

# **Happiness and Health: well-being among self-employed**

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## *Abstract*

During the last years researchers have shown an increasing interest in differences between the self-employed and employees regarding how they feel about work. A persistent result is that self-employed are more satisfied with their jobs than wage-earners are.

This paper extends the comparison between the well-being of self-employed and wage-earners to also incorporate mental health problems, physical health, life-satisfaction and feelings about whether the job is stressful and mentally straining. The data used is a survey consisting of about 2 000 individuals who have been interviewed about their living and working conditions in 1991 and in 2000.

The preliminary analysis indicates that well-being is higher among the self-employed. The main conclusion is that those who are self-employed in 2000 are more satisfied with their jobs and are less likely to feel that the job is mentally straining than employees are in 2000. A clear difference between the groups is not found in 1991. Well-being in general is lower in 2000 than in 1991, a result which is in line with the changes on the labour market during the 1990s. Findings presented in this paper suggest that those who become self-employed are less likely to experience a drop in well-being between 1991 and 2000 compared to employees. This is a novel finding which deserves more attention. It is important to understand what facets of self-employment that protect the self-employed from experiencing this drop in well-being. Such knowledge can then be used to improve health and happiness among the workforce in general.

JEL classification: J23, J28, I19, J81

Key words: self-employment, job-satisfaction, life-satisfaction, health, well-being

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## **1. Introduction**

During the last few years researchers have shown an increasing interest in differences between the self-employed and employees regarding how they feel about work.<sup>1</sup> A persistent result is that self-employed are more satisfied with their jobs than wage-earners are. It is possible that this finding is merely a selection effect, i.e. that happy and satisfied people choose to become self-employed to a higher extent than those who are less happy and satisfied. However, the result still stands when fixed-effect models are estimated. Being independent and ones own boss, deciding working hours and effort put into the job are factors which often are believed to be important in explaining the higher levels of job satisfaction reported by self-employed. There is however some evidence of that the self-employed do not feel so well in spite of higher levels of satisfaction. Studies show that self-employed work longer hour, they feel that their work is stressful and they are often tired and have problems to sleep (Blanchflower, 2004).

Using data from the Swedish Level-of-Living Survey (SLLS), this paper studies well-being among self-employed and wage-earners in Sweden in 1991 and 2000. This paper differs from earlier studies in several respects and can hence increase our understanding of the situation for self-employed. The purpose of this paper is to analyse and discuss how well-being differs between self-employed and wage-earners using six different measures; feelings about whether the job is stressful, feelings about whether the job is mentally straining, mental health problems, general health problems, job-satisfaction and life-satisfaction. Since self-employed are assumed to work longer hours, have more responsibility both for his or her own income and for that of employees, it is reasonable to believe that they are more likely to feel that the job is stressful and mentally straining. This does not have to be negative but there are a number of studies that show that long work hours are associated with health problems such as subjectively reported physical health and subjective fatigue.<sup>2</sup> Many individuals feel that a certain amount of stress and pressure can increase well-being. For other individuals it is possible that working hard and hence have less time for rest and recovery will have a negative impact on both mental and physical health. This could in turn have an impact on the overall satisfaction with life. In addition, researchers in psychology have found a high correlation between happiness and mental health (Furnham and Cheng, 1998 and Lu and Shih, 1996). *Ex ante* the effect of being self-employed on health is arbitrary; it is possible that self-employed

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<sup>1</sup> See for example Blanchflower (2004), Taylor (2004), Benz and Frey (2004) for new results on this topic as well as a thorough presentation of earlier research.

<sup>2</sup> In van der Hulst (2003) the results found on the correlation between work hours and health are summarised.

have a worse health than wage-earners but it is also possible that there is no differences between the groups if self-employed in general are individuals who feel that a certain amount of stress and pressure is stimulating. As was mentioned before, a robust result is that self-employed are more satisfied with their job than wage-earners are. This result is also expected to be found here. Regarding life-satisfaction there are some evidence of that self-employed also are more satisfied with their lives in general, but this result does not stand when estimating fixed-effect models.<sup>3</sup>

In this paper well-being is seen as a combination of the six measures discussed above. Since it is believed that self-employed feel more pressure at work but they at the same time are expected to be more satisfied with the job, it is not obvious whether well-being in general is higher among self-employed. An index which weights together the six indicators has been created in order to get an aggregate measure of well-being. This is a first attempt to evaluate well-being in general among self-employed. It is however important to point out that well-being can mean different things for different individuals. In this paper a measure of the individual's economic situation has for example not been included.

To empirically investigate well-being among self-employed six different pooled logit models are estimated where a time dummy is included. This time dummy has an important interpretation since it captures differences in how people feel about their work and their lives between 1991 and 2000. An explicit analysis of the time dimension has not been done in earlier work on self-employment and happiness and as it turns out, considering changes between the years leads to interesting conclusions. The difference between self-employed and being an employee is discussed in the light of the changes on the labour market during the 1990's. A question also analysed in this paper is whether these changes has had a different effect on self-employed and wage-earners, and if so what does it mean?

In surveys, the questions that are asked are often used as categorical variables, i.e. the respondent can for example order his or her health into five categories. There is no commonly used method for estimating fixed-effect models using categorical dependent variables. In the paper this problem is handled by transforming the dependent variable to a dichotomous variable and estimating conditional fixed-effect logit models. Fixed-effects models are estimated for two reasons. First, using this estimation strategy, individual specific effects are cancelled out and the results are based on intra personal comparison rather than inter personal. If there is a selection of a certain type of people into self-employment, the fixed-effect results

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<sup>3</sup> See Benz and Frey (2004).

are more reliable. Second, these models allow for an investigation of the changes between 1991 and 2000. It is for example possible to estimate the effect of a transition from being an employee to becoming self-employed on changes in the dependent variables. Controlling for changes in other time-variant variables, this is the closest we can get in this paper to make a causal interpretation of the effect of becoming self-employed on perceptions about work, health and happiness.

The remainder of the paper is organised as follows; in section two earlier research is presented and in section three changes on the labour market between 1991 and 2000 are described. In section four the data and method are described and in section five the results from both the pooled logit regressions and the fixed-effects models are presented and discussed. Section six concludes and summarises the paper.

## **2. Earlier research**

In this section a brief summary of earlier results on happiness and life- and job-satisfaction among self-employed is presented.

In a paper by Blanchflower and Oswald (1998), data from a survey performed in 1989 in the U.S., the U.K and Germany is used to study self-employment and happiness. They find that a rather high share of the respondents state that they would like to be self-employed if they could. An implication of this is that those who actually are self-employed should report a higher level of life- and job satisfaction. As a measure of happiness, or overall utility, they use answers to one question on how satisfied or dissatisfied the respondents are with their jobs and one question on how satisfied they are with their life as a whole. Self-employment turns out to have a positive significant effect on both these outcomes and the authors draw the conclusion that self-employed report that they are more satisfied with their jobs and life than employees. Blanchflower (2000) draws the same conclusion based on the results of several job satisfaction equations estimated for 11 countries in Blanchflower and Freeman (1997). He concludes; “The self-employed are more satisfied with their jobs than are individuals who work for somebody else”.<sup>4</sup>

In a more recent paper, Blanchflower (2004) shows using data from the US and Europe that self-employed report a higher level of job-satisfaction than employees.<sup>5</sup> This result is also found in Taylor (2004) using the British Household Panel Survey (BHPS) and in Benz and

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<sup>4</sup> The quotation is from Blanchflower (2000) p. 21.

<sup>5</sup> The data used is the General Social Survey (GSS) for the US and the Eurobarometer Survey (EBS) for Europe.

Frey (2003, 2004) using the BHPS, the German Socioeconomic Panel Survey (GSOEP) and the Swiss Household Panel Survey. This result holds when estimating fixed-effects models. Benz and Frey ask why self-employed are happier with their jobs. They conclude that the higher degree of job-satisfaction is due to independence at work and absence of hierarchy. According to the authors, independence at work appears to have a value of its own. In the psychological literature it is well known that independence is important for people's well-being.<sup>6</sup> Benz and Frey show that when controls for "evaluation of autonomy" and evaluation of "work is interesting" are included in an ordered logit regression for job-satisfaction, the coefficient for self-employment becomes insignificant. Using the EBS, Blanchflower looks at the impact self-employment on different indicators of mental health. The coefficient for self-employed (with employees) is positive and significantly different from zero for the indicators; "job is stressful", "feels exhausted after work", "being tired", "being fed up with work", "lose sleep" and "feel unhappy and depressed".

So far, the main part of the results is related to how self-employed feel about their work. Blanchflower (2004) reports that when running a regression for life-satisfaction there is no significant effect for being self-employed for eight different countries including Sweden. However, for ten countries the coefficient for self-employment enters the regression with a positive sign and is significantly different from zero. He concludes that even though self-employed show signs of having a worse mental health than employees they appear to be more satisfied with life.

In the psychological literature one has found a positive correlation between happiness and extraversion and a negative relationship between happiness and neuroticism.<sup>7</sup> One also finds these correlations when the outcome is subjective well-being rather than happiness. As extraverts and neurotics are labels for type of personality it can be hard to identify this in data not constructed for this purpose. In a paper by Lu and Shih (1997) the hypothesis that mental health is a mediator between personality and happiness is tested. In other studies one finds that neurotics tend to have poorer mental health and extraverts tend to have better mental health. Relating these results to the relationship between self-employment and happiness, the question is if self-employed are extraverts to a higher extent. To be able to test this idea it has to be possible to identify mental health at a point in time before an individual actually became self-employed. If this relationship is neglected, the impact of self-employment on happiness

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<sup>6</sup> See Blanchflower (2004).

<sup>7</sup> This research has been summarised in Furnham and Cheng (1998) and Lu and Shih (1996).

needs not to be an indication of that self-employed is happier with their life and work. It can rather be the case that those who become self-employed to a higher extent are extraverts.

Gerdtham and Johannesson (1997) look at the correlation between happiness and health and they find that there is such a relationship. Their result is based on the same data as is used in this paper with the exception that they only use data for 1991. They first estimate a structural equation, the impact of different socio-economic variables and health on happiness, all measured at the same point in time and the effect of the same set of socio-economic variables and initial health on health today. As a proxy for initial health, BMI (Body Mass Index, a measure for overweight) and health problems in the family are used. A reduced form equation is estimated for the effect of socio-economic variables and initial health on happiness. The reason for why they choose to estimate both structural and reduced form equations is that they, as all researchers dealing with health, happiness and other characteristics, recognise that there is a causality problem. They find that health status has a positive effect on happiness.

### ***3. Changes in the labour market between 1991 and 2000***

In this section some important changes in the labour market between 1991 and 2000 are discussed. First, the increased time pressure in general is discussed in relation to effects on health and differences between self-employed and wage earners. Second, the development of unemployment, employment, self-employment, working time and sick absence between 1990 and 2001 based on the labour force survey (AKU) is presented.

#### **3.1. Time pressure, health and self-employment**

During the last decade, time pressure has increased in modern societies. Individuals spend more time working while the same amount of work is supposed to be done in the household. There are several reasons for this development.<sup>8</sup> In the 1990's, "just-in-time" production has become a commonly used concept in especially manufacturing. Firms do no longer have large stocks but are instead prepared to produce instantly upon demand. Since there is uncertainty about changes in the demand, the work-force needs to adapt quickly, both to increases and decreases in demand. These changes are likely to have contributed to the increased time pressure. Another factor related to these changes is the economic downturn in the beginning of the 1990's where unemployment rose sharply. Due to increased uncertainty, firms have become more restrictive in hiring new workers. The share that is employed on temporary contracts has increased since firms try to take precautions against laying off large number of

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<sup>8</sup> Miller and Åkerstedt (1998) discuss these changes and factors that might have caused them.

employees in a new recession. As a consequence it is often argued that fewer workers are expected to do the same amount of work as before. The technological development, mostly of information technology, is also likely to contribute to the increased pressure and stress. The amount of information available in society has increased, much because of the widespread use of Internet, and people are expected to be familiar with how to access and use all this information. Workers are also expected to be available on e-mail and cell-phone almost 24-hours a day and even on week-ends and vacations. There is a large literature and an ongoing debate about these changes but there does not seem to be any disagreement on that the time pressure has increased. In general, the increased time pressure is assumed to have a negative effect on people's health, to be "burned out" has become a commonly used term during the last years. The increased stress and pressure can also affect the physical health. One factor which seems to be important for when increased press and stress do have a negative impact on health is whether individuals feel that they have a chance to influence their working conditions and their working time. This is a factor that is likely to differ between wage earners and self-employed; self-employed have a better control of what they should do at work, when they should do it and how it should be done. Self-employment in it self can have a protective effect against the increased time pressure. Another possible difference between self-employed and wage earners is that individuals differ in how well they can handle the increased pace of life and it is possible that this "type" of people are overrepresented among self-employed. This is a possible explanation evaluated in this paper for why we observe higher levels of satisfaction among self-employed.

