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The impact of health on wages in Europe – Does gender matter?

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ABSTRACT

The impact of income and earnings on health has been well-examined in the literature while the impact of health on wages has been far less studied. Even rarer in previous work is the possible difference between the influences of health on wages for men versus women. As there is such a divergence between men and women in developed countries regarding both wages and health, studying the interaction of health and wages and how the relationship differs by gender is an important addition to our understanding of the complex relationship between health and labour market outcomes. The analysis draws on individual level data from up to eight waves of the European Community Household Panel (ECHP). Estimation procedures are applied to unbalanced panels from 14 different countries. The samples consist of employed adults aged 24 to 64 years. The data is used in estimation of Mincer-type wage functions where the natural logarithm of an individual's hourly wage is function of a number of individual specific characteristics such as age, education, work experience, type of job, and health. Two health variables are included: self-assessed health status and an indicator of chronic illness or disability. The first estimates are obtained from pooled ordinary least squares. Further estimates are obtained from random effects and fixed effects panel models. A gender-related difference in the association between health and wages has been found in several of the countries examined however; these differences are not the same in magnitude. For a number of countries, there appears to be no significant gender difference. Overall, self-assessed health has greater effects on men's wages than women's, while chronic illness appears to be more significant for women. The largest "gender-gap" seems to exist in France, Portugal, Spain and the United Kingdom.

Keywords: gender, self-assessed health, wages, unbalanced panel, ECHP, Mincer wage equation

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1. INTRODUCTION

There are marked differences between men and women in developed countries with respect to both health and labour market characteristics. In particular, the existence of a gender gap in wages and earnings has been long-noted. The sources of this gender gap in various countries have been studied to a reasonable extent. The impact of experience, education, training and a vast number of other individual characteristics have been analyzed in previous studies. However, very few have considered health as a potential factor in differences between the hourly wages of men and women. This paper, using panel data from a number of European countries, investigates whether or not health has an impact on labour market productivity as indicated by hourly wages and whether this health effect differs by gender.

Cross-country comparisons should help to explain the existence (or non-existence) of the gender differences in the effect of health on wages by allowing to account for institutional and cultural differences. For instance, if there is a greater impact of health on wages for women than men in northern versus southern Europe, one may be able to analyze the cultural and political environments in these areas to determine whether differences in societal attitudes or workplace conditions and regulations contribute to such differences.

In order to address whether there are differences across Europe regarding the relationship between men's and women's health and wages, this present analysis involves estimation of earnings functions for men and women. The data for the present analysis comes from eight waves of the European Community Household Panel (ECHP) data set and includes unbalanced panels from fourteen European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom[1]. The econometric treatment involves pooled ordinary least squares estimation, the random effects panel estimator and the fixed effects panel estimator.

The remainder of the paper proceeds as follows. Section 2 summarizes previous studies which are relevant to the present analysis. Section 3 outlines the model and econometric techniques used. The data and variables are discussed in section 4. The estimation results are discussed in section 5. Finally, Section 6 serves as a conclusion.

2. PREVIOUS STUDIES

The idea of health having an effect on wages or earnings is theoretically grounded in the concept of individual health as a component of human capital. Human capital theory has been extended much since its inception in the 1950s. Much of the literature has focused on returns to education and training. The first model of the returns to schooling was introduced by Mincer (1958) and since then there has been much analysis of human capital investment. While returns to investment in education and training have received much attention, relatively less interest has been paid to the role of health in human capital. One of the earliest mentions of health in relation to human capital is from Becker (1962) who points out nutrition and medical care as means of investing in human capital. Mushkin (1962) also examined how investments in health add to capital.

Health as an important component of human capital was especially emphasized by Becker (1964) and Fuchs (1966). Subsequently, Grossman (1972) developed the premier model of the demand for health capital. Health can be viewed as a consumption good or an investment good. People desire good health for the utility gained directly from being in a good health state (consumption element) as well as for the utility gained from the impact of

[1] The data set contains two series pertaining to Germany (the original ECHP data and SOEP data), Luxembourg (the original ECHP data and PSELL data), and the United Kingdom (the original ECHP data and BHPS data). The Luxembourg PSELL data is not included here as it does not contain the relevant health variable. The ECHP Data also covers Sweden, with data from non-ECHP survey, but this country is excluded from the analysis as it does lacks a number of essential earnings variables.

health on market and non-market activities (investment element). In the Grossman model, health is treated as a component of human capital in which one will invest so as to increase the number of hours one can work as well as one's level of productivity. It is this treatment of health that motivates studying the link between health and earnings. According to this framework, a higher health stock is expected to increase earnings through not only greater hours of work but also through increased productivity of the worker. The returns of investment in human capital can be examined through estimation of wage or earnings functions.

Research into the capital returns to health investment typically involves the estimation of earnings, income or wage functions. Mincerian wage functions[2] have probably been the most utilized form in such work. Luft (1975) examines the relationship between various components of earnings, including wages, and indicators of illness and disability. The analysis involves fairly simple mean analysis and regression analysis using a cross-section of adults from the United States. This is one of the earliest papers to distinguish between men and women when presenting the results, as many early papers involved analysis of males only. Luft finds that the impact of poor health on earnings is greater for women than men but this differs slightly by race. While Luft differentiates between men and women, this is not the focus of the analysis and it goes on to aggregate the impact of illness and disability on income.

Bartel and Taubman (1979) examine data on US-born male twins and find that the presence of various diseases decreases labour supply and wage rates. Berkowitz *et al* (1983) study the impact of health on wages, labour supply and annual earnings only for white males. They find negative effects of a number of poor health indicators on wages. An important feature of their paper is that Berkowitz *et al* examine not only labour supply effects of health

[2] The Mincer-type wage equation is discussed in Section 3.

but also effects on earnings and wages. Lee (1982) also bases analysis of adult males in the US on the Grossman model and finds that wages and health are strongly jointly dependent. While wages have a strong positive effect on the demand for health, good health is also found to increase market productivity. Again, a major shortcoming of Lee is that the sample excludes females. Similarly, Haveman *et al* (1994) analyze the health of male adults. They use panel data and find that lagged ill-health (as indicated by a categorical variable) reduces wages.

The early work on the impact of health on wages has largely been limited to analysis of males and often only cross-sectional data. However, as data on females and longitudinal data becomes more readily available, more comprehensive studies have been produced. Mullahy and Sindelar (1993) examine the different effects of alcoholism on labour market outcomes for men and women. Their results seem to depend on the control variables included and on the dependent variable chosen. They find differences between the genders in terms of the effect on income but find a negative impact of alcoholism on participation for both sexes. Similarly, Baldwin and Johnson (1994) analyze discrimination based on disability by sex in the United States. They find large differences in employment rates and wages between disabled and non-disabled men. An overview of the American literature related to health and labour market outcomes is presented by Currie and Madrian (1999). They include not only wages and health status but also look at health insurance, employment, hours of work, retirement and a number of other outcomes. Their survey suggests that poor health has significant impacts on wages and other labour market outcomes but cite that quantifying such effects can be sensitive to the choice of health measure included in analysis.

