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Being on Sick Leave – Possible Explanations for Differences of Sick-leave Days Across Countries

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Ifo Working Paper No. 19

November 2005

An electronic version of the paper may be downloaded from the Ifo website: www.ifo.de

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Abstract

Sick-leave days differ widely among industrialised countries. For the US it is 5, for Sweden 20 and for Poland 26 days per year and per employee. The possible causes for these differences have apparently not been systematically analysed. Two groups of contributing factors are considered: (1) natural causes, like the general health situation, employment of women and older persons, and (2) behavioural reactions (a) to macroeconomic conditions, like unemployment or the possibility to work outside the official labour market, and (b) to the design of institutions, like the generosity of granting sick leave. On the basis of 20 countries it is econometrically shown that the main explanatory factors are: generosity of granting sick leave, opportunity costs due to income differentials with neighbouring states, and employment of older people. The unemployment rate – contrary to the result of some single-country studies – and the employment of women do not contribute to the explanation of sick-leave differences between countries.

JEL Code: I12, I18.

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1. Introduction

There are large differences in sickness absence across industrialised countries (see figure 1). The differences between the country with the lowest level of days absent due to illness (USA) and the one with the highest level (Poland) are more than fivefold. It is also striking that the Eastern European transition countries (Czech Republic, Hungary, Slovak Republic and Poland) are all among the countries with the highest number of days absent, with Poland, Slovak Republic and the Czech Republic ranked on top. This article seeks to explain these differences.

Figure 1:

Sick-leave days per year and per employee, 1996 - 2002
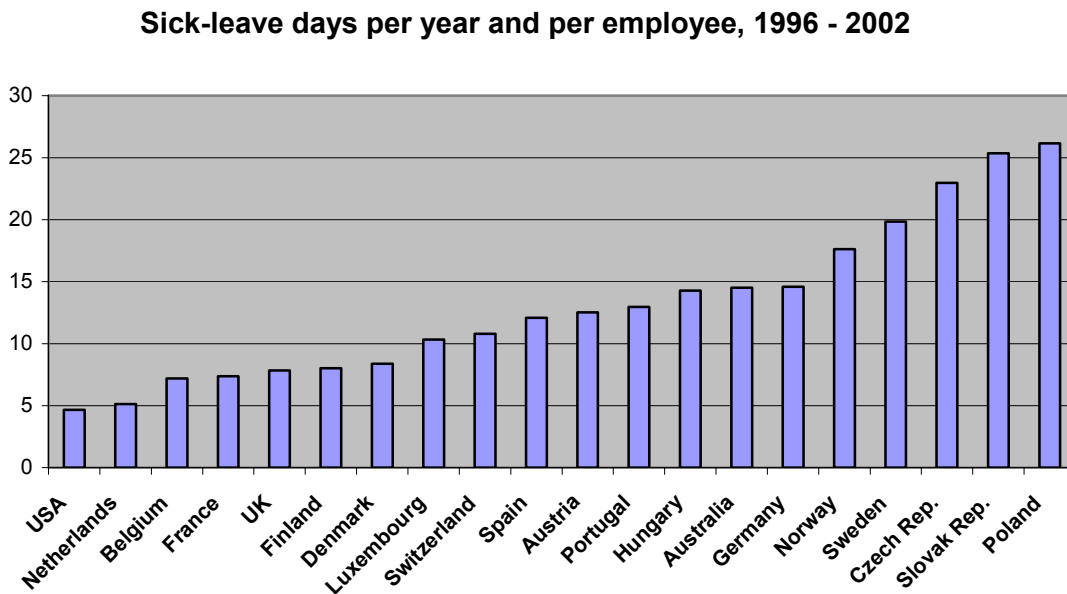
Section 2 describes what the literature has to say to that question and what it does not say. Annex A contains an annotated list of the literature. The next section discusses possible explanatory variables in the light of the literature and adds two variables which apparently have not been taken into account up to now. Section 4 contains the econometric analysis. The data is described, the method introduced and the results presented. Sections 5 and 6, respectively, offer a conclusion on economic policy reform and some ideas for further research.

2. The literature and open questions

There is a growing literature on sickness absence. It can be classified into country studies, international comparisons and single topic studies. Annex Table A.1 gives an overview. Most studies (at least most of the studies listed) are by economists, but also sociologists and psychologists are engaged in the debate. All studies, with one exception, are of an empirical nature, albeit using methods of quite different degrees of sophistication. The exception is the study of Holmlund (2004), who presents a theoretical model of employee behaviour under specific benefit

schemes applied to different labour force states (like at work, on sick-leave, unemployed). The majority of studies focuses on single countries, sometimes with a look to other countries.

Compared to single country studies, there is a much lower number of international comparisons. An even smaller number covers many countries *and* tries to assess the determinants of differences in sickness absence. One recent example for the latter type of studies is the yet unpublished work of Frick and Malo (2005).

