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OCCUPATIONAL PENSION PLANS AND INDIVIDUAL RETIREMENT SAVING: COMPLEMENTARY OR SUBSTITUTE? EVIDENCE FROM SPAIN

PLANES DE PENSIONES OCUPACIONALES Y AHORRO INDIVIDUAL PARA LA JUBILACIÓN: ¿COMPLEMENTARIOS O SUSTITUTIVOS? EVIDENCIA PARA ESPAÑA

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ABSTRACT

The evolution of pension systems across Europe is influenced by the intricate dynamics among three pillars: public pensions, occupational pensions, and individual retirement savings. This paper examines the connection between the second and third pension pillars in Spain, utilising data from the Spanish Survey of Household Finances 2020. The study employs logit and cluster analysis to explore how the promotion of occupational pension schemes influences the uptake of individual private pension plans, with a particular focus on the reference person within households. Overall, the analysis emphasises the complementary nature of the individual and occupational pension pillars in Spain.

Keywords: Spanish Survey of Household Finances; household savings; individual private pension plans; occupational pension plans; logit; cluster

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RESUMEN

La evolución de los sistemas de pensiones en Europa está condicionada por la compleja interacción entre tres pilares: las pensiones públicas, las pensiones ocupacionales y el ahorro individual para la jubilación. Este artículo analiza la relación entre el segundo y el tercer pilar del sistema de pensiones en España, utilizando datos de la Encuesta Financiera de las Familias de 2020. Para ello, se aplican modelos logit y técnicas de análisis cluster con el fin de examinar cómo la promoción de los planes de pensiones ocupacionales influye en la contratación de planes individuales privados, prestando especial atención a la persona de referencia del hogar. En conjunto, los resultados ponen de relieve el carácter complementario de los pilares ocupacional e individual en el contexto español.

Palabras clave: Encuesta Financiera de las Familias; ahorro de los hogares; planes de pensiones privados individuales; planes de pensiones ocupacionales; modelo logit; clusters.

1. INTRODUCTION

Pension systems were developed in Europe from the second half of the 19th century and the beginning of the 20th century. In most Continental European countries, the so-called Bismarck model was adopted, conceived as a mandatory protection system financed through contributions from both the employee and the employer (Fenge & Von Weizsäcker, 2010). In Northern Europe and the Anglo-Saxon countries, the so-called Beveridge model was developed, based on the universal recognition of a vital minimum financed from general budgets (Cigno, 2008; Ebbinghaus, 2021).

In 1977, the Institute of Social Security of the Catholic University of Louvain organised the "September Colloquiums" which concluded with the determination of what has become known as the "Louvain Code." This code outlined the architecture of the European social security model, consisting of three pillars: the first pillar constituted by public social security, the second by supplementary social security for employment and the third by individual instruments. Implementation across European countries has not been uniform, with significant differences in both the replacement rate and the relevance of each of the three pillars (Montanari *et al.*, 2008).

A significant challenge facing developed societies, particularly European ones, is the ageing of their populations, due to declining birth rates and a sustained increase in life expectancy. This demographic shift impacts pensions (Rey-Ares *et al.*, 2018) and the labour market (Gurvich & Ivanova, 2018).

Given the foreseeable difficulty in financing public pensions, countries have actively pursued reform policies, at varying speeds and extents. This has primarily involved parametric reforms that make the existing pay-as-you-go system less generous and the establishment of a funded contribution system to complement or partially replaces the pay-as-you-go system, enhancing the replacement rate of future retirees (Arcanjo, 2019; Bonenkamp *et al.*, 2017; Börsch-Supan *et al.*, 2005)

Spain is currently at a pivotal moment in the reform of its pension system, covering all three pillars. Legislative developments align with some recommendations of the latest report on the evaluation and reform of the Toledo Pact (Congreso de los Diputados, 2020). The reform of the second pillar, through the recently approved Law 12/2022 regulating the promotion of occupational pension plans (Spain, 2022), aims to foster the development of supplementary social provision at company level. As the second pillar is voluntary, the success of this initiative depends on the success of the social dialogue and the transfer of its results to sectoral collective bargaining agreements.

Amidst a consistent increase in overall public pension expenditure (Harper, 2014), and parametric reforms of the first pillar aiming to reduce the initial pension amount (for the Spanish case see Díaz-Saavedra, 2020), promoting occupational pension plans could serve as an alternative for families to save in the long term, supplementing Social Security public pension in retirement (Mussio & Garabato, 2009). The extended scope of this initiative may

increase the population's awareness of retirement savings products. Since not all companies promote occupational pension schemes, many workers will not have the option of joining this second pillar instrument, instead they will have to rely on individual private pension plans as retirement savings alternatives. However, in contrast to other countries such as the Netherlands, Switzerland and the United Kingdom, individual private pension plans are underdeveloped in Spain (OECD, 2023).

The debate on the complementary or substitutable nature of the second and third pillars is ongoing, both in the specialised literature (Higgins, 1985; Schoeplein, 1970) and at the social and political level. In Spain, the current reform, encouraging the promotion of occupational pension schemes and establishing a common legislation for occupational and individual pension schemes, may be detrimental to the development of the third pillar (Schoeplein, 1970). However, according to Gómez-García & Villanueva (2022), this effect is positive, suggesting that the development of occupational pension schemes would also stimulate the development of individual pension schemes. Nevertheless, a comprehensive debate has emerged within the financial-insurance sector on this issue.

This paper analyses, quantifies and determines the relationship between the second and third pillars using data from the Spanish Survey of Household Finances 2020 (Banco de España, 2022b). The primary objective is to examine whether the development of the second pillar influences the development of the third pillar. This analysis is conducted at both the household and individual levels, focusing on the reference person. Additionally, we explore whether the economic profile of households has any effect on this relationship between the second and third pillars, utilizing the employment status variable of the reference person and several household-related variables.

One of the key findings of this paper underscores the importance of distinguishing the household member participating in the occupational pension plan when evaluating the impact of the second pillar on the third pillar through the reference person. If the reference person is the participant, the effect is negligible. However, if it is another household member, there is a 10.1% increase in the likelihood that the reference person possesses a third pillar instrument. In households with substantial real assets and anticipating lower future income (evidenced by high disposable income, low indebtedness, and the reference person nearing retirement), this percentage escalates to 46%.

When confronted with the question of whether the second and third pillars in Spain are complementary or substitutes, our study allows us to conclude that, at a global level, these two pillars complement each other. Policies aimed at promoting the development of the occupational pillar also have a positive influence on the number of contracts for instruments of the pillar focused on individual savings.

This paper makes a valuable contribution to both the scientific and social debates. It delves deeply into the relationship between savings in third and second pillar instruments in the specific case of Spain, providing objective data for reflection on the application of measures for the development of supplementary social provision.

This paper is organised as follows. In the next section, we review previously published papers dealing with the factors that influence household savings decisions, with special emphasis on those related to retirement. In the third section we define the sources of information and discuss the statistical methodology used (logit and cluster analysis). In the fourth section we establish three logit models, where the dependent variable is whether the reference person is a member of an individual private pension plan and/or has a voluntary retirement insurance, these are used to test the hypotheses. We divide the general population into 3 homogeneous clusters based on economic variables. Following that, we present the empirical results, distinguishing between those applied to the general population and those resulting in each of the clusters. Finally, the paper concludes with a discussion of the results and a summary of the main findings.

