

# The Effect of Health on Consumption Decisions in Later Life: Evidence from the UK

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## **Editorial Note**

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## **Abstract**

The analysis in this paper focuses on the impact of health on the savings and consumption decisions of the elderly. In principle, there are at least five alternative channels through which health may affect consumption and savings. Ill health may affect both consumption capacities and needs while the risk of deteriorating health might increase subjective mortality expectations inducing higher consumption. Conversely ill health may induce lower consumption and an increase in precautionary savings given that agents may anticipate increased consumption needs following a negative health shock. Our main objective in this paper is to describe how consumption decisions of the elderly adjust to health changes and to disentangle of the different channels through which consumption responds to health changes. To identify the effect of health on consumption and saving decisions we use data from the British Household Panel Survey and the English Longitudinal Survey of Ageing (ELSA) and we estimate a series of regression models which relate health changes to observed consumption changes. Our findings suggest that there are significant adjustments in the composition of consumption following an illness onset. These adjustments reflect mainly the combined effect of increased costs associated with illness onset as well as the effect of constraints on opportunity to spend associated with illness onset.

Keywords: health, consumption, wealth

JEL numbers: I100, D91

## 1. Introduction

The analysis in this paper focuses on the impact of health on the savings and consumption decisions of older people. In principle, there are at least five alternative channels through which health may affect consumption and savings. Ill health may affect both consumption capacities and needs while the risk of deteriorating health might increase subjective mortality expectations inducing higher consumption. Conversely ill health may induce lower consumption and an increase in precautionary savings given that agents may anticipate increased consumption needs following a negative health shock.

Our main objective in this paper is to describe how consumption and saving decisions of older people adjust to health changes and to disentangle of the different channels through which these effects operate. A better understanding of the constraints, changes in needs and changes in expectations associated with the onset or worsening of health problems in retirement would help to design more effective financial and other support for vulnerable older people while at the same time can provide a missing piece of the jigsaw in explaining patterns of consumption over the lifecycle.

To identify the effects of health on consumption we estimate a series of regression models which relate health changes to observed consumption changes. Our results indicate that there are significant adjustments in the composition of consumption following deterioration in health or the onset of impairment. Poor health and limitations in performing activities of daily living were found to be associated with decreased expenditure in some discretionary spending categories, such as leisure, and eating out and an increase in gas and electricity spending—but with some important differences in the magnitude and significance of the effects depending on which health measure was used. Data limitations precluded more precise estimates of overall consumption effects, but alternative questions on self-reported financial circumstances confirmed a perception increased costs among people who experienced onset of impairment. These findings are consistent with increased needs and/or decreased marginal utility of certain forms of consumption leading to changes in spending priorities (as a result of constraints on opportunities to spend or changing preferences).

The paper is structured as follows: Section 2 describes in more detail the theoretical background and related literature and discusses in more detail the potential effects of health changes on consumption decisions. Section 3 describes the data used in our analysis while section 4 describes the empirical strategy used to identify the health effects on consumption. Section 5 presents certain health statistics for the sample used in our analysis as well as a description of the cross-sectional relationships between health, income, consumption and savings. Section 6 provides the results of our analysis. We end with a discussion and conclusion in Section 7.

## 2. Theoretical background

Health and the risk of health status deterioration have been widely recognised in the related literature as being important determinants of consumption and saving decisions. During working age, periods of poor health may constrain labour supply decreasing lifetime earnings and benefits and possibly resulting in lower pension wealth than would have achieved otherwise (Smith, 1999). In post retirement years the labour supply effects of new health events are not significant but depending on the degree of correlation of past and current health people in poor health will have lower economic resources to finance consumption during retirement. In addition to the health effects on labour supply and by extension on lifetime resources there are five other pathways through which health may affect consumption and saving decisions.

A first pathway through which health may affect consumption and wealth accumulation (deaccumulation) is increased health related costs. We refer to this pathway as “increased medical costs”.

A second channel through which health may affect consumption is by increasing other types of non-medical expenditures. Non-medical expenditures that may increase as a result of illness onset may include for example, extra heating for the house, purchasing aids and adaptations or paying for a special diet (Zaidi and Burchardt, 2005) or for household help. In this case, the marginal utility of consumption on these items increases (Rust and Phelan, 1997), which could result either in reallocation of expenditures away from other items, or in a decrease in savings. We refer to this effect as the “increased needs” effect. Lillard and Weiss (1996), using dynamic programming techniques and data on wealth and medical expenses from the US Health and Retirement Study, find evidence that the marginal utility of consumption is increasing in periods of poor health. Other studies that find that the marginal utility of consumption increases in periods of poor health include DiNardi et al. (2006) as well as Rust and Phelan (1997).

A third channel through which health may affect consumption and wealth dynamics is by imposing constraints on spending opportunities. Some types of consumption may become difficult in practice or less enjoyable following deterioration in health or the onset of impairment; for example someone with failing eyesight may find it difficult to travel independently. This implies a decrease in the marginal utility of consumption (Börsch-Supan and Stalh, 1991; Viscusi and Evans 1990). We refer to this effect as the “constraining” effect.

A fourth pathway through which health shocks may affect consumption and wealth dynamics is by changing actual or perceived time horizons and mortality risks. According to the standard lifecycle model if after a health shock people adjust their expectations about remaining years of life downwards, there may be an incentive to spend down accumulated wealth (with the magnitude of the effect depending on attitudes towards risk and time preferences). We refer to this effect as “subjective life expectancy” effect.

A final pathway through which health may affect savings and consumption decisions is by changing people's perceptions about future medical and health related needs and the associated expenses. Worsening health or the onset of a new condition could increase perceived likelihood of future medical and long-term care expenses and encourage precautionary savings. This would tend to decrease current consumption (for a evidence concerning the importance of precautionary savings see Davies, 1981; Hubbard et al. 1994; Kennickell and Lusardi, 2001, 2005; Palumbo, 1999). We refer to this effect as the "precautionary saving" effect.

In this paper we aim to estimate the overall effect of health on consumption and we attempt to disentangle the potential channels through which the effect operate. Note that our analysis focuses on people that have already retired. Restricting our analysis to retired older people allows us to concentrate on consumption decisions and to disregard the effects of health on labour supply and retirement decisions and their effects on consumption and saving decisions.

### **3. Data and sample construction**

The ideal dataset to examine the health effect on consumption would be a long-running panel with a large sample of elderly people, and information on health status, consumption, savings and wealth. No such dataset exists for the UK but two surveys meet several of these criteria and have strengths which complement each other: the British Household Panel Survey (BHPS) and the English Longitudinal Study of Ageing (ELSA).

The British Household Panel Survey is an annual longitudinal survey of private households in Great Britain (England, Wales and Scotland south of the Caledonian Channel). The initial sample was designed as a nationally representative sample of the adult population (aged 16 years and older) and included more than 5,000 households with a total of 10,000 adults. The first wave of the survey was conducted between September 1990 and April 1991.<sup>1</sup> The same individuals are re-interviewed in successive waves and if they split off from their original households are also re-interviewed along with all adult members of their new households. The main advantage of BHPS is its long panel dimension. Currently there are data from 14 waves of BHPS, with full information on health status, monthly savings and income, and limited data on consumption and wealth.

The English Longitudinal Survey of Ageing (ELSA) is also a longitudinal survey which currently has three waves. Its core sample members are individuals aged 50 years and older in 2002 who were living in residential addresses in England. Spouses

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1 In addition to initial sample members the survey also includes new people who join panel households (i.e. babies, partners, lodgers). The survey has achieved year-to-year response rate of about 95 percent. The initial selection of sample was based using a two-stage stratified clustered design (for details about the survey, see Taylor 1998).

of core sample members were also interviewed regardless of whether or not they were in the target age group. A total of 12,100 individuals were interviewed in 2002. The second wave of ELSA was carried out in 2004. The achieved sample in 2004 includes 9,381 individual who gave full interviews in 2002 and 2004 as well as 51 individuals who were interviewed in 2004 but not in 2002. Of the remaining 22.5 percent of the sample who were not interviewed in wave 2, 509 have died. The third wave of the survey was conducted in 2006. Our analysis is restricted to the first two waves given that data from the third wave were not available when the analysis of this paper was undertaken. Although it has a short panel dimension, ELSA has the advantage of a large sample size of elderly people and a dedicated module on consumption at wave 2. Both waves have detailed information on health, income and wealth.<sup>2</sup>

In both BHPS and ELSA we restrict the sample used in our analysis to persons who are older than 65 years old and to those who are ‘permanently’ retired (for couples both spouses must fulfil these requirements to be included in our sample). The restriction concerning the labour status is made given that there are (as shown extensively in the literature) substantial consumption changes around the time of retirement. A further reason for the age and labour status restrictions is that we want to preclude the labour supply effects of health changes on consumption and savings decisions. We further restrict our sample to households consisting of only one ‘benefit units’<sup>3</sup>. After applying these restrictions and excluding some observations due to missing information the estimation samples in BHPS consists of 16,074 observations (8,276 of which are couples and 7,798 are singles). This corresponds to 1,699 households; 616 couples and 1,090 singles. In ELSA 4,556 observations fulfil our sample criteria (2,560 of which are couples and 1,996 are singles). This corresponds to 1,638 households; 640 couples and 998 singles (see Table 1 for more details).

### ***Measures of health***

As discussed above both ELSA and BHPS have a wealth of information to assess respondents’ health. In this study we use three measures of health and impairment so as to capture different aspects of health status and health changes and the effect that these may have on consumption behaviour. These measures include (i) an indicator of poor health based on respondents’ self-assessed health status (ii) an indicator of limitations in the ability to perform activities of daily living and (iii) an indicator of major health conditions.<sup>4</sup> Note here that all health measures are defined at household level. This means that couples are classified as being in poor health if either the respondent and/or his spouse are in poor health. In addition to these health measures we use information on subjective survival probabilities. This later measure is used to capture whether consumption decision adjust to changes in perceptions about remaining years of life. Each one of these measures is explained in more detail below:

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2 For further details about the survey see ELSA User Guide.

3 A benefit unit is a single person or a couple with any dependent children (but note that no dependent children are present in our sample because of our selection criteria).

4 Other specifications were also tried but rejected for inconsistency.

#### SELF-ASSESSED POOR HEALTH INDICATOR

The first health measure we employ is based on questions about self-assessed health status. Self-assessed health status and its changes have been used extensively to examine the effect of health on various indicators of economic well-being. Its main advantage is that it is an overall measure, which correlates usually very well with other more objective measures of health (Idler and Benyamini, 1997; Hurd and McGarry, 1995; Hurd and McGarry, 2002). However, the problems of endogeneity and that of conditioned expectations are always a drawback of such self-rated measures. An individual may for example feel that his health has improved relative to the year before but this may be due to the fact that the household is financially better off, or because he has become accustomed to his condition.

In the BHPS the measure of self-assessed health status is derived from answers to the following question: “Compared to people of your age would you say that your health has on the whole been excellent, good, fair, poor or very poor?” The self-assessed health question and categories were reworded for wave 9 when the SF-36 questionnaire was included in the survey. The distribution of SAHS at wave 9 is quite different from the other waves and we have confined the analysis based on this health measure to the remaining waves. Based on this question we construct a dichotomous variable poor health which takes the value of one if the respondent rates his/her health as “poor” or “very poor” and zero otherwise.

Unlike BHPS, which uses a relative definition to health status (with respondents rating their health status relative to people of similar age), in ELSA respondents are asked to rate their general health status without having to condition their responses on what they think about the health of people of similar age. The exact phrasing in the ELSA questionnaire is as follows: “Now I would like to ask you some questions about your health. Would you say your health is excellent, very good, good, fair or poor?” For ELSA we create a dichotomous variable poor health, which takes the value of one if individual rates his or her health as “fair” or “poor” and zero otherwise.

#### THE ADL INDICATOR

The second measure that we employ is a dichotomous variable which we name ADL that indicates people who report limitations in performing activities of daily living (such as dressing bathing and toileting) and instrumental activities of daily living (for instance washing clothes and preparing food and drinks). In the BHPS the phrasing of the question used to rate individuals’ physical function is the following: “Does your health in any way limit your daily activities compared to most people of your age?” After this introductory question respondents are asked to indicate whether they find it difficult to manage on their own activities related to doing housework, climbing stairs, getting dressed walking more than 10 minutes or something else.

In ELSA respondents were also asked to indicate any difficulties in performing activities of daily living and instrumental activities of daily living due to health and/or mental health problems (the list of activities include dressing, walking across a room, bathing or showering, eating, getting in or out of bed, using the toilet including getting

up or down, using a map to figure out how to get around in a strange place, preparing a hot meal, shopping for groceries, making telephone calls, taking medications, doing work around the house or garden, managing money such as paying bills and keeping track of expenses). For the purpose of our analysis people reporting limitations in any of these activities are categorised as having limitations in performing ADL.

#### MAJOR HEALTH CONDITIONS (MJHC)

The third measure that we use is a dichotomous variable named MJHC that indicates whether the respondent has any major health conditions. In our analysis we categorize as major health conditions those conditions that are related to the cardiovascular and the respiratory system. Major health conditions of that kind are expected to have long-term impact on subjective and objective survival probabilities. Unfortunately cardiovascular conditions in BHPS are determined by single variable which include high blood pressure (which cannot be considered as a major health condition for the people older than 65) in the list of cardiovascular conditions- and thus we cannot exclude high blood pressure from other more serious cardiovascular health conditions. In ELSA there is information on a very detailed list of conditions that the respondents may have. In ELSA we construct two indicators for major health conditions- one which includes high blood pressure in the list of conditions categorised as major (in order to be comparable to the BHPS definition) and one which excludes it (MJHCN).

