The effects of job displacement on the onset and progression of diabetes[a]

by

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Abstract

Are there negative health effects from losing the job? We analyze the causal effect of job displacement on diabetes incidence and prevalence. Type 2 diabetes is an illness that is directly affected by lifestyle factors and psychosocial stress, and with severe side-effects deteriorating the quality of life. We use rich Swedish register data that allows us to identify workers displaced through plant downsizing between 2002 and 2004, matched to detailed information on diabetes status from the Swedish National Diabetes Register. As those displaced at large layoffs may still be a selective group with respect to health we match them to comparable workers not being displaced.

On average we do not find signs for a significant increase in the diabetes onset in case an individual is mass laid off. However, we find substantial effect heterogeneity when distinguishing between different socio-economic characteristics which additionally differ between men and women. For example, the probability of the onset of diabetes increases due to being mass laid off in case men do not have a partner. In addition there are signs that women in case of having a partner and a child below 18 also suffer in terms of diabetes incidence in case they are mass laid off. Moreover, we find that women's diabetes progresses faster due to being mass laid off.

Keywords: diabetes, unemployment, health, matching

JEL-codes: I18, C14, J64, J65

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1 Introduction

We analyze the effect of losing the job on incidence on and progression of diabetes. There are many negative consequences from job displacement apart from the direct effects on earnings. Indeed, a large literature has not only been documenting scaring effects of displacement in terms of lower future wages, earnings potential and worse employment prospects (see for example Ruhm 1991; Jacobson, Lalonde and Sullivan 1993; Eliason and Storrie 2006; Bender and von Wachter 2006; Huttunen, Moen and Salvanes 2009), but also negative social consequences on family stability (Eliason 2004), family fertility decisions (Del Bono, Weber and Winter-Ebner 2010; Huttunen and Kellokumpu 2010), and obesity and alcohol consumption for individuals at risk (Deb et al. 2009).

There is also a growing interest in the health consequences of job displacement; the worry is that a job separation leads to psychosocial and financial stress and a loss of social networks, which could both have direct health consequences, but could also lead individuals to develop a less healthy lifestyle (e.g. less exercise, tobacco use and alcohol consumption) and also make them more susceptible to exogenous shocks. Recent work has analyzed the effects of job displacement on mortality (Sullivan and von Wachter 2009; Eliason and Storrie 2009a), hospital inpatient care consumption (Browning, Dano and Heinesen 2006; Eliason and Storrie 2009b, 2010; Kuhn, Lalive and Zweimüller 2009), usage of antidepressant drugs (Kuhn, Lalive and Zweimüller 2009) and disability benefits (Rege, Vorterba and Telle 2009). There is evidence that mortality of men and the take up of disability benefits increases due to being displaced. In addition, inpatient care increases for specific reasons like alcohol consumption or psychological reasons. Furthermore, men and women use antidepressant drugs more often following a displacement. However, there is, for example, no evidence that individuals following a displacement are more likely to be admitted to hospital due to cardiovascular problems.

So overall, there is evidence that displacement has an effect on health. However, little is known about the role of the socioeconomic environment for the size of the effects and underlying pathways of these effects. The use of rather crude health measures, which makes it difficult to pin down the underlying causes of the effects, probably explains the lack of research in this area.

In this paper, we study the causal effects being laid off from work on the probability of retrieving, and the progression of, type 2 diabetes. By using diabetes, i,e. one specific disease, we are better able to identify the role of the socioeconomic environment and pathways of the effects. In addition, we avoid the drawbacks of the previous literature: it is based on an objective health measure diagnosed by a physician[1] and not a consumption measure like hospital care or drug usage; type 2 diabetes is not a rare health event but a chronic disease usually diagnosed and managed in the primary care. Moreover it is a disease strongly related to life style.[2]

Diabetes is a growing health concern worldwide; a review article in *Nature* labeled it as "one of the main threats to human health in the 21st century" (Zimmet, Alberti and Shaw 2001, p. 782). Diabetes mellitus is a chronic disease caused either by an absolute deficiency of the Beta cells in the Pancreas to produce insulin (type 1)—insulin is a hormone that regulates blood sugar—or by the body being insensitive to the insulin being produced and/or an abnormal insulin secretion resulting in bad control of blood sugar levels (type 2).[3] WHO (2011) estimates that around 220 million people globally have diabetes; a number that is expected to rise to 366 million by 2030 due to increased longevity and urbanization. The expected increase in prevalence is driven by type 2 diabetes; type 2 diabetes account for about 90 percent of all diabetes and incidence increases rapidly with age from about 40 (Wild et al. 2004). If the diabetes is not controlled it leads to hyperglycemia, or raised blood sugar, which damages many of the body's systems, especially the nerves and blood vessels, which over time can lead to severe side effects such as heart disease and stroke; diabetic retinopathy which can lead to blindness; kidney failure; diabetic neuropathy which can lead to foot ulcers and limb amputation. The associated burden for the health care system for both direct and indirect effects of diabetes is large. Clearly, the list of negative effects of diabetes does not stop here. Productivity loss due to diabetes constitutes, for example, an additional problem.

[1] See American Diabetes Association (2007) for diagnostic criteria for diabetes.

[2] There exist a number of studies which look at the relationship of diabetes and labor market outcomes (Bastida and Pagan 2002, Brown, Pagan and Bastida 2005, Kahn 1998, Tunceli, Bradley, Nerenz, Williams, Pladevall, and Lafata 2005). However, their focus lies on the reverse relationship, i.e. on the effect of having diabetes on labor market outcomes and do not focus or disregard the potential causal effect of labor market status changes on the diabetes risk.

[3] Other less common types of diabetes are Gestational diabetes (or Pregnancy diabetes) and Secondary diabetes caused by damage to the pancreas due to other health reasons.

According to the medical literature, the risk of developing type 2 diabetes is partly driven by genetic disposition and partly by individuals' life style and psychosocial environment (Östensson 2010 gives a research overview of such factors). In particular, factors like obesity, physical inactivity (Hamman 1992), tobacco use (Persson et al. 2000; Tonstad 2009) and psychosocial stress including symptoms of anxiety, apathy, depression, fatigue and insomnia (Agardh et al. 2003; Eriksson et al 2008; Heraclides et al. 2009) may cause decreased insulin sensitivity. It has also been suggested that tobacco and stress can lead to impaired insulin secretion (Daviani et al. 2004; Yoshikawa et al. 2005; Rosengren et al., 2010). Moderate alcohol consumption, on the other hand, can reduce the diabetes risk, whereas the effects larger quantities can be harmful, but this is still uncertain (see Meta study by Carlsson, Hammar and Grill 2005). As these factors are related to the level of glycemic control they also affect the progression of diabetes; for example smoking increase the risk of diabetic side effects (Eliasson 2003). Hence, there are different mechanisms through which job displacement may affect diabetes incidence and morbidity: (1) individuals may develop a different lifestyle when losing a job and with it a restrain social networks and income, and (2) there can be a direct effect from the increased/reduced stress (e.g. worries about the future, more time for oneself) on insulin sensitivity and secretion. Note, that a priori, the direction of the effect is not obvious. The focus of our empirical analysis will especially lie on the role of the socioeconomic environment with respect to the heterogeneity of the effects.

To identify the effects of job displacement on the diabetes risk, we have to take care of potential endogeneity of displacement; i.e. that individuals with bad health are more likely to lose their job. In conjecture with the literature we only use displacements where all, or a large fraction of, employees at a workplace are laid off. At large layoffs employers are less able to discriminate between persons with different health states. Still, individuals who are displaced may not be a random group, as for example, firms in different sectors face different business risks which might also affect the diabetes risk. We take care of this selection problem by matching on a rich set of individual, workplace, and labor market specific controls. This richness of the data available makes our identification strategy particularly credible for the current setting.

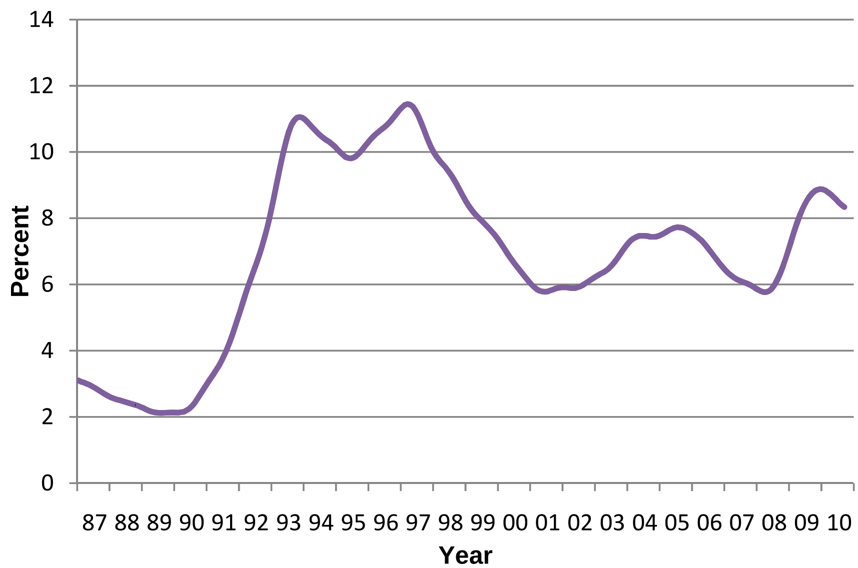
We use data on diabetes from the Swedish National Diabetes Register (NDR) between 2001 and 2008, covering about 60 percent of all Swedish patients in Sweden (NDR 2009). The NDR data—which enables us to observe the time of diabetes contraction and the severity of the illness—is linked to matched employer-employee data covering the universe of Swedish workers and workplaces, which enables us identify layoffs and individuals job separations. In addition we have access to very rich background information including firm characteristics, workers socioeconomic profile, past inpatient care usage (by ICD9 chapter of the main diagnosis), past long term sick absence and local labour market conditions.

