LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER
IN FINANCE

MASTER´S FINAL WORK
DISSERTATION

THE ROLE OF FINANCIAL LITERACY AND INDIVIDUAL DEMOGRAPHICS ON FINANCIAL BEHAVIOUR: EVIDENCE OF COVID19 CRISIS

PATRICIA MARTINS DE LIMA

OCTOBER - 2020

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SUPERVISION:
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ABSTRACT, KEYWORDS, AND JEL CODES

In the context of 2020 COVID-19 crisis, we aim to understand how well people prepare for economic distress, and what drives good preparation. Several studies verify that financial conducts like retirement planning and level of indebtedness are influenced by the level of financial literacy. However, even after the Portuguese program for financial education implemented in 2011, the level of retirement savings in the country did not increase. This raises the question if there are other drivers for better financial behaviour. Literature points to individual characteristics, that could as well impact people's attitudes. However, since different policy measures are undertaken between countries, we consider important to analyse if there are differences between how Brazilians and Portuguese perceive the crisis.

We design a survey to measure literacy and behaviours of the Portuguese and Brazilian populations. This study is conducted alongside the crisis, giving it a particular feature of understanding any differences in personal decision making during difficult macroeconomic context. We construct several indices to measure both financial literacy levels and different financial behaviours: retirement planning; over-indebtedness; self-perception; risk profile; and crisis preparedness. We find a positive, yet statistically not significant, relationship between financial literacy and good financial behaviour, here understood by more retirement planning, crisis preparedness, and lower levels of indebtedness. The financial knowledge is only positively significant when analysing the level of confidence, given by the self-assessment of literacy. Moreover, personal characteristics, like employment, income level, and gender, appear to be consistently statistically significant on the likelihood of having efficient financial conduct and higher knowledge, rather than financial literacy, as argued by previous literature.

KEYWORDS: FINANCIAL LITERACY; FINANCIAL BEHAVIOUR; FINANCIAL CRISIS; RETIREMENT PLANNING; OVER-INDEBTEDNESS; GENDER; PORTUGAL; BRAZIL

JEL CODES: G40; G41; G50; G51; G53; J24; J26

TABLE OF CONTENTS

TABLE OF FIGURES

GLOSSARY

ASF - Insurance and Pension Funds Supervisory Authority

BdP – Central Bank of Portugal

CMVM - Portuguese Securities Market Commission

COVID-19 – Coronavirus Disease 2019

CPI – Crisis Preparedness Index

DECO – Consumer's Protection Organization

FLI – Financial Literacy Index

FLI EW – Financial Literacy Index Equal Weight

GAS – Over Indebted Support Cabinet

GDP – Gross Domestic Product

GPF - Financial Protection Cabinet

ISEG – Lisbon School of Economics & Management

MFW – Master Final Work

OECD – Organization for Economic Cooperation and Development

WHO - World Health Organization

1. INTRODUCTION

After unstable economic scenarios, like the 2009 financial crisis and the current 2020 crisis, given the COVID-19 pandemic, the importance of financial literacy is increasingly highlighted as a possible mitigator of downsides.

Several studies relate financial knowledge with financial behaviour, and it is common to see both public and private programs of financial education, given the perception that if people know more, they perform better. However, behaviour appears to be affected as well by other characteristics, whether intrinsic to the individual formation or contingent to each owns' context.

Thus, the main questions that we seek to answer are: what are the main drivers of financial behaviour? Can the financial education improve it? And which are the personal and environmental components that impulse this financial knowledge?

We use the data from our designed survey to assess people's financial literacy and capabilities. The former was measured by technical questions and the later in terms of how they plan, and perceive their knowledge, personal financial situation, economic environment, and risk appetite. The survey also collected the socioeconomic characteristics of the inquired. It was conducted online, to Brazilian and Portuguese respondents, from June to August of 2020. We construct several indices to measure both financial literacy levels and different financial behaviours: retirement planning; over-indebtedness; self-perception; risk profile; and crisis preparedness. We find a positive, yet statistically non-significant, relationship between financial literacy and good financial behaviour, here understood by more retirement planning and crisis preparedness, and lower levels of indebtedness. The financial knowledge is only positively significant when analysing the level of confidence, given by the self-assessment of literacy. Moreover, personal characteristics, like employment, income level, and gender, appear to be consistently statistically significant on the likelihood of having efficient financial conduct and higher knowledge.

Our work contributes for further understanding of financial behaviour and, different from what observed in Casagrande (2016); Klapper, Lusardi & Panos (2013); and Lusardi & Mitchell (2011b), shows that financial literacy is not sufficient to improve financial behaviour. We also contribute to understand individual financial decision making in the

context of macroeconomic crises. We do so twofold: first, by conducting our survey during a pandemic crisis with enormous impact on economic conditions. Secondly, by specifically enquiring survey respondents about the impact and their response to those economic consequences of COVID19 crisis.

This study is structured as follows: in section 2 we examine the existing literature about financial literacy and its relations with the behavioural aspects of retirement planning, over-indebtedness, economic crisis, personal self-assessment, and risk profile. Section 3 describes the propositions of our study and what we expect from each analysis, as well as the methodology to obtain the data used. Finally, Section 4 presents the data analysis and model results, and Section 5 summarises and concludes.

2. LITERATURE REVIEW

Population ageing is a challenge that has been affecting the world in different forms, yet consistently. Its biggest issue is the fact that countries are constantly pressured to pay increasing pensions, while the contributions from the workforce are decreasing. This trend leads to a transfer of responsibility from the government to the people in the participation of their retirement planning. According to the life cycle theory, people start life with low rates of savings, increasing it during life, to spend those in elderly ages (Deaton, 2005). Adequate financial behaviour and the construction of a safety net is not only important for retirement, but also in case of any unpredictable events as, for example, changes in the macroeconomic scenario, and health or employment conditions.

The greatest challenge of this shift in responsibility is forcing people to make more financial decisions, which are frequently based on hardly predictable factors. For instance, to predict how to sustain a pattern of consumption in retirement age, it is necessary to take into consideration life longevity, a variable that is in constant change. Furthermore, insufficient financial planning can lead people to face poorness in this fragile stage of life, where health expenses tend to increase, while the cash inflow diminishes. Researchers show that performing retirement planning contributes to a greater wealth accumulation in older stages of life, even between people with higher educational levels (Lusardi & Mitchell, 2011a).

This emphasizes the importance of efficient retirement savings. However, Portugal has consistently one of the lowest gross household saving rates in Europe, with 6.74% in

2019, while the Euro area presents 13.02% (Eurostat, 2020). So, an important question must be made: why are people not saving?

Part of the literature assumes that countries that offer more social benefits, as education, health, and retirement planning tend to lower the willingness of its population to save (Jappelli & Padula, 2013). This can be true for the Portuguese case, where the pension system is mainly public.

Alternatively, some argue that people do not make proper retirement planning because of a lack of financial knowledge (Lusardi & Mitchell, 2011b). Saving requires not only available income but also constant financial decisions, like the types of investments and renegotiation of interests, always taking into consideration risk preferences and expectations about the economy. Lusardi & Mitchell (2011a) state that "… less sophisticated individuals who do not have a good grasp of interest compounding may engage in high-cost credit-card borrowing, or they may be more likely to pay high fees when using financial services." (Lusardi & Mitchell, 2011a, p. 8)

Also, teaching financial knowledge in early stages of life, for example in school, contributes to a better result in saving returns even if people do not keep pursuing knowledge and let it depreciate. Consequently, this positively impacts the economy (Lusardi & Mitchell, 2014).

Thus, this capacity of making informed and rational decisions about personal financial planning, relating to pensions, debt, wealth accumulation, and taking into consideration the economic environment, is named financial literacy (Lusardi & Mitchell, 2014). In other words, Hira (2009) describes being financially literate as possessing the knowledge about money, credit, investments, banking, insurance, and taxes; notions about risks, losses, gains; and using all this information to make thorough financial decisions.

Through the literature, there is a consensus about this definition. However, OECD (2005) defines financial education in a more complete aspect. It highlights that this knowledge is not only constituted by information, but also experience, and confidence, achieved through regulation:

> Financial education can be defined as "the process by which financial consumers/investors improve their understanding of financial products, concepts and risks and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and

opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being".

In: OECD (2005), p. 3

In the Portuguese case, the importance given to financial knowledge is quite recent. The National Plan for Financial Education was first released in 2011, with a time frame until 2015. It aims to "increase the level of financial knowledge of the population and to promote the adoption of appropriate financial behaviours" by creating financial education projects, thus increasing "the wellbeing of the population and the stability of the financial system" (Conselho Nacional de Supervisores Financeiros, 2011, p. 3). The responsible for its planning is a working group formed by representatives of the three financial regulators in the country: Central Bank of Portugal (BdP); Portuguese Securities Market Commission (CMVM); and Insurance and Pension Funds Supervisory Authority (ASF). Currently, the plan encounters itself in the second phase, covering from 2016 to 2020 (Conselho Nacional de Supervisores Financeiros, 2011).

But, how to measure something as subjective as financial literacy? In Lusardi, Kappler & Oudheusden (2015), being financially literate means being able to answer correctly at least 3 out of 4 financial questions involving risk diversification, inflation, and calculation of simple and compounded interests. Their results show that, globally, only 33% of adults can be considered financially literate. Concerning the European Union, the average level is 49%, while Portugal has the second-worst level in the group, with only 26% of financially literate adults. These low rates of financial literacy might not only implicate in lower levels of saving but also higher debt. Casagrande (2016) studies the relationship between financial literacy and over-indebtedness in Portugal, finding that a higher level of financial knowledge leads to a lower probability of being over-indebted. Moreover, between the already over-indebted population, a higher literacy is related to lower levels of debt.

The European Commission defines some basic characteristics to standardize the concept of over-indebtedness. It should be considered over-indebted a household that, even considering all the possible resources, cannot solve all recurring obligations without lowering its living standards. Here, we should consider an entire household since income is pooled between family members. But this concept is still highly subjective and hardly

measurable, opening space for different interpretations between countries and studies (Fondeville, Ozdemir & Ward, 2010).

According to D'Alessio & Iezzi (2013), because of this difficulty, the best way to define if a household is over-indebted is by asking directly to them. Even though there is still subjectivity in this procedure, usually people do not hide their financial difficulties from official surveys. According to the Portuguese Consumer's Protection Organization (DECO), the effort rate measures the weight of the total amount of loan in the total income of the household, considered healthy under 35%. For this reason, we will consider over-indebted every household that declares an effort rate higher than 35% (DECO Proteste, 2020).

DECO has a specific division to deal with the financial situation of the population, the Financial Protection Cabinet (GPF). It is responsible for giving information, advising about budget management, and intervening in case of over-indebtedness. Statistics from the organization show that the level of both support requests and interventions for over-indebtedness seem stable since 2014, being close to 30,000 requests for the first and 3,000 for the second (Gabinete de Apoio ao Sobre-endividado, 2013, 2014, 2015, 2016; Gabinete de Proteção Financeira, 2017, 2018, 2019).