#### SUBJECTIVE SURVIVAL PROBABILITIES

As discussed in the theoretical section subjective expectations about remaining years of life is an important determinant of the intertemporal consumption and saving decisions and may be an important channel through which health changes may affect consumption dynamics in the old age.

Both BHPS and ELSA have information on respondents' subjective longevity expectations. In ELSA respondents are asked to evaluate the percentage chance that they would live to certain age A, where A depends on respondent's current age and is between 11 to 15 years above respondent's current age. A similar wording is used in BHPS (11th wave). However, unlike ELSA respondents of BHPS were not asked to give a percentage figure to their survival likelihood but rather they were asked to evaluate the chance as being 1 "very likely" 2 "likely" 3 "unlikely" or 4 "very unlikely". For comparability reasons we changed the ordering of this variable with higher values corresponding to answers that imply higher likelihood (i.e. 1 "very unlikely" 2 "unlikely" 3 "likely" or 4 "very likely"). Note that in BHPS the question on subjective survival probabilities is available only in wave 11 which precludes the analysis of the effect of changes in subjective survival probabilities on consumption.

#### *Consumption*

One of the main limitations of most longitudinal datasets is the lack of detailed information about household consumption. Despite the fact that consumption data with a panel dimension are still far from perfect, over the last years considerable additions have been made in many major panel datasets.

In the first waves of BHPS the only information about household consumption concerns the average weekly expenditures (in bands) on food and groceries consumed at home (including takeaways consumed in the house) as well as annual household expenditures on gas and electricity. Additional information on consumption has been introduced in wave 7 where respondents were asked to give a banded value of their average monthly personal spending on eating out (including expenses on food eaten out or on take-away food from a restaurant, pub or café) and on leisure activities, entertainment and hobbies (other than eating out). While information on spending on food in and gas and electricity spending was asked at household level, information on eating-out and leisure spending was asked at individual level. For our analysis we exploit information on all four spending items (assigning the midpoint of each band to each answer) and all figures were aggregated at household level and converted to monthly values.

Similarly to BHPS the first wave of ELSA contained information only for two components of household spending namely weekly spending on food consumed in the house and on eating out. The former measure includes all spending on food and groceries consumed at the house (excluding takeaways) while eating out includes takeaways as well as food consumed at restaurants and meals consumed at workplace (note the difference with BHPS in which spending on takeaways was recorded as food consumed at the home). In wave 2, the ELSA questionnaire contained a supplemental expenditure section which included questions on spending on four additional consumption items: clothing, leisure, transfers and gas and electricity.<sup>5</sup> All expenditures in ELSA are asked at household level. The reference period used to determine the average spending of household differ for different consumption items. For example while households are asked to report their average weekly food at home expenditure, they are asked to give a figure of their leisure, clothing and transfers spending over the last four weeks. For the purpose of our analysis we convert expenditures for each of the spending items into monthly figures.<sup>6</sup>

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5 As in wave 1, food in includes average weekly spending on food consumed at home (excluding takeaways), while food out refers to average monthly spending on takeaways meals and meals eaten outside the home (including those eaten at work). Expenditures on clothing refers to expenditures on outerwear, underwear, footwear, and clothing accessories while leisure includes spending on leisure activities (such as cinema, theatre, sports, subscriptions to clubs, fees for classes, internet and television subscriptions and TV licences). Transfers include money given to people outside the household (including charity donations). Finally, gas and electricity includes information on spending on gas, electricity, coal, wood, oil and so on.

6 Note also that while in wave one respondents were asked to give a weekly figure of their spending on food out, in wave two they were asked to report their monthly spending. Converting all figures in monthly amounts and comparing the estimates, we find that the change in the way spending on food out is recorded has a substantial effect on the estimates of mean spending on food out- with the mean weekly spending on food out being significantly under-reported in wave 2 compared to wave 1.

### ***Regular savings, wealth and perceptions of financial hardship***

Given that the information on spending that is available can be considered that proxy overall consumption only partially, we enrich our understanding of the overall effect of health on consumption using three additional measures.

The first is regular savings i.e. the usual amount of income that respondents (and/or his/her spouse in the case of couples) save each month. Information on regular monthly savings is available only in BHPS. Controlling for income, regular savings can be considered as an indicator for the lower bound of overall consumption. The second measure with which we supplement our analysis is total net non-pension wealth. This measure is available in ELSA and is contained in the financial derived variable files.<sup>7</sup> Finally, the third measure that we use is respondents' perceptions of financial hardship. As with all other measures perceptions about financial hardship is defined at family level –with a family classified as being in financial hardship if either the respondent or his spouse in case of couples report having financial difficulties (i.e. finding it quite or very difficult to manage financially).

### ***Income***

The measure of income that we use in our analysis is total net household income. Note that income in BHPS is defined at household level while in ELSA it is defined at benefit unit level. However these two measures coincide for the sample used in our analysis because our sample selection criteria exclude households with more than one benefit units. Income is deflated using the CPI (converted in constant 2004 prices) and is expressed in monthly figures.

## **4. Empirical methods and estimation strategy**

To examine the health effect on consumption and consumption composition we start by estimating a series of OLS regression models which relate consumption to various health measures. These models are specified as follows:

$$C_{it} = \beta_0 + \beta_1 h_{it} + \gamma X_{it} + \lambda Z_{it} + \varepsilon_{it} \quad (1)$$

In equation (1)  $C_{it}$  refers to the level of consumption of household  $i$  at time  $t$ . Consumption  $C_{it}$  is measured as the sum of expenditures items that are included in ELSA, which include spending on food consumed in the house, eating out, gas and electricity, clothing and leisure. In addition to the overall level of consumption separate models are also estimated for each of the different consumption goods as well as for the measure of regular saving. In equation (1) the regressor  $h_{it}$  denotes the health status of the individual (and his spouse in case of couples) at time  $t$ ;  $X_{it}$  are individual characteristics including age and education of the respondent and his spouse (in case of couples);  $Z_{it}$  refers to household characteristics such as

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<sup>7</sup> Information on wealth is also available in waves 5 and 10 of the BHPS but small sample size precluded the analysis of this measure for BHPS.

demographic composition of the household, the number of children, family size, age of the household head and total net household income as well as other controls to capture potential differences in preferences and resources across households<sup>8</sup>; finally  $\varepsilon_{it}$  represents the error term that includes all unobservable factors. All financial measures (income, wealth, regular savings and all spending measures) are deflated using the CPI and are expressed in constant 2004 prices.

Each of the models is estimated separately for each of the three alternative measures of health i.e. the *poor health* indicator, the *ADL* indicator, and the *MJHC* indicator. The rationale for using three different health measures is that we want to capture the different potential mechanisms through which health affect consumption. Differentiating by health conditions which *a priori* we expect to affect differently preferences and consumption needs we aim to pin down the importance of these potential mechanisms. Health shocks associated with major health conditions are hypothesised that can lead to larger increases in medical spending compared to health shocks that lead to limitations in performing ADL whereas health shocks that lead to limitations in the ability of performing ADL can lead to larger increases in non-medical consumption (i.e. due to for example extra spending on heating, on purchasing aids and adaptations or paying for special diet or housekeeping help).

Also differentiating between major health conditions and limitations in performing ADL and looking at their effect on different components of consumption we also aim to identify the importance of a “*constraining effect*” of health on consumption. Given that the onset of limitations in performing ADL imposes greater constraints on the physical consumption opportunities of the elderly than major health shocks do, we expect a greater decrease in spending for consumption components like leisure and food out when people experience the onset of conditions that lead to limitations in performing ADL than when they experience major health shocks. In order the “*constraining effect*” interpretation to be valid however the potential increase in consumption needs associated with limitations in performing ADL must not be greater than that associated with major health shocks. Otherwise a lower spending on certain items would reflect the fact that people have lower resources to spend on these items. Finally, differentiating between health conditions associated with an increase in mortality (for example major health conditions such as heart problems) and those associated with an increase in needs but not mortality (for example conditions that lead to limitations in ADL) helps to distinguish between the subjective life expectancy and current health related costs.

Our main analysis proceeded in three stages. At baseline we examine differences in the cross-sectional spending patterns among people in poor and good health using OLS regression techniques. The crucial assumption behind this specification is that  $\varepsilon_{it}$  in equation (1) is uncorrelated with any covariates in the regression. Under this assumption the coefficient of health status  $\beta_1$ , can be interpreted as the marginal effect

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<sup>8</sup> Wealth is not controlled for since it is clearly endogenous in consumption (changes in consumption may affect wealth).

of current health status on current consumption  $C_{it}$ . Accordingly, a positive estimate of  $\beta_1$  implies that a negative health shock leads to more consumption ( $C_{it}$ ), while a negative one implies that a negative health shock leads to less consumption. However, if there are unobservable factors that are correlated with  $h_{it}$ ,  $X_{it}$  or  $Z_{it}$  then the OLS estimates based on equation (1) will be biased. These unobservable variables might vary systematically by health status and contaminate estimation of the true relationship between health and consumption. In order to address these problems we have to control for the potential bias arising from unobserved heterogeneity. To address the heterogeneity bias, in the second stage of our analysis we used a fixed effects specification. The impact of a health shock under this specification is identified by comparing the consumption of a given household before a shock with the consumption of the same household after a shock has occurred and thus the estimates are not subject to bias arising from time-invariant unobservable characteristics that differ across people in different health states.

## 5. Descriptive analysis

### *Health status profiles*

Figure 1 depicts age profiles of health in terms of the three different health measures that we employ in our analysis i.e. the *poor health indicator*, the *ADL indicator* and the *MJHC indicator*. The upper panel of the figure is based on ELSA while the bottom one is based on BHPS. The age profiles in terms of each health measures are depicted separately for couples and single elderly people.

Note that the age profiles in each of these figures are based on a sample of pooled cross-sectional observations (two waves for ELSA and a maximum of 14 waves for BHPS). As a result the profiles reflect the combined effect of age and cohort differences, as well as the effect of differential mortality.<sup>9</sup> The latter effect affects the characteristics of the surviving respondents: those individuals who remain in the panel are likely to be healthier on average than the sample surveyed at the initial wave.

Keeping in mind that the age profiles in each of these figures combine the effect of cohort, age and mortality differences we can start our analysis. Considering singles initially and based on data from ELSA we find that the percentage of respondents who rate their health as being poor is steadily increasing with age (from 27 percent at the 65-70 age groups to 37 percent at the 80 plus age group). A similar increasing age pattern is detected in the percentage of single elderly people who report limitations in performing ADL (which increases from about 31 percent at the 65-70 age group to about 59 percent at the 80 plus age group) and those reporting major health conditions (which increases from 67 percent at the age group 65-70 to 73 percent at the age group 80 plus). The age health profiles for couples are similar except that at every age a higher percentage of couples are in poor health in terms of all three indicators of health (this is something that was expected given we defined health at household level

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<sup>9</sup> Concerning cohort differences Deaton and Paxson (1998) analysing data from the PSID and NHIS found that on average health status has improved over time across cohorts.

– a couple is classified being in poor health if either the respondent or his spouse is in poor health). Data from BHPS shows a similar increasing age profile in the incidence of ADL and MJHC for both family types but much lower percentage of people in poor health and a much flatter age profile in terms of the *poor health* indicator. This mainly reflects differences between the two surveys in the definition of the *poor health* indicator as well as the fact that in BHPS the respondents are asked to condition their answers regarding their health status relative to the health of people of similar age. Significant differences also exist between the two surveys in the age profile estimated based on the MJHC indicator. These differences are difficult to be explained but most probably mainly reflect differences in the definitions of major health conditions indicator in each survey.

Figure 2 presents the probability of experiencing a transition from good to poor health between two consecutive waves by age group in terms of the three health measures used in our analysis (i.e. the probability of moving from good to poor health, the probability of experiencing onset of limitations in ADL and the probability of experiencing the onset of a MJHC between two consecutive waves). As before figures on the upper panel of this figure are based on ELSA while the bottom ones are based on BHPS. For singles, data from ELSA, show an increasing age pattern in the probability of moving from good to poor health (increasing from about 12 percent in the 65-70 age group to about 20 percent at the 80 plus age group), a similarly increasing age pattern in the probability of experiencing an ADL onset (increasing from 16 percent at the age group 65-70 to about 35 percent at the age group 80 plus) but a much flatter age profile in the probability of experiencing an MJHC onset. For couples we have to be note two things. First, at all age groups couples have a higher probability of experiencing a transition from good to poor health, or the onset of limitations in ADL and the onset of MJHC. This reflects the fact that health is defined at family level and as such it reflects negative health transitions experienced by either the respondent and/or his/her spouse. A second thing that have to be noted is that the age profiles of experiencing a transition from good to poor health is steeper for couples than that for singles (as it is the age profiles of ADL onset and MJHC onset). Despite some differences the general picture emerging from the analysis of BHPS data is similar for both couples and singles.

### ***Subjective life expectancy***

As discussed in the theoretical section subjective expectations about remaining years of life is an important determinant of the intertemporal consumption and saving decisions of the individuals and potentially an important channel through which health may affect consumption dynamics in the old age.

