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HEALTH AND LABOR SUPPLY DYNAMICS OF OLDER MARRIED WORKERS

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Abstract

This empirical analysis investigates how the labor supply dynamics of married workers aged 46-65 is influenced by their own health conditions and by those of their cohabiting partners. Exploiting the information conveyed by the European Community Household Panel (1995-2001), our econometric specifications focus on the transition towards not employment within the next year and use alternative health indicators to describe the overall physical and mental conditions of couple members. We also control for partners labor supply because of its close relationship with their own health and the well-documented coordination with the labor market position of the other couple member. Our results show that while healthier individuals present higher chances of remaining at work in the future, living with healthier spouses affects positively the likelihood of ceasing from work. Finally, when the spouse is employed, the probability of keeping on working is estimated to rise. This last result upholds the hypothesis, suggested by the literature, that couple members prefer to spend their time in the same employment status.

JEL Codes: J26, J14.

Keywords: Labor supply, health, married workers.

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1 Introduction

Population ageing is one of the greatest challenges faced by Europe. Currently, the proportion of EU citizens aged 65 or over is 16 percent and it is expected to approach 30 percent in 2050. The support ratio, which relates working age persons (20 to 64 years old) to those aged over 65, will halve in the next decades, declining from about 3.7 in 2000 to 1.9 in 2050. The combination between the decline of working age population and the low employment rates exhibited by the elderly questions the financial sustainability of public pension systems[1]. Aware of this, the Lisbon and Stockholm agreements plan to raise the participation to the labor market at all ages and, in particular, focus their attention upon the purpose of prolonging the working life of individuals around retirement. In this respect, a deep understanding of the factors determining the labor market outcomes of older workers is needed to effectively design strategies aimed at enhancing their employment chances.

Our analysis considers married employed individuals aged 46-65 and draws data from the waves 1995-2001 of the European Community Household Panel (ECHP) to assess empirically how their transitions towards not employment within the next year are affected by their own health conditions and by those of their spouses. In line with Blau (1994), we prefer to focus on labor supply dynamics rather than assume some predefined definition of retirement in order to (i) not exclude, for instance, episodes of re-entering the status of employed and (ii) consider information which would be otherwise dropped because of sample selection requirements[2]. In addition, as retirement process exhibits cross-country variability due to different institutional arrangements, imposing a unique rule of exit from the labor force may turn out to be unrealistic and produce misleading results.

The existing empirical literature shows a general consensus in considering health as an important determinant of older workers labor supply. In particular, several studies, such as Bound et al. (1999) and Disney et al. (2006)[3], show how healthier workers are more likely to remain employed. These findings

[1] See Economic Policy Committee (2000) and OECD (1998).

[2] Inclusion in the sample may depend on the years of contribution to the Social Security system or the frequency of unemployment spells during the working career.

[3] See also Hagan et al. (2006), Lindeboom and Kerkhofs (2002), Rice et al. (2007) and Zucchelli et al. (2007).

confirm the theoretical predictions of a positive relation between psychophysical well-being and employment chances. As highlighted by Lumsdaine and Mitchell (1999), a bad shock on health may affect labor supply by altering both the budget constraint and the system of preferences. For instance, an ill employee is likely (i) to face worse compensation opportunities due to her reduced productivity and (ii) to value less the time spent in the labor market because of an enhanced disutility of work and the need of medical assistance. Further, according to Grossman (1972), health conditions in a given time period result from a production function depending on the entire stream of health care investments previously made. In this framework, the empirical results quoted above suggest that adopting healthier life styles since early childhood may make individuals more likely to be healthier throughout their lives and to be more valuable for the labor market even at older ages.

Focusing uniquely on workers own health status translates in discarding the potential effects on the labor market position exerted by the psychophysical well-being of their relatives. In literature we find several contributions exploring the negative effects produced by caregiving demand of family members on employment patterns[4]. However, these investigations look mainly at the impact of looking after parents and analyse samples representative of the overall working age population.

Our analysis pursues a different goal. We restrict the attention to married older workers and examine how their probability of ceasing from work is influenced by the health status of their cohabiting partners. Finding a positive effect of spouse health conditions on the labor market attachment could uphold the view according to which workers in this age group not involved in looking after sick partners tend to prolong their working careers. As a result, the implementation of policies aimed at (i) exempting individuals from the provision of informal care and (ii) fostering the development of professional care market might turn out to be valuable in order to increase the low employment rates exhibited by the middle-aged and elderly population in Europe. Nevertheless, we do not focus only on the effect of caregiving but widen our interest to the more complex role played by spouse health in the determination of the labor

[4]See Ettner (1996) and Heitmueller and Michaud (2006).

supply of a married individual.

On the one hand, a healthy spouse may represent a source of help for managing nonmarket tasks, such as housework, and then result in an incentive to keep on working. On the other hand, the propensity of a worker towards leaving the labor market may be enhanced by the possibility of spending her spare time with a healthy partner.

In addition, when a bad shock occurs on the health of a married individual, the labor earnings of the spouse could be considered as an additional source of income that can be exploited in order to afford the negative socio-economic effects engendered by the poor health episode, such as increased medical expenditures[5]. Alternatively, the worker may prefer to opt out of the labor market in order (i) to replace her spouse effort in home production activities and (ii) to provide the care eventually needed. Keeping on working may entail to consider the market as the provider of both (i) the goods previously home produced and (ii) the medical assistance for the partner. If the resulting costs are higher than the rewards of remaining employed, for instance in terms of labor income and pension wealth accrual, the individual might choose to leave her job.

Several works, such as Blau (1998), Blau et al. (1999), Jimènez et al. (1999) and Pozzebon and Mitchell (1989), document the presence of coordination between couple members labor supply. As pointed out by Michaud (2003), this relationship is likely to be established by spouses preference towards spending their time in the same occupational state. Additionally, in our set-up considering partner employment position is suitable in order to control for its close link with her own health. Not allowing for one of these factors could give rise to misleading estimates of the parameters of interest and imputing to a variable effects that are actually due to the other. As an example, the effect of spouse health on the labor supply of an individual described by a specification not allowing for spouse labor market outcomes could reflect the impact it is intended to capture along with the one produced by the omitted variable, since those who are healthier experiment higher chances of being employed, *ceteris paribus*[6].

[5] See Berkowitz and Qiu (2006), Rosen and Wu (2004) and Wu (2003) for a discussion concerning the impact of couple members health conditions on household wealth accumulation and saving decisions.

[6] Rice et al. (2007) and Zucchelli et al. (2007) investigate how the labor supply of older workers is affected by the health and employment status of the other couple member. Remarkably, they consider a sample consisting of both married and unmarried individuals. This

The paper is organized as follows. In Section 2 we briefly review the issues about the measurement of health conditions in an econometric framework. Section 3 describes data and sample selection. Section 4 contains the results of descriptive nonparametric duration analysis. Section 5 is aimed at presenting the specifications adopted to produce the main results of this study, which are reported in Section 6. Finally, Section 7 concludes.

2 Measuring health conditions

Health conditions are difficult to gauge correctly at an empirical level. Several datasets collect the opinion of individuals concerning their own health status, the so-called self-defined health status. Respondents are asked to rank their own physical and mental conditions according to a predefined scale, which usually spans from very good to very poor. This information is shown to be correlated with mortality indexes, as documented by Currie and Madrian (1999), and widely used in empirical works. Moreover, it presents the advantage of summarizing in a single variable all the information that contributes to determine the overall physical and mental conditions.

However, the opinion of an individual concerning her own health may be driven by factors unlikely to be available to the researcher, such as her concept of fair health status. As a result, people in the same health conditions may rank them differently because of unobserved heterogeneity causing the incomparability of self-assessments in the population and, consequently, their unreliability. Nevertheless, the same conclusion applies even when the unobserved heterogeneity is assumed to be person-specific as well as time-varying. If it is the case, an individual experiencing the same health conditions in different time periods may self-rate them differently because its concept of fair health status has changed over time.

How to measure health properly is an open question. Bound et al. (1999) and Disney et al. (2006), exploit the information conveyed by more circumstantial health indicators, like indexes of functional activity or the diagnosis of severe health conditions, in order to purge self-assessments from the effects of in-

different sample selection prevents us from comparing our results with those produced by their analyses.

dividual unobserved heterogeneity. The validity of this approach crucially relies on the assumption that these detailed health indexes are measured according to a scale common to all population and not altered by individual characteristics.