However, the existing literature mentions a certain number of possible determinants of sick-leave differences across countries. These determinants will be incorporated into this analysis. At first one might consider the *objectively given health situation* of the population as a determining effect on sickness absence. But there seems to be no study in which this is suggested to be the case. (This could be different if countries of largely diverging per-capita income and health-care provision levels were analysed. But all studies mentioned in Table A.1 relate to industrial countries.) In many studies the determining effect of the *unemployment rate* (specifically: of its change) has been established. The employment of *women and older persons* also seems to contribute to sickness absence. Many studies stress the importance of *institutional regulations* which determine the *degree of generosity* to which sick-leave absence is granted or made possible. But there is no study, to our knowledge, which establishes systematically a relation between a measure of generosity to the amount of sickness absence in a country-comparative context, with the exception of a preliminary study by Osterkamp (2002).

One possible (co-)determining factor for sickness absence, which especially relates to the high number of days absent in the transition countries, is, to our knowledge, never mentioned in the literature: the opportunity for employees in lower income countries to earn income in the unofficial labour market of neighbour states. Some studies on the determinants of sickness absence do make (verbal) reference to opportunity cost considerations and respective behavioural reactions of employees but do not consider explicitly the question whether the opportunity to earn income in the black market of neighbour countries might be related to sickness absence behaviour.

3. Explaining variables

The aim is to explain the differences of sickness absence across countries. The potential explaining variables are taken from the above-mentioned literature and from further own considerations. The variables can be grouped in *natural causes* and *behavioural reactions*.

Natural causes

Differences in the *general health condition of the population* might, at a first glance, be able to explain different sickness absence rates. However, it is not very plausible that the general health conditions in industrialised countries vary so much that the large differences in sickness absence

rates could be explained. Moreover, the "objectively given general health of a population" is difficult, if not impossible, to measure. Single variable measures, like mortality rates, do not seem to cover adequately what is meant by "general health of a population". There do exist individual, self-reported judgements of own health in cross-country studies (e.g. Banks et al., 2004). But the results are difficult to assess. It has been found that more than half of the differences in the self-reports are based on response scale differences (Banks et al., 2004). Thus, this factor has not been included in the list of potential explaining variables.

Research at the enterprise level (e.g. Moreau et al., 2004, Barmby et al., 2000) shows that in most cases women and older persons are more often absent due to sickness than men or younger persons (by about 10% in both cases). *Female and old-age participation rates* have therefore been incorporated in the study.

Behavioural reactions

The *unemployment rate* and its change is the most intensively studied single factor for explaining different (and changing) absence rates. In most countries there is a clear pro-cyclical behaviour of sickness absence. This relation is specifically pronounced e.g. in Germany, Norway and Sweden. For Norway, Askildsen et al. (2002) have shown that the pro-cyclical behaviour of sickness absence cannot be explained by a composition effect (changing age and health structure of an enterprise's employees during the cycle) but must be due to a disciplining effect of the cycle. The level of unemployment, thus, has been included in the research.

A further behavioural reaction can be expected to stem from *institutional regulations* concerning sick leave, which can be characterised by the following factors:
- Is there a waiting period (and of how many days), after which sick-leave pay starts?
- Is there the possibility of self-certification for being sick (and for how many days)?
- The official sickness certificate is issued by whom – by the patient's own doctor or by an independent examining doctor who works on behalf of the employer or the sickness fund?
- In case of sickness absence, how long does the employer continue to pay the salary, and is there any reduction?
- In case of sickness absence, how long does the sickness fund continue to pay the salary, and is there any reduction?

These factors are condensed into a *measure of generosity of granting sick leave*. For the first three factors it is straightforward to integrate them into the measure of generosity. A longer waiting period reduces generosity, more self-certification days increase it. The issuance of the

official sickness certificate by a doctor of the *patient's confidence* is of high generosity,[1] while the issuance by a doctor of the *employer's or the sickness fund's confidence* is of lower generosity. The latter two cases mean that there is an external proof. Also straightforward is the amount (percentage) of continuation of payment, either by the employer or by the sickness fund. The higher the amount, the higher generosity. With respect to the question of who pays – the employer or the sickness fund – we assume that the longer the employer pays and the later the sickness fund steps in, the lower the generosity. The reason is that the employer–employee relation is less distant and more personal than the relation between sickness fund and employee. Moreover, the sickness fund draws on anonymous funds, while the employer uses his own money for paying sick leave. Thus, the latter has better instruments and more incentives to monitor the employee going or being on sick-leave.

If a sickness is not too serious – all the more if there is no sickness at all – an employee has an advantage from being on sick leave. He (she) avoids the disutility of work, can perform simple tasks at home or can even offer working hours on the *black labour market*, while, at the same time, sick-leave pay is received. The major *enabling factor* for this behaviour is the practice and generosity of granting sick-leave (see above under institutional factors). The *driving factor* of such behaviour is the size of the opportunity income (of various forms) that can be earned this way.

