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PART-TIME SICK LEAVE AS A TREATMENT FOR INDIVIDUALS WITH MENTAL DISORDERS?

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Part-time sick leave as a treatment for individuals with mental disorders?

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Abstract

It has been suggested that using, when possible, part-time sick leave (PTSL) rather than full-time sick leave (FTSL) for employees diagnosed with a mental disorder (MD) decreases their likelihood of being on sick leave for long periods. However, no study has analyzed this "treatment". Using a one-factor loadings model and a sample of 627 employees on sick leave due to an MD diagnosis, we estimate the impact of the PTSL "treatment" on the probability of full recovery of lost work capacity. The results indicate that employees with an MD diagnosis assigned to PTSL after 60 days of FTSL have a relatively high probability of full recovery. More exactly, the average treatment effect of PTSL is relatively low (0.015) when assigned in the beginning of the spell, but relatively high (0.387), and statistically significant, when assigned after 60 days of FTSL.

Keywords: Part-time sick leave; mental disorders; one-factor loadings model

JEL Classification: I12; J21; J28

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1. Introduction

The latest update of the WHO's Global Burden of Disease project (2004) estimates that by 2030, *unipolar depressive disorders* will be the leading causes of burden of disease worldwide (6.2% of total DALYs), up from third place in 2004 (4.3% of total DALYs) (WHO, 2008, Figure 27, page 51). This is expected to affect not only the well being of many more people (e.g., their families, friends, colleagues, etc.), but also the budgets of many countries. There are already calls on public health officials and the medical community alike to place a greater emphasis on treating mental disorders (MDs) in general. KELA's (2006) analysis of the promotion of mental health and prevention of mental ill-health in four countries in Northern Europe (Finland, Germany, the Netherlands, and Sweden) shows that mental ill-health issues are an increasing cause of sickness absenteeism and work disability pensions. Given that MDs are often complex in nature, it has been suggested that mental health promotion strategies must take a variety of approaches. This includes development of good practices for maintenance, rehabilitation, and re-integration into employment of employees who are mentally susceptible to impairment in working life.

In Sweden, where musculoskeletal and mental disorders are the most common causes of sick leave (SBU, 2003), it has been suggested that, in some cases, employees with a diagnosis belonging to these two groups are better off if they do *not* leave the labor force but instead are supported to remain in it (Andrén and Palmer, 2004). One way of doing this is to give those employees the opportunity to work a reduced number of hours per week. Therefore, since the end of the 1990s there has been a focus on the use of part-time sick leave instead of full-time sick leave, when possible. However, part-time sick

leave is a complex "treatment" that requires an initial joint decision made by the employee, employer, physician, and social insurance administrator as well as actions and decisions (by the employee, colleagues, and employer) to adjust both the work time and work demands during the treatment period and afterwards (Andrén and Andrén, 2008).

Despite the interest in using part-time sick leave as a treatment for individuals on sick leave, few studies have evaluated the impact on recovery in general,[2] and none, to our knowledge, has evaluated the impact of part-time sick leave on recovery among employees with mental disorders. This study sets out to fill this void. We analyze the effect of starting this treatment from the beginning of the sick leave and during the sick leave period, respectively, on the probability to return to work with full recovery of lost work capacity within one year. The results show that employees can gain from the part-time treatment, which implies efficiency improvements from assigning employees with an MD diagnosis, when possible, to part-time sick leave. Yet, the timing of the assignment is important. Part-time sick leave is associated with a larger likelihood of full recovery for employees with MDs, if they are assigned to the PTSL treatment after 60 days of full-time sick leave.

The rest of the paper is structured as follows: Section 2 describes the institutional settings and the intervention design, and Section 3 presents the data. Section 4 presents the empirical strategy, Section 5 presents the results, and Section 6 concludes the paper.

[2] E.g., Scheel et al. (2002), Andrén & Andrén (2007, 2008, 2009), and Andrén & Svensson (2009)

2. Institutional settings and intervention design

2.1 Definition and earlier studies

The two most commonly used classification systems for mental disorders are the International Classification of Disease, ICD-10 (WHO, 1992) and the Diagnostic and Statistical Manual, DSM-IV (APA, 1994). In Sweden, the DSM-IV is used as a complement to the ICD-10. In addition, other instruments have been developed to rate mental health problems in general, without association to a specific diagnosis (Hensing and Wahlstrom, 2004). The term "disorder" is used throughout the classification in Chapter V (Mental and behavioral disorders) of ICD-10 so as to avoid even greater problems inherent in the use of terms such as "disease" and "illness". "Disorder" is used to imply the existence of a clinically recognizable set of symptoms or types of behavior associated in most cases with distress and with interference with personal functions. Social deviance or conflict alone, without personal dysfunction, is not a mental disorder as defined here (WHO, 1992, page 11). All documents linked to this classification suggest *that the process of determining such a diagnosis is complex*. Two reviews on the effects of interventions for major depressive disorder on occupational health outcomes (Timbie et al. 2006; Nieuwenhuijsen et al. 2008) reported a lack of studies specifically addressing work issues during treatment. Despite the sensitive search strategy that was employed, no studies that have focused on work-directed interventions could be identified. Nieuwenhuijsen et al.'s 2008 systematic review evaluated the effectiveness of occupational health interventions among employees with depressive disorders and concluded that it remains unclear whether worker- or work-directed interventions can reduce sickness absence in depressed workers. However, Llena-Nozal (2009) using data

from longitudinal surveys from Australia, Canada, Switzerland and the UK found that non-employment generally is worse for mental health than working. The mental-health payoff to employment varies depending on the type of employment contract and working conditions.

