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**HEALTH AND RANDOM SHOCKS:  
SELF-PERCEIVED HEALTH IN SPAIN AND IN SOME EUROPEAN  
COUNTRIES DURING THE FINANCIAL CRISIS**

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## Health and Random Shocks: Self-Perceived Health in Spain and in some European Countries during the Financial Crisis

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### Abstract

We report in this Policy Paper on our results from two research papers, either published already or in the process to do it<sup>1</sup>. In those papers we evaluate the association between the variations in income and wealth (both aggregate and split between real estate and financial wealth), and self-perceived health in Spain and in some other European countries using a longitudinal sample of individuals before and after the financial crisis. We estimated generalized linear mixed models, with a binomial response and a logistic link, for three/four waves of the European Survey of Household Finances (before and after the crisis), adjusting for variables at the family and individual levels. We also controlled for familial and individual heterogeneity and for temporal trends. In the case of Spain (2005, 2011, 2015, 2017), while an increase in wealth greatly increases the probability of younger individuals reporting better health, this is not the case for older individuals. Decreases in gross wealth are associated with decreases in the probability of declaring good/very good health only in families whose reference person is over 44 years old. We find moreover that: (i) not just income but net wealth effects impact on the consequences of income fluctuations on consumption and health assessed, (ii) the composition of individuals' net wealth may also matter, since they are differently affected by the shocks in the economic crisis, (iii) age plays a significant role and, finally, (iv) individual reactions in terms of consumption and savings, given any level of income and wealth, according to the risk aversions for precautionary idiosyncratic motives, may also need to be considered in order to complete the picture.

For the whole set of European countries we estimate three waves of the Eurosystem Household Finance and Consumption Survey (HFCS) (2011, 2015, 2017), adjusting for family and individual heterogeneity and for temporal trends. We observe that overall variations in income have a positive and significant impact on changes in self-perceived health during the financial crisis, but not after 2015 (expansion period). As a result, changes in income are important in protecting health during crisis periods. We do not observe an effect of changes in wealth. When comparing the results by country, our findings still hold for most of them, with income being the main driving force behind better self-perceived health.

These results are important because changes in individuals' income seem to be more important than net wealth, and are differently affected by the shocks in the economic crisis. Minor effects in changes of net wealth can be found just for the Netherlands and Germany. In brief we conclude that despite the fact that the financial crisis affected European countries differently, in most of them, income, rather than wealth, played an important role in protecting health. However, changes in income were not relevant in the expansion period. Wealth variation in all the specification types proves to have minor or no effect.

**Keywords:** self-assessed health; income; wealth composition; the European household survey

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<sup>1</sup> See from the authors "Saved by Wealth? Income, Wealth, and Self-Perceived Health in Spain during the Financial Crisis" *Int. J. Environ. Res. Public Health* 2020, 17, and "Health and random shocks: Self-perceived health in the European countries during the financial crisis" (mimeo).

## 1. Introduction

There is an extensive body of literature analyzing socioeconomic inequalities in well-being (for a review, see O'Donnell et al. [1]). A better socioeconomic position is generally associated with both higher average and lower variation in self-reported health. The earlier papers in this body of literature use level of education as surrogates of socioeconomic conditions. More recently, the availability of administrative data has allowed tax records to be used to measure socioeconomic conditions.

However, the joint role wealth and income have in shaping well-being has been studied to a much lesser extent; especially for younger adults. Notable exceptions to this are the work of Poterba et al. in the case of retirement [2], Schwandt [3] and Pool et al. [4] for wealth shocks, Finkelstein et al. [5] for wealth, health, and well-being, Liu and Menegatti for wealth investment and health [6], and Blázquez and Budria [7] and Saez et al. [8] for population health in Spain during the financial crisis. Most of the literature, however, has focused on income more than actual wealth and the composition of asset portfolios. Among those who investigate the role asset composition plays on determining well-being, a more macro (rather than micro) approach is usually taken, comparing static levels of wealth and their variations as their main explanatory factors influencing health.

