UNIVERSITY OF MESSINA

DEPARTMENT OF ECONOMICS

RESEARCH DOCTORATE COURSE IN ECONOMICS, MANAGEMENT AND STATISTICS

XXXII CYCLE

Essays on Households Finance and Financial Literacy in Italy

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A.Y. 2018/2019

Abstract

The research aim is to go deeper in the analysis of financial literacy level and its role in Italian financial habits. To investigate the best practices in the financial literacy field, the thesis consists of three chapters. The first one reviews the existing literature on the subject. The second chapter concerns an experiment personally set up in 2018 in a high school of Reggio Calabria. The sample is composed of 650 students from the fourth and fifth classes. Among these, 126 attended a course in financial education (61 a traditional course based on the rule of thumb and 65 a digital course based on learning by playing, for a total of six fourth classes, chosen and allocated to the treatment randomly). Since the design of the experiment allows us to adopt the counterfactual technique, it was possible to determine the positive and persistent effect of both courses. A comparison of the averages of the share of right answers, before and after the course, was carried out. Then, the difference-in-differences statistical technique has been applied as a robustness check. The additional benefit of the course is the increase in their perceived level of knowledge. Finally, the last chapter investigates the financial habits of Italian heads of families in relation to their level of expertise in this field. Through four waves of SHIW Bank of Italy data, in which financial literacy questions were administered, it was possible to investigate the relationship between financial knowledge and use of remote banking, number of withdrawals and the use of the overdraft, choice of the main bank and the ability to make ends meet. What emerges is that a higher level of financial knowledge mitigates improper financial behavior, and promotes informed financial choices.

Acknowledgements

Chapter 1

Here we are:
Financial Literacy Survey

Abstract

The research goal is to support the relationship between financial literacy and sound wealth management. The attempt is to take into account every aspect of financial management. Although it is a relatively new theme, an increasing interest is showed on the topic. The paper aims to provide a screenshot of the actual stage of literature about real and perceived financial literacy. The contribution is to create survey literature as much complete as possible to give a framework for future field experiments. Several useful implications derive from a minimum additional improvement in financial literacy. A basic financial knowledge determines a higher awareness and a better financial decision-making process. Over debt and Overconfidence will be reduced, Saving and Diversification increased. Here we are, and this is only the starting point to increase financial literacy in the future.

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. 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) argued 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, for Financial

Education is meant a set of tools for improving consumer financial literacy (OECD, 2005). Instead, financial literacy is the mix of financial and numerical knowledge and skills necessary to manage their finances autonomously and rationally, combined with motivation and self-confidence, in order to allow for greater participation in economic life (OECD, 2014). Finally, financial capability, even if it is commonly used as a synonymous for financial literacy, it is slightly different as the last one incorporates it. Financial capability is the ability to put into practice financial knowledge in order to adopt healthy financial behaviors that are appropriate to personal needs. The World Bank definition provides a more technical, clear and concise definition, in fact, states that it is the "internal capacity to act in one's best financial interest, given socioeconomic and environmental conditions" (www.worldbank.it).

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 has become 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) highlighted a total lack of financial literacy in Europe, Australia and Japan.

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), which shows that lesser accountability of Italian students can explain the lagging behind of them on economic and financial aspects (OECD, 2012). Thus, PISA has spread 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).

Although the poor result is shared by many countries (of which only 2.1 percent qualify as top performers), Italians in the survey above have been the worst in terms of financial literacy, better than just Colombians. Therefore, as the PISA report shows, 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 has also confirmed the rise in persistent financial knowledge among Italian adults and those more skilled in other developed countries (Kappler 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 stressed 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

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1 Among them Standard & Poor's Ratings Services Global Financial Literacy Survey (S&P Global FinLit Survey, based on initiaves 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.

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 skills more dangerous than financial distress family problem for children (Hackman, 2006).

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.

Moreover, 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 Governator 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.

So 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. 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, have shown 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.

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, in 2017, Professor Annamaria Lusardi[2], the leader in this research field, was appointed the director of the Committee[3] for the planning and coordination of financial education activities in Italy. She is working with deep passion together with ten other members with proven skills and experience in the field to construct the italian national financial education strategy.

This chapter is organized in five main paragraphs: a relevant literature review related to the financial literacy measures. Than financial literacy effects on financial behavior, the third one related to the experiments in this field, and finally a section on behavioral finance before the conclusion.

2. How real and perceived financial literacy are measured

Real financial literacy

The measure issue is involving all institutions in charge of the debate about financial literacy level all over the world. Lusardi and Mitchell (2008, 2011b, c) based their famous Big Three[4] 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 FINRA Financial Capability Survey was conducted (Lusardi 2011), including two sophisticated concepts such as understanding of mortgages/mortgage payments and asset pricing. Unfortunately, this report also revealed the critical picture of

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2 Professor Annamaria Lusardi is the Denit Trust Endowed Chair of Economics and Accountancy at the George Washington University School of Business (GWSB) and the founder and academic director of GWSB's Global Financial Literacy Excellence Center.

3 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."

4 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

the financial knowledge of the respondents. Indeed, only 21% of Americans know about the inverse relationship between bond prices and interest rates. 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. (2018) 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 famous aggregate form of measure is the TIAA Institute-GFLEC Personal Finance Index (P-Fin Index). This index examines eight areas of personal finance and provides a robust indicator of overall personal finance literacy level. Overall, P-Fin Index data highlight the gap between current personal finance knowledge levels and the level required for sound financial decision-making in the normal course of life. The need for a better financial literacy level emerges, and it is major for millennials who will face several crucial financial decisions early in their working experience.

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 overconfidence[5] 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 report of Bank of Italy (2019) about IACOFI 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 women or 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).

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[5] 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).

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 will 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 have shown 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. Recently, in fact, it has been widely demonstrated how individuals are not able to cope with the complicated financial situation around them. In fact, Lusardi et al. (2011) argue that financial fragility[6] is a common problem in the USA. It is from this awareness that both scholars and politicians have shifted their focus to the need to spread financial culture and to study the determinants of decision-making.

The first to study the links between financial knowledge, saving and investment behavior were Delavande, Rohwedder and Willis (2008), Jappelli and Padula (2011), Hsu (2011), and Lusardi, Mitchaud and Mitchell (2013). Delavande, Rohwedder, and Willis (2008) conducted a two-period model of consumer saving and portfolio allocation, considering financial knowledge as a human capital investment in order to achieve higher earnings (à 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 argued 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, have found that better social security benefits affect lower levels of financial literacy (see also Jappelli, 2010). In order to stimulate adequate

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

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interest and equitable treatment, the spread of financial education in high schools should be used. Jappelli et al. (2010), has always defended 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) is one of the most used datasets in the study of the determinants of financial literacy acquisition.

Empirical evidence shows that providing financial knowledge to 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 (Lusardi, Mitchaud and Mitchell, 2011).

Furthermore, Lusardi and Tufano (2009a, b) argued 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, was 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% have correctly placed their questions (Lusardi et al., 2011). In addition, Brugiavini et al. (2015), argued that their short course in financial literacy increased 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 and Mitchell (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 introduced above 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; Bucciol et al., 2018).

Therefore, the increasing and significant interest in the relationships between gender and financial literacy has led many studies to undertake through research on this subject. For example, Hsu (2011) stated 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.

Still, a widely dealt with the topic is the inherent relationship between financial literacy and ability. Some scholars have shown a close link between them. Lusardi, Mitchell, and Curto (2010), while controlling cognitive aspects, found the persistence of heterogeneity in the acquisition of financial literacy. Moreover, it has also been shown 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) have found 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) have shown 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 (2012), 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, stressed 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 became financially independent in the future. Giving a pocket money strating from 8 years is one of the way in which parents can make their kids confident with money management. However, was demonstrated in literature that this tool without any teaching control during adolescence (12-16 years) has no positive effect in wealth management. In fact, what matter most and persist overtime are pieces of advice received from parents about how manage money which show positive effects both on saving attitude and on savings amount when adults (Bucciol et al., 2014). They found 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 emerged in literature (Fornero et al., 2016), Bucciol 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 found 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) highlighted 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), used policies of banks of PattiChiari consortium as an instrumental variable to estimate the effect of financial literacy on financial assets. Doing so, they found 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, introduced 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 have used the IV approach to financial literacy (Bucher-Koenen and Lusardi (2011) in Germany have found 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, this panel-level study and using 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, it is widely demonstrated that low financial literacy rates result in high transaction costs and excessive interest rates. Thinking about the most common case 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 be investigated, the growing interest in literature has meant that the relationship between financial culture and behavior was studied more and with different methods of estimation, including the experimental method, which will be followed during the dissertation. It provides for parallel and comparative analysis on two groups, conducting a financial education program on a group called the treatment group, testing tests will be conducted to trace the salient features of the generated behavior, to be compared with the behavior of the so-called control group, who has not participated in the educational program (Collins and O'Rourke, 2010).

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 someway, 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 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). The effect of financial education on behavior should be investigated and evaluated proving the effectiveness through counterfactual techniques, that involves a comparison between beneficiaries (treated group) and a group of people very similar on several characteristics which do not follow any course (control group).

In literature, particular attention has been 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 possible following the four principles mentioned above and explained further in chapter 2.

In the next chapter, are reported three main field experiments in literature which share some characteristics with "Futuro Sicuro: Sapere per sapersi difendere" field experiment personally set up. 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., (2016). 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, who was 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. Behavioral finance: the base for future research

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 was formulated according to some (Shiller, 2000), in contrast to the Expected Utility Theory, 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 demonstrated the existence of numerous contrasting phenomena of the dominant economic theory, especially the hypothesis of absolute rationality of economic agents. Indeed, from the empirical evidence taken from the Prospect Theory emerges the existence of "framing" effects. They consist of three main effects (effect-certainty, effect-reflection and isolation-effect), which consist of the mutation of the decision-making process based on how an event is proposed. As argued by Levin et al. (1998), there are three significant classifications of framing effects: the so-called risky choice framing, concerning the presentation of the different levels of risk entailed by choices that can be represented by emphasizing earnings rather than on potential losses. The goal framing, which concerns the positive or negative attributes highlighted in the description of the behavior to adopt in order to reach a specific objective. The so-called attribute framing, which concerns the evaluation of a character that can be distorted according to the description in positive or negative terms.

From numerous other empirical evidences the consistency of the framing effect emerged, which consists of two main moments: initially a structuring phase (editing), in which how the event is placed is decisive, and subsequently a phase of evaluation, which uses 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. In fact, the two psychologists have shown 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 aforementioned theory, 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 less for positive ones. Finally, the isolation effect is another anomaly of the decision-making process that emerged from the authors' analysis, which 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), ie the point chosen based on the context and in relation to individual perception. As the many experiments show, this consideration, which takes into account the variation in wealth pursued following a choice (status quo) (an idea initially proposed by the US economist Harry Markowitz in 1952), as demonstrated by the multiple experiments, is in fact a point of separation with the traditional theory referring to a benchmark of total wealth.

Since a profound loss aversion characterizes individuals, people will be more risk-averse in the presence of high gains, where the function is concave (payoff area). On the contrary, and it is here that the innovative contribution of behavioral finance is revealed, in the case of certain losses, the same, will be decidedly more inclined to risk, as evidenced by the convexity and the greater inclination that characterizes the curve in the negative case (area risk-seeking) (Barberis and Thaler, 2002). Even Consob studies (Linciano and Soccorso, 2012) have shown that there is an opposite reaction to the certainty effect in the case of only negative events. In the case of certain loss, individuals prefer a probable loss, even if the expected value is higher. Contrary to standard theory, therefore, gains and losses do not play the same role in the minds of individuals. Therefore in conditions of uncertainty, it can be deduced that the risk appetite is not constant but varies according to the domain of the expected results.

The more considerable empirical evidence led the founding fathers of behavioral finance, Tversky and Kahneman (1992), to propose an extension of their original theory, in this case, applicable to events with more than two solutions. This theory has in fact undergone further changes, evolving into the famous "Cumulative Prospect Theory" (1992). It differs from the first essentially in the weighting function. In fact, in the theory of cumulative prospectus, the weighting function refers to the cumulative distribution of probabilities, rather than the probabilities of individual outcomes. Some aspects of this evolved theory are referred to by 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 a device factor, i.e. how he arranges himself concerning risk and return objectives, taking into consideration the cumulative distribution of losses and gains.

Behavioral finance studies show that our emotions and cognitive processes have adapted over the years, so much to determine shortcuts (heuristics) in order to simplify everyday problems, as we have already mentioned. 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 representativeness (i.e., a familiar image in our mind), but not considering the 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 of the psyche, however, in addition to the positive aspects, involve also negative aspects. Kahneman and Tversky were also pioneers in identifying "heuristics biases" on this occasion. Although these shortcuts can help in everyday life, in the financial sphere, they could be misleading, as is denoted by the Anglo-Saxon term biases "prejudices", meaning 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, creating a collective contagion effect, resulting 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 a surreal desire (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 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 this responsibility is lost 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).

From the previews, several specific biases originate.The well-known distortion effect 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, although most of the time they are even inadequate. This mechanism can explain the reduced use of portfolio diversification, which is crucial for the investors' economic well-being.

On the other hand, the dangerous actions of the conservatism of the status quo can originate from anchoring. In this perspective, another distorted behavior is included, namely the "Confirmation bias", for which people are skeptical in seeking theses that refute 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).

The task 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.

Moreover, as traditional finance has tried to explain the most frequent puzzles typical of the markets, misunderstood and unresolved questions, in this sense, behavioral finance has also helped to solve them (Barberis and Thaler, 2002).

An example relating to the functioning of the stock market in aggregate is that of the equity premium puzzle (Mehra and Prescott, 1985), that is the theme concerning the premium associated with equities, defined as the difference between stock market yields and bond yields. It has not been explained by traditional finance why investors, although their long-term time horizons, do not prefer to invest in much more profitable securities because of a huge perception of risk. In fact, the higher premium associated with investing in equities seems to be configured as a reward for the investor who has decided to risk more, choosing a stock characterized by high volatility (volatility puzzle), the result of overconfidence and loss aversion variations in relation to the gains achieved or the losses suffered recently. The core element of the equity premium puzzle is the attractiveness of the actions, which have a high average rate of return and a low covariance with consumption (Barberis and Thaler, 2002).

Behavioral finance responds to this problem with two alternative solutions. The first is based on Prospect theory and finds an explanation in the investor's famous myopic vision (myopic loss aversion). 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 special mental accounts (mental accounting). The second solution introduces the principle of ambiguity aversion, i.e., the principle that individuals are not willing to accept gambles without knowing the probability

distribution (the so-called Ellsberg paradox) since, in this case, the expected return would be unknown. However, this question remains only partially explained (Barberis and Thaler, 2002).

For future research, it is, therefore, essential to understanding the role of financial literacy in a context of decision-making under uncertainty such that in which investors operate.

6. Conclusion

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) stated that financial education must be the instrument to become advocates of themselves. Several are the positive effects of financial education 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 very often 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 your financial knowledge.

Chapter 2

Financial Literacy in Italy:
What works among millennials most?

Abstract

The research aim is to investigate the relationship between financial literacy and behavior in the face of the growing challenge of Financial Technology. To do so, a financial education program for high school students called "Futuro Sicuro" was set-up to understand if it may change financial habits among millennials. This program provides two treatments at the class level, namely 1) a theoretical, rule-of-thumb based treatment with the presence of a financial advisor, and 2) a digitized treatment using an App and websites based on the learn-by-playing rule. The empirical research is carried out using data collected during the aforementioned program involving 650 students.[7]

1. Introduction

With the advent of globalization and the development of technology, the financial world has become more accessible. However, accessible is not synonymous with simple. Besides stipulating mortgages, accessing credit and investing have also become actions taken by those who do not know what the conditions and the implications of these actions are. Financial inclusion and consumer protection thus make financial literacy an object of interest for policymakers. It is crucial to spread financial literacy in particular among millennials, who will be riding the crest of financial technology (Fintech) wave. This notion is also widely supported by the Italian economic press and several institutions. The aim of this research is to identify which one of the two courses proposed is the best one to spread financial literacy among millennials in the most natural way possible and in doing so, contribute to a positive change in their saving habits.

