
**FINANCIAL LITERACY LEVEL AND SAVING PROPENSITY OF PORTUGUESE
HIGHER EDUCATION STUDENTS: IS THERE A RELATION?**

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Abstract

In the last decades, the savings rate of Portuguese households has followed a decreasing route, being currently one of the lowest in Europe. Additionally, and according to the 2015 financial literacy survey targeting 1100 Portuguese residents aged 16 and over, despite some improvements compared to 2010, financial literacy (FL) of the Portuguese population continues relatively low. To the extent that education matter for FL and that higher education (HE) students are likely to strongly influence Portugal's future savings rates, it is relevant to scrutinize the savings behaviours and propensity of Portuguese HE students.

Several studies have been developed analysing the importance of FL for the saving behaviour of households. However, few studies analyse this relationship in young people, let alone in HE students. The scarce literature that focused on HE students have, in general, analysed small samples and few countries (France, Indonesia, Malaysia, Thailand, Mexico, South Africa, United States) and did not address the extent to which the area of study, directly and indirectly, impact on the savings propensity.

Given the absence of publicly available information on the subject, we construct and implement a questionnaire that targeted all the HE students in Portugal. Based on 1476 valid responses, and resorting to descriptive and econometric analyses, several results are worth highlighting: 1) The vast majority of the respondents (85.8%) hold at least one type of savings product, with students from Engineering & Exact Sciences (88.1%) with the highest percentage and those from Humanities & Social Sciences with the lowest percentage (79.9%); 2) Less than half of the respondent demonstrate high FL with students from Economic & Business Sciences revealing the highest level of FL and Health & Life Sciences the lowest; 3) Both perceived (regardless of the type of savings product) and objective (in the case of the number of saving products, emergency savings and holding shares/ bonds) FL impacts positively and significantly on savings propensity of Portuguese HE students; 4) The study area matters for directly explaining the savings propensity of Portuguese HE students, with Engineering & Exact Sciences and Health & Life Sciences (Humanities & Social Sciences) students revealing, on average, all the remaining factors being held constant, higher (lower) saving propensity; 5) The study area mediates the impact FL has on the savings propensity – the impact of FL on savings propensity of Engineering & Exact Sciences students is amplified as compared to that of other study areas.

Keywords: Financial literacy; Savings propensity; Education type

Resumo

Nas últimas décadas, a taxa de poupança das famílias portuguesas tem seguido uma trajetória decrescente, sendo atualmente das mais baixas da Europa. Segundo o inquérito à literacia financeira (LF) de 2015, dirigido a 1100 residentes portugueses com pelo menos 16 anos, apesar de melhorias face a 2010, a LF da população portuguesa continua relativamente baixa. Uma vez que a educação é importante para a LF e que os alunos do ensino superior (ES) são suscetíveis de influenciar fortemente as taxas de poupança futuras de Portugal, é relevante examinar os comportamentos e a propensão à poupança (PP) dos alunos do ES em Portugal.

Vários estudos têm sido desenvolvidos analisando a importância da LF para o comportamento de poupança das famílias. No entanto, poucos analisam essa relação em jovens, e são ainda menos os que a analisam em alunos do ES. A escassa literatura relacionada com alunos do ES analisou, em geral, pequenas amostras e poucos países (França, Indonésia, Malásia, Tailândia, México, África do Sul, Estados Unidos) e não abordou até que ponto a área de estudo impacta direta e indiretamente a PP.

Dada a inexistência de informação pública disponível sobre este tópico, elaborámos e partilhámos um questionário dirigido a todos os alunos do ES em Portugal. Com base em 1476 respostas válidas, e recorrendo a análises descritivas e econométricas, vários resultados merecem destaque: 1) A grande maioria dos participantes (85,8%) detém pelo menos um tipo de produto de poupança, tendo os alunos de Engenharia e Ciências Exatas (88,1%) a percentagem mais elevada e os de Humanidades e Ciências Sociais a percentagem mais baixa (79,9%); 2) Menos da metade dos participantes demonstram alta LF, com alunos de Economia e Ciências Empresariais demonstrando o nível mais alto de LF e os de Saúde e Ciências da Vida o mais baixo; 3) Tanto a perceção do nível de LF (independentemente do tipo de produto de poupança) como a LF efetiva (no caso do número de produtos de poupança, poupança de emergência e detenção de ações/ obrigações) impacta positiva e significativamente a PP dos alunos portugueses do ES; 4) A área de estudo é importante para explicar diretamente a PP dos alunos portugueses do ES, sendo que os alunos de Engenharia e Ciências Exatas e de Saúde e Ciências da Vida (Humanidades e Ciências Sociais) revelam, em média, *ceteris paribus*, superiores (inferiores) propensão para poupar; 5) A área de estudo medeia o impacto da LF na PP - o impacto da LF na PP dos alunos de Engenharia e Ciências Exatas é ampliado em comparação com outras áreas de estudo.

Palavras-chave: Literacia financeira; Poupança; Áreas de Estudo

1. Introduction

Financial literacy can be defined as the ability to understand, analyse, manage, and communicate personal finance matters (Vitt, Kent, Lyter, Siegenthaler & Ward, 2000). According to the literature, financial literacy is positively associated with saving rates (Finney & Finney, 2018).

Population's financial literacy is assumed to be critical for countries' economic sustainability as it is expected that it is related to a pro-savings behaviour (Dudchuk, Matvijchuk, Kovinia, Salnykova & Tubolets, 2019). In addition, it tends to be positively related to small and medium enterprises adequate financial decisions (Owusu, Ismail, Osman, and Kuan 2019). In a nutshell, savings are beneficial not only for households but also for entire nations once it permits the creation of conditions for long-term investments and infrastructure development (Mahdzan & Tabiani, 2013).

Young adults, the majority of higher education students, live in a shift period where they are about to start to manage their own finance and acquire financial habits that will persist later on (Sohn et al., 2012). A study developed in eight European countries concluded that most students are not interested in their retirement plans (Ergün, 2018). Moreover, it was demonstrated that students with low financial literacy are more likely to undervalue future loan payments, which can generate future problems to repay their debt (Artavanis & Karra, 2020). One additional study, developed by Aydin & Selcuk (2019), demonstrated that those who prefer present than future time, have more negative financial attitudes due to differences in saving behaviours.

Articles relating to financial literacy and financial behaviours are not rare (e.g., Deuflhard et al., 2019; Hauff et al., 2020; Morgan & Long, 2020). However, articles studying those two variables in higher education students are scarce (Oseifuah et al., 2018; Pangestu & Karnadi, 2020). One of the few contributions in this area, namely a very recent study by Pangestu & Karnadi (2020), investigates the effects of financial literacy and materialism on the saving decisions of generation Z in Indonesia. Albeit important, this contribution focuses on urban areas with predominant Chinese participants, whose saving behaviours are totally distinct from those observed in Western Europe in general, and in Portugal in particular.

Portugal is way below the Euro area's average in terms of saving rates. Indeed, in 2018, the household saving rate in the Euro area was about 12% while in Portugal it reached a historical minimum of 4,6% (Source: INE and Eurostat), albeit in the latter country financial literacy

indicators have improved (Banco de Portugal, 2016). Considering that higher education students are the Portuguese population that in the nearby future will define household saving rates, it would be scientific pertinent to scrutinize their behaviour assessing the extent to which they are financially literate and whether the literacy degree is related to more adequate saving behaviours.

Given that a substantial number of countries face similar saving behaviour challenges as Portugal (e.g., Greece, Poland, Spain, U.K.), the evidence gathered might be useful for policy purposes beyond the Portuguese borders.

Additionally, studies focusing on (higher education) students have not explored the role of studies areas in savings propensity both as a direct or indirect (mediating) factor. This is likely to constitute a critical issue in the sense that studies areas might indicate distinct departure condition that can foster or hamper savings propensity and/ or enhance or mitigate the impact financial literacy has on savings propensity.

The present study aims to overcome the referred literature gaps and puts forward three main research questions: 1) Does financial literacy matter for HE students' savings propensity?; 2) Does the study area directly or indirectly impact (mediate) savings propensity (the role of FL on savings propensity)?; and 3) Does FL impacts distinctly on different types of savings?

To answer these research questions we constructed and implemented an online questionnaire for all Portuguese HE students. Based on the 1476 valid responses, we scrutinized the impact of FL on savings propensity resorting to binary logit models.

The dissertation is organized as follows: Section 2 presents a revision of the literature concerning both theoretical mechanisms and empirical studies regarding the impact of financial literacy and other determinants on saving rates. Section 3 explains the main hypotheses to be tested as well as the chosen methodology and the econometric specification. Further, it also specifies the proxies used for each relevant variable. Section 4 presents the results obtained with a descriptive analysis followed by a description of the results obtained from the regressions and a discussion of the results. Finally, Section 5 contains the conclusion of the study.

2. Determinants of savings propensity with a focus on financial literacy: The theoretical framework

2.1. Financial literacy and saving propensity: Main theoretical mechanisms

Savings can be simply defined as household's income minus consumption during a specific time period (Browning & Lusardi, 1996). According to Canova, Rattazzi, and Webley (2005), Keynes, in 1936, was the first to handle the topic of saving motives identifying eight: 'precaution', 'foresight', 'calculation' (referring to the desire for interest), 'improvement', 'independence', 'enterprise', 'pride' and 'avarice'. Later, Browning and Lusardi (1996) added one additional motive, the "down-payment motive", this is, the aspiration to accumulate savings to be used as down payments for expensive goods like a house.

One of the most prominent saving theories, the life cycle saving theory, developed by Modigliani and Brumberg (1954), defends that individuals plan their spending or saving behaviours over their lifetime considering their future income. For instance, they assume that people, during high earning periods, will save more while smooth expenditure. And, on the other hand, people will use their savings to fund their needs during low-income periods such as prior employment time and during retirement. Besides financial security, savings are used for specific personal needs and desires that vary from individual to individual (Canova, Rattazzi & Webley, 2005).

Although people have always been responsible for their own money and the way they manage it, it is increasingly important that individuals understand the impact of their financial choices on their well-being (Dudchuk, Matvijchuk, Kovinia, Salnykova & Tubolets, 2019). The financial market is now more complex and sophisticated (Sohn, Joo, Grable, Lee & Kim, 2012), consumers are offered a large variety of financial instruments either for borrowing and for saving (Hauff, Carlander, Gärling & Nicolini, 2020), and so, individuals must be capable of comparing the available options and understand the pros and cons of each alternative (Navickas, Gudaitis & Krajnakova, 2014). Further, the risk that people face when making those choices will have a major impact on their future (Mandell & Klein, 2009). With the increase in life expectancy, saving for pension is even more important once people will have longer periods of retirement (Hauff, Carlander, Gärling & Nicolini, 2020). Besides, there is a tendency to increase the responsibility of individuals in terms of pensions which,

was once, responsibility of the government and employers (OECD, 2006). In a nutshell, the relevance of financial literacy for savings emerges as critical.

Financial literacy comprehends the “knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life” (OECD, 2014, page 33) and, as referred, emerges usually positively associated to savings-related matters (Finney & Finney, 2018).

Financial literacy is determined by experience, expertise, and a person’s needs, and can have a positive impact on consumers’ involvement in financial markets and services (Mahdzan & Tabiani, 2013). This positive association is generated because financially literate people tend to know better how to manage their money, understand financial institutions, and also possess analytical skills (Beal & Delpachtra, 2003).

Gordon (2018) established that financial literacy equips an individual with better decision-making power. According to him, a financially literate person can create favourable long-term conditions for well-being and be an effective consumer of financially complex products. The author further argues that financial literacy is based on three basic principles: the ability to make interest rate calculations, understand the causes and consequences of inflation, and be aware of the value of risk diversification (Gordon, 2018).

A positive level of financial competence is important for the well-being of households (Dudchuk, Matvijchuk, Kovinia, Salnykova & Tubolets, 2019). Moreover, it contributes to the growth of government revenues and investment, which in turn, should finance socially significant projects and programs (Dudchuk, Matvijchuk, Kovinia, Salnykova & Tubolets, 2019). As Lusardi and Olivia (2011) state, the development of retirement plans is crucial for future security and wealth. According to these authors, those who do not implement a retirement plan, retire with approximately half the capital than those who do. Summing up, knowledge in finance makes individuals prone to better retirement conditions through better saving and insurance plans (Mahdzan & Tabiani, 2013).

According to the OECD (2006), without financial knowledge individuals would fail to decide between the savings and investment options available in the market and are more prone to be victims of fraud. Alternatively, if people understand the basic concepts of finance, they

will be more likely to save and to find financial products better adapted to their needs which will be converted into positive levels of investment and economic growth (OECD, 2006).

Based on the above, we conjecture that

H1: Financial literacy has a positive impact on the savings propensity of higher education students.

Although no theoretical fundaments were found to support the relevance of the type of education or studies area, one would expect that students enrolled in courses that involve financial-related subjects (such as economy, management, and some engineering courses) convey and diffuse higher financial-related knowledge and thus capacitate students with higher financial literacy, and ultimately yielding higher levels of savings. Several authors have already studied the impact of the participation in financial education programs and courses on savings or financial behaviours (Peng, Bartholomae, Fox & Cravener, 2007; Mandell & Klein, 2009; Chaiphath, 2019; Amari, Salhi & Jarboui, 2020) supporting the idea that those who deal with financial subjects are expected to have higher savings propensity.

Thus, we contend that

H2: The impact of financial literacy on the savings propensity of higher education students is mediated by the area of study.

2.2. Other determinants of the savings propensity

Besides financial literacy, there are other determinants for the amount individuals/ families save. These can be grouped into two main categories: the macroeconomic context, and individuals' related factors.

Factors related to macroeconomic context often include interest rates, inflation, business cycles, unemployment expectations, and geographical proximity to financial institutions, as it is related to the access and use of financial products (Morozko, Morozko & Didenko, 2018). These factors influence savings either by changes in income or changes in consumption perspectives.

A rise in interest rates implies that current savings are more attractive once those savings will yield a greater amount of future consumption (International Monetary Fund, 1990). This is often called the substitution effect because it requires the substitution of today's

consumption for the future's consumption (Elmendorf, 1996). Nevertheless, the opposite effect may also happen. Due to the income effect, an increasing interest rate implies that less money is needed to fund future consumptions leading people to save less for future projects (Elmendorf, 1996). Besides, a rise in interest rate increases future income and wealth, promoting an increase in current consumption (International Monetary Fund, 1990). A third effect, the wealth effect, supports that an increase in interest rates increases savings. The increase in interest rate lowers the present discounted value of the family's future income. Besides, it also decreases the present discounted value of future capital income, indicating a downward revaluation of financial wealth (Elmendorf, 1996). On the other hand, some authors defend that those who expect returns from investments may also increase savings when interest rates are in a descending period once the lower rate of return from the investment must be compensated by a higher saving rate (Aizenman, Cheung & Ito, 2017).

Inflation also strongly affects saving rates (Premik & Stanislawski, 2017). When facing a period of inflation growth, savings response may vary according to the way households react to this growth. If households wish to maintain their level of consumption of consumer durables, saving rates will decrease (Chaturvedi, Kumar & Dholakia, 2008). Besides that, a higher rate of inflation lowers the after-tax rate of interest encouraging borrowing, and so, discouraging saving behaviour (International Monetary Fund, 1990). On the other hand, those households who intend to maintain their wealth real value, need to increase their savings, and so, increase their saving rates. Furthermore, inflation is usually associated with economic uncertainty, leading households to save for precautionary motives (Chaturvedi, Kumar & Dholakia, 2008).

Regarding business cycles, household saving rates are, on average, countercyclical, this is, saving rates are higher in recession periods (Adema & Pozzi, 2015). A recession is characterized by a drop in the gross domestic product (GDP) accompanied by increasing unemployment and falling incomes. This factor leads to greater uncertainty about the future increasing the desire to establish precautionary savings (Mody, Ohnsorge & Sandri, 2012).

Due to precaution, families will save more as the risk of job loss increases (Basten, Fagereng & Telle, 2016). A perspective of unemployment reflects lower future income so, consequently, households will create precautionary savings smoothing the consumption for the eventuality of becoming unemployed. Even if the individual does not expect a reduction

in future income, a precautionary saving may be created once future income is unsure (Baidoo & Akoto, 2019).

Geographical proximity to financial institutions carries advantages in terms of saving propensity. One interesting approach to reduce the existing inclusion gap and to reduce poverty is to promote microfinance, which includes several financial instruments such as credit, insurance, mortgages, and savings solutions (Gonzalez, Diniz & Pozzebon, 2015). Gonzalez, Diniz, and Pozzebon (2015) recognized benefits from the knowledge and skills that local institutions provide to locals, furthermore, the proximity of commercial banks to households, helps to understand the local needs.

Individual factors such as families' income level, age, level of education and gender also influence savings.

Families with low-income levels have lower saving rates once they spend most of their resources on current consumptions. Also, the little resources they have left, are usually used for future consumption regarding expected duties (Morozko, Morozko & Didenko, 2018). Moreover, it is easier for individuals with higher income levels to save without restraining desired consumption (Metzger, 2017).

The age structure of the population is another extremely important factor influencing nations' saving rates. Following the life-cycle hypothesis, by Modigliani and Brumberg (1954), in general terms, young people expect increases in their future incomes, which generates low saving propensity. Moving on into middle-aged people, those are the ones who tend to save the most anticipating the low retirement incomes. Finally, the elderly use to have almost no saving rates unless they wish to leave a bequest to their heirs or unless they anticipate a long-life expectancy.

The level of education also impacts saving behaviours. Bebczuk, Gasparini, Amendolagine, and Garbero (2015) argue that individuals with a higher level of education have a lower time preference and are more patient. Indeed, the decision to study delaying the entry into the labour market reveals a pro-saving behaviour.

Concerning the influence of gender on saving behaviours, Fisher (2010) developed some conclusions starting to notice that women are more risk-averse than men. So, due to risk aversion, women have a stronger need for precautionary savings (Fünfgeld & Wang, 2009) while men invest in more risky assets (Barber & Odean, 2001).

∴

The full theoretical framework is presented below, summarizing the impact of (and the corresponding mechanisms through which) several factors on savings propensity.

The main hypotheses to be studied is that financial literacy has a positive impact on savings propensity (H1) and that the impact of financial literacy on savings propensity is mediated by the area of studies (H2).

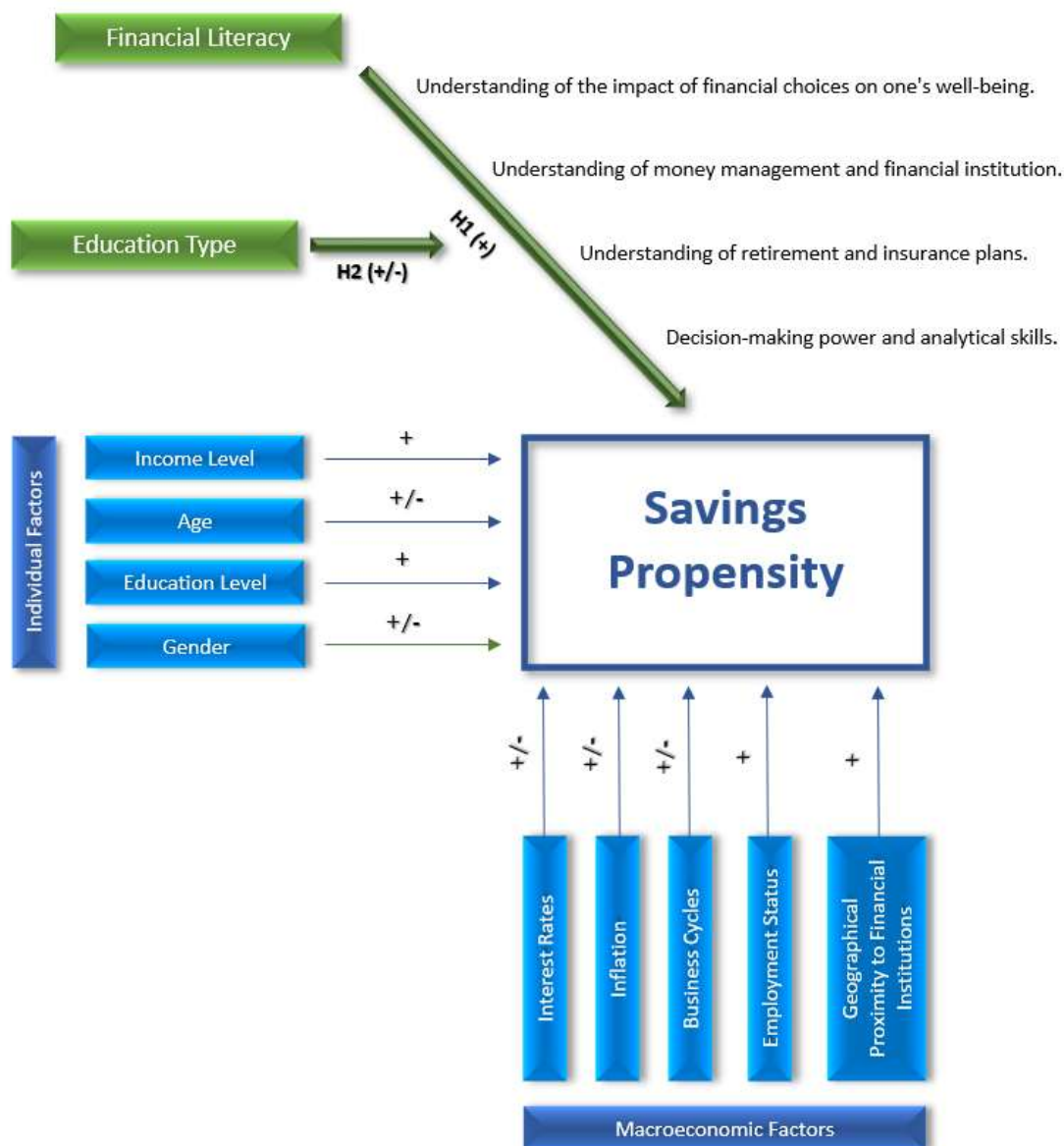


Figure 1: Determinants of the savings propensity – a theoretical framework

Legend: positive signal (+) when the relation between the given factor and savings is theoretically positive, negative signal (-) if the relationship is theoretically negative or both (+/-) if the theoretical relationship varies according to other factors.

