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# Financial literacy: an exploratory analysis in Portugal

**TAVARES Fernando Oliveira**
*ISCET - Higher Institute of Business and Tourism*

**ALMEIDA Luís Gomes**
*ISCET - Higher Institute of Business and Tourism*

**SOARES Vasco Jorge**
*ISVOUGA - Higher Institute of Between Douro and Vouga*

**TAVARES Vasco Capela**
*ISEG-UL - Lisbon School of Economics & Management, University of Lisbon*

***Abstract:***

*This work aims to verify, through an exploratory factor analysis, which are the determinants of the financial literacy of the Portuguese over 18 years old. The quantitative method is used, by using a questionnaire survey, and 839 surveys were obtained. It is observed that the factors resulting from the exploratory factor analysis are: (1) planning and financial goals to 1-2 years, (2) long-term savings and (3) the taste for numerical calculation. We analyse the statistically significant differences between means regarding gender, school education, the existence of household budgets and age. It is concluded that it is important to obtain some financial training at the beginning and throughout life, to better be able to make the financial family planning, to make applications with better return and to reduce the financial risk of the family. It is concluded that the closer to the retirement age, the more people tend to save, since during retirement income usually decreases.*

***Key words:*** *Financial literacy, Financial education, Financial literacy, Financial decisions, Financial well-being.*

## 1. Introduction

Financial literacy is not uniquely and universally defined, although it is understood as a measurement of the level to which a person understands key financial concepts, and which offers capability and confidence to individuals to manage their personal finances conveniently. In that sense, financial literacy allows to make solid short-term decisions, to make a financial plan on the long run, and to be aware of the everyday events and of changes in the economic conditions.

Financial literacy became an essential social competence to live and thrive in modern economy, affecting economic and financial stability, both individually and collectively. The decisions and financial risks taken today by populations are much more challenging than the ones taken by previous generations. This is associated with the development and complexification of the financial markets, as well as with the increasingly easy and premature access to financial products and services.

To authors such as Cull & Whitton (2011) and Bianco & Bosco (2011), studying financial literacy is important and crucial to the future of the world economy. Bad decisions taken today may affect the individual well-being forever, as well as the future of the economy. Moreover, Tavares et al. (2020) regards financial literacy as an important tool for the effective functioning of today's society, improving its general and economic well-being and supporting social inclusion.

The development and constant change of the world economy and the increasing complexification and sophistication of financial markets, in addition to strong consumer marketing, leads to consumption and excessive credit of consumers. This makes the increase of the level of financial knowledge an imperative subject, as well as its application, in order to overcome the difficulties this evolution conveys. Consumers with higher levels of financial literacy, that is, with greater knowledge and financial capability, are less vulnerable.

The economic-financial crisis initiated in 2007 showed that poorly informed and inconsequent financial decisions have dramatically negative implications on individual and global levels, emphasizing financial literacy, which became considered and regarded as an essential tool for the 21st century (Lusardi, 2015).

In this work, a questionnaire survey was used, which was a data collection method that presents big advantages and was adopted by various authors like, for instance, Chen & Volpe (1998) and by the Jumpstart organization (Mandell, 2009). In a first phase, its results allow to identify the priority areas of operation and, next, also constitutes an important tool in the elaboration of financial training programmes.

The objective of this work is to study the level of financial literacy of the Portuguese population over 18 years old. To achieve the proposed goals, beyond this introduction, this article presents in the next section the review of the literature on this topic. Posteriorly, the methodology used in the study is presented, which is followed in the next section by the presentation and analysis of the study's results. Finally, conclusions are presented.

## 2. Literature Review

There is evidence in the literature which indicates that financial literacy directly impacts indebtedness and, consequently, the household default rate, constituting a variable that contributes to the psychological, social and health aspects of societies. Financial literacy has been gaining preponderance through studies which demonstrate that individuals with better levels of financial literacy and financial education can make better decisions, plan consumption and savings better and carry out better plans, throughout their lives. These individuals make better financial decisions for their families, which allows them to improve their economic stability and safety, and financial well-being.

The number of mortgage loans, bankruptcies and consumer over-indebtedness are a global preoccupation, and constitute an objective of public politics, analysed and explained by financial literacy (Huston, 2010).

Authors such as Huston (2010), and Fernandes, Lynch & Netemeyer (2014) refer that although it is a subject of known relevance, there is no consensus about a definition and globally accepted operationalization of financial literacy.

According to Xu & Zia (2012), the term financial literacy may comprise different subjects, among which, sensibilization and knowledge about finance, financial products, institutions, personal abilities, money management capability, and financial planning. According to the reviewed literature, financial literacy has been defined by several authors. Despite having diverse definitions, in a generic way financial literacy is defined by knowledge, abilities, and competences in making responsible financial decisions.

