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Health effects of unemployment in Denmark, Norway and Sweden 2007-2010: Differing economic conditions, differing results?

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Abstract:	The current paper investigates short-term health effects of unemployment for individuals in Denmark, Norway and Sweden during an economic downturn (2007-2010) that hit the Scandinavian countries with diverging strength. The longitudinal part of the EU-SILC data material is analyzed, and results from generalized least squares estimation indicate that Denmark is the only Scandinavian country in which health status deteriorated among the unemployed. The individual level (and calendar year) fixed effect results confirm the negative relationship between unemployment and health status in Denmark. This result is robust across different subsamples, model specifications and changes in both the dependent and independent variable. It is especially among women and people in prime working age (30-59 years) that health status deteriorated. There is, however, only scant evidence of short-term health effects among the recently unemployed in Norway and Sweden. The empirical findings are discussed in light of (i) the adequacy of the unemployment insurance system, (ii) the likelihood of re-employment for the displaced worker, and (iii) selection patterns into and out of employment in the years preceding and during the economic downturn.

Abstract

The current paper investigates short-term health effects of unemployment for individuals in Denmark, Norway and Sweden during an economic downturn (2007-2010) that hit the Scandinavian countries with diverging strength. The longitudinal part of the EU-SILC data material is analyzed, and results from generalized least squares estimation indicate that Denmark is the only Scandinavian country in which health status deteriorated among the unemployed. The individual level (and calendar year) fixed effect results confirm the negative relationship between unemployment and health status in Denmark. This result is robust across different subsamples, model specifications and changes in both the dependent and independent variable. It is especially among women and people in prime working age (30-59 years) that health status deteriorated. There is, however, only scant evidence of short-term health effects among the recently unemployed in Norway and Sweden. The empirical findings are discussed in light of (i) the adequacy of the unemployment insurance system, (ii) the likelihood of re-employment for the displaced worker, and (iii) selection patterns into and out of employment in the years preceding and during the economic downturn.

Introduction

A large number of people have recently experienced unemployment because of the ongoing economic downturn in Europe. For the 28 EU member countries as a whole, the unemployment rate increased from 7 per cent in the start of 2008 to 11 per cent in 2013 (1). In December 2014 approximately 24 million people were registered as unemployed in the EU-28. Becoming unemployed usually implies an income loss (2), and it might also lead to human capital devaluation. Furthermore, the unemployment period leaves a "scar" on a persons' résumé, and the chances of re-employment could therefore be substantially lowered (3, 4). To loose one's job could also be coupled with feelings of inferiority and shame (5). Unemployment is clearly an undesirable event, but does it make you sick? The current study will investigate the *health effects of unemployment* in order to answer this question.

Previous research on health status and unemployment has yielded mixed results, where some find negative health effects of unemployment (6), whereas others do not (7). This discrepancy is probably related to characteristics of the samples included in these studies and/or the identification strategy (more on this issue below), and there is currently no consensus on the topic. Further inspection is therefore warranted.

In order to investigate health effects of unemployment, this study will use the longitudinal part of the EU-SILC data material, in which there is individual information on labor market attachment and health. EU-SILC is a

four-year rotary panel, and we can hence only investigate *short-term* health effects of unemployment. The present paper will therefore provide a first glance of the potential health effects, and the long-term health consequences of the current economic downturn is left for future research. The observational period is 2007 to 2010, so that we can follow individuals both before and during the economic downturn. The following analysis consists of generalized least squares (GLS) estimation, and individual level (and calendar year) fixed effects models (FE), where all time-invariant personal characteristics are controlled for.

The research context is set to Scandinavia; Denmark, Norway and Sweden. The Scandinavian countries share many similarities (e.g. high tax levels, and high public spending on social welfare), and are often placed within the same "Welfare State Regime" (8). However, there are some vital differences between these countries that could have an impact on the health effects of unemployment. Firstly, the *generousness of the unemployment benefit schemes* show some variation among the countries, with Norway being the most and Sweden the least generous. Secondly, the *re-employment chances* for laid-off workers are not equally good throughout Scandinavia, where the "tight" Norwegian labor market is a clear contrast to the neighboring countries. Thirdly, the countries have experienced differing overall demand for labor in the recent years, which means that the *selection patterns* into and out of employment have been quite dissimilar.

The current study asks two main research questions: (i) Are there any signs of short-term health effects of unemployment during the ongoing economic downturn in Scandinavia? If so, (ii) in which of the Scandinavian countries are the short-term health effects of unemployment most pronounced? This paper therefore contributes to the existing literature on two important domains. Firstly, by investigating short-term health effects of unemployment during an *economic downturn*, which hit the Scandinavian countries with diverging strength. The negative health impact of unemployment could quite possibly be sensitive to changing economic conditions. And secondly, through an *explicit comparative design*. The harmonized data material allows an examination of whether or not health effects of unemployment are related to diverging labor market characteristics in Scandinavia.