Source: Own elaboration

2.3 Financial literacy and saving propensity: Empirical evidence

Several studies were analysed in order to sum up the main contributions regarding empirical evidence about the impact of financial literacy on saving propensity. The synthesis of the analysed empirical evidence can be observed in Table 1. The table is organized according to the proxy for savings and the type of participants. Studies concerning households and adult individuals are the firsts presented in the table and those are grouped according to the savings' proxy used in the empirical studies. Studies concerning youngsters and students are the last ones represented in the table and are also grouped according to the proxy for savings.

The variable savings have been analysed by the literature using several different proxies such as retirement planning, the use of financial products, precautionary savings, and informal savings.

Concerning retirement planning, it was found that the impact of financial literacy on it is statistically significant in several distinct contexts: Slovak (Cupák, Kolev & Brokešová, 2019), US (Lusardi & Mitchell, 2011), China (Niu & Zhou, 2018), and Japan (Sekita, 2011). In Slovak, Cupák, Kolev, and Brokešová (2019), using the propensity to voluntary save for private pension saving schemes as a proxy for saving propensity, found a strong impact of financial literacy on it, mainly when households do not have employers' contributions for pension savings. In the United States, besides the statistical significance found, the authors concluded that understanding and computing the effect of interest rates and inflation on savings did not emerge as statistically significant for retirement planning (Lusardi & Mitchell, 2011). Similarly, in China, the understanding of the effects of interest rate did not emerge as statistically significant when considering active planning (i.e., if the respondents plan to use savings, investments, and/ or commercial pensions to prepare for retirement) as a proxy for retirement savings (Niu & Zhou, 2018). In Japan, a positive impact between financial literacy and savings was found, mainly because of the increasing difficulty for Japan to fund public pensions, requiring individuals to take responsibility for their own finances after retirement (Sekita, 2011). Fernández-López, Otero, Vivel, and Rodeiro (2010) concerning data collected in eight countries,¹ concluded that, in the global model, financial literacy positively influences retirement savings. The same conclusion was reached in individual countries' models except for Spain. Metzger (2017), on the other hand, using data concerning German individuals,

¹ France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, and the United Kingdom.

found little evidence that an increase in financial literacy leads to higher savings for retirement.

Studies about the impact of financial literacy in the use of financial products (e.g., deposits, stocks, and life insurance) as a proxy for savings propensity were also developed (see Table 1). Analysing 1000 Laos individuals in 2018, Morgan and Long (2020) found that financial behaviour and overall financial literacy (i.e., financial behaviour, attitude, and knowledge) were positive and statistically significant related to the likelihood of an individual having had savings products in the past two years. However, the authors also concluded that financial attitude and knowledge, individually, did not impact savings behaviour. Using a smaller sample (491 individuals), restricted to the middle-class individuals living in the city of Bangkok (Thailand), Grohmann (2018) concluded that financial literacy positively impacts the likelihood of a middle-class individual holding assets other than saving accounts and holding fixed deposit accounts. Nevertheless, she also concluded that financial literacy does not impact the probability of holding stocks and that it is negatively and significantly related to the prospect of holding life insurances. With a sample of 3360 Indonesians, Cole, Sampson, and Zia (2011) concluded that the demand for commitment savings, deposit collector, and retirement savings products is superior for households that have a fatalistic outlook, have a higher interest in financial issues, and report saving enough for the future. Scrutinizing the behaviour of 600 adult individuals in Ghana, Baidoo, Boateng, and Amponsah (2018) also conclude that financial literacy positively influences the amount individuals deposit at a formal financial institution. The authors uncovered that the more financially literate an individual is, the better is his/ her recognition of the importance of saving.

Analysing the issue of precautionary savings, Babiarz and Robb (2014) found that, back in 2009, financial literacy enhanced the likelihood of 25765 US citizens to engage in emergency funds (i.e., funds that would cover expenses for 3 months in case of sickness, job loss, economic downturn, or other emergencies).

Dealing with a rather unexplored issue – informal savings –, Murendo and Mutsonziwa (2017) evidenced that financial literacy level positively impacts the propensity of 4000 adults from Zimbabwe to save both formally and informally, having nevertheless a stronger impact on formal savings.

The above-mentioned studies focused on, in general, adult population. Fewer empirical studies have addressed the impact of financial literacy on savings among youngsters (including millennials), high school students, and higher/ tertiary education students.

Several authors studied the impact of the participation in financial education programs and courses on savings or financial behaviours (Peng, Bartholomae, Fox & Cravener, 2007; Mandell & Klein, 2009; Chaiphath, 2019; Amari, Salhi & Jarboui, 2020). In the United States, a research about the impact of investment knowledge level on savings behaviour of high school and college students, developed in a large Midwest University, concluded that the participation in personal finance education led to higher investment knowledge (Peng et al., 2007). However, the impact of investment knowledge on savings was not robust. When only education variables were entered in the model, investment knowledge was positively associated with higher saving rates; nevertheless, when other variables (e.g. level of income, parental savings behaviour, and investment asset ownership) were added to the estimation models, this relationship was not so clear and other individual factors are prevalent. Mandell and Klein (2009), analysing 79 high school students, concluded that those who took a personal financial management course were not found to be more financially literate than those who had not taken that course and were not found to have better financial behaviours. In contrast, using a free financial literacy program, offered by the School of Management at the University of Normandy to young households, in France, Amari, Salhi, and Jarboui (2020) demonstrated that financial literacy training and knowledge acquired was perceived by youngsters as important for a better attitude toward saving decisions and retirement planning. In Thailand, Chaiphath (2019), in a study regarding students taking the 'Practical Economics of Daily Life' course concluded that between pre-course and post-course student's financial behaviour did not differ much. However, even though the post-course score on financial literacy is still low, a t-test analysis showed a statistically significant improvement.

Considering the impact of financial literacy on financial behaviours, where savings are included, several authors reached different conclusions (Felipe, Ceribeli & Lana, 2017, Kim, Anderson & Seay, 2019, Dewi, Febrian, Effendi & Anwar, 2020). In Mexico, Felipe, Ceribeli, and Lana (2017), with a survey distributed to university students at a university in Coahuila, could not conclude that financial knowledge impacts financial behaviour. In contrast, in the

United States, considering the millennial generation,² Kim, Anderson, and Seay (2019) concluded that financial knowledge strongly impacts both short and long-term financial behaviours, more specifically, it was found to impact the propensity to establish both emergency funds and retirement plans. Considering Indonesian individuals born between 1982 and 2002, Dewi et al. (2020) concluded that there is a strong correlation between financial attitude and financial management behaviour, meaning that individuals with a good financial attitude are capable of managing their money. Despite these findings, the authors concluded that financial knowledge is not statistically significant regarding financial management behaviour in the millennial generation.

Mudzingiri, Muteba Mwamba, and Keyser (2018) and van Deventer (2020) studied some determinants of financial behaviours in South Africa. In both studies, savings were not studied separately but included in financial behaviour instead. It was concluded that African students' personal finance behaviour has a positive statistical significance when related to management skills, however, no significance was found between financial knowledge and personal finance behaviour (van Deventer, 2020). Regarding financial literacy perception, Mudzingiri, Muteba Mwamba, and Keyser (2018) demonstrated that personal finance behaviour is impacted by the level of financial literacy of the individual.

Measuring savings as a percentage of the income, Pangestu and Karnadi (2020), examining the generation Z³ in Indonesia, aged between 17 and 21 years old, found that financial literacy, measured using questions regarding financial attitude, behaviour, knowledge, and materialism, positively influences saving rates. Regardless of their age, students have shown that they are cautious regarding their finances.

In Malaysia, Sabri and MacDonald (2010) demonstrated that higher education students' financial literacy is positively associated with better savings behaviour when considering three different items: 'savings to achieve a goal'; 'savings until the end of the semester'; and 'savings to paying down debts'.

Summing up, even though Mandell and Klein (2009) and Metzger (2017) did not find robust evidence about the impact of financial literacy on savings, the generality of the empirical

² The years in which there is a generational change are not an exact science and may vary according to the source. The Pew Research Center, in Washington D.C., considers as Millennial anyone born between 1981 and 1996 (Dimock, 2019).

³ Also known as Zoomers, are the generation succeeding Millennials. The Pew Research Center, in Washington D.C., considers as part of Generation Z anyone born from 1997 onward (Dimock, 2019).

evidence concerning different saving and financial literacy proxies, as well as several distinct contexts, concluded that financial literacy has an important role in savings behaviours.

The selected empirical studies also take into consideration other determinants that are likely to impact on savings behaviour/ propensity, namely age, gender, education, income, employment/ unemployment, and distance from financial institutions.

The impact of age on savings behaviour is not unanimous among the studies (see Table 1). Whereas some authors conclude that this impact is not statistically significant (Cole, Sampson & Zia, 2011; Lusardi & Mitchell, 2011; Grohmann, 2018), others concluded that this impact varies with age (e.g., Sekita, 2011; Babiartz & Robb, 2014; Cupák, Kolev & Brokešová, 2019). In Germany, empirical evidence demonstrated that saving rates increases with age due to the uncertainty of retirement income that becomes more relevant as individuals become more aware of their need to save (Metzger, 2017). Babiartz and Robb (2014) concluded that the probability of establishing emergency funds increases over ageing. The same conclusion was reported regarding savings products and both formal and informal forms of saving (Murendo & Mutsonziwa, 2017; Morgan & Long, 2020). Sekita (2011) concluded that the probability of retirement planning decreases until 36 years old and increases after that. In this matter, evidence collected by Fernández-López, Otero, Vivel, and Rodeiro (2010) and Baidoo, Boateng, and Amponsah (2018) support the life-cycle theory by Modigliani and Brumberg (1954), concluding that the impact of age on retirement planning follows a U-shape. Niu and Zhou (2018) found a positive relation concerning retirement planning contrasting with a negative relation concerning active retirement planning. Another negative relationship was found by Cupák, Kolev, and Brokešová (2019) that concluded that voluntary savings for retirement decrease with rising age. Lastly, Amari, Salhi, and Jarboui (2020) did not find a consistent conclusion about this matter across their regression models.

The impact of gender on savings behaviours varies across the different studies (see Table 1). In several countries, namely Malaysia, Laos, Germany, the US, France, and Zimbabwe conclusions state that female individuals have lower propensity for saving (Sabri & MacDonald, 2010; Babiartz & Robb, 2014; Metzger, 2017; Murendo & Mutsonziwa, 2017; Amari et al., 2020; Morgan & Long, 2020). Differently, some other studies concluded that gender has no statistically significant impact on saving behaviour (Lusardi & Mitchell, 2011; Cole et al. 2011; Mudzingiri et al., 2018; Cupák et al., 2019). Distinct conclusions were

gathered by Grohmann (2018) giving the proxy used for saving behaviours. For the proxies 'holding assets other than saving accounts' and 'holding a fixed deposits account', a positive statistical significance was found, however, for the proxies 'owning stocks' or 'owning life insurance', the conclusion is that gender is not statistically significant on savings (Grohmann, 2018). Besides that, some authors also concluded that females have a higher propensity for saving and for retirement planning than men (Peng, Bartholomae, Fox & Cravener, 2007; Fernández-López, Otero, Vivel & Rodeiro, 2010; Sekita, 2011). According to Peng, Bartholomae, Fox, and Cravener (2007) higher school and college male students save 2% less than their females' counterparts. Fernández-López, Otero, Vivel, and Rodeiro (2010) found that in the global of the eight studied countries, females are more likely to save for retirement. The same conclusion was reached in the individual models for Italy and Poland, however, in the remaining countries, the conclusion states that gender is not statistically significant on the impact of retirement planning. Lastly, Sekita (2011), concluded that in Japan women are 4% more prone to plan for retirement than men.

Regarding education level, it is nearly consensual that the higher the education level of an individual, the higher is his propensity for saving (Lusardi & Mitchell, 2011; Babiarz & Robb, 2014; Murendo & Mutsonziwa, 2017; Grohmann, 2018; Morgan & Long, 2020). Between the studies that analysed the statistical significance of education level on savings attitudes, only the studies developed by Fernández-López et al. (2010), Cupák, Kolev, and Brokešová (2019) and Amari, Salhi, and Jarboui (2020), concluded that, though the relation is positive, it is statistically insignificant in the majority of the models used.

Several studies concluded that higher income leads to higher financial inclusion in a high level of statistical significance (Lusardi & Mitchell, 2011; Metzger, 2017; Murendo & Mutsonziwa, 2017; Cupák, Kolev & Brokešová, 2019; Amari, Salhi & Jarboui, 2020; Morgan & Long, 2020). A positive statistical significance was found by Grohmann (2018) in three of the proxies used for savings propensity, however, when the proxy used was 'holding a life insurance' no statistical relevance was found. Niu and Zhou (2018) demonstrated that lower income levels are negative for the use of savings, investments, and/ or commercial pensions to prepare for retirement. Sekita (2011) found that higher income leads to higher retirement planning in Japan. The same conclusion was reached by Fernández-López et al. (2010) in the global model of the eight studied countries.

Analysing the impact of income shocks on savings, Lusardi and Mitchell (2011) concluded that individuals who suffered an income shock are more likely to plan for retirement motivating individuals to think about the future. In contrast, Sekita (2011), in Japan, concluded that individuals who have suffered an income shock are less probable to plan for retirement. The same conclusion was reached by Babiartz and Robb (2014), that besides a positive relationship between higher incomes and savings propensity, also concluded that recent income shocks negatively influence saving behaviours.

Concerning the employment status of adults in Ghana, Baidoo, Boateng, and Amponsah (2018), concluded that self-employees and private sector employees are more probable to save than those employees from the public sector. In Germany, Metzger (2017) determined that individuals working full or part-time and those who are only temporarily out of employment have higher saving rates. The opposite was observed for unemployed individuals and fixed-term employees.

Lastly, the only study under consideration that analysed the statistical significance of the distance from banks on the saving behaviours is the one from Morgan and Long (2020), considering Laos. In this study the authors concluded that this determinant negatively influences financial inclusion, specifically active consumption. However, regarding holding products it was found not statistical significance.

Table 1: Synthesis of the empirical literature on the relation between financial literacy and savings behaviour

Study	Country	No. participants	Type of participants	Period	Savings measure	Financial Literacy measure	Data collection methodology	Data analysis methodology	Results FL → Savings behaviour	Other determinants
Cupák et al. (2019)	Slovak	2135	Households	2010-2014	Dummy - 1 if a nonretired individual voluntarily saves in private pension savings schemes.	Set of questions on financial fundamental concepts (interest rates, inflation, riskiness, and diversification of portfolios). FL1 : number of correct answers on financial literacy questions	Slovak Household Finance and Consumption Survey	Instrumental Variables (IV) estimations	+++	Age : +++ Gender : 0 Education : ++/0 Job : +++ Income : +++ (without employers' contribution); ++ (with employers' contribution)
Lusardi & Mitchell (2011)	United States	1200	Individuals	2009	Retirement Planning: "Have you ever tried to figure out how much you need to save for retirement?"	Measures of financial literacy: FL1 - dummy, which equals 1 if the respondent correctly answers all three questions, ² zero otherwise. FL2 - the total number of correct answers. FL 3/FL4/FL5 – dummy, which equals 1 if the respondent correctly answers the interest/ inflation/risk correctly.	National Financial Capability Study	Instrumental Variables (IV) estimations	+++ (FL1) ++ (FL2) 0 (FL3) 0 (FL4) ++ (FL5)	Age : 0 Gender : 0 Education : +++ Income : +++ Employment (self-employment) : + Unemployment : 0
Niu & Zhou (2018)	China	28143	Households	2013	Retirement planning- dummy equals 1 if the respondent has planned for retirement, zero otherwise.	Measures of financial literacy: FL1 - dummy, which equals 1 if the respondent correctly answers all three questions, ² zero otherwise. FL2 - the total number of correct answers. FL 3/FL4/FL5 – dummy, which equals 1 if the respondent correctly answers the interest/ inflation/risk correctly.	China Household Finance Survey	Instrumental variable (IV) estimations	++ (FL1) ++ (FL2) ++ (FL3) + (FL4) +++ (FL5)	Age : +++ Education : +++ Income : +++ (4 th quartile) Employment : ++
					Active planning - dummy equals 1 if the respondent plans to use savings, investments and/or commercial pensions to prepare for retirement				+ (FL1) +++ (FL2) 0 (FL3) +++ (FL4) ++ (FL5)	Age : --- Education : 0 Income : -- (2 nd quartile) Employment : ++
Sekita (2011)	Japan	4739	Households	January – February 2010	Retirement Planning measured with the question: "Do you have a savings plan for after the household head retires?"	The authors use the three questions ² first developed by Lusardi & Mitchell (2006) for the Health and Retirement Study in 2004. FL1 : All three correct.	Survey	GMM	+++ (OLS) ++/+ (GMM)	Age : --- Gender : ++/+++ Education : 0 Income : +++ Income Shock : --
						FL2 : Number of correct answers		GMM	+++ (OLS) ++ (GMM)	
Fernández-López et al. (2010)	8 European Union Countries ³	6036	Individuals aged 18–65 years	2007	A dummy variable was created measured by asking: "What do you/would you save for?" Respondents who answered that they do/would save for retirement as a first option, as well as those who had pension funds, were coded as 1, 0 otherwise. ⁴	It was created a dummy variable tested by asking: "Saving products: Which ones are you familiar with? (bank deposits, bonds and public debt, shares, collective investment funds, pension funds, insurance)." The variable equals 1 if the individual knew at least four products, 0 otherwise.	The data used is from the study: "The EU Market for Consumer Long-Term Retail Savings Vehicles", sponsored by the European Commission.	Probit regression	+++	Age : +++ Gender : +++ Education : 0

Study	Country	No. participants	Type of participants	Period	Savings measure	Financial Literacy measure	Data collection methodology	Data analysis methodology	Results FL → Savings behaviour	Other determinants
Metzger (2017)	Germany	4990	Individuals (individuals not already receiving a pension)	2010 - 2011	The study pretended to find how much individuals save for retirement. A dummy variable was used equalling 1 if the respondent has at least one saving contract to which he/she actually contributes, 0 otherwise.	The authors have included three questions about financial topics. These questions test the understanding of inflation, compound interest rates and diversification of assets. If answered correctly, these variables take the value of one and otherwise zero.	Eurosystem’s “Household Finance and Consumption Survey”	Logit estimation	0/+ (depending on the model)	Age: +++ Gender: -/-- Unemployed: -- Income: +++
Morgan & Long (2020)	Laos	1000	Individuals	June – August 2018	Savings is a dummy variable, taking the value of one if the individual has held any type of savings products in the last two years	Financial knowledge.	Harmonized OECD/ INFE questionnaire	Instrumental variable (IV) estimations	0	Age (30 – 60): 0 Age (>60): +++ Gender: 0 Primary education: --- Secondary education: 0 Income: +++ Employment: 0
						Financial behaviour.			+++	
						Financial attitude.			0	
						Overall score for financial literacy: sum of the scores for the three components.			+	
Grohmann (2018)	Thailand (Bangkok)	491	Middle-class individuals	December 2012	Dummy - equals 1 if the respondent holds an asset other than a savings account.	Financial literacy was measured following Lusardi and Mitchell score. ² The questions used test three key financial concepts: interest rates, inflation, and risk diversification. In addition, respondents were asked to name foreign banks that operate in Thailand. Summing up, the overall score is in the range between zero and four.	Survey	Instrumental Variables (IV) estimations	+++	Age: ++ Gender: ++ Education: +++ Income: +++
					Dummy - equals 1 if the respondent holds a fixed deposit account.				+++	Age: 0 Gender: ++ Education: +++ Income: +++
					Dummy - equals 1 if the individual owns stocks.				0	Age: 0 Gender: 0 Education: ++ Income: +++
					Dummy - equals 1 if the individual holds a life insurance				--	Age: 0 Gender: 0 Education: +++ Income: 0
Cole et al. (2011)	Indonesia	3360	Households	July – December 2007	Commitment Savings	Financial Literacy Score	World Bank’s Access to Finance survey	Instrumental Variables (IV) estimations	++	Age: 0 Gender: 0
					Deposit Collector				+++	
					Retirement Savings				+++	
Baidoo et al. (2018)	Ghana	600	Adult individuals	January – June 2016	The savings variable is obtained by asking: “have you saved or deposited any money in your formal bank account in the past 12 months?”. The variable takes the value 1 if the individual saves and 0 otherwise.	The respondents are asked five questions or statements with binary responses: “yes” or “no”. Then, it was created a score from 0 to 5 based on responses provided.	Both self-administered and face-to-face interview were employed	Binary probit estimation	+++	Age: +++ Gender: 0 Income: +++ Education: +++ Self-employees & Private sector employees: +++
Babiarz & Robb (2014)	United States	25765	Individuals	2009	Dummy equal to 1 if the individual has set aside emergency funds that would cover expenses for 3 months,	FL1: Dummy variable created to indicate the correct answer for each of the questions.	Survey	Probit Model	+++	Age: -- (25-34) ---(35-44) 0 (45-54) +++ (> 55)