Financial literacy allows people to communicate about financial concepts and to become apt to manage their personal finance, make appropriate financial decisions and to be confident when efficiently planning the future of financial needs. For Huston (2010), financial literacy has two dimensions: comprehension and utilization. Comprehension aggregates the knowledge of personal finance, while utilization is referent to the application of personal finance. Therefore, the author considers that financial literacy is not the same as financial knowledge, because financial literacy implies the capability to make financial decisions with the possessed knowledge. Huston (2010) also refers that financial education may be understood as someone's capability to understand the financial information attached to operational transactions. For Aksoylu et al. (2017), financial alphabetization can be defined as the ability to understand financial concepts and questions, in order to make the right decisions before changes in financial conditions and to manage the own financial status through financial planning.

Remund (2010) considers that, despite the lack of agreement about the best definition of financial literacy, investigators are fast to identify the reasons why people have low levels of financial literacy. The author, in his investigation, divided the arguments responsible for the low levels of financial literacy in populations into three categories: (i) the banking deregulation and the increase in the complexity of the global economy, which is in accordance with the conclusions of Anthes (2004) and Kozup & Hogarth (2008); (ii) the lack of contact with financial education in schools, which is also the opinion of Anthes (2004); Edwards, Allen & Hayhoe (2007); Fox, Bartholomae, & Lee (2005) and, (iii) a persuasive culture of immediate satisfaction, caused by aggressive consumer marketing and a proliferation of available credits, which is also referred by authors such as Anthes (2004); Kozup & Hogarth (2008).

Lusardi & Mitchell (2014) mention that consumers with an inferior level of literacy are less likely to plan their retirement, to accumulate wealth, or to invest in stocks. On the contrary, these consumers are more likely to contract a loan in disadvantageous conditions. On the other hand, Messy & Monticone (2016) corroborate the opinion of Lusardi (2015) that financial literacy is a critical competence in the 21st century, as an element of stability in the economic development and growth, through promoting and raising awareness of actions on the economy, both in individual and in collective aspects.

The authors Huston (2010), Opletalová (2015) and Tavares & Santos (2020) regard financial literacy as the ability people have to manage their own personal finance, and as a tool to intellectually enable more responsible decision-making, which turns it into a hot subject in works of academic research and investigation. Pacheco, Ribeiro & Tavares (2016) observe that on a political level there has been a growing preoccupation regarding financial literacy, evaluated by the adoption of policies and measures that intend to financially alphabetize populations. The different governments acknowledge and accept that the lack of financial alphabetization is one of the variables that leads to bad financial decisions, especially on indebtedness, which generates repercussions on the economy (Braunstein & Welch, 2002; Huston, 2010).

Having high levels of financial illiteracy has thus been a preoccupation of both developing countries and more industrialized countries (Mandell & Klein, 2009). According to Fernandes, Lynch & Netemeyer (2014), financial literacy is the antidote needed in the combat against the growth and complexity of the financial decisions that families face. Also, Messy & Monticone (2016) and Tavares, Almeida & Cunha (2019) defend that there should be efforts to perfect it, with the goal of protecting families and helping the world's economic growth. Rjitsalu (2018) concluded that offering courses to increase financial education presents positive results by the end of 6 months, thus concluding that education on this level must be improved, since it comes with an increase in financial literacy.

Additionally, Andreou & Philip (2018) appraised the financial behaviour of the students in the five biggest universities in Cyprus, with ages comprised between 18 and 24 years, and observed that 6.24% of the students answered to all questions correctly, and that 36.9% presented a good level of proficiency in financial knowledge. The authors found evidence that parental background and their counselling does not play an important role to high financial knowledge. Moreover, Allgood & Walstad (2016) appraised the impact of financial training on the financial behaviour of North Americans. The authors tested the impact of the training on the behaviour of individuals regarding the utilization and resource to credit cards, investments, loans, insurances, and financial consultancy. A probit analysis was carried out, finding evidence that the apprehended financial literacy influences financial behaviours. Likewise, Boisclair, Lusardi & Michaud (2017) found evidence for Canadians that lower educational levels are directly related with low levels of financial literacy. The authors conclude that 42% of the sample presents good levels of financial knowledge, and that planning retirement is directly related with higher levels of training.

The authors Amagir et al. (2018) carried out a systematic literature review and evaluated the effectiveness of the education programmes and interventions on the financial education for children and teenagers. The results prove that the financial education programmes at schools can improve financial knowledge and the attitudes of children and teenagers. The authors conclude that for children and adolescents, at primary and secondary schools, experimental forms of learning must be utilized, while at universities the focus should be on specific life events of these students.

