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Abstract

This paper analyses the role of health on exits out of and entries into employment using data from the first twelve waves of the British Household Panel Survey (1991-2002). We use discrete-time duration models to estimate the effect of health on the hazard of becoming non-employed and on the hazard of becoming employed. The results show that general health, measured by a variable that captures health limitations and by a constructed latent health index, affects entries into and exits out of employment; the effects being higher for men than for women. Moreover, results suggest that changes in mental health status influences only the hazard of non-employment for the stock sample of workers. The results are robust to different definitions of employment, and to the exclusion of older workers from the analysis.

Keywords: health, health shocks, discrete-time hazard models, employment, BHPS

JEL classification: I1, C41, J60

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1. Introduction

There is a large literature that highlights the existence of a relationship between individual's socioeconomic conditions and their health status. However, there is a lack of consensus on the direction of the relationship, and on the different mechanisms that can drive the observed association. In this paper we focus on the association between socioeconomic status and health, through the analysis of the causal relationship of ill-health and labour market outcomes.

We use data from the British Household Panel Survey (BHPS) to analyse the effect that ill-health has on exits out of and entries into employment using discrete-time hazard models. We use both psychological and physical measures of health, to enable us to estimate the relative importance of each with respect to labour market decisions. Moreover, we focus on the working-age population rather than a more narrowly defined sample of individuals approaching retirement, as previous evidence suggests that ill-health may also influence younger workers and, in this case there would be long-term income effects as pensions would not cushion the effect.

Our empirical findings show that own health is an important determinant for employment transitions and the effects are higher for men than for women. However, there are some differences depending on the measure of health used. General health, measured by health limitations and a constructed latent health index, has an effect on exits from employment and entries into employment. Further, a measure of psychological well-being appears to influence the hazard of becoming non-employed for the stock sample of workers, but there is a non-significant effect on the hazard of leaving non-employment status. Surprisingly, the effects are robust to the exclusion of older workers from the sample.

2. Health and labour market outcomes

The expected relationship between health and labour market outcomes can be illustrated using the health production model (Grossman, 1972). Individuals are assumed to maximize an intertemporal utility function which depends on the stock of health, consumption of other goods, leisure and preferences. Labour supply will depend on the

endogenous health variable (Currie and Madrian, 1999). Therefore, poorer health status may reduce the probability of work if it rises the disutility of work or reduces the return to work via lower wages (Disney et al, 2006), or by entitling the individual to disability benefits which would increase the reservation wage and thus provide an incentive to drop out of the labour market (Blundell et al, 2002).

Currie and Madrian (1999) stress that the empirical evidence suggests the existence of an effect from health to labour market participation, but that there is a lack of consensus on the magnitude of the effect and whether it is important when compared to other variables. Moreover, there are only a few studies which use panel data to control for the presence of unobservable characteristics which influence both health and labour market participation. In addition, Currie and Madrian (1999) also highlight the lack of studies that analyse age groups other than elderly workers, and further, that study gender differences in labour market behaviour as a response to health shocks.

When studying the relationship between health and labour outcomes, the literature has traditionally focused on older workers and retirement transitions. Several studies (see e.g., Bound et al., 1999; Au et al., 2005; Disney et al., 2006; Hagan et al., 2006 ; Rice et al., 2006; Zucchelli et al, 2007) focus on individuals older than 50 and show that decreases in health status have explanatory power for retirement decisions. Riphahn (1999) finds that health shocks increase the probability of unemployment by 84% and the probability of dropping out of the labour force by 200% for individuals aged 40 to 59 in Germany. Jiménez-Martín et al (2006) find that, for Spanish workers aged between 50 and 64, the probability of continued working decreases with the severity of the shock. Smith (2004) also finds that for individuals older than 50 who suffer a health shock there is a 15% decrease in the probability of working and, although this effect diminishes over time, it remains substantially high at nearly 4% five years after the shock.

The number of studies that focus on the role played by health on labour market transitions for younger individuals is less extensive. Among these, Lindeboom et al. (2006) estimate an event history model for transitions between work and disability states and find that the effects of health shocks on employment are not direct, but rather act through the onset of a disability, which increases by 138% after the onset of a health shock. At the same time, the onset of a disability at age 25 reduces the probability of employment at age 40 by 0.205. Messer and Berger (2004) use the US Health and

Retirement Survey and find that permanent adverse health conditions reduce both wages (8.4% for males and 4.2% for females) and hours worked (6.3% for males and 3.9% for females). Moreover, the larger effects of health on labour outcomes are found on prime-age individuals, as the peak of loss of wages after the onset of a permanent illness occurs at ages 40-49 for males (wages are 12.1% lower) and 30-39 for females (wages are 9.2% lower). Dano (2005) finds that there are both short and long-run effects on the probability of being employed for Danish males who have been injured in a road accident, and that this effect holds even when individuals receiving disability benefits are excluded from the analysis. García-Gómez and López-Nicolás (2006) analyse the effects of a health shock on the probability of leaving employment and transiting out to unemployment or inactivity for the Spanish population. They find that suffering a health shock decreases the probability of remaining in employment by 5% and increases the probability of transiting into inactivity by 3.5%. Similar results are also found for other European countries (García-Gómez, 2008).

There are very few studies that analyse the effect of ill-health on transitions into employment. Stewart (2001) examines Canadian data on the effects of health limitations on the kind and amount of activity that individuals can do at work, and finds that individuals with impaired health have a lower probability of leaving unemployment and thus experience longer unemployment spells. Böheim and Taylor (2000) use calendar data from the first seven waves of the BHPS to analyse transitions from unemployment to part-time work, self-employment and economic inactivity. Their results show that the existence of a health condition that limits the type or amount of work observed before an unemployment spell doubles the exit rate from unemployment into economic inactivity.

3. Econometric methods

3.1 *Employment entries and exits*

We are interested in the effect that ill-health has on two different labour market transitions: employment entries and exits. We study these transitions separately. Thus, our first sample of interest are those individuals who are working (employed or self-

employed) in the first wave of the survey and we follow these until they first become non-employed or are censored[1]. Secondly, we analyse the effect of ill-health on leaving a jobless state. We pursue this by selecting two different samples of individuals. We first select the sample of non-working individuals in the first wave of the survey and we follow them until they first find a job or are censored. Next, we select the group of individuals for whom we observe a transition out of work, regardless of their working situation in the first wave of the survey, and follow these individuals until they return back to work or are censored.

Duration in a labour market state, s, can be modelled using a hazard function representing the instantaneous probability of leaving the state at time t, conditional on survival in the state until time t. A discrete-time representation of the continuous-time hazard rate can be defined as:

$$h_{it}^{s} = \Pr[T_i = t \mid T_i \geq t, x_{it}] \tag{1}$$

where x_{it} is a vector of covariates that may vary with time, t, and T_i is a discrete random variable representing the time at which the end of the spell occurs.