Study	Country	No. participants	Type of participants	Period	Savings measure	Financial Literacy measure	Data collection methodology	Data analysis methodology	Results FL → Savings behaviour	Other determinants
					in case of sickness, job loss, economic downturn, or other emergencies	FL2: Dummy variable taking the value of 1 if all questions are correctly answered, 0 otherwise. FL3: “On a scale from 1 (low) to 7 (very high), how would you assess your overall financial knowledge?”				Gender: -- Education: +++ Income Shock: ---
Murendo & Mutsonziwa (2017)	Zimbabwe	4000	Adults	July – August 2014	Dummy - equals 1 if the individual saved formally in the past twelve months.	- <u>The perceptions on finance</u> - how respondents deal with money in their daily lives. - <u>Attitude to financial matters</u> - the extent of respondents’ belief in financial planning. - <u>Perceptions on savings</u> - the respondents’ belief in the propensity to save. - <u>Knowledge of financial terms</u> - if the individual knows what capital markets, stock exchange, shares and unit trust are.	FinScope Consumer Survey	OLS, Instrumental Variables (IV) estimations & Probit Model	+++	Age: ++ on saving decisions and informal portfolio/ +++ on formal portfolio Gender: ++ on saving decision/ +++ on formal portfolio/ 0 on informal portfolio Education: +++ on formal portfolio Income: +++
					Dummy - equals 1 if the individual saved informally in the past twelve months.				+	
						FL2: dummy variable taking the value of 1 if all questions are correctly answered			++	
Peng et al. (2007)	United States	1039	Midwestern University Alumni	2005	Savings were measured using the question: “Not including income you earn on your assets and investments, what percentage (0–100%) of your yearly household earnings are you currently—saving—in all forms, including contributions you make to retirement plans but not contributions made by your employer?”	The survey contained 10 questions about investment knowledge test. ⁵ The score had a range from zero to ten.	46-question web-based survey	OLS	+++ (with only education variables entered) 0 (when other variables were added)	Age: 0 Gender: -- Income: +++ Education: +++/++
Mandell & Klein (2009)	n/a	79	High School Students	n/a	Questions about the students’ financial behaviour and attitude toward risk were included.	The entire 2004 Jump\$tart questionnaire was included to test the current level of financial literacy.	Survey	OLS & Significance of difference based on Pearson X2	0	n/a
Amari et al. (2020)	France	512	Young Households	2018	Dummy - 1 if the respondent has a positive saving analysed using the question: “After the financial education training, you felt that you are now more aware of your financial security and well-being?”	A questionnaire including 11 questions about financial topics. ¹ FL1: Numbers of the correct answers	Survey	Logistic regression models	+++	Gender: +++ Income: +++ Education: +++/0
Chaiphath (2019)	Thailand	155	Students who were taking the Practical Economics for Daily Life course	2017	Financial behaviour and attitude were measured through a questionnaire with 10 5-rating scale questions.	Financial Knowledge was measured with a test containing 10 questions.	Students were asked to complete a questionnaire and a test before and after taking the course.	Questionnaire: analysed using mean and standard deviation. Test: comparisons between	+++	n/a

Study	Country	No. participants	Type of participants	Period	Savings measure	Financial Literacy measure	Data collection methodology	Data analysis methodology	Results FL → Savings behaviour	Other determinants
								‘pretest’ and ‘posttest’ using t-test analysis.		
Felipe et al. (2017)	Coahuila, Mexico	278	University students	October 2015 – March 2016	To measure financial behaviour, the authors used 20 questions on a five Likert scale (1 = ‘never’ and 5 = ‘always’). Financial behaviour includes financial management, planned consumption, investments, and savings.	To measure the level of financial knowledge, the authors used two subgroups: i) basic knowledge and ii) advanced knowledge. To evaluate the basic knowledge three questions regarding basic financial skills (inflation, tax rates and the value of money in time) were used. To evaluate the advanced knowledge, five questions about complex financial instruments (shares, public bonds and risk diversification) were used.	Survey	Structural equation modelling technique	0	n/a
Kim et al. (2019)	United States	6784	Millennials (18-34 years old)	June – October 2015	Financial behaviour includes savings behaviours. To measure it, the authors used short and long-term question. ⁶	Financial knowledge is the proxy used to measure financial literacy level. ⁷	Survey	Logistics regression	+++	Age: 0 Gender: +++ (long-term only) Income: +++ Education: 0 (High school degree & some college) +++ (Bachelor’s degree) +/+++ (Post-bachelor degree) Unemployed: +++
Dewi et al. (2020)	Indonesia	194	Individuals born between 1982 and 2002	n/a	The dependent variable, financial management behaviour, was measured using seven items, consisting of questions that measured consumption, cash flow management, savings and investment, and credit management.	Financial Knowledge	Survey	Chi-square	0	n/a
						Financial Attitude			+++	
						Financial Skills			++	
van Deventer (2020)	South Africa	385	18-24 years old students enrolled at a South African public higher education institutions	n/a	Personal finance behaviour	Financial Knowledge	Survey	Single cross-sectional research method	0	n/a
						Finance Management Skill			+++	
Mudzingiri et al. (2018)	South Africa	191	University students	2016	Financial behaviour scaled questions where ‘1’ represents “never” and ‘7’ “always” on saving and Investment. ⁸	Set of financial literacy perception statements, where ‘1’ represents “strongly disagree” and ‘7’ “strongly agree” ⁹	Survey	t-test analysis and OLS analysis	++	Gender: 0

Study	Country	No. participants	Type of participants	Period	Savings measure	Financial Literacy measure	Data collection methodology	Data analysis methodology	Results FL → Savings behaviour	Other determinants
Pangestu & Karnadi (2020)	Indonesia	430	Generation Z students (aged between 17 and 21)	n/a	Savings rate were calculated as a percentage of income.	Questions were used to determine their financial attitude, financial behaviour, financial knowledge, and materialism scores. These were then used to calculate financial literacy score.	Online questionnaire	OLS	+++	Age: 0 Gender: 0
Sabri & MacDonald (2010)	Malaysia	2519	Students from 11 different universities	n/a	Three savings behaviour items: “saving to achieve a goal”, “saving until the end of the semester”, and “saving for paying down debts”.	Financial literacy was measured with 25 questions concerning financial goals, financial records, savings, investments, retirement, banking system, time value of money, wills, insurance, education loan, and general knowledge on personal finance.	Survey	T-test	++	Gender: +

Legend: +++ (+) [+]/ --- (-) [-]: positive/negative and statistically significant at 1% (5%) [10%]; 0 – not statistically significant.

Note: ¹ 1) “Suppose you had 100D in a savings account and the interest rate was 2% per year. After five years, how much do you think you would have in the account if you left the money to grow?”; 2) “Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account?”; 3) “If interest rates rise, what will typically happen to bond prices?”; 4) “Which of the following statements describes the main function of the stock market?”; 5) “Which of the following statements is correct? If somebody buys the stock of firm B in the stock market: (1) He owns a part of firm B, (2) He has lent money to firm B, (3) He is liable for firm B’s debts.”; 6) “Which of the following statements is correct? If somebody buys a bond of firm B: (1) He owns a part of firm B, (2) He has lent money to firm B, (3) He is liable for firm B’s debts.”; 7) “Considering a long time period (e.g. 10 or 20 years), which asset normally gives the highest return?”; 8) “Normally, which asset displays the highest fluctuations over time?”; 9) “When an investor spreads his money among different assets, does the risk of losing money: (1) Increase, (2) Decrease, (3) Stay the same time, (4) Do not know, (5) Refusal.”; 10) “Stocks are normally riskier than bonds. True or false?”; 11) “If the interest rate falls, what should happen to bond prices?”.

² 1) “Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?”; 2) “Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?”; 3) “Please tell me whether this statement is true or false. ‘Buying a single company’s stock usually provides a safer return than a stock mutual fund.’”

³ France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, and the United Kingdom.

⁴ In Poland, since many of the participants in pension funds are “forced” participants, the decision to save for retirement is measured by considering both respondents who answered that they do/would save for retirement as a first option, and those who had shares, fixed income bonds or collective investment funds.

⁵ 1) “If you buy a company’s stock...: a. The company will return your original investment to you with interest, b. You are liable for the company’s debts, c. You own a part of the company, d. You have lent money to the company, e. Do not know/Not sure”; 2) “If you buy a company’s bond...: a. You can vote on shareholder resolutions, b. You own a part of the company, c. You are liable for the company’s debts, d. You have lent money to the company, e. Do not know/Not sure”; 3) “Which type of bond is the safest?”; 4) “Which of the following is the best definition for a “junk bond”?” 5) “In general, if interest rates go down, bond prices...: a. Go down, b. Go up, c. Are not affected, d. Do not know/Not sure”; 6) “A “no-load” mutual fund is one that...: a. Carries no fees, b. Carries no sales charges, c. Does not contain high-risk securities, d. Has no limits on the period of time in which it can be bought and sold, e. Do not know/Not sure”; 7) “True or false? In general, investments that are riskier tend to provide higher returns over time than investments with less risk.”; 8) “Over the last 20 years in the US, the best average returns have been generated by...: a. Stocks, b. Bonds, c. CDs, d. Money market accounts, e. Precious metals, f. Do not know/Not sure”; 9) “What is a reasonable average annual return that can be expected from a broadly diversified US stock mutual fund over the long run?”; 10) “Which of the following organizations insures you against your losses in the stock market?”

⁶ Short-term financial behaviours questions: Emergency funds: “Have you set aside emergency or rainy-day funds that would cover your expenses for 3 months, in case of sickness, job loss, economic downturn, or other emergencies? 1. Yes; 2. No”; Spending: “Over the past year, would you say your spending was less than, more than, or about equal to your income? Please do not include the purchase of a new house or car, or other big investments you may have made. 1. Yes; 2. No”; Overdrafts: “Do you overdraw your checking account occasionally? 1. Yes; 2. No”; Budgeting: “Does your household have a budget? A household budget is used to decide what share of your household income will be used for spending, saving or paying bills. 1. Yes; 2. No”

Long-term financial behaviours questions: Retirement planning (amount needed): “Have you ever tried to figure out how much you need to save for retirement? 1. Yes; 2. No”; Retirement account (ownership): “Do you have any retirement plans through a current or previous employer, like a pension plan or a 401(k)? 1. Yes; 2. No”; “Do you have any other retirement accounts NOT through an employer, like an IRA, Keogh, SEP, myRA, or any other type of retirement account that you have set up yourself? 1. Yes; 2. No”; Investments (ownership): “Not including retirement accounts, do you have any investments in stocks, bonds, mutual funds, or other securities? 1. Yes; 2. No”; Financial goals “I set long term financial goals and strive to achieve them. 1. Yes; 2. No”

⁷ Objective financial knowledge: Interest: “Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? 1. More than \$102; 2. Exactly \$102; 3. Less than \$102”; Inflation: “Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? 1. More than today; 2. Exactly the same; 3. Less than today”; Bond price: “If interest rates rise, what will typically happen to bond prices? 1. They will rise; 2. They will fall; 3. They will stay the same; 4. There is no relationship between bond prices and the interest rate”; Mortgage: “A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total.

interest paid over the life of the loan will be less. 1. True; 2. False”; Portfolio: “Buying a single company’s stock usually provides a safer return than a stock mutual fund. 1. True; 2. False”; Subjective financial knowledge: “On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?”; Financial education: “Was financial education offered by a school or college you attended, or a workplace where you were employed? 1. Yes, but I did not participate in the financial education offered; 2. Yes, and I did participate in the financial education; 3. No”

⁸ (i) How often have you considered saving and investing your money?; (ii) To what extent are your current savings and investments satisfying your personal needs?; (iii) How often are you frustrated when you fail to have the opportunity to save and invest?; (iv) How often do you dream about investing and saving money one day?; (v) How likely are you prepared to start saving and investing if the opportunity arises?; (vi) How often have you looked for information on savings and investment?

⁹ (i) I know what makes me a good or bad credit risk; (ii) I understand what affects the credit terms I am offered by different lending institutions; (iii) I am comfortable with my ability to make decisions about savings instruments based on their fixed and compounded interest rates; (iv) I understand the general relationship between risk and reward in investing; (v) I feel confident in my understanding of the differences between bonds, stocks, U.S Treasury bills and mutual funds; (vi) I feel comfortable with my understanding of the various financial terms that go along with buying a home someday; (vii) I understand what personal net worth means; (viii) I am confident in my ability to write a monthly budget.

3. Methodological considerations

3.1. Main hypotheses to be tested and the econometric specification

Based on the theoretical framework developed in Section 2, the main hypotheses to be tested are the following:

H1: Financial literacy has a positive impact on the savings propensity of higher education students.

H2: The impact of financial literacy on the savings propensity of higher education students is mediated by the area of study.

Besides the main hypotheses, this study also analyses whether individual characteristics and individuals' perceptions of the macroeconomic contexts influence their savings propensity. The set of all factors to be tested can be observed in the theoretical framework (see Figure 1). To test it, the following econometric specification is used:

$$Savings_propensity_i^j = \beta_1^j + \beta_2^j FL_i + \beta_3^j IL_i + \beta_4^j Age_i + \beta_5^j EL_i + \beta_6^j ET_i + \beta_7^j Gender_i + \beta_8^j IR_i + \beta_9^j Inflation_i + \beta_{10}^j BC_i + \beta_{11}^j SS_i + \beta_{12}^j GP_i + \mu_i^j ,$$

where:

i represents the individual

j represents the course in which the individual is enrolled, $j=0$ (all), 1 (Economics & Business Sciences), 2 (Engineering & Exact Sciences), 3 (Health & Life Sciences), 4 (Humanities & Social Sciences), 5 (Arts & Architecture).

FL_i : Financial literacy; IL_i : Income level; Age_i : Age; EL_i : Education level; $Gender_i$: Gender; IR_i : Interest rate; $Inflation_i$: Inflation; BC_i : Business cycle; SS_i : Student status; GP_i : Geographical proximity to financial institutions.

μ : random error term.

Given the specificity of the dependent variable (binary), since it is not plausible to expect that the random perturbation errors follow a normal distribution and, given the need to interpret the results as probabilities, the most appropriate estimation model to apply is, accordingly with the literature (Fernández-López et al., 2010; Babiartz & Robb, 2014;

Metzger, 2017; Baidoo, 2018; Kim et al., 2019; Amari et al., 2020), the estimation of logistic regressions.

According to the theoretical framework (see Section 2), the savings propensity depends on a set of determinants, among which financial literacy, income level, age, education level, gender, interest rate, inflation, business cycle, student status, geographical proximity to financial institutions. This set of determinants are represented by the vector \mathbf{X} , in such a way that:

$$Prob(Y = 1) = F(\mathbf{X}, \boldsymbol{\beta}) \text{ and } Prob(Y = 0) = 1 - F(\mathbf{X}, \boldsymbol{\beta}),$$

Y represents the binary variable ‘savings’ with $Y = 1$ when the student has a saving account or other similar financial asset, and $Y = 0$ if not. $\boldsymbol{\beta}$ reflects the impact of changes in \mathbf{X} in students’ propensity of savings.

In order to test the relevant hypotheses, we estimate a logistic model with the following general specification:

$$P(savings) = \frac{1}{1+e^{-Z}}, \text{ com } Z = \beta_1^j + \beta_2^j FL_i + \beta_3^j IL_i + \beta_4^j Age_i + \beta_5^j EL_i + \beta_6^j ET_i + \\ \beta_7^j Gender_i + \beta_8^j IR_i + \beta_9^j Inflation_i + \beta_{10}^j BC_i + \beta_{11}^j SS_i + \beta_{12}^j GP_i + \mu_i^j$$

Re-writing the model in terms of the ratio of natural logarithm probability (*odds* – ratio between the probability of saving and the probability of not saving), we have:

$$\log \left(\frac{Prob[savings_i]}{Prob[no savings_i]} \right) = \beta_1^j + \beta_2^j FL_i + \beta_3^j IL_i + \beta_4^j Age_i + \beta_5^j EL_i + \beta_6^j ET_i + \\ \beta_7^j Gender_i + \beta_8^j IR_i + \beta_9^j Inflation_i + \beta_{10}^j BC_i + \beta_{11}^j SS_i + \beta_{12}^j GP_i + \mu_i^j,$$

The logistic coefficient can be interpreted as the change in the natural logarithm of the probability ratio relative to the unit change in the independent variables. Thus, e^{β_i} is the factor by which the *odds* of saving changes when the *i-th* independent variable increases 1 unit. If β_i is positive, this factor is higher than 1 meaning that the *odds* of saving increases. If β_i is negative, the factor is lower than 1, meaning that the *odds* of savings decreases.

In the case $\widehat{\beta}_2^j$ is positive and statistically significant, H1 (*Financial literacy has a positive impact on the savings propensity of higher education students*) is validated. Regarding H2 (*The impact of financial literacy on the savings propensity of higher education students is mediated by the area of study*), its validation implies that $\widehat{\beta}_2^1 \neq \widehat{\beta}_2^2 \neq \dots \neq \widehat{\beta}_2^5$.

3.2. Proxies and data sources for the relevant variables

There is no publicly available data that allows testing the econometric specification proposed and thus testing the hypotheses put forward. Therefore, to obtain the required information, we design an online survey, based on the relevant literature (cf. Section 2), which targets Portuguese students enrolled in Higher Education (University and Polytechnic).

The survey is structured in four sections: 1) saving behaviours; 2) financial literacy; 3) individual perceptions on the evolution of key macroeconomic variables and conditions; and 4) sociodemographic information.⁴

Regarding the savings behaviour section, the survey relies on the questions used by several authors (Fernández-López et al., 2010; Babiartz & Robb, 2014; Kim et al., 2019; Amari et al., 2020; Morgan & Long, 2020). The question covers several proxies used to measure savings, such as retirement planning and precautionary savings. One question asks respondents to measure their own savings behaviours, permitting to assess the extent to which individuals' perceived savings behaviour corresponds to their actual savings behaviour (Mandell & Klein, 2009).

Concerning financial literacy, this study relies on the questions developed by Lusardi and Mitchell (2011) and Amari et al. (2020). The set of selected questions allows to gather information about the main finance topics such as interest rates, inflation, and risk diversification and information about financial instruments: savings accounts, bonds, and stocks. Similarly to the section about savings, one question is made about how respondents assess their own financial literacy. In this way, it is possible to assess eventual mismatches between perceived and actual financial knowledge (Lusardi & Mitchell, 2011).

The literature establishes that the macroeconomic context impacts savings propensity. The most cited macroeconomic factors affecting saving rates are inflation (Premik & Stanislawski, 2017), interest rates (Elmendorf, 1996), business cycles (Adema & Pozzi, 2015), and job uncertainty (Basten, Fagereng & Telle, 2016). As we are analysing one point in time, the influence of the macroeconomic context is assessed by asking respondent about their perception of macroeconomic evolution in the nearby future. Thus, to measure how Portuguese higher education students' perceived macroeconomic changes may affect their

⁴ In Annex 1, we present the survey.

saving behaviours, the questionnaire comprises three factors: individuals' perception about the evolution of inflation, interest rates, and business cycles.

Job uncertainty is usually measured by extant studies by the employment status (Metzger, 2017; Baidoo, Boateng, & Amponsah, 2018). As the target of this study is higher education students, this factor was not included in the survey. In turn, a question about the student's status (for instance, ordinary student, student worker, high-performance sport practitioner, among others) is included in the sociodemographic section.

To complete the study about the impact of macroeconomic context on savings, a question about the geographical proximity to financial institutions is included in the survey. According to Gonzalez, Diniz, and Pozzebon (2015), financial institutions provide locals with better financial knowledge and skills and carry advantages in terms of saving propensity.

In the last section, the inclusion of sociodemographic questions will permit to understand whether individual factors influence savings propensity. The sociodemographic characteristics considered in the theoretical framework, and those most considered by the literature as impacting savings propensity are: families income level (Metzger, 2017; Morozko, Morozko, & Didenko, 2018), age (Modigliani & Brumberg, 1954), education level (Bebczuk et al., 2015), and gender (Barber & Odean, 2001; Fünfgeld & Wang, 2009; Fisher, 2010).

Finally, to test hypothesis 2 (H2), one question about the course (which was then grouped into 5 main areas of study, Economics & Business Sciences, Engineering & Exact Sciences, Health & Life Sciences, Humanities & Social Sciences, and Arts & Architecture) was included in this last section of the survey.

To guarantee the proper functioning of the online questionnaire, as well as its correct understanding, the survey was shared and pre-tested with a sample of 6 university students.

3.3. Data measurement

The different definitions of the variables led to the creation of several models according to the proxies selected for the main variables. The following sections will describe the ways data were measured as well as the organisation of the models that are then analysed in detail in Section 4.

3.3.1. Dependent variable

To ensure the richness of the study, we considered 7 proxies for the savings propensity (SP), 6 objective and 1 subjective (perceived) measures – see Table 2. Regarding the objective SP, and in line with the extant literature (Babiarz & Robb, 2014; Grohmann, 2018; Kim et al., 2019), we considered 5 dummy variables that assume the value 1 if the respondent claimed to have a given type of savings/ investment (ordinary savings, precautionary savings, retirement savings, shares/ bonds investments) or have at least one type of savings/ investment product (at least one savings product), and 1 continuous variable, the number of savings/ investment products that the individuals have. The perceived (subjective) savings, based on Mandell and Klein (2009), comprises a dummy variable that assumes the value 1 when the individual considers him/herself as “moderately spared, save money regularly” or “very spared, saves money whenever possible”.

3.3.2. Core independent variable

In line with the extant literature (Amari et al., 2020; Babiarz and Robb, 2014; Baidoo, Boateng, and Amponsah, 2018), to measure financial literacy (FL) we considered two proxies: ‘objective’ FL and the ‘subjective’ (perceived) FL.

The ‘objective’ FL is measured by the number of correct answers given to 6 questions that aimed to assess the financial knowledge of the respondents (see Table 2). The variable ‘FL - Number of correct answers’ ranges between 0 (no correct answers – lowest FL) and 6 (all answers were correct – highest FL).

The ‘subjective’ (perceived) FL reflects the perception of the respondent’s own financial literacy with the response to the question “*How do you rate your general financial knowledge?*”. This proxy assumes the value 1 when the respondent answered 5 (moderate) to 7 (high) general financial knowledge, and 0 otherwise.