2. BACKGROUND AND HYPOTHESES

Household savings decisions are influenced by two types of factors: those linked to the global economic situation (macroeconomic and political factors), and on the other hand, those arising from the household's internal structure. The latter includes factors related to each of the members of the household (age, gender, marital status, education, occupational sector, employment status, among others) and factors considering the family unit as a whole (level of risk aversion, real income and assets, debts or the number of household members). Households' savings behaviour is determined by interpretation and prioritisation of these factors.

Macroeconomic factors play an important role in household saving decisions. Saving is influenced by a complex interaction of macroeconomic variables, encompassing economic growth, inflation, consumer confidence, interest rates and wealth effects. The impact of economic growth on saving remains a debated topic, with studies suggesting higher household savings due to higher incomes, precautionary motives, and favorable interest rates, decrease in savings due to higher spending on public services or potential economic imbalances if savings are excessively high. For an in-depth discussion, refer to Staal (2023) or Aizenman *et al.* (2019). Inflation, influenced by its present value and future performance expectations, can alter household savings behaviour (Howard, 1978).

Political factors can also significantly affect economic agents' decisions, directly impacting household saving behaviour through changes in taxation, social security (Bloom *et al.*, 2007; Callen & Thimann, 1997 or Niculescu-Aron & Mihăescu, 2012) , retirement benefits and savings incentives. Political stability and effective governance contribute to economic stability, influencing household savings. Political decisions, including those promoted by governments, can influence long-term targeted savings instruments, such as IRAs in the US (Holden & Schrass, 2021), German Rürup-Rente or Riester-Rente (Metzger, 2017) or Spanish simplified employment plans. Changes in eligibility requirements, contribution limits or the structure of these programmes may influence the retirement saving behaviour of households.

Even within the same macroeconomic scenario and policy context, household savings decisions vary due to future income expectations. The life-cycle model, initially emphasising preparing for old age, has been extended to include various saving motives, such as precautionary saving (Ando & Modigliani, 1963; Carroll, 1997; Friedman, 1957 or Gourinchas & Parker, 2002) housing-related motives (Hayashi *et al.*, 1988) and inheritance (Hurd, 1987). Life-cycle theory allows for the analysis of retirement savings decisions by providing a model in which individuals anticipate their financial needs over their lifetime, considering factors such as employment status, occupational sector, disposable income, assets fungibility (Fall *et al.*, 2001 or Han *et al.*, 2009), age, in particular, the time remaining until retirement (Kaplan *et al.*, 2014). Ekerdt (2009), revealing that the closer to retirement, the more motivated workers were to plan their pension savings. Life-cycle theory helps to explain how people plan for a stable standard of living throughout their lives and make informed savings, consumption and investment decisions.

Retirement savings decisions are also influenced by family structure as defined by marital status, number of members (Tamborini & Purcell, 2016), the gender of family members (Lee *et al.*, 2018) and level of education (van Rooij *et al.*, 2011), as well as other subjective factors such as perceived health status (Ricketts *et al.*, 2013) and the degree of risk aversion (Hariharan *et al.*, 2000; Hilgert *et al.*, 2003). Marital stability correlates with higher savings, while divorce and widowhood are associated with lower financial well-being (Szinovacz & Deviney, 2000; Wilmoth & Koso, 2002). Other studies have shown similarities and differences in retirement preparedness between men and women in their 30s and 50s (Hassan & Lawrence, 2007a, 2007b). Education is another key factor affecting the likelihood of having a savings plan and the ability to make informed financial decisions. According to Cupák *et al.* (2019) retirement savings in supplementary pension plans are positively associated with financial literacy after controlling for a set of relevant socio-economic variables. For Barth *et al.* (2020) financial literacy and education acquired in the workplace (pension plans developed at the company level), can positively impact retirement planning and saving behaviour.

Research suggests that less risk-averse individuals tend to lean towards savings mechanisms with a high-risk component (Jacobs-Lawson & Hershey, 2005), influencing retirement savings decisions (Sunden & Surette, 1998).

In the literature focusing on the Spanish case, Domínguez & Turner (2022) analyse the evolution of supplementary pension systems in the period 1994 to 2019. Díaz-Giménez & Díaz-Saavedra (2017) study the effects of two previous pension reforms. Antón *et al.*(2014) examines the impact of tax relief on retirement savings instruments, while Moreno-Herrero *et al.*(2017) explores the variables that influence the uptake of private pension plans.

To the best of our knowledge, the relationship between savings in third pillar instruments and second pillar instruments has not undergone comprehensive scrutiny either in general or in the specific case of Spain, from both theoretical and empirical perspectives. Our research specifically investigates this relationship between the second and third pillars using EFF2020. We study the connection between the second and third pillars within Spanish households where the reference person is between 18 and 65 years of age.

The study utilizes EFF2020 to create two databases: DB1, households with at least two members where the reference person and at least one other individual are between 18 and 65 years old, and DB2, households excluded from DB1 where the reference person is between 18 and 65 years old. Two main research hypotheses guide our study:

(H1) The development of the second pillar has an influence on the development of the third pillar, taking into account only the fact of having the product.

(H2) Concerning the reference person, being a member of an occupational pension plan has an influence on being a member of an individual private pension plan and/or having a voluntary retirement insurance.

To test these two hypotheses in the two databases, we propose three models, the fundamental characteristics of which are defined in the Table 2.

In addition, we study whether the economic profile of households has any effect on the relationship between the second and third pillar, determining the validity hypotheses H1 and H2 on the economic profile group in which the test is conducted.

3. DATA SOURCE AND METHODOLOGY

In this study, EFF2020 has been used as a source of data.

3.1 The Spanish Survey of Household Finances

The EFF2020 is the primary source of our analysis, which contains financial information about Spanish families. For data processing, we have utilised Files dataimp1.xls, dataimp2.xls, dataimp3.xls, dataimp4.xls, and dataimp5.xls. These files handle missing data from the survey corresponding to unanswered questions or "I don't know" responses. The multiple imputation technique was applied, resulting in the five datasets included in these files. In our statistical analyses, we opted to incorporate imputed values, allowing for the use of complete data methods.

The variable *fancine3* includes the weights assigned to households in the sample. This variable aims to balance the probability of the selected household in the sample, considering oversampling and geographic stratification and addresses missing responses. The total number of households in the fourth quarter of 2020 (18,821,645) can be estimated by summing the weights included in this variable. It is imperative to factor in these weights when deriving totals, means, and population participation from EFF2020 data. Nonetheless, there is some controversy regarding the appropriate application of statistical weighting techniques, such as in regression or cluster analysis (Cameron & Trivedi, 2005; Deaton, 1997).

In our first database, DB1, we only include surveys from households with two or more members where the reference person and at least one other member are between 18 and 65

years old. In our second database, DB2, we exclude included in DB1, and then we selected households where only the reference person is between 18 and 65 years of old.

The number of surveys and households taking into account the facine3 weight in DB1 and DB2 are shown in Table *1*.

	Global	
	DB1	**DB2**
Number of surveys	3,213	1,025
Number of households	10,205,214	3,674,103

Table 1*. Number of surveys and households*

Descriptive statistics of the databases used can be found in Table 8, Table 9 and Table 10.