2 Empirical setting

The Swedish labor market is characterized by high labor force participation and active labor market policy. Employment has traditionally been high, with unemployment averaging around 3 percent during the 1970's and 1980's (Forslund, Calmfors and Hemström, 2001). *Figure 1* shows that during the first half of the 1990's, the economic crisis sharply pushed up unemployment rates to well over 10 percent. In the prolonged economic boom that followed, unemployment fell and stabilized around 6-8 percent during the most part of the 2000's. It appears as if Sweden, during this period, transited from being a high-inflation-low-unemployment economy to an equilibrium with higher unemployment levels even in good times more similar to economies in continental Europe. Indeed, estimates suggest that the natural rate of unemployment has increased from 3 percent up until the early 1990's to around 8 percent (National Institute of Economic Research, 2010). Our analysis based on massive plant-level layoffs between 2002 and 2004, is thus cast in a boom with a fair amount of unemployment.

In order to identify exogenous layoffs and to compare the diabetes status across displaced and non-displaced workers, we need rich individual level data where we can observe (i) diabetes incidence and morbidity; (ii) displacement at downsizing firms; (iii) background characteristics such as workers' labor market history, socio-economic status, and underlying health. Such data is available from Swedish register data sources. Sweden also have a unique personal identifier—a ten digit number—used to define the individual in all contacts with the authorities, which means that individual level information from different registers easily can be matched by Statistics Sweden.

Figure 1. Percentage unemployed ages 16 to 64 in Sweden 1986-2010



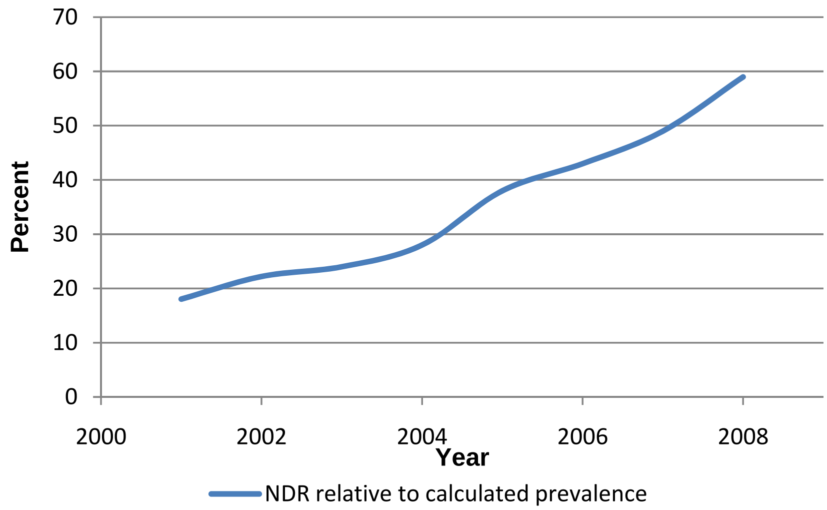
Source: Statistics Sweden (2010)

In the next section we describe the information on diabetes incidence and prevalence, and in the subsequent section we describe the data on layoffs and background characteristics.

2.1 Diabetes data

The data on diabetes comes from patient level data on diabetes morbidity from the Swedish national diabetes register (NDR). NDR is a register managed by the Swedish society of diabetology and was initiated in 1996 in order to support evidence-based treatment of diabetes. The aim is to provide annual information on glycaemia, other risk factors, diabetic complications and process measures in diabetes care for Sweden’s diabetes patients. Currently 4 percent of the Swedish population is estimated to have diabetes, of which 85-90% is of type 2 (Gudbjörnsdottir et al. 2010).

Figure 2. Estimated share of diabetes patients included in NDR 2001-2008.



Note: The series displays diabetes patients in NDR relative to a calculated diabetes prevalence of 4 percent.

The register is based on a local organization of participating clinical departments of medicine and at primary care centres. Participation by these facilities is not mandatory; still in 2007 compliance was over 90 percent for hospitals and around 80 percents for the primary care. The registration of individual patients is generally carried out by their physician; specialists in endocrinology or internal medicine or family physicians, or by a nurse educated in diabetology. The data entry is performed using a printed form, specific computer software, or via the Internet. Each patient actively has to give his consent before being included in the register. Any non-compliance of diabetes patients from the register thus comes from two sources: either the diabetes patient has a physician who is not working at any of the health care facilities collaborating with NDR, or the patient has declined to participate in the register. In 2008, 59 percent of all diabetes patients were estimated to be included in the NDR (Gudbjörnsdottir et al. 2010). We use NDR data collected between 2001 and 2008; as shown in *Figure 2* compliance to the register was steadily increasing during this period. Since the NDR contains retrospective information on the year that diabetes debuted, the lower compliance in the earlier part of our observation window is less of a problem.

Nevertheless we conduct a sensitivity analysis using coverage variation on county level in order to check the sensitivity of our results (see Sections 3.2 and 4.2).

For each patient included in NDR we have access to information about the year of diabetes debut, the age at the debut, and the type of diabetes. We use an epidemiological definition of type 2 diabetes where an individual is either (1) being treated through diet or oral glucose lowering agent, or (2) having a debut age over 40 and being treated with insulin.. In addition we have yearly information—given that the patient visits his physician at the recommended yearly basis—on the type of diabetes treatment; i.e. whether the patient is treated through diet; through oral glucose lowering agents; or through insulin.

The information from NDR thus allows us to identify yearly incidence through the retrospective information on the year of diabetes debut for all individuals included in the register. In addition, we have information on any progression of the diabetes for all patients who are observed in the register for at least two years. At the onset diabetes type 2 is usually treated only with diet, but once the disease progress the diet is supplemented with oral glucose lowering agents. As the diabetes progress to an even worse state it is treated with insulin or even in a combination of oral agents and insulin. We define the diabetes to have progressed as patients switch treatment from diet to either oral agents or insulin; or has progressed from oral agents to insulin.

2.2 Additional data sources

In addition to the data on diabetes incidence and morbidity, we need information on displacement at downsizing firm and background characteristics on firms and individuals included in the analysis.

Displacement data

We use matched employer-employee data (RAMS data) based on wage income data, that employers are mandated to report to the tax authorities, to identify worker displacement for the year 2002 to 2004. Specifically, for income tax declaration purposes all employers have to report the annual wage sum paid to each employee, and the months for which the wage is paid. For each individual we thus have information on the wage income paid to him from each employer; the months that the wage is paid and the workplace at which he worked. Each workplace and firm is indentified with a unique identification number.

This data provides us with information on the number of employees at each workplace and firm; i.e. the number of individuals receiving wage payments from the firm: We calculate the monthly wage earnings, as well as an employment indicator, in December for each individual.[4] In section 3.1 we describe in detail how we define layoffs.

Background characteristics

In the analysis it is important to control for a number of background characteristics both at the workplace level and at the individual level. To this end, the matched employer-employee data provides workplace level information on whether the employer is public or private, as well as detailed industry codes which we aggregate to 37 different industries excluding (agriculture, forestry and fishing). It also allows us to calculate how long the plant has been in operation.[5] At the individual level the matched employer-employee data provides information on past wage earnings and tenure at the firm; i.e. how long the employee has been working at a specific firm.

It is important to control for individuals underlying differences in health. We first use data from the Swedish Social insurance agency on the number of long-term sickness days year-by-year during the previous 3 years. In the Swedish sickness insurance the employer has to pay the benefit during the initial “sick-pay” period of a sickness spell; the length of this period has varied between two and three weeks over the years. After the sick-pay period the sickness benefit is paid by the Social insurance agency, and only this part of the sickness insurance is registered in any central registers. More specifically, we have yearly information on the number of days in the sickness insurance exceeding three weeks (for those spells lasting longer than three weeks) during the past three years.

[4] The employment indicator is defined as having a monthly wage earning in December larger than 10,000 SEK for. We have used a cut-off larger than zero in order to reduce noise caused by for example delayed holiday payments or over time compensation.

[5] We have indicators for whether the firm was in operation each year 1 to 9 years back, and an indicator for 10 years or more.

As a second attempt to capture underlying differences in health we use data on inpatient hospital care consumed during the past three years from the Swedish inpatient register. Specifically, we use an indicator for the number of inpatient hospital episodes during the past three years. Hospital episodes can both differ and have different length and causes. We therefore also use information on the number inpatient hospital days—the past three years—grouped by the ICD9-chapter[6] of the main diagnosis of the hospital episode.

We also have individual level data on socioeconomic characteristics such as age, gender, place of residence, schooling level, and marital status and family composition from an addition data source (Louise data).

