



The Impact of Financial Constraints on Quality of Life and Mental Health in the Elderly: Evidence from Spain

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Abstract

This study analyzes the association between financial difficulties and quality of life and depression in Spain. We apply extended probit models in order to control for potential endogeneity, in a sample of 1,759 people over 65 years of age. The results show that facing financial difficulties is significantly related to a lower quality of life and a higher probability of depression, particularly for women. Negative expectations about future finances are inversely and significantly related to the individual's quality of life. These findings suggest that financial advisory and public intervention programs focused on the elderly with financial constraints are necessary to mitigate this negative impact.

Keywords: Quality of Life, Mental Health, Financial Constraints, Ageing Population.

JEL Classification: I0, I3.

1. Background

Increased life expectancy and low fertility rates are driving the process of population ageing in most Western countries, with substantial implications for the sustainability of health and long-term care systems. Currently, people are living for longer, and the proportion of the world population over 60 is expected almost to double between 2015 and 2050, rising from 12% to 22% (World Health Organization, WHO, 2022).

Spain is a country particularly affected by the ageing of the population. Between 1975 and 2021, the average age increased by more than ten years. Life expectancy at birth was

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80.2 years for men and 85.8 years for women in 2021 (Instituto Nacional de Estadística, INE, 2022a). Regarding the ‘ageing of ageing’ phenomenon, people over 80 years of age represented 6.1% of the total population in 2020 (INE, 2022b). In 2050, people over 65 years of age are expected to represent 30% of the total population, and the number of people aged 80 or over will double (INE, 2022c). According to the United Nations, Spain will be the most aged country in the world in 2050 (only behind Japan), where 41% of the total population is expected to comprise people over 60 years of age (United Nations, 2017).

The elderly is the population group with the worst economic situation compared to any other age group in Spain. The condition of being a woman over 75 years old increases the risk of suffering severe poverty (Ortiz, 2010). The average income for the Spanish population was around €38,900 at the end of 2020 (Banco de España, 2022a). The average income of Spaniards between 65 and 74 years of age was €36,200, while for those over 75 years of age, average income fell to €31,100. For this year, regarding the financial burden on the elderly, 8.3% of households of people between 65 and 74 years of age, and 12.8% of those over 75 years of age, allocated more than the 40% of their gross income to debt repayment. Moreover, 7.7% of indebted households with elderly people of between 65 and 74 years of age, and 8.4% of households with people over 75 years of age, had a debt that exceeded their gross annual income by more than three times (Banco de España, 2022a).

According to the 2020 Living Conditions Survey (INE, 2022d), 11.4% of individuals over 65 reported material deprivation in 2020 (9.5% in 2018) and 3.2% experienced severe material deprivation (3.3% in 2018). Regarding unexpected expenses (a surgical operation, purchase of a household appliance, paying the costs of a funeral, among others), 33.5% of respondents over 65 years of age declared that they would be unable to afford such expenses.

The financial difficulties of the elderly become particularly relevant in situations of high inflation. According to a recent Bank of Spain report, for those families in which the reference person is over 65 years old, the inflation rate is one percentage point higher than for other families. Households headed by an elderly person recorded an inflation rate of 5.74% between April 2021 and March 2022, while the inflation rate for those households headed by individuals under 65 was 4.66%. This gap may be mainly due to households within this age group have a lower level of income (Banco de España, 2022b).

1.1. Theoretical framework

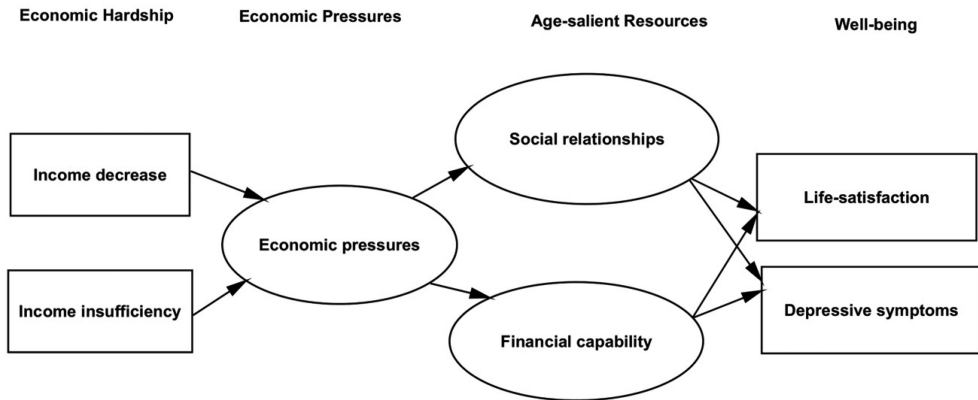
In order to identify the key mechanisms through which the individual’s economic situation leads to poor health, theoretical frameworks such as the *stress process* (Pearlin, 1981), *materialism* (Inglehart, 1981) or the *economic stress model* (Ranta *et al.*, 2019) can be relevant and useful.

While the experience of financial hardship can be considered a possible source of stress, there are other aspects that contribute even more to the stress levels of the elderly person, such as acute medical symptoms or a sudden relocation, among others. In the context of the

Stress Process Theory, it could be said that life events –such as retirement in the case of the elderly– that involve changes in the individual’s economic situation, affect both the individual and society, and ultimately contribute to or exacerbate any pre-existing sources of stress (Pearlin, 1981). Furthermore, following the *Theory of Materialism*, it can also be argued that older people may exhibit greater materialism than other population groups, derived from having lived through insecure times such as the Great Depression (Inglehart, 1981).