In this section we look at the relationship between longevity expectations and other more objective measures of health. We start our exploration of this relation with Table 2 where we examine the relationship between subjective longevity expectations and the three health indicators used in our analysis: i.e. the *poor health*, the *ADL* and the *MJHC* indicators. The relationship is estimated using ordered probit models when using data from BHPS (given the categorical nature of the responses of survival

probabilities) and OLS models when using data from ELSA. The estimates on all health measures in both ELSA and BHPS are negative and significant with the effect being stronger for the *poor health* than for the *ADL* and the *MJHC* indicators. To examine further the relationship between health and subjective longevity probabilities, we estimated changes in subjective survival probabilities as a function of health changes. Analysis of changes rather than levels allows us to control for unobserved differences across individuals. Results from this exercise are presented in Table 3 (note that this analysis is undertaken using data only from ELSA given that information on subjective survival probabilities in BHPS is available in only one wave (wave 11)). What we note from the figures of this table is that the only variable that reduces significantly the subjective survival probabilities is the self-assessed poor health indicator while neither ADL nor MJHC has any significant effect. Using a narrower indicator of major health conditions MJHCN (one which excludes high blood pressure from the list conditions classified as major conditions) increases the magnitude of the effect suggesting that respondents reduce their subjective survival probabilities at the onset of a major health conditions but the effect is still insignificant (the insignificance of the effect most probably is due to the small number of observations).

### ***Income, wealth and perceptions of financial hardship by health status***

In this section we explore the cross-sectional relationships between health and three different indicators of socio-economic status namely income, wealth and financial hardship. Our aim is to examine whether there are differences in the age profile for each of these indicators of socio-economic status between people in good and poor self-assessed health. The upper panel of Figure 3 is based on data from ELSA while the bottom one from BHPS. Each profile is presented separately for couples and singles.

Considering ELSA first and looking at the age income profile we note that while good health is associated with higher income at younger ages, differences between people in good and poor health are getting less evident as people get older. This pattern is evident for couples and single people, although the relationship is stronger for singles than couples in all ages. That the income health gradient is getting less pronounced as people get older is consistent with findings of other studies and reflects both the general deterioration of health status with age and the fact that health shocks after retirement do not usually adversely affect pensions and social security (Deaton and Paxson, 1997). Regarding the latter effect we also have to note that in the UK health shocks after retirement may lead to an increase in income given that people suffering a health shock can claim disability related benefits. The relationship between income and health in BHPS is similar, except that the gradient is weaker especially at younger ages.

A strong health gradient is also notable for wealth (Figure 4). Compared to income the health wealth gradient is much stronger at younger ages and although becomes less

pronounced as people get older it remains strong even at older ages.<sup>10</sup> A strong health gradient is also evident for the financial hardship indicator. Similarly to income and wealth the relationship between health and financial hardship is stronger at younger ages and gets weaker at older ages (Figure 5). Nevertheless the gradient between health and financial hardship is strong even at older ages.

### ***The relationship between health and consumption***

In this section we take a preliminary look at the relationship between health and consumption by examining how simple averages of spending differ between people in good and poor health (based on the self-assessed *poor health* indicator) in each age group. Note that here we examine the cross-sectional relationships between health and consumption without attempting to document the paths of bad health and low consumption and without controlling for income and wealth or any other characteristics that may affect consumption decisions. Also note once again that cross-sectional age profiles reflect a combination of age, cohort and mortality differences.

Figure 6 illustrates the relationship between age and total spending for people in poor and good health separately. What is immediate evident from this figure is that total spending is lower among people in poor health than among those in good health at all ages. Also the negative slope of the lines suggests that average spending is falling with age both for people in good and in poor health.

Next we consider the age patterns of the relationship between self-assessed health status and four different spending items: food, eating out, leisure and gas and electricity spending (Figure 7). The general decreasing age pattern which we observed for total spending holds for all types of expenditures in both surveys (although not included in the graphs we present here, transfers was the only category where an increasing age pattern is detected). Generally, too, spending by those in good health is higher at all ages than those in poor health. Differences by health status are larger for the spending categories of eating out, leisure (and clothing which is not shown here) and smaller for the spending categories of food consumed in the house and gas and electricity. For both the leisure and eating out spending categories differences between people in good and poor health are getting smaller with age but are not eliminated (in contrast with the picture which emerges for clothing spending – not shown here – for which differences in the average spending between people in poor and good health are eliminated with age). The age pattern of gas and electricity spending is much flatter than that of all other spending categories and in contrast to the picture observed for other spending items average spending on gas and electricity is higher (although

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<sup>10</sup> The positive association between health and measures of socio-economic status such as income and wealth is a well-established finding (Smith and Kington, 1997; Smith, 1999; Smith 2003). Deaton and Paxson (1998) also documented a similar strong negative association but also reported that this negative correlation varies with age; it is small among those in their early 20s, but becomes steadily larger (in absolute value), reaching a peak between ages 50 and 60. After the age of 60 the correlation between income and health weakens as health deteriorates in general.

slightly) for people in poor health than for people in good health. This is the case for single older people but not for couples.

Figure 8 depicts the relationship between health and consumption by income quartile. As we would expect, income appears to be a very important determinant of spending. Irrespective of health status, people in the richest quartile of the equivalised net household income distribution spend more than people with income in the poorest quartile. Differences in average spending by health status are evident however even when we hold income constant: average total spending within each quartile is higher for people in good health than that for people in poor health. Looking at each spending category separately we can observe that differences are mainly coming from lower spending on eating out and leisure while for the food and gas and electricity spending categories differences are much smaller.

Overall, while these results of this section are suggestive of a negative relationship between health and consumption (suggesting that the constraints on spending and/or precautionary savings explanations dominate the other two explanations) we need to move beyond simple comparisons of means to refine our estimates. This observation is particularly important given that a number of variables are known to be correlated with both health and consumption (e.g. age, income, wealth). Hence in the next section we turn to a multivariate approach.

## **6. Empirical results**

### *OLS estimates*

In this section we present results from a series of OLS regression models, which relate consumption patterns to respondents' current health status. The two estimation samples (from BHPS and ELSA) include people older than 65 years old who are permanently out of the labour market. Different models are estimated for each spending category as well as for total consumption and for regular saving. The dependent variable in each model is expressed in logarithm. Each of the models is estimated separately for each of the three alternative measures of health that we consider here i.e. the poor health indicator, the ADL indicator, and MJHC indicator. Other controls included in each model include the age of the household head, household size, total net household income and the number of children of all household members.

We first consider estimates of the effect of poor health based on the self-assessed health status. Results from ELSA and BHPS are summarised in Table 4 with Panel A presenting the estimates from ELSA while panel B presenting the estimates from BHPS. The estimates for couples and singles are presented in the first and second section of each panel respectively. Significance levels are denoted with asterisks with one, two and three asterisks denoting significance at 90, 95 and 99 significance levels respectively.

The estimates on the *poor health* indicator suggest that being in poor health is associated with significantly lower spending on eating out, leisure and transfers for both couples and singles, lower spending on clothing for singles and significantly higher spending on gas and electricity for both couples and singles (effect however that is only significant in BHPS). No significant effect is identified on food spending for either couples or singles. Except from the estimates on gas and electricity which are significant in BHPS but not in ELSA, results in similar spending items are comparable in both surveys. The effect of poor health on total spending is negative for both singles and couples indicating that people in poor health spend significantly less than people in good health, controlling for other factors. Taken together these results tend to indicate that people in poorer health spend significantly less than people in better health with the main differences coming from the lower spending that people in poorer health have on leisure and on eating out. This result tends to indicate that the consumption constraints and/or the precautionary saving dominate the extra cost and reduced life expectancy mechanisms.

In order to distinguish further between the possible mechanisms, we next ran specifications of equation (1) in which we include limitations in ADL and MJHC as alternative indicators of health status. Each of these health indicators is hypothesised to affect consumption patterns differently. First, the variable which indicates whether the respondent has any limitations in performing ADL is hypothesised to be associated with higher needs compared to the MJHC indicator. In this respect we expect to find the ADL variable to be associated with higher spending at least for some spending items compared to MJHC variable. Secondly, limitations in ADL may impose more constraints on spending opportunities compared to MJHC (and as such to be associated with lower spending especially on consumption items like leisure and other types of recreational goods). We attempt to pin down these two effects by examining the effect of ADL limitations on different consumption items and by examining differences in the effects identified in terms of ADL and MJHC indicators.

Results from the models estimated using these two alternative health indicators are reported in Table 5. For expositional simplicity we only report the coefficients of each health measure while coefficients of all other covariates are ignored.

The estimates on the ADL variable based on ELSA suggest that people who report limitations in ADL have significantly lower spending on eating out, clothing, leisure and transfers compared to their counterparts who report no limitations in ADL (but with the estimated effects on clothing and transfers being significant only for couples). Similar negative effects are also identified in BHPS for the comparable spending categories. Positive effects are also identified in terms of this health measure on gas and electricity spending but the effect is significant for singles and only in BHPS. With the exception of a significant negative effect that is identified in ELSA for leisure spending of singles none of the other estimates on the MJHC indicator is significant.

Overall, the results from the OLS models suggest that poor health has a negative effect on overall spending with the main effects coming from the lower spending on leisure and eating out. Given the types of consumption concerned and the fact that the effects are mainly associated with limitations in ADL (i.e. where functioning is limited) and less with MJHC points to the possibility that opportunities for consumption of this kind are constrained (“constraints on opportunities to spend” effect). However, a negative effect of health on these items would also be consistent with increased needs leading to a reallocation of spending towards goods and services such as transport, household services and health costs – categories which are not recorded in BHPS or ELSA. Some insights concerning the overall effect of health on consumption can be gained examining the effect of health on monthly savings (data for which are available in BHPS). Results for this measure – reported in the second column from the end of Tables 4 and 5 (panel B) – suggest that people in poor health have lower monthly savings than people in good health. Similar conclusions can be drawn based on the ADL and the MJHC indicators. These results tends to indicate that the lower spending on leisure, food out and clothing may be driven by an “increase in needs” rather than by a “constraining” effect of health on consumption overall. Alternatively, however, lower spending and monthly savings may reflect other unobserved differences between people in good and poor health including differences in their lifetime resources (which themselves may be driven by health), discount rates, mortality considerations and other unobserved factors that have not been controlled for in the specification adopted in the analysis of this section. To determine whether health is associated with higher costs which are not captured by the consumption items for which we have information on or whether it is the result of unobserved heterogeneity that drive the effects is something that has to further to be examined. We will return to this issue later when we will estimate the effect of health on consumption taking into account the effect of unobserved heterogeneity.

### ***OLS estimates controlling for initial health***

In the section above the effect of health on consumption was identified by estimating a series of OLS models relating spending to respondents’ current health status. The central assumption for the legitimacy of these OLS estimates is that the error term in each of the estimated equations is uncorrelated with any of the covariates that are included in each model. However, if there are unobservable factors that affect health and consumption then the estimates for the effect of health status will be biased.

In this section we make a first attempt to control for unobserved heterogeneity by controlling for respondents’ initial health status. Table 6 reports the results of this exercise in terms of the three indicators we consider here with panels A and B reporting the estimates based on ELSA and BHPS respectively. Note that in all models we include controls for demographic and economic characteristics, as well as a dichotomous variable indicating whether respondents experienced deterioration in health between two consecutive waves. We used three indicators of health deterioration (i.e. health deterioration based on respondents self-assessed health status, one indicating the onset of limitations in ADL and one indicating the onset of MJHC).

Estimates in the first section of each panel are for couples while those reported in the second section are for singles.

Looking, first at the estimates on self-assessed health status deterioration and considering the results for couples we note two things. First, although the estimates for the effect of health status deterioration suggest that poorer health has a negative effect on leisure and eating out spending, the magnitude and the significance of these negative effects are significantly lower than when the effects were identified without controlling for respondents' initial health status (the estimates are still significant in BHPS but most turn insignificant in ELSA). Controlling for respondents' initial health status also has a significant effect on the estimates for the gas and electricity spending: a significant positive effect is now identified in ELSA while the effect turns insignificant in BHPS. The positive estimate on the health deterioration variable that is identified in ELSA for the gas and electricity spending suggests that those respondents whose health deteriorates have significantly higher spending on gas and electricity than people who remain healthy throughout the panel. For singles, similarly to the effects identified in the previous section, health deterioration is found to exert a significant negative effect on clothing, leisure and eating out spending (although the effect on eating out spending is significant only in BHPS) with the estimates however, being smaller (both in terms of magnitude and significance) than those estimated without controlling for initial health. A positive effect of health is identified on gas and electricity spending but the effect is significant only in BHPS and not in ELSA (similarly to the estimates derived without controlling for initial health).

Attempting to gain a partial insight into the effect of health on overall consumption in Table 6 (Panel B second column from the end) we examined differences in monthly savings between people who experienced health deterioration and those who remained healthy between two consecutive waves. Results from this exercise suggested that health status deterioration has a negative effect on savings for both singles and couples.

Sensitivity analysis with alternative health indicators (reported in subsequent rows of each panel of Table 6) shows that the negative effect of health on leisure and eating out spending is mainly associated with the onset of conditions that lead to limitations in performing ADL while MJHC onset does not have any other significant negative effect on spending (with the exception of a significant negative effect on leisure spending that is identified for singles in ELSA). A significant positive effect is identified for ADL onset on the gas and electricity spending (identified however only in BHPS), while such an effect is not identified in terms of the MJHC indicator. For MJHC onset however we identify a significant positive effect on the eating out spending of couples. Both ADL and MJHC onset have significant negative effect on monthly savings.

### ***Fixed effect estimates***

In this section we estimate a series of fixed effects models, which control for household fixed effects. Our aim is to obtain estimates of the effect of health on

spending patterns, which are net of the effect of unobserved heterogeneity. Results from these fixed effect regressions are reported in Table 7. Once again the upper panel of the table presents the estimates for couples while the bottom one presents those for singles.