The sample log-likelihood function of the observed duration data can be simplified by defining a dummy variable $y_{it}=1$ if $t=T_i$ and the individual is non-censored; and $y_{it}=0$, otherwise. Accordingly, for individuals remaining in the labour market state of interest, $y_{it}=0$ for all periods, while for those who exit the state, $y_{it}=0$ for all periods except the period in which the exit occurs, when $y_{it}=1$. The log-likelihood can be then be written in a form familiar for the analysis of a binary variable y_{it}, where the unit of analysis is the spell period (see e.g. Allison, 1982; Jenkins, 1995):

$$\log L = \sum_{i=1}^{n}\sum_{k=1}^{t_i} y_{it} \log \frac{h_{ik}}{1-h_{ik}} + \sum_{i=1}^{n}\sum_{k=1}^{t_i} \log(1-h_{ik}) \tag{2}$$

To complete the specification of the likelihood we need to choose the functional form for the hazard rate. We define a complementary log-log hazard rate, as it has the

[1] Censoring occurs if an individual drops out of the survey or remains in the survey but fails to exit employment by the end of the survey period.

convenient property that it is the discrete counterpart of an underlying continuous-time proportional hazard model (Prentice and Gloecker, 1978) such that:

$$h_{it}=1-\exp\{-\exp[\theta(t)+\beta'X_{it}]\} \quad (3)$$

We model the baseline hazard rate ($\theta(t)$) as a step function, by specifying dummy variables to represent each period. This leads to a semi-parametric specification of the discrete-time duration model.

The empirical model presented here assumes that we observe the natural starting point of each episode. This holds for the third sample of individuals analysed, that is, those that we observe leaving employment and are followed until they become employed once again or are censored. However, for the two stock samples consisting of either non-workers or workers in the first wave, we cannot assume that we observe the natural starting point for the duration episode. However, Jenkins (1995) shows that conditioning on a stock sample renders the contribution to the likelihood of individuals prior to selection into the sample ignorable. Accordingly, the likelihood can also be simplified to the likelihood suitable for the estimation of a binary response as expressed in (2).

3.2. *Models for Health*

The use of subjective measures of health has been a major cause of concern in the analysis of the causal relationship between health and labour outcomes (Anderson and Burkhauser, 1985; Bazzoli, 1985; Stern, 1989; Bound, 1991; Kerkhofs and Lindeboom, 1995; Bound et al., 1999; Disney et al., 1999). First, individuals with the same level of underlying health may use different thresholds when providing categorical responses to questions on health status (Kerkhofs and Lindeboom, 1995; Lindeboom and van Doorslaer, 2004). Secondly, labour market status can affect health status (García-Gómez and López Nicolás, 2006) and moreover, individuals who are not working may report being in worse health, as ill-health is a legitimate reason to be out of employment (known as "justification bias").

We deal with the problems of reporting bias in the use of subjective measures of health following the approach suggested by Bound (1991) and implemented by Bound et al.

(1999), Au et al. (2005), Disney et al. (2006), and Rice et al (2006). Thus, we use a latent variable approach to predict an objective index of health. Specifically, we estimate separate generalised ordered probit models by gender and use the predicted values as our measure of health stock. As an alternative to the predicted health stock we further use a measure of health limitations and a measure of psychological well-being. Both of these variables are described more fully in section 4.2.

We include in our duration models both initial period health and lagged health, which allows us to interpret the estimated coefficient on lagged health as a deviation from some underlying health stock, that it is captured through initial health. Moreover, the use of lags has the advantage of reducing fears of endogeneity bias by exploiting the "timing of events" as the change in health occurs before employment transitions are observed.

4. Data

We use the first twelve waves (1991-2002) of the British Household Panel Survey (BHPS). The BHPS is a longitudinal survey of private households in Great Britain designed as an annual survey of each adult (16+) member of a nationally representative sample of more than 5,000 households, with a total of approximately 10,000 individual interviews. The first wave of the survey was conducted between 1st September 1990 and 30th April 1991. The initial selection of households for inclusion in the survey was performed using a two-stage stratified systematic sampling procedure designed to give each address an approximately equal probability of selection. The same individuals are re-interviewed in successive waves and, if they split from their original households are also re-interviewed along with all adult members of their new household. Moreover, children in the original households are interviewed when they reach the age of 16. Importantly, the BHPS contains a rich set of socio-economic variables together with information on health status.

4.1. The samples

Our first sample of interest is defined by the group of workers at wave 1 who were at risk of becoming non-employed. The sample contains 2954 men aged 16 to 64 and 2672 women aged 16 to 59, who had provided a full interview and were in work (defined here as employed or self-employed) in the first wave of the survey. Similarly, we select 1552

women and 892 men, who are non-workers in the first wave. Lastly, we select the group of individuals for whom we observe a transition out of work. This sample consists of 2411 women and 1523 men.

For all three samples our models are estimated on complete sequences of observations such that if an individual leaves the panel but then returns at a later wave, we only use the information up to the first wave of exit. Moreover, for the analysis reported here we do not consider second or further spells, so our models focus on the first transition out of work or the first transition into work.

4.2. Variables

Labour market status

We use self-reported current economic activity to classify individuals as employed or non-employed. Individuals are classified as employed if they report to be either employed or self-employed. Non-employment covers individuals who report unemployment, retirement, maternity leave, family care duties, being a student, being long-term sick or on a government training scheme. We also test the sensitivity of our results to the inclusion of being on maternity leave within the employment or the non-employment category.

Health variables

The BHPS includes a number of health and health-related variables. In order to build the stock measure of health discussed in section 3.2, we use the five-point SAH variable. A continuity problem arises with this variable because in wave 9 there was a change in the question together with a modification to the available response categories. We follow the method of Hernández-Quevedo et al (2008) and recode SAH into the following 4 categories: 1 excellent health, 2 good or very good health, 3 fair health, 4 very poor or poor health. This ensures coverage of the categories of SAH used in both wave 9 and all other waves. The health indicators used to predict SAH are derived from self-reports of specific health problems associated with: arms, legs or hands, sight, hearing, skin conditions or allergies, chest/breathing, heart/blood pressure, stomach or digestion,

diabetes, anxiety or depression, alcohol or drugs, epilepsy or migraine, or other. We create a dummy for the presence of each specific problem.

We also use a measure of self-reported functional limitations, based on the question "does your health in any way limit your daily activities compared to most people of your age?"[2]

The BHPS also includes information about psychological health, and in particular, we use the General Health Questionnaire instrument (GHQ). The GHQ (Goldberg and Williams, 1988; Bowling, 1991) was developed as a screening instrument for psychiatric illness and is often used as an indicator of psychological well-being (Weich, Lewis and Jenkins, 2001; Wildman, 2003; Jones and López Nicolás, 2004; Hauck and Rice, 2004; García-Gómez and López-Nicolás, 2005). The shortened GHQ includes 12 elements: concentration, sleep loss due to worry, perception of role, capability in decision making, whether constantly under strain, perception of problems in overcoming difficulties, enjoyment of day-to-day activities, ability to face problems, loss of confidence, self-worth, general happiness, and whether suffering depression or unhappiness. Responses are provided on a 4-point scale ranging from 0 to 3, with 0 being the best score. We use the Likert scale, which sums the individual components (Likert, 1952). This gives an overall scale that runs from 0 to 36, being 0 the best possible psychological well-being state.

Income and Socioeconomic characteristics

The income variable used is the individual specific mean of log equivalent household income[3] for all the periods the individual is observed before the transition, i.e., for the stock sample of workers it is the mean for all the periods the individuals are observed working, while for the samples of non-workers it is the mean for all the periods the individuals are observed out of employment. We follow this approach in order to minimise endogeneity problems, as labour market transitions are likely to affect disposable income.

[2] This question is not asked in wave 9. In our analysis we assume that wave 8 values hold in wave 9.
[3] Equivalent household income consists of labour and non-labour equivalised real income, adjusted using the Retail Price Index and equivalised with the McClement's scale to adjust for household size and composition.

