



Contents lists available at ScienceDirect

Economic Analysis and Policy

journal homepage: www.elsevier.com/locate/eap

Analyses of Topical Policy Issues

The impact of financial insecurity on self-reported health: Europe in cross-national perspective

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ARTICLE INFO

Article history:

Received 21 October 2022

Received in revised form 13 September 2023

Accepted 28 September 2023

Available online 2 October 2023

JEL classification:

C29

D14

I31

Keywords:

Self-assessed health

Financial insecurity

Cross country differences

Prospect theory

Loss aversion

Scarring and anticipation effects

Multilevel techniques

ABSTRACT

Using the EU-SILC 2008 module on over-indebtedness and financial exclusion, this paper analyses how perceived future-orientated economic insecurity alters individual self-assessed health (SAH), once controlling for past and current financial situation in a range of European countries. Those effects differ by gender and by country. Our results also suggest that country characteristics explain a larger part of the unknown variability of individual levels of SAH than individual-household characteristics. Thus, our findings might be of help in designing the most effective policies intended to alleviate the individual welfare costs of perceived financial insecurity provoked by upcoming business-cycle downturns.

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1. Introduction

For the Commission on the Measurement of Economic Performance and Social Progress (see Stiglitz et al., 2011), measuring economic insecurity is fundamental to understand people's economic well-being and give economic policy a wider perspective. Standard measures of socio-economic status, such as poverty and material deprivation, are mostly static and free from subjective perceptions and anticipation effects.

The multifaceted economic dangers unveiled by economic crises, like the one that began in 2008, the one provoked by the COVID-19 pandemic or the current one with high inflation rates, are likely to affect people's lives in many spheres, from the fear of losing one's job to the anxiety of not being able to make ends meet, or from being over-indebted to suffering a sharp fall in asset prices. These dramatic changes in economic conditions provide a good opportunity to look back and assess how individuals from different EU countries faced the economic insecurity caused by the threat of the economic downturn and what its implications were in terms of individual subjective well-being measured as self-assessed health (SAH, henceforth).¹

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¹ The economics literature generally considers subjective well-being, life satisfaction and happiness to be exchangeable. Subjective well-being is related to self-assessed health, but they do not mean the same thing. We will elaborate on this in next section.

The literature to date has extensively appraised the socioeconomic gradient of SAH (Clark, 2018, for a review). Also, a bunch of recent studies have focused on *scarring effects* and *adaptation* which state that past insecurity experiences have ongoing effects on SAH (Di Tella et al., 2010; Clark et al., 2020). The most remarkable one is unemployment (Strandh et al., 2014). Job loss in the past exerts negative effects on current SAH. This scarring effect is the result of worsened expectations of the probability of becoming unemployed or being fired in the future (Knabe and Rätzel, 2011). Another important circumstance is income fluctuations. Clark et al. (2016) concluded that the negative effects of poverty are not ephemeral: poverty starts bad and stays bad in terms of subjective well-being. In other words, poverty scars, i.e., it has long lasting effects even among those who scape from it. However, the evidence is not conclusive, since other studies have found that the effects of past income losses on current well-being tend to vanish after a period of 3–4 years (Clark and Georgellis, 2013).

However, all this literature focuses on realized events. The interest in the study of economic insecurity relies precisely on the fact that the negative effects of insecurity on well-being can be experienced across the income distribution and without any objective event occurring (Kopasker et al., 2018). This explains that the well-being effects of future-orientated economic insecurity had recently gained attention among researchers. Thus, the anticipation of a pleasant or unpleasant event has been also considered as an important component of individual SAH. This *anticipation hypothesis* suggests that future events, including income/financial fluctuations, marriage, divorce and unemployment may cause movements in current well-being, relative to the individual's baseline level (Clark and Georgellis, 2013). This is not a new idea, insofar as it is related to the concept of *loss aversion* introduced by prospect theory (Kahneman and Tversky, 1979), a concept that was framed in the context of insecurity about the future and captures the idea that 'losses loom larger than gains'. Moreover, it has strong neurological basis, according to which anticipation confers adaptative benefits by engaging a suite of preparatory mechanisms (cognitive, affective and behavioural) that help individuals to adapt to potential challenging environments (Grube et al., 2013).

Although there is evidence suggesting that negative attitudes towards the future are associated to some mental health disorders such as depression (MacLeod and Byrne, 1996; Abler et al., 2007) or anxiety (Nitschke et al., 2009; Boehme et al., 2014), which highlights the necessity of study individual well-being and life events from a dynamic perspective, the literature that has analysed the socio-economic gradient in health has not deserved enough attention to this dynamic context.

This paper attempts to contribute to this literature by analysing the effect of past, current, and future financial events jointly on individual SAH in a range of European countries. This analysis will help us to determine whether the effects of the anticipation of future financial events have been over and beyond the ones caused by past and current economic strains. Considering past, current and future economic circumstances together is key in the analysis of individual's well-being insofar as although people's perceptions of insecurity are often drawn of their past and current experience, they also have a prospective dimension related to risk.

As subsidiary questions, we will pay special attention to gender and cross-country differences as regards how perceived financial insecurity has affected current individual levels of SAH. For these purposes, we will use the 2008 wave of the Statistics on Income and Living Conditions (EU-SILC) survey that includes a specific module on over-indebtedness and financial exclusion. Unfortunately, more recent data are not available in the EU-SILC for those items.² Insofar as there is international evidence that women consistently rate their subjective health lower than men, even in healthy countries (see Dahlin and Haärkönen, 2013), we carry out separate analyses for males and females. Cultural beliefs, attitudes, and values, which are highly conditioned by gender, might partially explain these gender differences in the self-perception of health.

Our main results can be summarized as follows. Perceived future financial conditions alter individual SAH, once controlling for past and current financial situation. The significant effect of past financial strain on current levels of SAH suggests the existence of a *scarring* effect, while the asymmetry in current and future financial situation does so for *loss aversion*. The positive effect of expectations of financial improvement does not fully compensate the negative effect of past and current financial strain. Both expectations of financial worsening and lack of knowledge about future financial situation exert a negative effect on current levels of SAH, which is more detrimental than the past or present occurrence of negative shocks.

Additionally, we find that the effects of future financial situation on SAH differ by country and that country characteristics explain a larger part of the unknown variability of individual levels of SAH than individual-household characteristics. The importance of country characteristics varies by gender, with their impact being more relevant for females.

Thus, our results provide interesting insights about the importance of expectations regarding private financial situation and the influence of the macroeconomic context in determining current individual well-being. Detecting individual differences and asymmetries in this respect is of key relevance to identifying the best strategies to cope with uncertain situations that might have a serious impact on future economic outlook and therefore on individual's future welfare. Moreover, insofar as the risk of adverse future events is growing but people's abilities to cope and recover are not improving accordingly, economic insecurity should be to the forefront of the policy agenda. In this respect, there is recent evidence suggesting that while economic security and confidence in the future have traditionally characterized the middle

² Special module 2020 "Over-indebtedness, consumption and wealth as well as labour" does not include questions about financial expectations, and it is only comparable with 2008 special module in over-indebtedness questions.

class, this population group is feeling increasingly insecure, at least in developed countries (Vaughan-Whitehead, 2016). Thus, governments have to face the challenge of reinforcing their social protection systems, labour market institutions and public services in order to help people to feel secure and hopeful about the future.

The paper is organized as follows. The next section provides an overview of the literature and the research hypothesis. Section 3 presents the method of analysis and Section 4 describes the dataset and the main variables. Section 5 includes the regression results. Section 6 presents the concluding remarks and further discussion.

