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Reality or Perception? Financial Literacy Survey and Behavioral Insights

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Reality or Perception? Financial Literacy Survey and Behavioral Insights*

Abstract

The research goal is to support the relationship between financial literacy and sound wealth management, including behavioral insights. The attempt is to take into account every aspect of the financial management and decision-making process. Although financial literacy is a relatively new theme, an increasing interest is showed on the topic. The paper aims to provide an overview of the actual stage of literature about real and perceived financial literacy. The contribution is to create a bridge between the financial literacy literature survey as much complete as possible and behavioral biases related to money management to give a framework for future research.

JEL-codes: G53, G51, G410.

Keywords: Financial Literacy; Perceived Financial Literacy; Heuristics Biases; Behavioral Finance; Decision-Making Process.

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1. Introduction

One of the best take-home messages that financial literacy literature gives us is that the prototype of the best consumer is as good as more informed he is (Hathaway and Khatiwada, 2008). This message is true in particular with the advent of globalization and the constant development of technology applied to the financial world (Fintech). In fact, the financial environment has become more and more handy for anyone, but it could be often tricky. Thinking about the recent results of the GFLEC report on millennials using online payments, Fintech is associated with mismanagement financial practices. Who use mobile payments, also admit to overdraw their checking account occasionally — however, financial literacy helps in reducing mistakes (Hasler et al., 2018). The overwhelming majority of people make a choice based basically on trust or on the relationship established with the intermediary. Unfortunately, however, the recent financial crisis (which started in 2007) has taught us how important it is to be able to count on its discernment capabilities. Such abilities are the result of an adequate amount of knowledge and skills. As in human action, standard rules of conduct universally agreed, allow us to act *erga omnes* behaving correctly, so in the financial field, albeit a minimal knowledge of basic concepts helps actors to behave correctly in a system too large and complex.

In addition, it must always be clear that although there are many well-advised consultants, there are so many of them that pursue their economic interests rather than those of the investor. In this regard, Collins (2011) and Finke (2013) argue that financial advice should be necessarily associated with financial literacy. Analyzing the post crises, German investors show a concrete example of the damage of the lack of financial knowledge in the financial market. Less financially experienced households have frequently sold assets in loss, worsening their situation inexorably (Bucher-Koenen and Ziegelmeyer, 2011).

Before to go over with the discussion, some clarifications about the terminology are needed. In fact, Financial Education is a set of tools for improving consumer financial literacy (OECD, 2005). For financial literacy exist several definitions. The World Bank definition provides a technical, clear and concise definition of financial literacy such as the "internal capacity to act in one's best financial interest, given socioeconomic and environmental conditions" (www.worldbank.it). However, a complete and innovative definition is that one which considers it as a necessary skill to do effective decision making and that holds across countries. In particular, the OECD definition (2014) states it as the mix of financial and numerical knowledge and skills necessary to manage personal finances autonomously and rationally, combined with motivation and self-confidence, to allow for greater participation in economic life. Another innovative aspect is stressing the fact that financial literacy

improves financial well-being as a whole in society, not only single saving behavior, and so on. So from this last definition, financial literacy becomes essential, like reading, writing, and knowledge of science to participate in economic life (Lusardi, 2015). Finally, financial capability incorporates financial literacy since it is the ability to put into practice financial knowledge to make sound financial decisions.

This work is organized in six sections. After a brief introduction, Section 2 reviews the relevant literature on real and perceived financial literacy measures. Then, section 3 describes some financial literacy effects on financial behavior. Section 4, reviews financial literacy experiments, and finally Section 5 explores the importance of behavioral finance to reduce financial mispractices. Finally, section 6 concludes.

2. Real and perceived financial literacy

2.1 Real financial literacy

Although there is much literature on this field, the methodological strategy is still weak and in the process of becoming. However, financial education programs' offer is constantly increasing in the last few years. If the impact valuation is appropriately carried out, they could be valuable data sources to identify priorities in the agenda of the policymakers. Several are the policy implications among them improving people's financial inclusion, their capabilities, and consumer protection. To reach this objective, there is the need to have a clear framework of the real state of knowledge throughout the world. Very common to this purpose is the use of national and international surveys¹, in order to identify target population's needs, the potential channels for delivering financial education, and the link between financial literacy and behavior. Organization for Economic Co-operation and Development (OECD 2005) highlights a total lack of financial literacy in Europe, Australia and Japan.

¹ Among them Standard & Poor's Ratings Services Global Financial Literacy Survey (S&P Global FinLit Survey, based on initiatives of the International Network on Financial Education (INFE) of the Organization for Economic Co-operation and Development (OECD), the World Bank's Financial Capability and Household Surveys, the Financial Literacy around the World (FLAT World) project and national surveys such as Bank of Italy Survey on Households Income and Wealth (SHIW) or Household Finance and Consumption Survey (HFCS) or Dutch DNB Household Survey.