Garhammer (2003) analyses the increased pace of life in relation to changes in happiness. Perhaps a bit surprising, he finds that increasing time pressure also increases subjective well-being, both on the micro and macro level. He proposes three explanations for this; firstly, the living standard has increased in modern societies and this can compensate individuals for increased time pressure, secondly time pressure does not have to have a negative effect on individuals, it can rather work as a inspiration and motivation and thirdly, even if the majority of individuals does not report lower levels of happiness in times of rising time pressure it can have a severe negative effect on disadvantaged groups.

### **3.2 The Swedish labour market 1990 to 2000**

In the beginning of the 1990's, Sweden, as well as other European countries, experienced turbulent times. Sweden experienced the deepest recession since the 1930's. From *figure 1a* we see that the number of unemployed increased from 150 000 in 1991 to 350 000 in 1993.

This corresponds to an increase from slightly above 2 per cent in 1991 to 8.2 per cent in 1993 (Björklund et al. 2000). After 1997, unemployment started to decrease. In *figure 1b* and *1c*, the number of employees and the number of self-employed 1993-2001 is plotted.<sup>9</sup> The number of employees co-varies with the unemployment but it is more difficult to find a clear pattern for the development of self-employment. There seems to be large variation between the years and there is no clear trend. Between 1993 and 1994, in a period of increasing unemployment, the number of self-employed rose from 300000 to approximately 312000. As unemployment fell after 1997, the number of self-employed fell which can be an indication of that the number of self-employed is negatively correlated with unemployment.

Figure 1a

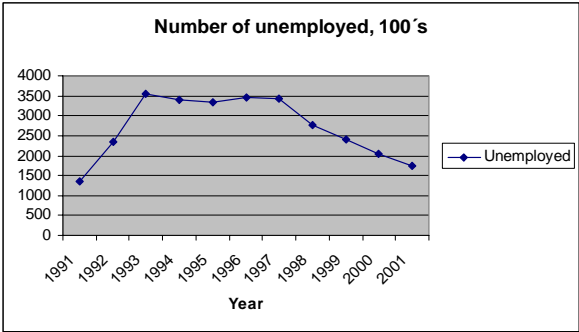


Figure 1b

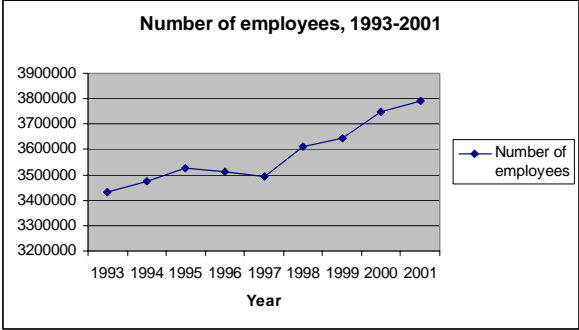
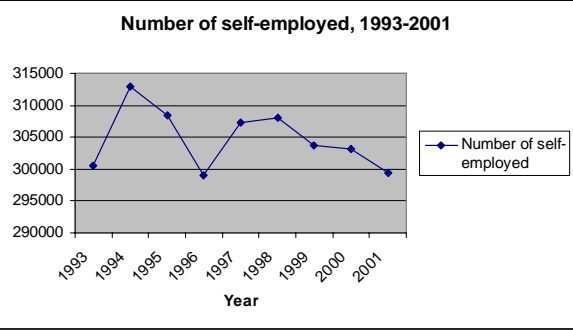


Figure 1c



Source: The labour force survey (AKU)

One implication of the changes on the labour market described in section 3.1 is that we can expect that people work longer hours. In *figure 1d* we see the development of average working time per week from 1990 to 2001. The self-employed work longer hours than wage earners do which is also what we expected to find. It is however; a bit surprising that average working time has not changed much during this period. This is probably mainly due to that the working time stated in the agreements for wage earners has not changed. Working time can also be described with total amount of hours worked in the economy by wage earners and

<sup>9</sup> For number of employees and number of self-employed, the labour force survey provides data starting from 1993



self-employed, as in *figure 1e* and *1f*. The development of hours worked for wage-earners follow the development of unemployment; when unemployment increases, total hours worked decreases. Total hours worked by self-employed do not vary with the number of self-employed in the same way; between 1994 and 1995 when the number of self-employed decreased the total hours worked by self-employed increased. This can be an indication of that in times of recession, those who survive as self-employed need to work more, perhaps to be able to stay in business. After 1999 the number of self-employed decreased and so did total hours worked by self-employed in the economy.

Figure 1d

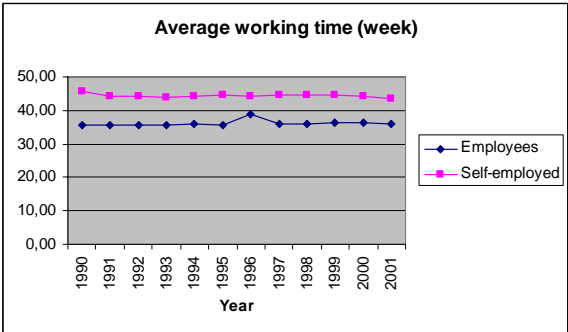


Figure 1e

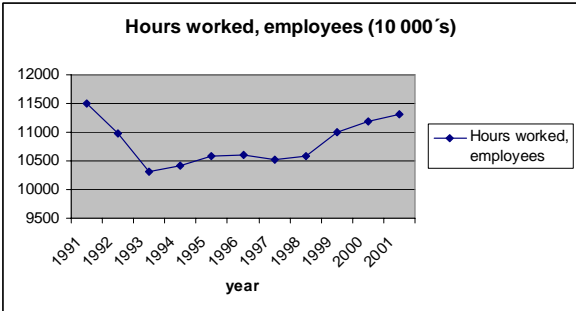
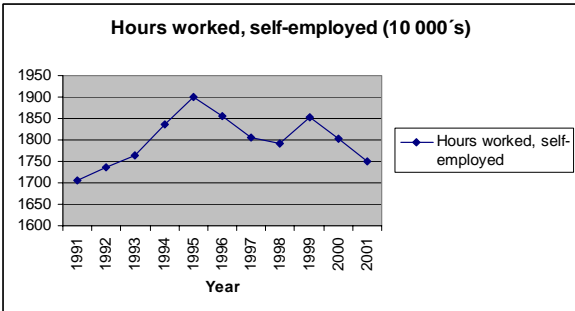


Figure 1f

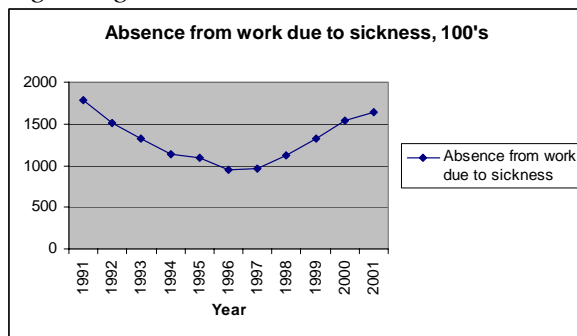


Source: The labour force survey (AKU)

As was discussed above, the increased time pressure is likely to be correlated with an increased in health problems in the population. In *figure 1g* we see the development of absence from work due to illness. During the recession in the beginning of the 1990's we in fact see a decrease in absence. This can be explained by that those who got to keep their jobs were less inclined to stay home from work when they are sick since. When the situation on the labour market improved, the number who were absent from work also increased. Either this is a delayed effect of that those who escaped unemployment in the beginning of the 1990's had to work harder and perceived the work to be more straining, or people are more inclined to stay home in good times when they have no fear of losing their jobs. It can also be a selection effect that gives this pattern in sick-absence; those who did not loose their jobs

can also be individuals with a better health. Or put differently, those with a bad health are perhaps those who are most likely to be laid-off in a recession.

*Figure 1g*



Source: The labour force survey (AKU)

## 4. Empirical analysis

### 4.1. Data

The data used is the Swedish Level-of-Living survey (SLLS), a survey that has been conducted in 1968, 1974, 1981, 1991 and 2000. A sample of the Swedish population has been interviewed about their living and working conditions. Some of the individuals have been interviewed in several waves of the survey so they can be combined to a panel rather than just a number of cross-sections. In this paper the sample is restricted to only include the two latest waves since some questions, like the one on job-satisfaction, was not posed before the wave of 1991. As was mentioned in the introduction, I study the correlation between self-employment and six different outcomes; if the job is stressful, if the job is mentally straining, mental health problems, bad general health, job satisfaction and life satisfaction. The first two variables are used as indicators about perceptions about work, the third and fourth are indicators of health and the two last are indicators of happiness. In the survey questions about these indicators are asked but the response alternative varies from two (job is mentally stressful and job is mentally straining) to five (job satisfaction). In addition, the variable used to study mental health problems is in fact an index containing information whether an individual has had problems with sleep, tiredness, anxiety or depression or if he or she has had no such problems. The chosen estimation strategy is to transform these indicators to dummy variables. An obvious drawback of doing so is that one loses some variation in the dependent variables which can affect the results. There are two reasons for this transformation; first, by doing so the same method can be used when estimating the correlation between self-employment and the outcomes. This is strength since it simplifies the comparisons and interpretation of the results. Second, since fixed-effect models are estimated,

estimating logit models in the first step allows us to use a fairly simple method when including fixed-effects; conditional fixed-effects models. In the earlier literature one has often used ordered logit models in the first step and hence used all information in the answers. However, this is troublesome in the second step since fixed-effects ordered logit models is as of yet not a commonly used method. An exception is D’Addio, Eriksson and Fritjers (2004) who propose such an estimation method. In Taylor (2004), random effects ordered probit models are estimated to deal with the selection problem and in Benz and Frey (2004) ordinary least squares fixed effects estimators are used. Using these methods is not without problems and there is a trade-off between transforming the variables in a suitable way and use a more direct method and using all variation in the dependent variables but using a less suitable fixed effects model. In Björklund (1984) and Winkelmann and Winkelmann (1998) the dependent variables which is mental health problems, is transformed in the same way as has been done here. In *table 1* it is described how the variables are defined. The questions that are posed are presented in appendix A.

**Table 1 Description of dependent variables**

Dependent variables	Description
<b>Job is stressful</b>	1 if job is perceived as stressful, 0 otherwise.
<b>Job is mentally straining</b>	1 if job is perceived as mentally straining, 0 otherwise
<b>Mental health problems</b>	1 if one has had sleeping problems, been tired, been depressed or anxious, 0 if no such problems.
<b>Bad general health</b>	1 if general health is perceived to be bad or not so good, 0 if general health is perceived to be good.
<b>Job satisfaction</b>	1 if one is very satisfied with work, 0 otherwise.
<b>Life satisfaction</b>	1 if one is satisfied with life most of the time, 0 otherwise

In other studies on self-employment and happiness, those who are self-employed are compared to all wage earners. The choice of reference group can be crucial since it is important to which category self-employed is compared. In this paper wage earners are divided into five different categories; unskilled blue-collar, skilled blue-collar and three groups of white-collar workers (low level, middle level and high level) and skilled blue-collar workers are used as reference group. The motivation for choosing this group is that many self-employed have a profession corresponding to this group of wage earners. This is a choice that can be discussed. If one want to explore the hypothesis that being at the top of the hierarchy in a firm is important for job-satisfaction and perceptions about work, then a more suitable comparison group is high level white-collar workers since this group of employees is likely to have more responsibility, freedom and self-determination than other categories of wage

earners have. In a sensitivity analysis of the results, all equations are re-estimated using this group as references category and the results do differ. These results are not presented in the paper but results will be discussed briefly below.

## **4.2. To use self-reported variables**

The outcomes that are used are gathered from a survey and hence they are self-reported. The use of such variables is not entirely unproblematic. Freeman (1978) discusses the use of “job-satisfaction” as an economic variable. He means that economists for a long time ignored self-reported variables in labour market studies. The ignorance was partly due to the fact that these variables rather tell the researcher what people say than what they do. However, it is my belief that in some cases it is more interesting for the researcher to know how an individual perceives his or her situation than to draw inference about reasons for certain behaviour by observing the behaviour itself.

The most discussed problem using self-reported variables in economic analysis is the one of comparability between individuals.<sup>10</sup> Reporting that one is “very satisfied with work” does not necessarily mean that all individuals reporting this are equally satisfied. What one thinks is good depends on earlier experience and references. Winkelmann and Winkelmann (1998) refer to this problem as one of “anchoring”; it is possible that individuals anchor their scale at different levels. If this is the case that differences in anchoring between individuals is correlated with some explanatory variable, then the estimates are biased. This issue was raised in the introduction regarding self-employed and reported level of life-satisfaction. One way to deal with this problem, if panel data is available, is to estimate fixed effect models.

## **4.3. Method**

In this section, a brief description of the estimation strategy is described.