2.2 Sickness insurance, sick listing practice and sick leave

Sickness insurance aims to reduce the economic burden for a person with reduced work capacity due to sickness. In Sweden, for example, the Swedish National Insurance Act covers all residents 16–64 years of age and regulates sickness benefit. At the time of the study period, employed persons were compensated by their employer during the first 2 weeks of sickness absence. Thereafter, and for unemployed persons during the whole period, the sickness benefits were paid by the national social insurance system. Except for the first week, a person must be able to present a sickness certificate issued by a physician in order to obtain sickness benefit. When writing the medical certificate, the physician seems to mediate between the patient's needs and the formal rules. It has been observed that physicians often give in to patient demand for sick-listing, even in cases when the physician feels that sick-listing is not needed (Englund & Svärdsudd, 2000).

Nearly every employee contacts a general practitioner (GP) at the beginning of a sick leave. Most patients with stress-related mental disorders (SMDs) are managed in primary care, and are thus not referred to specialized secondary care. Despite the fact that mental health problems are common in primary care, GPs may still find it difficult to diagnose and treat them, unless they have a high degree of suspicion (Hickie, 1999). GPs often advise patients to go or stay on sick leave, to get some rest, and/or to seek distraction and relaxation instead of actively confronting and coping with the experienced

difficulties. Cooperation between GPs and the occupational health care system seems to be in the best interest of everybody involved. However, variations in sick-listing practice among individual physicians, physician categories and physicians in various geographical areas have been demonstrated in several studies (e.g., Peterson et al. 1997; Arrelöv et al. 2001). Knowledge on the impact of interventions on functioning in the workplace should complement the knowledge of effects on sickness absence. In this way, a more comprehensive view of the effects of interventions on work disability can be established.

2.3 Part-time sick leave

In Sweden, *both* full-time and part-time workers can be on full- and part-time sick leave (since the early 1960s). Given the institutional framework, it is possible for people who have not lost more than 75% of their work capacity to be on sick leave part-time and work part-time (for the remaining work capacity). The right to compensation of income loss due to sickness or disability is based on the medical evaluation of the person's loss of work capacity due to the disease, sickness, or injury. Following the physician's medical evaluation, the social insurance office decides whether an individual is entitled to compensation, and if so the extent of it (i.e., 25%, 50%, 75%, or 100%). In most cases, social insurance officers accept the recommendation of physicians as final rather than use their own judgment (Hensing et al. 1997). However, there is a clear distinction between these two deciding parties: the certifying physician determines to what extent disease or injury is impairing a patient's ability to perform his or her work, while the case manager at the local social insurance office formally determines whether the patient is entitled to monetary sickness benefits. Nevertheless, the social insurance officers do experience

some lack of control over the decision process, as regulations and other stakeholders restrict their work (Ydreborg et al., 2007).

3. Data

We use data from the 2002 sample of the RFV-LS database of the National Agency of Social Insurance in Sweden, which contains data on 5,000 individuals and is representative for all the residents registered with the social insurance office in Sweden. All individuals in the analyzed subsample, were 20-64 years old, and employed, and started a sickness spell due to an MD diagnosis between 1 and 16 February 2001. We excluded all employees who ended their sick leave because of incarceration, emigration, or participation in a rehabilitation program. All in all, 627 employees were or had been on (part-time or full-time) sick due to an MD diagnosis (Sample 1). Most of them (87.4% or 548) *started* their sick leave on full-time (Sample 2), and 33.03% (or 181 persons) of this group *finished* on part-time sick leave.

The treatment and control groups are constructed by using different definitions of part-time sick leave. In the first definition, the *part-time* dummy variable takes the value 1 for all employees who started their period covered by the sickness insurance with 25%, 50%, or 75% sick leave (the treatment group), and it takes the value 0 for those who started with 100% sick leave (the control group). Only 12% of the employees who were on sick leave due to a MD, started their period covered by part-time sickness insurance, and up to 90 days, the treatment group recovered much slower than the control group. In the second definition (Sample 2), all employees started on full-time sick leave, and the *part-time* dummy variable takes the value 1 for all employees who ended their period

covered by the sickness insurance with 25%, 50%, or 75% sick leave (the treatment group); it takes the value 0 for those who ended with 100% sick leave (the control group).

The outcome variable (*Full recovery at 360 days*) is a dummy variable taking the value 1 if the individual had fully recovered the lost work capacity after one year, and zero otherwise. Given the general guidelines used for sick listing (Försäkringskassan & Socialstyrelsen, 2006; Socialdepartementet, 2007), we control whether full recovery was reached within other time periods as well (from 30 to 360 days, by 30-day interval). Descriptive statistics for these outcomes for Sample 1 and Sample 2 (Tables A1 and A2, respectively), and the percentage of full recovery by the type combination of degree of sick leave in the beginning and the end at all "control" points for Sample 1 (Table A4), suggest that we should analyze the outcome at the end of the observation period.