In this study only one form of opportunity income is taken into consideration, namely the income that can be earned from engaging in the labour market of a neighbour country. For countries of low per-capita income *and* with access to the labour market of high-income countries the size of that opportunity income and, thus, of the incentive to be engaged in black labour activities of the neighbour country is measured by the difference in per-capita income. For Hungary, Poland, Portugal, the Czech Republic and Slovakia the incentive is, thus, measured as the percentage that the neighbouring country's.[2] per capita income exceeds its own income.

4. Econometric Analysis
4.1 Data
Data on sick leave absence for several countries are provided by the OECD (Health Database) and the WHO (Health for all Database). Sickness absence is measured on an annual basis by the

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[1] Privately practicing doctors compete for patients. Issuance of sickness certificates is one of their important instruments to meet the competition. To our knowledge, there is only one systematic survey that assesses the behaviour of doctors in issuing sickness certificates (Hussey et al., 2004, for general practitioners in Scotland). The study reports that most doctors are neither willing nor do they feel able to differentiate between really sick patients and malingerers. The study concludes that there "appeared to be important deliberate misuse of the system by general practitioners" – and by patients, could be added.

[2] Austria and Germany are considered as neighbouring countries for Poland, Czech Republic, Slovakia and Hungary. For Portugal the "neighbouring" high-income country has been assumed to be France.

number of work days lost per year and per employee. In order to reduce possible influences from the cycle, sickness absence figures have been calculated as the average of the years 1996-2002. There exist contradictions between data published by official country sources and OECD and WHO data. These are possibly due to different methods of measurement. While it is certainly preferable to use national sources in single country studies, we prefer data from international organizations to assure comparability across countries.

The data on female employment is calculated as percentage of female employed to total employed. Old age employment is measured as the percentage of 55-64 year old employed to total number employed. Figures on female employment, old age employment, the standardized unemployment rate and per capita income are all taken from the *OECD Statistical Compendium* (2004). Information on the institutional factors has been gathered from several sources. The main source was the database *Social Security throughout the World* (2004) and the database *Reformmonitor* (2004) of the German Bertelsmann Foundation.

4.2 Estimation Approach

Because of the small number of observation[3] it is crucial in our analysis to save on the number of degrees of freedom to be able to make interferences. Thus, we aggregate the various measures of generosity to form a single index. To construct the index of generosity we have formed indices of the single factors, which are normalised to lie within a range of 0 and 1.[4] Each single index is coded in such a way that the higher the value of the subindex the higher the level of generosity according to our reasoning in the previous section. The aggregate index of generosity is then an unweighted average of the single indices.

Instead of assigning identical weights to the single components of our index we alternatively use a factor analytical aproach to establish weights of the single factors. The basic idea is that the statistical relationship among indicators (measured by the correlation matrix) can be explained by their common dependency on one or a few common factors. Goal of factor analysis is to organize subindices or clusters in a way – not a priori, but on the basis of the information contained in the data - that the indicators within a subindex are more similar than the indicators in another subindex. The similarities of the subindices are computed from the information contained in the indicators. To calculate the subindices factor analytical methods try to reveal approximate linear dependencies among indicators. This procedure assures that the smallest number of linear combinations (indicators) is constructed out of a set of subindices with the least loss of information. It is often the case that a small number of linear combinations provide the same amount of information for plots, regressions or cluster analysis as the original data.

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[3] In most of the regression specifications the number of observation is 20. The countries included are Australia, Austria, Belgium Czech Republic, Denmark, Finland, France, Germany, Hungary, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom and the United States.

[4] The calculation of the indices has been done according to the following formula: (Observed value – Min (all values)) / (Max (all values) – Min (all values))

Work in progress. More to come…

To investigate the differences in the number of sick leave days we employ a simple cross-country OLS estimation approach. The main focus of our analysis lies in the institutional determinants of granting sick leave days across countries. These institutional determinants usually stay constant over longer periods of time. Thus, the explanatory power of institutions to explain variations in sick-leave days is likely to stem from variations across countries and not within countries. This might explain why single-country studies that take into account institutions do not find clear cut evidence of a connection.

More formally we estimate the following equation:

$$(1) \qquad y_i = \alpha + \beta\, I_i + \gamma X_i + \varepsilon_i \quad,$$

where y_i is the average number of sick leave days per employee and year, I_i is our index of generosity and X_i is vector of control variables that have been found to explain sick leave days in the literature. Additionally we include in this set of control variables a measure of income differences between neighbouring countries. Finally, ε_i is an error term with the usual properties exept that we allow the variance to vary across observations by using White's heteroskedastic consistent standard errors in all our specifications.