### **Logit**

When the dependent variable is a binary variable, a latent variable model can be used to estimate the effect of the independent variables on the outcome. If one assumes an unobservable latent continuous variable  $y^*$ , then there exists some threshold,  $\tau$ . For values above this threshold we observe that the binary variable  $y$  equals 1 and for values below the threshold we observe that  $y$  equals 0. The idea is that for some values of  $y^*$  where a change

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<sup>10</sup> See D’Addio, Eriksson and Frijters (2004) for an extensive analysis of this problem.

cannot be observed, we observe a change in  $y$ . The relation between  $y^*$  and the covariates can be described as

$$y^* = X_i \beta + \varepsilon_i \quad (1)$$

and the relation between  $y$  and  $y^*$  can be described as

$$y_i = 1 \text{ if } y_i^* > \tau \quad (2)$$

$$y_i = 0 \text{ if } y_i^* \leq \tau \quad (3)$$

The probability that the dependent variable equals one is calculated by evaluating the cdf of the error distribution at  $X\beta$ . The errors are assumed to have a logistic distribution and hence the probability can be described as

$$\Pr(y = 1 | X) = F(X\beta) = \frac{e^{x\beta}}{1 + e^{x\beta}} \quad (4)$$

This is estimated by defining the log likelihood equation and using maximum likelihood estimation. The likelihood equation consists of the products of the probability that the both events happen; i.e. the probability that  $y = 1$  times the probability that  $y = 0$ . The log likelihood thus consists of the sum of these probabilities

$$\ln L(\beta | y, X) = \sum_{y=1} \ln \Pr(y_i = 1 | x_i) + \sum_{y=0} \ln(1 - \Pr(y_i = 1 | x_i)) \quad (5)$$

Using equation (3), (4) can be written as

$$\ln L(\beta | y, X) = \sum_{y=1} \ln F(X_i \beta) + \sum_{y=0} \ln(1 - F(X_i \beta)) \quad (6)$$

### Conditional fixed-effects logistic regression

Since panel data is available we can use a fixed-effects version of the logit model to consider individual specific effects which are constant over time. This can be particularly important when using survey data since we possible have an anchoring problem, i.e. that individuals differ with respect to at which level they anchor their scales. When fixed-effects models are used we calculate the variation in the outcome within the group. Here a group is an individual so in other words we compare the outcome of individual  $i$  at time  $t$  with the outcome of the same individual at time  $t + 1$ . In this setting, the individual specific effect,  $c_i$ , drops out of the equation. Chamberlain (1980, 1984) describes how fixed-effects models can be estimated when we have a bivariate dependent variable. We are interested in estimating the effect of changes in the covariates on changes in the dependent variable, that is we are only interested

in the cases where either  $y_{i,1} = 0$  and  $y_{i,2} = 1$  or  $y_{i,1} = 1$  and  $y_{i,2} = 0$ . This can be described as  $y_{i,1} + y_{i,2} = 1$ . Let  $w_i = 1$  if  $(y_{i,1}, y_{i,2}) = (0,1)$  and  $w_i = 0$  if  $(y_{i,1}, y_{i,2}) = (1,0)$ . We then want to calculate

$$\Pr(w_i = 1 | y_{i,1} + y_{i,2} = 1) = \frac{\Pr(w_i = 1)}{(\Pr(w_i = 0) + \Pr(w_i = 1))} = \frac{e^{\beta(x_{i,2} - x_{i,1})}}{1 + e^{\beta(x_{i,2} - x_{i,1})}} \quad (7)$$

The individual specific effect has now disappeared from the equation; hence we have dealt with the problem of time-invariant omitted variables.

### Odds ratios

The parameters in both the logit and the fixed-effects logistic regressions are to be interpreted as log odds and the interpretation of a one unit change in the  $x$ -variable results in a  $\beta$  unit change in the log of the odds. Since this interpretation is not very intuitive the odds ratios are presented in all tables. The odds ratios are calculated by  $e^\beta$ . This is interpreted as, if  $x$  is a dummy variable, a unit change in the  $x$  are expected to change the odds of having  $y = 1$  with a factor  $e^\beta$ . For such a change in the  $x$ -variable we can also compute the percentage change in the odds, we can say something about with how many per cent the odds is assumed to increase for a one unit increase in the  $x$ -variable. This is calculated as  $[100(e^{\beta*\delta}) - 1]$  where  $\delta$  is the change in the variable  $x$ . If  $x$  is a dummy variable,  $\delta = 1$ . Below an example is given.

**Table 2 Example of odds ratios**

$x_1 = 1$ if woman, 0 if man $\delta = 1$		
$\beta$	$e^\beta$	$100((e^{\beta*\delta}) - 1)$
0.25	1.28	28 %
-0.23	0.80	-20 %

If the coefficient is 0.25 the odds ratio is 1.28 and if we do the calculation as it is described in the third column, we can say that the odds of having  $y=1$  is 28 per cent higher for women compared to men.

## 5. Results

### 5.1. Description of the sample

In *table 3* descriptive statistics for the sample is presented. For each year, the population is divided between wage-earners and self-employed. The self-employed are older, a smaller share is women, a higher share is married, a higher share lives in rural areas and on average,

the self-employed have fewer years of education. This simple description has some interesting implications when we look at health variables, perceptions about work, happiness and job characteristics. In the sample in 1991 there appears to be no differences between self-employed and wage earners. The share of self-employed who stated that they are very satisfied with their work is not significantly different from the share among wage earners. Nor is there a difference in the share who states that job is mentally straining. When these questions were asked in 2000 there are some interesting differences. A significantly lower share among the self-employed state that the job is mentally straining compared to wage earners (46.4 per cent versus 53.7 per cent). This is particularly interesting in the light of that the share who stated this increased among wage earners (48.6 per cent to 53.7 per cent) while the share among self-employed decreased (52.3 per cent to 48.6 percent). The same pattern is found when we look at job satisfaction and life satisfaction; in 1991 there were no significant difference between employees and self-employed but in 2000 a higher share of self-employed state that they are very satisfied with their job and feel satisfied with their lives most of the time. If these changes are related to the economic situation in Sweden between 1991 and 2000, one possible explanation is that self-employed has not been effected by the raise in unemployment and the increased time pressure on the labour market in the same way as wage earners have been. A time dummy is included in all regressions to capture the effect of changes in the economy but this time variables is assumed to have the same effect on self-employed and wage earners. To allow the time effect to be different an interaction term between time and self-employment is included in the regressions and a likelihood ratio test is performed to see whether the interaction term should be included. The test indicates that the variable only should be included in the regressions for a mentally straining job and job-satisfaction. This support the idea that changes in the economic environment has an impact on changes in perceptions about work and satisfaction.

One difference that is stable is that self-employed works on average significantly more hours per week compared to employees. This is not a novel finding and we saw on the aggregate level for Sweden in section three. However, the questions asked self-employed and wage-earners. For employees the question that is asked is; "*How many hours per week is your ordinary working time?*" . For self-employed the question is "*How many hours do you usually work in the firm per week on average over a year?*". Since ordinary working time is referred to the working time stated in the contract and not to the actual hours worked, this comparison can be a bit misleading. Even if overtime is added to the working time for wage-earners, it is not likely that they on average work as many hours as self-employed do.

A higher share of self-employed also stated that they are satisfied with their wage which is interesting since it is commonly believed that self-employed have lower incomes than wage earners have. This is at least what one finds when information collected by the tax agency is analysed.<sup>11</sup>

**Table 3 Descriptive statistics**

	Employed in 1991	Self-employed in 1991	Employed in 2000	Self-employed in 2000
<b>Occupation</b>				
Unskilled blue-collar	24.9	-	20.8	-
Skilled blue-collar	21.2	-	19.5	-
White-collar, low level	17.8	-	16.8	-
White-collar, middle level	21.3	-	25.0	-
White-collar, high level	14.9	-	17.9	-
Self-employed	-	100.0	-	100.0
<b>Socio-economic characteristics</b>				
Age	37.1	41.2***	46.2	48.0**
Women	49.1	26.2***	49.7	27.5***
Unmarried	21.1	13.4***	12.8	6.3***
Divorced	4.4	3.4	6.6	6.3
Widow	0.5	0.0***	1.9	0.5**
Married	74.0	83.2***	78.6	86.9***
Children living at home	1.1	1.2	0.86	0.82
<b>Place of residence</b>				
Stockholm	15.5	18.1	16.1	17.4
Gothenburg	7.7	6.7	7.4	6.8
Malmö	4.5	1.3***	4.1	2.4
City>30 000 inhabitants	22.1	16.1*	19.2	15.0
City<30 000 inhabitants	19.9	17.4	18.4	15.9
Rural area	30.3	40.3**	34.8	42.5**
Native	93.1	87.2**	92.7	92.3
Education	11.7	10.9***	12.2	11.7**
<b>Health</b>				
Bad general health	9.7	11.4	19.6	18.4
Mental health problems	22.2	20.1	33.0	29.9
Feeling overstrained	6.0	9.4	12.4	13.5
Job is mentally straining	48.6	52.3	53.7	46.4**
Job is stressful	68.0	72.5	72.5	75.4
Life-satisfaction	61.4	64.4	59.1	70.5***
Job-satisfaction	42.8	48.3	31.4	49.8***
<b>Job characteristics</b>				
Hours worked	37.3	49.2***	37.6	47.6***
Satisfied with the wage	53.0	69.8***	45.1	63.3***
Feeling control over life	75.1	79.9	75.4	86.5***
Number of individuals	1 849	149	1 791	207

Note: \*\*\*, \*\* and \* indicates that the difference between the mean values for employed and self-employed in 1991 and in 2000 respectively, are significantly different from each other at the 1, 5 and 10 percent level of significance.

<sup>11</sup> See Andersson and Wadensjö (2004).



## 5.2. Pooled logit estimates

*Table 4* summarises the results from the logit regressions. The results are presented in terms of odds ratios since this allows for a quantitative interpretation of the results. Standard errors are in parentheses. In the appendix the complete tables are presented. In the first model no variables except occupational dummies and time dummies are included. In the second model controls for socio-economic and demographic variables are included and in the third model, controls for job and health characteristics are added. The controls added in the third model differ depending on which outcome that is studied and it can be discussed if the correct controls have been included or whether something has been excluded.<sup>12</sup>

In the model for a mentally straining job and job satisfaction an interaction term between time and self-employment is included.<sup>13</sup> This variable has an interesting interpretation. To get an intuitive feeling for what it we can compare it to an evaluation of a natural experiment using difference-in-difference estimators. Suppose that we see those who become self-employed as treated and we observe their levels of job-satisfaction in 1991 before they become self-employed and in 2000 when they are self-employed. As a comparison group we have individuals who are wage-earners in both periods and we observe the outcome for this group in 1991 and in 2000. In a setting like this the coefficient for the interaction term between self-employment and year 2000 would be interpreted as the difference-in-differences estimator, i.e. the effect of the treatment (becoming self-employed) on the outcome (having a mentally straining job and job-satisfaction). Of course, in this paper a natural experiment is not evaluated and the coefficient is not to be interpreted as a measure of the causal effect of self-employment on the outcome but it can still be instructive to relate the strategy in this paper to the “perfect” research situation.

In the regression for having a mentally straining job we get some interesting results. First, we see that the “time-effect” is positive and significant in all models. The odds is about 25 percent higher that job is reported to be mentally straining in year 2000 compared to in 1991. This finding is in line with the discussion of that time pressure has increased on the labour market in the 1990’s. It may be a negative change for many people but not for all individuals. We also see that self-employed in general are more likely to say that the job is mentally straining but those who are self-employed in 2000 are actually less likely to state this. The

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<sup>12</sup> It has been problematic to decide which variables that should be included in the regressions but the focus is on the result for self-employment and a number of different specifications have been tried but they all come up with a stable result for self-employment.

<sup>13</sup>This variable was first included in all regression and through likelihood ratio tests it was determined whether the interaction terms should be include in the regressions. The test confirmed the inclusion of the variable for having a mentally straining job and for job-satisfaction.

odds is about 40 percent lower than an individual who is self-employed in 2000 report to have a mentally straining job compared to those who are not self-employed in 2000.<sup>14</sup> These results give us an indication of that the changes on the labour market has not affected self-employed and wage-earners in the same way.

The results in the job-satisfaction equations are in line with earlier research; self-employed are more satisfied with their jobs than wage-earners are. However it is important to note that a distinction between different occupations is made in this paper, this is not done in earlier studies, and the choice of reference group has an effect on the results.<sup>15</sup> In the job-satisfaction equation we also see that the odds of reporting a high level of satisfaction in 2000 is about 60 per cent lower compared to 1991. We also see that those who were self-employed in 2000 in fact are more likely to report that they are very satisfied with their job compared to those who were not self-employed.