Given the number of confounding mediators and moderator factors that are present, it is extremely difficult to classify all the relevant literature into separate pieces that translate income to wealth and health, and health to well-being, either on levels or change of levels. At any rate, some studies have mainly focused on (i) the pure income-wealth-health link [9–11], (ii) the relation between net wealth (i.e., gross wealth minus debt) and its composition and health [12–14], and (iii) the impact of over-indebtedness (net wealth burden) and individual health status with regard to emotional states associated with depression, stress, anxiety and mental health [15,16], declining physical health [17], unhealthy behavior [18–20] and suicidal tendencies [21,22].

In this body of literature, living conditions may be a first mediator. Aittomäki et al. explored how the wealth of an individual or a household affects health through the effects on living conditions as well as through social comparison and experiences of deprivation [9]. From a survey of Finnish men and women aged from 45 to 67 years, all of whom were civil servants, and in a period before the crisis (2001–2007), they found household wealth to have a strong and consistent association with self-rated health, with poor health decreasing as wealth increased. The relationship was only partly attributable to the association of wealth with employment status, household income, work conditions, and health-related behavior. The association of household income with self-rated health was greatly diminished when taking into account employment status and wealth, and even further attenuated by work conditions. The insufficiency of current income as the only measure of material welfare and the conditions associated with long-term accumulation of material welfare may be a significant aspect of the causal processes that lead to socioeconomic inequalities in ill health. Benzeval and Judge pay particular attention to the role of long-term income as a proxy for wealth, to conclude that wealth is more important for health than current income, and persistency is more harmful to health than occasional episodes [23].

Psychological elements may be moderators of the former factors. Bridges and Disney show that although there is a positive association between subjective measures of financial well-being and psychological well-being, individuals differ in their psychological response to objective household financial situations [16]. Dietz and Haurin focus their attention on the effects of real assets to note that homeowners are happier and healthier than non-owners. However, the correlation between both variables has some clear confounding factors, such as income and education [24]. At any rate, homeowners report higher self-ratings on their physical health even after controlling for age and socioeconomic factors.

With regard to net wealth variations, Gathergood analyzes over-indebtedness to conclude that individuals exhibiting problems repaying their debt obligations also exhibit much poorer psychological health [25]. Using individual-level UK panel data, local house price movements exogenous to individual households are used to establish the causality from problem mortgage debt to psychological health. Interestingly, there seems to exist a sort of ‘social norm effects’ of debt (how extended, how general these problems are) by investigating local bankruptcy and repossession rates.

On the importance of asset composition, Berger et al., analyze data from 1987 to 1994 from the USA National Survey of Families and Households in a series of regression models, some of which included individual-specific fixed effects, to estimate associations of particular types and levels of debt with adult depressive symptoms [14]. Results suggest that household debt is positively associated with greater depressive symptoms. However, this association appears to be driven by short-term (unsecured) debt; they found little evidence of associations with depressive symptoms for mid- or long-term debt. In similar terms, Brown et al., explore the association between debt and psychological well-being amongst heads of households using the British Household Panel Survey [13]. Household heads who have outstanding (non-mortgage) credit, and who have higher amounts of such debt, are significantly less likely to report complete psychological well-being. No such significant association is found in the case of mortgage debt. Their results highlight the psychological cost associated with the consumer credit culture in Britain.

Turunen and Hiilamo survey a sample of 33 peer-reviewed studies [26]. From the results, they show serious health effects related to indebtedness. Individuals with unmet loan payments had suicidal ideation and suffered from depression more often than those without such financial problems. Unpaid financial obligations were also related to poorer subjective health and health-related behavior. In a similar vein, Richardson et al., conclude that those with depression are more than twice as likely to be in debt; 42% of those in debt have a mental disorder compared to 18% with no debt. Furthermore, 25% of those with a mental disorder are in debt, compared to 9% in those who are healthy [27].