Several things have to be noted from the figures of this table. First, the magnitude and significance of the negative effect of health on leisure and food out spending are considerably reduced (or turn insignificant) when we control for the effects of unobserved heterogeneity. This result is suggestive of the importance of unobserved differences among people in good and poor health but it may also reflect the fact that health shocks may in fact be correlated with existing conditions and behaviours well before the shocks are observed in our sample. The largest effects are identified in terms of the self-assessed poor health indicator with the estimates suggesting a negative effect of poor health on leisure and eating out spending and a positive effect on gas and electricity spending but with both effects being significant only for singles. Some negative effects are also identified in terms of the ADL indicator but none of the estimates maintains its significance. The MJHC indicator once again is found to exert no significant negative effect on spending for either singles or couples.

Given that the consumption components for which we have information on cover only a limited subset of the overall consumption, in the last two columns of Table 7 we present results concerning the effect of health on monthly savings (based on data from BHPS) and wealth (based on data from ELSA). Changes in wealth and monthly savings can provide an indication of overall consumption changes. The general conclusion that can be drawn from the estimates is that health exerts no significant effect on either monthly savings or on wealth. These findings tend to indicate that any increase in consumption due to health shocks is not financed by running down accumulated wealth and that any negative effects of health on spending are not leading to any significant increase in monthly savings. One possibility for this latter result may be that the decrease in leisure and food out spending is small and does not lead to a significant increase in savings. An alternative explanation however, may be that there is a reallocation of spending towards other goods and services. To explore further the possibility that a health shock leads to a reallocation of spending which we cannot capture given the limitation of the available consumption data we estimate a series of models relating changes in health to how respondents rate their financial situation. The dependent variable in these regressions is a dummy variable which indicates whether respondents perceive their financial situation as worse than a year before and state increased spending as the main reason behind this deterioration. Estimates from these models are reported in Table 8. Estimated effects suggest that especially among single older people health shocks lead to an increase in expenditure and this increase leaves them in a worse financial situation – with the effects again being significant for the onset of limitations that lead to ADL but not for the onset of MJHC.

All in all, the results from the fixed effect specification suggest that health deterioration lead to a significant decrease in leisure and eating out spending. This

result is stronger for couples than for singles and when health changes are measured in terms of the self-assessed indicator of health status. Given the types of consumption concerned, and the fact that negative effects were identified for the poor health and the ADL indicators (i.e. where functioning is limited) but not for the MJHC indicator, points to the possibility that opportunities for consumption of this kind are constrained (supporting the operation of a “constraining” health effect). At the same time the evidence also suggests that health shocks lead to an increase in spending of some consumption components. Given that information on spending was available only for a limited subset of the components which comprise the consumption bundle we were able to identify increased spending only for the gas and electricity spending category (among singles). Indicative of the operation of an “increased needs” effect however, was also the evidence concerning the effect of poor health and limitations in ADL on perceptions about financial hardship. Given that the indicators that are found to be associated with lower spending are also those that are associated with “increased needs” the decrease in expenditure on leisure and food out could reflect reallocation of spending to higher priority categories reflecting new needs, rather than constraints on consumption. The evidence on this is not conclusive.

The overall effect of health changes on consumption is small and insignificant in terms of all health measures. This result which is supported by the fact that neither monthly savings nor wealth is significantly affected by health changes tends to indicate that the positive and the negative effects of health on consumption are offsetting each other.

## **7. Conclusions**

The analysis in this paper focused on the impact of health on the consumption decisions of the older people in the UK. As discussed in section 2, there are five different mechanisms through which health may affect consumption. Ill health may affect consumption capacities and needs while the risk of deteriorating health might increase subjective mortality rates leading to higher consumption. Conversely ill-health may induce lower consumption and an increase in precautionary savings given that agents may anticipate increased consumption needs following a negative health shock. The main objective in this paper was to describe how consumption and saving decisions of the elderly adjust to health changes and to disentangle among the different pathways through which consumption and savings respond to health changes. To identify the potential effects of health we used data from the British Household Panel Survey (BHPS) and the English Longitudinal Survey of Ageing (ELSA) and we estimated a series of regressions models which related health changes to observed consumption and savings changes.

According to our results health seems to be a very significant determinant of well-being even at later stages of the lifecycle. People in poor health are more likely to be in financial hardship, have lower income and wealth as well as spend considerably

less than people in good health. Although a significant part of the effects of health on consumption are operating through unobserved factors the evidence also suggests that new health shocks lead to some significant adjustments in the composition of consumption. In particular, our evidence suggests that health shocks lead to an increase in spending on some consumption components. Given that information on spending was available only for a limited subset of the components which comprise the consumption bundle we were able to identify increased spending only for the gas and electricity spending category (among singles). Results based on perceptions of financial situation also support the hypothesis of “increased needs” especially for single older people in poor health. At the same time the evidence of this paper suggests that health shocks lead to a significant decrease in some discretionary spending categories such as leisure and eating out. Given the types of consumption concerned, and the fact that negative effects are identified in terms of the poor health and the ADL indicator (but with the estimates on ADL indicator being significant in the OLS but not in the fixed effects specification) but not for the MJHC indicator, it points to the possibility that opportunities for consumption of this kind are constrained. Given that the indices that are found to be associated with lower spending are also those that are associated with “increased needs” the decrease in expenditure on leisure and eating out could reflect reallocation of spending to higher priority categories reflecting new needs, rather than constraints on consumption. The evidence on this is not conclusive.

The overall effect of health changes on consumption is small and insignificant in terms of all health measures. This result which is supported by the fact that neither monthly savings nor wealth is significantly affected by health changes tends to indicate that the positive and the negative effects of health on consumption are offsetting each other.

Although we could not test the effect of changes in longevity expectations directly (given the unavailability of longitudinal information of subjective longevity expectations data in BHPS and the poor correlations of the MJHC indicator as defined in BHPS with subjective life expectancy) the evidence does not suggest that a strong spending down is taking place following a health shock. Any increase in spending that we identified was mainly associated with increased health related needs. Although we do not have strong evidence for the importance of precautionary savings precautionary saving motive the fact that the negative effects that we identified were associated with limitations in ADL tends to suggest that behind this result operates a constraining effect of health on consumption opportunities rather than a precautionary saving motive.

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## Tables and Figures

**Table 1: Sample used in the analysis**

	<b>Observations</b>	<b>Households</b>
<b>ELSA</b>		
All	4,556	1,638
Couples	2,560	640
Singles	1,996	998
<b>BHPS</b>		
All	16,074	1,699
Couples	8,276	619
Singles	7,798	1080

Note: Data are from the two first two waves of the ELSA and the waves 1-14 of BHPS. I restrict the sample used in the analysis to a subsample of households in which the respondent and his spouse (in the case of couples) are permanently retired and over the age of 65 (but with the age limit for respondent's spouse set to 60 years old). We also select households for whom we have interviews for at least two waves and for which there is no changes in the household composition during the relevant observation period.

**Table 2: Ordered probit and OLS estimates on longevity expectations**

<b>BHPS</b>	<b>Ordered probit</b>			
	Model 1	Model 2	Model 3	Model 4
Poor health	-0.57*** [0.00]			
Limitations in performing ADL		-0.50*** [0.00]		
Major Health Conditions (broad definition)			-0.39*** [0.00]	
age	-0.01 [0.11]	-0.01 [0.17]	-0.01* [0.05]	
female	0.12 [0.34]	0.14 [0.28]	0.14 [0.28]	
Single elderly	-0.09 [0.44]	-0.05 [0.69]	-0.09 [0.46]	
Log total household income	0.02 [0.72]	0.07 [0.20]	0.06 [0.23]	
Obs.	634	634	634	
R-squared	0.0169	0.0190	0.0163	
<b>ELSA<sup>2</sup></b>	<b>OLS estimates</b>			
	Model 1	Model 2	Model 3	Model 4
Poor health	-11.24*** [0.00]			
Limitations in performing ADL		-7.90*** [0.00]		
Major Health Conditions (broad definition)			-5.56*** [0.00]	
Major Health Conditions (narrow definition)				-5.40*** [0.00]
age	-1.22*** [0.00]	-1.15*** [0.00]	-1.24*** [0.00]	-1.24*** [0.00]
female	-0.67 [0.52]	-0.26 [0.80]	-0.78 [0.46]	-0.66 [0.53]
Single elderly	2.85*** [0.00]	3.82*** [0.00]	3.20*** [0.00]	2.84*** [0.00]
Log total net household income	0.78 [0.33]	1.23 [0.12]	1.19 [0.14]	1.24 [0.12]
Constant	135.05*** [0.00]	124.95*** [0.00]	134.01*** [0.00]	132.57*** [0.00]
Obs.	4392	4392	4393	4393
R-squared	0.123	0.110	0.102	0.102

Note: 1. The dependent variable in these models is a categorical variable indicating respondents' subjective evaluation of their survival likelihood to a certain age with 1 "very unlikely" 2 "unlikely" 3 "likely" 4 "very likely" 2. The dependent variable in each of these models is a continuous variable ranging from 0 to 100 which indicates the probability chance that respondents give to their survival likelihood.

**Table 3: Fixed effect models for the effect of health on subjective longevity expectations**

ELSA	Fixed effect estimates			
	Model 1	Model 2	Model 3	Model 4
Poor health	-3.51**			
	[0.02]			
Limitations in ADL		-0.16		
		[0.91]		
Major Health Conditions MJHC (broad definition)			0.76	
			[0.75]	
Major Health Conditions MJHCN (narrow definition)				-3.06
				[0.30]
Age	-0.21	-0.25	-0.27	-0.20
	[0.40]	[0.31]	[0.29]	[0.43]
Log total net household income	-0.94	-1.04	-1.03	-1.06
	[0.43]	[0.38]	[0.38]	[0.37]
Constant	70.17***	72.92***	73.46***	70.08***
	[0.00]	[0.00]	[0.00]	[0.00]
<i>Obs.</i>	4392	4392	4393	4393
<i>R-squared</i>	0.003	0.001	0.001	0.001

Note: The dependent variable in each of these models is the change in subjective longevity expectations.

**Table 4: OLS estimates of the effect of health on consumption, wealth and savings and probit estimates of the probability of being in financial hardship**

	Food in	Eating out	Clothing	Leisure	Gas and electricity	Transfers	Total Spending	Financial hardship
<b>Panel A: ELSA</b>								
<b>Couples</b>								
poor health	-0.00 [0.86]	-0.44*** [0.00]	-0.09 [0.61]	-0.35** [0.03]	0.04 [0.36]	-0.42** [0.01]	-0.09** [0.03]	0.88*** [0.00]
age	-0.01** [0.03]	-0.06*** [0.00]	-0.06*** [0.00]	-0.10*** [0.00]	0.00 [0.73]	0.00 [0.75]	-0.01*** [0.00]	-0.01 [0.56]
A-level or equivalent	-0.04 [0.69]	-0.08 [0.86]	-0.72 [0.23]	-1.05** [0.03]	-0.10 [0.42]	-1.22** [0.03]	-0.27* [0.07]	1.03 [0.26]
O-level or equivalent	-0.06 [0.49]	0.25 [0.48]	-0.15 [0.76]	0.31 [0.46]	-0.05 [0.68]	-0.07 [0.89]	0.05 [0.74]	0.72 [0.37]
no qualifications	-0.14* [0.08]	-0.41 [0.22]	-0.59 [0.22]	-0.60 [0.13]	-0.10 [0.43]	-1.12** [0.01]	-0.23* [0.10]	0.89 [0.25]
number of children	0.02 [0.65]	0.56* [0.10]	0.49 [0.18]	0.12 [0.69]	-0.09 [0.25]	0.43 [0.16]	0.18*** [0.01]	0.01 [0.99]
log of household income	0.09*** [0.00]	0.99*** [0.00]	0.36* [0.06]	0.68*** [0.00]	0.02 [0.71]	0.89*** [0.00]	0.32*** [0.00]	-0.89*** [0.00]
constant	5.31*** [0.00]	-0.12 [0.94]	4.89** [0.01]	5.55*** [0.00]	3.28*** [0.00]	-3.28* [0.06]	4.99*** [0.00]	3.92* [0.08]
Obs.	603	603	603	603	602	603	603	601
R-squared	0.065	0.196	0.063	0.191	0.132	0.117	0.190	0.058
<b>Singles</b>								
poor health	0.02 [0.46]	-0.18 [0.13]	-0.40*** [0.00]	-0.46*** [0.00]	0.02 [0.61]	-0.29** [0.04]	-0.08** [0.05]	0.69*** [0.00]
age	-0.01** [0.01]	-0.01* [0.07]	-0.04*** [0.00]	-0.04*** [0.00]	-0.00* [0.08]	0.01 [0.18]	-0.01*** [0.00]	-0.03** [0.02]
A-level or eq.	-0.06 [0.41]	0.19 [0.56]	0.11 [0.79]	-0.21 [0.56]	-0.12 [0.36]	-0.26 [0.53]	-0.18* [0.10]	0.20 [0.70]
O-level or eq.	-0.08 [0.27]	-0.13 [0.67]	0.50 [0.17]	-0.30 [0.38]	-0.03 [0.80]	-0.73* [0.05]	-0.23** [0.02]	0.16 [0.74]
no qualifications	-0.11 [0.13]	-0.42 [0.13]	0.12 [0.71]	-0.32 [0.32]	-0.11 [0.42]	-1.14*** [0.00]	-0.33*** [0.00]	0.43 [0.34]
number of children	0.11** [0.01]	0.21* [0.10]	-0.13 [0.42]	0.03 [0.85]	0.03 [0.63]	0.25 [0.12]	0.06 [0.24]	0.12 [0.53]
log household income	0.09* [0.08]	0.44*** [0.00]	0.23* [0.10]	0.26** [0.03]	0.15*** [0.00]	0.66*** [0.00]	0.29*** [0.00]	-0.60*** [0.00]
constant	4.69*** [0.00]	-0.12 [0.92]	3.60*** [0.01]	3.36*** [0.00]	2.64*** [0.00]	-2.37* [0.09]	4.52*** [0.00]	4.89*** [0.01]
Obs.	868	868	868	868	867	868	868	866
R-squared	0.029	0.054	0.050	0.063	0.118	0.077	0.117	0.046