4.2 Results

Table 1 (Annex C) provides first evidence of a positive relationship between the generosity of granting sick leave days and the average number of sick leave days. The table displays regression results of different specification of the generosity index and sick leave days. In all specifications the index is highly significant. It should be highlighted that when the employer's duration of payment is included in the index the coefficient increases and the standard error reduces.[5] This supports our notion that there is a negative relationship between the duration of the employer's payment and the level of sick leave days. In all regressions below we use the specification in which all single indicators are included (generosity index 1). This is our prefered specification as it is able to explain the highest share of the variation in sick leave days.

To further explore if there indeed is a positive relationship between institutions that determine the level of generosity and the number of sick leave days or wether the index simply picks up the effect of omitted variables we control for a number of different explanatory variables proposed in the literature. The results are shown in table 2.

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[5] The index of employer`s duration of payment is coded such that the higher the the level of the index the higher generosity.

First we control for the level of unemployment. A high unemployment rate might discipline employees by inducing pressure of loosing their jobs. Table 2 column 1 shows that while the index of generosity stays highly significant the unemployment rate also exhibits a significant impact. However, the coefficient is positive. This result is counterintuitive and needs further investigation. Column 2 displays the results when a measure of employment protection is added to the regression.[6] Stricter employment protection might act as a counter force to unemployment rates, as it reduces the danger of job loss. Since employment protection and unemployment are likely to be positively correlated the coefficient of the unemployment rate might be biased upwards. While the coefficient of the generosity index only reduces marginally and stays highly significant the coefficient of the unemployment rate decreases by more than 10% and is now only significant at the 10% level. Employment protection is marginally significant (15% level) and has the expected sign. We take this result as evidence that the positive effect of the unemployment rate on sick leave days can at least partially be explained by differences in labour market institutions.

Inspection of figure 1 reveals that the Eastern European countries rank on top in the level of sick leave days in the sample. To control for the effect of Eastern European countries we include a dummy variable (column 3). The results are striking. The coefficient of the dummy variable is highly significant. Moreover, the coefficient of the the unemployment rate decreases by more than 50% and is no longer significant. The coefficient on strictness of employment protection also declines but is now significant at the 10% level. Our measure of generosity is still highly significant. The initial counterintuitive effect of the unemployment rate can therefore entirely be traced back to the influence of the transition countries.

This last result raises the question as to what the underlying causes for the exceptional high absence days in Eastern European countries might be. We propose as one possible explanation per capita income differences between neighbour states. Income differentials can be interpreted as opportunity costs and thus provide an incentive to call in sick and offer labour in the informal sector of the neighbour state. To test this hypothesis we include income differentials into our regression specification. The results in column 4 show that income differentials have significant explanatory power (only slightly above the 5% level). Furthermore, differences in per capita income seem to reflect more information than simply picking up the effect of the transition countries, as the dummy variable turns insignificant. Employment protection looses its significance as well.[7]

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[6] We use the OECD index of employment protection legislation of regular contracts. The index is coded on a scale from 1 to 6, where a higher index value reflects stricter employment protection. The number of observations decreases to 19 since there is no observation for Luxemburg fort his index.

[7] We experimented with different and more general measures of labour market regulations, e.g. a measure provided by the Fraser Institute, but they all turn out to be insignificant.

Finally, we control for two more explanatory variables that are regularly proposed in the litera-
ture: employment of women and employment of the old. While we do not find an impact of
female employment (column 5) on sick –leave days we do find a significant effect of the em-
ployment of the old (column 6).

In table 3 we report next to our preferred specification (column1) results were we add women
employment and strictness of employment protection separately and then jointly. As expected
the results do not change significantly.

As a very preliminary robustness check we employ a factor analytic method of aggregating in-
stitutional variables into our measure of generosity.[8] The advantage of this more sophisticated
data reduction technique is that the weights of the single variables are no longer arbitrarily cho-
sen to be equal. Column 5 of table 3 displays the result. While this changes the results quantita-
tively – the coefficient on the index drops by more than a third – qualitatively the results stay
the same – the generosity index is still highly significant. We take this as a hint that while equal
weights might not be an appropriate way of aggregation the conclusion we drew are still valid.
Work in progress. More to come…

6. Conclusions

The national discussion in many countries on how to reduce sickness absence seems to be de-
termined by the idea that *work makes you sick*. Accordingly, the linchpin of redressing exces-
sive absenteeism (as far as this is the case) is seen in requiring changes of the working condi-
tions, above all less repetitive work and more moral and social encouragement of the employ-
ees.

