

# Understanding the demand for financial literacy

## Insights from the Theory of Planned Behaviour

*F.C. Billari\**, *M. Gentile\*\**, *N. Linciano\*\**, *F. Saita\*\*\**

## Abstract

One of the obstacles in policy-makers' efforts to develop financial education programs is to attract the interest and the attention of the individuals who should be trained. This is particularly important for programs for adults, who – differently from young students trained in schools – cannot generally be involved in financial education programs unless they want to. Despite that, very little is known about the demand for financial literacy (especially among the least literate individuals), and about the drivers of individual intentions to learn about finance. We build on the social-psychological framework of the Theory of Planned Behaviour (TPB) to study the intention to learn more about savings and investments as a function of attitudes, subjective norms, and perceived behavioural control, also controlling for individual background factors, including psychological traits. We develop a novel TPB-based module for the CONSOB 2018 Survey on financial investments by Italian households, administered to 1,601 individuals. Results show that attitudes, subjective norms and perceived behavioural control are significant determinants of intentions to learn more about savings and investments, as predicted by TPB. Differences in attitudes, subjective norms, and perceived behavioural control contribute to financial literacy gaps for women and less literate individuals in general. Moreover, intention is related to subsequent self-declared effort in learning in the next year, even if there is no significant improvement on a small subset of financial literacy questions that were replicated in the 2019 survey. Future financial education interventions should also target the determinants of individuals' intentions, especially for adults that are generally involved in financial education programs on a voluntary basis.

JEL Classifications: G40, G41, G53.

Keywords: financial literacy; Theory of Planned Behaviour; financial education; financial knowledge.

\*Department of Social and Political Science and Carlo F. Dondena Center for Research on Social Dynamics and Public Policy, Bocconi University.

\*\* Consob, Research Division, Department of Economic Research

\*\*\* Department of Finance and Baffi Carefin Center, Bocconi University.

# 1 Introduction and motivation

The ability of individuals to make conscious and well-informed decisions over savings, expenditures, borrowing and retirement planning has become more and more important over time, also as a consequence of the increasing complexity of the economic and financial system (Hastings, Madrian and Skimmyhorn 2013, Lusardi and Mitchell, 2014). The responsibility for long-term investment decisions increasingly rests on individuals, given the structural changes in pension systems that tend to become less generous also with rising life expectancy.

Stricter regulation on product transparency and intermediaries' rules of conduct aimed at improving the quality of interactions between financial institutions and clients may help, along with the creation of simple default products. It is however unquestionable that raising the level of financial literacy, or knowledge<sup>1</sup>, of the population is a key goal for the good functioning of markets and the achievement of desirable social outcomes. The 2007-2008 financial crisis has shown that individuals who are educated to make more conscious and long-term oriented saving, borrowing and investment decisions can contribute to reducing financial risks, both at the individual level and the systemic level. In addition, it is important to fill the financial knowledge gaps among groups within the population, which penalise the relatively poorer and weaker segments of the population, particularly vulnerable to economic downturn, as this could also help to reduce economic inequalities (Hung, Yoong and Brown 2012). Finally, improving financial knowledge is an essential component of the toolbox of financial regulators and supervisors, as it may be a precondition for the effectiveness of regulation.

There is in fact abundant evidence that financial literacy is with desirable financial behaviours. Individuals with higher level of knowledge tend to have higher stock market participation (Christelis, Jappelli, and Padula 2010; van Rooij, Lusardi, and Alessie 2011; Arrondel, Debbich, and Savignac 2012). Financial literacy is also correlated with retirement planning, as it has been shown by evidence both from the US (see in particular Lusardi and Mitchell 2007a, Lusardi and Mitchell 2007b) and from other countries (see for instance Almenberg and Säve-Söderbergh 2011, Klapper and Panos 2011, Fornero and Monticone 2015). Symmetrically, individuals with low financial knowledge may engage in more costly borrowing (Moore 2003, Mottola 2013, Lusardi and Tufano 2015).

While financial literacy is undoubtedly desirable, actual knowledge tends to be low and to vary substantially by gender, age, and other markers of social stratification (see in particular Lusardi and Mitchell 2014 for a thorough review of existing evidence and Hung, Yoong and Brown 2012 for a specific focus on gender differences in financial literacy). The evidence of these gaps has prompted policy-makers around the world to engage in the enhancement of financial literacy, also through the definition of nationwide strategies (OECD, 2015).

Generally, the discussion about how to enhance financial literacy is focused on how to *offer* financial education programs. Less attention has been devoted so far to the *demand* for financial education by individuals and to the elements that may influence their intentions to increase financial knowledge. This issue is however crucial given that the biggest challenge is to transform knowledge into behaviours, as pointed out by Fernandes et al. (2014) whose meta-analysis shows that the financial interventions analysed explain only 0.1% of the variance of target financial behaviours. Moreover, Fernandes et al. (2014) points out the need to also account for psychological traits when analysing the linkage between financial literacy and financial behaviours. While other meta-analyses (see in particular Miller *et al.* 2014 and Kaiser and Menkhoff 2017)

<sup>1</sup> In what follows we use 'financial knowledge' and 'financial literacy' as synonyms.

have reached more favourable conclusions about the effectiveness of financial education efforts, the aim of understanding better what can contribute to make financial education efforts effective remains crucial. Carpena *et al.* (2019) have experimentally tested potential effects of combining financial incentives, a psychological nudge consisting in goal setting, or personalized financial counselling on the effectiveness of a financial education treatment, identifying significant effects on outcomes for goal setting and counselling. However, little attention has been devoted directly so far to individual motivation and its determinants. Individual motivation to increase one's financial knowledge, as a step towards more conscious financial decisions can potentially be relevant both in order to increase the effectiveness of a financial education treatment and, when participation to financial education programs is on a voluntary basis, to attract people to participate to financial education programs. Understanding the factors that may trigger personal engagement in the learning process is therefore key. The aim of this paper is precisely to investigate the determinants of the intention to become more financially literate, which can be considered as the measure of an individual's demand for financial education.

From a policy perspective, studying the intentions to become (more) financially literate is important, first because (as already mentioned) the effectiveness of any financial education policy is intertwined with the willingness of the beneficiary individuals and groups to actively engage in their education. Secondly, given that these intentions may depend on different factors, it is important to identify the elements that matter the most in shaping them. Finally, understanding intentions is relevant in order to appreciate whether differences in the levels of financial literacy among population subgroups are also with a different intensity of the intention to learn about finance. If disadvantaged subgroups are less interested in becoming financially literate, then part of the effort should be devoted not only to offer them chances for financial education but also to increase their willingness to take full advantage of these chances. In current academic and policy literature most of the debate about how to fill the gaps for the most financially illiterate is mostly centered on evaluating the effectiveness of the *supply* of financial education programs, and on increasing the supply itself from a policy perspective. However, if differences in the intention to learn emerged, this could suggest that devoting greater attention to how to increase the *demand* for financial literacy among weaker subgroups could be equally important. In order to identify the determinants of the intention to increase one's own financial literacy, we make use of the framework of the Theory of Planned Behaviour (Ajzen, 1988, 1991). The Theory of Planned Behaviour (TPB from now onwards) has been developed in the field of social psychology and subsequently extensively applied in several domains to predict behaviours that depend on purposive, intentional actions. To our knowledge, only a few papers apply this conceptual framework to analyse the intention to make certain financial decisions (East, 1993, Lau *et al.*, 2001, Shih and Fang, 2004, Cucinelli *et al.*, 2017, Nosi *et al.*, 2017), but none has specifically dealt with the intention to learn more about finance and with potential differences across population subgroups. According to the TPB, the intention to perform a given behaviour (in our case, learning more about finance and investments) is the main trigger of a behaviour. This behavioural intention is essentially driven by attitudes (i.e., the perceived costs and benefits associated with the behaviour), subjective norms (i.e., the perception of the social pressure to perform, or not to perform, a behaviour deriving from the opinions of 'important others'), and perceived behavioural control (i.e., the perceived ease or difficulty of performing a behaviour). The background characteristics of an individual may in turn affect attitudes, subjective norms, and perceived behavioural control, and at times directly behavioural intentions.

We build on the conceptual framework of the TPB to develop a specific module within the 2018 wave of the CONSOB Survey on financial investments of Italian households (also CONSOB 2018 Survey from now onwards). The Survey provides data on a representative sample of 1,601 individual decision-makers, i.e. the higher income earner in the family, and the background factors – such as gender, age, trust and

other psychological traits – that can influence individuals’ attitudes, norms and behavioural control, which are found to be associated with households’ level of debt and assets (Brown and Taylor 2014), stock market participation (Conlin et al. 2015) and propensity to save and borrow (Roa, Garron and Barboza, forthcoming).

As a preview of our findings, analyses suggest that the TPB can be a powerful model to explain individuals’ intentions to learn more about finance and investments. Attitudes, norms and perceived behavioural control result to be statistically and substantially significant in explaining behavioural intentions, even after controlling for education and a number of background factors, including gender, age, trust, psychological traits. With the exception of perceived behavioural control, this holds true even when the analysis is replicated separately across gender subsamples. Secondly, despite the survey is targeted to the higher income earner in the family who is also likely to have a larger influence on household finance and investment decisions, the full sample model shows that women tend to display a lower intention to learn about finance and investments than men. In addition, there are clear differences in attitudes, subjective norms and perceived behavioural control among individuals with different levels of financial literacy.

Based on our approach that allows to distinguish the role of (non-modifiable) background factors and the role of attitudes, subjective norms and behavioural control, we discuss the directions that can be followed to influence individual intentions to increase financial literacy. Our results also suggest that policy efforts aimed not only at providing opportunities to learn but also at strengthening the intention to learn are equally important when trying to fill the gender gap in financial literacy. Overall, we believe that our methodological approach can help shedding light on a crucial component (individuals’ *demand* for financial education) that has received so far limited attention.

Lastly we attempt to measure the relation between intention to learn finance and self-assessed effort to improve own financial literacy level. In this part of the analysis we use the panel component of both 2018 and 2019 CONSOB Surveys by taking into account year-on -year financial literacy score changes in the subsample of people participating in two consecutive surveys. Results point out that intention to learn about savings and investments in 2018 is positively and significantly correlated with self-assessed efforts to learn in the subsequent year, while there is no significant relationship between intention and improvements in the financial literacy scores on a small subset of five financial literacy questions that were replicated in the 2019 survey. Possible interpretations for these results (note that respondents were neither offered training nor given suggestions about training tools between the two surveys) are discussed later in the paper.