4. The empirical strategy

Before deciding on an empirical strategy, there are some characteristics of employees on sick leave due to an MD diagnosis that should be mentioned: 1) there is a (difficult) self selection process of individuals to accept that they might have an MD diagnosis and decide to get a medical evaluation; 2) the data contains only information about some characteristics of the employees and their sick-leave period, e.g., the degree of sick leave (e.g., part-time or full-time) *only* at the *beginning* and the *end* of the sick-leave period; 3) for those with an MD diagnosis is,, in many cases, difficult to overlap the verbal meaning of full recovery of lost work capacity, and therefore we use only the setting of the social insurance, where lost work capacity is divided in four categories (<25; 25-49, 50-75, >75%).

The question is how to model the effect of being on part-time sick leave on workers' probability of returning to work with full recovery of lost work capacity after having received an MD diagnosis. Using a dummy variable to pick up the effect of part-time sick leave in a random sample of employees on sick leave (i.e., both full-time and part-time sick leave) due to an MD diagnosis might be inappropriate since employees may self-select into or out of part-time sick leave (treatment) and/or physicians may select them into part-time following general guidelines. Thus, selection into part-time sick leave and full recovery of lost work capacity at any given point in time may *not* be random. The suitable model depends on how one judge the selection into part-time sick and its outcome. The descriptive statistics (Tables A1-A4) show that there are different short-term and long-term outcomes of the part-time sick leave. At 60 days, employees who started on full-time had a lower probability to return to work with full recovery of lost work capacity than did those who started on part-time sick leave. Yet, at 90 days, this difference change direction since at this point relatively more employees who started on part-time sick leave (53.2%) than those who started on full-time sick leave (49.6%) had fully recovered, and this difference remains (at each one-month control point) until the end of the observation period, about one year after the beginning of the sick leave (77.2% and 74.8% respectively, as seen in Table A1).

The outcome is slightly different for the subsample of employees who started on full-time sick leave (Sample 2). The descriptive statistics (Table A2) show that employees who started on full-time sick leave but were on part-time sick leave on the day before full recovery was achieved were less likely to have returned to work at all "control" points than those who were on full-time sick leave during the entire period, yet

the difference is decreasing in time (from about 30 percentage points up to 120 days to about 10 percentage points thereafter). Given that "more than 60 days on sick leave" is used by the social insurance statistics to report long-term sickness, and implicitly, might be a potential source of institutional ending of some cases, we analyze a third sub-sample (Sample 3). It contains all individuals from Sample 2 who had a sick-leave spell lasting longer than 60 days, i.e., all employees started their sick leave on a full-time basis and ended with 25%, 50%, or 75% sick leave (earliest at 61 days after the start).

The fact that full-time sick leave is associated with quicker recovery (Tables A1-A4) may be due to the beneficial effect of being on full-time sick leave (causal effect). Although unlikely, it might also be that employees with a higher likelihood of recovery are assigned to full-time sick leave (selection effect). If it is indeed a selection effect that drives the association, a policy prescription of assigning more individuals to part-time or full-time sick leave will not have any beneficial effect on recovery. On the other hand, if it is a causal relationship, a policy prescription of assigning more individuals to part-time or full-time sick leave is likely to have beneficial effects on recovery times. However, in order to be on part-time sick leave, the social insurance rules require that the employees have not lost more than 75% of their work capacity, which implies that not all employees can are entitled to this treatment. Even though the part-time sick leave "policy" aims to help employees to remain in contact with their work, it is unlikely that the selection into the treatment type (part-time or full-time) is determined simultaneously with the outcome (e.g., full recovery of lost work capacity).

Given these important institutional and methodological aspects, we assume that both the decision to be on part-time sick leave and the employee's return to work with

full recovery of lost work capacity are driven by common unobserved characteristics, and choose a one-factor loadings model to estimate the impact of part-time sick leave on the probability to return to work with full recovery of lost work capacity. We use the same model as Andrén and Andrén (2008, 2009), based on Aakvik et al. (2005), which is a single period model with discrete outcomes. For each person i, assume two potential outcomes (Y_{0i}, Y_{1i}) corresponding, respectively, to the potential full recovery of lost work capacity in the untreated and treated states. It is assumed that Y_0 and Y_1 are defined for everyone and that these outcomes are independent across persons so that there are no interactions among agents. Let $D_i = 1$ denote receipt of part-time sick leave treatment; $D_i = 0$ denotes no such receipt (or full-time sick leave). A latent variable model generates the indicator variable D. Specifically, we assume that the assignment to part-time is generated by a latent variable D^*_i, $D^*_i = \mu_D(Z_i) - U_{Di}$, which is the net utility (or gain) to the decision-maker from choosing part-time sick leave (state 1) instead of full-time sick leave (state 0). Therefore $D_i = 1$ if $D^*_i \geq 0$; $= 0$ otherwise. Z_i is a vector of observed random variables and U_{Di} is an unobserved random variable. The potential outcome equation for part-time sick leave is $Y_{1i} = \mu_1(X_i, U_{1i})$, and the potential outcome for full-time sick leave is $Y_{0i} = \mu_0(X_i, U_{0i})$, where X_i is a vector of observed random variables and (U_{1i}, U_{0i}) are unobserved random variables.