Other covariates include age, gender, martial status, educational attainment, ethnicity and regional dummies. We also include variables that indicate the employment skills of the individual in wave 1 for the stock sample of workers, and in the last year before leaving their jobs for the last sample defined in section 3.1.

Spousal/Partner variables

The evidence on retirement decisions shows that there are complementarities in leisure among spouses (Michaud, 2003; Baker, 2002; Blau, 1997 and 1998), but as far as we know there is little evidence regarding these effects on decisions at younger ages. The health status of a spouse might have effects on individual's employment transitions, due to care giving within a household diminishing the probability of employment (Viitanen, 2005; Heitmuller, 2007; Heitmueller and Michaud, 2006; Casado-Marín et al, 2006). To investigate these effects we model the impact of health on labour market transitions separately for men and women. For both we include a variable representing the health status of the individual's spouse or partner (should they have one). For each model the specific health variable specified for the spouse corresponds to the health variable specified for the individual under analysis. We also include a variable representing whether a spouse or partner is employed, lagged one period to reduce endogeneity concerns. Variables names and definitions are summarised in Table 1.

Table 1. Variables names and definitions

Variable	Description
Work	Binary dependent variable, =1 if respondent states they are working, 0 otherwise
Nowork	Binary dependent variable, =1 if respondent states they are not working, 0 otherwise
hlltyes	Self-assessed health limitations: 1 if health limits daily activities, 0 otherwise
ghq	GHQ index
sah	Self-assessed health; 1: very poor or poor, 2: good or very good, 3:fair, 4: very poor or poor
sahvpp	Self-assessed health: 1 if poor or very poor, 0 otherwise
sahfair	Self-assessed health: 1 if fair, 0 otherwise
sahgvg	Self-assessed health: 1 if good or very good, 0 otherwise
sahex	Self-assessed health: 1 if excellent, 0 otherwise
age1519	1 if respondent is aged 15 to 19 (inclusive), 0 otherwise (baseline category)
age20240	1 if respondent is aged 20 to 24 (inclusive), 0 otherwise
age25290	1 if respondent is aged 25 to 29 (inclusive), 0 otherwise
age30340	1 if respondent is aged 30 to 34 (inclusive), 0 otherwise
age35390	1 if respondent is aged 35 to 39 (inclusive), 0 otherwise
age40440	1 if respondent is aged 40 to 44 (inclusive), 0 otherwise
age45490	1 if respondent is aged 45 to 49 (inclusive), 0 otherwise

age50540	1 if respondent is aged 50 to 54 (inclusive), 0 otherwise
age55590	1 if respondent is aged 55 to 59 (inclusive), 0 otherwise
age60640	1 if respondent is aged 60 to 64 (inclusive), 0 otherwise
mlnhinc	Individual-specific mean of log equivalised real household labour and non-labour income
white	1 if respondent race is white, 0 otherwise
male	1 if respondent is a man, 0 otherwise
marcoup	1 if married or living as a couple, 0 otherwise
divsep	1 if divorced or separated, 0 otherwise
nvrmar	1 if never married, 0 otherwise
widowed	1 if widowed, 0 otherwise (baseline category)
hhsize	Household size
NorthW	1 if respondent resides in North West, Merseyside or Greater Manchester, 0 otherwise
NorthE	1 if respondent resides in North, South Yorkshire, West Yorkshire, North Yorkshire, Humberside or Tyne & Wear, 0 otherwise
SouthE	1 if respondent resides in South East or East Anglia, 0 otherwise
SouthW	1 if respondent resides in South West, 0 otherwise
Midland	1 if respondent resides in East or West Midlands or West Midlands Conurb, 0 otherwise
Scot	1 if respondent resides in Scotland, 0 otherwise
Wales	1 if respondent resides in Wales, 0 otherwise
London	1 if respondent resides in Inner or Outer London, 0 otherwise (baseline category)
deghdeg	1 if highest educational attainment is degree or higher degree, 0 otherwise
hndalev	1 if highest educational attainment is HND or A level, 0 otherwise
ocse	1 if highest educational attainment is 0 level or CSE, 0 otherwise
noqual	1 if no qualifications, 0 otherwise (baseline category)
prof	1 if present job is Professional, 0 otherwise
mantech	1 if present job is managerial or technical, 0 otherwise
Sknonm	1 if present job is skilled non-manual, 0 otherwise
Skmanar	1 if present job is skilled manual or in the armed forces, 0 otherwise
Ptskill	1 if present job is partly skilled, 0 otherwise
Unskill	1 if present job is unskilled, 0 otherwise (baseline category)

5. Results

5.1 *Descriptive statistics*

Descriptive statistics, by employment status, for the different samples of individuals used in our analysis are presented in Table 2. While most of the respondents classify themselves as having good or very good health, it is remarkable that the proportion of individuals reporting bad or very bad health is about 3.5 times higher within the group of individuals non-employed than for the employed, for all of the samples. The same result holds for the proportion of individuals that report being limited by a health condition. Moreover, the psychological health of individuals who work is also greater than for non-workers, although the differences are not as marked as for the general measures of health. Regarding partner's health status, it can be seen that the differences between individuals remaining in employment and those that leave employment are small for the stock

sample of workers at wave 1. The differences between the employed and non-employed are more evident in the stock sample of non-workers at wave 1 and the flow sample of individuals who had a transition from employment to non-employment just prior to entering the sample. For the latter, the proportion of partners reporting having a health limitation or in bad health is higher for the sub-sample remaining in non-employment.