Moreover, also an internationally comparable survey of youth financial literacy is beneficial to assess the general knowledge in financial topics. The first one is the OECD's Program for International Student Assessment (PISA)², which shows that lesser accountability of Italian students can explain the lagging behind of them on economic and financial aspects (OECD, 2014). Thus, PISA spreads the idea that financial literacy is a prerequisite for being able to work consciously in today's financial markets (Financial Literacy Framework in PISA, OECD).

PISA surveys reveal that young Italian students perform worse than their peers in OECD countries. In particular, in the most recent release, Italian 15-year-old students are 29 points under OECD average score in 2018. So, Italy is at the thirteenth position among 20 countries and economies that participated in this optional assessment (OECD, 2020). Therefore, as PISA reports show, the importance of spreading financial literacy is paramount both for consumer protection and in helping to avoid market instability (Montanaro et al., 2016). Since the recent S&P FinLit Survey report also confirms the rise in persistent financial knowledge among Italian adults and those more skilled in other developed countries (Klapper et al., 2015), this proves that it is necessary to address this problem in the most appropriate age range (16-19 years) by offering ad hoc financial literacy projects. In particular, the OECD stresses the importance of increasing literacy for new generations starting from school (OECD, 2005; OECD-INFE, 2012). Indeed, the school environment also allows those who are disadvantaged to take advantage of the moment when they are particularly receptive.

However, the Coleman Report, and other recent works shed light on the key role of families and not schools as the major sources of inequality in student performance. In fact, by the third grade, gaps in test scores across socioeconomic groups are stable by age, so school quality has little effect in reducing or widening the gaps that appear before students enter school. Looking at this kind of results, there is the need to take into account also non-cognitive skills such as motivation, perseverance and tenacity which role is really important as they act as drivers in the acquisition of cognitive ones (Hackman, 2006). Human development is affected by the environments and experiences involving empathy in the first years of childhood. Family are at the base of this circle. In that context children can reinforce acquired skills and motivation to learn more, which reflect in an easier and more likely continuous learning process in the future. There is scientific evidence which shows that among children from 4 to 6 start to emerge and to remain persistent, gaps in cognitive and non-cognitive

² PISA is a triennial international survey among 15-year-old students' skills and knowledge in three key domains: mathematics, reading, and science, conducted in 2000 for the first time. From 2012, the survey also includes a financial literacy domain assessing about 510,000 students in 65 economies. PISA questionnaires are completed by students, heads of school, and, in some countries, parents.

skills more dangerous than financial distress family problem for children (Hackman, 2006). Moreover, for 9 out of 10 15-years-old students, the family is the first environment where to learn about money management, as the PISA wave in 2018 shows (OECD, 2020).

However, even if customized financial literacy programs are erogated in other environments, the strategy evaluation is often weak: e.g. for school-age students, see Bruhn et al. (2016) for Brazil, Romagnoli and Trifilidis (2013); for Italy, for working professionals, see Bernheim and Garrett (2001), Clark and d'Ambrosio (2008) and Clark et al. (2012a, 2012b); for household literacy programs, see Collins and O'Rourke (2010), Fort et al. (2016). The most critical issue to consider is that even if several are the initiatives from different parties (see Franceschi et al. 2017) financial education programs often lack an evaluation as part of the design. However, Becchetti et al. (2013) and Lührmann et al. (2015) assess the effect of financial education programs on high-school students. Lührmann et al. (2015) analyzing short training sessions on financial attitudes they find a positive impact on interest both in financial matters and saving propensity. The effect on financial literacy deseappears in Becchetti et al. (2013). Besides, Brugiavini et al. (2018), find that a one-day short course (on a sample of 579 university students) increases more self-assessed financial literacy in comparison with the actual increase in knowledge. Taken together, a positive impact of such programs on hypothetical behaviors does seem to emerge. Moreover, Sconti (2020), on a sample of 650 high-school students, comparing a traditional course and a digitized one found that attending a short course of just 8 hours increases real financial knowledge after three weeks. After three months, results are still persistent.

However, since all education decays over time, also financial education follows this pattern. For this reason, “just-in-time” education, the provision of pieces of information directly when wealth management decisions are taken, has been proposed as an alternative to financial education. However, Annamaria Lusardi, the leader in this research field, argued that “just-in-time” education could be too late to learn and she stressed the importance of financial education program at school to behave properly in the financial environment (www.wsj.com). She, in the same interview, argued that it is not a medicine to be provided when there is exposure to the financial environment, but the right path to follow to be financially healthy. She clarified the concept talking about the value of retirement planning benefits which are maximum if planned several years before and not just in the retirement period. More in details, Lusardi et al. (2016) show that higher levels of finacial literacy acquired early in life can explain about 40% of retirement wealth inequality in the United States. Another macroeconomic contribution in this direction is that one given by Montagnoli et al. (2017). According to them, not only financial literacy affects current and future financial choices, but it can affect views

on “personal capital”. Their results suggest that higher level of financial literacy reduce the demand of government intervention for income redistribution.