Before going deeper, it is necessary to define and specify certain terms. Financial Education identifies a set of tools for improving consumer financial literacy. According to the Organization for Economic Cooperation and Development, financial literacy is the mix of financial and numerical knowledge and the skills which are necessary for good autonomous wealth management (OECD, 2005). Moreover, financial literacy allows greater rational, motivated and self-confident participation in economic life (OECD, 2014) which is an important safeguard against market instability. Finally, financial capability is

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the ability to put into practice one's financial knowledge and to adopt sound financial behaviors that are appropriate to one's needs. The level of financial literacy is very low throughout the world with only 2.1 percent of countries qualifying as top performers. Italy is among the worst performers in terms of financial literacy, better only than Colombia. Despite recognizing the need to improve financial literacy levels worldwide, the best way to achieve this is far from clear. For instance, while financial literacy programs were targeted at many groups, the existing literature provides little evidence on their effects of these programs: 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 (2003), Clark and d'Ambrosio (2008) and Clark et al. (2012a, 2012b); for household literacy programs, see Collins and O'Rourke (2010). The most critical issue to consider is that financial education programs often lack an evaluation as part of the design. Notable exceptions are Becchetti et al. (2013) and Lührmann et al. (2015) who assess the effect of financial education programs on high-school students. Lührmann et al. (2015) find a positive impact of short training sessions on financial attitudes such as interest in financial matters and saving propensity. In contrast, Becchetti et al. (2013) do not find a statistically significant effect of the treatment on financial literacy. Besides these, Brugiavini et al. (2018), focusing on 579 university students, also find that a short one-day course increased 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.

In this paper, we focus on students from a secondary school in the south of Italy (Reggio Calabria). We organized short courses in financial literacy for some of the classes of the last year of a secondary school. The course involved about 126 students in treated classes (exposed to the course) and we collected data on more than 650 students from treated and untreated (not exposed to the course) classes. Importantly, we have quasi-experimental variation in exposure to courses because there is no particular selection of students into classes (according to the teachers and the manager, the students are randomly allocated into classes). Consistently with this, we find that students' observable characteristics are balanced in treated and untreated classes.

The financial courses are of two types. The first one is delivered traditionally. It consists of four frontal lessons by a financial advisor using slides. The other one is delivered in a highly digitized way through the platform "Kahoot" following the same schedule. The main difference between the two treatments is that the digitized course involves the learning-by-playing concept. In it, students answered short quizzes projected on an interactive multimedia whiteboard using their smartphone as a pushbutton. They were also able to verify and improve their knowledge through watching short videos freely available on YouTube.com. Besides these, a tracking task that was part of both treatments, the task required students to track down their expenses digitally or traditionally depending on their course type. A prize, valued at around 10 EUR acted as an additional incentive for students to try their best.

The contribution of the paper to the existing literature consists of the investigation of the effects of two similar financial literacy courses in terms of their contents duration and goals but very different with respect to the methods of dissemination. To the best of our knowledge, this is the first paper to focus on this particular population within a quasi-

experimental setting using the concept of learning-by-playing to increase financial literacy among millennials and the expertise of a financial advisor through the rule of thumbs[8].

High school students in Italy are an excellent target of financial literacy courses for the following reasons: they are enrolled in a school which randomly assigns them to different classes and the school stores personal details and marks for each student within each subject. Moreover, classrooms are a familiar environment in which the students are accustomed to learning. They don't have to separately recruit and so the data collection process is considerably simplified. Even if the target chosen by Brugiavini et al. (2018) is a different subgroup of millennials, both with respect to their personal interests and in terms of their age, the advantages highlighted by them are reasonably applicable also to our target. Both targets are able to do simple calculations required by financial literacy standards. Homogeneity is ensured not only in age but also in the area of residence. High-school students more than university ones in Italy have little exposure to financial concepts required to do safe and sound wealth management. For this reason, like Brugiavini et al. (2018) argued, courses in financial education could have a significant impact on their financial skills.

We provide two substantive findings. First, our results indicate a positive effect of financial education on financial literacy. After the course, the treated students appeared more financially literate than before in comparison with the control group. Some effects persist after three months following treatment. Second, following a short course on financial education, the actual result is a better alignment between self-assessed and real financial literacy. Other findings are explained in detail below.

The paper is organized as follows. First of all, a relevant literature review related to the financial literacy is provided. Then, there is a description of the research design and methodology. In the end, tables and figures are useful to sum up our findings.

2. Literature

It has been widely demonstrated how individuals are not able to cope with the complex financial situations around them. It is from this awareness that both scholars and politicians have shifted their focus to the need to spread financial culture and to study the determinants of financial decision-making.

Several scholars have considered financial literacy akin to human capital investment, both of which are geared toward eventually achieving higher earnings. Among them, Jappelli and Padula (2011) studied a multi-period life cycle model in which financial literacy is considered endogenous and hump-shaped. They argued that the relationship between financial literacy and wealth is strongly correlated over the life cycle, except after retirement. The most important thing introduced by Jappelli and Padula (2011) is that since financial literacy is similar to an investment, then there could be sub-groups for which it would require unacceptably high costs. In this regard, the OECD stressed the importance of increasing literacy for new generations starting from school (OECD, 2005; OECD-INFE, 2012) where it would be possible to take advantage of the time period during which people tend to be particularly receptive. Another interesting aspect is the positive

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[8] The costs of each course could be similar if financial advisors are free of charge. However traditional course requires a lot of efforts in comparison to the digitized one.

relationship between financial literacy and education. Lusardi and Mitchell (2011) have argued that children who attended college comprehensively understand complex concepts such as financial diversification, unlike those who did not attend the college. Empirical evidence shows that providing financial knowledge to the least educated group improves their wellbeing by 82 percent in the pre-employment stage and 56 percent for college graduates (Lusardi et al., 2011).

Moreover, there is empirical evidence which has shown a gender gap (Lusardi et al., 2014). The literature suggests that while women are less financially literate, they are also those who most recognize their limits in this field by choosing more often "do not know" as a response (47% women against the only 26% of men in the US).

As can be seen in the literature a solution must be found to protect wealth. First of all, protecting wealth also means safeguarding savings and having the ability to evaluate when it is convenient and how much it costs to borrow money. In fact, it is widely demonstrated that people with low financial literacy pay high transaction costs and excessive interest rates (Lusardi and Tufano, 2009).

The goal of financial education programs should be (according to 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). The effect of financial education on behavior should be investigated and evaluated proving the effectiveness through counterfactual techniques, that involves a comparison between beneficiaries (treated group) and a group of people very similar on several characteristics which do not follow any course (control group).

To the best of our knowledge, three are the main studies in literature similar in some way to the field experiment "Futuro Sicuro: Sapere per sapersi difendere" personally set up, object of the second chapter. The first one is a traditional financial education program called "Finanzas en mi colegio" (Frisancho, 2018), conducted on large-scale using counterfactual techniques and a good evaluation strategy. It involved 300 schools in Peru, and the main result is increasing saving behavior both for students and teachers. The quantitative impact of this financial education program is 0.14 standard deviation (SD) in the real knowledge on average in the pooled sample of students. In addition, not only students learnt more but they became also more aware of their financial proficiency (0.11 SD). According to Frisancho et al., (2018) this study was the first one which included a cost-benefit evaluation in this context. They found that their intervention was cost-effective. In fact, on a sample of 31,000 students in 150 schools, they spent US$ 6.6 per student and the cost-effectiveness ratio was 0.021. In the end, they pointed out that every dollar spent per student is equivalent to a 2.2 point improvement in the PISA 2015 financial literacy test. The second financial literacy field experiment of interest was conducted in the north of Italy by Brugiavini et al., (2016). It was an intensive short course in which university students were interviewed before and after being exposed to financial education videos in the same day. On a sample of 579 university students, the statically significant effect on financial knowledge was 0.046 for "Inflation" after the course, 0.176 for "Interest compounding" and no effect emerged for "Diversification" outcome. However, the number of correct answers after the course increased by 0.229. The main results are that this kind of course, increases both real financial knowledge and perceived one, but the last one increases more quickly. The similarity here is about a short period and the use of video.

Finally, the last one is an example of a digital program, and this is a similar characteristic even if the digital contents in Futuro Sicuro program is through smart whiteboard and smartphones. The tablet-based program by Attanasio et al. (2019), addressed to a female target, who was involved in a conditional money transfer program (CCT) in Colombia, indicates significant positive impacts on knowledge, attitudes, practices and financial performance. Who takes 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. The impact on the treatment group were 0.20 SD immediately after the program, and it was persistent seven months later 0.18 SD, as well as two years later, with 0.14 SD higher compared to the control group for the basic test.

3. The field experiment

An experiment to be considered a field experiment must meet six kee factors: the nature of subject pool, the nature of the information that the subjects bring to the task, the nature of the commodity, the nature of the task or trading rules applied, the nature of the stakes and the nature of the environment that the subject operates in (Harrison and List, 2004). Following these criteria, our experiment not only can be considered a field experiment, but can also be considered a *natural field experiment* since it is set in an environment such as classrooms where subjects, in our case students, generally are already involved in a learning process whithout information about being involved into an experiment.
Having reviewed all the initiatives implemented by many banking and non-banking parties (Franceschi et al. 2017), we develop a program in line with what has already been done for extrinsic parameters (like mean, duration and general content). The chosen target is 16 to 18-years-old students attending the fourth classes of the L. da Vinci Scientific High School in Reggio Calabria. This target has been chosen because they are able to follow key financial concepts like students of fifth classes, but also allows us to expand the study the following year. This field experiment involved 6 treated and 28 untreated classes, chosen randomly. The treatment is the exposure to the financial course that can be the traditional or the digitized one (henceforth T and D). Different treatments (T and D) were randomly assigned to the treated.

We describe the timeline of the experiment in Figure 1. Before the start of the course (t_0 in Figure 1), we measured the level of financial literacy with a questionnaire for students in T, D and untreated classes (henceforth, C). Specifically, students were required to answer questions about their personal characteristics and family background in the first section, their financial habits (such as saving habits and use of prepaid card) and risk aversion behavior in the second section[9], and their financial literacy (inflation, interest and diversification) in the last one.

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[9] Since the effect of risk aversion is strictly linked to financial behavior I report the two questions addressed to the students about their risk aversion and preferences:
If you win the lottery an amount corresponding to your family's annual income, which will be paid to you in a year. To what extent would you give up part of the amount to withdraw the residual amount immediately?
• I would give up 20% too • I would give up 10% • I would give up 5% • I would give up only 2%
If you could choose from the following options, you would prefer:
• a certain gain of 5% • flip a coin by gaining 10% if it comes heads, 0 if it comes cross

One week after the survey (t_1 in figure 1), the courses T and D started, with 2 hour lessons once a week. Attendance was compulsory because it fell within school hours. We asked students in T, D and C (untreated classes) to fill the same questionnaire again at the end of the course (t_2). We repeated the same procedure (i.e. asking students to fill the questionnaire) three months later (t_3) but only for students in the T and D classes.

Figure 1 – Study Timeline
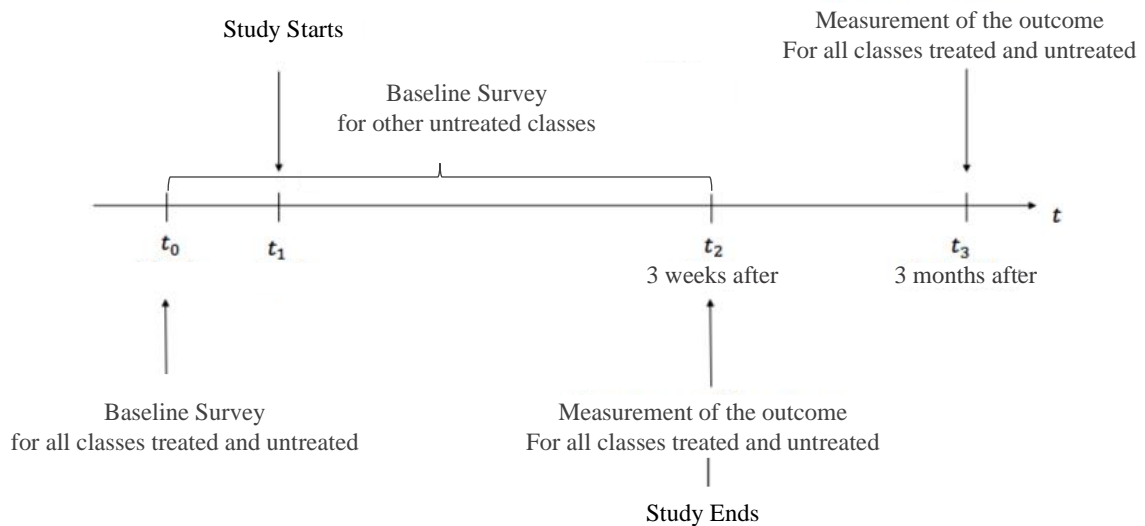
Additionally, a tracking task was assigned to each treatment group which required them to make notes of their expenses. Thus, a pre-printed sheet was distributed to the treated of the theoretical course (T treatment). The treated of the digital course was asked to download a free app called 70.20.10 (available for both IOS and Android devices) to keep digitized track of their expenses. For both of them, the deadline to complete the task was fixed at the end of the course. This task allows us to evaluate the degree of participation of students and their involvement. Furthermore, it will enable us to understand which method is more effective for millennials to keep track of their expenses. Finally, it allows us to know whether these methods succeeded in changing saving habits or their interest and so their knowledge. In order to increase their participation, a prize consisting of a handmade credit card holder (valued at around 10 EUR) was promised to those who were able to complete it.

The traditional course is characterized by the presence of professional financial advisors (in three T classes)[10].During the first lesson of the traditional course, a motivation lecture about the importance of increasing human capital was made after a brief re-telling of the popular fairytale, Pinocchio. Then the task was explained (and a balance sheet distributed) introducing the importance of planning in wealth management as well as in everyday life. Moreover, daily examples from the expertise of a financial advisor focused on investment (i.e. planning, diversification and so on) were provided. Slides were used to keep things simple enough. Price and inflation were the main topics of the second lesson. The third one, was about saving and payment instruments, taking into account inflation and

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[10] In particular classes 4th P, 4th C, 4th D.

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refreshing the concept of simple interest calculations. The fourth and last lesson, after an overview of financial markets was a brief introduction to mortgages, insurance and retirement. The same schedule was followed for the parallel digitized course. To the best of our knowledge, it is the first short course in financial literacy which covers all topics of wealth management using this particular digitized methodology. Since the aim of the digitized course (in three D classes)[11] is to learn by playing, the first lesson started with a video clip from Pinocchio's cartoon. Then, a video on human capital was showed and details of the course and task structure were explained (as well as the instructions to download the app). The human capital concept was chosen to increase their awareness and their involvement in their learning process as a whole, not only for the course. Then, the first short quiz (10 questions) about financial planning was administered through a user-friendly platform called Kahoot. The quiz was projected on an interactive multimedia whiteboard and computers or smartphones were used by students as pushbuttons. They had to join by entering a unique code (automatically randomly generated every time a quiz started) on their smartphones and to choose their nickname (the same for each test which they join in from then on). After each question was answered, they were made aware of the right choice by a message on the whiteboard. Then, a classification in comparison with their schoolmates appeared. A short video freely available on YouTube about financial planning was projected after the first quiz. A Q&A section followed at the end of each lesson. In the second lesson, students tested and verified their knowledge about prices and inflation. In the third lesson, the quizzes were about saving and payment instruments. During this lesson, the concept of interest compounding was introduced. After the fourth and last lesson, students tested their knowledge about the composition of financial markets and about the basic concepts related to mortgages, insurance and retirement. After each quiz, a short video concerning the same theme was showed.

The design of the field experiment allows us to test several questions and hypotheses. The first question to address regards the effectiveness of the financial courses, This involves measuring the level of financial literacy before and after the courses for students in treated (T and D) and untreated classes (C). Another aim was to understand which course was more effective. In doing so, we measure the impact of the courses not only on financial literacy but also on financial behavior (risk aversion and savings). The data was collected for a large sample of students which allowed us sufficient power to study many hypotheses. First, we checked whether male and female students were equally aware of their financial literacy level before and after the course. Second, we checked if the data showed some specific effect of their characteristics before the course (like pocket money, the preference for a future economic university path, or freelance parents) on financial literacy outcomes. Third, we checked whether being enrolled in a financial literacy program could change financial habits and produce some positive externalities (amplification effect). Finally, we determined whether the particular design chosen (different methods of dissemination for different treatments) highlighted a technological gap between students. The next section describes the data collection process used to test our hypotheses.

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[11] (In particular classes 4th A, 4th G, 4th M)

3.1 Data

The total sample is composed of 650 students, 126 treated (61 in the T treatment and 65 in the D treatment) and 524 untreated.