On the effects of wealth changes, Pool et al., explores how a sudden loss of wealth—a negative wealth shock—may take a significant mental health toll and leave fewer monetary resources for health-related expenses [4]. With limited years remaining to regain lost wealth in older age, the health consequences of these negative wealth shocks may be long-lasting. Among US adults aged 51 years and older, a loss of wealth over two years was associated with an increased risk of all-cause mortality. By estimating how the marginal utility of consumption

varies with health, from data on permanent income, health in older people and people of a similar elderly age, and proxy for utility with measures of subjective well-being, Finkelstein et al., find that the marginal utility of consumption declines as health is felt to deteriorate [5]. This has a substantial effect on the optimal levels of health insurance benefits and life-cycle savings. This latter issue is taken up by Liu and Menegatti [6]. They study how health and wealth investments react to the presence of random returns, distinguishing the case where only the level of health investment is chosen from the case where both health and wealth investments are chosen. The authors show that this reaction depends mainly on certain features of preferences: cross-prudence/imprudence in wealth, cross-prudence/imprudence in health, and the value of the indices of relative prudence in wealth and in health being larger or smaller than the threshold in determining optimal choices.

Finally, there is a wide range of papers that focus on risk aversion and household characteristics as these two factors shape the impact on health in terms of reflecting individual attitudes. See Riley and Chow for how risk-taking changes with wealth [28], Pålson with age [29], Bellante and Saba across the life cycle [30], Bellante and Green on the type of portfolio [31], Albert and Duffy by observing intergenerational attitudes [32], and Bommier and Rochet as individuals increase their share of wealth held in risky assets when they age [33].

From an aggregate national perspective, Bover et al., present the differences across the Euro area countries of well-being and the distributions of various measures of debt conditional on household characteristics, including the probability of holding debt, the amount of debt held and, in the case of secured debt, the interest rate paid on the main mortgage [34]. In fact, the patterns of secured and unsecured debt outcomes vary markedly across countries. Clayton et al., investigate the relationship between aggregate household debt and aggregate health outcomes across 17 European countries over the period 1995 to 2012 [12]. They estimate an instrumental variable (GMM) model to address possible reverse causality concerns. Aggregate household debt affects health outcomes, and this varies by the maturity of debt. Long-term (rather than short/medium term) unsecured debt and mortgage debt are associated with poorer health outcomes.

Finally, Schwandt analyzes how wealth shocks affect the health of older people in developed countries [3]. By exploiting the booms and busts in the US stock market as a natural experiment that generated considerable gains and losses in the wealth of stock-holding retirees, the author links wealth shocks as the interaction of stock holdings with stock market changes, to find that wealth shocks predict wealth changes and they strongly affect health outcomes. A 10% wealth loss leads to an impairment of 2–3% of a standard deviation in physical health, mental health, and survival rates.

For Spain, the single study we have found is that of Blázquez and Budría [7]. They construct some measures of debt strain such as debt-to-income ratios. Their paper differentiates between mortgage and non-mortgage debts and spans to 2011, thus including the housing bubble and the beginning of the financial crisis. The results, based on a random effects model, show that non-mortgage debt payments and debt arrears are negatively related to people's health. However, Blázquez and Budría approach debt rather than wealth and the period does not cover the end of the crisis. In addition, they ignore the structural change associated with

the crisis, as results from a previous paper of ours [8]. Moreover, they do not account for the fact that the distribution of wealth is heavily skewed, which is why the data source from where they obtain the data (the Spanish Survey of Household Finances) oversamples the wealthiest households [8].

In summary, after examining the literature, our hypothesis here is that wealth has an observed, rather robust protective role for well-being and via this for health when income falls. Likewise, the increase in the burden of those indebted (net wealth changes) may move in the opposite direction, thus creating anxiety, stress, increased cardiovascular risk and health deterioration. In addition, we postulate that the impact the rate of change and volatility have on health may be very relevant, even more so than rates and levels, and that the portfolio composition of debt is also important: financial versus real estate assets, type and liquidity of the financial assets, credit card use, and debt liability and maturity. In addition, portfolio compositions differ for age cohorts, household composition, and perhaps previous health status (to control for reverse causality) as they vary among countries [8,22].