Finally, as labour market conditions differ widely across Sweden, we have collected information on the labour market region of residence (defined by commuting patterns) and matched this to the information on labor market tightness, as defined by the ratio of the number of vacancies over unemployed.

3 Empirical strategy

In order to estimate the causal effect of job displacement on diabetes incidence and progression, we need to compare the diabetes status of displaced workers to that of otherwise comparable but non-displaced individuals. This means that we have to take care of any endogeneity in the displacement process; i.e. that persons with worse health are more likely to be laid off.

In Sweden the labour market legislation from 1982 stipulates a "last-in-first-out" principle when laying off workers for business reasons. This principle mandates that if *n* workers are to be laid off from this should be the *n* workers with shortest tenure at the firm. This legislation is only "dispositive" in the sense that an employer can make agreements with the local trade union to deviate from the last-in-first-out principle. In practice, there is therefore a certain scope for an employer to select workers with low

[6] ICD is an abbreviation the International Statistical Classification of Diseases and Related Health Problems; a system for coding of diseases and signs, symptoms, abnormal findings, complaints, social circumstances and external causes of injury or diseases created by the WHO. Every health condition can be assigned to a unique diagnose code. The diagnose codes are grouped into "chapters" of similar diseases. ICD9 consists of 17 main chapter.

productivity or bad health, if there are valid reasons for reducing the workforce; eg. for business reasons. For small firms—with ten employees or less—there are also special rules allowing them to exempt two workers from the last-in-first-out rule by assigning them "key worker" status. These key workers will then escape layoff even if they ought to have been the one to go if last-in-first-out rule were followed strictly (see for example Below and Thoursie, 2010).

For this reason we will only look at displacements where a large fraction of employees, or all, at a workplace are laid off at the same time, and at firms with more than ten employees. Having to lay off a large fraction of employees within the last-in-first-out rule it is more difficult for firms to discriminate according to health status. Still, individuals who are mass laid off might not be a random group of individuals. Firms in different sectors may face different business risks which might also affect the diabetes risk. Similarly, individuals might chose for certain reasons (e.g. family reasons) to work in firms that are less likely to have layoffs. These reasons might also have an effect on health. Moreover, individuals with good outside options may leave the firm quickly after first rumours of a potential mass lay off appear and those individuals might be especially productive and healthy. Finally, there still might be some leverage for firms to choose to lay off the less productive, less healthy individuals.

We take care of these selection problems by matching on a rich set of individual, workplace, and labor market specific controls as described in Section 2.2.

In the next section we will explain how we define job displacement as a large reduction of workers, and in the subsequent section we describe the matching strategy used to account for any remaining confounding factors.

3.1 Layoffs

For each year t=2002...2004 we sample all stable establishments in Sweden with more than 10 employees in t-1.[7] Being *stable* means that we require these establishments to have been in operation for at least three years, and not to have been subjected to any

[7] A work establishment is an organizational unit for workplaces; e.g. a plant, a shop or an office. All employers (e.g. a private firm) run its business in at least one establishment. An employer can have several establishments if business is operated at different geographical locations or if the operation belongs to different industries. The last-in-first-out principle is applied at the establishment—or an even more detailed organizational—level.

major change in staffing during the last three years; that is yearly staff reductions (or increases) t-3...t-1 must be less than 30 percent. The number of employees is defined by the number of individuals who received wage payments larger than 10,000 SEK (1500 USD) in December each year. These establishments can be followed over time through the unique identifier-number used by the tax authorities.

For all sampled establishments we say that they have been subjected to massive layoffs if they have reduced the number of employees with at least 30 percent between t-1 and t. A potential problem here is that we by mistake may take reorganizations or mergers—where an establishment may change its identifier-number or a large share of employees change establishment—as a major layoff. Therefore we only define a massive layoff to take place if less than 30 percent of the employees in an establishment in t-1 work together as colleagues in a different establishment in t.

We define individuals as being mass laid off if they left a firm during the year of a mass layoff. Unfortunately, we do not know whether these are individuals that left voluntarily or involuntarily. However, as a reduction of a firm by 30% is unlikely to be voluntarily, it is more than plausible to assume that the main part of the former employees left involuntarily.

3.2 Identification

We compare individuals in two different situations (treatment states): Individuals that were mass laid off with individuals that were not. The second group consists of both, individuals that were not mass laid off although there was a mass layoff in their firm workplace but were not affected by it as well as individuals that worked at workplace where no mass layoff took place.

Due to the above mentioned potential selection issues we conduct matching. Matching is well suited in order to estimate treatment effect in the presence of selection on observables (see for example Imbens and Wooldridge, 2009, Blundell and Costa Dias, 2009, for recent overviews). We think that in our application the assumption of selection on observables is well justified as we have very detailed data on the individuals (see Section 2.2).

We focus on the average treatment-on-the-treated effect. Due to practicability issues we use two different matching approaches. For the estimation of the effect of being mass laid off on the diabetes incidence we use simple nearest neighbour matching on the propensity score. The standard errors are calculated by approximate standard errors that, however, do not take into account that the propensity score is estimated (see Leuven and Sianesi, 2003). Nearest neighbour matching on the propensity score is very attractive in order to analyse a large amount of data as in the present application. For the empirical analysis of the diabetes incidence we can use the full sample instead of a subsample without running into capacity issues of the server where the data is stored. The downturn, however, is that the standard errors are not fully correct.

For the analysis of diabetes progression, where we have a much smaller sample. Here we are able to use Mahalanobis matching on the covariates where the standard errors are calculated analytically allowing for heteroscedasticity. In order to estimate the propensity score for the analysis of the diabetes incidence we control for the following characteristics: age, educational level, industry (38 dummies), family composition, former wage, local labor market tightness, tenure at firm, years of firm existence, number of sickness leave days in the last 3 years, and hospital days due to 15 different reasons in the last 3 years (see the Appendix for examples of estimations of the propensity score). For the analysis of diabetes progression we reduce to industry controls to 9 and skip the hospital days due to the smaller number of observations.

Note that the incomplete documentation of diabetes incidence and progression has an effect on our estimates. Under the plausible assumption that the reporting rate doe not differ between those who are mass laid off and those who aren’t we will underestimate the impact of being mass laid off on the diabetes incidence and progression.

4 Results

4.1 Selection of the Sample

We use two different samples for our analysis. For the diabetes incidence we use a sample of individuals that were mass laid off or not in 2002. Choosing the year 2002 has two advantages. First, before and after 2002 Sweden experienced relatively stable unemployment, thus 2002 is a typical year without any major disruptions on the labor market. In addition we have a relatively long observation period afterwards in order to measure the effects on diabetes. To analyse the diabetes progression we merge 3 different years of layoff, namely 2002, 2003 and 2004. Here again, before and after this period unemployment is relatively stable and we have a fair amount of years afterwards to analyse. We merge three different years as there are relatively few observation per year for which we can observe potential progression of diabetes. The basic selection rule for each sample consists of the following. We exclude very small firms (firms that have ten and less employees) as they are subject to less strict firing rules. In addition, we exclude very large firms (firm that have more than 1000 employees), as a mass layoff involves a very large number of employees and might therefore have different effects than in not so large firm. We only look at individuals aged between 46 and 60 years. Younger individuals are very unlikely to contract diabetes type 2 and older individuals might leave the firms just because of (early) retirement and not due to the layoff. As we cannot determine the reason why an individual left the firm we decided to exclude the older individuals. In addition, we drop workplaces in agriculture, fishing and forestry.

In the following we will always distinguish between men and women. It is well known that women react differently to labor market events or shocks (see for example Bergemann and van den Berg 2008). In addition men and women have different physiologies which might lead to different effects of displacement on diabetes incidence and progression.

In our incidence sample of (potential) mass layoffs in 2002 app. 3.5% of the men and app. 2.0% of the women report that they already have diabetes in 2002 (see Table A.1). Given an estimated reporting rate of 59% we can assume that in reality app. 5.9 % of the men in the particular sample have diabetes and 3.4 % of the women. For the following analysis of the effects of mass layoffs on diabetes incidence we drop those individuals who reported that they have already contracted diabetes at the time of the mass layoff.

Table A2. gives an overview of the descriptive statistics of the incidence sample, excluding those cases that reported to have diabetes, i.e. the sample that we use for the causal analysis of the effect of being mass laid off on the probability to contract diabetes. We find that those who are mass laid off and those who aren't have approximately the same age distribution. However, they differ for example with respect to the educational level. Those who are mass laid off have on average a lower educational level. This is true for men as well as for women. For example 29% (31%) of the mass laid off men (women) have a postsecondary degree whereas 33% (37%) of the non mass laid off individuals have such a degree. At the same time, the average monthly income in the year preceding the layoff was lower among those who were mass laid off than among those who were not.

There also seem to be a selection according to family status. At the time of the (potential) mass layoff individuals who are mass laid off are more likely to be single than those who are not mass laid off.