Before starting the courses, a three-section questionnaire was drawn up following the Lusardi and Mitchell (2011) approach – Simplicity, Relevance, Brevity and Capacity to differentiate. This was administered both to the treated (in the T and D classes) and to the students in the untreated classes (C). In the first section, we collect students' personal information, family background, whether the student is an only child or not, the educational experience of family members and individual marks obtained in English, Italian and Mathematics during the year. The next two sections allow us to collect data useful for testing hypotheses about their saving habits and their financial literacy levels and these were administered before the courses, just after the course and three months after the end of the courses. In these sections, questions have been introduced concerning the main topics of financial planning, inflation, diversification and interest calculation to quantify the students' financial knowledge. The same financial literacy questions (but arranged in a different order, as suggested by Lusardi and Mitchell (2009) and Van Rooij, Lusardi and Alessie (2011)) was administered after the course. In addition, new personal questions were included in the questionnaire during this second administration to find out if the treatment proposed resulted in any positive externalities in their everyday life. This follow up allows us to verify the last hypothesis. After discussing practical examples of daily life with the help of financial experts or through a learning-by-playing approach, we also wanted to understand if the student spoke about the project with family, amplifying the effect of the course in the affirmative case. In the end, comparing answers of the control group to treated ones in the second and the third wave, we can then ascertain any learning-effects.

As mentioned before, there were two treated groups and one control group. Students in the treated groups received training D (digitized course) and T (traditional course). Students in the control group C did not receive any training but participated in the survey. The experiment was conducted at the class level. Specifically, we had classes in which all the students were treated and classes in which all the students were untreated.

Before estimating a model, we want to corroborate the idea that we have a quasi-experimental variation. The identifying assumption in model 1 is that students are assigned to treatment D or T (or to the control group) randomly. Since the randomization was done at the class level with a few classes, this assumption is equivalent to the random assignment of students into different classes. Conversations with the principal of the school and the teachers ensured that students are indeed allocated to different classes without any criteria so we should not, for instance, observe some classes with a disproportionate number of high ability students and some with a disproportionate number of low ability students. To support our assumption, we conduct a balancing test where we report for the three groups (T, D or Control) the average characteristics of observables at the student level.

	Treated_g	T Classes	D Classes	Control_g	Diff1	Diff2	Diff3	Diff4
	Treated group	Traditional Course	Digitized Course	Control group	(T Classes-Control_g)	(D Classes-Control_g)	(T Classes-D Classes)	(Treated_g-Control_g)
Female	0.524	0.459	0.587	0.472	-0.013	0.116*	0.128	0.052
	(0.050)	(0.502)	(0.496)	(0.500)	(0.067)	(0.066)	(0.089)	(050)
Age	16.590	16.58	16.60	16.82	-0.238***	-0.217***	-0.019	-0.227***
	(0.555)	(0.561)	(0.555)	(0.529)	(0.076)	(0.073)	(0.1)	(0.055)
Income	0.629	0.661	0.6	0.601	0.060	-0.001	0.061	0.027
	(0.485)	(0.473)	(0.494)	(0.490)	(0.063)	(0.065)	(0.087)	(0.049)
Foreign	1.000	1	1	0.982	0.017***	0.017***	1	0.017***
	(0)	(0)	(0)	(0.130)	(0.017)	(0.006)	(0)	(0.005)
Foreign Parents	0.968	0.967	0.969	0.940	0.026	0.028	-0.003	0.027
	(0.176)	(0.1810)	(0.174)	(0.237)	(0.025)	(0.024)	(0.031)	(0.018)
Only Child	0.166	0.147	0.184	0.131	0.017	0.053	-0.037	0.035
	(0.374)	(0.357)	(0.391)	(0.337)	(0.047)	(0.050)	(0.050)	(0.036)
City Centre	0.861	0.880	0.844	0.889	-0.007	-0.045	0.037	-0.027
	(0.346)	(0.326)	(0.366)	(0.314)	(0.044)	(0.047)	(0.062)	(0.034)
Repetition	0.008	0.016	0	0.018	-0.001	-0.018**	0.016	-0.009
	(0.090)	(0.128)	(0)	(0.133)	(0.017)	(0.006)	(0.016)	(0.010)
Economics	0.150	0.193	0.111	0.116	0.077	-0.005	0.081	0.033
	(0.358)	(0.398)	(0.316)	(0.320)	(0.054)	(0.042)	(0.066)	(0.035)
Father Degree	0.369	0.339	0.4	0.321	0.018	0.078	0.061	0.048
	(0.484)	(0.477)	(0.494)	(0.467)	(0.065)	(0.067)	(0.089)	(0.048)
Mother Degree	0.418	0.439	0.4	0.357	0.082	0.043	0.038	0.061
	(0.495)	(0.501)	(0.493)	(0.480)	(0.069)	(0.064)	(0.090)	(0.049)
Father Freelance	0.411	0.517	0.312	0.343	0.173**	-0.032	0.205	0.068
	(0.494)	(0.504)	(0.467)	(0.475)	(0.069)	(0.063)	(0.089)	(0.049)
Mother Freelance	0.110	0.069	0.15	0.2	-0.131***	-0.050	-0.081	-0.089***
	(0.314)	(0.255)	(0.360)	(0.4)	(0.038)	(0.050)	(0.057)	(0.034)
N	126	61	65	524	585	589	126	650

Table 1 - Balancing Test

Table 1 shows that students' personal characteristics are quite balanced. Although the differences in age between both groups of treated respectively and the control group are highly statistically significant, their values are minimal and so not worthy of note. The same is true for the difference in repeating the school year or in the case of nationality of parents comparing the digitized treatment group and the control group. The statistically significant differences that emerged from the comparison between traditionally treated and the control group regarding parent's freelance activity are taken as control in the following analysis. Statistical difference may depend on large sample size difference between treated and control groups.

Table 2 - Balancing Test - Knowledge on financial literacy before the course

	Treated	T Classes	D Classes	Control_g	Diff1	Diff2	Diff3	Diff4
	Treated Group	Traditional Course	Digitized Course	Control group	(T Classes-Control_g)	(D Classes-Control_g)	(T Classes-D Classes)	(Treated-Control_g)
Inflation	0.444 (0.498)	0.229 (0.424)	0.554 (0.501)	0.420 (0.494)	-0.190*** (0.058)	0.134** (0.065)	-0.098 (0.088)	0.015 (0.049)
Interest	0.587 (0.494)	0.590 (0.495)	0.584 (0.496)	0.609 (0.488)	-0.019 (0.066)	-0.024 (0.065)	0.005 (0.088)	-0.033 (0.048)
Diversification	0.720 (0.450)	0.672 (0.473)	0.754 (0.434)	0.683 (0.466)	-0.011 (0.063)	0.071 (0.057)	-0.093 (0.080)	0.024 (0.045)
Math	6.990 (1.167)	7.016 (0.999)	6.969 (1.310)	6.660 '(1.569)	0.356** (0.146)	0.309* (0.176)	0.047 (0.207)	0.363*** (0.124)
Italian	7.232 (1.032)	7.100 (0.969)	7.353 (1.081)	7.219 (1.058)	-0.119 (0.133)	0.135 (0.141)	-0.253 (0.183)	0.017 (0.103)
English	6.927 (1.134)	6.983 (1.049)	6.875 (1.214)	7.046 (1.366)	-0.063 (0.147)	-0.171 (0.162)	0.108 (0.203)	-0.097 (0.117)
N	126	61	65	524	585	589	126	650

Table 2 makes it possible to assume that financial knowledge among students is quite balanced before the course. We also collect data about their abilities in subjects related to this field and we control for math abilities.

4. Results

Table 3 - Treatment effects: outcomes 3 weeks after the end of the course

	Treated_g	T Classes	D Classes	Control_g	Diff1	Diff2	Diff3	Diff4
	Treated Group	Traditional Course	Digitized Course	Control Group	T Classes - Control_g	D Classes - Control_g	T Classes - D Classes	Treated_g - Control_g
Inflation	0.788 (0.409)	0.744 (0.440)	0.823 (0.385)	0.505 (0.5)	0.24*** (0.068)	0.318*** (0.054)	-0.077 (0.080)	0.284*** (0.046)
Interest	0.807 (0.396)	0.894 (0.311)	0.742 (0.441)	0.609 (0.488)	0.285*** (0.05)	0.133** (0.06)	0.151** (0.072)	0.198*** (0.044)
Diversification	0.889 (0.314)	0.916 (0.279)	0.869 (0.340)	0.733 (0.442)	0.183*** (0.045)	0.135*** (0.048)	0.047 (0.059)	0.156*** (0.036)
Math	7.459 (1.227)	7.187 (1.276)	8.136 (1.125)	7.351 (1.234)	-0.164 (0.318)	0.784*** (0.246)	-0.546** (0.215)	0.093 (0.123)
Italian	7.549 (1.084)	7.437 (1.03)	8.045 (0.95)	7.645 (1.055)	-0.208 (0.257)	0.399* (0.208)	-0.422** (0.192)	-0.067 (0.108)
English	7.221 (1.109)	7 (1)	7.310 (1.129)	7.552 (1.22)	-0.552** (0.247)	-0.234 (0.247)	-0.133 (0.200)	-0.358 (0.113)
N	126	61	65	524	585	589	126	650

After three weeks, the same questionnaire was administered both to the treated group and to the control group. Comparing the results before (Table 2) and after the course (Table 3),

it is possible to argue that both courses are powerful (had positive effects increasing financial knowledge).

 As a matter of fact, traditional course students, after the course, show a higher probability of answering the inflation question correctly by 24 percentage points (p.p.) in comparison to the control group. It is possible to argue the same for the question on diversification (18 p.p.) and interest outcomes (28 p.p.). Attending the digitized course had a positive effect, but this is larger in comparison to the traditional course only in the case of the inflation question. The digitized course students show the probability to correctly answer financial literacy questions in comparison to the control group by 31 p.p., 13 p.p. and 13 p.p. for inflation, diversification and interest, respectively. This could be an interesting result for future policies that aim to improve financial literacy in the shortest possible period at the lowest possible cost.

A graphical analysis before and after the course could be useful in understanding what the focus point is. The bar graphs depict a clear picture of the differences in the share of correctly answered questions before, three weeks and three months after the courses for each group (see figures 2, 3 and 4). What matters most to us, however, is the persistence of the effect three months after the course. To verify it, the same questionnaire was administered to the whole sample for the third time. The results of the last administration are reported in last bars in each figures below.

Figure 1 highlights not only the persistence of the effect but also an increment in inflation knowledge three months after the course for the traditional group. The digitized course, on the other hand, seems to lose effectiveness three months after. However, their share of right answers is still higher in comparison to the original one in Figure 2 (before the course). Looking at the control group results, it seems to confirm a learning effect or maybe spillover effect. If this is the case, the treatment effects would be underestimated and so it should be higher than the reported results below. Maybe, just filling out questionnaires more than twice triggered a mechanism that excites their curiosity about the theme. It could be a compelling public policy starting point.

Interest outcome in Fig. 3 highlights an increased and persistent knowledge both three weeks and three months after for treated groups. However, we need to take into account the fact that students are attending a scientific high school. For this reason, maybe they become more proficient at math calculations over the course of a few months. The figure above (3) shows not only the persistence of the effect for both groups but also the digitized group increment in interest calculation ability three months after.

In contrast to adults, millennials understand better diversification concept and not enough inflation outcome. Analyzing diversification outcomes (Fig. 4), before and after the course, a ceiling effect seems to affect the statistical significance of the results for the digitized group. However, traditional treated increased the share of right answers more in comparison to the other groups.

 However, the effectiveness of both courses is persistent after three months, even if it is slightly reduced for both treated groups, but a little bit more for digitized one.

Figure 2: Inflation

Knowledge before, three weeks and three months after the course for each group
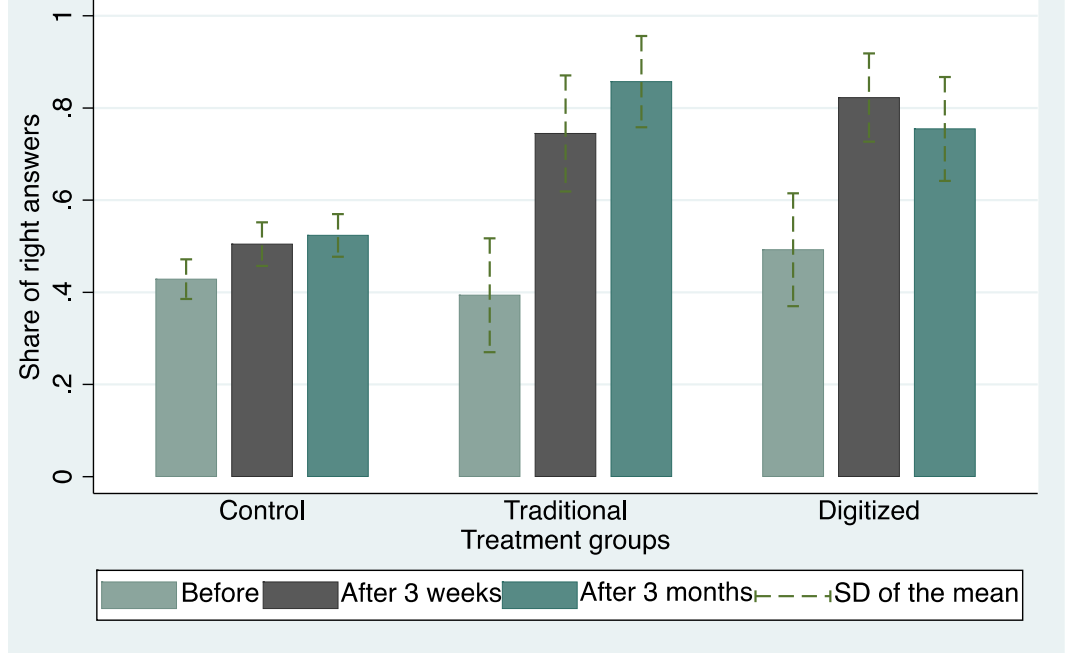
Figure 3: Interest

Knowledge before, three weeks and three months after the course for each group

Figure 4: Diversification

Knowledge before, three weeks and three months after the course for each group
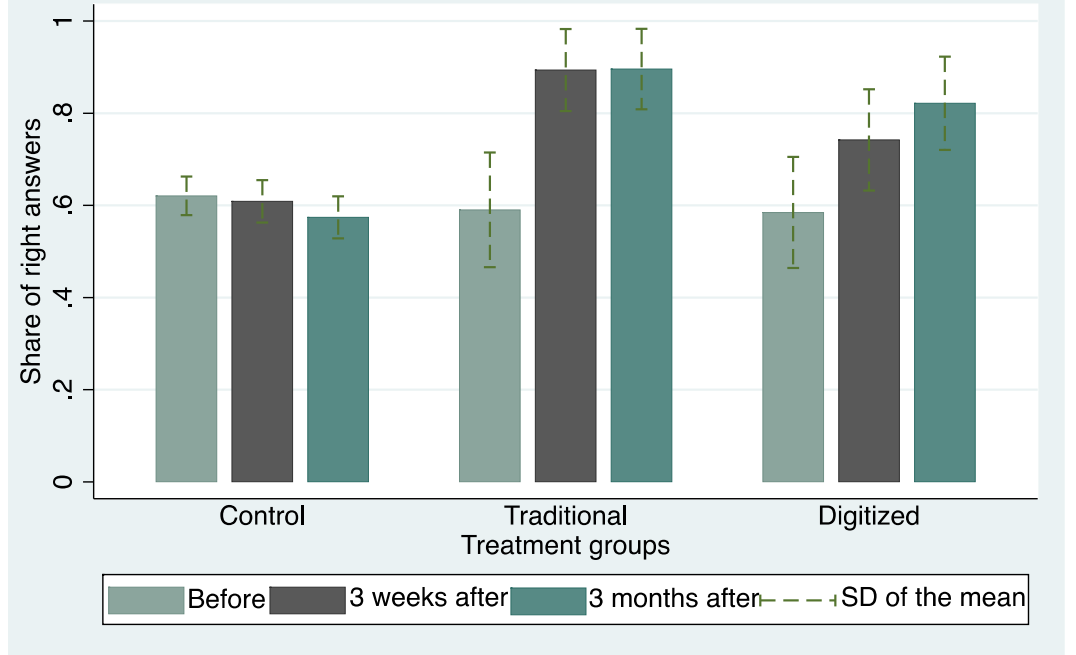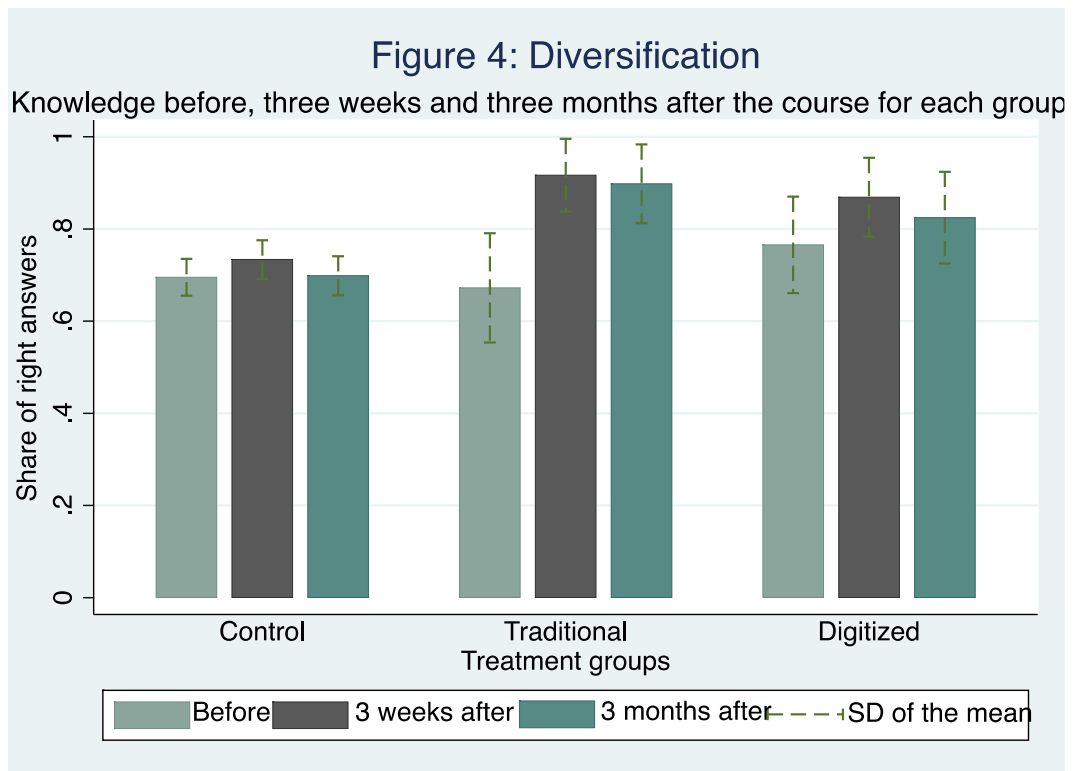
Moreover, looking at an aggregate measure of financial literacy knowledge, a financial literacy index was created. It is the sum of the big three financial literacy questions regarding inflation, interest and diversification. This index assumes value 0 if no one question is answered correctly, 1 if at least one question is answered correctly, and so on up to 3. Comparing this index before and three weeks after the course, it reveals that the share of students who respond correctly to all the three questions passed from 22% to 60% (14 to 28) for the traditional group and from 38% to 54% (24 to 33) for the digitized group. The above description is another way to show the results of this financial education program and can also be seen from Figure 5 below. This share seems to remain quite stable after three months.