In a study for Brazil, Potrich, Vieira & Kirch (2018) found a correlation between financial literacy and gender, as men presented higher levels of financial literacy. The authors concluded that more efforts should be done to improve the level of financial literacy, especially for single women with low income and education levels. In a study for Austria,

Silgoner, Greimel-Fuhrmann & Weber (2015) found evidence of financial illiteracy in the population, especially among women, both young and elderly people, and people with low education and training levels. The authors conclude that the lack of financial knowledge leads to risky financial behaviour, such as insufficient savings, lack of a retirement plan, contracting loans for no reason, impulse purchasing, and compulsive consumption. In a study for Asia, Yoshino, Morgan & Wignaraja (2015) concluded that an effective management of the savings and investments of the families contributes to the general economic growth. Furthermore, as societies age and government taxes increase, families become more responsible of their own retirement plan. Agarwal et al. (2015) investigated about financial literacy in India on the perspective of financial planning, having concluded that the vast majority of the interviewees was financially alphabetized regarding questions such as interest rates, inflation, and risk / diversification. However, there were found variations among demographic and socio-economic groups, finding evidence of diversity between the groups when risk tolerance, investment preferences, and investments goals were analysed.

Table 1 presents some of the most relevant conclusions of some studies on financial literacy.

**Table 1 – Studies on the Importance of Financial Literacy.**

| Description of the items | Authors |
|---|---|
| People with more financial skills can make better decisions. | Mandell & Klein (2009) |
| Financial literacy is particularly important when financial products are complex. Financial ignorance conveys significant costs. | Lusardi & Tufano (2015); Calcagno & Monticone (2010) |
| People with strong financial skills make better work planning and retirement savings, as well as presenting less indebtedness and more savings. Generally, families increase their levels of savings in times of economic recession. | Klapper, Lusardi & Panos (2012); Lusardi (2015). |
| Financial literacy avoids the over-indebtedness of populations, allows for financial safety, and contributes for the economic growth of societies. Financially literate people can bear economic shocks more easily, without having to resort to credit. | Lewis & Messy (2012). |
| Consumers with financial literacy make better decisions for their families and improve their economic safety and well-being. | Rahmandoust et al. (2011). |
| The business world is constantly changing and is abundant in information, and only with financial literacy one can establish a balance between the relevance of information and the ability to perceive and interpret that information. | Gouws & Shuttleworth (2009) |
| The omnipresence of the banking system and the crescent complexity of the financial instruments are the basis of the increasing investment into financial training. | Lusardi & Mitchell (2011); Messy & Monticone (2016) |

Source: Own elaboration.

Table 2 presents the most studied items/aspects in financial literacy.

**Table 2 – Items / aspects studied in financial literacy**

| Description of the items | Authors |
|---|---|
| The studies on financial literacy are associated with diverse items: gender, age, education level, region, marital status, professional situation, income level, training on economy/finance, experience, and knowledge in finance, jobs, and career. | Robb, Babiarz &Woodyard (2012); Fonseca et al. (2012); Monticone (2010) |
| Points responsible for low financial literacy: the banking deregulation, the increasingly complex global economy, the lack of contact with financial education at schools, the persuasive culture driven by consumer marketing. | Anthes (2004); Edwards, Allen & Hayhoe (2007); Fox. |
| Knowledge of financial investors. | Abreu & Mendes (2010) |
| Education level of the parents. | Lusardi & Mitchell (2014) |
| Basic notions of stocks and risk diversification. | Finke, Howe & Huston (2016). |
| Factors that impact financial literacy are: (i) the financial education and training taught by the family during childhood and adolescence, (ii) the financial training and education taught in school during childhood and adolescence, (iii) perceptions about savings, and (iv) the comprehension about the cost of money. | Pacheco, Ribeiro & Tavares (2016). |
| The levels of financial literacy impact the probability to accumulate wealth and to plan the retirement. | Bernheim & Garrett (2003); Cutler & Delvin (2000); Chen & Volpe (2005) |
| Ability to analyse interest rates, inflation, risk diversification and sales discount. | Knoll & Houts (2012), Lusardi &Mitchell (2014) |
| Inflation, interest rates, the cost of money throughout time, risk, diversification, stock market, credit, government bonds, and financial alphabetization. | Potrich, Vieira & Kirch (2018) |
| Financial alphabetization of young people, and socio-economic and demographic factors. | Garg & Singh (2018). |

Source: Own elaboration.

The most studied items on financial literacy are: gender, age, education level, region of the study, marital status, professional situation, indebtedness level, training on economics or finance, experience and knowledge of financial products, job, and profession. There are still other studies that connect the level of financial literacy with financial training and education obtained throughout life and at school, and the individual perceptions regarding savings and the cost of money. For these past two decades, it has been observed that studied have been branching out towards other areas, such as: knowledge on short-term and long-term interest rates, inflation rates, analysis of profitability and risk, the value of money throughout time, diversification, stock market and government bonds, and financial alphabetization.