2. Background and research hypotheses

2.1. Individual self-assessed health

Subjective well-being is the scientific term used in psychology and economics to refer to an individual's evaluation of the intensity that he/she experiences in terms of positive and negative affect, health, happiness, or satisfaction with life (Stutzer and Frey, 2010). Although economists have traditionally been sceptical of subjective data due to concerns about the potential biases arising from cultural differences, framing problems, cognitive bias, and mood effects, subjective well-being theory posits that each individual is capable of evaluating her/his level of well-being in terms of her/his own circumstances, others' circumstances, past experiences, and future expectations (Oswald and Wu, 2010; OECD, 2013).

Among all the existing alternatives to measure subjective well-being (see van Praag et al., 2003), physical or mental health is one of the most prevalent measures in the literature. From the early 1980s, there is evidence that SAH and subjective well-being are positively and significantly related (see Okun et al. 1984 for a meta-analysis based on studies of United States adults). Social scientists have relied heavily on self-assessed measures of health, as self-evaluations of health could reflect individuals' overall physical and mental well-being and would therefore be a better predictor of individual labour force participation, retirement decisions, and so on. In addition, self-reported measures of health have been shown to be significantly correlated with physicians' assessments and are a strong predictor of morbidity and mortality (Baker et al., 2004). Furthermore, unlike other indicators, most surveys across the world are very consistent in framing questions on SAH, thus facilitating cross-country comparisons with previous works (van Doorslaer and Koolman, 2004). In this respect, Baker et al. (2004) matched a wide range of self-reported chronic health conditions to records of public health care usage in Canada, finding clear evidence that such conditions are subject to a large amount of systematic reporting error.

Nonetheless, as any other subjective measure, self-reported health measures also have some drawbacks regarding measurement error. As reviewed in OECD (2013), the main disadvantage is that different populations may use different threshold levels when being asked to assess their health. This is what is known as the reporting heterogeneity problem. For a given true health status, individuals are likely to use different reference points depending on their demographic and socio-economic characteristics (see, for example, income in (Hernandez-Quevedo et al., 2004; Etile and Milcent, 2006); gender in (Arber and Cooper, 2006); and education in (Bago d'Uva et al., 2008)). Despite this, SAH continues to be a reasonable source of health data. As stated in OECD (2013), since self-reported health measures are empirically strong predictors of objective health measures, it could be argued a priori that measurement error remains minor. See the work of Gupta et al. (2010) and OECD (2013) for a more detailed explanation of the merits and pitfalls of both subjective and objective measures of health. Moreover, given the same wording of the health question in all countries included in the EU-SILC dataset, which has been profusely used in the literature and other studies using other datasets, measurement error is likely to be small.

2.2. Standard socio-economic characteristics

In related literature, a set of personal characteristics have been found to be associated with SAH. Overall, females consistently have poorer self-reported health than do men (Dahlin and Haärkönen, 2013). People living with a partner or those who are married report higher SAH (Ferrer-i-Carbonell, 2005; Bartolini et al., 2013), while there is no clear evidence as regards the presence of children (D'Ambrosio and Frick, 2012; Bartolini et al., 2013) and age (Bartolini et al., 2013) or years of education (D'Ambrosio and Frick, 2007; Bartolini et al., 2013). Nonetheless, a strong positive relationship between good health and educational level has been found (Kiuila and Mieszkowski, 2007; Mackenbach et al., 2008; Raghupathi and Raghupathi, 2020; Ross and Wu, 1995). Being unemployed (employed) is negatively (positively) associated with SAH (D'Ambrosio and Frick, 2007, 2012; Cortés-Aguilar et al., 2013).

Recent research highlights that individuals' SAH depends also heavily on the characteristics of the household to which the individual belongs. In particular, income (absolute or relative) as a measure of socio-economic status is well known to positively affect SAH (Clark, 2018). Wealth and debt burdens have received scarce attention (Blázquez et al., 2020).

2.3. Financial insecurity

Recent applied research has unveiled the links between economic insecurity in different aspects of life and various social ills, including low subjective well-being, diminished psychological health, and overall low self-rated health (Rohde et al., 2017; Kopasker et al., 2018). The term 'economic insecurity' has been increasingly used in the recent literature to

describe the sense of stress or anxiety experienced by individuals when faced with inadequately insured economic risk regarding future income, wealth, unemployment, unexpected expenses, and a range of other factors (Hacker et al., 2014; Osberg, 2018). The interest in the study of economic insecurity and its effects on individual SAH relies precisely on the fact that the effects of insecurity can be experienced across the income distribution and without any objective event occurring (Kopasker et al., 2018). This literature is still relatively scarce, especially that which addresses financial insecurity.

Overall, most of the papers deal with measures of current financial insecurity. However, the past and future financial events also matter for current levels of individual SAH. On the one hand, there might be *scarring effects* of past negative financial events, or analogously *anti-scarring effects* of past positive financial events, which are likely to continue to affect current well-being conditional on the current individual socio-economic circumstances (for unemployment see Strandh et al., 2014; Clark and Lepinteur, 2019; for income fluctuations see Clark et al., 2020). More recently, Clark et al. (2020) have used the time profiles of both major financial improvements (e.g. having won a lottery or received an inheritance) and major financial worsening (e.g. having gone bankrupt) to examine the impact of both contemporaneous and past financial events on life satisfaction. Some of these papers also test the so-called *adaptation hypothesis*, which states that higher levels of past stimulus may offset the effect of current stimulus by changing expectations (Kahneman and Tversky, 1979). There is no conclusive evidence of either full or partial adaptation in terms of SAH (see Di Tella et al., 2010; Clark et al., 2020).

The anticipation of favourable or unfavourable changes in one's own financial situation, on the other hand, is likely to be an important component of SAH. As suggested by Rohde et al. (2016, 2017), perceived financial risks are sometimes found to be more damaging (in different dimensions) than realized events and are over and beyond those determined by current economic circumstances. Moreover, as found by some recent works (Fang and Niimi, 2017), asymmetries may exist between the effects of expected positive and negative changes in future financial situation. The existence of such asymmetries provides evidence of the relevance of loss aversion in the relationship between financial conditions and SAH. This concept, introduced by prospect theory (Kahneman and Tversky, 1979), captures the idea that people derive utility from gains and losses defined in relation to a reference point, rather than from the absolute level of income or wealth, and people tend to be more sensitive to losses (negative changes) than to gains (positive changes). The former refers to reference dependence, while the latter refers to loss aversion, both of which are key properties of prospect theory.

Reference dependence and the important role played by relative income have been extensively examined in the literature (e.g. Ferrer-i-Carbonell, 2005). In contrast, research on loss aversion in the context of well-being remains relatively limited. Some exceptions are the works of Vendrik and Woltjer (2007), Di Tella et al. (2010), and Boyce et al. (2013), which provide evidence of the presence of asymmetric effects of expected income changes. Also, the papers of Fang and Niimi (2017) and Di Tella et al. (2010) included both expected income changes and actual income changes as determinants of happiness and find evidence of asymmetric effects that are not uniform across the happiness distribution.

2.4. Country characteristics

European households have witnessed a dramatic change in economic conditions during recent years, moving from a long period of sustained growth accompanied by the easing of credit constraints and an enormous rise in household debt, to an unprecedented economic downturn starting in 2008. Thus, the euphoria and subsequent pessimism that households in many European countries have experienced in the past years provides a good opportunity to test whether macroeconomic conditions matter for individual SAH.