Theory and previous research

Potential explanatory mechanisms

In order to properly explain the relationship between unemployment and subsequent health deterioration, we need to introduce mechanisms that are theoretically capable of generating the observed statistical association (9). Why should a period of unemployment cause someone's health to deteriorate? The unemployment experience acts as a stressor, and it might cause elevated "allostatic loads" among those who lose their job. Allostatic load refers to the

cumulative price the body has to pay for repeated exposure to challenging psychosocial situations, and this bodily "wear and tear" may leave unemployed individuals more vulnerable to disease (10, 11). Correspondingly, Maier et al. (12) finds a significant increase in cortisol levels among long-term unemployed people, indicating that the stress surrounding unemployment episodes can be harmful for ones' physical health. In addition, substantial parts of the negative effects of unemployment will probably be mediated via deteriorating mental health (13, 14). Not going to work could be damaging for a persons' mental health because of a lack of the *latent functions* of employment (15, 16, 17). Apart from income, employment provides activity, time structure, social contacts, collective purpose, and social status for the individual. Without these functions in everyday life, a persons' psychological well-being could be expected to deteriorate.

There might also be some *positive* aspects of experiencing unemployment. Not going to work could imply less stress (physical and/or psychological) and more time to exercise. And with less money to spend, the unemployed might drink less alcohol and smoke fewer cigarettes[1]. Moreover, whether the unemployment status is considerably worse than employment depends on the quality of the job (18). If the job previously held was insecure and involved health damaging work conditions, the health status could actually improve while unemployed. Although being unemployed could have positive features in the short-term, there are good reasons to suspect that prolonged

unemployment, and the accompanying insecurity, is undesirable. Life satisfaction tends to be lower among the unemployed (19, 20), and this is probably related to the stress that surrounds the unemployment status.

But what exactly is so stressful about the unemployment experience? Previous research has highlighted two important domains of stress: financial hardship and social stigma (21, 22). (i) *Financial hardships* can potentially have quite serious consequences, and might be mediated through stress related to bills, not being able to pay for nutritious meals or medical expenditures, etc. (ii) *Social stigma* associated with being unemployed could also affect health. Being made redundant could be coupled with feelings of inferiority, failure and shame, feelings with potentially adverse health impacts.

It should be noted that the EU-SILC data material is not well suited for the search for explanatory mechanisms, but potential differences between the Scandinavian countries in the health effects of unemployment might nonetheless shed some light on the issue. For instance, if the health effects are most pronounced in the country with least generous unemployment benefits, this could indicate that financial hardship is an important mediating mechanism.

Unemployment and health status: previous research

Unemployment and ill health is clearly correlated, but this does not necessarily imply that the former *causes* the latter. It might as well be that people with ill health are selected to unemployment to a higher extent. Or, alternatively, the relationship could be caused by important omitted variables that are correlated with health and unemployment. Unemployed individuals will probably be a negatively selected group on a number of characteristics, both on observable (e.g. educational level, health) and unobservable features (e.g. personality, cognitive ability).

This selection into unemployment is extremely difficult to account for in statistical estimations, unless we can identify a "natural experiment" in which the layoff- decision is not influenced by this unobservable heterogeneity. Accordingly, there seems to be a divergence in the existing literature that stems from whether the study investigates so-called *exogenous* unemployment, or if *endogenous* unemployment is also included. Displacements due to plant closures is an example of the former, while ordinary firing is an example of the latter.

The identification problem most often stems from the available data sets, since it is impossible to create a laboratory experiment in which the variables of interest (unemployment and health) is randomly assigned to a treatment and control group. Additionally, there has been a lack of longitudinal data in the past. To overcome the possible selection problems in

their cross-sectional American data, Kessler, House and Turner (23) generated a subsample of unemployed people who were not at fault for their job loss. These unemployed people had significantly worse status for a number of health measures, including physical illness, anxiety and depression. Similarly, a British study deals with the potential problem of reversed causality through an unemployment measures that pre-dates onset of symptoms (6). The authors find that unemployment is a significant risk for depression and anxiety, resulting in medical consultation. Furthermore, analysis of data from 13 European countries shows that unemployment has a negative impact on the length of time spent in good health (24). Moreover, a number of studies has established a statistical association between unemployment and mortality (25, 26, 27). However, it should be mentioned that Lundin et al. (28) find few statistically significant associations between unemployment (>90 days) and cause-specific mortality in their Swedish sample.

Research that investigates all types of unemployment seems to agree that the experience is associated with a subsequent deterioration in health. The picture is somewhat different when only *exogenous* unemployment is considered. Analysis of American data indicates no significant health effects of job loss due to business closures (29). Similarly, analysis of the German Socio-Economic Panel does not find evidence of negative health effects among individuals experiencing plant closures (7). Furthermore, a Danish study finds no effect of displacement due to plant closures/ downsizing on

stress-related diseases of the circulatory- or digestive system (30). Lastly, unemployment does not seem to worsen self-assessed health in Finland either, a result derived from panel data with difference-in-difference estimation and propensity score matching techniques (31).

The present study is located between these two broad research strategies, because the sample consists of unemployment of all kinds, while the longitudinal data allows control for time-invariant personal characteristics. Even though the unemployment experience can be considered to be "more random" during a recession, we do not know in which cases the dismissals are truly exogenous. Moreover, even during an economic downturn there will most certainly be a selection into unemployment on a number of personal features (including health profile), since the employers wish to keep the most productive employees. This is worrying from a causal inference perspective, because this (health) selection could bias the results. In order to deal with these difficulties, the longitudinal part of the EU-SILC data material is utilized. With individual level fixed effect models, the effect of a *change* in unemployment status on a subsequent *change* in health status can be estimated. This way, all time-invariant personal characteristics are controlled for, and we can be more convinced that the estimated association between unemployment and health status is not a spurious one. Hence, our first research question is:

Are there short-term health effects of unemployment during the ongoing economic downturn in Scandinavia?