If the assignment to the treatment (e.g., the degree of sickness) and the outcome (e.g., the propensity to fully recover) differ among individuals with identical observable characteristics, then the unobserables will have an important role. The degree of sickness and the propensity to recover within a given point in time would most likely be negatively correlated since the more sick an employee is initially the lower is his/her

propensity to recover within a given time period. However, recovery time could also be affected by the degree of sick leave at the beginning of the spell. That is, being extremely sick due to an MD diagnosis and being placed on part-time sick leave might extend the sick leave since working (which could also be one of the factors behind the diagnosis) could worsen the sickness. On the other hand, if the employee has a residual work capacity (e.g., after having lost someone very close), working part-time might help avoid losing contact with the job and the labor market, which in itself could extend the sick leave. Hence, the degree of sickness and the choice of state are related and should be matched. Since the selection equation is a measure of the propensity to be assigned to part-time sick leave, the unobservables will most likely have a relatively high value for those with a relatively low degree of sickness (or those who have lost very little of their normal work capacity), while the unobservables will have a relatively low value if the degree of sickness is relatively high (e.g., major loss of normal work capacity).

5. Results

We use a one-factor loadings model to estimate the impact of part-time sick leave on the probability of fully recovering the lost work capacity, and to compute the mean treatment effects (i.e., treatment on the treated (TT) and the average treatment effect (ATE)), as well as the distributions of treatment effects defined on various subpopulations.[3]

Table 1 present two mean parameters, namely the ATE and the TT for five different populations on sick leave: three different populations of employed individuals on sick leave due to mental disorders (Sample 1-3), the population of all employees who started

[3] The estimates for the selection equation, the employment equation for FTSL employees (Y_0) and the employment equation for PTSL employees (Y_1) for Samples 1-3 (reported in Tables A5, and A6a-c) have reasonable signs, but very few are statistically significant for the FTSL employees, and none of them statistically significant for PTSL employees.

their sick leave on a full-time basis (Sample 4, which is Sample 2 extended to include all diagnoses), and the population of those who started their sick leave on a full-time basis with a diagnosis other than MD (Sample 5, which is Sample 4, excluding employees with an MD diagnosis).

Table 1 ATE and TT, by sample

	Only mental disorders (MDs)			All diagnoses	All diagnoses excluding MDs
	Sample 1	Sample 2	Sample 3	Sample 4	Sample5
ATE					
Estimated parameter	0.015	0.004	0.387 ***	-0.027	0.009
(std err)	(0.273)	(0.251)	(0.128)	(0.145)	(0.239)
TT					
Estimated parameter	-0.126	-0.023	0.428 ***	0.004	0.364 ***
(std err)	(0.219)	(0.410)	(0.135)	(0.193)	(0.038)
n	627	548	327	3232	2684
Treatment group	79	181	155	640	459
Control group	548	367	172	2592	2225

For the population of employees on sick leave due to an MD diagnosis (Sample 1), part-time sick leave has a slight positive effect (0.015), yet has a (stronger) negative effect for those who are selected into the PTSL-"treatment" (-0.126). This suggests that selection into part-time sick is perverse on net gains.

For the population of employees who started on full-time sick leave due to a MD diagnosis (Sample 2), part-time sick leave has a slight positive effect (0.004), whereas it has a slight negative effect for those who were selected into the "treatment" (-0.023). This suggests, as for Sample 1, that selection into PTSL is perverse on net gains. In comparison, the raw difference in mean outcomes, $(E(Y_1|D = 1) - E(Y_0|D = 0)$, is 0.024, is 0.078, which suggest that is important to control for selection in these data.

Nonetheless, part-time sick leave has a relatively strong positive effect (0.387) for the population of MD long-term sick employees (e.g., on sick leave for longer than 60 days) who started their sick leave on a full-time basis (Sample 3), and an even stronger positive effect for those who were selected into the "treatment" (0.423). In comparison, the raw difference in mean outcomes is 0.12, which suggest that is important to control for selection.

Part-time sick leave has a slight positive effect (0.009) for employees who started sick leave related to a diagnosis other than MD on a full-time basis (Sample 5), and a larger positive effect for those who are selected into the "treatment" (0.364). For the population of all employees who started on full-time sick leave (Sample 4), the part-time sick leave has a slight negative effect (-0.027), whereas it has a slight positive effect for those who were selected into the "treatment" (0.004).

Since the estimated ATE is lower than the estimated TT, there is some indication that program administrators do not select individuals who benefit less from part-time sick leave than a randomly person in the population. This result suggests that the part-time selection might be based on employee work characteristics adapted to their work capacity.

Table 2 reports the distributional treatment effect parameters, which capture an additional type of treatment effect heterogeneity beyond that previously discussed for mean treatment effects. For example, if a group of randomly selected employees on sick leave for more than two weeks due to an MD diagnosis are assigned to part-time in the beginning of the spell (Sample 1), 17.8% of them will benefit from the PTSL (i.e., will fully recover their lost work capacity after being on part-time sick leave but would *not*

have fully recover their lost work capacity without the part-rime sick leave treatment). However, 16.3% will be hurt, relatively speaking, by receiving the treatment, i.e., they will *not* fully recover whereas they would have fully without the part-time treatment. The previously reported mean parameter for ATE of 0.015 masked the underlying heterogeneity.

If a group of randomly selected employees on full-time sick leave due to an MD diagnosis are assigned to part-time at any point after 15 days (Sample 2), 17.7% of them will benefit whereas 17.4% will be hurt compared to if they would have remained on full-time sick leave. The mean parameter for ATE, 0.004, masks the underlying heterogeneity. Moreover, if a group randomly selected employees on long-term full-time sick leave due to an MD diagnosis are assigned to part-time *at any point* after 60 days (Sample 3), 42.3% of them will be better off and 3.6% will be worse off.