On policy grounds, understanding better financial education demand is clearly important to understand which levers could be used to increase the intention to learn about finance and investment for the whole population (especially for the less literate and therefore weaker groups). Based on our results, possible interventions could ideally be focused on attitudes, subjective norms and perceived behavioural control. Here, we could learn from other fields in which interventions have been informed by the Theory of Planned Behaviour, such as health. Such levers include for example the provision of information, increasing skills and persuading individuals on the possibility of performing a specific behaviour, encouraging planning, providing social support for a behaviour. These interventions might affect attitudes, subjective norms, and perceived behavioural control, intentions and finally behaviour, as documented by recent meta-analyses by Sheeran et al. (2016) and Steinmetz et al. (2016).

The remainder of this paper is structured as follows. Section 2 briefly reviews the Theory of Planned Behaviour. Section 3 describes our data and methods. Section 4 presents the estimation results on the determinants of the intention to learn more about finance and investments. Lastly, in Section 5 we focus on the

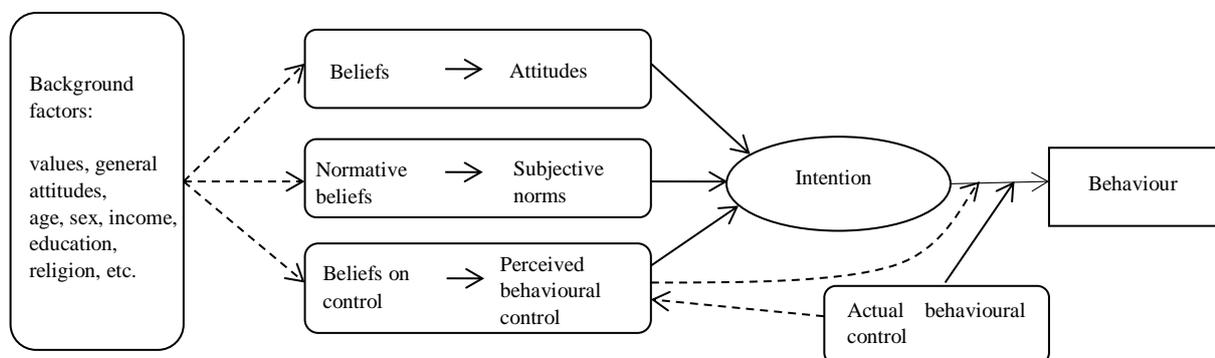
relation between the intention to learn, subsequent effort in learning and changes in financial literacy scores. Section 6 concludes.

## 2 The Theory of Planned Behaviour

The Theory of Planned Behaviour was introduced by the social psychologist Icek Ajzen (Ajzen, 1988, 1991) as an extension of the earlier ‘Theory of Reasoned Action’ by Fishbein and Ajzen (1975). According to the TPB, the performance of a specific behaviour is jointly determined by the intention to perform the behaviour and actual behavioural control, i.e. the actual ability to perform the behaviour. First, TPB extends the earlier Theory of Reasoned Action by assuming that not only a behavioural intention is the key antecedent of a behaviour, but that the actual performance of a specific behaviour can also depend on the individual’s perceived and actual behavioural control. Intuitively, the relative role of behavioural intentions and behavioural control can vary depending on the behaviour (consider for instance the difference between the ordering a soft drink and ceasing to smoke). Secondly, according to the TPB framework, the determinants of behavioural intentions can be identified in attitudes (i.e. perceived costs and benefits), subjective norms (i.e. the perception of the degree to which ‘important others’ approve or disapprove the specific behaviour), and perceived behavioural control. In turn, these factors can be influenced by background factors. Figure 1 sketches a simplified representation of the TPB.

The TPB framework has been tested extensively since its early years and has proved to perform well in a number of applications (see for instance the early meta-analytic review by Armitage and Conner, 2001). The TPB has only rarely been applied (and often on small samples) to financial behaviour and decisions, for instance in modelling the decision to apply for shares in cases of privatization (East, 1993), the intention of using either Internet banking or online trading (Lau, Yen and Chau 2001, Shih and Fang 2004), the intention of retail investors to apply for medium- or high-risk financial products (Cucinelli, Gandolfi and Soana 2016), and the intention to become an entrepreneur (von Graevenitz, Harhoff and Weber 2010). Yet, to our knowledge, the TPB has never been applied to the intention to increase the level of one’s own financial literacy.

**Figure 1 – A schematic presentation of the Theory of Planned Behaviour**



Source: Fishbein and Ajzen, 2005, p. 194.

In what follows, we build on the TPB approach to assess the determinants of an individual’s intention to improve his or her financial literacy, i.e. attitudes, subjective norms and perceived control. Following

Ajzen (1991), we evaluate attitudes by combining two elements: the subjective probability that the behaviour will produce a certain outcome (a benefit or a cost), and the perceived desirability of that outcome (outcome evaluation). Similarly, subjective norms, i.e. the social pressure that an individual may (or may not) perceive in learning more about savings and investments, result from the combination of the strength of normative beliefs (which are linked with the likelihood that ‘important others’ may approve or disapprove a given behaviour) and the importance attributed to the evaluation of each ‘important other’ (i.e., the motivation to comply to others’ expectations and opinions). Perceived behavioural control is measured here directly and aims at capturing the individual perceived ability to perform the behaviour (i.e., learning more about finance and investments).

### 3 Data and methods

#### 3.1 The CONSOB Survey

We draw our data mainly from the CONSOB 2018 Survey ‘The approach to finance and investment of Italian households’, administered by GfK Italia to a representative sample of Italian retail financial decision-makers<sup>2</sup>, and for Section 5 only also from the panel component of the subsequent 2019 wave of the same survey. A ‘financial decision-maker’ is defined here as the primary family income earner (or the oldest male member, when nobody works, or the oldest female member, when there are no male family members), aged between 18 and 74 (bank employees, insurance company employees and financial advisors are not included). The definition of the financial decision-maker may not capture the actual decision-making process within the households, as financial choices may result from the interaction among household members. However, there is empirical evidence supporting the relation between personal earnings and the role in household financial decision-making (Johnston, Kassenboehmer and Shields 2016).

Sample descriptive statistics are reported in Table 1. On the basis of our descriptive statistics, Italian financial decision-makers are mainly middle-aged men, living in the North. 42% of respondents attended either only the primary or also the secondary school (‘less than high school’ dummy variable), 40% declare to hold the high school diploma (‘high school’ dummy variable), while 18% hold at least a bachelor’s degree (‘at least bachelor’s degree’ dummy variable). As for financial wealth, 52% of the sample declare to hold no more than 10,000 euros, while more than 80% declare to earn a monthly income up to 3,000 euros.<sup>3</sup>

The Survey also gathers information on psychological traits (the so-called ‘Big five’) and generalized trust. ‘Big five’ personality traits were elicited following a validated, 10-item questionnaire by Rammstedt and John (2007), in the Italian version validated by Guido et al. (2015). Respondents were asked to state their opinion according to a 5-point Likert scale (from 1 - ‘strongly agree’ to 5 - ‘strongly disagree’) on the following ten statements: ‘I perceive myself as someone who: tends to find faults with others; is generally trusting; tends to be lazy; does a thorough job; is relaxed, handles stress very well; gets nervous easily; is reserved; is outgoing, sociable; has few artistic interests; has an active imagination. Generalised trust was measured through the following question, drawn from the European Social survey 2012: ‘In general, do you think that it is possible to trust people or that it is better to be wary? Give an answer on a 1 to 10 scale, where 1 means that it is necessary to be wary while 10 means that it is possible to trust people’.

2 The sample is representative of Italian population on the basis of weights provided by ISTAT to GfK, which refer to gender, age, geographic area (north, center, south and islands), size of the city/town of residence by number of inhabitants.

3 Financial wealth and earnings data could be affected, however, by under-reporting.

The 2018 Survey also measures respondents' financial knowledge with respect to seven items, including the so-called 'financial literacy big five' by Lusardi (risk-return trade-off, inflation, compound interest, diversification, mortgage), as well as two more sophisticated questions (the relation between price and interest of bonds and riskiness of stocks; Table 2). Respondents are classified as low or high financially literate on the basis of an overall score based on the number of correct answers. The level of financial literacy is evaluated to be high (low) if the number of correct answers is above (below or equal to) the sample median score (i.e., 3 correct answers out of a total of 7 questions).

**Table 1 – Sample descriptive statistics**  
(frequencies in percentage values)

variable	percentage	variable	percentage
<b>Gender</b>		<b>Financial wealth</b>	
men	74.0	<=10,000 euros	52.0
women	26.0	10,001 – 50,000 euros	27.0
<b>Education</b>		50,001 – 250,000 euros	18.0
less than high school	42.0	> 250,000 euros	3.0
high school	40.0	<b>Monthly family income</b>	
at least bachelor degree	18.0	< 1,200 euros	22.0
<b>Area of residence</b>		1,201 - 3,000 euros	60.0
North	49.0	3,001 - 5,000 euros	15.0
Centre	20.0	> 5,000 euros	3.0
South and islands	31.0	<b>Generalised low trust</b>	
<b>Marital status</b>		<b>Psychological traits<sup>1</sup></b>	
single	11.3	extroversion	33.0
cohabitant	8.4	agreeableness	41.0
married	66.2	openness	33.0
widow/widower	5.9	conscientiousness	66.0
separated	3.1		
divorced	5.3		
<b>Age</b>			
<=35	8.8		
35<age <=45	21.9		
45<age <=55	28.2		
55<age <=65	22.3		
age > 65	18.8		

Source: own elaborations on CONSOB 2018 survey data. The sample does not include bank employees, insurance company employees and financial advisors. As for 'employment status' group, 'out of labour' includes housewives, students and unemployed. Frequencies are adjusted by sample weights (provided by GfK Eurisko), i.e. the inverse of the probability to be included in the sample. The accuracy of the estimates of the average values has been tested by computing the corresponding confidence intervals based on the Jackknife variance estimator (the estimates of the confidence intervals are available on request). Income and wealth missing values are imputed by using GfK Eurisko methodology. Income and wealth could be under-reported. Generalised trust is considered 'low' if the trust score is lower than 6. <sup>1</sup> Frequencies refer to the scores of psychological traits higher than 6.