Figure 5: Real FinLit Index

Real knowledge before, three weeks and three months after the course by group
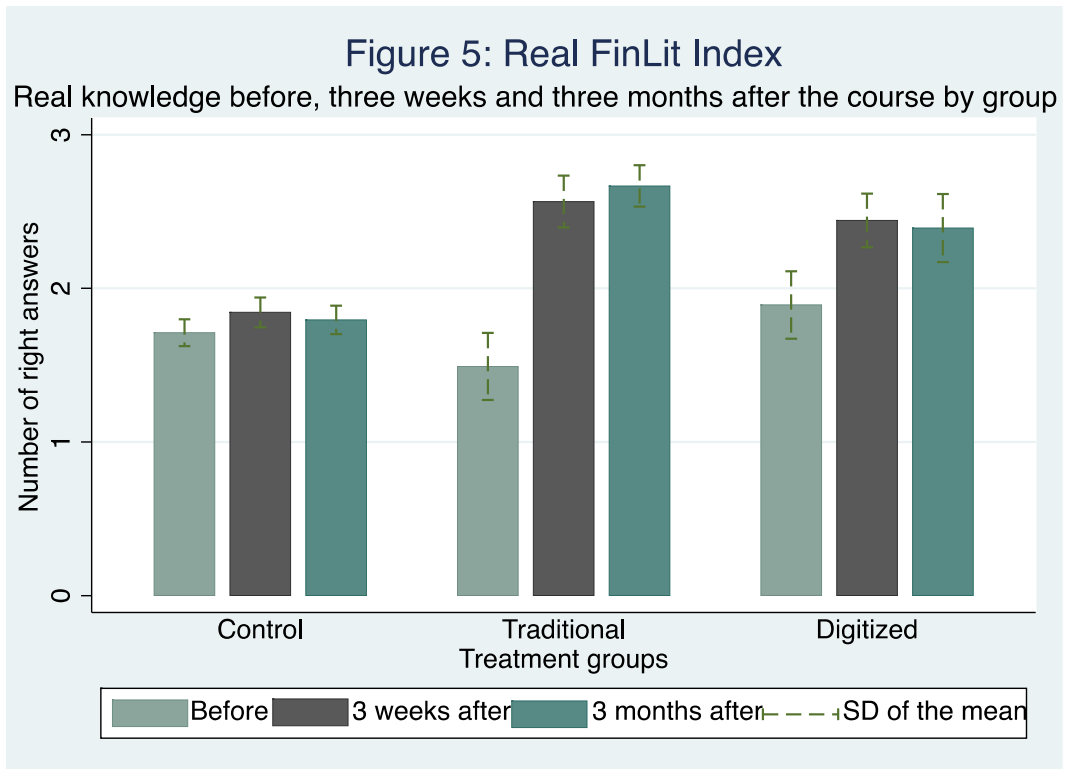
As a robustness check, a dummy variable regarding the number of correct answers was created to identify their real level of financial literacy. It assumes value 0 if they respond to only one question correctly, 1 if they answered more than one question correctly.

Figure 6: Real FinLit Knowledge

Real knowledge before, three weeks and three months after the course by group
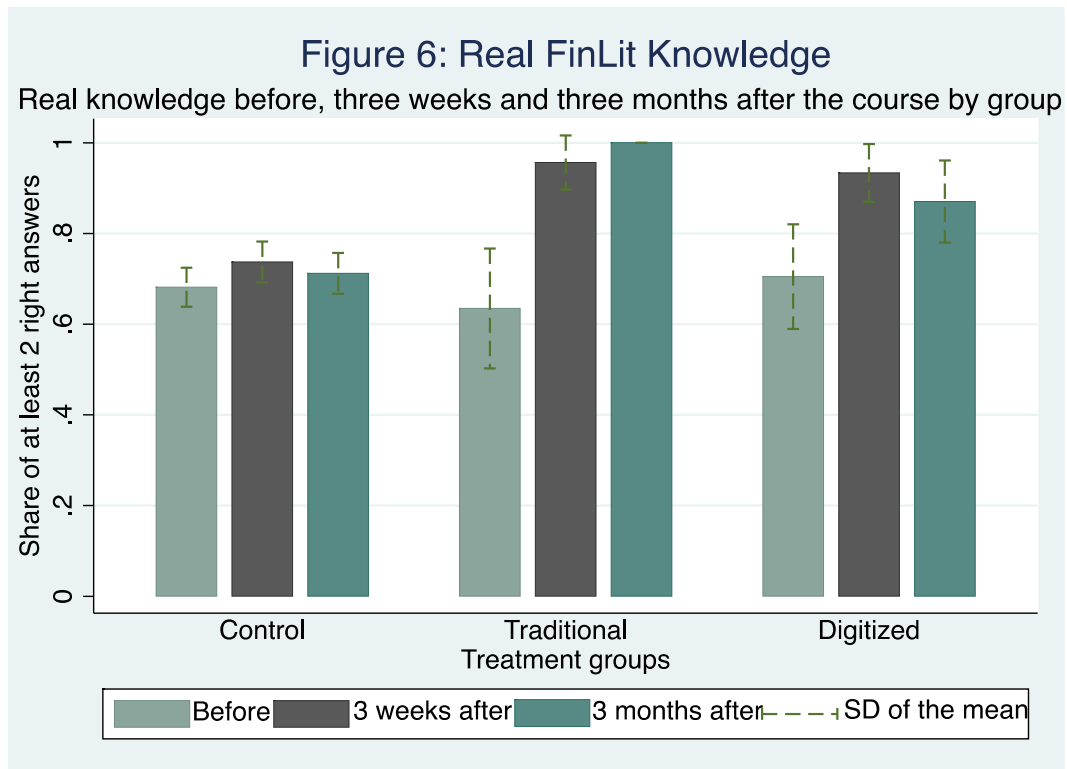
As we can see from Figure 6, it is clear that real financial literacy increased for both treated groups. To conclude, the aggregate measure of financial literacy outcomes after three months confirms the persistency effect of the treatment but also an increment of right

answers'share for the control group, it might be considered as a lower bound spillover effect. Figure 6 above, as a robustness check, reveals that the traditional course shows a higher effect three months after the course in comparison to the digitized one.

4.1 Diff-in-diff analysis

The design of the experiment allows us to use a diff-in-diff analysis. In this approach we can relax the assumption that students in T, D and C classes are randomly allocated. In particular, while differences in fixed characteristics can be accounted by the diff-in-diff design, the key hypothesis is the absence of differential trends for treated and untreated students affecting their level of financial literacy.

The treatment dummies D and T are equal to 1 if a student i is in class j treated with D or T and 0 otherwise, and y_{ij} is our outcome of interest (inflation, interest and diversification). We will estimate the variation of the following model:

$$y_{ij} = \alpha + \beta_1 D_{ij} + \beta_2 P1_{ij} + \beta_3 P2_{ij} + \beta_4 D_{ij}P1_{ij} + \beta_5 D_{ij}P2_{ij} + \beta_6 T_{ij} + \beta_7 T_{ij}P1_{ij} + \beta_8 T_{ij}P2_{ij} + \beta_9 X_{ij} + \varepsilon_{ij} \quad (1)$$

where the dummy period P1 and P2 assumes value 0 before the treatment, 1 three weeks and three months after the treatment, respectively. β_2 β_3 are the expected mean change in outcome from before to three weeks and three months after the treatment. Finally, β_4 β_5 β_7 and β_8 are the coefficients of interest, namely the interactions between each treatment dummy and the dummy period. So, they reveal if the expected mean change in outcome from before to after was different in the two groups both three weeks and three months later. X is a vector of individual controls (age, sex, income and predetermined individual characteristics). Robust standard errors have been included at the class level.

Table 4 – Diff-in-diff Estimates of Financial Literacy Outcomes

VARIABLES	Inflation	Interest	Diversification
D Classes	0.12	-0.002	0.079
	(0.076)	(0.073)	(0.069)
After 3 weeks	0.058	-0.024	0.035
	(0.038)	(0.037)	(0.034)
D Classes*After 3 weeks	0.234**	0.142	0.051
	(0.107)	(0.104)	(0.097)
After 3 months	0.091**	-0.037	0.01
	(0.038)	(0.037)	(0.034)
D Classes*After 3 months	0.1	0.214**	-0.002
	(0.109)	(0.105)	(0.098)
T Classes	0.064	-0.056	0.014
	(0.077)	(0.075)	(0.07)
T Classes*After 3 weeks	0.241**	0.339***	0.172*
	(0.114)	(0.112)	(0.103)
T Classes*After 3 months	0.286**	0.344***	0.14
	-0.114	-0.111	-0.102
Female	-0.157***	-0.115***	-0.080***
	(0.029)	(0.028)	(0.026)
Age	-0.051*	0.009	0.006
	(0.029)	(0.028)	(0.026)
Income	0.017	-0.018	-0.056**
	(0.03)	(0.029)	(0.027)
Repetition	-0.237**	0.02	-0.099
	(0.119)	(0.116)	(0.107)
Economics	0.023	0.091**	0.03
	(0.045)	(0.044)	(0.04)
Math Grade (>=6)	0.119***	0.085**	0.04
	(0.041)	(0.04)	(0.037)
Father Freelance	-0.019	-0.005	0.054*
	(0.032)	(0.031)	(0.028)
Mother Freelance	-0.094**	-0.002	0.031
	(0.04)	(0.038)	(0.036)
Constant	1.137**	0.522	0.597
	(0.52)	(0.501)	(0.465)
N	1,189	1,192	1,187
R-squared	0.095	0.054	0.038

Controls not statistically significant:Father degree, Mother Degree, Only child, City Centre, Foreign, Foreign Parents.
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

What emerges from this estimation is a different effect of the two treatments in improving the knowledge of financial literacy outcomes. Both courses increased the probability to give right answers three weeks after the course for 2 out of 3 outcomes. The effects regarding inflation knowledge is quite heterogeneous after the course. In particular, in comparison to the control group, attending one of the two courses increases the probability

to right answer inflation question by 0.24 percentage points. The probability to answer correctly to interest questions three weeks after the course is increased by 34 percentage points for students who were exposed to the traditional treatment, and by 14 p.p. for students who attended a digitized course. No statistically significant effect on diversification outcome emerged for digitized course, but it increases by 17 p.p. for students who were involved in the traditional treatment. Besides, in the long run the probability to answer correctly to the interest question increases by 21 p.p. for digitized treated group. Students with a passion for economics topic, who would like to study Economics at the University, perform 9 p.p. better in the calculation of interest. The traditional course interest outcome effect is the same also three months after and seems to be higher in the long run for the digitized group.

Several students answered correctly to the diversification questions before the course. It could be due both before to the simplicity of the item (from Bank of Italy SHIW questionnaire) and after to a better knowledge of what they intuitively answer before. After three months it lost part of its statistical significance.

To wrap up, following one of the two types of courses proposed, traditional or digitized, based on the same free available material published by the museum of savings, has positive effects of dissemination of financial education at negligible costs. In just 8 hours, attending the course increases the probability of responding correctly to inflation question, after three weeks. But, what is noteworthy more is the fact that supporting the findings, both treatments are effective except for diversification where the students starting point was already higher. However, although traditional course effect is persistent in the long run, it requires a lot of efforts in comparison to the digitized one. According to these findings and taking into account the difference of cost and efforts required, the digitized course could be a good starting point from which building new policies to improve financial literacy in the shortest possible time even if the traditional one is more expensive but also more persistent.

In a variation of the model (1) we will include several interactions between different treatments and the characteristics (for example sex, ability in math, and so on) of the student. The interactions coefficients will tell us if the program is more effective for students with that characteristics or not (for example for girls, or for whom performs better in math, and so on). A similar heterogeneity exercise is reported in the Appendix in tables A1 and A2.

4.2   Real and Self-Assessed Financial Literacy

Several findings emerged from the descriptive analysis. Among which, an interesting aspect is the misalignment between self-assessed and real financial knowledge. In contrast with the adult population (Di Salvatore et al., 2018), millennials are not overconfident with their self-assessed level of financial literacy. In fact, the first survey conducted before the course reveals that more than 75% of students interviewed (485 students out 642) self-assessed a low financial literacy level. However, about 23% (150) argued that they know enough about financial knowledge and only 1% (7) students considered themselves very financially literate. On top of that, who followed one of the two courses showed an increased self-assessed financial literacy level. In fact, not only attending a traditional course increases financial knowledge, but also the awareness of their real financial

knowledge level. The steps to argue these results are the following. Another dummy variable regarding the self-assessed financial literacy level was created. Its value will be 0 if students consider their level very low, value 1 if they affirm to have a good or a very good level of financial literacy.

Figure 7: Self-assessed FinLit
FinLit awareness before, three weeks and three months after the course by group
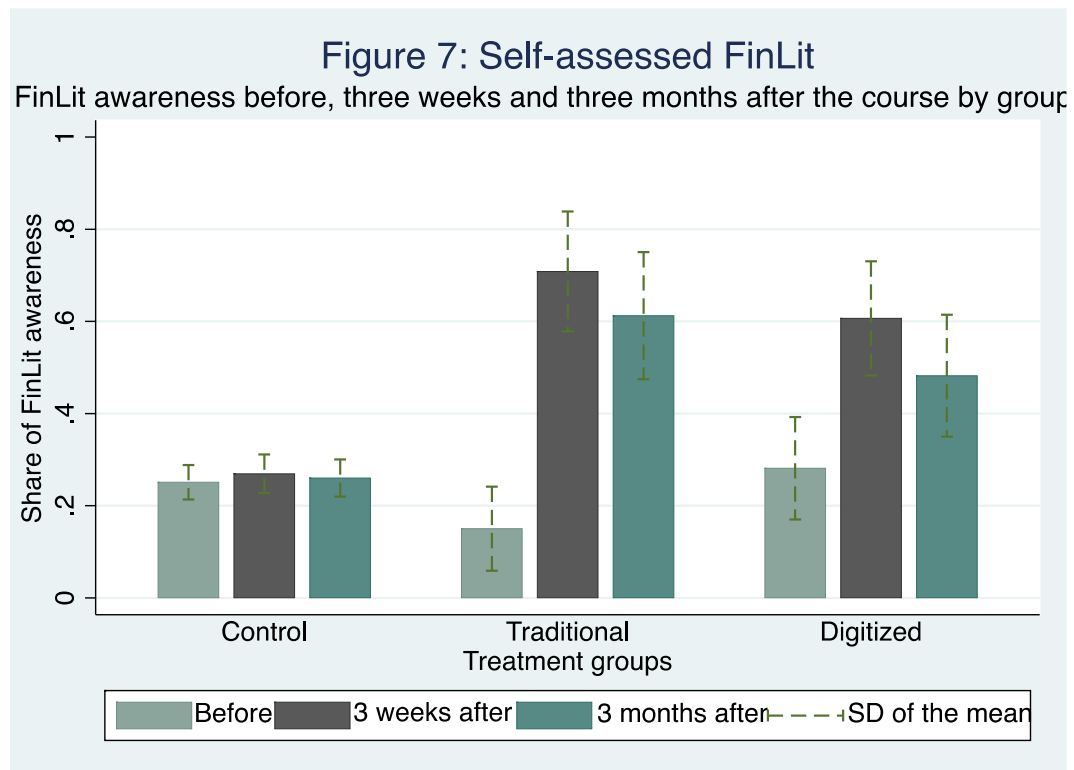
However, taking into account results from the last figure above (Fig. 7), we can conclude that following one of the two simplified financial education short programs proposed, it improves and aligns real and perceived financial literacy. In fact, even if both real and perceived financial literacy are still higher in comparison to the beginning period, when real financial literacy decreases for natural pass of time then, also their perception about their knowledge decreases.