Cross-national differences: unemployment benefits and labor market demand

The Scandinavian countries share a whole range of characteristics, and they are classified within the social democratic "Welfare State Regime" (8). Denmark, Norway and Sweden all have high tax levels, free or heavily subsidized education, a universal health care system, and an emphasis on egalitarian values. These similarities are an advantage from a methodological point of view, since the respondents live in countries that are organized quite similarly. This ensures, furthermore, that there probably will not be important cross-national differences in response bias.

Nevertheless, there are some cross-national differences that could have an impact on the health effects of unemployment. Financial security is crucial for both physical and mental wellbeing, and generous *unemployment benefits* could prove to be an important "tool" in the combating of health problems during unemployment (32, 33). Sweden has recently (2007-2008) altered their unemployment regulations, and considerably fewer people are eligible for benefits now (34). Denmark and Norway, on the other hand, are still quite generous in their unemployment benefit schemes. Accordingly, the

replacement rate shows some divergence between the three countries: A short-term unemployed single person without children, on average wage, would in 2012 be compensated 65 % in Norway, 57 % in Denmark, and 45 % in Sweden (35).

Figure 1 here

Another noticeable dissimilarity between the Scandinavian countries concerns overall *demand for labor*. The unemployment rates from 2004 to 2013 are shown in figure 1. Denmark and Norway had a quite similar trend in the years preceding the downturn, with a low unemployment rate and a slight reduction over time. From 2008 and onwards, there were a rapid increase in unemployment in Denmark, while the unemployment rate remained low in Norway (2.5 – 3.5 %). Sweden has experienced a high unemployment rate in the entire period (never below 6 %), as well as a clear rise in the first part of the economic downturn (2009-2010).

The dissimilar overall demand for labor in Scandinavia could have an impact on the following analysis for two reasons. Firstly, because the *re-employment chances*[2] for the unemployed – that could moderate the negative impact of an unemployment period (19, 20) – are quite different in the three Scandinavian countries. Both Denmark and Sweden are experiencing rather low demand for labor, and there are few opportunities for individuals wishing to regain employment. Chances for re-employment are substantially better in Norway. Secondly, due to *differential selection* into and out of employment. Because of continuingly low demand for labor in Sweden, those inside the

labor force pre-2007 could be positively selected on health characteristics, and thus be less inclined to deteriorate in health if they lose their jobs. The composition of the employment population is different in Norway and Denmark, in which labor demand were high up until 2008. People with ill health (or vulnerable health profiles) probably joined the labor force to a high extent before the economic downturn, ensuring that those who lose their jobs during the downturn could be negatively selected on health characteristics.

Table 1 here

The cross-national differences are summarized in table 1. The unemployed in Sweden should be worse off if unemployment benefits are crucial, whereas health effects are expected to be quite noticeable in both Denmark and Sweden if re-employment chances are important. Lastly, the health consequences would be greatest in Denmark and Norway if a negatively selected unemployment population is driving the results. Consequently, the second research question of the present study is:

In which of the Scandinavian countries are the negative short-term health effects of unemployment most pronounced?

Data and method

Data

The longitudinal part of the European Union Statistics on Income and Living Conditions (EU-SILC) data material is used in the present study. EU-SILC is an annual survey which provides micro data on a variety of variables, including health status and unemployment. The EU-SILC has a panel structure, and surveys from the years 2007-2010 is chosen for the subsequent analysis. By using this time window, we can follow the same individuals from before the start of the economic downturn until its "peak" (see figure 1 above).

Table 2 here

EU-SILC is a rotary panel, where individuals are followed for a maximum of four years. This means that we can only investigate short-term health effects of unemployment, and the more long-term health impact of the economic downturn is hence left for future research. The EU-SILC data material is harmonized for comparative purposes, and therefore very well suited for the current study. Table 2 presents the participation rates. The Norwegian sample is the most balanced one, where almost half of the respondents have answered the survey questions four times.

Operationalization

Dependent variable in the following analysis is *limiting long-standing illness* (LLSI). This dummy variable is constructed from answers to two related questions: "Suffer from any chronic (longstanding) illness or condition?", and "Limitations in activities people usually do because of health problems for at least the last six months?" If the respondent answers "yes" to both of these questions, he/she is coded 1. It would obviously be preferable to have a more objective measure, but the reliability of self-reported health measures seems to be satisfactory (36). LLSI could be considered as a "slow" variable that is unlikely to change in the short run because of a job loss. However, the present paper aims to investigate whether unemployment *deteriorates* health, not whether the health status is lowered somewhat. A different health measure – *self-rated health* – will nonetheless be used to check the robustness of the results. This is a continuous measure (values 0-4), where people are asked to rate their health from very good to very bad. The higher the value, the worse health status in general.

The *unemployment* variable is constructed from two questions: "Actively looking for a job in the previous four weeks?" and "Available for work in the next two weeks?" If the respondent answers yes on both, he/she is coded 1. A potential problem with the current unemployment variable is that it does not take into account those who would like to work, but take no actions to find work because they believe they would not succeed (37). This is

probably less of a challenge in Scandinavia, where active labor market policies require that the unemployed have to search for work in order to receive benefits. Another potential problem is that people who are currently working could – in theory – answer yes on both of the abovementioned questions. Hence, a different unemployment measure, *self-defined economic status*, will be used as a sensitivity test. Those who state being currently unemployed are coded 1 (else = 0).

