upper Austria, with the beginning and end date as well as with information on the medical cause of absence coded with the International Classification of Diseases and Related Health Problems (ICD9).[11] The matched dataset thus contains, on the one hand, full information on absence spells as well as employer and personal characteristics for the years 2004-2007. On the other hand, the link with the employment history back to the 1970s enables to construct numerous variables at the individual worker and firm level.

The data have some obvious advantages: due to their administrative character, they are highly reliable and universal coverage makes it possible to carry out analyses at disaggregated levels, focusing in detail on effects affecting comparatively small groups of people. The limitations of the ASSD are due to their exclusive focus on information which is necessary for the calculation of pension contributions and for social security entitlements. While the ASSD contains information on age, gender and occupational status, ideally for the purpose of this study also educational level and working conditions would be of interest. With respect to the information on sickness spells, the main problem is represented by under-reporting of short-term sickness absence. Whereas for absences of more than 3 days a medical certification is mandatory, it is up to the employers to request such a certification from their employees for sick leaves of shorter duration.[12] Unemployed persons are obliged to report to a general practitioner on their first day of illness, so in theory coverage of sickness in the statistics should be comprehensive. There is however very little institutional control over the first three days of illness because sick pay has a waiting period of three days and accordingly neither the jobseeker nor the public employment services have an incentive to report short sickness episodes. In practice it is therefore likely that the number of short sickness spells which goes unreported is not lower in unemployment than in employment.

In order to achieve consistency with the aggregate statistics published by the Federation of Austrian Social Insurance Institutions, I define unemployment on the basis of observed social insurance status. Accordingly, those persons are counted as unemployed who perceive either

[11] The duration of absence spells is expressed in calendar days rather than in actual working days lost due to absence. No distinction is drawn between weekdays and weekends. Starting with 2004, also the ICD10 nomenclature was used. I adapted the data by recoding ICD10 entries into ICD9 entries (a recoding in the other direction is not possible without losing some information).

[12] Estimates on the number of unreported short-term sickness spells are difficult, as no recent information is available in this respect. A survey carried out by the Austrian Federation of Social Insurance Institutions in 1999 indicates that one third of blue-collar workers' absence spells were not certified by a general practitioner, a share which can be interpreted as a minimum floor for the under-coverage of short sickness spells in the statistic.

unemployment benefit, unemployment assistance, a benefit related to an activation measure or one of the transitory benefits paid to workers who have filed a pension claim or who are waiting to retire. Table A1 in the appendix contains some descriptive statistics for the resulting sample.

4 Empirical analysis

4.1 Differences in sickness absence of employed and unemployed persons

This section is dedicated to a descriptive analysis of sickness occurrences in employment and in unemployment, with the twofold aim to highlight differences between the two and to shed light on the health situation of unemployed persons. Tables 1, 2 and 3 present summary statistics for the composition of unemployment as well as for the distribution of sickness absence across groups of employed and unemployed workers. In 2007 in Upper Austria the unemployed reported on average 30.8 absence days, the employed only 13.5. Contrarily to what we observe in employment, where men have higher absence rates than women, among the unemployed it is women who report more sickness days than men. This can partly be accounted for by the fact that occupational accidents play a major role for gender differences in sickness absence among the employed (see for instance *Leoni – Mahringer*, 2009). It is thus not surprising to find that women have slightly higher absence rates than men in unemployment, where accidents no longer play a role.[13]

Table 1: Sickness absence in employment and unemployment, by gender

2007, Upper Austria

	Insured persons		Sickness absence	
	Employed	Unemployed	Employed	Unemployed
	share (in %)		in days	
..				
Men	57.8	51.5	14.0	30.2
Women	42.2	48.5	12.8	31.3
Total	100.0	100.0	13.5	30.8

Source: OÖGKK, WIFO.

The next table highlights the existence of a strong correlation between age and sickness absence irrespective of employment status. All age groups report considerably more sickness days in unemployment than in employment. In absolute terms jobseekers in the age group 50

[13] Women are over proportionally represented in unemployment, this is a specificity of the Upper Austrian labour market which has attracted attention in previous studies and which can be related to the industrial mix of the regional economy (see *Biffl – Leoni*, 2006 and *Huber*, 2007).

to 54, who were ill almost 48 days in the course year, reveal the highest incidence of illness. In relative terms the sickness gap between employed and unemployed workers is highest in the groups of those aged between 40 and 49, where the absence rate of the unemployed is between 2.7 and 2.8 times higher than for the corresponding group in employment. The gap is comparatively small for the youngest (below 25) as well as for the oldest cohorts (above 55). With respect to older persons, selection effects from unemployment into early retirement might account for the observed pattern: In analogy to the "healthy worker" effect in employment, we can expect sicker persons to leave the labour market altogether once they get close to retirement age.

Table 2: Sickness absence in employment and unemployment, by age group

2007, Upper Austria

	Insured persons		Sickness absence	
Age	Employed	Unemployed	Employed	Unemployed
	share (in %)		in days	
15 - 19 years	6.3	2.5	13.7	17.4
20 - 24 years	10.6	12.1	11.9	18.5
25 - 29 years	11.4	11.7	11.3	20.5
30 - 34 years	11.0	10.7	11.1	24.5
35 - 39 years	13.6	12.6	11.3	29.0
40 - 44 years	15.5	13.2	12.3	33.8
45 - 49 years	13.9	11.9	14.3	40.5
50 - 54 years	10.3	10.5	17.9	47.9
55 - 59 years	6.2	11.3	22.2	38.9
60 - 64 years	1.2	3.4	16.9	21.1
65 years and older	0.1	0.1	12.1	16.7
Total	100.0	100.0	13.5	30.8

Source: OÖGKK, WIFO.

Table 3 clearly indicates that blue-collar workers are characterised by a high risk of unemployment. In 2007, although white collar employees made up almost half of our sample in employment, less than one third of those in unemployment held a white-collar job before becoming unemployed. Qualification correlates strongly with sickness absence, this is true in employment as well as in unemployment. In employment blue-collar workers spend roughly 80% more time on sick leave than white-collar employees, a figure which corresponds to almost 8 additional days per year. In unemployment this gap increases to almost 9 days, although in relative terms it diminishes to one third. It follows that in spite of the high absolute number of sick leave days reported by blue-collar workers, the relative difference between employment and unemployment is more pronounced for white-collar employees. Differences in health outcomes between the employed and the unemployed are not confined

to the average number of sickness days recorded by the two groups. There are several indicators which reveal also qualitative differences, corroborating the view that the unemployed are characterized by a high incidence of severe health problems.

Table 3: Sickness absence in employment and unemployment, by occupational group

2007, Upper Austria

	Insured persons		Sickness absence	
	Employed	Unemployed	Employed	Unemployed
	share (in %)		in days	
…				
blue-collar	51.6	68.3	17.2	33.6
white-collar	48.4	31.7	9.6	24.8
Total	100.0	100.0	13.5	30.8

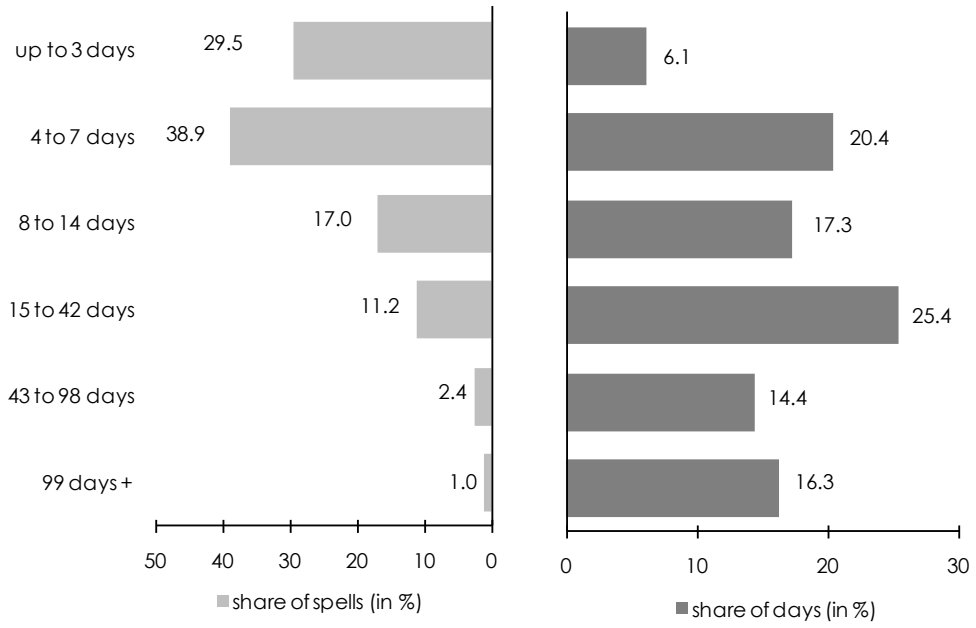
Source: OÖGKK, WIFO.