3.3.3. Other independent variables

In accordance with the literature review (Section 2), we also considered a set of control variables that are likely to influence SP and whose proxies are detailed in Table 2.

Table 2: Description of the proxies for the relevant variables

Group of variables	Variable	Measure
Dependent variable - Savings Propensity	Savings product	Ordinary savings – dummy variable that assumes the value 1 if the respondent answer yes to the question “Do you have or have you had any savings account in the last 2 years?”, and 0 otherwise.
		Precautionary savings – dummy variable that assumes the value 1 if the respondent answer yes to the question “Do you have savings capable of covering 3 months of expenses in case of illness, unemployment, strong economic recession or other emergencies?”, and 0 otherwise.
		Retirement savings – dummy variable that assumes the value 1 if the respondent answer yes to the question “Do you have a retirement account, such as a retirement savings account (not counting the contributions made by potential employers)?”, and 0 otherwise.
		Shares/ bonds investments – dummy variable that assumes the value 1 if the respondent answer yes to the question “Do you currently have any type of shares or bonds?”, and 0 otherwise.
	At least one type of savings	Dummy variable that assumes the value 1 if the respondent answer yes to at least of the questions: “Do you have or have you had any savings account in the last 2 years?”; “Do you have savings capable of covering 3 months of expenses in case of illness, unemployment, strong economic recession or other emergencies?”; “Do you have a retirement account, such as a retirement savings account (not counting the contributions made by potential employers)?”; “Do you currently have any type of shares or bonds?”, and 0 otherwise.
Core independent variable - Financial literacy (FL)	Number of savings products	The number of saving products that the respondent has, ranging from 0 (no savings/ investments) to 4 (all the savings/ investment products).
	Perceived (subjective) savings	Dummy variable that assumes the value 1 if when answering the question “How do you classify yourself?”, the individual responds “Moderately spared, save money regularly” or “Very spared, saves money whenever possible”, and 0 otherwise (Very cost-oriented, never saves money; Cost-oriented, rarely saves money; Not considered to be spared or oriented towards expenses).
	Objective FL – Number of correct answers	The number of correct answers to the following questions: – Suppose that you have € 100 in your savings account and that the interest rate is 2% per year. After 5 years, how much do you think you will have in your account (considering that you have not used or added money to the account during that time)? – Suppose that the interest rate on your savings account is 1% per year and the inflation rate is 2% per year. After 1 year, how much will you be able to buy with the money you have in your savings account today? – Please indicate whether the following sentence is true or false: ‘Buying shares in a single company generally offers a safer return than investing in a stock fund.’ – If interest rates go up, what will (normally) happen to bond prices? – Shares generally have more risk than bonds. True or false? – When an investor divides his money between different assets, what happens to the risk of losing money?
Expectations regarding macroeconomic context	Perceived (subjective) FL	Using the question: “how do you rate your general financial knowledge? (where 1 means ‘very low’ and 7 means ‘very high’)” a dummy variable was created taking the value ‘1’ if the respondent selects the level 5, 6, or 7 as their financial literacy level, corresponding to the higher levels of financial literacy perception, and ‘0’ otherwise.
	Interest rate (IR)	Dummy variable that takes the value ‘1’ if the respondent expects that the nominal interest rate for the next six months will slightly or drastically increase, ‘0’ otherwise
	Inflation	Dummy variable that takes the value ‘1’ if the respondent expects that the inflation for the next six months will slightly or drastically increase, ‘0’ otherwise
Geographical proximity to financial institutions (GP)	Business cycle (GDP)	Dummy variable that takes the value ‘1’ if the respondent expects that the Portuguese economy will face a slight economic expansion, an economic expansion, or a strong economic expansion, ‘0’ otherwise.
		Close proximity to financial institutions - dummy variable that takes the value 1 if the respondents’ residence is at a distance below 5 km and 0 otherwise.
Household traits	Income level (IL)	Medium income - dummy variable that takes the value 1 if the respondent’s household monthly salary range varies between 1000€ and 3000€, and ‘0’ otherwise. High income – dummy variable that takes the value 1 if the respondent’s household monthly salary is higher than 3000€, and 0 otherwise.
	Family size	The number of individuals that belongs to the respondent's household.
Individual traits	Female (Gender)	Dummy variable that takes the value 1 if the respondent is female, and 0 otherwise.
	Age	The age in number of years of the respondent.
Education variables	Education level (EL)	Bachelor - dummy variable that assumes the value ‘1’ if the education level of the respondent is ‘1st cycle - Master (including the first 3 years of the Integrated Master courses)’
		Master - dummy variable that assumes the value ‘1’ if the education level of the respondent is ‘2nd cycle - Master (including the last 2 years of the Integrated Master courses)’
		PhD - takes the value ‘0’ if the respondent’s education level is ‘1st cycle – Bachelor’s Degree (including the first 3 years of the Integrated Master courses)’.
	Student Status	Dummy variable that takes the value ‘1’ if the respondent is enrolled under the ‘student worker’ status, and ‘0’ otherwise.
	Economics & Business	Dummy variable that takes the value ‘1’ if the respondent is enrolled in a course of the Economics & Business area, and ‘0’ otherwise.
	Engineering & Exact Sciences	Dummy variable that takes the value ‘1’ if the respondent is enrolled in a course of the Engineering & Exact Sciences area, and ‘0’ otherwise.
	Health & Life Sciences	Dummy variable that takes the value ‘1’ if the respondent is enrolled in a course of the Health & Life Sciences area, and ‘0’ otherwise.
	Humanities & Social Sciences	Dummy variable that takes the value ‘1’ if the respondent is enrolled in a course of the Humanities & Social Sciences area, and ‘0’ otherwise.
Arts & Architecture	Arts & Architecture	Dummy variable that takes the value ‘1’ if the respondent is enrolled in a course of the Arts & Architecture area, and ‘0’ otherwise.

4. Results

4.1. Descriptive results

The questionnaire was shared through social media platforms and the mailing list of some Portuguese higher education institutions between February 3rd and March 26th of 2021.⁵ At the end of the process, 1476 responses were collected. Given that the population of tertiary students amounts, in 2020/21, to 399553 students,⁶ this represents a rather low response rate (0.4%). However, this is one of the largest studies targeting HE students. Indeed, out of the 10 studies (see Table 1) that explicitly focused on students' savings propensity, only that of Sabri & MacDonald (2010), which analysed 2519 students from 11 different universities in Malaysia presents a higher number of responses, albeit in relative terms (in percentage of total enrolment), the value is lower (0.3%) than the present study.

The median age of the respondents is 22 years old, with 939 (63.6%) being females, about half of the total students (54.3%) were enrolled in a bachelor's degree, and 73.6% have a status of 'ordinary student'. In terms of broad areas of study/ courses, 28.2% of the students are enrolled in 'Health & Life Sciences', 25.8% in 'Economics & Business Sciences', 24.0% in 'Engineering & Exact Sciences', 19.6% in 'Humanities & Social Sciences', and 2.4% in 'Arts & Architecture'.

The income level of the households demonstrates that the majority of the respondents belongs to the middle-class: 16,8% of the respondent's household earn less than 1000€ per month, 67,8% earn between 1000€ and 3000€ and 15,4% earns more than 3000€. In the last 12 months, 38% of these households have suffered losses in their earnings and 14,2% of households have someone that has lost his job in the last year.

Regarding the distance to financial institutions, 79.1% of the respondents have financial institutions within a range of 5 km of their residence and in the case of 1.7%, the financial institutions are located at a distance above 20 km.

Concerning the family size, 309 of the respondents (20.9%) belong to a household with only one or two individuals, 1026 (69.5%) belong to a household with three or four individuals, and only 141 (9.57%) belong to a household with more than four individuals.

⁵ University of Porto, University of Beira Interior, University of Aveiro, Instituto Superior de Gestão, Fundação Fernando Pessoa, ISEC, Instituto Universitário Militar - Escola Naval and Universidade Portucalense.

⁶ In <https://www.dgeec.mec.pt/np4/EstatVagasInsc/>, last accessed on May 2021.

In terms of savings behaviours, one quarter (25.1%) of the participants consider being highly prone to save, with a large percentage of students (86%) claiming to have at least one type of savings product, 69% having savings accounts, and 67% explicitly referring that they have a saving account for emergencies (i.e., being able to cover 3 months of expenses in case of illness, unemployment, strong economic recession, or other emergencies). Savings through stock and bonds and retirement accounts are less frequent with 21% and 18% of the total students (see Table 3).

In a nutshell, 14,2% of the respondents do not hold any sort of savings products, and only 5.4% of the respondents possessing all four types of saving products.

Table 3: Summary of the propensity of savings of the respondent HE students

Study area (N; % of total)	High saving propensity (perception)	Number of savings products	Has at least 1 type of savings product	Has savings accounts	Savings account for emergency	Savings account for retirement	Savings in the form of stocks and bonds
All (1476; 100%)	25.1%	1.7	85.8%	68.9%	66.8%	17.8%	20.5%
Economics & Business Sciences (380; 25.7%)	26.8%	1.8	86.8%	69.7%	68.7%	18.9%	18.4%
Engineering & Exact Sciences (354; 24.0%)	26.0%	1.9	88.1%	69.5%	72.6%	17.5%	28.5%
Health & Life Sciences (416; 28.2%)	23.6%	1.8	87.0%	70.2%	65.1%	20.2%	19.5%
Humanities & Social Sciences (289; 19.6%)	23.9%	1.5	79.9%	64.0%	60.2%	11.1%	14.2%
Arts & Architecture (36; 2.4%)	22.2%	2.0	83.3%	77.8%	61.1%	33.3%	25.0%

Although ‘Arts & Architecture’ students perceived themselves as high savers to a lesser extent than students from other courses (Figure 2), these are the ones who, in general, revealed higher ‘objective’ savings propensity, with 78% stating to possess a savings account (which contrasts with the 64% of the students from ‘Humanities & Social sciences’), one third declared to have a savings retirement account (11% in the case of the students from Humanities & Social sciences), and 25% claimed to have savings in the form of stocks or bonds (14.2% in the case of the students from Humanities & Social sciences’) (Figure 3).

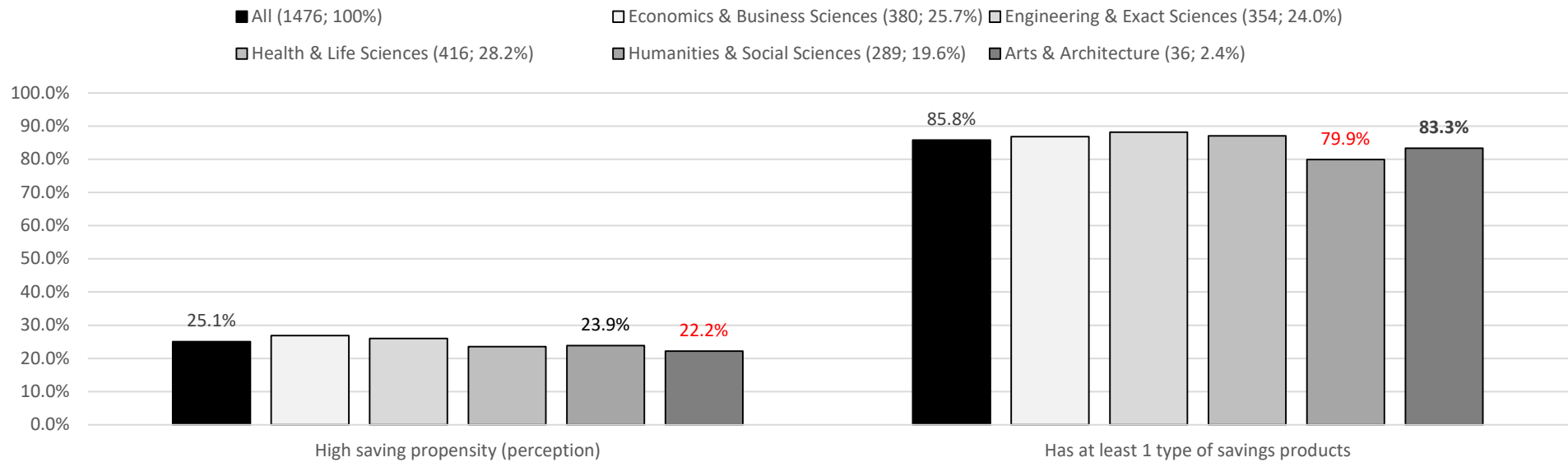


Figure 2: Savings propensity by area of study (% of total respondents)

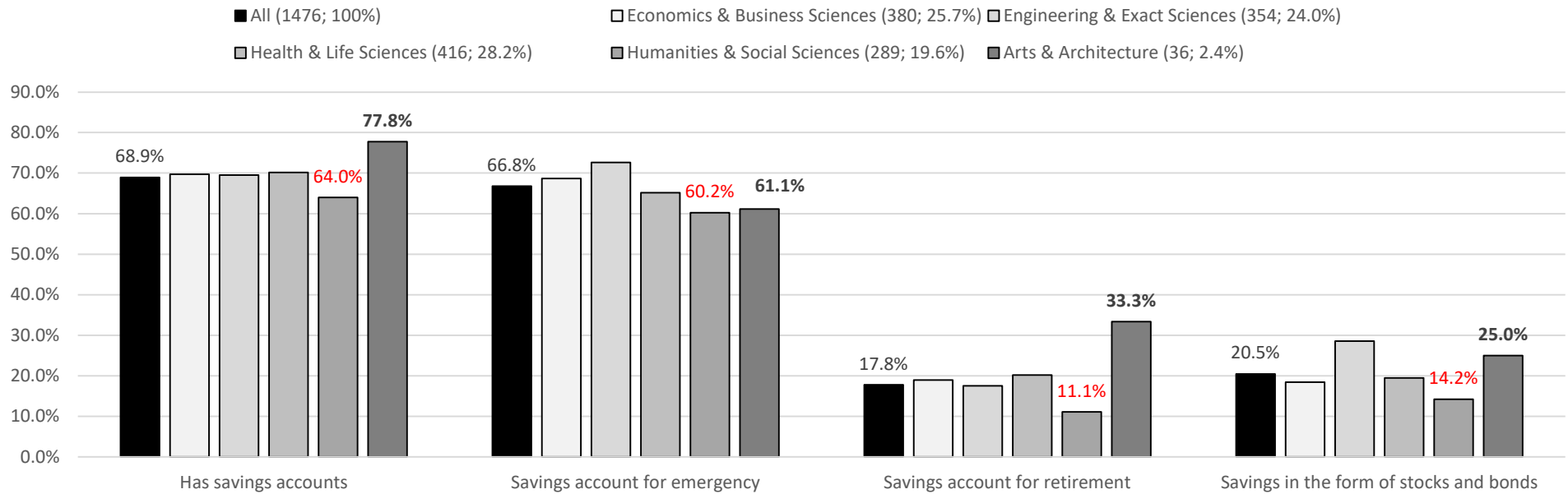


Figure 3: Savings propensity by type of saving products and by area of study (% of total respondents)

About one-third of the respondents considered themselves as having high levels of financial literacy (FL). In general, students' objective FL, as reflected in the number of correct answers given to the 6 FL questions, is higher than the perception students have on their FL. Indeed, although only 55% of the students enrolled in courses related to Economics & Business Sciences state they have high FL, 70% managed to respond correctly to the 6 questions posit. In Health & Life Sciences and Arts & Architecture, the difference between perceptions and real financial literacy is even more pronounced. Less than 17% of the students enrolled in courses of Health & Life Sciences and Arts & Architecture areas recognize to have high FL, but more than 40% correctly answered the FL questions.

As expected, students from Economics & Business Sciences present higher subjective and objective FL compared to the remaining students. In terms of objective FL (average percentage of students who correctly answered the FL questions), 59% of the students enrolled in Engineering & Exact Sciences courses correctly answered the FL questions, much below than (70%) of Economics & Business Sciences students, but much higher than the percentage achieved by Humanities & Social Sciences (45%), Arts & Architecture (44%) and Health & Life Sciences (43%).

Table 4: Summary of the financial literacy of the respondent HE students

	All (1476; 100%)	Economics & Business Sciences (380; 25.7%)	Engineering & Exact Sciences (354; 24.0%)	Health & Life Sciences (416; 28.2%)	Humanities & Social Sciences (289; 19.6%)	Arts & Architecture (36; 2.4%)
High FL (perception)	30.4%	55.0%	30.8%	15.9%	40.1%	16.7%
FL1	73.6%	86.1%	83.3%	64.7%	60.2%	58.3%
FL2	59.8%	77.1%	67.5%	45.4%	48.1%	58.3%
FL3	59.2%	79.7%	60.7%	47.6%	49.1%	41.7%
FL4	16.9%	35.0%	13.8%	6.7%	12.1%	11.1%
FL5	46.2%	62.4%	50.8%	32.0%	40.5%	38.9%
FL6	69.0%	81.3%	74.9%	60.6%	58.8%	58.3%
N° of correct answers (%answered correctly)	3.2 (54.1%)	4.2 (70.3%)	3.5 (58.5%)	2.6 (42.8%)	2.7 (44.8%)	2.7 (44.4%)

Note:

FL1: Answered correctly to the question: "Suppose that you have € 100 in your savings account and that the interest rate is 2% per year. After 5 years, how much do you think you will have in your account (considering that you have not used or added money to the account during that time)?"

FL2: Answered correctly to the question: "Suppose that the interest rate on your savings account is 1% per year and the inflation rate is 2% per year. After 1 year, how much will you be able to buy with the money you have in your savings account today?"

FL3: Answered correctly to the question: "Please indicate whether the following sentence is true or false: 'Buying shares in a single company generally offers a safer return than investing in a stock fund.'"

FL4: Answered correctly to the question: "If interest rates go up, what will (normally) happen to bond prices?"

FL5: Answered correctly to the question: "Shares generally have more risk than bonds. True or false?"

FL6: Answered correctly to the question: "When an investor divides his money between different assets, what happens to the risk of losing money?"

Higher education students are not very optimistic regarding the prospects of economic recovery. Only approximately 12% expect that Gross Domestic Product (GDP) will increase in the next few months, with Economics & Business Sciences students comprising the highest percentage of optimistic students, about 15%, and Health & Life Sciences students the lowest, about 9% (see Table 5).

Regarding the inflation rate, the majority of students expects that this rate will increase. No great differences are observed by the study area in this regard. The same happens regarding the evolution of interest rate, but in this case, only about 38% of the students predict that interest rates will increase in the next few months.

Table 5: Expectations regarding the evolution of interest rates, inflation and GDP

Expectations of increase in	All (1476; 100%)	Economics & Business Sciences (380; 25.7%)	Engineering & Exact Sciences (354; 24.0%)	Health & Life Sciences (416; 28.2%)	Humanities & Social Sciences (289; 19.6%)	Arts & Architecture (36; 2.4%)
Interest rate	38,3%	34,5%	40,4%	37,5%	43,3%	30,6%
Inflation	65,7%	63,4%	69,5%	65,4%	64,0%	66,7%
GDP	11,7%	15,3%	12,7%	8,9%	9,7%	11,1%

4.2. Results from the econometric estimations

The aim of the econometric estimations is to validate (or not) the hypotheses put forwarded: H1 (*Financial literacy has a positive impact on the savings propensity of higher education students*) and H2 (*The impact of financial literacy on the savings propensity of higher education students is mediated by the area of study*). In total, we estimated 84 models, 42 models concerning the objective FL and 42 models which included alternatively the perceived (subjective) FL. Tables 6 and 7 include only the impact of, respectively, objective and subjective FL on savings propensity of Portuguese HE students. Annex 3 (objective FL) and Annex 4 (subjective FL) present the corresponding full estimated models.

Models Ax.1 and Bx.1, which have the number of savings/ investment products as the dependent variable, were estimated by weighted ordinary least squares whereas the remaining models were estimated resorting to logistic regressions. Diagnosis tests, the Breusch–Pagan (for testing the homoscedasticity of the residuals) and VIF (for testing for multicollinearity) indicate, in general, that residuals are heteroscedastic (we reject the null hypothesis of the Breusch-Pagan test) and no evidence of multicollinearity emerges (VIF below 5) – see Tables

A(B)1-7 in Annexes 3 and 4. When heteroscedasticity was present, the estimations were performed with robust errors.

Generally, both the weighted ordinary least squares and logistics regressions are statistically significant. In the latter case (logistics) the Hosmer and Lemeshow test accepts for the vast majority of the models the null hypothesis that the models estimated represent the reality well, and the percentage of observations of the dependent variable that are correctly predicted is, in general, above 75%. Thus, the goodness of fit of the models is satisfactory.

When analysing the impact of 'objective' FL on the savings behaviour of Portuguese HE students (Table 6), we found that all the remaining factors that influence savings behaviour are held constant, on average, FL positive and significantly impact the number of savings accounts that students possess, having savings capable of covering 3 months of expenses in case of illness, unemployment, strong economic recession or other emergencies, and investing/saving by owning stocks and bonds. On average, an increase of 1% in FL leads to a 0.07% increase in the number of saving products. Moreover, students that present high FL competencies have a savings odds 1.5 ($e^{0.3918}$) higher than their colleagues with lower FL competencies in the case of precautionary savings and 1.8 ($e^{0.5953}$) higher in the case of investment in stocks and bonds.

Summing up, hypothesis 1 (H1: *Financial literacy has a positive impact on the savings propensity of higher education students*) is validated when savings behaviour is measured by the number of saving products, the possession of a precautionary/ emergency savings account, and to have investments in stocks and bonds, but not in the remaining types of savings (possessing at least one type of savings product; to possess an ordinary savings account; to possess a retirement saving account or to perceived him/herself as a moderate or high saver).