**Table 2 – Financial literacy questionnaire**

<b>financial literacy item</b>	<b>question wording</b>
<b>risk-return trade off</b>	Q1) In general, riskier investments tend to provide higher returns over time than safer investments: 1 = true; 2 = false ; 3 = do not know ; 4 = refusal
<b>inflation</b>	Q2) Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, would you be able to buy with the money in this account: 1 = more than today; 2 = exactly the same as today; 3 = less than today; 4 = do not know; 5 = refusal
<b>compound interest</b>	Q3) Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? 1 = more than €102; 2 = exactly €102; 3 = less than €102; 4 = do not know; 5 = refusal
<b>portfolio diversification</b>	Q4) Investing 1000 euro in one stock of one firm is generally less risky than investing 100 euro in 10 stocks of different firms. 1 = true; 2 = false; 3 = do not know; 4 = refusal
<b>mortgage</b>	Q5) A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less. 1 = true; 2 = false; 3 = do not know ; 4 = refusal
<b>relationship between interest rate and price of bonds</b>	Q6) If the interest rate falls, what should happen to bond prices? 1 = rise; 2 = fall; 3 = stay the same; 4 = none of the above; 5 = do not know; 6 = refusal
<b>risk of stocks</b>	Q7) Unlisted stocks are normally riskier than listed stocks. 1= true; 2 = false; 3 = do not know; 4 = refusal

### 3.2 The intention to learn more about savings and investments: item design and descriptive statistics

In CONSOB 2018 questionnaire, we designed a module on the intention to learn more about personal finance, with specific reference to savings and investments. This intention is elicited in a time-specific format, i.e. with respect to a 12 month horizon<sup>4</sup>, with the following question: ‘I intend to learn more about savings and investments right now or within 12 months at latest’. Answers are expressed on a 5-point Likert scale (from 1 - ‘strongly agree’ to 5 - ‘strongly disagree’).

Following the TPB approach, intentions are regarded as dependent on three latent variables: attitudes (i.e. one’s own overall evaluation of the behaviour), subjective norms (expressing the perceived social pressure in favour or against the behaviour) and perceived behavioural control (i.e. perception of one’s own ability to enact the behaviour). Attitudes are gathered through two components: beliefs about the consequences of learning more (behavioural beliefs) and judgments about these consequences (outcome evaluation).

Subjective norms are measured with both the individual perception about how other people would like the person to behave, and the individual consideration of other people’s opinion, where proximal people

4 The Survey also elicited intention in a generalized format, i.e. without specifying any time horizon, with the following question: ‘I intend to learn more about savings and investments’. We verified that using the generic intention as dependent variable does not significantly change the econometric results (estimates available upon request).

may be the partner, relatives, friends and colleagues. Finally, perceived behavioural control is measured by gathering control beliefs regarding learning more about savings and investments. The above-mentioned constructs are elicited through multiple answer questions, requiring respondents to score their own preferences on a 5-point Likert scale (Table 3). For each of the psychological constructs (attitudes, subjective norms and perceived behavioural control) items were presented to respondents in a random order.

Table 3 reports the survey questions for attitudes, subjective norms and perceived behavioural controls together with their average scores. Some extra statistics on the aggregate scores for each TPB construct by gender and level of financial literacy are reported in Appendix2.

**Table 3 – Survey questions collecting information on attitudes, subjective norms and perceived behavioural control**

psychological constructs	items
<b>Attitudes</b>	
behavioural beliefs	<p>For each of the following statements, choose the answer which best describes your attitude (scale from 1- strongly agree to 5-strongly disagree):</p> <p>Learning more about savings and investments would...</p> <ul style="list-style-type: none"> <li>a) help me to save</li> <li>b) make me feel more secure</li> <li>c) avoid unnecessary expenses</li> <li>d) be boring</li> <li>e) be a way to learn new things</li> <li>f) be useful to choose on my own</li> <li>g) be important for choosing better who can support me</li> <li>h) help me to invest better</li> <li>i) improve my understanding of financial information</li> <li>j) help me to plan better for retirement</li> <li>k) make me feel more appreciated</li> </ul>
outcome evaluation	<p>For each of the following statements, choose the answer which best describes your attitude (scale from 1- strongly agree to 5-strongly disagree):</p> <p>To me it is important to....</p> <ul style="list-style-type: none"> <li>a) save</li> <li>b) feel more secure</li> <li>c) avoid unnecessary expenses</li> <li>d) not get bored</li> <li>e) learn new things</li> <li>f) choose on my own</li> <li>g) choose better who can support me</li> <li>h) invest better</li> <li>i) improve my understanding of financial information</li> <li>j) plan better for retirement</li> <li>k) feel more appreciated</li> </ul>
<b>Subjective norms</b>	
normative beliefs	<p>For each of the following statements, choose the answer which best describes your attitude (scale from 1- strongly agree to 5-strongly disagree):</p> <p>I should learn more about savings and investments according to my:</p> <ul style="list-style-type: none"> <li>a) partner</li> <li>b) close relatives</li> <li>c) friends</li> <li>d) colleagues</li> </ul>

motivation to comply	For each of the following statements, choose the answer which best describes your attitude (scale from 1- strongly agree to 5-strongly disagree):
	I value the opinion of my...
	a) partner
	b) close relatives
	c) friends
	d) colleagues

**Perceived behavioural control**

	For each of the following statements, choose the answer which best describes your attitude (scale from 1- strongly agree to 5-strongly disagree):
	Learning more about savings and investments is difficult because...
	a) topics are too complex
	b) I don't know who can help me or where I can find financial information
	c) people who can help me are not on my side
	d) it takes too long

Table 4 reports the outcomes of the question on the intention to learn finance within 12 months at latest by categories of agreement, gender and financial literacy level. As it can be seen from this preliminary table, intention is higher for men and is lower for individuals with lower financial literacy.

**Table 4 – Distribution of intention to learn more about savings and investments by gender and financial literacy level** (in percentage)

agreement categories	all sample	gender		financial literacy	
		men (a)	women (b)	low (c)	high (d)
strongly disagree	13.2	12.0	16.5	15.5	10.4
disagree	16.7	15.5	19.9	14.7	19.2
neither agree nor disagree	46.8	48.0	43.3	50.0	43.0
agree	19.3	20.7	15.4	16.2	23.3
strongly agree	4.0	3.7	4.9	4.0	4.2
<b>t-test (a)-(b)</b>		<b>1.9*</b>			
<b>t-test (c)-(d)</b>				<b>-2.7***</b>	

Source: own elaborations on CONSOB 2018 Survey data. T-test verifies if the reported difference is significantly different from zero. Reported frequencies are adjusted by sample weights. \* indicates significance at 10%; \*\*\* indicates significance at 1%.

### 3.3 Background factors

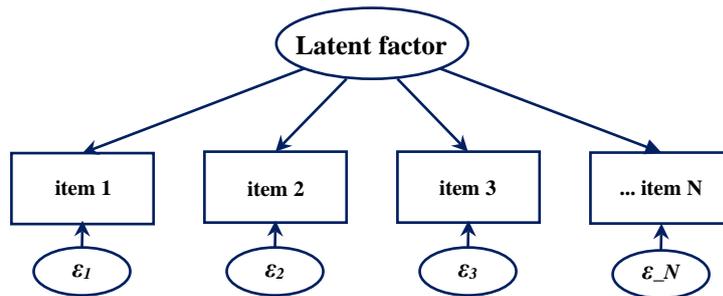
According to the TPB, several background factors may underpin the constructs leading the intention to perform a behaviour, i.e. psychological traits, socio-economic and demographic features, and financial literacy. As mentioned above, the CONSOB 2018 Survey includes psychological traits (such as personality traits, risk aversion, loss aversion, generalized trust, etc.), socio-economic and demographic factors (such as education, age, gender and income), and financial literacy. In empirical analyses, we strongly restrict the set of background factors to avoid endogeneity issues. In particular, among personal traits, we select the classic ‘big five’ psychological traits (agreeableness, conscientiousness, emotional stability, extroversion, openness) and the level of generalized trust, while as for social factors we consider only gender, age and education.

### 3.4 Analytical strategy: confirmatory factor analysis (CFA) and structural equation models (SEM)

In the previous section, attitudes, subjective norms and perceived behavioural control were approximated as weighted scores for descriptive statistical purposes. According to the TPB, however, they are psychological constructs and should be more accurately considered as latent factors, which can be measured through a set of items measured, in turn, through multiple answer questions.

The so-called confirmatory factor analysis (CFA analysis) allows to treat attitudes, subjective norms and perceived behavioural control as latent factors, which influence the answers to multiple item questions (Figure 2).

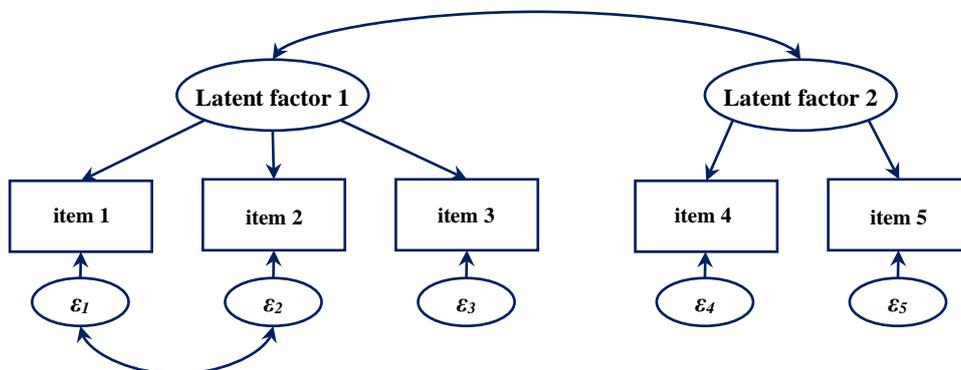
Figure 2 - Confirmatory factor analysis (CFA) graphical representation



Following conventional signs, ovals indicate latent factors, while rectangles observable variables; ' $\epsilon_i$ ' is an idiosyncratic error. The graph represents the relation between the latent factor and the items of the question used for measurement.

When multiple latent factors are considered, CFA allows to account for both the possible correlation among the latent factors and the possible correlation among the measurement errors of the items due to noise in survey responses (Figure 3).

