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Sickness Absence and Local Cultures

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Abstract

Sickness absence has been found to vary substantially across geographical areas. There are large differences between different countries but also between different regions within a particular country. In the literature some of these observed differentials have been suggested to stem from differences in local norms with regard to the legitimacy of living off benefits. The aim of our study is to investigate the effect of geographical and presumed cultural context on sickness absence. In order to identify this effect we compare changes in sickness related absence for individuals who move from one Swedish region to another with those occurring when individuals move within Swedish regions. Our results indicate that the region of residence is important to the individual sickness related absence. Moreover, we cannot rule out the possibility that the observed patterns are caused by local cultures regarding sickness absence and the existence of a so called "cultural illness".

Keywords: Sickness absence, social norms, domestic migration

JEL classification: J22, R23, Z13

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1 Introduction

The levels of sickness absence vary substantially between different countries but also across regions within a particular country. Some of these variations have been attributed to varying sickness insurance systems giving rise to differences in economic incentives. These explanations are however, not sufficient for explaining any of the within-country variations or all of the between-country variations. Other explanations such as differences in organizational and demographic structure shed some light on the remaining differentials but even after taking these factors into consideration there is still much to be explained. One idea put forth in the sickness absence literature is that the large variations stem from differences in norms regarding the utilization of the welfare system. If attitudes towards living off benefits are positive, an individual is more prone to accept help from society as compared to countries where attitudes towards benefits are negative.

Data reveals also that Sweden is characterized by large geographical variations in the levels of sickness absence. Absence rates tend to be higher in northern Sweden and in rural areas as compared to in southern Sweden and in more densely populated regions. Some of the geographical divergences can be explained by differences in the demographic and industrial structure. However, large differences remain even after taking these characteristics into consideration (Dutrieux and Sjöholm 2003; Lundberg 2006). The remaining regional differentials in sickness absence have been attributed to differences in approach and organizational culture within the Swedish Social Insurance Agency (SSIA) (SOU 2000), as well as to cultural diversity regarding the legitimacy of benefits across regions (Palmer 2006).

Attitudes toward sickness benefits as a mean of livelihood vary among citizens, doctors and insurance officers throughout the country and are believed to cause sickness absence to differ across regions (Olsson (2006). This phenomenon has been labeled “cultural illness” (Lindbeck et al. 2004; Frykman and Hansen 2005). The term suggests that different norms regarding legitimate absence behavior, due to illness, prevail in different parts of the country. As a consequence, individuals with otherwise similar characteristics utilize the sickness insurance system differently, depending on where in the country they live. Even though the term “cultural illness” has been used quite frequently in the public debate, only a few studies have put this possible phenomenon to the test (Frykman and Hansen 2008; Lindbeck et al. 2007; Schierenbeck 2010).

The purpose of this paper is to investigate the effect of geographical and presumed cultural context on sickness absence. In order to identify this effect we compare changes in sickness related absence for individuals who move from one Swedish region to another, with those occurring when individuals move within Swedish regions. A region is defined as a cluster of municipalities which are similar with respect to certain geographical, political and economical characteristics. In this way we associate municipalities with presumably similar norms regarding the legitimacy of living off benefits. We study individuals who moved in the years 1996 to 1998 and evaluate the effect of changing regions in 1999 to 2005. A difference-in-differences (DiD) matching estimator is used to evaluate the variations in change of average days of sickness related absence between the groups. Our study will contribute to existing literature on sickness absence and social norms by explicitly investigating the effect of sickness absence when moving between regions. Moreover, adherence to new norms is likely to happen gradually. Our study is the first to evaluate the effects of moving from one region to another over a series of years rather than only immediately after the move.

Our results suggest that individuals who move from regions with a low (high) absence rate to regions with a high (low) level increase (decrease) their sickness related absence as compared to those who move within the region. This indicates that the geographical location is important to the individual sickness related absence. We find the effect to be immediate but increasing over time, indicating that the assimilation to new norms happens gradually. We cannot rule out the possibility that these patterns are caused by local cultures regarding sickness absence and the existence of a so called "cultural illness".

The rest of the paper is organized as follows: Section 2 contains the theoretical and empirical motivation behind the study. Section 3 outlines the hypotheses and the methodology. Data is presented in Section 4. The results are reported in Section 5 and, finally, Section 6 concludes the paper.

2 Social norms and economic outcomes

Culture can be defined as "the way of life of an entire society" (Jary and Jary 1995). Members of the same cultural context share norms, beliefs and values and have common patterns of behavior. Individuals live, act and make decisions within their local context and variations in local cultures and norms could cause individuals, as well as entire communities and regions with otherwise similar characteristics, to behave and evolve differently (Rao and Walton 2004).

2.1 Norms regarding absence

The absence literature recognizes that individual absence decisions might depend on the social context (Kaiser 1998). People's absence behavior is influenced by how it is judged by others. When a large number of individuals is absent, such behavior is likely to be more excepted than would otherwise be the case. The larger the number of people who is absent the less stigmatized is the absent individual. In the absence literature, the term "absence culture" (Chadwick-Jones et al. 1982) has been used to denote the social consensus in a society or organization regarding the legitimacy of nonworking behavior, including being absent from work. Johns and Nicholson (1982) define absence culture as "the established 'custom and practice' of employee absence behaviour". According to Johns and Nicholson (1985) the nature of absence cultures on a societal level depends on both attitudes towards absence (i.e. which causes of absence are acceptable) and assumptions about employment (i.e. which obligations and rights does an employee and citizen have).