Although it focuses primarily on conceptualizing age-salient social relationships and financial capability as mediators between economic hardship and well-being, the *Economic Stress Model* proposed by Ranta *et al.* (2019) (see Figure 1) can also be applicable to the elderly. This model is based on how experiencing economic hardship, both a decreased income and income insufficiency, generates economic pressures that affect social relationships and financial capability, ultimately influencing the individual’s well-being in life-satisfaction and depressive symptoms. In this sense, in the mechanisms involved, from the presence of economic difficulties to its impacts on the well-being of the individual, both financial capacity and social relations mediate, as will be shown in the following section.

Figure 1
ECONOMIC STRESS MODEL



Source: Ranta *et al.* (2019).

1.2. Previous evidence

There is extensive empirical evidence of the relationship between financial situation, health status, and quality of life (Adler *et al.*, 1994). Experiencing a poor financial situation throughout life is a factor underlying the health inequalities experienced among older people. These health problems may include the individual’s functional and cognitive decline, the development of depressive symptoms (Kahn and Pearlin, 2006; Lynch *et al.*, 1997), poorer health status, increased stress, and a higher prevalence of risky behaviors (Bisgaier and Rhodes, 2011). Income level and wealth are established as risk factors for cardiovascular diseases (Lemstra *et al.*, 2015), respiratory diseases (Sahni *et al.*, 2017), or decreased physical and

functional capacity (House *et al.*, 1990). Variations in financial situation also lead to an increased risk of premature mortality (Lee and Huang, 2015).

Personal finances can also be a relevant factor determining an individual's mental health. According to a recent report (Keeter, 2021), personal health and financial security are associated with psychological stress. These conclusions are supported by different studies that have analyzed the consequences of experiencing financial difficulties (Kahn and Pearlin, 2006; Kiely *et al.*, 2015; Ryu and Fan, 2022). Experience of financial constraints affects the psychological well-being of the elderly, increasing the risk of suicide and the risk of premature death (Choi *et al.*, 2021; Elbogen *et al.*, 2020; Fiksenbaum *et al.*, 2017; Rasul *et al.*, 2004; Tucker-Seeley *et al.*, 2009).

Financial constraints are one of the most important stress factors during adult life and one of the most influential factors in terms of mental health problems (Butterworth *et al.*, 2009, 2012; Kahn and Pearlin, 2006). Different studies have found a direct relationship between financial constraints and depression (Liu *et al.*, 2021; Lorant *et al.*, 2007). In addition to being a factor in the onset of mental problems, it may play a relevant role in the maintenance of depressive symptoms.

The elderly seem to be more vulnerable to the development of depressive symptoms. It has been shown that such symptoms increase after middle age, accelerating in old age (Aichele *et al.*, 2019; Mirowsky and Ross, 1992). This makes the elderly a particularly vulnerable population group in situations of economic stress. Depression is one of the most common neuropsychiatric disorders among the elderly. In Spain, it is suffered by one in four people over 65 years of age (Araújo *et al.*, 2021), a figure much higher than that for the general population (5.25%) (INE, 2021a). Therefore, depression, and mental health in general, is a problem that especially affects the elderly (Aichele *et al.*, 2019).

Financial constraints have been shown to limit the performance of activities that favor recovery from a mental health problem, thus having a reinforcing effect on depressive situations (Butterworth *et al.*, 2009). However, the effects can go further, increasing the probability of engaging in risky behaviors such as use of tobacco, alcohol, and illegal drugs (Barbaglia *et al.*, 2012; Bisgaier and Rhodes 2011; Kessler *et al.*, 2008).

Financial restrictions also impact on the different dimensions that are collected in the indicator of Quality of Life. Experience of economic hardship is related to a worse perceived quality of life among the elderly (Cobo *et al.*, 2021; Fernández-Ballesteros *et al.*, 1997; Portellano-Ortiz *et al.*, 2018; Wiggins *et al.*, 2004). The Spanish Multidimensional Quality of Life Indicator scores worsened for the elderly in Spain in 2020 (INE, 2021b). Compared with other population groups, there are specific factors that determine quality of life in the elderly. Firstly, a reduction in income is expected after leaving the labor market. Secondly, social relationships are often reduced and the elderly are more likely to suffer from loneliness. Loneliness increases vulnerability to situations of poverty (Sandström and Smeeding, 2005). Around 10% of the elderly live in a situation of involuntary loneliness, and this situation worsens with age (Alemany and Ayuso, 2021). Thirdly, both the state of health and

the physical and cognitive capacity of individuals become more relevant at this stage of life since, above a certain threshold, there is a direct relationship between age and physical and mental deterioration (Martínez *et al.*, 2021).

1.3. Aim of the study and contribution to the literature

The aim of this paper is to analyze the effects of financial difficulties on the quality of life and the mental health of the elderly in Spain. This research contributes to the previous literature from several perspectives. Firstly, most of the studies on the subject focus on the adult population, with the elderly being excluded from the analysis. The studies that only consider the older population are scarce at international level. Moreover, this becomes especially relevant for Spain, as no previous evidence analysing this relationship is available. Spain is a country particularly affected by ageing and the economic vulnerability of the elderly (Ortiz, 2010) and has been also hard hit by the economic crisis, in comparison with other European countries (Eurostat, 2013). In this regard, we consider it relevant to include financial difficulties as one of the variables of interest, since it has been shown that it better captures the economic condition of the individual (Heflin and Iceland, 2009).