Self-employed are more likely to report that job is stressful but the coefficient is not significantly different from zero when controlling for hours worked, self-employed work longer hours than wage earners. The two indicators of health show that the self-employed do not have a worse mental health or a worse general health than skilled blue-collar workers. As was argued earlier, we expect that long working time and finding the job stressful and mentally straining should have a negative impact on health. This does not appear to be the case for self-employed. The explanation may be that those who choose to become self-employed are better equipped to handle stress, pressure, hard work and little rest. Since they also report higher levels of job and life-satisfaction this is an indication of that they like a job that requires a high input of effort. Since self-employed are assumed to have control over their working condition it can be a choice to work hard and intensive which could be associated with a positive and stimulating stress. A conclusion of the non-impact of self-employment on health is that the pressure and the stress that they experience are not transmitted into health problems.

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<sup>14</sup> In the third specification the coefficient for the interaction term is significantly different from zero at the 10.1% level of significance.

<sup>15</sup> In sensitivity analysis white-collar high-level workers are used as reference group. In these models the main findings are; self-employed are not more likely to report that the job is stressful, they are *less* likely to say that the job is mentally straining (odds ratio is 0.62 and the p-value 0.002), there is no difference in mental health problems but self-employed are more likely to report that they have a bad general health (odds ratio is 1.48 and p-value 0.091). They are not more likely to state that they are satisfied with life in general. They are not more likely to state that they are very satisfied with their jobs but the interaction terms shows that self-employed in 2000 are more likely to be satisfied with the job compared to white-collar high level employees

Another interesting finding is that the time dummy is larger than one and significantly different from zero in all health equations. This implies that individuals are more likely to report health problems in 2000 than in 1991. The result is stable when age is controlled for.

In the last column in *table 4* the result for the life-satisfaction equations are presented. Here we see that the odds to state that one is satisfied with life most of the time is between 61 and 84 per cent higher for self-employed compared to skilled blue-collar workers. The time dummy is not significantly different from zero in the first and third model which means that individuals do not tend to change their reported level of life-satisfaction to a large extent. It has been argued that individuals in general are less inclined to report low levels of life-satisfaction and an explanation for this is that it is less socially acceptable to say that one is not satisfied with ones life. One can argue that life satisfaction is a better measure of overall happiness and that job satisfaction only says something about how one feels about work.<sup>16</sup> The results in *table 4* can then be interpreted as that self-employed are both more satisfied with their work and happier in general. There is however the possibility that there is a selection of happier people into self-employment and there exists some time invariant individuals specific characteristic that is omitted in these regressions. It can be a measure of how positive and energetic an individual is. By estimating fixed-effects model this omitted variable is cancelled out since the comparison between the two years is made within an individual. Analysing the results of these models is the next topic of the paper.

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<sup>16</sup> Garhammer (2003) argue that people are less inclined to evaluate their life as “not satisfying” since this would violate their feelings of self-esteem.

**Table 4 Result from pooled logit regressions. Odds ratios are presented and standard errors are in parentheses**

	<b>Job is stressful</b>	<b>Job is mentally straining♣</b>	<b>Mental health problems</b>	<b>Bad general health</b>	<b>Job satisfaction</b>	<b>Life satisfaction</b>	<b>Controls</b>
Unskilled blue-collar	0.89 (0.095)	0.79 (0.082)**	1.24 (0.143)*	1.62 (0.219)***	0.93 (0.100)	0.93 (0.094)	
Skilled blue-collar	reference	reference	reference	reference	reference	reference	
White-collar, low level	1.50 (0.184)***	1.21 (0.132)*	1.29 (0.158)**	0.91 (0.143)	1.23 (0.139)*	1.42 (0.157)***	
White-collar, middle level	1.11 (0.121)	2.20 (0.227)***	1.16 (0.136)	0.72 (0.109)**	1.28 (0.136)**	1.71 (0.177)***	
White-collar, high level	1.25 (0.152)*	3.06 (0.355)***	1.10 (0.139)	0.61 (0.105)***	1.56 (0.178)***	1.92 (0.221)***	
Self-employed	1.32 (0.191)*	1.58 (0.289)**	1.00 (0.151)	0.97 (0.176)	1.44 (0.264)**	1.84 (0.250)***	
Year=2000	1.22 (0.085)***	1.15 (0.079)**	1.73 (0.125)***	2.35 (0.223)***	0.59 (0.042)***	0.90 (0.059)	
Year=2000, self-emp.=1	-	0.68 (0.154)*	-	-	1.79 (0.402)**	-	
Likelihood ratio	35.18	223.93	63.51	128.66	97.35	83.26	
Unskilled blue-collar	0.56 (0.094)	0.80 (0.085)**	1.00 (0.131)	1.50 (0.210)***	0.87 (0.096)	0.88 (0.091)	Age, age squared, gender,
Skilled blue-collar	reference	reference	reference	reference	reference	reference	marital status, place of
White-collar, low level	1.47 (0.186)***	1.09 (0.124)	1.09 (0.140)	0.85 (0.139)	1.10 (0.129)	1.29 (0.148)**	residence, native, education,
White-collar, middle level	1.07 (0.126)	1.77 (0.196)***	1.08 (0.135)	0.79 (0.128)	1.20 (0.135)	1.52 (0.169)***	children,
White-collar, high level	1.30 (0.184)*	2.33 (0.313)***	1.25 (0.184)	0.69 (0.137)*	1.54 (0.205)***	1.68 (0.225)***	
Self-employed	1.36 (0.202)**	1.68 (0.316)**	1.13 (0.174)	0.88 (0.164)	1.48 (0.277)**	1.74 (0.241)***	
Year=2000	1.46 (0.116)***	1.29 (0.092)***	2.09 (0.173)***	1.77 (0.191)***	0.59 (0.046)***	0.87 (0.065)*	
Year=2000, self-emp.=1	-	0.66 (0.143)*	-	-	1.76 (0.399)**	-	
Likelihood ratio	88.83	343.43	191.05	221.58	125.43	155.79	
Unskilled blue-collar	0.88 (0.097)	0.81 (0.086)**	1.00 (0.130)	1.54 (0.230)***	0.82 (0.093)*	0.89 (0.096)	Age, age squared, gender,
Skilled blue-collar	reference	reference	reference	reference	reference	reference	marital status, place of
White-collar, low level	1.46 (0.186)***	1.08 (0.124)	1.13 (0.156)	0.80 (0.140)	1.109 (0.133)	1.28 (0.153)**	residence, native, education,
White-collar, middle level	1.04 (0.122)	1.75 (0.195)***	1.11 (0.150)	0.74 (0.128)*	1.15 (0.135)	1.51 (0.174)***	children,
White-collar, high level	1.23 (0.177)	2.31 (0.315)***	1.26 (0.203)	0.58 (0.122)***	1.37 (0.190)**	1.63 (0.227)***	
Self-employed	1.07 (0.170)	1.44 (0.287)*	1.14 (0.192)	0.85 (0.168)	1.30 (0.263)	1.61 (0.231)***	
Year=2000	1.43 (0.115)***	1.25 (0.098)***	1.80 (0.160)***	1.35 (0.155)***	0.63 (0.051)***	0.91 (0.072)	
Year=2000, self-emp.=1	-	0.68 (0.159)	-	-	1.67 (0.395)**	-	
Job is mentally straining	-	-	-	-	yes	-	

Job is stressful	-	-	-	-	yes	-
Mental health problems	-	-	-	yes	-	yes
Bad general health	-	-	yes	-	-	yes
Feeling control over life	yes	yes	yes	yes	yes	yes
Feeling overstrained	-	-	yes	yes	-	yes
Hours worked	yes	yes	-	-	yes	-
Satisfied with the wage	yes	yes	-	-	yes	-
Likelihood ratio	136.85	369.50	713.07	584.99	387.48	428.76

Note: \*\*\*, \*\* and \* indicates that the coefficients are significantly different from zero at the 1, 5 and 10 percent level of significance.

♣A model without the interaction term between year and self-employment was estimated but the likelihood ratio test indicates that the model has a better fit if the interaction term is included (Prob>chi2=0,0898). When this variables is included one sees that employees perceive their work as more mentally straining in 2000 while the interaction term indicates that those who were self-employed in 2000 are less likely to report that Job is mentally straining.

### 5.3. Fixed-effects logistic estimates

When estimating fixed-effects models, the fixed effect or the individual heterogeneity, is cancelled out. The estimated coefficients are then based on intra personal changes rather than on differences between individuals. Another reason for estimating these models is to explicitly consider the effect of a change in occupational status, particular a transition from being an employee to becoming self-employed, on a change in the dependent variable. If a casual interpretation should be made, it is in terms of that the change in occupation causes the change in the dependent variable. Before estimating these models it is important to describe these changes.

In *table 5* and *6* the changes observed in the data between 1991 and 2000 is presented for four different groups; those who are self-employed in both periods, those who are employees in 1991 and self-employed in 2000, those who are self-employed in 1991 and employees in 2000 and those who are employees in both 1991 and 2000. In *table 5*, the shares for which the dependent variable is one in each year and are presented for each group. The stars indicate whether the shares in 1991 and 2000 are significantly different from each other. Self-employed, independent of year, on average work ten hours more per week than wage earners. This is supported by what we saw using the labour force survey (see *figure 1d*). Those who became self-employed increased their average working time from 37.8 hours per week to 48.1 hours and those who left self-employment decreased their working time with approximately the same number of hours. In the group who remained being employees, a significantly higher share stated in 2000 that they felt that the job was stressful and mentally straining. None of the other groups experienced such a development. Both those who became self-employed and those who continued to be employees experienced a significant increase in the share with mental health problems which for employees can be correlated with the fact that they felt that pressure on the job increased.

Earlier studies have argued that job satisfaction increases for those who become self-employed but the data used here lead to a different interpretation. In fact, among those who became self-employed, the share that was very satisfied with their job in 2000 is not significantly higher than the share that reported this in 1991. On the other hand, job satisfaction decreased for those who continued to be wage-earners. The share that was very satisfied with their jobs declined from 42.5 per cent to 31.2 per cent. Among those who left self-employment, that share that was very satisfied declined from 55.6 per cent in 1991 to 38.6 per cent, however, the shares are not significantly different from each other and this

group only consist of 36 individuals so the findings should be interpreted with great care. However, it is interesting to note this drop in job satisfaction. In sum, *table 5* shows that the group that became self-employed has experienced other changes than those who continued to be wage-earners. One interpretation is that those who became self-employed are different in some way but when one compares the answers in 1991; those who later became self-employed are fairly similar to those who stayed employees.

In *table 6*, I have defined the  $w$ -variables as they were described in section 4. For example  $w_1$  is 1 if an individual reported that the job was not stressful in 1991 and reported that the job was stressful in 2000. Correspondingly,  $w_1$  is zero if an individual did state that work was stressful in 1991 but that it was not in 2000. The share within each group for which the variable  $w_1$  is one and the share for which the value is zero are presented in. The number of individuals is reported within parentheses. The individuals for whom the  $w$ -variable is not missing values are included in the regression. Missing values are created if individuals have not reported a change in the dependent variables and hence these individuals are dropped from the regression. The shares in *table 6* correspond to the share that has made a certain change *out of all changers*, not out of all individuals in the group. This table can give us an indication of the result we can expect from the regressions. For example, 30 per cent of those who were employees in 1991 and self-employed in 2000 have changed from not thinking that the job is mentally straining to thinking that it is. Among those who continued to be employees, 59.2 per cent report that work has become mentally straining. The share among those who switched to self-employment that has reported a worsening in general health is 55.6 per cent while the corresponding share among those who remained employees is 78.7 per cent.

There is also a large difference between “switchers” and “stayers” regarding changes in job satisfaction; 61.9 per cent in the first group has become very satisfied with the job while this is the case for only 34.3 percent of those who remained being wage-earners. Looking at these variables indicate that those who continued to be wage-earners in general are more likely to report a decrease in well-being compared to those who became self-employed. This in turn, imply that well-being among those who become self-employed has not increased in absolute terms but has *improved relative to those who continue to be employees*. This result can be interpreted in the light of the changes on the labour market described earlier; the time pressure has increased and so is the burden at work and at home also likely to have done. It is possible that this primarily has had an effect on employees and not so much on self-employed. One must however keep in mind that those who are employees in 1991 and in 2000 can have

been unemployed or self-employed at some point in between these years. It is then possible that an individual was an employee in 1991, was laid off and unemployed for a while and then re-hired at a job for which he or she was overqualified for or just a job that was not as good as the first one. We will return to this result later.