Figure 3 - Two factor CFA



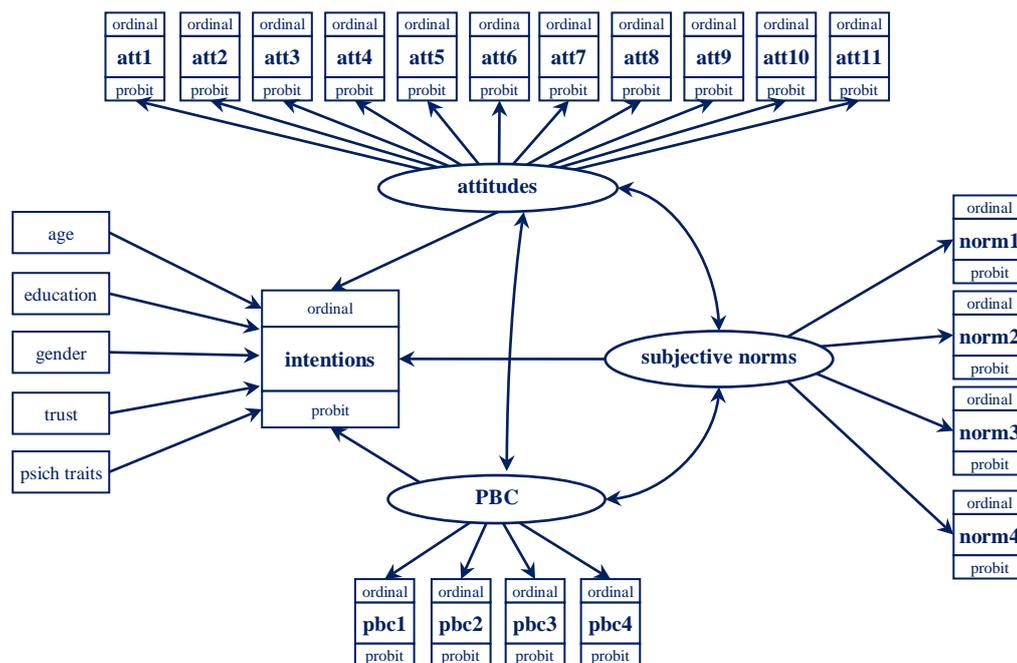
Following conventional signs, ovals indicate latent factors, while rectangles observable variables; ' $\epsilon_i$ ' is an idiosyncratic error. Arrows signal that: a) covariance between the two latent factors is significant; b) item1, item2, item3 are used to measure the first latent factor; c) item 4 and item 5 are used to measure the second latent factor; d) covariance between the idiosyncratic errors  $\epsilon_1$  and  $\epsilon_2$  is significantly different from zero.

In addition, the CFA enables to treat the non-linearity of the causal relationship among latent factors and respondents' answers. Indeed, given that, as already mentioned in Table 3, answers are given on a Likert

scale ranging from 1 to 5 (i.e., from ‘strongly disagree’ to ‘strongly agree’), response variables are discrete categorical variables that can be best analysed through an ordinal probit model.

Finally, the CFA analysis can be included in a more general model of the intention to perform a given behaviour by simultaneously estimating the causal relationships between latent factors and the corresponding item responses on one side, and the relationship among intentions and latent factors on the other side. To simultaneously model these relationships, we apply the CFA to move, as a second step, to a more general structural equation modelling (Generalized Structural Equation Model - GSEM), where the non-linear links between attitudes, subjective norms, perceived behavioural control and intentions are also estimated through an ordered probit model as they are elicited on a Likert scale (Figure 4).

**Figure 4 - Generalized structural equation model with a latent component**



Following conventional graphical signs, ovals indicate latent factors, while rectangles observable variables. ‘psych traits’ (psychological traits) refer to the Big five personal traits. ‘att1’ – ‘att11’ are the product between behavioural beliefs and outcome evaluation elicited by attitude measurement questions; ‘norm1’-‘norm4’ are the product between normative beliefs and motivation to comply elicited by social pressure measurement questions; ‘pbc1-pbc4’ are perceived behavioural control items. The variables ‘att1-att11’ and ‘norm1-norm4’ range from 1 to 25, while ‘pbc1-pbc4’ range from 1 to 5. The variable ‘education’ is measured by 2 dummy variables (‘high school’ and ‘at least university degree’). The variable ‘gender’ is a dummy variable equal to 1 if the decision-maker is male. The dependent variable ‘intentions’ ranges from 1 to 5 (5-point Likert scale). Arrows represent: a) relations among latent factors and measurement items; b) covariances among latent factors; c) relations between intentions and explicative variables/latent factors. Models applied are: 1) ordinal probit between latent factors and measurement items; 2) ordinal probit between the independent variable ‘intentions’ and latent factors /explicative variables.

As shown in the next section, the empirical analysis first tested the degree of coherence and correlations among the answers referring to the same latent factor (i.e., 11 items for attitude, 4 items for perceived social pressure and 4 items for perceived behavioural control); secondly, it applied the CFA; finally, it estimated a generalized structural equation model, for both the full sample and for subsamples drawn for gender and financial literacy level.

## 4 Results

The theoretical specification of the determinants of the intention to learn more about finance rests on the hypothesis that the latent factor ‘attitude’ can be related to the product between ‘behavioural beliefs’ and ‘outcome evaluations’ (11 items, also att1-att11 henceforth); the latent factor ‘subjective norms’ can be related to the interaction between ‘normative beliefs’ of ‘important others’ and ‘motivation to comply’ (4 items, also norm1-norm4 henceforth); the latent factor ‘perceived behavioural control’ relates to ‘control beliefs’ (4 items; pbc1-pbc4).

In particular, given that all the items are measured on a 5-point Likert scale, the observable variables att1 – att11 and norm1-norm4 range from 1 to 25 while pbc1-pbc4 range from 1 to 5. As already mentioned, they are all self-reported scores, that increase with the degree of respondent’s agreement.

Before the application of the CFA, preliminary analyses were carried out to test the degree of coherence and commonality among the answers referring to the same latent factor (i.e., through Cronbach’s  $\alpha$  and principal component analysis; see Table 5 for more details). The levels of correlation among responses justifies the application of the confirmatory factor analysis along the lines already detailed in section 4. Indeed, Cronbach’s  $\alpha$  among the items related to attitude, social pressure and perceived behavioural control is equal to 0.95, 0.91 and 0.85 respectively, while the first principal component explains 67%, 80% and 70% of the sample variance respectively<sup>5</sup>.

5 There are items, however, which are less correlated than others: a) ‘learning more about savings and investments would be boring’ in the attitude group of responses; b) ‘partner’ in the subjective norm group of variables; c) ‘learning more about savings and investments is difficult because people who can help me are not on my side’ in the perceived behavioral group of responses.

**Table 5 – Level of coherence among psychological construct components**

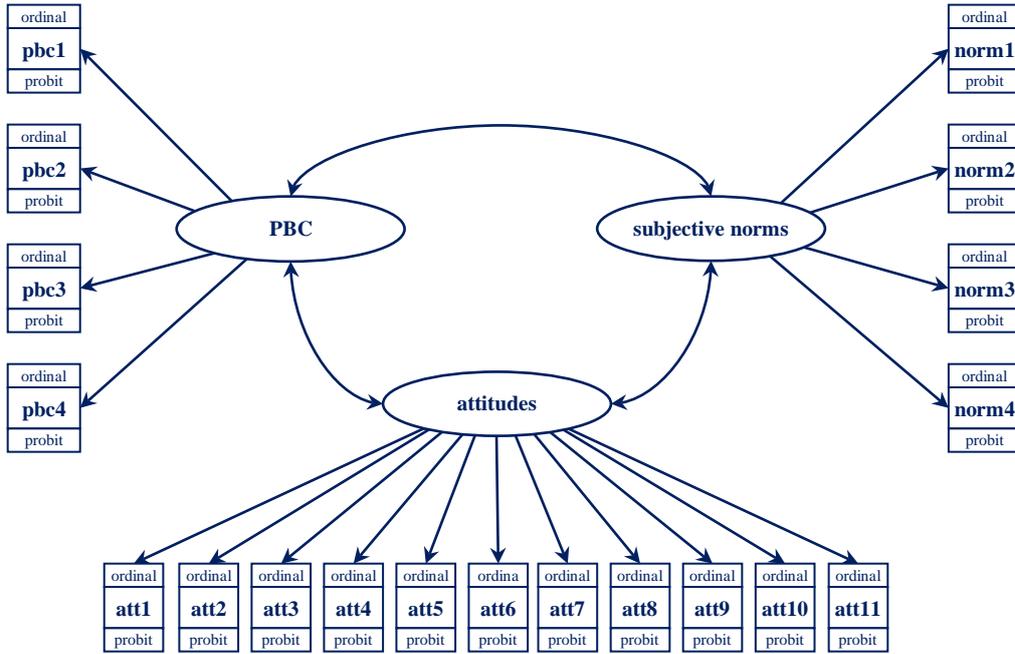
	factor loadings first principal component	Cronbach's $\alpha$		factor loadings first principal component	Cronbach's $\alpha$
<b>Attitudes</b>			<b>Subjective norms</b>		
att1	0.90	0.94	norm1 (partner)	0.80	0.93
att2	0.91	0.94	norm2 (relatives)	0.91	0.88
att3	0.85	0.94	norm3 (friends)	0.93	0.87
att4	0.37	0.96	norm4 (colleagues)	0.92	0.88
att5	0.84	0.94	<i>Variance explained (%)</i>	<b>80</b>	
att6	0.81	0.94	<i>Total <math>\alpha</math></i>		<b>0.91</b>
att7	0.84	0.94	<b>Perceived behavioural control</b>		
att8	0.87	0.94	pbc1	0.87	0.78
att9	0.88	0.94	pbc2	0.84	0.81
att10	0.87	0.94	pbc3	0.78	0.84
att11	0.73	0.94	pbc4	0.83	0.81
<i>Variance explained (%)</i>	<b>67</b>		<i>Variance explained (%)</i>	<b>70</b>	
<i>Total <math>\alpha</math></i>		<b>0.95</b>	<i>Total <math>\alpha</math></i>		<b>0.85</b>

Source: own elaborations on CONSOB 2018 survey data. For each row, the reported  $\alpha$  is computed without taking into account the correspondent item in the same row; 'att1'-'att11' are the product of behavioural belief and outcome evaluation; 'norm1'-'norm4' are the product between normative beliefs and motivation to comply; 'pbc1'-'pbc4' are perceived behavioural control items.

#### 4.1 Attitudes, subjective norms and perceived behavioural control: results from the CFA

This section reports estimate results referring to the measurement component of the generalised structural equation model described in section 4 (Figure 5).