In line with Johns and Nicholson's theories concerning absence cultures, Swedish ethnologists and political scientists argue that cultural differences exist between regions in Sweden, and affect the absence rates. Frykman and Hansen (2008) compare the situation of two Swedish counties, Kronoberg and Jämtland. Kronoberg is characterized by low levels of sickness absence, while the levels in Jämtland are high. The analysis, which is based on interviews with citizens, politicians and local SSIA officials, reveals that different norms regarding work, leisure and the acceptance of living off benefits have developed in the two counties. The researchers argue that these differences have emerged because of differences in historical and economical features in the civic society. Moreover, Frykman and Hansen (2005) conclude that the performance of institutions set up by the national government is not neutral to the regional setting. The citizens' use of the sickness insurance system depends on the prevailing norms within the region. When studying the process of medicalization[1] of sickness absence, Schierenbeck (2010) finds that local cultures and contexts affect the judgment of both administrators within the SSIA and physicians responsible for issuing

[1] Medicalization describes a process by which previously defined non-medical problems become defined and treated as medical problems, usually in terms of illnesses or disorders.

medical certificates. She concludes that values and attitudes regarding what kind of illness is considered legitimate (and thus eligible to sick leave benefits and disability pension) differ both depending on time and region.

2.2 Local cultures in the economic context

In the economic literature incorporation of the social interplay in models for economic decision making is still a relatively new phenomenon. Since neither culture nor social norms are traditional economic variables their importance has been overlooked by economists (Sen 2004). In recent years, however, the strand of both theoretical and empirical literature combining economic decisions, social interactions and social norms has increased substantially; see Manski (2000); Dietz (2002); Soetevent (2006) for reviews. By extending the individual's utility function also to include social concerns economists have been able to incorporate the importance of social norms for economic outcomes. For example, Lindbeck and Persson (2008) include social norms in a theoretical model regarding individual absence behavior. It is assumed that the social norm is to work rather than to live off benefits. Individuals acting in a way that does not conform to the norm (i.e. those absent and living off benefits) are stigmatized. The strength of the norm, and hence the magnitude of the social cost inflicted on absent individuals, can in this model be either exogenous or endogenous. In the case of endogenous norms the strength of the norm depends on the number of absent people. The discomfort felt by the individual living off benefits is higher (lower) when the proportion of people upholding the norm is higher (lower). Hence, when individuals make their decisions about working or not they take the behavior of all other individuals into consideration. Individual behavior is thus amplified by group influence.

Performing an empirical investigating of the importance of local norms for individual behavior is rather challenging since measures of norms are rarely available to the researcher. Nevertheless there is a number of empirical studies which try to explore the relationship between existing local norms and various economic outcomes. Most studies investigate this relationship implicitly by exploring similarities and differences in people's behavior within and between geographical areas. Using data on individuals working for an Italian bank, Ichino and Maggi (2000) study differences in work absence between workers in southern and northern Italy. After controlling for a number of work place as well as regional characteristics it appears that the average absence level is higher in the south than in the north. These results support the view that individual absence depends on the norm regarding work absence in the region.

Another way to deduce the impact of local norms is to explore the behavioral changes of individuals who move from one geographical area to another. Ichino and Maggi (2000) find that bank employees who move from one bank branch to another adjust their absence behavior to that of the new branch. In a Swedish study, Lindbeck et al. (2007) study individuals in Sweden who move from one residential area to another. Their results show, similarly to the Ichino and Maggi study, how individuals adjust their short-term sickness absence in accordance with the behaviour in their new surroundings.

3 Methodology

3.1 Identifying strategy and hypotheses

To receive sickness benefits in Sweden three separate decisions must be made. The first decision is made by the individual when he/she considers himself/herself incapable of working. Secondly, a physician makes a professional evaluation of the individual’s health status. Thirdly, a SSIA official determines if the health status is serious enough to prevent the individual from working. Each of these three decisions is likely to be influenced by the local culture.

Directly measuring the effect of local cultures on sickness absence requires data that enables identification of differences in people’s attitudes towards living off sickness benefits. Because of lack of data on beliefs and preferences we seek to indirectly estimate the effect of local cultures on sickness absence. If we assume that observed differences in sickness absence across regions to some extent reflect differences in social norms, we expect rational individuals who move from one region to another to adjust their behavior accordingly. In addition, norms among physicians and SSIA officials evaluating health status and work capacity are likely to vary depending on region. Based on the theoretical predictions in the model by Lindbeck and Persson (2008) and earlier empirical findings, e.g. Ichino and Maggi (2000) and Lindbeck et al. (2007), we expect individuals who move from regions with low (high) rates of absence due to sickness to regions with high (low) levels to increase (decrease) their sickness absence as compared to if they had never moved. Adherence to new norms and a new culture is likely to develop gradually as the individual adapts to the new society. However, an individual's exposure to new norms among physicians and SSIA officials is immediate. We thus expect the effect on sickness absence to be immediate but increasing over time.

In order to evaluate the effect of moving from one region to another we would need a control group consisting of individuals similar to those who move from one region to another. However, the purpose of this study is not to evaluate the effect of moving per se, but rather to evaluate the effect of changing local context. Given this and the possibility that movers in their own right could differ in mentality and other characteristics from individuals who do not move, the latter are ruled out as a good set of controls. Instead, we define as our set of controls the group of individuals who move but do not change local context. More specifically, our set of controls consists of individuals who move within the region.[2] By comparing the trajectory of sickness absence in the group of individuals moving from one region to another with the trajectory of sickness absence for those who move within their region, the effect of changing local context and presumably also cultural environment can be identified.

3.2 Matching

In evaluation studies, the counterfactual outcome (i.e. what would have happened if the individual had not been treated) is of main interest.[3] Let Y_{iD} be the outcome of individual i and $D = \{0,1\}$ be an indicator of whether individual i has been treated or not, such that the outcome given treatment is denoted by Y_{i1} and outcome given no treatment is denoted by Y_{i0}. The treatment effect is then given by:

$$\Delta = Y_{i1} - Y_{i0}.$$

In reality, an individual has either been treated or not been treated, implying that for each individual, only Y_{i1} *or* Y_{i0} is observed. The counterfactual outcome is thus unknown to the

[2] Moving within the region implies moving across a municipality boarder within the region.