This hypothesis is fully validated when FL is measured based on students' perceptions. Indeed, for HE students who considered themselves as having high FL, the savings propensity is significantly higher regardless of the type of savings product (Table 7). On average, an increase of 1% in perceived high FL leads to a 0.15% increase in the number of saving products. Additionally, the savings odds of HE students with perceived high FL is 1.5 ($e^{0.4151}$) (to possess an ordinary savings account) to 2.1 ($e^{0.4151}$) (to possess precautionary/ emergency savings account) higher than in the case of low FL students.

The results gathered from HE students in Portugal are in line with the ones found using different types of participants in different countries (see Table 1). Indeed, as in the case of

the present study, most of the literature has found statistically significant impact at 1% of FL on SP (Fernández-López et al., 2010; Cole et al., 2011; Babiarz & Robb, 2014; Baidoo et al., 2018; Chaiphath, 2019; Cupák et al., 2019; Amari et al., 2020). Moreover, when saving behaviour is measured by the possession of precautionary/ emergency savings and by the possession of stocks/ bonds, our results are in line with the results found in the United States for a sample of 25765 individuals (Babiarz & Robb, 2014) and a sample of 6784 Millennials (Kim et al., 2019). Regarding the literature focusing on HE students, we verify that our results are also in line with some existing studies. For instance, Mudzingiri et al. (2018) for South Africa and Sabri and MacDonald (2010) for Malaysia have concluded that FL impacts SP considering several proxies (savings accounts, investments, saving to achieve a goal, saving until the end of the semester, and saving for paying down debts), which contrasts with Felipe et al.'s (2017), who did not find a statistically significant impact of FL on savings behaviour of Mexican HE students.

Table 6: Estimates of the impact of 'objective' FL on savings behaviour of Portuguese HE students

	Number of saving products	At least 1 type of saving product	Ordinary savings accounts	Precautionary / Emergency savings	Retirement savings account	Shares & bonds investments	Perceived savings behaviour
All	0.0683*** (0.0263)	0.1043 (0.1631)	0.0814 (0.1266)	0.3918*** (0.1270)	0.1329 (0.1787)	0.5953*** (0.1846)	0.0737 (0.1605)
Economics & Business Sciences	0.0947* (0.0589)	0.2876 (0.3647)	0.5335** (0.2762)	0.2600 (0.3037)	0.0577 (0.4222)	0.7882* (0.4785)	0.5868 (0.3719)
Engineering & Exact Sciences	0.2506*** (0.0630)	10.112*** (0.3944)	0.5504* (0.3054)	0.9129*** (0.3072)	0.6806 (0.4497)	10.945*** (0.4741)	-0.1154 (0.3562)
Health & Life Sciences	0.0151 (0.0431)	-0.0206 (0.3060)	-0.1839 (0.2292)	0.5007** (0.2166)	0.0181 (0.3012)	-0.2336 (0.2588)	-0.3576 (0.2758)
Humanities & Social Sciences	-0.0153 (0.0568)	-0.4593 (0.3157)	-0.2571 (0.2634)	0.0230 (0.2529)	0.0647 (0.4264)	0.8994** (0.4278)	0.1710 (0.3193)
Arts & Architecture	-0.1519 (0.3518)	-2.442 (1.502)	-1.812 (1.376)	0.4407 (1.023)	-0.1320 (1.334)	-3.254 (2.429)	-
H1	Validated	Not validated	Not validated	Validated	Not validated	Validated	Not validated
H2	Validated	Validated	Validated	Validated	Not validated	Validated	Not validated
Source: Annex A	Table A1	Table A2	Table A3	Table A4	Table A5	Table A6	Table A7

Results further evidence that the area of study mediates the impact high (objective and perceived) FL has on HE students' savings behaviour. When high FL is measured objectively (Table 6), excluding the retirement savings account and perceived savings behaviours, for HE students enrolled in courses related to Engineering & Exact Sciences, the impact of high

FL is amplified. The same happens in the case of students enrolled in courses related to Economics & Business Sciences but only for the number of savings, ordinary saving accounts and investment in stocks and bonds. High FL is particularly relevant for the precautionary saving behaviour of HE students enrolled in courses related to Health & Life Sciences, whereas in the case of Humanities & Social Science high FL presents an amplified effect for investment in stocks and bonds. In a nutshell, H2 (*The impact of financial literacy on the savings propensity of higher education students is mediated by the area of study*) is validated. When high FL is measured by perceptions (Table 7) the mediating effect of the study area is even more pronounced.

Table 7: Estimates of the impact of ‘subjective’ (perceived) FL on savings behaviour of Portuguese HE students

	Number of saving products	At least 1 type of saving product	Ordinary savings accounts	Precautionary/ Emergency savings	Retirement savings account	Shares & bonds investments	Perceived savings behaviour
All	0.1520*** (0.0264)	0.6015*** (0.2016)	0.4151*** (0.1400)	0.7378*** (0.1444)	0.4527*** (0.1608)	0.5651*** (0.1523)	0.7069*** (0.1822)
Economics & Business Sciences	0.0824* (0.0470)	0.2198 (0.3418)	0.1891 (0.2391)	0.3509 (0.2514)	0.3592 (0.2918)	0.5575* (0.3130)	0.5548* (0.3336)
Engineering & Exact Sciences	0.1737*** (0.0507)	0.9230* (0.4960)	0.7048** (0.2948)	0.5497* (0.3010)	0.5002 (0.3188)	0.6266** (0.2736)	0.9266** (0.3705)
Health & Life Sciences	0.1782*** (0.0513)	0.9337 (0.5655)	0.6157* (0.3455)	1.326*** (0.3806)	0.0782 (0.3466)	0.6161* (0.3244)	0.9902** (0.4642)
Humanities & Social Sciences	0.2484*** (0.0720)	1.026** (0.5149)	0.5149 (0.3477)	1.454*** (0.4162)	1.270*** (.4309)	0.7262 (0.4592)	0.4059 (0.4789)
Arts & Architecture	0.0304 (0.3205)	3.276 (2.262)	-0.6009 (1.166)	1.100 (1.583)	0.1266 (1.299)	-14.500** (7.043)	-
H1	Validated	Validated	Validated	Validated	Validated	Validated	Validated
H2	Validated	Validated	Validated	Validated	Validated	Validated	Validated
Source: Annex B	Table B1	Table B2	Table B3	Table B4	Table B5	Table B6	Table B7

Regarding the other determinants of the savings behaviours/ propensity of Portuguese HE students (Table 8), results evidence that households traits are critical factors explaining that behaviour. Specifically, students from richer and smaller households tend to present a higher savings propensity. These findings go accordingly with the idea that families have lower savings rates once they spend most of their resources on current consumptions (Morozko, Morozko & Didenko, 2018).

Gender has an ambiguous effect. Females tend to present a higher propensity to possess ordinary savings accounts whereas the opposite happens for precautionary/ emergency savings and investments in stocks and bonds. This is supported by the literature that contends that men are less risk-averse, investing more in more risky assets such as stocks and bonds (Barber & Odean, 2001). However, according to Fünfgeld and Wang (2009), and contradicting the results of this study, once women are more risk-averse they have a higher tendency for holding precautionary savings.

Age and student's status matters only in the case of retirement savings and investments in stocks and bonds with older HE and working students saving/ investing more than their younger and ordinary counterparts, all the remaining factors being held constant. These findings follow the life-cycle hypothesis by Modigliani and Brumberg (1954).

Master and PhD students tend to save more than their first cycle colleagues for precautionary motives agreeing with Bebczuk, Gasparini, Amendolaggine, and Garbero (2015) that suggest that individuals with a higher level of education reveal a pro-saving behaviour.

Compared to HE students enrolled in courses related to Economics & Business Sciences, Engineering & Exact Sciences and Health & Life Sciences HE students present, on average, all the other factors being constant, a higher number of saving products and are more prone to invest in stock and bonds, whereas those who are enrolled in Humanities & Social Sciences present a lower number of saving products and are less prone to save for retirement purposes.

Table 8: The impact of objective FL level on savings behaviour (All students)

Variable		Number of saving products	At least 1 type of savings product	Ordinary savings account	Precautionary/ emergency savings	Retirement Savings	Socks & bonds investment	Perceived savings behaviour	
		Model A1.1	Model A2.1	Model A3.1	Model A4.1	Model A5.1	Model A6.1	Model A7.1	
Financial literacy (FL)		N° of correct responses	0.0683*** (0.0263)	0.1043 (0.1631)	0.0814 (0.1266)	0.3918*** (0.1270)	0.1329 (0.1787)	0.5953*** (0.1846)	0.0737 (0.1605)
Macroeconomic expectations regarding an increase in...		Interest rate (IR)	-0.0569** (0.0246)	-0.4072*** (0.1554)	-0.4037*** (0.1191)	-0.0596 (0.1207)	-0.2698* (0.1560)	0.2049 (0.1412)	0.0610 (0.1466)
		Inflation (INF)	-0.0194 (0.0245)	-0.0596 (0.1668)	-0.0205 (0.1241)	-0.1354 (0.1245)	-0.0963 (0.1544)	-0.0310 (0.1439)	0.0897 (0.1477)
		GDP	0.0360 (0.0351)	0.1842 (0.2536)	-0.1742 (0.1740)	0.0236 (0.1855)	0.4823** (0.2116)	0.3518* (0.1864)	0.1800 (0.2241)
Geographical proximity (GP)		Distance below 5 km	-0.0224 (0.0284)	-0.0733 (0.1846)	0.0831 (0.1405)	-0.3982*** (0.1456)	-0.0680 (0.1787)	0.1775 (0.1782)	-0.4350** (0.1898)
Household traits	Default: Less than 1000€	1000€< Income level <3000€	0.1046*** (0.0353)	0.4305** (0.2012)	0.5246*** (0.1596)	0.3159* (0.1652)	0.2885 (0.2240)	0.2255 (0.2114)	0.3930** (0.1878)
		Income level > 3000€	0.1932*** (0.0456)	0.9256*** (0.3143)	0.7916*** (0.2227)	0.8051*** (0.2306)	0.4525 (0.2816)	0.4241 (0.2616)	0.1988 (0.2448)
	Default: Small family size	Large family size	-0.1424*** (0.0329)	-0.6846*** (0.2487)	-0.5260*** (0.1759)	-0.5918*** (0.1774)	-0.3077* (0.1853)	-0.3762** (0.1828)	-0.4452** (0.2018)
Individual traits		Female	-0.0380 (0.0266)	-0.1569 (0.1828)	0.2783** (0.1314)	-0.2879** (0.1370)	-0.1182 (0.1633)	-0.5682*** (0.1452)	0.3308** (0.1629)
		Age (ln)	0.0859 (0.0630)	-0.2661 (0.4216)	-0.2638 (0.3145)	0.1204 (0.3280)	1.3628*** (0.3403)	0.7914** (0.3396)	-0.5932* (0.3585)
Education variables	Default: 1st cycle	Master	0.0300 (0.0257)	0.4670*** (0.1785)	0.6004 (0.1273)	0.3345*** (0.1295)	-0.3680** (0.1542)	0.0791 (0.1449)	0.2061 (0.1538)
		PhD	0.0629 (0.0529)	0.7381 (0.4611)	0.0136 (0.2942)	0.9015*** (0.3410)	-0.4260 (0.3196)	0.0699 (0.3154)	0.0732 (0.3353)
	Default: others	Working student status	0.0614* (0.0315)	0.3073 (0.2321)	-0.1310 (0.1561)	0.4420*** (0.1721)	0.4134** (0.1846)	0.2925 (0.1827)	0.0970 (0.1920)
	Default: Economics & Business	Engineering & Exact Sciences	0.0557* (0.0335)	0.1374 (0.2374)	0.0944 (0.1710)	0.2232 (0.1744)	0.0143 (0.2065)	0.5897*** (0.1922)	-0.2727 (0.2151)
		Health & Life Sciences	0.0538* (0.0326)	0.1881 (0.2269)	0.0200 (0.1674)	0.1352 (0.1681)	0.2844 (0.2001)	0.5237*** (0.1966)	-0.4265 (0.2141)
		Humanities & Social Sciences	-0.0736* (0.0384)	-0.3621 (0.2350)	-0.2032 (0.1810)	-0.1859 (0.1805)	-0.6024** (0.2525)	-0.0468 (0.2425)	-0.2793** (0.2319)
		Arts & Architecture	0.1010 (0.0886)	-0.0473 (0.4991)	0.5277 (0.4254)	-0.0592 (0.3825)	0.8895** (0.4090)	0.7769* (0.4527)	-0.1688 (0.4668)
		N	1476	1476	1476	1476	1476	1476	
Diagnosis tests		Breusch Pagan test	15.39 (0.0001)	63.12 (0.0000)	32.29 (0.0000)	104.82 (0.0000)	62.91 (0.0000)	75.01 (0.0000)	28.66 (0.0000)
		VIF [max]	1.39 [1.91]	1.39 [1.91]	1.39 [1.91]	1.39 [1.91]	1.39 [1.91]	1.39 [1.91]	1.39 [1.91]
Goodness of fit		F-stats /Wald (p-value)	7.60 (0.0000)	61.11 (0.0000)	41.61 (0.0041)	104.69 (0.0000)	79.57 (0.0000)	96.98 (0.0000)	28.78 (0.0366)
		Correctly classified	-	85.77%	68.36%	66.80%	82.59%	79.95%	82.72%
		H-L test (p-value)	-	1429.16 (0.1792)	1443.97 (0.1164)	1415.49 (0.2535)	1469.38 (0.0485)	1497.60 (0.0149)	1430.30 (0.1838)
Estimation method		OLS	Logistic estimations						

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

5. Conclusion

Higher education (HE) students are about to become state taxpayers and have a potentially important role in defining countries' savings rates. To the extent that financial literacy (FL) fosters savings propensity (SP), it is pertinent to assess and understand the potential impact of FL on the SP of HE students. Although there exist some (few) scientific contributions in this topic, no study has been done for Portugal, a context characterized by low saving rates and modest FL levels amongst its population. Additionally, the extant literature overlooks the potential effect of the study area in influencing directly and indirectly, via FL, HE students SP.

To address these literature gaps, a direct survey was created targeting all Portuguese HE students. Based on 1476 responses and using logistic regressions, it was possible to analyse the impact of both objective and perceived FL on both objective and perceived SP, as well as the direct and mediating influence of the field of study on SP.

Objective FL was found as having a strong and positive statistically impact on the number of saving products that a student holds as well as on the establishment of emergency funds and on the probability of holding shares/ bonds. When perceived FL was considered, its impact on SP is even more accentuated. This positive impact was found for almost all the proxies considered for savings behaviour, meaning that the higher the perception of one's financial knowledge, the more savings-oriented a student is prone to be.

Considering students enrolled in Economics & Business (who revealed higher levels of FL) as the default/comparison group, and controlling for a set of factors likely to impact on SP, we found that Engineering & Exact Sciences and Health & Life Sciences students were more prone to have various types of savings products and to hold shares/ bonds; on the other hand, students from Humanities & Social Sciences were less likely to hold several savings products and savings for retirement; finally, students from Arts & Architecture were found to be more predisposed to save for retirements and to hold shares/ bonds.

The current study contributes to the literature at the empirical level. It is, to the best of our knowledge the first large scale study analysing the FL and SP of Portuguese HE students. Moreover, it uncovered the fact that the study area matters for explaining SP.

Portugal is characterized by low and decreasing saving rates and relatively low levels of FL. Considering that more than 40% of the students demonstrate relatively low levels of FL (that

is, have answered incorrectly questions regarding interest rates, inflation, and shares/ bonds), and that FL matter for SP, it would be of public interest to invest strongly in the financial education of those who are going to be the next taxpayers and company owners of the country to improve both individuals' quality of life and the country's economy, particularly of those enrolled in Engineering & Exact Sciences where the impact of FL on SP is amplified.

Thus, given the relatively low levels of FL of HE students, it would be important to guarantee that they know how to take advantage of the financial system, in general, and of the banking system, in particular, and that they know what the consequences of their financial choices may be. Despite some attempts to develop financial programs in Portugal, such as the *Plano Nacional de Formação Financeira* (PNFF),⁷ the initiatives within the tertiary/ higher education have been of limited reach. In 2020, there was only one activity within the PNFF which target HE students, performed by the *Associação Portuguesa de Fundos de Investimento, Pensões e Patrimónios*, with the support of the Euronext and MoneyLab, “*Invest talk: Poupar & Investir*” targeting 600 HE students that saw it live (CNSF, 2021). It would be pertinent if the HE curricula, for each course, included a mandatory subject that could enhance the knowledge about basic finance, showing the importance of the topic and preparing students for their future duties.

Despite the contributions, some limitations of the study need to be acknowledged. A limitation intrinsic in the cross-sectional design is the inability to establish a temporal relationship; thus, our methodology of analysis is not able to correct for the potential endogeneity (the value of one independent variable is dependent on the value of other predictor variables). This would require panel data, and thus to follow respondents in several moments in time, allowing the use of other methods such as instrumental variables. Additionally, the method of data collection (direct survey) can constitute a further limitation since there is no guarantee that the students answered the questions in a reliable and attentive way. To mitigate this problem, in future research the employment of experimental methods, namely field experiments by HE courses would allow the testing the relevant hypotheses in a real-world context.

⁷ The PNFF was launched in May 2010 and the web portal “Todos Contam” (www.todoscontam.pt) in 2012. The Portal is intended to promote the financial education of the Portuguese population and responsible financial citizenship. The “Todos Contam” Portal provides useful information and tools on the management of the family budget and the financial decisions inherent in the different stages of life. The themes cut across all areas of the retail financial markets and are treated in an accessible language and in a pedagogical way.

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Annex 1: Validation by the U.Porto Ethics Committee


U. PORTO
COMISSÃO DE ÉTICA

PARECER Nº 107/CEUP/2021

PARECER DA COMISSÃO DE ÉTICA DA UNIVERSIDADE DO PORTO SOBRE O PROJETO:

Financial literacy level and saving propensity of Portuguese higher education students:

Is there a relation?

SUBMETIDO POR:

Profª. Doutora Aurora Amélia Castro Teixeira

INSTITUIÇÃO DE ORIGEM:

Faculdade de Economia da Universidade do Porto

RELATOR:

Prof. Doutora Carlos J. Cabral Cardoso

Fevereiro de 2021

Calisto, 2011
L.P.

Título do projeto: *Financial literacy level and saving propensity of Portuguese higher education students: Is there a relation?*

Investigadora principal: Alexandra Rodrigues Pina, mestranda na Faculdade de Economia da Universidade do Porto, sob orientação da Professora Doutora Aurora Amélia Castro Teixeira.

Serviço(s) e unidade(s) em que o estudo irá decorrer: Estudantes inscritos em qualquer ciclo de estudos, em instituições do ensino superior universitário e politécnico.

Objetivos do estudo: O estudo pretende avaliar em que medida o nível de literacia financeira dos estudantes do ensino superior influencia a sua propensão para adotar comportamentos de poupança.

Pertinência e conceção do estudo: O estudo decorre do reconhecimento na literatura da especialidade, de que o nível de literacia financeira influencia o comportamento financeiro dos indivíduos e das sociedades, incluindo os comportamentos de poupança. A poupança é importante para a sustentabilidade financeira das famílias e das sociedades, mas é um comportamento cada vez menos 'natural', em sociedades orientadas para o curto-prazo e o usufruto imediato. A população objeto de estudo é constituída por estudantes universitários, um grupo que se confronta com os desafios próprios da entrada na vida adulta, mas também com preocupações de mais longo-prazo, nomeadamente as relativas ao rendimento disponível em idades mais avançadas que dependem, em boa medida, dos seus comportamentos de poupança. O estudo procura saber se o nível de literacia financeira e a área de estudo dos estudantes influenciam a sua propensão para adotar comportamentos de poupança.

O estudo empírico implica a recolha de dados primários através de um inquérito *online* aplicado a estudantes do ensino superior universitário e politécnico, inscritos em qualquer ciclo de estudos.

Benefícios, riscos ou incómodos para os participantes: Não estão previstos benefícios diretos, nem se identificam riscos relevantes para os participantes. O eventual incómodo, para os participantes, é o inerente ao tempo dedicado ao preenchimento do questionário. Algumas questões incluídas no questionário poderão suscitar incómodo a alguns participantes, por ex., a indicação do rendimento mensal do agregado familiar, situações de perdas salariais ou desemprego no agregado familiar, mas que se encontra salvaguardado pela indicação de que a "participação neste estudo é de carácter

voluntário, não acarretando qualquer prejuízo para o respondente em caso de desistência.”

Crítérios de inclusão/exclusão: n/a

Confidencialidade dos dados e consentimento informado: A investigadora afirma “garantir a confidencialidade dos dados”, e que “os dados obtidos serão utilizados unicamente para fins académicos”. O questionário é anónimo, não sendo feita referência à sua eventual destruição depois de analisados.

O preenchimento do questionário inclui a confirmação, por parte do respondente, de que “Li e concordo com o consentimento informado”. Todavia, sendo o consentimento informado a primeira questão do questionário, não fica claro se este consentimento é também anónimo; ou, não sendo, como é possível garantir o anonimato do questionário quando uma das questões implica a identificação do respondente.

A declaração de consentimento informado não foi disponibilizada.

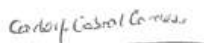
Respeito pela liberdade e autonomia dos participantes: Poderá ser garantido através da indicação de concordância com a declaração de consentimento informado.

Curriculum da(s) investigadora(s) envolvida(s): Adequados aos objetivos da investigação proposta.

Conclusão: Em face do exposto, entendeu a CEUP dar parecer favorável à realização desta pesquisa, com a recomendação de clarificação da questão suscitada relativamente à declaração de consentimento informado.