Alternatively, other studies, like Berkowitz and Qiu (2006) and Wu (2003), gauge health condition just on the basis of the more objective health information mentioned above. However, although such indicators are less likely to be error-ridden, this advantage comes at the cost of potentially discarding other aspects relevant to define appropriately health status[7].

A further approach is to use anchoring vignettes. Its main drawback lies in the fact that its implementation crucially depends on the design of the survey questionnaire. In fact, this method consists of asking respondents to rate short hypothetical vignettes, or scenarios, describing different severity levels of health. Hence, vignettes could provide an estimate of the effects produced by unobserved person-specific heterogeneity in the determination of self-assessments. By relating individuals self-described health to the way they describe the vignettes, it is hypothetically possible to translate responses from different individuals to a scale that is comparable across different population groups and over time[8].

The unavailability of anchoring vignettes in the ECHP questionnaire and the necessity of exploiting all the relevant information to cast a reliable estimate of the health conditions of an individual lead us to tackle the likely measurement error of health self-assessments following the strategy proposed by Bound et al. (1999).

3 Data and sample selection

The ECHP survey[9] is designed by Eurostat and carried out yearly between 1994 and 2001 collecting information about European Union (EU) citizens aged 16 or over and living in Germany, Denmark, Netherlands, Belgium, Luxembourg, France, United Kingdom (UK), Ireland, Italy, Greece, Spain, Portugal, Austria,

[7] An ulterior strategy is that of considering self-assessments jointly with more detailed indicators, as proposed in Jimènez et al. (1999). We think that summarizing health conditions in an unique variable is more appropriate to simplify the interpretation of the parameters and avoid redundancy problems.

[8] In the Survey of Health, Ageing and Retirement (SHARE) the description of anchoring vignettes is asked to a subsample of respondents for each country. By doing this, it is possible to purge self-assessments from unobserved country-specific heterogeneity.

[9] See Peracchi (2002) for an introduction.

Finland and Sweden. ECHP is featured by a multipurpose questionnaire dealing with demographics, income, labor participation, education, training, health, social relations and migration.

The actual availability of variables relevant for the scopes of this work forces our sample to consist of the information conveyed by the 1995-2001 waves of ECHP about married employed individuals[10] aged 46-65 and resident in Denmark, Netherlands, Belgium, Ireland, Italy, Greece, Spain, Portugal, Austria and UK.

Table (1) contains the number of observations and individuals in the sample used for the following analyses. As it is displayed, the sample is stratified by gender and splits employees from self-employed. Table (2) shows how in all the groups of interest more than 85% of workers and their spouses report to be in at least fair health[11]. This is not striking, at least for workers, because, in general, their health should be good enough to allow them to carry out a job. In addition, it is shown how most spouses are themselves employed, conveying raw empirical evidence in favor of the hypothesis asserting that couple members prefer to spend their time in the same labor market position.

The focus of this analysis lies on the transition towards not employment. More precisely, we consider individuals employed at time $t = 1995, ..., 2000$ and look at their employment status in $t + 1$ by means of a dichotomous variable taking on value 1 if the individual moves to a not-employment state for whatever reason and 0 otherwise.

Table (3) points out that males at work experiment a lower probability of being not-employed in the next time period than females. Notably, this gap appears to be more sizeable for self-employed and widely goes up with age. Further, future labor market attachment is shown to be positively related to health measured at time t according to individual self-assessments. For instance, 8% of female employees in good health conditions at time $t = 1995, ..., 2000$ do not carry out a job in $t+1$, but this percentage more than doubles when we look at their counterparts in bad health. Moreover, workers with a spouse in bad

[10] Note that the unit of interest is the married individual and not the couple. This amounts to say that if the spouse of a worker in the sample does not satify the eligibility criteria in terms of age and employment, her labor supply dynamics is not considered.

[11] Health self-assessments are defined according to a scale distinguishing 5 health levels, very good, good, fair, bad, very bad.

health conditions face a higher probability of exiting the state of employed[12]. While 13% of female employees with a partner in poor health quit their job, this percentage falls to 9% when those with a partner in good health are considered. This is in line with the view that workers cope with a bad shock on their spouses health by leaving their job and enhancing their role in home activities. Finally, it should be noted that the occupational patterns of couple members are shown to be correlated. In particular, for employees, the probability of becoming not employed drops by about one half when the cohabiting partner is not working.

We argue that examining the transitions out of employment in our sample may actually describe retirement from labor market because of the small probability of finding a new job exhibited by the population not at work in this age interval. More precisely, as documented in Table (4), among married individuals aged 46-65 only 5% (7%) of women (men) not employed at time t are at work at time $t+1$. It is worth noting how these re-employment rates exhibit cross-country variability. While in Denmark about 10% of individuals not at work find a job within the next year, in Italy this percentage diminishes to 3% and 6% respectively for women and men.

4 Nonparametric duration analysis

In this section labor supply dynamics are explored by means of a nonparametric duration analysis. The goal is to provide an estimate of the association between the probability of keeping on working in the future and the explanatory variables of interest. Our approach consists of (i) stratifying the sample according to such variables and (ii) comparing the Kaplan-Meier estimates of the survival functions obtained for the so-formed groups.

We first consider the effect on the employment patterns of a married worker exerted by changes in her own health. As before, health is measured according to the self-assessments provided by ECHP and ranked according to three distinct levels: good, fair and bad[13].

As documented in Figure (1), healthier female employees have higher chances

[12] We are conditioning on spouses health at time t. The same timing choice holds for their labor market position, which will be examined later.

[13] An individual is assumed to be in good (bad) health if she declares to be in at least good (at most bad) health conditions.

of remaining at work in the future. For instance, while the probability of keeping on working amounts on average to about 50% for women aged 55 in at least fair health, it drops by more than one half for their counterparts in poor health. Remarkably, the health differentials are not negligible even for individuals aged 60 or over. Figure (2) points out that although, as expected, male employees present higher chances of remaining employed than women, the positive relationship between employment chances and health is magnified. While at age 55 those in either good or fair health experience at least 70% of chances of remaining at work next year, this probability falls dramatically to 25% for workers in bad health conditions. As before, the gap between individuals in bad health conditions and those healthier is still evident at older ages. Analogous considerations hold when self-employed are looked at.

Next, we conduct a similar analysis taking into account the association between the probability of remaining employed and partner health conditions. Figure (3) displays how female employees with a spouse in at least fair health steadily face higher probabilities of keeping on working. Figure (4) confirms this pattern for male employees. Notably, the gap between the three health-groups is sharper than in the case of women.

Turning to self-employed, the health conditions of the partner do not seem to play an active role in women labor supply dynamics. The opposite is found for men. In this case, the estimates of the survival functions are clearly separated and point to a negative relationship between the probability of ceasing from work and spouse health conditions.

To summarize, apart from the self-employed women case, the results of this descriptive analysis are consistent with the view according to which living with unhealthy spouses causes a decline in the time spent in the labor market because workers find more profitable either providing the medical assistance or replacing partner effort in the home production of goods.

Finally, we look at the relationship between the probability of remaining employed of a married individual and the labor market position of her partner. Figures (5) and (6) points out that employees with a spouse at work are more likely to carry on working. This evidence confirms the hypothesis that couple members prefer to spend their time endowment in the same occupational state.

On the contrary, when self-employed are looked at, this evidence holds for males but not for females. For this group the probability of keeping on working seems not to be affected by the labor participation of their spouses.

All these findings are confirmed by the log-rank test, which formally checks the equality between the Kaplan-Meier estimates of the survivor functions. The complete set of results is reported in Table (5).

The appeal of this nonparametric approach lies in the fact that it does not impose any functional assumption on the probability of remaining employed. This implies to allow for explanatory variables only by means of sample stratifications. As a result, conditioning on a wider set of control factors may lead to small sample size problems and, consequently, to unreliable and imprecise estimates. The next section intends to set up an econometric framework aimed at overcoming these limitations.

5 Linear probability model

The transition towards not employment is defined by a dichotomous variable y_{it} that takes on value 1 if an individual i employed at time t moves to a state of not employment within $t+1$ and 0 otherwise. We assume that y_{it} is determined by a linear probability model specification, such that

$$y_{it} = \beta_0 + \boldsymbol{\beta}_1' \mathbf{x}_{it} + \boldsymbol{\beta}_2 \mathbf{h}_{it} + \boldsymbol{\beta}_3 \mathbf{sh}_{it} + \beta_4 se_{it} + c_i + e_{it}. \quad (1)$$

Whereas the vector $\mathbf{x}_{it}$ contains control factors, $\mathbf{h}_{it}$ and $\mathbf{sh}_{it}$ indicate the set of variables characterizing the health conditions of, respectively, the individual i and her spouse at time t. The labor market position of the partner at time t is described by the dummy se_{it}, taking on value 1 if she is employed and 0 otherwise. Finally, the error term e_{it} is for the moment assumed to be uncorrelated with the explanatory variables[14].