These results also show that perceived financial literacy is linked to real financial knowledge learning and not only to a right answer. For this reason, the control group increased in share of right answers but not in the perceived level of their real financial knowledge. To go deeper, we analyze the results through another statistical technique in the next section.

Figure 8: Self-assessed FinLit
FinLit awareness before and three weeks after the course by sex

Legend: M Before | F Before | M After | F After | SD of the mean
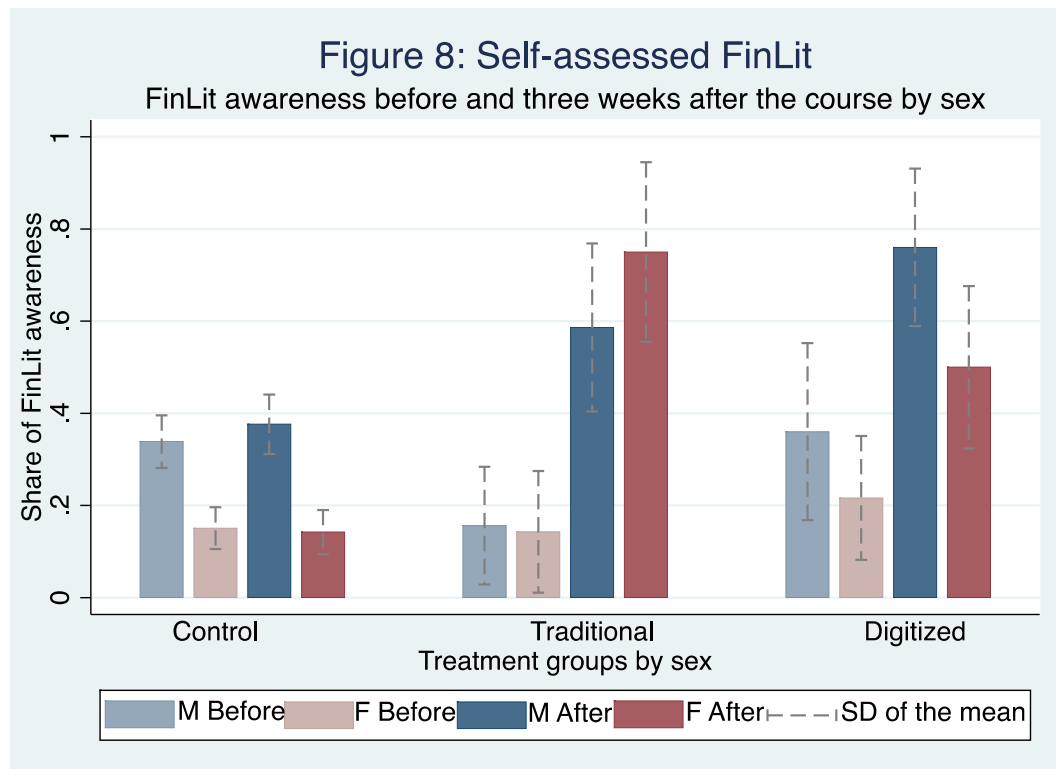
Starting from the traditional one, before the course, 85% (51 students, 27 males and 24 females) argued that they had a low financial literacy level, 15% (9, 5 male and 4 female) self-assessed a medium level and no one claimed to have a higher level. After the course, these shares changed. In fact, only 35% (17 students, 12 males and 5 females) confirmed a low self-assessed financial literacy level. Moreover, now 61% (30 students, 50% males and 50% female) self-assessed a medium level and 4% of students (1 male and 1 female) argued to have a higher one. The same for the digitized course. Before the treatment, 72% students (46, 16 male e 29 female) self-assessed a low financial literacy level, 26% of students (17 students 9 male and 7 female) argued a medium level of financial literacy and only a student (female) declares to have a high financial literacy level. After the course, the share of students who think they have low financial literacy knowledge decreased to 38% (among these 23, 18 were female 76%). The share for the self-assessed medium level of financial knowledge is increased up to 61% (36, 19 males and 16 females). Finally, only one student argued for the second time to have a high financial literacy level. Following Brugiavini et al. (2018) we analyze if self-assessed knowledge corresponds to real knowledge level before and after and if a gender effect is present. As figure 8 shows, although the level of self-assessed financial literacy was the same both for male and female of the traditional treated group before the course, after the course it is higher for the female, instead among who attended the digitized course, male financial awareness increased more compared to their female school-mates. Maybe the reason why this gender effect emerges is linked to non-cognitive skills and higher comfort of male with technology.

Also for the real financial literacy level after the course male students who attended the digitized course have higher knowledge. However, the probability of answering correctly at least 2 out of 3 questions is increased after the course for all students.

Figure 9: Real FinLit Knowledge by sex

Real FinLit knowledge before and three weeks after the course by sex
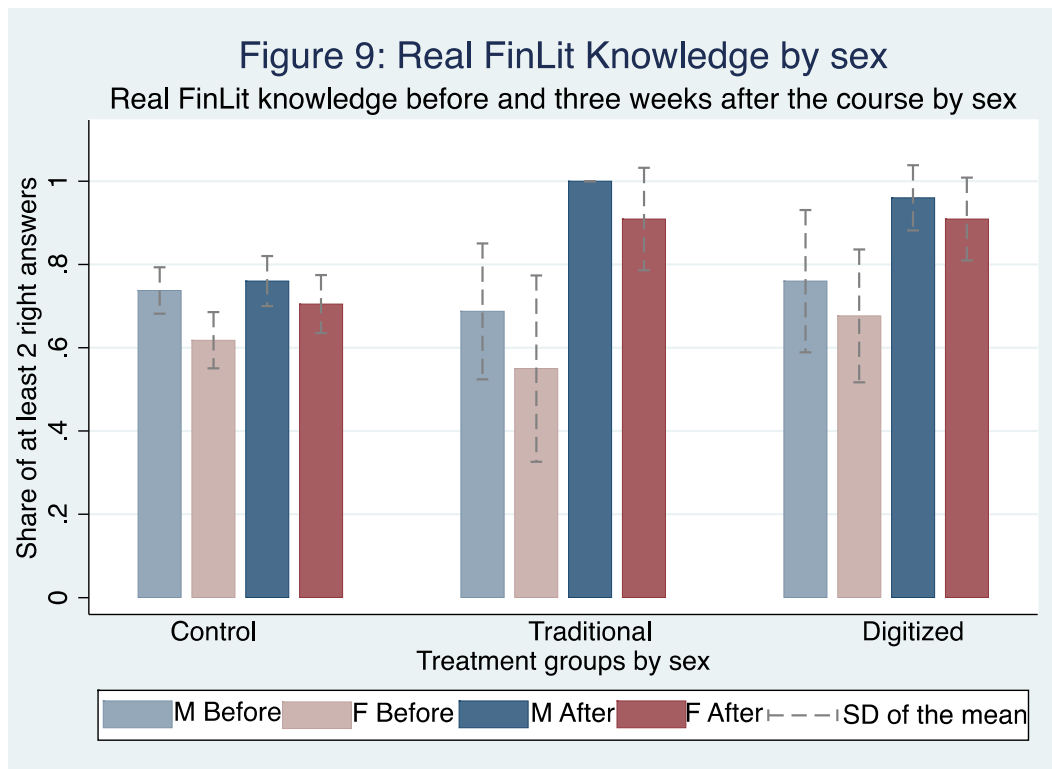
Comparing their correlations before and after the course both for the treated and control group, a good starting point for future policy implication emerges. It seems that also a survey if repeated, could improve awareness among millennials. This is an interesting point if you think about overconfidence and investment choice. The fact that millennials are more aware of their financial knowledge could reasonably support the idea that they could make better savvy financial decisions in their next future. These results are not negligible. But testing the differences between real knowledge after three weeks and after three months, the knowledge acquired through a traditional simplified course is not only more persistent in comparison to the digitized treatment, but these results are also independent of the incentives given to the students for the second survey (after three weeks from the end of the course). However, if you consider cost-benefit analysis, it could be possible to opt for the digitized one since you can watch at the video whenever you want to fix better the concept or to refresh your memory, at the only cost of internet Wi-fi connection. However, some effects are more relevant for traditional course. In fact, awareness has increased exponentially for students who attended the course with the support of a financial advisor, in particular among females. Maybe it is because talking about daily problems with a good dose of expertise related to this field could increase their curiosity as well as their ability to face up good wealth management requirements.

Table 5 - Correlation between Self-Assessed FinLit and Real FinLit

	σ_{pre}	σ_{post}
Total Sample	0.17*** [626]	0.24*** [517]
Control_g	0.20*** [503]	0.21*** [418]
D Classes	0.09 [63]	-0.08 [57]
T Classes	-0.08 [60]	0.33** [42]

Moreover, looking at the total sample, the correlations between their knowledge and their self-assessment are not only positive but the last one double the second time they fill in the questionnaire. An explanation of this effect could be the sensitization of students in front of financial literacy only because they were repeatedly interviewed. It is a crucial point to further investigate in the future.

Table 6 - Correlation between Self-Assessed FinLit vs Real FinLit by Gender

	Male		Female	
	σ_{pre}	σ_{post}	σ_{pre}	σ_{post}
Total Sample	0.21*** [318]	0.27*** [260]	0.07 [293]	0.21*** [247]
Control_g	0.25*** [261]	0.24*** [213]	0.11 [229]	0.11* [197]
D Classes	-0.02 [25]	-0.12 [24]	0.05 [36]	-0.11 [31]
T Classes	-0.05 [32]	. [23]	-0.14 [28]	0.66*** [19]

During the first administration of the questionnaires, only male students showed a positive statistically significant correlation between self-assessed financial literacy level and the

real one among the control group. This correlation increased both for male and female students during the second time of the administration, becoming highly statistically significant also for female students. Results do not support any statistically significant change for students who followed the digitized treatment.

Besides, focusing on the traditional course, it is interesting the result which highlights a higher unmotivated underconfidence of boys in comparison with girls before the course. Moreover, 38% of girls before the course declare a lower level of financial literacy in comparison with the real one, versus 40% of boys. Following this type of financial education program improves both their knowledge and their awareness of their real financial literacy level. However, the gender gap in financial literacy level before the course is vast and it is reduced after the course. If the treatment would be addressed mainly to female students, the existing gap could be alleviated or even eliminated.

Table 7 - Male and Female Real Financial Literacy before and three weeks after the course for each treatment

	Male		Female		Difference	
	$\%_{pre}$	$\%_{post}$	$\%_{pre}$	$\%_{post}$	$\%_{pre}$	$\%_{post}$
Total Sample	0.66 [329]	0.74 [266]	0.51 [306]	0.66 [254]	0.15*** (0.038)	0.08** (0.039)
Control_g	0.65 [264]	0.69 [217]	0.49 [230]	0.59 [198]	0.16*** (0.044)	0.10** (0.044)
Digitized	0.69 [26]	0.96 [25]	0.44 [36]	0.88 [34]	0.25** (0.12)	0.08 (0.10)
Traditional	0.66 [33]	1 [24]	0.43 [28]	0.91 [22]	0.23* (0.14)	0.09 (0.06)

The real-financial-literacy gap between male and female treated in both courses reveals different results. For the traditional one, it is statistically significant before, but the difference is filled attending the course. Instead, the gender gap becomes weakly statistically significant after students attended the digitized course. A gender gap in the total sample as well as in the control group emerged before the course and it is persistent, even if reduced, also after the course.

Table 8 - Male and Female Self-Assessed Financial Literacy before and three weeks after the course for each treatment

	Male		Female		Difference	
	$\%_{pre}$	$\%_{post}$	$\%_{pre}$	$\%_{post}$	$\%_{pre}$	$\%_{post}$
Total Sample	0.32 [323]	0.43 [272]	0.16 [304]	0.23 [256]	0.16*** (0.03)	0.2*** (0.04)
Control_g	0.34 [266]	0.38 [218]	0.15 [239]	0.14 [204]	0.19*** (0.04)	0.23*** (0.04)
Digitized	0.36 [25]	0.76 [25]	0.22 [37]	0.5 [32]	0.14 (0.11)	0.26** (0.123)
Traditional	0.16 [32]	0.59 [29]	0.14 [28]	0.75 [20]	0.01 (0.093)	-0.16 (0.14)

As showed in Table 8, a gender self-assessed gap emerged. Both in the first one and the second one, the difference in financial awareness among students is highly statistically significant. Instead, following a digitized course, male students increased their financial awareness more than female students and this difference is highly significant. Two possible explanation arise: the first one could be related to differences in non-cognitive skills and the second one could be related to a technological gap between male and female, where female could be less comfortable with it. Looking at the tables below (9 and 10), the main message here is that there is no statistically significant difference between the increment both of real financial literacy and self-assessed financial literacy between traditional and digitized treated. In contrast, for both of them, their difference between students who attended a financial literacy program in comparison with who did not attend anyone is higher and highly statistically significant. In particular, real financial literacy level increased by more than 28 percentage points for each group in comparison to the control group. Moreover, the increment in self-assessed knowledge is in line with the real level.

Table 9 - Real Financial Literacy before and three weeks after the course for each treatment

Treated-Control_g $\Delta_{TT(POST-PRE)} - \Delta_{c(POST-PRE)}$	Digitized-Control_g $\Delta_{D(POST-PRE)} - \Delta_{c(POST-PRE)}$	Traditional-Control_g $\Delta_{T(POST-PRE)} - \Delta_{c(POST-PRE)}$	Traditional-Digitized $\Delta_{T(POST-PRE)} - \Delta_{D(POST-PRE)}$
0.29***	0.30***	0.28***	0.02
(0.057)	(0.072)	(0.08)	(0.10)
[514]	[468]	[454]	[106]

Table 10 - Self-Assessed Financial Literacy before and three weeks after the course for each treatment

Treated-Control_g $\Delta_{TT(POST-PRE)} - \Delta_{c(POST-PRE)}$	Digitized-Control_g $\Delta_{D(POST-PRE)} - \Delta_{c(POST-PRE)}$	Traditional-Control_g $\Delta_{T(POST-PRE)} - \Delta_{c(POST-PRE)}$	Traditional-Digitized $\Delta_{T(POST-PRE)} - \Delta_{D(POST-PRE)}$
-0.37***	-0.28***	-0.47***	-0.18*
(0.05)	(0.064)	(0.068)	(0.112)
[532]	[484]	[474]	[106]

Finally, it is interesting to test if their financial awareness and real financial literacy level are aligned among each group. The probability of becoming more aware among those who have a high level of financial knowledge increased in each group of treated in comparison with the control group (it increased more in the traditional one even if their difference is not statistically significant). Their differences from the control group are positive and highly statistically significant. At the same time, following a financial literacy program decreases the probability of students who self-assessed a low level of financial literacy in comparison with the control group.