In their studies, the authors Knoll & Houts (2012) and Lusardi & Mitchell (2014) utilized measures to evaluate interest rates, inflation, and risk diversification. Plus, Klapper et al. (2015) included four questions of financial education which covered simple interest rates, compound interest rates, inflation rates, sales discounts, the value of money over time,

besides other questions on the knowledge related with complex financial instruments such as: stocks, securities and mutual funds, and knowledge on concepts like risk diversification and the trade-off between risk and return.

## 3. Methodology

Considering that approximating the phenomenon is intended, with the goal to know its different characteristics, the most adequate methodological approach to initiate this investigation was considered to be the quantitative (Günther, 2006). This study was based on the application of a self-administered questionnaire survey, composed of two parts. Firstly, a set of questions on the demographic profile of the respondents and their knowledge and habits of financial literacy was put forward. The second part comprises an adaptation of the questionnaire presented in the study of Fernandes, Lynch & Netemeyer (2014). To assess the scale of knowledge and perceptions of attitudes, a 5-point Likert scale was used (1 – Completely disagree to 5 – Completely agree).

The final version of the questionnaire was pre-tested with 50 queries. After minor adjustments, the questionnaires were distributed for autofill, having obtained a non-probabilistic sample, composed of 839 individuals. The analysis of the data which resulted from administrating the questionnaire survey was carried out using the statistic programme IBM SPSS Statistics. The questionnaire's structure must not only integrate clear and unambiguous questions, but also allow investigators to obtain accurate information. Quivy & Campenhoudt (2008) refer that the quantitative treatment of the data which results from applying a questionnaire survey implies pre-coding the questions and aiming to limit the answers of the respondents. The survey is suggested by Quivy & Campenhoudt (2008) as a method to collect information like forms to analyse ways of living, behaviours, values, knowledge, expectations, opinions, and attitudes regarding various options. An investigation by a questionnaire survey frequently resorts to non-probabilistic sampling, where convenience samples are framed as a set of individuals who are easily identifiable and accessed by the investigator.

The questionnaires were distributed to auto fill them in person. The non-probabilistic convenience sample was initially composed of 850 people. A total of 839 were validated, with ages between 18 and 71 years, since 11 were filled irregularly. The field work was carried out between March 10 and April 20, during 2019. Filling the questionnaire took 20 to 30 minutes. To study the query, the Principal Components Analysis of the Factor Analysis (PCAFA) was used. According to Hair et al. (2005), Factor Analysis is a set of multivariate statistical techniques, which analyses the patterns of complex relationships simultaneously, in order to define the underlying structure of a group of variables. For Malhotra (2001), PCAFA is a technique of interdependence, because it examines a group of interdependent relationships simultaneously. For the author, the specification of these variables must be based on previous investigations or in the investigator's judgement. Pestana & Gageiro (2014) and Marôco (2015) explain that it is a technique of exploratory analysis which goal is to discover a measuring scale for factors that somehow control the original variables. Thus, PCAFA was utilised to trim the big number of considered variables to a much lower number

of factors. The variables destined to multivariate analysis come from questions which were obtained from answers in a 5-point Likert scale.

The Kaiser-Meyer-Olkin (KMO) test, according to Pestana and Gageiro (2014), establishes that ]0,9 – 1,0] = Marvellous; ]0,8 – 0,9] = Meritorious; ]0,7 – 0,8] = Middling; ]0,6 –0,7] = Mediocre; ]0,5 – 0,6] = Miserable; KMO<=0,5 = Unacceptable. Taking that into consideration, the Bartlett's test is added to ascertain its significance level: if it is equal to 0.000, the hypothesis that the correlation matrix of the population is the identity matrix is rejected. The values of the Cronbach's alpha, according to George & Mallery (2003), have the following interpretation: ]0,9 – 1,0] = Excellent; ]0,8 –0,9] = Good; ]0,7 –0,8] = Acceptable; ]0,6 –0,7] = Questionable; ]0,5 –0,6] = Poor; <=0,5 = Unacceptable.

The model of orthogonal rotation of factors was used, and to rotate the factor axes, the Varimax orthogonal method with a Kaiser normalization was utilized, following Marôco (2015). According to Pestana & Gageiro (2014) and Marôco (2015), the Student's t-test also tests if the average values of two populations are statistically different or not. According to these authors, the test statistic of the Student's t-test, as well as this test's critical value are only valid to compare the average values of exactly two populations. This test requires both samples to be randomly obtained from two populations and that dependent variables follow a normal distribution and homogeneous variances. In the words of Marôco (2015), for two populations (for example, A and B), where the variable X under study follows a normal distribution, the hypotheses to be tested are:

$$H_0: \mu_A = \mu_B \quad \text{vs.} \quad H_1: \mu_A \neq \mu_B$$

Or equivalently:

$$H_0: \mu_A - \mu_B = 0 \quad \text{vs.} \quad H_1: \mu_A - \mu_B \neq 0$$

In the empiric part of the questionnaire, we intend to study if there are differences between the answers of males and females that are statistically significant to a 5% significance level. That is, it is intended to study if $H_0: \mu_1 = \mu_2$ vs. $H_1: \mu_1 \neq \mu_2$. The Student's t-test was applied to test these hypotheses.