**Figure 5 - Joint CFA of attitudes, perceived social pressure and perceived behavioural control**



Following conventional graphical signs, ovals indicate latent factors, while rectangles observable variables. ‘Psych traits’ (psychological traits) refer to the Big five personal traits. ‘att1’-‘att11’ are the product between behavioural beliefs and outcome evaluation elicited by attitude measurement questions; ‘norm1’-‘norm4’ are the product between normative beliefs and motivation to comply elicited by social pressure measurement questions; ‘pbc1-pbc4’ are perceived behavioural control items. The variables ‘att1-att11’ and ‘norm1-norm4’ range from 1 to 25, while ‘pbc1-pbc4’ range from 1 to 5. Arrows signal: a) relations among latent factors and measurement items; b) significant covariance among latent factors. The model applied is an ordinal probit between latent factors and measurement items.

As already mentioned, the discrete, ordinal nature of each variable justifies the application of the ordered probit estimation method. In particular, we estimate 11 ordered probit models for the latent factor attitude, 4 in the case of subjective norm and 4 with respect to the latent factor perceived behavioural control. As an example, for the observable variable ‘att1’, we estimate the following probabilities:

$$Prob(att_1 = i | Attitude) = Prob(c_{i-1} < Attitude * \beta_1 + \varepsilon_{1i} < c_i)$$

where  $i=1, \dots, 25$ ,  $\varepsilon_{1i} \sim N(0,1)$ ,  $c_0 = -\infty$  and  $c_{25} = +\infty$ . Therefore, the domain of a Normal distribution with mean zero and 1 standard deviation is divided in 24 cut-off points and the score ( $Attitude * \beta_1 + \varepsilon_{1i}$ ) is used along with the cut-off points to obtain the probabilities that each respondent shows a specific degree of agreement (from 1=‘strongly disagree at all’ to 5=‘strongly agree’).<sup>6</sup>

Table 6 reports estimates of the parameters representing the strength of the causal relationship between each latent factor and correspondent multiple answer items. For identification purposes we constrain

<sup>6</sup> For robustness purposes, a linear representation of the relation between latent factor and item responses was estimated as well, by applying the Asymptotic Distribution Free (ADF) estimation method. Results (available on request to the authors) are in line with the order probit estimates reported in the paper.

to 1 respectively the observable variables att2 (*make me feel more secure*), norm1 (*friends*) and pbc1 (*financial knowledge topics too complex*), as these variables record the highest factor loadings in the principal component analysis (see Table 8 for more details). All the coefficients are significant at 1% level.

**Table 6 – Confirmatory factor analysis estimates**

Psychological constructs	estimates
<b>Attitudes: learning more about savings and investments would...</b>	
att2: make me feel more secure	1.00
att1: help me to save	0.99***
att3: avoid unnecessary expenses	0.68***
att4: be boring (reverse coded)	0.17***
att5: be a way to learn new things	0.65***
att6: be useful to choose on my own	0.53***
att7: be important for choosing better who can support me	0.64***
att8: help me to invest better	0.74***
att9: improve my understanding of financial information	0.75***
att10: help me to plan better for retirement	0.74***
att11: make me feel more appreciated	0.44***
<b>Subjective norms: I should improve my knowledge regarding savings and investments according to my...</b>	
norm3: friends	1.00
norm1: partner	0.34***
norm2: close relatives	0.63***
norm4: colleagues	0.86***
<b>Perceived behavioural control: learning more about savings and investments is difficult because...</b>	
pbc1: topics are too complex (reverse coded)	1.00
pbc2: I do not know who can help me /source of information (reverse coded)	0.80***
pbc3: people who can help me are not on my side (reverse coded)	0.57***
pbc4: it takes too long (reverse coded)	0.72***
<b>Covariances among latent factors</b>	
attitude and subjective norms	3.6***
attitude and perceived behavioural control	-1.5***
subjective norms and perceived behavioural control	-2.4***

Source: own elaborations on CONSOB 2018 survey data. \*\*\* indicates significance at 1%.

Estimation results allow us to rank the items according to the strength of their linkage with latent factors. The main contributor to the attitude towards improvement of one's own financial knowledge is att1 ('help me to save') while the least relevant is att4 ('learning would be boring' reverse coded). As for subjective norms and perceived control, norm4 ('colleagues') and pbc2 ('I don't know who can help me/the source of information') are respectively the most relevant items.

Lastly, while the covariance, between attitudes and subjective norms is significant and positive, covariances between perceived behavioural control and the other two psychological constructs are significantly negative (all at 1% level)<sup>7</sup>. One possible interpretation of this empirical evidence is that more overconfident individuals are more likely to display both less positive attitudes towards learning and higher perceived behavioural control. Analyses using simple *t-tests* provide empirical support to this interpretation. Following Broihanne *et al.* (2014), we define individuals as *overconfident* (*underconfident*) if the sign of the difference between the self-reported number of correct answers to financial literacy questions and the number of actual correct answers is positive (negative). Based on this definition, the attitude towards learning of overconfident respondents is on average lower (at a 1% significance level) than that of underconfident ones. On the other hand, perceived behavioural control of overconfident respondents is on average higher (at a 10% significance level) than that of underconfident ones.

## 4.2 Intentions to learn more about savings and investments: results from the SEM

Let us now turn to the joint estimation of the relationship among the intention to improve one's own financial knowledge in a time-specific horizon and attitudes, subjective norms and perceived behavioural control) (Figure 4). The GSEM allows to jointly estimate both the structural part and the latent building block of our model with a high level of flexibility. The specification of the model also includes some background factors, added on the basis of the already underlined exogeneity criterion: age, education, gender, generalized trust and psychological traits such as extroversion, openness, consciousness, agreeableness and emotional stability<sup>8</sup>.

Given that the intention to learn about savings and investments is a discrete variable which ranges from 1 to 5, we apply an ordered probit model.

In particular, the structural component of the model is formalized through the equation:

$$Prob(intention = i|Y) = Prob(c_{i-1} < Y * \gamma + \eta < c_i)$$

where  $i=1, \dots, 5$ ,  $\eta \sim N(0,1)$ ,  $c_0 = -\infty$  and  $c_5 = +\infty$ ,  $\gamma$  is a vector of coefficients, the matrix  $Y$  includes the latent and the background factors. Therefore, the domain of a Normal distribution with mean zero and 1 standard deviation is divided in 4 cut-off points and the score ( $Y * \gamma + \eta$ ) is used along with the cut-off points to obtain the probabilities that each respondent shows a specific degree of agreement (from 1='do not agree at all' to 5='strongly agree')<sup>9,10</sup>. The model does not raise any identification issues as it is totally recursive.

7 This result is confirmed when we take into account deterministic scores.

8 We build up for gender a dummy variable that is equal to 1 when the financial decision-maker is a man; education is presented by 2 dummy variables: 'high school' and 'at least bachelor degree'; psychological traits are considered in the model on 5-point Likert scale, while generalized trust on 10-point Likert scale.

9 For robustness purposes, a linear representation of the relation between latent factor and item responses has been estimated as well by applying ADF estimation method. Results, available on request, are in line with the order probit estimates reported in this section.

10 In the linear specification we tested also a model of the determinants of attitudes, subjective norms and perceived behavioural control through the following equations:

$$Attitudes = \alpha_0 + \alpha_1 age + \alpha_2 age^2 + \alpha_3 man + \alpha_4 dummy_{high\ school} + \alpha_5 dummy_{bachelor} + \varepsilon_1 \quad (1)$$

$$Norms = \gamma_0 + \gamma_1 age + \gamma_2 age^2 + \gamma_3 man + \gamma_4 dummy_{high\ school} + \gamma_5 dummy_{bachelor} + \varepsilon_2 \quad (2)$$

$$PBC = \theta_0 + \theta_1 age + \theta_2 age^2 + \theta_3 man + \theta_4 dummy_{high\ school} + \theta_5 dummy_{bachelor} + \varepsilon_3 \quad (3)$$

Estimates of the determinants of intention are reported in Table 7. Attitudes, subjective norms and perceived behavioural control are significant determinants of the intention to learn more about savings and investments. However, the incidence of the attitudes is higher than the influence of subjective norms and, above all, than the impact of perceived behavioural control. Among the background factors, psychological traits and gender tend to have a significant influence on the willingness to learn finance. The effect of gender and financial knowledge will be deeply analysed in the following section through a group comparison analysis.

**Table 7 – Determinants of the intention to learn more about savings and investments (GSEM)**

variable	estimates	variable	estimates
attitudes	0.32***	trust	0.00
subjective norms	0.16***	extroversion	-0.05**
perceived behavioural control	0.10***	openness	0.07***
woman	-0.22***	conscientiousness	-0.06**
age	-0.01	agreeableness	0.02
age squared	0.00	emotional stability	0.01
high school	-0.06		
at least bachelor degree	0.13		

Source: own elaborations on CONSOB 2018 survey data. \*\* indicates significance at 5%; \*\*\* indicates significance at 1%.

### 4.3 Group comparisons by gender and financial literacy level

Group comparison by gender shows that the intention to learn about savings and investments differs significantly among men and women. Being man (woman) increases (decreases) the probability of being willing to learn more about finance. The difference is especially remarkable given that the sample female group refers to financial decision-makers, that is to the highest income earner, who is also likely to have a greater role in household financial decision-making. As a consequence, one may suspect that this gender difference could be even larger in the overall population including also non decision-makers. At the same time, this difference suggests that trying to reinforce women’s intention to learn more about finance could be a relevant part of a financial education strategy aimed at reducing the financial literacy gender gap.

To analyse this issue further, we applied the model over the two gender groups by segmenting also on the basis of financial knowledge level (Table 8). As already mentioned, the level of financial knowledge is high (low) if the number of correct answers is above (below or equal to) the sample median score (3 correct answers out of a total of 7 questions).

Given that all the  $R^2$  related to these equations are not greater than 0.05 (results available on request), we decided to represent them as correlations among explicative variables rather than through causal relations.

**Table 8 – Determinants of the intention to learn more about savings and investments by group comparison (GSEM)**

	all the sample	gender		financial literacy	
		men	women	low	high
attitudes	0.32***	0.33***	0.31***	0.37***	0.27***
subjective norms	0.16***	0.16***	0.16***	0.23***	0.11***
perceived behavioural control	0.10***	0.12***	0.05	0.12***	0.07**
woman	-0.22***	...	...	-0.34***	-0.07
age	-0.01	-0.03	0.03	0.03	-0.04
age squared	0.00004	0.0002	-0.0003	0.00	0.00
high school	-0.06	-0.09	0.01	-0.12	0.00
at least bachelor degree	0.13	0.1	0.24	0.00	0.19
trust	0.002	0.02	-0.05*	-0.02	0.02
extroversion	-0.05**	-0.04	-0.08*	-0.03	-0.06
openness	0.07***	0.08***	0.02	0.04	0.07**
conscientiousness	-0.06**	-0.08***	0.002	-0.08***	-0.01
agreeableness	0.02	0.01	0.03	0.02	0.01
emotional stability	0.01	-0.0004	0.05	0.01	0.00
number of observations	1,601	1,205	396	844	757

Source: own elaborations on CONSOB 2018 survey data. \*\* indicates significance at 5%; \*\*\* indicates significance at 1%. Respondents are classified as having low or high financial literacy on the basis of an overall score resulting from the number of correct answers. The level of financial literacy is evaluated to be high (low) if the number of correct answers is above (below or equal to) the sample median score (3 correct answers over a total of 7 questions).