A more recent relevant study is from Contoyannis and Rice (2001). They use the first six waves of the BHPS and estimate the earnings function using various estimators. Contoyannis and Rice split their sample by sex and while gender inequalities are not their main focus, they do discuss some of the differences between men and women and recognize the importance of partitioning the sample by sex. They use single equation fixed effects and random effects instrumental variable estimators. Included in the analysis are variables indicating marital status, work experience, age, occupational class, unionization, and education. Their results show a significant impact of psychological well-being on the hourly wage for men and a significant impact of self-assessed health on women's wages.

3. MODEL AND METHODS

As previously stated, this analysis involves use of pooled ordinary least squares (OLS), random effects (RE) and fixed effects (FE) techniques to estimate a Mincer-type earnings function in which the natural logarithm of hourly wage is given as a function of a number of regressors which include indicators of health status. The sample is split by sex and separate estimations are made for men and women from each country. Variables indicating age, education, work experience, type of work and other important characteristics of the individuals are included so that the health effect on wages may be isolated.

The earnings function is well-known in labour economics. It has developed with human capital theory and over the years there have been a number of amendments to the original specification. Mincer's model of earnings (1974) has been used as the framework for estimating the role of returns to schooling and work experience. It has also been used to consider the difference in these returns between men and women. The standard form of the Mincer earnings model relates earnings to schooling and experience as follows:

$$\ln[w(s,x)] = \alpha_0 + \rho_s s + \beta_0 x + \beta_1 x^2 + \varepsilon \qquad \textbf{(1)}$$

where w is hourly wage, s is level of schooling, x is work experience and ε is a mean zero residual with $E(\varepsilon \mid s, x) = 0$. The coefficients on s, x and x^2 represent the returns to schooling and work experience[3], respectively. In equation (1) it is assumed that the constant term and slope coefficients are identical for all individuals. However, a more general model would not make such a restriction and would allow returns to schooling and experience, as well as the constant term, to differ across individuals as follows:

$$\ln[w(s_i, x_i)] = \alpha_{0i} + \rho_{si} s_i + \beta_{0i} x_i + \beta_{1i} x_i^{\ 2} + \varepsilon_i \qquad \textbf{(2)}$$

Equation (2) represents the random coefficient model of the earnings function.

Three important implications of Mincer's model are (i) log-earnings experience profiles are parallel across schooling levels; (ii) log-earnings age profiles diverge with age across schooling levels; and (iii) the variance of earnings over the lifetime has a U-shaped pattern. These implications of Mincer's model have been largely supported by the literature.[4]

For the analysis here, it is necessary to further augment the standard Mincer specification (1), as it has been in much work subsequent to the original. Most relevant here is to include a relationship between health and earnings in the specification. Additionally, the model must allow for the panel nature of the data and for other important variables to be included. Such allowances result in the following:

$$W_{it} = X_{it}\beta + \alpha_i + \eta_{it}, \; i = 1, \ldots, N, \; t = t_i, \ldots, T_i \qquad \textbf{(3)}$$

[3] Experience is often represented as the number of years since a person has left full-time education. This is a measure of *potential* work experience. This measure has been found appropriate in examining the wages of men but less suitable for analysis of females. Potentially then, there is a risk of misspecification when using this measure to indicate experience. Another possibly useful measure, which is used in this analysis is tenure or number of years in particular occupation.

[4] Heckman, Lochner and Todd (2003) examine the evidence obtained through use of Mincer's earnings function and find it largely supportive of the model, even with modifications for variables not considered in the original specification.

where *i* represents each individual and *t* each time period for which there is data on the individual. As the working sample is an unbalanced panel it is necessary to indicate that individuals do not necessarily appear in all time periods and the total number of periods for which there is information on a respondent is individual-specific. The time subscript here ranges from t_i to T_i rather than from 1 to T as is the case for a balanced panel. W_{it} is the natural logarithm of hourly wage and; X_{it} is a vector of time-varying, individual specific regressors including age, work experience, health and others. In the data used for this application, there are no individual level variables that are time-invariant for all individuals however, some individuals exhibit some time-invariant characteristics. α_i and η_{it} are disturbance terms. α_i is time-invariant, individual-specific and is assumed to be *iid* $N(0, \sigma_\alpha^2)$ whereas η_{it} is time-varying and assumed *iid* $N(0, \sigma_\eta^2)$. It is assumed that the time-varying disturbances, η_{it}, are not correlated with the explanatory variables or with the other disturbances, α_i. The time-invariant, individual effects, α_i, may be correlated with some of the explanatory variables. However, given the absence of time-invariant exogenous variables in the data, the Hausman-Taylor IV approach, as used by Contoyannis and Rice (2001), cannot be implemented.

In all estimations there are additional assumptions that should be noted. The first estimation technique implemented here is pooled OLS. In this procedure, the panel structure of the data is ignored and all observations are treated in a combined fashion. OLS is unbiased and consistent as long as the errors (v_{it}) are not correlated with the observable explanatory variables (x_{it}), that is, OLS will achieve a consistent estimates if $E(x_{it}' v_{it}) = 0$ where $v_{it} = \alpha_i + \eta_{it}$. This is however, a restrictive assumption. Inference using OLS requires estimation of the robust covariance matrix and robust test statistics. Pooled OLS will be inefficient as there is within-individual correlation of the errors. The benefit of the information inherent in the panel is not fully exploited through OLS estimation and so other estimation procedures that do exploit this information are also implemented.

Panel estimation allows us to control for individual heterogeneity and improve efficiency. Similar to the OLS estimator, but taking advantage of the panel data is the second estimator used – the random effects estimator (RE). Like OLS, RE puts the individual effect, α_i, in the error term. It imposes stricter assumptions than pooled OLS – strict exogeneity in addition to orthogonality between the individual effects and the observable explanatory variables. A stronger conditional mean independence is necessary to substantiate inference. The strict exogeneity assumption can be stated as $E(\eta_{it}|x_i, \alpha_i) = 0$ and the orthogonality assumption as $E(\alpha_i|x_i) = E(\alpha_i) = 0$. For consistency, the usual rank condition for GLS is also necessary: rank $E(\mathbf{X}_i'\mathbf{\Omega}^{-1}\mathbf{X}_i) = K$ where $\mathbf{\Omega}$ is the unconditional variance matrix of $\mathbf{v}_i$, $\mathbf{\Omega} \equiv E(\mathbf{v}_i\mathbf{v}_i')$. Efficiency of RE requires that $E(\boldsymbol{\eta}_i\boldsymbol{\eta}_i' | \mathbf{x}_i, \alpha_i) = \sigma_u^2\mathbf{I}_T$ (conditional variances are constant and conditional covariances are zero), and $E(\alpha_i^2 \mid \mathbf{x}_i) = \sigma_\alpha^2$ (same as $Var(\alpha_i|\mathbf{x}_i) = Var(\alpha_i)$ – homoskedasticity assumption on the unobserved effect, α_i). When all previous conditions are satisfied, RE is asymptotically equivalent to generalized least squares (GLS).