<b>Panel B: BHPS</b>	Food in	Eating out	Leisure	Gas and electricity	Regular Savings	Financial hardship
<b>Couples</b>						
poor health	0.03 [0.23]	-0.42*** [0.00]	-0.34*** [0.00]	0.05* [0.07]	-0.33*** [0.01]	0.51** [0.05]
age	-0.01*** [0.00]	-0.05*** [0.00]	-0.07*** [0.00]	-0.00** [0.01]	0.01 [0.47]	-0.00 [0.94]
A-level or equivalent	0.02 [0.65]	-0.18 [0.26]	-0.10 [0.50]	-0.13*** [0.01]	-0.50* [0.09]	0.62 [0.49]
O-level or equivalent	0.02 [0.70]	-0.46*** [0.01]	-0.27 [0.10]	-0.12** [0.01]	-0.72** [0.01]	0.80 [0.34]
no qualifications	-0.03 [0.55]	-0.69*** [0.00]	-0.59*** [0.00]	-0.20*** [0.00]	-0.88*** [0.00]	1.17 [0.16]
number of children	-0.00 [0.57]	-0.08** [0.04]	0.02 [0.71]	0.00 [0.82]	-0.03 [0.59]	0.18** [0.04]
log of household income	0.23*** [0.00]	0.55*** [0.00]	0.55*** [0.00]	0.07** [0.01]	1.58*** [0.00]	-0.84*** [0.01]
constant	4.49*** [0.00]	3.49*** [0.01]	4.80*** [0.00]	3.48*** [0.00]	-9.09*** [0.00]	1.10 [0.68]
<i>Obs.</i>	3587	2053	2053	3126	3363	3595
<i>R-squared</i>	0.130	0.162	0.182	0.142	0.164	0.061
<b>Singles</b>						
poor health	0.01 [0.72]	-0.61*** [0.00]	-0.52*** [0.00]	0.07*** [0.01]	-0.34*** [0.00]	0.93*** [0.00]
age	-0.01*** [0.00]	-0.03*** [0.00]	-0.05*** [0.00]	-0.00** [0.02]	-0.01* [0.09]	-0.08*** [0.00]
A-level or eq.	-0.01 [0.90]	-0.22 [0.28]	-0.07 [0.63]	-0.05 [0.36]	-0.52* [0.06]	0.86 [0.14]
O-level or eq.	0.01 [0.78]	-0.23 [0.22]	-0.35** [0.02]	-0.05 [0.32]	-0.65*** [0.01]	1.16** [0.03]
no qualifications	-0.02 [0.67]	-0.68*** [0.00]	-0.69*** [0.00]	-0.13*** [0.00]	-0.81*** [0.00]	1.33** [0.01]
number of children	-0.00 [0.87]	-0.06** [0.01]	-0.01 [0.67]	0.01 [0.28]	-0.01 [0.52]	0.13** [0.01]
log household income	0.19*** [0.00]	0.46*** [0.00]	0.40*** [0.00]	0.03* [0.07]	0.52*** [0.00]	-0.62*** [0.00]
constant	4.17*** [0.00]	1.79** [0.01]	3.89*** [0.00]	3.31*** [0.00]	-0.89 [0.20]	5.25*** [0.00]
<i>Obs.</i>	6878	3640	3640	5411	6576	7061
<i>R-squared</i>	0.067	0.143	0.168	0.138	0.072	0.088

Note: The table reports results from OLS (column 1-6) and from logit regression models (column 7). The dependent variable in each model in the first six columns of the table is in logarithms while the dependent variable in the model reported in column 7 is a dichotomous variable which indicates whether the respondent is in financial hardship. Coefficient significance are reported with asterisks with \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 5: OLS estimates of the effect of health on consumption, wealth and savings and logit estimates of the probability of being in financial hardship**

	Food in	Eating out	Clothing	Leisure	Gas and electricity	Transfers	Total Spending	Financial hardship
<b>Panel A: ELSA</b>								
<b>Couples</b>								
<b>Limitations in ADL</b>								
ADL or IADL	0.03 [0.35]	-0.32** [0.02]	-0.37** [0.03]	-0.50*** [0.00]	-0.05 [0.16]	-0.35** [0.04]	-0.12*** [0.01]	0.64*** [0.00]
<i>Obs.</i>	610	610	610	610	609	610	610	608
<i>R-squared</i>	0.068	0.187	0.069	0.196	0.131	0.113	0.195	0.045
<b>Major conditions</b>								
MJHC	0.03 [0.52]	-0.07 [0.76]	0.12 [0.68]	-0.18 [0.48]	-0.07 [0.25]	-0.38 [0.17]	0.01 [0.92]	0.57 [0.14]
<i>Obs.</i>	609	609	609	609	608	609	609	607
<i>R-squared</i>	0.067	0.183	0.063	0.183	0.129	0.110	0.185	0.037
<b>Singles</b>								
<b>Limitations in ADL</b>								
ADL or IADL	0.02 [0.53]	-0.41*** [0.00]	0.17 [0.19]	-0.28** [0.02]	0.02 [0.60]	0.16 [0.23]	-0.03 [0.44]	0.70*** [0.00]
<i>Obs.</i>	876	876	876	876	875	876	876	874
<i>R-squared</i>	0.029	0.066	0.042	0.051	0.119	0.071	0.115	0.047
<b>Major conditions</b>								
MJHC	-0.01 [0.86]	-0.12 [0.33]	0.04 [0.79]	-0.41*** [0.00]	-0.01 [0.75]	0.10 [0.50]	0.01 [0.84]	0.49*** [0.01]
<i>Obs.</i>	876	876	876	876	875	876	876	874
<i>R-squared</i>	0.028	0.052	0.040	0.057	0.118	0.070	0.114	0.036

<b>Panel B: BHPS</b>	Food in	Eating out	Leisure	Gas and electricity	Regular Savings	Financial hardship
<b>Couples</b>						
<b>Limitations in ADL</b>						
ADL or IADL	0.01	-0.49***	-0.58***	0.04	-0.22*	0.09
	[0.71]	[0.00]	[0.00]	[0.14]	[0.07]	[0.71]
<i>Obs.</i>	3316	1787	1787	2870	3106	3323
<i>R-squared</i>	0.129	0.177	0.207	0.144	0.160	0.056
<b>Major conditions</b>						
MJHC	0.01	-0.05	0.05	0.01	-0.19	-0.18
	[0.65]	[0.63]	[0.63]	[0.67]	[0.15]	[0.53]
<i>Obs.</i>	3871	2339	2339	3401	3631	3880
<i>R-squared</i>	0.126	0.148	0.167	0.142	0.158	0.048
<b>Singles</b>						
<b>Limitations in ADL</b>						
ADL or IADL	0.00	-0.54***	-0.44***	0.05**	-0.26***	0.69***
	[0.90]	[0.00]	[0.00]	[0.02]	[0.00]	[0.00]
<i>Obs.</i>	6432	3191	3191	5028	6170	6609
<i>R-squared</i>	0.064	0.145	0.169	0.131	0.073	0.083
<b>Major conditions</b>						
MJHC	0.03	-0.08	-0.09	0.00	-0.09	0.17
	[0.12]	[0.27]	[0.16]	[0.99]	[0.20]	[0.25]
<i>Obs.</i>	7425	4209	4209	5885	7113	7628
<i>R-squared</i>	0.067	0.119	0.145	0.136	0.067	0.072

Note: The table reports results from OLS (column 1-6) and from logit regression models (column 7). The dependent variable in each model in the first six columns of the table is in logarithms while the dependent variable in the model reported in column 7 is a dichotomous variable which indicates whether the respondent is in financial hardship. The key independent variables are the ADL and the MJHC indicators. Other controls variables include age of the household head; the number of children; three dummy variables for household head's educational level and the logarithm of total household income. P-values of the coefficients are in parentheses. Standards errors are clustered by household. Coefficient significance are reported with asterisks with \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 6: OLS estimates of the effect of health on consumption and logit estimates of the effect of health on financial hardship controlling for initial health**

	Food in	Eating out	Clothing	Leisure	Gas and electricity	Transfers	Total Spending	Financial hardship
<b>Panel A: ELSA</b>								
<b>Couples</b>								
<b>Self-assessed health status</b>								
Health deterioration	-0.03	-0.10	-0.07	-0.11	0.09*	-0.09	-0.04	0.57*
	[0.54]	[0.65]	[0.79]	[0.64]	[0.08]	[0.72]	[0.53]	[0.06]
<i>Obs.</i>	601	601	601	601	600	601	601	600
<i>R-squared</i>	0.068	0.206	0.070	0.199	0.135	0.124	0.194	0.058
<b>Limitations in ADL</b>								
ADL onset	0.05	0.19	-0.23	-0.60**	-0.07	-0.20	-0.08	0.39
	[0.22]	[0.36]	[0.36]	[0.01]	[0.28]	[0.40]	[0.23]	[0.22]
<i>Obs.</i>	609	609	609	609	608	609	609	608
<i>R-squared</i>	0.071	0.205	0.069	0.201	0.132	0.118	0.202	0.053
<b>Major conditions</b>								
MJHC onset	-0.05	0.68*	-0.06	-0.23	0.05	-0.06	-0.00	0.07
	[0.54]	[0.08]	[0.91]	[0.64]	[0.62]	[0.90]	[0.99]	[0.92]
<i>Obs.</i>	609	609	609	609	608	609	609	604
<i>R-squared</i>	0.069	0.189	0.064	0.183	0.132	0.111	0.186	0.031
<b>Singles</b>								
<b>Self-assessed health status</b>								
Health deterioration	0.01	-0.11	-0.40**	-0.41**	0.03	-0.62***	-0.07	0.66***
	[0.82]	[0.53]	[0.03]	[0.01]	[0.68]	[0.00]	[0.16]	[0.00]
<i>Obs.</i>	867	867	867	867	866	867	867	866
<i>R-squared</i>	0.030	0.059	0.050	0.064	0.120	0.083	0.120	0.045
<b>Limitations in ADL</b>								
ADL onset	-0.03	-0.18	0.16	-0.29*	0.01	-0.25	-0.10	0.73***
	[0.52]	[0.25]	[0.38]	[0.08]	[0.86]	[0.21]	[0.11]	[0.00]
<i>Obs.</i>	872	872	872	872	871	872	872	871
<i>R-squared</i>	0.032	0.074	0.045	0.053	0.120	0.081	0.121	0.043
<b>Major conditions</b>								
MJHC onset	-0.10*	-0.05	-0.28	-0.42*	-0.09	-0.24	-0.12*	0.42
	[0.08]	[0.80]	[0.21]	[0.06]	[0.32]	[0.33]	[0.08]	[0.17]
<i>Obs.</i>	876	876	876	876	875	876	876	875
<i>R-squared</i>	0.032	0.052	0.043	0.060	0.121	0.073	0.119	0.035

<b>Panel B: BHPS</b>	Food in	Eating out	Leisure	Gas and electricity	Regular savings	Financial hardship
<b>Couples</b>						
<b>Self-assessed health status</b>						
Health deterioration	0.05** [0.05]	-0.24* [0.10]	-0.32** [0.02]	0.02 [0.48]	-0.33** [0.03]	0.20 [0.63]
<i>Obs.</i>	2742	1607	1607	2358	2564	2743
<i>R-squared</i>	0.126	0.165	0.196	0.141	0.164	0.055
<b>Limitations in ADL</b>						
ADL onset	0.01 [0.83]	-0.30** [0.04]	-0.39** [0.01]	0.05* [0.08]	-0.33** [0.04]	-0.17 [0.70]
<i>Obs.</i>	2466	1339	1339	2098	2302	2466
<i>R-squared</i>	0.124	0.170	0.219	0.145	0.157	0.049
<b>Major conditions</b>						
MJHC onset	0.05 [0.17]	0.28* [0.06]	0.14 [0.38]	0.06 [0.14]	-0.32* [0.09]	-0.01 [0.99]
<i>Obs.</i>	3259	2129	2129	2862	3056	3263
<i>R-squared</i>	0.121	0.143	0.174	0.143	0.159	0.044
<b>Singles</b>						
<b>Self-assessed health status</b>						
Health deterioration	-0.00 [0.96]	-0.49*** [0.00]	-0.41*** [0.00]	0.11*** [0.00]	-0.23*** [0.01]	0.64*** [0.00]
<i>Obs.</i>	5508	2955	2955	4219	5246	5637
<i>R-squared</i>	0.074	0.152	0.169	0.131	0.067	0.084
<b>Limitations in ADL</b>						
ADL onset	-0.02 [0.48]	-0.29*** [0.01]	-0.32*** [0.00]	0.05* [0.07]	-0.27*** [0.00]	0.62*** [0.00]
<i>Obs.</i>	5080	2516	2516	3853	4856	5202
<i>R-squared</i>	0.070	0.155	0.168	0.121	0.068	0.070
<b>Major conditions</b>						
MJHC onset	-0.00 [0.99]	0.06 [0.54]	-0.08 [0.36]	-0.02 [0.36]	-0.08 [0.35]	0.23 [0.26]
<i>Obs.</i>	6548	4019	4019	5140	6257	6712
<i>R-squared</i>	0.069	0.121	0.144	0.135	0.062	0.061