3.2 Methodology

This paper employs two statistical methodologies to achieve its objectives. First, logit analysis (Hosmer *et al.*, 2013; Long, 1997) is applied to analyse the relationship between the dichotomous variable *reference person is a member of an individual private pension plan and/or has a voluntary retirement insurance* and a series of independent or explanatory variables, which change according to the model. Second, homogeneous groups based on economic variables are identified using k-means cluster analysis. This method involves partitioning the set of observations into clusters, where each observation is assigned to the cluster with the closest mean value (Hennig *et al.*, 2015). Given that the EFF2020 dataset comprises five imputed datasets, we have employed a modified methodology to address this circumstance, drawing inspiration from the work of Basagaña *et al.* (2013). The construction of these clusters utilised the R package miclust (Basagaña & Barrera-Gómez, 2021), specifically employing the miclust function tailored for k-means cluster analysis on data with multiple imputations, as seen in the case of EFF2020. This function integrates optional procedures for selecting the number of clusters and assessing variable significance, while also presenting the uncertainty introduced by imputations in the results.

4. MODEL

In order to test the first hypotheses, we propose 3 logit models whose basic characteristics are shown in Table 2.

		Logit model		
DDBB	**Hypothesis**	**Model**	**Dependent variable**	**Variables whose significance is used to test each hypothesis**
DB1	H1	A	Reference person is a member of an individual private pension plan and/or has a voluntary retirement insurance	One or more household members are members of an occupational pension plan
	H2	B	Reference person is a member of an individual private pension plan and/or has a voluntary retirement insurance	Reference person is a member of an occupational pension plan
DB2	H1=H2	C	Reference person is a member of an individual private pension plan and/or has a voluntary retirement insurance	Reference person is a member of an occupational pension plan

Table 2*. Basic characteristics of the logit models*

In the three models, the dependent variable is that the reference person is a member of an individual private pension plan and/or has a voluntary retirement insurance (henceforth referred to as "individual private pension plan" or "third pillar products"). The independent variables are classified into three groups. The first group includes a series of dichotomous variables, one of which is essential for testing the desired hypothesis. The other two groups encompass control variables, which in principle are also expected to influence the dependent variable, related to either the reference person (second group) or the household (third group). Table 7 details the explanatory variables included in the three models and Table 8 to 10 present descriptive statistics.

Table 4 illustrates the percentage of households with a reference person being a member of an individual private pension plan. The data reveals that 22.78% (20.83%) of households in DB1(DB2) possessed an individual private pension plan. This indicates that among the 10,205,214 (3,674,103) households, only 2,325,270 (765,395) had at least an individual private pension plan or a voluntary retirement insurance.

In DB1 and DB2, health and age exhibit similar effects, where better the health and increase age positively impacting the percentage. As expected, the percentage is zero for ages 18-24. The analysis of educational levels indicates that having an education level lower than high school negatively affects the percentage, as observed with singles and the unemployed. The occupational sector demonstrates significant discriminatory power, where the percentage of managers is three times higher than that of unskilled workers (skilled craftsmen and skilled workers in manufacturing, construction and mining) in DB1 (DB2). Gender also plays a discriminatory role, with 26% of men having an individual private pension plan compared to 19% of women in DB1, while in DB2 the percentages are reversed (17% of men and 24% of women). Among the household-related variables, in DB1 and DB2, the only one that clearly has a discriminatory effect on the percentage of households whose reference person is a member of an individual private pension plan is risk aversion, where risk-averse households have a 10 point difference compared to risky households. The evolution of the household's future income significantly distinguishes between those expecting lower future incomes and those who do not, with the number of household members only having a discriminative effect in DB2 for households with four members or more due to their composition.

The economic clusters are constructed based on per capita income of the household, ratio of expenditure to total household income, ratio of debt to income, ratio of debt payments to income, risk aversion, evolution of future household income, real assets of the household and employment situation of the reference person. The justification of the variables chosen for the construction of the clusters is based on previous works referred to in the literature review section (see for example Fall *et al.*, 2001; Han *et al.*, 2009; Hilgert *et al.*, 2003 or Staal, 2023). We initially obtained four clusters, but one was discarded due to its small size (only three families). The analysis continues with three clusters. The number of surveys and the number of households they represent is detailed in Table 3. The two variables that actually determine the configuration of the clusters are real assets and evolution of future household income[1]. The importance of the latter variable is also shown in Table 12, where 99% of households in Cluster 1 expect lower future incomes, 99% of households in Cluster 2 expect to maintain their income level, and the same percentage of households in Cluster 3 anticipate higher future income. Real assets are also important to the definition of the clusters, with mean (and median) values higher in Cluster 1 than in Cluster 2, and higher in Cluster 2 than in Cluster 3.

Descriptive statistics for the rest of variables in each cluster can be found in Table 11, Table 12 and Table 13. Among these variables, age and the ratios of total expenditure, debt and debt payments to income indicate that households in Cluster 3 have much higher ratios to income compared to the other two clusters and also feature a younger reference person (only 18.72% are over 55 years old, in contrast to Clusters 1 and 2 with percentages of 43.47% and 36.29% respectively).

	Cluster 1		**Cluster 2**		**Cluster 3**	
	DB1	**DB2**	**DB1**	**DB2**	**DB1**	**DB2**
Number of surveys	457	144	1,653	517	1,099	364
Number of households	1,249,307	431,978	4,964,143	1,799,238	3,990,151	1,442,887

Table 3. *Number of surveys and households.Source: own elaboration based on Banco de España (2022b).*

The percentage of households whose reference person is a member of an individual private

[1] The centroid of cluster 1 (2;3) expects to have less (equal; lower) future income and has real assets of 735,540€ (630,000€; 412,723€).

pension plan in the different clusters is included in Table 4. In general, it is observed that this percentage is lower in Cluster 3, for all variables and databases. This is reasonable given that the reference person of Cluster 3 households is younger and these households have less income and less disposable income.