Another differentiating aspect of the present study is that it incorporates the expectations that individuals have about their future finances. From the studies reviewed that analyze this topic, they do so on the basis of current financial difficulties, or at most, financial difficulties experienced in the past. To date, no one has evaluated how future financial expectations may impact on the present quality of life and the development of depressive symptoms. Additionally, to the best of our knowledge, this is the first European study that analyze the association between financial difficulties and expectations with quality of life and depression in the elderly population. The proposed hypotheses are the following: 1) the existence of financial difficulties will determine a poorer quality of life and increase the probability of depression among the elderly; and 2) people's perception of their future finances will determine their quality of life and the occurrence of mental health disorders such as depression.

The paper is structured as follows. Section 2 presents the empirical model of the study. The Survey of Health, Ageing and Retirement in Europe (SHARE), the variables included, and the econometric procedure implemented for the estimations are also described in detail in this section. Section 3 presents the results obtained in the analysis and section 4 discusses these results, while the last section outlines the main conclusions and some policy implications.

2. Data and Methods

2.1. Data

This study was carried out using data from the SHARE for the Spanish population (Börsch-Supan, 2022; Börsch-Supan *et al.*, 2013). The SHARE is designed with the aim of

providing information to analyze the causal relationships between economic, health, psychological, and social factors that determine the characteristics of ageing in Europe. It is a harmonized survey that can be compared with the English Longitudinal Study of Ageing (United Kingdom), the Irish Longitudinal Study of Ageing (Ireland), and the Health and Retirement Study (United States). Computer-assisted personal interviews were conducted with non-institutionalized individuals over 50 years of age from 27 European countries and Israel. The present paper used data from Wave 8 (individuals were surveyed between 2019 and 2020). Only Wave 8 is considered since it is the first wave to incorporate data on the individual's financial expectations, one of the variables of interest in this study.

The complete sample includes 2,129 persons over 50 years of age. This sample was restricted to individuals who at the time of the interview were 65 years of age or older (legal retirement age in Spain) in this study. This restriction was established in order to eliminate the potential influence of labor incomes by including in the analysis only those individuals who were no longer participating in the labor market. In addition, this age is also justified in order to compare the results with the published literature that uses population samples restricted to those over 65 years of age (Huang *et al.*, 2020; Kahn and Pearlin, 2006). The final sample size was 1,759 individuals, 772 men and 987 women over 65 years of age, non-institutionalized and living in Spain.

Dependent variables

As dependent variables in this study, two indicators that reflect the quality of life and the possibility of experiencing depression in the elderly were chosen in the SHARE: CASP-12 and EURO-D.

Quality of life: the CASP-12 indicator

The SHARE includes the scores obtained in the interviews from the CASP-12 instrument, designed specifically to assess the quality of life of the elderly. This instrument is a shortened and revised version of the CASP-19 quality of life indicator (Hyde *et al.*, 2003). The instrument is composed of four dimensions: control, autonomy, self-fulfillment, and well-being. The 12 items that make up this indicator are presented in the form of questions or statements to the interviewee. These items are evaluated on a four-level Likert scale: "often", "sometimes", "rarely", and "never". The scale score is the result of the sum of these twelve items; it ranges from a minimum score of 12 points (lower quality of life) to a maximum of 48 points (higher quality of life). The psychometric and consistency properties of the instrument have been confirmed and validated by Pérez-Rojo *et al.* (2018) for the Spanish elderly population.

As a threshold for determining high or low quality of life in the instrument scores, Hyde *et al.* (2003) proposal is considered. High or very high quality of life will be established on the basis of scores equal to or greater than 37 points. A dichotomous variable is generated, taking the value of 1 if the CASP-12 score is greater than or equal to 37, and the value of 0 for lower scores.

Mental health and depression: EURO-D indicator

As a mental health outcome variable, the scores obtained in the survey with the EURO-D instrument are used in the analysis. The EURO-D scale was developed to establish a common scale of depressive symptoms in old age. The EURO-D consists of 12 items that capture different aspects of the mental health status of the elderly: depression, pessimism, suicidal tendencies, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment, and sadness (Prince *et al.*, 1999). The score ranges from 0 to 12, 0 being a non-depressive state, and 12 being a very depressive state. A score of 4 or more points is considered a case of depression (Prince *et al.*, 1999). The survey itself gives a value of 1 to this indicator when the score is equal to or higher than 4, and 0 when it is lower than 4. The psychometric properties of this indicator have been extensively investigated and its cross-cultural validity has been guaranteed in European, Indian, and Latin American populations (Castro-Costa *et al.*, 2007; Prince *et al.*, 1999).

Independent variables

Current financial difficulties and expectations for future finances. Indicators of financial constraints assess whether or not people are excluded from minimum living standards due to insufficient financial resources. Previous literature has recommended this type of measure instead of poverty measures based on current income because it reflects the consequences of insufficient resources without the need to specify a certain level of income (Heflin and Iceland, 2009). Different studies have analyzed these indicators, finding that alongside a positive and significant association between economic hardship and common mental disorders, conventional measures of socioeconomic status had a weaker association between these variables (Jenkins *et al.*, 2008; Lahelma *et al.*, 2006).