One of the reasons why we use the matching approach is the concern that there might be selection according to the health status, i.e. that those who are mass laid off might be less healthy than those who are not mass laid off. And indeed the average number of sickness leave days is higher among those that are mass laid off than among those who are not. The average number of sickness leave days in the year before the (potential) mass layoff took place amounts to 25 (51) for men (women) who are mass laid off later and to 19 (39) for those who aren't. Over all these seem to be high numbers. However, one needs to take into account that a substantial number of individuals are on sickness leave for the whole year. That fact that women have a higher number of sickness leave days than men is probably the result of the more specific finding for Sweden that women with children are less healthy than men or women without children (Angelov et al. 2010).

Looking at the raw diabetes incidence rates following a (potential) mass lay off , one can see that those who are mass laid off are slightly more likely to contract diabetes after the (potential) mass layoff. For example, five years after the (potential) mass lay off 2.61% (1.74%) of the mass laid of men (women) have developed diabetes whereas only 2.41% (1.47%) of the non mass laid off men (women).

The analysis of the progression is built on individuals for whom we observe the diabetes treatment in the year of the (potential) layoff and for whom we have additional observation in the years directly preceding the year of the (potential) mass layoff. We define progression of diabetes by at least one switch from one level of treatment to the next. In the year of the (potential) mass layoff 26% of the non mass laid off men control their diabetes by way off nutrition, 54 % take tablets as a treatment and 20% use insulin shots or pumps (see Table A.3). The mass laid off men have on average slightly higher treatment form. For example, 22% use insulin as a treatment. On average, the women in our sample have a slightly less severe form of diabetes. For example, among the non laid off women 33 % control the diabetes by way of nutrition, 50% with tablets and 17% with insulin. The mass laid off women differ from the non mass laid off women mainly by way of a higher proportion (+6%) of using tablets rather than nutrition.

Looking at the descriptive statistics of the progression sample (see Table A.4) some differences compared to the selection within the incidence sample become apparent. For example, those men who are mass laid off are younger and have more often a partner than those men who are not mass laid off.

With respect to the progression rate, the data shows that those who are laid off have a higher progression rate than those who are not (at least in the first three years after the mass layoff). In the second year after being mass laid off the diabetes of men and women progressed with a probability of 25% whereas the percentage of those who are not laid off was lower by 4 percentage points.

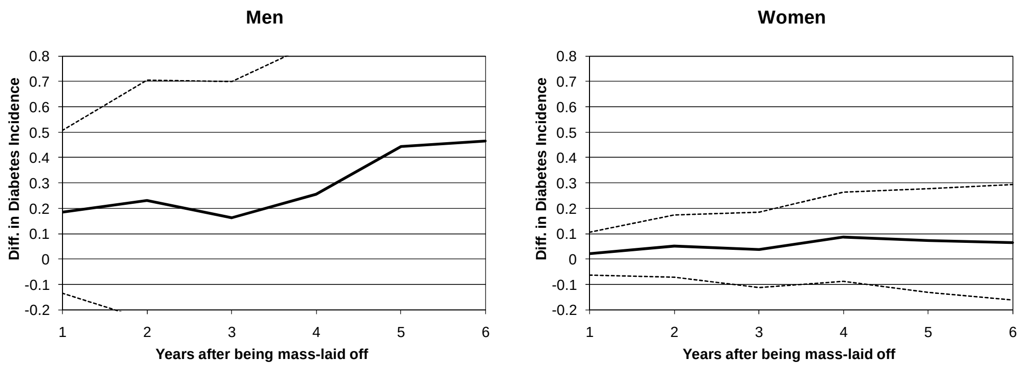
4.2 Matching results

We display the empirical results in form of graphs that depict the estimated effects of being mass laid off on the probability of contracting diabetes (thick line) in percentage points. Around the estimated effect we draw a 95%-confidence interval (dotted line).

For our first set of results we estimate the effect of being mass laid off for all men aged 46 to 60 and for all women aged 46 to 60. The results suggest that on average the incidence of men and women to contract diabetes is not influenced by being mass laid off (see Figure 3). For both genders the estimated effect is positive (for women between 0.02 and 0.08 percentage points and for men between 0.16 and 0.47 percentage points), however never significant on the 5 % level. The very broad confidence interval for men suggests that especially for men there is a lot of heterogeneity in the effects.

Heterogeneity in the effect could especially derive from different socioeconomic background. Different socioeconomic background could influence the coping mechanism of individuals with respect to shocks, thus leading individuals to be differentially affected by a shock. In the following we distinguish between different family composition at the time of the mass layoff, different educational level and different former income levels of the individuals at the time of the mass layoff.

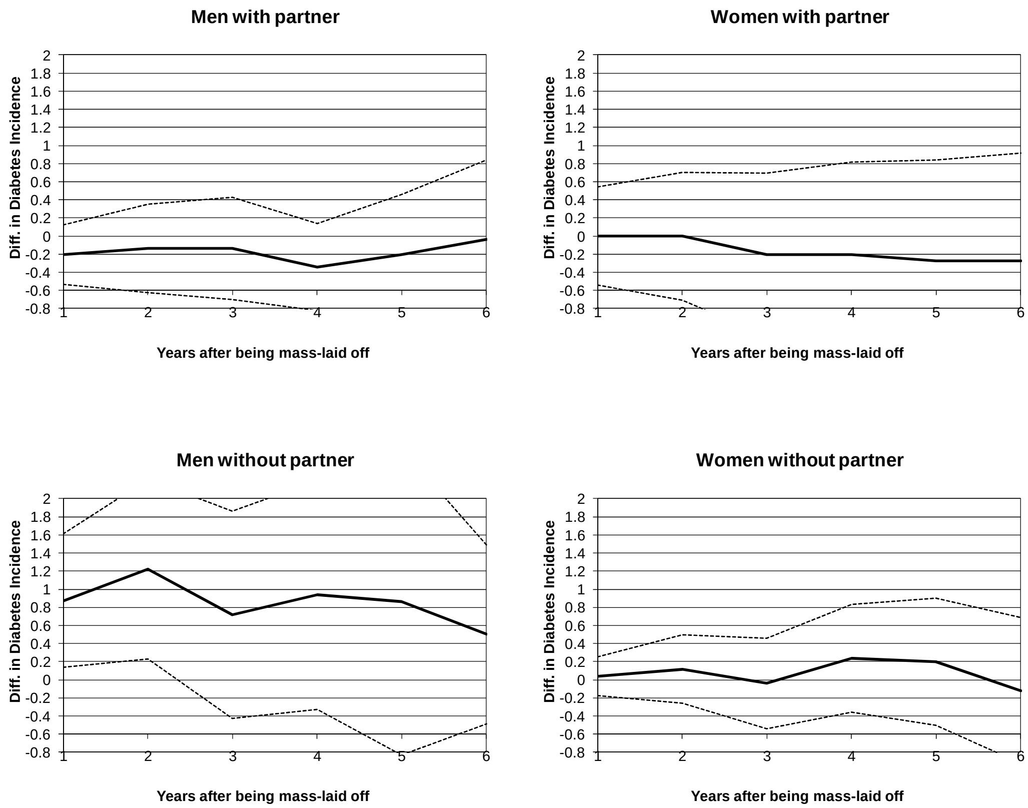
Figure 3. Change in diabetes incidence due to being mass laid off



With respect to family composition one could assume that being in a partnership might help in order to prevent adverse effects of such a shock, whereas having children below the age of 18 might increase the stress level, as one need to financially take care of the kids. Indeed we find substantial variation in the effects with respect to family composition.