Our analysis suggests that there are other factors that policymakers should take into account. In
a sample of 20 OECD countries we find a strong positive relationship between the generosity of
granting sick leave days and days of absenteeism. Furthermore, our results suggest that there is
a positive relationship between income differences of neighbouring states and sick leave days.
We interpret this as evidence that employees of lower income countries in the OECD have an
incentive to report in sick on their regular job and instead work in the unofficial market of the
high income neighbour state. In light of the demographic trend of ageing societies in many
OECD countries it is noteworthy that we find a significant correlation between the number of
older people employed and the number of sick leave days. However, the unemployment rate and

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[8] We apply a *principal factor* analysis on our seven indicators of generosity. We extract only the first
principal factor since it is the only one having an eigenvalue greater than 1. This factor corresponds to
our index of generosity above. To obtain the weights of the single indicators we estimate the latent
factor via the regression method (Thomson, 1951). The regression coefficients are than used as the
weights.

the employment share of women do not contribute to the explanation of cross country differences in sickness absence.

7. Further research

First, a factor analytical approach to obtain weights of the index of generosity is preferable, since it overcomes the problem of arbitrarily chosen weights.

Second, it would be desirable to scrutinise the sick-leave data as well as the factors of generosity on the basis of a detailed country-by-country survey. A review of individual country sources might also lead to an enlargement of the number of countries incorporated in the analysis.

Third, panel analysis might shed additional light on the question treated here. In particular, one could control for unobserved heterogeneity, which might be present in this context. However, that requires that information on generosity factors is available in time series.

References

Aronsson, G., K. Gustafsson, M. Dallner (2000), "Sick but yet at work. An empirical study of sickness presenteeism", *Journal of Epidemiology and Community Health*, 54, 502 – 509.

Askildsen, J. E., E. Bratberg, Ö. A. Nilsen (2002), "Unemployment, Labour Force Composition and Sickness Absence: A Panel Data Study", IZA Discussion Paper 466.

Banks, J., A. Kapteyn, J. P. Smith, A. v. Soest (2004), "International Comparisons of Work Disability", IZA Discussion Paper 1118.

Barmby, T. A., M. G. Ercolani, J. G. Treble (2000), "Sickness Absence: An International Comparison", IRISS Working Paper 2000-03.

Beatty, C., S. Fothergill, R. MacMillan (2000), "A Theory of Employment, Unemployment and Sickness", *Regional Studies*, Vol. 34, Oct., 617 – 630.

Bengtsson, T. and K. Scott (2002), "Immigrant Consumption of Sickness Benefits in Sweden, 1981 – 1991", Working Paper, Dep. of Economic History, Lund University.

Biffl, G. (2002), „Der Krankenstand als wichtiger Arbeitsmarktindikator" (Sick leave as an important labour market indicator), WIFO-Monatsberichte, 1, 39 – 52.

Boss, A. (1999), "Lohnfortzahlung und Krankenstand" (Sick-leave payment and sickness absence), Kiel Working Papers, 935.

Campioletti, M. and J.N. Lavis (2000), "Disability Expenditures in Canada, 1970 – 1996: Trends, Reform Efforts and a Path for the Future", *Canadian Public Policy – Analyse de Politiques*, XXVI, 2.

Ercolani, M. (2000), "A Simple Empirical Model of Sickness Absence Appkied to UK Survey Data", Working Paper, Institute for Labour Research, University of Essex.

European Foundation for the Improvement of Living and Working Conditions (1997), *Preventing Absenteeism at the Workplace*, Luxembourg.

Eurostat (2004), *Work and Health in the EU – A Statistical Portrait, 1994 – 2002*, 2003 edition.

Frick, B., M. A. Malo (2005), Labour Market Institutions and Individual Absenteeism in the European Union, unpublished conference paper

Danish Ministry of Employment (2003), *Analyse af det danske sygefravaer* (Analysis of Danish sickness absence), Copenhagen.

Gimeno, D., F. G. Benavides, J. Benach, B. C. Amick III (2004), "Distribution of sickness absence in the European Union", *Occupational and Environmental Medicine*, 61, 867 – 869.

Holmlund, B. (2004), "Sickness Absence and Search Unemployment", CESifo Working Paper 1227.

Hussey, S., P. Hoddinott, Ph. Wilson, J. Sowell, E. Barbour (2004), "Sickness certification system in the United Kingdom: qualitative study of views of general practitioners in Scotland", *British Medical Journal*, January.

Ichino, A. and R. T. Riphahn (2001), "The Effect of Employment Protection on Worker Effort: A Comparison of Absenteeism During and After Probation", IZA Discussion Paper 385 and CESifo Working Paper 596.

Jensen, Ch., A. Aronsson, O. Björnstad, H. K. Gunnarsdottir (2003), *Sygefravaer i Norden* (Sick leave in the Nordic countries), Copenhagen.

Kelly, K. and W. Nichol (1988), *Sickness Beneficiaries – Trends and Characteristics*, Dept. of Social Security, Canberra.

Osterkamp, R. (2002), "Work Lost Due to Illness – An International Comparison", CESifo Forum, December, 36 – 40.

Moreau, M., F. Valente, R. Mark, E. Pelfrene, P. de Smet, G. De Backer, M. Kornitzer (2004), "Occupational Stress and Incidence of Sick leave in the Belgian Workforce: the Belstress Study", *Journal of Epidemiology and Community Health*, 58, 507 – 516.