Note: The table reports results from OLS (column 1-6) and from logit regression models (column 7). The dependent variable in each model in the first six columns of the table is in logarithms while the dependent variable in the model reported in column 7 is a dichotomous variable which indicates whether the respondent is in financial hardship. The key independent variables are the health deterioration, the ADL onset and the MJHC\_onset. Other controls variables include age of the household head; the number of children; three dummy variables for household head's educational level and the logarithm of total household income. P-values of the coefficients are in parentheses. Standards errors are clustered by household. Coefficient significance are reported with asterisks with \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

**Table 7: Fixed effect estimates of the effect of health on spending and savings: results from the BHPS**

	<b>BHPS</b>					<b>ELSA</b>
	Food in	Eating out	Leisure	Gas and electricity	Regular Savings	Wealth
<b>Couples</b>						
<b>Self-assessed health status</b>						
poor health	-0.00	-0.11	-0.14	-0.00	0.02	-0.09
	[0.94]	[0.20]	[0.11]	[0.81]	[0.83]	[0.42]
<i>Obs.</i>	3587	2053	2053	3126	3363	1266
<i>R-squared</i>	0.011	0.002	0.007	0.030	0.003	0.027
<b>Limitations in ADL</b>						
ADL	-0.01	-0.13	-0.14	0.00	-0.02	0.01
	[0.42]	[0.21]	[0.18]	[0.80]	[0.78]	[0.93]
<i>Obs.</i>	3316	1787	1787	2870	3106	1277
<i>R-squared</i>	0.010	0.003	0.008	0.031	0.003	0.024
<b>Major conditions</b>						
MJHC	0.01	-0.03	-0.08	-0.01	0.01	-0.16
	[0.52]	[0.74]	[0.29]	[0.59]	[0.92]	[0.36]
<i>Obs.</i>	3871	2339	2339	3401	3631	1278
<i>R-squared</i>	0.010	0.001	0.006	0.034	0.003	0.024
<b>Subjective longevity expectations</b>						
SLE						0.00
						[0.68]
<i>Obs.</i>						1220
<i>R-squared</i>						0.031
<b>Singles</b>						
<b>Self-assessed health status</b>						
poor health	-0.03*	-0.20***	-	0.03*	-0.06	-0.12
	[0.07]	[0.01]	0.19***	[0.06]	[0.33]	[0.43]
<i>Obs.</i>	6885	3642	3642	5412	6587	1982
<i>R-squared</i>	0.017	0.008	0.008	0.023	0.003	0.013
<b>Limitations in ADL</b>						
ADL	-0.00	-0.12	-0.04	0.01	0.07	-0.08
	[0.86]	[0.11]	[0.52]	[0.53]	[0.25]	[0.51]
<i>Obs.</i>	6438	3193	3193	5029	6180	1991
<i>R-squared</i>	0.016	0.005	0.002	0.021	0.002	0.012
<b>Major conditions</b>						
MJHC onset	0.03**	-0.04	0.05	-0.01	0.05	-0.27
	[0.02]	[0.49]	[0.40]	[0.43]	[0.36]	[0.22]
<i>Obs.</i>	7432	4211	4211	5886	7124	1995
<i>R-squared</i>	0.018	0.006	0.004	0.021	0.003	0.013
<b>Subjective longevity expectations</b>						
SLE						-0.00
						[0.43]
<i>Obs.</i>						1,889
<i>R-squared</i>						0.012

Note: The table reports results from fixed effect models. The dependent variable in each model is in logarithms. The key independent variables are the poor health, the ADL and the MJHC indicators. Other controls variables include age of the household head; the number of children; three dummy variables for household head's educational level and the logarithm of total household income. P-values of the coefficients are in parentheses. Standards errors are clustered by household. Coefficient significance are reported with asterisks with \* p<0.10, \*\* p<0.05, \*\*\* p<0.01.

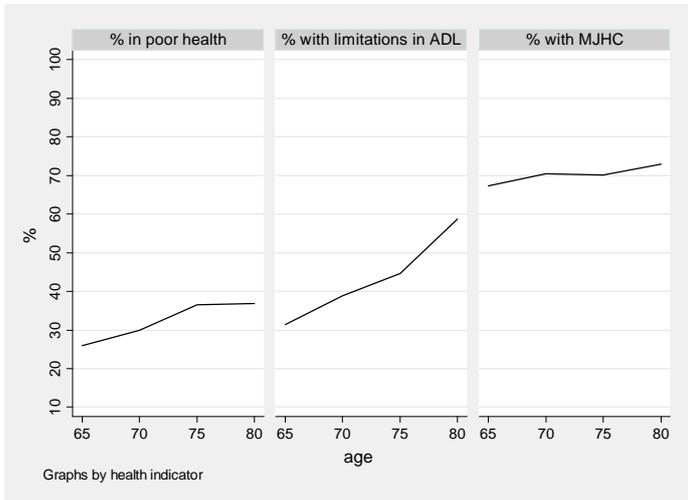
**Table 8: The effect of changes in health on the probability of being worse off than a year before due to higher spending**

	Probability of being worse off than a year before due to higher spending
<b>Couples</b>	
<b>Self-assessed health status</b>	
Health deterioration	0.46*** [0.00]
<i>N</i>	2561
<i>Pseudo-loglikelihood</i>	-1156.61
<b>Limitations in ADL</b>	
Onset of limitations in performing ADL	0.21 [0.30]
<i>N</i>	2284
<i>Pseudo-loglikelihood</i>	-1023.60
<b>Major conditions</b>	
Onset of MJHC	0.13 [0.56]
<i>N</i>	3083
<i>Pseudo-loglikelihood</i>	-1400.81
<b>Singles</b>	
<b>Self-assessed health status</b>	
Health deterioration	0.30** [0.04]
<i>N</i>	5173
<i>Pseudo-loglikelihood</i>	-2030.15
<b>Limitations in ADL</b>	
Onset of limitations in performing ADL	0.41*** [0.00]
<i>N</i>	4728
<i>Pseudo-loglikelihood</i>	-1852.91
<b>Major conditions</b>	
Onset of MJHC	-0.08 [0.58]
<i>N</i>	6246
<i>Pseudo-loglikelihood</i>	-2418.77

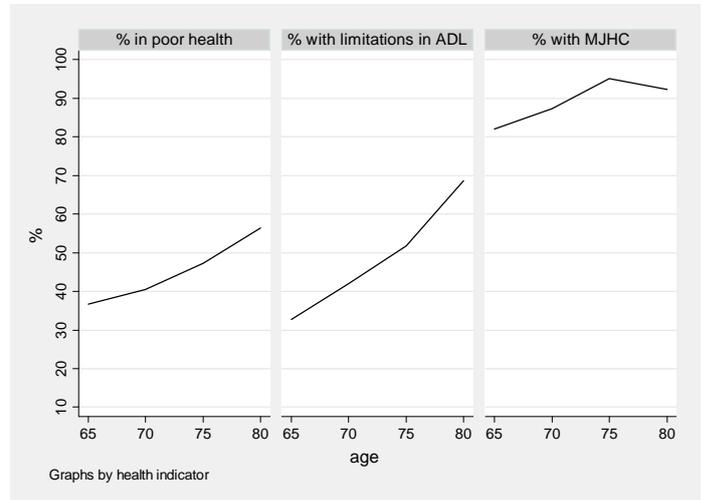
**Figure 1: Age health profiles in terms of different health indicators**

**Panel A. Based on data from ELSA**

**Singles**

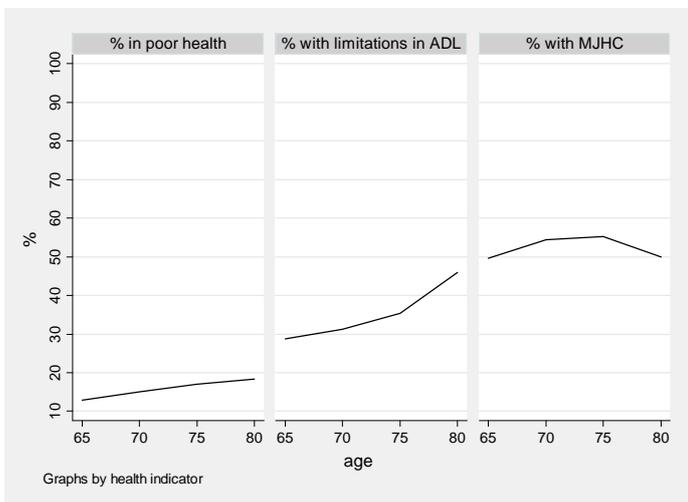


**Couples**

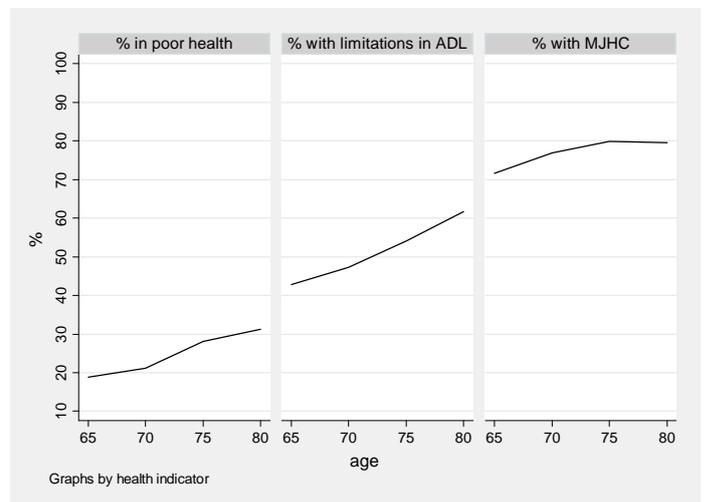


**Panel B: Based on data from BHPS**

**Singles**



**Couples**



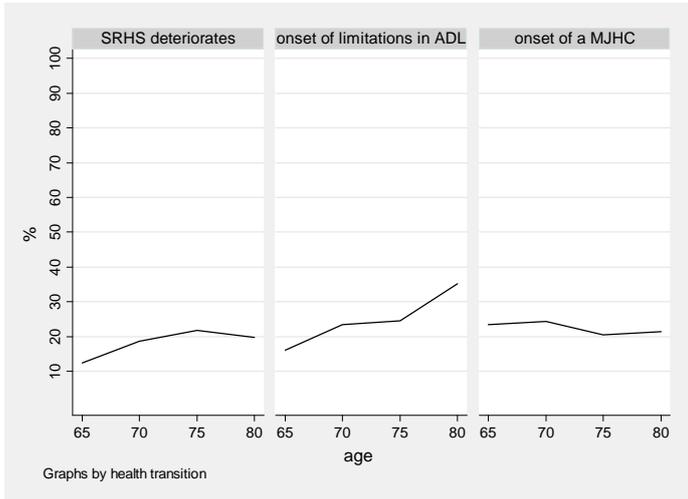
Source: Author's calculation based on data from ELSA and BHPS.

Note: The first graph in each of the four figures shows the percentage of people in poor health based on the self-assessed health status indicator. The second shows the percentage of people who report limitations in ADL and the third the percentage of those with major health conditions (MJHC).

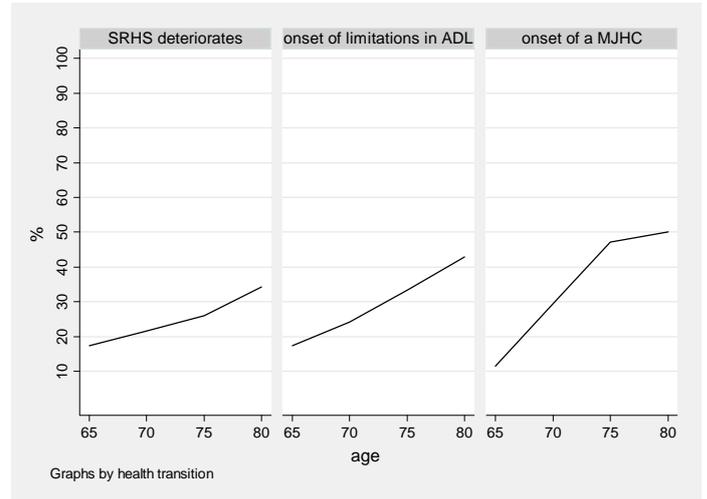
**Figure 2: Age profiles of conditional health transition probabilities in terms of different health indicators**