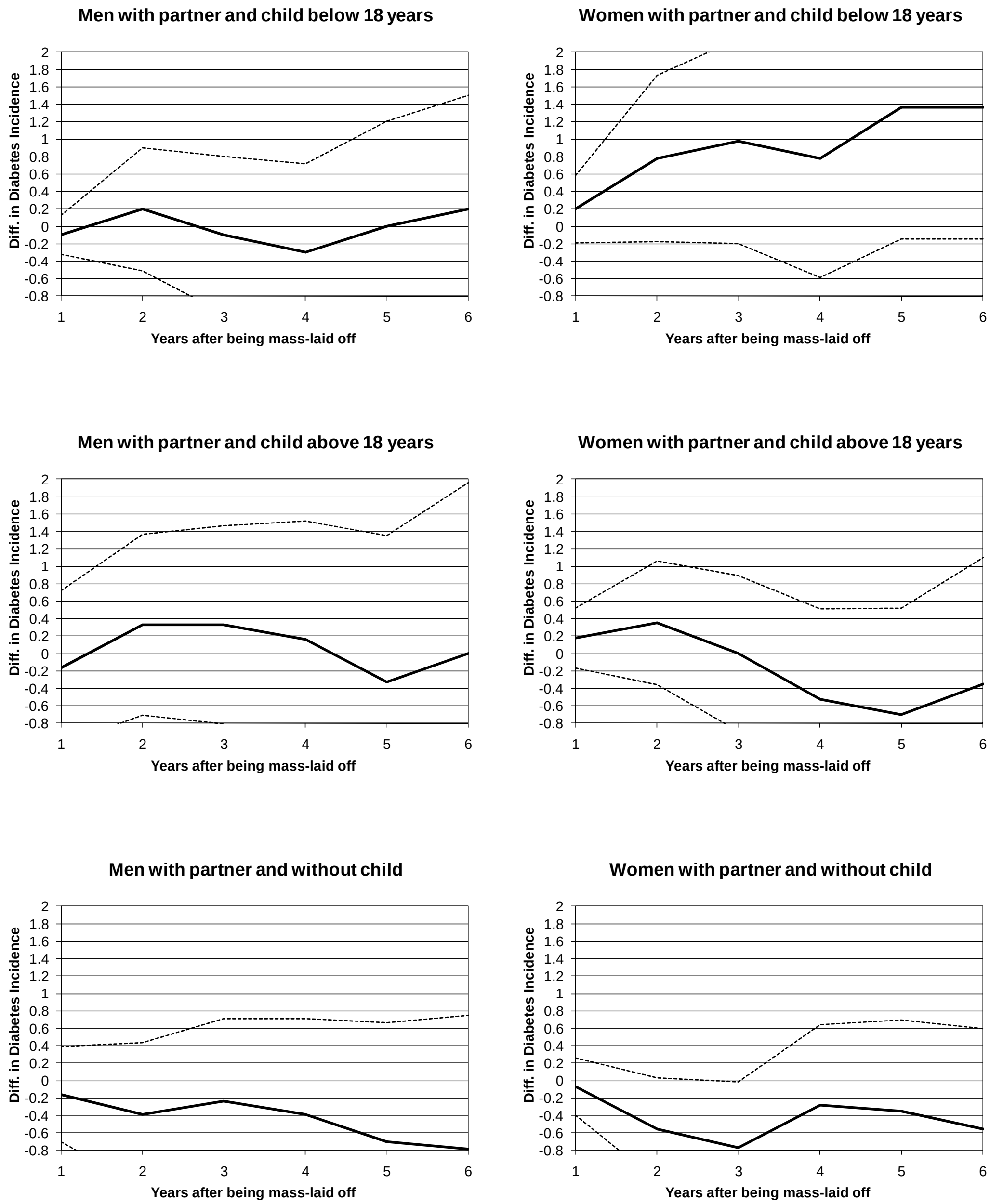
Remarkably these variations differ with respect to gender. When distinguishing between individuals having a partner and not (see Figure 4), we find that in the first two years after the shock of being mass laid off single men have a significantly higher probability of contracting diabetes than single men that are not mass laid off. This effect seems to fade away in later years. In contrast a mass layoff does not lead to a higher risk of contracting diabetes if men have a partner. The estimated effects even have a negative sign but are not significant at conventional levels. For women, we do not find such remarkable differences when differentiating between partnership stati. Although the signs of the effects for women point into a similar direction as the effect for men, the effects for women are much smaller in size and nowhere significantly different from zero. Thus the results suggest that for men having a partner seems to be an insurance against health risks of a shock, whereas women seem to be able to insure themselves against the risks of a shock.

Figure 4. Change in diabetes incidence due to being mass laid off - Differentiated by having a partner or not



Having children seems to have especially for women an impact on the risk of contracting diabetes after being mass laid off. Here we look at individuals that have a partner and differentiate whether they have children registered at their address or not. As Figure 5 reveals, a mass layoff does not influence the risk of contracting diabetes for men that have a child at home regardless whether it is below or above 18 years old. However there are some signs that for women having a child below the age of 18 at home increases the risk of contracting diabetes after a mass layoff (significant at the 10% level). A possible explanations for this at first sight counterintuitive results for women is that women with children are pushed by the mass layoff over a kind of point of no return so that they contract diabetes, given that they have in general already a quite a bad health status (compare Section 5).

Figure 5. Change in diabetes incidence due to being mass laid off - Differentiated by having children in the household in case a partner is present



In addition, the results suggest that for men and women who have partner but no child registered at their address the risk of contracting diabetes reduces after being mass laid off. 8 This points towards the direction that if there is a person to rely on without the financial burden of children individuals could actually benefit in terms of health from losing a job.

Let us now turn to whether there are differences with respect to education (see Figure 6). Being highly educated might help with coping with such a shock as being mass laid off. And indeed for the highly educated (having a postsecondary education and more) we find an effect of being mass laid off on the diabetes incidence that is basically zero, whereas we find a significant increase for low educated men. Surprisingly though, the effect for low educated women, shortly after the mass layoff is negative (i.e. it has a lowering effect on the diabetes incidence) and very close to being significant on the 5 % level. In year 4 and later after the mass layoff this effect disappears again.

Finally one could assume that having earned a high income and consequently having higher saving could help with cushioning adverse effects of a mass layoff (see Figure 7). Although the effects differentiated by income level are all not significant different from zero at the 5% level, the results point toward the direction that the rise in the risk of contracting diabetes is concentrated among those that have a lower to middle income. This seems to be especially the case for women

In addition we conducted a sensitivity analysis in order to check how the incomplete coverage of the diabetes register affects our results. We run our estimations exclusively on those counties that have a high coverage of all diabetes patients (i.e. more than 60 % of all patients). And indeed the results suggest that if we make an estimation error due to the low coverage of diabetes patients we tend to underestimate the effect.[9]

[8] Unfortunately, a similar analysis for single individuals is not possible as even if parents have joint custody the child is only registered at one address, thus the category "Being single with no child" is not very informative.
[9] Results are available on request.

Figure 6. Change in diabetes incidence due to being mass laid off - Differentiated by educational level