Universidade do Porto, 23 de Fevereiro de 2021

O Relator



Prof. Doutor Carlos J. Cabral Cardoso

O Presidente da CEUP



Prof. Doutor Luís Carlos Amaral

Annex 2: Questionnaire

Impacto da literacia financeira na propensão à poupança dos estudantes do ensino superior em Portugal

O presente inquérito insere-se na dissertação de mestrado de Alexandra Rodrigues Pina, que se encontra em curso no âmbito do Mestrado em Gestão da Faculdade de Economia do Porto (FEP), Universidade do Porto.

A dissertação tem por objetivo analisar, do ponto de vista quantitativo e econométrico, em que medida o nível de literacia financeira dos estudantes portugueses inscritos no ensino superior influencia a sua propensão à poupança. Não existindo informação pública disponível sobre o tema, a recolha primária de informação é fundamental para a concretização da dissertação.

O questionário tem por população-alvo todos os estudantes portugueses inscritos em qualquer ciclo de estudos do ensino superior em Portugal. As respostas obtidas serão analisadas em agregado garantindo-se a confidencialidade dos dados. Os dados obtidos serão utilizados unicamente para fins académicos.

A participação neste estudo é de carácter voluntário, não acarretando qualquer prejuízo para o respondente em caso de desistência.

Os resultados do estudo serão incluídos na dissertação da autora disponíveis a partir de julho de 2021 no Repositório Aberto da Universidade do Porto -

<https://repositorioaberto.up.pt/?locale=pt>

No sentido de conseguir a submissão atempada da dissertação, a data limite de resposta ao inquérito é 26 de março de 2021.

Agradecendo desde já a valiosa colaboração, encontro-me ao dispor para qualquer esclarecimento através do e-mail up201605867@fep.up.pt

*Obrigatório

*

☐ Li e aceito participar no estudo tal como descrito acima.

Seguinte

Página 1 de 6

Parte 1: Comportamentos de poupança

1. Como se classifica? *

- ☐ Muito orientado(a) para os gastos, nunca economiza dinheiro
- ☐ Orientado(a) para os gastos, raramente economiza dinheiro
- ☐ Não se considera poupado(a) nem orientado(a) para os gastos
- ☐ Moderadamente poupado(a), economiza dinheiro regularmente
- ☐ Muito poupado(a), economiza dinheiro sempre que possível

2. Possui alguma conta destinada à reforma, como por exemplo uma conta poupança-reforma (não considerando as participações feitas por eventuais entidades empregadoras)? *

- ☐ Sim
- ☐ Não

3. Possui ou possuiu nos últimos 2 anos algum tipo de conta poupança? *

- ☐ Sim
- ☐ Não

4. Possui poupanças capazes de cobrir 3 meses de despesas em caso de doença, desemprego, forte recessão económica ou outras emergências? *

- ☐ Sim
- ☐ Não

4. Possui poupanças capazes de cobrir 3 meses de despesas em caso de doença, desemprego, forte recessão económica ou outras emergências? *

- ☐ Sim
- ☐ Não

5. Para que fim possui as suas poupanças/pensaria em começar a poupar? (Se seleccionar a opção 'outra', por favor especifique).

- ☐ Reforma
- ☐ Habitação
- ☐ Férias e viagens
- ☐ Saúde
- ☐ Família
- ☐ Consumo de um bem específico (exemplo: carro)
- ☐ Evento especial (exemplo: casamento)
- ☐ Possíveis emergências
- ☐ Sem razão específica
- ☐ Outra: _____

6. Possui, atualmente, algum tipo de ações ou obrigações? *

- ☐ Sim
- ☐ Não

Anterior

Seguinte

Página 2 de 6

Parte 2: Literacia financeira

1. Como classifica o seu conhecimento financeiro geral? (sendo que 1 significa 'muito baixo' e 7 significa 'muito alto') *

Muito baixo 1 2 3 4 5 6 7 Muito alto

2. Suponha que possui 100€ na sua conta poupança e que a taxa de juro da mesma é 2% ao ano. Ao fim de 5 anos, quanto pensa que terá na sua conta (considerando que não usou nem acrescentou dinheiro à conta nesse intervalo de tempo)? *

- ☐ Mais de 102€
- ☐ Exatamente 102€
- ☐ Menos de 102€
- ☐ Não sei

3. Suponha que a taxa de juro da sua conta poupança é de 1% ao ano e que a taxa de inflação é de 2% ao ano. Ao fim de 1 ano, quanto conseguirá comprar com o dinheiro que tem na sua conta poupança hoje? *

- ☐ Mais do que hoje
- ☐ O mesmo que hoje
- ☐ Menos do que hoje
- ☐ Não sei

4. Por favor indique se a seguinte frase é verdadeira ou falsa: 'Comprar ações de uma única empresa oferece, geralmente, um retorno mais seguro do que investir em um fundo de ações.' *

☐ Verdadeira
☐ Falsa
☐ Não sei

5. Se as taxas de juros subirem, o que acontecerá (normalmente) com os preços das obrigações? *

☐ Vão subir
☐ Vão descer
☐ Não sei

6. As ações possuem, geralmente, mais risco do que as obrigações. Verdadeiro ou falso? *

☐ Verdadeiro
☐ Falso
☐ Não sei

7. Quando um investidor diversifica o seu dinheiro entre diferentes ativos, o risco de perder dinheiro: *

☐ Aumenta
☐ Diminui
☐ Mantém-se
☐ Não sei

Anterior Seguinte

Página 3 de 6

Parte 3: Percepção sobre contexto macroeconómico

1. Qual a sua expectativa relativamente à taxa de juro nominal para os próximos 6 meses? *

☐ Diminuir drasticamente
☐ Diminuir ligeiramente
☐ Manter-se constante
☐ Aumentar ligeiramente
☐ Aumentar drasticamente

2. Qual a sua expectativa relativamente à taxa de inflação para os próximos 6 meses? *

☐ Vai diminuir drasticamente
☐ Vai diminuir ligeiramente
☐ Vai manter-se constante
☐ Vai aumentar ligeiramente
☐ Vai aumentar drasticamente

3. Qual a sua expectativa relativamente à evolução da economia portuguesa nos próximos meses? *

☐ Forte recessão económica
☐ Recessão económica
☐ Algum abrandamento económico
☐ Alguma expansão económica
☐ Expansão económica
☐ Forte expansão económica

Anterior Seguinte

Página 4 de 6

Parte 4: Características sociodemográficas

1. Idade (em anos)? *

A sua resposta

Sexo *

Selecionar

3. Ciclo de escolaridade que frequenta? *

☐ 1º ciclo – Licenciatura (incluindo os primeiros 3 anos dos cursos de Mestrado Integrado)
☐ 2º ciclo – Mestrado (incluindo os últimos 2 anos dos cursos de Mestrado Integrado)
☐ 3º ciclo - Doutoramento

4. Área de estudos? (Se seleccionar a opção 'outra', por favor especifique). *

☐ Ciências da educação
☐ Artes
☐ Humanidades
☐ Economia

☐ Outras Ciências Sociais e do Comportamento

☐ Informação e Jornalismo

☐ Gestão

☐ Outras Ciências Empresariais

☐ Direito

☐ Ciências da Vida

☐ Ciências Físicas

☐ Matemática e Estatística

☐ Engenharia

☐ Indústrias Transformadoras

☐ Arquitetura

☐ Agricultura, Silvicultura e Pescas

☐ Ciências Veterinárias

☐ Medicina

☐ Outras Áreas da Saúde

☐ Serviços Sociais e Pessoais

☐ Serviços de Transporte

☐ Proteção do Ambiente

☐ Serviços de Segurança

☐ Outra: _____

5. Estatuto de estudante *

☐ Regime geral ("Ordinário")

☐ Trabalhador Estudante

☐ Praticante de Desporto de Alto Rendimento

☐ Mãe ou Pai Estudante

☐ Necessidades Educativas Especiais

☐ Outra: _____

6. Quantas pessoas (incluindo a si próprio(a)) fazem parte do seu agregado familiar? *

A sua resposta: _____

7. Qual é, aproximadamente, o intervalo salarial mensal do seu agregado familiar? *

☐ < 1000€

☐ 1000€ - 1500€

☐ 1501€ - 2000€

☐ 2001€ - 2500€

☐ 2501€ - 3000€

☐ 3001€ - 3500€

☐ 3501€ - 4000€

☐ > 4000€

8. O seu agregado familiar observou, nos últimos 12 meses, perdas salariais? *

☐ Sim

☐ Não

9. Alguém do seu agregado familiar ficou, nos últimos 12 meses, desempregado? *

☐ Sim

☐ Não

10. Distância (aproximada) entre a sua residência e a instituição financeira (e.g., Bancos, Caixas de Crédito Agrícola Mútuo, Caixas Económicas, Sociedades de Investimento, Sociedades de Locação Financeira) mais próxima: *

☐ < 1km

☐ 1km a 5km

☐ 6km a 10km

☐ 11km a 15km

☐ 16km a 20km

☐ > 20 km

[Anterior](#)

[Seguinte](#)

Página 5 de 6

Impacto da literacia financeira na propensão à poupança dos estudantes do ensino superior em Portugal

Muito obrigada pela sua colaboração.

[Anterior](#)

[Submeter](#)

Página 6 de 6

Annex 3: Estimated models of the impact of objective financial literacy (FL) on savings propensity (SP)

Table A 1: The impact of FL level on SP (Number of savings products)

Variable		Model A1.1 All	Model A1.2 Economics & Business	Model A1.3 Engineering & Exact Sciences	Model A1.4 Health & Life Sciences	Model A1.5 Humanities & Social Sciences	Model A1.6 Arts & Architectur e
Financial literacy (FL)	N° of correct responses	0.0683*** (0.0263)	0.0948 (0.0590)	0.2507*** (0.0631)	0.0152 (0.0431)	-0.0154 0.0568	-0.1519 (0.3518)
Macroeconomic expectations	Interest rate (IR)	-0.0569** (0.0246)	-0.0689 (0.0489)	-0.0169 (0.0466)	-0.0956** (0.0461)	-0.0583 0.0596	0.0397 (0.3404)
	Inflation (INF)	-0.0194 (0.0245)	0.0027 (0.0479)	0.0122 (0.0502)	-0.0338 (0.0438)	-0.0222 0.0606	-0.2730 (0.2984)
	GDP	0.0360 (0.0351)	-0.0246 (0.0646)	0.0780 (0.0681)	0.1723*** (0.0599)	-0.0257 0.0994	0.0309 (0.2451)
Geographical proximity (GP)	Distance below 5 km	-0.0224 (0.0284)	-0.0450 (0.0589)	-0.0858 (0.0577)	-0.0145 (0.0513)	0.0368 0.0675	0.1879 (0.3373)
Household traits	1000€ < Income level < 3000€	0.1046*** (0.0353)	0.1179* (0.0472)	0.2419*** (0.0704)	0.1454** (0.0667)	-0.0705 0.0991	0.0656 (0.2729)
	Income level > 3000€	0.1932*** (0.0456)	0.1450* (0.0814)	0.2144** (0.0859)	0.3066*** (0.0906)	0.2534** 0.1199	-0.1945 (0.6066)
	Family size	-0.1424*** (0.0329)	-0.1245* (0.0454)	-0.1522*** (0.0574)	-0.1859*** (0.0610)	-0.0783 0.0809	0.0146 (0.4489)
Individual traits	Female	-0.0380 (0.0266)	-0.1110** (0.0481)	-0.0380 (0.0508)	-0.0467 (0.0545)	0.1035 0.0699	-0.0259 (0.3146)
	Age	0.0859 (0.0630)	0.2825** (0.1118)	-0.0782 (0.1315)	-0.0293 (0.1561)	0.1358 0.1496	0.5329 (0.5497)
Education variables	Master	0.0300 (0.0257)	0.0042 (0.0485)	0.0653 (0.0522)	0.0452 (0.0466)	0.0030 0.0632	0.07196 (0.3485)
	PhD	0.0629 (0.0529)	-0.0849 (0.2081)	0.1403 (0.1008)	0.0600 (0.0986)	0.010 0.1210	0.1866 (0.4824)
	Student Status	0.0614* (0.0315)	0.0429 (0.0536)	0.0945 (0.0684)	0.1410* (0.0728)	0.0333 0.0789	-0.2587 (0.4243)
	Engineering & Exact Sciences	0.0557* (0.0335)					
	Health & Life Sciences	0.0538* (0.0326)					
	Humanities & Social Sciences	-0.0736* (0.0384)					
	Arts & Architecture	0.1010 (0.0886)					
	N	1476	380	354	416	289	36
Diagnosis tests	Breusch Pagan test	15.39 (0.0001)	2.25 (0.1338)	6.72 (0.0096)	18.99 (0.0000)	0.43 (0.5130)	9.79 (0.0018)
	VIF [max]	1.39 [1.91]	1.34 [2.25]	1.36 [2.09]	1.41 [2.23]	1.36 [2.13]	2.17 [3.97]
Goodness of fit	F-stats	7.60 (0.0000)	2.79 (0.0008)	4.35 (0.0000)	3.96 (0.0000)	1.56 (0.0977)	0.97 (0.9672)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table A 2: The impact of FL level on SP (Any type of savings products)

Variable		Model A2.1 All	Model A2.2 Economics & Business	Model A2.3 Engineering & Exact Sciences	Model A2.4 Health & Life Sciences	Model A2.5 Humanities & Social Sciences	Model A2.6 Arts & Architecture
Financial literacy (FL)	N° of correct responses	0.1043 (0.1631)	0.2877 (0.3657)	1.1127*** (0.3944)	-0.0206 (0.3060)	-0.4593 (0.2989)	-2.4423 (1.5021)
Macroeconomic expectations	Interest rate (IR)	-0.4072*** (0.1554)	-0.2953 (0.3264)	-0.1193 (0.3439)	-1.0581*** (0.3122)	-0.0770 (0.3262)	-8.1509*** (2.7918)
	Inflation (INF)	-0.0596 (0.1668)	-0.0684 (0.3460)	0.1658 (0.3651)	0.0038 (0.3253)	-0.1017 (0.3430)	3.3248* (1.8108)
	GDP	0.1842 (0.2536)	-0.2844 (0.4452)	0.0958 (0.4927)	2.0406* (1.0639)	0.1456 (0.4937)	-
Geographical proximity (GP)	Distance below 5 km	-0.0733 (0.1846)	0.0510 (0.3853)	-1.2680** (0.6476)	0.0781 (0.3376)	0.2753 (0.3635)	7.4691** (3.2906)
Household traits	1000€ < Income level < 3000€	0.4305** (0.2012)	0.6141 (0.3930)	1.1197** (0.4440)	0.6640 (0.4256)	-0.3843 (0.4275)	2.0325 (1.8167)
	Income level > 3000€	0.9256*** (0.3143)	0.8778* (0.5274)	1.1321* (0.5918)	1.4486* (0.7613)	1.1376 (0.8816)	-7.0326** (3.3378)
	Family size	-0.6846*** (0.2487)	-0.2988 (0.5718)	-0.6522 (0.4768)	-1.6711*** (0.5738)	-0.2481 (0.4645)	1.1961 (3.6093)
Individual traits	Female	-0.1569 (0.1828)	-0.4468 (0.3606)	-0.3005 (0.3560)	-0.1987 (0.4283)	0.3726 (0.3532)	-0.4612 (2.8669)
	Age	-0.2661 (0.4216)	0.7249 (0.8712)	-1.2127 (0.9013)	-0.2353 (1.2415)	0.0462 (0.8499)	8.7634* (4.8595)
Education variables	Master	0.4670** (0.1785)	0.3791 (0.3829)	0.8649** (0.4004)	0.4334 (0.3788)	0.1693 (0.3523)	5.7219** (2.6990)
	PhD	0.7381 (0.4611)	-	1.5502 (1.3062)	-0.0711 (0.8781)	0.4019 (0.7021)	-
	Student Status	0.3073 (0.2321)	0.2554 (0.3709)	0.3772 (0.5676)	0.3778 (0.5753)	0.5424 (0.5042)	-7.1219** (3.1616)
	Engineering & Exact Sciences	0.1374 (0.2374)					
	Health & Life Sciences	0.1881 (0.2269)					
	Humanities & Social Sciences	-0.3621 (0.2350)					
	Arts & Architecture	-0.0473 (0.4991)					
	N	1476	375	354	416	289	30
Diagnosis tests	Breusch Pagan test	63.12 (0.0000)	16.67 (0.0000)	25.51 (0.0000)	40.65 (0.0000)	9.96 (0.0016)	15.49 (0.0001)
	VIF [max]	1.39 [1.91]	1.34 [2.25]	1.36 [2.09]	1.41 [2.23]	1.36 [2.13]	2.17 [3.97]
Goodness of fit	Wald test (p-value)	61.11 (0.0000)	16.47 (0.1708)	24.37 (0.0279)	34.09 (0.0012)	10.08 (0.6870)	21.73 (0.0265)
	Correctly classified	85.77%	86.67%	87.85%	87.02%	79.93%	83.33%
	H-L test (p-value)	1429.16 (0.1792)	351.70 (0.3332)	371.39 (0.0356)	390.52 (0.2114)	300.34 (0.0879)	12.60 (0.8147)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table A 3: The impact of FL level on SP (Ordinary savings)

Variable		Model A3.1 All	Model A3.2 Economics & Business	Model A3.3 Engineering & Exact Sciences	Model A3.4 Health & Life Sciences	Model A3.5 Humanities & Social Sciences	Model A3.6 Arts & Architecture
Financial literacy (FL)	N° of correct responses	0.0814 (0.1266)	0.5335* (0.2763)	0.5504* (0.3055)	-0.1839 0.2293	-0.2571 (0.2580)	-1.8129 (1.3764)
Macroeconomic expectations	Interest rate (IR)	-0.4037*** (0.1191)	-0.5862** (0.2433)	-0.0455 (0.2485)	-0.6313*** 0.2293	-0.3177 (0.2755)	-2.0471* (1.2289)
	Inflation (INF)	-0.0205 (0.1241)	0.1330 (0.2490)	0.1123 (0.2593)	-0.2072 0.2466	0.1394 (0.2806)	-1.0753 (1.6147)
	GDP	-0.1742 (0.1740)	-0.2293 (0.3286)	0.0262 (0.3555)	-0.1823 0.3568	0.0853 (0.4425)	-0.7593 (1.9896)
Geographical proximity (GP)	Distance below 5 km	0.0831 (0.1405)	-0.0018 (0.3126)	-0.1832 (0.3363)	-0.0345 0.2567	0.4634 (0.2991)	0.8138 (1.5043)
Household traits	1000€< Income level <3000€	0.5246*** (0.1596)	0.5860* (0.3374)	1.1764*** (0.3386)	0.5918* 0.3154	-0.0459 (0.3407)	0.1581 (1.3794)
	Income level > 3000€	0.7916*** (0.2227)	0.8232* (0.4251)	0.7215* (0.4107)	1.4341*** 0.5405	0.9299 (0.5728)	-2.1587 (2.0652)
	Family size	-0.5260*** (0.1759)	-0.2954 (0.3908)	-0.6084* (0.3343)	-0.6987* 0.3744	-0.3552 (0.3738)	-0.0613 (2.0304)
Individual traits	Female	0.2783** (0.1314)	0.0623 (0.2437)	0.4663* (0.2705)	0.0606 0.2908	0.8905*** (0.3187)	-0.7904 (1.6151)
	Age	-0.2638 (0.3145)	0.4737 (0.6187)	-0.8919 (0.6400)	-0.3369 0.7840	0.0889 (0.7238)	0.1541 (1.9631)
Education variables	Master	0.6004 (0.1273)	-0.2569 (0.2534)	-0.1538 (0.2650)	0.5637** 0.2692	0.0331 (0.2856)	1.2533 (1.3494)
	PhD	0.0136 (0.2942)	-0.6008 (0.8969)	0.0822 (0.6115)	-0.2447 0.5989	-0.0095 (0.5378)	-
	Student Status	-0.1310 (0.1561)	-0.1394 (0.2658)	0.0806 (0.3518)	0.2121 0.3741	-0.5168 (0.3663)	-2.1133 (1.8116)
	Engineering & Exact Sciences	0.0944 (0.1710)					
	Health & Life Sciences	0.0200 (0.1674)					
	Humanities & Social Sciences	-0.2032 (0.1810)					
	Arts & Architecture	0.5277 (0.4254)					
	N	1476	380	354	416	289	34
Diagnosis tests	Breusch Pagan test	32.29 (0.0000)	9.40 (0.0022)	9.34 (0.0022)	9.96 (0.0016)	17.82 (0.0000)	10.34 (0.0013)
	VIF [max]	1.39 [1.91]	1.34 [2.25]	1.36 [2.09]	1.41 [2.23]	1.36 [2.13]	2.17 [3.97]
Goodness of fit	Wald test (p-value)	41.61 (0.0041)	15.28 (0.2901)	20.77 (0.0775)	21.86 (0.0575)	16.53 (0.2218)	19.88 (0.0693)
	Correctly classified	68.36%	70.26%	70.62%	71.63%	66.09%	73.53%
	H-L test (p-value)	1443.97 (0.1164)	371.68 (0.1548)	346.12 (0.1905)	426.00 (0.0215)	282.22 (0.2636)	25.07 (0.2442)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table A 4: The impact of FL level on SP (Precautionary/ emergency savings)