Yet, in the year 2020, the world is facing a global health crisis. With the COVID-19 pandemic, the economies are entering large-scale quarantines, with travel restrictions and closure of borders, which leads to a financial slowdown. The European Commission (2020) lists a series of reasons why the European economy got affected by the new virus. Between them, is the effect from China's initial contraction in the first quarter of 2020; the supply shock from the interruption of business and supply chains; the demand shock by lower consumption and investments; and the impact of a reduction of liquidity for companies. The estimates in March of 2020 were a reduction of 2.5% in the projected real GDP of the area.

The sudden drop in consumption affects not only the GDP of countries, but it is highly affecting the stock markets and especially smaller businesses. The real effect of this crisis will only be seen after it has ended. However, it is possible to assume that the unemployment and corporate bankruptcy rates will tend to go higher (McKinsey & Company, 2020). In the Portuguese case, this can be especially true. Consumption and

tourism have a key role in the region, where the first accounted for 64.3% of GDP in 2019, and the second had revenues in the order of 8.3% of GDP in 2018 (Aníbal, 2020).

Given that the main causes for imbalance in the Portuguese household accounts throughout the years are unemployment and deterioration of labour conditions (Gabinete de Apoio ao Sobre-endividado, 2013, 2014, 2015, 2016; Gabinete de Proteção Financeira, 2017, 2018, 2019), it seems reasonable to assume that the country will face an increase in the over-indebted population in the short run. From the beginning of the State of Emergency declared by the Portuguese government, on March 18th, until May 11th, DECO received 3,600 new requests of assistance. The biggest motivation behind the cases of intervention were losses of income (57%), possibly because of layoff programs, followed by unemployment (17%). From those cases, the effort rate was around 71%, on average (Gabinete de Proteção Financeira, 2020).

In terms of job losses, the most affected groups seem to be the young and female populations. From all the work positions lost in Portugal, during the months of March and April, 38% belonged to the first and 90% to the second category. The possible reason is the more fragile labour bond that both categories have when comparing to the older masculine ones (Observador, 2020).

Even though most of the world decided from the beginning to stay at home to control the pandemic situation, some nations went in other directions. Worried about the impacts that lockdowns could bring to the economy, the Brazilian government decided to take a different posture than most of the European countries. The president of the country gave several polemic statements diminishing the complexity of the new virus and questioning the safety measures proposed by the World Health Organization (WHO). The country was the second to reach more than 50,000 deaths from the disease and, on October of 2020, was still the second one in the number of cases. From the first case, reported in February, until October of 2020, Brazil had three health ministers, mainly because of divergences between them and the president in how the health crisis should be dealt with (BBC, 2020).

Despite the president resistance in acknowledging the importance of the situation, the Brazilian Congress approved the distribution of 600 Brazilian reais (around €92[1]) per

[1] Considering September 1st of 2020's exchange rate of 6.51 R$/€, by the European Central Bank.

citizen that proved to not have a regular job during the pandemic. An article from Lima, Rosati & Iglesias (2020), for Bloomberg, says that with this measure, launched in April of 2020, the national poverty rate reached the lowest level from the last 16 years. Still, the debate left is on how to finance it and if it is effective to fight the economic slowdowns caused by the pandemic. On one hand, Brazil is headed to its largest primary deficit ever. However, on the other hand, the economy is expected to drop 5% this year, a lower level than its neighbours Mexico and Argentina, that could decrease 10% (Lima et al., 2020).

Regardless of the unpredictability of the situation, the literature suggests that a better understanding of finance could make people more prepared to face unexpected disturbances in income and macroeconomic shocks. Klapper, Lusardi & Panos (2013) study the real consequences of financial literacy in Russia during the 2008 crisis. The dependent variables are the experience of a negative income shock during the previous year; the level of spending capacity; and the availability of unspent income. For those, they consider the outcomes of 2009 while using the 2008 parameters of financial literacy and other independent variables. As a result, they find that financially literate individuals are more likely to have more available unspent income and to be less likely to report low spending capacity and a negative income shock during the crisis period.

To analyse the international differences in financial literacy, Lusardi & Mitchell (2011a) compare the results of the financial questions in different countries. There were two main conclusions found. The first is that financial illiteracy seems to be present everywhere, even in places with developed financial markets. The second is that macroeconomic experiences seem to affect financial knowledge. For example, countries that experienced high inflation periods were more likely to answer questions about it correctly, the ones with high scores on math tests tend to do better in numeracy, and where pensions became private the population was more knowledgeable about risk diversification.

However, not only great economic impacts can influence one's financial knowledge. One interesting topic studied by Lusardi, Mitchell & Curto (2009) is exactly what are the determinants of financial literacy among the young population, in the United States. They analysed the results of the financial-related questions, included in the National Longitudinal Survey of Youth, fielded in 2007-2008. Surprisingly, the authors found that

financial behaviour is not only related to cognitive abilities but also with personal aspects, like the parental background. For example, the family wealth, financial sophistication, and education were all statistically significant for higher literacy. For the first, they analysed if the parents owned a home and/or had retirement savings. The second was determined by having a bank account and being in the stock market. The last one was examined by including the mother's educational attainment.

As a matter of fact, women seem to be consistently less financially literate than men. Lusardi & Mitchell (2014) show that this pattern is observed in different countries and it does not depend on age. The literature does not seem to have a conclusion about the reasons behind this aspect, but one interesting observation is that women tend to answer more 'do not know' in financial questions than men, a consistent result across countries. The authors even propose that this characteristic "may make women ideal targets for financial education programs" (Lusardi & Mitchell, 2014, p. 19).

Using the results of financial knowledge questionnaires from three different countries - the United States, Netherlands, and Germany - the study of Bucher-koenen, Lusardi, Alessie & Rooij (2012) confirms that even controlling for demographic and economic characteristics, women were almost 12% less likely to answer all financial literacy questions correctly. Moreover, they were 17% more likely to answer 'do not know' in the Netherlands, and 7% in Germany and the United States.

Other studies argue different conducts between males and females when considering the risk willingness. In the study of Prudential (2013), 70% of the women declared to be interested only in guaranteed returns products, and consider themselves savers rather than investors. Therefore, there is still a great part of the gender influence in finance that remains unexplained. Since 50% of the world's working-age population is female and consequently responsible for 50% of the pension savings, there should be a concern about how to solve the gender gap in finance. (International Monetary Fund, 2019)

One possible explanation is the behavioural aspect of confidence. The assumption is that women tend to be less confident about their financial skills, corroborating with the higher level of 'do not know' demonstrated before. As an example, Bucher-koenen et al. (2012) present the case of the German survey. The possibility of responding 'do not know' to a question only came in the 2009 survey, while in 2007 people were forced to

answer. "Of those who responded 'do not know' in 2009, more than 70% had answered the question correctly two years earlier. We take this as an indication that many of those answering 'do not know' actually do know the answer but do not feel confident about their knowledge" (Bucher-koenen et al., 2012, p. 38).

Not only gender but also age seems to influence financial confidence. As referred by Lusardi & Mitchell (2011a), "Across countries we tend to see that younger people know very little and acknowledge it. By contrast, older people consistently rate themselves as very knowledgeable despite the fact that they are actually less literate than average." (Lusardi & Mitchell, 2011a, p.11)

This behavioural aspect of self-assessments is important to notice, since the financial decision-making process involves the perceptions of knowledge that people have. "As an example, individuals who have a lot of confidence in their skills relative to objectively measured knowledge are more likely to make retirement calculations and set up a financial plan for retirement saving" (Bucher-koenen et al., 2012, p.39).

3. RESEARCH PROPOSITIONS AND METHODOLOGY

This paper aims to test whether the Portuguese and Brazilian populations follow the same behaviour found in the literature, which mainly focus on Anglo-Saxon countries.

It is important to evaluate if the Portuguese and Brazilian populations are suffering from a lack of financial literacy, which are the most affected groups, the expectations about the new economic scenario, and if this financial knowledge leads them to prepare better for possible crisis scenarios. With the answers to these questions, regulators, policy makers and other entities should be able to effectively act and improve society's welfare.

This paper intends to contribute to the recent studies made worldwide regarding understanding the real role that financial literacy has in individual decisions. It will especially try to understand if the lack of financial literacy might have a great impact on individual behaviours, such as being over-indebted and not preparing itself either for expected (retirement) or unexpected (crisis) events.

First, we want to pursue the possible drivers of financial literacy beyond regular financial education. We call these propositions **P1** and **P2**, which are divided into Personal Aspects and Country Aspects. Here, we test whether financial literacy is driven

by any personal aspects, previously argued, or even by country effects. For that matter, we test the impact of Gender; Age; Income; Educational Level; Marital Status; and Employment Status. P2, on the other hand, will focus on Country of Residency.

The third proposition (**P3**) is based on Lusardi & Mitchell (2011b) and relates the level of financial literacy to the action of saving for retirement, where the former should influence the latter in a positive way.

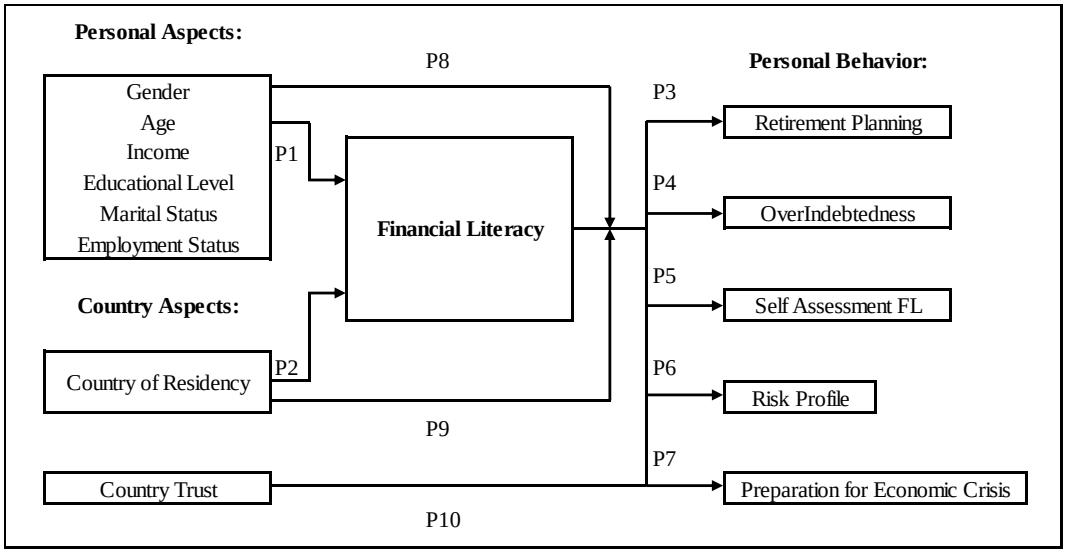
The next proposition (**P4**) adapts Santos & Abreu (2013) and Casagrande (2016) and relates levels of financial knowledge with over-indebtedness. A higher financial literacy should decrease the intensity of debt.

Following the propositions that the levels of financial literacy can influence behavioural aspects, we decided to assess if that would be also true for one's self-perception of their financial knowledge. We argue the more a person knows should be reflected in how much they think they know. But, at the same time, we understand confidence can emerge from outer aspects. The same logic is applied to the risk willingness of a person. These are analysed in Propositions **P5** and **P6**. Considering the work of Klapper et al. (2013), we proceed to Proposition **P7** which relates to whether people face an economic crisis better when they have higher financial knowledge.