Lastly, to analyse the influence of the factors which resulted from the factor analysis in relevant items of financial literacy, the multiple linear regression was used, and the regression model was estimated observing the coefficient of correlation (R), the coefficient of determination ($R^2$), the Durbin-Watson statistic, the Kolmogorov-Smirnov normality, and the collinearity test. Therefore, analysing the regression, a p-value (observed significance level) to a significance level of 5% was considered.

The coefficient of determination (generally represented as $R^2$) measures the dimension of the effect of the independent variable on the dependent variable, as described by the regression model (Marôco, 2015). $R^2$ measures the proportion of the total variability which is explained by the regression ($0 \leq R^2 \leq 1$), or alternatively, the proportion of the total variability of Y attributable to the dependence of Y on all $X_i$ as defined by the fit of the regression model to the data. When $R^2 = 0$, the model clearly does not fit the data; on the contrary, when $R^2 = 1$, the fit is perfect. The $R^2$ value which is considered to characterize an adequate fit is subjective (Marôco, 2015). In the case of exact sciences, $R^2 > 0.9$ are generally accepted as indicators of a good fit, while in the case of social sciences, a value of $R^2 > 0.5$ is already indication of a good fit.

It was verified that there is no multicollinearity between explanatory variables, that is, in the empirical part, the variance inflation factor (VIF) was less than 2 for all models (Marôco, 2015).

## 4. Questionnaire results

In terms of generally characterizing the sample's profile, the questionnaire was answered by 839 people, 499 males (59.5%) and 340 females (40.5%), which presented an age average of 37.38 years, a minimum age of 18 years and maximum age of 71 years, with a standard deviation of 12.049. As far as their marital status is concerned, 50.5% were single or separated, 49.2% were married or in a common-law marriage, and 0.2% were widowed. Regarding education level, 2.0% studied until the 9$^{th}$ grade, 22.9% until the 12$^{th}$ grade, 49.8% have a Bachelor's degree, and 25.3% have a Master's degree or a PhD. It should be mentioned that 56.9% of the respondents were trained in the area of Economics, Management, Finance, Accounting or in similar areas, whereas 43.1% were not trained in these areas. About the annual illiquid income of the household, 14.8% presented an annual illiquid income inferior to 10.000,00€, 29.6% of the sample was located between 10.001,00€ and 20.000,00€, 18.0% between 30.001,00€ and 45.000,00€, 8.9% of the sample earns between 45.001,00€ and 60.000,00€, and 8.0% present an annual illiquid income over 60.000,00€.

### 4.1. Exploratory Factor Analysis

In the factor analysis, to conclude if it was adequate, the KMO statistic and the Bartlett's t-test were calculated. Considering the value of the KMO (0.902), which according to Pestana & Gageiro (2014) and Marôco (2014) allows for a marvellous factor analysis, and that associated with the Bartlett's test was a 0.000 significance level, the hypothesis that the correlation matrix of the population is the identity matrix was rejected. We can conclude the Factor Analysis is suitable.

Having verified the correlation between the variables in all previous tests, the factor analysis may continue, by analysing the Cronbach's alpha to verify the internal consistence of the factors. Table 3 also allows to verify that the eigenvalues of the three factors are all greater than 1 (Kaiser criterion). There were carried out many attempts so that each variable's loading was greater than 0.5, that is, the variables with a loading inferior to 0.5 were successively removed (Table 4).

Factor analysis resulted in the extraction of three factors responsible for 70.788% of the total variance (Table 3). The unexplained variance, 29.212%, may be related with other less relevant factors, resultant from other combinations of the variables.

Regarding the factor 1, observing the variables which contribute to explain it allows to conclude that we are before variables related with the planning and definition of financial goals to 1-2 years. Thus, this factor is explained by the concern of people with aspects related to maintaining a strict financial budget, checking that budget when necessary, planning and deciding how to utilize the money, and setting financial goals. All these items are referent to 1-2 years planning. This factor presents great consistency.

As far as the factor 2 is concerned, observing the variables which contribute to explain this factor supports that these are variables related with medium and long-run savings. This factor is explained by the fact that people opt to regularly put some money aside for their future, to stick to a budget, and to be cautious with money and saving, in order to prepare themselves better for old age. This factor presents good consistency.

To factor 3, there is a contribution from variables such as the satisfaction to solve every-day problems about numbers, the pleasure of working using numbers, and the pleasure of doing calculations using numerical information; items that showcase pleasure for numerical calculus. This factor presents good consistency.