One piece of evidence which points in this direction comes from an analysis of sickness episodes by duration. Sickness absence data typically show a skewed distribution, with a high frequency of short spells and a long tail of infrequent, but very long spells. In terms of total absence volume the comparatively small number of long illness episodes carries the highest weight (at least for sickness absence as recorded by Austrian social insurance). A comparison between employed workers and jobseekers reveals that in case of the latter group long sickness spells play an even more prominent role (see figures 5 and 6). In Upper Austria in 2007 sickness episodes lasting for more than 6 weeks represented 3.4% of all spells, but they accounted for almost one third of total absence days. In unemployment, the share of long-term episodes amounted to 9.1% of spells and almost half of all days. On the opposite, short episodes of less than 2 weeks carry a comparatively low weight: Less than 10% of all days have their origin in episodes which lasted for less than one week, further 13.4% in episodes of one to two weeks. The corresponding shares for people in employment lie at 26.5% and 17.3%. The mean duration of an illness episode is 10.3 days in employment, against 19 days in unemployment, the median duration 5 days against 9 days.

The high incidence of long-term sickness episodes can be interpreted as an indicator for the concentration of severe health problems in unemployment. Further evidence comes from a glance at hospitalisations for employed and unemployed workers. Figure 7 shows a comparison of the average days of hospitalisation of employed and unemployed workers. In 2007 Upper Austrian unemployed workers spent on average 4 days in a residential health structure, the corresponding figure for those in employment was only 1.6 days. A look at previous years indicates that this pattern is very stable over time. This finding confirms

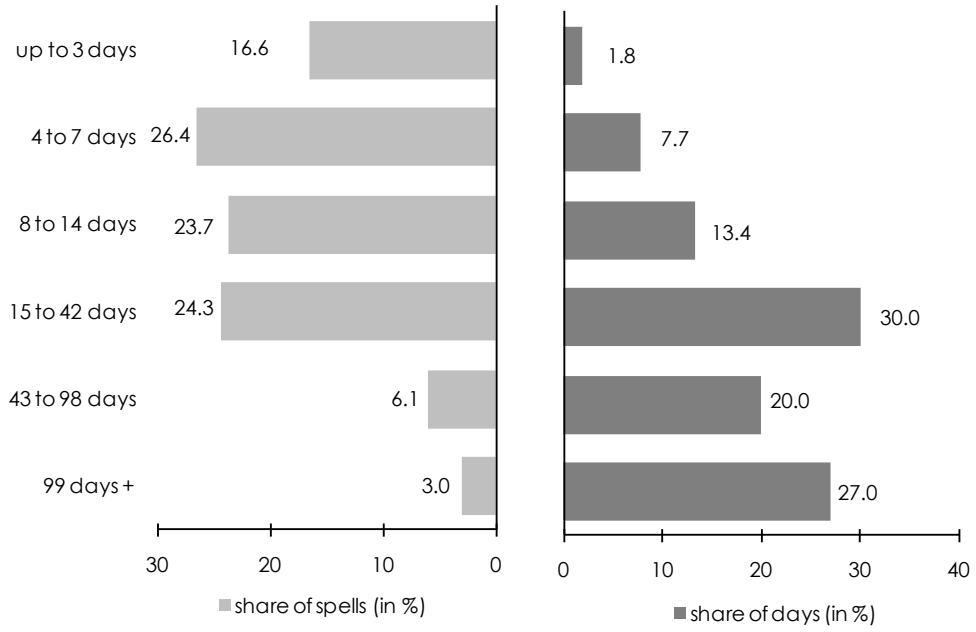
previous results provided by *Penner* (2009) using data for Upper Austria and *Füzi - Reichardt* (2009) using data for Burgenland. Calculations based on German social insurance data reveal that in Germany unemployed men and women spend respectively 2.3 times and 1.7 times more days in hospital than their employed counterparts (*Hollederer,* 2006). Although the additional number of days spent in hospital by unemployed persons is not high in absolute terms, it can be interpreted as evidence for the poor health status of this labour force segment. The share of sick leave days spent in hospitals is similar in employment and unemployment (12% as compared to 14%). However the distribution of these days differs considerably between the two groups: whereas in employment hospitalisation cases are concentrated on 14% of all sick leave episodes, in unemployment almost every fourth episode (23% in 2007) leads to a hospitalisation.

Figure 5: Sickness spells and sickness days by spell duration, employed workers



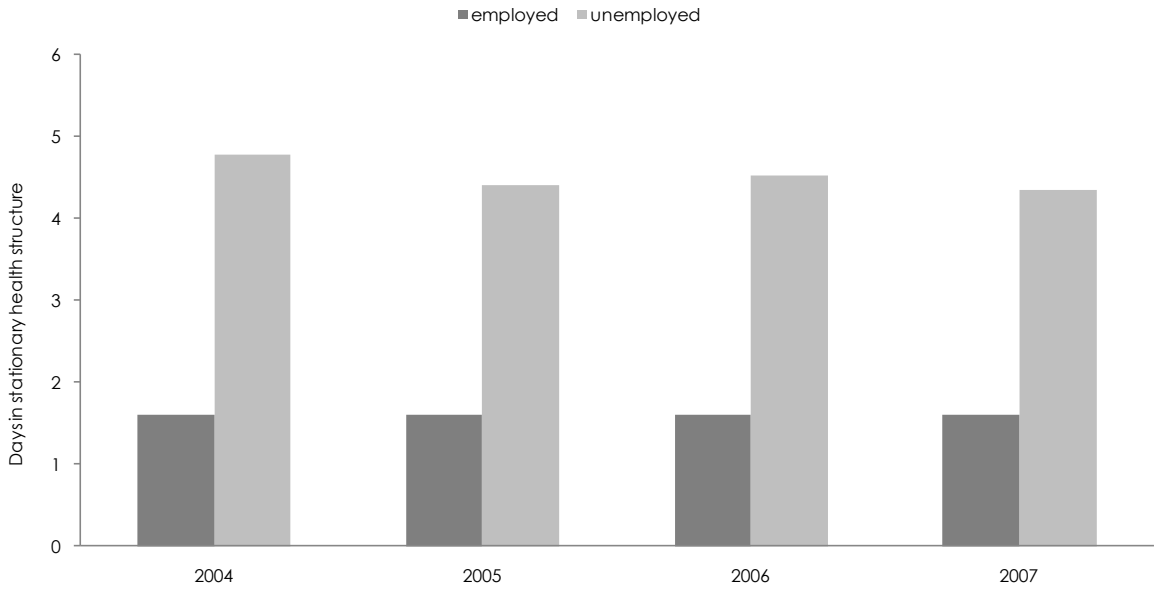
Source: *Leoni* (2010); Federation of Austrian Social Insurance Institutions, OÖGKK.

Figure 6: Sickness spells and sickness days by spell duration, unemployed workers



Source: *Leoni* (2010); Federation of Austrian Social Insurance Institutions, OÖGKK.

Figure 7: Days in hospital, employed and unemployed workers



Source: *Leoni* (2010); OÖGKK, WIFO.

Long duration is a characterizing trait of illness spells in unemployment irrespective of the cause of illness. Table 4, which displays data for number of illness spells and days for each of the major ICD categories, evidences that differences in spell frequency tend to be minor between employed and unemployed workers. In some cases, such as 'injuries and poisoning' or 'diseases of the respiratory system', we do actually observe a higher incidence for the employed than for the unemployed. Across all diagnostic codes the unemployed do however reveal a higher per capita count of absence days. Mental disorders and musculoskeletal disorders account for the largest number of sickness days: Taken together these two categories of disease cause more absence days among the unemployed than the total sum over all diagnostic codes among employed workers. Statistically speaking, each unemployed persons reports three times more absence days due to musculoskeletal disorders than the average worker. With respect to mental disorders, the corresponding ratio is 8 to 1. In employment mental disorders represent a share of only 5% of total sick leave, in unemployment the share lies at 18%. This large differential is to a good extent due to a long duration of episodes. In employment sickness absence caused by mental health problems have a mean duration of 28.6 days, in unemployment the average duration is close to 45 days.

Table 4: Number of sickness days and spells, by ICD diagnostic code

2007, Upper Austria

	Employed		Unemployed	
	Sickness spells	Sickness days	Sickness Spells	Sickness days
	Days / spells per 100 persons			
Infectious and parasitic diseases	14	66	15	105
Neoplasms	1	34	1	53
Endocrine, nutritional and metabolic diseases, and immunity disorders	1	8	1	23
Diseases of the blood and blood-forming organs	<1	1	<1	2
Mental disorders	2	68	12	554
Diseases of the nervous system and sense organs	5	44	5	108
Diseases of the circulatory system	3	52	5	128
Diseases of the respiratory system	49	299	42	380
Diseases of the digestive system	6	50	7	104
Diseases of the genitourinary system	3	29	4	62
Complications of pregnancy, childbirth, and the puerperium	1	13	2	25
Diseases of the skin and subcutaneous tissue	2	19	2	42
Diseases of the musculoskeletal system and connective tissue	21	312	39	920
Congenital anomalies	<1	2	<1	5
Certain conditions originating in the perinatal period	<1	<1	<1	<1
Symptoms, signs, and ill-defined conditions	6	60	10	149
Injury and poisoning	17	279	14	380
Other accidents	<1	2	<1	11
Not classified	1	11	1	25
Total	131	1,350	162	3,076

Source: *Leoni* (2010); OÖGKK, WIFO.