A number of covariates will also be included in the following analysis. Obviously, we could envision a whole range of confounding variables that should be included in the regressions. However, since individual level fixed effects analysis controls for all time-invariant factors, it is only important to include variables that potentially *change* during the investigated time window.

There is an educational gradient in health, as highly educated people tend to have better health than those with less education (38). Educational level consists of two dummy variables computed from a question on highest education attained. Pre-primary, primary and lower secondary is collapsed to *primary education*, while (upper) secondary and post-secondary non-tertiary is collapsed to *secondary education*. Higher educational qualifications (*tertiary education*) is thus the reference category. People's health tend to deteriorate in old age, and we therefore need to examine the impact of age. Age is coded as two dummy variables: *Old age* (= >60 years) and *young age* (= <30 years).

Age 30-59 is the reference category. The continuous variables *age* and *age squared* are used in some model specifications.

People who get married could possibly be different on a number of unobserved individual characteristics, and models without a marriage variable could hence be miss-specified. Those who report to be *married* are coded 1 (else = 0). The continuous variables *income* and *income squared* will be included in the FE models, because people who experience a drop in income could be inclined to deteriorate in health afterwards. The analysis will also be stratified by gender, as women tend to report more health troubles than men do (39).

Descriptive statistics

Descriptive statistics by gender and country are presented in table 3. Women report more limiting longstanding illness than men in all three countries, a difference that exists within each of the three age categories (results not shown). The Scandinavian countries are strikingly similar in the amount of LLSI being reported: 6.3, 6.1 and 6.4 per cent for male respondents. The unemployment experience is more or less identically distributed among men and women in all three countries. Respondents in Sweden have experienced the most unemployment on average, followed by Denmark and Norway.

Table 3 here

The educational level is fairly equally distributed among the three countries, although Sweden is somewhat dissimilar with relatively few respondents with primary education (men and women), and fewer male respondents with tertiary education. There are a bit more women than men with higher educational qualifications in all three countries, and the "gender gap" is largest in Sweden, where 31.1 % women and 22.5 % men have tertiary education.

Average gross yearly income is higher in Denmark and Norway than in Sweden, and there are noticeable gender differences within each country (largest in Norway). Respondents from Denmark are married to a higher extent than their Norwegian and Swedish counterparts, and the mean age of the respondents is lowest in Norway, followed by Sweden and Denmark. Mean age is low in Norway because of a relatively low number of respondents of age 60 and above. In contrast, the Danish sample is comparatively old because of rather few respondents below the age of 30. The gender differences in age and marital status are small.

Analysis

The present ill health-measure is a dichotomous variable and it could therefore be tempting to use logistic regression, but there are a number of pitfalls to be aware of (40, 41). Because the variance is assumed to be fixed in a logistic

distribution, the size of the parameter estimate is not only affected by the included covariates, but also the degree of unobserved heterogeneity in the model specification. Additionally, it is not straightforward to compare estimates derived from logistic regression for different samples. A solution to these challenges is to rather use linear probability models. Ordinary least squares (OLS) will yield biased standard errors when estimated on repeated observations, and generalized least squares (GLS) models are thus preferable. The first part of the following analysis consists of GLS models, where ill health is regressed on unemployment and a number of covariates. The results could indicate whether there are certain groups – women or people with low education, for instance – that are more prone to ill health, or to health effects of unemployment.

The GLS analysis rests on the *random effects* assumption, which implies that unobserved differences across individuals are uncorrelated with the independent variables and the error term (42). This assumption is unlikely to be fulfilled in non-experimental settings. However, if we specify an individual level *fixed effects* (FE) model on longitudinal data, all unobserved time-invariant personal characteristics are automatically controlled for (43, 44). The FE analysis is performed on a subsample that excludes people who had ill health and/ or were unemployed in 2007, before the economy took a turn for the worse. The basic idea is to calculate the effect of a *change* in

unemployment status on a *change* in health, and the intention is to establish whether there exists a (causal) link. The following equation will be estimated:

$$(1)\ Ill\ health_{it} = Unemployed_{it1}\,\beta_1 + Year_{it2}\,\beta_2 + v_i + \varepsilon_{it}$$

Where $_i$ represents the individual, and $_t$ represents time. β_1 is the parameter of interest, namely the effect of a change in unemployment on the probability of ill health. v represents all unobserved factors that vary across individuals but are constant over time, while ε represents all unobserved time-varying characteristics. Calendar year dummy variables (β_2) will capture potential underlying time-trends in the unemployment experience. Additional time-variant covariates (marital status, educational level, age, and income) will be included in some model specifications, yielding the following equation:

$$(2)\ Ill\ health_{it} = Unemployed_{it1}\,\beta_1 + Year_{it2}\,\beta_2 + Married_{it3}\,\beta_3$$

$$+ Education_{it4}\,\beta_4 + Age_{it5}\,\beta_5 + Income_{it6}\,\beta_6 + v_i + \varepsilon_{it}$$

Unobserved heterogeneity is still an issue of concern, since we have no way of controlling for other things that has changed during the observational period that could cause people who lose their jobs to deteriorate in health. In addition, there is some concern that the causal direction flows from ill health to unemployment, something which could have been investigated with a *lagged* unemployment variable. This was, however, not possible because the panel is unbalanced. As a sensitivity test, we restrict the outcome measure (LLSI) to the years 2009/2010 and 2010 only. These models will help us in

ruling out the danger of reverse causality, since it is unlikely that ill health in 2009 and/or 2010 is able to cause unemployment during the investigated time window.