**Table 3 – Total Variance explained by the answers of Financial Literacy**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 6,836 | 45,571 | 45,571 | 6,836 | 45,571 | 45,571 | 4,496 | 29,973 | 29,973 |
| 2 | 2,214 | 14,759 | 60,330 | 2,214 | 14,759 | 60,330 | 3,618 | 24,122 | 54,096 |
| 3 | 1,569 | 10,457 | 70,788 | 1,569 | 10,457 | 70,788 | 2,504 | 16,692 | 70,788 |

Source: Own elaboration.

Table 4 presents the three resulting factors from the exploratory factor analysis.

**Table 4 - Matrix of the Components of Answers about Financial Literacy**

| | Component | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| I consider the steps I should make to stick to my budget for 1-2 years. | 0,853 | | |
| I like to see my budget for the next 1-2 years to predict my future expenses. | 0,853 | | |
| I like to check my budget to see how much money I have for the next 1-2 years. | 0,825 | | |
| I previously decide how my money will be used in the next 1-2 years. | 0,814 | | |
| I feel better when I plan my personal finance for the next 1-2 years. | 0,809 | | |
| I set financial goals for the next 1-2 years. | 0,780 | | |
| I regularly put money aside for the future. | | 0,761 | |
| I am very cautious with money. | | 0,730 | |
| I follow a careful financial budget. | | 0,717 | |
| I draw financial plans for the future. | | 0,716 | |
| I save now to prepare my old age. | | 0,715 | |
| I keep track of my money. | | 0,714 | |
| Solving every-day problems about numbers is satisfactory. | | | 0,913 |
| I like to work using numbers. | | | 0,888 |
| I like to do calculations using numerical information. | | | 0,871 |
| **Cronbach's alpha** | 0,935 | 0,863 | 0,888 |

Source: Own elaboration.

### 4.2. Statistically significant difference between the means of the AFE items

Table 5 presents the statistically significant differences between the means of the diverse items in the questionnaire about financial literacy, regarding distinct genders. It is possible to observe that there is a set of items where the differences are statistically different.

**Table 5 – t-test for differences between means - gender**

| | Levene's test for the equality of variances (do we accept $H_0$?) | | | t-test for the equality of means |
|---|---|---|---|---|
| | t-test (p-value) | Male | Female | t-test (p-value) |
| I am cautious with money | 0,168 | 3,76 | 3,92 | 0,012 |
| I stick to a careful financial budget | 0,204 | 3,58 | 3,74 | 0,029 |
| Solving every-day problems with numbers is satisfactory. | 0,000 | 3,85 | 3,61 | 0,000 |
| I like to work using numbers. | 0,000 | 3,91 | 3,66 | 0,001 |
| I like to do calculations using numerical information. | 0,000 | 3,92 | 3,66 | 0,000 |

Source: Own elaboration.

Note: $H_0$ = Equality of variances/means; * p<0,05; ** p<0,01 and *** p<0,001.

It is possible to observe that females give more importance to caution when using money and pleasure in following a careful financial budget. On the other hand, males are more satisfied by solving every-day problems with numbers and by working using numbers.

Table 6 allows to observe the statistically significant differences presented by people who are trained in Finance, Accounting, Economics, and such, relatively to the rest. It is possible to recognize that for all items, averages are higher and statistically significant in people who are trained in the aforementioned areas. Also, it is evident that people value (give more importance to) budget, planning, and fulfilment of financial goals.

**Table 6 – t-test for difference between means – training in the areas of Finance, Economics, and Accounting**

| | Levene's test for the equality of variances (do we accept $H_0$?) | | | t-test for the equality of means |
|---|---|---|---|---|
| | t-test (p-value) | Yes | No | t-test (p-value) |
| I consider the steps I should make to stick to my budget for 1-2 years. | 0,033 | 3,54 | 3.38 | 0,019 |
| I like to see my budget for the next 1-2 years to predict my future expenses. | 0,037 | 3,70 | 3,57 | 0,050 |
| I previously decide how my money will be used in the next 1-2 years. | 0,148 | 3,44 | 3,29 | 0,030 |
| I set financial goals for the next 1-2 years. | 0,026 | 3,64 | 3,43 | 0,002 |
| I regularly put money aside for the future. | 0,000 | 4,03 | 3,79 | 0,000 |

| | | | | |
|---|---|---|---|---|
| I follow a careful financial budget. | 0,053 | 3,72 | 3,54 | 0,011 |
| I draw financial plans for the future. | 0,038 | 4,06 | 3,88 | 0,006 |
| I keep track of my money. | 0,151 | 4,23 | 4,08 | 0,007 |
| Solving every-day problems about numbers is satisfactory. | 0,000 | 4,03 | 3,40 | 0,000 |
| I like to work using numbers. | 0,000 | 4,10 | 3,43 | 0,000 |
| I like to do calculations using numerical information. | 0,000 | 4,02 | 3,54 | 0,000 |

Source: Own elaboration.