Previous studies have highlighted that the health dimension of unemployment is not free of gender-specific aspects, with men being typically more affected by the unemployment experience than women. For instance, *Grobe - Schwartz* (2003) use German survey and social insurance data to show that health status differences between employed and unemployed workers are larger for men than for women. The most sizeable deviation concerns the incidence of mental disorders, with unemployed men spending seven times and unemployed women three times more days on leave than their employed counterparts. These results can at least in part be corroborated with the Upper Austrian data. Although overall the employed-unemployed absence gap is higher for women than for men, with respect to mental disorders the opposite is true. Whereas in the case of women, unemployment is associated with a threefold increase in illness days due to mental disorders, unemployed men report ten times more sick leave days because of mental disorders than employed workers.

4.2 The selection of "sick" workers into unemployment

The fact that in Austria health insurance and sick pay regulations cover both employed and unemployed workers alike enables to investigate the extent to which a selection of already

sicker workers from employment in unemployment takes place. A rough measure for the extent of selection of persons with high absence rates into unemployment can be derived from a comparison between previous absence rates of persons who become unemployed and those who remain continuously in employment. Table 5 contains the results of such as comparison between those workers who become unemployed in the course of the first quarter 2007 and those who were continuously employed over the same period. Whereas the latter averaged an absence rate of 2.9% in the previous year (2006), workers who lost their job in the first months of 2007 had previously an absence rate of 5.9%. In other words those who lost their job reported an average of 11 additional absence days compared to those persons who were continuously employed (who had on average 10.5 sick leave days). The difference between employed and unemployed persons is more pronounced for women (with a difference of 13.9 days, i. e. 140%) than for men (9.6 days, i. e. 86%). This would suggest that the selection effect is stronger for women than for men.

Table 5: Evidence on the selection effect of sick workers in unemployment

	Sickness absence rate 2006		Difference in sickness absence between unemployed and employed workers
	Continuous employment during I. quarter 2007	Unemployment beginning I. quarter 2007	
	in %		in days
Men	3.0	5.6	9.6
Women	2.7	6.5	13.9
15 to 29 years	2.7	5.5	10.4
30 to 49 years	2.6	5.9	11.9
50 to 64 years	3.9	6.6	9.9
Total	2.9	5.9	11.0

Source: *Leoni* (2010); OÖGKK, WIFO.

A further disaggregation by age groups shows that in relative terms the difference between those who are continuously employed and those who eventually lose their job is highest for younger worker cohorts and lowest for those aged above 50. In absolute terms differences are however of a similar magnitude. Those who became unemployed at the beginning of 2007 reported 10.4, 11.9 and 9.9 more absence days in the previous year if compared to those who stayed in employment, respectively for the age groups 15 to 29, 30 to 49 and 50 to 64.

All values in table 5 are based on a comparison which did not take into account the extent of employment in the previous year.[14] It can be expected that the group of those who became unemployed was affected more than proportionally by unemployment in the past as well. In fact, whereas those who lost their job in 2007 averaged only 266 days in employment in the previous year, the control group had a mean of 342 employment days. It cannot be ruled out that a part of the observed gap in absence rates is already the consequence of negative health influences due to previous unemployment spells. In order to control for this possibility, I carried out a robustness check by restricting the analysis to workers who were continuously employed in 2006 (see table A2 in the appendix).[15] This restriction does not however change the substantial results of the analysis discussed above: the difference in average yearly sick leave between those who become unemployed and the control group still amounts to 11 days, although the distribution is less even across age groups.

Further robustness checks confirm that these results can be reproduced focusing also on other time periods. Table A2 displays findings with respect to the third quarter of 2007, as well as calculations for absence rate differentials two years before unemployment (i. e. for the year 2005 instead of 2006). Results for the third quarter of 2007 confirm the existence of a selection of less healthy individuals in the pool of the unemployed, with a differential of 12.5 sick leave days. They do however question the existence of a clear gender bias, as in this case it is men who reveal a stronger selection effect than women. As we would expect extending the observation to two years prior to unemployment leads to a reduction in sick leave differential between treatment and control groups. The differential between those who are continuously employed and those who become unemployed is however still sizeable, amounting on average to almost 8 sick leave days per year. This finding suggests that for the majority of workers changes in health status take place over longer time periods.

Statistical evidence for the fact that unemployed workers had higher absence rates in employment than those who stay in employment goes some way to explain the high sickness rate in unemployment. It does however not necessarily imply that health problems and high absenteeism are the causal origin of unemployment. In order to answer this question in a clear-cut way, it would be necessary to disentangle the link between high absence levels and other worker characteristics which can be associated with low productivity and therefore with

[14] In order to calculate absence rates, the total number of sick leave days in the course of the year was divided by the total number of days spent in employment and unemployment. Atypical forms of employment and other stati which are not relevant for sick leave were excluded from the analysis.

[15] The analysis was confined to workers who spent 365 days in employment in 2006.

an increased risk of being laid off. In other words, we would ideally want to observe productivity perfectly, so as to identify workers who are identical with respect to all characteristics relevant for productivity but with different levels of absenteeism. Such an identification strategy could be successful for determining the causal relationship between sickness absence and the risk of losing the job. The available data do not enable to go that far, they do however give the opportunity to test if sickness absence is a reliable predictor of unemployment risk (even if this might be because absenteeism covers or proxies other characteristics which increase the risk of unemployment).

Table 6 displays the estimation output of a probit model with the aim to investigate the likelihood of unemployment as a function of observed personal and occupational characteristics as well as of previous absence behaviour. The sample is restricted to those workers who were either continuously employed or who became unemployed during the year 2006. In order to control for unobserved heterogeneity with respect to the risk of becoming unemployed, information on employment status in the previous year as well as on unemployment episodes over the previous five years is included in the specification. Further variables cover also a set of firm characteristics, such as industry, firm size, wage level as well as age structure and gender structure.

Results fall in line with expectations, highlighting that men and blue-collar workers faced a higher risk of unemployment than the respective reference categories. Age reveals a positive although non-linear relationship with unemployment risk, whereas being employed in larger firms reduces the likelihood of losing the job. Prior atypical employment spells as well as out-of-labour-force periods are associated with positive coefficients, whereas time spent in regular employment tends to reduce the risk of losing the job. As we would expect, past unemployment is a strong predictor of the likelihood to become unemployed again at later points in time – this can be seen from the large and highly statistically significant coefficient for the variables which describe unemployment in the short (1 year) and long run (5 years). Other variables describing industry of occupation and firm characteristics complete the picture. Not surprisingly, industries with a strong seasonal component such as construction and tourism are characterized by the highest unemployment risk. Also agriculture and transport reveal positive and significant coefficients, whereas the coefficient for business-related services turns up positive as expected but fails to reach statistical significance. Workers in companies characterised by a high wage level and a high share of female employees are less likely than others to become unemployed.

Sickness absence reveals a sizeable and statistically highly significant positive coefficient. Marginal effects indicate that an additional month spent in sick leave in the course of 2005 increases the likelihood of unemployment in 2006 by about half as much as an additional month spent in unemployment in the same year. As previously discussed it is not possible to interpret this result as a strict causal relationship, because high levels of absenteeism might mask other characteristics which influence the risk of unemployment. In fact it cannot be ruled out that high absence rates might also be partly the consequence of individual employment perspectives within the firm: *Kauermann – Ortlieb* (2004) find evidence according to which in downsizing firms those workers who are already set to leave the firm report higher levels of sick leave shortly before their exit. In spite of these caveats, results from the probit estimation indicate that the absence rate in a given time period is a meaningful predictor for the risk of unemployment in subsequent periods. Although health might not be isolated as a causal factor, it is plausible to assume that health status and absence levels might be at the very least co-determinants of future employment perspectives. This finding carries interesting policy implications, because it suggests that targeting preventive measures at workers with high absence rates while they are still in employment might be an effective way to address existing health problems and to reduce the risk of unemployment.

Table 6: Probit model to estimate the likelihood of unemployment

	Dependent variable: Continuous employment vs. begin of unemployment spell in 2006			
	Probit			
	Coeff.	std. err.	Z	p>|z|
Female	-0.005	0.001	-7.23	0.000
Age	0.001	0.000	10.20	0.000
Agesquare	0.000	0.000	-12.74	0.000
White-collar	-0.012	0.001	-20.20	0.000
Wage level (previous five years)	0.000	0.000	-11.36	0.000
Employment status in previous year:				
Unemployment (in months)	0.025	0.001	48.20	0.000
Atypical empl. (in months	0.002	0.001	3.33	0.001
Regular empl. (in months)	-0.006	0.000	-19.71	0.000
Out of labour force (in months)	0.006	0.000	13.09	0.000
Unemployment in previous 5 years	0.002	0.000	45.95	0.000
Sick leave in previous year (in months)	0.013	0.000	44.46	0.000
Agriculture, mining	0.040	0.005	8.73	0.000
Manufacturing	-0.005	0.001	-4.15	0.000
Electricity, water	-0.018	0.002	-9.53	0.000
Construction	0.050	0.003	16.83	0.000
Wholesale and retail trade	0.002	0.001	1.37	0.171
Hotels, restaurants	0.017	0.002	7.12	0.000
Transport, communication	0.011	0.002	5.22	0.000
Financial intermediation, real estate	-0.004	0.002	-2.16	0.031
Business activities	0.002	0.002	1.28	0.200
Public administration	-0.009	0.001	-6.20	0.000
Education	-0.012	0.001	-8.46	0.000
Health and social services	-0.004	0.002	-2.08	0.038
Other services, activities of household	0.005	0.002	2.75	0.006
Mean age in the firm	0.000	0.000	2.93	0.003
Median wage level in the firm	0.000	0.000	-31.62	0.000
Fraction of female employees in the firm	-0.025	0.001	-19.04	0.000
Firm size	0.000	0.000	-21.60	0.000
Log pseudolikelihood	-61,008.639			
Pseudo R^2	0.407			
Number of observations	419,795			
0 (continuous employment)	391,783			
1 (unemployment)	28,012			

Source: own calculations; OÖGKK, WIFO.