Table 2 Distributional parameters, by sample

	Only mental disorders (MDs)			All diagnoses	All diagnoses excluding MDs
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
ATE					
Positive effect	0.178	0.177	0.423	0.129	0.160
Positive indifferent	0.603	0.581	0.340	0.671	0.631
Negative indifferent	0.056	0.068	0.202	0.043	0.058
Negative effect	0.163	0.174	0.036	0.156	0.151
TT					
Positive effect	0.078	0.187	0.465	0.185	0.446
Positive indifferent	0.693	0.507	0.179	0.556	0.313
Negative indifferent	0.025	0.095	0.320	0.078	0.160
Negative effect	0.204	0.210	0.037	0.181	0.082

Our results also indicate that for a large majority of the employees on sick leave (about 60% of those with an MD diagnosis and 63% of those with other diagnoses), it does not matter whether or not they experienced or not the part-time or full-time sick

leave treatment from the beginning of the spell or from a point during the spell, suggesting that it might be possible to assign more individuals to part-time instead of full-time sick leave (the entire sick leave period or a shorter portion of a spell). Both the ATE and TT parameters suggest that it might be effective to assign employees with a MD diagnosis to part-time after about two months of full-time sick leave.

6. Discussion and conclusions

Using a sample of 627 employees on sick leave due to an MD diagnosis, this paper estimates the impact of the PTSL "treatment" on the probability of full recovery of lost work capacity. The results suggest that active connection to the labor market after more than two months of part-time sick leave is beneficial for the recovery of patients with MDs.

Our evaluation of the use of part-time sick leave as "vocational rehabilitation" is based on *full recovery* of the individual one year after starting a sick leave spell due to an MD diagnosis, which is a post-program outcome measure. However, given the fact that there were no explicit guidelines about part-time sick leave as a treatment, we cannot expect the social insurance administrators to have an incentive to select into program only the employees with the highest probability to fully recovery. However, their judgment is always coordinated with the *medical certificate*, which, as already mentioned when describing the institutional settings, seems to show in most cases the patient demand for sick-listing. Despite the fact that MDs are common in primary care, general practitioners may still find it difficult to diagnose and treat them unless they have a high degree of suspicion. Social insurance administrators are seldom able to estimate "treatment effects" from the active connection with the labor market, and therefore the

guidance on who ought to participate should be based on results from research rather than on rules-of-thumb. We find that the employment gains will be enhanced if the selection rule is changed to encourage employees to return to work part-time after about 8 weeks of full-time sick leave. However, we were unable to find out whether these employees received any additional support during the first days/weeks of sick leave. Given that all of them were given a medical certificate, it is reasonable to expect that they were informed about their health status and about how to improve it.

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Table A1 Mean and standard error (se) for used variables, by the type of sick leave (part/full-time) at the beginning of the sick-leave spell, and the *t* statistic (t) for the hypothesis of no difference in mean, Sample 1

		The type of sick leave at the beginning of the sick-leave spell				
		Full-time		Part-time		
		548		79		
		Mean	se	Mean	se	t
Outcomes						
duration		144.1	5.85	148.35	14.47	0.272 **
Full recovery (FC)						
	Full recovery within 30 days	0.235	0.018	0.152	0.041	-1.876 *
	Full recovery within 60 days	0.403	0.021	0.354	0.054	-0.841
	Full recovery within 90 days	0.496	0.021	0.532	0.057	0.584
	Full recovery within 120 days	0.569	0.021	0.582	0.056	0.217
	Full recovery within 150 days	0.633	0.021	0.646	0.054	0.213
	Full recovery within 180 days	0.646	0.020	0.671	0.053	0.437
	Full recovery within 210 days	0.682	0.020	0.722	0.051	0.716
	Full recovery within 240 days	0.714	0.019	0.722	0.051	0.148
	Full recovery within 270 days	0.724	0.019	0.747	0.049	0.424
	Full recovery within 300 days	0.730	0.019	0.759	0.048	0.569
	Full recovery within 330 days	0.739	0.019	0.772	0.047	0.648
	Full recovery within 360 days	0.748	0.019	0.772	0.047	0.470
NUTS regions						
	Stockholm	0.255	0.019	0.127	0.038	-3.068 ***
	East Central	0.148	0.015	0.215	0.047	1.377
	Småland plus islands	0.082	0.012	0.089	0.032	0.190
	South	0.141	0.015	0.114	0.036	-0.683
	West	0.170	0.016	0.215	0.047	0.924
	North central	0.102	0.013	0.114	0.036	0.307
	Central north	0.064	0.010	0.038	0.022	-1.077
	Far north	0.038	0.008	0.089	0.032	1.514
Male		0.319	0.020	0.215	0.047	-2.057 **
Age-dummies						
	Age 16 – 25	0.053	0.010	0.000	0.000	-5.529 ***
	Age 26 – 35	0.221	0.018	0.203	0.046	-0.374
	Age 36 – 45	0.330	0.020	0.241	0.048	-1.713 *
	Age 46 – 55	0.254	0.019	0.380	0.055	2.174 **
	Age 56 – 64	0.142	0.015	0.177	0.043	0.762
Occupations						
	Legislators, senior officials and managers	0.053	0.010	0.025	0.018	-1.367
	Professionals	0.193	0.017	0.329	0.053	2.431 **
	Clerks	0.093	0.012	0.089	0.032	-0.129
	Service and shop sales workers	0.268	0.019	0.089	0.032	-4.811 ***
	Craft and related trades workers	0.058	0.010	0.025	0.018	-1.620
	Plant/machine operators & assemblers	0.086	0.012	0.038	0.022	-1.932 *
	Other	0.243	0.018	0.405	0.056	2.774 ***
Physician						
	Primary care	0.544	0.021	0.430	0.056	-1.891 *
	Company	0.166	0.016	0.228	0.047	1.234
	Private	0.131	0.014	0.215	0.047	1.720 *
	Specialist (at the hospital)	0.159	0.016	0.127	0.038	-0.789
Level of education						
(occupational	Very small or not requirement	0.058	0.010	0.051	0.025	-0.290
requirement)	High-school	0.511	0.021	0.241	0.048	-5.112 ***
	High-school or some in the top	0.177	0.016	0.342	0.054	2.935 ***
	University	0.193	0.017	0.329	0.053	2.431 **
	Senior officials and managers	0.060	0.010	0.038	0.022	-0.930
Employer						
	Private	0.396	0.021	0.316	0.053	-1.404
	Municipality	0.370	0.021	0.354	0.054	-0.276
	Regional	0.106	0.013	0.165	0.042	1.335
Married	=1 if married; = 0 otherwise	0.440	0.021	0.367	0.055	-1.404
Country of birth						
	Sweden	0.874	0.014	0.949	0.025	2.633 ***
	Other Nordic country	0.044	0.009	0.025	0.018	-0.932
Sickness history	=1 if at least one previous sick leave; =0 otherwise	0.221	0.018	0.253	0.049	0.618
Ceiling	=1 if income over the ceiling; =0 otherwise	0.044	0.009	0.063	0.028	0.674