[3] In this study *treatment* corresponds to moving from one region to another (See section 4.3 for a detailed description of regions) as compared to moving within the region. *The counterfactual outcome* corresponds to the sickness related absence for an individual that have moved between regions, would he/she have moved within the region.

researcher. In the literature this problem of missing data has been dealt with in several ways. In case of non-experimental data, methods such as IV-estimation, Heckman's selection model and the matching estimator are commonly used. Recent econometric research suggests that matching is a more efficient method as compared to regression-based methods in reducing the selection bias present in almost all studies relying on observational data (Heckman et al. (1997), Smith and Todd (2005). Selection bias in the setting of evaluation studies refers to the discrepancy in characteristics between treated and controls that influence both treatment and the outcome variable of interest.

Matching is a non-parametric method that deals with the problem of missing data by enabling the researcher to identify a suitable control group for the group of treated. The main purpose of matching is to remove the selection bias by finding a matching individual in the non-treatment group for every individual in the treatment group. The outcome for individuals in the control group will then serve as proxies for the missing counterfactuals in the treatment group.

Identification of the control group in the matching procedure is based on a set of characteristics, Z , important both to the probability of treatment and to the outcome variable.[4] Individuals in the treatment group are matched with individuals in the non-treatment group based on this set of observable characteristics. Following the seminal paper by Rosenbaum and Rubin (1983) the observed characteristics are used to predict the probability of group membership, using either a probit or logit model. Based on this the so called "propensity score", i.e. the probability of being treated conditional on Z , matching is performed. Individuals in the treatment and control group, with similar probabilities of being in the treatment group, are matched together.

In the model estimating the propensity score only covariates that influence both treatment and the outcome variable should be included. The choice of which covariates to include is based on economic theory as well as on previous empirical results (Smith and Todd 2005). To ensure that all covariates used in the propensity score model are unaffected by treatment they should either be fixed over time or measured prior to treatment.

[4] In this study, Z is a set of variables that are important to the moving decision as well as to the level of sickness related absence.

Having estimated the propensity score, there are several methods used to match the treated with the non-treated[5] (Bryson et al. 2002; Baser 2006). Alternative matching procedures differ in how the neighborhood observations, i.e. observations in treatment and control groups having similar probability of being in the treatment group, are defined and in how weights for each observation are constructed.

Once the treatment and the control groups have been identified, the effect of treatment can be evaluated. The most commonly used estimator is often referred to as simply "the matching estimator" and measures the effect on the outcome in levels. Following the notation of Smith and Todd (2005), this estimator can be written as:

$$\widehat{\alpha}_M = \frac{1}{n_1} \sum_{i \in I_1 \cap S_P} \left[Y_{1i} - \sum_{j \in I_0} W(i,j) Y_{0j} \right]$$

where I_1 and I_0 denotes the set of treated and non-treated, respectively, S_P is the set of common support, n_1 is the number of individuals in the set $I_1 \cap S_P$ and $W(i,j)$ is the chosen weighting system.[6] In order for the matching estimator to be valid, the conditional independence assumption (CIA) has to hold. The CIA implies that, conditional on Z, the outcome variable is independent of treatment. Unfortunately, there is no direct method for a researcher with only non-experimental data at hand to test the plausibility of the CIA assumption. However, in the work by Heckman et al. (1998) the assumption supporting the matching estimator is tested using non-experimental control groups in combination with experimental data. Their conclusion is rejection of the CIA assumption. Instead, they find that the weaker assumption underlying the DiD matching estimator is much more plausible. This weaker assumption allows for time-invariant differences in unobservables between treatment and control group individuals. As the name indicates the DiD matching estimator evaluates the treatment effect in differences rather than in levels. The impact of treatment is measured as the difference between changes in average outcomes for treated individuals and changes in average outcomes for control group members, where the changes are measured relative to some benchmark time period. The estimator can be applied when longitudinal or repeated

[5] Nearest neighbor matching, Stratified matching, Radius matching, Kernel matching and Mahalanobis matching are some examples.

[6] Common support denotes the region of overlap of propensity score for treated and controls. It has been shown that matching is valid only on the region of common support.

cross-sectional data is available to the researcher. Given longitudinal data the estimator can be written as:

$$\hat{\alpha}_{DDM} = \frac{1}{n_1} \sum_{i \in I_1 \cap S_P} \left[(Y_{1ti} - Y_{1t'i}) - \sum_{j \in I_0 \cap S_P} W(i,j)(Y_{0tj} - Y_{0t'j}) \right]$$

.

Even though there is no direct method of testing the assumptions behind the DiD matching estimatorthere are a number of techniques for testing the quality of the matching in terms of observables. Some commonly used tests checking the balance between treated and controls are paired t-tests for covariates entering the propensity score model, check of standardized bias over all covariates and investigation of the pseudo R^2. Lack of balance between groups after matching indicates that the model estimating the probability of being treated is not correctly specified.

4 Data

The analysis in this paper is based on data provided by Statistics Sweden. The data obtained from the LISA database contains a large number of socioeconomic variables for all individuals aged 16 and older for the years 1995 to 2005.

4.1 Sample construction

The sample used in the analysis includes individuals who moved from one municipality to another during the time period 1996-1998[7], either within one of the specified regions or across those regions. We compare individuals who move from one region to another with individuals who have moved within the region. Both groups of individuals are evaluated every year after the move until the year 2005. This means that the average time of living in the new region for individuals in the treatment group is approximately eight years. Each year subsequent to the time of movement the treatment and control groups somewhat decreases (people move to other municipalities and regions, leave the country or die) and the composition of both groups changes. All analyses are therefore based on the sample of treated and controls where all individuals have continued to live in the same region after their move.

[7] The average number of movers in a year is approximately 275 000.

In order to increase the share of individuals in the sample entitled to sickness benefits, individuals below the age of 25 are removed. Furthermore, individuals who reach the retiring age before the end of the evaluation period are excluded from the sample. The sample only includes individuals who are aged 25 to 55 at the time of the move.

Due to large differences in the patterns of sickness related absence between men and women as well as differences regarding conditions of employment, men and women are treated separately in the analyses.