**Table 5 Changes in hours worked and the dependent variables between 1991 and 2000 for different groups**

Hours worked and dependent variables	Self-employed both in 1991 and in 2000	Employee in 1991 and self-employed in 2000	Self-employed in 1991 and employee in 2000	Employee both in 1991 and in 2000
Hours worked in 1991 (per week)	49.1	37.8	49.1	37.3
Hours worked in 2000	47.2	48.1***	38.8***	37.6
Job is stressful in 1991	75.2	74.5	63.9	67.6
Job is stressful in 2000	76.1	74.5	69.4	72.5***
Job is mentally straining in 1991	50.4	58.5	58.3	48.1
Job is mentally straining in 2000	43.4	50.0	61.1	53.6***
Mental health problems in 1991	17.7	20.2	27.8	22.3
Mental health problems in 2000	25.7	35.1**	36.1	32.9***
Bad general health in 1991	11.5	11.7	11.1	9.6
Bad general health in 2000	22.1**	13.8	22.2	19.5***
Very satisfied with the job in 1991	46.0	47.9	55.6	42.5
Very satisfied with the job in 2000	42.5	58.5	38.9	31.2***
Satisfied with life in general in 1991	63.7	67.0	66.7	61.1
Satisfied with life in general in 2000	69.0	72.3	55.6	59.2
Number of observations	113	94	36	1 755

Note: \*\*\*, \*\* and \* indicates that the difference between the mean values in 1991 are significantly different from the mean values in 2000 for each group respectively at the 1, 5 and 10 percent level of significance.

**Table 6 Share in each group that reports positive and negative changes in the dependent variables**

		Self-employed both in 1991 and in 2000	Employee in 1991 and self-employed in 2000	Self-employed in 1991 and employed in 2000	Employee both in 1991 and in 2000
Job is stressful ( $w_1$ )	$w_1 = 1$ if (0,1)	51.9 (14)	50.0 (14)	60.0 (6)	57.6 (326)
	$w_1=0$ if (1,0)	48.1 (13)	50.0 (14)	40.0 (4)	42.4 (240)
Job is mentally straining ( $w_2$ )	$w_2 = 1$ if (0,1)	39.5 (15)	30.0 (6)	55.6 (5)	59.2 (310)
	$w_2=0$ if (1,0)	60.5 (23)	70.0 (14)	44.5 (4)	40.8 (214)
Mental health problems ( $w_3$ )	$w_3 = 1$ if (0,1)	65.5 (19)	73.3 (22)	66.7 (6)	67.2 (364)
	$w_3=0$ if (1,0)	34.5 (10)	26.7 (8)	33.3 (3)	32.8 (178)
Bad general health ( $w_4$ )	$w_4 = 1$ if (0,1)	75.0 (18)	55.6 (10)	83.3 (5)	78.7 (240)
	$w_4=0$ if (1,0)	25.0 (6)	44.4 (8)	16.7 (1)	21.3 (65)
Job satisfaction ( $w_5$ )	$w_5 = 1$ if (0,1)	44.4 (16)	61.9 (26)	35.0 (7)	34.3 (216)
	$w_5=0$ if (1,0)	55.6 (20)	38.1 (16)	65.0 (13)	65.7 (414)
Life satisfaction ( $w_6$ )	$w_6 = 1$ if (0,1)	58.8 (20)	56.1 (23)	33.3 (4)	47.3 (302)
	$w_6=0$ if (1,0)	41.2 (14)	43.9 (18)	66.7 (8)	52.7 (336)

In fixed-effect models in general, the effect of a dummy variable on the outcome is identified by individuals who change the value of the dummy between the years. For the coefficient for self-employed this means that it is both identified by those who become self-employed and those who leave self-employment. As we have seen, the number of individuals in the data who leave self-employment is low so the coefficient for self-employment is mainly the effect of becoming self-employed on the dependent variables. In the regressions for having a mentally straining job and job-satisfaction, the interaction term can directly be interpreted as the effect of becoming self-employed since it will have the value one only for individuals who are not self-employed in 1991 and are self-employed in 2000

In *table 7* the results from the conditional fixed-effects logit models are presented. The odds for those who become self-employed to report that the job has become mentally straining is about 45 per cent lower compared to those who do not become self-employed and the odds to report an increased level of job-satisfaction is almost 90 per cent higher. Should we interpret this as that becoming self-employed has a causal effect on these changes, i.e. is it reasonable to believe that becoming self-employed has caused changes in these dependent variables? These are difficult questions to answer but there is some evidence that suggest that such an interpretation can be made. Looking at *table 5* we see that a *higher* share among those who stay employees' report that the job is mentally straining in 2000 compared to in 1991. Among those who become self-employed a *lower* share states that the job is mentally straining in 2000. The same patten is found for job-satisfaction. Since this result holds in the regressions when controlling for other variables we should feel fairly confident that becoming self-employed has the proposed effect. But what is also very interesting is that the effect can be due to that those who stay wage-earners experience a significant drop in well-being measured in terms of these variables. This should be compared to the relatively small increase in well-being for those who become self-employed.

An explanation for these results is that becoming self-employed protected these individuals from experiencing a drop in well-being of the same magnitude as employees did. If the drop for employees is an effect of the changes on the labour market during the 1990's, as was suggested earlier, becoming self-employed seems to have had a protective effect against increased pressure. One must also think about the possibility that those who become self-employed are individuals who are better equipped to handle pressure and stress at work in general and if they would have stayed employees, they would not have reported that their job had become mentally straining and had reported lower levels of job-satisfaction.

In the equation for having a stressing full job, there is no significant effect of self-employment; neither does it appear to be a significant effect of self-employment on mental health problems. In the third model for having a bad general health, we see that self-employed in fact are less likely to have experienced a worsening health during this period.

In the fixed-effects model with life-satisfaction as the dependent variable we see that there is no impact of occupation. In the pooled logit we found that the odds that self-employed report that they are satisfied with their lives most of the time were about 60 per cent higher compared to skilled blue-collar workers. One way to interpret the fixed-effects models is that the significant difference in the logit was due to a selection by happier and more satisfied people into self-employment. When we take this selection into account and by making an intra personal comparison we see that self-employed are not more likely to report an increased level of life-satisfaction. This could in other words mean that individuals who are or become self-employed are overrepresented among those with the highest level of life-satisfaction and cannot by definition report an increased level of satisfaction.

**Table 7 Conditional fixed-effects logit estimates**

	<b>Job is stressful</b>	<b>Job is mentally straining</b>	<b>Mental health problems</b>	<b>Bad general health</b>	<b>Job satisfaction</b>	<b>Life satisfaction</b>	<b>Controls</b>
Unskilled blue-collar	0.75 (0.170)	0.54 (0.140)**	0.94 (0.239)	1.05 (0.347)	1.08 (0.252)	0.98 (0.223)	
Skilled blue-collar	reference	reference	reference	reference	reference	reference	
White-collar, low level	1.29 (0.355)	1.31 (0.370)	1.50 (0.433)	1.38 (0.561)	1.06 (0.299)	0.93 (0.251)	
White-collar, middle level	1.12 (0.283)	1.53 (0.406)	1.45 (0.390)	2.04 (0.726)**	0.94 (0.238)	1.17 (0.299)	
White-collar, high level	1.70 (0.546)*	2.86 (0.977)***	1.97 (0.645)**	1.66 (0.868)	0.88 (0.262)	0.88 (0.279)	
Self-employed	1.05 (0.381)	0.74 (0.357)	2.17 (0.803)**	1.05 (0.474)	1.92 (0.516)*	1.42 (0.438)	
Self-employed in 2000	-	0.66 (0.203)	-	-	0.82 (0.237)	-	
Likelihood ratio	7.99	32.36	9.29	4.98	5.36	3.12	
Unskilled blue-collar	0.77 (0.183)	0.58 (0.158)**	0.95 (0.262)	1.27 (0.518)	0.97 (0.238)	0.92 (0.213)	Age, age squared, gender,
Skilled blue-collar	reference	reference	reference	reference	reference	reference	marital status, place of
White-collar, low level	1.14 (0.323)	1.23 (0.362)	1.41 (0.440)	1.09 (0.548)	1.10 (0.320)	0.89 (0.245)	residence, native, education,
White-collar, middle level	1.06 (0.276)	1.30 (0.362)	1.09 (0.321)	1.34 (0.582)	1.11 (0.299)	1.21 (0.315)	children,
White-collar, high level	1.55 (0.511)	2.11 (0.759)**	1.25 (0.454)	1.03 (0.673)	1.25 (0.403)	0.91 (0.294)	
Self-employed	0.86 (0.325)	0.62 (0.309)	1.23 (0.488)	0.44 (0.245)	1.48 (0.575)	1.49 (0.473)	
Self-employed in 2000	-	0.53 (0.179)*	-	-	1.98 (0.620)**	-	
Likelihood ratio	29.69	67.82	94.14	130.99	82.00	10.84	
Unskilled blue-collar	0.77 (0.186)	0.58 (0.159)**	1.03 (0.304)	1.43 (0.640)	0.89 (0.227)	0.84 (0.230)	Age, age squared, gender,
Skilled blue-collar	reference	reference	reference	reference	reference	reference	marital status, place of
White-collar, low level	1.18 (0.342)	1.21 (0.358)	1.52 (0.514)	1.10 (0.596)	1.02 (0.310)	0.80 (0.226)	residence, native, education,
White-collar, middle level	1.06 (0.281)	1.28 (0.358)	1.12 (0.359)	1.60 (0.756)	1.08 (0.303)	1.29 (0.350)	children,
White-collar, high level	1.52 (0.511)	2.06 (0.743)**	1.28 (0.497)	1.16 (0.804)	1.22 (0.406)	0.94 (0.315)	
Self-employed	0.66 (0.262)	0.52 (0.274)	1.48 (0.646)	0.35 (0.217)*	1.19 (0.491)	1.27 (0.421)	
Self-employed in 2000	-	0.55 (0.190)*	-	-	1.92 (0.626)**	-	
Job is mentally straining	-	-	-	-	yes	-	
Job is stressful	-	-	-	-	yes	-	
Mental health problems	-	-	-	yes	-	yes	
Bad general health	-	-	yes	-	-	yes	
Feeling control over life	yes	yes	yes	yes	yes	yes	
Feeling overstrained	-	-	yes	yes	-	yes	
Hours worked	yes	yes	-	-	yes	-	
Satisfied with the wage	yes	yes	-	-	yes	-	
Likelihood ratio	49.48	70.70	168.59	169.12	129.08	62.07	
Number of observations	1 262	1 182	1 220	706	1 456	1 450	
Number of individuals	631	591	610	353	728	725	

Note: \*\*\*, \*\* and \* indicates that the coefficients are significantly different from zero at the 1, 5 and 10 percent level of significance.

In *table 8* the results are summarised by presenting the estimated odds ratios for self-employment and the interaction between self-employment and year 2000. Only the result from the third specification is presented to simplify a summary. The stars indicate whether the estimates are significantly different from zero on the 1, 5 and 10 per cent level of significance, respectively.

When controlling for number of hours worked there is no difference between self-employed and wage-earners regarding whether they feel that the job is stressful or not. Even though there is no significant difference between the groups it is interesting to note that the odds ratio in the logit regression is larger than one while it is lower than one in the fixed-effects model.

The results of the regression where a mentally straining job is used as dependent variable indicate that those who were self-employed in 2000 are less likely to report this. The odds ratio in the fixed-effects model decreases to 0.55 which means that the odds to report that the job has become mentally straining is 45 per cent lower for those who become self-employed compared to those who did not make this transition. A conclusion is then that an individual who perceived his or her job as mentally straining when being a wage-earner, in fact can be better off when he or she becomes self-employed.

There are basically no evidence of that there is any correlation between being self-employed and having mental and physical health problems. The odds ratio in the fixed-effects model is however significant and smaller than one which means that there are some support for that self-employed have a better health.

Self-employed are more satisfied with their jobs, a well-known result. The positive correlation between self-employment and high levels of life-satisfaction disappears in the fixed-effects models; hence we can not rule out that the correlation is due to that self-employed individuals differ in some to us unobserved but time invariant way from wage-earners. It can be the cases that the self-employed in fact are individuals who are happier, more positive and more stable than wage-earners.

**Table 8. Summary of results from logit and conditional fixed- effects models. Odds ratios.**

	<b>Logit</b>	<b>Fixed effects</b>	<b>Logit</b>	<b>Fixed effects</b>	<b>Logit</b>	<b>Fixed effects</b>
	Job is stressful		Job is mentally straining		Mental health problems	
Self-employed	1.07	0.66	1.44*	0.52	1.14	1.48
Self-employed in 2000	-	-	0.68~	0.55*	-	-
	<b>Logit</b>	<b>Fixed effects</b>	<b>Logit</b>	<b>Fixed effects</b>	<b>Logit</b>	<b>Fixed effects</b>
	Bad general health		Job satisfaction		Life satisfaction	
Self-employed	0.85	0.35*	1.30	1.19	1.61***	1.27
Self-employed in 2000	-	-	1.67**	1.92**	-	-

~This odds ratio is significant at the 10.1 % level of significance.

#### 5.4. Aggregate measure of well-being

So far we have looked at each of the measures of well-being individually. Evidence suggest that well-being is higher among self-employed and that it is not only due to selection of happier and more satisfied people into self-employment. This conclusion is based on the results found in the fixed-effect models where we found that those who become self-employed are significantly less likely to report that the job has become mentally straining, they are less likely to report a worsening in the general health and they are significantly more likely to report that they job has become very satisfying. To get an aggregate measure of well-being an index has been created consisting of 15 levels where 15 is the highest level of well-being and one the lowest. A description of how the index is constructed is given in appendix and the distribution of the value of the index for different groups are summarised in *table 9*.