Following studies such as Kiely *et al.* (2015) or Liu *et al.* (2021), an individual presents a situation of financial difficulties when he/she has been unable to afford a certain expense during the last 12 months because of sufficient economic resources. In this study, a dichotomous variable was created, taking the value of 1 if the interviewee answered positively to at least one of the following three situations: 1) being cold and not turning on the heating in order to reduce expenses; 2) having renounced some type of health benefit because of the cost it would have entailed; and 3) being unable to afford an unexpected expense of €700 without borrowing money.

In order to further explore the effects of financial difficulties on the health indicators, a second financial variable is included in the analyses. This variable captures the individual's perception or negative expectations about his or her finances in the future. Specifically, this variable reflects the individual's probability of running out of money at some point in the future. The survey included the following question: "What do you think are the chances that you will run out of money some time in the future?"

The models also include variables that the literature has identified as relevant to explain mental health and well-being among the elderly: 1) gender; 2) age; 3) marital status; 4) area

of residence; 5) level of education; 6) self-perceived health status; and 7) the individual's social relationships.

Gender. Previous literature has shown that gender appears to play a relevant part in the relationship between financial hardship, quality of life, and mental health problems. In comparison with men, women have a worse perception of quality of life and a higher risk of developing some form of relative mental illness (Kessler, 2003; Moreno *et al.*, 2019). In addition, they experience greater income inequalities than men, which implies a greater risk of suffering from health problems (Ross and Huber, 1985).

Age. Age is also related to individuals' well-being and mental health. Several studies have revealed that a person's quality of life increases once he or she reaches 50 years of age and peaks at 68 years of age. There is a drop in quality of life after this age (Netuveli *et al.*, 2006). Depressive symptoms increase from middle age onwards and peak at around 80 years of age, mostly due to the physical deterioration and loss of status associated with old age (Mirowsky and Ross, 1992). Controlling for sociodemographic and health variables, income determines quality of life and mental health to a greater extent in older people (Muramatsu, 2003; Villas-Boas *et al.*, 2019). Income tends to decrease in old age, and health-related expenses tend to increase at the same time. In some cases, this could suggest unmet needs (Litwin and Sapir, 2009).

Marital status. The individual's marital status can also affect his or her state of health and well-being. According to previous studies, being married has a wide range of benefits over being single, as the married have a lower risk of long-term diseases, better physical health, and a lower risk of mortality (Manzoli *et al.*, 2007; Murphy *et al.*, 1997). Recent studies have also shown that living as a couple reduces depressive symptoms and psychiatric problems, and improves people's emotional and psychological well-being (Kim and McKenry, 2002; Lamb *et al.*, 2003; Spiker, 2014). In addition, married people are less predisposed to risky behaviors such as use of alcohol, tobacco, or drugs (Duncan *et al.*, 2006; Salvatore *et al.*, 2020).

Area of residence. The environment constitutes a relevant variable in the health of the elderly population due to their lower mobility and the availability of basic health care services. Several studies have determined that living in a rural area decreases the probability of developing depressive symptoms among the older population (Abe *et al.*, 2012; Sengupta and Benjamin, 2015; Walters *et al.*, 2004). However, regarding its influence on the quality of life of the elderly, the results are mixed and inconclusive (Dos Santos-Tavares *et al.*, 2014; Mudey *et al.*, 2011; Sabbah *et al.*, 2003; Zhou *et al.*, 2011).

Level of education. The moderating role of educational level on health status and well-being has also been supported in the literature. A higher level of education is associated with better quality of life in adulthood and old age (Edgerton *et al.*, 2012). On the other hand, educational level affects mental health. Achieving a low level of education positively influences the development of mental health problems, increasing the probability of suffering from depressive symptoms (Chang-Quan *et al.*, 2010; Niemeyer *et al.*, 2019).

Health. Different studies have shown the role of self-perceived health indicators as good predictors of individuals' physical, objective, and subjective health (Steptoe *et al.*, 2015). Following Kunst *et al.* (1995) and Wagstaff *et al.* (1989), the self-perceived health variable is included in the models with a value of 1 if the individual reports a "good, very good, or excellent" health status, and 0 when he/she reports a "fair, poor, or very poor" health status.

Both self-perceived health and education are expected to present a positive and significant relationship with quality of life (Fernández-Ballesteros and Maciá, 1993; Oliver *et al.*, 2021; Portellano-Ortiz *et al.*, 2018), and a negative and significant relationship with the depression variable (Handing *et al.*, 2022; Khalaila, 2016).

Social relationships. Social contacts play a determining role in the development of depressive symptoms and in maintaining a good quality of life in old age. Living in a state of social isolation (low number of contacts) or unwanted loneliness (negative subjective perception of social contacts) is associated with a lower quality of life and a higher probability of developing mental illnesses such as depression (Beridze *et al.*, 2020; Wang *et al.*, 2020).