Arguing that all these behavioural conditioning can emerge from previous sociocultural context; we propose to include in the analysis the effects of the personal and country aspects in each of the analyses. We call these propositions **P8** and **P9**.

Finally, for the specific case of Crisis Preparedness, where we conduct tests to assess how well people are preparing for an economic crisis, we argue other aspects could be significant. Possibly, in this situation, people act depending on how they trust the economy they are part of. Because of the differences in how the pandemic was dealt with, it can be interesting to evaluate whether the political measures and environment can influence people's behaviour about how to prepare for an upcoming financial crisis. For this reason, we include in the analysis the variable Country Trust. The reasoning makes us believe that people that are more pessimistic about their economy would prepare better to face crises, to be more conservative and cautious. For this, we argue **P10**.

Figure 1: Conceptual Model



Our data set comes from a survey designed and distributed through social media and the e-mail database of the Lisbon School of Economics and Management (ISEG). This questionnaire was available from June 12th of 2020 until August 20th of 2020. It had an expected completion time of 8 minutes and took place online.[2]

In the construction of this questionnaire, we intend to apply the four principles put forth by Lusardi & Mitchell (2014). The questions should be (i) simple; (ii) relevant, meaning being pertinent to daily life and non-context-specific; (iii) short; and (iv) capable of differentiate and compare the financial knowledge of people.

Regarding financial literacy, the following aspects will be measured: (i) basic financial literacy, relating to macroeconomic fundamentals such as inflation; (ii) advanced financial literacy, related to the specifics of financial markets; and (iii) numeracy (Lusardi & Mitchell, 2014). Also, we will collect data on the personal assessment of financial skills; economic expectations; and possible safety measures, considering the pandemic of COVID-19. For the last one, we intend to use the questions posted by the National Endowment for Financial Education (2020). We also aim to obtain the demographic profile of the households.

The questions are all based on previous works on the topics. For retirement planning we are using the questions from Lusardi & Mitchell (2011b), to analyse if people think

[2] The complete survey is available through request to the author.

about their future needs and how well they keep with this plan. Besides that, to analyse whether people already have savings or other investments, even if not thinking about retirement, and the risk tolerance they have, we based ourselves on the survey of investor profiles in Portugal made by Gabinete de Estudos da CMVM (2019). For the financial literacy questions, we used Lusardi & Mitchell (2014) and Banks & Oldfield (2007).

We will use this questionnaire to construct three different financial literacy indices. The first one follows Santos & Abreu (2013), and consists of the percentage of questions correctly answered, equally weighted. The second and third indices are based on the approaches used by Casagrande (2016), with slight changes. Aggregate FLI considers that each question will have different weights based on their complexity level. The value of the questions follows the sequent pattern: 15 points for the numeracy question about simple interests; 20 points for the basic financial question about inflation; and 65 points for the last category, of sophisticated questions. In this last category, we have two questions and the punctuation will be split into 25 and 40 points, still defined by the complexity level. To determine which has a higher difficulty level we evaluate which has a higher number of correct answers, therefore being considered easier. The total number of points for every question correctly answered is, consequently, 100.

The last one is called Simple FLI. It follows the same principles of the Aggregate FLI but here, for the sophisticated questions, we consider only the most representative question. This means we consider only the question used by Lusardi & Mitchell (2014) for this category, about risk diversification, for a total of 65 points. Thus, the total number of points remains 100. The incorrect or "do not know" answers will value 0 for all the indices.

Following the methodology of Lusardi & Mitchell (2011b), our respondents are divided into 4 categories of retirement planning. The *Non-Planners* are the ones that answer they do not calculate how much they would need for retirement and do not make any plans for it. *Simple Planners* are the ones that admit trying to do a calculation for how much they would need in retirement, but not necessarily develop a plan for it. *Serious Planners* are the ones that developed a plan but were rarely or not able to stick to it. Finally, the *Successful Planners* are the ones that were able to do all the three conditions.

4. DATA AND RESULTS

The survey has 378 answers, but not all of them complete. Considering the responses with all questions filled, we have a total amount of 235 replies. The most frequent characteristics are women (54.3%), from 18 to 29 years old (38%), single (48.7%), residents in Brazil (50.4%), with higher level of education than bachelor (43.2%), and with a monthly income of the household between €1,501 and €2,500 (23.5%). The complete demographic data is found in Annex 1.

Bearing in mind the differences between the two countries, we observe that the Portuguese data is composed of 55.1% of men, 51.4% from 18 to 29 years old, 46.7% with higher degrees than the bachelor and 29% with monthly income of the household between €1,501 and €2,500. These numbers are not as representative of the reality of the population which is composed of 53% women; 64% population between 15-64, where 37% are from 30-49; and 20% with high educational level (PORDATA, 2011b, 2011a, 2019; The World Bank, 2019a, 2019b). On the other hand, the Brazilian sample showed 64.4% of women, 41.5% from 50 to 65 years old, 40.7% with a bachelor's degree, and 21.2% with monthly income of the household between €1,001 and €1,500. Comparing to the real data we have 51% women; and 70% population between 15-64, where 41% are from 30-49 (IBGE, 2010; The World Bank, 2019a, 2019b).

We can observe that our Portuguese sample appears to be more biased than the Brazilian one. The reason behind it could be sending the survey to ISEG students, thus, the difficulty to reach a broader group given the pandemic situation. For further studies, we would recommend obtaining a broader sample, following the profile of the country.

It is important to point out that the Brazilian population is younger, therefore the pressure on the pension system is not as strong as the Portuguese one. When comparing the real data from both countries, and considering only people older than 18, we have 24% of Portuguese residents older than 65 years, while in Brazil, they represent 10%.

4.1 FINANCIAL LITERACY

On the matter of the financial literacy questions, we can observe that the ones about inflation and interest rate have the highest level of correct answers, with 77% and 83.4%, respectively. As mentioned before, between the sophisticated questions, the one with a higher accuracy rate is considered easier and thus have a smaller value in the construction

of our FLI Aggregate. The risk diversification question had a correctness level of 66.4%, while the bond prices one had 23.4% correct. Hence, the first has a weight of 25 and the second 40. The percentages of accuracy per question are shown in Annex 2.

From the three Financial Literacy indices constructed, the FLI Simple was the one with the highest score, with an average of 71 out of 100 points for the total sample, and the FLI Aggregate had the lowest, with 53.87. For the FLI Equally Weighted, 41.3% of the sample has 75 out of 100 points of financial knowledge while, for the FLI Aggregate, 37.4% scored 60 points. For the FLI Simple, the largest part of the sample (55.3%) has 100 points score. At the same time, the Portuguese sample appears to have a higher score than the Brazilian one for every index, e.g. 76.67 points for the first and 65.17 for the second, considering FLI Simple. Overall, the largest part of the sample seems to have a higher literacy than 50 points. However, the FLI Equal Weighted presents the highest number of financially illiterate, with 40.8% of the sample, when considering scores below the average. For Brazilians, the illiterate ones on this index are 49.1%.

It is worth noting that most of the respondents answered the financial questions posted, even having the possibility of choosing 'do not know'. Only 5.5% of the total sample answered they 'do not know' all the four questions. While the majority of the masculine population (82.2%) did not use these resources at all, more than half of the feminine population (51.6%) chose a 'do not know' in at least one of the questions, indicating the same behaviour of previous research (Lusardi & Mitchell, 2014). From a country point of view, we observe that, on average, 23.31% of Brazilians use this tool, while only 12.27%, on average, of the Portuguese do.

4.2 THE FINANCIAL LITERACY DRIVERS

Our first proposition aims to verify if financial literacy is affected by personal aspects like gender; age; income; educational level; and marital and employment status. According to the literature review there are reasons to believe that women have less literacy, while individuals with higher income and education have higher levels (Lusardi & Mitchell, 2014). For this reason, the first analysis that we perform is a bivariate comparison of means. With this test, we intend to verify if there is an actual difference in the level of financial literacy between groups, for each one of the demographic aspects. The complete results can be observed in Table I.

Observing the outcomes, we understand that men appear to have a statistically significant higher chance of retaining more financial knowledge than women for all indices, consistent with the previous results found in the literature (Lusardi & Mitchell, 2014).

While age and marital status do not appear to have significant impacts on financial literacy, all other independent variables have a significant positive one. The higher levels of financial knowledge appear on the higher bands of income, with its peak from € 3501 to € 4000 per month (92.78 points), and on higher educational levels (78.68 points for Post Degrees). In terms of employment, the lowest levels are between unemployed (47.50) and retired (59.31) individuals (all results refer to FLI Simple).

For our second proposition, we want to evaluate if the residency country has any impact on financial knowledge. This is reasonable to argue, once this type of familiarity can be obtained by macro experiences, such as inflation, culture, and possible educational programs created by regulators (Lusardi & Mitchell, 2011a). In this case, the residents of Brazil (65.17 points – FLI Simple) have statistically significant less financial knowledge than the Portuguese population (76.67), for all financial literacy indices.

Table I: Bivariate Analysis - Mean Comparison of level of Financial Literacy

Proposition 1					
	Bivariate Analysis (t-test)	N	**FLI Aggregate**	**FLI Simple**	**FLI Equal Weight**
Gender	Male	107	66.8692	85.9346	75.4673
	Female	128	43.0078	58.6328	51.7578
	Test Value (t)		7.1629***	6.1835***	6.8320***
	Std. Error Difference		3.3101	4.4152	3.4926
	Bivariate Analysis (ANOVA)				
Age	Test Value (F)	235	0.6230	0.6867	0.7552
Income	Test Value (F)	235	2.2431**	3.3474***	2.0746*
Educational Level	Test Value (F)	235	2.8380**	3.8846***	2.7424**
Marital Status	Married	96	54.2188	71.3021	62.7604
	Divorced	18	53.6111	71.3889	62.5000
	Single	115	54.3913	71.4348	63.0435
	Widowed	6	39.1667	59.1667	50.0000
	Test Value (F)		0.3998	0.2086	0.5230
Employment Status	Working in the private sector	91	52.2527	70.2747	60.7143
	Working in the public sector	34	67.6471	85.2941	75.7353
	Self-Employed	33	52.5758	68.3333	62.1212
	Retired	29	45.5172	59.3103	53.4483

	Unemployed	14	36.0714	47.5000	46.4286
	Student	33	60.9091	82.7273	69.6970
	Test Value (F)		3.6326***	3.5870***	3.6848***

Proposition 2

	Bivariate Analysis (t-test)	N	FLI Aggregate	FLI Simple	FLI Equal Weight
Country of Residency	Portugal	108	60	76.6667	68.2870
	Brazil	118	47.8814	65.1695	56.7797
	Test Value (t)		3.0561***	2.3266**	3.1524***
	Std. Error Difference		3.7654	4.9416	3.8443

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

To test our first two propositions, we ran an Ordinal Logit Regression model, since financial literacy is a variable scaled from 0 to 100. The model is described by Equation 1, below.

(1) $Financial\ Literacy = a + b_1 Gender + b_2 Age + b_3 Income + b_4 Educational\ Level + b_5 Marital\ Status + b_6 Employment\ Status + b_7 Country\ of\ Residency + e$[3]

As we observe in the results described in Table II, for all FLI, income level, being a private sector worker, unemployed, a man, or Brazilian have significant impacts. Besides, it is worth noting that only income and males increase the odds of having higher levels of financial literacy.