4.2 The outcome variable

The outcome variable corresponds to the sum of days of sickness cash benefits and the number of days on disability pension. We have chosen to name this variable "sickness related absence". Even though mere sickness absence is a more common outcome variable in the absence literature, there are at least two reasons why the variable "sickness related absence" is a better option in our particular setting. Firstly, the sick leave insurance and disability pension insurance are the two most comprehensive programs in the Swedish sickness insurance system. The number of days with either sickness cash benefits or disability pension corresponds to approximately 99 per cent of the so called "sick rate", a measure used by the SSIA to summarize all absences in Sweden caused by sickness. Secondly, over time individuals tend to move across different programs in the social insurance system. For example, individuals who have been on sick leave for a long period of time tend to end up receiving income compensation from the disability pension insurance. Examining only benefits from one program ignores regional differences in the propensity to transfer people from one program in the social insurance system to another, which in turn could hamper the analyses.[8]

A review of the sickness insurance system and the most important changes that have taken place during the time period of interest in this paper can be found in Appendix 1.

[8] For example, in the municipality of Överkalix in northern Sweden the average number of days of sickness cash benefits has for several years been below both regional and national averages. The number of days of income compensation from the disability pension insurance, however, is among the highest in the country.

The number of days of sickness related absence is a highly skewed variable. For any given year during the time period of this study, 80 to 90 per cent of all individuals have no sickness related absence at all. Awareness of this feature is important when we try to understand and interpret differences in the average number of days of sickness related absence across groups and over time. A higher average number of days of sickness related absence can imply two things: either a larger share of individuals are on sick leave and/or receive benefits from the disability pension insurance or those receiving benefits have longer spells of absence.

4.3 Regions

A region is defined as a geographical area with certain characteristics that separates it from other areas. Regions can be formed on the basis of administrative purposes, historical roots, social conditions, economic performance, distinctive geographical attributes and/or cultural expressions and traditions (Castensson 1994; Törnqvist 1998). Today, there is no unanimous division of Sweden into different regions. Instead, all existing classifications are made depending on purpose. Using any of the existing regional groupings in our study is therefore somewhat arbitrary. Using the existing administrative classification, i.e. counties or even groups of counties, ignores the differentials in socio-economic conditions as well as absence behavior that exist across municipalities within the same counties. Forming regions on the basis of absence patterns is also problematic since absence is the outcome variable in our analysis. In our study we have chosen to form regions by collecting municipalities that are similar with respect to certain geographical, political and economical characteristics. More specifically the regions are formed on the basis of four dichotomous variables; voting patterns in the referendum concerning a Swedish membership in the European Union (EU)[9] and the national elections[10], being a metropolitan area[11] or not, and the relative importance of the private sector[12]. Together these variables reflect the socio-economical and political situation in the municipality, which in turn could be associated with the underlying differences in the attitudes among citizens, doctors and/or personnel at the local insurance offices regarding the usage of the sickness insurance system.

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[9] The variable takes the value 1 if more than half of all voters in the municipality voted "yes" to Swedish membership in the EU.

[10] This variable takes the value 1 if the socialist parties received more votes than the non-socialist ones in at least two of the three elections held in 1994, 1998 and 2002.

[11] This variable takes the value 1 if the municipality is belonging to one of the three metropolitan areas in Sweden.

[12] This variable takes the value 1 if more than 50 per cent of all incomes in the municipality come from the private sector.

The results in the EU-referendum revealed large differences in voting patterns between southern and northern Sweden and between rural and urban areas. Political scientists have interpreted this geographical variation as partly reflecting the degree of political and economical marginalization felt by the citizens (Gilljan 1996). In other words, the further away the citizens felt they were from the political and economical centers, the more skeptical to the EU they were. In marginalized areas the dependency of the public transfer systems is typically large (Frykman and Hansen 2005) and voting patterns in the referendum may hence serve as a proxy for differences in the usage of the welfare system. The socialist parties traditionally advocate more generous transfer systems than the non-socialist ones. To the extent that voting patterns reflect self-interests or family concerns (Seymore 1981), the outcomes in the national elections provide an indication of differences in the usage of the welfare system. Population density and share of income coming from the private sector both serve as measures of the dynamics of the municipality. Densely populated areas and/or areas with a large share of the citizens' incomes coming from the private sector are usually characterized by both population growth and economic growth. According to widely held opinions people in these areas are both hard working and very conscious of their personal responsibilities (Selander 2005). The welfare system is expected to be less utilized in these areas.

On the basis of the above discussed variables Sweden's 290 municipalities are divided into 16 regions. Out of these 16 regions four regions, representing 204 out of 290 municipalities and approximately 75 per cent of Sweden's population aged 25-55, were large enough to be included in the analysis.[13]

As can be seen in *Table 1* Region 1 consists of 30 municipalities, all located in Sweden's three metropolitan regions (Stockholm, Göteborg and Malmö). More than half of the incomes of the citizens in these municipalities came from the private sector, more than half of the voters voted yes in the EU-referendum and the non-socialist parties received more votes than the socialist ones. The average sick rate in Region 1 is 21.4 days for men and 30.7 days for women. Region 2 contains 25 municipalities outside the metropolitan regions, all located in the southern part of Sweden. Less than half of the citizens' incomes in these municipalities came from the private sector, more than half of the voters voted yes in the EU-referendum and

[13] A full presentation of all municipalities in each of the four clusters is found in Appendix 2.

the non-socialist parties received more votes than the socialist ones. The average sick rate in Region 2 is 22.0 days for men and 34.2 days for women respectively. Region 3 contains 32 municipalities outside the metropolitan regions, all located in the southern part of Sweden Less than half of the incomes of the citizens in these municipalities came from the private sector, more than half of the voters voted yes in the EU-referendum and the socialist parties received more votes than the non-socialist ones. In Region 3 the average sick rate is 23.6 days for men and 37.3 days for women. Finally, Region 4 holds 117 municipalities. A majority of these is found in the northern part of Sweden. Less than half of the citizens' incomes in these municipalities came from the private sector, more than half of the voters voted no in the EU-referendum and the socialist parties received more votes than the non-socialist ones. The average sick rate in Region 4 amounts to 26.3 days for men and 41.2 for women.