Most of the evidence shows the linkage between the macroeconomic characteristics and subjective well-being. We will adopt their arguments in our analysis, as SAH is an indicator of subjective well-being (van Praag et al., 2003). In particular, subjective well-being has been proved to be strongly correlated with both levels and changes in GDP (Di Tella et al., 2003; Helliwell et al., 2018). The evidence on the relationship between income inequality and subjective well-being is mixed (Schneider, 2016). Aggregate unemployment is commonly found to be associated with lower levels of well-being among the employed (Clark et al., 2020). Inflation is another macroeconomic variable that is likely to affect individual subjective well-being insofar as it might affect individuals' perceptions as regards their standard of living. As suggested by some papers, inflation matters but is less harmful than unemployment (Blanchflower et al., 2014). A scenario of increasing interest rates and/or of falling housing prices might also be deleterious for subjective well-being, especially among those individuals living in households with a significant amount of pending debt.

Cross-country differences in these variables may be of key relevance as they might have been accompanied by cross-country heterogeneity in wealth and debt portfolios in the EU at the beginning of the 2008 crisis. Thus, the dynamics of house price developments over time matter for how wealthy households are, and differences in them may contribute to explain differences in individual levels of well-being (Bover et al., 2014). A country's welfare generosity is also likely to affect individual levels of well-being insofar as it reduces income insecurity and inequality and provides equal opportunities to the poor to maintain a decent standard of living (Di Tella et al., 2003; Flavin et al., 2011).

At the aggregate level, several studies have analysed cross-country differences as regards the well-being effects of "quality of delivery", that refers to the reliability and responsiveness of governments in their design and delivery of services – i.e. government effectiveness, regulatory quality, rule of law, and the control of corruption (Helliwell et al., 2018). Finally, homeownership rate is another macroeconomic variable that might affect individuals' subjective well-being. There is evidence of cross-country differences both in homeownership rates (Herbers and Mulder, 2017) and the amount of debt held (Georgarakos et al., 2010; Bover et al., 2014) effects on well-being.

Finally, the economic standing of a given country is highly relevant for life chances, and thus, the level of subjective economic (in)security among its citizens. Thus, it is likely that the macroeconomic characteristics of a country condition individuals' perceptions of economic security, and consequently, their self-reported levels of health. For instance, higher levels of social protection, as well as the transparency and trust of country's institutions are key determinants of subjective security (Mau et al., 2012). In this respect, comparative analyses have shown that less developed countries, as well as those in economic transition, experience the greatest levels of perceived insecurity, while in developed and relatively prosperous economies, perceptions of economic insecurity are comparatively low (Haller and Hadler, 2006; Böhnke, 2008; Chung and van Oorschot, 2011).

Some macroeconomic conditions, such as unemployment, have been proven to affect feelings of insecurity in society. In particular, high unemployment is not only harmful for the life chances of the unemployed, but it also impacts negatively on those in employment (Burchell, 1993; Mendenhall et al., 2008). Thus, we would expect that in countries with high unemployment, people would feel comparatively less secure and vice versa. Some papers also provide evidence of the relationship between social inequality and perceptions of insecurity (Anderson et al., 2009) and the impact of socio-economic inequality on well-being, even among people not located in the lower strata (Wilkinson and Pickett, 2009a,b).

3. Econometric method

We account for the hierarchical structure of data using two levels, namely individuals nested into countries. To handle the issue of correlated observations within a country, we rely on multilevel regression techniques, which allow us to explore the information beyond clustering by specifically analysing the effect of country-level variables (see Bryan and Jenkins, 2016). Furthermore, we will consider not only a country-specific effect on average subjective well-being (random intercept), but also a country-specific effect regarding the effect of financial expectations (random slope). We estimate alternative models to evaluate the relative importance of personal, household, and country-level determinants in explaining cross-national variation in subjective well-being.

Before presenting our model, we need to consider the nature of our original job insecurity measure. As was already mentioned previously, the original SAH measure is a 5-point response scale. Given that the ordinal scale has no interpretation other than reporting higher or lower health, we transform the original variables into a numerical evaluation. In other words, we assume that respondents interpret the evaluations in cardinal terms. Although in terms of trade-offs between explanatory variables the choice of ordinality versus cardinality is irrelevant (Ferrer-i Carbonell and Frijters, 2004), cardinality has the advantage of directly interpreting coefficients as marginal effects. We adopt probit-adapted ordinary least squares (POLS) as developed by van Praag and Ferrer-i-Carbonell (2008). Implementing POLS begins by assuming that SAH_i is a function that, after proper transformation, follows a normal distribution with mean 0 and variance 1. Let us derive the $\{\mu_j\}_{j=0}^J$ values of a standard normal distribution associated with the cumulative frequencies of the J different categories of the dependent variable, with $\mu_0 = -\infty$ and $\mu_j = \infty$. The expectation of a standard normally distributed variable is taken for an interval between any two adjacent values. Thus, if the true unobserved continuous variable for individual i is SAH_i^* where the observed continuous variable is $SAH_i = s$ if $\mu_{j-1} < SAH_i^* < \mu_j$ for $j=1, \dots, J$, then the conditional expectation of the latent variable is:

$$SAH_i = E(\mu_{j-1} < SAH_i^* < \mu_j) = \frac{n(\mu_{j-1}) - n(\mu_j)}{N(\mu_j) - N(\mu_{j-1})}$$

Let us then consider a two-level structure where individuals, i (first level), are nested into countries, c (second level). Let SAH_{ic} denote the level of individual SAH for individual i in country c . We first propose the null model (Model A) that only includes the constant term but gives us information on whether there are country differences in individual levels of SAH.

$$SAH_{ic} = \alpha_0 + \varepsilon_{ic} + \xi_{0c} \tag{Model A}$$

where ξ_{0c} designates the random intercept and ε_{ic} comprises the individual-level residuals. Both are assumed to be independent and to follow normal distributions with zero mean. Random effects are described according to their estimated variance. We denote the between-country variance by $\sigma_{\xi_0}^2$, and the within-country between-individual variance by σ_{ε}^2 . As is usual in the literature, we use the variance partition coefficient (VPC) to express the proportion of the total variance due to between-country differences. Additionally, the estimated specific country value, $\hat{\xi}_{0c}$, gives us information to classify countries in terms of a level of self-assessed health below the average ($\hat{\xi}_{0c} < 0$), above the average ($\hat{\xi}_{0c} > 0$), or just on the average ($\hat{\xi}_{0c} = 0$).

Next, we extend the previous model by including individual and household characteristics (Model B) and a random coefficient for variables regarding the future financial situation.

$$SAH_{ic} = \alpha_0 + \alpha'_1 X_{ic} + \alpha'_2 F_{ic} + \varepsilon_{ic} + \xi_{0c} + \xi'_{1c} F_{ic} \tag{Model B}$$

where vector X_{ic} contains first level characteristics (individual and household characteristics) commonly used in the self-assessed health literature. Vector F_{ic} comprises a set of variables to capture the past ($F_{P_{ic}}$), current ($F_{C_{ic}}$), and future ($F_{F_{ic}}$) financial situation of the household. Random coefficients are modelled in terms of the household's future financial

Table 1
Self-assessed health status by gender.

	Males					Females				
	Mean	SD	Min	Max		Mean	SD	Min	Max	
SAH	2.81	0.87	0	4		2.81	0.86	0	4	
	<i>Very Bad</i>	<i>Bad</i>	<i>Moderate</i>	<i>Good</i>	<i>Very Good</i>	<i>Very Bad</i>	<i>Bad</i>	<i>Moderate</i>	<i>Good</i>	<i>Very Good</i>
Distribution SAH	1.40%	6.08%	21.91%	50.10%	20.51%	1.26%	6.35%	22.35%	49.73%	20.31%
Average SAH_partner	1.81	3.05	2.36	2.86	3.47	1.83	2.08	2.35	2.87	3.51

situation (F_{Fic}). This procedure will provide us an extra set of estimated parameters, in particular the variance of the random slopes ($\sigma_{\xi_1}^2$). We assume the random effects, ξ_{0c} and ξ_{1c} , and the individual level residuals, ε_{ic} , to be independent and to follow normal distributions with zero mean.