Lusardi et al. (2014) demonstrated that higher financial literacy would benefit not only for the individual but for the entire community, the same point stressed by the Bank of Italy Governor Ignazio Visco in 2010. In this context, what emerges is the certainty that continuous investment in human capital, understood as a mix of general and financial knowledge, can only lead to a conscious decision-making process and therefore an increase in welfare for the whole community.

To evaluate financial literacy improvements, we need a measure conventionally adopted. The measure issue is involving all institutions in charge of the debate about financial literacy levels all over the world. Lusardi and Mitchell (2008, 2011b, c) based their famous Big Three³ questions about inflation, interest and diversification knowledge on the following principles: Simplicity, Relevance, Brevity and Capacity to differentiate. The first one is concerning basic elements of the matter in question, the second one means financially inherent in management daily life. A short number of questions, insure brevity. Finally, the last principle is fixed to compare different people answers.

These Big three questions became so popular that are used for surveys in the United States and abroad. The first time they appeared was in 2004 when they were included in a financial literacy module of the Health and Retirement Study (HRS) in the U.S. Although these questions are also considered too simple interviewed people over50 who experienced also Enron and inflation periods, shown a widespread financially illiteracy. In fact, only one third could answer all three questions correctly (Lusardi and Mitchell, 2011b). With the same intent, the The Financial Industry Regulatory Authority (FINRA)⁴ Financial Capability Survey was conducted (Lusardi et al., 2011), including two sophisticated concepts such as understanding of mortgage payments and asset pricing. Unfortunately, this report also revealed the critical picture of the financial knowledge of the respondents. Indeed, only 21% of Americans know about the inverse relationship between bond prices and interest rates.

³ As are called the following questions: 1) “Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?” A) More than \$102 B) Exactly \$102 C) Less than \$102 D) Don’t know E) Refuse to answer 2) “Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, with the money in this account, would you be able to buy...” A) More than today B) Exactly the same as today C) Less than today D) Don’t know E) Refuse to answer 3) “Do you think the following statement is true or false? Buying a single company stock usually provides a safer return than a stock mutual fund.” A) True B) False C) Don’t know D) Refuse to answer

⁴ The Financial Industry Regulatory Authority (FINRA) is an independent regulator securities firms doing business in the United States.

For the same reason, also Agarwal et al. (2009) showed that the best targets to make financial mistakes are the young and the old.

OECD guidelines wish to have a homogenous measure for financial literacy. The Big Three questions seem to reach several research adoptions. However, different scholars decide to investigate financial literacy knowledge as an index considering them all together, or disentangling the effect for each question. Bucciol et al. (2018a) follow both options and considering effects separately allow them to go deeper into the analysis. In fact, they show a different effect of the three topics generally investigated in financial literacy research: inflation knowledge, numeracy ability and diversification concept. Interest calculation ability increases the probability to save by 10.4% and by 7.7% the probability to hold debt. However, from their study emerges that inflation knowledge decreases by -8.4% retirement planning probability and increases holding debt by 7.5%. Finally, diversification concept knowledge and the understanding of financial market mechanisms make people more propense to hold financial assets.

Another aggregate form of measure is the TIAA⁵ Institute-GFLEC Personal Finance Index (P-Fin Index). This index is a robust indicator of overall personal finance literacy level since it takes into account eight areas of personal finance. Overall, the need for a better financial literacy level emerges from P-Fin Index data. The gap between current financial literacy and the level required for good and autonomous financial decision-making in the normal course of life is major for millennials who will face several crucial financial decisions early in their working experience.

2.2 Perceived financial literacy

Cognitive and behavioral biases affecting the decision-making process are one of the focus points in which policymakers are interested in (Lefevre and Chapman, 2017). One of the most critical biases in the financial environment is overconfidence⁶ which may shape financial behavior and knowledge, among them worthless investments, personal financial information risks provision, and become a victim of unauthorized use of a personal payment card (di Salvatore et al., 2018). In literature, it is measured through direct questions to the respondents in which is required to self-assessed their knowledge level on a numerical (1-5 or 1-7) or categorical scale (Low, Medium, High). From the

⁵ Teachers Insurance and Annuity Association of America Institute.

⁶ Overconfidence is an overestimation of one's own ability to successfully perform a particular task or to make an accurate judgment (Bank of Italy, 2018).

report of Bank of Italy (2019) about IACOFI⁷ survey, underconfidence emerges among Italian adults, assessing (a quarter of individuals) skills below average while they perform better than the average. However, men with a higher level of education or high independence in the workplace like self-employed workers are more likely to become overconfident in Italy. Instead, from other countries, identikit is different. In fact, there is a higher probability for people with a lower educational level to become overconfident. From the same report is highlighted that lower financial inclusion is associated with a lower level of self-assessed financial knowledge (lower investments, lower access to debt, and lower appeal for pension plans). Besides, women are underconfident in self-assessed their financial knowledge (GFLEC, 2020). However, another finding from Sconti (2020) is that providing financial education program of at least 8 hours can result in better alignment between self-assessed financial literacy and the real one.