Despite the smaller size of the female subsample (396 individuals), which has to be taken into account when interpreting results, attitudes and subjective norms are still statistically significant, with coefficients being very similar across subsamples. Instead, perceived behavioural control and trust are significant only for male financial decision makers. In addition, the gender gap in intentions seems to be even stronger in the low financial literate subsample.

From a policy standpoint, it is also interesting to look closer at the evaluation for individual attitude and PBC items, which could suggest where to intervene when communicating and promoting financial education programs (relatively less can be done as far as social norms are concerned, unless widespread campaigns in favour of financial literacy may help increasing social pressure on individuals with lower financial literacy). Table 9 reports (together with the coefficient of the item relative to the latent variable) the average value for the behavioural belief (how much a potential outcome is associated to learning more about savings and investments) and the average importance attributed to the outcome. For women and for the low literacy subsample we also report average differences relative to the full sample.

**Table 9 – Determinants of the intention to learn more about savings and investments by group comparison (GSEM)**

Attitudes	Latent variable coefficients	Behavioural belief: learning more about savings and investments would... (e.g. make me more comfortable)			Outcome evaluation: for me it is important to... (e.g. feel more comfortable)		
		Average value (full sample)	Women vs full sample	Low literacy subgroup vs full sample	Average value (full sample)	Women vs full sample	Low literacy subgroup vs full sample
att2: make me feel more secure	1.00	3.29	0.07	-0.12	3.43	0.05	-0.15
att1: help me to save	0.99	3.31	0.03	-0.14	3.45	0.02	-0.13
att3: avoid unnecessary expenses	0.68	3.22	0.02	-0.11	3.41	0.03	-0.12
att4: be interesting	0.17	3.10	-0.04	-0.03	3.09	-0.04	-0.02
att5: be a way to learn new things	0.65	3.41	0.10	-0.17	3.35	0.04	-0.15
att6: be useful to choose on my own	0.53	3.31	0.03	-0.13	3.34	0.01	-0.09
att7: be important for choosing better who can support me	0.64	3.23	0.11	-0.15	3.18	0.05	-0.13
att8: help me to invest better	0.74	3.32	0.02	-0.19	3.28	0.05	-0.16
att9: improve my understanding of financial information	0.75	3.28	0.08	-0.17	3.19	0.03	-0.14
att10: help me to plan better for retirement	0.74	3.28	0.06	-0.17	3.29	0.05	-0.12
att11: make me feel more appreciated	0.44	2.98	0.02	-0.03	3.02	-0.02	-0.02

Overall, the outcomes of feeling more comfortable/free from anxiety and having a stimulus in saving are the two elements that (considering both the link with the latent variable and the average values of behavioural belief and outcome evaluation) appear to be the most relevant. Women appear to be even slightly more conscious than average about the potential benefits associated with a higher level of financial literacy, and attribute a similar importance to all outcomes. Instead, the low literacy subgroup shows both a weaker association between financial literacy and the different potential benefits (as it can be seen by lower-than-average values in the behavioural beliefs' section) and less interest in those benefits. While for some items this might depend on the socio-economic status of the respondent (for instance, poorer individuals who do not invest may perceive less the benefit of being able to invest better), other elements such as the possibility to spend a more comfortable/less anxious life or to be able to plan better for retirement should be relevant for every individual and could be emphasized/brought to the attention of low literacy targets in order to increase their intention to learn.

For a similar reason, it is interesting to look at the individual items linked to perceived behavioural control (to make interpretation easier, values are reported in Table 10 without reverse coding, so that a higher value implies a greater relevance of the obstacle to learning identified in each item).

**Table 10 – Determinants of the intention to learn more about savings and investments by group comparison (GSEM)**

Perceived behavioural control	Latent variable coefficients	Learning more about savings and investments is difficult because...*		
		Average value (full sample)	Women vs full sample	Low literacy subgroup vs full sample
topics are too complex	1	3.05	0.12	0.12
I do not know who can help me /source of information	0.80	2.92	0.06	0.09
people who can help me are not on my side	0.57	2.91	0.01	0.08
it takes too long	0.72	3.09	0.09	0.03

\*In this table answers are not reverse coded

From a policy perspective, the importance to design interventions whose complexity is tailored to the expertise of the target (i.e., avoiding to propose overambitious and excessively technical contents to low literacy targets that need easier concepts first) is relevant for the full sample and markedly more relevant for women and less literate individuals. The second and third item in the table also point out that being aware of the existence of publicly available and independent financial education programs could lower potential barriers, which are perceived to be higher especially by the least literate. To a certain extent, therefore, the characteristics of financial education supply can have an impact on perceived ability to learn and therefore on intentions and on financial education demand.

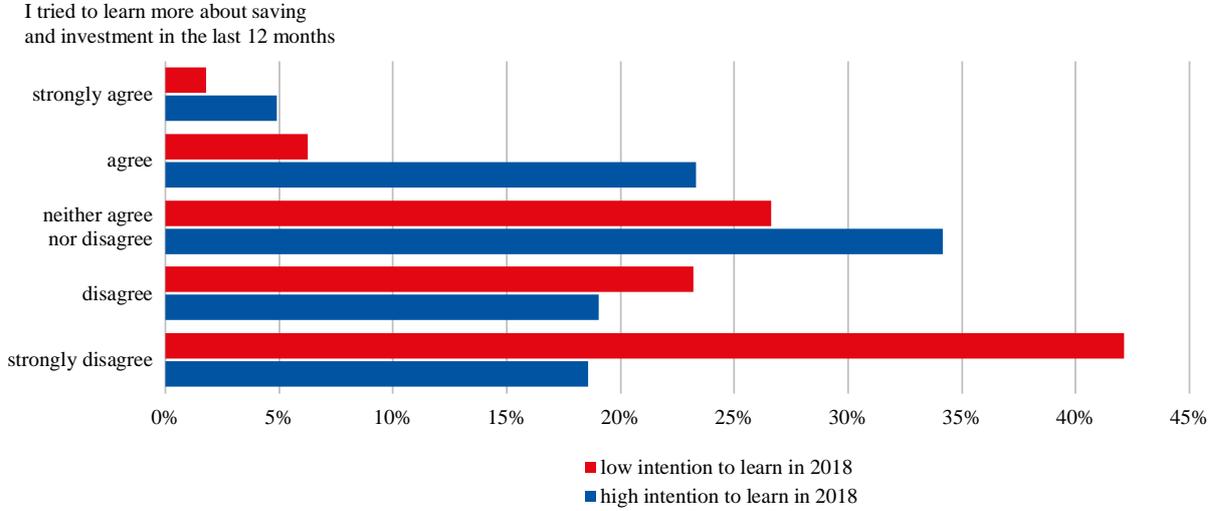
## 5 Intention to learn and effort made to increase financial literacy

In this section we attempt to measure the relation between intention to learn finance and behaviour. In particular, we use the panel component of both 2018 and 2019 CONSOB Surveys which is composed by 1,311 financial decision makers. We test the relationship between intention, perceived behavioural control and behaviour (according to the TPB model presented earlier in figure 1) using two different metrics for behaviour.

The first one is represented by the declared effort to learn more about finance, measured on the basis of the following question on a 1 to 5 Likert scale: “Express to what extent you agree with the following statement (on a scale from 1: “I strongly disagree” to 5 “I strongly agree”): over the last 12 months, I tried to learn more about savings and investments”. The second one is the change in the number of correct answers given to the five financial literacy questions in common between the two surveys. These questions (labelled as Q1, Q2, Q3, Q5, Q6 in Table 2) referred to the risk-return tradeoff, inflation, interest compounding, mortgages and the relationship between rates’ level and bond prices. Both ways of measuring behaviour have potential limitations. On one hand, self-declared effort has the potential pitfall of not being an objective measure of the result achieved by the individual. On the other hand, the objective measure identified by the variation in the number of correct answers to the five literacy questions focuses on learning on some specific, even if clearly important, elements of finance and may not capture other actual efforts made by individuals, e.g. in understanding better investment products’ characteristics before investing. Moreover, actual improvement in financial knowledge may also be conditioned by the ability to access information or financial education opportunities, independently on individual true effort.

Given this premise, and analysing first the relationship between the intention to learn and the effort to increase one's own financial literacy level, a quick look at data suggests the existence of a positive correlation (Fig. 6), that we statistically verify by adding a second equation in the model described in section 4.2.

**Figure 6 – Self-evaluated effort to increase own financial literacy level**



More precisely, we add the following ordinal probit equation

$$Prob(effort = i | intention, PBC) = Prob(c_{i-1} < \alpha * intention + \beta * PBC + \eta < c_i)$$

where  $i=1, \dots, 5$ ,  $\eta \sim N(0,1)$ ,  $c_0 = -\infty$  and  $c_5 = +\infty$ ,  $\alpha$  and  $\beta$  are parameters and PBC stands for perceived behavioural control. Intention keeps being represented by the following equation

$$Prob(intention = i | Y) = Prob(c_{i-1} < Y * \gamma + \eta < c_i)$$

where  $i=1, \dots, 5$ ,  $\eta \sim N(0,1)$ ,  $c_0 = -\infty$  and  $c_5 = +\infty$ ,  $\gamma$  is a vector of coefficients, the matrix Y includes the latent and the background factors, as described in section 4.2. All the background factors and latent factors refer to 2018 Survey. Only the effort variable is measured on 2019 wave of the survey.

Intention to learn and perceived behavioural control are positively and significantly associated with self-assessed effort as it is expected from the theory; intention determinants results are confirmed (Table 11).

The second test relates to the impact of intention to learn on changes in the financial literacy score by adding the following equation to the model:

$$Prob(Financial\ literacy\ score\ changes = i | intention, PBC) = Prob(c_{i-1} < \alpha * intention + \beta * PBC + \eta < c_i).$$

The financial literacy score year-on-year change is computed by referring to the sum of correct answers in the financial literacy questions available in both surveys. The questions were referred to risk-return tradeoff (Q1 in Table 2), inflation (Q2), interest compounding (Q3), mortgages (Q5) and the relation-

ship between rates' level and bond prices (Q6). Financial literacy score changes, therefore, can assume positive, negative or null values, indicating the improvement or worsening or stability of the number of correct answers.