Since the probabilities of having a higher financial knowledge are not statistically significant for formal education, it seems reasonable to wonder if financial literacy is driven by the environment one is in and its cultural aspects, as previously showed in the literature review. For example, macroeconomic effects could influence knowledge, as exposed by Lusardi & Mitchell (2011). However, in this case, the Brazilian population should have a higher accuracy rate for the inflation question, given the hyperinflation period from 1980 to 1990, which does not hold on our data, even when considering only the population older than 50 years.[4]

Table II: Ordinal Logit Regression for Financial Literacy Indices

Ordinal Logit Regression for Financial Literacy Indices

		Financial Literacy Equal Weight		Financial Literacy Simple		Financial Literacy Aggregate	
	Groups	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Gender	Male	1.5398***	0.2882	1.4197***	0.3034	1.4897***	0.2800

[3] Variables defined in Annex 6.

[4] Accuracy level for the inflation question per country: Brazil 71%; Portugal 83%. Non tabulated results provided by request to the author.

Marital Status	Married	-0.1368	0.8135	-0.2681	0.8201	-0.0685	0.7992
	Divorced	0.5584	0.8914	0.5033	0.9122	0.4970	0.8749
	Single	-0.2040	0.8878	-0.3278	0.9095	-0.1205	0.8714
Employment Status	Private Sector	-0.7374*	0.3987	-0.7684*	0.4409	-0.7463*	0.3897
	Public Sector	0.2295	0.5330	0.0761	0.6378	0.1824	0.5199
	Self Employed	-0.4906	0.5253	-0.6076	0.5811	-0.4435	0.5132
	Retired	-0.4755	0.6285	-0.7829	0.6791	-0.3497	0.6145
	Unemployed	-1.5586**	0.6055	-1.6354***	0.6274	-1.6311***	0.5939
Country of Residency	Brazil	-0.5352*	0.2889	-0.3474	0.3136	-0.4937*	0.2820
Age		-0.1300	0.2016	-0.0288	0.2221	-0.1460	0.1968
Educational Level		0.1980	0.1443	0.2015	0.1502	0.1802	0.1412
Income Level		0.1858**	0.0761	0.2395***	0.0860	0.1628**	0.0740
N		234[5]		234		234	
Pseudo R-Square		0.2958		0.2513		0.2717	

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

4.3 THE IMPACT OF INDIVIDUAL CHARACTERISTICS AND FINANCIAL LITERACY ON PERSONAL BEHAVIOUR

To investigate about impacts on personal financial behaviour, we perform a bivariate analysis to assess if financial literacy, individual demographics, or country of residence can explain the different levels of financial decision. The results are shown in Table III.

Propositions 3 to 7 estimate people's conduct based on the financial literacy levels. As possible to observe from Table III, the FLI appears to be, to some extent, positively significant only for the first three propositions, related to Retirement Planning; Over Indebtedness; and Self-Assessment of Financial Literacy. The positive relation with Over Indebtedness is not expected, considering the literature (Casagrande, 2016). Additionally, at a first look, the Risk Profile, measured in a scale of risk appetite, and both measures of Crisis Preparedness, Weighted and Simple, do not seem to have a significant contribution from higher levels of financial knowledge.

This leads us to Propositions 8 and 9. Can personal and country characteristics be drivers of personal financial behaviour? The results from Table III make us believe so. In general terms, gender appears to bring significant differences to all our dependent variables, for at least 5% of significance, with exception for both Crisis Preparedness indexes. Being a man has a positive relationship with Retirement Planning; Self-

[5] One of the answers was not considered in the regression because of inconsistencies.

Assessment of Financial Literacy and Risk Profile, while it has a negative one with Over Indebtedness. This can be translated into acknowledging that men apparently have better financial behaviour than women, in terms of higher planning and lower debt. However, at the same time, they tend to seek more risk and be more confident about their knowledge, which can result in a dangerous combination, if not alongside actual higher literacy.

Table III: Bivariate Analysis – Mean Comparison of Personal Behaviour Variables

	Propositions		3	4	5	6	7	
	(ANOVA)	N	**Retirement Planning**	**Over Indebt.**	**Self Assessment**	**Risk Profile**	**Crisis Prepare Weighted**	**Crisis Prepare Simple**
FLI Equal Weight	Test Value (F)	235	3.0322**	3.0873**	16.3733***	1.8939	0.2581	1.4769
FLI Simple	Test Value (F)	235	1.3530	1.8138*	8.7127***	0.9057	0.5117	1.4131
FLI Aggregate	Test Value (F)	235	1.1765	1.2783	5.8487***	1.2838	0.5473	1.0275
			Proposition 8					
	(t-test)	N	**Retirement Planning**	**Over Indebt.**	**Self Assessment**	**Risk Profile**	**Crisis Prepare Weighted**	**Crisis Prepare Simple**
Gender	Male	107	1.5888	0.8505	3.5421	2.8972	1.8037	1.8785
	Female	128	1.2109	1.1094	2.6797	2.4453	1.7500	1.8281
	Test Value (t)		2.4121**	-2.00659**	6.9276***	3.2197***	0.6235	0.6067
	Std. Error Difference		0.1566	0.1290	0.1245	0.1403	0.0862	0.0830
	(ANOVA)							
Age	Test Value (F)	235	4.6393***	2.2845*	2.4395*	1.8125	0.3037	0.2423
Income	Test Value (F)	235	2.5993**	0.6215	2.2525**	1.7758	1.4085	2.0725*
Educational Level	Test Value (F)	235	3.2747**	0.6244	3.5718***	0.2471	1.1939	1.0846
Marital Status	Married	96	1.6979	1.0625	3.1563	2.6979	1.8542	1.9271
	Divorced	18	1.2222	0.8889	2.8333	2.7778	1.5000	1.6111
	Single	115	1.1652	0.9304	3.0696	2.5826	1.7652	1.8435
	Widowed	6	1.0000	1.3333	2.5000	2.8333	1.5000	1.5000
	Test Value (F)		3.8642**	0.6086	1.1301	0.3427	1.8954	1.9680
Employ Status	Working in the private sector	91	1.5604	0.9780	3.2198	2.6484	1.8901	1.9670
	Working in the public sector	34	1.7941	0.9118	3.1176	2.5588	1.8824	2.0294
	Self-Employed	33	1.1818	1.0606	3.0303	2.9394	1.4242	1.5152
	Retired	29	1.4828	0.9655	2.8966	2.6207	2.0345	2.0345
	Unemployed	14	1.3571	1.4286	2.7857	2.9286	1.5000	1.5000
	Student	33	0.6364	0.9091	2.9091	2.3939	1.5758	1.6667
	Test Value (F)		4.1987***	0.6676	0.9250	1.0567	4.9993***	5.3538***

Proposition 9								
	(t-test)	N	**Retirement Planning**	**Over Indebt.**	**Self Assessment**	**Risk Profile**	**Crisis Prepare Weighted**	**Crisis Prepare Simple**
Country Of Residency	Portugal	108	1.2130	0.8519	3.2963	2.5463	1.7500	1.8519
	Brazil	118	1.5424	1.1186	2.8475	2.7542	1.7712	1.8305
	Test Value (t)		-2.07157**	-2.04033**	3.2993***	-1.4259	-0.2417	0.2525
	Std. Error Difference		0.1590	0.1308	0.1360	0.1458	0.0877	0.0845

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

4.3.1 RETIREMENT PLANNING

As previously stated, the level of retirement planning according to Lusardi & Mitchell (2011b) would escalate according to the sequence: calculation; planning; and consistency. For this reason, a person can only be considered a Serious Planner if they fulfilled the first two conditions. However, in our sample, we found that more people answered *'Yes'* to the question *'Did you develop a plan?'* (51.9% of total sample) than to the question *'Did you try to figure out how much to save for retirement?'* (43%).

These results make us believe that even people that are worried about their future conditions, and try to save for retirement, might be doing it insufficiently, since they do not try to calculate how much would be needed. While we understand that this calculation is a complex task (given the intrinsic unpredictability of life longevity), we wonder if a retirement saving plan without knowing how much is needed is indeed effective. For this reason, we consider the cases of households that have a plan but never calculated how much they need as *Simple Planners*, together with the ones that only calculate but never developed a plan. Consequently, the ones that never calculated, but developed a plan and keep this plan are going to be included in the *Serious Planners* but will not be considered *Successful*.

Looking at the univariate analysis, in Annex 1, and considering that this index goes from *'Do Not Plan'* (0) to *'Successful Planner'* (3), we realize that our sample is mainly placed between '*Simple'* and '*Serious Planners'*, with an average of 1.38. However, the most expressive group is the one of *'Non-Planners'* representing 34% of the data.

Considering the third study proposition and analysing the bivariate ANOVA test in Table III, we observe that only the Equal Weight index associates with significant

differences per level of financial knowledge. In this case, it is possible to say that the highest planning level is found within the most knowledgeable.

For Retirement Planning propositions, P8 and P9, all the personal traits imputed in the bivariate analysis turn out to be significant. As previously stated, gender seems to have a potential differential role in financial behaviour. Even though the means are not too far apart, men (1.59 out of 3) appear to have a greater concern about retirement planning than women (1.21).

It appears to exist a positive relationship between Retirement Planning and other personal variables. So, we can consider that the older, highly educated, and wealthier have higher chances of creating a retirement strategy, together with married and workers in the public sector, who appear to plan more than the other groups.

While there exists a positive relationship with the personal variables, there is an interesting conclusion when bearing in mind the Country of Residency. Considering this classification, the Brazilian population appears to have a higher level of concern with retirement planning than the Portuguese one. The first has 52.6% that can be considered Serious or Successful Planners, while the second has only 37.9%. Being true that the retirement worries increase with age and considering the high level of young population in our Portuguese sample, this is an expected result. However, the Portuguese public pension system suffers higher pressure than the Brazilian one, making us believe this is a worrying behaviour from the young Portuguese population.

Retirement Planning is an ordinal variable, containing three categories with an order that goes from less planning (0) to more planning (3). Consequently, we regress (2) through an Ordinal Logit Regression. The results are presented in Table IV.

(2) $Retirement\ Planning = a + b_1 Financial\ Literacy + b_2 Gender + b_3 Age + b_4 Income + b_5 Educational\ Level + b_6 Marital\ Status + b_7 Employment\ Status + b_8 Country\ of\ Residency + e$[6]

From this analysis, we can argue that, although positively related, neither of the financial literacy indices seem to have a statistically significant impact on the possibility of being a *Successful Planner*. Besides, from all the personal aspects, only income, and

[6] Variables defined in Annex 6.

especially the status of employment, with exception of self-employees, significantly explain the odds of better planning.

Summarizing, apparently what drives a person to save more for retirement is not how much financial knowledge they have, but simply a matter of having a guaranteed available income, given that only the categories that receive a fixed monthly wage are the ones significant for all FLI for this type of savings. Also, workers have more access to special conditions' pension funds associated with the companies they work for. This facility can incentivize them to save more.

This conclusion goes against what the literature says about the topic (Lusardi & Mitchell, 2011b). However, it is mainly studied with Anglo-Saxon data, which has a different system of pensions. For both Brazil and Portugal, there is a public compulsory system of discounts from the monthly wages, which means that every worker has a pension that can be received in the retirement ages. Because of this guarantee, many people may not worry about constructing alternative pension funds. This lines up with the concept from Jappelli & Padula (2013) discussed previously.