The random effects model may be reasonable to use in this context as the sample is drawn from a large population. It also saves many degrees of freedom. However, there is a major drawback of the RE model as it assumes that the random error associated with each cross-sectional unit is uncorrelated with any of the other regressors. This assumption may be unrealistic and failure to meet this assumption may result in biased estimates.

The fixed effects, or within, estimator is the third method employed. The FE estimator is unbiased and consistent as N and/or $T \rightarrow \infty$ even if α_i is correlated with the regressors. The FE estimator is however, likely to be inefficient. The first assumption of the FE model is that of strict exogeneity of the explanatory variables conditional on α_i: $E(\eta_{it}|\mathbf{x}_i,\alpha_i) = 0$. Unlike in the case of RE, orthogonality is not assumed here. In FE, $E(\alpha_i|\mathbf{x}_i)$ is allowed to be any function of $\mathbf{x}_i$. FE is more robust than RE however, time-constant factors in $\mathbf{x}_{it}$ drop out of the FE estimates. Under this first assumption of strict exogeneity FE results in unbiased estimates. The second assumption of FE is the standard rank condition on the matrix of time-demeaned explanatory variables: $rank\left(\sum E(\ddot{\mathbf{x}}'_{it}\ \ddot{\mathbf{x}}_{it})\right) = rank\left[E(\ddot{\mathbf{X}}'_{it}\ \ddot{\mathbf{X}}_{it})\right] = K$. This assumption illustrates why time-constant variables are not permitted in FE analysis as if an element of x_{it} that does not vary over time for any *i*, then $\ddot{\mathbf{X}}_{it}$ would contain a column of zeros for all *i*. To ensure efficiency of FE requires a third assumption: $E(\boldsymbol{\eta}_i\boldsymbol{\eta}_i'|\mathbf{x}_i,\alpha_i) = \sigma_\eta^2\mathbf{I}_T$ which implies that the idiosyncratic errors have a constant variance across all periods and are serially uncorrelated. Another important potential problem with the FE estimates here is that there is not a great deal of individual-level variation over time in many of the left-hand side variables. Under low variation of the regressors, the FE estimates can be imprecise (Wooldridge 2002).

4. DATA AND VARIABLES

The data used in this analysis comes from the ECHP survey. This survey consists of eight waves from 1994 to 2001, although not all countries contain data for all 8 waves. The ECHP versions of the Germany, Luxembourg and UK data are not available from 1997 onwards. Austria is not present in 1994. Finland is not present for 1994 and 1995. The countries used in the analysis are: Austria, Belgium, Denmark, Finland, France, Germany (ECHP and SOEP versions), Greece, Ireland, Italy, Luxembourg (ECHP version), the Netherlands, Portugal, Spain, and United Kingdom (ECHP and BHPS versions).

The sample for each country has been selected through dropping observations with missing information that is necessary for the analysis. The sample contains only those observations for which the individual is employed for pay. Self-employed persons, those in full-time education or training, retired individuals, and those in military or community service are eliminated from the sample. Economically inactive individuals and those working less than 15 hours per week are also dropped from the sample. The sample has been partitioned by sex and separate analyses have been performed for males and females. The total number of observations and the number of individuals present in each sample are given in Table 1. The German SOEP sample is the largest, while the Luxembourg sample is the smallest.

Dependent variable

Definitions of all variables are shown in Table 2. The dependent variable used is the natural logarithm of hourly wage. As there is no direct measure of hourly wage available in the data, information on total hours per week and gross monthly wages and salary was used to calculate the hourly wage for individuals. Table 3 indicates the average hourly wage for men and women in each sample. These values are given in local currency units and have not been adjusted for inflation. Also shown are the differences between male and female mean wages, in absolute and percentage terms. Amongst the 14 countries (16 samples) the United Kingdom is shown to have the greatest gender gap in wages as the average female wage is equal to 71.24% of the male average. The lowest difference between men and women seems to be in Portugal where the average hourly wage for women is 97.34% of men's.

Explanatory variables

The earnings function estimated here includes the typical explanatory variables involved in such analysis. However, the health variables, which have not typically been used in explaining hourly wages, are of greatest interest in this analysis. There are four health variables used in the estimation of the wage functions: *sah_vgood, sah_good, sah_fair,* and *chronprb*. These are all dummy variables. The first three variables correspond to a self-assessed health question in the ECHP. This question asks respondents "How is your health in general?” and offers five categorical responses: “very good”, “good”, “fair”, “bad”, and “very bad”.[5] The reference category for the self-assessed health status includes those individuals who indicated their health as “bad” or “very bad”. *sah_vgood, sah_good, sah_fair* are expected to have positive estimated coefficients as they represent better health than the reference category. Additionally, the magnitude of the *sah_vgood* coefficient is expected to be greatest of these as it indicates the best health status and hypothetically, the highest productivity. The proportions of respondents in each category of the self-assessed health variable and *chronprb* are shown in Table 4. For most of the countries, the greatest proportions of observations are in the two highest categories of self-assessed health, *sah_vgood* and *sah_good.* Portugal and Germany – SOEP, however, have less than 10% of all observations indicating “very good” self-assessed health while Greece has the highest percentage (69.94%, 68.56%). The fourth health variable, *chronprb,* indicates whether or not an individual has a chronic physical or mental health problem, illness or disability. This is a negative measure of health status as a value of one indicates the presence of one or more health problems and so the coefficient on *chronprb* is expected to be negative. Table 4 also outlines the distribution of observations for *chronprb*. For both males and females, Finland has the highest percentage of observations reporting one or more health problems (*chronprb* = 1) and Greece has the lowest such proportion. For all countries, less than 27% of male and 31% of female observations indicate the presence of chronic disability or illness.

There is not a great deal of individual variation in the health variables over time, as outlined in Table 5. The percentage of observations exhibiting changes in self-assessed health from one interview to the next ranges from 18.51% (UK) to 35.71% (UK – BHPS) for men and from 19.72% (UK) to 36.64% (UK - BHPS) for women. The proportion of observations for which there are changes in the value of *chronprb* is significantly smaller

[5] The wording of this question, as well as the categories for responses, is slightly different across countries.

than those with variation in self-assessed health. 4.27% (Italy) to 15.71% (Germany – SOEP) of males and 3.39% (Greece) to 16.97% (Germany – SOEP) of female observations show changes in health indicated by *chronprb*. In most countries, except Greece with respect to self-assessed health and Austria with respect to chronic illness, a smaller proportion of the sample indicates increases or improvements in health as opposed to decreases in health. It is important to realize that with small individual level variation in the health variables, the precision of the estimates, especially those obtained with fixed effects, may be adversely affected.