In this analysis, social relationships are measured through the loneliness experienced by the individual. Loneliness was collected through the variable generated by the SHARE based on the Three Item Loneliness Scale (TIL). An individual is classified as lonely or living in a state of loneliness if the indicator score is equal to or greater than 6; scores below that cut-off point are understood as not lonely (Steptoe *et al.*, 2013). Del Sequeros *et al.* (2022) and Trucharte *et al.* (2021) have recently confirmed that the TIL scale has good psychometric properties for the measurement of unwanted loneliness in the Spanish population.

Different studies have obtained robust evidence of the existence of a negative relationship between loneliness and quality of life (Ekwall *et al.*, 2005; Neri *et al.*, 2018) and a positive relationship between loneliness and depression (Handing *et al.*, 2022).

Table 1 shows the descriptive statistics of the sample. The quality of life indicator presents a mean score of 37.17 points. Following the cut-off score (37 points) proposed by Hyde *et al.* (2003), more than half of the sample presents a good quality of life (56.67%). Regarding the EURO-D indicator, the mean score (2.76) is lower than the cut-off point established for a situation of depression (4 points).

Of the 1,759 individuals in the sample (56% women), almost 35% reported being in a situation of unwanted loneliness, while 52% reported being in good health. As for pessimistic expectations about their future finances, around 21% of respondents reported the possibility of running out of money at some point in the future. In terms of financial difficulties, 7.17% of the sample reported being cold because they did not turn on the heating in order to reduce expenses; 3% were unable to pay for oral health benefits; and 27% reported not being able to afford an unexpected expense of €700 without borrowing money.

Table 1
VARIABLES AND DESCRIPTIVE STATISTICS OF THE SAMPLE

Variable	Categories	Observ.	Mean (or %)	Std. Dev.	Min.	Max.
<i>Quality of life</i>		1,551	37.17	6.50	14	48
	1 = good quality of life (≥ 37)	879	(56.67)			
	0 = bad quality of life (< 37)	672	(43.32)			
<i>Mental health</i>		1,605	2.76	2.58	0	12
	1 = depression (≥ 4)	501	(31.21)			
	0 = no depression (< 4)	1,104	(68.78)			
<i>Gender</i>		1,759				
	1 = woman	987	(56.11)			
	0 = man	772	(43.89)			
<i>Age</i>	Age	1,759	77.33	8.3	65	101
<i>Marital status</i>		1,690				
	1 = married/registered partnership	1,128	(66.75)			
	0 = separated/never married/divorced/ widowed	562	(33.25)			
<i>Education</i>	Number of years of education	1,555	8.15	4.99	0	25
<i>Area of residence</i>		1,586				
	City 1 = big city and large city	679	(42.81)			
	Small Town 1 = small town	552	(34.80)			
	Rural Area 0 = rural area or village	355	(22.39)			
<i>Loneliness</i>		1,633	3.79	1.34	3	9
	1 = lonely (≥ 6)	567	(34.72)			
	0 = no lonely (< 6)	1,066	(65.28)			
<i>Self-perceived health</i>		1,746				
	1 = excellent, very good, or good	913	(52.29)			
	0 = regular, bad or very bad	833	(47.71)			
<i>Expectations</i>	Probability of becoming out of money at a time in the future	1,426	19.77	25.58	0	100
<i>Financial constraints</i>		1,744				
	1 = presence of financial constraints: being cold and not turning on the heating in order to reduce expenses; or/and having renounced some type of health benefit because of the cost it would have entailed; or/and not being able to afford an unexpected expense of €700 without borrowing money	364	(20.87)			
	0 = no presence of financial constraints	1,380	(79.13)			

Source: Author elaboration.

2.2. Methods

Baseline regression model

In order to analyze the relationship between the effect of finances on quality of life and depression in the elderly, as both dependent variables are discrete and binary, probit regression models have been developed.

The basic regression model has the following functional form:

$$y_i^* = \alpha_0 + \alpha_1 x_i + \alpha_2 s_i + \varepsilon_i \quad (1)$$

$$y_i = \begin{cases} 1, & y_i^* > 0 \\ 0, & y_i^* \leq 0 \end{cases} \quad (2)$$

where y_i^* is an unobservable or latent variable, representing the values of quality of life or the state of depression of the individual i ; α is the vector of parameters to be estimated that accompanies the vector of explanatory variables (x_i) and control variables (s_i) listed in Table 1; and ε_i represents the random disturbance term. Two models are estimated, one for each dependent variable (quality of life and mental health), with the same explanatory variables in both.

Addressing potential endogeneity

The impact of two potentially endogenous covariates (*self-perceived health* and *loneliness*) could lead to endogenous problems in the analysis, in the form of inconsistent estimated coefficients. It is also possible for reverse causality to do so. In order to consider this issue and to improve causal inference, we turned to the instrument variable approach, which is widely used to deal with endogeneity problems. Instead of performing a Two-stage model, we have chosen to use the Extended Probit model (*eprobit*) in the Extended Regression Model framework. This model is preferable and superior to a standard Two-stage model because it includes instrumental variable estimates with binary dependent variables, endogenous covariates and interactions (StataCorp, 2019). The biggest advantage of this model is that it can deal with the endogeneity of explanatory variables or control variables, the non-random distribution of variables and the endogenous sample selection problem (for a detailed introduction to the model, see the manual of the regression tool *eprobit* used in *Stata*).