Table 2. Descriptive statistics

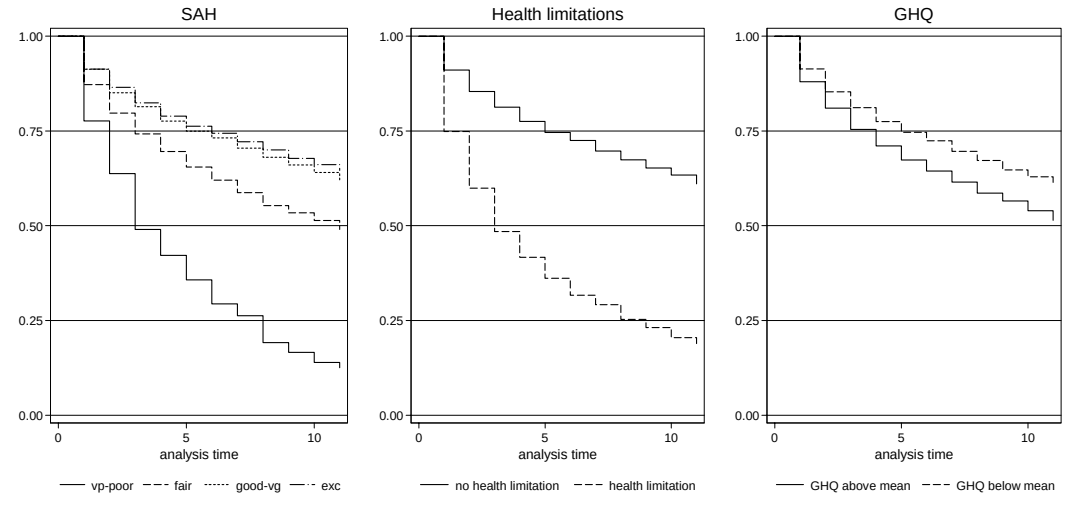
	AT WORK T=1		OUT OF WORK T=1		LEAVE WORK	
	Work	No work	Work	No work	Work	No work
Own health						
sahvpp	0.040	0.140	0.046	0.194	0.050	0.156
sahfair	0.158	0.197	0.168	0.263	0.190	0.250
sahgvg	0.525	0.441	0.528	0.379	0.520	0.428
sahex	0.277	0.222	0.257	0.164	0.240	0.166
hlltyes	0.061	0.187	0.073	0.328	0.092	0.287
ghq	10.83	12.35	10.48	12.55	10.69	12.20
Socioeconomic characteristics						
mlnhinc	9.880	9.721	9.188	9.142	9.544	9.362
white	0.971	0.969	0.938	0.937	0.959	0.966
male	0.551	0.393	0.370	0.307	0.365	0.346
marcoup	0.795	0.759	0.588	0.634	0.689	0.724
divsep	0.070	0.071	0.088	0.118	0.075	0.094
nvrmar	0.120	0.150	0.314	0.196	0.225	0.156
widowed	0.015	0.020	0.011	0.052	0.010	0.025
hhsize	2.950	2.924	3.493	3.120	3.260	2.866
deghdeg	0.142	0.133	0.187	0.094	0.171	0.111
hndalev	0.284	0.242	0.246	0.145	0.281	0.207
ocse	0.341	0.313	0.330	0.251	0.361	0.304
noqual	0.233	0.312	0.237	0.510	0.187	0.378
prof0	0.066	0.040			0.035	0.024
mantech0	0.310	0.251			0.239	0.216
sknonm0	0.241	0.285			0.265	0.260
skmanar0	0.220	0.195			0.184	0.185
ptskill0	0.129	0.164			0.206	0.216
unskill0	0.033	0.063			0.060	0.084
Spousal/Partner Variables						
swork	0.635	0.499	0.434	0.309	0.553	0.389
ssahvpp	0.046	0.064	0.035	0.079	0.042	0.091
ssahfair	0.131	0.134	0.119	0.148	0.128	0.161
ssahgvg	0.407	0.368	0.261	0.262	0.337	0.319
ssahex	0.202	0.180	0.155	0.131	0.167	0.140
shlltyes	0.075	0.099	0.061	0.141	0.057	0.163
sghq	8.58	8.42	6.03	6.97	7.19	7.91

There are also differences across employment status for some of the socioeconomic characteristics. Individuals who are non-employed have a slightly lower household income. The samples of non-employed are characterised by fewer men (around 35%)

than the sample of employed. Moreover, within each sample the percentage of men at work is higher than the percentage of men outside work. This is due to the higher labour mobility among women. The data shows some educational gradient among individuals non-employed at the first wave, and an occupational gradient among individuals employed at wave 1. There appear to be job complementarities among partners evidenced by the lower proportion of partners being employed in the group of individuals with non-employment compared to those with employment.

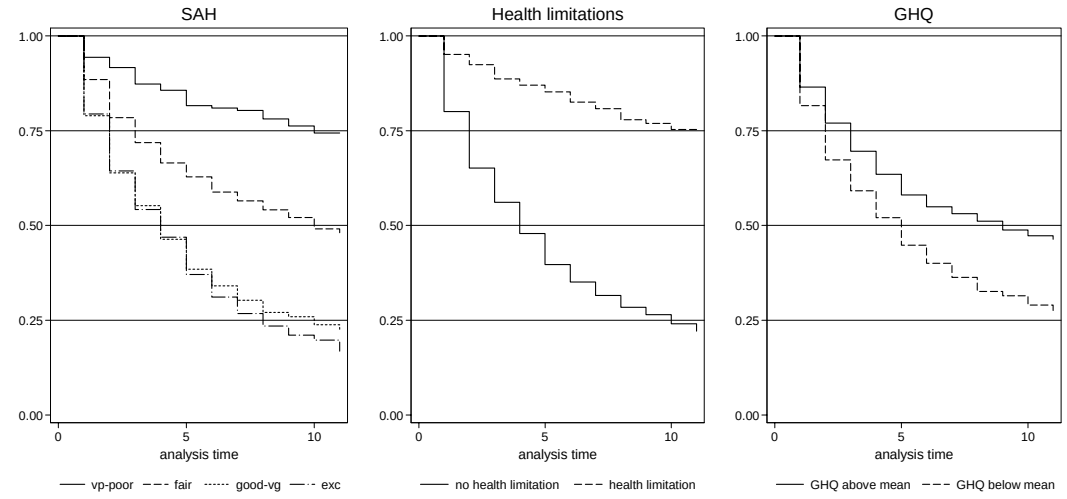
Figures 1 to 3 show Kaplan-Meier estimates of the probability of survival in the two labour market states (employment or non-employment depending on the sample used) together with the χ^2 values (and probabilities) of the Log-rank and Peto-Peto-Prentice tests of equality of survivor functions by health status. We have defined two categories for the GHQ index, if the individual's GHQ falls below or above the mean of her sample. We can see that individuals with better health, regardless of the measure of health considered, are more (less) likely to remain employed (non-employed). Moreover, equality of survivor functions is always rejected.

Figure 1. Kaplan-Meier survival estimates and Long-rank and Peto-Peto-Prentice tests of equality of survivor functions [χ^2 (Prob)] for workers at wave 1, by health status



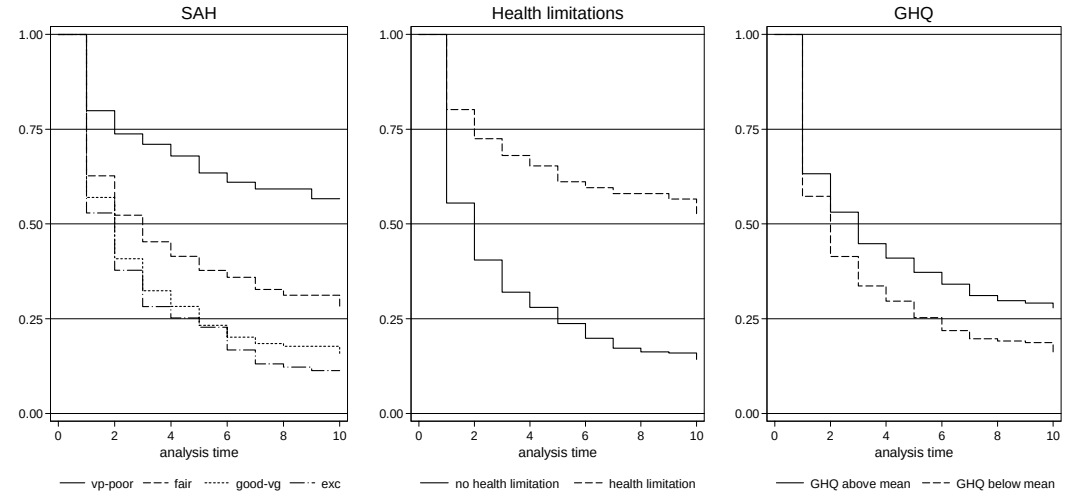
Log-rank	431.64 (0.000)	438.06 (0.000)	38.48 (0.000)
Peto-Peto-Prentice	397.86 (0.000)	429.45 (0.000)	38.35 (0.000)

Figure 2. Kaplan-Meier survival estimates and Long-rank and Peto-Peto-Prentice tests of equality of survivor functions [χ^2 (Prob)] for non-workers at wave 1, by health status



Log-rank	206.82 (0.000)	243.37 (0.000)	40.67 (0.000)
Peto-Peto-Prentice	184.98 (0.000)	222.81 (0.000)	34.25 (0.000)

Figure 3. Kaplan-Meier survival estimates and Long-rank and Peto-Peto-Prentice tests of equality of survivor functions [χ^2 (Prob)] for non-workers previously employed, by health status



Log-rank	165.83 (0.000)	220.32 (0.000)	37.13 (0.000)
Peto-Peto-Prentice	151.84 (0.000)	208.2 (0.000)	32.38 (0.000)

5.2 *Empirical modelling results*

We have estimated the health stock variable using generalised ordered probit models for men and women using the same specification as Rice et al (2006). In order to be able to

derive the latent health of a spouse we did not restrict the sample either by age or by labour status.