In terms of our parameter of interest, the first of our goals is tested with estimated parameters included in α_2 corresponding to household’s past (F_{Pic}), current (F_{Cic}), and future (F_{Fic}) financial situation. First, we test whether the estimated parameters of future expectations (F_{Fic}) are significantly different from zero and with a higher size than the corresponding ones for the current and past financial situation. Concerning our second goal, the parameters of interest are the ones of vector α_2 corresponding to the household’s future financial expectations (F_{Fic}) and a random effect ξ_{1c} with zero mean and variance $\sigma_{\xi_1}^2$. In particular, the estimated random effect $\hat{\xi}_{1c}$ allows us to rank countries with an effect of financial expectations on SWB below ($\hat{\xi}_{1c} < 0$) or above ($\hat{\xi}_{1c} > 0$) the estimated average effect ($\hat{\alpha}_2$).

Finally, to check whether country-level determinants have an effect over and beyond the effect of individual/household characteristics, we propose the extended model (Model C):

$$SAH_{ic} = \alpha_0 + \alpha'_1 X_{ic} + \alpha'_2 F_{ic} + \alpha'_3 W_c + \varepsilon_{ic} + \xi_{0c} + \xi'_{1c} F_{ic} \tag{Model C}$$

where vector W_c includes the second level (country) characteristics. All models will be estimated separately for males and females so that we can also test for gender differences.

An important concern when analysing the causal impact of financial expectations on self-assessed health is endogeneity. From a theoretical viewpoint, it is very difficult to establish the causal link between individual self-assessed health and financial expectations, although it is likely that the process governing the formation of expectations causes lower levels of health. However, it might also be the case that financial expectations are dictated by self-assessed health. A natural extension to address this concern is an instrumental variables approach, which unveils the true impact of financial expectations on health. Unfortunately, it is very difficult to find valid instruments which serve that purpose in large-scale surveys like the one we use in this paper. An alternative attempt would rely on dynamic panel models to control for health-state dependence and initial health. Nonetheless, this via is also close to ours insofar as our analysis is based on cross-sectional data extracted from the specific 2008 EU-SILC module on over-indebtedness and financial exclusion.

The approach used in this paper to correct potential estimated bias to the greatest possible extent is threefold. First, we apply multilevel techniques that allow us to control for unobserved country heterogeneity. Secondly, we include spouses’ SAH to control for a large variety of unobserved heterogeneity and confounding factors surrounding the association between future expectations and individual SAH. Thirdly, we use past financial situation to somehow pre-date the measure of our dependent variable. As pointed out in Clark et al. (2020), the time dimension of the financial situation variables helps to alleviate the above-mentioned bias.

Nonetheless, despite our efforts to ameliorate the bias in our estimates, we are unable to completely rule out the possibility that our estimated coefficients are affected by confounding unobserved factors. Thus, it is important to highlight that although we sometimes abuse the language in the paper somewhat and refer to ‘effects’, the results do not necessarily imply a causal interpretation. Thus, we recognize that our results should be interpreted with caution.

4. Dataset and main variables

The EU-SILC dataset is an instrument aimed at collecting timely and comparable cross-sectional and longitudinal micro data on income, poverty, social exclusion, and living conditions. However, we use only the 2008 wave, which is the only wave that contains a module on over-indebtedness and financial exclusion as there is no more recent data in EU-SILC.

For this study, we retain households with at least two adults (heterosexual couples) aged between 16 and 80 years, in which the reference person and his/her partner are identified, with non-missing information for the selected variables for 26 European countries. This results in a final sample of 199,038 observations.

Our measure of subjective well-being refers to SAH, the only measure available in our database. In particular, it is derived from the question ‘How is your health in general?’, with a five-point response scale ranging from ‘0–very poor’ to ‘4–very good’ (Table 1 for descriptive statistics). For identification purposes, as explained in Section 3, we include spouses’ SAH ($SAH_{partner}$) in the regressions, which is positively correlated with individual SAH.

4.1. Socio-demographic variables

We consider the most common variables used in the related literature (see Panel A, Table 2). As our sample comprises couples, 50% of the sample are females.³ We include a set of dummies for different age groups (*Young* below 40 and *Old* above 65, with those between 40 and 65 as the reference category),⁴ for different levels of education (*Secondary* and *Tertiary*, with primary education as the reference category) and for being an immigrant (*Immigrant*).

We also account for individual labour market situation and individual work intensity compared to the household. Work intensity, at any level, is calculated as the ratio of months actually worked over the total potential months. We consider two different dummies: one for being active but with a work intensity below the household average (*Intpart_less*), and another one for being active but with a work intensity above or equal the household average (*Intpart_more*). Finally, we also include two dummies to capture whether the individual has some limitation that hampers usual daily activity (*Limited*) or the individual is strongly limited (*Limited_strong*).

To assess the impact of household type, we include two dummy variables to reflect the presence of young and old dependants (*Dep_young* and *Dep_old*). We also include a dummy to reflect if the household is the owner of the accommodation (*Owner*).

4.2. Financial situation variables

Current financial situation is accounted for, first, by means of household equivalent disposable income (*Income*). Second, we consider a set of dummies to capture the incapacity to afford a one-week annual holiday away from home (*Cap_holiday*), a meal with meat, chicken, fish (or vegetarian equivalent) every second day (*Cap_meat*), to face unexpected financial expenses (*Cap_unexp*), and finally the inability to keep the home adequately warm (*Cap_warm*). Note that these items, together with some others, are the standard ones proposed for Eurostat to measure financial deprivation and they are considered here to capture the effect of material deprivation. Additionally, to control for housing burden we include the ratio of monthly costs related to the household accommodation over monthly disposable income (*Ratio_house*). Insofar as this ratio is likely to vary between owners and tenants, we also include an interaction of this ratio with the fact of being the homeowner (*Ratio_house*Owner*).

In order to account for past (last 12 months) financial strain, we include information on *Arrears*. Households with no arrears are taken as the reference group (90.6% of our sample). Additionally, we consider a dummy variable (*Drop*) to reflect the fact of having experienced a major drop in household income in the last 12 months due to one of the two following reasons: 'job loss/redundancy' or 'change in hours worked and/or in wages'.

Finally, to account for future financial expectations, we include 3 dummies that capture whether in the next 12 months financial conditions are expected to improve (*Exp_improve*), to worsen (*Exp_worse*), or whether this information is not known (*Exp_unknown*). Given the cross-sectional nature of our data, we cannot include positive and negative changes in the financial situation as in Di Tella et al. (2010), Fang and Niimi (2017), or Clark et al. (2020). In our model, all variables on past and current financial situation are modelled as dummy variables. As in Boyce et al. (2013), we do not have data on the contrary events, but the value zero of the dummies capture them to some extent. Thus, the inclusion of these dummies allows us to somehow capture the asymmetric effect of either current or past gains and losses. In terms of future expectations, however, our set of dummies adequately controls for positive and negative changes. Therefore, past financial situation captures the *scarring* effect, whereas current and future financial situation capture *loss aversion*. In terms of incidence of financial difficulties, we find that 11.6% reports expecting to improve, 53.7% unknown expectations and 27.5% to worsen.⁵

4.3. Macroeconomic variables

Macroeconomic conditions are accounted for a range of variables, extracted from Eurostat for year 2008, that allow us to control for country-level factors (Herbers and Mulder, 2017 and Helliwell et al., 2018).⁶ First, we include a group of variables reflecting the economic conditions such as per capita GDP (*Gdp_pc*); income inequality through the income share earned by the top 20% of the distribution over the share received by the bottom 20% (*s80s20*); the activity rate (*Act_rate*); and the annual average harmonized index of consumer price rate of change (*HICP_change*) to capture the cost of living. Additionally, we account for the effect of social protection benefits (*Social Protection*) measured as a percentage of GDP per capita.