The instrumental variables (IV) have to be correlated with the endogenous covariates, but are not directly related to the outcome variable. Nor are they correlated with the random disturbance term (Gujarati, 1995). Self-perceived health is one of the variables for which an auxiliary instrumental equation has been estimated. Instruments are related to individuals' vigorous activities (frequency of doing sports, heavy housework, or a job that involves physical labour), Z_1 , and the number of doctor visits within the past year, Z_2 . The selection of these IV bases on the study of Dostálová *et al.* (2021) and Chandola and Jenkinson, (2000) in the information regarding Z_1 and Z_2 are related to self-perceived health and treated as exogenous. They demonstrate that Z_1 and Z_2 can influence the individual when it comes to perceiving their health as good.

For the loneliness variable, instruments are related to individuals' extroversion (Z_3) and a proxy of the contacts he/she has, measured by information on whether the respondent has personally given help to a family member from outside the household, friend or neighbour (Z_4). Help in this context incorporates personal care (e.g. help with dressing, bathing, eating, getting out of bed, using the toilet), practical household help and help with paper work, such as settling financial or legal matters. To instrument the variable of loneliness, Z_3 and Z_4 were selected as they maintain influence on this endogenous variable and were treated as exogenous, as demonstrated by Rosenberg *et al.* (2023) and Wieczorek *et al.* (2021).

The estimated coefficients of probit and eprobit provided only the direction of the effect of explanatory variables on the dependent variable, not their magnitude. Thus, for a further interpretation of the results, we used marginal effects. All analyses are performed using Stata programming software, version 17.0 (StataCorp, 2021).

Treatment of missing values

Since there may be respondents who have not answered all of the questions, the program has discarded those observations, since they are not complete. The action taken by the program has been respected since, as values on crucial variables are missing, the best option is to remove them rather than to impute them by replacing means, medians or another regression. If there were missing values on variables that are not relevant from the point of view of the analysis, such as sociodemographic variables (i.e. education), and this would result in the loss of observations, we could choose the imputation option without any problem. However, when it comes to the variables relevant to the study, it is best to work with the complete remaining observations, which, in the last regressions, are considerable (Colin and Pravin, 2022).

3. Results

Quality of life

Table 2 presents the results of the *probit* and *eprobit* models for quality of life and depression. Results are expressed in marginal effects so that they are easier to interpret. These results show, both for *probit* and *eprobit* models, a negative and significant association of financial constraints with quality of life. Interpreting this coefficient in the eprobit (model with corrected endogeneity), when averaged across individuals, the probability of having good quality of life is 10.8% lower for someone with financial constraints. Regarding pessimistic financial expectations, a negative and significant association is also found in probit and eprobit models. This means that the probability of reporting better levels of quality of life decreases among individuals who state a negative perception of their future finances. In particular, a 1% increase in the probability that the individual believes he/she may run out of money in the future (a one-unit change in variable expectations), is associated with a 0.26% decrease in the probability of having good quality of life.

A situation of unwanted loneliness also has a negative and significant influence on the quality of life among the elderly. The probability of having good quality of life is 42.3% lower for someone who feels lonely. Being a woman also has a negative and significant impact on the probability of having a high quality of life, with a decrease of 9.35% in this probability compared to men. Age is also relevant when it comes to perceiving a high quality of life, since the probability of having good quality of life decreases 0.76% for each year of life added. Living in a small town also has a significant and negative impact on the probability of having good quality of life, since it decreases 7.31% with respect to living in rural areas.

In contrast, a self-perceived good state of health and a higher educational level increases the probability of reporting higher levels of quality of life by 30.7% and 0.59% respectively.

Table 2
RESULTS OF PROBIT AND EPROBIT MODELS WITH MARGINAL EFFECTS (AMEs)

Variables	probit		eprobit	
	CASP-12 dy/dx (DMSE)	EUROD dy/dx (DMSE)	CASP-12 dy/dx (DMSE)	EUROD dy/dx (DMSE)
Financial constraints	-.1210104*** (.0333709)	.0479044* (.0289679)	-.1088898*** (.0346282)	.0455513* (.0292756)
Woman	-.0713632*** (.0257287)	.1446026*** (.0228773)	-.0935144*** (.0268081)	.159291*** (.0235345)
Age	-.0085493*** (.0016979)	.0042528*** (.0016154)	-.0076886*** (.001806)	.0036603** (.00171)
Married	-.0166793 (.0304041)	.025853 (.0273045)	-.0241276 (.0314416)	.0345852 (.0278858)
Education	.0048941* (.0027321)	-.006782*** (.0025059)	.005978** (.0028296)	-.0085434*** (.0025761)
Big city	-.0368966 (.0318738)	.0489567* (.0296241)	-.0489451 (.0333449)	.0623724** (.0309505)
Small town	-.0547768 (.0341277)	.0578255* (.0314233)	-.0731855** (.0353026)	.0725205** (.0325288)
Loneliness	-.3038173*** (.0472329)	.2941626*** (.0380938)	-.4231077*** (.052647)	.3640851*** (.0524343)
Self-perceived health	.2274307*** (.023047)	-.2440337*** (.0203757)	.3075829*** (.0870112)	-.5457813*** (.084663)
Expectations	-.0022985*** (.0005033)	-.0000107 (.0004546)	-.0026572*** (.0005249)	.0000363 (.0004669)
N	1,158	1,187	1,157	1,186

Notes: DMSE=Delta-method standard error; * p<0.10; ** p<0.05; *** p<0.01. Marginal effects are referred as average marginal effects (AME).