3. Financial literacy and behavior

Deducting economic theory from the concept of consumption, as a preeminent part of aggregate demand, has always been one of the main interests of economists in order to use them in econometric estimates designed to generate ideas for formulating economic policies. Moreover, it is precisely on the main conventional theories, including the theory of the life cycle of Modigliani and Brumberg (1954) and Friedman's permanent income theory (1957), which is based on the decision-making theory.

In fact, according to the leading theory, the rational and well-informed person adjust his consumption to the amount of his income. For example, the individual will be free to consume when the income will be high and instead will save when it tends to decrease in order to keep constant consumption levels along the life cycle.

Although many studies show that multiple motivations, including different levels of risk aversion or social security benefits, may affect a life cycle optimization process, the most critical factor is the failure of the underlying hypothesis, namely the idea of a totally rational and knowledgeable person. Unfortunately, individuals are not able to cope with the complicated financial situation around them. In fact, Lusardi et al. (2011) argue that financial fragility⁸ is a common problem in the USA. From

⁷ *Indagine sull'Alfabetizzazione e le Competenze Finanziarie degli Italiani* (IACOFI).

⁸ It means that individuals are not able to cope with unexpected expenses (Gflec report, 2018).

this awareness, both scholars and policymakers shift their focus to the need to spread financial culture and study the determinants of decision-making.

The first to study the links between financial knowledge, saving and investment behavior are Delavande, Rohwedder and Willis (2008), Jappelli and Padula (2013), Hsu (2011), and Lusardi, Mitchaud and Mitchell (2013). Delavande, Rohwedder, and Willis (2008) conduct a two-period model of consumer saving and portfolio allocation, considering financial knowledge as a human capital investment in order to achieve higher earnings (Ben-Porath, (1967), and Becker, (1975)).

Hsu (2011) considers the case where only husbands specialize in financial knowledge, as long as their wives, who have become widows, do not necessarily need it. Jappelli and Padula (2011) differentiate because they consider a multi-period life cycle model in which financial literacy is considered endogenous. They claim that the relationship between financial literacy and wealth is strongly correlated over the life cycle, except after retirement. Moreover, they argue that the presence of social security benefits does not incentivize nor save or invest in financial literacy. Although previous studies have been useful, the extension of the multi-period model of Lusardi, Mitchaud and Mitchell (2011, 2013) allows researchers to investigate model implications for social wealth.

The importance of this study is manifold, both because it demonstrates that endogenously-determined financial knowledge is hump-shaped, and because it highlights why financial literacy can be invested, it is required that such costs be rewarded. Lastly, it points out that specific sub-groups will always show low levels of financial literacy, for example, for lower educated clusters for whom it may not be worthwhile to support these costs. Jappelli and Padula's (2011), sharing that idea, find that better social security benefits affect lower levels of financial literacy (see also Jappelli, 2010). In order to stimulate adequate interest and equitable treatment, the spread of financial education in high schools should be used. Jappelli (2010), stresses the idea of greater utility in knowing the level of financial knowledge before the working life stage. For this reason, Jump \$tart Coalition for Personal Financial Literacy and the Council for Financial Education (CEE) are the most used datasets to study the factors which contribute to acquiring financial literacy.

Lusardi et al. (2011) shows that the least educated group improves their wellbeing by 82 percent of their initial wealth even if this is only in pre-employment and 56 percent for college graduates if they improve their financial knowledge.

Furthermore, Lusardi and Tufano (2009a, b) argue that ‘debt literacy’ is another people problem: in fact, there is evidence for which, if someone is borrowing at a 20 percent interest rate, two-thirds of respondents do not know how long it would take for debt to double, such as any other population interviewed in the world. Sweden, on the other hand, are the best with only 18% of missing responses regarding risk diversification maybe because it has privatized a component of its national social security system. The same relationship between financial literacy and debt emerges also in Almenberg et al. (2016).

A related problem of financial illiteracy is also the misalignment between the real knowledge and the perceived one. The U.S. Financial Capability Study (2009) reveals that despite the desperate general picture of financial knowledge, 70% of respondents are overconfident given their score of 4 or higher (out of 7), although only 30% place correctly their questions (Lusardi et al., 2011). In addition, Brugiavini et al. (2015), argue that their short course in financial literacy increases their perceived level of financial literacy more than their real knowledge. This is an important policy implication point to design future financial program. This misalignment could be different between males and females.

General interest has always been demonstrated in trying to investigate the relationship between gender and financial literacy (among them Almenberg et al., 2015). Although women are less prepared in financial culture, surely what emerges from several academic studies is that they are more consciously aware of their poor financial knowledge by choosing more often “do not know” as a response (47% women against the only 26% of men in the U.S.). As Lusardi et al. (2013) point out, this is an essential point in identifying women as the ideal potential target for financial education programs. However, the design of the PISA tests is able to neutralize the effects of the different approaches of males and females during the test. So what emerges is that the different levels are due to gender discrimination in education since adolescence (Lusardi, Mitchell and Curto, 2010; Lusardi and Mitchell, 2009; Lusardi and Tufano, 2009a, b; Buccioli et al., 2019). The most recent PISA wave, conducted in 2018, unfortunately, confirms Italian students’ financial illiteracy (29 points below the OECD average) and a persistent gender gap among young students (OECD, 2020).