One study conducted in Portugal after applying the Financial Literacy Program, from 2010 to 2015, shows that, from the total amount addressed to savings, the value for retirement reserves decreased from 5.9%, in the first period, to 4.3%, in the last. In fact, 82% of the interviewed said they only intend to use the public mandatory contribution as pension funds (Conselho Nacional de Supervisores Financeiros, 2016).

There are two main issues with this. First, when reaching retirement ages, this public monthly pension usually represents a substantial drop in earnings, compared to previous wages. This can lead to lower living standards or, even worse, to higher debt contraction on a delicate period of life. The second is that, with this compulsory contribution, today's workers are financing the current retirees, and not their own retirement. With the aging of the population, and its pressure on these systems, there is a possibility of collapse, not guaranteeing a comfortable future for everyone.

Table IV: Ordinal Logit Regression for Retirement Planning Index

Ordinal Logit Regression for Retirement Planning

	Regression (I): FLI EW		**Regression (II): FLI Simple**		**Regression (III): FLI Aggregate**	
Groups	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error

Gender	Male	0.3205	0.2844	0.3527	0.2807	0.3226	0.2829
Marital Status	Married	1.0293	0.8348	1.0267	0.8344	1.0022	0.8338
	Divorced	0.4389	0.9083	0.4628	0.9073	0.4088	0.9085
	Single	0.8010	0.9055	0.8019	0.9051	0.7723	0.9046
Employment Status	Private Sector	1.4514***	0.4279	1.4480***	0.4286	1.4473***	0.4280
	Public Sector	1.1471**	0.5426	1.1864**	0.5432	1.1282**	0.5428
	Self Employed	0.6542	0.5451	0.6793	0.5464	0.6521	0.5452
	Retired	1.2256*	0.6462	1.2533*	0.6482	1.1997*	0.6458
	Unemployed	1.3213	0.6273	1.3214**	0.6308	1.3300**	0.6283
Country of Residency	Brazil	0.4566	0.2875	0.4287	0.2855	0.4613	0.2879
Age		0.1233	0.1990	0.1178	0.1988	0.1254	0.1992
Educational Level		0.1050	0.1439	0.1047	0.1442	0.1010	0.1440
Income Level		0.1654**	0.0764	0.1666**	0.0769	0.1671**	0.0762
FLI Equal Weight		0.0059	0.0049	-	-	-	-
FLI Simple		-	-	0.0036	0.0037	-	-
FLI Aggregate		-	-	-	-	0.0061	0.0048
N		234		234		234	
Pseudo R-Square		0.1785		0.1766		0.1792	

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

4.3.2 OVER-INDEBTEDNESS

To access the indebtedness level of our sample, we ask which was their effort rate in percentage, calculated by the Total Monthly Debt divided by the Total Monthly Income, times 100. From the answers given, we construct an Over-Indebtedness index.

As stated before, for this work we consider being over-indebted when a household declares to have an effort rate of more than 35% (DECO Proteste, 2020). At the same time, some papers assume that the indebtedness starts to be worrying when an effort rate is higher than 50% (Banco Central do Brasil, 2020). Therefore, we assume four levels: *Non-Over-Indebted* (0), the ones with an effort rate until 35%*; Simple Over-Indebtedness* (1), the ones with an effort rate from 35% to 55%*; Risky Over-Indebtedness* (2), from 55% to 100%*;* and *Extreme Over-Indebtedness* (3), over 100%.

On the univariate level, observed in Annex 1, we observe that the majority (56.1%) of our sample is, to some extent, over-indebted, where 31.9% can be considered *Risky*. Comparing the two countries, Portugal seems to have, at the same time, the biggest amount of *Extreme* (5.6%) and *Non-Over-Indebted* (51.9%) cases. On average, the

Brazilian sample has a higher level of over-indebtedness (1.12 out of 3), being located between *Simple* and *Risky*.

Observing Table III, we conclude that both FLI Simple and FLI Equal-Weight are positively statistically significant in explaining over-indebtedness. However, this pattern can be considered odd, if taking into consideration what the literature proposes. Technically, the higher the financial literacy the lower the over-indebtedness level (Casagrande, 2016).

In terms of the relations between personal aspects and over-indebtedness (P8), it seems that only age and gender have a significant aspect. Women (1.11 out of 3) appear to have higher levels of indebtedness than men (0.85) and the oldest have higher chances of riskier debt level.

Related to Proposition 9, we can observe that the Country of Residency seems to be a significant driver for the over-indebtedness level. Comparing with the previous data of financial literacy, where the Brazilian population showed to have less knowledge levels, this result seems to be consistent with the literature hypothesis that higher knowledge leads to a lower indebtment. However, we obtained a positive relationship with financial literacy, which can indicate either a nonlinear relationship between financial knowledge and over-indebtedness or that there are outer country aspects that affect indebtedness.

We perform a multivariate analysis through an Ordinal Probit Regression[7], to understand the impact of each independent variable in the odds of a household attaining higher debt levels, showed by Equation 3.

(3) $$OverIndebtedness = a + b_1 Financial\ Literacy + b_2 Gender + b_3 Age + b_4 Income + b_5 Educational\ Level + b_6 Marital\ Status + b_7 Employment\ Status + b_8 Country\ of\ Residency + e$$[8]

The complete results for this regression are available in Annex 3. Even though financial literacy shows a negative impact, similar to the literature (Casagrande, 2016), only age, and being retired, appear to have a significant relation with over-indebtedness. However, unlike age, retirement has a negative relationship. The interpretation would be

[7] Understanding that Probit and Logit have similar results, we chose the one with best fit to our sample.
[8] Variables defined in Annex 6.

that the older a person is, the higher the possibilities of becoming extremely overindebted. This confirms the bivariate analysis previously made. Yet, at the same time, being retired decreases those odds. This result is quite peculiar and pushes us to perform additional analysis.

Considering the results found by Santos & Abreu (2013), financial conduct can have a stronger impact on the likelihood of over-indebtedness than financial literacy. Because of this, we use our measure of financial behaviour, the Crisis Preparedness Index Simple, to study if there is a significant impact on higher debt. The results are disclosed in Table V.

With this new input, the results seem more reasonable. It seems that having better conduct for the crisis period also translates into better general conduct, and it appears to have a great influence on the levels of over-indebtedness. Its negative significant relationship indicates that better behaviour makes people less over-indebted. Alongside, financial literacy shows the expected negative behaviour (Casagrande, 2016), although not statistically significant. Also, we find that men have a higher trend of having less debt levels, while older people tend to contract more of it. This last aspect shows a problem, since it seems that exactly when the household should be spending the reserves made during life, they are contracting more debt. Recalling our previous discussion about Retirement Planning, one possibility could be given by not constituting enough previous reserves and (or) not correctly preparing for retirement needs.

Table V: Alternative Ordinal Probit Regression for Over Indebtedness

Ordinal Probit Regression for Over Indebtedness

		Regression (I): FLI EW		**Regression (II): FLI Simple**		**Regression (III): FLI Aggregate**	
	Groups	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Gender	Male	-0.2997*	0.1761	-0.2888*	0.1736	-0.293*	0.1750
Marital Status	Married	0.0954	0.5008	0.0813	0.5006	0.1020	0.5004
	Divorced	-0.3807	0.5488	-0.3850	0.5482	-0.3726	0.5491
	Single	0.2870	0.5465	0.2733	0.5463	0.2916	0.5461
Employment Status	Private Sector	0.1061	0.2472	0.0924	0.2480	0.1042	0.2467
	Public Sector	-0.0996	0.3279	-0.1210	0.3289	-0.0950	0.3281
	Self Employed	-0.2935	0.3207	-0.3179	0.3223	-0.2942	0.3206
	Retired	-0.3728	0.3931	-0.3979	0.3947	-0.3667	0.3922
	Unemployed	0.2152	0.3670	0.1830	0.3692	0.2036	0.3671

Country of Residency	Brazil	0.1113	0.1770	0.1171	0.1761	0.1070	0.1772
Age		0.3754***	0.1229	0.3769***	0.1229	0.3724***	0.1230
Educational Level		0.0304	0.0889	0.0337	0.0890	0.0322	0.0890
Income Level		0.0391	0.0466	0.0435	0.0469	0.0397	0.0465
Crisis Prepare Simple Index		-0.5085***	0.1325	-0.5102***	0.1321	-0.5095***	0.1321
FLI Equal Weight		-0.0021	0.0030	-	-	-	-
FLI Simple		-	-	-0.0023	0.0023	-	-
FLI Aggregate		-	-	-	-	-0.0026	0.0030
N		234		234		234	
Pseudo R-Square		0.1623		0.1643		0.1633	

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

4.3.3 SELF-ASSESSMENT OF FINANCIAL LITERACY

To assess if the financial literacy level befits what people believe they know, we ask each respondent to evaluate its financial knowledge on a scale from 1 to 5, 1 meaning *'Really Low'* and 5 *'Really High'*.

In general terms, 38.7% of our total sample consider their financial knowledge to be *'Average'* (3) and the mean is located close to it, with 3.07 out of 5. Brazil shows a similar pattern, with the middle level being represented by 45.8% of the sample. However, Portugal seems to have a higher confidence level, with 34.3% of the people considering having a *'High'* (4) knowledge. Also, while more Brazilians seem to respond as *'Really Low'* (11.9%) than *'Really High'* (5.1%), the opposite happens for the Portuguese (3.7% and 11.1%, respectively), as presented in Annex 1.

As said previously, women answered more *'Do not know'* than men for the financial literacy questions. However, not only men gave an answer more times, but also, they seem to have more confidence in their financial knowledge. The self-assessment results show that 50.5% of them consider their financial literacy level to be 4 or higher. At the same time, the women that considered themselves at the same level are only 20.3%.

In Table III, we observe, for Proposition 5, that the different levels of knowledge do produce different personal perceptions of it, with a positive relationship, for a 99% confidence level.

For Proposition 8, we perceive a significant positive relation for every personal aspect, with exception of marital and employment status. As previously stated, men

appear to have higher confidence in their financial knowledge than women. The highest levels of self-assessment appear to be in the highest levels of income and education, and for the elderly. In terms of the country difference (P9), the Portuguese population show a significant higher confidence in its financial knowledge (3.30 out of 5, on average) than the Brazilian population (2.85). As well, this confidence appears to be sustained by a real level of higher knowledge, as exposed previously.

We test a regression to study the impacts on the Self-Assessment of Financial Knowledge, given by Equation 4. We performed an Ordinal Probit Regression due to the characteristics of our dependent variable. The results are given in Table VI.

(4) $$Self\ Assessment = a + b_1 Financial\ Literacy + b_2 Gender + b_3 Age + b_4 Income + b_5 Educational\ Level + b_6 Marital\ Status + b_7 Employment\ Status + b_8 Country\ of\ Residency + e$$ [9]

In line with P5, the financial literacy indices seem to have a significant positive impact on the chances of a person declaring itself as highly knowledgeable. This is consistent with the idea that the more a person knows, the more they believe they know. Among the indices, the FLI Equal-Weight appears to be the one with a higher influence on self-assessment. However, technical knowledge is not the only significant driver for confidence. As discussed before, and investigating P8, gender seems to have an important role in people's perceptions.