Source: Author elaboration.

Depression

Considering mental health, a positive and significant relationship between experiencing financial difficulties and suffering from depression is obtained from the *probit* and *eprobit* models. Specifically, when averaged across individuals, the likelihood of being depressed is 4.5% higher for someone with financial difficulties. The variable reflecting negative expectations about future finances is not significant in these models.

A situation of unwanted loneliness is significant and positively related to depression. The probability of reporting depression is 36.4% higher for someone who feels lonely. Being a woman and being older also have a positive influence on developing depressive symptoms. In particular, meeting these conditions means an increase of 15.9% (compared to men) and 0.03% (for each year of life added) in the probability of suffering from depression. Regarding area of residence, and in contrast to the quality of life model, here both categories are statistically relevant. The probability of being depressed is 6.23% and 7.25% higher for someone living in a big city or small town, respectively, and compared to those living in rural areas.

On the other hand, a higher level of education and a good self-perceived health status significantly reduce the probability of being depressed by 0.85% and 54.5%, respectively.

Table 3
IV MODEL TEST RESULTS (eprobit)

Variables	CASP-12			EUROD		
	Coefficient	Robust std. error	P> z	Coefficient	Robust std. error	P> z
<i>Self-perceived health</i>						
Number of doctor visits	-.0102644	.0016133	0.000	-.0107205	.0014529	0.000
Active	.2519035	.0297968	0.000	.2438731	.0263893	0.000
Constant	.5416336	.0230923	0.000	.5529093	.0204121	0.000
<i>Loneliness</i>						
Extroversion	-.0016799	.001186	0.157	-.0030525	.0012706	0.016
Help	-.0043897	.0021176	0.038	-.0002194	.0020925	0.100
Constant	.1036193	.009406	0.000	.1049251	.00089063	0.000
corr (e.self-perceived health, e.casp)	-.1593254	.0327073	0.000			
corr (e.loneliness, e.casp)	.9989973	.0001935	0.000			
corr (e.self-perceived health, e.eurodcat)				.1863792	.0048417	0.000
corr (e.loneliness, e.eurodcat)				-.9985028	.0000266	0.000

Source: Author elaboration.

To address potential endogeneity, *eprobit* regressions were carried out. In Table 3, it can be seen that the instrument variables have a significant impact on the endogenous ones which also verifies that the instrument variables meet the correlation requirements. The correlation

test of residual items showed that the correlation between the regression of the main and auxiliary equations is significant, indicating that self-perceived health and loneliness are indeed endogenous variables. After endogenous treatment and based on marginal effects, we can also demonstrate some bias in the estimated coefficients between the *probit* and *eprobit* models because of endogeneity. As shown in Table 2, endogenous *probit* models (baseline models) overestimate the impact of financial distress on both dependent variables, as well as the effect of age. For the rest of the significant variables, the opposite occurs. The endogenous probit model underestimates the effects that these variables have on quality of life and depression.

4. Discussion

The influence of financial constraints on the quality of life and the presence of mental health problems among the elderly was confirmed by the results obtained in the models. This effect is also supported by previous empirical literature that evidenced the influence of an individual's financial situation on their mental health, increasing the risk of depression, psychological stress, and even suicidal tendencies (Choi *et al.*, 2021; Elbogen *et al.*, 2020; Fiksenbaum *et al.*, 2017; Ryu and Fan, 2022).

Our results are in line with the results obtained by Liu *et al.* (2021), who analyzed how financial hardship was related to depression. The authors used a logistic regression model for cross-sectional data of a sample of individuals ages 50-65 years (year 2020), concluding that there was a positive and significant relationship between the variables of interest during the pandemic (OR = 1.272; p-value < 0.001). Kahn and Pearlin (2006) obtained similar results for a sample of 1,167 Americans over 65 years of age who were beneficiaries of Medicare. Their regression models confirm that having experienced financial difficulties at some point in life is associated with depressive problems ($\beta = 0.042$; $0.001 < p\text{-value} \leq 0.01$). Moreover, current financial difficulties positively influence the development of depressive symptoms ($\beta = 0.085$; $0.001 < p\text{-value} \leq 0.01$).

To our knowledge, this is the first European study that explores the association between current financial difficulties and expectations related to quality of life and depression among the elderly population. Thus, previous literature in Europe that has analysed similar relationships found that material factors and, especially, current financial strain had a higher mediating function in the association between socioeconomic status and depression among older adults (50+) in Finland, Poland and Spain (Domènech-Abella *et al.*, 2018); childhood financial hardship can be a potential factor in late-life depression, in a sample of older adults (50+) in Spain (Domènech-Abella *et al.*, 2021); and the elderly (65+) from lower socioeconomic groups were more vulnerable to mental health problems, in Slovak and Dutch cities (Behanova *et al.*, 2017). These results are also in line with those obtained in this study, both in that the financial situation of the elderly is key when it comes to perceiving their quality of life and developing depressive symptoms.