	Global		Cluster 1		Cluster 2		Cluster 3	
	DB1	**DB2**	**DB1**	**DB2**	**DB1**	**DB2**	**DB1**	**DB2**
Total number of households	22.78	20.83	25.83	24.87	26.00	23.83	17.84	15.88
Variables related to the reference person								
Educational level (less than high school)	18.09	17.08	17.18	22.71	19.53	19.63	16.62	12.86
Educational level (high school)	25.82	27.63	37.88	32.63	30.02	31.36	17.25	21.33
Educational level (university)	29.07	23.02	32.69	25.46	34.64	24.81	20.73	18.94
Employment status (employed)	24.58	26.27	27.71	31.43	28.24	29.51	18.85	19.26
Employment status (self-employed)	34.54	26.15	21.98	18.35	45.57	38.86	29.07	20.78
Employment status (unemployed)	9.51	10.53	18.11	13.93	7.04	9.25	9.88	10.96
Employment status (retired)	31.09	19.24	39.99	24.19	32.38	20.21	19.49	14.50
Occupational sector (OS1)	34.69	26.97	35.29	21.03	42.42	37.07	23.98	21.56
Occupational sector (OS2)	29.17	20.24	27.70	29.30	39.32	16.38	17.24	23.01
Occupational sector (OS3)	23.19	21.00	23.18	25.10	33.28	20.61	18.33	16.76
Occupational sector (OS4)	24.52	20.99	29.04	15.34	26.10	25.68	20.78	14.48
Occupational sector (OS5)	15.05	21.82	16.29	59.68	17.39	26.96	12.32	11.19
Occupational sector (OS6)	18.59	17.46	0	23.09	13.93	20.99	29.74	10.79
Occupational sector (OS7)	19.15	9.02	23.96	0	21.83	8.29	14.91	12.34
Occupational sector (OS8)	22.29	23.88	40.99	38.19	20.52	16.44	19.71	34.18
Occupational sector (OS9)	11.12	19.95	7.21	22.82	11.59	27.18	11.71	11.65
Occupational sector (OS10)	32.91	15.30	56.02	-	16.22	16.30	34.81	14.07
Occupational sector (OS11)	21.36	9.43	0	0	15.40	9.52	49.67	100.00
18 ≤ Age <25	0	0	0	0	0	0	0	0
25 ≤ Age <35	4.73	6.78	11.50	0	5.28	0	3.84	12.48
35 ≤ Age <45	17.61	9.56	25.99	4.06	16.34	11.04	16.96	8.94
45 ≤ Age <55	26.89	25.67	22.90	21.71	32.12	31.49	21.20	21.19
55 ≤ Age ≤65	29.78	27.41	29.86	32.67	31.00	29.47	26.80	18.63
Gender (male)	25.56	17.49	34.32	17.36	29.50	20.38	19.00	14.00
Gender (female)	19.36	24.41	16.56	34.11	22.24	27.39	16.05	17.90
Health (good)	24.56	22.22	27.02	26.20	29.65	24.98	17.98	17.41
Health (acceptable)	18.47	18.76	24.86	27.61	16.58	21.88	17.88	12.93
Health (bad)	8.60	10.16	15.34	7.47	6.08	13.49	11.37	8.23
Marital status (single)	10.85	17.97	19.36	19.87	13.57	20.69	7.64	14.67
Marital status (married)	25.42	28.70	27.93	65.46	28.04	25.78	20.88	7.17
Marital status (divorced)	26.45	24.42	22.71	23.31	30.17	28.76	23.08	19.55
Marital status (widow/widower)	23.54	27.29	9.84	31.56	28.54	27.77	21.17	17.41
Variables related to the household								
Risk aversion (the household does not like to take risks)	29.63	28.02	40.90	41.80	37.27	29.02	18.83	23.30
Risk aversion (at-risk household)	20.85	19.03	21.41	21.45	23.23	22.48	17.51	14.00
Evolution of the household's future income (higher)	18.01	16.04	27.07	-	24.92	28.48	17.99	15.95
Evolution of the household's future income (equal)	25.86	23.79	21.74	-	26.01	23.84	5.15	8.69
Evolution of the household's future income (lower)	25.55	24.51	25.84	24.87	0.11	0	7.94	0
Number of household members (number=1)	-	20.89	-	24.81	-	23.64	-	16.19
Number of household members (number=2)	21.19	21.63	27.43	25.71	26.56	26.91	12.80	14.22
Number of household members (number=3)	23.42	21.18	25.82	27.20	24.75	20.41	20.91	20.45
Number of household members (number=4)	24.71	7.70	25.29	0	28.73	11.24	19.19	7.15
Number of household members (number≥5)	19.76	0	21.21	0	20.19	0	18.94	0

Table 4. *Percentage of households whose reference person is a member of an individual private pension plan and/or has subscribed to a voluntary retirement insurance according to different variables. Source: own elaboration based on Banco de España (2022b). These percentages have been calculated taking into account the fancine weights.*

5. EMPIRICAL RESULTS

In this section, we first present the main results of the three logit models defined in Table 2, followed by the results of the logit models applied to the different economic groups.

5.1 Global

In Table 5, we present the odds ratio[2] and the significance levels of variables in models A, B and C.

In Model A it is observed that the presence of an occupational pension plan for any household member, whether the reference person or any other member, does not influence whether the reference person has an individual private pension plan. This might suggest that the development of the second pillar does not impact the development of the third pillar. However, this would be misleading, if we consider separately whether the member of the occupational plan is the reference person or another household member (Model B) we see that the fact that it is a member other than the reference person who has the occupational plan actually increases the probability that the reference person has a third pillar instrument by 10.1%. The reference person having an occupational pension plan does not influence the likelihood of also having a third pillar product. This aligns with two key characteristics of pension plans in Spain. Firstly, occupational pension plans are the result of collective bargaining, meaning participation depends on the decision of third parties to set up the plan. Therefore, if the reference person does not work in a company with an occupational pension scheme, the only way for them to obtain supplementary social provision is through third pillar products. Secondly, Spanish legislation imposes a joint maximum limit for contributions to any type of pension plan[3] (excluding voluntary insurance, a minority product). If another household member has the occupational plan, the 10% increase in the probability that the reference person has an individual plan may be attributed to an enhancement of the household's financial literacy induced by the occupational pension plan. Fornero & Monticone (2011) found, with Italian data, that financial literacy has a positive impact on the probability of having a pension plan and Kalmi & Ruuskanen (2018) also found a positive relationship between retirement planning and an extended measure of financial literacy.

Model C is based on DB2 where only the reference person in the household can have an individual private pension plan echoes the results of Model A. In this scenario, the fact that the reference person has an occupational plan does not influence whether they also has a third pillar instrument.

Having tested the hypotheses of the models, we now examine the significance of the variables related to the household and to the reference person included in the logit analysis, along with their impact on the dependent variable. In models A and B with practically identical results, we refer only to the percentage increase/decrease in the probability that the reference person has a third pillar instrument in Model A.

Among the significant variables, being a university graduate and working in occupational sectors 3, 4, 6, 7 and 9 have the greatest substantial impact, albeit with varying effects. A university education increases the probability by 15%, while working in sectors 3, 4, 6, 7 increases the probability by 15%, 20%, 24% and 18% respectively. Conversely, working in sector 9 decreases the probability by 18%. As anticipated, a higher the ratio of debt payments to income and total expenditure to total income both reduce the likelihood of having an individual private pension plan. The remaining significant variables exhibit negative effects, with reductions of 8% for being female, 10% for expecting lower future income, between 3% and 10% for households with four or more members, and 3% for being single. Employment

[2] An odds ratio greater than one indicates that an explanatory variable increases the probability of owning an individual private pension plan and/or voluntary retirement insurance. Conversely, an odds ratio between 0 and 1 decreases the probability.

[3] This joint ceiling amounts to €8,000 in 2020. As of 2021 (Spain, 2020) important changes were initiated in the regulation of the limits on contributions to social welfare instruments, which were intended to encourage the development of the second pillar.

status, age, health status, risk aversion and real assets coefficients show no significance.

The significance and the effect of the variables related to the household and the reference person that have been included in the logit analysis are highly sensitive to the composition of the household in terms of number of members and their ages. In Model C, which analyses households in which there is either only one member (between 18 and 65 years old) or among all members only the reference person is between 18 and 65 years old, the sex of the reference person loses significance, while the level of education remains significant (although it now discriminates significantly in favour of high school) and marital status continues to be significant (being widow/widowed or divorced decreases the probability by 28% and 16%, respectively).