Looking at the average values of the index we see that in 1991, wage-earners had a mean value of 7.9 while the mean value is 7.6 for self-employed in 1991. The median value for all groups and for both years is 8. There is a crowding of individuals between the index-values nine to five, while a relatively small share have a value of the index over 13 and under four. This pattern is the same four all groups and there are no obvious differences in the distribution. Since this index can approximately be seen as a continuous variable it is easier to analyse it estimating a regression. OLS and regular fixed-effect models are estimated and three different specifications are estimated which include the same set of covariates as the earlier regressions.<sup>17</sup>

The results presented in *table 10* suggest that the index of well-being is 0.55 units higher for self-employed in 2000 compared to those who are not self-employed this year. In the fixed-effects models, the coefficient only decreases slightly but is still significantly different

<sup>17</sup> In the first specification only controls for occupation and time is included, in the second a set of individual characteristics are included and in the third specification controls for hours worked, wage-satisfaction and feelings of control are included.

from zero.<sup>18</sup> Hence, it appears to be the case that well-being is higher among self-employed and that the correlation found in the OLS regression is not due to selection. It also interesting to note that the coefficient for the time dummy is negative and significantly different from zero. The value of the index is on average 0.29 units lower in 2000 compared to in 1991. The estimated coefficient for all included covariates is presented in Appendix B and it is interesting to note that hours worked has a negative impact on the index; if your working time is increase by one hour, the value of the index will then decrease by 0.03 units. In the light of that we already know that well-being is higher among self-employed and that self-employed tend to work longer hours, this is an interesting finding but it is not entirely clear how it should be interpreted.

Although the results of the regression using the index as a dependent variable are very interesting and lead to conclusions that support what we have found earlier, the results can depend very much on how the index is constructed. Therefore, other ways of constructing the index should be tried before we can be at ease with the results.

**Table 9 Index for well-being**

	<b>Employee in 1991</b>	<b>Self-employed in 1991</b>	<b>Employee in 2000</b>	<b>Self-employed in 2000</b>
<b>Average</b>	7.9	7.6	7.5	7.9
15	0.8	0.0	0.7	2.4
14	1.1	1.3	1.1	1.0
13	0.8	0.0	0.9	1.0
12	7.7	11.4	5.5	10.6
11	8.3	5.4	8.8	8.7
10	8.3	4.0	6.8	0.0
9	13.8	14.8	9.4	16.4
8	16.0	17.5	18.0	14.0
7	10.6	10.7	12.3	10.6
6	10.0	12.1	6.9	12.6
5	12.8	10.1	15.2	10.1
4	8.1	8.1	11.5	9.7
3	0.3	0.0	0.6	1.0
2	0.7	2.0	1.3	0.5
1	0.7	2.7	1.0	1.5
<b>N</b>	<b>1 849</b>	<b>149</b>	<b>1 791</b>	<b>207</b>

<sup>18</sup> If the index is transformed into  $\log(\text{index})$  the coefficient is 0.091 which means that being self-employed in 2000 increases the value of the index with 9.1 per cent.

**Table 10 Index for well-being: OLS and fixed-effects models. Dependent variable is index and standard errors are in parentheses.**

	INDEX FOR WELL-BEING		Controls
	OLS	Fixed-effect models	
Unskilled blue-collar	0.13 (0.138)	0.45 (0.236)*	
Skilled blue-collar	reference	reference	
White-collar, low level	-0.07 (0.144)	-0.18 (0.270)	
White-collar, middle level	-0.27 (0.136)**	-0.31 (0.253)	
White-collar, high level	-0.47 (0.143)***	-0.62 (0.310)**	
Self-employed	-0.38 (0.253)	0.56 (0.388)	
Time dummy(=1 for 2000)	-0.37 (0.089)***	-	
Self-employed in 2000	0.62 (0.319)**	0.131 (0.280)	
Constant	8.03 (0.108)***	7.76 (0.175)***	
R <sup>2</sup>	0.010	0.010	
Unskilled blue-collar	0.07 (0.140)	0.39 (0.236)*	Age, age squared, gender,
Skilled blue-collar	reference	reference	marital status, place of
White-collar, low level	-0.11 (0.149)	-0.11 (0.270)	residence, native, education,
White-collar, middle level	-0.21 (0.144)	-0.164 (0.256)	children,
White-collar, high level	-0.30 (0.166)*	-0.41 (0.314)	
Self-employed	-0.34 (0.255)	0.46 (0.389)	
Time dummy(=1 for 2000)	-0.34 (0.100)***	-	
Self-employed in 2000	0.63 (0.317)**	0.59 (0.295)**	
Constant	8.78 (0.674)***	10.74 (1.135)***	
R <sup>2</sup>	0.015	0.028	
Unskilled blue-collar	0.04 (0.140)	0.36 (0.236)	Age, age squared, gender,
Skilled blue-collar	Reference	Reference	marital status, place of
White-collar, low level	-0.11 (0.147)	-0.12 (0.270)	residence, native, education,
White-collar, middle level	-0.22 (0.144)	-0.14 (0.256)	children, wage-satisfaction,
White-collar, high level	-0.33 (0.167)**	-0.37 (0.314)	hours worked and feeling
Self-employed	-0.16 (0.264)	0.73 (0.402)*	control over life.
Time dummy(=1 for 2000)	-0.29 (0.099)***	-	
Self-employed in 2000	0.55 (0.306)*	0.53 (0.295)*	
Constant	8.94 (0.708)***	11.35 (1.178)***	
R <sup>2</sup> (within)	0.035	0.033	
Number of observations	3 996	3 996	
Number of individuals	1 998	1 998	



## **6. Summary and conclusion**

In this paper we ask whether well-being is higher among self-employed using six different indicators; “job is stressful”, “job is mentally straining”, “mental health problems”, “bad general health”, “job-satisfaction” and “life-satisfaction”. In recent studies, it has been shown that self-employed are more satisfied with their jobs but there is also evidence of that they feel more tired and stressed about work than wage-earners do.

Contrary to earlier results, this paper shows that self-employed are less likely to have a mentally straining job and that there is no difference in neither the mental nor the physical health between self-employed and wage-earners. We have also seen that self-employed are not more likely to state that their job is stressful. We have also seen that self-employed are more likely to state that they are very satisfied with their job, a result which stands when estimating fixed-effects models and which is in line with earlier research. The results for life-satisfaction do however indicate that there is some form of selection of happier and more satisfied people. Odds ratios in the logit model tells us that self-employed are more likely to state that they are satisfied with their lives most of the time but when including fixed-effects this result is not significantly different from zero.

One explanation for these findings is that well-being among employees has dropped between 1991 and 2000 while well-being for self-employed has increased slightly. This means that self-employment appears to have had a protective effect against a drop in well-being probably caused by general changes on the labour market in the 1990's. To take this discussion one step further one can ask why the self-employed have handled these changes better than employees have. One reason for this is probably that self-employed have better control over their own situation; there is less uncertainty for the individual about what is going to happen with the firm that you work at. In a recession, employees can feel uncertainty about whether they are to be laid off or not. Another reason is that self-employed are in general used to work a lot and the number of hours worked might not differ so much depending on whether we are in a boom or in a recession. For wage-earners, an economic downturn can possible cause more changes in the employment situation; more overtime, less fringe benefits, smaller wage increases and so forth.

To finally conclude the findings in this paper; well-being is indeed higher among self-employed and while wage-earners have experienced a increase of the shares with health problems, an increase in the shares that find the job stressful and mentally straining and a decrease in the share who is very satisfied with their jobs, the self-employed have not experienced these changes to the same extent. Although a selection of happier, healthier and

more work-loving individuals is considered by estimating fixed-effects models there is still reason to believe that there is some form of selection into self-employment that we have not been able to control for. This idea is supported by the non-effect of self-employment on life-satisfaction in the fixed-effects model.

I believe that becoming self-employed has a causal effect on for example job-satisfaction but I am not still convinced that there is a causal effect for everybody who chooses to become self-employed.

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## **Appendix A. Dependent variables – the questions**

### **JOB IS STRESSFUL**

*Is your job stressful?*

1. *Yes*
2. *No*

### **JOB IS MENTALLY STRAINING**

*Is your job mentally straining?*

1. *Yes*
2. *No*

### **MENTAL HEALTH**

The variable used in the analysis is constructed from the following four questions;

*Have you during the last 12 months had; general tiredness?*

- 1) *No*
- 2) *Yes, light*
- 3) *Yes, difficult*

*Have you during the last 12 months had; problems to sleep?*

- 1) *No*
- 2) *Yes, light*
- 3) *Yes, difficult*

*Have you during the last 12 months had; nervous problems (anxiety worries)?*

- 1) *No*
- 2) *Yes, light*
- 3) *Yes, difficult*

*Have you during the last 12 months had; depression?*

- 1) *No*
- 2) *Yes, light*
- 3) *Yes, difficult*

Mental health is considered to be “normal” if one has answered no to all the above questions or if one has had problems with tiredness and sleeping problems. In all other cases the individual is considered to have had mental health problem.

### **GENERAL HEALTH**

*How do you judge that your general health is? Is it...*

- 1) *Good*
- 2) *Bad*
- 3) *Something in between*

### **JOB SATISFACTION**

*We have now asked you a number of questions about your work. In general, how satisfied are you with your present job?*

1. *Very satisfied*
2. *Fairly satisfied*
3. *Neither satisfied nor dissatisfied*
4. *Fairly dissatisfied*
5. *Very dissatisfied*

### **LIFE SATISFACTION**

*Do you usually feel that your life is a source for personal satisfaction?*

1. *Yes, most of the time*
2. *Yes, sometimes*
3. *No*

## **Appendix B. Result from regression**

### ***Pooled logit regressions***

<b>Job is stressful</b>	<b>Model I Odds Ratio</b>	<b>Model II Odds Ratio</b>	<b>Model III Odds Ratio</b>
Unskilled blue-collar	0.89 (0.095)	0.56 (0.094)	0.88 (0.097)
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.50 (0.184)***	1.47 (0.186)***	1.46 (0.186)***
White-collar, middle level	1.11 (0.121)	1.07 (0.126)	1.04 (0.122)
White-collar, high level	1.25 (0.152)*	1.30 (0.184)*	1.23 (0.177)
Self-employed	1.32 (0.191)*	1.36 (0.202)**	1.07 (0.170)
Age		0.99 (0.025)	0.97 (0.025)
Age squared/100		0.99 (0.030)	1.00 (0.031)
Women		1.11 (0.082)	1.26 (0.100)***

Unmarried		reference	reference
Divorced		1.28 (0.229)	1.33 (0.240)
Widow		1.04 (0.347)	1.06 (0.355)
Married		1.44 (0.155)***	1.48 (0.161)***
Children living at home		0.98 (0.039)	0.99 (0.039)
Stockholm		reference	reference
Gothenburg		0.91 (0.146)	0.88 (0.144)
Malmoe		0.93 (0.185)	0.89 (0.179)
City>30 000 inhabitants		0.83 (0.102)	0.81 (0.100)*
City<30 000 inhabitants		0.71 (0.088)***	0.71 (0.088)***
Rural area		0.87 (0.100)	0.85 (0.098)
Native		0.83 (0.118)	0.87 (0.125)
Education		1.00 (0.014)	1.00 (0.014)
Hours worked			1.03 (0.006)***
Satisfied with the wage			0.84 (0.061)**
Feeling control over life			0.77 (0.066)***
Time dummy	1.22 (0.085)***	1.46 (0.116)***	1.43 (0.115)***
Likelihood ratio	35.18	88.83	136.85
Number of observations	3 996	3 996	3 996
Number of individuals	1 998	1 998	1 998

<b>Job is mentally straining</b>	<b>Model I Odds Ratio</b>	<b>Model II Odds Ratio</b>	<b>Model III Odds Ratio</b>
Unskilled blue-collar	0.79 (0.082)**	0.80 (0.085)**	0.81 (0.086)**
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.21 (0.132)*	1.09 (0.124)	1.08 (0.124)
White-collar, middle level	2.20 (0.227)***	1.77 (0.196)***	1.75 (0.195)***
White-collar, high level	3.06 (0.355)***	2.33 (0.313)***	2.31 (0.315)***
Self-employed	1.58 (0.289)**	1.68 (0.316)**	1.44 (0.287)*
Age		1.05 (0.026)**	1.05 (0.026)*
Age squared/100		0.92 (0.027)***	0.93 (0.028)**
Woman		1.31 (0.091)***	1.40 (0.103)***
Unmarried		reference	reference
Divorced		0.91 (0.157)	0.93 (0.160)
Widow		1.36 (0.449)	1.37 (0.455)
Married		0.99 (0.102)	1.00 (0.103)
Children living at home		1.02 (0.038)	1.03 (0.038)
Stockholm		reference	reference
Gothenburg		1.30 (0.195)*	1.28 (0.191)
Malmoe		1.53 (0.286)**	1.50 (0.282)
City>30 000 inhabitants		1.11 (0.125)	1.09 (0.123)
City<30 000 inhabitants		1.08 (0.124)	1.06 (0.123)
Rural area		1.15 (0.120)	1.13 (0.118)
Native		0.73 (0.095)**	0.74 (0.098)**
Education		1.08 (0.015)***	1.09 (0.015)***
Hours worked			1.02 (0.005)***
Satisfied with the wage			0.80 (0.054)***
Feeling control over life			0.89 (0.070)
Time dummy	1.15 (0.079)**	1.29 (0.092)***	1.25 (0.098)***
Self-employed in 2000	0.68 (0.154)*	0.66 (0.143)*	0.68 (0.159)
Likelihood ratio	223.93	343.43	369.50
Number of observations	3 996	3 996	3 996
Number of individuals	1 998	1 998	1 998