Although this set-up discards the evaluation of the state-dependence[15] in

[14] All the inference presented in the paper is robust to unknown (i) heteroskedasticity and (ii) autocorrelation at the individual level of the error term.

[15] See Heckman (1981) and Wooldridge (2002) for an introduction to the econometric techniques usually adopted to estimate the state-dependence in stochastic processes and Cappellari et al. (2007) for an application of such specifications to the study of the labor supply of older workers in UK.

labor supply determination, it explicitly models the potential transition out of employment of individuals currently at work. Hence, this specification strategy is particularly suited to capture the effects of the variables of interest on the individual decision of *keeping on* working in the future, which is the major concern of this work.

Our framework allows for the existence of time-invariant unobserved heterogeneity, denoted by the term c_i, relevant for both the labor supply of a married individual and all the factors in the right-hand-side of the model. Neglecting this issue may end up in obtaining only measures of the partial association between y_{it} and the explanatory variables. Following Chamberlain (1984), we assume that

$$c_i = \tau + \gamma' \overline{\mathbf{x}_i^c} + a_i. \tag{2}$$

where τ is an intercept, $\overline{\mathbf{x}_i^c}$ collects the averages over time of time-varying explanatory variables and a_i is a stochastic component. Plugging (2) in (1) leads to

$$y_{it} = \widetilde{\beta}_0 + \boldsymbol{\beta}_1' \mathbf{x}_{it} + \boldsymbol{\beta}_2 \mathbf{h}_{it} + \boldsymbol{\beta}_3 \mathbf{sh}_{it} + \beta_4 se_{it} + \gamma' \overline{\mathbf{x}_i^c} + u_{it}, \tag{3}$$

where $\widetilde{\beta}_0 = \beta_0 + \tau$ and $u_{it} = e_{it} + a_i$. Particularly important for our purposes, this specification strategy permits us to allow for unobserved time-invariant characteristics, such as past socio-economic conditions, affecting both the employment and the health outcomes of couple members.

At first, health conditions are described by a set of dummies defined according to self-assessments. As in the previous section, we distinguish among three levels of psychophysical well-being: good, fair and bad, which is the baseline.

Next, we tackle the issue of the measurement error potentially affecting self-assessments by estimating an alternative health index as in Bound et al. (1999). In this case, the health variables in $\mathbf{h}_{it}$ and $\mathbf{sh}_{it}$ are the linear predictions of ordered probit specifications that regress couple members health self-ratings at a given time t on all the contemporaneous exogenous variables of the model[16]

[16] That is, $\overline{\mathbf{x}_i^c}$, $\mathbf{x}_{it}$ and $\mathbf{ze}_{it}$, which includes the additional instruments used to address the possible endogeneity of spouse labor market position.

and a set of more objective indicators, $\mathbf{zh}_{it}$[17]. Information collected in the latter vector should refer to precise aspects of the physical and mental conditions of couples members, whose measurement cannot be altered by their beliefs and perceptions. In other words, such health indicators should be gauged according to a scale common to all population and not affected by person-specific heterogeneity. Exploiting the health section of ECHP questionnaire, the vector $\mathbf{zh}_{it}$ collects, for each spouse, three dummy variables, the first equals to one if the individual has spent at least one night in a hospital during the last twelve months, whereas the remaining two indicate the consultation with either a general practitioner or a medical specialist during the same reference period[18]. Once health indexes are calculated, their predicted values are plugged in $\mathbf{h}_{it}$ and $\mathbf{sh}_{it}$.

Although health indexes are obtained by means of first-stage regressions, OLS point estimates are still consistent but their variance and covariance matrix is not valid because it does not reflect the sample variability of the generated explanatory variables. Hence, hypothesis testing is performed by bootstrapping nonparametrically the overall estimation procedure[19].

Problems arising in rating health conditions lead us to discard the fixed effects (FE) approach in estimating (1) since this method crucially relies on the time-variation exhibited by regressors. If the changes over time characterizing the health status of an individual are at least partially spurious and attributable to reporting errors, FE may exacerbate the bias coming from the unobserved heterogeneity involved in the determination of self-assessments. Hence, we argue that in our context Chamberlain technique is safer to purge the estimates of the parameters of interest from the effect of c_i, even when corrections for measurement error are taken into account.

5.1 Endogeneity of spouse labor supply

As long as spouse employment status is considered exogenous, the parameters of interest in (3) are estimated by standard OLS technique. Removing this assumption translates into switching towards an instrumental variable (IV) ap-

[17] In order to allow for more flexibility in the estimation of health indexes, the ordered probit regressions are run separately for each wave.

[18] Totally, the vector $\mathbf{zh}_{it}$ consists of six variables.

[19] See Wooldridge (2002) for further details on the bootstrap technique.

proach[20].

The feasibility of the IV strategy relies on the availability of additional instruments $\mathbf{ze}_{it}$. In particular, we need an exogenous source of variation correlated with the employment position of the spouse se_{it}. A natural candidate is the yearly employment rate calculated for the population of individuals of the same gender and living in the same country as the spouse at time t. This indicator is reckoned by exploiting the waves 1995-2000 of ECHP as released by Eurostat. As long as they provide representative samples for the countries participating to the survey, valid estimates of domestic employment rates can be calculated on the basis of this data source. Further, this choice permits to calculate the employment rates for age-intervals narrower than those usually considered by official statistics. We group the respondents aged at most 20 and assemble their older counterparts according to age-classes three-year long.

Each wave is stratified by country, gender and age-classes. For each respondent in each stratum we calculate the proportion of the *other* group-members at work. Excluding individuals from the calculation of their associated employment rate is crucial to solve our endogeneity problem. In fact, instrumenting the spouse labor supply with an index depending on this variable itself would not tackle appropriately this issue because it might be endogenous as well. Instead, our approach allows us to obtain a measure that is (i) informative of the labor market conditions faced by individuals similar[21] to the spouse and (ii) constructed without exploiting the information on her own actual labor supply.

This *ad-hoc* employment rate is expected to be a valid instrument since it should be correlated with the labor market participation of the spouse but, conditional on the other observables, have a negligible influence on the employment outcomes of the other couple member.

More specifically, the consistency of the IV estimates based on $\mathbf{ze}_{it}$ requires (i) the information in $\mathbf{ze}_{it}$ to be correlated with the potential endogenous variable (*relevance of additional instruments*) and (ii) the whole set of instruments to be uncorrelated with the error term u_{it} (*validity of instruments*). Finally,

[20] IV estimation is carried out in STATA® using the *ivreg2* routine by Baum, Schaffer and Stillman (2007).

[21] Two individuals are defined as similar if they belong to the same group. As it is clear, there is a trade-off between the precision in measuring the similarity among individuals and the ensuing sample size of the groups.

(iii) if the right-hand-side variables in equation (3) are exogenous, OLS estimates should be preferred because of their higher efficiency (*exogeneity*).

While the hypotheses of validity of instruments and exogeneity are checked by carrying out respectively the usual Hansen[22] and Hausman[23] tests, the relevance of additional instruments is tested by regressing the potential endogenous variable on the whole set of instruments[24] and conducting a test of joint insignificance for the variables in $\mathbf{ze}_{it}$.

When generated health indexes are adopted, inference is carried out by bootstrapping the whole IV strategy. Notably, whereas the variance and covariance matrices considered to test the properties (i) and (iii) are estimated by bootstrapping the corresponding auxiliary regressions, the p-value of the Hansen test is calculated as the fraction of times the bootstrapped test statistics are higher than the one obtained from the original sample.

Finally, it is worth noting that when dealing with the endogeneity of binary explanatory variables, linear probability models turn out to be computationally advantageous if compared to other discrete choice specifications. While the latters usually require the implementation of cumbersome nonlinear estimation methods, the consistency of the standard IV technique is unaffected by the nature of the endogenous covariate.