We account for the size of the shadow economy of a country (*Shadow*), and three governance indicators: (i) the government effectiveness indicator (*Gov_effectiveness*); (ii) the rule law indicator (*Rule_law*); and (iii) a corruption indicator (*Corruption*). Finally, in order to capture the financial situation at the macroeconomic level, we include an indicator for house price index changes (*House_price_change*) and two variables to reflect the private credit sector: one for the flow, which is liabilities throughout the year (*PrivCredit_flow*), and another one which is the stock of liabilities (*Household_debt*).

³ Specific definitions of variables are reported in Table S1 and main descriptive statistics in S2 in the Supplemental Material.

⁴ We have also considered age groups excluding from young individuals those between 16 and 25 years old to preclude the effect of being studying or being dependent. Results do not change. See Table S4 in the Supplemental Material.

⁵ The incidence by country is reported in Table S.3 of the Supplemental Material.

⁶ As in the case of individual variables, we relegate the definitions of these variables to Table S1 and their main descriptive statistics to Table S2.

Table 2
Estimation results.

	Males			Females		
	Model A	Model B	Model C	Model A	Model B	Model C
<i>SAH_partner</i>		0.286*** (0.002)	0.286*** (0.002)		0.283*** (0.002)	0.283*** (0.002)
<i>Future financial situation</i>						
<i>Exp_improve</i>		0.044*** (0.010)	0.044*** (0.010)		0.045*** (0.011)	0.045*** (0.011)
<i>Exp_worse</i>		-0.045*** (0.008)	-0.045*** (0.008)		-0.043*** (0.007)	-0.043*** (0.007)
<i>Exp_unknown</i>		-0.033** (0.011)	-0.032** (0.011)		-0.022 (0.014)	-0.022 (0.014)
<i>Current financial situation</i>						
<i>Income</i>		0.030*** (0.004)	0.029*** (0.004)		0.014** (0.004)	0.013** (0.004)
<i>Cap_holiday</i>		-0.048*** (0.005)	-0.048*** (0.005)		-0.054*** (0.005)	-0.054*** (0.005)
<i>Cap_meat</i>		-0.004 (0.007)	-0.004 (0.007)		-0.042*** (0.007)	-0.041*** (0.007)
<i>Cap_unexp</i>		-0.016** (0.005)	-0.016** (0.005)		-0.033*** (0.005)	-0.032*** (0.005)
<i>Cap_warm</i>		-0.026*** (0.007)	-0.026*** (0.007)		-0.039*** (0.007)	-0.039*** (0.007)
<i>Ratio_house</i>		0.044 (0.034)	0.043 (0.034)		0.048 (0.033)	0.047 (0.033)
<i>Ratio_house*Owner</i>		0.025 (0.037)	0.026 (0.037)		-0.030 (0.036)	-0.030 (0.036)
<i>Past financial situation</i>						
<i>Arrears</i>		-0.025*** (0.007)	-0.025*** (0.007)		-0.011 (0.007)	-0.011 (0.007)
<i>Drop</i>		-0.018* (0.007)	-0.018* (0.007)		-0.017* (0.007)	-0.017* (0.007)
<i>Country characteristics</i>						
<i>Gdp_pc</i>			0.124*** (0.023)			0.170*** (0.026)
<i>S80_S20</i>			0.063** (0.021)			0.063** (0.024)
<i>Act_rate</i>			0.032* (0.015)			0.062*** (0.017)
<i>HICP_change</i>			-0.061*** (0.010)			-0.081*** (0.012)
<i>Social_Protection</i>			-0.840+ (0.448)			-0.852+ (0.508)
<i>Shadow</i>			-0.005 (0.004)			-0.005 (0.004)
<i>Gov_effectiveness</i>			0.252* (0.116)			0.277* (0.131)
<i>Rule_law</i>			0.295** (0.094)			0.546*** (0.106)
<i>Corruption</i>			-0.403*** (0.102)			-0.619*** (0.116)
<i>House_price_change</i>			-1.004*** (0.257)			-1.515*** (0.290)
<i>Household_debt</i>			-0.360** (0.130)			-0.546*** (0.147)
<i>PrivCredit_flow</i>			2.031*** (0.340)			2.585*** (0.385)
<i>Socioec. characteristics^(a)</i>						
<i>Const.</i>	No	Yes	Yes	No	Yes	Yes
	0.036 (0.065)	-0.315*** (0.056)	-0.639** (0.204)	0.023 (0.071)	0.033 (0.060)	-0.412+ (0.230)
<i>No. Observations</i>	995 19	995 19	995 19	995 19	995 19	995 19

Note: Standard errors in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

^(a) These results are obtained controlling for age, education, work intensity, health status, immigrant status, dependants, and tenure. See Table S5 in the Supplemental Material for details.

Table 3
Estimation results (Random effects).

	Males			Females		
	Model A	Model B	Model C	Model A	Model B	Model C
$\sigma_{\xi_0}^2$	0.093*** (0.028)	0.026*** (0.008)	0.003*** (0.001)	0.110*** (0.033)	0.039*** (0.012)	0.004*** (0.001)
σ_{ε}^2	0.770*** (0.003)	0.373*** (0.002)	0.373*** (0.002)	0.740*** (0.003)	0.360*** (0.002)	0.360*** (0.002)
$\sigma_{\xi_{1,improve}}^2$		0.001*** (0.001)	0.001*** (0.001)		0.002*** (0.001)	0.002*** (0.001)
$\sigma_{\xi_{1,worse}}^2$		0.001*** (0.001)	0.001*** (0.000)		0.001*** (0.000)	0.001*** (0.000)
$\sigma_{\xi_{1,unknown}}^2$		0.001*** (0.000)	0.001*** (0.001)		0.002*** (0.001)	0.002*** (0.001)
VPC_{ξ_0}	0.108*** (0.029)	0.061*** (0.014)	0.007** (0.002)	0.129*** (0.034)	0.094*** (0.026)	0.012** (0.004)
$VPC_{\xi_{1,improve}}$		0.064*** (0.015)	0.010** (0.003)		0.097*** (0.026)	0.015*** (0.004)
$VPC_{\xi_{1,worse}}$		0.062*** (0.014)	0.008** (0.002)		0.094*** (0.026)	0.013*** (0.004)
$VPC_{\xi_{1,unknown}}$		0.062*** (0.015)	0.010*** (0.003)		0.095*** (0.026)	0.013** (0.004)

Note: Standard errors in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5. Results

Table 2 reports the estimation results, separately for males and females and corresponding random effects are in Table 3.⁷ Given the large size of the sample, the odds ratios and statistical significance levels are fairly stable across models.

Before analysing the effect of financial situation, our main goal, we would like to point out that the effect of the partner's SAH is, by far, the largest effect if we compare it with the rest of controls except for country characteristics (see Table 2). In particular, one standard deviation increase in partners' SAH for males (females) accounts for 32.9 (32.8) percent of a standard deviation increase in own SAH.⁸

Now we turn into our main goal, that is, the effect of past, current and future financial situation on SAH. We focus our comments on results of Model C, where individual, household, and country characteristics are controlled for.

Our results related to the variables that capture the current financial situation confirm the presence of a socioeconomic gradient in health. However, some gender differences are noteworthy in this respect. For males, we find, in line with other papers in the literature (see for instance Contoyannis et al., 2004), that this result is mainly driven by income as a measure of socioeconomic status.⁹ However, as in Blázquez et al. (2014), material deprivation exerts a major impact on females' health status. In particular, household's incapacity to afford holidays away from home, unexpected financial expenses and keeping the home adequately warm (*Cap_holiday*, *Cap_unexp* and *Cap_warm*) have a more detrimental impact on females' SAH,¹⁰ and the incapacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day (*Cap_meat*) does not significantly affect males' SAH while it is highly health detrimental for females.¹¹ As in Fang and Niimi (2017) and Boyce et al. (2013), these results provide some evidence of loss aversion.