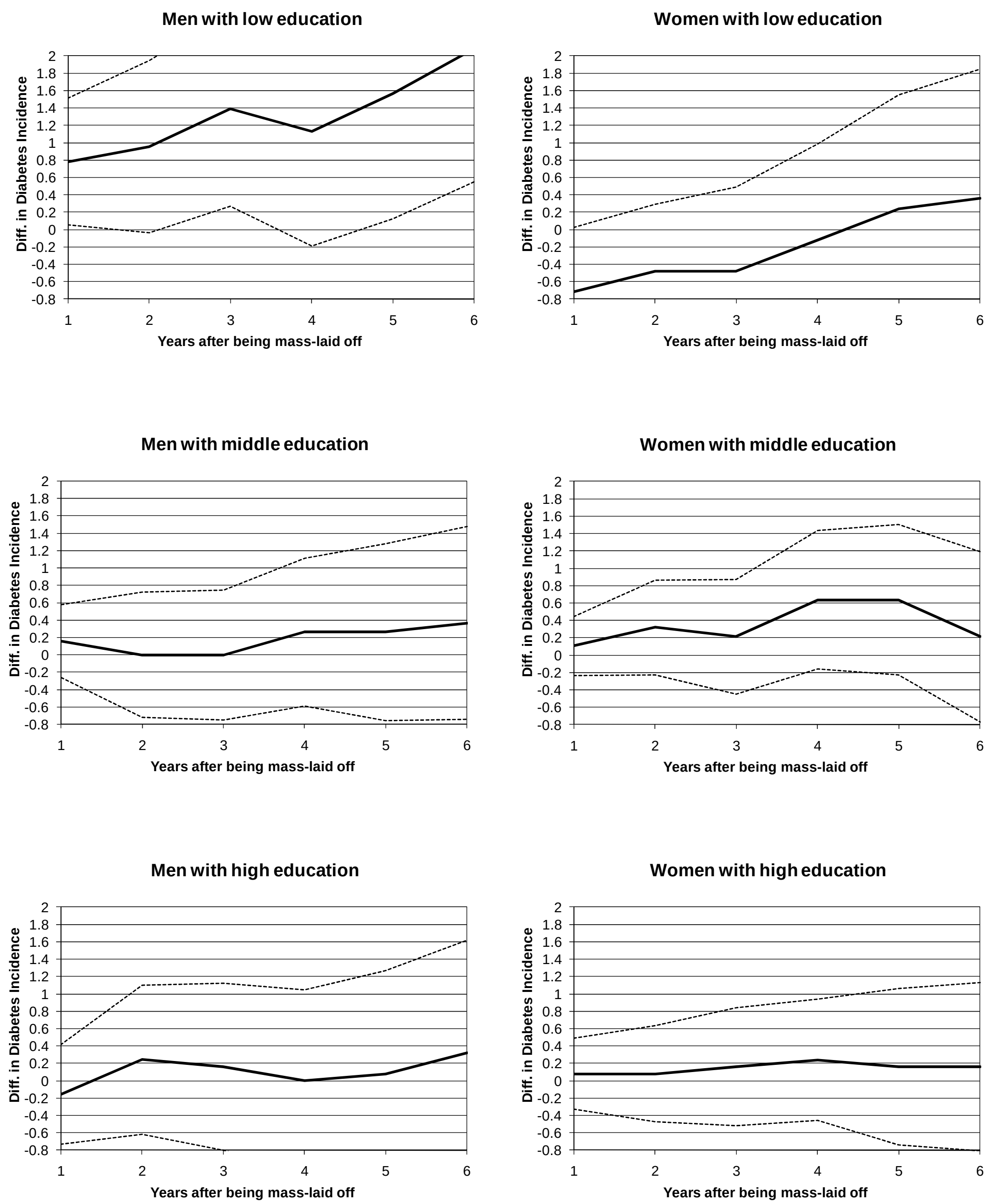
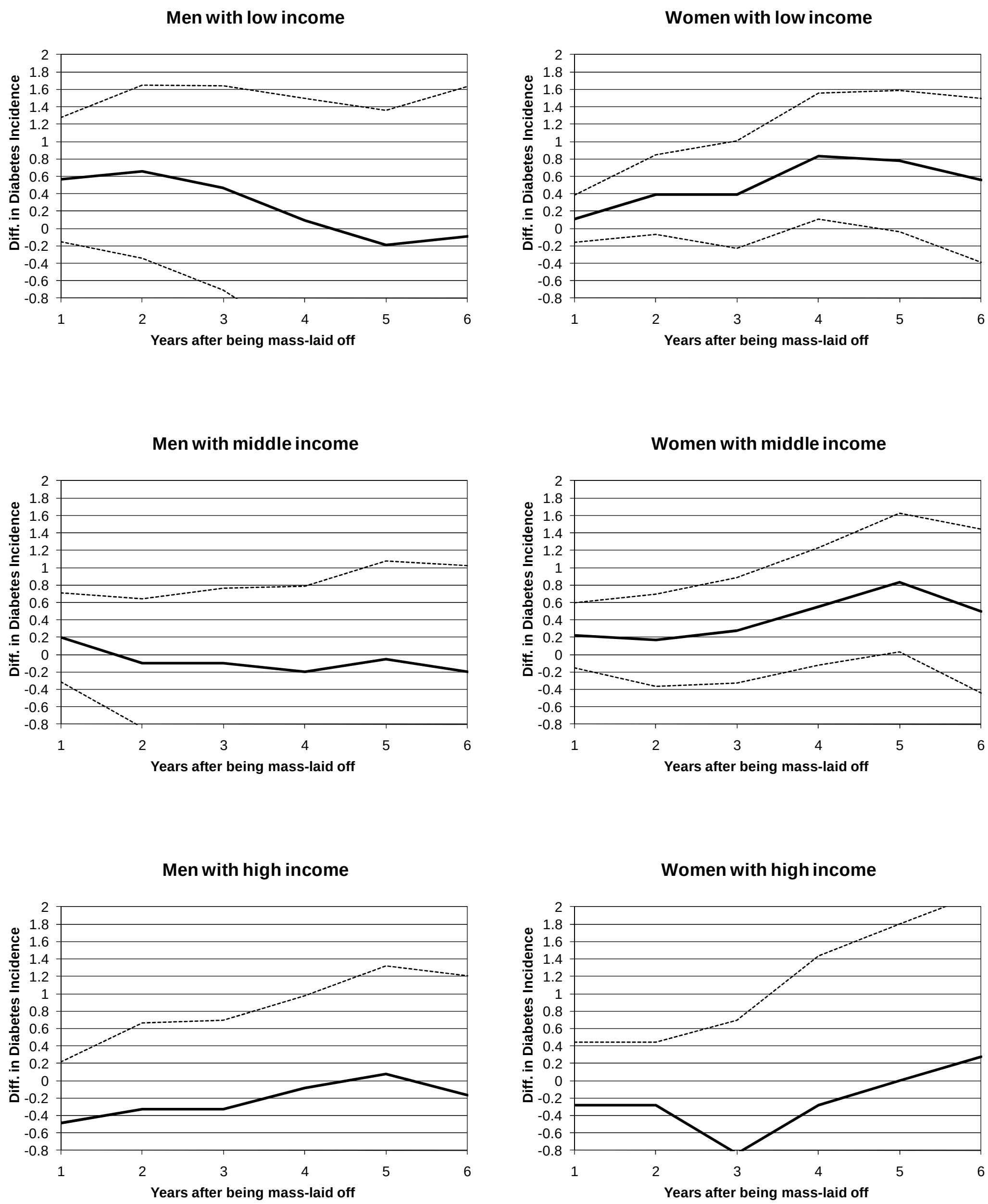
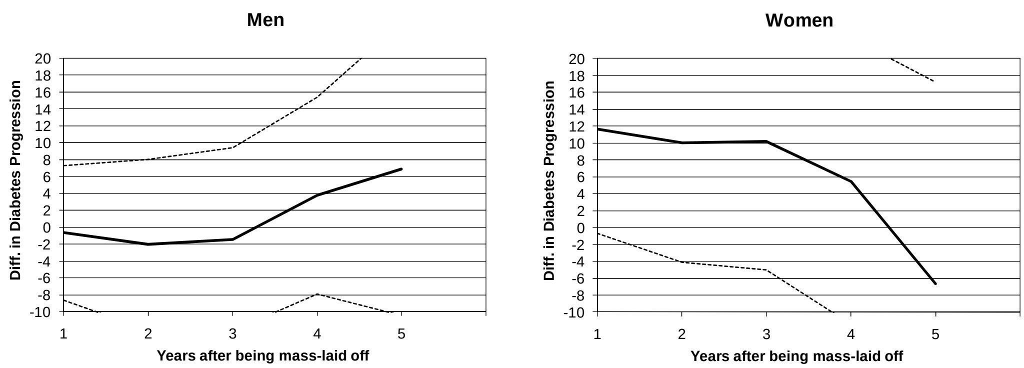


Figure 7. Change in diabetes incidence due to being mass laid off - Differentiated by income level



Let us now turn to the final set of results the impact of being mass laid off on the progression of diabetes. Here the outcome variable is defined as a 0 – 1 variable, whereby 1 indicates that the diabetes treatment progressed to a more severe treatment regime at least once. The graphs depict the estimated effect on the progression probability in percentage points.

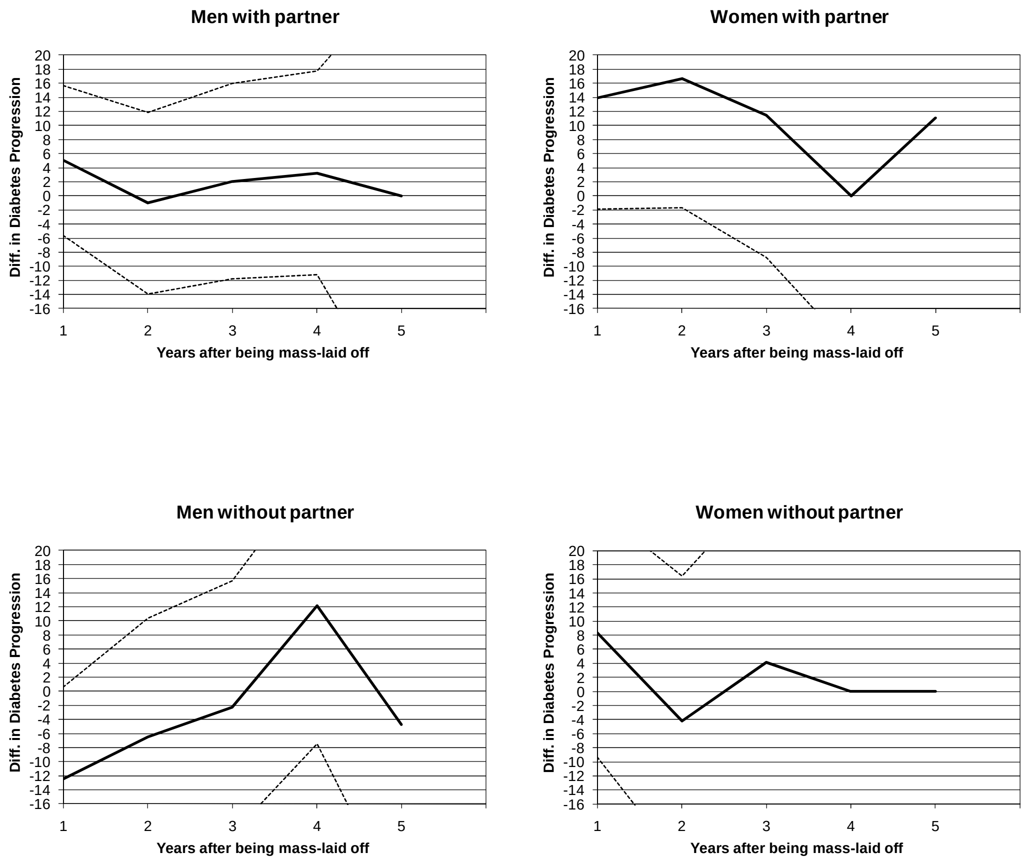
Figure 8. Progression of diabetes treatment due to being mass laid off



When distinguishing between men and women the results suggest that shortly after the mass layoff women have a higher probability of diabetes deterioration than women that did not experienced to be mass laid off (significant on the 10% level). This progression fades however away after approximately 4 years. For men, we do not find evidence for a change of their diabetes level.

Additionally, we also checked whether there is heterogeneity in the impact on diabetes progression with respect to partnership status. This differentiation reveals that the potential initial increase in diabetes progression for women is mainly concentrated among women with a partner.

Figure 9. Progression of diabetes treatment due to being mass laid off - differentiated by having a partner or not



5 Conclusions

In this paper we analyze the causal effect of job displacement on the onset and progression of diabetes type 2. It is interesting to study diabetes in relation to job loss since it diabetes is a major health threat and at the same time diabetes type 2 is a disease that is affected by lifestyle factors; there is an established relation between smoking, weight gain and excessive alcohol consumption and diabetes incidence. That is, life style changes that may be related to job loss or unemployment. There is also recent evidence suggesting a direct link between stress and type 2 diabetes.

Moreover studying the effect of job loss with respect to one particular disease increases the chances to pin down specific contributing factors or pathways that influence potential effect heterogeneity.