Results for the discrete-time hazard models are presented in Table 3 and Table A1 (see Appendix). Table 3 reports the effects of the health variables only, while all effects are shown in Table A1. For each sample and model, the results are presented as hazard ratios, which measure the proportional effect on the underlying (instantaneous) hazard of retiring of a one unit change of that variable. All models were estimated defining the hazard ratio as a complementary log-log function. Further all models were estimated including unobserved heterogeneity using a Gamma mixture distribution (Meyer, 1990)[4]. The null hypothesis of no heterogeneity was only rejected in the stock sample of workers and accordingly, the results shown here are for estimates including unobserved heterogeneity for the stock sample of workers and without unobserved heterogeneity for the two samples of non-workers.

The first column (1) reports results for the stock-sample of individuals that work in the first period where the hazard represents the transition to non-employment. The hazard ratios of becoming employed are shown in column (2) for the stock-sample of non-workers and in column (3) for the flow sample of non-workers.

Table 3. Effects (hazard-ratios) of health for different labour market states.

		Stock sample **working** in the first wave: Hazard: not-working (1)		Stock sample **non-working** in the first wave. Hazard: Working (2)		Individuals who **stop working**. Hazard: back to work (3)	
Model	Variable	Men	Women	Men	Women	Men	Women
Health limitations	lhlltyes	3.839***	2.202***	0.301***	0.511***	0.713	0.629**
	hlltyes0	0.802	1.063	0.656*	0.772	0.628**	0.784
Health stock	llatsah	1.874***	1.402***	0.495***	0.660***	0.700**	0.815**
	latsah0	1.009	1.096	0.992	1.023	0.829	0.946
GHQ	lghq	1.056***	1.025**	0.998	0.997	0.99	1.018**
	ghq0	1.006	1.034*	1.017	0.999	0.999	0.986*

Note: * p<.1; ** p<.05; *** p<.001

We estimate three different models according to different measures of health. In the first model, we measure health using the information about whether the individual declares

[4] These models can be estimated in Stata using the *pgmhaz8* routine (Jenkins, 1998).

that health limits their daily activities. The second model includes the latent health measure and the third model focuses on mental health.

The results show that all measures of a negative change in health are associated with an increase in the hazard of non-employment for the stock-sample of workers. The presence of limitations due to health increases the hazard of leaving employment, with a higher effect for men (284%) than for women (120%). The effects of the lagged health stock and lagged psychological health are also higher for men than for women.

For the samples of non-employed individuals, firstly, the presence of a health problem that limits daily activities in the first period diminishes the hazard of employment for men. Further, for all except men in the flow sample, a shock to health resulting in a limitation is also associated with a significant decrease in the hazard of returning to employment. For both men and women a decline in the health stock diminishes the hazard of returning to employment, while in general first period latent health has little effect on subsequent transitions. Psychological health appears to have a negligible effect on subsequent employment transitions.

The effects of other covariates are very stable across the different models, as can be seen in Table A1 in the Appendix. For example, the hazard of becoming non-employed for the employed stock sample initially diminishes with age and then increases. Further, the results show the expected gradient among the stock and flow sample of non-employed, that is, the hazard of employment becomes smaller as individuals age.

The hazard of employment (non-employment) increases (decreases) as mean household equivalent income increases. For the stock sample of workers, individuals with higher or first degree education have a hazard of non-employment of around 75% for men and 100% for women greater than workers without educational qualifications. At the same time, their hazard of employment is also higher, which suggests that they change jobs more frequently. Marital status only seems to have effects on the hazard ratio of employment for the male's flow-sample, as compared to widows (omitted category) the rest of individuals have a hazard ratio of employment at least 170% lower. Household size increases the hazard ratio of non-employment for female workers and decreases the hazard ratio of employment for the stock-sample of female non-workers.

Concerning the relationship with the spouse's employment, we can observe that in general there are complementarities. The hazard ratio of non-employment by male workers is reduced by 37% when their partner or spouse works and similarly the hazard of employment is increased among the non-employed (males and females) when their partner or spouse works. The effects regarding the health status of the spouse depend on the measure of health used. If the spouse had a health limitation, the hazard ratio of employment of non-working males is decreased by 95%. On the other hand, if we use our constructed measure of latent health, the hazard of leaving employment is increased and the hazard of employment is decreased whenever the health status of the partner is decreased for working and non-working males, respectively. By contrast, the worse the mental health of the partner the higher the hazard ratio of non-employment is for working women.

5.3. Heterogeneous effects

It has been argued (OECD, 2003) that educational attainment plays an important role in the incidence of disability, as disability rates are observed to be considerably higher among individuals with low educational attainment. Moreover, education might influence the way in which individuals respond to a health shock. To investigate in more detail the role that education might play in determining the effect of a health shock on employment transitions, we re-estimate the models allowing the effects of health to differ across groups defined by educational attainment[5]. The hazard ratios for each of the health measures by education are presented in the Appendix in Table A2. Table 4 presents associated χ^2 values and probabilities of the test of equality of the coefficients on health across the educational groups. Rejection of the null hypothesis of equality of coefficients implies that the impact of health shocks on employment transitions varies with educational achievement.

In general we cannot reject the hypothesis that the effects are the same across the four educational groups[6]. However, having a health limitation increases the hazard of non-employment for women without qualifications by 250%, while the increase is about

[5] The educational groups represent : no qualification, O level or CSE, HND or A level, degree or higher degree.
[6] The full set of results are available from the authors on request

115% for women with a degree or a higher. Similar results are found for the constructed latent health variable for women both in the stock sample of workers and non-workers; women without qualifications have a relatively higher hazard rate of non-employment when their latent health decreases, and a relatively lower hazard rate of re-employment.

Table 4. χ^2 (Prob>χ^2) of equality of coefficients across educational attainment groups

Health definition	Variable	Stock sample **working** in the first wave: Hazard: not-working (1)		Stock sample **non-working** in the first wave. Hazard: Working (2)		Individuals who **stop working**. Hazard: back to work (3)	
		Men	Women	Men	Women	Men	Women
Health limitations	lagged	3.02 (0.39)	11.55 (0.01)	4.23 (0.24)	1.79 (0.62)	3.79 (0.28)	2.73 (0.44)
	initial	3.24 (0.36)	8.58 (0.04)	2.45 (0.48)	2.02 (0.57)	2.57 (0.46)	1.03 (0.79)
Latent health	lagged	3.00 (0.39)	9.02 (0.03)	1.27 (0.74)	6.74 (0.08)	7.86 (0.05)	2.45 (0.48)
	initial	2.01 (0.57)	2.06 (0.56)	3.94 (0.27)	1.27 (0.74)	7.59 (0.06)	4.43 (0.22)
GHQ	lagged	3.90 (0.27)	1.84 (0.61)	0.91 (0.82)	2.32 (0.51)	2.21 (0.53)	1.87 (0.60)
	initial	1.05 (0.79)	4.36 (0.23)	2.43 (0.49)	3.21 (0.36)	2.07 (0.56)	2.49 (0.48)

5.4. Sensitivity analysis

It could be argued that the previous results were driven by the effects of health on labour market outcomes of older individuals. In order to rule out this hypothesis, we re-estimate the models excluding all individuals older than 50. The results in the first quarter of Table 5 (A) show that there are not noticeable differences in the results when older workers are excluded from the analysis.