	Model A DB1 H2	Model B DB1 H1	Model C DB2 H1=H2
Reference person is a member of an occupational pension plan		0.6483	0.5937
Another household member is a member of an occupational pension plan		1.1014*	
One or more household members are members of an occupational pension plan	0.7377		
Another household member is a member of an individual pension plan and/or has subscribed to a voluntary retirement insurance	7.0620	7.153	
Variables related to the reference person			
Educational level (high school)	1.3628	1.3612	1.2514***
Educational level (university)	1.1566***	1.1518***	1.1008
Employment status (self-employed)	1.3285	1.3019	1.4830
Employment status (unemployed)	0.5656	0.5556	0.7022
Employment status (retired)	0.6316	0.6280	0.5214
Occupational sector (OS1)	1.4673	1.4868	0.6951***
Occupational sector (OS2)	1.2871	1.3030	0.5891
Occupational sector (OS3)	1.1562*	1.1739**	0.6781
Occupational sector (OS4)	1.2076***	1.2126***	0.6458
Occupational sector (OS6)	1.2475*	1.2682*	0.9591*
Occupational sector (OS7)	1.1887**	1.1948**	0.6077
Occupational sector (OS8)	0.9972*	1.0048*	1.1279*
Occupational sector (OS9)	0.8158***	0.8187**	0.7091***
Occupational sector (OS10)	2.3494	2.3268	1.9470
Occupational sector (OS11)	2.1470	2.1890	0.1772
18 ≤ Age <25	0.0000*	0.0000*	0.0000*
25 ≤ Age <35	0.2432	0.2459	0.1168
35 ≤ Age <45	0.6754	0.6770	0.1930
45 ≤ Age <55			0.7235
55 ≤ Age ≤65	1.1940	1.1987	
Gender (female)	0.9229**	0.9204**	1.8227
Health (acceptable)	0.7965	0.7927	0.7868
Health (bad)	0.4532	0.4556	0.4993
Marital status (single)	0.9669*	0.9592*	
Marital status (married)			0.6332
Marital status (divorced)	1.7513	1.7754	0.8410***
Marital status (widow/widower)	1.7244	1.7404	0.7176***
Variables related to the household			
Ratio of expenditure to total income	0.9433*	0.9453*	1.0767
Risk aversion (at-risk household)	0.7288	0.7282	0.4663
Real assets	1.0511	1.0514	1.0100*
Evolution of the household's future income (higher)	0.8112	0.8107	0.7756
Evolution of the household's future income (lower)	0.8980**	0.9000**	0.8453*
Ratio of debt to income	1.0044*	1.0040*	1.0233
Ratio of debt payments to income	0.7120***	0.7160***	1.0327*
Number of household members (number=2)	0.7589	0.7609	1.1488*
Number of household members (number=3)			2.3038
Number of household members (number=4)	0.8944***	0.8918***	1.6631*
Number of household members (number≥5)	0.9697*	0.9721*	0.0000*
Per capita income	1.4240	1.4816	2.0547

Table 5. *Logit models for reference person. DB1 y DB2. Odds ratios and significance . Source: own elaboration.*
Dependent variable: = 1 if the reference person of the household is a member of an individual private pension

plan and/or has a voluntary retirement insurance; 0 = otherwise.
The reference category for the dummy variables in DB1 with two or more categories was a three-member household that does not like to take risks and expects to maintain its income level in the future and whose reference person had less than secondary education, was a married man, in good health, employed, working in the occupational sector OS5 and aged between 45 and 54.
The reference category for the dummy variables in DB2 with two or more categories was a one-member household that does not like to take risks and expects to maintain its income level in the future and whose reference person had less than secondary education, was a single man, in good health, employed, working in the occupational sector OS5 and aged between 55 and 65.
****, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively, of t-statistics.*

5.2 By Economic Group

The findings from Table 6 highlight the significant impact of the economic profile of households on the relationship between the second and third pillars. The response to the contrast of hypotheses varies depending on the economic profile group in which the test is performed.

In the global scenario, the presence of an occupational pension plan for any household member, whether the reference person or anyone else, does not influence the fact that the reference person has an individual private pension plan (see Table 5). This remains the case for households in Cluster 1. However, in the other two clusters, it does influence, and negatively so, reducing the probability that the reference person has a third pillar product by 11.42% and 0.69% in Clusters 3 and 4, respectively. That is, except in households with high real assets, lower expected future income, high disposable income, and the reference person nearing retirement (Cluster 1), the second pillar acts as a substitute for the third pillar. This substitution effect is minimal for households with low real assets, higher expected future income, low disposable income and the reference person far from retirement (Cluster 3). The potential differentiator behind this substitution effect is the youth of the reference person in Cluster 3 households, making it challenging for them to obtain an occupational plan.

When considering whether it is the reference person or another member of the household who has the occupational plan, it is observed that the reference person having an occupational plan negatively affects their possession of an individual plan, only in households in Cluster 2. This implies that, in this cluster, a significant portion of households has a reference person who, despite the characteristics of the Spanish labour market, has an occupational plan, but lacks a third pillar. If we analyse the influence of another household member with an occupational pension plan, we observe that, except in Cluster 3, the positive influence is maintained, albeit with varying magnitudes. In households with high real assets, lower expected future income, high disposable income, low indebtedness, and the reference person nearing retirement (Cluster 1), the probability of the reference person having a third pillar product increases by 46%, if another household member has an occupational plan.

Focusing on DB2, which exclusively includes households where only the reference person is aged between 18 and 65, we find that the behaviour concerning second and third pillar savings is very different according to the economic condition of the household. The probability that the reference person has a third pillar product increases by 91% (14%) if they have an occupational pension plan in Cluster 1 (Cluster 3).

	Cluster 1			Cluster 2			Cluster 3		
	Model A DB1 H2	**Model B DB1 H1**	**Model C DB2 H1=H2**	**Model A DB1 H2**	**Model B DB1 H1**	**Model C DB2 H1=H2**	**Model A DB1 H2**	**Model B DB1 H1**	**Model C DB2 H1=H2**
Reference person is a member of an occupational pension plan		0.3103	1.9121***		0.9462*	0.5383		0.4542	1.1441*
Another household member is a member of an occupational pension plan		1.4608*			1.0612*			2.4149	
One or more household members are members of an occupational pension plan	0.6207			0.8858*			0.9931*		
Another household member is a member of an individual pension plan and/or has subscribed to a voluntary retirement insurance	7.5455	8.0576		7.9795	8.0218		10.2944	10.5055	
Variables related to the reference person									
Educational level (high school)	1.7449	1.8398	1.1761*	1.4795	1.4716	1.7353	1.4009	1.3747	1.3646**
Educational level (university)	1.9717	2.1251	1.2732*	1.3838	1.3684	1.8058	1.7049	1.7196	1.4270**
Occupational sector (OS1)						2.3616	2.1898	2.0978	1.7536***
Occupational sector (OS2)	0.6343	0.6164	1.5403*	0.7521	0.7497	0.9061*	1.3263*	1.3011*	1.5431*
Occupational sector (OS3)	0.5496	0.5570	0.3960***	0.5390	0.5342	1.3423**	1.4516***	1.4989***	0.9971*
Occupational sector (OS4)	0.5356	0.5736	0.3946***	0.5074	0.5038		1.3468**	1.3724**	1.0629*
Occupational sector (OS5)	0.3582	0.3626	1.8519**	0.3529	0.3514	1.2283*			
Occupational sector (OS6)	0.0000*	0.0000*	3.6137**	0.6791*	0.6840*	0.8726*	3.1890	3.1139	0.9893*
Occupational sector (OS7)	0.3534	0.3648	0.0000*	0.3845	0.3853	0.9454*	1.4018**	1.3979**	0.8338*
Occupational sector (OS8)	0.6795**	0.7209*	0.8320*	0.3282	0.3297	1.2627*	1.2126*	1.1842*	2.4484
Occupational sector (OS9)	0.3112	0.3181	0.2688	0.1850	0.1853	0.9540*	1.0441*	1.0478*	0.6932*
Occupational sector (OS10)	1.8304*	1.5883*	-	0.2866	0.2879	1.3251*	5.7654	5.4856	13.5562
Occupational sector (OS11)	0.0000*	0.0000*	0.0000*	0.5685**	0.5730*	0.1591	4.3411	4.4128	-
18 ≤ Age <55	0.0000*	0.0000*	0.1829*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*
25 ≤ Age <35	0.0812	0.0769	0.0000*	0.1427	0.1428	0.0000*	0.3685	0.3842	0.2972
35 ≤ Age <45	0.9494*	0.9572*	0.0632	0.6041	0.6045	0.3029			0.2993
45 ≤ Age <55	0.8226*	0.7995**	0.8833*			0.9005	0.9922*	0.9720*	
55 ≤ Age ≤65				1.2276	1.2275		0.6146	0.6206	1.2579*
Gender (female)	0.6891	0.6735	1.6137***	0.8025	0.8058	1.6404	0.8641**	0.8558	1.3902***
Health (acceptable)	0.6924	0.6709	0.7770*	0.6098	0.6090	0..7122	0.9482*	0.9260*	0.6130
Health (bad)	0.8630*	0.8537*	0.1212	0.2330	0.2327	0.3052	0.2984	0.2955	0.5767**
Marital status (single)	0.6854*	0.6254**		1.3699	1.3731		0.8300*	0.7937**	
Marital status (married)			2.1611***			0.3524			1.0200*
Marital status (divorced)	1.0477*	1.0742*	1.3312*	2.0549	2.0646	0.8048***	1.7995	1.8189	0.9306*
Marital status (widow/widower)	1.6718*	1.6391*	0.5550*	2.1202	2.1250	0.6686***	1.3168*	1.3406*	1.0459*
Variables related to the household									
Number of household members (number=1)	-	-		-	-		-	-	
Number of household members (number=2)	1.0461*	1.1032*	0.7830*	0.8402***	0.8425***	1.1339*	0.5349	0.5246	0.7662**
Number of household members (number=3)			1.7814*	0.9468*	0.9477*	1.1729*			1.6005***
Number of household members (number=4)	0.6397	0.6008	0.0000*			1.7758*	0.9655*	0.9774*	0.6621*
Number of household members (number≥5)	0.8899*	0.8277*	0.0000*	0.9110*	0.9170*	0.0000*	1.0006*	1.0013*	0.0000*