6 Results

Labor supply dynamics are described allowing for time dummies, country dummies, couple members age and education[25], household size, number of children aged less than 16, labor income, other household income, job characteristics (blue/white collar), sector of employment and number of years of contribution as

[22] The overindentification is attained by including in $\mathbf{ze}_{it}$ an additional variable, along with the employment rate described above. For males and female employees $\mathbf{ze}_{it}$ is augmented with the interaction between the *ad-hoc* employment rate and the number of children aged 16 or less living in the household. For self-employed females $\mathbf{ze}_{it}$ takes in the squared *ad-hoc* employment rate.

[23] We consider the usual regression-based Hausman test. See Wooldridge (2002) for ulterior explanations.

[24] In every time period t the set of instruments is made up of $\mathbf{ze}_{it}$, $\overline{\mathbf{x}_i^c}$, $\mathbf{x}_{it}$, and the vectors of health variables $\mathbf{h}_{it}$ and $\mathbf{sh}_{it}$, regardless of their definition.

[25] Workers age is described by a set of four dummies, (i) aged 50 or less, (ii) aged 51-54, (iii) aged 55-59, (iv) aged 60 or over, which is the baseline. Instead, partners age is controlled by a second degree polynomial. Education is described by means of three dummies based on the ISCED code, (i) primary education (ISCED 0-2), secondary education (ISCED 3), high education (ISCED 5-7), which is the baseline.

of the time the worker enters the sample[26]. Following Chamberlain (1984), the time-invariant unobserved heterogeneity is controlled for by enriching the specifications with the averages over time of worker age and age squared, household size, number of children aged less than 16, labor income and other household income[27].

We look at the results of two different specifications. The former takes the self-defined health status of couple members as reliable indicators of their psychophysical well-being. In this case, the parameters on health variables represent the average differential effect on the probability of becoming not employed with respect to the baseline, i.e. being in poor health. The latter addresses the issue concerning the potential measurement error affecting health self-ratings by adopting the alternative indicator suggested in Bound et al. (1999). This specification identifies the average changes in the outcome of interest produced by marginal variations in the health indexes. In both cases, the impact of couple members health is allowed to vary across workers age by interacting the health variables with a dummy taking on value 1 if the worker is aged 54 or less (*younger worker*) and 0 otherwise (*older worker*).

Although the OLS estimates are illustrated in Tables (8)-(11), for sake of brevity we comment only on IV results since the Hausman test reveals that the exogeneity assumption for spouse labor supply is generally rejected by data. The consistency of the IV strategy is based on (i) the relevance of the additional information collected in $\mathbf{ze}_{it}$ and (ii) the not-rejection by the Hansen test of the null hypothesis of validity for the overall set of instruments. Tables (6) and (7) summarize the IV point estimates of the causal effects of changes in partner labor supply and couple members health on the probability of transition towards not employment of a married worker. Tables (12)-(15) contain an extended set of results, including the IV specification tests.

In general, the estimates of the parameters on the main control factors report the expected sign and the unobserved heterogeneity c_i seems to play an active role in the determination of transitions towards not employment. This

[26]We include the interactions between time dummies and a dummy taking on value 1 if the respondent live in Southern Europe, namely Portugal, Spain, Italy and Greece. Also, we include the interaction between number of years of contribution and having at least secondary education (ISCED$\geq$3). Years of contribution are approximated using the age at the first job.

[27]In other words, the vector $\overline{\mathbf{x}_i^c}$ collects these averages.

latter evidence is produced by conducting a test of joint insignificance for all the parameters on the variables in $\overline{\mathbf{x}_i^c}$ assumed to describe the deterministic component of the unobserved dynamics.

Table (6) shows the results of the specifications describing health by means of self-assessments. The first column refers to female employees. As expected, healthier women present a significantly lower probability of leaving the initial state of employed. Irrespective of age, being in good health conditions is associated with an average increase of about 8 percentage points in the likelihood of remaining at work. Conversely, whereas the positive impact of experiencing fair health conditions amounts to 6 percentage points for younger workers, it attenuates and becomes statistically negligible when the older counterparts are considered. Comparing these IV point estimates with the corresponding raw differences highlights that netting out observable and unobservable characteristics usually reduces the effect object of study. Nevertheless, it remains sizeable and generally significant.

For younger employees, living with a partner in good (fair) health conditions induces an increase in the probability of ceasing from work of 5 (4) percentage points. Instead, for older workers, while the good health of the partner induces a significant rise of 4 percentage points in the likelihood of leaving the state of employed, the effect of fair health dissolves. It is noteworthy that the raw variation suggests an opposite and smaller effect, probably due to different sample compositions faded away at least partially by the set of control factors used in this regression analysis. Finally, our results point to the coordination between couple members employment status. When the spouse is at work, the future labor force attachment increases on average by 10 percentage points.

Next, we move to examine the results for self-employed females. Regardless of their age, healthier workers face a lower risk of leaving the state of employed. On the contrary, cohabiting with healthier spouses reduces the labor force attachment. For self-employed aged 54 or less, living with a partner in good (fair) health conditions makes stopping work in the future more likely by 10 (6) percentage points. This impact shrinks with age and for older individuals only having a partner in good health conditions is found to yield a significant drop in the likelihood of keeping on working. Finally, as in the employees case, an employed spouse induces an increase in the probability of carrying on work.

All these findings are overall upheld when male employees are looked at. Instead, a different pattern emerges for self-employed males. In this case, changes in their partners psychophysical well-being are not expected to bring about significant variations in their probability of ceasing from work.

The adoption of the alternative health index does not alter qualitatively the results. Table (7) documents that improvements in the psychophysical well-being of a worker are still estimated to have a positive impact on her likelihood of remaining employed, whereas the opposite pattern is found for the health of the cohabiting partner. Note that in the case of self-employed males the Hausman test fails to reject the null (Table 15), and then spouse labor supply can be taken as exogenous. This amounts to say that OLS results in Table (11) should be considered in view of their higher efficiency.

7 Conclusions

The empirical analysis in this paper exploits the information conveyed by the waves 1995-2001 of the European Community Household Panel (ECHP) to examine the labor supply determinants of married workers aged 46-65. More specifically, we look at individuals employed at time $t = 1995, ..., 2000$ and focus on their likelihood of moving towards not employment within $t+1$. Using linear probability model specifications, our goal is to assess the impact on the probability of keeping on working determined by variations in the health conditions of workers and in those of their cohabiting partners.

The overall physical and mental conditions of individuals are difficult to measure correctly. In this study they are first described by their self-assessments. This information is documented to be correlated with mortality indexes and collapses in a single variable all the aspects relevant to gauge the psychophysical well-being of a person. In spite of this, its determination may depend on unobserved heterogeneity producing a measurement error and prejudicing the comparability of self-ratings in the population. We follow the approach proposed by Bound et al. (1999) in order to filter out self-ratings from the unobserved dynamics causing their unreliability.

The specifications adopted to describe labor supply dynamics allow for a wide set of control factors, in particular the employment position of partners. This choice is suggested by (i) the evidence provided by the wide research vein asserting the presence of coordination between the labor market outcomes of couple members and (ii) the close relationship existing between the health and the employment status of an individual. Hence, not allowing for partners labor supply could lead to (i) the exclusion of a relevant determinant of the optimal allocation of leisure for married workers and (ii) the parameter on partner health to capture even the effect that should be imputed to her own employment status, providing a misleading assessment of the causal effect of interest.

Health of married workers is estimated to affect significantly their employment conditions. In fact, in line with the existing literature, those who are healthier are always shown to report higher chances of remaining at work in the future.

In addition, apart from the case of self-employed males, we provide evidence of a positive relationship between spouse health and the probability of giving up working. Our findings are in line with Pozzebon and Mitchell (1989), who find that in US married females with a sick spouse experiment a higher labor market attachment. Their results can be rationalized adducing the necessity to afford the costs of professional care and the incentives to work yielded by the fact that their job may furnish health insurance coverage to their partners. Although the need of purchasing medical assistance is likely to represent a major reason even in our context, the same does not hold for job-related health insurance, which is an institutional arrangement considerably more widespread in the US than in Europe. Our findings show that European married workers with sick partners are shown to increase their likelihood of keeping on working even in the absence of this policy. The introduction of such plans may strengthen this link but at the cost of producing a negative effect on the propensity to work of the spouses themselves, as described by Buchmueller and Valletta (1999) and Chou and Staiger (1997).

A further explanation for the pattern proposed by our results could be that better physical and mental conditions of the partner induce a rise in leisure attractiveness that diminishes the labor market attachment of the worker. However, discerning whether the impact of couple members health on their labor market outcomes is driven by an effect on the system of preferences or on the budget constraint requires the specification of structural models and it is beyond the scopes of this work.