Table A2 Descriptive Statistics for all who started their sick leave on a full-time basis, by the type of sick leave at the end of the sick-leave spell (Part/full-time), Sample 2

		The type of sick leave at the end of the sick-leave spell				
		Full-time		Part-time		
		367		181		
		Mean	se	Mean	se	t
Duration		123.47	7.07	186.22	9.69	5.23 ***
Full recovery	(=1; =0 otherwise)					
	Full recovery within 30 days	0.324	0.024	0.055	0.017	-9.024 ***
	Full recovery within 60 days	0.531	0.026	0.144	0.026	-10.498 ***
	Full recovery within 90 days	0.608	0.026	0.271	0.033	-8.058 ***
	Full recovery within 120 days	0.651	0.025	0.403	0.037	-5.603 ***
	Full recovery within 150 days	0.681	0.024	0.536	0.037	-3.269 ***
	Full recovery within 180 days	0.695	0.024	0.547	0.037	-3.343 ***
	Full recovery within 210 days	0.730	0.023	0.586	0.037	-3.330 ***
	Full recovery within 240 days	0.752	0.023	0.635	0.036	-2.753 ***
	Full recovery within 270 days	0.760	0.022	0.652	0.036	-2.582 **
	Full recovery within 300 days	0.766	0.022	0.657	0.035	-2.593 ***
	Full recovery within 330 days	0.766	0.022	0.685	0.035	-1.961 *
	Full recovery within 360 days	0.774	0.022	0.696	0.034	-1.911 *
NUTS regions						
	Stockholm	0.275	0.023	0.215	0.031	-1.551
	East Central	0.125	0.017	0.193	0.029	1.992 **
	Småland plus islands	0.087	0.015	0.072	0.019	-0.634
	South	0.144	0.018	0.133	0.025	-0.378
	West	0.163	0.019	0.182	0.029	0.543
	North central	0.095	0.015	0.116	0.024	0.728
	Central north	0.065	0.013	0.061	0.018	-0.210
	Far north	0.044	0.011	0.028	0.012	-0.985
Male		0.343	0.025	0.271	0.033	-1.754 *
Age-dummies						
	Age 16 – 25	0.054	0.012	0.050	0.016	-0.238
	Age 26 – 35	0.240	0.022	0.182	0.029	-1.578
	Age 36 – 45	0.332	0.025	0.326	0.035	-0.151
	Age 46 – 55	0.226	0.022	0.309	0.034	2.040 **
	Age 56 – 64	0.147	0.019	0.133	0.025	-0.464
Occupations						
	Legislators, senior officials and managers	0.044	0.011	0.072	0.019	1.283
	Professionals	0.174	0.020	0.232	0.031	1.550
	Clerks	0.098	0.016	0.083	0.021	-0.591
	Service and shop sales workers	0.297	0.024	0.210	0.030	-2.254 **
	Craft and related trades workers	0.076	0.014	0.022	0.011	-3.065 ***
	Plant/machine operators & assemblers	0.095	0.015	0.066	0.019	-1.207
	Others	0.213	0.021	0.304	0.034	2.261 ***
Physician						
	Primary care	0.569	0.026	0.492	0.037	-1.714 *
	Company	0.123	0.017	0.254	0.032	3.584 ***
	Private	0.134	0.018	0.127	0.025	-0.211
	Specialist (at the hospital)	0.174	0.020	0.127	0.025	-1.489
Level of education						
(occupational	Very small or not requirement	0.046	0.011	0.083	0.021	1.569
requirement)	High-school	0.569	0.026	0.392	0.036	-3.968 ***
	High-school or some in the top	0.158	0.019	0.215	0.031	1.591
	University	0.174	0.020	0.232	0.031	1.550
	Senior officials and managers	0.052	0.012	0.077	0.020	1.110
Employer						
	Private	0.406	0.026	0.376	0.036	-0.684
	Municipality	0.376	0.025	0.359	0.036	-0.386
	Regional	0.093	0.015	0.133	0.025	1.356
Married	=1 if married; = 0 otherwise	0.411	0.026	0.497	0.037	1.895 *
Country of birth						
	Sweden	0.864	0.018	0.895	0.023	1.077
	Other Nordic country	0.049	0.011	0.033	0.013	-0.910
Sickness history	=1 if at least one previous sick leave; =0 otherwise	0.210	0.021	0.243	0.032	0.867
Ceiling	=1 if income over the ceiling; =0 otherwise	0.033	0.009	0.066	0.019	1.620