Table 1: Region characteristics

Region	Number of municipalities	Population density	Outcome in the EU referendum	Outcome in the national elections	> 50 % of income from the private sector	Sick rates [1] for women and men
1	30	Metropolitan area	Yes	Non-Socialist	Yes	30.7 (W) 21.4 (M)
2	25	Non-metropolitan area	Yes	Non-Socialist	No	34.2 (W) 22.0 (M)
3	32	Non-metropolitan area	Yes	Socialist	No	37.3 (W) 23.6 (M)
4	117	Non-Metropolitan area	No	Socialist	No	41.2 (W) 26.3(M)

1. Calculations based on individuals age 25-55.

Taken together Region 2 and Region 3 are similar to each other with respect to municipality characteristics, while Region 1 and Region 4 are each other's opposites. Region 4 has higher average sick rates compared to all other Regions. The difference in average sick rates is largest between Region 1 and Region 4.

The number of movers across and within regions during the time period 1996 to 1998 is presented in *Table 2*. The diagonal shows the number of movers within each specified region.

Table 2: Movers across and within regions

To / From	Region 1	Region 2	Region 3	Region 4
Region 1	35 970 (F) 42 567 (M)	1 828 (F) 1 800 (M)	2 105 (F) 2 187 (M)	3 319 (F) 3 323 (M)
Region 2	3 232 (F) 4 001 (M)	2 372 (F) 2 728 (M)	1 540 (F) 1 957 (M)	588 (F) 721 (M)
Region 3	927 (F) 1 117(M)	568 (F) 604 (M)	1 284 (F) 1 641 (M)	724 (F) 833 (M)
Region 4	4 707 (F) 6 019 (M)	1 757 (F) 1 957 (M)	3 482 (F) 3 781 (M)	16 932 (F) 19 213 (M)

The number of movers within Region 2 and Region 3, respectively, is quite small. In some cases there are even fewer movers within a region than across regions. In order for matching on the propensity score to be tenable a large number of non-treated observations are needed (Bryson et al. 2002). Since that is not the case for Region 2 and Region 3, no analysis is performed for movers from these two regions.

4.4 Descriptive statistics

The descriptive statistics presented in *Table 3* and *Table 4* show individual characteristics of individuals that move within one of the defined regions and those who move across regions. One of the most striking differences is that for Region 1, movers within the region have fewer average days of sickness related absence as compared to those who move to other regions. The opposite is true for Region 4, i.e. movers within Region 4 have more average days of sickness related absence compared to movers to other regions.

Table 3: Descriptive statistics for women

Variables at t-1	Movers							
	Within Region1	From Region1 to Region2	From Region1 to Region3	From Region1 to Region4	Within Region4	From Region4 to Region2	From Region4 to Region2	From Region4 to Region3
Days of sickness related absence	15.37 (61.10)	20.74 (72.96)	24.95 (80.03)	26.93 (83.15)	38.22 (97.20)	13.82 (59.65)	23.31 (76.43)	24.88 (80.59)
Age	34.53 (8.49)	36.05 (9.06)	34.32 (8.12)	34.73 (8.41)	36.05 (8.98)	33.42 (8.40)	35.68 (8.84)	36.56 (8.86)
Marital status (1=married/ cohabitation)	0.44	0.46	0.41	0.40	0.40	0.41	0.56	0.52
Children (1 = children living at home)	0.30	0.32	0.32	0.35	0.35	0.28	0.41	0.40
Education (1 = post secondary)	0.45	0.46	0.46	0.40	0.30	0.50	0.41	0.32
Log income	7.54 (0.72)	7.47 (0.73)	7.41 (0.67)	7.37 (0.65)	7.39 (0.57)	7.38 (0.71)	7.48 (0.61)	7.45 (0.61)
Unemployment (1 = period of unemployment)	0.20	0.25	0.30	0.31	0.39	0.41	0.37	0.38
Sector (1 = working in private sector)	0.58	0.48	0.44	0.44	0.34	0.40	0.29	0.31
Immigrant (1 = born abroad)	0.19	0.14	0.16	0.13	0.11	0.25	0.25	0.25
No of observations	35 970	1 828	2 105	3 319	16 932	4 707	1 757	3 482

Table 4: Descriptive statistics for men

Variables at t-1	Movers							
	Within Region1	From Region1 to Region2	From Region1 to Region3	From Region1 to Region4	Within Region4	From Region4 to Region2	From Region4 to Region2	From Region4 to Region3
Days of sickness related absence	10.25 (51.56)	18.82 (73.93)	16.92 (69.43)	22.98 (79.35)	24.08 (79.99)	8.84 (47.87)	15.00 (64.06)	16.53 (79.35)
Age	34.88 (8.17)	37.17 (8.97)	35.82 (8.39)	35.82 (8.41)	35.68 (8.77)	32.70 (7.82)	35.56 (8.54)	36.10 (8.71)
Marital status (1 = married/ cohabitation)	0.42	0.44	0.39	0.39	0.40	0.37	0.51	0.49
Children (1 = children living at home)	0.22	0.23	0.22	0.23	0.21	0.16	0.29	0.27
Education (1 = post secondary)	0.43	0.47	0.45	0.37	0.27	0.50	0.43	0.33
Log income	7.53 (0.77)	7.46 (0.76)	7.38 (0.75)	7.36 (0.75)	7.38 (0.64)	7.35 (0.76)	7.43 (0.69)	7.40 (0.66)
Unemployment (1 = period of unemployment)	0.21	0.23	0.28	0.32	0.40	0.42	0.35	0.36
Sector (1 = working in private sector)	0.74	0.62	0.61	0.60	0.61	0.56	0.49	0.56
Immigrant (1 = born abroad)	0.22	0.19	0.18	0.14	0.10	0.24	0.25	0.23
No of observations	42 567	1 800	2 187	3 323	19 213	6 019	1 957	3 781