**Table 11–Intention to learn and effort to learn finance (GSEM)**

<b>Intention to learn finance</b>		<b>Effort to learn finance</b>	
attitudes	0.27***	intention to learn finance	0.53***
subjective norms	0.14***	perceived behavioural control	0.08***
perceived behavioural control	0.10***		
woman	-0.20		
age	-0.03		
age squared	0.0003		
high school	-0.08		
at least bachelor degree	0.23		
trust	0.03		
extroversion	-0.09***		
openness	0.12***		
conscientiousness	-0.09***		
agreeableness	0.05		
emotional stability	-0.02		
Number of observations	1.214		

Source: own elaborations on CONSOB 2018 survey data. \*\* indicates significance at 5%; \*\*\* indicates significance at 1%. In the estimation process missing values regarding the effort to learn finance are discarded (number of observations = 1.214).

Results point out that, even if the relation between intention and effort is significant and robust, there is no evidence of a relationship between the intention to learn and an actual improvement on the five financial literacy questions under analysis (Tab.12). This is confirmed even when computing the change in the financial literacy score only on the basic questions (Q1, Q2, Q3) or restricting the analysis to specific subsamples (high/low financial literacy, overconfident/underconfident individuals).

As a further check, since according to the TPB model actual behaviour is jointly influenced by intention, perceived behavioural control but also by actual behavioural control, we also included education and age as proxies of actual behavioural control, i.e. of the individual's ability to actually learn given the intention. However, the relationship between intention and the change in the number of correct answers does not become positive and significant even when controlling for age and education.

**Table 12– Intention to learn and changes in financial literacy score (GSEM)**

<b>Intention to learn finance</b>		<b>Changes in financial literacy scores (2018-2019)</b>	
Attitudes	0.27***	intention to learn finance	-0.07
subjective norms	0.14***	perceived behavioural control	-0.01
perceived behavioural control	0.10***		
woman	-0.20		
age	-0.03		
age squared	0.0003		
high school	-0.08		
at least bachelor degree	0.23		
trust	0.03		
extroversion	-0.09**		
openness	0.12***		
conscientiousness	-0.09**		
agreeableness	0.05		
emotional stability	-0.02		
Number of observations	1.311		

Source: own elaborations on CONSOB 2018 survey data. \*\* indicates significance at 5%; \*\*\* indicates significance at 1%. In the estimation process missing values regarding the effort to learn finance are discarded.

When interpreting the mixed results of the relationship between intention and behaviour (under the double metric represented by self-assessed effort and the change in the number of correct answers) one possible view is that respondents have simply overvalued their true efforts in learning finance. The alternative view is that they may have actually devoted time to learn more about finance and investments, but devoting their efforts in different directions as opposed to learning the five financial literacy questions included in the two surveys. For instance, respondents might have concentrated on understanding better the characteristics of available banking and investment products, without trying to understand better the effects of inflation or the effects of interest rate changes on bond prices. We must remind that in this case survey participants were not offered a financial education training or suggested a specific way to improve their knowledge between the two surveys. As a consequence, individuals who actually tried to learn may have devoted their efforts in a different direction than learning how to answer some of the standard financial literacy questions. Using an analogy, even the intention of learning skiing may be correlated with the individual effort to learn how to ski, but it is likely that trying to learn skiing autonomously without a master could produce negligible results in terms of skiing performance, or at least could not lead to acquire the standard set of basic skiing skills identified by expert skiers.

The implication is that while we are stressing the importance of understanding better, and possibly influencing, the demand of financial literacy by understanding the role of the intention to learn, financial literacy supply, I.e. financial education programs and resources, maintain a crucial role, also because they help focusing the energies of those who are willing to learn on the key concepts that they have to learn first.

## 6 Conclusions

Increasing the level of financial literacy, especially for the most illiterate segments of the population, is an increasingly important aim for policy-makers over the world. However, reaching this aim may not only depend only on the number, size and variety of financial education initiatives (i.e. from financial education supply). On one hand, a rigorous assessment of whether and when financial education efforts can be effective is important. On the other hand, attention should also be devoted to the demand of financial education, i.e. to whether and to which extent individuals are willing to become more financially literate.

Understanding individuals' demand for financial education, and its heterogeneity, can be potentially relevant for multiple reasons. For people who are exposed to a financial education program independently on their own will (as it often happens for school students, when the decision to join the program is made by the single teacher or by the school/institution), individual motivation to learn can make the transmission of financial knowledge more effective. For people who are offered financial education programs but can decide whether to participate or not, as it is more common for adults, it can also be crucial for the first key step of attracting people into the program. Moreover, we argue that lack of demand of financial literacy may contribute to explain financial literacy gaps, and if this were the case it would not be sufficient to increase the number and quality of financial education initiatives if part of the people needing it the most firmly believe that financial literacy is either irrelevant or impossible to be achieved.

The key focus of this paper is therefore to shed light on the demand of financial literacy, by studying the determinants of the intention to become more financially literate. We implement a module building on Ajzen's (1988, 1991) Theory of Planned Behaviour and subsequently analyse data on a stratified sample of 1,601 financial decision-makers in Italy.

Our findings support the view that the TPB can be a powerful model to explain individuals' intentions to learn more about finance and investments. In fact, attitudes, norms and perceived behavioural control are important determinants of intentions, even when controlling for psychological traits, trust, age, gender and education. In addition, TPB-based constructs continue to be statistically significant also when analysing gender subsamples, with the exception of perceived behavioural control in the women subsample.

Results also support the view that less literate subgroups may also be characterized by weaker intention to learn about finance. Controlling also for psychological traits, this is the case in our sample for women, which are considered in many country as a key target of financial education initiatives (and even more in Italy, given the even stronger gender gap in financial literacy, as reported among others by Bottazzi and Lusardi 2016, Hasler and Lusardi 2017). This gender gap in intentions is even more remarkable considering that the survey targeted the primary income earners in the family (and in more than two-thirds these are men), and that about 75% of the 396 women in the sample are single decision-makers, who should therefore be more motivated than average to gain a greater control on personal finance. It must be noted that women show a slightly more positive attitude towards becoming more financially literate, but they also show a lower level of perceived behavioural control, i.e. there are less confident in their ability to really increase their financial knowledge. When analysing the subgroup with lower-than-median financial literacy, we observe a higher sensitivity to subjective norms (i.e. they feel a stronger social pressure to improve their level of literacy), but lower levels of attitude and perceived behavioural control, i.e. in relative terms they perceive less the benefits of becoming financially literate, and they are less confident about their ability to become more literate.

When analysing the relationship between intention and behaviour on the subsamples of respondents who participated to the 2018 and 2019 waves of the survey, we find a positive and significant relationship between intention and self-declared effort to learn more about savings and investments over the last 12 months. At the same time, we observe no improvement in the financial literacy score based on five standard questions. The question remains open whether this implies that self-declared effort has simply been overestimated or whether the effort was real but either unsuccessful or devoted to different topics from the ones covered by the five questions, since respondents were not offered or suggested a specific financial education training between the two waves of the survey. This reminds the crucial role of designing financial education programs, which can also help focusing the attention of the people who want to be trained on key topics. While we believe that demand of financial education should deserve more attention in financial education research, financial education supply (and its effectiveness) keeps being fundamental. At least some willingness to learn may therefore be a necessary, but certainly not sufficient, condition to guide individuals to become more financially literate.

The ability of the Theory of Planned Behaviour to provide a conceptual framework to understand the intention to become more financially literate, which is confirmed by our findings, also supports the hypothesis that interventions combining the proposal of a financial education initiative with a stimulus aiming at either clarifying the benefits of financial education (influencing attitudes) or reducing the perceived obstacles to learn (impacting on perceived behavioural control) could prove to be more effective. Potentially also efforts aimed at providing social support towards learning more about finance (with an effect on social norms) may help, even if they may be harder to implement in practice. While we do not test empirically this hypothesis in our paper, in different fields such as health (in order to promote healthy lifestyles, or periodic health screenings) the TPB framework has been already widely used also to design interventions. This might become an interesting opportunity also for future financial education experiments, and more generally greater attention to whether stronger demand can contribute to raise the level of financial education in equilibrium may be warranted to design policies able to work also for less literate individuals.

# References

- Ajzen, I. (1988), *Attitudes, Personality and Behavior*, Milton Keynes: Open University Press
- Ajzen, I. (1991), The Theory of Planned Behavior, *Organizational Behavior and Human Decision Processes*, 50, 179-211
- Armitage, C.J. and M. Conner (2001), Efficacy of the Theory of Planned Behaviour: A Meta-Analytic Review, *British Journal of Social Psychology*, 40, 471-499.
- Arrondel, L., M. Debbich and F. Savignac (2013), Financial Literacy and Financial Planning in France, *Numeracy* 6(2)
- Bottazzi, L. and A. Lusardi (2016), Gender Difference in Financial Literacy: Evidence from PISA Data in Italy, <https://institute.eib.org/wp-content/uploads/2016/10/gender-diff.pdf>
- Broihanne, M.H., M. Merli and P. Roger (2014), Overconfidence, Risk Perception and the Risk-taking Behavior of Finance Professionals, *Finance Research Letters*, 11(2), 64-73
- Brown, S. and K. Taylor (2014), Household Finances and the 'Big Five' Personality Traits, *Journal of Economic Psychology* 45, 197–212
- Carpena F., S. Cole, J. Shapiro and B. Zia (2019), The ABCs of Financial Education: Experimental Evidence on Attitudes, Behavior, and Cognitive Biases, *Management Science*, 65(1), 346-369.
- Christelis, D., T. Jappelli and M. Padula (2010), Cognitive Abilities and Portfolio Choice, *European Economic Review* 54(1), 18–38
- Conlin, A., P. Kyröläinen, M. Kaakinenc, M.R. Järvelin, J. Perttunen and R. Sventog, 2015, Personality Traits and Stock Market Participation, *Journal of Empirical Finance*
- CONSOB (2018), Report on financial investments of Italian households
- Cucinelli, D., G. Gandolfi and M.G. Soana (2016), Customer and Advisor Financial Decisions: the Theory of Planned Behavior Perspective, *International Journal of Business and Social Science*, 7(12)
- Cucinelli, D., G. Gandolfi and M.G. Soana (2017), La teoria del comportamento pianificato e le scelte finanziarie degli investitori italiani, *Bancaria*, 2, 14-31
- East, Robert (1993), Investment Decisions and the Theory of Planned Behavior, *Journal of Economic Psychology*, 13, 337-375
- Fernandes, D., J.G. Lynch Jr. and R.G. Netemeyer (2014), Financial Literacy, Financial Education, and Downstream Financial Behaviours, *Management Science*, 60(8), 1861-1883.
- Fishbein, M. and I. Ajzen (1975), *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley
- Fornero, E. and C. Monticone (2011), Financial Literacy and Pension Plan Participation in Italy, *Journal of Pension Economics and Finance*, 10(4), 547-564