Regarding sociodemographic variables, our study obtains results in line with the literature. In this sense, the probability of a lower quality of life and suffering depression is greater

with the age of the individual and in the case of women (Leung and Mui, 2021; Moreno *et al.*, 2019; Yang, 2007). Variables such as level of education, self-perceived health status, and place of residence have also been found to be determinants of quality of life and mental health among the elderly. People with lower levels of education are more likely to report a poorer quality of life and to suffer from depressive symptoms. A higher level of education is associated with higher income and lower future financial constraints, so the education variable may influence the development of mental health problems or the individual's quality of life (Mojtabai and Olfson, 2004). Several studies have also shown that place of residence is a factor that determines the development of depressive problems and the well-being of individuals (Moreno and Ximénez, 1996; St John *et al.*, 2009).

A further relevant result is the relationship between a situation of unwanted loneliness and the probability of reporting a poorer quality of life and a state of depression, similar to that obtained by previous research (Ekwall *et al.*, 2005; Handing *et al.*, 2022; Wang *et al.*, 2020). As well as being a key predictor of developing depressive symptoms and being a clear determinant of a good life, loneliness is linked to other types of serious condition. Loneliness in older people is associated with an increased risk of dementia, stroke, and heart disease, among others. In addition, it is linked to an increased risk of premature mortality and a lower level of quality of life (Courtin and Knapp, 2017; National Academies of Sciences, 2020; Ong *et al.*, 2016).

A number of limitations should be taken into consideration when interpreting and extrapolating the results obtained here to the elderly population as a whole and also, as recognition of the need for further research on the subject. Regarding the instrument for measuring the quality of life of the elderly (CASP-12), it should be pointed out that there are no widely accepted standardized scales for quality of life of the elderly. The most commonly used measures focus on assessing health variables that may suggest a negative perspective of ageing. However, the quality of life measure used in this study includes more dimensions than physical or mental health, which would reduce the impact of the individual's age on the score obtained from the instrument. In future work, it would be of interest to incorporate generic measures of quality of life into the models, such as the EQ-5D or the SF-6D, in order to evaluate the robustness of our results. The possibility that omitted variables may help to explain the effect of financial constraints is another limitation that should be considered. Further understanding of the factors that explain the quality of life and mental health of the elderly constitutes another interesting line for future research. Finally, since this paper uses cross-sectional data, it would be desirable to consider future waves of SHARE that already include data for other years on personal financial expectations, in order to perform a broader analysis using longitudinal models.

5. Conclusions

To the best of our knowledge, this is the first study to obtain empirical evidence of the impact of personal finances on the well-being and mental health of the elderly population

in Spain. To our knowledge, no one has analysed how future expectations about personal finances impact on quality of life and the likelihood of developing depressive symptoms. The results show that negative future expectations about personal finances is a relevant factor in explaining well-being and mental health status. Literature that explores the determinants of quality of life and mental health has focused mainly on biological aspects while economic determinants have scarcely been treated (Carter *et al.*, 2012; Walker, 2005). However, the financial situation of individuals and the impact on their well-being and health is particularly important in studies that focus their analysis on the elderly. The aim of this paper has been to fill this gap and to present new evidence for the elderly Spanish population.

In Spain, the elderly are the population group with the worst economic situation in comparison to any other age group, especially when the risk of poverty is considered (Ortiz, 2010). The evidence reported in our study highlights the importance of financial difficulties for the quality of life and mental health of the elderly. A poor financial situation negatively affects their quality of life and impacts on the probability of suffering from depression. Negative expectations about future personal finances also determine lower levels of quality of life.

The results obtained are relevant for both health professionals and public decision-makers who have to prioritize health care resources that are increasingly limited due to the continuous ageing of the population. Regarding health professionals, the results of this study provide evidence and understanding of the factors that influence mental health among the elderly. These professionals should be aware that financial constraints experienced by an individual may be a potential factor in future mental health problems. Establishing preventive mental health measures aimed at people experiencing financial difficulties may be relevant to minimize future health care needs.

In the area of interventions by public decision-makers, the prioritization of social and health care services for the elderly with financial difficulties needs to be reviewed. The limited places in daycare centers or residences for elderly people and the existing pressure in the supply of home help services makes private payment necessary, at least temporarily, while there is no official assessment of dependency and admission in the public care services. In light of this situation, it is crucial to incorporate financial variables when making decisions on prioritizing care resources that are already insufficient.

Furthermore, it would be desirable to establish financial education programs and advisory services that would enable the elderly to improve their skills in terms of understanding and planning their personal finances. The social and health care sector should begin to consider aspects related to the finances of the dependent elderly as a new dimension of the care provided, an issue that is not being considered so far. The design of public policies aimed at reducing financial difficulties and situations of poverty among the elderly population, such as subsidies for energy consumption in the home, could generate potential gains in terms of better health and well-being indicators, and could help to reduce the pressure on health care services in the future.

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Resumen

Este estudio analiza la asociación entre las dificultades económicas y la calidad de vida y depresión en España. Aplicamos modelos probit extendidos para controlar la posible endogeneidad, en una muestra de 1.759 personas mayores de 65 años. Los resultados muestran que experimentar dificultades económicas está significativamente relacionado con una menor calidad de vida y una mayor probabilidad de depresión, especialmente en mujeres. Las expectativas negativas sobre finanzas futuras están inversa y significativamente relacionadas con la calidad de vida del individuo. Estos resultados sugieren que son necesarios programas de asesoramiento financiero y de intervención en salud pública centrados en las personas mayores con dificultades financieras para mitigar este impacto negativo.

Palabras clave: calidad de vida, salud mental, dificultades financieras, población envejecida.

Clasificación JEL: I0, I3.