4.3 Unemployment as a health risk factor

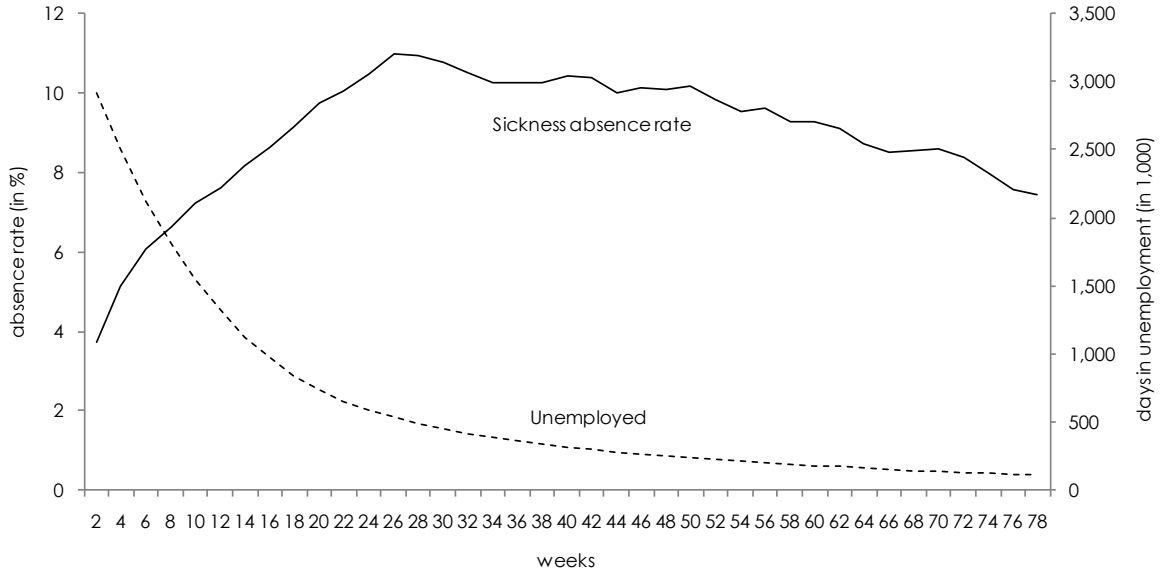
In spite of the fact that the unemployed are a selected group of persons with above-average sickness rates, the vast literature on this topic stresses that unemployment is associated with a deterioration of health status. This deterioration might be the consequence of factors which aggravate pre-existing health problems and predispositions, as well as of the emergence of entirely new disorders as a result of experiencing unemployment. The effects of unemployment are difficult to identify precisely because of the multi-factorial nature of most health problems. Unemployment can be part of a vicious circle made of pre-existing health problems, new psycho-social risk factors and decreasing economic, personal and social resources to face these problems. The loss in perspectives typically associated with long-term unemployment can moreover lead to changes in life-style and behaviour which represent an additional burden on health. *Kieselbach – Beelmann* (2006) for instance find that particularly unemployed youngsters tend to increase risky attitudes such as smoking, high consumption of alcohol and lack of physical activity. The negative consequences of this behaviour might become fully apparent at later stages, which might explain the link between job loss and increased mortality risks documented in longitudinal studies such as *Gerdtham – Johannesson* (2003) and *Sullivan - von Wachter* (2009).

The existing literature supports the notion that the effects of unemployment on health are at least partly a function of the duration of unemployment spells. Data for Upper Austria show that the long-term unemployed contribute more than proportionally to the total volume of sickness absence reported to social insurance agencies. As we would expect, the distribution of unemployment across spells is skewed, with a mean duration of 91 days and a median duration of 51 days. Moreover, sick leave is distributed unevenly across unemployment spells of different duration.[16] Brief unemployment spells of less than one month account for 3% of all unemployment days in one year, but their share of sickness days is only 0.8%. Similarly, unemployment spells with duration between 1 and 6 months, which represent 35% of total unemployment, cause only 22.6% of sick leave. More than three sickness days out of four (76.7%) can be attributed to unemployment episodes with duration of more than six months, representing 61.9% of total unemployment.

[16] The following figures refer to the year 2006.

Figure 8: Sickness absence and unemployment duration

All unemployment spells with start in 2005 or 2006



Source: *Leoni* (2010); OÖGKK, WIFO.

A graphical representation of this pattern shows that unemployment duration and absence rate are inversely related. If we group together all unemployment episodes which began in a certain period (in this case the years 2005 and 2006) and construct a weekly sickness indicator by dividing the number of certified sick leave days (ordered by the week in which they occurred within the individual unemployment spell) by the total number of unemployment days, we get figure 8. The horizontal time axis spans a period of 78 weeks, i. e. 1½ years. This means that a movement to the right on the horizontal axis restricts the view to increasingly longer unemployment spells. Whereas the number of spells falls rapidly due to the fact that only a small fraction of them last for longer than a few months, the share of time spent on sick leave increases rapidly and peaks after approximately six months. In the first one or two months, absence rates in unemployment, though considerably higher than those affecting the employed workforce, are comparably low. After one month in unemployment workers average an absence rate of roughly 5% and this rate increases to 11% if we look at the sixth month in unemployment. In the subsequent weeks and months the share of sickness absence decreases slightly while remaining at a high level.

A further disaggregation of the data by age reveals both common characteristics and differences between groups (figures A1, A2 and A3 in appendix). Irrespective of age there is an inverse relationship between unemployment duration and sick leave levels. For all three

groups the highest share of sickness absence is reached after approximately six month in unemployment. Further permanence in unemployment tends to be associated with at most stable or slightly declining sickness absence rates. In this respect there are however notable differences between age groups: Relatively stable absence patterns for those in the young and middle age cohorts as compared to a sharp decrease in sick leave for older cohorts. Old workers are also characterized by high levels of sick leave at the entry in unemployment and by a particularly sharp increase in absence rates in the following weeks and months. It can also be seen from the graph (i. e. from the flat shape of the curve measuring unemployment) that only few workers over 50 who become unemployed are able to find a new job.

The strong discontinuity observed with respect to absence rates in long unemployment spells of older workers can largely be attributed to selection processes out of unemployment and into retirement. In fact, it is plausible that workers with the highest incidence of health problems and the highest number of sickness days are also most likely to be granted early retirement (for instance through a disability pension). These exits out of the labour force can be interpreted as a selection of particularly sick workers and are bound to reduce the average absence rate of those workers who continue to be long-term unemployed. In the case of unemployed workers of younger age, retirement is unlikely to play a significant role.

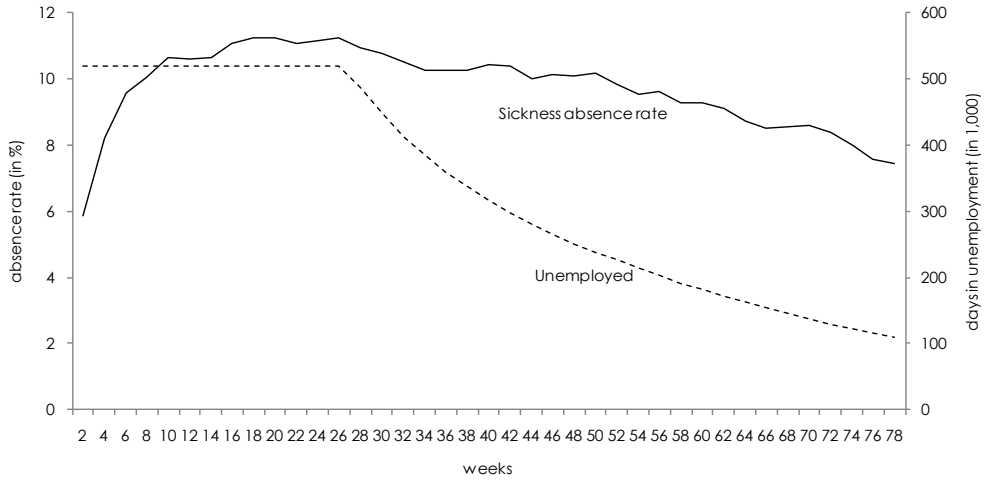
One difficulty in the interpretation of these results is due to the fact that pooling together short- and long-term unemployment spells leads to obscure the role of selection effects: It can be asked whether absence rates actually increase with unemployment duration, or whether on the contrary the pattern displayed in figure 8 is results from the fact that the long-term unemployed have very high absence rates from the beginning. The role of selection effects out of unemployment can be minimized by restricting the analysis to workers hit by long-term unemployment. As we would expect, the long-term unemployed have higher sick leave rates than the average unemployed from the beginning (see figures 9 to 11). We can also observe that the rise in absence rates during the first months in unemployment is steeper than for the total population in unemployment. Nevertheless the fundamental pattern, whereby the share of time in which unemployed workers are sick increases with the duration of unemployment up to a point and then remains constant or decreases slightly, holds true. Workers with unemployment spells lasting at least six months have on average absence rates of 6% when they enter unemployment, with rates reaching over 11% after approximately five months. After six months, when we observe also the first exits from unemployment, the average time spent on sick leave starts to decrease.