Table A3 Descriptive Statistics for long-term sick by the type of sick leave (Part/full-time), Sample 3

		Full-time		Part-time		
		172		155		
		Mean	se	Mean	se	t
Duration		228.98	10.26	211.12	10.01	-1.246
Full recovery	(=1; =0 otherwise)					
	Full recovery within 90 days	0.16	0.03	0.15	0.03	-0.358
	Full recovery within 120 days	0.26	0.03	0.30	0.04	0.951
	Full recovery within 150 days	0.32	0.04	0.46	0.04	2.575 **
	Full recovery within 180 days	0.35	0.04	0.47	0.04	2.250 **
	Full recovery within 210 days	0.42	0.04	0.52	0.04	1.661 *
	Full recovery within 240 days	0.47	0.04	0.57	0.04	1.871 *
	Full recovery within 270 days	0.49	0.04	0.59	0.04	1.911 *
	Full recovery within 300 days	0.50	0.04	0.60	0.04	1.820 *
	Full recovery within 330 days	0.50	0.04	0.63	0.04	2.426 **
	Full recovery within 360 days	0.52	0.04	0.65	0.04	2.353 **
NUTS regions						
	Stockholm	0.25	0.03	0.21	0.03	-0.937
	East Central	0.16	0.03	0.19	0.03	0.723
	Småland plus islands	0.08	0.02	0.08	0.02	-0.132
	South	0.12	0.03	0.13	0.03	0.188
	West	0.16	0.03	0.17	0.03	0.274
	North central	0.13	0.03	0.14	0.03	0.202
	Central north	0.03	0.01	0.05	0.02	0.737
	Far north	0.06	0.02	0.03	0.01	-1.132
Male		0.31	0.04	0.26	0.04	-0.871
Age-dummies						
	Age 16 – 25	0.03	0.01	0.05	0.02	0.737
	Age 26 – 35	0.23	0.03	0.16	0.03	-1.626
	Age 36 – 45	0.40	0.04	0.32	0.04	-1.479
	Age 46 – 55	0.19	0.03	0.32	0.04	2.844 ***
	Age 56 – 64	0.15	0.03	0.14	0.03	-0.088
Occupations						
	Legislators, senior officials and managers	0.04	0.02	0.08	0.02	1.601
	Professionals	0.18	0.03	0.24	0.03	1.293
	Clerks	0.08	0.02	0.08	0.02	0.081
	Service and shop sales workers	0.29	0.03	0.20	0.03	-1.914 *
	Craft and related trades workers	0.09	0.02	0.01	0.01	-3.338 ***
	Plant/machine operators & assemblers	0.08	0.02	0.06	0.02	-0.586
	Other	0.23	0.03	0.30	0.04	1.562
Physician						
	Primary care	0.48	0.04	0.48	0.04	-0.093
	Company	0.17	0.03	0.28	0.04	2.363 **
	Private	0.13	0.03	0.12	0.03	-0.480
	Specialist (at the hospital)	0.22	0.03	0.13	0.03	-2.077 **
Level of education						
(occupational	Very small or not requirement	0.03	0.01	0.08	0.02	1.655 *
requirement)	High-school	0.55	0.04	0.37	0.04	-3.271 ***
	High-school or some in the top	0.19	0.03	0.22	0.03	0.745
	University	0.18	0.03	0.24	0.03	1.293
	Senior officials and managers	0.05	0.02	0.09	0.02	1.556
Employer						
	Private	0.40	0.04	0.34	0.04	-0.999
	Municipality	0.38	0.04	0.37	0.04	-0.189
	Regional	0.09	0.02	0.15	0.03	1.706 *
Married		0.41	0.04	0.54	0.04	2.228 **
Country of birth						
	Sweden	0.83	0.03	0.89	0.03	1.685 *
	Other Nordic country	0.06	0.02	0.04	0.02	-0.820
Sickness history	=1 if at least one previous sick leave; =0 otherwise	0.24	0.03	0.23	0.03	-0.130
Ceiling	=1 if income over the ceiling; =0 otherwise	0.06	0.02	0.07	0.02	0.251

Table A4 Full recovery by cut-off points and the type combination of degree of sick leave in the beginning and at the end (Sample 1)

	FT→FT (n=366)	FT→PT (n=182)	PT→PT (n=67)
≤ 30	32.2	6.0	17.9
≤ 60	53.0	14.8	38.8
≤ 90	60.7	27.5	59.7
≤ 120	65.0	40.7	65.7
≤ 150	68.0	53.9	71.6
≤ 180	69.4	55.0	73.1
≤ 210	73.0	58.8	76.1
≤ 240	75.1	63.7	76.1
≤ 270	76.0	65.4	79.1
≤ 300	76.5	65.9	80.6
≤ 330	76.5	68.7	82.1
≤ 360	77.3	69.8	82.1

Note: there only 12 observations which switched from part-time (PT) to full-time (FT) sick leave.