Thalmeier, A. (1999), „Bestimmungsgründe von Fehlzeiten: Welche Rolle spielt die Arbeitslosigkeit?" (Determinants of sickness absence: which role for unemployment?), IZA Discussion Paper 62.

Thornton, P. (2003), *Disability Management – Statement and Comments*, Disability Management in the Netherlands, Nov. 24 – 25.

Annex A: Review of the literature and raw data

Table A. 1

Review of the literature on sickness absence

Author, year, author's profession	Title	Countries	Content
Single country studies			
Kelly and Nichol, **1988**, (economists)	Sickness Beneficiaries – Trends and Characteristics	Australia	Strong increase of sick leave days (SLD) was accompanied by growing unemployment in 1980s (i.e.: anti-cyclical development). The increase of SLD is explained by higher use of sick-leave payment instead of (less attractive) unemployment compensation.
Boss, **1999**, (economist)	Lohnfortzahlung und Krankenstand (Sick-leave payment and sickness absence)	Germany	The generosity of granting sick leave plays a dominant role in explaining the level and development of SLD. Moreover, SLD behave pro-cyclically. There is a short look also at the sick-leave regulations of other countries (NL, USA, UK, Sweden).
Thalmeier, **1999**, (economist)	Bestimmungsgründe von Fehlzeiten: Welche Rolle spielt die Arbeitslosigkeit? (Determinants of sickness absence: which role for unemployment?)	Germany	Main determinant of SLD is unemployment (and, thus, the cycle). SLD develop pro-cyclically. Changes of generosity have had minor effects on SLD.
Aronsson, Gustafsson and Dallner, **2000**, (sociologists)	Sick but yet at work. An empirical study of sickness presenteeism	Sweden	"Presenteeism" means *not* being on sick leave although sick. The study is based on self-reported data. It finds that presenteeism is combined with working in care, welfare or teaching occupations, with low wages as well as with high sickness absence.
Campioletti and Lavis, **2000**, (economists)	Disability Expenditures in Canada, 1970 – 1996: Trends, Reform Efforts and a Path for the Future	Canada	Description of the various relevant social support systems for disability (sickness included), of expenditure trends and of ongoing reforms. Further necessary reforms are seen in a better program coordination and benefit integration.
Ercolani, **2000**, (sociologist)	A Simple Empirical Model of Sickness Absence Appkied to UK Survey Data	UK	An "Underlying Propensity for Sickness Absence" is measured by individual socio-economic characteristics.
Askildsen, Bratberg and Nilsen, **2002**, (economists)	Unemployment, Labour Force Composition and Sickness Absence: A Panel Data Study	Norway	There is a pro-cyclical development of sickness absence which can be explained by effects of the cycle on workers' discipline, but *not* by the composition effect of the cycle
Bengtsson and Scott, **2002**, (economists)	Immigrant Consumption of Sickness Benefits in Sweden, 1981 – 1991	Sweden	Part of the high Swedish SLD figures is explained by the relatively intensive use of the sick-leave possibility by immigrants.
Biffl, **2002** (economist)	Der Krankenstand als wichtiger Arbeitsmarktindikator (Sick leave as	Austria	Main determinants of SLD are seen to be the development of unemployment (i.e.: SLD behave pro-cyclically) and of labour force participation rates (gender and age). The latter factor is influenced

	an important indicator for the labour market)		by societal developments to facilitate early retirement and disability pensions.
Danish Ministry of Employment, **2003**	Analyse af det danske sygefravaer (Analysis of Danish sickness absence)	Denmark	SLD are mainly attributed to institutional conditions (generosity of granting sick leave). Short comparisons of those conditions with Sweden, Norway and UK
Thornton, **2003**, (economist)	Disability Management – Statement and Comments	NL and UK	The contribution reviews critically the ongoing reform developments in the Netherlands to increase the responsibility of employers for reducing sickness absence (disability management practices) and the possible transfer of this method to the UK.
Hussey et al., **2004**, (physicians)	Sickness certification system in the United Kingdom: qualitative study of views of general practitioners in Scotland	UK	The study concludes that sick-leave certificates are issued to an important degree in deliberate misuse of the system.
Moreau et al., **2004**, (physicians and public health economists)	Occupational stress and incidence of sick leave in the Belgian workforce: the Belstress study	Belgium	Study on the enterprise level. Sickness absence is mainly attributed to strained jobs with low social support.
Single topic studies			
Beatty, Fothergill and MacMillan, **2000**, (economists, geographers)	A Theory of Employment, Unemployment and Sickness	UK data as an example	The study concludes that job dismissals may result in higher recorded sickness (absence) instead of higher recorded unemployment.
Ichino and Riphahn, **2001**, (economists)	The Effect of Employment Protection on Worker Effort: A Comparison of Absenteeism During and After Probation	An Italian firm as an example	The study shows that after the end of the probation period (beginning of employment protection) sickness absence more than doubles.
Holmlund, **2004**, (economist)	Sickness Absence and Search Unemployment	Theoretical paper	Different labour force states are considered (employed, on sick-leave, unemployed with or without searching due to health conditions). It is assumed that the benefit structure applied for the different states influences the choice of the state. It is shown that there might be a socially optimal benefit structure with differentiated benefits across labour force states.
International comparisons			
European Foundation for the Improvement of Living and Working Conditions,	Preventing Absenteeism at the Workplace	EU-15 + Norway	Differences in institutional regulations (generosity of granting sick leave) across countries are described but are not seen as explanatory factors for differences in SLD. The main part of the study relates to the enterprise level, presents "models of good practice" (from 8 countries) and formulates 9 recommendations for enterprises to reduce sickness absence.

