

Emanuele Bajo, Massimiliano Barbi, Sandro Sandri

# Financial Literacy, Households' Investment Behavior, and Risk Propensity

(doi: 10.12831/80534)

Journal of Financial Management, Markets and Institutions (ISSN 2282-717X)

Fascicolo 1, gennaio-giugno 2015

**Ente di afferenza:**

()

Copyright © by Società editrice il Mulino, Bologna. Tutti i diritti sono riservati.

Per altre informazioni si veda <https://www.rivisteweb.it>

## **Licenza d'uso**

L'articolo è messo a disposizione dell'utente in licenza per uso esclusivamente privato e personale, senza scopo di lucro e senza fini direttamente o indirettamente commerciali. Salvo quanto espressamente previsto dalla licenza d'uso Rivisteweb, è fatto divieto di riprodurre, trasmettere, distribuire o altrimenti utilizzare l'articolo, per qualsiasi scopo o fine. Tutti i diritti sono riservati.

---

# Financial Literacy, Households' Investment Behavior, and Risk Propensity



Emanuele Bajo

University of Bologna, Italy

Massimiliano Barbi

University of Bologna, Italy

Sandro Sandri

University of Bologna, Italy

## Abstract

We investigate the role of socio-demographic characteristics of households on their level of self-declared financial literacy and investment experience, and the effect of financial literacy on household risk aversion, leveraging on about 38,000 MiFID questionnaires provided to us by an Italian primary bank. We find that the level of financial literacy is lower for the young and the old, women, less wealthy and financial fragile, less-educated individuals living in the Southern part of Italy, and in less densely populated areas. Past professional expertise in a finance-related field helps increasing the level of financial literacy. Risk aversion of households is significantly affected by financial literacy, as the less financially knowledgeable tend to be more risk averse.

**Keywords:** Financial Literacy; Household Finance; Risk Aversion.

**JEL Codes:** G34.

---

## 1 Introduction

In their day-by-day life, households and individuals are called to make personal and complex financial decisions. Relevant examples are decisions concerning portfolio asset allocation and diversification, financial planning and wealth accumulation, saving for retirement and contributions to pension plans, mortgage financing and related refinancing opportunities. According to the economic theory, at micro-level personal finance decisions are taken by fully informed and rational agents, whose objective is to maximize their expected lifetime utility. At macro-level, the aggregate of individual financial decisions affects household welfare, economic growth, and the stability of the financial system. With these three macro-outcomes in evidence, it is no surprise that in recent years – especially after the financial crisis – scholars have gradually concentrated their attention on the process of household's financial decision making, and the literature on

*Corresponding author:* Emanuele Bajo, emanuele.bajo@unibo.it, Department of Management, University of Bologna, via Capo di Lucca 34, 40126 Bologna, Italy.

*We would like to thank the Editor (Paola Bongini) and an anonymous referee whose suggestions improved the presentation of the paper. All remaining errors are our responsibility.*

the topic has flourished. It is now well-known that individuals are generally not well-equipped to make complex financial decisions. The reason is that their average level of financial literacy is surprisingly low. Geographical and socio-demographic differences exist on this regard, but it seems that this conclusion holds in general.

Lusardi and Mitchell (2014) provide a clear-cut picture of the phenomenon, reviewing geographical and socio-demographic characteristics of individuals in terms of basic financial literacy, i.e. at the level of interest compounding, nominal interest rates and inflation, and risk diversification. Only about 30 percent of US individuals are able to correctly assess these financial concepts (Lusardi and Mitchell, 2011a), and similar percentages are found across other well-developed countries, such as Germany (Bucher-Koenen and Lusardi, 2011), France (Arrondel *et al.*, 2013), Japan (Sekita, 2011), the Netherlands (Alessie *et al.*, 2011), Australia (Agnew *et al.*, 2013), and others. Italy displays a particularly low level of basic financial literacy, as only about one fourth of individuals can manage these notions (Fornero and Monticone, 2011). Jappelli (2010) compares the level of financial literacy among executives in 55 countries, spanning the period 1995-2008, and finds that financial literacy is heterogeneous among countries, and depends on educational achievement, social interactions, and financial development. In particular, among the first 10 European countries by GDP, Italy and Spain show the lowest score, while Sweden, Switzerland and the Netherlands have the highest. Also, the distribution of financial literacy is not uniform across socio-demographic characteristics of individuals. In particular, financial literacy is lower among low-educated and less wealthy individuals, the young and the old, women, and ethnic minorities (Lusardi, 2008; Lusardi and Mitchell, 2008; Calvet *et al.*, 2007, 2009; Jappelli and Padula, 2013; Santos and Abreu, 2013). In Italy, there is evidence that Centre- and North-located individuals have higher financial literacy (Monticone, 2010; Fornero and Monticone, 2011).