## **2. Hypothesis testing**

Spain is a good case study to test firstly our hypotheses for at least two reasons. First, the share of individuals owning a house is the largest in the European Union, which in itself has been considered a stabilizing factor of wealth distribution. House ownership (along with pension entitlement) protects adults and older people, and its evolution is rather stable due to the role of inheritance on a dynastic basis. However, the variation in housing prices and mortgage interest rates may have created anxiety in comparison with the volatility of other assets. This may have to do with variations and levels of over-indebtedness and the burden of other existing debts with regard to current income and changes in the saving capability of individuals. First, our data (the Spanish Survey of Household Finances) shows how wealth stabilizes consumption for the young cohorts through indebtedness. The change in average household consumption due to income changes is lower in households with more wealth in those families where the head of household is under 55 years old. Specifically, in a household with little relative wealth (the one with only 5% of the households below) and in which the head of the family is 30 years old, a 1% decrease in income generates a 0.5% drop in consumption. The decrease is lower (0.1%) in households with the highest wealth (those with less than 95% of households). However, in households over 55 years of age, the drop in consumption before a 1% decrease in income is always around 0.3%, regardless of wealth level [35]. Second, the degree of resilience for the link between wealth fluctuations and health may be approached with data from the past financial crisis. In Spain, this has implied a loss of per capita income of around a tenth of its previous level with a reduction in the value of some dwellings being even higher; estimated as a 37% average loss [18,19]. A sensible hypothesis is to test whether the economic and financial crisis has affected health as a result of the changes experienced in net wealth.

Our objective in this paper is to evaluate the association between the variations in income and wealth (both in aggregate and in split between real estate and financial wealth) and self-perceived health. We take advantage of a rich data set covering the financial crisis Spain



suffered, which, in turn, created a plethora of inferences on its effects on Spanish health. The financial crisis was directly triggered by the collapse of the housing bubble in the United States in 2006, which caused a mortgage loan crisis in the last quarter of 2007. The crisis took place between 2007 and 2013, albeit with some differences between countries in its timing and scale. In Spain, the financial crisis began in the first quarter of 2009 and ended in 2014.

We consider the levels of wealth and the variation of its two main components – real estate wealth and financial wealth, gross and net wealth, and within each of these categories, between gross and net wealth—on self-perceived health. As the explanatory variables of control, we include variables at the family level: (i) savings rate; (ii) number of family members; (iii) number of family members who work; (iv) property regime of the family dwelling (not owned by the family-reference category—or owned by the family) and (v) proportion of real estate wealth over total wealth. We also include control variables at the individual level: sex, age, educational level, occupation, and marital status.

We extend thereafter the former analysis to a set of European countries that share a similar data basis. Building on previous literature, the objective of this paper is to evaluate the association between the variations in income and wealth (aggregated and disaggregated into real estate and financial wealth) and variations in self-perceived health in those European Union (EU) countries which form part of the Eurosystem's Household Finance and Consumption Survey (HFCS) in the three available waves (2011, 2015, 2017). We take advantage of a rich and unique dataset covering the financial crisis suffered in Europe which, in turn, created a plethora of inferences on its effects on European's health (see [28] for a critical review) and which refers to variables related to wealth (see [3,26,29], among many others).

We meet in this new context our objective by considering different levels of wealth and the variation of its two main components – real estate wealth and financial wealth, gross and net wealth —on variations in self-perceived health. As explanatory variables, we include variables at the family level: (i) number of family members; (ii) number of family members who work; and (iii) property regime of the family dwelling (not owned by the family-reference category—or owned by the family). We also include control variables at the individual level: gender, age, educational level, occupation, and marital status. We anchor each estimate of the net wealth and income levels at the start of the periods: 2011-2015 for the recession period and 2015-2017 for the recovery.

Our contribution to the existing literature here is twofold. First, we use variations in our estimates instead of levels, thus capturing the importance of time variation. Second, we exploit a rich dataset for Spain and for some EU countries over three periods of time (2011, 2015, 2017), allowing us to investigate the effect of an economic recession first and an expansion later.

The remainder of this paper is structured as follows. Sections 2 and 3, respectively, describe the data and methodology used for our analysis. Results are presented in Section 4, and Section 5 concludes the paper.

### 3. Data

#### 3.1. Data Sources

We use data from the Spanish Survey of Household Finances (SSHF henceforth), a longitudinal database [36] collecting socioeconomic information on a random sample of the Spanish population every three years and stratified by gender and age. We make use of two waves prior to the financial crisis (2005 and 2008), one during the crisis (2011) and the other at the end of it (2014). The SSHF provides detailed information on the assets, debts, income, and spending of Spanish household units. It also contains socioeconomic and demographic information and self-reported health status. The longitudinal nature allows us to follow a set of households at various points in time. More importantly, this survey is the only source of data that provides information on the wealth of Spanish families over time, allowing us to not only focus on wealth levels, but also on its composition (housing or financial assets). Our study sample includes the members of families who were interviewed in at least two waves of the SSHF and who were interviewed both before and after the crisis.