Results

Table 4 presents results from GLS regression of ill health by unemployment both without (model 1) and with (model 2) a number of covariates. Starting with model 1, Denmark is the only country in which there seems to be health effects of unemployment. Surprisingly, people who experience unemployment actually have *better* health than those who do not in Sweden. This unexpected result for Sweden is no longer present after adjustments for gender, age, marital status and educational level (model 2). The reference category in this model are unmarried men of prime age (30-59 years) with tertiary education that have not experienced unemployment. The positive coefficient remains statistically significant for Denmark. Hence, the GLS analysis indicates that there is an association between unemployment and ill health in Denmark, while this is not the case in neither Norway nor Sweden.

The included covariates show the expected direction in almost all cases, the only major exception being that people with secondary educational level in Denmark does not have statistically significant worse health than their tertiary educated counterparts do. Young people have better health, whereas

older people have worse. Women report to have more health problems than men do, and the married have better health on average. The point estimates are quite similar throughout the Scandinavian labor market, reflecting the similarity of the three investigated countries.

Table 4 here

Further examination using GLS models indicate that there are some heterogeneity regarding which groups of people who are more susceptible to health effects of unemployment in Scandinavia (results not shown). For instance, unemployed women are less likely than men to experience health deterioration, but only significantly so in Sweden. Furthermore, young individuals are less likely to decline in health status, but only in Denmark. People of old age are less likely to experience health deterioration after unemployment in both Denmark and Norway, while the coefficient is not significant for the Swedish sample. Hence, it is important to investigate whether the health effects of unemployment are *heterogeneous* in the following fixed effects models. Health status might deteriorate only among certain subgroups of the samples.

The evidence presented thus far indicates that the health status of the unemployed deteriorated in Denmark, but not in Norway or Sweden. However, GLS estimation does not deal properly with unobserved individual characteristics that might bias the results. Now focus is switched to FE models, and the question is whether a change in unemployment status is related to a change in health status. Table 5 present results from individual

level (and calendar year) FE models. Model 1 does not include any additional covariates, while model 2 includes age, age squared, educational level, income, income squared, and marital status. The analysis confirms that health deteriorated among the recently unemployed in Denmark, while the same relationship is not observed in neither Norway nor Sweden. The inclusion of additional covariates (model 2) does not alter the results.

Table 5 here

In order to rule out reverse causality, the outcome measure has been restricted to only consider ill health in 2009 and/or 2010 (results available on request). Basically, the same results are derived from these models, with the exception that the coefficient for Denmark is no longer statistically significant when we restrict the outcome to the year 2010 (b= 0.020, SE = 0.015), possibly because the health effects are *heterogeneous*. We therefore need to consider the sensitivity of the results more carefully, and a number of different model specifications is shown in table 6.

The results presented earlier could be biased because the panel is unbalanced. Model 1 shows estimates from a panel where the individuals have participated at least three years, and the results remain robust. Model 2 presents estimates from a subgroup analysis, where younger and older workers have been excluded. Denmark is still the only country where there is a noticeable health deterioration, and the point estimate is somewhat higher in this model specification.

Table 6 here

The analysis performed separately for women and men are found in model 3 and 4, respectively. It is apparently among Danish women that the health effects of unemployment is most pronounced. Additionally, there is some evidence of health deterioration among Swedish men, although the coefficient is quite small. The coefficient is actually bigger for men in the Norwegian sample, but not statistically significant. The health variable has been changed to *self-assessed health status* in model 5. This is a continuous measure, ranging from 0 to 4, where 4 equals very bad general health. The results remain basically unaltered, and the coefficient for Denmark is quite large (b = 0.121, SE = 0.068). The unemployment coefficient is actually negative for Sweden, but not significant. Model 6 presents results from a model in which the unemployment measure has been changed. It is now based on a question regarding respondents' self-defined *current economic status*. Again, the results for Denmark remain robust. The coefficient is also positive and significant for the Norwegian sample, but not for Sweden.

Table 7 here

The results from the sensitivity testing indicated that it is among women and people of prime working age that the health effects of unemployment is most pronounced in Denmark, and this is investigated more thoroughly in table 7. Here we restrict the ill health measure to the year 2010, in order to be more certain about the causal direction. The results are confirmed for both prime age workers (panel a) and women (panel b). The health effects of unemployment are particularly marked among women of

prime working age in Denmark (panel c), where the effect size is doubled (from 0,060 to 0,124). The Norwegian and Swedish women of prime age, however, tend to significantly *improve* their health status in the aftermath of an unemployment experience.

In summary, the analysis indicates that there is a negative short-term health effect of unemployment in Denmark, especially among women and people of prime working age. There is some evidence of health effects among Swedish men as well, although of a noticeably smaller effect size. The unemployed seems to be quite "healthy" in Norway, where the unemployment coefficient was positive and significant in only one model specification. Before these results are discussed in greater detail, some limitations have to be mentioned.