Considering that women answered more '*Do not know'* to the financial literacy questions, we wonder if their lower level of knowledge could be related to this lack of confidence. An interesting aspect emerges when we look to retired and age. Like for over-indebtedness, they behave in opposite ways. While the first indicates that retired people have more chances of answering that they have a high level of financial literacy, the negative association from the second one shows that the older the person, the less confident it is. Since usually the oldest group is also retired, one would expect that they would behave accordingly. However, in our sample, the majority (62.1%) of the retirees are between 50 to 65 years old. Assuming the age behaviour, this group would have a

[9] Variables defined in Annex 6.

higher estimation of its knowledge than the older one, which could boost the self-assessment for the retired.

At the same time, having a higher education level and working in the private sector, seem to increase the possibility of having a high self-assessment level. Only when considering the regression with the FLI Simple, the self-employed also appear to have a significant positive relation. Besides, for the one with FLI Aggregate, the income level appears to have a significant positive relationship with the odds of having a high self-assessment. In terms of P9, being Brazilian seems to have a significant negative relation with personal confidence in the financial knowledge. This fact follows the lower scores on the financial literacy indices achieved.

Table VI: Ordinal Probit Regression for Self-Assessment of Financial Knowledge

Ordinal Probit Regression for Self-Assessment of Financial Knowledge

		Regression (I): FLI EW		**Regression (II): FLI Simple**		**Regression (III): FLI Aggregate**	
	Groups	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Gender	Male	0.6603***	0.1676	0.7015***	0.1656	0.6814***	0.1669
Marital Status	Married	0.3012	0.4809	0.3286	0.4813	0.2564	0.4803
	Divorced	0.1313	0.5246	0.1677	0.5245	0.1057	0.5244
	Single	-0.0082	0.5227	0.0222	0.5231	-0.0403	0.5221
Employment Status	Private Sector	0.5022**	0.2300	0.5225**	0.2305	0.4772**	0.2294
	Public Sector	0.0041	0.3025	0.0967	0.3027	-0.0181	0.3025
	Self Employed	0.4678	0.3024	0.5404*	0.3039	0.4479	0.3019
	Retired	0.8513**	0.3661	0.9222**	0.3677	0.7899**	0.3650
	Unemployed	0.3257	0.3538	0.3806	0.3562	0.3109	0.3536
Country of Residency	Brazil	-0.2510	0.1672	-0.2995*	0.1664	-0.2495	0.1672
Age		-0.2344**	0.1169	-0.2417**	0.1169	-0.2218*	0.1168
Educational Level		0.1660**	0.0843	0.1546*	0.0844	0.1632*	0.0843
Income Level		0.0707	0.0439	0.0620	0.0442	0.0758*	0.0438
FLI Equal Weight		0.0142***	0.0030				
FLI Simple				0.0105***	0.0022		
FLI Aggregate						0.0130***	0.0029
N		234		234		234	
Pseudo R-Square		0.3563		0.3529		0.3484	

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

4.3.4 RISK PROFILE

Using the univariate analysis in Annex 1, we notice that our population mainly declare to be Risk Averse (32.8%), followed by Risk Neutrals (25.1%) and Risk Seekers (23.4%). However, for the Brazilian population, most people declared to be Risk Neutrals (33.1%), followed by Risk Seekers (25.4%), while in Portugal the main category is Risk Averse (42.6%), followed by Risk Seekers (21.3%).

Analysing the bivariate table, in Table III, it seems that Proposition 6 does not sustain. In other words, the financial literacy level does not seem to promote risk willingness. Gender appears to be the only significant cause for differences in the risk appetite between groups, for a 1% significance level. Considering 1 as *'Really Risk Averse'* and 5 *'Really Risk Seeker'*, men (2.90) appear to have a higher risk appetite than women (2.45), but both averages are located between the risk aversion and risk neutrality. This particularity reinforces the hypothesis raised previously that even though, on average, men do appear to have a higher financial literacy level than women, and possibly their confidence level is related to this, their risk-willingness does not have a relation with how much they know, what might be problematic.

Since Risk Profile can be considered an ordinal variable, which means that it has different possible profiles, each one indicating a higher magnitude of the effect, we perform an Ordinal Logit Regression with **(5)**. The results are presented in Table VII.

(5) $$Risk\ Profile = a + b_1 Financial\ Literacy + b_2 Gender + b_3 Age + b_4 Income + b_5 Educational\ Level + b_6 Marital\ Status + b_7 Employment\ Status + b_8 Country\ of\ Residency + e$$[10]

From the regression proposed, we observe that income level; self-employees; unemployed; and men have a positive significant impact on the odds of a person being *'Really Risk Seeker'*, while age has a negative one, where younger people seem to be more risk inclined (P8). In terms of P9, Brazilians seem to be more likely to appreciate risk, given the significant positive relationship found. The financial literacy indices do not appear to have a significant impact on the level of risk appetite, although they present positive behaviours (P6).

[10] Variables defined in Annex 6.

The results make us wonder: is more willing to take risks an individual who has more available income, or could it be the case of an endogenous effect, where who takes more risks have higher returns? Could it be that being self-employed, given its nature, makes a person more comfortable with risks, or is it because a person is more risk tolerant that they choose to be self-employed? Is the risk appetite the driver or the driven?

Table VII: Ordinal Probit Regression for Risk Appetite Level

Ordinal Probit Regression for Risk Profile

		Regression (I): FLI EW		Regression (II): FLI Simple		Regression (III): FLI Aggregate	
	Groups	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Gender	Male	0.4931***	0.1641	0.5178***	0.1619	0.5134***	0.1635
Marital Status	Married	-0.4085	0.4750	-0.4016	0.4752	-0.4210	0.4750
	Divorced	-0.1253	0.5177	-0.1109	0.5176	-0.1262	0.5180
	Single	-0.6737	0.5173	-0.6673	0.5175	-0.6834	0.5173
Employment Status	Private Sector	0.1606	0.2271	0.1592	0.2277	0.1486	0.2268
	Public Sector	-0.1904	0.3003	-0.1649	0.3005	-0.1939	0.3004
	Self Employed	0.5529*	0.2997	0.5677*	0.3010	0.5438*	0.2995
	Retired	0.3398	0.3606	0.3553	0.3618	0.3197	0.3600
	Unemployed	0.6791*	0.3513	0.6756*	0.3536	0.6597*	0.3513
Country of Residency	Brazil	0.4271**	0.1662	0.4076**	0.1651	0.4211**	0.1663
Age		-0.3435***	0.1167	-0.3461***	0.1167	-0.3406***	0.1168
Educational Level		0.0112	0.0832	0.0104	0.0834	0.0122	0.0832
Income Level		0.0841*	0.0434	0.0835*	0.0437	0.0869**	0.0433
FLI Equal Weight		0.0044	0.0029	-	-	-	-
FLI Simple		-	-	0.0027	0.0022	-	-
FLI Aggregate		-	-	-	-	0.0033	0.0028
N		234		234		234	
Pseudo R-Square		0.1545		0.1513		0.1510	

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

4.3.5 CRISIS PREPAREDNESS

For the measurement of how people are preparing themselves to face an economic crisis, we create an index following the previous logic. We inquire people about their main concerns and adjustments made relating to their financial state giving the pandemic situation. For each of the possible answers were given different weights, depending on its seriousness level. Answers that indicate a healthier behaviour, or less dangerous worries

about its personal situation, have a higher value, and therefore indicate a higher level of preparation for the crisis. For example, being concerned about the ability to pay rent or any other continuous expenses was considered more dangerous than being concerned about the volatility of the financial markets, and for this reason have a smaller value, indicating being less prepared. The answers *'Not Concerned'* have the highest value, since we believe that not being concerned indicates a controlled financial situation. The first index is called *Crisis Preparedness Index Simple* and is composed of the three questions (Self-Assessment of Personal Financial Situation; Main Concerns; and Adjustments Made) equally weighted. However, given that worries and the personal perception of the financial situation could be given by previous factors, we suppose that the actual adjustments made by a household could represent more significantly the change in the situation faced, thus we defined that this variable has a double weight in the construction of our second index, *Crisis Preparedness Index Weighted*.

Analysing each one of the indices, in Annex 1, we observe that, in general people appear to be slightly more prepared when considering the Simple Index (1.85) rather than the Weighted (1.77). However, the composition of both is quite similar. The main difference is between the level of *'Badly Prepared'*, where the first has 28.5% and the second 35.3% of the sample. When comparing both countries, we perceive that its averages are near each other. For the Simple Index, Portugal can be considered the most prepared, although for the Weighted Index Brazil has the highest mean. These similarities point to no statistical difference between countries.

Once more, our propositions aimed to test if financial literacy (P7); personal traits (P8), and country aspects (P9) could affect how people prepare for an economic crisis. However, in this analysis, we decided to include another proposition, P10, where the trust level of a person in their residency economy could influence the quality of the preparation they make. This new addition is essentially different from the other variables used since it is a measure of perception for the near future, being strongly affected by the latest events, what makes us believe that it can translate into a stronger driver for a sudden behaviour change. Therefore, we asked how people feel about the economic situation for the next 12 months, on a scale from 1 to 5, 1 being *'Really Pessimistic'* and 5 *'Really Optimistic'*. Results are in Table VIII.

Table VIII: Mean Comparison of Crisis Preparedness per Economic Trust level

Proposition 10				
	Bivariate Analysis (ANOVA)	N	**Crisis Preparedness Weighted**	**Crisis Preparedness Simple**
Economic Trust	1 - Really Pessimistic	52	1.7308	1.7500
	2 – Pessimistic	63	1.6825	1.8095
	3 – Neutral	83	1.7470	1.8313
	4 – Optimistic	34	2.0000	2.0588
	5 - Really Optimistic	3	2.6667	2.6667
	Test Value (F)		2.8750**	2.6523**
	Sum of Squares		4.8118	4.1354

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

As it is possible to observe, considering the bivariate analysis in Table III, together with Table VIII, only employment status, income, and economic trust appear to be positively significant for the differences in preparation between groups. This means that P7 does not appear to hold in this case, since the financial knowledge of people seem to not affect the way they prepare for crisis. In terms of personal aspects (P8), retirees appear to better prepare for both indices, while income is only significant for CPI Simple. As exposed before, the country of residency (P9) does not cause significant differences between groups. Relating to our new proposition (P10), it is interesting to notice that the most optimistic are the ones with a better-prepared behaviour.

It is especially interesting to notice that the employment categories with lower levels of confidence in the national economy are mainly the ones suffering most from the effects of the recent crisis. Unemployed are the most pessimistic group, with an average trust level of 1.79 and self-employees have an average of 2.3, as seen in Annex 5.

To test the influence of each dependent variable in our Crisis Preparedness index, we run an Ordinal Logit Regression with **(6)**. The results are summarized in Table IX.

(6) $Crisis\ Preparedness = a + b_1 Financial\ Literacy + b_2 Gender + b_3 Age + b_4 Income + b_5 Educational\ Level + b_6 Marital\ Status + b_7 Employment\ Status + b_8 Country\ of\ Residency + b_9 Contry\ Trust + e$[11]

Analysing our P7, despite the positive relationship, the financial knowledge does not appear to be significant for both Crisis Preparation indices. Therefore, it seems that preparing itself for a crisis is not a matter of not knowing how or what do to. For both indices, we can observe that there is a significant positive relationship with some of the

[11] Variables defined in Annex 6.

personal aspects (P8), like being married or single; and for the workers of both private and public sectors or retired. For the Simple Index, other aspects are included, like having a higher income.