Differences between genders are not very pronounced. Generally speaking men who experience long-term unemployment reach on average higher absence rates than women. The broad picture, with sick leave levels roughly doubling and peaking within the first six month in unemployment, and slightly decreasing afterwards, can be observed for male and female jobseekers alike. A further test of this issue focusing on unemployment spells with duration of more than one year does not alter the bottom line results (see figures A4, A5 and A6 in appendix).

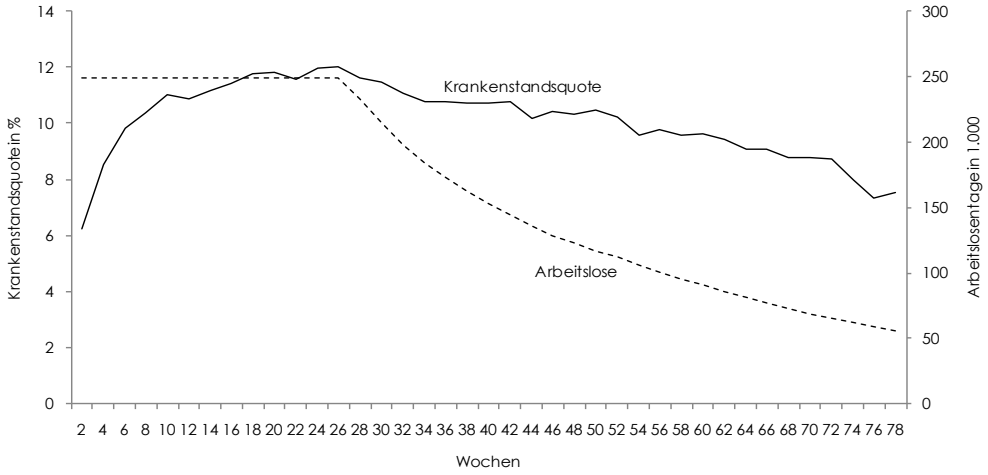
Figures 9, 10 and 11: Sickness absence and unemployment duration

All unemployment spells with start in 2005 and 2006 and duration of more than 6 months

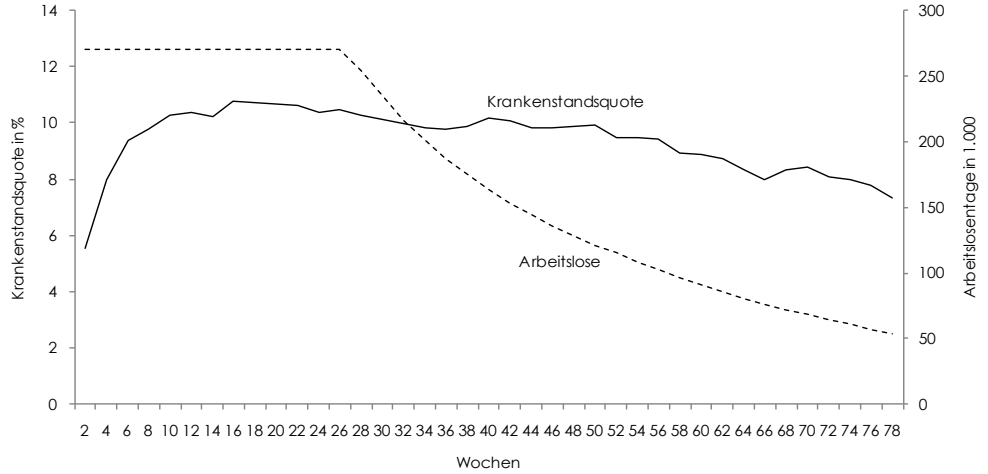
Total



Men



Women



Source: own calculations; OÖGKK, WIFO.

The evidence suggesting that in the long run sickness absence tends to remain stable or to decrease is not easy to interpret. One hypothesis which is often discussed in the literature concerns the implications of long-term unemployment for psychological well-being and life satisfaction. Although there are good reasons to believe that longer unemployment spells are more detrimental to health and happiness, it is possible that the negative effects may actually decrease after a certain period in unemployment. *Clark* (2006) mentions two arguments which support this view: The first is that the there might be beneficial effects due to a learning process, whereby unemployed individuals learn how to cope with their situation (e. g. by finding new social contacts) and therefore in the long run return to higher levels of satisfaction and well being. This might in turn reflect positively on health, especially for what its mental dimension is concerned. In second place it can be assumed that after a certain time adaptation or habituation sets in, i. e. a reduction in the intensity with which the unfavorable circumstances associated with unemployment are perceived.

A look at the literature does not however lead to a clear consensus with respect to the existence and magnitude of these effects. *Clark* (2006) for instance concludes his investigation of the relationship between unemployment duration and happiness, based on three European panel data sets, by saying that "habituation to unemployment does not seem to have been a widespread phenomenon in Europe in the 1990's". In a previous study Clark *et al.* (2001), who used a broad measure of unemployment duration by calculating total exposure to unemployment over a period of three years, found that the psychological impact of unemployment diminishes with increasing experience of unemployment.

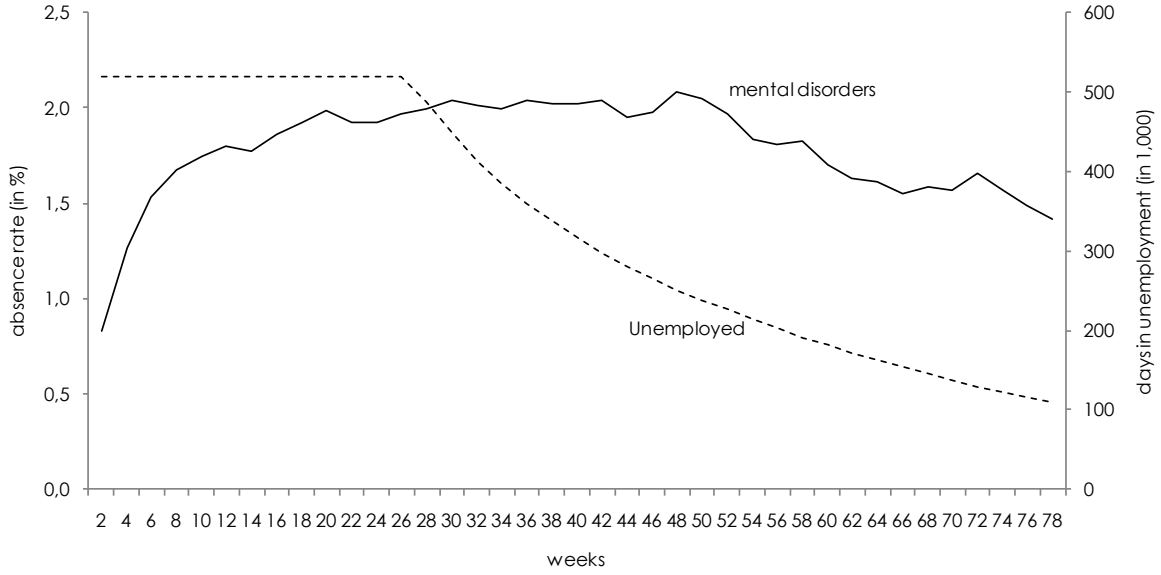
In order to find evidence which might be relevant for the hypothesis that the negative effects of unemployment on mental well-being diminish once the benefits of learning processes and habituation set in, I carry out an analysis focusing only on sick leave episodes diagnosed as mental disorders (ICD9 categories 290 to 319). Figures 12 and 13 are restricted to workers experiencing unemployment for at least six months and one year, respectively. Results can be reconciled with the habituation hypothesis, and they lend moderate support to this theory. The habituation hypothesis would lead us to expect that mental health problems decrease over time, and that this decrease is more than proportional with respect to other causes of sick leave.

Empirical results however suggest that mental disorders follow the trend that we observe for overall sickness along unemployment duration. The share of mental disorders on total sickness increases in the first months of unemployment, and remains to a large extent constant