On average, we do not find signs for a significant increase in the diabetes onset in case an individual is mass laid off. However, we find substantial effect heterogeneity when distinguishing between different socio-economic characteristics which additionally differ between men and women. The most remarkable differences concern partnership status and having children in the household. The probability of the onset of diabetes increases due to being mass laid off in case a man does not have a partner. In addition there are signs that women in case of having a partner and a child below 18 also suffer in terms of diabetes incidence in case they are mass laid off. Furthermore, our findings suggest that the progression of diabetes worsens for women with a partner due to a mass layoff at least shortly after the mass layoff. We do not find similar pattern for men. One explanation for these finding could be that partnership and children have different stress enhancing components for men and women in case of a layoff.

Additional results concern effect heterogeneity with respect to education. Less educated men tend to suffer more in terms of diabetes incidence due to being mass laid off than higher educated individuals or women. Moreover we find that women's diabetes progresses faster due to being mass laid off.

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Appendix

Industry categories used in the matching

Mining and quarrying
Food, etc.
Textile and clothing industry
Wood products
Pulp and paper
Publishing and printing industry
Chemical industry
Rubber and plastic products
Non-metallic mineral products Man
Steel and metal
Metal
Machinery
Industry for electrical and optical equipment
Hauliers Industrial Average
Other manufacturing industries
Energy, Water and Waste Management
Construction
Trade and repair of motor vehicles and petrol stations
Wholesale trade and commission trade
Retail, etc.
The transport and warehousing
Post and telecommunications
Banks and other credit institutions
Insurance
Real estate companies and property managers
Rental Firms
Computer and related service agencies
Other business services
Education
Research and development
Health
Childcare
Elderly and disabled
Other health and social care
Hotels and restaurants
Non-profit and religious organizations
Recreation, culture and sports
Other service
Public administration, etc.

Table A1. Descriptive Statistics: Diabetes incidence in the sample of selected firms and age of employees in 2002.

	Men		Women	
	Not mass laid off	Mass laid off	Not mass laid off	Mass laid off
	%			
Diabetes incidence in the year of the mass layoff	3.5	3.4	1.9	2.2

Table A2. Descriptive Statistics for the Diabetes Incidence Effects Estimates of a Mass Lay Off: Sample of selected firms and age of employees, excluding reported diabetes cases in 2002.

	Men			Women		
	Not mass laid off	Mass laid off	Total	Not mass laid off	Mass laid off	Total
	%					
Age						
Age 46 to 50	34.61	34.9	34.61	34.46	36.14	34.48
Age 51 to 55	37.38	37.12	37.37	37.7	35.29	37.67
Age 56 to 60	28.01	27.98	28.01	27.84	28.57	27.85
Total	100	100	100	100	100	100
Educational level						
Presecondary < 9 years	15.62	16.47	15.64	9.83	10.93	9.85
Presecondary 9-10 years	9.96	10.37	9.97	9.21	10.15	9.23
Secondary at most 2 years	24.89	26.84	24.92	35.65	36.72	35.66
Secondary at most 3 years	16.23	17.59	16.25	8.11	10.83	8.14
Postsecondary < 3 years	13.21	11.88	13.19	14.08	14.24	14.08
Postsecondary >= 3 years	18.34	16.01	18.3	22.48	16.81	22.41
Graduate school	1.74	0.84	1.73	0.63	0.33	0.63
Total	100	100	100	100	100	100
Family status						
Partner and children < 18	34.55	33.61	34.53	22.47	20.23	22.45
Partner and children >= 18	22.63	20.34	22.6	25.03	22.53	25
Without partner	42.82	46.05	42.87	52.49	57.24	52.55
Total	100	100	100	100	100	100
Size of establishment						
Former wage up to 15000 SEK	18.76	24.88	18.85	41.19	45.41	41.24
Former wage up to 25000 SEK	48.1	46.51	48.08	49.14	45.56	49.1
Former wage > 25000 SEK	33.14	28.61	33.08	9.66	9.04	9.66
Total	100	100	100	100	100	100
Industry						
Mining, quarrying	0.42	0	0.42	0.04	0	0.04
Food, etc.	1.87	2.05	1.87	1.16	1.72	1.17
Textile, clothing industry	0.53	0.56	0.53	0.47	1.64	0.48
Wood products	2.04	1.49	2.03	0.37	0.3	0.37
Pulp, paper	2.55	1.93	2.54	0.7	0.76	0.7
Publishing, printing industry	2.3	2.31	2.3	1.31	1.01	1.31
Chemical industry	1.46	1.21	1.46	0.63	1.19	0.64
Rubber, plastic products	1.04	3.08	1.07	0.54	1.79	0.56
Non-metallic mineral products Man	1.35	0.54	1.34	0.33	0.05	0.33
Steel, metal	1.79	0.42	1.77	0.38	0.33	0.38
Metal	3.93	4.22	3.94	0.87	0.73	0.87
Machinery	5.86	4.31	5.84	1.28	0.53	1.27
Industry for electrical, optical equ.	1.96	9.44	2.06	1.07	6.11	1.13
Hauliers Industrial Average	2.84	2.17	2.83	0.62	1.49	0.63

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	Men			Women		
	Not mass laid off	Mass laid off	Total	Not mass laid off	Mass laid off	Total
	%					
[…]						
Other manufacturing industries	1.11	1.96	1.12	0.48	0.83	0.49
Energy, water, waste management	2.41	0.61	2.39	0.51	0.08	0.51
Construction	7.29	6.94	7.28	0.82	0.78	0.82
Trade, repair of mot.veh., petrol stat.	2	0.93	1.99	0.43	0.2	0.42
Wholesale trade, commission trade	5.11	4.03	5.09	2.22	2.9	2.23
Retail, etc.	1.36	0.65	1.35	4	2.15	3.98
Transport and warehousing	6.47	6.94	6.48	1.29	2.3	1.3
Post, telecommunications	2.06	1.37	2.05	1.27	6.81	1.34
Banking, insurance	2.22	1.05	2.21	2.71	1.24	2.7
Real estate comp., property managers	2.07	2.21	2.07	1.13	1.21	1.13
Rental Firms	0.17	0.23	0.17	0.03	0.18	0.03
Computer, related service agencies	1.17	3.12	1.2	0.38	1.21	0.39
Other business services	4.22	5.68	4.24	3.09	4.75	3.11
Education	10.81	6.17	10.74	22.67	13.81	22.56
Research, development	0.7	0.07	0.69	0.47	0.03	0.46
Health	2.25	0.84	2.23	11.45	6.11	11.39
Elderly, disabled, other care	1.66	3.82	1.69	15.57	16.78	15.59
Childcare	0.26	1.79	0.28	4.61	7.22	4.65
Hotels, restaurants	0.6	1.12	0.61	0.88	2.42	0.89
Non-profit, religious organizations	2.84	1.44	2.82	2.43	1.79	2.42
Recreation, culture, sports	1.78	0.96	1.77	1.59	0.88	1.58
Other service	0.15	0.12	0.15	0.25	0.18	0.25
Public administration, etc.	11.34	14.21	11.38	11.93	8.51	11.88
Total	100	100	100	100	100	100
	Mean values					
Size of establishment	169	207	169	140	189	141
Last monthly income	23058	21571	23036	16088	15020	16075
Vacancy-unemployment rate	0.232	0.240	0.232	0.236	0.248	0.236
Tenure at firm in years	5.7	3.9	5.7	5.5	3.9	5.5
Years of establishment existence	8.4	7.1	8.4	8.7	7.2	8.7
Sickness leave days in last year	19	25	20	39	51	39
Sickness leave days 2 years before	15	18	15	30	38	31
Sickness leave days 3 years before	11	13	11	22	27	22
Number of hospital days for:						
Infectious, parasitic diseases	0.027	0.037	0.027	0.022	0.034	0.022
Neopl., dis. of blood /-forming org.	0.118	0.117	0.118	0.250	0.325	0.251
Endocrine, metab. dis., imm. disord.	0.013	0.009	0.013	0.019	0.022	0.019
Mental disorders	0.102	0.117	0.102	0.112	0.180	0.113
Dis. of the nervous system	0.040	0.032	0.040	0.036	0.037	0.036

Table A2 continues on next page …

… Table A2 continued

	Men			Women		
	Not mass laid off	Mass laid off	Total	Not mass laid off	Mass laid off	Total
	Mean values					
[…]						
Dis. of the sense organs	0.020	0.014	0.020	0.018	0.014	0.018
Dis. of the circulatory system	0.282	0.283	0.282	0.122	0.134	0.122
Dis. of the respiratory system	0.038	0.023	0.038	0.038	0.038	0.038
Dis. of the digestive system	0.133	0.137	0.133	0.137	0.109	0.137
Dis. of skin, subcutan. tissue	0.009	0.012	0.009	0.009	0.004	0.009
Dis. of musc. system, connect. tissue	0.092	0.100	0.092	0.105	0.102	0.105
Dis. of the genitourinary system	0.039	0.073	0.040	0.107	0.107	0.107
Compl. of pregn., birth, puerperium	0.000	0.000	0.000	0.001	0.003	0.001
Cert. cond. origin. in perinatal period	0.000	0.000	0.000	0.000	0.000	0.000
Congenital anomalies	0.004	0.004	0.004	0.004	0.002	0.004
Symptoms, signs, ill-defined cond.	0.086	0.095	0.086	0.084	0.098	0.084
Injury, poisoning	0.102	0.147	0.103	0.082	0.083	0.082
	%					
Incidence						
After one year	0.44	0.61	0.44	0.26	0.28	0.26
After two years	0.90	1.26	0.90	0.54	0.61	0.54
After three years	1.36	1.56	1.36	0.82	0.91	0.82
After four years	1.85	1.98	1.85	1.11	1.36	1.11
After five years	2.41	2.61	2.41	1.47	1.74	1.48
After siy years	2.89	3.19	2.90	1.77	2.07	1.77
Number of Observations	291362	4292	295654	324891	3962	328853

Table A3. Descriptive Statistics: Progression in the sample of selected firms, age of employees and conditional on having recorded diabetes treatment, average over 2002, 2003 or 2004.