As previously said, the country where the person is located (P9) does not produce significant effects on the dependent variable. However, including the Country Trust (P10) variable in the regression, we observe that indeed it has a statistically significant positive impact on the chances of someone being *'Well Prepared'* to face an economic crisis. This corroborates our previous interpretation made in the bivariate analysis.

In summary, with these results, and considering the composition of both indices, we believe that people will prepare better for a crisis not motivated by what they know they should do, but mainly by if they can do it. Considering the Crisis Preparedness Simple Index, which ponders equal importance for the questions made, we see that people with more available guaranteed income and that have more trust in the economic situation of their country are the ones better prepared. When giving more importance to the modifications that a person is doing (CPI Weighted), we observe that the main driver for better behaviour during times of uncertainty appears to be having a guaranteed monthly wage.

Table IX: Ordinal Logit Regression for Crisis Preparedness Index

Ordinal Logit Regression for Crisis Preparedness Index Weighted

		Regression (I): FLI EW		**Regression (II): FLI Simple**		**Regression (III): FLI Aggregate**	
	Groups	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Gender	Male	-0.1319	0.3066	-0.0805	0.3016	-0.1121	0.3051
Marital Status	Married	1.8083*	0.9463	1.7944*	0.9446	1.7929*	0.9448
	Divorced	0.7007	1.0249	0.7163	1.0229	0.6967	1.0246
	Single	1.9616*	1.0221	1.9493*	1.0205	1.9473*	1.0208
Employment Status	Private Sector	1.0385**	0.4290	1.01766**	0.4299	1.0283**	0.4283
	Public Sector	1.1055*	0.5649	1.1248**	0.5654	1.1055*	0.5650
	Self Employed	-0.3924	0.5722	-0.3924	0.5743	-0.3960	0.5720
	Retired	2.0412**	0.6937	2.0385**	0.6952	2.0294***	0.6926
	Unemployed	-0.1002	0.6623	-0.1531	0.6667	-0.1185	0.6628
Country of Residency	Brazil	-0.1334	0.3251	-0.1646	0.3233	-0.1428	0.3256
Age		0.0295	0.2177	0.0225	0.2175	0.0293	0.2178
Educational Level		-0.0634	0.1562	-0.0587	0.1563	-0.0630	0.1563
Income Level		0.1135	0.0816	0.1188	0.0822	0.1161	0.0815

Trust Country		0.1936	0.1375	0.1942	0.1375	0.1942	0.1375
FLI Equal Weight		0.0034	0.0053	-	-	-	-
FLI Simple		-	-	0.0006	0.0040	-	-
FLI Aggregate		-	-	-	-	0.0024	0.0052
N		234		234		234	
Pseudo R-Square		0.1849		0.1832		0.1840	

Ordinal Logit Regression for Crisis Preparedness Index Simple

		Regression (I): FLI EW		**Regression (II): FLI Simple**		**Regression (III): FLI Aggregate**	
	Groups	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Gender	Male	-0.4020	0.3135	-0.3366	0.3081	-0.3546	0.3115
Marital Status	Married	1.9976**	0.9526	1.9667**	0.9462	1.9541**	0.9484
	Divorced	1.0623	1.0256	1.0663	1.0193	1.0495	1.0227
	Single	2.1395**	1.0313	2.1121**	1.0252	2.1021**	1.0274
Employment Status	Private Sector	1.1730***	0.4417	1.1515***	0.4427	1.1429***	0.4406
	Public Sector	1.5849***	0.5869	1.6247***	0.5878	1.5761***	0.5864
	Self Employed	-0.1689	0.5702	-0.1524	0.5720	-0.1818	0.5693
	Retired	2.2814***	0.7154	2.2776***	0.7158	2.2383***	0.7131
	Unemployed	-0.1915	0.6697	-0.2369	0.6744	-0.2393	0.6698
Country of Residency	Brazil	-0.2155	0.3312	-0.2618	0.3293	-0.2358	0.3315
Age		-0.0987	0.2230	-0.1075	0.2227	-0.0968	0.2229
Educational Level		0.0512	0.1600	0.0534	0.1601	0.0513	0.1600
Income Level		0.1628*	0.0833	0.1654**	0.0839	0.1694**	0.0832
Trust Country		0.2336*	0.1406	0.2330*	0.1404	0.2343*	0.1405
FLI Equal Weight		0.0083	0.0055	-	-	-	-
FLI Simple		-	-	0.0041	0.0041	-	-
FLI Aggregate		-	-	-	-	0.0059	0.0053
N		234		234		234	
Pseudo R-Square		0.2209		0.2154		0.2164	

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

5. CONCLUSION

The aim of this paper was to analyse which are the main drivers of a set of financial behaviours: retirement planning, over-indebtedness, self-perception of financial knowledge, risk profile, and preparation for economic crisis. We tested the effects of two categories of drivers: cognitive (financial literacy), and demographic (sub-sets: personal and country). We believe this analysis is important to define how to improve society's financial behaviour. If it is strongly improved by financial literacy, the regulators should

invest in financial education programs. However, if the demographic aspects have bigger impact, the solution is more complex, involving structural aspects of the society.

We studied, as well, which are the main drivers for financial literacy. We do so to identify which social groups lack this knowledge and could benefit from focused financial education programs. Again, we believe this is important to consider when building strategies to diminish possible gaps and promote equality.

Related to financial literacy, our findings corroborate the existing literature, where men and wealthier households have statistically significant higher chances of superior financial knowledge (Lusardi & Mitchell, 2014). At the same time, being Brazilian, private sector worker or unemployed showed a negative statistically significant relationship. Therefore, there are possible advantages in creating specialized financial education programs, focusing on women, or the poorest, for example.

In terms of the financial behaviour variables, financial literacy seems to not contribute as much as expected. Although it showed a mitigator effect for all the studied behaviours, it was mostly statistically non-significant.

When considering retirement planning, financial literacy shows a positive behaviour like the one in Lusardi & Mitchell (2011b), yet not statistically significant. In fact, only income and the type of employment were statistically significant positive. However, different from most works, our study was made within two countries with a public pension system – Brazil and Portugal. Therefore, we can argue that, when in this setting, people will save more for retirement if they have a guaranteed available income.

About over-indebtedness, like Casagrande (2016), financial literacy has a mitigator effect. However, this was not statistically significant. Testing the proposition of Santos & Abreu (2013), where financial behaviour has a more expressive impact, we found that having a better conduct statistically significant decreases over-indebtedness. Alongside, women and the older populations increase the odds of higher levels of over-indebtedness, also in a significant way. Given the results, over-indebtedness appears to be more a structural than cognitive problem.

Assuming that higher confidence leads people to perform more efficiently (Bucher-koenen et al., 2012), we tested the drivers for self-assessment. In a statistically significant way, higher financial literacy also translates into higher confidence. Simultaneously,

being a man, self-employed, worker of the private sector, retired or having higher education levels makes people more confident about their knowledge, in a statistically significant way. Oppositely, we found that being Brazilian (for the FLI Simple) or older, opposite as exposed by Lusardi & Mitchell (2011a), leads to lower confidence.

Associated to risk profile, we found a positive, yet statistically non-significant, relationship with financial literacy. However, we found that being a man has a positive significant relationship with risk willingness, confirming Prudential (2013) statements. Also, being Brazilian, wealthier, younger, self-employed, or unemployed increase the odds of being really risk seeker.

For both of the crisis preparedness indexes financial literacy has a positive, corroborating Klapper et al. (2013), but statistically non-significant impact. For CPI Weighted only the employment and marital status were significant. However, for CPI Simple, we also observe a positive significant impact for the wealthier and optimistic about the economy. This indicates that the people behave better when they feel safer – by having more money, a stable job, or trusting more in the economy.

This work contributes to the literature by showing how financial literacy and demographic aspects affect financial behaviour in crisis periods. We directly perceive these effects when analysing the crisis preparedness. However, we must remember that this study was conducted, and its data collected, during the COVID19 pandemic. This brings a special characteristic to our work, by capturing the immediate personal responses in distress periods. In summary, it seems that financial literacy can lose its significance on financial conduct in unstable scenarios, giving place to features that provide stability.

For the same reasons, we struggled in collecting broader data. Our sample can be considered biased and does not completely represent the reality of the countries. Yet, with this more homogeneous sample, we better observe the effect of small changes in our independent variables. For further studies, we would recommend obtaining a larger sample. We also consider important to give sequence to this study, by replicating the survey and tracking the effects on behaviour, given the economic environment changes.

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APPENDICES

Annex 1: Demographic Aspects and Univariate Analysis

Comparison per Country of Residency and Total Sample		Portugal	Brazil	Total
N		108	118	235
Gender	Male	54.6%	35.6%	45.5%
	Female	45.4%	64.4%	54.5%
Age	From 18 to 29 years	51.9%	24.6%	38.3%
	From 30 to 49 years	37.0%	22.0%	29.8%
	From 50 to 65 years	7.4%	41.5%	24.3%
	More than 65 years	3.7%	11.9%	7.7%
Marital Status	Married	27.8%	53.4%	40.9%
	Divorced	4.6%	11.0%	7.7%
	Single	67.6%	30.5%	48.9%
	Widowed	0.0%	5.1%	2.6%
Educational Level	Elementary School	0.9%	0.0%	0.4%
	High School	5.6%	11.9%	8.5%
	Associate Degree	5.6%	7.6%	6.4%
	Bachelor's Degree	40.7%	40.7%	41.3%
	Post Degree, Master, MBA or PhD	47.2%	39.8%	43.4%
Employment Status	Working in the private sector	46.7%	31.4%	38.9%
	Working in the public sector	9.3%	20.3%	14.5%
	Self-Employed	12.1%	16.1%	14.1%
	Retired	1.9%	22.9%	12.4%
	Unemployed	7.5%	5.1%	6.0%
	Student	22.4%	4.2%	14.1%
Income Level of Household	Until € 500 or R$ 2700 monthly	8.3%	9.3%	8.9%
	From € 501 to € 1000 or R$ 2701 to R$ 5400 monthly	21.3%	20.3%	21.3%
	From € 1001 to € 1500 or R$ 5401 to R$ 8100 monthly	16.7%	21.2%	18.3%
	From € 1501 to € 2500 or R$ 8101 to R$ 13500 monthly	29.6%	19.5%	23.8%
	From € 2501 to € 3500 or R$ 13501 to R$ 18900 monthly	13.0%	11.9%	11.9%
	From € 3501 to € 4000 or R$ 18901 to R$ 21500 monthly	2.8%	4.2%	3.8%
	More than € 4000 or R$ 21500 monthly	8.3%	13.6%	11.9%