Variable		Model A4.1 All	Model A4.2 Economics & Business	Model A4.3 Engineering & Exact Sciences	Model A4.4 Health & Life Sciences	Model A4.5 Humanities & Social Sciences	Model A4.6 Arts & Architecture
Financial literacy (FL)	N° of correct responses	0.3918*** (0.1270)	0.2600 (0.3037)	0.9129*** (0.3073)	0.5008** (0.2166)	0.0230 (0.2551)	0.4407 (1.0231)
Macroeconomic expectations	Interest rate (IR)	-0.0596 (0.1207)	0.0247 (0.2607)	-0.0977 (0.2558)	-0.2021 (0.2264)	-0.0513 (0.2700)	-0.0698 (0.9606)
	Inflation (INF)	-0.1354 (0.1245)	-0.2246 (0.2491)	0.0204 (0.2827)	-0.0920 (0.2308)	-0.3160 (0.2822)	0.7736 (0.8187)
	GDP	0.0236 (0.1855)	0.1005 (0.3486)	0.1277 (0.4055)	0.2442 (0.4045)	-0.6134 (0.4446)	1.0744 (1.4029)
Geographical proximity (GP)	Distance below 5 km	-0.3982*** (0.1456)	-0.3607 (0.3048)	-0.6198* (0.3707)	-0.4224 (0.2631)	-0.3919 (0.3075)	0.8463 (1.0587)
Household traits	1000€ < Income level < 3000€	0.3159* (0.1652)	0.2778 (0.3515)	0.8150** (0.3560)	0.4738 (0.3263)	-0.034 (0.3570)	-0.0763 (0.9758)
	Income level > 3000€	0.8051*** (0.2306)	0.1850 (0.4248)	1.0174** (0.4491)	1.4464*** (0.5158)	1.7767** (0.7383)	-1.4204 (1.9007)
	Family size	-0.5918*** (0.1774)	-0.8688** (0.4128)	-0.4357 (0.3441)	-0.6923** (0.3445)	-0.2242 (0.3840)	-0.1487 (1.7789)
Individual traits	Female	-0.2879** (0.1370)	-0.7172*** (0.2687)	-0.1879 (0.2686)	-0.0419 (0.2854)	0.0271 (0.3187)	-1.6707 (1.4407)
	Age	0.1204 (0.3280)	-0.1693 (0.6045)	-0.5118 (0.7084)	0.0957 (0.8133)	1.2285* (0.7271)	2.8882 (2.1291)
Education variables	Master	0.3345*** (0.1295)	0.5577** (0.2653)	0.5620** (0.2845)	0.2329 (0.2633)	-0.0329 (0.2905)	-0.0554 (1.1675)
	PhD	0.9015*** (0.3410)	-	1.5867** (0.7826)	1.0654 (0.6576)	-0.3032 (0.5932)	-
	Student Status	0.4420*** (0.1721)	0.6925** (0.3008)	0.4539 (0.4154)	0.05467 (0.3878)	0.5514 (0.3867)	0.7184 (1.5537)
	Engineering & Exact Sciences	0.2232 (0.1744)					
	Health & Life Sciences	0.1352 (0.1681)					
	Humanities & Social Sciences	-0.1859 (0.1805)					
	Arts & Architecture	-0.0592 (0.3825)					
	N	1476	375	354	416	289	34
Diagnosis tests	Breusch Pagan test	104.82 (0.0000)	41.52 (0.0000)	26.08 (0.0000)	36.7 (0.0000)	13.27 (0.0003)	9.58 (0.0020)
	VIF [max]	1.39 [1.91]	1.34 [2.25]	1.36 [2.09]	1.41 [2.23]	1.36 [2.13]	2.17 [3.97]
Goodness of fit	Wald (p-value)	104.69 (0.0000)	32.70 (0.0011)	30.24 (0.0043)	32.78 (0.0018)	24.76 (0.0248)	9.06 (0.6981)
	Correctly classified	66.80%	68.00%	72.88%	65.63%	66.78%	64.71%
	H-L test (p-value)	1415.49 (0.2535)	361.11 (0.2175)	335.93 (0.3123)	387.55 (0.2432)	290.16 (0.1684)	30.68 (0.0792)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table A 5: The impact of FL level on SP (Retirement Savings)

Variable		Model A5.1 All	Model A5.2 Economics & Business	Model A5.3 Engineering & Exact Sciences	Model A5.4 Health & Life Sciences	Model A5.5 Humanities & Social Sciences	Model A5.6 Arts & Architecture
Financial literacy (FL)	N° of correct responses	0.1329 (0.1787)	0.0578 (0.4223)	0.6807 (0.4497)	0.0182 (0.3012)	0.0648 (0.4494)	-0.1320 (1.3350)
Macroeconomic expectations	Interest rate (IR)	-0.2698* (0.1560)	-0.4802 (0.3163)	-0.0614 (0.3206)	-0.2978 (0.2974)	-0.7849* (0.4527)	-0.5920 (1.1284)
	Inflation (INF)	-0.0963 (0.1544)	0.2647 (0.3015)	-0.4247 (0.3256)	-0.3715 (0.2959)	0.3944 (0.4273)	0.4009 (1.0876)
	GDP	0.4823** (0.2116)	-0.0121 (0.4075)	0.4025 (0.4231)	1.2854*** (0.3998)	0.6006 (0.5773)	2.1510 (1.4166)
Geographical proximity (GP)	Distance below 5 km	-0.0680 (0.1787)	-0.8571 (0.3568)	0.3901 (0.4212)	0.0599 (0.3138)	-0.1618 (0.4468)	-1.3135 (1.7683)
Household traits	1000€< Income level <3000€	0.2885 (0.2240)	0.0078 (0.4663)	0.5331 (0.4469)	0.6113 (0.4914)	0.0295 (0.5610)	0.0850 (1.1433)
	Income level > 3000€	0.4525 (0.2816)	0.0780 (0.5437)	0.1725 (0.5449)	0.9186 (0.6041)	1.3364* (0.7536)	-
	Family size	-0.3077* (0.1853)	0.0849 (0.3297)	-0.1943 (0.3574)	-0.7337* (0.4115)	-0.6799 (0.4681)	-0.1421 (1.9918)
Individual traits	Female	-0.1182 (0.1633)	-0.4030 (0.2864)	-0.4098 (0.3582)	-0.1246 (0.3594)	0.1434 (0.4704)	-
	Age	1.3628*** (0.3403)	2.7964*** (0.6185)	0.4968 (0.7439)	0.0676 (0.8453)	1.3284 (0.8595)	2.1407 (2.0962)
Education variables	Master	-0.3680** (0.1542)	-0.1761 (0.2805)	-0.4606 (0.3222)	-0.4553 (0.3130)	-0.1245 (0.4257)	-1.2810 (1.4003)
	PhD	-0.4260 (0.3196)	-0.1401 (0.9259)	0.2167 (0.5764)	-0.4346 (0.5658)	-1.0290 (0.8736)	-
	Student Status	0.4134** (0.1846)	0.0920 (0.3135)	0.7862** (0.3946)	1.0990** (0.4457)	-0.3393 (0.5027)	0.7570 (1.9480)
	Engineering & Exact Sciences	0.0143 (0.2065)					
	Health & Life Sciences	0.2844 (0.2001)					
	Humanities & Social Sciences	-0.6024** (0.2525)					
	Arts & Architecture	0.8895** (0.4090)					
	N	1476	380	354	416	289	25
Diagnosis tests	Breusch Pagan test	62.91 (0.0000)	14.86 (0.0001)	16.07 (0.0001)	38.17 (0.0000)	12.89 (0.0003)	6.51 (0.0107)
	VIF [max]	1.39 [1.91]	1.34 [2.25]	1.36 [2.09]	1.41 [2.23]	1.36 [2.13]	2.17 [3.97]
Goodness of fit	Wald (p-value)	79.57 (0.0000)	30.43 (0.0041)	28.31 (0.0082)	40.13 (0.0001)	12.94 (0.4521)	7.24 (0.7023)
	Correctly classified	82.59%	82.11%	83.90%	79.09%	88.93%	64.00%
	H-L test (p-value)	1469.38 (0.0485)	387.10 (0.0586)	349.09 (0.1617)	390.49 (0.2117)	291.65 (0.1535)	22.79 (0.0637)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table A 6: The impact of FL level on SP (Savings shares or bonds)

Variable		Model A6.1 All	Model A6.2 Economics & Business	Model A6.3 Engineering & Exact Sciences	Model A6.4 Health & Life Sciences	Model A6.5 Humanities & Social Sciences	Model A6.6 Arts & Architecture
Financial literacy (FL)	N° of correct responses	0.5953*** (0.1846)	0.7883 (0.4786)	1.9456*** (0.4741)	-0.2336 (0.2588)	0.8994* (0.4812)	-3.2550 (2.2379)
Macroeconomic expectations	Interest rate (IR)	0.2049 (0.1412)	0.2919 (0.3195)	-0.0704 (0.2790)	0.5357** (0.2523)	-0.1361 (0.3803)	0.1373 (1.3592)
	Inflation (INF)	-0.0310 (0.1439)	0.0269 (0.2956)	0.3279 (0.3114)	0.0660 (0.2730)	-0.4200 (0.3580)	-1.9436 (1.8914)
	GDP	0.3518* (0.1864)	0.0414 (0.3674)	0.8785** (0.3501)	0.7354* (0.4047)	-0.2977 (0.5542)	0.2884 (2.2687)
Geographical proximity (GP)	Distance below 5 km	0.1775 (0.1782)	0.1312 (0.4099)	-0.0916 (0.3569)	0.2375 (0.3366)	0.7808 (0.5109)	-1.2709 (1.4687)
Household traits	1000€ < Income level < 3000€	0.2255 (0.2114)	0.8452* (0.5070)	0.3931 (0.3949)	0.3728 (0.4578)	-0.8742* (0.4570)	5.7369* (3.1572)
	Income level > 3000€	0.4241 (0.2616)	0.7817 (0.5745)	0.4793 (0.4899)	0.6018 (0.5570)	-0.3885 (0.6830)	-
	Family size	-0.3762** (0.1828)	-0.8069** (0.3621)	-0.6469* (0.3412)	-0.0568 (0.4124)	0.1200 (0.4836)	-0.0408 (2.4045)
Individual traits	Female	-0.5682*** (0.1452)	-0.7826*** (0.2897)	-0.6831** (0.3204)	-0.8639*** (0.2930)	0.0595 (0.4115)	-3.8400* (2.1622)
	Age	0.7914** (0.3396)	1.6049** (0.6536)	0.5499 (0.6784)	0.7138 (0.7863)	-0.5483 (1.0348)	25.9012 (15.7752)
Education variables	Master	0.0791 (0.1449)	-0.0497 (0.2927)	0.4639 (0.2900)	0.0020 (0.2983)	-0.0786 (0.3895)	1.0508 (2.7707)
	PhD	0.0699 (0.3154)	-	0.3409 (0.5175)	0.3246 (0.6136)	0.9891 (0.6801)	-
	Student Status	0.2925 (0.1827)	0.0707 (0.3475)	0.5542 (0.3938)	0.9904** (0.3993)	0.3241 (0.5273)	-23.6893* (13.3836)
	Engineering & Exact Sciences	0.5897*** (0.1922)					
	Health & Life Sciences	0.5237*** (0.1966)					
	Humanities & Social Sciences	-0.0468 (0.2425)					
	Arts & Architecture	0.7769* (0.4527)					
	N	1476	375	354	416	289	32
Diagnosis tests	Breusch Pagan test	75.01 (0.0000)	34.69 (0.0000)	30.28 (0.0000)	27.99 (0.0000)	17.03 (0.0000)	3.63 (0.0567)
	VIF [max]	1.39 [1.91]	1.34 [2.25]	1.36 [2.09]	1.41 (2.23)	1.36 [2.13]	2.17 (3.97)
Goodness of fit	Wald (p-value)	96.98 (0.0000)	26.65 (0.0087)	56.47 (0.0000)	33.92 (0.0012)	17.27 (0.1872)	7.26 (0.7776)
	Correctly classified	79.95%	80.27%	74.86%	80.29%	85.47%	87.50%
	H-L test (p-value)	1497.60 (0.0149)	376.43 (0.0905)	343.70 (0.2163)	402.15 (0.1132)	287.16 (0.2013)	19.37 (0.4979)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table A 7: The impact of FL level on SP (Perceived savings behaviour)

Variable		Model A7.1 All	Model A7.2 Economics & Business	Model A7.3 Engineering & Exact Sciences	Model A7.4 Health & Life Sciences	Model A7.5 Humanities & Social Sciences	Model A7.6 Arts & Architecture
Financial literacy (FL)	N° of correct responses	0.0737 (0.1605)	0.5868 (0.3719)	-0.1154 (0.3562)	-0.3577 (0.2758)	0.1711 (0.3191)	-
Macroeconomic expectations	Interest rate (IR)	0.0610 (0.1466)	-0.0434 (0.3122)	0.4597 (0.3012)	0.0082 (0.2774)	-0.2329 (0.3362)	-
	Inflation (INF)	0.0897 (0.1477)	-0.2738 (0.3230)	0.1723 (0.3164)	0.0544 (0.2714)	0.4550 (0.3248)	-
	GDP	0.1800 (0.2241)	-0.1302 (0.4401)	0.0591 (0.4191)	0.3668 (0.4986)	0.2938 (0.5609)	-
Geographical proximity (GP)	Distance below 5 km	-0.4350** (0.1898)	-1.1340** (0.5585)	-0.1651 (0.3980)	-0.2378 (0.3238)	-0.3839 (0.3974)	-
Household traits	1000€ < Income level < 3000€	0.3930** (0.1878)	0.1552 (0.3960)	0.6560* (0.3651)	0.6930** (0.3570)	0.0559 (0.4540)	-
	Income level > 3000€	0.1988 (0.2448)	-0.3302 (0.4699)	0.3149 (0.4391)	1.0444** (0.5385)	0.3305 (0.6322)	-
	Family size	-0.4452** (0.2018)	0.1630 (0.4365)	-0.3039 (0.3595)	-0.7277** (0.4040)	-1.2914** (0.5929)	-
Individual traits	Female	0.3308** (0.1629)	0.2972 (0.3242)	-0.0099 (0.3018)	0.2769 (0.3152)	0.8411** (0.3659)	-
	Age	-0.5932* (0.3585)	-0.9821 (0.6700)	-1.2400* (0.7366)	-0.4502 (0.7866)	0.7918 (0.7767)	-
Education variables	Master	0.2061 (0.1538)	0.6585* (0.3398)	0.1390 (0.3055)	-0.1562 (0.2827)	0.1150 (0.3843)	-
	PhD	0.0732 (0.3353)	-	0.1639 (0.7170)	-0.2526 (0.5872)	-0.4137 (0.7127)	-
	Student Status	0.0970 (0.1920)	0.2797 (0.3581)	-0.0293 (0.4209)	0.0423 (0.3812)	-0.0595 (0.4652)	-
	Engineering & Exact Sciences	-0.2727 (0.2151)					
	Health & Life Sciences	-0.4265 (0.2141)					
	Humanities & Social Sciences	-0.2793** (0.2319)					
	Arts & Architecture	-0.1688 (0.4668)					
	N	1476	375	354	416	289	-
Diagnosis tests	Breusch Pagan test	28.66 (0.0000)	18.82 0.0000	8.83 (0.0030)	8.02 (0.0046)	13.45 (0.0002)	0.68 (0.4108)
	VIF [max]	1.39 [1.91]	1.34 [2.25]	1.36 [2.09]	1.41 [2.23]	1.36 [2.13]	2.17 [3.97]
Goodness of fit	Wald (p-value)	28.78 (0.0366)	16.44 (0.1718)	10.09 (0.6862)	9.37 (0.7448)	15.44 (0.0712)	-
	Correctly classified	82.72%	85.60%	80.79%	81.01%	83.39%	-
	H-L test (p-value)	1430.30 (0.1838)	364.87 (0.1791)	339.79 (0.2622)	402.40 (0.1115)	306.41 (0.0532)	-

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Annex 4: Estimated models of the impact of subjective/ perceived financial literacy (FL) on savings propensity (SP)

Table B 1: The impact of FL level on SP (Number of savings products)

Variable		Model B1.1 All	Model B1.2 Economics & Business	Model B1.3 Engineering & Exact Sciences	Model B1.4 Health & Life Sciences	Model B1.5 Humanities & Social Sciences	Model B1.6 Arts & Architecture
Financial literacy (FL)	Perception of high FL	0.1520*** (0.0264)	0.0825* (0.0492)	0.1738*** (0.0508)	0.1783*** (0.0514)	0.2484*** (0.0709)	0.0305 (0.3205)
Macroeconomic expectations	Interest rate (IR)	-0.0159 (0.0281)	-0.0675 (0.0501)	-0.0222 (0.0466)	-0.0989** (0.0453)	-0.0546 (0.0585)	-0.2567 (0.2938)
	Inflation (INF)	-0.0555** (0.0243)	-0.0007 (0.0472)	0.0336 (0.0508)	-0.0283 (0.0432)	-0.0257 (0.0600)	-0.0163 (0.2483)
	GDP	-0.0151 (0.0242)	-0.0116 (0.0666)	0.0669 (0.0710)	0.1536*** (0.0589)	-0.0381 (0.0953)	0.1552 (0.3314)
Geographical proximity (GP)	Distance below 5 km	0.0327 (0.0347)	-0.0415 (0.0582)	-0.0669 (0.0558)	-0.0079 (0.0510)	0.0445 (0.0657)	0.0111 (0.3361)
Household traits	1000€ < Income level < 3000€	0.0998*** (0.0349)	0.1090 (0.0731)	0.2426*** (0.0712)	0.1383** (0.0640)	-0.0855 (0.0747)	0.0679 (0.2738)
	Income level > 3000€	0.1850*** (0.0450)	0.1372 (0.0852)	0.2448*** (0.0852)	0.3027*** (0.0877)	0.1848 (0.1135)	-0.2137 (0.5977)
	Family size	0.0600 (0.0626)	-0.1188 (0.0736)	-0.1674*** (0.0594)	-0.1742*** (0.0603)	-0.0670 (0.0755)	-0.0224 (0.4404)
Individual traits	Female	0.0271 (0.0256)	-0.1107** (0.0467)	-0.0713 (0.0499)	-0.0366** (0.0543)	0.1106 (0.0696)	0.0219 (0.2936)
	Age	0.0702 (0.0516)	0.2648*** (0.0988)	-0.0987 (0.1381)	-0.0529 (0.1522)	0.0527 (0.1545)	0.4802 (0.5512)
Education variables	Master	-0.0363 (0.0263)	0.0030 (0.0511)	0.0759 (0.0526)	0.0441 (0.0458)	0.0057 (0.0612)	-0.0037 (0.2903)
	PhD	0.0557* (0.0308)	-0.0904 (0.1305)	0.1576 (0.1003)	0.0744 (0.0981)	0.0244 (0.1072)	0.1564 (0.4756)
	Student Status	-0.1393*** (0.0326)	0.0400 (0.0496)	0.0678 (0.0677)	0.1371* (0.0719)	0.0019 (0.0798)	-0.1908 (0.3734)
	Engineering & Exact Sciences	0.8096** (0.0336)					
	Health & Life Sciences	0.8019** (0.0321)					
	Humanities & Social Sciences	-0.0480 (0.0369)					
	Arts & Architecture	0.1328 (0.0893)					
	N	1476	380	354	416	289	36
Diagnosis tests	Breusch Pagan test	17.34 (0.0000)	1.71 (0.1910)	8.11 (0.0044)	16.61 (0.0000)	2.69 (0.1012)	5.51 (0.0189)
	VIF [max]	1.38 [1.90]	1.34 [2.27]	1.35 [2.05]	1.40 [2.23]	1.36 [2.10]	2.06 [3.91]
Goodness of fit	F-stats /Wald (p-value)	9.70 (0.0000)	3.38 (0.0001)	4.32 (0.0000)	5.04 (0.0000)	3.07 (0.0003)	0.36 (0.9704)

Note: ***(***)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table B 2: The impact of FL level on SP (Any type of savings products)

Variable		Model B2.1 All	Model B2.2 Economics & Business	Model B2.3 Engineering & Exact Sciences	Model B2.4 Health & Life Sciences	Model B2.5 Humanities & Social Sciences	Model B2.6 Arts & Architecture
Financial literacy (FL)	Perception of high FL	0.6015*** (0.2016)	0.2199 (0.3419)	0.9230* (0.4960)	0.9337* (0.5656)	1.0263* (0.5326)	3.2767 (2.2620)
Macroeconomic expectations	Interest rate (IR)	-0.0583 (0.1843)	-0.3004 (0.3333)	-0.1606 (0.3425)	-1.0996*** (0.3131)	-0.0629 (0.3254)	-10.6257** (4.3577)
	Inflation (INF)	-0.4070*** (0.1559)	-0.0746 (0.3470)	0.2673 (0.3625)	0.0226 (0.3242)	-0.1660 (0.3389)	4.6107* (2.3889)
	GDP	-0.0522 (0.1665)	-0.2327 (0.4428)	-0.0948 (0.5003)	2.0400* (1.0756)	0.0400 (0.5010)	-
Geographical proximity (GP)	Distance below 5 km	0.1619 (0.2517)	0.0570 (0.3842)	-1.0760* (0.5935)	0.118 (0.3385)	0.2447 (0.3611)	11.2400 (6.9451)
Household traits	1000€ < Income level < 3000€	0.4104** (0.2015)	0.5800 (0.4001)	1.0566** (0.4316)	0.6752* (0.4092)	-0.4311 (0.4239)	3.6574 (3.1996)
	Income level > 3000€	0.8643*** (0.3132)	0.8547 (0.5472)	1.2593** (0.5812)	1.4220** (0.7205)	0.8099 (0.8722)	-9.0211* (5.0376)
	Family size	-0.3919 (0.4305)	-0.2712 (0.5866)	-0.7133 (0.4890)	-1.7187*** (0.6019)	-0.1973 (0.4565)	0.2375 (2.6683)
Individual traits	Female	0.4552** (0.1793)	-0.4498 (0.3566)	-0.4151 (0.3551)	-0.1702 (0.4363)	0.4298 (0.3560)	0.2315 (2.6194)
	Age	0.7605* (0.4578)	0.6888 (0.8827)	-1.3952 (0.8588)	-0.3093 (1.2188)	-0.3968 (0.8357)	16.1416 (9.8038)
Education variables	Master	-0.1267 (0.1818)	0.3752 (0.3856)	0.9124** (0.3949)	0.4177 (0.3787)	0.2077 (0.3551)	5.8539 (4.3887)
	PhD	0.3017 (0.2343)	-	1.4489 (1.1850)	-0.0480 (0.8594)	0.5240 (0.6849)	-
	Student Status	-0.6712*** (0.2517)	0.2430 (0.3714)	0.3205 (0.5790)	0.3609 (0.5984)	0.4383 (0.4956)	-9.6404*** (3.5073)
	Engineering & Exact Sciences	0.2539 (0.2424)					
	Health & Life Sciences	0.3287 (0.2215)					
	Humanities & Social Sciences	-0.2251 (0.2256)					
	Arts & Architecture	0.0885 (0.4981)					
	N	1476	375	354	416	289	30
Diagnosis tests	Breusch Pagan test	73.48 (0.0000)	16.41 (0.0001)	24.49 (0.0000)	41.97 (0.0000)	17.50 (0.0000)	9.50 (0.0021)
	VIF [max]	1.38 [1.90]	1.34 [2.27]	1.35 [2.05]	1.40 [2.23]	1.36 [2.10]	2.06 [3.91]
Goodness of fit	Wald test (p-value)	70.18 (0.0000)	15.71 (0.2049)	23.60 (0.0350)	35.64 (0.0007)	15.40 (0.2832)	15.29 (0.1695)
	Correctly classified	85.77%	86.67%	88.14%	87.02%	79.93%	93.33%
	H-L test (p-value)	1341.27 (0.3777)	338.87 (0.3709)	323.82 (0.2079)	332.15 (0.4719)	265.92 (0.2911)	14.85 (0.6725)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table B 3: The impact of FL level on SP (Ordinary savings)