Limitations

The measures included in this study are *self-reported*, and might therefore be prone to measurement error. People could overstate their amount of health problems in an effort to rationalize the fact that they are currently unemployed, leading to upwardly biased estimates. Problems stemming from *cultural differences* in how ill health and unemployment is reported are probably negligible, since table 3 shows that the Scandinavian countries are astonishingly similar in the amount of ill health being report. It should also be

stressed that this paper is only able to investigate the *short term* health effects of unemployment, due to the four year rotary panel structure of the EU-SILC data material.

The most important limitation of the conducted study, however, concerns the *identification strategy*. The use of FE models does only eliminate the threat from time-invariant personal characteristics, and things that has changed during the investigated time window could still bias the estimates. In addition, this study has examined unemployment of all kinds, including endogenous. It would have been better from a causal inference perspective to only investigate exogenous unemployment; lay-offs due to plant closures, for instance. This was, however, not possible with the present data material. Furthermore, due to a rather low number of unemployment observations and an unbalanced panel, it was not possible to include a lagged unemployment measure in the statistical models. By restricting the outcome measure to only consider ill health in the years 2009 and/or 2010, the possibility of reverse causality (i.e. people with ill health are selected to unemployment) are diminished, but not flawlessly so. With these caveats, we move on to the discussion.

Discussion

The results show that Denmark is the only Scandinavian country in which there is noticeable short-term health effects of unemployment. These effects are heterogeneous in the sense that they are most pronounced among women and people of prime working age (30-59 years), and especially among 30-59 year old women. The picture is completely different for Norway and Sweden, where unemployed 30-59 year old women tend to significantly *improve* their health status. This is a pretty odd result, to which we return below. There is some evidence of health deterioration among Swedish men as well, although of a much smaller effect size. Overall, the unemployed seem to be quite "healthy" in Norway, where the unemployment coefficient is positive and significant in only one model specification.

The evidence from this study thus indicates that the health consequences of unemployment are considerably worse in Denmark, compared with Norway and Sweden. Why is this so? The answer is probably not related to the adequacy of the *unemployment insurance system*, since the Danish system is more generous than the Swedish. It should also be noted that Swedish labor unions seem to "buffer" against income losses during unemployment periods (Sjöberg, 2011). The differences between Sweden and the neighboring countries are therefore probably not as marked as the replacement rates would indicate, since the unions play a bigger part in the Swedish institutional arrangement. Hence, all three Scandinavian countries

appears to be able to protect the unemployed against financial hardships. Moreover, controlling for (changes in) income did not alter the results to any substantial extent, providing more support for this interpretation.

This does, however, not imply that the financial situation is trivial for the health and wellbeing among the unemployed, quite the contrary. Previous research has indicated that health status of the unemployed is more vulnerable when they are not sufficiently protected by unemployment benefits (32, 33). Furthermore, the current study have only investigated short term health effects, and prolonged unemployment, with accompanying financial hardship, will most likely be health damaging. It should also be kept in mind that health care is free of charge or heavily subsidized throughout Scandinavia, **and the (low) costs involved are similar regardless of labor market attachment. Hence,** unemployed people with declining health status does not need to sacrifice a visit to the doctor in order to provide food on the table, to put it bluntly. The linkages between unemployment, health and income could therefore be more pronounced outside the Scandinavian context.

The likelihood of *re-employment* for the displaced worker (19, 20) is another potential explanation for the observed cross-national difference. The Norwegian labor market is quite "tight", and chances for re-employment rather good. The trivial health consequences of unemployment in Norway could therefore be explained by good prospects for re-employment, ensuring that the unemployed stay in good spirit. What is more puzzling, however, is the

difference between Denmark and Sweden. The demand for labor is quite low in both countries, and the probability of re-employment equally so. One could argue that the Swedish labor market has been characterized by continuingly high overall unemployment rate the preceding years, and that the Swedes are "accustomed" to this situation. Denmark, on the other hand, went from a situation of high to low demand for labor in merely two years' time. This critical worsening of the economic situation is likely to affect people's perception of their chances on the labor market, and might even influence their health status.

That the Danish respondents' health should be so severely affected by the worsening economic conditions is rather doubtful. A more promising explanation is linked to differential *selection patterns* into and out of employment in the years preceding and during the economic downturn. There were high demand for labor up until 2008 in Denmark, and people with ill health probably joined the labor force to a high extent. After 2008 there was a massive rise in unemployment, and people with ill health and/ or vulnerable health profiles were probably among the first to exit from employment. Sweden, on the other hand, has had low demand for labor for a number of years, and individuals with vulnerable health profiles have therefore to a much lesser extent been a part of the labor force. Those who became unemployed during the downturn are hence positively selected on health characteristics, at least compared with the Danish respondents.

But how does this interpretation fit with the results for Norway? People who lose their job in Norway – where labor demand has been continuingly high – are probably a more selected group on a number of personal characteristics, including health status. Hypothetically, this would imply *stronger* health effects in Norway, since those who become unemployed are expected to have a more vulnerable health profile. But because of the favorable economic context in Norway, there are quite simply too few lay-offs in order for there to be a systematic selection out of employment among those with vulnerable health. Moreover, since the re-employment chances are good, and the unemployment benefits generous, the stress associated with unemployment is probably less pronounced in Norway. Furthermore, differential selection patterns could, in fact, explain the rather weird finding that unemployed 30-59 year old women tend to improve their health status in both Norway and Sweden. Being unemployed for a (short) while is not health damaging for these women simply because they are positively selected on health characteristics.