5 Empirical application and results

5.1 Estimation of the propensity score

The propensity score, i.e. the probability of moving from one region to another conditional on a set of variables is given by

$$P\left(D_{i,t} = 1 \middle| Z_{i,t-1}\right) = F\left(Z_{i,t-1}\right)$$

where $D_{i,t} = 1$ denotes moving from one region to another in time period t and $Z_{i,t-1}$ is a vector of individual, family and municipality characteristics in the time period before moving. The variables included in $Z_{i,t-1}$ are variables believed to affect both the decision of moving from one region to another and the sickness related absence. The choice of what variables to include is motivated by the literature regarding determinants of domestic moves and regarding determinants of sickness absence. Empirical results in migration studies show that certain individual, family and regional characteristics influence short and long moves differently (see Nivalainen (2004) for a review). A high level of education, good health status and unemployment in the family are factors predicted to increase the likelihood of long distance moves, while old age, children and living in a large town raises the probability of short distance moves. Age, previous health status, being born abroad, family status, unemployment/employment and educational level are factors also known to be determinants of absence (see Alexanderson and Norlund 2003 for a review). Taken together the covariates used to estimate the propensity score are age, log of disposable family income, log of municipality population, dummy variable indicating marriage/cohabitation, dummy variable indicating children in the family, dummy variable indicating working in the private sector, dummy variable indicating post-secondary education, dummy variable indication being born abroad, dummy variable indicating period of unemployment and days of sickness related absence. All covariates are measured at time $t-1$ and in all cases we use a probit model to estimate the propensity scores. To the extent that higher orders of the covariates improve the balancing between movers across regions and movers within regions, they are included in the propensity score model.

5.2 Matching and balancing tests

Matching is performed using the nearest neighbor matching technique. This technique implies that each individual in the treatment group is matched with the observation in the control group having the closest resemblance in terms of the estimated propensity score. Matching is made with replacement.

In order to get a sense of how successful the matching has been in terms of balancing the differences in covariates between movers across regions and movers within regions a number of balancing tests are performed. For each covariate entering the propensity score model paired t-tests are carried out in order to establish that no significant differences exist between the treated and the controls once matching has been performed. The standardized bias over all covariates is also examined, both before and after matching. If the matching is successful the standardized bias should decrease significantly. Finally, the pseudo R^2 before and after matching are compared to each other. A low R^2 after matching indicates that no difference in the distribution of covariates exists between the groups of treated and controls.

The paired t-tests show no significant difference for any of the covariates entering the propensity score once matching is performed. The standardized biases before and after matching as well as the pseudo R^2 before and after matching are presented in *Table 5* and *Table 6*. The standardized bias decreases by 82 to 96 per cent and the R^2 after matching drops to 0.003 or below. Taken together we conclude that the matching has balanced differences in covariates between the group of treated and the group of controls, both for men and women.

5.3 Difference-in-differences matching estimates

Estimation is based on the DiD matching estimator. The results for women and men are presented in *Table 5* and *Table 6*, respectively. The estimates correspond to the average effect on sickness related absence of moving from one region to another as compared to moving within the original region. It should be noted that a significant treatment effect could be interpreted as different propensities for individuals to become absent across regions as well as geographical differences in the duration of absence spells for those individuals that utilize the sickness insurance system.

The results for women, presented in *Table 5*, give only limited support of an effect on the average number of sickness related absence of moving from Region 1 to either Region 2 or Region 3. In most years the change in average days of sickness related absence does not differ significantly between treated and controls. The effect of moving from Region1 to Region 4, however, is positive and significant in most years and the results indicate that the effect is increasing over time. For the groups of women that have moved from Region 4 there is a negative effect on the average days of sickness related absence in all cases. The magnitude of these estimates is also increasing over time. Worth noting is the overall change in pattern at the very end of the period. For most groups the increase in magnitude of the estimate has been reversed between the years 2004 and 2005, indicating smaller differences between treated and controls in 2005 as compared to previously.

Table 5: DiD matching estimates, women

	From Region1			From Region4		
Effect at	To Region2	To Region3	To Region4	To Region1	To Region2	To Region3
1999	-1.57	**-3.47***	0.83	**-3.20****	-0.53	0.15
	(2.02)	(1.89)	(1.58)	(1.39)	(2.17)	(1.55)
2000	-2.01	-1.32	**3.16**	**-5.94*****	-3.59	**-4.00****
	(2.41)	(2.13)	(1.86)	(1.74)	(2.60)	(1.93)
2001	0.59	-0.94	**4.49****	**-9.46*****	**-7.33****	**-6.15****
	(2.67)	(2.35)	(2.13)	(2.03)	(3.14)	(2.27)
2002	-4.02	-2.22	**5.49*****	**-8.13*****	**-7.69****	**-6.28*****
	(2.86)	(2.58)	(2.32)	(2.33)	(3.43)	(2.57)
2003	**5.33***	3.55	**5.72****	**-7.27*****	**-9.51****	**-6.80****
	(2.99)	(2.64)	(2.45)	(2.33)	(3.71)	(2.75)
2004	**6.58****	2.81	**7.15*****	**-6.64****	**-9.82****	**-7.56****
	(3.03)	(2.78)	(2.54)	(2.74)	(3.79)	(2.87)
2005	3.553	2.68	**5.14****	**-8.28*****	**-9.82****	-3.47
	(3.18)	(2.92)	(2.58)	(2.47)	(4.02)	(3.00)
Balancing indicators						
Mean bias before	10.172	12.377	12.356	21.134	16.136	15.251
Mean bias after	1.522	1.471	2.210	1.192	1.600	1.625
Pseudo R2 before	0.020	0.025	0.046	0.093	0.042	0.051
Pseudo R2 after	0.001	0.001	0.001	0.000	0.000	0.001
Observations						
Controls	35 970	35 970	35 970	16 932	16 932	16 932
Treated -matched	1 828	2 105	3 319	4 707	1 757	3 482

Analytically derived standard errors are shown in parentheses. (***), (**) and (*) indicate statistical significance at the 1% , 5% and 10 % levels, respectively.