Therefore, the increasing and significant interest in the relationships between gender and financial literacy results in more studies undertaking thorough research on this subject. For example, Hsu (2011) states that such differences could derive from a voluntary and rational division of husband and wife habits, so wives would only learn the main financial concepts if they were widowed. However,

as Lusardi and Mitchell (2013) point out, if this were so, it would not be explained why single women continue to show a low level of financial literacy although they have to manage independently. Even if there is just weak evidence (so there is the need to further investigate it in the future), we can identify a reasonable answer to this persistent behavior in some answers of IFF (institut für finanzdienstleistungen e.V.)⁹ study's focus groups. As reported also in Murro (2017), they reveal that among the women interviewed, some of them admit delegating wealth management to their sons, once they became widowed (IFF, 2018).

Still, a widely dealt with the topic is the inherent relationship between financial literacy and ability. Some scholars show a close link between them. Lusardi, Mitchell, and Curto (2010), while controlling cognitive aspects, find the persistence of heterogeneity in the acquisition of financial literacy. Moreover, it also shows that the technical and practical employment benefits of employees involve higher levels of financial literacy compared to the unemployed (Lusardi and Mitchell, 2011c).

Another interesting aspect is the relationship between financial literacy and education. Lusardi and Mitchell (2007a, 2011b) find a link between the acquisition of financial literacy and education, in fact, the children who attended college comprehensively understand complex concepts such as financial diversification, unlike those who did not attend the college. However, Lusardi and Tufano (2009a) show that financial literacy is higher for those who have highly qualifying assignments and have more financial resources. It is also important to note, from a study by Mahdavi et al. (2014), that although the level of wealth would not involve a higher level of financial knowledge among students, the latter would be linked to the positive relationship between father's background and female daughters. Financial socialization is as important as financial literacy education through "parent-child socialization" (Danes, 1994). Ward, in 1974, stresses the critical role of money education into development of skills, attitudes and acquiring information process to reach autonomous capabilities in financial sector. In this sense, Houser *et al.*, (2016) show that childhood is the best moment in which parents could affect children's social and moral behavior. In addition, Serido and Deenanath (2016), argue that pieces of advice received by parents are useful to become financially independent in the future. Giving a pocket money starting from 8 years old is one of the way in which parents can make their kids confident with money management. However, is demonstrated in literature that this tool without any teaching control during adolescence (12-16 years) has no positive effect in wealth

⁹ This report and its Annex present the results of the research project "Promoting the contribution of private savings to pension adequacy: Integrating residential property with private pensions in the EU" led by iff, institute for financial services, Hamburg.

management. In fact, what matters most and persists overtime are pieces of advice received from parents about how to manage money, which shows positive effects both on saving attitude and on savings amount when adults (Buccioli et al., 2014). They find that parental teaching to save is positively correlated with a better saving behavior increasing the likelihood to save when adult by 16%, and the saving amount by about 30%. In other words, they explain the effectiveness of their results saying that parental teaching improves propensity to save people as much as they were employed or college graduate also when it is not the case.

In line with what emerges in literature (Fornero et al., 2016), Buccioli et al. (2018), using Dutch data from the DNB Household Survey, show that money education received from the family during adolescence is as good as advanced level of financial literacy in individuals' wealth decisions, with males more affected than females. They find a money education statistically significant effect both for improving saving attitudes when adults (7.8%) and retirement planning (9.6%). Moreover, they highlight a higher probability to hold safe financial assets (3.9%).

Even in the geographic context, the differences are significant, in fact, Fornero and Monticone (2011) highlight the differences between the Italian regions as well as Bumcrot, Lin, and Lusardi (2011) in the United States of America. The situation in Italy is more critical than in other countries, in fact, Southern youth whose average score is 440 points, down 26 points to the national average, makes them among the last places (di Salvatore et al., 2018). Multiple variables that can affect, for example, greater proximity to the city center or population density, positively affect the financial prepayment of respondents (Klapper and Panos, 2011). However, comparing the results from two recent surveys in Italy, a better financial knowledge (inflation 13% and risk diversification 15%) emerges from SHIW survey (2016 wave) against Italian Literacy and Financial Competence Survey, IACOFI (2017). Through the analysis of SHIW data, Fort et al. (2016), use policies of banks of PattiChiari consortium as an instrumental variable to estimate the effect of financial literacy on financial assets. Doing so, they find that one standard deviation increase in financial literacy determines an increase in household financial assets by 35% of a standard deviation (8.000 euros).