To focus on unemployment of all kinds is clearly troublesome from a causal inference perspective, but at the same time highly desirable from a policy point of view. It is, in the end, the health effects of *all* unemployment that a welfare state have to deal with economically. The results presented here indicates that Denmark might be facing considerable costs in the aftermath of the recession, with rising medical expenses and more sickness absence. This

might not be the case, however, if the health status of the unemployed improves again when the demand for labor rises and re-employment can be ensured. Furthermore, there is still uncertainty regarding the long-term health consequences of the economic downturn in Scandinavia, and this is something that warrants further investigation.

What are the main policy implications of this paper? Overall, the results tend to be quite positive, with rather few signs of short term health declines among the recently unemployed in Scandinavia. In order to ensure that the unemployed stay fit and healthy, two elements need to be in place. Firstly, sufficient economic support, in order to prevent financial hardships. Secondly, free or subsidized health care, so that (potential) health problems can be dealt with early on. It should, however, be stressed that we do not know to what extent these factors are able to prevent health effects of unemployment, but it is likely that they play an important part.

The present study was not able to localize what mechanisms that are generating the relationship between unemployment and (declining) health. Future research should emphasize this theoretical puzzle, **as a better understanding of the mechanisms that are causing health to deteriorate after an unemployment spell will make it easier to recommend policy solutions.**

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Footnotes

[1] Health behaviors changed during the 2008- crisis in Iceland, with less consumption of both unhealthy (smoking, heavy drinking, sweets, and fast food) and healthy (fruits and vegetables) products, probably due to *increased prices* (46). People smoke more and drink less during economical upturns in the USA, but they also exercise less, a finding that could be related to how *time-consuming* these goods are (47). Hence, individuals' health behavior could change during an unemployment period, but it is not given whether the changes will amount to negative or positive health consequences.

[2] Over-all unemployment rate is a rather crude proxy for re-employment chances, and the number of job vacancies would obviously be preferable. Job vacancy statistics are, however, not available for Denmark in the Eurostat database.

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Tables

Table 1. Cross-national differences. In which country can we expect the health effects of unemployment to be most pronounced?

	Ungenerous unemployment benefits	Slim re-employment chances	Negatively selected unemployed population
Denmark		**X**	**X**
Sweden	**X**	**X**	
Norway			**X**

Table 2. Longitudinal survey participation rates, by country (number and per cent).

	Denmark		Norway		Sweden	
	N	%	N	%	N	%
1	558	2,98	3274	11,30	2558	8,80
2	5312	28,39	6138	21,18	8032	27,63
3	6372	34,06	5196	17,93	9021	31,03
4	6468	34,57	14368	49,59	9464	32,55
Total	18710		28976		29075	

Table 3. Descriptive statistics, by country and gender.

	Denmark		Norway		Sweden	
	Men	Women	Men	Women	Men	Women
Ill health (LLSI)	6,3	9,1	6,1	8,8	6,4	10,2
Unemployment	2,8	2,6	1,6	1,6	3,6	3,5
Education						
Primary	27,0	28,5	24,9	24,9	23,4	20,5
Secondary	44,3	37,5	43,2	39,1	52,7	47,2
Tertiary	27,1	32,5	28,8	32,4	22,5	31,1
Income in € *(Std. Dev.)*	32672,45 *(32800,29)*	24733,74 *(22862,52)*	35643,21 *(41023,00)*	21974,77 *(22314,64)*	20167,25 *(22440,85)*	14323,91 *(15622,53)*
Age						
<30	16,0	14,2	21,2	20,5	22,4	20,3
30-59	52,6	56,9	54,8	56,2	48,3	50,4
>60	31,4	28,9	24,0	23,3	29,2	29,3
Married	67,7	65,2	55,3	55,5	51,0	50,9
N	9496	9853	15728	15647	15351	15407

Table 4. Result from GLS regression of ill health, by unemployment and covariates.

	Denmark		Norway		Sweden	
	(1)	(2)	(1)	(2)	(1)	(2)
Constant	0,074***	0,095***	0,071***	0,056***	0,081***	0,061***
	(0,002)	(0,007)	(0,002)	(0,005)	(0,002)	(0,005)
Unemployment	0,035***	0,041***	0,004	0,013	-0,017**	-0,003
	(0,011)	(0,011)	(0,010)	(0,010)	(0,007)	(0,007)
Woman		0,024***		0,025***		0,037***
		(0,005)		(0,004)		(0,004)
Young age		-0,099***		-0,070***		-0,066***
		(0,008)		(0,005)		(0,005)
Old age		0,037***		0,058***		0,080***
		(0,006)		(0,005)		(0,005)
Married		-0,059***		-0,040***		-0,044***
		(0,006)		(0,004)		(0,004)
Primary education		0,025***		0,050***		0,028***
		(0,007)		(0,005)		(0,006)
Secondary education		0,007		0,037***		0,018***
		(0,006)		(0,004)		(0,005)
R^2	0,001	0,028	0,000	0,034	0,001	0,040
Individuals	7118		12431		12470	
Observations	19349		31375		30758	
Significance level	*** = 0.01 ** = 0.05 * = 0.1 NS/(empty) = > 0.1					
	Reported standard errors (in parentheses) are clustered on individuals.					