The results for men, presented in *Table 6*, show a pattern similar to that for women. The results suggest that there is no significant effect on the average number of days of sickness related absence for men that move within Region 1 as compared to men that move to either Region 2 or Region 3. Moving from Region1 to Region 4 however yield a positive effect on the number of days of sickness related absence. For the groups of men that have moved from Region 4 there is a negative effect on sickness related absence. As in the case of women the results indicate a break between the years 2004 and 2005. In two out of six cases the differences between treated and controls decrease between 2004 and 2005.

Table 6: DiD matching estimates, men

	From Region 1			From Region 4		
Effect at	To Region2	To Region3	To Region4	To Region1	To Region2	To Region3
1999	2.01	-1.04	3.25	**-2.08****	-2.28	-0.15
	(1.76)	(1.51)	(1.49)	(1.04)	(1.81)	(1.53)
2000	1.94	-0.71	3.93	-1.90	-2.93	**-4.00****
	(2.03)	(1.73)	(1.73)	(1.24)	(2.18)	(1.93)
2001	1.83	1.22	**5.12****	**-3.02****	**-4.30***	**-6.15*****
	(2.22)	(1.94)	(1.91)	(1.44)	(2.51)	(2.27)
2002	1.12	**3.96***	**4.88****	-2.52	**-5.47****	**-6.28****
	(2.48)	(2.12)	(2.08)	(1.58)	(2.72)	(2.57)
2003	1.05	**4.30***	**6.32****	-1.39	**-6.62****	**-6.80****
	(2.61)	(2.35)	(2.24)	(1.66)	(2.90)	(2.75)
2004	-0.23	1.51	3.72	-2.10	**-5.73***	**-7.56****
	(2.74)	(2.75)	(2.31)	(1.71)	(3.06)	(2.87)
2005	0.38	1.70	**5.54****	**-4.83****	-2.17	-3.70
	(2.80)	(2.54)	(2.35)	(1.71)	(3.05)	(3.00)
Balancing indicators						
Mean bias before	11.284	13.009	14.481	21.981	15.595	11.037
Mean bias after	1.873	1.233	1.350	0.768	2.206	0.953
Pseudo R2 before	0.022	0.026	0.052	0.102	0.049	0.030
Pseudo R2 after	0.001	0.000	0.000	0.000	0.001	0.000
Observations						
Untreated	42 567	42 567	42 567	19 213	19 213	19 213
Treated	1 800	2 187	3 323	6 019	1 957	3 781

Analytically derived standard errors are shown in parentheses. (***), (**) and (*) indicate statistical significance at the 1% , 5% and 10 % levels, respectively.

6 Discussion

The results presented in *Table 5* and *Table 6* suggest that individuals that move between regions that are similar with respect to average sickness related absence (from Region1 to

Region 2 or Region 3) do not change their absence behavior as compared to individuals who move within the original region (Region 1). However, individuals who move to a region where the sickness related absence differ substantially from that in the original region (from Region 1 to Region 4 and from Region 4 to all other regions) do change their absence behavior. This holds for both men and women, but is more evident for women than for men. In line with predictions from the theoretical model in Lindbeck and Persson (2008) and with earlier empirical findings, e.g. Ichino and Maggi (2000) and Lindbeck et al. (2007), movers from regions with low (high) rates of absence to regions with high (low) rates increase (decrease) their sickness related absence as compared to those who move within the original region. The observed patterns are consistent with the idea that local cultures are important to individual sickness absence. One possible interpretation is that individuals adapt to the norms in their new environment. Moreover, the differences between movers across and within regions could be reflecting differences in norms and behavior of practicing physicians and SSIA officers. The results indicate that there is an immediate effect but that the effect is increasing over time[14]. This corresponds well to our hypothesis that exposure to new norms among physicians and SSIA officers happens immediately after the move, but that individual adherence to new norms and a new culture takes some time. As noted earlier, our results point towards that there is a change in the pattern at the very end of the period. For many groups that have had an increase in magnitude of the estimate prior to the year 2005, the magnitude has instead decreased between the years 2004 and 2005. In January 2005 the SSIAs changed from being locally independent to being one centralized agency. As a consequence, the decisions regarding individual work capacity were no longer made locally but at the centralized agency and the guidelines for implementation of rules regarding sickness absence were no longer under influence of local norms. We believe that the decrease in magnitude is a consequence of this change.

[14] It should be noted that when evaluating medium or long-term treatment effects using propensity score matching there is a risk that systematic changes in individual characteristics between treated and controls, that take place after the time of matching and that are affecting the growth path of the outcome variable, might bias the results. In order to check if it is likely that this is a problem in our study we have investigated the time varying variables in our propensity score model. There are some differences in the development of time variant variables between the groups of treated and controls. In Region 1, at the end of the evaluation period, individuals are to a larger extent employed within the privates sector, have fewer kids and have a higher average income compared to individuals in all other clusters. This holds for movers both within Region 1 and movers to Region 1. The differences in the mentioned variables across Region 2, Region 3 and Region 4, on the other hand, are quite small.

There are other possible explanations to our results. For instance, one could argue that there are health related issues such as differences in temperature and levels of pollution that could have caused the observed patterns to appear. There is however, one feature of the results that indicates that this is not the case. As previously noted there is a break in the patterns of estimates between the years 2004 and 2005. It does not seem likely that this break can be explained by changes in health related factors but that it is instead, as pointed out above, a consequence of changes in the institutional setting of the sickness insurance. Consequently, there is no reason to believe that the results prior to 2005 reflect (at least not primarily) health related factors.