Table 11 - High Self-Assessed and Real Financial Literacy difference before and three weeks after the course for each treatment

Treated-Control_g $\Delta_{TT(POST-PRE)} - \Delta_{c(POST-PRE)}$	Digitized-Control_g $\Delta_{D(POST-PRE)} - \Delta_{c(POST-PRE)}$	Traditional-Control_g $\Delta_{T(POST-PRE)} - \Delta_{C(POST-PRE)}$	Traditional-Digitized $\Delta_{T(POST-PRE)} - \Delta_{D(POST-PRE)}$
0.37***	0.31***	0.42***	0.1
(0.044)	(0.056)	(0.057)	(0.09)
[650]	[589]	[585]	[126]

Table 12 - Low Self-Assessed and Real Financial Literacy difference before and three weeks after the course for each treatment

Treated-Control_g $\Delta_{TT(POST-PRE)} - \Delta_{C(POST-PRE)}$	Digitized-Control_g $\Delta_{D(POST-PRE)} - \Delta_{c(POST-PRE)}$	Traditional-Control_g $\Delta_{T(POST-PRE)} - \Delta_{c(POST-PRE)}$	Traditional-Digitized $\Delta_{T(POST-PRE)} - \Delta_{D(POST-PRE)}$
-0.22***	-0.22***	-0.22***	0.004
(0.052)	(0.07)	(0.07)	(0.084)
[650]	[589]	[585]	[126]

Other findings could be worth noting. For example, among students who attended one of the two courses, 81% of students (87 on 108 students who answered this question on a sample of 121 treated students) discuss about financial treated themes in family or with friends (in particular, 40% of the traditional group (total sample 49) and 41% (44 out 59)

of the digitized one). We cannot measure how much this effect could improve the knowledge of their families, but we can consider this effect as a positive externality of the project.

A technology gap could be the reason why 24% of the total digitized sample did not track notes of their expenses (in fact 70% of them argued that they would act differently - taking more notes - if the task was paper-based). However, 53% of students who attended the traditional course completing the task, argued that they would prefer a digital method to track their expenses. Considering the total sample of treated, only a tiny part of students (7%) would act differently if the task would be different and 12% of students argued that any digital support would not change their actions.

5. Conclusion

More research is required before we can make conclusive statements about the behavior changes of millennials attending financial education programs. However, we can conclude that, taking into account ceiling effect, on average the probability that the treated group answers correctly to financial literacy questions is increased by more than 20 percentage points in comparison with the control group. The analysis could be more in-depth taking into account the financial habits section of the questionnaire. Nevertheless, based on these findings, it appears that the "*futuro sicuro*" setting causes significant improvements both simplifying training and relying more on digital power. So, the contribution is to identify alternatives way to teach financial concepts, making the learning process more straightforward and funny at negligible costs. Nowadays, the need to improve financial literacy is very widespread throughout the world. The study conducted on six classes suggests that both courses have some positive and statistically significant effects. Findings indicate the opportunity to obtain higher results also with lower stress increasing also self-assessed financial knowledge. However, in the long run, only the traditional course seems to confirm the same statistical significance effect for two out of three outcomes. If you compare costs between traditional and the digitized course, the last one outperforms the traditional course. However, even if the traditional course is much more expensive due to the presence of an expert in the classroom such as a financial advisor, its effect seems to be more impressive in the minds of students in the long run in comparison to the effect of the digitized course. However, several are the next steps to do before to reach a final position about them. First of all, behavioral aspects must be an object of analysis to understand if the courses could change them after the course. Finally, the courses could be spread wider to increase financial literacy among millennials. The replication of the study in the North of Italy or other countries could be interesting to verify the existence of some specific country effects.

Chapter 3

Financial Habits in Italy: Can Financial literacy and Remote Banking matter?

Abstract

The financial sector is challenged everywhere throughout the world by technology. To provide insights on the financial habits of Italian people, we compare adults and young (under 35 in 2006) householders looking at their financial behavior using data from the Bank of Italy Survey of Households Income and Wealth (SHIW). Taking into account only waves with financial literacy questions, we find differences in financial habits between financially literate and illiterate people. Notably, we find that financial literacy could reduce the number of bank withdrawals among the youngest population. Besides, younger people with a higher level of financial literacy spend less than their monthly income saving more. Moreover, Fintech usage (broadly intended like remote_banking) is positively correlated with mismanagement financial practices. But, it turns to be negatively correlated if we consider its interaction with financial literacy. Other findings show that financial literacy affects the determinants behind the choice of the main bank, paying more attention to economic characteristics if financial literacy level is higher.

1. Introduction

Although in a perfect market such that one of Modigliani-Miller, banks seem to be not useful, in a market characterized by asymmetric information and high sunk costs, banks are the central mechanism behind any capitalist economy (Consoli, 2005). The financial world is changing everywhere across the globe and its evolutionary development affects consumer behavior. In order to enhance their processing capacity, include more services and reach a larger share of customers, banks invested in information and communication technology (ICTs), which shifted the back office device directly to the hand of the customers (Bàtiz-Lazo and Wood, 2000; Consoli, 2005). This is not only due to Fintech revolution but starting from it several changes in labour division, consumption capabilities and normative sector resulted, unexpectedly, in disadvantages for dominant banks and advantages for new ones (Llewellyn, (1985) and (1999); Ingham and Thompson, (1993); Antonelli (2001); Langlois and Cosgel, (1988); Loasby, (2000); Metcalfe, (2002)). Fintech revolution never seems to stop, so it is a challenge still today also for consumers, both for adult or digital immigrants and young people, considered digital natives12 (Prensky, 2001). New payment methods are faster and freely available for any device from smartphones to smartwatches like Apple pay, Google wallet, and so on. Nowadays, over the top (OTT) players such as Google, Apple and Facebook are going to threat banks entering into the financial sector (Bank of Italy, 2017). Doing so, they are subtracting them a big slice of

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12 Digital Natives who access into a digital world at an early stage in their life, instead Digital Immigrants are people who access into this world at an older age.

dynamic clients attracted by Fintech. Fintech definitions are quite broad and ambiguous. Following the Financial Stability Board definition "Fintech" refers to "financial innovation made possible by technological innovation, which can materialize into new business models, processes or products, producing a decisive effect on financial markets, structures, or service offerings"13. For this reason, under its umbrella are included both financial services and information technologies in all sectors of banking and financial intermediation. Among them there are crowdfunding and peer-to-peer (P2P) lending, robo-advisory, instant payments, blockchain technology, virtual currencies, biometric identification but more generally the provision of services through cloud computing14 and big data). Keeping in mind all the pieces of information reported above, Fintech could have a significant impact also on people personal wealth management. An important study conducted by KPMG and CB Insights (2017) reveals that the global Fintech startup industry in 2016 received 30% more in investments in comparison with 2015 for a total of $25 billion in 2016. The innovation of the customer experience is the core of over 70% of these investments (Citi, 2016). The same goal emerges from the Bank of Italy report (2017). However, Italy compared to other European countries is characterized by few Fintech companies and it is still linked to an ancient traditional banking model. Their low technology use and big branches network reflects in a smaller amount allocated for the initiatives reported above, about 135 million (Bank of Italy, 2017)15. In fact, more than 50% of the banks interviewed (9 out of 17) are involved mainly in initiatives to improve remote banking experience to simplify operations and attract new target of consumers.

For this reason, using data from a national Survey on Households Income and Wealth (SHIW)16, we choose remote banking to shed light on the effect of Fintech on financial behavior and investigate the role of financial literacy in this relationship. Unfortunately, financial literacy questions were administered only in four waves, for this reason, our analysis covers a period between 2006 and 2010 plus 2016. We compare the financial behavior of adult household population with the youngest one because of the critical role of the getting longer life expectancy. It means that learning how to deal with retirement planning is more crucial now in comparison with previous generations (Lusardi et al., 2019).

Besides, our study has the goal to investigate the differential effect of financial literacy on Italian households Fintech users' behavior. To do so, we considered three financial capability indicators. The first one is withdrawals behavior at ATM (measured in the

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13 The Financial Stability Board (FSB) follows and evaluates Fintech's developments in consideration of its mandate to promote international financial stability against the operational risk of service providers, cyber risks and macroprudential risks. For detailed information, refer to "Fintech credit Market structure: business models and financial stability implications", May (2017), http://www.fsb.org/2017/05/Fintech-credit-market-structure-business-models-and-financial-stability- implications/, and "*Financial Stability Implications from Fintech*", http://www.fsb.org/2017/06/financial-stability- implications-from-Fintech, June (2017).

14 There are three types of cloud computing: SaaS (Software as a Service), PaaS (Platform as a Service) and IaaS (Infrastructure as a Service). This kind of product provides on-demand access to a shared and configurable set of processing resources (eg. networks, servers, memory, applications and services) that can be acquired and released quickly and with minimum management effort or interaction with the service provider.

15 In fact, looking at the Ernst & Young study regarding Fintech adoption throughout the world, Italy is not even mentioned "*EY Fintech Adoption Index 2017*".

16 This data are collected from Bank of Italy every two years.

number of withdrawals per month). The second one is overdrawing behavior (measured annually), households who can withdraw more than their possibility as an option by contract. The third one is about the ability to deal with the budget to make ends meet (this question is related to expenditures lower than the income, spend all the income or spend more than the income going on debt annually). The last indicator is concerning the determinants behind the choice of the main bank provider (financial, convenience, bank type or other reasons).

We run a regression analysis using the same set of variables for each indicator. We added also a dummy for freelance as a control of their financial behavior. In our opinion, their financial exposure is much higher so they need a particular focus. Moreover, we investigate the existence of several differential effects adding interaction terms (such as young population/Fintech users/or both of them with financial literacy). Finally, we conduct an exploratory analysis to understand what is behind the choice of the main bank. To understand in which way the determinants could be affected by financial literacy level or remote banking use, we add them as two different interaction terms in SUREG estimations for the last behavioral indicator.

In line with the main literature in the field (Lusardi et al., 2018), financial literacy plays a central role in reducing financial mismanagement. Besides, also in this study, the interaction with financial knowledge is negative for almost all regressions and statistically significant. Our main finding is that financial literacy reduces most of the financial mismanagement indicators we observe. Financial literacy increases the probability to make ends meet. No effect is shown for young Fintech users. However, it increases the probability to do a higher number of withdrawals at ATM (where generally there are lower or zero fees in comparison to the branch) by 16%. Although in literature financial literacy is commonly related to good financial management practices, we found that a higher level of financial knowledge increases the probability to overdraw checking account annually by 4.5 p.p. for adult households. As already argued in the literature (Lusardi et al., 2019), young people are negatively affected by technology use in their financial behavior. In our case, remote banking usage increases the probability to overdraw checking account by 57.7 p.p. for young Fintech users. However, one of the main results is the power of financial literacy to change the overdraw behavior of young Fintech users. In fact, the relationship highlighted above turns to be negative considering young financial literate households. More specifically, young households who use remote banking if know more about financial concepts, on average, they show a lower probability to overdraw their checking account (-63 p.p.). In other words, financial literacy decreases the probability to incur in this bad financial practice by 5.3 p.p. Finally, on average, young households who know more about financial topics chose their main bank looking at financial indicators such as better interest rates and lower fees with 10 p.p. probability more in comparison to their peer without any financial knowledge. Moreover, they are 12 p.p. less likely to give importance to home/job-distance convenience.

Despite the large number of individual level variables included in the analysis, it is problematic to attribute a causal interpretation to this results. However, taken together with the ones in chapter 2, these results highlight the importance of financial literacy in households' financial behavior. The paper is organized as follow: after this brief introduction, a short review of the main literature is presented, then the data set creation, as well as the empirical analysis, are explained into details. Finally, a section with main remarks and an Appendix conclude the paper.

2. Related Literature

Adam Smith, in the fifth book of the Wealth of Nation describes two different but strictly related functions of the bank. According to him, banks play mainly a private business but whose effects involved public interest. Bank activity is commonly recognized as twofold. On the one hand, banks act as a competitive free-enterprise, on the other hand, banks are authority instituted to safeguard the monetary and financial system. The double role of banks increases the barriers to entry both because of asymmetric information, elevated sunk costs and restrictive form of regulation. However, after the 1960s, something changed in the level of barriers, both technological and institutional, in this industry, becoming lower and inducing banks to revise their strategic plans (Channon, 1986; Llewellyn, 1985). An example, is the UK retail banking transformation (Consoli, 2005). In the late 1970s, the number of financial institutions and branches in the British banking market changed increasing exponentially until 1990 and then they have been drastically reduced. However, who remained in the market increased their number of employees. Besides, Frazer and Vittas (1982), shade light on different costs for paper-based transactions which costs increased overtime against a continuous reduction of costs for electronic transactions. This lower cost barrier allowed competitors to enter into the market. Inside of the technological paradigm, which affected banks strategic management through the automation of clearing system (Morris, 1986) and of retail money transfer mechanism (Thomson, (1967); Mandell, (1990)), in the mid-1970s, there is the first automated teller machine (ATM). The first one was installed in the UK by the pioneering experience of Barclays[17], mainly to save labor costs allowing the Saturday closure of branches. Then other services such as debit card or electronic funds transfer at the point of sale (EFTPOS) were available to consumers at the end of the 1980s which made possible to replace paper-based transactions (Consoli, 2005). These dynamics, as already mentioned above, affect human behavior also considering the age at which people become part of the technological world. Following the approach of Bleakly and Chin, (2004, 2010) according to whom, there is a critical period hypothesis in learning foreign language at young age among immigrants, when learning process is quicker, we identified in 1995 the introduction of internet banking from Cariplo as the critical event to distinguish cohort of consumers who were exposed to this service during adolescence age. All these transformations led to what today can be referred as an autonomous wealth management. However, personal finance maybe is perceived as too personal. A recent GFLEC report shows that people prefer to not talk about personal finance topics since this particular object is considered as taboo (Lusardi et Hasler, 2019). However, the possibility to do better wealth management has never been more necessary. The same research reveals that one-third of the Millennial sample argued that even when they cannot afford something, instant gratification gained the upper hand (Lusardi et Hasler, 2019). Fintech progress could play an important role. Even if Fintech speed and user-friendly use are generally recognized, its use (combined to a lack of financial literacy) could lead to financial mismanagement (Lusardi et Hasler, 2019). In fact, a positive relationship between mobile payment usage and poor financial management practices (overdraw, debt, and lower savings) emerged, unless the level of financial literacy is higher.

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[17] This bank is also responsible for having issued the UK's first card in 1966.

Nowadays, mobile payments are a widespread use of Fintech services. Contrary to all the expectations, from the GFLEC report mentioned above emerges that, even if they are richer and well educated, millennials mobile payments users show a low level of financial literacy and do not follow best financial practices. A considerable part of Millennial mobile payment users (37%) withdrew their retirement account within the past year, compared to non-users (9%) (Lusardi et al., 2018). Besides, they admit to occasionally overdraw their checking account (in the 33% of Millennial in NFCS compared to 19% of non-users) — which generally is followed by exorbitant penalty fees (The Pew Charitable Trusts, 2016; Consumer Financial Protection Bureau, 2016). In fact, the possibility to access liquidity, even if the funds are not sufficient, is severely charged by banks. A steep overdraft fee costs about 35$ in the USA (according to PEW, 2016) and within a range of 25-35 euros (except for few banks which don't charge clients overdraw) in Italy (www.ilsole24ore.it, www.quifinanza.it). Several Pew research (2014 and 2016) have shown that financially vulnerable account holders incur more often in overdrafts. Generally, they have lower incomes in comparison to the general population in the USA. Besides, from the same reports emerges that heavy overdrafters spent on overdraft fees on average an amount up to a week of salary. Following this vicious circle, the most common thing that happens to people involving in overdrafts is to become ineligible to remain into the banking system. In particular, those who use mobile payments are nearly 16 percentage points more likely to overdraw their checking account and 23 percentage points more likely to turn to Alternative Financial Services (AFS), such as auto title loans, payday loans and so on. Results change if people are financially literate (Lusardi, Del Grappa et al., 2019). This insight must not be underestimated since there has been a 100% increase from 2015 of smartphone users who reported to use mobile payments (Federal Reserve Board, 2016). Besides, mobile point-of-sale transactions are forecasted to grow to about $200 billion in 2021, taking into account the starting point in 2016, nearly $30 billion (Lusardi, Del Grappa et al., 2019). Although the Pew charitable trust suggested several best practices to reduce the probability to overdraw checking accounts, banks continue charging customers. For all the reasons above, the goal is to contribute to the actual state of literature in this field. To this extent, we have also chosen another side of literature about the main bank choice. Their main result is that convenience (intended as proximity to job-place or home) was the main reason (63% of *PattiChiari* clients and for 67% of other respondents) with a very massive difference if we look at the Financial reasons share - less than 15% of the respondents (Fort et al., 2016). They explained this gap as a binding constraint of convenience in comparison with financial services, which is not binding considering multi-products banks. However, our contribution is to investigate the influence of financial literacy in this choice. To push further these results, we refer to the different target of users: young, remote banking users and their various combinations as explained in the next section.