Finally, when the partner is employed, the likelihood of ceasing from work is always estimated to drop. Our results support the hypothesis that, even conditioning on their health, couple members prefer to spend their time in the same employment state and that there exists coordination between their labor supply due to observable and unobservable determinants. This well-known pattern should play an important role in the design of policies aimed at enhancing the employment rates of older workers. For instance, pension systems allowing women to retire earlier than men are expected to produce a twofold effect on the labor supply of couple members. On the one hand, wives are expected to be more prone to leave the state of employed, *ceteris paribus*. On the other hand, their increased propensity to stop working induces a detrimental impact on their husbands labor supply driven by the coordination mechanism. Discarding these dynamics may translate in missing an important part of the process underlying the employment decisions of married workers.

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Table 1: Europe, married workers aged 46-65. For each population of interest we report the sample size and the number of individuals between brackets.

Country	Females		Males	
	Employees	Self-employed	Employees	Self-employed
Denmark	1,560	89	1,863	239
	(466)	(35)	(511)	(81)
Belgium	1,984	192	3,751	333
	(641)	(79)	(1102)	(123)
Netherlands	807	179	1,632	327
	(272)	(60)	(488)	(99)
Ireland	955	229	1,708	1,113
	(333)	(92)	(527)	(346)
Italy	2,040	835	4,603	2,501
	(628)	(290)	(1364)	(756)
Greece	718	1,424	2,281	3,215
	(249)	(464)	(697)	(904)
Spain	1,097	581	3,560	1,615
	(409)	(222)	(1111)	(502)
Portugal	1,919	1,505	3,282	2,253
	(577)	(481)	(923)	(668)
Austria	1,007	494	2,015	484
	(330)	(165)	(618)	(171)
UK	2,576	266	2,704	825
	(687)	(93)	(719)	(239)
Total	14,663	5,794	27,399	12,905
	(4,592)	(1,981)	(8,060)	(3,889)

Source: ECHP 1995-2001.

Table 2: Europe, married workers aged 46-65. For each population of interest we report the sample composition in percentage terms by age, health, spouse health and spouse labor participation.

Variable	Females		Males	
	Employees	Self-employed	Employees	Self-employed
By age				
54 or less	75.60	58.03	68.59	51.39
55 or over	24.40	41.97	31.41	48.61
By health				
Good	68.44	56.51	72.47	67.05
Fair	25.79	32.33	23.25	26.35
Bad	5.77	11.17	4.28	6.60
By spouse health				
Good	67.02	54.19	66.18	64.72
Fair	24.99	31.77	25.66	25.73
Bad	7.99	14.03	8.16	9.55
By spouse labor participation				
Not employed	23.67	22.68	48.34	48.52
Employed	76.33	77.32	51.66	51.48

Source: ECHP 1995-2001. Note: Health status is defined according to self-assessments.

Table 3: Europe, married workers aged 46-65. For each population of interest we report the proportion of transitions towards not employment stratifying the sample according to age, health, spouse health and spouse labor participation.

Variable	Females		Males	
	Employees	Self-employed	Employees	Self-employed
By age				
54 or less	7.24	12.17	3.95	2.70
55 or over	18.14	20.76	15.74	11.51
By health				
Good	8.15	14.66	6.43	4.98
Fair	12.08	14.84	9.31	9.18
Bad	20.80	24.11	19.42	18.54
By spouse health				
Good	8.84	15.35	6.56	5.16
Fair	11.62	16.02	9.20	9.25
Bad	13.32	16.85	11.67	13.22
By spouse labor participation				
Not employed	16.02	18.72	10.27	8.24
Employed	8.00	14.91	5.20	5.79
Total	9.90	15.77	7.65	6.98

Source: ECHP 1995-2001. Note: Health status is defined according to self-assessments. Proportions are expressed in percentage terms.

Table 4: Europe, married workers aged 46-65. For each population of interest we report by country the proportions of not-employed individuals moving towards employment within the next year.

Country	Females	Males
Denmark	10.08	10.16
Belgium	5.06	4.25
Netherlands	2.60	3.28
Ireland	6.40	11.34
Italy	2.80	5.85
Greece	4.65	8.22
Spain	4.13	8.50
Portugal	7.42	10.26
Austria	3.46	3.42
UK	6.44	7.72
Total	4.67	7.02

Source: ECHP 1995-2001.

Table 5: Europe, married workers aged 46-65. Results of the log-rank test maintaing the null hypothesis of equality among the survivor functions of the groups obtained stratifying the sample by health, spouse health and spouse labor participation.

Variable	Females		Males	
	Employees	Self-employed	Employees	Self-employed
Health				
	105.32	22.19	168.21	122.58
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Spouse health				
	8.82	1.75	19.22	40.84
	(0.0122)	(0.4163)	(0.0001)	(0.0000)
Spouse labor participation				
	35.96	0.45	71.37	3.24
	(0.0000)	(0.5027)	(0.0000)	(0.0718)

Source: ECHP 1995-2001. Note: We report the test statistics and the p-value between brackets. Health status is defined according to self-assessments.

Table 6: Europe, married workers aged 46-65. IV linear probability model estimates of the effects on the likelihood of transition towards not employment produced by discrete changes in spouse employment position and couple members health. Health is defined according to individual self-assessments. Raw differences in the sample are reported in italics.

Variable	Females		Males	
	Employees	Self-employed	Employees	Self-employed
All				
Employed spouse	-9.85 **	-33.90 ***	-18.89 **	-23.13 **
	-8.03	*-3.81*	*-5.07*	*-2.45*
Aged 54 or less				
Good health	-7.65 ***	-6.11 **	-7.88 ***	-4.51 **
	-11.07	*-5.48*	*-11.71*	*-8.62*
Fair health	-5.93 ***	-6.64 ***	-7.51 ***	-2.49
	-8.63	*-7.07*	*-10.25*	*-6.13*
Spouse good health	4.57 ***	9.74 ***	4.13 *	1.38
	-1.96	*1.63*	*-3.15*	*-4.25*
Spouse fair health	3.52 **	6.49 ***	3.49 **	1.61
	-0.54	*0.64*	*-1.57*	*-2.24*
Aged 55 or over				
Good health	-8.15 ***	-11.20 ***	-6.67 ***	-7.29 ***
	-11.18	*-9.39*	*-10.82*	*-14.12*
Fair health	-2.56	-9.51 ***	-4.58 **	-4.71 **
	-5.05	*-9.19*	*-7.83*	*-10.17*
Spouse good health	4.48 *	7.03 *	4.22 **	3.16
	-3.98	*-1.49*	*-2.87*	*-7.04*
Spouse fair health	3.25	3.47	3.44 **	3.79
	-0.82	*-1.63*	*-0.60*	*-2.82*

Source: ECHP 1995-2001. Note: Effects are expressed in terms of percentage points. The baselines are (i) spouse not at work, (ii) bad health and (iii) spouse bad health. Details on the estimation results are provided by Tables (12) and (13). ***: p-value ≤ 0.01, **: $0.01 <$ p-value ≤ 0.05, *: $0.05 <$ p-value ≤ 0.1.

Table 7: Europe, married workers aged 46-65. IV linear probability model estimates of the effects on the likelihood of transition towards not employment produced by changes in spouse employment position and couple members health. Health is measured according to a linear index obtained following Bound et al. (1999). Raw differences in the sample are reported in italics.

Variable	Females		Males	
	Employees	Self-employed	Employees	Self-employed
All				
Employed spouse	-9.69 **	-31.75 ***	-19.33 **	-23.00
	-8.03	*-3.81*	*-5.07*	*-2.45*
Aged 54 or less				
Health	-1.98 ***	-3.20 ***	-3.23 ***	-3.28 ***
Spouse health	1.14	2.78 **	1.33 **	0.69
Aged 55 or over				
Health	-2.43 ***	-3.66 ***	-2.78 ***	-3.39 ***
Spouse health	1.44 **	3.11 ***	1.28 **	0.89

Source: ECHP 1995-2001. Note: Effects are expressed in terms of percentage points. The baseline for spouse employment position is being not at work. Details on the estimation results are provided by Tables (14) and (15). ***: p-value $\leq$ 0.01, **: 0.01 $<$ p-value $\leq$ 0.05, *: 0.05 $<$ p-value $\leq$ 0.1.