In general, the most important thing is to separate the cause from the effect of financial literacy and take into account the endogeneity problem. For example, the individual investing in the financial market is more likely to engage in deepening financial issues by reaching higher levels of knowledge than those who do not come into contact with this world, as if more financially informed, it will have less fear in dealing with on the financial market to invest and will be skilled in both day-to-day financial management (Christelis, Jappelli and Padula, 2010; van Rooij, Lusardi and Alessie, 2011).

In this sense, the latter, by analyzing how financial literacy can influence stock market participation, introduce instrumental variables, including past financial experiences of relatives and acquaintances, which contribute most to determining the positive impact of financial literacy on the stock market participation.

Numerous other scholars apply the IV approach to financial literacy. Bucher-Koenen and Lusardi (2011) in Germany find an interesting link between regional policy attitudes and financial behavior, and what emerges is that estimates obtained from a process with instrumental variables are much larger than those performed by other scholars through the OLS approach. Therefore, the panel-level study and the use of a fixed-effect confirm that these results are statistically significant and do not affect other omitted variables. Another reason supported by empirical evidence from an IV approach (Behrman, Mitchell, Soo, and Bravo, 2012; van Rooij, Lusardi and Alessie, 2012) is the importance of investing in financial literacy for the positive impact that wealth generates on wealth. For wealth, it does not just mean gains from the investment but also the protection of savings and the ability to evaluate when it is convenient and how much it costs to borrow money. Indeed, low financial literacy rates result in high transaction costs and excessive interest rates. Thinking about the most common causes of erroneous expenses, the small number of new cardholders accounting for 29% claim 42% of costs (Lusardi and Tufano, 2009a).

Although countless would be the relationships to investigate, the growing interest in literature is in the relationship between financial literacy and behavior with different methods of estimation, including the experimental one, which is more detailed in the following section.

4. Research on the field

Spreading financial literacy at the national level involves cost-benefit analysis. The heterogeneity of the targets which need financial literacy comports customization associated with high costs in terms of time and opportunity and uncertainty of the results (Willis, 2011). In some way, as argued by Lusardi et al. (2013) looking at numerical simulations of their life-cycle model, the process to learn financial concepts requires too many costs, as much as the optimal solution could be to avoid it.

The goal of financial education programs should be (according to OECD- International Network on Financial Education - INFE) the acquisition of expertise in the following area: money and transactions, financial planning and management, risk and performance and basic numerical skills and knowledge of the financial system (terms and roles). To investigate the effect of financial education on behavior evaluation through counterfactual techniques is necessary. It involves a

comparison between a treated group who receives treatment and a control group composed of people very similar to those in the treated group for several characteristics that do not follow any course.

In literature, particular attention is paid to the identification of measurement errors. For example, it could be depending on how questions are worded. In order to identify this possibility, Lusardi and Mitchell (2009) and van Rooij, Lusardi and Alessie (2011) following a different order (a) or (b), they randomly ask two groups of respondents to answer the same risk question. So, if those questions that could be considered right, changing the order of arrangement change option, then they were just the fruit of the case. Field experiments should follow the approach of PISA, paying attention to the content, that is, the cultural baggage necessary to best handle the choices, to the process, in order to verify what they learned, and finally to the context, to verify the ability to address specific situations as case-studies (OECD, 2013). Another important aspect is the '*choice architecture*' in order to make the concepts and questions relevant to the target and as simple as already introduced by the four principles introduced by Lusardi et al. (2011).

Following the above guidelines, to increase financial literacy among millennials, I personally set up a financial education program for millennials called "*Futuro Sicuro: Sapere per sapersi difendere*" (Sconti, 2020). It involves 650 high-school students attending the 4th class of a Scientific High School in Reggio Calabria. There are two treatments, a traditional and a digitized one. Students are randomly allocated at the class level to the treated groups and the control group. The main results are the following. First of all, it improves financial knowledge by more than 20 p.p. after the course (persistent three months later). Second, attending a financial education program aligns self-assessed financial literacy and current financial knowledge. Three main field experiments in literature share some characteristics with it. The first one is a financial education program called "*Finanzas en mi colegio*" (Frisancho, 2018) which involved 300 schools in Perù, using counterfactual techniques and a strong evaluation strategy. It is similar for the traditional type of lesson adopt in our traditional course. The main result is increasing saving behavior both for students and teachers. An intensive short course in financial literacy was conducted in the north of Italy by Brugiavini et al., (2015). The similarity is about the short period characteristic even if our time-span is longer. It was addressed to university students who were interviewed before and after being exposed to financial education videos in the same day. This course increases both real financial knowledge and perceived one, but the last one increases more quickly. Finally, the last one is an example of digital program, and this is a similar characteristic even if the digital contents in Futuro Sicuro program is provided through smartphones. The tablet-based program by Attanasio et al. (2019), addressed to a female target

involved in a conditional money transfer program (CCT) in Colombia, indicates significant positive impacts on knowledge, attitudes, practices and financial performance. Who take more advantages are also here the poorest, least educated and most rural populations, with users who showed an increase in financial health over two years later.