5. RESULTS

While the individual estimates for non-health variables are not reported here, Table 6 compares the expected signs of the coefficients on these variables to the estimated signs. The table outlines those samples for which the expected signs were not obtained. Tables 7, 8 and 9 outlines the results of estimation for the health variables for all samples obtained from OLS, RE, and FE, respectively.

Non-Health Variables

For the most part, the expected relationships between the non-health variables and hourly wages, as indicated by the coefficient signs, were as expected, *a priori.* However, as Table 6 indicates, there are some important exceptions to note. The majority of samples exhibit a concave relationship between age and wages. As the dependent variable is the log transformation of hourly wage, a positive coefficient on age would indicate a concave relationship between age and wages. The results also show that such a concave association also exists between the logarithm of wages and age. Unexpectedly, there is a negative OLS coefficient estimated for *age* and a positive coefficient for *agesq* for the male Austrian sample. However, the coefficient for *age* is not statically significant at any reasonable level and the *agesq* estimate is not significant at the 5% level. The FE estimates of the coefficient of *agesq* also have positive signs for the male sample from Greece and the female sample from Luxembourg. Neither of these coefficients is statistically significant at the 10% level. As the existence of a concave relationship between earnings and age has been shown widely across the labour literature, the unexpected signs here are not desirable results. The expected increase in wages associated with occupational classes is evident in the OLS and RE estimates for the first four categories (*manager, profess, tech, clerk*) but there are some contradictions to the expected positive signs for the FE estimates. A negative relationship between the natural logarithm of hourly wage and skilled agricultural and fishery workers (*agrfish*) is evident in a significant number of cases. It is plausible that the coefficient on *agrfish* should indeed be negative, particularly in countries with troubles in such primary industries and with limited government support for agricultural and fishery workers. The other negative coefficients associated with occupational classes may be due to industry conditions in particular regions. The high number of instances where FE results in unexpected signs for the occupational class coefficient estimates may reflect the low variation within individuals which is reasonable as certain constraints such as education and age may prevent people from moving between the classes to any great extent. For example, it is unlikely that poorly educated, older workers would move from unskilled or elementary occupations to professional or managerial occupations within the time considered here.

Working in the private sector was expected to have a positive impact on the log of hourly wages for men but a negative effect for women, as found by Disney and Gosling (1998), Dustmann and van Soest (1997), and many others. In the present analysis, there are some deviations from these expectations worth noting. For males, the OLS estimate on *private* is positive for 9 of the 16 samples. Negative coefficients for males persist across all estimators for France, Greece, Ireland, Luxembourg, and UK – BHPS. For females, the majority of coefficient estimates for *private* are negative however, Germany, Denmark and Finland have positive estimates with OLS, RE and FE.

The coefficients for *isced57* and *isced3* are expected to be positive as both variables indicate higher levels of education over the reference category. The majority of estimates for these coefficients are positive. There are more incidents where the estimate for the coefficient of *isced3* goes against expectation than for the highest level of education indicator, *isced57*. Again, the FE estimates vary the most in terms of sign.

As is expected with age, a concave relationship between years of experience in one's current job, *exp*, and wages is also expected. Once again, the expected positive coefficient for the linear term of experience would satisfy a concave relationship. However, the additional negative coefficient for the squared term indicates a concave relationship between wages and the logarithm of wages as well. This concave relationship is apparent for most samples but there are contradictions in some countries. The OLS and RE estimates on *age* are positive in all samples, while the FE estimate is negative for females in Austria. The estimates for *expsq* are negative as expected in most cases, except those indicated in Table 6. Another feature of these differences between the expected and estimated signs is that they are slightly more apparent amongst women than men. As noted earlier, the accuracy of any measure of experience may differ by sex. Experience is measured here as the number of years since a person started their current job. Admittedly, this measure may fully not account for absences due to maternity leave or for other reasons. However, it is likely a more accurate measure for women than is potential experience (the number of years since finishing school). The unexpected signs on the experience variables for women then may be in part due to the measure of experience not being a true representation for the female experience.

The other non-health variables included in the estimation have estimated coefficients that are largely reasonable according to *a priori* expectations and have not been included in Table 6.

Health Variables

The OLS and RE estimates obtain the hypothesized signs on the health variables in most instances but the FE estimates are not as frequently in accordance with expectations. For men, the expected positive sign of the OLS coefficient estimates for *sah_vgood*, *sah_good* and *sah_fair* is obtained for all except the Netherlands for *sah_fair* which is not statistically significant. The OLS coefficient estimate for *chronprb* is negative, as expected, for all male samples except Finland, Greece, Italy, Luxembourg, and UK. For these countries, the estimates are not statistically significant. For the female samples, all OLS coefficient estimates for *sah_vgood* and *sah_good* are positive, however, not all are statistically significant. In the case of *sah_fair,* all countries except Austria, Belgium, Germany and Germany-SOEP, have positive coefficient estimates, but only the estimates for France and Portugal are statistically significant. The negative coefficient for *chronprb* is obtained for all females except those in the samples from Austria, Germany, Greece, Ireland, Italy and Portugal.

The RE estimates for males are also positive for *sah_vgood* and *sah_good* for all countries. Once again, for *sah_fair* there are exceptions, as the coefficients for Belgium, Germany and the Netherlands are negative but not statistically significant. All except Belgium, Italy, Portugal and UK have negative coefficient estimates for *chronprb*, as expected. Only four countries have statistically significant estimates for *chronprb*: France, Germany-SOEP, Netherlands and UK – BHPS. For females, there are more exceptions to the expected positive coefficients on the self-assessed health variables according to the RE estimates than there are for males or the OLS estimates. Austria has a negative coefficient for *sah_vgood*, *sah_good* and *sah_fair*, but only the estimate for *sah_fair* is significant. Luxembourg also has a negative coefficient for *sah_good* as does Belgium for *sah_fair*. These negative coefficients are not statistically significant except for the coefficient on *sah_fair* for Austria. For all female samples except Germany, Ireland, Italy and Greece, the coefficients for *chronprb* are negative. The *chronprb* coefficient is significant only for Denmark and France.

The third set of estimates was obtained using fixed effects estimation. There are many more cases where the signs for the health coefficients are not as expected for the FE estimates than for the OLS and RE estimates. The number of statistically significant coefficients is also much lower for the FE estimates. For men, the expected positive signs of the self-assessed health variables are obtained for all countries except Austria, Belgium, Finland, Germany, Italy and the Netherlands. Only Belgium, Italy, Portugal, Spain, UK and UK – BHPS have unexpected positive coefficient estimates for *chronprb*. Only a few countries have statistically significant estimates for the health variables, and those that do have the expected signs. For women, there are more contradictions to hypotheses amongst the FE estimates. The coefficient for *sah_vgood* is negative for Austria, Belgium, Italy, Luxembourg and the Netherlands. Similarly, unexpected negative coefficient estimates are obtained for *sah_good* in Austria, Belgium, France, Luxembourg and the Netherlands. Austria, Denmark, France, Portugal, Spain and UK have positive coefficients for *chronprb,* which are contrary to *a priori* expectations.