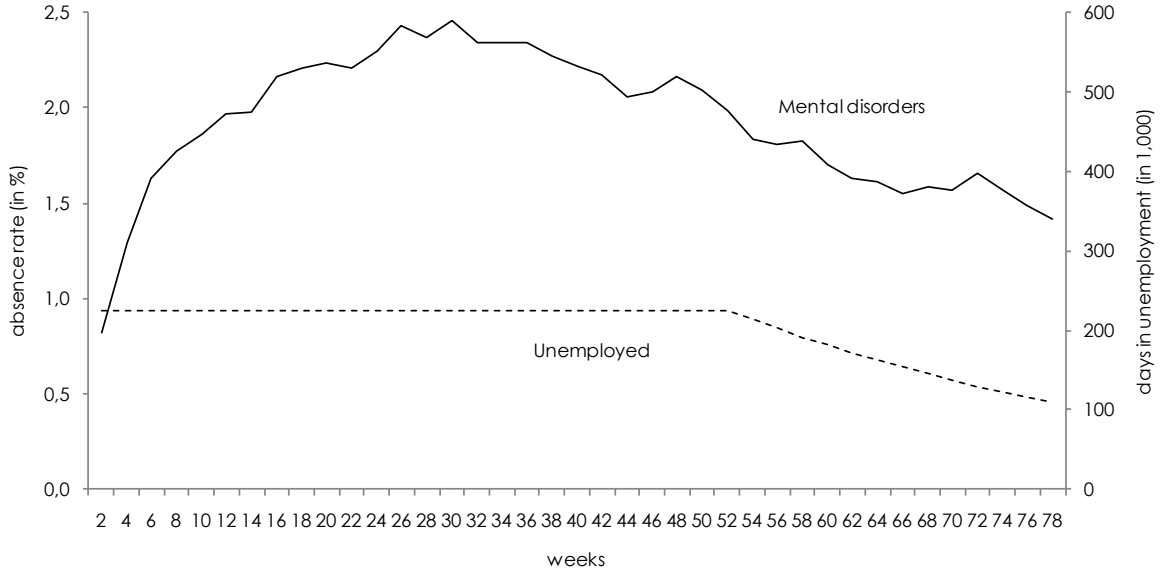
thereafter. Although mental disorders account for less than 5% of sickness absence in employment, this figure increases to 15% for sick leave in unemployment and to approximately 20% for long-term unemployment. The fact that in the long run mental disorders account for a constant share on total sickness might be interpreted as evidence against the habituation hypothesis. Since sick leave irrespective of diagnostic cause tends to decrease after the first six months in unemployment, it might be argued that other factors are responsible for the observed sick leave pattern in connection with unemployment spell duration. For instance, this pattern might be the consequence of changes in the reporting of sickness rather than in genuine changes in health conditions in long-term unemployment.

Figures 12 and 13 : Sick leave due to mental disorders and unemployment duration

All unemployment spells with start in 2005 and 2006 and duration of more than 6 months



All unemployment spells with start in 2005 and 2006 and duration of more than 1 year



Source: own calculations; OÖGKK, WIFO.

4.4 The role of structural and institutional factors

As discussed in section 2.2, structural economic shifts and institutional changes in the social protection system and in labour market policy might help to explain the long-term increase in sick leave observed in unemployment. These aspects cannot be investigated in depth here, because the micro-data on which the present analysis is based cover only a comparatively short period of time. Moreover, this period (2004-2007) falls within a decade in which the Upper Austrian labour market experienced a favourable development, characterized by sustained job creation and the attainment of the lowest unemployment rate of all Austrian federal states. The Upper Austrian economy is dominated by a large, export-oriented manufacturing sector, which underwent a painful restructuring process lasting until the second half of the 1990s. Following a period of downsizing and consolidation, the job loss in manufacturing was first stopped and then reversed. Between 1995 and 2007, Upper Austria's share on total Austrian employment increased by almost 1 percentage point (from 16.8% in 1995 to 17.7% in 2007). Over the same period, the unemployment rate dropped from 5.1% to 3.6% (in Austria: from 6.6% to 6.2%).

The social insurance data used in this study are thus not well-suited to investigate why sick leave in unemployment increased so dramatically starting with the 1990s. It can be hypothesized that this development was at least in part the consequence of a long-term increase in unemployment as well as of changes in the composition of unemployment. Arguably the inflow of high shares of older workers coming from industries with high exposure to physically straining and hazardous working conditions contributed to increase sickness levels in unemployment. Although this hypothesis cannot be tested here, evidence from the Upper Austrian social insurance data can help to highlight the importance of compositional factors for sickness levels in unemployment. Table 7 reports the structure of unemployment and sick leave levels by industry of last occupation for the year 2007. As can be seen, in Upper Austria manufacturing workers accounted for a comparatively low share of unemployment. On the contrary, workers with a background in construction and – much more so – tourism are represented more than proportionally in unemployment. This is largely due to the fact that both industries are characterized by high levels of seasonal unemployment, a fact which in turn might explain why the absence rates of these unemployed lie below the average. Comparatively high shares of unemployed were previously working in the educational sector, and a much larger share of them was employed in business-related services. These business-related services comprise temporary work as well as a large number of low-skilled jobs. It is

interesting to note that unemployed workers who come from these fields of employment have an above-average number of sick leave days while being unemployed. In total, this group of workers accounts for one fifth of all sickness absence days in unemployment. Workers from the public sector are highly under-represented in unemployment, the same is true of workers from the credit and finance industry and from the utilities sector (energy and water).

Table 7: Distribution of unemployment and sickness absence, by industry

	Employed		Unemployed	
	Share	Absence rate	Share	Absence rate
	in %			
Agriculture and mining	1.1	3.6	1.6	6.3
Manufacturing	28.1	3.9	15.9	8.8
Energy and water	0.9	3.6	0.2	10.4
Construction	9.5	4.1	10.3	7.4
Trade	17.6	3.2	16.8	8.0
Tourism	3.5	3.2	9.1	8.3
Transport	4.3	3.8	4.9	8.3
Finance, insurance and real estate	5.8	2.6	3.2	7.8
Business-related services	9.1	4.1	17.5	9.8
Public administration	7.9	4.4	4.4	8.6
Education	1.6	4.1	5.8	8.0
Health and social services	6.3	3.4	4.0	7.3
Other services	4.4	3.4	6.3	7.9
Total	100.0	3.7	100.0	8.4

Source: *Leoni* (2010); OÖGKK, WIFO.

Whereas the most momentous changes in the labour market have arguably taken place during the 1990s, numerous reforms in the social protection system and in labour market policy have been implemented in the course of the last decade. This has on the one hand contributed to a compositional change in the structure of unemployment, with an increasing share of persons who are on their way to retirement but in the meanwhile are still receiving benefits paid from unemployment insurance and are also still contributing to increase the number of sick leave days reported to social insurance agencies. On the other hand the paradigmatic shift in labour market policy, with a marked shift in the direction of activating measures and of stricter monitoring of jobseekers, has most likely also contributed to the rise in absence rates observed in unemployment.

Some evidence to substantiate these claims comes from an analysis of sickness absence by type of benefit. Table 8 presents the results from a zero-inflated negative binomial regression model to determine the propensity to be on sick leave in the course of an unemployment spell, as a function of personal characteristics and the type of benefit being perceived. Personal characteristics reveal the expected pattern, with women, older persons and blue-collar workers

being more likely to report sick than other categories of jobseekers. Estimation results highlight that there is also a statistically significant association between type of benefit and number of days on sick leave. With the exception of the residual category 'other types of benefits' all benefit categories display a sizeable and highly significant positive coefficient with respect to the reference category (i. e. workers who perceive unemployment benefit). In terms of magnitude, the largest coefficient is found for workers on a pension-related benefit, followed by those on unemployment assistance and by those who are participating in a training measure.

The high incidence of sickness among persons who perceive advance pension or transitory benefits related to retirement is easy to explain: These groups represent a selection of older unemployed workers with very low employment perspectives and an above-average likelihood of being affected by health problems. Moreover, the fact that in many instances these persons apply for disability pension represents a strong incentive to document and report all episodes of illness. Workers on unemployment assistance represent another specific sub-population, characterized by long-term unemployment and more unfavorable employment perspectives than those on unemployment benefit. The positive and sizeable coefficient for workers who are taking part in a training measure is of more difficult interpretation. On the one hand, training program participants represent a selected group of persons with longer unemployment spell durations than the average unemployment benefit recipient. On the other hand, it can be assumed that participation in ALMP leads to a more comprehensive reporting of sickness episodes, for instance with respect to short sickness spells which might otherwise go unreported. It is also possible that mandatory participation in training measures leads to a higher occurrence of strategic behaviour on the part of jobseekers, who might try to report sick so as to avoid participation in unwanted measures.

These results have to be interpreted as preliminary, indirect evidence. They do however support the notion that reforms in the pension system and changes in labour market policy, which led to an increase in the share of unemployed waiting for retirement as well as of those taking part in activating measures (see figure 4 in section 2.2.), contributed to the marked increase in absence rates in unemployment observed in the long run.

Table 8: Differences in absence days by type of benefit

	Dependent variable: Days on sick leave			
	Zero-inflated negative binomial			
	Marg. effects	Robust std. err.	Z	p>|z|
Female	1.722	0.075	23.00	0.000
Age	0.570	0.020	28.25	0.000
Agesquare	-0.004	0.000	-16.26	0.000
Type of benefit:				
Unemployment benefit (ref. category)				
Unemployment assistance	3.143	0.111	28.35	0.000
Benefits related to a training measure	2.011	0.120	16.78	0.000
Benefits related to retirement	3.899	0.178	21.92	0.000
Other types of benefits	-2.187	0.771	-2.84	0.005
Benefit duration	0.013	0.000	80.57	0.000
Log pseudolikelihood	-923,580.8			
Number of observations	525.395			
Zero observations	374.498			
Nonzero observations	150.897			

Source: *Leoni* (2010); OÖGKK, WIFO. Note: In order to avoid heteroskedasticity as a consequence of multiple observations (i. e. unemployment spells) for the same person, Z-values are based on robust standard errors calculated with the help of the STATA command option "cluster".

5 Summary and conclusions

Austrian social insurance data show that unemployed workers are sick considerably more often than employed workers. In 2008, the last year for which statistics are available, the unemployed averaged 32.5 days on sick leave, the employed only 12.5 days. This large differential is the product of a marked increase in sickness absence in unemployment over the last two decades. Between 1990 and 2008 sickness absence per unemployed worker has increased with a compound average growth rate of 3.2% per year (with the absence rate going from 4.7% to 8.9%). Over the same period absence rates in employment decreased by almost one fifth, from 4.2% to 3.4%. The high incidence of illness among jobseekers corroborates the view that unemployment is associated with a comparatively poor health status.