For the EU countries we use data from the Eurosystem's Household Finance and Consumption Survey (HFCS)<sup>2</sup>, a longitudinal database that collects household-level data on households' finances and consumption. It is a random sample of households within each EU country. We considered thirteen European countries (Austria, Belgium, Cyprus, Germany, Finland, France, Italy, Luxembourg, the Netherlands, Portugal, Slovenia, Slovakia and Spain) which form part of the HFCS in the three available waves allowing for the panel format of the data. We make use of wave 1 in the middle of the financial crisis (2011), wave 2 at the very end of it (2015) and wave 3 for the full recovery (2017)<sup>3</sup>. The HFCS provides detailed information on the assets, debts, income, and spending of the European household units included in the countries' samples. It also contains socioeconomic and demographic information at the household level. The longitudinal nature allows us to follow a set of households at various points in time. More importantly, this survey is the only source of data that provides information on the wealth of those European families over time, allowing us not only to focus on wealth levels, but also on its composition (housing or financial assets). Our study sample for each country includes the members of families who were interviewed in at least two waves of the HFCS and who were interviewed both before and after the crisis. The HFCS does not provide, however, data related to self-reported health status. For this reason, we matched it with the 2011, 2015 and 2017 releases of the cross-section sample survey of the EU Statistics on Income and Living Conditions (EU-SILC)<sup>4</sup>. EU-SILC offers microdata on income, poverty, social exclusion and living conditions in the EU.

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<sup>2</sup> [https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher\\_hfcn.en.html](https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_hfcn.en.html)

<sup>3</sup> HFCS wave 1 corresponds to interviews done between 2010 and 2011, wave 2 between 2013 and 2015 and wave 3 in 2017.

<sup>4</sup> <https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions>

## 3.2. Data Description

### 3.2.1. Variables. Description

#### *Outcome Variable*

Respondents are asked to rate their health in one of the following five categories: 'very good', 'good', 'fair', 'poor' and 'very poor'. We dichotomize their responses into two categories: fair, poor and very poor (taking value 0, which we will refer to as 'poor health') and very good and good (value 1, and labelled 'good health' in the rest of our analysis).

The HFCS does not provide data related to self-reported health status. For this reason we matched it with the 2011, 2015 and 2017 releases of the cross-section sample survey of the EU Statistics on Income and Living Conditions (EU-SILC)<sup>5</sup>. EU-SILC provides microdata on income, poverty, social exclusion and living conditions in the EU6. In the EU-SILC, respondents were asked to rate their health in one of the following five categories: 'very good', 'good', 'fair', 'poor' or 'very poor'. From this, we constructed our outcome variables, variation in self-perceived health between 2011 and 2015 and between 2015 and 2017. We categorized both variables into 'improved or maintained' (taking value 0) and 'worsened' (taking value 1).

#### *Explanatory Variables*

Our key explanatory variables were the variation in gross and net wealth. In addition to this, we considered the variation of its two main components: real estate wealth and financial wealth. We also considered the variation in total debt and real income. In the latter case, this was to compare it with the difference in the wealth variables. Specifically, our explanatory variables at the family level are:

- (i) number of family members.
- (ii) number of family members who work.
- (iii) property regime of the family dwelling (not owned by the family -reference category- or owned by the family). We also included control variables at the individual level: sex, age, level of education, occupation, and marital status.

Finally, we included the level of the variables of wealth, debt and income (2005, 2011, 2015, 2017), and for the EU countries in 2011 (in the model that analyzes the variation between 2011 and 2015) and in 2015 (in the model of the variation between 2015 and 2017).