To compare the impact of health on wages between men and women, the ratio of the male to female marginal effects[6] of the health variables were calculated for cases where the

[6] The coefficients have been transformed to give the effects on hourly wages rather than logarithm of wages. The possibility of problems related to retransformation and the error terms should be negated by the use of ratios in the analysis where the errors would cancel.

coefficient estimates for both men and women were statistically significant. These ratios, along with the difference between male and female marginal effects, are reported in Table 10. For most countries in Table 10, the marginal effects of “very good” health on wages are greater for men than women. The exception to this is Ireland, for which the marginal effects for women are 1.15 and 1.47 times higher than the marginal effects for men according to the OLS and RE estimates, respectively. The greatest gender difference in the marginal effects of *sah_vgood*, as per the OLS estimates, is shown in Spain where the effects for males are 2.66 times those for females. The UK – BHPS sample also indicates marginal effects for men that are more than twice those for women for both the OLS and RE estimates. There are no countries for which both male and female estimates of the coefficient on *sah_vgood* are statistically significant.

Ireland also has greater marginal effects of “good” self-assessed health for women than men, according to the OLS and RE estimates. Germany – SOEP also shows a greater influence of *sah_good* on wages for men than women as per the FE estimates. As was the case for the highest level of self-assessed health, Spain and UK – BHPS also show marginal effects of *sah_good* that are more than twice as large for men as for women. The greatest difference is indicated for France by the OLS estimates, which show marginal effects for men that are 2.90 times those for women.

The third self-assessed health variable, *sah_fair*, obtained statistically significant coefficients for both men and women in the fewest countries. Differences in the sample sizes of the countries considered as well as relatively low within-variation for this variable are likely causes for this result. However, where both genders had statistically significant estimates, the difference ratio of effects for men to women ranged from 2.77 in France to 1.29 in Portugal.

The marginal effects of the final health variable, *chronprb*, on hourly wages show less gender difference than the self-assessed health variables. Only Germany – SOEP exhibits greater marginal effects for women than men for both OLS and RE estimates. In the case of France, there are greater marginal effects of *chronprb* on men than women according to the OLS estimates, however, the RE estimates indicate the opposite relationship between the sexes. The OLS estimates for UK – BHPS, result in the greatest gender difference in the marginal effects of chronic disability or illness on wages as these effects for men are 1.58 times the effects for women.

In many of the cases reported in Table 10, the ratio of marginal effects of health for men versus women is greater under the RE estimates than under the OLS estimates. The ratio of male to female marginal effects of *sah_vgood* for France, Portugal and UK – BHPS, for instance are greater for the RE estimates than for the OLS estimates. This is also the case for Portugal with respect to the marginal effects of *sah_good* and *sah_fair*.

There are no instances of both male and female estimates for the health variables being statistically significant for Belgium, Denmark, Greece and the Netherlands. In Belgium and Denmark, the OLS estimates for *sah_vgood* and *sah_good* are positive and statistically significant but there are no effects of these variables on wages for women. Similarly, the OLS *chronprb* estimates for women are negative and significant for women but not men in Belgium and Denmark. No other estimates for Belgium and only the *chronprb* RE estimate for Denmark are also significant. None of the female estimates for Greece are statistically significant. Only the OLS and RE estimates of *chronprb* for men and the OLS estimate of *sah_vgood* for women are significant. In these countries then, there largely seems to be little, if any effect of health on wages for women but a more significant amongst men.

There are obviously differences across countries and gender regarding the estimated effects of health on wages in the samples considered here. Overall, there are fewer statistically significant estimates for women than men and for most countries the effects for men are larger than the effects for women. It is also important to note that the sign of the coefficient for *sah_fair* is negative in a relatively high number of cases and perhaps is a variable that could be considered further.

While the wage figures used in this analysis have not been adjusted to allow for absolute comparison between countries, it is still possible to determine some sort of rank for the given results. Spain has the largest ratio of male to female marginal effects of "very good" self-assessed health according to the OLS estimates, while under the RE estimates, UK – BHPS has the greatest gender difference. The marginal effects of "good" health on wages differ most between men and women in Spain according to OLS but in Portugal for RE. France has the largest relative gender difference in the marginal effects of "fair" health as estimated through OLS, while only Portugal had significant RE estimates for both sexes. Finally, the smallest relative differences of all the health variables are shown for *chronprb*. The greatest gender difference is obtained through the OLS estimates for UK – BHPS.

6. Conclusion

This paper has examined the effects of health on hourly wages in samples of employed adults from Europe through estimation of Mincerian wage equations. While the findings for the non-health variables that have been included in the analysis are largely as expected and in accordance with previous work, the estimates for the health variables are somewhat mixed in terms of sign and significance. Despite this, some conclusions about the relative effects of health on wages between men and women can be mentioned.

For all three estimation techniques used, there were more statistically significant estimates of the health variable coefficients for men than women. For both sexes, most of the significant coefficients were obtained through pooled OLS than through random or fixed effects estimation. For those samples where the estimates of the health coefficients were statistically significant for both sexes, the marginal effects of health on wages were compared. The marginal effects of very good self-assessed health for men were relatively largest compared to those for women in Italy, Spain and UK – BHPS samples according to the OLS estimates. The marginal effects of good self-assessed health differed between men and women most in France, Spain and UK – BHPS. Only France obtained marginal effects of fair self-assessed health on wages for men that were more than twice those for women. The results for the fourth health variable, *chronprb*, show the gender difference as being relatively smaller for this health variable. The largest ratio of the marginal effects of *chronprb* for men to women was found in the UK – BHPS sample (1.58).

The difference between men and women according to the RE estimates were greatest in the two United Kingdom samples for *sah_vgood*. For *sah_good*, the marginal effects for men were more than 1.5 times those for women in Portugal, Spain and UK – BHPS. Only Portugal had significant RE estimates for *sah_fair* for men and women and the marginal effects of fair health on wages were greater for men than women. The estimates for *chronprb* were statistically significant for men and women only in France where the marginal effects were greater for women than men. The only instance of statistically significant estimates for both sexes under FE estimation was for *sah_good* with the Germany – SOEP sample. Here, the marginal effects were larger for men than women.

Overall, the majority of samples examined for which both sexes had significant estimates, show greater marginal effects of health on wages for men than women. The main exception to this is Ireland. Also, regarding the variable *chronprb*, Germany – SOEP and France show greater effects for women than men. The samples from Belgium, Denmark, Greece and the Netherlands, had no cases for which both sexes had significant estimates for the same health variables.