Table 8: Europe, married female workers aged 46-65. Effects on the probability of transition towards not employment within the next year estimated by OLS linear probability model. Specifications allow for time and country dummies, spouses age and education, household size, number of children aged less than 16, labor income, job characteristics, sector of employment, years of contribution up to the time the worker enters the sample, other household income. For each parameter we report the point estimate and the standard error between brackets.

Variable	Employees	Self-employed
Employed spouse	-0.0211 ***	-0.0442 ***
	(0.0073)	(0.0140)
Aged 54 or less		
Good health	-0.0741 ***	-0.0558 **
	(0.0158)	(0.0248)
Fair health	-0.0575 ***	-0.0581 **
	(0.0162)	(0.0249)
Spouse good health	0.0228 **	0.0141
	(0.0106)	(0.0193)
Spouse fair health	0.0176	0.0048
	(0.0110)	(0.0195)
Aged 55 or over		
Good health	-0.0762 ***	-0.1022 ***
	(0.0251)	(0.0294)
Fair health	-0.0219	-0.0910 ***
	(0.0259)	(0.0269)
Spouse good health	0.0219	0.0009
	(0.0194)	(0.0267)
Spouse fair health	0.0180	-0.0115
	(0.0201)	(0.0241)
$H_0 : c_i = 0$	21.62 ***	6.56 ***
Num. Of Obs.	14,663	5,794
Num. Of Ind.	4,592	1,981

Source: ECHP 1995-2001. Note: Inference is robust to arbitrary heteroskedasticity and autocorrelation of the error terms at the individual level. Health is defined according to individual self-assessments. $H_0 : c_i = 0$ is a test of joint insignificance for all the parameters of the specification assumed to describe c_i. ***: p-value ≤ 0.01, **: $0.01 <$ p-value ≤ 0.05, *: $0.05 <$ p-value ≤ 0.1.

Table 9: Europe, married male workers aged 46-65. Effects on the probability of transition towards not employment within the next year estimated by OLS linear probability model. Specifications allow for time and country dummies, spouses age and education, household size, number of children aged less than 16, labor income, job characteristics, sector of employment, years of contribution up to the time the worker enters the sample, other household income. For each parameter we report the point estimate and the standard error between brackets.

Variable	Employees	Self-employed
Employed spouse	-0.0188 ***	-0.0198 ***
	(0.0038)	(0.0048)
Aged 54 or less		
Good health	-0.0702 ***	-0.0512 ***
	(0.0134)	(0.0162)
Fair health	-0.0711 ***	-0.0365 **
	(0.0135)	(0.0165)
Spouse good health	-0.0023	-0.0225 *
	(0.0072)	(0.0118)
Spouse fair health	0.0044	-0.0117
	(0.0075)	(0.0122)
Aged 55 or over		
Good health	-0.0555 ***	-0.0669 ***
	(0.0193)	(0.0186)
Fair health	-0.0391 **	-0.0522 ***
	(0.0197)	(0.0185)
Spouse good health	0.0173	-0.0104
	(0.0130)	(0.0134)
Spouse fair health	0.0188	0.0048
	(0.0135)	(0.0136)
$H_0 : c_i = 0$	23.58 ***	9.96 ***
Num. Of Obs.	27,399	12,905
Num. Of Ind.	8,060	3,889

Source: ECHP 1995-2001. Note: Inference is robust to arbitrary heteroskedasticity and autocorrelation of the error terms at the individual level. Health is defined according to individual self-assessments. $H_0 : c_i = 0$ is a test of joint insignificance for all the parameters of the specification assumed to describe c_i. ***: p-value ≤ 0.01, **: $0.01 <$ p-value ≤ 0.05, *: $0.05 <$ p-value ≤ 0.1.

Table 10: Europe, married female workers aged 46-65. Effects on the probability of transition towards not employment within the next year estimated by OLS linear probability model. Specifications allow for time and country dummies, spouses age and education, household size, number of children aged less than 16, labor income, job characteristics, sector of employment, years of contribution up to the time the worker enters the sample, other household income. For each parameter we report the point estimate and the standard error between brackets.

Variable	Employees	Self-employed
Employed spouse	-0.0191 ***	-0.0425 ***
	(0.0072)	(0.0131)
Aged 54 or less		
Health	-0.0188 ***	-0.0348 ***
	(0.0069)	(0.011)
Spouse health	0.0039	0.0062
	(0.0059)	(0.0091)
Aged 55 or over		
Health	-0.0232 ***	-0.0386 ***
	(0.007)	(0.0111)
Spouse health	0.0070	0.0087
	(0.0061)	(0.0094)
$H_0 : c_i = 0$	139.78 ***	45.50 ***
Num. Of Obs.	14,663	5,794
Num. Of Ind.	4,592	1,981

Source: ECHP 1995-2001. Note: Inference is robust to arbitrary heteroskedasticity and autocorrelation of the error terms at the individual level. Health is measured according to a linear index obtained following Bound et al. (1999). Standard errors are computed bootstrapping 500 times the two-step estimation strategy. $H_0 : c_i = 0$ is a test of joint insignificance for all the parameters of the specification assumed to describe c_i. ***: p-value $\leq$ 0.01, **: 0.01 $<$ p-value $\leq$ 0.05, *: 0.05 $<$ p-value $\leq$ 0.1.

Table 11: Europe, married male workers aged 46-65. Effects on the probability of transition towards not employment within the next year estimated by OLS linear probability model. Specifications allow for time and country dummies, spouses age and education, household size, number of children aged less than 16, labor income, job characteristics, sector of employment, years of contribution up to the time the worker enters the sample, other household income. For each parameter we report the point estimate and the standard error between brackets.

Variable	Employees	Self-employed
Employed spouse	-0.0185 ***	-0.0209 ***
	(0.0039)	(0.0047)
Aged 54 or less		
Health	-0.0311 ***	-0.0253 ***
	(0.0044)	(0.0049)
Spouse health	0.0055	-0.0077
	(0.0040)	(0.0050)
Aged 55 or over		
Health	-0.0264 ***	-0.0267 ***
	(0.0047)	(0.0051)
Spouse health	0.0051	-0.0061
	(0.0041)	(0.0050)
$H_0 : c_i = 0$	132.84 ***	62.27 ***
Num. Of Obs.	27,399	12,905
Num. Of Ind.	8,060	3,889

Source: ECHP 1995-2001. Note: Inference is robust to arbitrary heteroskedasticity and autocorrelation of the error terms at the individual level. Health is measured according to a linear index obtained following Bound et al. (1999). Standard errors are computed bootstrapping 500 times the two-step estimation strategy. $H_0 : c_i = 0$ is a test of joint insignificance for all the parameters of the specification assumed to describe c_i. ***: p-value ≤ 0.01, **: $0.01 <$ p-value ≤ 0.05, *: $0.05 <$ p-value ≤ 0.1.

Table 12: Europe, married female workers aged 46-65. Effects on the probability of transition towards not employment within the next year estimated by IV linear probability model. Specifications allow for time and country dummies, spouses age and education, household size, number of children aged less than 16, labor income, job characteristics, sector of employment, years of contribution up to the time the worker enters the sample, other household income. For each parameter we report the point estimate and the standard error between brackets.

Variable	Employees	Self-employed
Employed spouse	-0.0985 **	-0.3390 ***
	(0.0463)	(0.0998)
Aged 54 or less		
Good health	-0.0765 ***	-0.0611 **
	(0.0158)	(0.0254)
Fair health	-0.0593 ***	-0.0664 ***
	(0.0162)	(0.0254)
Spouse good health	0.0457 ***	0.0974 ***
	(0.0171)	(0.0351)
Spouse fair health	0.0352 **	0.0649 ***
	(0.0151)	(0.0293)
Aged 55 or over		
Good health	-0.0815 ***	-0.1120 ***
	(0.0254)	(0.0307)
Fair health	-0.0256	-0.0951 ***
	(0.0262)	(0.0281)
Spouse good health	0.0448 *	0.0703 *
	(0.0240)	(0.0373)
Spouse fair health	0.0325	0.0347
	(0.0225)	(0.0299)
$H_0 : c_i = 0$	133.00 ***	40.35 ***
F-test	112.07 ***	26.23 ***
Hansen test	0.29	0.31
Hausman test	3.05 *	9.81 ***
Num. Of Obs.	14,663	5,794
Num. Of Ind.	4,592	1,981

Source: ECHP 1995-2001. Note: Inference is robust to arbitrary heteroskedasticity and autocorrelation of the error terms at the individual level. Health is defined according to individual self-assessments. $H_0 : c_i = 0$ is a test of joint insignificance for all the parameters of the specification assumed to describe c_i. The IV approach controls for the endogeneity of spouse employment status. F-test is a test of joint insignificance of the additional instruments in the IV first-stage regression. ***: p-value ≤ 0.01, **: $0.01 <$ p-value ≤ 0.05, *: $0.05 <$ p-value ≤ 0.1.