The long-term evolution of sick leave in unemployment, which is not the main focus of the present paper, can be explained only tentatively on the basis of aggregate data. Changes in the composition of the unemployed population as well as institutional changes affecting labour market policy and social protection can be seen as relevant factors in this respect. Structural shifts in the economy have considerably worsened the labour market perspectives of older

workers with low and medium skill levels. As a result, there has been a strong inflow of these categories of workers into unemployment, accompanied by an increase in unemployment duration. Reforms of the pension system may also have contributed to engross the number of unemployed workers characterised by low employability and a high incidence of health problems. At the same time, a paradigmatic shift in labour market policy, with a stronger emphasis on activating measures, may have increased the incentive to call in sick and therefore the number of illness episodes recorded by social security agencies.

The present paper focuses primarily on present-day differences between employed and unemployed workers and investigates these differences with the help of micro-data from social insurance. The empirical analysis relies on sick leave data covering all employed and unemployed workers in Upper Austria, one large Austrian federal state, in the period 2004-2007. Results reveal that the unemployed have not only quantitatively more, but also qualitatively different occurrences of illness than the employed. Several indicators suggest that among the unemployed there is a higher incidence of severe health problems causing prolonged periods of illness. In unemployment, almost one tenth of reported sickness episodes last for longer than six weeks (i. e. a share three times higher than in employment), accounting for one half of total absence. The over-proportional share of long-term illness in unemployment results in a mean illness episode duration of 19 days in unemployment, against 10.3 days in employment, and a median duration of 9 days against 5 days. In addition the unemployed report a larger number of days in hospital, with a much higher share of sickness episodes leading to hospitalisation.

These findings lead to the question whether the health situation of the unemployed is a matter of selection of already sicker persons out of active employment (the selection effect) or whether unemployment is in itself responsible for health status deterioration (the causation effect). These two hypotheses, which have been widely discussed in the literature, should not be seen as mutually excluding. In fact it may be argued that both aspects play a role and reinforce each other. The empirical evidence presented in this article points in this direction: One the one hand, those workers who become unemployed have considerably higher absence rates in employment than fellow workers who stay continuously in employment. This difference, which can be interpreted as an approximation for the size of the selection effect, accounts for roughly half the observed gap in sick leave between the employed and the unemployed. Multivariate analysis confirms the existence of a strong association between the absence rate in employment and the propensity to become unemployed, after controlling for a

number of personal and occupational characteristics. Although the absence rate in employment cannot be identified as a causal reason for job loss and subsequent unemployment, it still goes some way to explain why the unemployed as a group reveal a very high incidence of sick leave.

On the other hand, there exists a positive albeit non-linear relationship between sickness and unemployment duration. The number of sick leave days increases rapidly in the course of the first months in unemployment, with the long-term unemployed reaching the highest level after five to six months. In the following months, the amount of time spent on sick leave tends to decrease. In spite of the difficulty to interpret this non-linear trend, the evidence suggests that unemployment duration is associated with negative health status developments. In accordance with previous empirical findings and with theoretical approaches to the health dimension of unemployment, the unemployed suffer frequently from mental disorders. In employment, in the course of one year less than 70 sick leave days are diagnosed as mental disorders for every 100 workers; in unemployment, the corresponding figure is over 550. Although women have a higher incidence of mental disorders (or at least a higher number of illnesses diagnosed as such) than men in both employment and unemployment, it is unemployed men who experience the sharpest increase in mental problems in the wake of unemployment. This finding lends support to the thesis that men suffer more than women from experiencing unemployment.

Irrespective of the answer we give concerning the relative weight of selection and causation effects associated with unemployed, it is a fact that the unemployed population is characterised by a poor health status and a high incidence of severe health disorders. These health problems jeopardize the employability and represent a major hurdle for the return to active employment. The deep recession of 2009 and the grim labour market outlook for the years to come give reason to be pessimistic with respect to further developments concerning the health status of the unemployed. The adverse labour market situation is likely to exacerbate selection effects of less healthy workers out of employment. In addition, those who become unemployed will find it more difficult to find their way back into employment, a dynamic which will lengthen unemployment spells and potentially further aggravate the negative health effects of unemployment.

Although there has been increasing awareness of the need to address health issues as part of labour market policies aimed at a re-integration of the (long-term) unemployed, so far there has been only limited progress on this front. In Austria, numerous projects have been

conceived and implemented with the objective to improve the health status and thus the employability of unemployed workers.[17] Most of these projects have however represented one-off experiences with a limited duration. In addition, there exists little scientific evidence on their effectiveness and efficiency, as only a small fraction of them have been evaluated on a rigorous basis. The Austrian situation does not represent an exception in the international context. According to an expertise commissioned by the German Association of Company Health Insurance funds in 2004, out of 36 projects addressing the health status of the unemployed, less than one sixth had been properly evaluated. Out of those projects which were evaluated, only 3 showed a measureable positive effect, and only 1 had been subjected to a cost-benefit analysis (*Kirschner – Elkeles*, 2006; *Kirschner*, 2008). It is beyond the scope of the present paper to discuss the most appropriate response to the challenge represented by health problems in the context of unemployment and labour market participation. In light of the complexity and multi-dimensionality associated with health issues, a broad range of different approaches and types of measures might be necessary. The empirical evidence uncovered in the present paper emphasises the need to address health problems early on in the individual career. The presence of sizeable selection effects suggests that waiting until workers are unemployed in order to involve them in health promoting activities might not be sufficient. On the contrary, health monitoring of those in employment (for instance using the number of sick leave days as a leading indicator) might represent a more promising avenue to recognize health problems and to improve employability before workers become unemployed and risk to get stuck in a vicious circle of deteriorating health conditions and worsening employment perspectives.

[17] Information on health projects can be found in the database of the *Fonds Gesundes Österreich* (FGÖ), under: http://zmi.fgoe.org/fgoe/plone/projektfoerderung/gefoerderte-projekte.

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Appendix

Table A1: Sample characteristics

Employed		**2004**	**2005**	**2006**	**2007**
Total	n of spells	811,983	809,350	818,935	829,586
	days	175,217,388	176,498,264	179,468,074	184,197,975
	sick leave	6,503,518	6,616,282	6,330,578	6,810,871
	mean n of sick leave days	13.5	13.7	12.9	13.5
Women	n of spells	343,308	338,484	344,390	354,000
	Days	74,206,458	74,799,646	75,895,281	77,802,600
	sick leave	2,575,181	2,639,431	2,515,247	2,725,252
	mean n of sick leave days	12.7	12.9	12.1	12.8
Men	n of spells	468,675	470,866	474,545	475,586
	Days	101,010,930	101,698,618	103,572,793	106,395,375
	sick leave	3,928,337	3,976,851	3,815,331	4,085,619
	mean n of sick leave days	14.2	14.3	13.4	14.0
Unemployed		**2004**	**2005**	**2006**	**2007**
Total	n of spells	250,720	187,472	195,910	182,637
	Days	11,507,724	13,803,460	13,744,227	12,356,643
	sick leave	1,011,487	1,107,583	1,092,999	1,041,343
	mean n of sick leave days	32.1	29.3	29.0	30.8
Women	n of spells	101,201	72,552	79,164	77,004
	Days	4,973,884	6,151,706	6,307,161	5,987,775
	sick leave	459,327	496,048	503,471	513,870
	mean n of sick leave days	33.7	29.4	29.1	31.3
Men	n of spells	149,519	114,920	116,746	105,633
	Days	6,533,840	7,651,754	7,437,066	6,368,868
	sick leave	552,160	611,535	589,528	527,473
	mean n of sick leave days	30.8	29.2	28.9	30.2

Source: own calculations; OÖGKK, WIFO.

Table A2: Robustness checks on the selection effect of sick workers in unemployment

Restriction to workers with continuous employment in 2006

	Sickness absence rate 2006		Difference in sickness absence between unemployed and employed workers
	Continuous employment during I. quarter 2007	Unemployment beginning I. quarter 2007	
	in %		in days
Men	2.9	5.9	10.8
Women	2.6	5.9	11.8
15 to 29 years	2.6	4.9	8.5
30 to 49 years	2.5	5.6	11.2
50 to 64 years	3.8	8.8	18.1
Total	2.8	5.9	11.2

Sample confined to employment and unemployment in III. quarter 2007

	Sickness absence rate 2006		Difference in sickness absence between unemployed and employed workers
	Continuous employment during III. quarter 2007	Unemployment beginning III. quarter 2007	
	in %		in days
Men	3.1	7.4	15.6
Women	2.7	5.2	9.2
15 to 29 years	2.8	5.8	11.1
30 to 49 years	2.7	6.5	13.9
50 to 64 years	3.9	7.4	12.8
Total	3.0	6.4	12.5

Comparison of absence rates two years earlier (2005)