	Men		Women	
	Not mass laid off	Mass laid off	Not mass laid off	Mass laid off
	%			
Diabetes progression				
Nutrition	26.3	24.5	32.7	26.7
Tablets	53.7	53.1	50.0	56.7
Insulin	20.0	22.4	17.3	16.6

Table A4. Descriptive Statistics for the Diabetes Progression Effect Estimates of a (Potential) Mass Lay Off in 2002, 2003 or 2004: Sample of selected firms and age of employees, including only those who have recorded diabetes treatments at the time of the mass lay off

	Men			Women		
	Not mass laid off	Mass laid off	Total	Not mass laid off	Mass laid off	Total
	%					
Age						
Age 46 to 50	22.1	25.85	22.16	21.17	21.67	21.17
Age 51 to 55	37.81	35.37	37.77	37.87	36.67	37.86
Age 56 to 60	40.08	38.78	40.06	40.96	41.67	40.97
Total	100	100	100	100	100	100
Educational level						
Presecondary < 9 years	24.26	25.17	24.27	17.05	20	17.09
Presecondary 9-10 years4	10.05	10.2	10.05	9.77	1.67	9.67
Secondary at most 2 years	28.29	25.85	28.25	43.49	55	43.63
Secondary at most 3 years	15.15	19.05	15.22	6.83	3.33	6.79
Postsecondary < 3 years	10.71	10.2	10.71	9.42	15	9.49
Postsecondary >= 3 years	10.83	8.84	10.8	13.04	5	12.94
Graduate school	0.71	0.68	0.71	0.39	0	0.39
Total	100	100	100	100	100	100
Family status						
Partner and children < 18	22.01	21.51	22	12.26	14.71	12.3
Partner and children >= 18	22.68	26.88	22.75	24.88	14.71	24.75
Without partner	55.32	51.61	55.25	62.85	70.59	62.96
Total	100	100	100	100	100	100
Size of establishment						
Former wage up to 15000 SEK	26.85	24.49	26.81	52.93	56.67	52.98
Former wage up to 25000 SEK	46.14	51.02	46.22	41.35	38.33	41.31
Former wage > 25000 SEK	27.01	24.49	26.97	5.72	5	5.71
Total	100	100	100	100	100	100
	Mean values					
Size of establishment	181	133	180	143	138	143
Last monthly income	20112	19882	20108	13817	12803	13805
Vacancy-unemployment rate	0.161	0.162	0.161	0.161	0.172	0.161
Tenure at firm in years	6.0	5.0	6.0	5.9	5.4	5.9
Years of establishment existence	8.5	8.0	8.5	8.9	8.7	8.9
Sickness leave days in last year	39	61	40	65	88	65
Sickness leave days 2 years before	34	40	34	56	74	57
Sickness leave days 3 years before	25	30	26	45	43	45
No. of observations	8,764	147	8,911	4,861	60	4,921

Table A4 continues on next page …

… Table A4 continued

	Men			Women		
	Not mass laid off	Mass laid off	Total	Not mass laid off	Mass laid off	Total
	Mean values					
	%					
*Probability of diabetes progression**						
After one year	12.49 (8,764)	16.33 (147)	12.56 (8,911)	13.17 (4,861)	18.33 (60)	13.23 (4,921)
After two years	20.56 (8,469)	24.83 (145)	20.63 (8,614)	21.37 (4,703)	25.00 (60)	21.42 (4,763)
After three years	28.30 (8,072)	30.00 (140)	28.32 (8,212)	28.65 (4,496)	30.51 (59)	28.67 (4,555)
After four years	34.91 (7,229)	40.60 (133)	35.02 (7,362)	36.31 (4,073)	30.91 (55)	36.24 (4,128)
After five years	41.83 (3,600)	51.72 (58)	41.99 (3,658)	44.17 (2,085)	33.33 (30)	44.02 (2,115)
After six years	47.10 (1,310)	38.89 (18)	46.99 (1,328)	50.85 (767)	62.50 (8)	50.97 (775)

*) Number of observations in parentheses

Table A6.

Propensity Score Estimates for being Mass laid off for Men and Women aged 46 to 60 years

	Men	Women
Age: Reference: 46 to 50 years		
Age 51 to 55 years	0.0237	-0.0193
	(0.0159)	(0.0163)
Age 56 to 60 years	0.0481**	0.0347+
	(0.0183)	(0.0184)
Education: Reference: Secondary education of 3 years		
Presecondary education <9 years	0.0212	-0.0760*
	(0.0232)	(0.0300)
Presecondary education >=9 years	0.0175	-0.0526+
	(0.0257)	(0.0295)
Secondary education <=2 years	0.0128	-0.0719**
	(0.0203)	(0.0237)
Postsecondary education < 3years	-0.0603*	-0.0199
	(0.0245)	(0.0277)
Postsecondary education 3 years and more	-0.0686**	-0.0404
	(0.0240)	(0.0280)
Graduate school	-0.1907**	-0.2983**
	(0.0672)	(0.1091)
Size of establishment: Reference: 11- 20 employees		
21- 50 employees	-0.0544**	-0.0117
	(0.0202)	(0.0221)
51- 100 employees	-0.2128**	-0.3108**
	(0.0228)	(0.0254)
101- 200 employees	-0.4279**	-0.3344**
	(0.0264)	(0.0269)
201- 500 employees	-0.4056**	-0.0617*
	(0.0272)	(0.0271)
501- 1000 employees	0.1977**	0.3742**
	(0.0256)	(0.0277)
Family type: Reference: Being single without children		
Married without children	-0.0461**	-0.0239
	(0.0176)	(0.0171)
Married with at least one child less than 18 years	-0.0020	-0.0385
	(0.0194)	(0.0245)
Married with at least one child over 18 years old	-0.0493*	-0.0335
	(0.0215)	(0.0222)
Cohabitating without children	-0.0680	0.0509
	(0.0624)	(0.0552)
Cohabitating with at least one child below 18 years	-0.0568	0.0024
	(0.0395)	(0.0521)
Cohabitating with at least one child above the age of 18 years	-0.0196	0.0107
	(0.0654)	(0.0648)
Single father with at least one child below the age of 18 years	0.0347	
	(0.0516)	
Single father with at least one child above the age of 18 years	-0.0080	
	(0.0389)	

Table A6 continues on next page…

… Table A6 continued

	Men	Women
Single mother with at least one child below the age of 18 years		-0.0294
		(0.0353)
Single mother with at least one child above the age of 18 years		0.0228
		(0.0295)
Average monthly wage in 2001: 20.000-25.000 SEK		
Up to 10.000 SEK	0.0630**	0.0352
	(0.0241)	(0.0246)
10.000 -15.000 SEK	0.0700*	-0.0025
	(0.0294)	(0.0239)
15.000-20.000 SEK	0.0370+	-0.0151
	(0.0191)	(0.0213)
25.000- 30.000 SEK	-0.0461+	-0.0325
	(0.0236)	(0.0339)
30.000-40.000 SEK	-0.0389	-0.0311
	(0.0250)	(0.0425)
Above 40.000 SEK	0.0018	-0.0982
	(0.0289)	(0.0650)
Local labor vacancy – unemployment ratio	0.2467**	0.3103**
	(0.0656)	(0.0655)
Private establishment	0.3212**	0.1174**
	(0.0240)	(0.0222)
Tenure at establishment: Ten years and more		
Less than 1 year	0.2718**	0.3112**
	(0.0262)	(0.0255)
One year	0.3235**	0.2786**
	(0.0269)	(0.0273)
Two to three years	0.2858**	0.2463**
	(0.0234)	(0.0238)
Four to six years	0.1311**	0.1834**
	(0.0248)	(0.0245)
Seven to nine years	-0.0475+	0.0236
	(0.0280)	(0.0273)
Years of establishment existence: Ten years and more		
Four to six years	0.2332**	0.1840**
	(0.0219)	(0.0229)
Seven to nine years	0.2744**	0.2535**
	(0.0200)	(0.0209)
Sick leave days in 2001	0.0004**	0.0004**
	(0.0001)	(0.0001)
Sick leave days in 2000	-0.0001	-0.0001
	(0.0002)	(0.0001)
Sick leave days in 1999	0.0002	0.0003**
	(0.0002)	(0.0001)
+ 37 industry dummies		
+ hospital days in the last 3 years for 15 different reasons		