5. Financial literacy and decision-making process

Human behavior is one of the most challenging things to predict. Since small details can affect human behavior disproportionately, understand some mechanisms in our minds is the first stage of an on-going process to help people make better decisions also in their wealth management. Of course, it is not enough, but it could be an additional tool to strengthen financial literacy.

Financial literacy is critical in everyday life since economic agents need to make choices based on incomplete information. Many scholars believe that the founding fathers of behavioral finance are the psychologists Kahneman and Tversky, with their famous contribution "Prospect Theory: An Analysis of Decision under Risk" (1979). This theory is formulated according to some in contrast to the Expected Utility Theory (Shiller, 2000), according to others on a different epistemological level (Linciano et al., 2012). Linciano and Soccorso (2012) identify the former as normative while the latter as descriptive, i.e., a theorization of the decision making optimization process.

Starting from the observation of reality, the authors demonstrate the existence of numerous contrasting phenomena of the dominant economic theory, especially the hypothesis of absolute rationality of economic agents. Indeed, from Prospect Theory, evidence emerges the existence of "framing" effects. They consist of three main effects *certainty effect*, *reflection effect* and *isolation effect*. In wealth management is essential to know more in-depth on how these effects work since each one generates a mutation of the decision-making process based on how an event is proposed. Levin et al. (1998), shed light on three significant framing effect classifications. The first one is the *risky choice framing*, concerning the presentation of the different levels of risk entailed by choices that can be represented by emphasizing earnings rather than potential losses. The second one is the *goal framing*, which concerns the positive or negative attributes highlighted to reach a specific objective. The last one is the *attribute framing*, which is the characteristic distortion according to the description in positive or negative terms. All these framing effects could affect information acquisition process (editing phase), and then affect financial and economic decisions (through a wrong evaluation phase). According to Kahneman and Tversky, the evaluation is based on a value function (instead of the traditional utility function proposed by Von Neumann and Morgenstern), to investigate decision-making processes in conditions of uncertainty.

In all cases, there is a reversal of the decision-making process envisaged by the Expected Utility theory. The two psychologists show that, in the choice between two lotteries having the same expected value, if they had different odds of winning or losing, the choice would not be unchanged, as prescribed by the theory mentioned above, but would favor the lottery whose gain is achievable with higher probability (certainty effect). Even the reflection effect demonstrates an apparent inversion of the rational behavior prescribed by the utilitarian theory. It shows the change in the propensity to risk as the possible outcomes change, becoming greater for negative results and lower for positive ones. Finally, the *isolation effect* consists of the decomposition of the process in order to simplify the choice. Through the value function, the Prospect Theory evaluates the trade-off between utility and wealth (gains/losses) compared to the so-called reference point (narrow frame), i.e. the point chosen based on the context and with individual perception. As many experiments show, this consideration, which takes into account the variation from the *status quo* in wealth pursued making a choice (an idea initially proposed by Harry Markowitz in 1952) is, in fact, a point of separation with the traditional theory, which is referring to a benchmark of total wealth.

In fact, contrary to standard theory, therefore, gains and losses do not play the same role in the minds of individuals. Therefore, in conditions of uncertainty, the risk propensity is not constant but varies according to the domain of the expected outcomes. People are more risk-averse in the presence of high gains, where the function is concave (payoff area) but more risk-takers, as evidenced by the convexity and the greater inclination that characterizes the curve on the contrary case (risk-seeking area) (Barberis and Thaler, 2002). Also Linciano (2010) and Linciano and Soccorso (2012) show that there is an opposite reaction to the certainty effect in the case of only negative events. In the case of inevitable loss, individuals prefer a probable loss and not a certain one, even if the expected value is higher.

5.1 Behavioral finance and heuristics biases

The empirical evidence leads the founding fathers of behavioral finance, Kahneman and Tversky, to propose an extension of their original theory, the "Cumulative Prospect Theory" (1992), for events with more than two outcomes. It differs from the first in the weighting function. The weighting function refers to the cumulative distribution of probabilities, rather than the probabilities of individual outcomes. Some aspects of this evolved theory refer to as the so-called Motivational Approach (Lopes, 1987) also applied to the Behavioral Portfolio Theory of Shefrin and Statman

(1985). This latter approach shows that individuals' decisions are based on self arrangements concerning risk and return objectives, taking into consideration the cumulative distribution of losses and gains.

Behavioral economics and finance show that our emotions and cognitive processes have adapted over the years, so much to determine shortcuts (*heuristics*) in order to simplify choices. They are mainly three. The first is called *representativeness* and indicates that the process by which the probability of an event is deduced only by evaluating its familiar image in our mind, but not considering its real characteristics. The second is *availability*, which bases the decision-making process on "available" memories. The third is called *anchoring* and uses an arbitrary initial value from which it is difficult to depart.

These shortcuts, however, in addition to the positive aspects, involve also negative aspects. To this attempt, Kahneman and Tversky are also pioneers in identifying "heuristics biases". They could be misleading, as is denoted by the term biases, which mean "prejudices", something that anticipates a judgment, not always representing a good thing (Barberis and Thaler, 2002). They can involve both errors and distortions in individual investment choices, which could also create a *herd effect* if adopted by more investors, resulting in both cases in market inefficiencies.