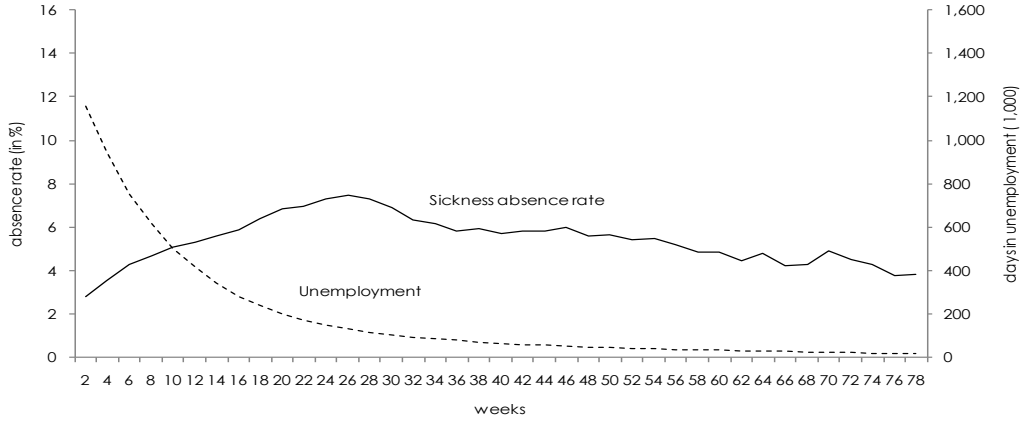
	Sickness absence rate 2005		Difference in sickness absence between unemployed and employed workers
	Continuous employment during I. quarter 2007	Unemployment beginning I. quarter 2007	
	in %		in days
Men	3.3	5.3	7.4
Women	2.9	5.3	8.5
15 to 29 years	2.9	5.1	7.8
30 to 49 years	2.9	5.3	8.8
50 to 64 years	4.0	5.7	5.9
Total	3.2	5.3	7.9

Source: own calculations; OÖGKK, WIFO.

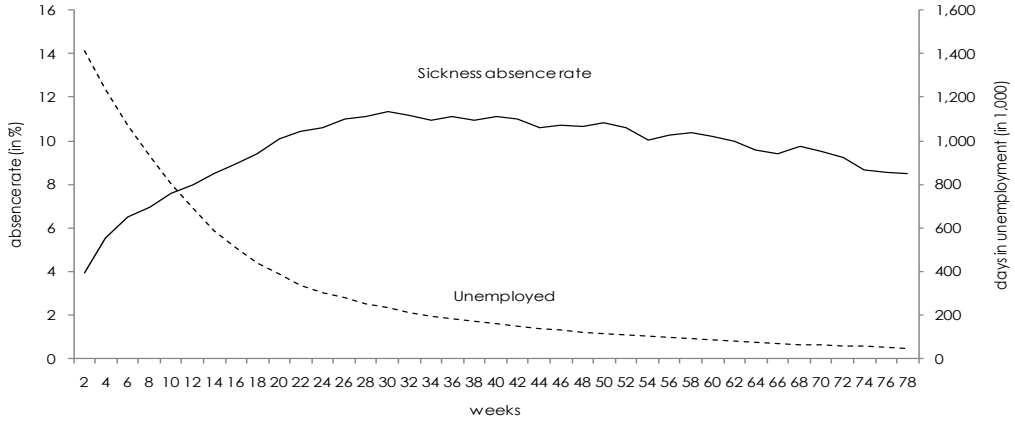
Figures A1, A2 and A3: Sick leave and unemployment duration

All unemployment spells with start in 2005 and 2006

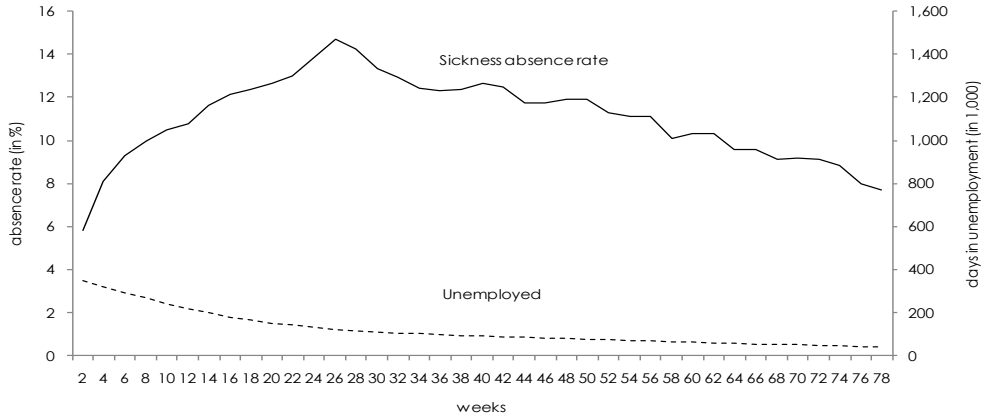
15 to 29 years



30 to 49 years



50 to 64 years

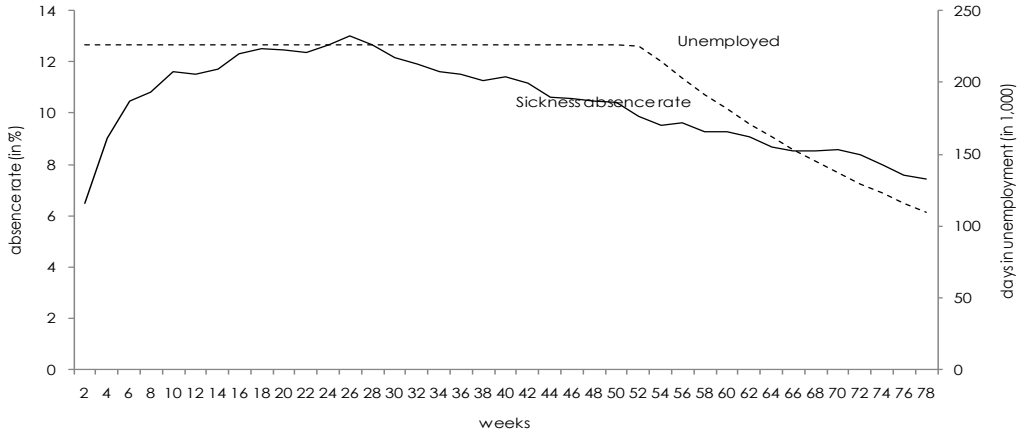


Source: *Leoni* (2010); OÖGKK, WIFO.

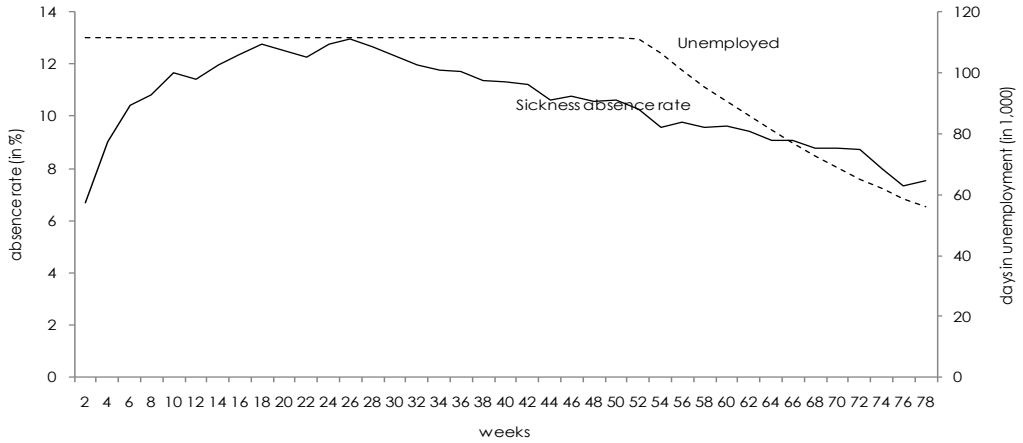
Figures A4, A5 and A6: Sick leave and unemployment duration

All unemployment spells with start in 2005 and 2006 and duration of more than 1 year

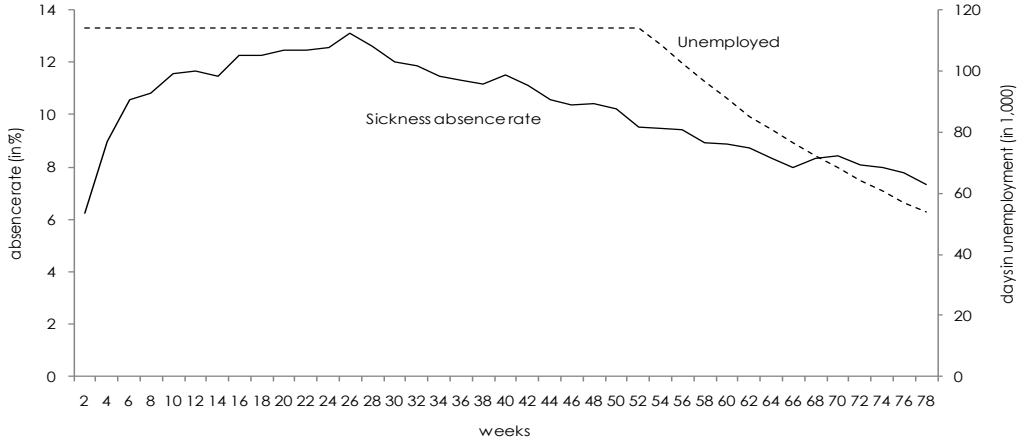
Total



Men



Women



Source: own calculations; OÖGKK, WIFO.

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