Table 13: Europe, married male workers aged 46-65. Effects on the probability of transition towards not employment within the next year estimated by IV linear probability model. Specifications allow for time and country dummies, spouses age and education, household size, number of children aged less than 16, labor income, job characteristics, sector of employment, years of contribution up to the time the worker enters the sample, other household income. For each parameter we report the point estimate and the standard error between brackets.

Variable	Employees	Self-employed
Employed spouse	-0.1889 **	-0.2313 **
	(0.0878)	(0.1243)
Aged 54 or less		
Good health	-0.0788 ***	-0.0451 **
	(0.0148)	(0.0186)
Fair health	-0.0751 ***	-0.0249
	(0.0143)	(0.0196)
Spouse good health	0.0413 *	0.0138
	(0.0237)	(0.0261)
Spouse fair health	0.0349 **	0.0161
	(0.0176)	(0.0221)
Aged 55 or over		
Good health	-0.0667 ***	-0.0729 ***
	(0.0208)	(0.0202)
Fair health	-0.0458 **	-0.0471 **
	(0.0207)	(0.0196)
Spouse good health	0.0422 **	0.0316
	(0.0188)	(0.0290)
Spouse fair health	0.0344 **	0.0379
	(0.0164)	(0.0249)
$H_0 : c_i = 0$	127.65 ***	54.46 ***
F-test	17.95	8.51 ***
Hansen test	0.32	0.07
Hausman test	4.18 **	3.64 *
Num. Of Obs.	27,399	12,905
Num. Of Ind.	8,060	3,889

Source: ECHP 1995-2001. Inference is robust to arbitrary heteroskedasticity and autocorrelation of the error terms at the individual level. Health is defined according to individual self-assessments. $H_0 : c_i = 0$ is a test of joint insignificance for all the parameters of the specification assumed to describe c_i. The IV approach controls for the endogeneity of spouse employment status. F-test is a test of joint insignificance of the additional instruments in the IV first-stage regression. ***: p-value ≤ 0.01, **: $0.01 <$ p-value ≤ 0.05, *: $0.05 <$ p-value ≤ 0.1.

Table 14: Europe, married female workers aged 46-65. Effects on the probability of transition towards not employment within the next year estimated by IV linear probability model. Specifications allow for time and country dummies, spouses age and education, household size, number of children aged less than 16, labor income, job characteristics, sector of employment, years of contribution up to the time the worker enters the sample, other household income. For each parameter we report the point estimate and the standard error between brackets.

Variable	Employees	Self-employed
Employed spouse	-0.0969 **	-0.3175 ***
	(0.0481)	(0.1004)
Aged 54 or less		
Health	-0.0198 ***	-0.0320 ***
	(0.0070)	(0.0114)
Spouse health	0.0114	0.0278 **
	(0.0073)	(0.0123)
Aged 55 or over		
Health	-0.0243 ***	-0.0366 ***
	(0.0070)	(0.0116)
Spouse health	0.0144 **	0.0311 ***
	(0.0075)	(0.0126)
$H_0 : c_i = 0$	141.70 ***	45.63 ***
F-test	197.64 ***	53.14 ***
Hansen test	0.16	0.30
Hausman test	2.73 *	7.64 ***
Num. Of Obs.	14,663	5,794
Num. Of Ind.	4,592	1,981

Source: ECHP 1995-2001. Note: Inference is robust to arbitrary heteroskedasticity and autocorrelation of the error terms at the individual level. Health is measured according to a linear index obtained following Bound et al. (1999). Standard errors are computed bootstrapping 500 times the two-step estimation strategy. $H_0 : c_i = 0$ is a test of joint insignificance for all the parameters of the specification assumed to describe c_i. The IV approach controls for the endogeneity of spouse employment status. F-test is a test of joint insignificance of the additional instruments in the IV first-stage regression. ***: p-value ≤ 0.01, **: $0.01 <$ p-value ≤ 0.05, *: $0.05 <$ p-value ≤ 0.1.

Table 15: Europe, married male workers aged 46-65. Effects on the probability of transition towards not employment within the next year estimated by IV linear probability model. Specifications allow for time and country dummies, spouses age and education, household size, number of children aged less than 16, labor income, job characteristics, sector of employment, years of contribution up to the time the worker enters the sample, other household income. For each parameter we report the point estimate and the standard error between brackets.

Variable	Employees	Self-employed
Employed spouse	-0.1933 **	-0.2300
	(0.0862)	(0.1453)
Aged 54 or less		
Health	-0.0323 ***	-0.0328 ***
	(0.0048)	(0.0077)
Spouse health	0.0133 **	0.0069
	(0.0057)	(0.0117)
Aged 55 or over		
Health	-0.0278 ***	-0.0339 ***
	(0.0050)	(0.0078)
Spouse health	0.0128 **	0.0089
	(0.0057)	(0.0119)
$H_0 : c_i = 0$	122.46 ***	52.65 ***
F-test	34.41 ***	15.68 ***
Hansen test	0.20	0.15
Hausman test	4.09 **	2.09
Num. Of Obs.	27,399	12,905
Num. Of Ind.	8,060	3,889

Source: ECHP 1995-2001. Note: Inference is robust to arbitrary heteroskedasticity and autocorrelation of the error terms at the individual level. Health is measured according to a linear index obtained following Bound et al. (1999). Standard errors are computed bootstrapping 500 times the two-step estimation strategy. $H_0 : c_i = 0$ is a test of joint insignificance for all the parameters of the specification assumed to describe c_i. The IV approach controls for the endogeneity of spouse employment status. F-test is a test of joint insignificance of the additional instruments in the IV first-stage regression. ***: p-value ≤ 0.01, **: $0.01 <$ p-value ≤ 0.05, *: $0.05 <$ p-value ≤ 0.1.

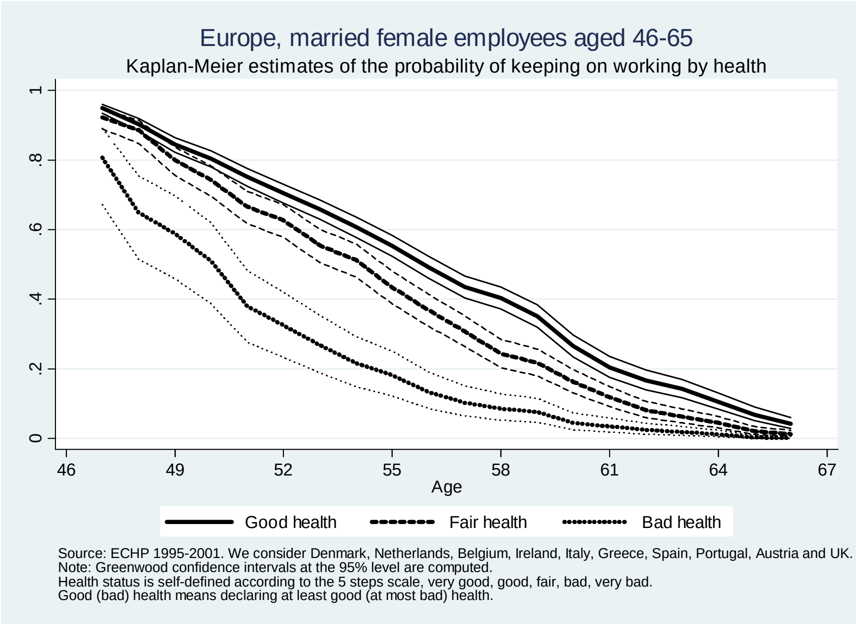

Figure 1: Nonparametric duration analysis.