Among the most common heuristics biases, there is *overconfidence*, widely mentioned above. It is the result of boundless confidence in oneself and derives from cognitive distortions that violate the law of small numbers (Kahneman and Tversky, 1979) that is the belief that small samples represent the entire population. To it, one can associate optimism and wishful thinking that characterizes the rosy vision of many investors. Overconfidence feeds the presumption of being able to beat the market and translates into a constant movement of the portfolio. Overconfidence is generally associated with a lower level of financial knowledge.

Overconfidence can also partly derive from *self-attribution bias* and *hindsight bias*. The first concerns the tendency of people to give themselves credit for achieving success, but they lost responsibility in the case of failures. This behavior repeated over time can lead us to believe that we have exceptional talent and become overconfident. Finally, the *hindsight bias* is the tendency of people to believe, after the occurrence of an event, that they have been able to predict it and that they will be able to do it even better in the future (Barberis and Thaler, 2002). These biases have a central role also in gambling, which is generally afflicting people with a low level of financial literacy (the poorest, the older and the lower educated).

From the previous, several specific biases originate. The well-known distortion effect is known as "Home bias" emerges from the representativeness of the markets, i.e., the effect for which aversive investors with regards to ambiguous situations prefer to invest in more familiar securities (for geographical and similar reasons), as they have more information. However, it means to lose a better opportunity on the market. This mechanism can explain the reduced use of portfolio diversification, which is crucial for the investors' economic well-being and one of the concepts less known (Lusardi et al., 2014).

On the other hand, the dangerous conservative action of the *status quo* can originate from *anchoring*, namely the *confirmation bias*. It means that people are generally skeptical in seeking what support their assumptions while searching for those that confirm their thesis. In financial markets, this bias translates into the need for confirmation, for example, of a positive market trend to push people to invest (Bertelli, 2007).

One of the tasks of behavioral finance is, therefore, to shed light on these behavioral traps and try to defuse them, through training and procedures implemented by the financial advisor who generally faces with myopic investors. It arises from the combination of two tendencies that characterize the investor: the tendency to suffer more losses than the joy achieved in case of gains (loss aversion) and the tendency to place information in individual mental accounts (mental accounting).

For future research, it is, therefore, essential to understanding the role of financial literacy in mitigating each bias in the decision-making process under uncertainty.

6. Conclusion

The severe crisis that broke out in 2007 (and which we still have effects today) sees the leading causes of the combination of limited financial literacy across the globe and rooted misleading beliefs in our minds. However, the need for higher financial knowledge is not an answer to the crisis, but a new essential skill for everyday challenges. In fact, the threats come not only from a large and varied financial system to the most unknown but also from our minds. Kahneman and Tversky (1979), two Israeli psychologists, show that many psychological aspects are known in the decision-making process as heuristics. Among them, some heuristics for example home bias, contribute to adopting wrong behaviors also in financial environment that involve considerable money losses.

Considering complex financial marketplace, consumers should be informed and able to compare different financial products in order to pursue their goals. Federal Reserve Board Chairman Bernanke (2011) states that financial education must be the instrument to become advocates of themselves. Several are the positive effects of financial knowledge. To this attempt, well-structured financial education programs are needed. The cost-benefit analysis must be part of the project as well as a proper impact evaluation strategy. The interest in this topic is continuously increasing, and in Italy, as Annamaria Lusardi reminds as President of Comitato Edufin, “we are late, but we can take advantage from advanced countries in this field”. As in everyday life, to put into practice the mantra of Mahatma Gandhi "*Be the Change You Want to see in the World*" it could help to prevent financial mismanagement practices behaving correctly, improving financial knowledge and self-control of mental heuristics.

Obviously, single and fragmented financial literacy dissemination will not change the critical solution existing at the world level. So, despite the first attempts to protect the consumer (for instance, Mifid II in Italy or The Dodd-Frank Act, in the USA) this is not enough to defend them from opportunistic behaviors, nor does it help to make them able to make conscious choices. There is, therefore, a need for a unique national financial education strategy as suggested by the OECD, which has a strong lead partner, coordinating and conveying the work of different stakeholders, scoring roadmaps and guidelines to contribute individually to the national strategy. To this purpose, since 2017, Professor Annamaria Lusardi¹⁰ is the Director of the Committee¹¹ for the planning and coordination of financial education activities in Italy. Following this path for future research is essential to understanding the role of financial literacy in mitigating each bias in the decision-making process under uncertainty.

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¹¹ It was established in 2017 by Decree of the Minister of the Economy and Finance, in concert with the Minister of Education, University and Research and with that of economic development, implementing Law Decree n. 237/2016, converted into Law no. 15/2017, containing "Urgent provisions for the protection of savings in the credit sector." More details are available on a super parties source of information www.quellocheconta.gov.it.

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