3. Data

To answer the above research questions, we used data from the Bank of Italy[18]. Among this significant amount of data, we choose four waves of SHIW data 2006, 2008, 2010 and 2016, the only ones in which financial literacy questions are administered. Unfortunately, different questions were addressed by Bank of Italy Survey in different waves, which

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[18] Data are available at the following link (https://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/bilanci-famiglie/distribuzione-microdati/index.html).

complicates the analysis. Graph 1 shows for all the waves we use, which financial literacy questions are addressed. Inflation topic is the only one investigated for all the four waves object of analysis. Instead, diversification question is present in 3 out of 4 waves (green bars in the graph). Finally, we have fewer data about the ability to calculate compounded interest which is available only in 2006 and 2016.

Graph 1 : FinLit Knowledge by year
Total Sample from 2006 to 2016 SHIW data - Bank of Italy
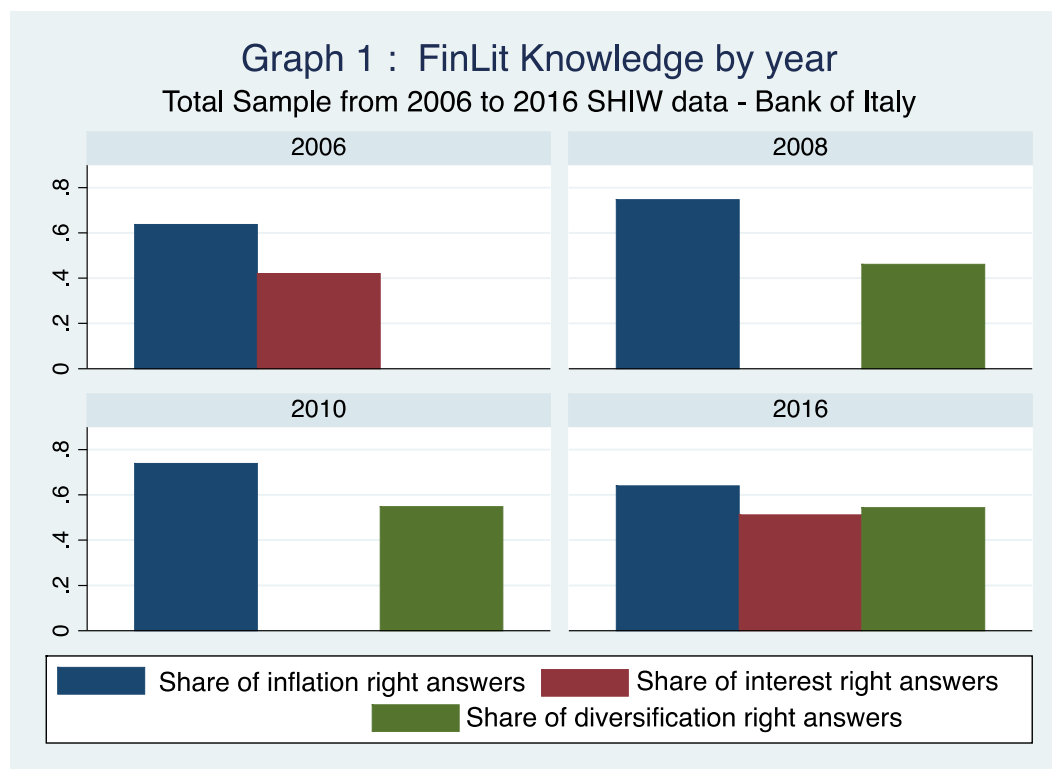
The following tables describe the summary statistics of the data subsamples used to investigate different financial indicators. Table 1.2 represents summary statistics to investigate the relationship between the number of bank or ATM withdrawals with the level of financial literacy in Table 1. On average, people draw up money from the ATM around three times more in comparison with the traditional method into the branches. In the first two waves, a high percentage of householders (85%) know at least one concept among inflation, interest or diversification. In this subsample, there are 68% male householders (1,932). The average amount of savings at the end of the year is 6317 euros for each householder. Moreover, 10% of interviewed householders are highly educated and 7% were under 35-years-old in 2006. Just 3% of the subsample is freelance. Remote banking, our broad proxy of Fintech, is used by 17% of householders in this sub-sample. Two related reasons stand behind this proxy choice. First of all, Italian bank's digitalization process was slow and limited before the last fifteen years. Then, as a matter of fact, in this dataset, we have not enough data about mobile payments or other proxy of Fintech generally used in literature for other countries, which is mainly due to the problem described above.

Table 1.2: Summary Statistics SHIW data Sub-sample 2006-2008

Variable	N	Mean	Std. Dev.	Min	Max
N. of Bank withdrawals*	2815	1.024	2.019	0	50
N. of ATM withdrawals*	2175	3.320	3.302	0	60
FinLit	2815	0.850	0.357	0	1
Savings_ln	2815	8.751	1.132	0	12.899
Young	2815	0.072	0.258	0	1
Male	2815	0.686	0.464	0	1
Fintech	2815	0.172	0.377	0	1
Freelance	2815	0.029	0.167	0	1
Degree	2815	0.098	0.298	0	1

*Withdrawals both at ATM and at Bank on monthly basis.

Table 2.2 shows the summary statistics of the subsample used to investigate the relationship between the capability to make ends meet and the financial literacy level in Table 2. This capability is, in turn, measured by three different dummy variables from 2008 to 2016. The first one, Saver, assumes value 1 if householders declare to be able to spend less than their income, saving part of it annually, 0 otherwise. The capability is considered lower if householders declare to be able to make ends meet, even if they spend their all income annually ("All income" householders are 50% of interviewed). Finally, Debt is the dummy for householders who affirm that not only they spend all their income but go on debt also (fortunately, just 8% of the interviewed are in this category). In these waves, 83% of the subsamples can be considered financial literate. Young householders are 10% of the subsample, 11% are the most educated and 57% male. Noteworthy is a higher percentage of Fintech users compared to the previews waves (23%). Freelance represent still 3% of the subsample under analysis. In this subsample, the average amount of saving is 6418 for each household.

Table 2.2: Summary Statistics SHIW data Sub-sample 2008-2016

Variable	N	Mean	Std. Dev.	Min	Max
Save*	4,504	0.417	0.493	0	1
All income*	4,504	0.500	0.500	0	1
Debt*	4,504	0.083	0.276	0	1
FINLIT	4,504	0.832	0.374	0	1
Savings_ln	4,504	8.767	1.157	1	13.816
Young	4,504	0.103	0.303	0	1
Male	4,504	0.579	0.494	0	1
Fintech	4,504	0.236	0.425	0	1
Freelance	4,504	0.029	0.167	0	1
Degree	4,504	0.117	0.321	0	1

*On annual basis.

Table 3.2 shows summary statistics for subsample 2008-2016 selected to investigate the relationship between overdraw behavior and financial literacy level. The dependent variable Overdraw is a dummy variable which assumes value 1 if householders declare to overdraw their checking account annually, 0 otherwise. Higher is also the percentage of financial literate householders. The average amount of savings is 7405 euros. Young householders account for 10% of the subsample. Instead, Fintech users' share is 33%. The subsample is composed of 69% of male, by 15% of graduated householders and 4% by freelance.

Table 3.2: Summary Statistics SHIW data Sub-sample 2008-2016

Variable	N	Mean	Std. Dev.	Min	Max
Overdraw*	2,757	0.146	0.353	0	1
FinLit	2,757	0.929	0.257	0	1
Savings_ln	2,757	8.915	1.189	0	12.899
Young	2,757	0.104	0.306	0	1
Male	2,757	0.694	0.461	0	1
Fintech	2,757	0.331	0.471	0	1
Freelance	2,757	0.045	0.206	0	1
Degree	2,757	0.153	0.360	0	1

*On annual basis.

Finally, table 4.2 represents summary statistics for the subsample between 2006 and 2010 used to investigate the determinants behind the choice of the main bank (see Table 4). Following Fort et al. (2016), 13 different alternatives are split into four broad categories (convenience, financial reasons, bank characteristics, and other reason). From table 4.2, a dramatic framework emerges. In fact, 50% of the subsamples choose their main bank just because it is on the way to go to the workplace or simply because it is not too far from home. The same convenience based reason happens when people remain in the respondent's business bank. Unfortunately, just 20% of householders declares financial

reasons such as lower fees, better interest rates or the speed of the service behind the main bank choice. Bank characteristics among which fame or size account for 35%. Other reasons are given by 6% of the subsample. Financial literate householders involved in this analysis are 86% of the subsample. In this subsample, the average amount of saving is 6418 for each household. Male householders compose 61% of the subsample, 10% is the share of young householders. Fintech users account for 19% between 2006 and 2010. Freelance continues to be a remaining part of the subsample (3%).

Table 4.2: Summary Statistics SHIW data Sub-sample 2006-2010					
Variable	N	Mean	Std. Dev.	Min	Max
Convenience*	4516	0.582	0.493	0	1
Financial reasons*	4516	0.208	0.406	0	1
Bank charachteristics*	4516	0.350	0.477	0	1
Other reasons*	4516	0.060	0.238	0	1
FinLit	4516	0.867	0.339	0	1
Savings_ln	4516	8.779	1.137	0.693	13.82
Young	4516	0.097	0.295	0	1
Male	4516	0.617	0.486	0	1
Fintech	4516	0.196	0.397	0	1
Freelance	4516	0.029	0.168	0	1
Degree	4516	0.113	0.317	0	1

*Broad categories to answer the question on why the main bank is chosen (13 alternatives).

4. Analysis

First of all, we run several OLS regressions to understand the effect of financial literacy and remote banking on three financial behavior indicators. Then, a framework of seemingly unrelated estimations has been applied to understand in which way financial literacy or Fintech usage could affect the choice of the main bank. To do so, we used the following model:

$$y_{itr} = \alpha + \beta_1 \, Young\_CF_{itr} + \beta_2 \, FinLit_{itr} + \beta_3 \, Remote\_banking_{itr} + \beta_4 X_{itr} + \delta_r + \gamma_t + \varepsilon_{it}$$

where y indicates the usage of overdraw, the number of withdrawals, and the capability to make ends meet in the following analysis, for individual i, at time t, in region r. $\beta1$ is the coefficient of the young chief of family dummy. Young chief of family is intended as people born after 1971 (for whom the dummy variable assumes value 1, otherwise 0). Hence, in our sample we compare chief of family between 35 years old at the beginning of the analysis in 2006 and 45 in 2016, the year of the last bank of Italy wave and adult population. $\beta2$ shows the effect of a good knowledge of Financial Literacy on the dependent variable. Financial Literacy index assumes value 1 if the individual answer

correctly: 1) at least at one question before 2016 (in which only two are the objects of the financial literacy analysis), and 2) again value 1, if people correctly answer at least at two questions after 2016, 0 otherwise. β3 is the coefficient of the usage of remote banking such as phone-banking or home-banking. It is a dummy which assumes value 1 if people use remote banking, phone banking and so on, 0 otherwise. β4 is the coefficient of a vector of personal characteristics such as sex, job status, wealth and education. Finally, we control for time and region fixed effect. In addition, our standard errors are robust and clustered by individual. Several are the regressions we have run, but for brevity, we report only one for each group of regressions.

4.1 Results

Although American reports were not specific about the method in which overdraw happen (using ATM or directly in branches), Bank of Italy data allow us to investigate also the channel in which people usually withdraw money. Table 5.2 reports the results of model 1 when the dependent variable is the number of withdrawals at the bank branch (column 1 and 3) and the number of withdrawals at ATM (columns 2 and 4). Unfortunately, we can observe this behavior only in two waves: in 2006 and 2008.

The first column highlights a generational change in financial habits. Younger Italian households prefer not as much as older households to go to the branch to withdraw money. In fact, the number of young households' bank withdrawals into a branch is 36% lower in comparison to older households. A negative relationship also emerges for remote banking users. More specifically, remote banking user households show a lower percentage (36%) to draw money directly in the bank. Also, a gender gap emerges, with a 14% higher number of bank withdrawals by male households on a monthly basis. Finally, higher education decreases by 20% the number of withdrawals into a branch.

The interaction term in the third column shows no effect of financial literacy on young Italian households. However, the second column reveals that financially literate people show a higher number of ATM withdrawals every month. More in details, the change of financial literacy from zero to one increases by 16% the number of withdrawals at ATM. This result is in line with literature which states that a higher level of basic financial concept decreases the probability to incur in higher fees, such that withdrawals in branches. The use of ATM is a habit which is continuously increasing every year. However, the number of ATM withdrawals is 11% higher for male compared to female Italian householders. A positive difference is also shown by Fintech users, with a number of ATM withdrawals 18% higher in comparison with householders who do not use remote banking. Finally, freelance householders show a 64% higher number of monthly withdrawals at ATM compared to not freelance households.

No evidence emerges about a differential effect of financial literacy on young household behavior in the last column, however the marginal effect of financial literacy is positive and statistically significant, (53 p.p.).

Table 5.2: Pooled OLS - Number of BANK and ATM withdrawals on monthly basis (SHIW 2006-2008)

VARIABLES	(1) BANK	(2) ATM	(3) BANK	(4) ATM
FinLit Index	-0.21	0.534**	-0.206	0.579**
	(0.135)	(0.219)	(0.143)	(0.234)
Young	-0.373***	0.072	-0.325	0.51
	(0.086)	(0.211)	(0.232)	(0.462)
FinLit Young	.	.	-0.056	-0.494
	.	.	(0.249)	(0.499)
Savings_ln	0.027	0.099	0.027	0.098
	(0.031)	(0.075)	(0.031)	(0.075)
Male	0.147**	0.359**	0.147**	0.357**
	(0.067)	(0.15)	(0.067)	(0.15)
Fintech	-0.366***	0.611***	-0.366***	0.613***
	(0.075)	(0.221)	(0.075)	(0.221)
Freelance	-0.082	2.128**	-0.082	2.126**
	(0.125)	(0.956)	(0.125)	(0.955)
Degree	-0.202*	0.251	-0.203*	0.247
	(0.117)	(0.278)	(0.117)	(0.279)
Constant	1.444***	0.027	1.442***	-0.003
	(0.281)	(0.653)	(0.281)	(0.655)
Years FE	YES	YES	YES	YES
Region FE	YES	YES	YES	YES
N	2,815	2,177	2,815	2,177
R-squared	0.035	0.073	0.035	0.073
Marginal Effects				
FinLit Index			-0.21	0.536**
			(0.134)	(0.219)
Young			-0.372***	0.07
			(0.085)	(0.210)

The dependent variable is the number of bank withdrawals (1)(3) or ATM withdrawals (2)(4)
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6.2 shows the results of a Pooled OLS estimation. In this case, we add to the model the single variables Young_CF and Fintech plus their interaction term Young_Fintech. Then we consider the triple interaction with financial literacy. In line with the literature, we can conclude that wealth and education are positively correlated with saving behavior. Financial literacy has a positive influence to make ends meet and saving behavior. In fact, the first column indicates that who know at least the basis of finance, consume less than their income saving, on average, 13% more annually. Financial knowledge shows a positive effect reducing the probability to spend all income by 6 p.p. (or in other words by 12 %). A high percentage of spending all income (25%) is shown by young household without any knowledge in financial topics. Fintech users show 11% (or 4.7 p.p.) of probability to be able to make ends meet, and they are 6 p.p. (12%) less likely to spend all their income. No financial literacy statistically significant effect emerges on capability to make ends meet of young Fintech user householders. Instead, wealth and education affect the ability to make ends meet. Who has a higher level of education are 12.3 p.p. (or 29%) respectively more likely to spend less than their income saving part of it annually. As well as, 25% lower probability to consume as much as they earn (12.4 p.p.). Moreover, higher is the amount of savings lower will be the probability to spend all the income. In particular,

one percent increase in the average amount of savings decreases the probability to spend all income by 0.00084 units, and by 0.00015 the probability to go on debt. Moreover, one-unit increase in logarithm of savings increases the probability to save part of the income annually by 0.099 (9.9%). In other words, (exp(0.099)≈) 1.10 is the expected change in the probability to became saver, ceteris paribus (0.01% for each euro saved or again 1% for 100 euros saved). A gender gap is highlighted, with males who perform better than females. In particular, the difference is 3.4 p.p. for male, that can be interpreted as 8% higher probability to be able to make ends meet in comparison with female households. Again, they show a lower probability (8% or 4.1 p.p.) compared to female householders to spend all their income annually. Freelance could be a job category to investigate more in-depth because of a possible higher level of financial exposure in their job. What emerges from this analysis is that they are on average 7.7 p.p. less likely to make ends meet, in other words, they are 18% less likely to save money annually. However, using only this target could be troubling since they are less than 5% in our sample. We could think about the possibility to aggregate them with self-employed et similia to be more confident about their coefficients.