Table 5. Results from fixed effects (FE) analysis of ill health (2008-2010), by unemployment and covariates.

	Denmark		Norway		Sweden	
	(1)	(2)	(1)	(2)	(1)	(2)
Unemployment	0,030*	0,031*	0,008	0,006	0,001	0,002
	(0,016)	(0,016)	(0,013)	(0,013)	(0,008)	(0,008)
Covariates (in addition to individual level and calendar year fixed effects)	None	Age, education, income, marital status	None	Age, education, income, marital status	None	Age, education, income, marital status
R^2	0,007	0,008	0,010	0,012	0,005	0,006
Individuals/ Observations	6955/ 18710	6955/ 18710	11667/ 28976	11664/ 28966	11947/ 29075	11875/ 28999
Person/Years	546/1585	546/1585	437/1400	437/1399	735/2147	735/2147
Hausman test†	-32,96	-118,64	-53,50	-254,38	-104,29	-207,35

Significance level *** = 0.01 ** = 0.05 * = 0.1 NS/(empty) = > 0.1

Reported standard errors (in parentheses) are clustered on individuals.

Individuals/observations refers to the total sample, while *person/years* is the number of observations contributing to the FE estimates.

†The Hausman test compares the reported FE models with GLS models.

Table 6. Results from fixed effects (FE) analysis of ill health (2008-2010) by unemployment and covariates – sensitivity tests.

	Denmark		Norway		Sweden	
	(1)	(2)	(1)	(2)	(1)	(2)
	Balanced panel	Subgroup: prime age	Balanced panel	Subgroup: prime age	Balanced panel	Subgroup: prime age
Unemployment	0,040* (0,020)	0,066** (0,028)	-0,001 (0,014)	-0,009 (0,024)	0,006 (0,011)	-0,013 (0,017)
Individuals/ Observations	3741/ 12840	3836/ 10277	5324/ 19559	6534/ 16198	5373/ 18485	5947/ 14453
Person/years	367/ 1227	267/ 759	312/ 1149	203/ 633	495/ 1667	259/ 747
	(3)	(4)	(3)	(4)	(3)	(4)
	Subgroup: women	Subgroup: men	Subgroup: women	Subgroup: men	Subgroup: women	Subgroup: men
Unemployment	0,048** (0,023)	0,017 (0,023)	-0,020 (0,018)	0,029 (0,019)	-0,014 (0,013)	0,018* (0,011)
Individuals/ Observations	3506/ 9434	3449/ 9276	5780/ 14290	5884/ 14676	5890/ 14368	5985/ 14631
Person/years	300/ 869	246/ 716	239/ 779	198/ 620	414/ 1214	321/ 933
	(5)	(6)	(5)	(6)	(5)	(6)
	Health measure II	Unemployed II	Health measure II	Unemployed II	Health measure II	Unemployed II
Unemployment	0,121* (0,068)	0,052** (0,018)	0,026 (0,062)	0,025* (0,015)	-0,047 (0,045)	0,007 (0,010)
Individuals/ Observations	3167/ 9070	6955/ 18710	5012/ 13743	11664/ 28966	5402/ 14069	11875/ 28999
Person/years	771/ 2342	546/ 1585	815/ 2739	437/ 1399	893/ 2717	735/ 2147
Significance level	*** = 0.01 ** = 0.05 * = 0.1 NS/(empty) = > 0.1					
Covariates:	Calendar year dummies, marital status dummy, educational level dummies, income, income squared, age, and age squared.					
	Reported standard errors (in parentheses) are clustered on individuals.					
	Individuals/observations refers to the total sample, while *person/years* is the number of observations contributing to the FE estimates.					

Table 7. Results from fixed effects (FE) analysis of ill health 2010, by unemployment and covariates among (a) prime age individuals, (b) women, and (c) prime age women.

	Denmark		Norway		Sweden	
(a) Prime age	(1)	(2)	(1)	(2)	(1)	(2)
Unemployment	0,061**	0,060**	-0,029	-0,030	-0,011	-0,012
	(0,028)	(0,028)	(0,022)	(0,022)	(0,013)	(0,013)
Person/years	216/ 577	216/ 577	149/ 435	148/ 433	215/ 580	215/ 580
(b) Women						
Unemployment	0,057**	0,061**	-0,003	-0,003	-0,023**	-0,018*
	(0,028)	(0,028)	(0,018)	(0,018)	(0,009)	(0,009)
Person/years	246/ 667	246/ 667	171/ 512	170/ 510	317/ 876	317/ 876
(c) Prime age women						
Unemployment	0,124**	0,124**	-0,060*	-0,060*	-0,040**	-0.039**
	(0,050)	(0,049)	(0,032)	(0,032)	(0,019)	(0,019)
Person/years	139/ 371	139/ 371	87/ 257	86/ 255	143/ 386	143/ 386
Covariates (in addition to individual level and calendar year fixed effects)	None	Age, education, income, marital status	None	Age, education, income, marital status	None	Age, education, income, marital status
Significance level	*** = 0.01 ** = 0.05 * = 0.1 NS/(empty) = > 0.1					
	Reported standard errors (in parentheses) are clustered on individuals.					

Figures

Figure 1. Unemployment rates 2004-2013, by country (Source: Eurostat).