This analysis has demonstrated that health does indeed impact the hourly wages of workers in many countries of Europe. It appears that these health effects are greater for men than women in most cases. The largest gender differences in terms of the marginal effects of health on wages are found in France, Portugal, Spain and the United Kingdom (both samples). However, differences between men and women also depend on the particular health indicators used as it appears that the effect of chronic illness or disability (*chronprb*) is more relevant for women than men.

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Table 1. Sample sizes for individual countries.

COUNTRY	MALE observations	MALE individuals	FEMALE observations	FEMALE individuals	TOTAL observations
AUSTRIA	9,581	2,235	6,507	1,664	16,088
BELGIUM	7,104	1,896	5,889	1,614	12,993
DENMARK	8,852	2,074	8,268	2,000	17,120
FINLAND	7,218	2,096	8,175	2,338	15,393
FRANCE	17,826	4,035	14,891	3,500	32,717
GERMANY	6,825	2,697	4,564	1,946	11,389
GERMANY – SOEP	21,628	4,488	15,307	3,601	36,935
GREECE	10,993	2,677	6,553	1,769	17,546
IRELAND	9,250	2,478	6,665	1,960	15,915
ITALY	20,206	4,656	12,926	3,077	33,132
LUXEMBOURG	1,546	585	952	385	2,498
NETHERLANDS	18,062	3,862	11,854	2,899	29,916
PORTUGAL	15,740	3,455	11,987	2,781	27,727
SPAIN	19,808	5,103	10,875	3,199	30,683
UK	4,755	2,369	4,401	2,168	9,156
UK – BHPS	13,668	3,077	13,161	3,112	26,829

Table 2. Variable names and definitions.

VARIABLE	DEFINITION
DEPENDENT VARIABLE	
lnhrwage	natural logarithm of (calculated) hourly wage in local currency units
HEALTH VARIABLES	
chronprb	do you have any chronic physical or mental health problem, illness or disability? 1 yes, 0 no.
self-assessed health status	**how is your health in general?**
sah_vgood	very good – 1, otherwise – 0
sah_good	good – 1, otherwise – 0
sah_fair	fair – 1, otherwise – 0
OTHER EXPLANATORY VARIABLES	
age	age in years
agesq	$age^2/100$
private	current job in private or public sector – 1 private, 0 public
exp	number of years in current job
expsq	$exp^2/100$
parttime	working less than 30 hours per week
marital status	**present marital status**
married	present marital status – 1 married, 0 otherwise
divorced	present marital status – 1 divorced, 0 otherwise
separated	present marital status – 1 separated, 0 otherwise
widowed	present marital status – 1 widowed, 0 otherwise
single (reference)	present marital status – 1 single, 0 otherwise
occupational class	**occupation in current job, ie. principal activity performed**
manager	legislators, senior officials and managers
profess	professionals
tech	technicians and associate professionals
clerk	clerks
servshop	service workers and shop and market sales workers
agrfish	skilled agricultural and fishery workers
crafttrade	craft and related trades workers
machop	plant and machine operators and assemblers
elementary (reference)	elementary occupations
education	**highest level of general or higher education completed**
isced02 (reference)	less than second stage of secondary education (ISCED 0-2)
isced3	second stage of secondary level education (ISCED 3)
isced57	recognized third level education (ISCED 5-7)
size of employer	**number of regular paid employees in the local unit in current job**
jbsize0	0 employees
jbsize14	1 – 4 employees
jbsize519	5 – 19 employees
jbsize2049	20 – 49 employees
jbsize5099	50 – 99 employees
jbsize100499	100 – 499 employees
jbsize500p	500 or more employees
children	**children present in household**
child012	one or more children age 0 – 12 years in household
child1315	one or more children age 13 – 15 years in household

Table 3. Average hourly wage and wages gaps for all countries[†]

	Male Mean Wage (W_M)	Female Mean Wage (W_F)	Gender Gap ($W_M - W_F$)	Gender Gap as % of W_M	Gender Gap as % of W_F	W_F as % of W_M
AUSTRIA	159.15	128.08	31.07	19.52	24.26	80.48
BELGIUM	510.78	451.02	59.76	11.70	13.25	88.30
DENMARK	133.66	115.72	17.94	13.42	15.51	86.58
FINLAND	77.23	61.18	16.06	20.79	26.24	79.22
FRANCE	74.68	64.56	10.12	13.55	15.67	86.45
GERMANY	26.62	20.73	5.89	22.12	28.41	77.87
GERMANY - SOEP	25.05	20.25	4.80	19.15	23.69	80.84
GREECE	1739.99	1581.00	158.99	9.14	10.06	90.86
IRELAND	9.18	7.85	1.33	14.53	17.01	85.51
ITALY	16.42	15.50	0.92	5.59	5.92	94.40
LUXEMBOURG	634.80	538.75	96.05	15.13	17.83	84.87
NETHERLANDS	35.23	28.51	6.72	19.08	23.58	80.93
PORTUGAL	750.41	730.42	19.99	2.66	2.74	97.34
SPAIN	1215.20	1090.82	124.38	10.24	11.40	89.76
UNITED KINGDOM	8.17	5.82	2.35	28.78	40.40	71.24
UK - BHPS	8.79	6.71	2.08	23.65	30.97	76.34

[†] in nominal local currency units

Table 4. Distribution of responses across health variables, by sex and country.

	Male				Female			
	sah_vgood %	*sah_good* %	*sah_fair* %	*chronprb* %	*sah_vgood* %	*sah_good* %	*sah_fair* %	*chronprb* %
AUSTRIA	39.41	45.43	13.30	11.66	42.31	44.46	11.39	10.02
BELGIUM	29.03	56.84	12.63	8.87	25.95	57.24	15.08	7.01
DENMARK	55.13	33.31	10.27	19.78	53.64	33.49	11.18	21.60
FINLAND	21.72	54.59	21.67	26.30	19.13	55.54	23.08	30.57
FRANCE	15.90	55.13	26.02	10.06	13.37	54.01	29.31	9.82
GERMANY	15.99	62.02	18.95	12.70	15.43	62.73	18.65	11.77
GERMANY - SOEP	9.42	48.90	31.71	23.64	8.52	46.33	32.44	27.12
GREECE	69.94	23.53	5.51	4.28	68.56	23.96	6.44	4.07
IRELAND	55.43	36.45	7.48	7.76	59.20	32.92	7.25	7.55
ITALY	19.04	53.69	24.08	5.04	15.18	54.43	26.85	5.24
LUXEMBOURG	30.72	50.19	16.30	8.93	29.20	46.01	20.59	8.51
NETHERLANDS	23.04	62.78	12.91	13.89	20.20	62.11	15.58	16.09
PORTUGAL	4.69	61.46	28.23	9.59	3.06	57.31	32.69	10.39
SPAIN	21.22	61.26	15.00	9.06	22.32	60.23	14.40	8.95
UNITED KINGDOM	41.60	43.85	13.23	12.81	40.31	42.94	15.11	12.54
UK - BHPS	28.69	49.17	17.56	22.94	23.60	50.80	19.58	24.78

Table 5. Occurrence of health changes as percentage of sample size.