It is indisputable that a low level of financial literacy leads individuals to make sub-optimal economic choices and commit financial mistakes. On the «asset side» of the household balance sheet, poor financial literacy affects saving and investment decisions, accumulation of wealth, access to financial markets, and portfolio choices. In particular, a poor level of financial literacy is related to lower saving and wealth accumulation before retirement (Lusardi and Mitchell, 2007; Clark *et al.*, 2012; Behrman *et al.*, 2012), leads investors to choose high-fees investment funds (Hastings and Tejada-Ashton, 2008; Hastings and Mitchell, 2011a), reduces the access to financial markets and stockholdings (Christelis *et al.*, 2010; van Rooij *et al.*, 2011; Klapper *et al.*, 2013; Cole *et al.*, 2014), and induces sub-optimal portfolio diversification (Guiso and Jappelli, 2009; Abreu and Mendes, 2010; Santos and Abreu, 2013). On the «liability side» poor financial literacy influences financing decisions in terms of funding costs, refinancing choices, and risk of over-indebtedness and financial distress. Lower levels of financial literacy are associated to higher mortgage fees (Campbell, 2006; Lusardi and Tufano, 2009; Lusardi and Mitchell, 2009), the use of more expensive financing alternatives (Agarwal *et al.*, 2009), over-indebtedness (Stango and Zinman, 2009; Gathergood, 2012; Lusardi and Tufano, 2009), and mortgage delinquency (Gerardi *et al.*, 2010). The social negative outcome of poor financial literacy is therefore financial fragility (Bernheim, 1995; Lusardi and Mitchell, 2007, 2009; Lusardi and Tufano, 2009).

In this paper we contribute to the literature on household finance investigating the determinants of financial literacy in Italy, a country which displays a particularly low level of it. We study self-assessed financial literacy and past experience on trading different asset classes, as a function of a set of socio-demographic attributes. In particular, we consider individual's awareness and experience on trading bonds, stocks, mutual funds, bank products, and financial derivatives. Also, we study the relationship between financial literacy and risk aversion of individuals. Literature has demonstrated that personal socio-demographic traits of individuals – such as gender, age, education, and wealth – affect their willingness to take risks (Morin and Suarez, 1983; Vissing-Jørgensen, 2002; Calvet *et al.*, 2007; Guiso and Paiella, 2008). Cognitive abilities affect risk aversion as well. Individuals with lower cognitive abilities are less likely to choose risky lotteries, implying that they exhibit higher risk aversion (Korniotis and Kumar, 2010; Dohmen *et al.*, 2011). In this paper, both financial literacy and risk aversion are measured through self-assessment, as we leverage on about 38,000 MiFID (Markets in Financial Instruments Directive) questionnaires provided to us by an Italian primary bank, and submitted to bank clients between 2011 and 2013. We are aware that self-assessed measures of financial literacy are strongly but not perfectly correlated with intrinsic financial literacy, as individuals tend to generally overstate their financial abilities (Agnew and Szykman, 2005; Lusardi and Mitchell, 2014). However, the literature has shown that self-assessed financial literacy measures not only are correlated with objective measures (Lusardi and Mitchell, 2009; Parker *et al.*, 2012), but have an independent explanatory power onto individual financial behavior (Allgood and Walstad, 2012, 2013; van Rooij *et al.*, 2011). Also, our sample allows to investigate financial literacy, risk aversion, and socio-demographic characteristics of individuals using a very large dataset of almost 38,000 observations, and to study their specific self-assessed knowledge and past experience on five asset classes, with a different extent of financial complexity. The granularity of our financial literacy variables allows for a two-level analysis, both in terms of household's specific financial literacy on the single asset classes, and their general financial knowledge, interpreted as the household's understanding of financial markets as a whole.