**Panel A: Based on data from ELSA**

**Singles**

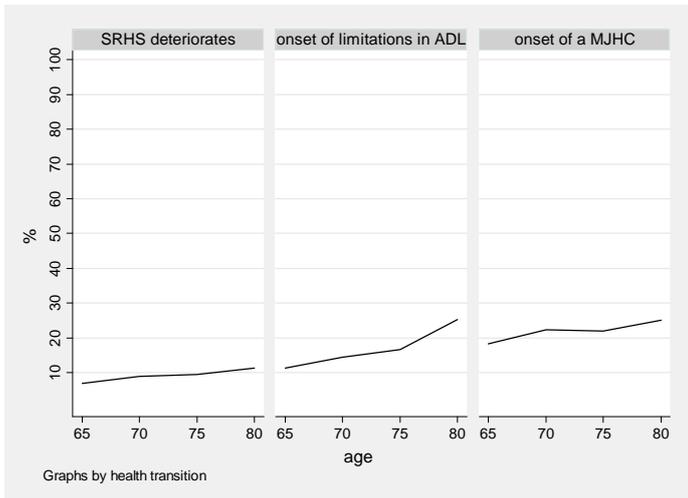


**Couples**

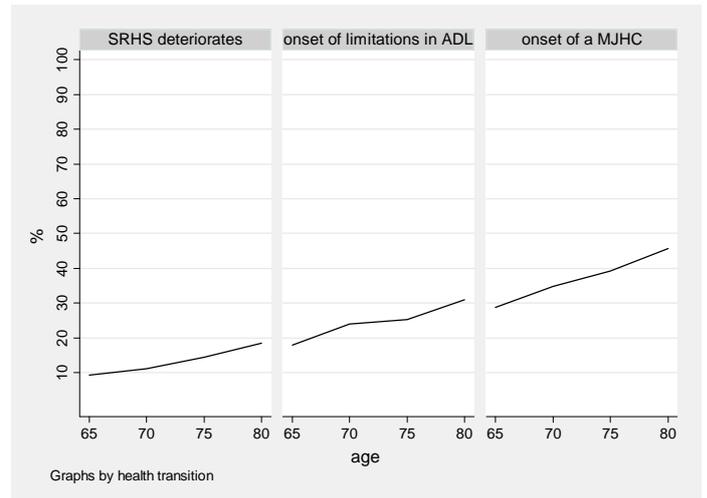


**Panel B: Based on data from BHPS**

**Singles**



**Couples**



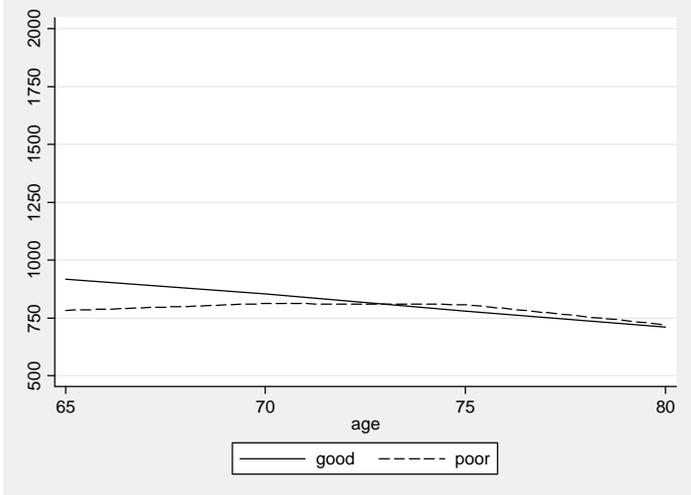
Source: Author's calculation based on data from ELSA and BHPS.

Note: The first graph in each of the four figures shows the percentage of people who experience deterioration in health in terms of the self-assessed poor health status indicator. The second shows the percentage of people who experience onset of limitations in ADL and the third the percentage of those with major health conditions (MJHC).

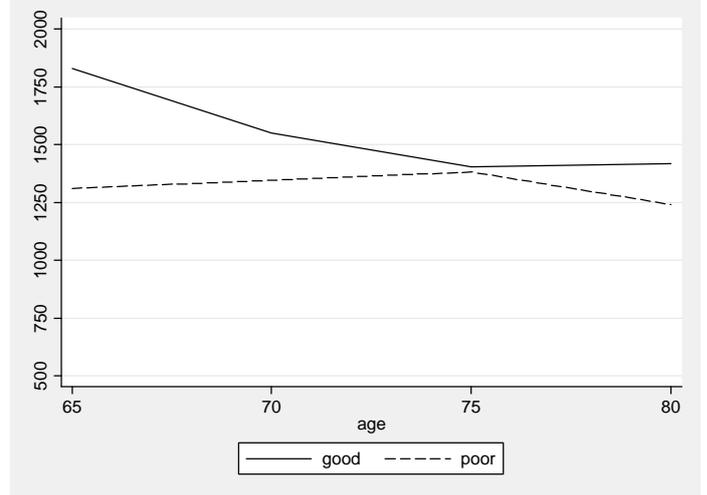
**Figure 3: Mean monthly benefit unit income by self-reported health status and age**

**Panel A: Based on data from ELSA**

Singles

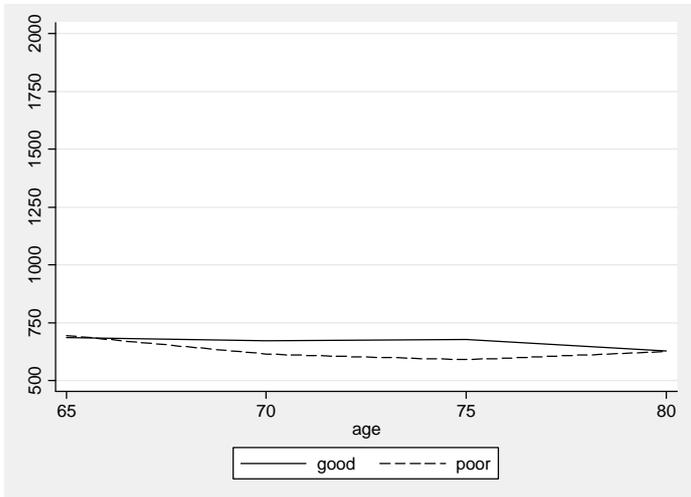


Couples

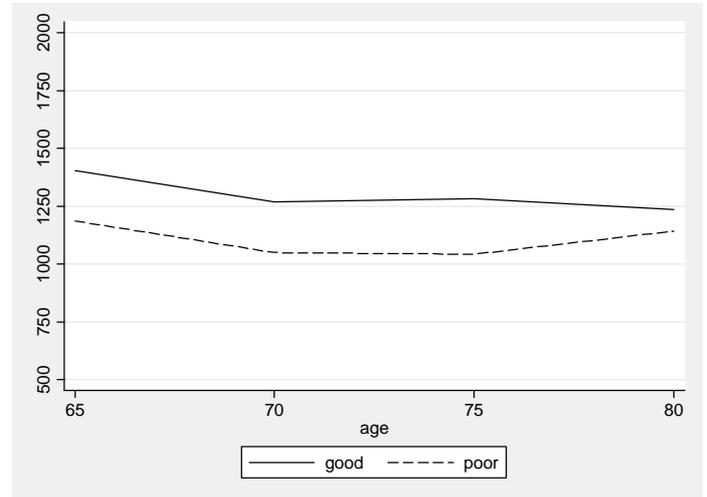


**Panel B: Based on data from BHPS**

Singles



Couples

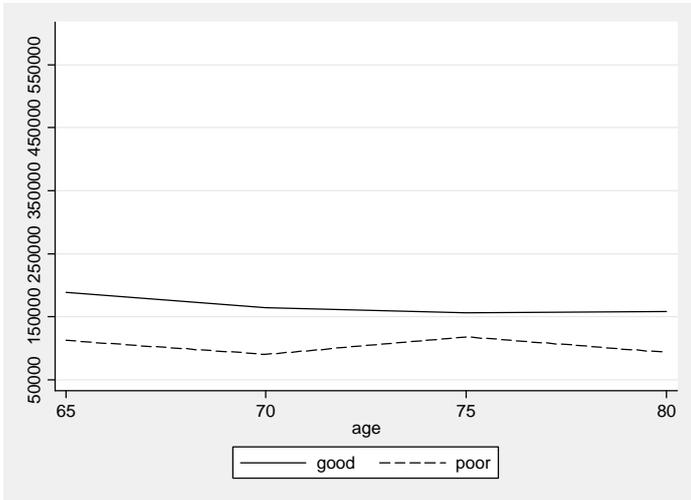


Source: Author's calculation based on data from ELSA and BHPS.

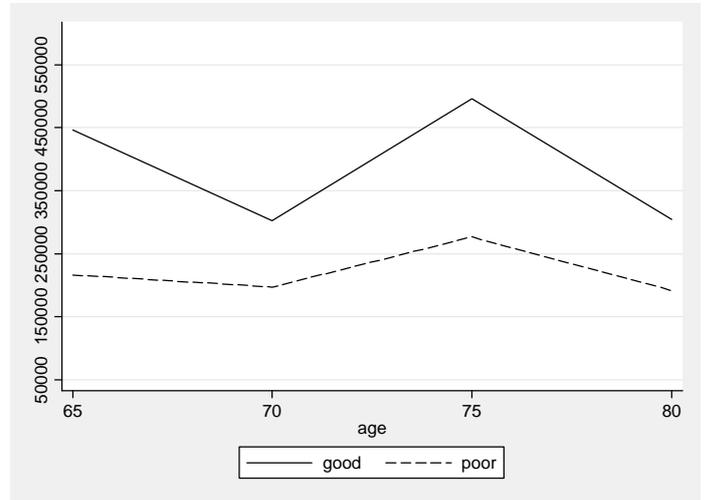
Note: Each of these figures show the average monthly net benefit unit income by age and health (the good-poor health indicator is defined based on self-assessed poor health status indicator. Age in the case of couples is defined based on the age of the family head.

**Figure 4: Mean total net non-pension wealth by self-reported health status and age group**

Singles



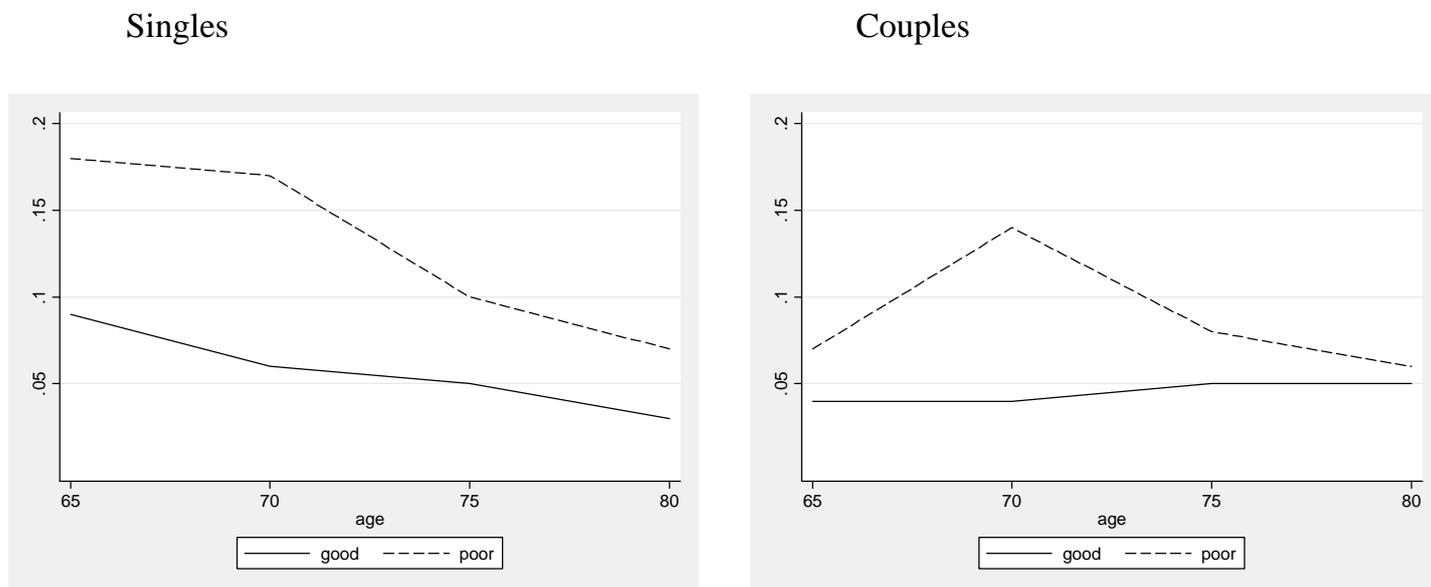
Couples



Source: Author's calculations based on data from ELSA.

Note: Each of these figures show the average monthly net benefit unit income by age and health status groups (age in the case of couples is defined based on the age of the family head).

**Figure 5: Probability of being in financial hardship by self-reported health status and age group**



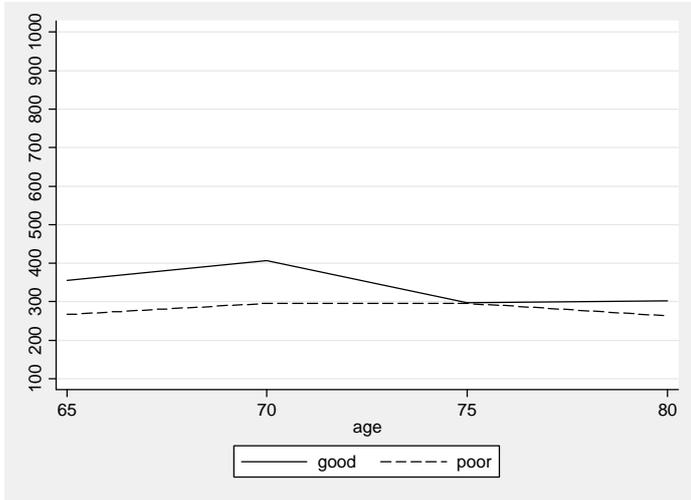
Source: Author's calculations based on data from BHPS.

Note: Each of these figures shows the average percentage of people in financial hardship by age and health status groups (age in the case of couples is defined based on the age of the family head).