Proceeding as in Di Tella et al. (2010), notice that the joint incidence of current financial difficulties, in terms incapacity to afford minimum standards of living, is equal to sum of the estimated parameters regarding *Cap_holiday*, *Cap_meat*, *Cap_unexp* and *Cap_warm*. This is -0.094 (p -value 0.000) for males and -0.166 (p -value 0.000). This implies that 31.0% (0.029/0.094) and 7.8% (0.013/0.166) of the decrease in SAH related to financial difficulties is similar in magnitude to the positive health effect associated to income for males and females respectively.

Past financial strain is also found to be associated with decreased levels of self-reported health, suggesting the presence of scarring effects of past negative financial events. However, again gender differences are worth noticing, with males'

⁷ The rest of estimated parameters are relegated to Table S5 in Supplemental Material.

⁸ Given the standard results regarding socio-economic individual and household variables, the corresponding estimated parameters are omitted and available upon requests.

⁹ In terms of size, an increase of 10% in males' (females') income will account for 0.003 (0.001) units of SAH. A 10% increase in income implies $0.29 \cdot \ln(1+0.10) = 0.003$ extra units of SAH.

¹⁰ For instance, the incapacity to afford a one-week annual holiday away from home (*Cap_holiday*) accounts for 0.048 (0.054) units of decrease in males' (females') SAH.

¹¹ The incapacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day (*Cap_meat*) accounts for 0.041 units of decrease in females' SAH.

SAH being more influenced by past conditions. In particular, being in arrears (*Arrears*) significantly reduces self-reported levels of health among men, while no significant effect is found for women. Having experienced a drop in income over the past 12 months (*Drop*) is associated with lower levels of SAH for both males and females, but for these latest the impact is slightly smaller. Thus, our results are somehow in line with previous works that have shown gender differences as regards scarring effects of past negative effects on subjective well-being such as unemployment experiences (see for instance Mousteri et al., 2018; Clark et al., 2001). These findings are in line with previous results regarding worsening financial situation in the past 12 months (Clark et al., 2020) on individuals' current well-being. The joint occurrence of all past financial difficulties subtracts 0.042 (0.028) units of males' (females') SAH. Thus, 69% and 46.4% of the negative health effects associated to past financial difficulties is similar in magnitude to the positive health effect associated to income for males and females, respectively. This would imply that the negative effect of past financial difficulties on males' (females') SAH still remains in the present, thus suggesting that the *scarring effects* of past financial difficulties are not negligible.

Expectations of financial worsening and expectations of improvement in the near future display an asymmetric effect. The latter, captured by the variable *Exp_improve*, exert a positive and significant effect on individual SAH for both males and females. The positive self-assessed health effect due to income increases is equivalent to just 65.9% (28.9%) of the positive effects produced by expectations of improvement in financial conditions for males and females, respectively.

Additionally, expectations of worsening financial conditions (*Exp_worse*) are deleterious for current levels of health. 64.4% (30.2%) of the negative health effects associated to these pessimistic expectations is offset by the positive effect associated to income for males and females, respectively. Finally, for those who do not know how their financial situation will evolve (*Exp_unknown*), 90.6% (59.1%) of the negative health effects produced by not knowing about future financial conditions is overcome by the positive health effect exerted by income for males and females, respectively.

These findings are in line with the related literature (Di Tella et al., 2010; Boyce et al., 2013; Fang and Niimi, 2017) on anticipated loss aversion, suggesting that well-being effects from losses and gains differ. However, contrary to Fang and Niimi (2017), who found that losses bite more than gains, we find that, in absolute terms, the positive effect on current levels of SAH produced by expectations of financial improvement is very similar to the negative effect caused by expectations of the worsening of such conditions. This finding does not completely fit the prospect theory hypothesis as it also requires the effect of losses to be larger than the effect of gains. This result might be partially explained by the fact that our survey period comprises the beginning of a financial recession. In this scenario, where the majority of the population is expecting to face worse conditions, the positive health effect caused by individuals' expectations of financial improvement is very likely to be magnified. An alternative explanation would be that individuals have already internalized the consequences of the economic downturn, and therefore the negative effect on health is not so large.

We now compare the self-assessed health effects of expectations on future financial conditions with the effects caused by current and past financial conditions. As shown previously, the joint occurrence of all past financial difficulties subtracts 0.042 (0.028) units of males' (females') SAH, while the net effect of current financial difficulties subtracts 0.065 and 0.153 units, respectively. Future expectations of financial improvement add 0.044 (0.045) units of males' (females') SAH. Thus, for males (females), we find that future expectations of financial improvement could offset 41.1% (24.9%) of the detrimental health effect associated to the concurrence of present and past difficulties.

Expectations of financial worsening and lack of knowledge about future financial situation add a negative effect on SAH (*Exp_worse* and *Exp_unknown*) equal to -0.077 units of SAH. This is almost twice the effect of past financial difficulties (-0.042) and is slightly larger than the effect of current financial situation (-0.065). For females, these gaps are larger, as the negative effect of *Exp_worse* and *Exp_unknown* amounts to -0.065 , while the negative effect of past and current financial difficulties is -0.028 and -0.153 units, respectively. This result is also in line with previous works (Brugard et al., 2009) suggesting that individuals' perceived future risks affecting their economic circumstances might exert adverse effects on individual well-being that could be as, if not more, detrimental than the past or present occurrence of shocks affecting individual's finances.

To sum up, the past and current financial difficulties, as expected, exert a negative effect on SAH. The standard positive effect of income does not compensate this negative effect. The positive effect of expectations of financial improvement does not either. Expectations of financial worsening and lack of knowledge about future financial situation add a negative effect, which is more detrimental than the past or present occurrence of shocks.

5.1. Country differences

Table 3 reports the corresponding random effects, which allows as to analyse differences by country. The results of the benchmark model (Model A) suggest that there are country differences in SAH for both males and females ($\hat{\sigma}_{\xi_0}^2$ is significantly different from zero). Moreover, the VPC reveals that 10.8% (12.9%) of the unobserved males' (females') differences in SAH is due to country differences. As expected, the estimated between-countries variance ($\hat{\sigma}_{\xi_0}^2$) significantly decreases but does not vanish when we control for both micro and macroeconomic determinants. The VPC decreases significantly to 0.7% for males and to 1.2% for females when we move to Model C. Table 3 reports the estimated country-specific random errors ($\hat{\xi}_{0c}$). In all cases, there is a group of countries located below the average ($\hat{\xi}_{0c} < 0$) and a group of countries above the average ($\hat{\xi}_{0c} > 0$). However, once we control for individual, household, and country characteristics (Model C), there is evidence of remaining country differences as there is a set of countries that remains below and above average.

Table 4
Estimation results for financial difficulties (random slope).