### 3.2.2. Statistical analysis

To match the HFCS and EU-SILC databases we used the Matching package in the free software R (version 4.1.2) [37]. Specifically, we matched the databases using the matching variables of gender, age (with a margin of +/- 5 years), educational level, employment status, marital status, year of survey and country. We made the assumption that a subject residing in a given country and interviewed in a given year would have, on average, the same data related to the

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<sup>5</sup> <https://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions>

<sup>6</sup> For the Spanish case we include the year of the survey wave (2005, 2008, 2011, and 2014). Using a smoothing spline, we allow the relationship between the explanatory variable of interest and the response variable to be non-linear. In particular, we include a random effect associated with the year of the wave, using a random walk of order 1 as a smoother.

self-reported health status as those subjects from the same country interviewed in the same year, with the same sex, the same age with a maximum difference of 5 years, and the same educational level, employment and marital status. We performed a multivariate matching without replacement, using a genetic search algorithm.

We specified for the former purpose a generalized linear mixed model with binomial response and a logistic link. The relationships between the explanatory variables (both those of interest and the controls) with probability of declaring good or very good health are not linear at all. We approximated the non-linearity by categorizing the selected variables.

#### **4. Results**

In the Spanish case a clear age gradient in wealth can be observed as well as a rather biased distribution (differences between mean and median values) with unequal distributions increasing with age (younger being more equally poor). As expected, real estate is much more concentrated among older populations while financial wealth goes to the over 55 to 75-year-old population (i.e., the baby boom generation), being the under 35s in the poorest situation. Debt is particularly high for the 35 years or younger age group, whereas this decreases in the 75-year-old group. Conversely, real income moves in the opposite direction i.e., those with lower incomes are those who are most in debt. Unequal distributions, as observed by the differences between the medians and the means, increase with age and wealth (not so much on real income probably as a consequence of the impact of pensions for retirees), showing actual levels equal to or even above those from the 35 years and younger generation. Static associations prove a clear gradient between good and very good health, and fair, poor, and very poor health with total debt (up and down); albeit not so much on the rest of the variables. Financial wealth distribution is highly skewed in self-rated health, as it is for total debts.

For the whole sample of European countries at 95% significance, we observe an important effect: a positive percentage change in income during the recession period (2011-2015) reducing the probability of individuals declaring a worsened health (Odds ratio=0.848 for the whole sample and almost all the specifications). However, the effect disappears when the economic situation improves (2015-2017). This result is expected since the improvement is, in itself, an indicator of the recovery. The variation of total debt also shows a significant and negative effect (odds ratio=0.991). A positive percentage change in debt reduces the probability of reporting worsened health in the recession period (2011-2015). This result in debt shows an unexpected sign but it could be the result of a delay effect of having issued debt from a previous more optimistic time interval. It is interesting to see how the effect changes between the two periods (recession vs expansion), losing statistical significance for the most recent one.

For higher confidence intervals, 90% significance, the effect of a percentage change in total gross real and estate assets are positive and significant in the expansion period (2015-2017), showing an increase in reporting worsened health. However, the magnitude of the effects is very small. Results for each country exhibit similar patterns: the importance of income change in the recession period, particularly in the cases of Austria, Belgium, Finland Netherlands,

Slovenia and Slovakia, with an effect that disappears thereafter, and a lack of significance of changes in total debt, net and for assets composition. Some minor effects result from changes of net wealth, albeit only in the cases of Netherlands and Germany, during the crisis period. This effect, however, disappears over time.

These results are important because changes in individuals' income seem to be more important than net wealth, and they are differently affected by the shocks in the economic crisis. Even if the financial crisis affected the European countries differently, in most of them income played an important role in protecting health. However, changes in income prove not to be relevant in the expansion period. Wealth variation in all the specification types shows minor or no effects. All indicate that self-perceived health is very sensitive to short-term income variations, with flow variables dominating the stock variations.

## **5. Discussion**

The waves of data used in our analysis for Spain covers a period of time in which there were major economic fluctuations between 2005/2008/2011/2014. In 2005, when the survey was carried out for the first time, the economy was doing well but in this very same year, the deceleration of the real GDP growth started after a decade of important non-stop increases. In 2008 Spain suffered from negative growth, but the worst was yet to come. As people started to become deeply concerned, the savings rate increased by a precautionary 4 points, although consumption held thanks to unemployment subsidies. In 2011, income and consumption dropped by 6 percentage points of GDP compared to 2005, but even so, it was not yet close to its lowest level—minus 9 points—in 2013. This occurred when unemployment subsidies vanished and although other non-contributive measures were introduced, they were at very much lower levels in comparison. The period from 2011 to 2014 was very unsettled and commenced with a very depressing double dip (meanwhile, the EU was recovering). One and half years later, there was an improvement thanks to, initially, public consumption (and larger deficits) and later on private consumption: the resulting 3-point fall in the savings rate over this period indicated a somewhat more optimistic perspective overall. Finally, in 2014 the future began to look more positive as employment started to be created once again.