In the analysis shown above we have included individuals who are on maternity leave in the non-employment category. However, these individuals can return to their previous job after maternity leave expires, and thus they might also be considered as employed. We re-estimate previous models including maternity leave as employment. The results shown in the second quarter of Table 5 (B) indicates that the results remain stable to this change in the definition of employment.

The second half ot Table 5 shows the hazard ratios when all models are first estimated without accounting for unobserved heterogeneity (C), and secondly assuming that it is normally distributed and constant over time (D). The results remain stable to the assumptions about unobserved heterogeneity.

Table 5. Hazard ratios for health measures: individuals younger than 50, maternity leave as an employment and different assumptions about unobserved heterogeneity

Sensitivity analysis	Health definition	Variable	Stock sample **working** in the first wave: Hazard: not-working (1)		Stock sample **non-working** in the first wave. Hazard: Working (2)		Individuals who **stop working**. Hazard: back to work (3)	
			Men	Women	Men	Women	Men	Women
Individuals younger than 50 (A)	Health limitations	lhlltyes	4.083***	1.632**	0.289***	0.492***	0.777	0.775
		hlltyes0	0.578*	1.256	0.775	0.886	0.567**	0.649**
	Health stock	llatsah	1.793***	1.335**	0.510***	0.686**	0.8	0.84
		latsah0	1.004	1.094	1.102	0.972	0.727**	0.887
	GHQ'	lghq	1.056***	1.021*	0.994	0.994	0.991	1.017*
		ghq0	1.004	1.040*	1.026*	1.003	0.998	0.982**
Maternity leave as employment (B)	Health limitations	lhlltyes	3.893***	2.114***	0.299***	0.433**	0.683*	0.622***
		hlltyes0	0.805	1.154	0.620*	0.499**	0.653**	0.795*
	Health stock	llatsah	1.887***	1.474***	0.493***	0.622**	0.687**	0.765**
		latsah0	1.036	1.095	0.977	0.879	0.847	1.006
	GHQ	lghq	1.057***	1.022**	0.995	1.013	0.992	1.008
		ghq0	1.008	1.02	1.018	0.987	0.998	0.995
No unobserved heterogeneity (C)	Health limitations	lhlltyes	3.441***	2.037***	0.301***	0.511***	0.713	0.629**
		hlltyes0	0.75	0.894	0.656*	0.772	0.628**	0.784
	Health stock	llatsah	1.746***	1.378***	0.495***	0.660***	0.700**	0.815**
		latsah0	0.908	1.018	0.992	1.023	0.829	0.946
	GHQ	lghq	1.054***	1.023**	0.998	0.997	0.99	1.018**
		ghq0	0.998	1.006	1.017	0.999	0.999	0.986*
Normal distributed unobserved heterogeneity (D)	Health limitations	lhlltyes	3.581***	2.071***	0.300***	0.509***	0.716	0.627**
		hlltyes0	0.768	0.913	0.645*	0.766	0.619**	0.772
	Health stock	llatsah	1.786***	1.387***	0.493***	0.656***	0.700**	0.813**
		latsah0	0.931	1.031	0.983	1.022	0.822	0.942
	GHQ	lghq	1.055***	1.023**	0.998	0.997	0.99	1.017**
		ghq0	1.000	1.008	1.017	0.999	0.999	0.986*

Note: * p<.1; ** p<.05; *** p<.001

6. Discussion and conclusion

This paper analyses the role of health on exits out of and entries into employment using data from the British Household Panel Survey. We use a discrete-time hazard approach to model the hazard of non-employment for the stock sample of individuals employed in

the first wave, and the hazard of employment for both the stock sample of individuals non-employed in the first wave and the flow sample of individuals who transit out of employment. We measure health using a measure of health limitations, a constructed latent health index and the GHQ index to measure psychological well-being.

The results show that own health is an important determinant for employment transitions and the effects are higher for men than for women. However, there are some differences depending on the measure of health used. General health, measured by health limitations and the latent health index, has an effect on exits from employment and entries into employment. Moreover, the size of the effect of health is found to be symmetric, that is, the size of the effect of health on the hazard of non-employment is similar to the size of the effect of health on the hazard of employment. On the other hand, mental health seems to matter regarding the hazard of becoming non-employed for the stock sample of workers, but there is not significant effect on the hazard of leaving the non-employment status.

The previous related literature has mainly focused on the causal relationship between ill-health and retirement among older workers. In contrast, we do not restrict our analysis to older workers, but focus on the entire working-age population, that is men aged 16 to 64 and women aged 16 to 59. Our results, even when we exclude older individuals from the analysis, show that the effects running from health to employment transitions are qualitatively similar to the ones found by previous studies. In fact, the hazard ratios of non-employment for the stock sample of workers are higher than those found by Hagan et al (2006) or Zucchelli et al (2007) using the same empirical approach and definition of health limitations, but different definitions of exits from employment. Rice et al (2006) also use data from the BHPS to analyse the effect of health on retirement and found a slightly larger effect of health limitations on the retirement hazard. Our results emphasize that health shocks represent a non-negligible determinant of employment transitions, but moreover, that health is important not only for the employment transitions of older workers but also for younger individuals.

There is an increased concern in developed countries about the fiscal implications of an aging population, which has encouraged the discussion about changes in the financial incentives to diminish early retirement and/or postpone the retirement age. However,

this may not be sufficient if individuals stop working due to shocks or deteriorations in health, and the challenge can be exacerbated when individuals drop out from the labour force at younger ages as they will not be affected by any of the policies that target individuals approaching retirement. The design of labour supply policies aimed at retaining workers within the labour force need to understand the determinants and financial incentives that younger individuals face after the onset of a health shock. Policies should be targeted at keeping individuals with disabilities or health problems to remain in the labour force.

The analysis here is based on a simplified division of the labour market, as it groups together in a single category all individuals in non-employment. Previous literature has discussed concerns about the loss of information when non-employed individuals are grouped in this way (Flinn and Heckman, 1983; Tano, 1991; Marzano, 2006). Moreover, we have also excluded from the analysis the information regarding previous transitions during our observational period. Therefore, a natural extension for further research would be to analyse the effect of health on the complex network of labour market transitions, including transitions among the separate states within non-employment.