Country	Exp_improve				Country	Exp_Unknown				Country	Exp_worse			
	Males		Females			Males		Females			Males		Females	
	Model A.1	Model C	Model A.1	Model C		Model A.1	Model C	Model A.1	Model C		Model A.1	Model C	Model A.1	Model C
ES	0.044	0.017	0.046	0.019	SK	-0.121*	-0.039	0.004	0.014	CY	-0.152*	-0.116*	-0.087*	-0.061*
MT	0.065	0.006	0.072	0.003	CY	-0.114*	-0.065	-0.126*	-0.115*	CZ	-0.144*	-0.052*	-0.133*	-0.035*
EE	0.075*	0.015	0.111*	0.028	UK	-0.111*	-0.045	0.017	-0.005	LV	-0.143*	-0.043*	-0.117*	-0.043*
PT	0.079*	0.028	0.097*	0.039	LV	-0.109*	-0.033	-0.059	-0.002	BG	-0.142*	-0.074*	-0.114*	-0.045*
UK	0.083*	0.012	0.109*	0.041	DE	-0.108*	-0.043	-0.048	-0.027	SK	-0.135*	-0.047*	-0.163*	-0.040*
CY	0.087*	0.033	0.140*	0.055	LU	-0.099*	-0.040	0.024	0.023	EE	-0.126*	-0.031	-0.140*	-0.028
LU	0.088*	0.036	0.062	-0.002	BE	-0.093*	-0.036	-0.036	-0.015	UK	-0.125*	-0.048*	-0.082*	-0.021
LV	0.091*	0.035	0.101*	0.044	PT	-0.084*	-0.035	-0.046	-0.025	PL	-0.123*	-0.041*	-0.154*	-0.056*
RO	0.095*	0.048*	0.090*	0.031	LT	-0.078*	-0.026	-0.029	0.000	IT	-0.120*	-0.028	-0.076*	0.014
IT	0.104*	0.040	0.116*	0.052*	IE	-0.077*	-0.038	-0.037	-0.013	HU	-0.119*	-0.045*	-0.117*	-0.051*
EL	0.106*	0.040	0.127*	0.053*	AT	-0.073*	-0.032	-0.040	-0.022	FR	-0.118*	-0.034	-0.162*	-0.065*
SK	0.111*	0.060*	0.167*	0.083*	CZ	-0.073*	-0.032	-0.040	-0.022	BE	-0.117*	-0.037	-0.098*	-0.035
IE	0.115*	0.024	0.105*	0.034	FR	-0.073*	-0.032	-0.040	-0.022	RO	-0.116*	-0.043	-0.111*	-0.044*
LT	0.117*	0.057*	0.133*	0.062*	MT	-0.073*	-0.032	-0.040	-0.022	IT	-0.114*	-0.044	-0.104*	-0.046
BE	0.117*	0.021	0.042	-0.020	BE	-0.073*	-0.023	-0.065	-0.017	AT	-0.111*	-0.035	-0.173*	-0.088*
BG	0.130*	0.080*	0.090*	0.075	EG	-0.056*	-0.032	-0.028	-0.031	DE	-0.110*	-0.029	-0.134*	-0.027
AT	0.132*	0.064*	0.078*	0.040	RO	-0.047*	-0.033	-0.018	-0.039	IE	-0.110*	-0.053*	-0.091*	-0.031
HU	0.141*	0.049*	0.183*	0.083*	ES	-0.040*	-0.029	-0.082*	-0.028	PT	-0.109*	-0.060*	-0.091*	-0.037
FR	0.152*	0.054*	0.130*	0.043*	HU	-0.038*	-0.016	-0.031	-0.018	LT	-0.103*	-0.044	-0.128*	-0.044*
CZ	0.163*	0.096*	0.149*	0.113*	IT	-0.030*	-0.009	-0.024	-0.011	MT	-0.101*	-0.053*	-0.082*	-0.047*
DE	0.168*	0.052*	0.134*	0.024	EL	-0.026*	-0.024	-0.107*	-0.076*	EL	-0.091*	-0.018	-0.141*	-0.055*
PL	0.206*	0.099*	0.173*	0.090*	PL	-0.013*	-0.013	-0.032	-0.003	ES	-0.054*	-0.010	-0.109*	-0.049*

Note: Model A1 is variation of Model A, which only includes variables for future financial situation (Model A1). Results for Model A1 are available upon requests. Country order is given by Model A.1 (males). * are significant at 5%.
 Note: Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czech Republic (CZ), Germany (DE), Estonia (EE), Greece (EL), Spain (ES), France (FR), Hungary (HU), Ireland (IE), Italy (IT), Lithuania (LT), Luxemburg (LU), Latvia (LV) , Malta (MT), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK) and United Kingdom (UK).

However, our interest relies more in whether the effect of future financial expectations on SAH differs by country. If we look at the estimated variances of the random slopes ($\hat{\sigma}_{\delta_1}^2$) corresponding to future financial expectations (Table 3), we find that, once we control for both individual, household and country characteristics (Model C), they remain significantly different from zero for both males and females. This implies that, even if individual-household characteristics are controlled for, the effect of anticipation of future financial events on individual well-being vary by country.

Table 4 shows the country-specific estimated random effects for the three variables capturing future financial expectations (*Exp_improve*, *Exp_worse* and *Exp_unknown*). It is worth noticing that the effect of financial expectations (*Exp_improve* and *Exp_worse*) remains to be heterogeneous across countries even in the case of Model C, where all controls are included. That is, there are countries in which the random effect is significantly different from zero (which is the average effect in the whole sample). This is not the case for *Exp_unknown*. The number and the specific countries that vary from the average level also differ by gender.

We can also assess the relative importance of macro-economic variables with respect to individual/household variables. We find that there are macro-variables that are positively associated with SAH levels, such as *GDP_pc*, *S80s20*, *Act_rate*, *Rule_law*, and *PrivCredi_flow*, while others like *HICP_change*, *Corrup*, *House_price_change*, and *Household Debt* are negatively related to individual well-being in terms of SAH. Overall, the magnitude of these effects, either positive or negative, are larger than the ones exerted by past, current, and future financial conditioners.

It is important to notice that the influence of macroeconomic conditions on self-assessed health is larger for females than for males. This result is in line with other papers in the literature. For instance, using data for 35 European countries for the period 2002–2014, extracted from the European Social Survey, Malisauskaite et al. (2022) found that women were overall more sensitive to GDP trends than men in respect to subjective bad health.

We compare the VPC before (Model A) and after including individual-household characteristics (Model B) and country characteristics (Model C), see Table 3. For males (females), the inclusion of individual-household characteristics reduces the VPC by 4.4 (3.3) percentage points. When country characteristics are included (Model C), the decrease in VPC is sharper: 5.5 (8.5) percentage points for males (females). These findings suggest that country characteristics explain a larger part of the unknown variability of individual levels of SAH than individual-household characteristics, with their impact being more relevant for females.

Finally, we have estimated a model in which we add the interactions of any country characteristic with the three variables measuring financial expectations. Estimation results are reported in Table 5.

Once we include interactions between our variables capturing past, current and future financial difficulties and cross-country macroeconomic conditions, we observe that for males only the expectation to improve remains positive (see marginal effect of variable *Exp_improve* in Model C, Table 2) and significantly different from zero. Moreover, in countries with higher shadow economy, higher government effectiveness and higher household debt this positive effect from expectations to improve decreases. Additionally, in countries with higher government effectiveness and lower rule of law the expectations to worsen induce a decrease in SAH (Table 5).

In the case of females, expectations to improve and unknown expectations are positively significantly different from zero. However, these two effects are lower in countries with higher GDP per capita and higher shadow economy in the

Table 5
Estimation results (Interaction effects, Model C).