- Guido G., A.M. Peluso, M. Capestro, and M. Miglietta (2015), An Italian Version of the 10-item Big Five Inventory: An Application to Hedonic and Utilitarian Shopping Values, Personality and Individual Differences, 76, 135-140.
- Hasler, A. and A. Lusardi (2017), The Gender Gap in Financial Literacy: A Global Perspective, GFLEC Working paper, July
- Hastings, J.S., B.C. Madrian and W.L. Skimmyhorn (2013), Financial Literacy, Financial Education, and Economic Outcomes, Annual Review of Economics, 5(1), 347-373
- Hung, A., J. Yoong and E. Brown (2012), Empowering Women through Financial Awareness and Education, OECD Working Papers on Finance, Insurance and Private Pensions, 14, March
- Klapper, L.F. and G.A. Panos (2011), Financial Literacy and Retirement Planning: The Russian Case Journal of Pension Economics and Finance, 10(4), 599–618
- Johnston, D.W., S.C. Kassenboehmer and M.A. Shields (2016), Financial decision-making in the household: Exploring the importance of survey respondent, health, cognitive ability and personality, Journal of Economic Behavior & Organization 132, 42–61
- Kaiser T. and L. Menkhoff (2017), Does Financial Education Impact Financial Literacy and Financial Behavior, and If So, When?, The World Bank Economic Review, 31(3), 611-630.
- Lau, A., J. Yen and P.Y.K. Chau (2001), Adoption of on-line trading in the Hong Kong financial market, Journal of Electronic Commerce research, 2(2), 58-65
- Lusardi, A. and O.S. Mitchell (2007a), Baby Boomer Retirement Security: The Roles of Planning, Financial Literacy, and Housing Wealth, Journal of Monetary Economics 54(1), 205–24.
- Lusardi, A. and O.S. Mitchell (2007b), Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education, Business Economics 42(1), 35–44
- Lusardi, A. and O.S. Mitchell (2014), The Economic Importance of Financial Literacy: Theory and Evidence, Journal of Economic Literature, 52(1), 5–44
- Lusardi, A. and P. Tufano (2015), Debt literacy, financial experiences, and overindebtedness, Journal of Pension Economics and Finance, 14(4), 332-368.
- Miller M., J. Reichelstein, C. Salas and B. Zia (2014), Can You Help Someone Become Financially Capable? A Meta-Analysis of the Literature, Policy Research Working Paper 6745, The World Bank.
- Mottola, G.R. (2013), In Our Best Interest: Women, Financial Literacy, and Credit Card Behavior, Numeracy 6(2)
- Nosi C., A. D’Agostino, M. Pagliuca and C.A. Pratesi (2017), Securing retirement at a young age. Exploring the intention to buy longevity annuities through an extended version of the Theory of Planned Behavior, Sustainability, vol. 9, 1069
- OECD (2015), National Strategies for Financial Education, OECD-INFE Policy Handbook, <https://www.oecd.org/daf/fin/financial-education/national-strategies-for-financial-education-policy-handbook.htm>
- Rammstedt, B. and O.P. John (2007), Measuring Big Five in one minute or less: A 10-item short version of the Big Five Inventory in English and German, Journal of Research in Personality, 41(1), 203–212

- Roa M.J., I. Garron and J. Barboza (2019), Financial decisions and financial capabilities in the Andean Region, *Journal of Consumer Affairs*, 53(2), 296-323
- Sheeran, P., A. Maki, E. Montanaro, A.Y. Aya, A. Bryan, W.M.P. Klein, E. Miles and A.J. Rothman (2016), The Impact of Changing Attitudes, Norms, and Self-Efficacy on Health-Related Intentions and Behavior: A Meta-Analysis, *Health Psychology*, 35(11), 1178-1188
- Shih, Y.Y. and F. Kwoting (2004), The use of a decomposed theory of planned behavior to study Internet banking in Taiwan, *Internet Research*, 14(3), 213-223
- Steinmetz, H., M. Knappstein, I. Ajzen, P. Schmidt and R. Kabst (2016), How Effective are Behavior Change Interventions Based on the Theory of Planned Behavior?, *Zeitschrift für Psychologie*, 224(3), 216-233
- van Rooij, M., A. Lusardi and R. Alessie (2011), Financial Literacy and Stock Market Participation, *Journal of Financial Economics* 101(2), 449–72
- Von Graevenitz, G., D. Harhoff and R. Weber (2010), The effects of entrepreneurship education, *Journal of Economic Behavior & Organization*, 76(1), 90-112

## Appendix

### 1. Sample descriptive statistics by gender and financial literacy level

**Table a1 – Sample descriptive statistics by gender and financial literacy groups**

(frequencies in percentage)

variable	women	men	low financial literacy	high financial literacy
<b>Marital status</b>				
single	28.1	5.7	10.0	12.7
cohabitant	11.9	7.2	8.3	8.5
married	13.7	83.4	66.3	66.1
widow/widower	20.3	1.2	6.2	5.5
separated	9.1	1.1	3.6	2.5
divorced	17.0	1.4	5.7	4.8
<b>Age</b>				
24<=35	7.6	12.6	9.8	7.7
35< age <=45	22.2	21.2	20.6	23.4
45< age <=55	29.0	25.5	28.8	27.5
55< age <=65	22.3	22.2	21.6	23.1
age >65	18.9	18.4	19.2	18.4
<b>Education</b>				
primary school	5.3	3.2	5.9	1.3
secondary school	16.7	23.7	27.6	15.7
high school	53.0	52.8	50.2	55.7
at least bachelor degree	25.0	20.2	16.2	27.2

Source: elaborations on CONSOB 2018 survey data. Financial decision makers belong to the low (high) financially literate group if their financial literacy level is lower (higher) than sample median.

## 2. Descriptive statistics attitudes, subjective norms and perceived behavioural control

Table a2 reports the distribution of the TPB constructs (i.e., attitude, subjective norms and perceived control) by their score levels. The score is a weighted and normalised sum of the items of the construct. For example, the score for 'attitude' is computed by multiplying each behavioural belief by the corresponding outcome evaluation and by summing the resulting weighted scores (with the scale of the last item 'learning about savings and investments would be boring' inverted). Subsequently, the score is normalized between 0 and 1 and categorised into the following classes: 'very low' between 0 and 0.2; 'low' between 0.2 and 0.4, 'medium' between 0.4 and 0.6, 'high' between 0.6 and 0.8, 'very high' between 0.8 and 1. These steps were followed also to compute subjective norms and perceived behavioural control indicators. As shown in Table 5, the proportions of individuals showing a high and a very high score for attitude, subjective norms and perceived behavioural control are, respectively, 19%, 6.4% and 22.4%.

Table a3 displays the distribution of the scores by gender and financial knowledge. Women tend to show a higher attitude towards learning finance as the proportion of those exhibiting a high or a very high score is significantly greater than that of men, while the opposite holds true for perceived behavioural control. Differences across levels of financial knowledge are more remarkable, as financial decision-makers with a higher level of financial literacy show, on average, stronger attitude and perceived behavioural control and feel lower social pressure.

**Table a2 – Distribution of attitudes, subjective norms and perceived behavioural control**  
(in percentage)

class	attitudes	subjective norms	perceived behavioural control
very low	9.8	30.6	7.0
low	39.9	49.5	22.5
medium	31.2	13.6	48.2
high	14.2	4.9	14.4
very high	4.8	1.5	8.0

Source: own elaborations on CONSOB 2018 Survey data. The internal consistency of the indicators was tested through the Cronbach's alpha statistic. The overall scores reported in the Table are normalised between 0 and 1 and categorised into the following classes 'very low' between 0 and 0.2; 'low' between 0.2 and 0.4, 'medium' between 0.4 and 0.6, 'high' between 0.6 and 0.8, 'very high' between 0.8 and 1. Average values are adjusted by sample weights.

**Table a3 – Attitudes, subjective norms and perceived behavioural control by gender and level of financial literacy**  
(in percentage)

psychological construct <sup>1</sup>	gender		financial literacy	
	men (a)	women (b)	low (c)	high (d)
<b>Attitudes</b>				
very low	9.2	11.5	13.4	5.2
low	42.2	33.5	45.3	33.1
medium	30.8	32.4	25.9	38.0
high	13.3	17.0	11.6	18.0
very high	4.5	5.6	3.7	6.2
<b>t-test (a)-(b)</b>	<b>-2.2**</b>			
<b>t test (c)-(d)</b>			<b>-8.4***</b>	
<b>Subjective norms</b>				
very low	29.0	35.3	28.4	33.4
low	51.0	45.3	51.2	47.2
medium	13.5	13.9	13.0	14.3
high	4.9	4.8	5.5	4.0
very high	1.7	0.7	1.9	1.0
<b>t-test (a)-(b)</b>	<b>0.5</b>			
<b>t-test (c)-(d)</b>			<b>3.1***</b>	
<b>Perceived behavioural control</b>				
very low	6.8	7.0	7.2	6.5
low	20.3	29.0	23.7	21.0
medium	50.8	40.8	51.2	43.7
high	14.3	14.6	9.9	20.1
very high	7.8	8.4	7.4	8.7
<b>t-test (a)-(b)</b>	<b>1.4*</b>			
<b>t-test (c)-(d)</b>			<b>-4.3***</b>	

Source: own elaborations on CONSOB 2018 survey data. <sup>1</sup>The overall scores are normalised between 0 and 1 and categorised into the following classes 'very low' between 0 and 0.2; 'low' between 0.2 and 0.4, 'medium' between 0.4 and 0.6, 'high' between 0.6 and 0.8, 'very high' between 0.8 and 1. Reported frequencies are adjusted by sample weights. T-test verifies if the reported difference is significantly different from zero. \* indicates significance at 10%; \*\* indicates significance at 5%; \*\*\* indicates significance at 1%.