1997			
Barmby, Erco- lani, Treble, **2000**, (sociolo- gists)	Sickness Absence: An International Comparison	8 EU coun- tries + Canada	Sickness absence is related to individual socio-economic factors (age, gender, marital status, income, sector, tenure). Moral hazard as an explanatory factor is mentioned but not analysed.
Osterkamp, **2002**, (econo- mist)	Work Lost Due to Illness – An International Com- parison	18 coun- tries	Sickness absence is related to a rough indicator of generosity of granting sick leave. To the usual measure of total health-care costs of the economy the non-production due to sickness absence is added.
Jensen et al., **2003**, (sociolo- gists, econo- mists)	Sygefravaer I Norden (Sick leave in the Nordic countries)	DK, N, Swed., Icel.	Sickness absence is mainly seen as a result of individual health and of the type of work and conditions of the work place.
Eurostat, **2004**	Work and Health in the EU – A Statistical Portrait	EU total	The publication provides commented tables and graphs. Sickness absence is only reported by sector, not by country.
Banks et al., **2004** (sociolo- gists, psycholo- gists)	International Compari- sons of Work Disability	US, UK, NL	The amount of self-reported work disability differs considerably across countries. The study shows that more than half of that dif- ference can be explained by response scale differences instead of by differences of the objectively given health status.
Gimeno et al., **2004**, (public health econo- mists)	Distribution of sickness absence in the European Union	15 EU coun- tries	Self-reported data for sickness absence of at least one day are used. Institutional regulations as possible explaining factors for differ- ences across countries are mentioned.
Frick and Malo, 2005 (econo- mists)	Labour market institu- tions and individual ab- senteeism in the EU	12 EU coun- tries	Data from the "European Survey on Working Conditions"; explain- ing variables as employment protection and sickness benefits are far less relevant than individual worker characteristics.

ANNEX B: Table B. 1
Possible causes for differences of sick-leave days, data and bivariate correlations

	Dependent variable	Independent variables												
	Sick-leave days	Unempl. Rate	Old-age empl.	Women empl.	Strict-ness empl. protec.	Wai-ting period in days	Employer payment duration in weeks	Employer payment in %	Sickness fund, max. duration in weeks	Sickness fund, amount	Self cert. in days	Ex-ternal proof	Genero-sity index	Neighb. income above own inc.
Australia	14,5	7,5	8,4%	43,3%	1,5	0	0	0	52	60%	0	0	0,51	0%
Austria	12,5	5,3	6,7%	42,8%	2,9	3	8	100	52	60%	3	0	0,66	0%
Belgium	7,2	7,9	6,2%	41,3%	1,7	1	4	70	52	60%	1	0,5	0,54	0%
Czech Rep.	23,0	6,9	7,9%	43,5%	3,3	0	2	100	62	60%	0	0	0,66	240%
Denmark	8,4	4,7	10,4%	45,8%	1,5	0	2	100	52	70%	3	0,5	0,66	0%
Finland	8,0	10,2	9,0%	47,4%	2,3	9	0	0	52	70%	0	1	0,31	0%
France	7,4	10,5	8,0%	44,3%	2,3	0	0,5	100	52	50%	1	0	0,64	0%
Germany	14,6	8,1	12,0%	42,7%	2,7	0	6	100	78	70%	3	0	0,77	0%
Hungary	14,3	7,5	5,3%	44,5%	1,9	0	2	70	52	60%	0	0	0,60	240%
Luxem-bourg	10,3	3,0	6,1%	37,9%	-	0	12	100	52	100%	1	0	0,75	0%
Netherlands	5,1	3,8	6,9%	41,9%	3,1	0	52	70	52	70%	0	1	0,35	0%
Norway	17,6	4,9	12,0%	46,2%	2,3	0	2,5	100	52	100%	4	0	0,84	0%
Poland	26,2	13,9	7,3%	45,0%	2,2	0	5	80	26	80%	0	0	0,61	380%
Portugal	13,0	5,9	11,1%	44,8%	4,3	3	0	0	52	70%	3	0	0,57	100%
Slovak Rep.	25,4	15,6	4,7%	45,1%	3,6	0	2	100	52	55%	0	0	0,63	450%
Spain	12,1	14,5	10,8%	35,5%	2,6	3	0	0	52	70%	3	0	0,57	50%
Sweden	19,9	5,8	14,5%	47,6%	2,9	1	2	80	52	80%	7	0	0,81	0%
Switzerland	10,8	3,1	11,8%	43,9%	1,2	3	2	90	100	70%	1	0,5	0,67	0%
UK	7,8	5,5	10,6%	44,8%	0,9	3	28	50	52	50%	0	0	0,44	0%
USA	4,7	4,8	9,7%	46,3%	0,2	15	15	80	52	70%	0	1	0,32	0%
Bivariate correlation		**0,474**	**-0,053**	**0,170**	**0,469**	**-0,438**	**-0,410**	**0,202**	**-0,188**	**0,138**	**0,142**	**-0,607**	**0,526**	**0,767**