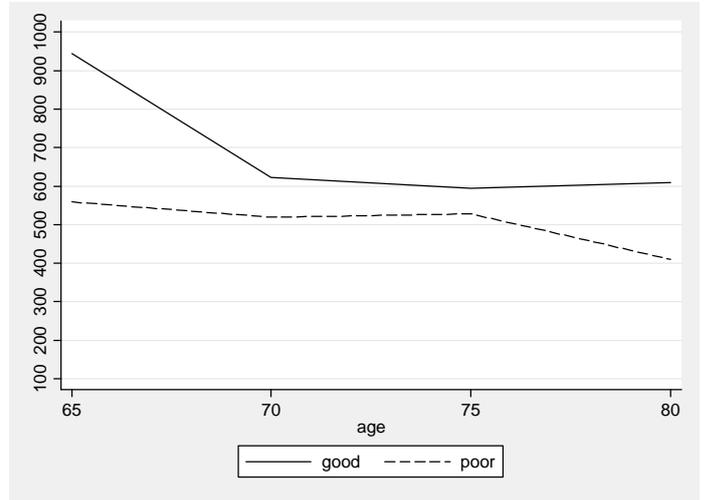
**Figure 6: Mean monthly “total” spending by self-reported health status and age**

**Panel A: Based on data from ELSA**

Singles

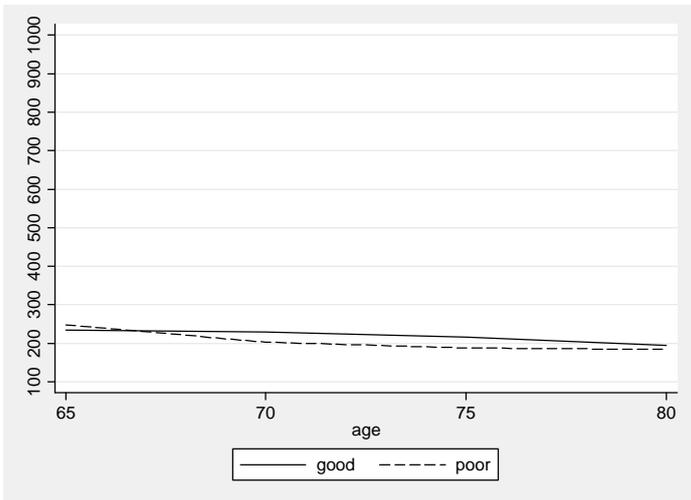


Couples

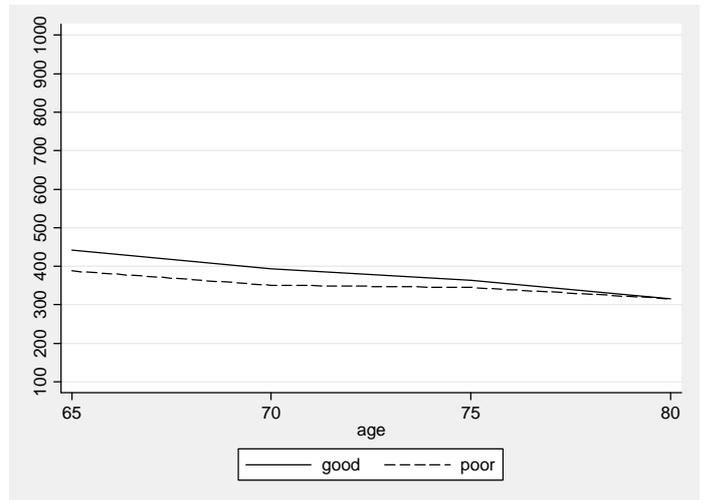


**Panel B: Based on data from BHPS**

Singles



Couples



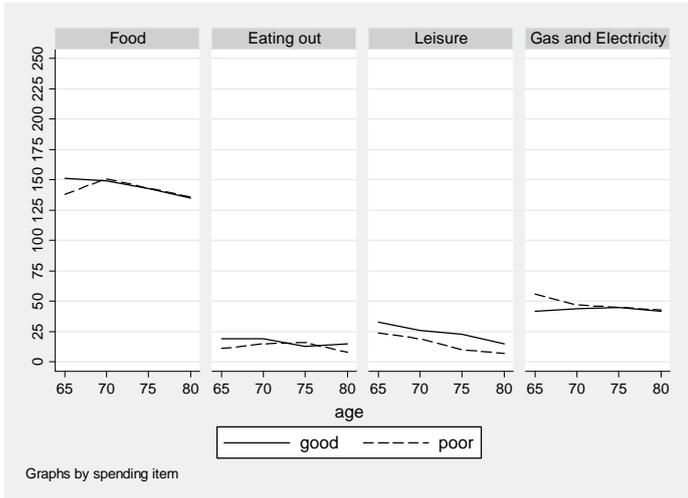
Source: Author’s calculations based on data from ELSA and BHPS.

Note: Total spending for ELSA is defined as the sum of food in, food out, leisure, clothing, gas and electricity and transfers. Total spending in BHPS is defined as the sum of food in, food out leisure and gas and electricity spending.

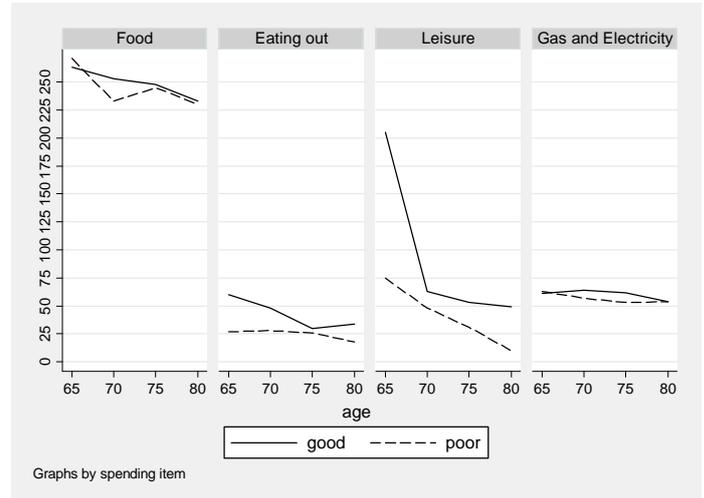
**Figure 7: Mean monthly spending for each spending item by self-reported health status and age**

**Panel A: Based on data from ELSA**

Singles

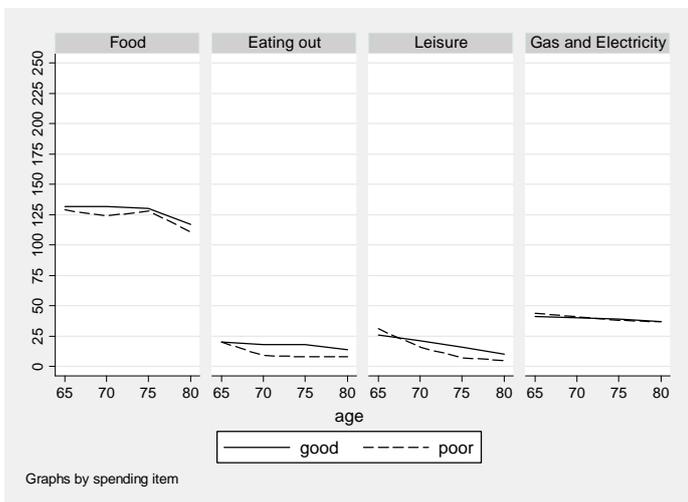


Couples

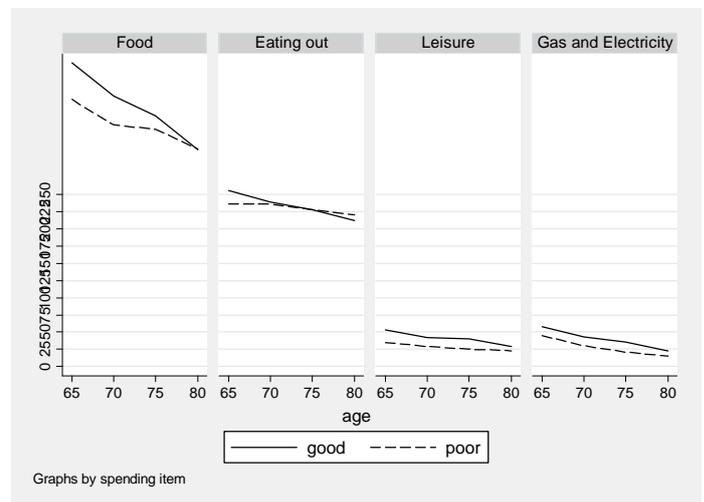


**Panel B: Based on data from BHPS**

Singles



Couples



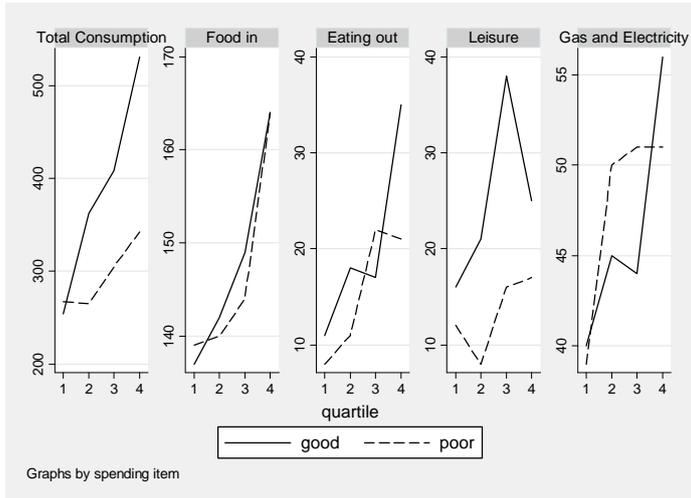
Source: Author's calculations based on data from ELSA and BHPS.

Note: The spending items we examine here are the food, eating out, leisure and gas and electricity spending.

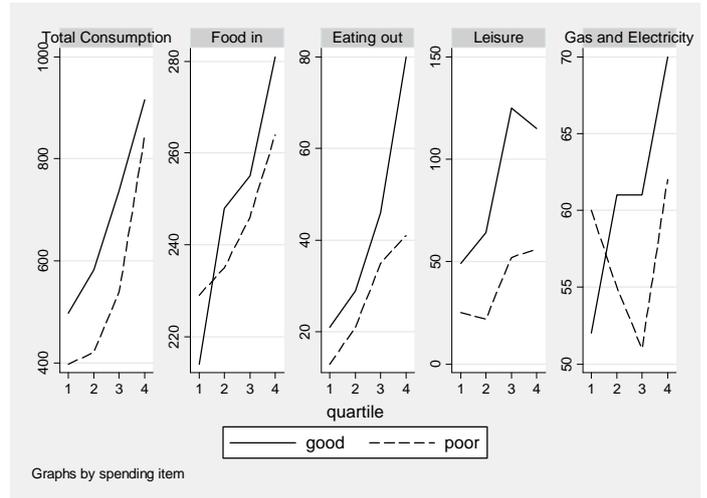
**Figure 8: Mean monthly spending for each spending item by self-reported health status and quartiles of equivalised household income distribution**

**Panel A: Based on data from ELSA**

**Singles**

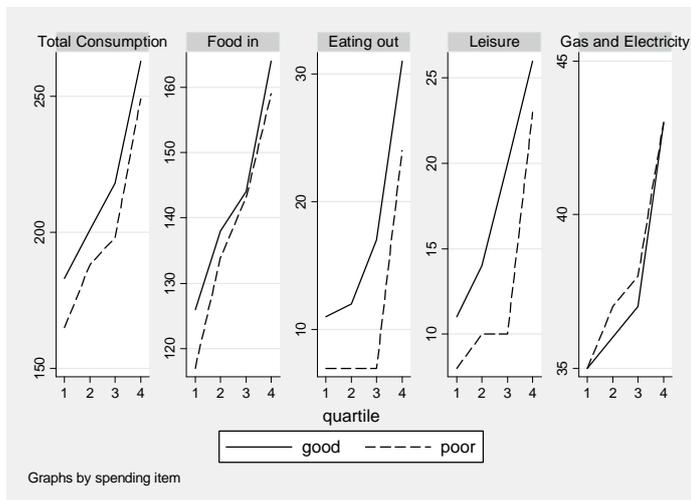


**Couples**

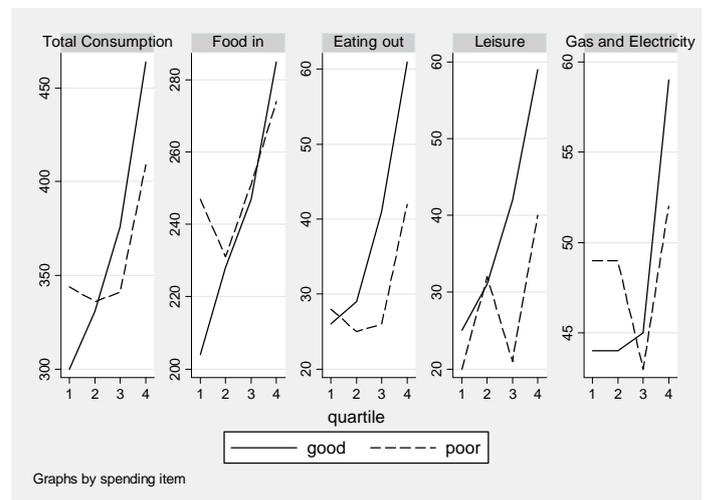


**Panel A: Based on data from BHPS**

**Singles**



**Couples**



Source: Author's calculations based on data from ELSA and BHPS.

Note: Total spending in ELSA is defined as the sum of spending on food, eating out, leisure, clothing, gas and electricity and transfers. Total spending in BHPS is defined as the sum of food in, eating out, leisure and gas and electricity spending.