	MALE				FEMALE			
	health increase *SAH* %	**health decrease *SAH* %**	**health increase *chronprb* %**	**health decrease *chronprb* %**	**health increase *SAH* %**	**health decrease *SAH* %**	**health increase *chronprb* %**	**health decrease *chronprb* %**
AUSTRIA	14.02	15.17	4.30	4.04	13.43	14.91	3.29	3.18
BELGIUM	11.39	13.92	2.31	4.79	12.07	13.70	1.80	3.63
DENMARK	12.87	15.92	4.38	8.61	13.00	16.34	4.06	8.38
FINLAND	10.82	13.47	5.51	6.35	11.90	14.03	5.47	6.81
FRANCE	14.74	18.39	3.21	5.61	14.51	16.92	2.85	5.02
GERMANY	9.08	12.04	1.89	8.54	9.42	11.17	2.39	7.78
GERMANY - SOEP	14.96	17.22	5.46	10.25	16.02	17.30	6.03	10.94
GREECE	11.84	10.73	1.74	2.57	11.54	10.48	1.30	2.09
IRELAND	13.05	14.49	2.05	3.62	11.99	13.16	2.04	3.41
ITALY	15.42	16.18	1.70	2.57	14.67	15.33	1.81	2.67
LUXEMBOURG	13.13	13.71	2.01	6.34	11.97	13.55	1.47	5.99
NETHERLANDS	12.55	14.08	3.79	6.15	13.23	14.50	4.06	6.76
PORTUGAL	10.20	12.97	2.64	4.13	10.14	12.78	2.55	4.32
SPAIN	16.50	17.66	3.23	5.11	15.71	16.82	2.93	4.71
UK	8.29	10.22	1.35	8.50	8.50	11.22	1.59	7.95
UK - BHPS	17.14	18.57	5.33	9.47	17.86	18.78	5.46	10.01

Note: Changes are for individuals who are present for one or more waves. The changes are not necessarily from *year to year* but from *wave to wave*.

Table 6. Samples[*] for which estimated coefficients have unexpected signs.

Variable name	Expected sign	OLS	RE	FE
age	> 0	Austria M		
agesq	< 0	Austria M		Greece M, Luxembourg F
manager	> 0			Luxembourg M, UK M
profess	> 0			Belgium F
tech	> 0			Belgium F, Germany F, Luxembourg, Netherlands M
clerk	> 0			Belgium F, Denmark M, Germany F, Italy F, Luxembourg, UK M
servshop	> 0	Ireland F	Belgium M, Ireland F, Germany – SOEP M, Luxembourg M	Belgium, Denmark, France M, Germany, Germany - SOEP, Greece M, Italy M, Luxembourg, Netherlands M, Spain, UK M, UK – BHPS M
agrfish	> 0	Austria, Belgium, Denmark M, Finland M, France M, Germany F, Germany - SOEP, Greece, Ireland M, Italy, Luxembourg M, Netherlands M, Portugal, Spain, UK, UK – BHPS M	Austria, Belgium, Denmark, Finland, France, Germany F, Germany – SOEP F, Greece, Italy, Luxembourg M, Netherlands M, Portugal, Spain, UK M, UK - BHPS	Austria F, Belgium M, Denmark, Finland M, Germany F, Germany – SOEP F, Greece M, Ireland F, Italy, Luxembourg F, Netherlands M, Portugal, Spain F, UK, UK - BHPS
crafttrade	> 0	Portugal F	Belgium F, Portugal F	Belgium, Denmark F, Finland F, France F, Germany F, Germany – SOEP F, Greece F, Netherlands, UK M, UK – BHPS F
machop	> 0	Denmark M, Portugal F	Denmark F, Netherlands M, Portugal F	Austria M, Denmark F, Germany F, Luxembourg M, Netherlands M, Portugal F, UK M
private M	> 0	France, Greece, Ireland, Italy, Luxembourg, Portugal, UK – BHPS	France, Greece, Ireland, Italy, Luxembourg, Portugal, Spain, UK – BHPS	Austria , France, Germany – SOEP, Greece, Ireland, Luxembourg, Netherlands, UK – BHPS
private F	< 0	Belgium, Denmark, Finland, Germany,	Denmark, Finland, Germany	Belgium, Denmark, Finland, Germany, Luxembourg
isced57	> 0			Belgium M, Demark F, France F, Germany F, Greece M, Luxembourg F, Netherlands M, UK – BHPS M
isced3	> 0	Germany M, Germany - SOEP	Netherlands M	Austria M, Belgium , Finland M
exp1	> 0			Austria F
exp1sq	< 0	Austria F, Belgium F, Luxembourg, Portugal M	Belgium F, Luxembourg	Belgium M, Germany F, Luxembourg

[*] M represents male sample, F represents female sample. Where neither is specified, both samples are relevant.

Table 7. OLS estimates of coefficients on health variables.

	MALE				FEMALE			
COUNTRY	*sah_vgood*	*sah_good*	*sah_fair*	*chronprb*	*sah_vgood*	*sah_good*	*sah_fair*	*chronprb*
AUSTRIA	0.0980*	0.0885*	0.0218	-0.0029	0.0785*	0.0585	-0.0025	0.0052
BELGIUM	0.0810*	0.0887*	0.0471	-0.0195	0.0223	0.0125	-0.0094	-0.0320*
DENMARK	0.0891*	0.0728*	0.0092	-0.0057	0.0142	0.0156	0.0026	-0.0262*
FINLAND	0.1179*	0.0886*	0.0498*	0.0065	0.0991*	0.0776*	0.0455	-0.0166*
FRANCE	0.1216*	0.1326*	0.1060*	-0.0524*	0.0890*	0.0478*	0.0396*	-0.0477*
GERMANY	0.0796*	0.0483	0.0101	-0.0083	0.0345	0.0049	-0.0259	0.0255
GERMANY - SOEP	0.0384*	0.0310*	0.0060	-0.0301*	0.0119	0.0137	-0.0034	-0.0366*
GREECE	0.1234*	0.1010*	0.0617*	0.0091	0.0579	0.0590	0.0255	0.0117
IRELAND	0.1476*	0.1125*	0.0978*	-0.0352*	0.1676*	0.1213*	0.0793	0.0069
ITALY	0.0869*	0.0879*	0.0613*	0.0015	0.0397*	0.0528*	0.0453*	0.0248*
LUXEMBOURG	0.2056*	0.1814*	0.1452*	0.0063	0.1610*	0.0840	0.0313	-0.0723
NETHERLANDS	0.0288	0.0226	-0.0220	-0.0363*	0.0671*	0.0329	0.0375	-0.0023
PORTUGAL	0.1578*	0.1248*	0.0774*	-0.0113	0.1191*	0.0820*	0.0605*	0.0134
SPAIN	0.1411*	0.1273*	0.0947*	-0.0116	0.0555*	0.0516*	0.0176	-0.0294*
UK	0.2096*	0.1967*	0.1567*	0.0082	0.0750	0.0560	0.0273	-0.0143
UK - BHPS	0.1228*	0.0884*	0.0606*	-0.0314*	0.0593*	0.0390*	0.0130	-0.0197*

Table 8. Random effects (RE) estimates of coefficients on health variables.