Table 6.2: Pooled OLS -Young Fintech Users Italian Households financial habits (SHIW 2008-2016)

VARIABLES	Without Interaction			With Interaction		
	Save	All Income	Debt	Save	All Income	Debt
FinLit Index	0.055***	-0.060***	0.005	0.045**	-0.046**	0.001
	(0.019)	(0.02)	(0.011)	(0.02)	(0.022)	(0.012)
Young_Fintech	0.059	-0.065	0.006	-0.089	0.02	0.07
	(0.05)	(0.05)	(0.028)	(0.157)	(0.166)	(0.102)
FinLit*Young_Fintech	.	.	.	0.147	-0.077	-0.07
	.	.	.	(0.163)	(0.171)	(0.106)
Young	0.005	0.012	-0.017	-0.098	0.126*	-0.029
	(0.029)	(0.031)	(0.016)	(0.068)	(0.076)	(0.04)
FINLIT_young	.	.	.	0.119	-0.132	0.013
	.	.	.	(0.074)	(0.082)	(0.043)
Fintech	0.047**	-0.061***	0.014	0.046	-0.03	-0.016
	(0.02)	(0.02)	(0.012)	(0.059)	(0.059)	(0.03)
FINLIT_fintech	.	.	.	0.003	-0.036	0.033
	.	.	.	(0.062)	(0.062)	(0.032)
Savings_ln	0.099***	-0.084***	-0.015***	0.099***	-0.084***	-0.015***
	(0.008)	(0.008)	(0.004)	(0.008)	(0.008)	(0.004)
Male	0.034**	-0.041***	0.008	0.033**	-0.041***	0.008
	(0.015)	(0.015)	(0.008)	(0.015)	(0.015)	(0.008)
Freelance	-0.077*	0.035	0.042	-0.077*	0.036	0.041
	(0.043)	(0.043)	(0.029)	(0.043)	(0.043)	(0.029)
Degree	0.123***	-0.124***	0.001	0.123***	-0.124***	0.001
	(0.024)	(0.023)	(0.014)	(0.024)	(0.023)	(0.014)
Constant	-0.654***	1.511***	0.143***	-0.646***	1.500***	0.146***
	(0.075)	(0.073)	(0.037)	(0.075)	(0.073)	(0.037)
Year FE	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES
N	4,504	4,504	4,504	4,504	4,504	4,504
R-squared	0.105	0.092	0.022	0.104	0.091	0.021
Marginal Effects						
FinLit Index				0.064***	-0.071***	0.007
				(0.019)	(0.020)	(0.011)
Young				0.001	0.015	-0.017
				(0.028)	(0.031)	(0.015)
Fintech				0.048**	-0.059***	0.011
				(0.020)	(0.02)	(0.011)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 7.2 shows the relationship between overdraw behavior and in particular, among young Fintech users. Overdraw often determines very high fees and sometimes also big economic problems if repeated like over debt. We find that financial literacy increases annual overdraw behavior by 4.5 p.p. (31%) on average (first column). Moreover, Fintech user households are 7.3 p.p. more likely to overdraw their checking account on average compared to households who do not use remote banking. Before we consider the interaction with the financial literacy level, young households, Fintech users or not, do not show any statistically significant difference from adult households overdraw behavior. Instead, adding the interaction term between young Fintech user households and financial literacy, the results change. Young households who use remote banking are, on average, 58 p.p. more likely to overdraw their checking account. Financial mismanagement mentioned above is notably reduced by the contribution of knowledge in the financial field.

In other words, young financially literate Fintech user households are 4.5% (or 63 p.p.) less likely to overdraw their checking account. To sum up, the overall effect of financial literacy on overdraw behavior of young Fintech user households is to reduce financial mismanagement by 5.3 p.p. in comparison to young Fintech users without any knowledge about financial topics. Moreover, overdraw behavior is also related to the amount of saving. The higher is the amount of saving the lower will be the probability to incur in this kind of financial mismanagement practice. In particular, one-unit increase in logarithm of savings decreases the probability to use overdraw by 0.00065 units. In other words, considering the opposite function of the logarithm ($\exp(0.065) \approx$) 1.06 is the expected change in the probability to overdraw your checking account, ceteris paribus. Finally, since freelance households are 19 p.p. (1.3%) more likely to overdraw their checking account, the results suggest that this job status could be one of the targets for a financial education program in the future.

Table 7.2: Pooled OLS - Young fintech users italian households annual overdraw behavior (SHIW 2008-2016)

VARIABLES	Without Interaction	With Interaction
FinLit Index	0.045*	0.057**
	(0.023)	(0.024)
Young_Fintech	-0.055	0.577***
	(0.052)	(0.179)
FinLit*Young_Fintech	.	-0.630***
	.	(0.185)
Young	0.049	0.149
	(0.037)	(0.153)
FINLIT_Young	.	-0.107
	.	(0.155)
Fintech	0.073***	0.089
	(0.018)	(0.069)
FINLIT_Fintech	.	-0.016
	.	(0.071)
Savings_ln	-0.064***	-0.065***
	(0.008)	(0.008)
Male	0.009	0.01
	(0.016)	(0.016)
Degree	-0.011	-0.012
	(0.021)	(0.021)
Freelance	0.194***	0.189***
	(0.047)	(0.047)
Constant	0.553***	0.545***
	(0.079)	(0.079)
Year FE	YES	YES
Region FE	YES	YES
N	2757	2757
R-squared	0.074	0.076
Marginal Effects		
FinLit Index		0.005
		(0.025)
Young		0.04
		(0.028)
Fintech		0.069***
		(0.016)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Moreover, our analysis investigates the relationship between determinants behind the choice of the main bank and financial literacy level as well as the usage of remote banking services (proxy of Fintech). Table 8.2 shows a Seemingly Unrelated Regression (SUR), without any interaction, and compare it with two different system of regressions. The first one adds an interaction term between financial literate and young households. The second one provides a different interaction, that one between financial literacy and Fintech usage. SUR model is a system of linear equations with errors that are correlated across equations for a given individual but are uncorrelated across individuals. So, we opt for SUR model and not for a simple OLS or other models because the object of the analysis involved a question with 13 choices (grouped following Fort et al., (2016) in 4 broad categories), so taking them all together allows us to gain efficiency. The results highlight that financially literate people choose their main bank focusing their interest on characteristics of the bank such as the size and how much famous it is (bank type). In particular, older households are 3 p.p. less likely to choose their main bank for logistic convenience (such as for a lower distance from home or job place or just because it is the respondent's business bank) and 9 p.p. more likely on average to choose a well-known bank. Considering the estimation without any interaction, young households follow the same pattern above for convenience but with a much lower probability (11 p.p.). In addition, they pay more attention to financial aspects 8 p.p. such as lower fees and better interest rates or the speed of the service. Remote banking users are 7 p.p. less likely to make bank choice based on convenience reasons. In fact, they are more likely to choose the main bank for financial reasons (7 p.p.), bank type (4 p.p.) or other reasons (3 p.p.).

Adding the interaction term between young and financial literacy, financial literate young households confirm their determinants trend but the effect is higher (-13 p.p. for convenience and 10 p.p. for financial reasons). Instead, the interaction term between remote banking users (Fintech) and financial knowledge, reveals that a higher financial knowledge decreases the probability by 14 p.p. of main bank choice focused on the bank type, compared to remote banking users without any basic financial knowledge. To be a freelance increases the probability to make a choice based on external characteristics of the bank. The need to increase financial literacy among households is confirmed by the fact that also who has a higher level of education are 2 p.p. less likely to choose their main bank looking at the financial side.

Table 8.2 : Sureg Estimation - Determinants behind the choice of the main bank - Young - Fintech Users Italian Households (Shiw 2006 and 2010)

VARIABLES	Without Interaction				With Interaction 1 (Young)				With Interaction 2 (Fintech)			
	Convenience	Financial	Bank type	Other reason	Convenience	Financial	Bank type	Other reason	Convenience	Financial	Bank type	Other reason
FINLIT	-0.035**	0.008	0.085***	0.006	-0.031**	0.004	0.087***	0.005	-0.032**	0.003	0.096***	0.003
	(0.015)	(0.012)	(0.014)	(0.007)	(0.015)	(0.013)	(0.014)	(0.007)	(0.015)	(0.013)	(0.015)	(0.008)
1 Young	-0.110***	0.086***	0.007	0.012	0.017	-0.029	0.057	-0.02	-0.110***	0.086***	0.007	0.012
	(0.024)	(0.02)	(0.023)	(0.012)	(0.081)	(0.068)	(0.078)	(0.04)	(0.024)	(0.02)	(0.023)	(0.012)
FINLIT#Interaction	.	.	.	.	-0.139*	0.126*	-0.055	0.035	-0.041	0.062	-0.144***	0.04
	.	.	.	.	(0.085)	(0.071)	(0.081)	(0.042)	(0.054)	(0.046)	(0.052)	(0.027)
2 Fintech	-0.074***	0.067***	0.045***	0.030***	-0.074***	0.066***	0.046***	0.030***	-0.035	0.008	0.183***	-0.008
	(0.012)	(0.01)	(0.011)	(0.006)	(0.012)	(0.01)	(0.011)	(0.006)	(0.053)	(0.045)	(0.051)	(0.026)
Freelance	-0.056	0.036	-0.017	-0.021	-0.056	0.036	-0.017	-0.021	-0.056	0.036	-0.016	-0.021
	(0.035)	(0.03)	(0.034)	(0.017)	(0.035)	(0.03)	(0.034)	(0.017)	(0.035)	(0.03)	(0.034)	(0.017)
Savings_ln	0.006	-0.005	0.014***	0.002	0.006	-0.005	0.014***	0.002	0.006	-0.005	0.014***	0.002
	(0.004)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.002)
Male	-0.005	0.01	-0.012	0.002	-0.005	0.009	-0.012	0.002	-0.005	0.01	-0.012	0.002
	(0.009)	(0.008)	(0.009)	(0.004)	(0.009)	(0.008)	(0.009)	(0.004)	(0.009)	(0.008)	(0.009)	(0.004)
Degree	0.001	-0.024*	0.027*	0.011	0.001	-0.024*	0.027*	0.011	0.001	-0.024*	0.026	0.012
	(0.017)	(0.014)	(0.016)	(0.008)	(0.017)	(0.014)	(0.016)	(0.008)	(0.017)	(0.014)	(0.016)	(0.008)
Constant	0.480***	0.251***	0.261***	0.007	0.476***	0.254***	0.260***	0.008	0.477***	0.255***	0.253***	0.01
	(0.042)	(0.035)	(0.04)	(0.021)	(0.042)	(0.035)	(0.04)	(0.021)	(0.042)	(0.035)	(0.04)	(0.021)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	11,332	11,332	11,332	11,332	11,332	11,332	11,332	11,332	11,332	11,332	11,332	11,332
R-squared	0.034	0.019	0.039	0.04	0.034	0.019	0.039	0.04	0.034	0.019	0.039	0.04
Marginal Effects												
FINLIT					-0.036**	0.009	0.084***	0.006	-0.041**	0.016	0.064***	0.011
					(0.014)	(0.012)	(0.014)	(0.007)	(0.016)	(0.014)	(0.016)	(0.008)
Young					-0.106***	0.082***	0.008	0.111				
					(0.024)	(0.020)	(0.023)	(0.111)				
Fintech									-0.07***	0.064***	0.055***	0.027***
									(0.012)	(0.010)	(0.011)	(0.005)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

5.Conclusion

Financial literacy is receiving every day, more and more attention all over the world. Its effect in literature appears higher on several financial good practices, so there is the need to spread it among the youngest population. We consider four different financial indicators (overdraw, number of withdrawals, ability to make ends meet, bank choice determinant). We use remote banking as a proxy for Fintech since in Italy this sector is still in progress and several initiatives were concentrated on remote experience improvements. The analysis reveals that young households who use remote banking are more likely to do financial mismanagement. However, the picture is changed when we consider the interaction with financial literacy level. In fact, young, financially literate households who use remote banking are more likely to do sound financial management. Several are the best practices proposed by The Pew Charitable Trusts (2016) to reduce overdraw behavior from the bank's side (such as declining ATM transactions, declining debit point-of-sale overdrafts, no reordering of transactions from high to low by dollar amount and instituting a threshold amount to trigger an overdraft). However, an important role is played by financial literacy and its improvements is a choice from the consumer side. Besides, we need to take into account withdrawals behavior evidence. They could be guidelines to explore new methods and tools to increase financial literacy in an informal financial environment (for example, at ATM where we could adopt new strategies to increase financial literacy and the correlated saving behavior). Finally, it could be interesting to ask for additional data to the Bank of Italy about the detail of the bank chosen, to investigate separate effects for a different kind of bank type. Next step to go further in the analysis is to include the adoption of several robustness checks considering each option behind each broad category for the SUREG estimation.

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APPENDIX

The results highlight the existence of a gender gap in answering all questions about financial literacy. On average, female students perform worse in comparison to the male ones considering the short run. However, female seems to learn more in the long run and if the method is traditional, with the presence of a financial expert.

VARIABLES	Inflation	Interest	Diversification
Table 1A – Diff-in-diff Estimates of Financial Literacy Outcomes (female)			
After 3 weeks	0.142**	-0.013	0.011
	(0.068)	(0.064)	(0.054)
After 3 months	0.143***	-0.049	0
	(0.052)	(0.047)	(0.033)
D Classes	0.141	0.008	0.065
	(0.087)	(0.123)	(0.08)
D Classes*After 3 weeks	0.239*	0.142	0.096
	(0.138)	(0.088)	(0.116)
D Classes*After 3 months	0.153	0.169	-0.012
	(0.127)	(0.1)	(0.17)
T Classes	-0.075	-0.049	-0.187**
	(0.054)	(0.132)	(0.08)
T Classes*After 3 weeks	0.168	0.339*	0.380***
	(0.141)	(0.193)	(0.095)
T Classes*After 3 months	0.377***	0.379***	0.430***
	(0.098)	(0.111)	(0.061)
Income	0.087	0.025	-0.102*
	(0.061)	(0.064)	(0.051)
Foreign Parents	-0.107	-0.300**	0.105
	(0.15)	(0.136)	(0.147)
Repetition	0.360***	-0.121	-0.132
	(0.125)	(0.238)	(0.179)
Father degree	-0.046	-0.025	-0.091*
	(0.061)	(0.054)	(0.047)
Math grade (>=7)	0.121*	0.069	0.123**
	(0.067)	(0.053)	(0.054)
Constant	0.726	1.112	1.143
	(0.753)	(1.11)	(1.076)
N	562	564	561
R-squared	0.126	0.054	0.075

Controls not statistically significant: Age, Father Freelance, Mother Freelance, Mother Degree, Only child, City Centre, Foreign.
Robust standard errors clusterized at class level in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Math ability is intended here as students whose initial grade is higher or equal to 7 (above the median value). Students with higher ability in math show a higher effect and persistent for the traditional course. A gender gap remains also if female students have high ability in math before the course. A family income higher than 30.000 a year reduces by 6 p.p. the probability to answer correctly to the diversification question among students who perform better in math.

Table 2A – Diff-in-diff Estimates of Financial Literacy Outcomes (math)

VARIABLES	Inflation	Interest	Diversification
After 3 weeks	0.051	0.001	0.052
	(0.055)	(0.046)	(0.042)
After 3 months	0.078	-0.039	-0.002
	(0.053)	(0.048)	(0.053)
D Classes	0.065	-0.051	0.155***
	(0.133)	(0.105)	(0.046)
D Classes*After 3 weeks	0.259*	0.134	-0.047
	(0.143)	(0.089)	(0.068)
D Classes*After 3 months	0.007	0.197*	-0.147
	(0.211)	(0.112)	(0.121)
T Classes	0.007	-0.121	0.053
	(0.069)	(0.105)	(0.045)
T Classes*After 3 weeks	0.185**	0.322***	0.063
	(0.07)	(0.098)	(0.06)
T Classes*After 3 months	0.162**	0.315***	0.019
	(0.061)	(0.095)	(0.059)
Female	-0.194***	-0.167***	-0.059
	(0.047)	(0.056)	(0.044)
Age	-0.070*	-0.001	0.009
	(0.04)	(0.046)	(0.034)
Income	0.053	-0.047	-0.067**
	(0.054)	(0.047)	(0.031)
Repetition	-0.687***	-0.136*	-0.11
	(0.102)	(0.075)	(0.087)
Father Freelance	-0.022	-0.032	0.101**
	(0.058)	(0.059)	(0.045)
Constant	1.562**	0.948	0.379
	(0.728)	(0.76)	(0.613)
N	673	674	672
R-squared	0.086	0.065	0.049

Controls not statistically significant: Age, Father Degree, Mother Freelance, Mother Degree, Only child, City Centre, Foreign, Foreign Parents, Economics.
Robust standard errors clusterized at class level in parentheses *** p<0.01, ** p<0.05, * p<0.1.