Variable		Model B3.1 All	Model B3.2 Economics & Business	Model B3.3 Engineering & Exact Sciences	Model B3.4 Health & Life Sciences	Model B3.5 Humanities & Social Sciences	Model B3.6 Arts & Architecture
Financial literacy (FL)	Perception of high FL	0.4151*** (0.1400)	0.1892 (0.2391)	0.1318** (0.0547)	0.6158* (0.3456)	0.5149 (0.3478)	-0.3009 (1.1668)
Macroeconomic expectations	Interest rate (IR)	0.0921 (0.1405)	-0.6069** (0.2456)	-0.0131 (0.0506)	-0.6366*** (0.2304)	-0.3013 (0.2730)	-1.5589 (1.0497)
	Inflation (INF)	-0.3979*** (0.1191)	0.1111 (0.2490)	0.0306 (0.0544)	-0.2194 (0.2472)	0.1067 (0.2796)	-1.1961 (1.6113)
	GDP	-0.0167 (0.1244)	-1.15573 (0.3265)	-0.0122 (0.0752)	-0.2770 (0.3555)	0.0240 (0.4359)	-1.2975 (1.7832)
Geographical proximity (GP)	Distance below 5 km	-0.1964 (0.1737)	0.0174 (0.3105)	-0.0347 (0.0643)	-0.0229 (0.2592)	0.4544 (0.2997)	0.5483 (1.4607)
Household traits	1000€ < Income level < 3000€	0.5117*** (0.1593)	0.5608* (0.3372)	0.2522*** (0.0712)	0.5579* (0.3165)	-0.0766 (0.3397)	0.3076 (1.4046)
	Income level > 3000€	0.7481*** (0.2205)	0.8302* (0.4270)	0.1643* (0.0872)	1.3492** (0.5281)	0.7240 (0.5615)	-2.2931 (1.7996)
	Family size	-0.3588 (0.3180)	-0.2656 (0.3859)	-0.1268* (0.0656)	-0.6651* (0.3890)	-0.3161 (0.3757)	-0.5610 (1.9513)
Individual traits	Female	0.0499 (0.1278)	0.0070 (0.2408)	0.0812 (0.0525)	0.1460 (0.2919)	0.9238*** (0.3218)	-0.5666 (1.3813)
	Age	0.0310 (0.1303)	0.4482 (0.6217)	-0.2135 (0.1385)	-0.4574 (0.7735)	-0.2038 (0.7187)	-0.2404 (1.9553)
Education variables	Master	0.3018** (0.1303)	-0.2315 (0.2550)	-0.0237 (0.0542)	0.5555** (0.2670)	0.0478 (0.2837)	0.4661 (1.0379)
	PhD	-0.1408 (0.1570)	-0.6173 (0.8815)	0.0153 (0.1125)	-0.2051 (0.5848)	0.0475 (0.5368)	-
	Student Status	-0.5152*** (0.1772)	-0.1791 (0.2670)	0.0026 (0.0745)	0.1755 (0.3746)	-0.5636 (0.3687)	-1.3170 (1.3578)
	Engineering & Exact Sciences	0.1814 (0.1734)					
	Health & Life Sciences	0.1289 (0.1666)					
	Humanities & Social Sciences	-0.1015 (0.1791)					
	Arts & Architecture	0.6401 (0.4283)					
N		1476	380	354	416	289	34
Diagnosis tests	Breusch Pagan test	37.36 (0.0000)	10.23 (0.0014)	9.90 (0.0017)	11.22 (0.0008)	23.53 (0.0000)	5.78 (0.0162)
	VIF [max]	1.38 [1.90]	1.34 [2.27]	1.35 [2.05]	1.40 [2.23]	1.36 [2.10]	2.06 [3.91]
Goodness of fit	Wald test (p-value)	49.40 (0.0001)	12.21 (0.5101)	24.16 (0.0297)	23.99 (0.0630)	17.79 (0.1655)	15.93 (0.1944)
	Correctly classified	68.83%	68.68%	70.90%	71.88%	65.05%	76.47%
	H-L test (p-value)	1342.07 (0.1980)	362.82 (0.1419)	327.19 (0.1725)	371.50 (0.0618)	262.14 (0.3495)	29.03 (0.1132)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table B 4: The impact of FL level on SP (Precautionary/ emergency savings)

Variable		Model B4.1 All	Model B4.2 Economics & Business	Model B4.3 Engineering & Exact Sciences	Model B4.4 Health & Life Sciences	Model B4.5 Humanities & Social Sciences	Model B4.6 Arts & Architecture
Financial literacy (FL)	Perception of high FL	0.7378*** (0.1444)	0.3510 (0.2514)	0.0971* (0.0528)	1.3263*** (0.3806)	1.4543*** (0.4162)	1.1008 (1.5833)
Macroeconomic expectations	Interest rate (IR)	-0.3628** (0.1444)	0.0358 (0.2597)	-0.0190 (0.0489)	-0.2326 (0.2289)	-0.0455 (0.2688)	-0.2334 (1.0381)
	Inflation (INF)	-0.0641 (0.1203)	-0.2277 (0.2508)	0.0149 (0.0526)	-0.0140 (0.2322)	-0.3323 (0.2856)	0.6888 (0.8327)
	GDP	-0.1057 (0.1245)	0.1478 (0.3506)	0.0168 (0.0786)	0.2547 (0.4392)	-0.7068 (0.4807)	1.2321 (1.3918)
Geographical proximity (GP)	Distance below 5 km	0.0208 (0.1894)	-0.3555 (0.3035)	-0.0951 (0.0621)	-0.3646 (0.2655)	-0.3422 (0.3071)	0.9287 (1.1280)
Household traits	1000€ < Income level < 3000€	0.2952* (0.1641)	0.2406 (0.3535)	0.1579** (0.0688)	0.4646 (0.3141)	-0.2910 (0.3613)	-0.0377 (0.9642)
	Income level > 3000€	0.7941*** (0.2295)	0.1394 (0.4285)	0.2180** (0.0841)	1.5585*** (0.4979)	1.5323** (0.7579)	-1.0976 (1.9074)
	Family size	0.0176 (0.3341)	-0.8376** (0.4103)	-0.0893 (0.0634)	-0.6742* (0.3665)	-0.2274 (0.3822)	-0.0310 (1.6409)
Individual traits	Female	0.3283** (0.1301)	-0.6712** (0.2667)	-0.0599 (0.0507)	-0.1065 (0.2908)	0.0303 (0.3301)	-1.5832 (1.3823)
	Age	0.9371*** (0.3405)	-0.2494 (0.6100)	-0.0856 (0.1338)	-0.0070 (0.8386)	0.9947 (0.7168)	3.1684* (1.8915)
Education variables	Master	-0.2980** (0.1361)	0.5342** (0.2689)	0.1111** (0.0523)	0.2564 (0.2560)	-0.0089 (0.2995)	0.0083 (1.0553)
	PhD	0.4219** (0.1740)	-	0.2276** (0.1086)	1.1770* (0.6746)	-0.1881 (0.6169)	-
	Student Status	-0.5893*** (0.1790)	0.6960** (0.3017)	0.0498 (0.0719)	0.0935 (0.3958)	0.3793 (0.3958)	0.3375 (1.4534)
	Engineering & Exact Sciences	0.3294* (0.1814)					
	Health & Life Sciences	0.2305 (0.1667)					
	Humanities & Social Sciences	-0.0936 (0.1780)					
	Arts & Architecture	0.0568 (0.3798)					
N		1476	375	354	416	289	34
Diagnosis tests	Breusch Pagan test	120.85 (0.0000)	41.95 (0.0000)	24.03 (0.0000)	59.71 (0.0000)	25.17 (0.0000)	7.24 (0.0071)
	VIF [max]	1.38 [1.90]	1.34 [2.27]	1.35 [2.05]	1.40 [2.23]	1.36 [2.10]	2.06 [3.91]
Goodness of fit	Wald (p-value)	112.4 (0.0000)	32.93 (0.0010)	27.83 (0.0095)	38.29 (0.0003)	33.15 (0.0016)	8.41 (0.7525)
	Correctly classified	67.82%	68.00%	73.16%	67.07%	65.40%	79.41%
	H-L test (p-value)	1346.04 (0.1775)	350.15 (0.2248)	316.59 (0.2978)	354.82 (0.1761)	286.47 (0.0789)	31.32 (0.0685)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table B 5: The impact of FL level on SP (Retirement Savings)

Variable		Model B5.1 All	Model B5.2 Economics & Business	Model B5.3 Engineering & Exact Sciences	Model B5.4 Health & Life Sciences	Model B5.5 Humanities & Social Sciences	Model B5.6 Arts & Architecture
Financial literacy (FL)	Perception of high FL	0.4527*** (0.1608)	0.3592 (0.2918)	0.5002 (0.3188)	0.0782 (0.3467)	1.2701*** (0.4310)	0.1267 (1.2995)
Macroeconomic expectations	Interest rate (IR)	-0.0548 (0.1795)	-0.4356 (0.3256)	-0.0561 (0.3225)	-0.2959 (0.2982)	-0.8040* (0.4507)	-0.6050 (1.1790)
	Inflation (INF)	-0.2589* (0.1563)	0.2644 (0.2969)	-0.3883 (0.3239)	-0.3691 (0.2915)	0.4205 (0.4399)	0.3765 (1.1024)
	GDP	-0.0954 (0.1547)	0.0033 (0.4042)	0.3768 (0.4309)	1.2780*** (0.4003)	0.6190 (0.6374)	2.1380 (1.3676)
Geographical proximity (GP)	Distance below 5 km	0.4636** (0.2134)	-0.5868* (0.3540)	0.4554 (0.4265)	0.0616 (0.3129)	-0.1213 (0.4752)	-1.3361 (1.7348)
Household traits	1000€ < Income level < 3000€	0.2741 (0.2260)	-0.0418 (0.4685)	0.5969 (0.4586)	0.6064 (0.4935)	-0.0592 (0.5714)	0.0782 (1.1543)
	Income level > 3000€	0.4167 (0.2829)	0.0083 (0.5402)	0.2914 (0.5446)	0.9188 (0.6082)	1.0301 (0.8300)	-
	Family size	1.2755*** (0.3409)	0.1151 (0.3318)	-0.2539 (0.3579)	-0.7267* (0.4100)	-0.6874 (0.4927)	-0.2541 (2.2330)
Individual traits	Female	-0.3851** (0.1547)	-0.3531 (0.2900)	-0.4998 (0.3570)	-0.1222 (0.3496)	0.2525 (0.4904)	-
	Age	-0.4018 (0.3198)	2.7204*** (0.6239)	0.4727 (0.7558)	0.0607 (0.8470)	1.0904 (0.9542)	2.0086 (2.0785)
Education variables	Master	-0.0970 (0.1628)	-0.2260 (0.2769)	-0.4392 (0.3210)	-0.4569 (0.3156)	-0.1817 (0.4370)	-1.3657 (1.4204)
	PhD	0.4033** (0.1831)	-0.1704 (0.9219)	0.2528 (0.5871)	-0.4277 (0.5678)	-1.1976 (0.9515)	-
	Student Status	-0.2938 (0.1853)	0.1182 (0.3134)	0.6985* (0.3860)	1.0991** (0.4434)	-0.6678 (0.5531)	0.7433 (1.9173)
	Engineering & Exact Sciences	0.1020 (0.2077)					
	Health & Life Sciences	0.4030** (0.2008)					
	Humanities & Social Sciences	-0.5036** (0.2545)					
	Arts & Architecture	1.0262** (0.4068)					
	N	1476	380	354	416	289	25
Diagnosis tests	Breusch Pagan test	73.64 (0.0000)	15.34 (0.0001)	20.43 (0.0000)	38.14 (0.0000)	24.44 (0.0000)	6.73 (0.0095)
	VIF [max]	1.38 [1.90]	1.34 [2.27]	1.35 [2.05]	1.40 [2.23]	1.36 [2.10]	2.06 [3.91]
Goodness of fit	Wald (p-value)	87.29 (0.0000)	32.02 (0.0024)	28.21 (0.0085)	40.08 (0.0906)	24.75 (0.0249)	7.35 (0.6917)
	Correctly classified	82.66%	82.37%	83.05%	79.09%	88.58%	64.00%
	H-L test (p-value)	1367.00 (0.0927)	377.36 (0.0551)	311.65 (0.3690)	351.37 (0.2114)	253.17 (0.5029)	22.89 (0.0621)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table B 6: The impact of FL level on SP (Savings shares or bonds)

Variable		Model B6.1 All	Model B6.2 Economics & Business	Model B6.3 Engineering & Exact Sciences	Model B6.4 Health & Life Sciences	Model B6.5 Humanities & Social Sciences	Model B6.6 Arts & Architecture
Financial literacy (FL)	Perception of high FL	0.5651*** (0.1523)	0.5576* (0.3131)	0.6266** (0.2737)	0.6161* (0.3245)	0.7263 (0.4593)	-14.5001** (7.0435)
Macroeconomic expectations	Interest rate (IR)	0.2164 (0.1779)	0.3081 (0.3202)	-0.0582 (0.2707)	0.5378** (0.2515)	-0.1374 (0.3825)	0.3509 (1.4805)
	Inflation (INF)	0.2113 (0.1422)	-0.03355 (0.2990)	0.4529 (0.3015)	0.0672 (0.2779)	-0.3712 (0.3490)	-0.8009 (1.8160)
	GDP	-0.0111 (0.1444)	0.1311 (0.3675)	0.9100*** (0.3459)	0.6039 (0.4126)	-0.2480 (0.5480)	0.3551 (1.5265)
Geographical proximity (GP)	Distance below 5 km	0.3676* (0.1881)	0.1806 (0.4051)	0.0072 (0.3462)	0.2556 (0.3289)	0.8989* (0.5052)	0.0831 (1.7883)
Household traits	1000€ < Income level < 3000€	0.2477 (0.2152)	0.8011 (0.5201)	0.5490 (0.4137)	0.3184 (0.4545)	-0.9059* (0.4620)	3.5405* (1.8896)
	Income level > 3000€	0.4682* (0.2662)	0.7545 (0.5851)	0.8573* (0.4896)	0.5020 (0.5618)	-0.4395 (0.7381)	-
	Family size	0.7472** (0.3462)	-0.7538** (0.3730)	-0.7606** (0.3363)	0.0213 (0.4066)	0.1166 (0.4992)	-2.8696 (2.5752)
Individual traits	Female	0.0816 (0.1460)	-0.7837*** (0.2914)	-0.9061*** (0.3123)	-0.7529** (0.2980)	0.100 (0.4160)	-5.1140* (2.8103)
	Age	0.1140 (0.3109)	1.4546** (0.6656)	0.7017 (0.6884)	0.5957 (0.7831)	-0.4107 (1.0757)	27.6589* (14.2781)
Education variables	Master	-0.6243*** (0.1468)	-0.06571 (0.3033)	0.4672* (0.2800)	-0.0351 (0.3014)	-0.0962 (0.3878)	-1.6729 (1.7652)
	PhD	0.2639 (0.1814)	-	0.3864 (0.4945)	0.3816 (0.6282)	0.9814 (0.6903)	-
	Student Status	-0.3863** (0.1850)	0.7178 (0.3443)	0.3457 (0.3411)	0.9483** (0.3981)	0.1778 (0.5387)	-21.3285** (10.8236)
	Engineering & Exact Sciences	0.6305*** (0.1941)					
	Health & Life Sciences	0.5470*** (0.2028)					
	Humanities & Social Sciences	-0.0359 (0.2423)					
	Arts & Architecture	0.8167* (0.4562)					
	N	1476	375	354	416	289	32
Diagnosis tests	Breusch Pagan test	81.46 (0.0000)	39.74 (0.0000)	18.03 (0.0000)	30.00 (0.0000)	13.86 (0.0002)	4.91 (0.0268)
	VIF [max]	1.38 [1.90]	1.34 [2.27]	1.35 [2.05]	1.40 [2.23]	1.36 [2.10]	2.06 [3.91]
Goodness of fit	Wald (p-value)	103.74 (0.0000)	27.81 (0.0059)	45.80 (0.0000)	37.83 (0.0003)	13.64 (0.3996)	7.31 (0.7734)
	Correctly classified	79.95%	80.00%	74.58%	81.01%	85.47%	90.63%
	H-L test (p-value)	1398.27 (0.0279)	347.95 (0.2502)	338.82 (0.0825)	379.08 (0.0351)	268.30 (0.2570)	21.88 (0.3471)

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.

Table B 7: The impact of FL level on SP (Perceived savings behaviour)

Variable		Model B7.1 All	Model B7.2 Economics & Business	Model B7.3 Engineering & Exact Sciences	Model B7.4 Health & Life Sciences	Model B7.5 Humanities & Social Sciences	Model B7.6 Arts & Architecture
Financial literacy (FL)	Perception of high FL	0.7070*** (0.1823)	0.5549* (0.3337)	0.9266** (0.3705)	0.9903** (0.4642)	0.4059 (0.4789)	-
Macroeconomic expectations	Interest rate (IR)	0.0702 (0.0918)	-0.0469 (0.3087)	0.4434 (0.3015)	-0.0063 (0.2786)	-0.2383 (0.3344)	-
	Inflation (INF)	0.1191 (0.2234)	-0.3097 (0.3306)	0.1635 (0.3140)	0.0298 (0.2707)	0.4663 (0.3273)	-
	GDP	0.1191 (0.2234)	-0.0504 (0.4408)	-0.0948 (0.4239)	0.1559 (0.4864)	0.2521 (0.5529)	-
Geographical proximity (GP)	Distance below 5 km	-0.4306** (0.1892)	-1.1192** (0.5686)	-0.2076 (0.3906)	-0.2084 (0.3239)	-0.3563 (0.3920)	-
Household traits	1000€ < Income level < 3000€	0.3725** (0.1878)	0.0951 (0.3916)	0.6877* (0.3640)	0.6250* (0.3583)	0.0226 (0.4486)	-
	Income level > 3000€	0.1102 (0.2420)	-0.3921 (0.4895)	0.1664 (0.4455)	0.9027* (0.5248)	0.2588 (0.6280)	-
	Family size	-0.4228** (0.2049)	0.2368 (0.4290)	-0.2527 (0.3714)	-0.6673 (0.4160)	-1.2867** (0.5868)	-
Individual traits	Female	0.3802** (0.1594)	0.2963 (0.3134)	0.0843 (0.2959)	0.4222 (0.3202)	0.8313** (0.3619)	-
	Age	-0.7838** (0.3629)	-1.1341* (0.6712)	-1.6758** (0.7503)	-0.6997 (0.7824)	0.7796 (0.7501)	-
Education variables	Master	0.1923 (0.1538)	0.6291* (0.3364)	0.1652 (0.3089)	-0.1728 (0.2807)	0.1317 (0.3820)	-
	PhD	0.1085 (0.3356)	-	0.2063 (0.7359)	-0.1664 (0.5711)	-0.3963 (0.7103)	-
	Student Status	0.0967 (0.1945)	0.3123 (0.3713)	0.0119 (0.4392)	-0.0189 (0.3996)	-0.1203 (0.4644)	-
	Engineering & Exact Sciences	-0.1167 (0.2158)					
	Health & Life Sciences	-0.2222 (0.2077)					
	Humanities & Social Sciences	-0.0867 (0.2305)					
	Arts & Architecture	0.0505 (0.4662)					
	N	1476	-	354	416	289	-
Diagnosis tests	Breusch Pagan test	42.58 (0.0000)	17.35 (0.0000)	14.14 (0.0002)	11.53 (0.0007)	14.92 (0.0001)	0.71 (0.3990)
	VIF [max]	1.38 [1.90]	1.34 [2.27]	1.35 [2.05]	1.40 [2.23]	1.36 [2.10]	2.06 [3.91]
Goodness of fit	Wald (p-value)	40.04 (0.00013)	14.45 (0.2730)	16.92 (0.2029)	11.09 (0.6029)	14.99 (0.3079)	-
	Correctly classified	82.72%	85.87%	81.07%	81.01%	83.04%	-
	H-L test (p-value)	1348.89 (0.1636)	362.17 (0.1148)	335.63 (0.1025)	361.96 (0.1163)	288.68 (0.0664)	-

Note: ***(**)[*] statistically significant at 1%(5%)[10%]. Robust standard errors.