The worst losses in disposable income occurred between 2007 and 2013, which saw the greatest increase in unemployment and a reduction in disposable income for all types of families: -18% on average with regard to 2007. After all this, those relatively worse off (above negative average) are single individuals less than 30 years old (loss of 35%), those between 30 and 65, and couples with two children (-20%). While an increase in wealth greatly increases the probability of younger individuals reporting better health, this is not the case for older individuals. Decreases in gross wealth are associated with decreases in the probability of declaring good/very good health only in families whose reference person is over 44 years old. We find monoparental families with at least one child are also in a very poor situation (-19%). Couples with a single child and couples with three or more children (likely to already be wealthy on average terms) are below the average, albeit better situated than the other groups, but below the levels of the departure year. In a more positive situation are those over 65 (with a positive plus 1%).

We extend the analysis of Blázquez and Budría [7] to a period, which fully captures the financial crisis under some dramatic changes. We improve the estimation method with regard to data bias (over-representation of the wealthy groups), and we focus on wealth rather than over indebtedness (the debt to income ratios during the economic expansion of the housing bubble). We analyze real estate versus financial asset composition (rather than mortgage/non-mortgage debt). Blázquez and Budría conclude that non-mortgage debt payments and debt arrears are negatively related to people's health. With regard to the existing literature, we offer a more complete picture of wealth variation effects on self-perceived health, and we analyze the three major factors at play. The influence of (i) not just income levels but net wealth changes reflect in health and optimism—these move with age with aged individuals being more sensitive to these changes, and income increases have a larger incidence on self-assessed health than equal amounts in income reductions; (ii) the composition of the net wealth of individuals (financial versus real assets)—this has also had a bearing as individuals have been differently affected by the shocks in the economic crisis and risk levels have diverged on both types of properties, as do random losses associated with them, with real more than financial wealth showing an association to self-perceived health; and (iii) age—since older people have the 'safety net' of their pensions and so are quite impermeable to the crisis i.e., real wealth changes have a smaller impact on the self-perceived health of aged individuals. Meanwhile, the individual reactions in terms of consumption and savings, given any level of income and wealth, and which would complete the picture, have not been considered here due to lack of data—despite the fact they possibly play a role as well.

In general, we observe that the associations with the variation in income are extreme, and their differences are wider than in the variations of the wealth variables. Young individuals have good or poor self-perceived health quite independent of the flow fluctuations of income, and in a less elastic way, in particular for real assets, than older individuals do.

We conclude that: (i) not just income but net wealth effects impact on the consequences of income fluctuations on consumption and health assessed, (ii) the composition of individuals' net wealth may also matter, since they are differently affected by the shocks in the economic crisis, (iii) age plays a significant role and, finally, (iv) individual reactions in terms of consumption and savings, given any level of income and wealth, according to the risk aversions for precautionary idiosyncratic motives, may also need to be considered in order to complete the picture.

By extending our approach to some other European countries with financial household surveys we find that changes in individuals' income seem to be more important than net wealth to explain variations in self-perceived health in the EU countries, and, in particular, in the recession period. Even if the financial crisis affected the European countries differently, in most of them, income changes played an important role in protecting health. However, changes in income prove not to be relevant in the expansion period. Wealth variation in all the specification types shows minor or no effects. All indicate that self-perceived health is very sensitive to short-term income variations, with flow variables dominating over the stock variables. Our results are in line with previous literature showing the importance income has on self-perceived health (see [9,23]).