<b>Mental health problems</b>	<b>Model I Odds Ratio</b>	<b>Model II Odds Ratio</b>	<b>Model III Odds Ratio</b>
Unskilled blue-collar	1.24 (0.143)*	1.00 (0.131)	1.00 (0.130)
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.29 (0.158)**	1.09 (0.140)	1.13 (0.156)
White-collar, middle level	1.16 (0.136)	1.08 (0.135)	1.11 (0.150)
White-collar, high level	1.10 (0.139)	1.25 (0.184)	1.26 (0.203)
Self-employed	1.00 (0.151)	1.13 (0.174)	1.14 (0.192)
Age		1.00 (0.027)	1.00 (0.030)
Age squared/100		0.97 (0.032)	0.96 (0.034)
Woman		1.85 (0.141)***	1.89 (0.157)***
Unmarried		reference	reference
Divorced		1.18 (0.214)	1.09 (0.220)
Widow		0.96 (0.338)	1.03 (0.389)
Married		0.89 (0.100)	0.92 (0.113)
Children living at home		1.04 (0.042)	1.07 (0.047)
Stockholm		reference	reference
Gothenburg		0.72 (0.115)**	0.79 (0.136)
Malmö		0.71 (0.144)*	0.72 (0.158)
City>30 000 inhabitants		0.67 (0.080)***	0.67 (0.087)***
City<30 000 inhabitants		0.67 (0.083)***	0.66 (0.089)***
Rural area		0.74 (0.082)***	0.73 (0.087)***
Native		0.68 (0.091)***	0.79 (0.115)*
Education		0.98 (0.015)	0.99 (0.016)
Bad general health			4.85 (0.515)***
Feeling overstrained			5.10 (0.646)***
Feeling control over life			0.61 (0.055)***
Time dummy	1.73 (0.125)***	2.09 (0.173)***	1.80 (0.160)***
Likelihood ratio	63.51	191.05	713.07
Number of observations	3 996	3 996	3 996
Number of individuals	1 998	1 998	1 998

<b>Bad general health</b>	<b>Model I Odds Ratio</b>	<b>Model II Odds Ratio</b>	<b>Model III Odds Ratio</b>
Unskilled blue-collar	1.62 (0.219)***	1.50 (0.210)***	1.54 (0.230)***
Skilled blue-collar	reference	reference	reference
White-collar, low level	0.91 (0.143)	0.85 (0.139)	0.80 (0.140)
White-collar, middle level	0.72 (0.109)**	0.79 (0.128)	0.74 (0.128)*
White-collar, high level	0.61 (0.105)***	0.69 (0.137)*	0.58 (0.122)***
Self-employed	0.97 (0.176)	0.88 (0.164)	0.85 (0.168)
Age		1.00 (0.033)	0.99 (0.035)
Age squared/100		1.03 (0.040)	1.06 (0.044)
Woman		1.06 (0.103)	0.79 (0.083)**
Unmarried		reference	reference
Divorced		1.69 (0.361)**	1.91 (0.436)***
Widow		1.00 (0.393)	1.11 (0.468)
Married		0.99 (0.148)	1.13 (0.179)
Children living at home		0.90 (0.049)*	0.88 (0.051)**
Stockholm		reference	reference
Gothenburg		0.55 (0.133)**	0.62 (0.157)*
Malmö		0.76 (0.206)	0.83 (0.243)
City>30 000 inhabitants		0.90 (0.141)	1.06 (0.177)
City<30 000 inhabitants		0.90 (0.144)	1.03 (0.176)
Rural area		0.93 (0.134)	1.03 (0.158)

Native		0.79 (0.133)	0.96 (0.174)
Education		0.95 (0.018)***	0.95 (0.019)**
Mental health problems			4.90 (0.522)***
Feeling overstrained			2.02 (0.282)***
Feeling control over life			0.59 (0.063)***
Time dummy	2.35 (0.223)***	1.77 (0.191)***	1.35 (0.155)***
Likelihood ratio	128.66	221.58	584.99
Number of observations	3 996	3 996	3 996
Number of individuals	1 998	1 998	1 998

	<b>Model I</b>	<b>Model II</b>	<b>Model III</b>
<b>Job-satisfaction</b>	<b>Odds Ratio</b>	<b>Odds Ratio</b>	<b>Odds Ratio</b>
Unskilled blue-collar	0.93 (0.100)	0.87 (0.096)	0.82 (0.093)*
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.23 (0.139)*	1.10 (0.129)	1.109 (0.133)
White-collar, middle level	1.28 (0.136)**	1.20 (0.135)	1.15 (0.135)
White-collar, high level	1.56 (0.178)***	1.54 (0.205)***	1.37 (0.190)**
Self-employed	1.44 (0.264)**	1.48 (0.277)**	1.30 (0.263)
Age		0.98 (0.024)	0.99 (0.025)
Age squared/100		1.03 (0.030)	1.02 (0.031)
Woman		1.30 (0.091)***	1.47 (0.113)***
Unmarried		reference	reference
Divorced		1.17 (0.199)	1.12 (0.1989)
Widow		1.32 (0.432)	1.40 (0.482)
Married		0.96 (0.099)	0.93 (0.100)
Children living at home		1.02 (0.037)	1.05 (0.040)
Stockholm		reference	reference
Gothenburg		1.19 (0.172)	1.25 (0.187)
Malmoe		1.17 (0.212)	1.21 (0.227)
City>30 000 inhabitants		1.04 (0.116)	1.08 (0.124)
City<30 000 inhabitants		0.86 (0.099)	0.90 (0.108)
Rural area		0.95 (0.100)	1.00 (0.109)
Native		1.12 (0.147)	1.12 (0.152)
Years in school		0.99 (0.013)	1.00 (0.014)
Job is mentally straining			0.83 (0.062)**
Job is stressful			0.77 (0.059)***
Hours worked			0.99 (0.005)
Satisfied with the wage			2.32 (0.163)***
Feeling control over the life			2.05 (0.177)***
Time dummy	0.59 (0.042)***	0.59 (0.046)***	0.63 (0.051)***
Self-employed in 2000	1.79 (0.402)**	1.76 (0.399)**	1.67 (0.395)**
Likelihood ratio	97.35	125.43	387.48
Number of observations	3 996	3 996	3 996
Number of individuals	1 998	1 998	1 998

	<b>Model I</b>	<b>Model II</b>	<b>Model III</b>
<b>Life-satisfaction</b>	<b>Odds Ratio</b>	<b>Odds Ratio</b>	<b>Odds Ratio</b>
Unskilled blue-collar	0.93 (0.094)	0.88 (0.091)	0.89 (0.096)
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.42 (0.157)***	1.29 (0.148)**	1.28 (0.153)**
White-collar, middle level	1.71 (0.177)***	1.52 (0.169)***	1.51 (0.174)***
White-collar, high level	1.92 (0.221)***	1.68 (0.225)***	1.63 (0.227)***
Self-employed	1.84 (0.250)***	1.74 (0.241)***	1.61 (0.231)***
Age		0.96 (0.023)*	0.96 (0.024)
Age squared/100		1.05 (0.031)*	1.05 (0.032)
Woman		1.29 (0.090)***	1.41 (0.103)***
Unmarried		reference	reference

Divorced		1.13 (0.190)	1.10 (0.193)
Widow		0.96 (0.309)	0.95 (0.321)
Married		1.58 (0.160)***	1.57 (0.165)***
Children living at home		1.07 (0.040)*	1.10 (0.042)**
Stockholm		reference	reference
Gothenburg		1.39 (0.210)**	1.28 (0.201)
Malmoe		1.47 (0.279)**	1.45 (0.286)*
City>30 000 inhabitants		0.97 (0.108)	0.92 (0.107)
City<30 000 inhabitants		1.05 (0.120)	1.05 (0.125)
Rural area		1.21 (0.127)*	1.21 (0.132)*
Native		1.04 (0.134)	0.98 (0.132)
Education		1.02 (0.014)	1.01 (0.015)
Mental health problems			0.76 (0.063)***
Bad general health			0.55 (0.057)***
Feeling overstrained			0.94 (0.115)
Feeling control over life			2.86 (0.228)***
Time dummy	0.90 (0.059)	0.87 (0.065)*	0.91 (0.072)
Likelihood ratio	83.26	155.79	428.76
Number of observations	3 996	3 996	3 996
Number of individuals	1 998	1 998	1 998

### ***Conditional fixed-effects logistic regression***

<b>Job is stressful</b>	<b>Model I Odds Ratio</b>	<b>Model II Odds Ratio</b>	<b>Model III Odds Ratio</b>
Unskilled blue-collar	0.75 (0.170)	0.77 (0.183)	0.77 (0.186)
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.29 (0.355)	1.14 (0.323)	1.18 (0.342)
White-collar, middle level	1.12 (0.283)	1.06 (0.276)	1.06 (0.281)
White-collar, high level	1.70 (0.546)*	1.55 (0.511)	1.52 (0.511)
Self-employed	1.05 (0.381)	0.86 (0.325)	0.66 (0.262)
Age		1.03 (0.051)	1.01 (0.052)
Age squared/100		0.99 (0.058)	1.01 (0.060)
Unmarried		reference	reference
Divorced		2.1 (1.153)	2.3 (1.326)
Widow		1.24 (0.908)	1.16 (0.859)
Married		1.96 (0.523)**	1.93 (0.520)**
Children living at home		0.99 (0.074)	1.02 (0.078)
Stockholm		reference	reference
Gothenburg		1.59 (1.189)	1.61 (1.218)
Malmoe		1.23 (0.968)	1.11 (0.870)
City>30 000 inhabitants		1.72 (1.044)	1.62 (0.984)
City<30 000 inhabitants		0.94 (0.598)	0.89 (0.572)
Rural area		1.44 (0.837)	1.37 (0.798)
Education		0.99 (0.062)	1.02 (0.065)
Hours worked			1.05 (0.012)***
Satisfied with the wage			0.85 (0.115)
Feeling control over life			1.03 (0.165)
Likelihood ratio	7.99	29.69	49.48
Number of observations	1 262	1 262	1 262
Number of individuals	631	631	631

<b>Job is mentally straining</b>	<b>Model I Odds ratio</b>	<b>Model II Odds ratio</b>	<b>Model III Odds ratio</b>
Unskilled blue-collar	0.54 (0.140)**	0.58 (0.158)**	0.58 (0.159)**
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.31 (0.370)	1.23 (0.362)	1.21 (0.358)
White-collar, middle level	1.53 (0.406)	1.30 (0.362)	1.27 (0.357)
White-collar, high level	2.86 (0.978)***	2.11 (0.759)**	2.06 (0.743)**
Self-employed	0.74 (0.357)	0.62 (0.309)	0.52 (0.274)



Self-employed in 2000	0.65 (0.203)	0.53 (0.179)*	0.55 (0.190)*
Age		1.28 (0.069)***	1.27 (0.070)***
Age squared/100		0.77 (0.050)***	0.77 (0.051)***
Unmarried		reference	reference
Divorced		0.36 (0.182)**	0.37 (0.184)*
Widow		4.91 (5.545)	4.99 (5.661)
Married		0.88 (0.231)	0.87 (0.228)
Children living at home		0.83 (0.068)**	0.84 (0.070)**
Stockholm		reference	reference
Gothenburg		3.08 (2.923)	3.26 (3.100)
Malmoe		2.83 (2.620)	2.99 (2.774)
City>30 000 inhabitants		3.05 (2.471)	3.18 (2.584)
City<30 000 inhabitants		3.56 (2.922)	3.78 (3.104)
Rural area		3.23 (2.530)	3.33 (2.618)
Education		1.00 (0.068)	1.01 (0.071)
Hours worked			1.01 (0.010)
Satisfied with the wage			0.85 (0.125)
Feeling control over life			0.87 (0.148)
Likelihood ratio	32.36	67.82	67.66
Number of observations	1 182	1 182	1 182
Number of individuals	591	591	591