	Males				Females			
		Improve ^(a)	Worsen	Unknown		Improve ^(a)	Worsen	Unknown
<i>Gdp_pc</i>	0.126*** [0.023]	−0.017 [0.013]	−0.004 [0.010]	−0.004 [0.018]	0.176*** [0.027]	−0.026* [0.013]	−0.027 [0.017]	−0.005 [0.011]
<i>S80_S20</i>	0.062** [0.021]	0.001 [0.012]	0.008 [0.008]	−0.008 [0.014]	0.065** [0.025]	−0.021+ [0.012]	−0.014 [0.014]	−0.012 [0.009]
<i>Act_rate</i>	0.031* [0.014]	−0.005 [0.009]	0.007 [0.006]	0.007 [0.011]	0.066*** [0.017]	−0.008 [0.009]	−0.017 [0.011]	−0.008 [0.007]
<i>HICP_change</i>	−0.061*** [0.010]	0.003 [0.007]	−0.006 [0.004]	−0.005 [0.008]	−0.084*** [0.012]	0.009 [0.006]	0.020* [0.008]	0.009+ [0.005]
<i>Social_Protection</i>	−0.848+ [0.438]	−0.007 [0.228]	0.019 [0.171]	−0.132 [0.493]	−0.889+ [0.518]	0.085 [0.224]	−0.17 [0.485]	0.206 [0.187]
<i>Shadow</i>	−0.004 [0.004]	−0.006** [0.002]	−0.003+ [0.002]	0.000 [0.004]	−0.004 [0.005]	−0.007** [0.002]	−0.008* [0.004]	0.001 [0.002]
<i>Gov_effectiveness</i>	0.285* [0.113]	−0.120* [0.060]	−0.101* [0.048]	−0.186+ [0.101]	0.296* [0.134]	−0.069 [0.059]	−0.196* [0.099]	−0.034 [0.051]
<i>Rule_law</i>	0.265** [0.092]	0.023 [0.060]	0.103** [0.038]	0.156+ [0.091]	0.563*** [0.109]	−0.033 [0.059]	−0.059 [0.090]	−0.082* [0.041]
<i>Corruption</i>	−0.398*** [0.100]	0.057 [0.058]	−0.026 [0.038]	−0.013 [0.071]	−0.636*** [0.118]	−0.021 [0.057]	0.168* [0.070]	0.038 [0.041]
<i>House_price_change</i>	−0.955*** [0.253]	0.061 [0.163]	−0.202+ [0.116]	−0.17 [0.235]	−1.566*** [0.297]	0.072 [0.160]	0.138 [0.232]	0.172 [0.123]
<i>Household_debt</i>	−0.327** [0.127]	−0.160* [0.069]	−0.098+ [0.050]	−0.159 [0.116]	−0.579*** [0.150]	0.101 [0.068]	0.013 [0.114]	0.173** [0.054]
<i>PrivCredit_flow</i>	2.005*** [0.333]	0.200 [0.189]	−0.036 [0.129]	−0.034 [0.279]	2.674*** [0.393]	−0.075 [0.186]	−0.394 [0.275]	−0.443** [0.141]
<i>No. Observations</i>	99519				99519			

^(a) This parameters reflect the interaction of expectations to improve with any of the country characteristics. Second column named “Worsen” reflects the interactions with expectations to worsen and finally the column named “unknown” reflects interactions with unknown expectations.

case of expectations to improve. Countries with lower rule of law, higher household debt and higher private credit flow the effect of unknown expectations increase for females. Finally, in countries with higher HIPC change, low rule of law and low government effectiveness the effect of expectations to worsen is negative.

6. Conclusions and discussion

This paper is intended to appraise the well-being costs of perceived financial insecurity caused by the threat of an EU recession starting in 2008, once accounting for past and current financial determinants. Our results show that perceptions regarding future financial events exert an effect on individuals' levels of current self-assessed health beyond the effects of past and current financial events. Moreover, we show that country characteristics explain a larger part of the unknown variability of individual levels of well-being than individual-household characteristics.

Governments have long been concerned with the well-being of citizens and much policy effort has been, and continue to be, directed towards improving well-being (Allin, 2014). Our findings may be of help for practitioners and policymakers for the design of policies intended to this aim by alleviating the individual welfare costs derived from financial insecurity produced by upcoming business cycle downturns, like the recent COVID-19-triggered economic slowdown. The unprecedented economic impact of COVID-19 has made the global economy to be headed for an economic nosedive that could rival, and even exceed, the past 2008 economic recession. Some recent studies have already confirmed that job insecurity and the greater financial concerns due to COVID-19 were directly associated with worse mental health (Wilson et al., 2020). Also, the current global economic crisis due to Russian-Ukraine war has reminded us of the constant risks faced by today's society that jeopardize its development and economic growth.

Insofar as basic psychological needs for autonomy, competence, and relatedness have been proved to act as important mechanisms driving the link between financial insecurity and well-being (Weinstein and Stone, 2018), potential interventions should be intended to bolster such needs. In this respect, two complementary routes might be followed in developing interventions. First, measures aimed at improving financial literacy at early stages, with special focus to debt literacy, or policy initiatives to fund financial counselling agencies that support household affected by financial problems to reschedule debt payments could serve to prevent the negative health consequences of financial insecurity. The literature has provided evidence that better financial literacy skills could contribute to improved individuals' financial decision making, which have positive effects not only on households but also on the overall economic and financial stability (OECD, 2009). For instance, it has been showed that individuals with low levels of financial literacy borrow at higher interest rates (Stango and Zinman, 2009), are less likely to have savings (Smith et al., 2010), and are more likely to default on mortgage payments (Gerardi et al., 2013). Thus, important efforts should be devoted to improving financial skills from early stages. Second, measures intended to recognize and promote coping strategies that may act as moderators in the relationship

between perceived financial insecurity and health, and serve to mitigate distress symptoms derived from financial strain. Coping strategies have been classified either into problem-solving (efforts to do something active to alleviate stressful circumstances) versus emotion-focused (efforts to regulate the emotional consequences of stressful or potentially stressful events), or active versus avoidant (Lazarus and Folkman, 1984; Lazarus, 1999). Identifying and promoting those strategies that are the most effective in buffering the harmful effects of financial insecurity should be of key relevance to improve individual's welfare and reduce inequality levels among individuals with heterogeneous financial conditions.

Our results also provide interesting insights as regards gender differences. First, in line with previous research we find that the socioeconomic gradient in health found among males is mainly driven by income, while females' health is more affected by material deprivation. Second, we find that past financial strain scars current health status, being this effect more pronounced among males. Finally, for males the detrimental health effect associated to expectations of financial worsening and lack of knowledge about future financial situation is larger than the ones caused by, either, past of current financial burden. For females, in contrast, current financial situation seems to exert the major impact on SAH.

All in all, policymakers, employers, financial institutions, social sector leaders, and the society as a whole are committed to working together to build sustainable solutions that enable people to manage the multifaceted economic dangers that are present in today's societies. Investing in truly universal public services, with new forms of social protection with agile programmes that adequately cover the necessities of the most vulnerable groups in response to systematic shocks is a crucial priority for a fairer, less precarious future. In this attempt, it is important to take into account the heterogeneous contexts faced by the different countries, not only as regards macroeconomic conditions but also the magnitude of the scourge of the pandemic.

An important limitation of this study should be noted. As we already mentioned, the cross-sectional structure of our dataset does not allow us to account properly for health-state dependence and initial health conditions. Thus, the patterns outlined in the present paper deserve further scrutiny as new data become available. In particular, efforts should be devoted to gather and monitor longitudinal data that contain detailed information on individual's financial situation and well-being, in order to examine the linkages between both variables from a dynamic perspective.

CRedit authorship contribution statement

Maite Blázquez: Conception and design of study, Material preparation, Data collection and analysis, Writing – original draft. **Ana I. Moro-Egido:** Conception and design of study, Material preparation, Data collection and analysis, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

All authors read and approved the final manuscript.

Funding

Financial support from R&D&r Programs of the Spanish Government through the project PID2019111765GB-I00 and of the Andalucía Government through the project PY18-4115 are gratefully acknowledged. Ana I. Moro also acknowledges support from R&D&r programmes of the Regional Government of Andalusia through project B-SEJ-10-UGR20.

Ethical standards

Research does not involve neither human participants nor animals, therefore there is no need for Informed Consent

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.eap.2023.09.038>.

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