Table A5 The estimated coefficients (beta) and standard errors (se) of the selection into treatment

	Part-time at the beginning of sick leave (n = 627) Sample 1		Part-time at the end (All full-time at the beginning) (n = 548) Sample 2		Long-term sick (> 60 days) in Sample 2 (n = 327) Sample 3	
	Beta	se	Beta	se	Beta	se
Men	-0.615	0.255 **	-0.294	0.213	-0.072	0.270
Born in Sweden	0.409	0.358	0.131	0.251	0.371	0.299
Age/10	-0.788	0.332 **	0.067	0.265	-0.174	0.341
Age-squared	0.109	0.041 ***	-0.007	0.034	0.026	0.043
Stockholm's region	-0.835	0.272 ***	-0.458	0.198 **	-0.359	0.239
At least one spell of sick leave previous year	0.049	0.235	0.118	0.197	-0.071	0.245
Married	-0.446	0.213 **	0.119	0.170	0.247	0.214
Physician (CG: Company)						
Primary care	-0.422	0.265	-0.747	0.225 ***	-0.341	0.275
Private	0.106	0.331	-0.743	0.296 **	-0.534	0.372
Specialist (at the hospital)	-0.362	0.348	-0.850	0.287 ***	-0.735	0.348 **
Municipality employer	-0.038	0.240	0.181	0.202	-0.082	0.256
Occupation (CG: Professionals)						
Legislators, senior officials and managers	-1.085	0.587 *	-0.014	0.410	0.407	0.473
Clerks	-0.512	0.402	-0.418	0.381	0.104	0.434
Service and shop sales workers	-1.140	0.331 ***	-0.630	0.264 **	-0.415	0.316
Craft and related trades workers	-0.744	0.597	-1.287	0.498 **	-1.798	0.641 ***
Plant/machine operators & assemblers	-0.917	0.515 *	-0.554	0.394	-0.004	0.487
Elementary occupations	0.063	0.254	0.016	0.245	0.070	0.298
Income from employment in 100 kr	0.181	0.240	0.055	0.196	0.169	0.253
THETA0	0.670	1.532	-0.104	1.178	-1.074	1.145
THETA1	-0.028	0.886	-0.228	1.028	-0.794	1.505
Log-likelihood	-543.3		-615.3		-413.9	

Table A6 The estimated parameters (Beta) and standard errors (se) of the Outcome equations

a) Part/full-time in the beginning (Sample 1)

	Full-time		Part-time	
	Beta	se	Beta	se
Men (CG: Women)	0.169	0.182	0.443	0.539
SGI	-0.074	0.166	0.039	0.427
Swedish born	0.389	0.375	0.407	0.784
Age/10	0.452	0.370	0.462	0.884
Age-squared/100	-0.072	0.053	-0.079	0.109
Sick leave previous year	-0.082	0.173	0.065	0.399
Married	-0.214	0.228	0.068	0.424
Physician (CG: Company)				
Primary care	0.414	0.298	-0.289	0.504
Private	0.234	0.309	0.099	0.550
Specialist (at the hospital)	-0.132	0.264	-0.649	0.626
Private employer	0.099	0.170	0.055	0.385
Occupation with small or no requirement of education's level	-0.077	0.187	-0.025	0.376

b) All full-time in the beginning (Sample 2)

	Full-time		Part-time	
	Beta	se	Beta	se
Men (CG: Women)	0.218	0.234	0.071	0.276
SGI	-0.050	0.183	-0.110	0.246
Swedish born	0.476	0.207 **	-0.130	0.350
Age/10	0.283	0.267	0.649	0.518
Age-squared/100	-0.053	0.031 *	-0.090	0.065
Sick leave previous year	-0.205	0.199	0.028	0.244
Married	-0.052	0.166	-0.361	0.275
Physician (CG: Company)				
Primary care	0.481	0.322	0.157	0.388
Private	0.177	0.350	0.267	0.456
Specialist (at the hospital)	-0.120	0.320	-0.018	0.493
Private employer	0.029	0.177	0.209	0.242
Occupation with small or no requirement of education's level	-0.157	0.241	-0.055	0.272

c) All long-term sick leave, full-time in the beginning (Sample 3)

	Full-time		Part-time	
	Beta	se	Beta	se
Men (CG: Women)	0.343	0.417	0.073	0.339
SGI	-0.523	0.460	-0.111	0.331
Swedish born	0.345	0.396	-0.328	0.529
Age/10	0.741	0.521	0.884	0.984
Age-squared/100	-0.142	0.086 *	-0.119	0.128
Sick leave previous year	-0.111	0.340	-0.021	0.307
Married	-0.377	0.399	-0.398	0.482
Physician (CG: Company)				
Primary care	0.021	0.418	0.133	0.382
Private	-0.268	0.547	0.278	0.576
Specialist (at the hospital)	-0.518	0.535	0.010	0.543
Private employer	0.150	0.332	0.154	0.326
Occupation with small or no requirement of education's level	0.047	0.410	-0.035	0.330