NOTES: SLD and unemployment rates are averages of 1996-2002, and female and old age employment rates are the averages of 1996 – 2000; the strictness of employment protection index relates to the end of the nineties and the other variables relate to the beginning of the 2000s.

Annex C: Regression Results
Table C 1

Dependent variable: sick leave days per employee and year	(1)	(2)	(3)	(4)
Generosity Index I (0,1) Scale	22.26 *** (4.51)			
Generosity Index II without employer payment duration		18.78 *** (4.71)		
Generosity Index III without external proof			17.91 *** (6.01)	
Generosity Index IV without waiting period				20.13 *** (4.36)
Constant	- 0.15 (2.40)	2.75 (2.60)	2.97 (3.58)	2.01 (2.47)
R-squared	27.55	22.55	15.19	23.35
Number of observations	20	20	20	20

Robust standard errors in parenthesis

*** significant at 1% level, ** significant at 5% level, *significant at 10% level

Table C 2

	Dependent variable: sick leave days per employee and year					
	(1)	(2)	(3)	(4)	(5)	(6)
Generosity Index (0,1) Scale	**23.9 ***** (3.58)	**22.19 ***** (3.9)	**19.49 ***** (4.02)	**20.00 ***** (4.49)	**19.92 ***** (3.66)	**15.95 ***** (3.33)
Unemployment Rate	**0.89 ***** (0.34)	**0.73 *** (0.38)	0.30 (0.23)			
Strictness of Empl. Prot. (0,6) Scale		1.30 (0.84)	**0.99 *** (0.55)	0.53 (0.65)		
Eastern European Dummy			**8.50 ***** (2.75)	0.17 (5.55)		
Neighbour Income above own Income				**3.09 **** (1.48)	**3.28 ***** (0.46)	**3.99 ***** (0.41)
Employment of Women					0.26 (0.22)	
Employment of Old						**0.65 **** (0.24)
Constant	-7.71 ** (2.92)	-8.42 ** (3.29)	-4.55 (2.29)	-2.12 (1.48)	-12.46 (10.5)	-5.16* (2.86)
R-squared	53.65	57.32	79.36	81.78	81.19	84.58
Adj. R-squared	48.20	48.79	73.47	76.57	77.67	81.69
Number of observations	20	19	19	19	20	20

Robust standard errors in parenthesis

*** significant at 1% level, ** significant at 5% level, *significant at 10% level

Table C 3

Dependent variable: sick leave days per employee and year

	(1)	(2)	(3)	(4)	(5)
Generosity Index	**15.95 *****	**15.43 *****	**16.26 *****	**15.52 *****	
(0,1) Scale	(3.33)	(4.39)	(3.51)	(4.41)	
Employment of Old	**0.65 ****	**0.62 ***	**0.62 ****	**0.59 ***	**0.69 ****
	(0.24)	(0.33)	(0.27)	(0.33)	(0.26)
Neighbour Income above	**3.99 *****	**3.81 *****	**3.93*****	**3.74 *****	**3.80 *****
own Income	(0.41)	(0.53)	(0.47)	(0.58)	(0.43)
Strictness of Empl. Prot.		0.55		0.60	
(0,6) Scale		(0.74)		0.80	
Employment of Women			0.065	0.093	
			(0.14)	(0.13)	
Generosity Index II					**9.18 *****
Factor Analysis, (0,1) Scale					(1.81)
Constant	-5.16*	-5.65	-7.82	-9.57	7.15 **
	(2.86)	(3.34)	(5.95)	(7.14)	(2.89)
R-squared	84.58	85.02	84.66	85.15	85.23
Adj. R-squared	81.69	80.74	80.56	79.44	82.46
Number of observations	20	19	20	19	20

Robust standard errors in parenthesis

*** significant at 1% level, ** significant at 5% level, *significant at 10% level

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