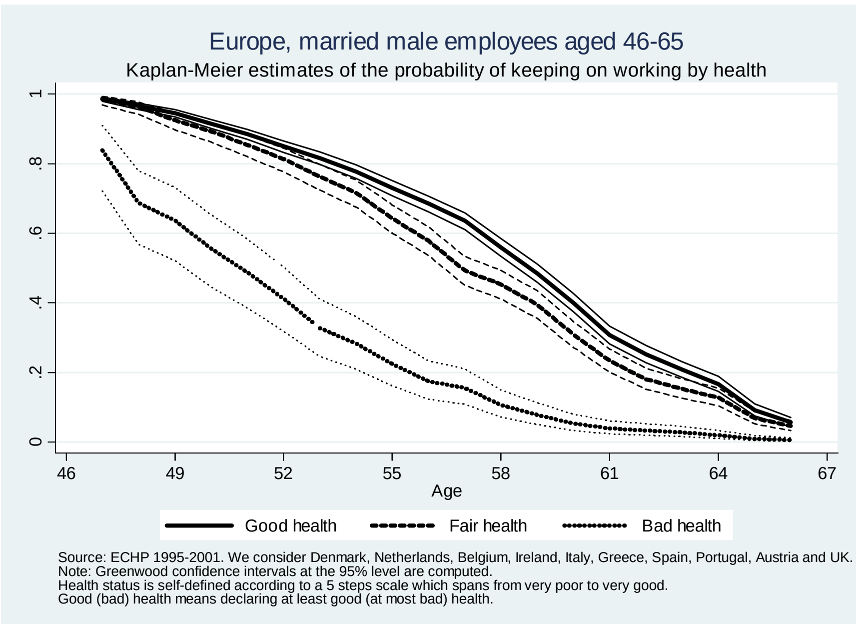

Figure 2: Nonparametric duration analysis.

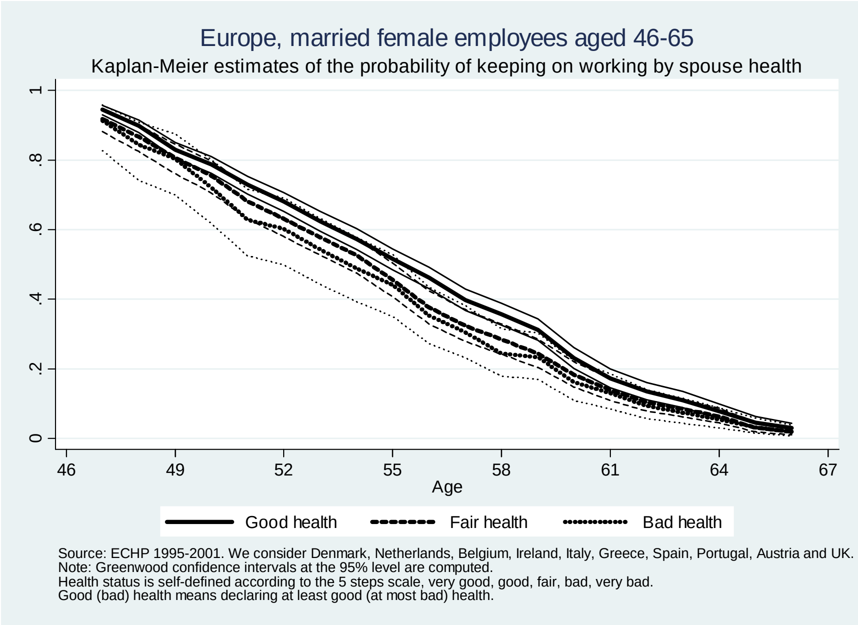

Figure 3: Nonparametric duration analysis.

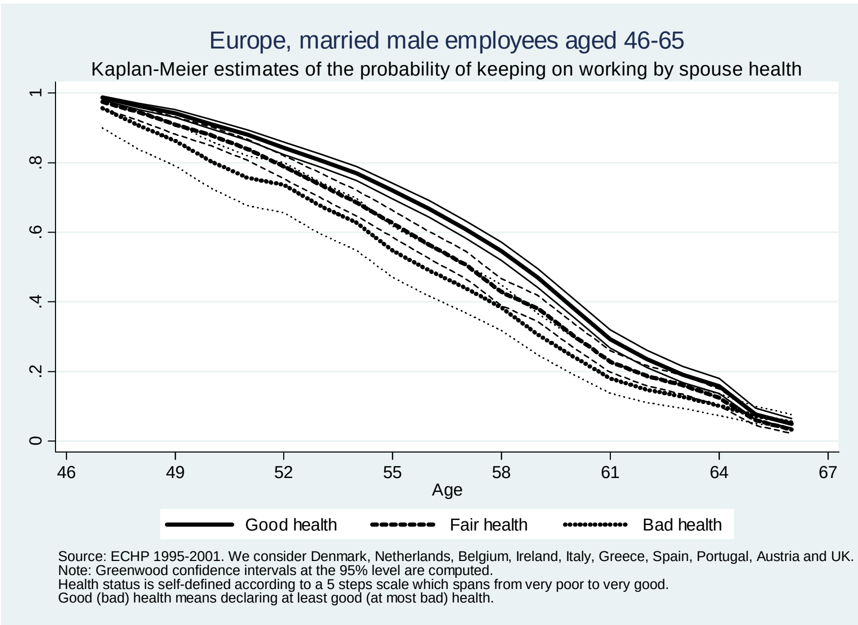

Figure 4: Nonparametric duration analysis.

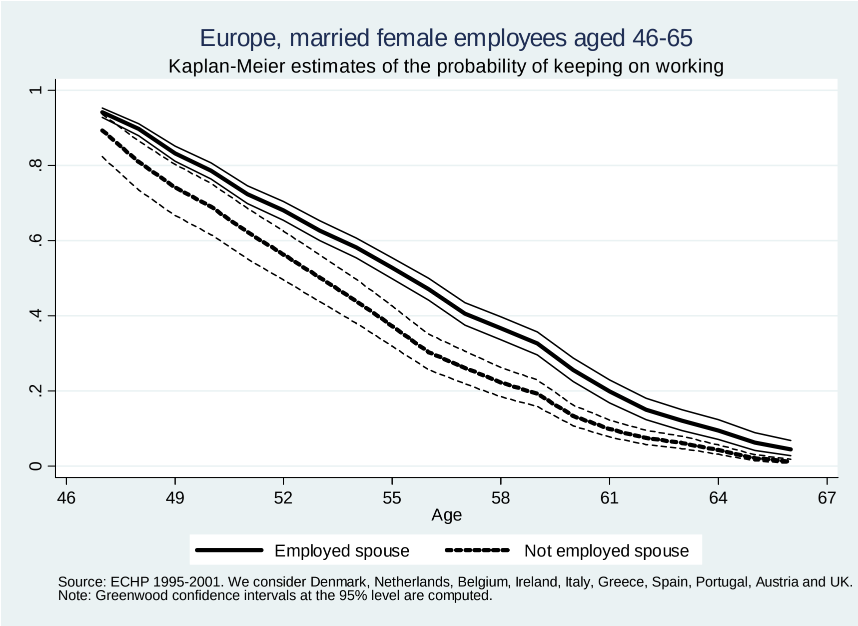

Figure 5: Nonparametric duration analysis.

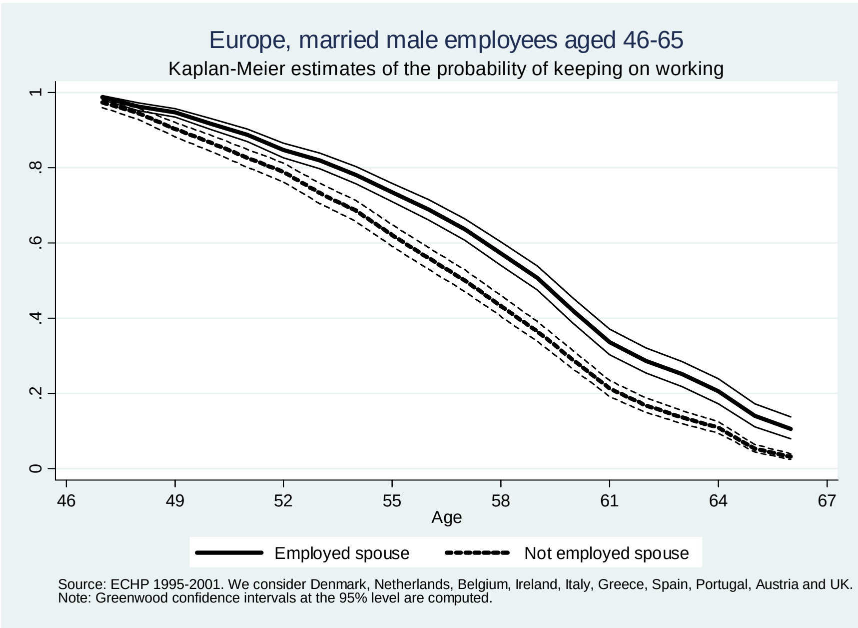

Figure 6: Nonparametric duration analysis.