Table 6. *Logit models for reference person in the different clusters.*

Source: own elaboration. Dependent variable: = 1 if the reference person of the household is a member of an individual private pension plan and/or has a voluntary retirement insurance; 0 = otherwise. The reference category for the dummy variables with two or more categories is indicated with an empty cell. The dash indicates that there is no value.

***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively, of t-statistics.

6. CONCLUSIONS

The data reveal that approximately one in five households in Spain has an individual private pension plan. This ratio drops to one in six when focusing only on those households with low real assets, higher expected future income, characterised by low disposable income, and whose reference person is far from retirement.

Our study emphasizes the importance of distinguishing the household member participating in the occupational pension plan when assessing the influence, through the reference person, of the second pillar on the third pillar. If the reference person is the participant, the effect is nil; however, if it is another household member, the probability that the reference person has a third pillar instrument increases by 10.1%. This percentage rises to 46% in households with high real assets, lower expected future income, high disposable income, low indebtedness, and a reference person nearing retirement). These results, though not entirely comparable due to different surveys, models, and variables, contradict those presented by Moreno-Herrero *et al.* (2017), who worked at the household level without distinguishing the participant in the pension plan.

The results of this study show that the significance and effect of the variables related to the household and the reference person included in the logit analysis are highly sensitive to the household composition in terms of number of members and their ages. In households with two or more members aged between 18 and 65, the probability of the reference person having an individual private pension plan is unaffected by employment status, age, health status, risk aversion and real household assets. However, educational level and occupational sector have a significant impact, with a university education increasing the probability by 15%, while being single reduces the probability by 3%. In households where the only person aged between 18 and 65 is the reference person, gender is no longer significant, and educational level now heavily favours high school). Marital status (being widowed or divorced) decreases the probability by 28% and 16%, respectively.

Some results regarding the relationship between household economic characteristics and the existence of a substitute or complementary effect between the second and third pillars lack sufficient explanation. The data aims to determine if there are mandatory occupational pension plans within the productive sector where the individual in question is employed. The EFF2020 provides information on the occupational sector, which doesn't align with the National Classification of Economic Activities 2009 (Spain, 2007). The latter is closely linked to the established structures of social dialogue in Spain (Boj *et al.*, 2022).

The personal socio-demographic variables used in this paper focus on the reference person, who is the one who answered the survey and that normally coincides with the person handling household economic matters (Banco de España, 2022a), making comparisons with other papers challenging (e.g. Moreno-Herrero *et al.*, 2017). The Bank of Spain defines the head of household as the reference person designated by the household for the purposes of answering the survey if he is male, or the partner of the reference person, if the reference person is female, providing the partner resides in the household (Banco de España, 2022b). The problems arising from this anachronistic definition of the head of household will be analysed in subsequent papers.

The relationship between contributions to second and third pillar instruments will be explored when EFF data for the 2023, the year after the latest regulatory changes (Spain, 2020, 2022) becomes available.

The results highlight gender disparities in individual private pension plans, showing that women who live with other adults aged 18-65 have fewer plans than their male counterparts, while women who do not live with other adults aged 18-65 have more plans. Table 5 and Table 6 confirm these influences on the likelihood of having an individual private pension plan. On the other hand, it appears from the data that marital status and age also have an influence on the likelihood of having an individual private pension plan. Further analysis is needed to understand the cross-over effect between gender, marital status and age, shedding light on

saving patterns in third pillar products with homogeneous groups.

In resolving the dilemma of whether the second and third pillars in Spain are complementary or substitutes, this study concludes that, globally, these two pillars complement each other. Policies promoting occupational pillar development positively influence contracts for individual savings instruments. These findings provide objective data that can help the social partners, the social welfare industry and legislators to contemplate measures for the advancement of complementary social welfare.

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8. APPENDIX

Variables related to the reference person	
Educational level	Less than high school =1 High school=1 University=1
Employment status	Employed=1 Self-employed=1 Retired=1 Unemployed or other inactive type =1
Occupational sector (OS)	Management of companies and public administrations (OS=1)=1 Scientific and intellectual technicians and professionals (OS=2)=1 Technicians and support professionals (OS=3)=1 Administrative type Jobs (OS=4)=1 Catering, personal services, protection and shop assistant workers (OS=5)=1 Skilled workers in agriculture and fishing (OS=6)=1 Skilled craftsmen and skilled workers in manufacturing, construction and mining, except plant and machinery operators (OS=7)=1 Stationary plant and machinery operators and fitters (OS=8)=1 Unskilled workers (OS=9)=1 Armed Forces (OS=10)=1 Not recorded (OS=11)=1
Age	18 ≤ Age <25; 25 ≤ Age <35; 35 ≤ Age <45; 45 ≤ Age <55; 55 ≤ Age ≤65
Gender	Male =1 Female=1
Health	Good=1 Acceptable =1 Bad=1
Marital status	Single=1 Married=1 Divorced=1 Widow/widower=1
Variables related to the household	
Ratio of expenditure to income (%)	Expenditure (food, other non-durable goods and cars and other vehicles) over household income
Risk aversion	The household does not like to take risks =1 At-risk household =1
Real assets (€)	Natural logarithm of the value of wealth in real assets
Evolution of the household's future income	Higher future income=1 Equal future income=1 Lower future income=1
Ratio of debt to income (%)	Debt (purchase of the main residence or other real estate properties, plus any other household debt, including credit card debt and debts with family or friends) over household income
Ratio of debt payments to income (%)	Debt annual payments (including repayment of principal and interest payments) over household income
Per capita income	Logarithm of household income per capita
Number of members (Models 1 and 2)	Number=2; Number=3; Number=4; Number ≥5
Number of members (Model 3)	Number=1; Number=2; Number=3; Number=4; Number ≥5