	MALE				FEMALE			
COUNTRY	*sah_vgood*	*sah_good*	*sah_fair*	*chronprb*	*sah_vgood*	*sah_good*	*sah_fair*	*chronprb*
AUSTRIA	0.0267	0.0197	0.0072	-0.0120	-0.0168	-0.0315	-0.0566*	-0.0054
BELGIUM	0.0111	0.0157	-0.0005	0.0011	0.0049	0.0018	-0.0201	-0.0028
DENMARK	0.0215	0.0119	0.0001	-0.0061	0.0157	0.0153	0.0034	-0.0140*
FINLAND	0.0461*	0.0291	0.0110	-0.0038	0.0452*	0.0337*	0.0116	-0.0080
FRANCE	0.0678*	0.0658*	0.0568*	-0.0142*	0.0373*	0.0153	0.0038	-0.0173*
GERMANY	0.0330*	0.0147	-0.0026	-0.0054	0.0279	0.0215	0.0112	0.0022
GERMANY - SOEP	0.0244*	0.0219*	0.0149*	-0.0102*	0.0180*	0.0191*	0.0088	-0.0053
GREECE	0.0710*	0.0537*	0.0452	-0.0037	0.0334	0.0348	0.0293	0.0022
IRELAND	0.0848*	0.0649*	0.0546	-0.0285	0.1231*	0.0994*	0.0916*	0.0131
ITALY	0.0356*	0.0344*	0.0169	0.0023	0.0065	0.0175	0.0125	0.0089
LUXEMBOURG	0.0327	0.0348	0.0389	-0.0059	0.0249	-0.0063	0.0096	-0.0067
NETHERLANDS	0.0201	0.0221	-0.0169	-0.0210*	0.0211	0.0007	0.0002	-0.0019
PORTUGAL	0.0893*	0.0666*	0.0493*	0.0024	0.0490*	0.0361*	0.0346*	-0.0047
SPAIN	0.0701*	0.0700*	0.0519*	-0.0042	0.0436*	0.0393*	0.0120	-0.0093
UK	0.1174*	0.1258*	0.1260*	0.0062	0.0606*	0.0482	0.0283	-0.0115
UK - BHPS	0.0492*	0.0331*	0.0238*	-0.0110*	0.0212*	0.0184*	0.0058	-0.0055

Table 9. Fixed effects (FE) estimates of coefficients on health variables.

	MALE				FEMALE			
COUNTRY	*sah_vgood*	*sah_good*	*sah_fair*	*chronprb*	*sah_vgood*	*sah_good*	*sah_fair*	*chronprb*
AUSTRIA	-0.0100	-0.0152	-0.0138	-0.0081	-0.0273	-0.0390	-0.0545*	-0.0043
BELGIUM	-0.0155	-0.0075	-0.0092	0.0101	-0.0018	-0.0023	-0.0193	0.0045
DENMARK	0.0071	0.0011	0.0010	-0.0044	0.0156	0.0171	0.0092	-0.0080
FINLAND	0.0053	-0.0045	-0.0119	-0.0070	0.0075	0.0035	-0.0040	0.0019
FRANCE	0.0487*	0.0441*	0.0410*	-0.0006	0.0116	-0.0051	-0.0119	-0.0055
GERMANY	0.0115	-0.0040	-0.0136	-0.0036	0.0208	0.0238	0.0213	0.0042
GERMANY - SOEP	0.0139	0.0147*	0.0123*	-0.0064	0.0149	0.0164*	0.0091	0.0015
GREECE	0.0139	0.0051	0.0201	-0.0166	0.0321	0.0356	0.0451	0.0068
IRELAND	0.0605	0.0523	0.0441	-0.0206	0.0478	0.0335	0.0548	0.0166
ITALY	0.0092	0.0071	-0.0066	0.0064	-0.0038	0.0061	0.0021	0.0110
LUXEMBOURG	0.0056	0.0096	0.0197	-0.0106	-0.0401	-0.0395	0.0021	0.0099
NETHERLANDS	-0.0162	-0.0068	-0.0351	-0.0058	-0.0045	-0.0159	-0.0195	0.0094
PORTUGAL	0.0577*	0.0432*	0.0333*	0.0069	0.0162	0.0184	0.0198	-0.0063
SPAIN	0.0245*	0.0257*	0.0179	0.0006	0.0218	0.0191	-0.0013	-0.0097
UK	0.0561	0.0776*	0.0972*	0.0105	0.0516	0.0439	0.0353	-0.0014
UK - BHPS	0.0181	0.0121	0.0126	0.0001	0.0041	0.0093	0.0005	0.0028

Table 10. Ratios and differences of male and female marginal effects of health variables

	OLS			RE			FE		
Variable		**M/F**	**M – F**		**M/F**	**M – F**		**M/F**	**M – F**
sah_vgood	Austria	1.26	0.0213	Finland	1.02	0.0009			
	Finland	1.20	0.0210	France	1.85	0.0321			
	France	1.39	0.0362	Germany-SOEP	1.36	0.0065			
	Ireland	**0.87**	**-0.0234**	**Ireland**	**0.68**	**-0.0425**			
	Italy	2.24	0.0503	Portugal	1.86	0.0432			
	Luxembourg	1.31	0.0536	Spain	1.63	0.0281			
	Portugal	1.35	0.0444	UK	1.99	0.0621			
	Spain	2.66	0.0945	UK - BHPS	2.35	0.0290			
	UK - BHPS	2.14	0.0696						
sah_good	Finland	1.15	0.0120	Germany-SOEP	1.15	0.0029	**Germany-SOEP**	**0.90**	**-0.0017**
	France	2.90	0.0928	**Ireland**	**0.64**	**-0.0375**			
	Ireland	**0.92**	**-0.0099**	Portugal	1.87	0.0321			
	Italy	1.69	0.0377	Spain	1.81	0.0324			
	Portugal	1.56	0.0475	UK - BHPS	1.81	0.0151			
	Spain	2.56	0.0828						
	UK - BHPS	2.32	0.0527						
sah_fair	France	2.77	0.0714	Portugal	1.44	0.0153			
	Italy	1.36	0.0169						
	Portugal	1.29	0.0181						
chronprb	France	1.10	-0.0045	**France**	**0.82**	**0.0031**			
	Germany-SOEP	**0.83**	**0.0063**						
	UK - BHPS	1.58	-0.0114						

Note: Bold typeface indicates cases where the marginal effects for females are greater than the marginal effects for males.