Note: $H_0$ = Equality of variances/means; * p<0,05; ** p<0,01 and *** p<0,001.

Table 7 allows to observe the statistically significant differences in means for individuals who present a household budget. These items, presented in EFA with statistically significant differences, all present the highest means for those who have a household budget.

**Table 7 – t-test for difference between means – Has a household budget in the household**

| | Levene's test for the equality of variances (do we accept $H_0$?) | | | t-test for the equality of means |
|---|---|---|---|---|
| | t-test (p-value) | Yes | No | t-test (p-value) |
| I consider the steps I should make to stick to my budget for 1-2 years. | 0,002 | 3,67 | 3,15 | 0,000 |
| I like to see my budget for the next 1-2 years to predict my future expenses. | 0,000 | 3,83 | 3,31 | 0,000 |
| I like to check my budget to see how much money I have for the next 1-2 years. | 0,000 | 3,86 | 3,03 | 0,000 |
| I previously decide how my money will be used in the next 1-2 years. | 0,653 | 3,93 | 3,48 | 0,000 |
| I feel better when I plan my personal finance for the next 1-2 years. | 0,000 | 3,74 | 3,22 | 0,000 |
| I set financial goals for the next 1-2 years. | 0,003 | 4,17 | 3,55 | 0,000 |
| I regularly put money aside for the future. | 0,000 | 3,97 | 3,60 | 0,000 |
| I follow a careful financial budget. | 0,000 | 3,91 | 3,18 | 0,000 |
| I draw financial plans for the future. | 0,000 | 4,20 | 3,64 | 0,000 |
| I save now to prepare my old age. | 0,001 | 3,81 | 3,22 | 0,000 |
| I keep track of my money. | 0,009 | 4,27 | 3,99 | 0,000 |

Source: Own elaboration.

Note: $H_0$ = Equality of variances/means; * p<0,05; ** p<0,01 and *** p<0,001.

In Table 8, for the statistically significant differences between means for people over 40 years old and less than 40 years old, it is seen that people who are under 40 years old regularly put money aside for the future, besides keeping more track of money. However, people over 40 years old value savings more as an objective to prepare themselves for old age.

**Table 8 – t-test for difference between means – age less than or over 40 years old**

| | Levene's test for the equality of variances (do we accept $H_0$?) | | | t-test for the equality of means |
|---|---|---|---|---|
| | t-test (p-value) | Under 40 | Over 40 | t-test (p-value) |
| I regularly put money aside for the future. | 0,235 | 3,99 | 3,84 | 0,027 |
| I save now to prepare my old age. | 0,001 | 3,44 | 3,75 | 0,000 |
| I keep track of my money. | 0,001 | 4,21 | 4,09 | 0,037 |

Source: Own elaboration.

Note: $H_0$ = Equality of variances/means; * p<0,05; ** p<0,01 and *** p<0,001.

Other statistically significant differences were studies by using Tukey tests, namely for the different levels of training and income. For the different levels of academic training, the EFA items presenting the highest means (which are statistically significant) for people who have a Master's or a PhD are: feeling better for having their finance planned for the next 2 years, putting money aside for the future regularly, having satisfaction in resolving day-to-day problems with numbers, enjoying working with numbers, and having pleasure by making calculations using numerical information.

On the other hand, regarding income difference, the items with the highest and statistically significant means are, for the level of income up to 10.000€, the fact they are very cautious with money, for those whose income is between 20.000€ and 30.000€, is tracing a financial plan for the future, and for people whose income is greater than 60.000€ it is the satisfaction of solving every-day problems using numbers.

### 4.3. Multiple Linear Regression

To perform the analysis of the multiple linear regression, the following four questions in the questionnaire were taken as independent variables: (1) I like to see my budget planned for the next 1-2 years; (2) I feel better when I plan my finance for the next 1-2 years; (3) I regularly put aside money for the future; and (4) it is satisfactory to solve every-day problems using numbers. As explanatory variables, the factors that resulted from the exploratory factor analysis were tested.

In the four models, all the variables are statistically significant to a 0.001 significance level, which means that the ordinary least squares (OLS) method has robust standard deviations. This method reveals to be adequate to bridge possible heteroscedasticity problems, prone to appear in sectional samples.

For these four models, the value of the F statistic that follows a Snedecor's F-distribution is associated with a p-value = 0.000, which means that it is statistically significant to a 0.001 significance level. So, $H_0$ is rejected, in favour of $H_1$, concluding that the model is significant.