In conclusion, the overall pattern of our results indicates that the region of residence is important to the individual sickness related absence. We interpret this as an indication of the difference in praxis regarding the utilization of the sickness insurance system across regions in Sweden. Furthermore, we cannot rule out the possibility that the patterns are caused by local cultures regarding sickness absence and the existence of a so called “cultural illness”.

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Appendix 1: The Swedish sickness insurance system[15]

The two most important parts of the Swedish sickness insurance system are the sick leave insurance and the disability pension insurance. T

The sick leave insurance

The Swedish sick leave insurance system is mandatory and covers all employed and self-employed workers in Sweden. The insurance system provides economic compensation in the event of work incapacity that amounts to at least a quarter of full time. An individual can receive sickness benefits corresponding to 25%, 50%, 75% or 100% of full time depending on his/her health status. The responsibility of providing economic compensation in the case of sickness is shared between the employer and the Swedish government. The first part of the sickness spell, labeled the sick-pay period, is paid for by the employer. (No compensation is paid the first day of the sickness spell. This is the so called waiting period.) The government is responsible for providing benefits for any additional time of sickness absence. The money paid by the Swedish government is mediated via the Swedish Social Insurance Agency (SSIA). Up to a certain limit, the sickness benefit corresponds to a certain share, i.e. the replacement rate, of the individual monthly salary. Above the cap, the compensation is fixed to the amount of the limit. In addition to benefits paid by SSIA, blue collar workers and municipality/county employees receive supplementary compensation from their employers through their collective bargaining.

During the time period 1995 to 2005 certain changes were made regarding replacement rates, the length of the sick pay period and supplementary compensation through collective bargaining. For most of the time period the sick-pay period was 14 days and the replacement rate was 80 per cent. From January 1 1996 to 31 of December the 1997 the replacement rate was lowered to 75 per cent and in 1997 and the first quarter of 1998 the sick-pay period was extended to 28 days. From July 1 2003 to 31 of December 2004 the sick-pay period was extended to 21 days and during the same time the replacement rate was lowered to 77.6 per cent. Before 1998 the collective bargain added 10 per cent of the normal wage to blue collar workers and municipality/county employees between the time the government becomes responsible for providing sick leave compensation to the 90th day of the sick spell. From Jan 1 1998 the extra 10 per cent in income loss compensation is paid between day 91 and day 360.

The disability pension insurance

Before 2003 individuals that permanently had lost their capacity to work by at least a quarter were eligible for disability pension. Depending on how much the work capacity was reduced disability pension could be full, three-quarter, half or a quarter. Disability pension was an income related benefit. The compensation was based on assumed income until normal retirement age. In 2003 the disability pension insurance was changed into “activity compensation” and “sickness compensation”. Activity compensation is for individuals aged 19 to 29 while sickness compensation is for individuals aged 30 to 64. The basic features of the disability pension, described above, remained the same.

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Appendix 2: Lists of municipalities in regions

Municipalities are presented in order of their municipality-code.

Region 1: Vallentuna, Österåker, Värmdö, Järfälla, Ekerö, Huddinge, Salem, Tyresö, Täby, Danderyd, Sollentuna, Stockholm, Nacka, Solna, Lidingö, Vaxholm, Sigtuna, Staffanstorp, Vellinge, Lomma, Kungsbacka, Härryda, Partille, Öckerö, Stenungsund, Tjörn, Lerum, Göteborg, Mölndal, Kungälv.

Region 2: Uppsala, Enköping, Strängnäs, Linköping, Söderköping, Jönköping, Mörbylånga, Borgholm, Skurup, Sjöbo, Hörby, Höör, Tomelilla, Klippan, Båstad, Simrishamn, Ängelholm, Hässleholm, Laholm, Falkenberg, Varberg, Sotenäs, Grästorp, Essunga, Ulricehamn.

Region 3: Nyköping, Flen, Katrineholm, Eskilstuna, Norrköping, Motala, Vadstena, Mjölby, Växjö, Kalmar, Gotland, Sölvesborg, Svalöv, Östra Göinge, Landskrona, Eslöv, Ystad, Kristianstad, Halmstad, Borås, Mariestad, Lidköping, Skara, Skövde, Hammarö, Karlstad, Örebro, Karlskoga, Kungsör, Hallstahammar, Köping, Arboga.

Region 4: Älvkarlebyn, Tierp, Vingåker, Gnesta, Boxholm, Åtvidaberg, Valdemarsvik, Nässjö, Tranås, Högsby, Hultsfred, Mönsterås, Nybro, Västervik, Karlskrona, Ronneby, Karlshamn, Munkedal, Karlsborg, Gullspång, Bengtfors, Mark, Tibro, Töreboda, Lysekil, Uddevalla, Strömstad, Vänersborg, Åmål, Tidaholm, Kil, Eda, Torsby, Storfors, Munkfors, Forshaga, Kristinehamn, Filipstad, Hagfors, Arvika, Säffle, Laxå, Hallsberg, Degerfors, Hällefors, Ljusnarsberg, Kumla, Askersund, Nora, Lindesberg, Skinnskatteberg, Surahammar, Norberg, Sala, Fagersta, Vansbro, Malung-Sälen, Gagnef, Orsa, Älvdalen, Smedjebacken, Mora, Falun, Borlänge, Säter, Hedemora, Avesta, Ludvika, Ockelbo, Hofors, Ovanåker, Nordanstig, Ljusdal, Gävle, Söderhamn, Bollnäs, Hudiksvall, Ånge, Timrå, Härnösand, Sundsvall, Kramfors, Sollefteå, Örnsköldsvik, Ragunda, Bräcke, Krokom, Strömsund, Åre, Berg, Härjedalen, Nordmaling, Robertsfors, Norsjö, Malå, Storuman, Sorsele, Dorotea, Vännäs, Vilhelmina, Åsele, Umeå, Lycksele, Skellefteå, Arvidsjaur, Arjeplog, Jokkmokk, Överkalix, Kalix, Övertorneå, Pajala, Gällivare, Älvsbyn, Luleå, Piteå, Haparanda, Kiruna.