<b>Mental health problems</b>	<b>Model I Odds ratio</b>	<b>Model II Odds ratio</b>	<b>Model III Odds ratio</b>
Unskilled blue-collar	0.94 (0.239)	0.95 (0.262)	1.03 (0.304)
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.50 (0.433)	1.41 (0.440)	1.52 (0.514)
White-collar, middle level	1.45 (0.390)	1.09 (0.321)	1.12 (0.359)
White-collar, high level	1.97 (0.645)**	1.25 (0.454)	1.28 (0.497)
Self-employed	2.17 (0.803)**	1.23 (0.488)	1.48 (0.646)
Age		1.20 (0.065)***	1.19 (0.069)***
Age squared/100		0.89 (0.057)*	0.88 (0.060)**
Unmarried		reference	reference
Divorced		2.09 (1.099)	2.17 (0.122)
Widow		0.52 (0.447)	0.59 (0.522)
Married		0.94 (0.235)	0.98 (0.264)
Children living at home		1.00 (0.080)	1.03 (0.088)
Stockholm		reference	reference
Gothenburg		2.23 (1.610)	2.34 (1.838)
Malmoe		1.82 (1.655)	1.90 (1.795)
City>30 000 inhabitants		0.95 (0.539)	0.93 (0.582)
City<30 000 inhabitants		1.17 (0.694)	1.46 (0.930)
Rural area		1.33 (0.680)	1.39 (0.778)
Education		0.84 (0.062)**	0.81 (0.067)***
Bad general health			3.44 (0.785)***
Feeling overstrained			3.23 (0.728)***
Feeling control over life			0.92 (0.162)
Likelihood ratio	9.29	94.14	168.59
Number of observations	1 220	1 220	1 220
Number of individuals	610	610	610

<b>Bad general health</b>	<b>Model I Odds ratio</b>	<b>Model II Odds ratio</b>	<b>Model III Odds ratio</b>
Unskilled blue-collar	1.05 (0.347)	1.27 (0.518)	1.43 (0.640)
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.38 (0.561)	1.09 (0.548)	1.10 (0.596)
White-collar, middle level	2.04 (0.726)**	1.34 (0.582)	1.60 (0.756)
White-collar, high level	1.66 (0.868)	1.03 (0.673)	1.16 (0.804)
Self-employed	1.05 (0.474)	0.44 (0.245)	0.35 (0.217)*
Age		1.24 (0.105)**	1.15 (0.105)
Age squared/100		0.91 (0.086)	0.96 (0.096)
Unmarried		reference	reference
Divorced		2.06 (1.736)	2.02 (1.769)
Widow		1.64 (1.920)	1.62 (1.922)
Married		1.51 (0.605)	1.39 (0.597)
Children living at home		0.75 (0.095)**	0.73 (0.100)**
Stockholm		reference	reference
Gothenburg		0.16 (0.211)	0.06 (0.083)**
Malmoe		4.31e-15 (7.00e-08)	1.05e-16 (7.63e-09)
City>30 000 inhabitants		0.27 (0.226)	0.15 (0.149)*
City<30 000 inhabitants		0.07 (0.078)**	0.04 (0.053)***
Rural area		0.36 (0.253)	0.20 (0.161)**
Education		0.91 (0.088)	0.90 (0.098)
Mental health problems			3.46 (0.849)***
Feeling overstrained			2.01 (0.696)**
Feeling control over life			0.78 (0.198)
Likelihood ratio	4.98	130.99	169.12
Number of observations	706	706	706
Number of individuals	353	353	353

<b>Job-satisfaction</b>	<b>Model I Odds ratio</b>	<b>Model II Odds ratio</b>	<b>Model III Odds ratio</b>
Unskilled blue-collar	1.08 (0.252)	0.96 (0.238)	0.89 (0.227)
Skilled blue-collar	reference	reference	reference
White-collar, low level	1.06 (0.290)	1.10 (0.320)	1.03 (0.310)
White-collar, middle level	0.94 (0.238)	1.11 (0.299)	1.08 (0.303)
White-collar, high level	0.88 (0.262)	1.25 (0.403)	1.22 (0.406)
Self-employed	1.92 (0.708)*	1.48 (0.574)	1.19 (0.491)
Self-employed in 2000	0.82 (0.237)	1.98 (0.620)**	1.92 (0.623)**
Age		0.94 (0.046)	0.92 (0.047)*
Age squared/100		0.98 (0.057)	1.02 (0.062)
Unmarried		reference	reference
Divorced		0.93 (0.429)	0.92 (0.435)
Widow		2.17 (1.322)	2.00 (1.272)
Married		0.85 (0.194)	0.94 (0.222)
Children living at home		1.07 (0.075)	1.12 (0.082)
Stockholm		reference	reference
Gothenburg		1.19 (0.822)	1.04 (0.759)
Malmoe		0.24 (0.283)	0.16 (0.195)
City>30 000 inhabitants		2.26 (1.267)	1.91 (1.11)
City<30 000 inhabitants		1.27 (0.767)	1.04 (0.652)
Rural area		1.22 (0.650)	0.98 (0.542)
Years in school		1.04 (0.073)	1.04 (0.076)
Job is mentally straining			0.92 (0.143)
Job is stressful			0.75 (0.111)*
Hours worked			1.01 (0.010)
Satisfied with the wage			2.09 (0.276)***
Feeling control over the life			1.41 (0.224)**
Likelihood ratio	5.36	82.00	129.08
Number of observations	1 459	1 459	1 459
Number of individuals	728	728	728

<b>Life-satisfaction</b>	<b>Model I Odds Ratio</b>	<b>Model II Odds Ratio</b>	<b>Model III Odds Ratio</b>
Unskilled blue-collar	0.98 (0.223)	0.92 (0.213)	0.84 (0.230)
Skilled blue-collar	reference	reference	reference
White-collar, low level	0.93 (0.251)	0.89 (0.245)	0.80 (0.226)
White-collar, middle level	1.17 (0.299)	1.21 (0.315)	1.29 (0.350)
White-collar, high level	0.88 (0.279)	0.91 (0.294)	0.94 (0.315)
Self-employed	1.42 (0.438)	1.49 (0.473)	1.27 (0.421)
Age		0.96 (0.044)	0.96 (0.046)
Age squared/100		1.04 (0.055)	1.05 (0.058)
Unmarried		reference	reference
Divorced		1.36 (0.529)	1.47 (0.595)
Widow		0.96 (0.610)	0.78 (0.519)
Married		1.26 (0.273)	1.37 (0.310)
Children living at home		0.99 (0.066)	1.00 (0.070)
Stockholm		reference	reference
Gothenburg		0.90 (0.558)	0.69 (0.500)
Malmoe		0.63 (0.520)	0.51 (0.430)
City>30 000 inhabitants		0.66 (0.335)	0.49 (0.259)
City<30 000 inhabitants		0.417 (0.223)	0.37 (0.206)*
Rural area		0.72 (0.326)	0.63 (0.304)
Education		0.93 (0.070)	0.93 (0.073)
Mental health problems			0.76 (0.111)*
Bad general health			0.57 (0.112)***
Feeling overstrained			0.86 (0.194)
Feeling control over life			2.32 (0.359)***
Likelihood ratio	3.12	10.84	62.07
Number of observations	1 450	1 450	1 450
Number of individuals	725	725	725

## ***Index for well-being-OLS and fixed-effects models***

### **Three different specifications**

	<b>Index for well-being</b>	
	<b>OLS</b>	<b>Fixed-effect models</b>
<b>MODEL I</b>		
Unskilled blue-collar	0.13 (0.138)	0.45 (0.236)*
Skilled blue-collar	reference	reference
White-collar, low level	-0.07 (0.144)	-0.18 (0.270)
White-collar, middle level	-0.27 (0.136)**	-0.31 (0.253)
White-collar, high level	-0.47 (0.143)***	-0.62 (0.310)**
Self-employed	-0.38 (0.253)	0.56 (0.388)
Time dummy(=1 for 2000)	-0.37 (0.089)***	-
Self-employed in 2000	0.62 (0.319)**	0.131 (0.280)
Constant	8.03 (0.108)***	7.76 (0.175)***
R <sup>2</sup> (within)	0.010	0.010
<b>MODEL II</b>		
Unskilled blue-collar	0.07 (0.140)	0.39 (0.236)*
Skilled blue-collar	reference	reference
White-collar, low level	-0.11 (0.149)	-0.11 (0.270)
White-collar, middle level	-0.21 (0.144)	-0.16 (0.256)
White-collar, high level	-0.30 (0.166)*	-0.41 (0.314)
Self-employed	-0.34 (0.255)	0.46 (0.389)
Time dummy(=1 for 2000)	-0.34 (0.100)***	-
Self-employed in 2000	0.63 (0.317)**	0.59 (0.295)**
Age	-0.02 (0.032)	-0.07 (0.045)
Age squared/100	0.03 (0.038)	0.04 (0.053)

Woman	0.20 (0.090)**	-
Unmarried	reference	reference
Divorced	-0.15 (0.222)	0.36 (0.406)
Widow	-0.21 (0.446)	-0.69 (0.648)
Married	-0.19 (0.132)	-0.28 (0.213)
Children living at home	0.07 (0.048)	0.15 (0.065)**
Stockholm	reference	reference
Gothenburg	-0.04 (0.178)	0.10 (0.663)
Malmoe	-0.23 (0.233)	-0.36 (0.782)
City>30 000 inhabitants	-0.17 (0.147)	-0.21 (0.513)
City<30 000 inhabitants	-0.08 (0.149)	-0.01 (0.542)
Rural area	-0.15 (0.137)	-0.11 (0.486)
Native	0.21 (0.171)	-
Education	-0.05 (0.017)***	-0.07 (0.061)
Constant	8.78 (0.674)***	10.74 (1.135)***
R <sup>2</sup> (within)	0.015	0.028
<b>MODEL III</b>		
Unskilled blue-collar	0.04 (0.140)	0.36 (0.236)
Skilled blue-collar	Reference	Reference
White-collar, low level	-0.11 (0.147)	-0.12 (0.270)
White-collar, middle level	-0.22 (0.144)	-0.14 (0.256)
White-collar, high level	-0.33 (0.167)**	-0.37 (0.314)
Self-employed	-0.16 (0.264)	0.73 (0.402)*
Time dummy(=1 for 2000)	-0.29 (0.099)***	-
Self-employed in 2000	0.55 (0.306)*	0.53 (0.295)*
Age	-0.01 (0.032)	-0.05 (0.045)
Age squared/100	0.010 (0.038)	0.03 (0.053)
Woman	0.14 (0.094)	-
Unmarried	reference	reference
Divorced	-0.20 (0.218)	0.31 (0.406)
Widow	-0.21 (0.424)	-0.68 (0.648)
Married	-0.23 (0.131)*	-0.27 (0.213)
Children living at home	0.07 (0.048)	0.14 (0.066)**
Stockholm	reference	reference
Gothenburg	-0.01 (0.176)	0.07 (0.662)
Malmoe	-0.20 (0.228)	-0.43 (0.780)
City>30 000 inhabitants	-0.14 (0.146)	-0.24 (0.513)
City<30 000 inhabitants	-0.04 (0.148)	-0.05 (0.541)
Rural area	-0.11 (0.136)	-0.12 (0.485)
Native	0.18 (0.170)	-
Education	-0.04 (0.017)***	-0.09 (0.061)
Hours worked	-0.03 (0.006)***	-0.025 (0.009)***
Satisfied with the wage	0.49 (0.088)***	0.13 (0.119)
Feeling control over the life	0.54 (0.101)***	0.26 (0.140)*
Constant	8.94 (0.708)***	11.35 (1.178)***
R <sup>2</sup> (within)	0.035	0.033
Number of observations	3 996	3 996
Number of individuals	1 998	1 998

# Appendix C. Index of well-being

Creating the index the variables “job is stressful”, “job is mentally straining”, “mental health problems” and “bad general health” is considered to be factors that have a negative impact on well-being. No ranking within this group of factors is made, i.e. stating that the job is stressful is considered to have the same negative effect on well-being as having mental health problems. The more of these questions that are answered in an affirmative way, the lower is well-being considered to be. These variables are referred to as “bad indicators”.

Being “very satisfied with the job” and “being satisfied with life most of the time” are factors that have a positive impact on well-being. No ranking is made between these factors. Answering affirmative to two of these questions is always considered to be better than answering affirmative to one of the questions. These variables are referred to as “good indicators”.

**Table C1. Description of index of well-being**

<b>Index</b>	<b>Description</b>
15	Two good indicators and no bad indicator
14	One good indicator and no bad indicator
13	No good indicator and no bad indicator
12	Two good indicators and one bad indicator
11	One good indicator and one bad indicator
10	No good indicator and one bad indicator
9	Two good indicators and two bad indicators
8	One good indicator and two bad indicators
7	No good indicator and two bad indicators
6	Two good indicators and three bad indicators
5	One good indicator and three bad indicators
4	No good indicator and three bad indicators
3	Two good indicators and four bad indicators
2	One good indicator and four bad indicators
1	No good indicator and four bad indicators