The importance of the analysis of inequality and the corresponding economy-wide distributions of asset positions as potential sources of individuals' economic instability has been reaffirmed by recent macroeconomic events. In this sense, the distribution of specific components of wealth has important implications for a family exposure to systemic risk and eroding welfare. At the aggregate level, the distribution of home equity, i.e., the net value of housing (excluding the mortgage debt), has transpired to play a crucial role for an assessment of potentially adverse feedback loops. For instance, an economy with a large fraction of households who finance the value of their homes with low levels of home equity is particularly vulnerable to declines in house prices.

Another relevant area of analysis is the potential cross-country asymmetries in responses to measures taken during the crisis at the European level. The HFCS provides the empirical foundation to establish this analysis. As mentioned earlier, housing wealth and mortgage debt are major items on the average balance sheets of households in countries in the Euro area, but with some cross-country heterogeneity of wealth and debt portfolios. For example, 45% of households in Austria and Germany own their main residence, as such, income and rents have a major influence. Mediterranean countries, on the other hand, have much higher homeownership rates, (e.g., Spain 82% and Italy 69%), as a result, mortgage interest rates and house prices are more important there. This, however, cannot be translated automatically to individual welfare since in these last two countries the rates of adult children living with their homeowner parents are very high. Housing wealth amounts twice the average gross household income in Germany and more than five times the average gross household income in Spain. However, in general, heterogeneity across households exceeds heterogeneity across countries. On the other hand, financial rather than real wealth is more important in the Netherlands, Belgium and Germany. The differences between mean and median values of net wealth show higher inequalities in France, Spain, Belgium and Austria.

The cross-country differences in the HFCS data suggest that when we analyze the heterogeneity in European household portfolios, we should consider the influence gross and net wealth and not just income, have on health (like it is for consumption and investment). As is reflected in wealth levels and composition, this influence may be different across countries. For instance, the data distinguishes between the value of housing and the value of financial assets while mortgage debt is relevant as a predominant gross liability item on household balance sheets. Portfolio restrictions are an important feature too. Most household debt is secured by real estate. This explains the importance of the explicit consideration of restrictions between the value of real estate and the amount of debt secured by real estate. Portfolio items on a household balance sheet differ by their degree of liquidity. Owner-occupied housing is a major asset for households in Europe, but transactions involving this asset tend to imply considerable cost adjustments. The maturity dimension of assets and liabilities on the household balance sheet plays a role in the type of risk exposure for households. An example is the distinction between long-term fixed-rate debt and short-term or adjustable-rate debt. The consumption responses resulting from changes in short-term interest rates may vary strongly across countries, depending on the maturity structure of the outstanding debt on the household balance sheets.

Cross-country differences in unemployment insurance schemes, public and private health insurance schemes, bankruptcy regulations, volatility of asset prices and returns, and inflation risk, may also have an influence related to the uncertainty about the sustainability of the position of the individuals' financial stance, which is then reflected on health and welfare. This effect does not result just from wealth changes shaping insecurity and anxiety, but also from changes in the affordability of health care in financial hardship and/or lack of social protection.

Financial protection is central to universal health coverage and a core dimension of health system performance. The financial and economic crisis tested the ability of the Member States. Voluntary health insurance in some countries may either increase (because of a deterioration in the public coverage) or decrease (because of a lack of out-of-pocket money for health care), with some effects on health. The WHO identifies catastrophic health spending when the out-of-pocket amount a household pays for health care exceeds a predefined share of its ability to pay for health care, which may make it difficult for the household to meet other basic needs. Financial strain is a great stressor that can be linked to health because of the resulting inability to manage one's income which can subsequently provoke stress, anxiety, and a feeling of helplessness. It has also been reported that individuals experiencing financial strain are more likely to have unhealthy behaviors. We need, therefore, to compare the prevalence of financial strain among individuals among different welfare state typologies, and to examine whether the relationship between financial strain and health status differs by welfare state regime.

As a limitation of our research, even if we used a panel format dataset for this study, causal inferences cannot be drawn due to potential endogeneity (unobserved factors). It remains unclear in this study if the burden comes from over-indebtedness rather than indebtedness changes. This may then impair an individual's health in the long run leading to financial difficulties. These unobserved factors may result in a higher risk of being unemployed or employed in a low-income job, to name some features that we have been unable to control for among the countries analysed. This could be the cause of relevant changes in perceived health. However, the assumed causation behind the strong association is possibly reversed or – even more plausibly – bi-directional.



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