Economic Trust of Country of Residency	Really Pessimistic (1)	13.9%	30.5%	22.1%
	Pessimistic (2)	24.1%	29.7%	26.8%
	Not Pessimistic nor Optimistic (3)	43.5%	29.7%	35.3%
	Optimistic (4)	17.6%	9.3%	14.5%
	Really Optimistic (5)	0.9%	0.8%	1.3%
	Median	3	2	3
	Mean (Std. Deviation)	2.6759 (0.95535)	2.2034 (1.00901)	2.4596 (1.030)
Retirement Planning Index	Do not Plan (0)	39.8%	28.0%	34.0%
	Simple Planner (1)	22.2%	19.5%	20.4%
	Serious Planner (2)	14.8%	22.9%	18.7%
	Successful Planner (3)	23.1%	29.7%	26.8%
	Median	1	2	1
	Mean (Std. Deviation)	1.213 (1.2)	1.5424 (1.18858)	1.3830 (1.20811)
Risk Profile Self-Evaluation	Really Risk Averse (1)	15.7%	16.1%	15.7%
	Risk Averse (2)	42.6%	22.9%	32.8%
	Risk Neutral (3)	16.7%	33.1%	25.1%
	Risk Seeker (4)	21.3%	25.4%	23.4%
	Really Risk Seeker (5)	3.7%	2.5%	3.0%
	Median	2	3	3
	Mean (Std. Deviation)	2.5463 (1.1055)	2.7542 (1.0855)	2.6511 (1.0927)
Investment Portfolio Level	Do not have investments	20.4%	18.6%	20.0%
	Until 10%	23.1%	23.7%	23.0%
	More than 10% to 25%	16.7%	20.3%	18.7%
	More than 25% to 50%	19.4%	16.1%	17.4%
	More than 50%	20.4%	21.2%	20.9%
Financial Literacy Self Evaluation	1 - Really Low	3.7%	11.9%	7.7%
	2 - Low	19.4%	19.5%	19.6%
	3 - Average	31.5%	45.8%	38.7%
	4 - High	34.3%	17.8%	26.0%
	5 - Really High	11.1%	5.1%	8.1%
	Median	3	3	3
	Mean (Std. Deviation)	3.2963 (1.02546)	2.8475 (1.01802)	3.0723 (1.041)
Financial Literacy Index - Equal Weight (% of correct answers)	0%	5.6%	9.3%	7.2%
	25%	9.3%	16.1%	12.3%
	50%	17.6%	23.7%	21.3%
	75%	41.7%	39.8%	41.3%
	100%	25.9%	11.0%	17.9%
	Median	75	75	75
	Mean (Std. Deviation)	68.287 (27.89468)	56.7797 (28.61866)	62.5532 (28.43632)
Financial Literacy Index - Aggregate (Using Different Weights for the 4 Questions)	0	5.6%	9.3%	7.2%
	15	4.6%	8.5%	6.4%
	20	3.7%	4.2%	3.8%
	25	0.9%	3.4%	2.1%

	35	13.0%	14.4%	14.0%
	40	1.9%	3.4%	3.0%
	45	2.8%	2.5%	2.6%
	55	0.0%	2.5%	1.3%
	60	37.0%	37.3%	37.4%
	65	0.0%	0.8%	0.4%
	75	0.9%	0.8%	0.9%
	80	3.7%	0.8%	2.6%
	85	0.0%	0.8%	0.4%
	100	25.9%	11.0%	17.9%
	Median	60	60	60
	Mean (Std. Deviation)	60 (29.98442)	47.8814 (27.80739)	53.8723 (29.14935)
Financial Literacy Index - Simple (Using Different Weights for the 3 Standard Questions)	0	5.6%	9.3%	7.2%
	15	4.6%	11.0%	7.7%
	20	3.7%	4.2%	3.8%
	35	13.9%	15.3%	14.9%
	65	0.9%	4.2%	2.6%
	80	5.6%	4.2%	5.5%
	85	2.8%	3.4%	3.0%
	100	63.0%	48.3%	55.3%
	Median	100	85	100
	Mean (Std. Deviation)	76.6667 (34.93652)	65.1695 (38.98790)	71.0638 (37.14628)
I Don't Know Index - Equal Weight (% of I don't know)	0%	74.1%	52.5%	63.8%
	25%	12.0%	22.0%	16.6%
	50%	8.3%	12.7%	10.6%
	75%	1.9%	5.1%	3.4%
	100%	3.7%	7.6%	5.5%
	Median	0	0	0
	Mean (Std. Deviation)	12.2685 (24.76416)	23.3051 (31.13398)	17.5532 (28.45510)
Over Indebtedness Index	Non-Over-Indebted (0)	51.9%	36.4%	43.8%
	Simple Over-Indebtedness (1)	16.7%	20.3%	18.7%
	Risky Over-Indebtedness (2)	25.9%	38.1%	31.9%
	Extreme Over-Indebtedness (3)	5.6%	5.1%	5.5%
	Median	0	1	1
	Mean (Std. Deviation)	0.8519 (0.99358)	1.1186 (0.97112)	0.9915 (0.99138)
Crisis Preparedness Index - Weighted (Using Different Weight for Adjustments)	Badly Prepared (1)	35.2%	37.3%	35.3%
	Moderately Prepared (2)	54.6%	48.3%	51.9%
	Well Prepared (3)	10.2%	14.4%	12.8%
	Median	2	2	2
	Mean (Std. Deviation)	1.75 (0.62838)	1.7712 (0.68452)	1.7745 (0.65713)
	Badly Prepared (1)	26.9%	31.4%	28.5%

Crisis Preparedness Index - Simple (Using Equal Weights)	Moderately Prepared (2)	61.1%	54.2%	57.9%
	Well Prepared (3)	12.0%	14.4%	13.6%
	Median	2	2	2
	Mean (Std. Deviation)	1.8519 (0.60858)	1.8305 (0.6577)	1.8511 (0.63309)

Annex 2: Financial Literacy – Answers to Questions (%)

	Numeracy	Inflation	Risk Diversification	Bond Prices
Incorrect / I don't know	16.6	23.0	33.6	76.6
Correct	83.4	77.0	66.4	23.4

Annex 3: Ordinal Probit Regression for Over Indebtedness Index

Ordinal Probit Regression for Over Indebtedness Level

		Regression (I): FLI EW		Regression (II): FLI Simple		Regression (III): FLI Aggregate	
	Groups	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Gender	Male	-0.2247	0.1735	-0.2251	0.1710	-0.2253	0.1727
Marital Status	Married	-0.2135	0.4927	-0.2286	0.4926	-0.2035	0.4925
	Divorced	-0.5373	0.5446	-0.5452	0.5438	-0.5290	0.5448
	Single	-0.0468	0.5375	-0.0606	0.5374	-0.0396	0.5373
Employment Status	Private Sector	-0.0794	0.2415	-0.0903	0.2423	-0.0783	0.2413
	Public Sector	-0.3006	0.3211	-0.3287	0.3217	-0.2949	0.3213
	Self Employed	-0.2815	0.3193	-0.3085	0.3213	-0.2801	0.3192
	Retired	-0.6977*	0.3835	-0.7242*	0.3850	-0.6870	0.3830
	Unemployed	0.2234	0.3651	0.1975	0.3676	0.2174	0.3653
Country of Residency	Brazil	0.1666	0.1753	0.1798	0.1743	0.1645	0.1754
Age		0.3635***	0.1219	0.3654***	0.1219	0.3597	0.1220
Educational Level		0.0231	0.0878	0.0260	0.0880	0.0245	0.0878
Income Level		0.0165	0.0458	0.0205	0.0462	0.0161	0.0457
FLI Equal Weight		-0.0034	0.0030	-	-	-	-
FLI Simple		-	-	-0.0028	0.0023	-	-
FLI Aggregate		-	-	-	-	-0.0035	0.0029
N		234		234		234	
Pseudo R-Square		0.0994		0.1007		0.0999	

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

Annex 4: Bivariate Analysis – Mean Comparison of Over Indebtedness per Financial Behaviour

Bivariate Analysis (ANOVA)			
		N	**Over Indebtedness Index**
Crisis Preparedness Index Simple	Badly Prepared	67	1.3582
	Moderately Prepared	136	0.9118
	Well Prepared	32	0.5625
	Test Value (F)		8.5361***
	Sum of Squares		15.7638

*** Significant at 1% level; ** Significant at 5% level; * Significant at 10% level.

Annex 5: Mean Comparison of Economic Trust per Category of Employment

National Economic Trust				
		N	**Mean**	**Std. Deviation**
Employment Status	Working in the private sector	91	2.6374	0.9946
	Working in the public sector	34	2.2353	1.0168
	Self-Employed	33	2.3030	1.0749
	Retired	29	2.5862	1.1807
	Unemployed	14	1.7857	0.8018
	Student	33	2.4848	0.9056

Value Range: 1 to 5

Annex 6: Variables Construction

Variable/Construct	Question
Financial Literacy Index (Equal Weight; Simple and Aggregate)	**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?**
(FLI EW; FLI Simple; FLI Aggregate)	(1- "More than $102" and 0- Incorrect or "Do not Know")
	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- "Less than today" and 0- Incorrect or "Do not Know")
(hundred-point scale with 0 and 100 as endpoints)	**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."**
	(1- "False" and 0- Incorrect or "Do not Know")
	If the interest rate falls, what should happen to bond prices?
	(1- "Rise" and 0- Incorrect or "Do not Know")
Retirement Planning Index	**Have you ever tried to figure out how much your household would need to save for retirement?**

(four-point scale with 0- "Do not plan" and 3- "Successful Planner" as endpoints)	(1- "Yes" and 0- "No")
	Did you develop a plan for retirement saving? (1- "Yes" and 0- "No") **How often were you able to stick to this plan: Would you say always, mostly, rarely, or never?** (four-point scale with 1- "Never" and 4- "Always" as endpoints)
Over Indebtedness Index (OI)	**Indicate the Effort Rate (in %) of your household.** (four-point scale with 0- < 35% or Non-Over Indebted and 3- >100% or Extreme Over Indebtedness as endpoints)
Self-Assessment of Financial Literacy	**How do you evaluate your general knowledge level of Finance?** (five-point scale with 1- "Really Low" and 5- "Really High" as endpoints)
Risk Appetite	**How do you classify your level of risk appetite when investing in securities?** (five-point scale with 1- "Really Risk Averse" and 5- "Really Risk Seeker" as endpoints)
Crisis Preparedness Index (Weighted and Simple)	**Considering the COVID-19 outbreak, how concerned are you right now about your personal financial situation (e.g., savings, debt, job security, housing, paying for health care)?**
(three-point scale with 1- "Badly Prepared" and 3- "Well Prepared" as endpoints)	(four-point scale with 1- "Extremely Concerned" and 4- "Not Concerned" as endpoints)
	Considering the COVID-19 outbreak, which of the following are among the top five things causing you the most stress right now regarding your personal finances? (multiple choices allowed; each factor is binary: 1- "Yes"; 0- "No"; and then rearranged in a four-point scale with 1- "Serious Worries" and 4- "Not Worried" as endpoints) **Which of the following financial adjustments have you made due to the COVID-19 outbreak?** (multiple choices allowed; each factor is binary: 1- "Yes"; 0- "No"; and then rearranged in a four-point scale with 1- "Concerning Adjustments" and 4- "Healthy Adjustments" as endpoints)
Economic Trust of Country of Residency	**Which is your confidence level in the state of the economy of the country you live in, for the next 12 months?** (five-point scale with 1- "Really Pessimistic" and 5- "Really Optimistic" as endpoints)