***Table 7**. Details on explanatory variables. Source: own elaboration based on Banco de España (2022b).*

Variables	% of households		
	General	***DB1***	***DB2***
Age			
18 ≤ Age <25	0.84	0.86	0.78
25 ≤ Age <35	9.17	9.48	8.33
35 ≤ Age <45	26.62	27.98	22.84
45 ≤ Age <55	**33.14**	**33.23**	32.91
55 ≤ Age ≤65	30.22	28.45	**35.15**
Gender			
Male	**54.30**	**55.25**	**51.67**
Female	45.70	44.75	48.33
Educational level			
Less than high school	**50.97**	**50.50**	**52.29**
High school	22.03	22.77	19.97
University	27.00	26.73	27.74
Marital status			
Single	29.74	18.43	**61.16**
Married	**52.36**	**69.43**	4.97
Divorced	16.64	9.53	28.83
Widow/widower	3.26	2.61	5.04
Employment status			
Employed	**57.05**	**58.65**	**52.61**
Self-employed	11.48	12.38	8.97
Unemployed	25.05	22.79	31.31
Retired	6.42	6.18	7.10
Health			
Good	**76.39**	**77.16**	**74.23**
Acceptable	19.24	18.96	20.01
Bad	4.37	3.88	5.75
Occupational sector			
Management of companies and public administrations	13.80	15.42	9.29
Scientific and intellectual technicians and professionals	12.43	12.23	12.99
Technicians and support professionals	10.01	9.38	11.75
Administrative type Jobs	11.28	10.55	13.29
Catering, personal services, protection and shop assistant workers	**16.50**	**16.56**	**16.34**
Skilled workers in agriculture and fishing	1.51	1.39	1.85
Skilled craftsmen and skilled workers in manufacturing, construction and mining, except plant and machinery operators	9.51	9.58	9.32
Stationary plant and machinery operators and fitters	8.46	9.11	6.66
Unskilled workers	14.74	14.22	16.18
Armed Forces	0.77	0.69	1.01
Not recorded	0.99	0.87	1.31

Table 8*. Descriptive statistics of the categorical explanatory variables related to the reference person. Source: own elaboration based on Banco de España (2022b).*

	% of households		
	General	***DB1***	***DB2***
Number of members			
1	18.58	-	**70.20**
2	**26.18**	28.36	20.13
3	24.84	**30.83**	8.20
4	22.38	30.08	0.99
>=5	8.01	10.72	0.48
Risk aversion			
the household does not like to take risks	**78.46**	**77.92**	**79,94**
At-risk household	21.54	22.08	20,06
Evolution of the household's future income			
Higher future income	38.84	38.69	39,27
Equal future income	**48.91**	**48.94**	**48,80**
Lower future income	12.25	12.37	11,93

Table 9. *Descriptive statistics of the categorical explanatory variables related to the household Source: own elaboration based on Banco de España (2022b).*

Variable	***Minimum***	***Maximum***	***SD***	***Mean***	***Median***	***1st Quartile***	***3rd Quartile***
General							
Real assets (€)	0	22,246,641	385,216	208,653	127,000	32,599	244,610
Per capita income (€)	0	148,667	13,035	15,444	11,936	7,460	19,297
Ratio of total expenditure to total income	0.01	175.93	2.25	0.66	0.32	0.16	0.63
Ratio of debt to income	0	460.78	7.61	2.46	0.93	0.22	2.63
Ratio of debt payments to income	0	160.49	1.17	0.32	0.15	0.07	0.30
DB1							
Real assets (€)	0	25,347,463	435,403	229,496	145,121	55,000	261,430
Per capita income (€)	0	166,612	14,753	13,796	11,480	7,311	17,943
Ratio of total expenditure to total income	0.01	62.23	0.52	0.81	0.32	0.18	0.59
Ratio of debt to income	0	140.75	1.89	3.35	0.86	0.20	2.40
Ratio of debt payments to income	0	19.98	0.23	0.39	0.14	0.06	0.27
DB2							
Real assets (€)	0	4,017,500	255,638	148,805	86,810	100	180,000
Per capita income (€)	0	99,928	14,297	17,712	13,253	8,007	23,414
Ratio of total expenditure to total income	0.02	125.71	3.98	0.87	0.34	0.18	0.67
Ratio of debt to income	0	425.79	13.74	3.33	1.07	0.23	3.04
Ratio of debt payments to income	0	84.41	2.68	0.51	0.19	0.10	0.39

Table 10*. Descriptive statistics of the non-categorical explanatory variables related to the household. DB1 and DB2.Source: own elaboration based on Banco de España (2022b).*

Variables	**% of households**								
	Cluster 1			**Cluster 2**			**Cluster 3**		
	General	**DB1**	**DB2**	**General**	**DB1**	**DB2**	**General**	**DB1**	**DB2**
Age									
18 ≤ Age <25	0.29	0.34	0.14	0.72	0.71	0.77	1.14	1.20	0.98
25 ≤ Age <35	3.74	4.64	1.13	6.28	5.84	7.50	14.46	15.54	11.51
35 ≤ Age <45	20.47	23.39	12.02	23.80	24.99	20.51	32.05	**33.16**	28.97
45 ≤ Age <55	32.47	31.24	36.02	32.91	**34.39**	28.82	**33.63**	32.39	**37.07**
55 ≤ Age ≤65	**43.47**	**40.39**	**50.69**	**36.29**	34.07	**42.40**	18.72	17.72	21.47
Gender									
Male	**52.95**	**52.19**	**55.18**	51.51	**51.81**	**50.70**	**52.86**	**60.17**	**51.83**
Female	47.05	47.81	44.82	48.49	48.19	49.30	41.83	39.53	18.17
Educational level									
Less than high school	**52.60**	**50.86**	**57.65**	**49.04**	**50.00**	**46.41**	**52.86**	**50.99**	**58.03**
High school	18.26	19.77	13.88	22.99	23.40	21.85	22.00	22.93	19.44
University	29.14	29.37	28.47	27.97	26.60	31.74	25.14	26.08	22.53
Marital status									