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Appendix

Table A1. Results for the baseline model

	Health limitations						Latent health						GHQ					
	Stock sample workers		Stock sample non-workers		Transition out of employment		Stock sample workers		Stock sample non-workers		Transition out of employment		Stock sample workers		Stock sample non-workers		Transition out of employment	
Variable	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W
lhlltyes	**3.839**	**2.202**	**0.301**	**0.511**	0.713	**0.629**												
hlltyes0	0.802	1.063	*0.656*	0.772	**0.628**	0.784												
llatsah							**1.874**	**1.402**	**0.495**	**0.660**	**0.700**	**0.815**						
latsah0							1.009	1.096	0.992	1.023	0.829	0.946						
lghq													**1.056**	**1.025**	0.998	0.997	0.99	**1.018**
ghq0													1.006	*1.034*	1.017	0.999	0.999	*0.986*
age20240	**0.480**	0.555	1.259	0.947	*0.743*	0.982	**0.435**	0.621	1.221	0.879	0.768	0.977	**0.433**	0.425	1.167	0.873	0.756	0.949
age25290	**0.240**	0.618	1.405	0.743	0.979	0.866	**0.194**	0.602	1.287	0.738	1.005	0.83	**0.198**	0.508	1.089	0.737	0.904	0.802
age30340	**0.177**	**0.325**	1.127	**0.660**	0.722	0.907	**0.145**	**0.335**	1.058	**0.654**	0.705	0.898	**0.140**	**0.229**	0.67	**0.610**	0.753	0.894
age35390	**0.309**	**0.196**	0.812	**0.600**	0.697	1.011	**0.266**	**0.205**	0.848	**0.596**	0.706	0.975	**0.268**	**0.156**	0.671	**0.553**	*0.652*	0.941
age40440	**0.309**	**0.137**	0.843	**0.471**	0.693	0.927	**0.250**	**0.167**	0.797	**0.460**	0.758	0.886	**0.259**	**0.083**	*0.603*	**0.406**	**0.622**	0.872
age45490	**0.392**	**0.168**	**0.415**	**0.374**	*0.637*	0.798	**0.305**	**0.194**	**0.357**	**0.370**	*0.658*	0.75	**0.334**	**0.109**	**0.250**	**0.307**	**0.569**	*0.707*
age50540	0.965	**0.347**	0.612	**0.205**	**0.421**	**0.396**	0.763	**0.363**	**0.496**	**0.217**	**0.488**	**0.371**	0.835	**0.293**	**0.273**	**0.170**	**0.378**	**0.333**
age55590	1.268	0.511	**0.137**	**0.192**	**0.170**	**0.317**	1.008	**0.451**	**0.125**	**0.206**	**0.195**	**0.300**	1.179	0.458	**0.092**	**0.185**	**0.159**	**0.264**
age60640	**2.066**		**0.119**		**0.120**		1.532		**0.134**		**0.141**		*2.037*		**0.095**		**0.112**	
mlnhinc	**0.443**	**0.365**	**1.454**	**1.263**	**1.361**	**1.304**	**0.418**	**0.407**	**1.501**	**1.236**	**1.372**	**1.337**	**0.440**	**0.357**	**1.477**	*1.171*	**1.414**	**1.322**
white	1.25	0.83	1.057	**1.569**	*0.715*	1.024	1.274	0.779	1.013	**1.686**	**0.639**	1.081	1.282	0.783	1.044	**1.697**	**0.656**	1.064
marcoup	*0.440*	1.335	1.376	1.588	**0.337**	1.062	*0.415*	1.531	1.233	1.452	**0.290**	0.961	*0.424*	1.325	1.22	1.357	**0.260**	1.118
divsep	0.632	1.62	0.926	1.876	**0.361**	1.176	0.672	1.609	0.868	1.723	**0.314**	1.141	0.556	1.83	0.893	1.534	**0.300**	1.114
nvrmar	0.707	1.007	0.922	1.329	**0.335**	1.09	0.682	1.217	0.782	1.256	**0.275**	1.015	0.648	1.258	0.672	1.135	**0.285**	1.016
hhsize	0.965	**1.335**	0.986	**0.896**	1.023	0.979	0.969	**1.243**	0.989	**0.904**	1.017	0.976	0.968	**1.458**	0.987	**0.905**	1.041	0.994
deghdeg	**1.748**	**2.022**	*1.366*	**1.572**	0.994	**1.379**	**1.728**	**1.826**	**1.488**	**1.570**	1.052	**1.508**	**1.596**	**2.243**	**1.555**	**1.761**	1.077	**1.602**
hndalev	**1.338**	0.95	**1.985**	**1.696**	1.214	**1.297**	**1.413**	0.989	**2.088**	**1.657**	1.22	**1.322**	1.288	1.013	**2.152**	**1.816**	1.169	**1.376**
ocse	1.152	*0.729*	**1.730**	**1.401**	*1.247*	**1.248**	1.219	*0.750*	**1.735**	**1.457**	**1.289**	**1.262**	1.129	0.742	**1.678**	**1.490**	**1.281**	**1.286**

	Health limitations						Latent health						GHQ					
	Stock sample workers		Stock sample non-workers		Transition out of employment		Stock sample workers		Stock sample non-workers		Transition out of employment		Stock sample workers		Stock sample non-workers		Transition out of employment	
Variable	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W
prof0	**0.329**	0.405			1.088	*1.596*	**0.293**	0.493			1.069	1.471	**0.296**	0.356			1.229	*1.570*
mantech0	**0.402**	0.767			1.168	1.153	**0.391**	0.772			1.194	1.113	**0.397**	0.71			1.249	1.092
sknonm0	**0.355**	1.05			1.179	0.984	**0.337**	1.042			1.163	0.996	**0.331**	0.981			1.222	0.960
skmanar0	**0.419**	0.855			*1.352*	1.194	**0.381**	0.861			*1.337*	1.176	**0.419**	0.782			*1.341*	1.160
ptskill0	**0.378**	1.003			1.279	1.060	**0.358**	0.943			1.315	1.079	**0.383**	0.917			1.281	1.032
lswork	**0.730**	1.197	*1.368*	*1.271*	**1.493**	*1.210*	**0.695**	1.172	*1.360*	**1.273**	**1.498**	**1.298**	**0.726**	1.175	**1.386**	**1.340**	**1.454**	**1.361**
lshealth	1.098	1.016	**0.515**	0.897	0.832	0.803	**1.209**	1.156	*0.777*	0.959	0.875	0.957	0.998	**1.029**	0.981	1.000	1.005	**0.979**
NorthE	0.957	0.946	0.94	1.014	0.954	0.862	0.96	1.067	0.943	1.008	0.987	0.833	0.92	1.055	0.819	1.031	0.983	0.848
SouthE	*0.697*	0.877	**1.580**	1.191	1.251	1.042	*0.708*	0.996	**1.590**	1.241	1.245	1.063	*0.679*	0.871	*1.454*	*1.380*	1.264	1.057
SouthW	*0.659*	1.138	**1.658**	1.057	**1.440**	0.858	*0.644*	1.251	**1.591**	1.111	1.303	0.862	**0.623**	1.333	*1.516*	1.144	*1.349*	0.871
Midland	0.759	0.967	*1.434*	1.001	0.944	1.039	0.755	1.029	*1.436*	0.983	0.928	1.047	*0.712*	1.068	1.296	1.046	0.931	1.053
Scot	0.832	1.164	1.049	0.924	0.96	0.938	0.827	1.274	1.028	0.895	1.029	0.939	0.791	1.23	0.868	0.905	0.971	0.955
Wales	0.973	1.377	1.317	1.175	0.978	0.997	0.967	1.367	1.123	1.141	1.008	0.977	0.937	1.504	0.723	1.253	0.983	1.029
t1	1.458	**0.216**	**4.411**	1.586	**11.015**	**5.422**	1.382	0.471	**4.648**	1.701	**10.927**	**5.508**	1.312	**0.097**	**6.559**	*1.793*	**12.381**	**4.964**
t2	1.293	**0.231**	**3.868**	1.646	**7.916**	3.021	1.282	0.433	**3.889**	*1.753*	**7.658**	3.023	1.199	**0.119**	**5.171**	*1.797*	**8.099**	2.721
t3	1.252	**0.232**	*2.958*	1.289	**5.235**	2.732	1.242	*0.407*	*2.920*	1.352	**5.081**	2.681	1.249	**0.138**	**3.800**	1.449	**5.423**	2.502
t4	0.979	**0.317**	**3.414**	1.307	**3.937**	1.465	0.961	*0.504*	**3.372**	1.371	**3.918**	1.432	0.885	**0.201**	**4.198**	1.486	**3.862**	1.35
t5	0.952	**0.365**	**5.815**	1.462	**4.576**	1.755	0.976	*0.532*	**5.415**	1.562	**4.591**	1.789	0.937	**0.221**	**6.964**	1.617	**4.019**	1.621
t6	0.843	**0.303**	**3.729**	1.109	1.821	2.164	0.855	*0.431*	**3.865**	1.218	1.918	2.317	0.799	**0.206**	**4.137**	1.211	1.759	2.092
t7	0.845	**0.435**	2.864	1.053	2.7	1.819	0.856	**0.553**	2.871	1.173	2.871	1.576	0.811	**0.338**	3.024	1.133	2.692	1.407
t8	1.032	**0.506**	**3.814**	0.986		0.793	1.058	**0.582**	**3.806**	1.096		0.929	1.078	**0.403**	4.118**	1.089		0.791
t9	0.778	**0.537**	1.149	0.721		0.281	0.802	**0.585**	1.149	0.729		0.292	0.797	**0.457**	1.127	0.687		0.288
t10	0.883	**0.576**		1.075			0.863	**0.613**		1.203			0.956	**0.521**		1.257		
Cons	**1480.653**	**14094.851**	**0.001**	**0.009**	**0.013**	**0.008**	**2962.10**	**1856.447**	**0.001**	**0.011**	**0.016**	**0.006**	**1377.309**	**19962.234**	**0.001**	**0.016**	**0.010**	**0.006**
N	17295	13401	2706	4731	2479	3782	17105	13081	2671	4634	2440	3683	16462	12630	2517	4379	2347	3541
ll	-2604	-3126	-877	-1652	-1145	-1972	-2581	-3050	-879	-1632	-1123	-1929	-2510	-2949	-867	-1573	-1112	-1876
aic	5300	6343	18323	3382	2373	4030	5253	6190	1836	3342	2330	3943	5112	5988	1813	3223	2307	3838