After estimating the regression, it is seen that it presents the next explanatory ability: (1) I like to see my budget planned for the next 1-2 years, 80.8%; (2) I feel better when I plan my finance for the next 1-2 years, 73.7%; (3) I regularly put aside money for the future, 63.7%; and (4) it is satisfactory to solve every-day problems using numbers, 85.2%. In the

models, the presence of multicollinearity was verified through VIF. In addition, the model does not present multicollinearity problems, and using the Pearson's correlation matrix, it is concluded that the variables present no correlation between themselves. Regarding the assumption of the independence of the residues, through the table "Critical Values for Durbin-Watson test", $H_0$ is not rejected, which is why it may be concluded that the residues are not self-correlated. By analysing the absolute values of the standardized regression coefficients, it is seen that the independent variables of the Exploratory Factor Analysis evidence a positive effect on the explanation of the independent variable.

**Table 9 – Dependent Variable, according to what is stated in the model**

| | Model 1 – I like to see my budget planned for the next 1-2 years | | Model 2 – I feel better when I plan my finance for the next 1-2 years | | Model 3 -I regularly put aside money for the future | | Model 4 - It is satisfactory to solve every-day problems using numbers | |
|---|---|---|---|---|---|---|---|---|
| (Constant) | 3,644 | ,000 | 3,763 | ,000 | 3,928 | ,000 | 3,753 | ,000 |
| Factor 1 – Financial planning and goals to 1-2 years | 0,817 | ,000 | 0,751 | ,000 | 0,196 | ,000 | 0,108 | ,000 |
| Factor 2 – Long-term savings | 0,258 | ,000 | 0,242 | ,000 | 0,719 | ,000 | 0,706 | ,000 |
| Factor 3 – Taste for numeric calculations | 0,880 | ,000 | 0,114 | ,000 | 0,111 | ,000 | 0,902 | ,000 |
| R | 0,899 | | 0,859 | | 0,798 | | 0,923 | |
| $R^2$ | 0,808 | | 0,737 | | 0,637 | | 0,852 | |
| $R^2a$ | 0,807 | | 0,736 | | 0,635 | | 0,852 | |
| D W | 2,064 | | 2,000 | | 2,025 | | 1,994 | |
| F | 1168,240 | *** | 781,800 | *** | 487,822 | *** | 1607,781 | ,000 |

Source: Own elaboration.

Note: $H_0$ = Equality of variances/means; * p<0,05; ** p<0,01 and *** p<0,001.

## 5. Conclusions

This work's objective was to verify, through a exploratory factor analysis, which are the determining factors of the financial literacy of the Portuguese, besides verifying if there are statistically significant differences in gender and area of training.

It was concluded that there are three factors that result from the exploratory factor analysis: (1) planning and definition of financial goals to 1-2 years; (2) medium and long-run savings; and (3) a taste for numerical calculation. This is observed to meet the effected literature review, as people who are better with finance carry out a better planning and savings, making better decisions for their families and increasing their economic safety and well-being. On the other hand, the third factor of the exploratory factor analysis – the taste for numerical calculation – also meets the literature review, since the importance of being able to analyse taxes, risk, profitabilities, and discounts was referred.

Moreover, in the literature review it is referred that, among others, differences in gender, training in the area, whether there is a household budget, and age are studied. Regarding the statistically significant differences between averages, it was noticed that females are more cautious with money and closely follow a financial budget. On the other hand, males prefer to work with numbers and to perform calculations, being satisfied by solving problems with numbers. It is also seen that there is a big number of favourable statistically significant differences for those who are trained in the areas of Finance, Economics, Accounting, and alike. In fact, it is concluded it is important to obtain some training in finance in the beginning and throughout life, so that it is possible to carry out the family's financial planning, decide on applications with better profitability and lower the family's financial risk. Furthermore, it is inferred that people who have a household budget have a more balanced financial life, are better at financial planning, keep more track of their money, and save more to prepare themselves for old age, which is in accordance with the literature review.

Additionally, regarding people who are over or under 40 years old, it is determined that people who are under 40 years old regularly put money aside for the future and keep more track of their money. People who are over 40 years old save to prepare for their old age. Therefore, it is concluded that the closer to the retirement age, the more people save, because during retirement, income diminishes.

Regarding the carried out multiple linear regressions, it was fully explained that the dependent variables (1) I like to see my budget planned for the next 1-2 years; (2) I feel better when I plan my finance for the next 1-2 years; (3) I regularly put aside money for the future; and (4) it is satisfactory to solve every-day problems using numbers, are explained by the independent variables represented by the factors of the exploratory factor analysis : (1) planning and definition of financial goals to 1-2 years; (2) medium and long-run savings; and (3) a taste for numerical calculation. These independent variables add robustness to the four models that were presented. It is concluded that, as far as financial literacy is concerned, the determining factors are financial planning and goals to 1-2 years, long-term savings, and taste for numerical calculation.

It is expected that this study may help academics, investigators, and professionals to understand the levels of financial literacy of the Portuguese population better. It may also contribute to help financial education policymakers to reformulate those policies and to create tools that help in the knowledge of financial literacy, a subject that is so important for both daily and future decisions.

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