Single	20.83	9.95	**52.32**	26.80	15.62	**57.65**	36.18	24.61	**68.19**
Married	**58.46**	**76.21**	7.13	54.28	**71.64**	6.38	**48.08**	**64.54**	2.57
Divorced	16.56	9.76	36.24	14.26	9.43	27.57	14.51	9.57	28.17
Widow/widower	4.14	4.08	4.31	4.67	3.31	8.40	1.23	1.28	1.07
Employment status									
Employed	**53.81**	**47.81**	**56.40**	**60.12**	**61.10**	**57.42**	**54.22**	**57.38**	**45.49**
Self-employed	17.89	18.21	16.97	9.23	10.40	5.99	12.30	13.02	10.30
Unemployed	20.93	20.04	23.50	21.99	20.60	25.83	30.13	26.39	40.48
Retired	7.37	8.84	3.13	8.66	7.90	10.76	3.35	3.21	3.73
Health									
Good	**69.65**	**67.97**	**74.53**	**76.04**	**76.24**	**75.51**	**78.88**	**81.17**	**72.54**
Acceptable	24.30	26.810	17.06	18.95	18.61	19.90	18.04	16.96	21.05
Bad	6.04	5.22	8.41	5.00	5.15	4.59	3.08	1.87	6.41
Occupational sector									
Management of companies and public administrations	**21.28**	**21.99**	**19.24**	12.81	**15.00**	**6.77**	**12.70**	13.88	9.45
Scientific and intellectual technicians and professionals	11.98	10.37	16.64	13.03	12.35	14.90	11.84	12.67	9.53
Technicians and support professionals	9.16	9.40	8.46	10.59	9.37	13.96	9.54	9.38	9.98
Administrative type Jobs	10.45	10.94	9.04	12.22	10.98	15.63	10.37	9.91	11.66
Catering, personal services, protection and shop assistant workers	14.31	15.18	11.81	14.94	15.36	13.78	19.12	**18.48**	**20.89**
Skilled workers in agriculture and fishing	1.93	2.10	1.45	1.29	1.02	2.04	1.65	1.62	1.72
Skilled craftsmen and skilled workers in manufacturing, construction and mining, except plant and machinery operators	8.01	6.39	12.69	9.06	10.04	6.34	10.52	9.98	12.03
Stationary plant and machinery operators and fitters	6.51	7.53	3.54	9.46	9.96	8.09	7.82	8.54	5.82
Unskilled workers	14.49	13.64	16.95	14.54	14.47	14.73	15.07	14.10	17.77
Armed Forces	0.82	1.10	0	0.64	0.46	1.13	0.99	0.85	1.15
Not recorded	1.05	1.35	0.18	1.43	0.99	2.63	0.43	0.58	0.00

Table 11. *Descriptive statistics of the categorical explanatory variables related to the reference person. Clusters.Source: own elaboration based on Banco de España (2022b).*

	% of households								
	Cluster 1			**Cluster 2**			**Cluster 3**		
	General	**DB1**	**DB2**	**General**	**DB1**	**DB2**	**General**	**DB1**	**DB2**
Number of members									
1	17.82		**69.36**	18.92		**71.13**	18.41		**69.30**
2	**28.82**	31.31	21.60	**25.09**	27.19	19.29	**26.74**	28.92	20.73
3	27.40	**34.20**	7.74	24.60	30.41	8.55	24.36	**30.31**	7.90
4	20.22	26.85	1.03	23.33	**31.52**	0.71	21.85	29.27	1.34
>=5	5.74	7.63	0.27	8.07	10.88	0.33	8.64	11.50	0.72
Risk aversion									
the household does not like to take risks	78.84	77.33	83.22	79.98	80.26	79.23	76.431	75.20	79.82
At-risk household	21.16	22.67	16.78	20.02	19.74	20.77	23.57	24.80	21.16
Evolution of the household's future income									
Higher future income	0.15	0.20	0	0.28	0.17	0.55	98.84	98.67	99.30
Equal future income	0.27	0.36	0	99.67	99.80	99.30	0.75	0.87	0.44
Lower future income	99.58	99.44	100	0.06	0.03	0.15	0.41	0.46	0.26

Table 12*. Descriptive statistics of the categorical explanatory variables related to the household. Clusters Source: own elaboration based on Banco de España (2022b).*

Variable	*Min.*	*Max.*	*SD*	*Mean*	*Median*	*1st Q*	*3rd Q*
Cluster 1							
General							
Real assets (€)	0	6,740,000	412,140	247,056	145,000	45,025	286,000
Per capita income (€)	239	181,493	24,084	19,440	12,558	7,411	22,031
Ratio of total expenditure to total income	0	211.12	4.51	0.68	0.35	0.17	0.63
Ratio of debt to income	0	248.19	9.23	2.10	0.22	0	1.39
Ratio of debt payments to income	0	35.19	0.47	0.17	0.06	0	0.18
DB1							
Real assets (€)	0	7,995,038	455,263	279,638	166,000	70,000	310,000
Per capita income (€)	1,003	196,201	26,163	19,177	12,061	7,162	20,429
Ratio of total expenditure to total income	0	2.83	0.42	0.52	0.42	0.26	0.63
Ratio of debt to income	0	83.28	3.02	1.24	0.35	0	1.33
Ratio of debt payments to income	0	2.13	0.18	0.14	0.09	0	0.18
DB2							
Real assets (€)	0	2,656,761	223,278	152,475	77,748	5,409	202,317
Per capita income (€)	239	111,406	16,520	20,158	15,020	7,952	29,610
Ratio of total expenditure to total income	0	62.83	3.76	0.75	0.28	0.15	0.60
Ratio of debt to income	0	335.11	8.26	1.6	0.13	0	1.21
Ratio of debt payments to income	0	48.61	2.37	0.27	0.02	0	0.18
Cluster 2							
General							
Real assets (€)	0	10,462,00	361,373	223,657	143,000	60,000	270,000
Per capita income (€)	0	124,916	12,324	16,178	12,682	7,959	20,391
Ratio of total expenditure to total income	0	33,600	635.29	25.15	0.32	0.17	0.61
Ratio of debt to income	0	220,000	1,590	28.16	0.23	0	1.50
Ratio of debt payments to income	0	17,412	269.20	7.45	0.07	0	0.18
DB1							
Real assets (€)	0	12,424,638	361,553	237,216	154,216	70,200	300,000
Per capita income (€)	209	124,916	11,214	14,879	11,936	7,699	18,501
Ratio of total expenditure to total income	0	24.13	0.78	0.51	0.33	0.18	0.57
Ratio of debt to income	0	124.47	3.48	1.31	0.28	0	1.44
Ratio of debt payments to income	0	8.04	0.31	0.15	0.07	0	0.17
DB2							
Real assets (€)	0	17,793,17	204,738	155,896	105,000	15,300	185,000
Per capita income (€)	0	94,185	14,344	19,761	15,945	9,470	25,365
Ratio of total expenditure to total income	0	16,716	632	38.32	0.33	0.19	0.60
Ratio of debt to income	0	70,000	2,382	88.78	0.06	0	1.34
Ratio of debt payments to income	0	16,248	399	16.40	0.04	0	0.20
Cluster 3							
General							
Real assets (€)	0	7,185,208	315,794	173,100	109,182	350	217,000
Per capita income (€)	0	90,591	10,307	13,347	10,822	6,763	16,606
Ratio of total expenditure to total income	0	41,520	846.64	51.62	0.34	0.17	0.69
Ratio of debt to income	0	340,000	6,804	322.49	0.35	0	2.40
Ratio of debt payments to income	0	29,520	485.55	22.52	0.08	0	0.27
DB1							
Real assets (€)	0	7,185,208	348,547	195,551	120,000	10,000	230,000
Per capita income (€)	0	84,562	9,624	13,072	10,792	6,841	16,140
Ratio of total expenditure to total income	0	26,000	570	15.25	0.33	0.18	0.60
Ratio of debt to income	0	82,000	1,006	17.59	0.49	0.01	2.54
Ratio of debt payments to income	0	5,160	86.63	2.27	0.09	0	0.24
DB2							
Real assets (€)	0	6,328,312	184,477	110,467	50,000	0	1,500,00
Per capita income (€)	0	104,841	17,269	15,914	11,007	6,701	19,354
Ratio of total expenditure to total income	0	26,000	1,290	132.12	0.40	0.21	0.74
Ratio of debt to income	0	127,401	3,647	234.31	0.08	0	1.52
Ratio of debt payments to income	0	9,360	410	31.37	0.03	0	0.24

Table 13. *Descriptive statistics of the non-categorical explanatory variables related to the household. Clusters.*

Source: own elaboration based on Banco de España (2022b).