	Health limitations						Latent health						GHQ					
	Stock sample workers		Stock sample non-workers		Transition out of employment		Stock sample workers		Stock sample non-workers		Transition out of employment		Stock sample workers		Stock sample non-workers		Transition out of employment	
Variable	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W	M	W
bic	5657	6680	2063	3634	2617	4298	5609	6526	2066	3593	2574	4210	5467	6323	2039	3472	2549	4103

Table A2. Hazard ratio (Standard errors) for health measures by educational attainment

Health definition	Variable	Educational attainment	Stock sample **working** in the first wave: Hazard: not-working (1)		Stock sample **non-working** in the first wave. Hazard: Working (2)		Individuals who **stop working**. Hazard: back to work (3)	
			Men	Women	Men	Women	Men	Women
Health limitations	lhlltyes	Noqual	5.04	3.511	0.238	0.397	0.692	0.439
			(1.341)	(0.897)	(0.102)	(0.127)	(0.237)	(0.159)
		Ocse	2.42	2.502	0.29	0.464	0.983	0.598
			(0.829)	(0.608)	(0.145)	(0.160)	(0.376)	(0.159)
		Hndalev	4.179	0.854	0.339	0.671	0.387	0.958
			(1.168)	(0.286)	(0.168)	(0.210)	(0.162)	(0.331)
		Deghdeg	3.607	2.158	1.095	0.659	1.265	0.776
			(1.587)	(0.870)	(0.689)	(0.295)	(0.753)	(0.305)
	hlltyes0	Noqual	0.698	0.646	0.504	0.592	0.537	0.774
			(0.269)	(0.298)	(0.238)	(0.189)	(0.196)	(0.271)
		Ocse	1.213	0.721	0.405	0.836	0.538	0.73
			(0.579)	(0.283)	(0.218)	(0.281)	(0.209)	(0.199)
		Hndalev	1.09	3.42	0.907	1.145	1.072	0.692
			(0.478)	(1.675)	(0.443)	(0.387)	(0.428)	(0.234)
		Deghdeg	0.334	0.572	1.072	0.796	0.403	1.101
			(0.215)	(0.435)	(0.566)	(0.363)	(0.274)	(0.411)
Latent health	llatsah	Noqual	2.254	1.879	0.53	0.427	0.334	0.836
			(0.390)	(0.266)	(0.157)	(0.090)	(0.101)	(0.182)
		Ocse	1.975	1.058	0.359	0.755	0.808	0.812
			(0.402)	(0.176)	(0.139)	(0.133)	(0.205)	(0.129)
		Hndalev	1.67	1.128	0.595	0.863	0.837	1.037
			(0.323)	(0.216)	(0.144)	(0.201)	(0.206)	(0.229)
		Deghdeg	1.336	1.628	0.489	0.816	1.058	0.6
			(0.381)	(0.382)	(0.233)	(0.233)	(0.450)	(0.162)
	latsah0	Noqual	0.973	0.983	0.585	1.159	1.685	0.883
			(0.223)	(0.208)	(0.209)	(0.247)	(0.505)	(0.200)
		Ocse	0.786	1.387	0.94	0.927	0.738	0.868
			(0.211)	(0.317)	(0.379)	(0.172)	(0.199)	(0.144)
		Hndalev	1.315	1.08	1.131	1.209	0.606	0.81
			(0.337)	(0.274)	(0.303)	(0.317)	(0.141)	(0.174)
		Deghdeg	1.04	0.841	1.657	0.877	0.855	1.51
			(0.390)	(0.274)	(0.706)	(0.270)	(0.365)	(0.374)
GHQ	lghq	Noqual	1.064	1.032	0.982	0.975	0.974	1.024
			(0.021)	(0.019)	(0.025)	(0.020)	(0.027)	(0.017)
		Ocse	1.055	1.04	1.006	1.011	0.999	1.016
			(0.021)	(0.017)	(0.028)	(0.015)	(0.020)	(0.013)
		Hndalev	1.073	1.008	0.989	0.993	0.981	1.026
			(0.018)	(0.018)	(0.023)	(0.019)	(0.018)	(0.016)
		Deghdeg	1.012	1.019	1.011	1.001	1.026	0.99
			(0.026)	(0.023)	(0.024)	(0.021)	(0.030)	(0.023)
	ghq0	Noqual	0.985	1.024	0.993	0.989	0.987	0.993
			(0.024)	(0.033)	(0.026)	(0.020)	(0.026)	(0.017)
		Ocse	1.006	0.993	1.021	0.988	1.001	0.979
			(0.026)	(0.030)	(0.030)	(0.016)	(0.019)	(0.013)
		Hndalev	1.015	1.096	1.042	1.026	1.015	0.98
			(0.024)	(0.043)	(0.023)	(0.023)	(0.018)	(0.015)
		Deghdeg	1.02	1.048	1.001	1.025	0.966	1.017
			(0.036)	(0.050)	(0.026)	(0.025)	(0.031)	(0.023)