Our findings can be summarized as follows. On a four-notch scale, i.e. «none», «low», «medium», and «high», the median degree of financial awareness in Italy can be described as «low», and the median Italian household has never traded 3 out of the 5 analyzed asset classes. This is in line with previous studies (Jappelli, 2010; Fornero and Monticone, 2011; Calcagno and Monticone, 2015). Both financial awareness and trading experience are positively affected by age, wealth, income, and a specific economic educational background, or explicit professional financial expertise. Individual's age and income have a quadratic effect, and financial illiteracy among the young and the poor reaches its maximum. Also, financial literacy is affected by the geographical origin of individuals, as households living in the Northern or Central areas of Italy, or living in more densely populated cities, are more financial literate than those located in the South of the country, or living in less densely populated cities. Our results continue to hold – even if their statistical significance sometimes weakens – when we pass to analyze the single asset classes. In particular, the case of derivatives is insightful, as knowledge and experience of these financial instruments, given their complexity, can be viewed as a narrower proxy of financial literacy. In this case, all the findings we have detailed before for the general level of financial literacy are jointly

confirmed, providing further robustness to our conclusions. Finally, financial literacy and risk aversion are negatively related, as individuals who are not aware of how specific (risky) financial instruments and markets function avoid them. Implicitly, this result means that financial illiterate individuals are *de facto* precluded most of portfolio diversification strategies.

Our conclusions deliver direct policy implications. In spite of the various financial education programs and initiatives set forth in Italy in the recent years (e.g., web initiatives by the Bank of Italy and the Italian financial regulator – CONSOB, education programs for schools jointly advanced by the Italian ministry of Education and the Bank of Italy, or activities of the Italian Banking Association to helping investors in making educated choices), it seems that the level of financial literacy remains very low, with the young, the less wealthy, and households living in the Southern area of the country particularly affected. These individuals are more vulnerable, and are exposed to sub-optimal economic decisions and financial mistakes.

The remainder of the paper proceeds as follows. In the following section we present the data we use in our study and the descriptive statistics of our sample. Section 3 reports and discusses the results of our empirical investigation. Section 4 offers some concluding remarks.

---

## 2 Data and Descriptive Statistics

We collect data from questionnaires filled by Italian investors complying with the «Markets in Financial Instruments Directive» (MiFID) questionnaire. The MiFID directive, passed down by the European Parliament in 2004, is in force in Italy from the 1<sup>st</sup> of November, 2007, and requires bank's retail clients to fill out a questionnaire before being eligible to purchase financial instruments, such as bonds, stocks, bank products, mutual fund shares, and derivatives. The questionnaire, which is compulsory to retail investors, has the aim to assess client's financial knowledge and experience, along with providing the bank with information on their risk taking preferences. The data used in this paper are provided to us by an Italian primary bank, and questionnaires have been submitted to bank's clients between June 2011 and December 2013.

Our dataset contains information on: *a*) the self-declared level of awareness, and experience (based upon the number of past trades), of five different asset classes, i.e. fixed income, equity, bank products, mutual funds, and derivatives; *b*) personal socio-demographic characteristics of individuals, such as age, profession, net income, gender, nationality, and city of residence (at the level of zip code). From the questionnaire we are also able to register whether individuals have an educational background in economics or finance, their declared financial fragility (i.e., a financial situation which does not allow for a regular monthly cash inflow), their professional financial expertise, and their declared risk aversion. From our initial sample, we drop observations for which all information on socio-demographic status of investors is missing. After data screens, our final sample is composed of 38,099 observations. Table 1 presents some descriptive statistics of our dataset.

Variables can be classified according to the following four sets of information: socio-demographic characteristics, geographical origin, financial literacy (knowledge and experience in trading financial instruments), and other potentially relevant attributes, such as financial education, professional expertise, and the (self-declared) level of risk aversion. The average

**Table 1:** Descriptive statistics

Variable	N	Mean	SD	Min	Q1	Median	Q3	Max
Age	37,992	40.8	10.2	21	33	39	47	67
Net Income, €	37,357	1,538.3	428.4	939	1,350	1,500	1,536	3,569
Wealthy, %	37,973	30.40	46.00	–	–	–	–	–
Man, %	37,991	67.22	46.94	–	–	–	–	–
Foreign, %	34,389	7.29	25.99	–	–	–	–	–
Population	38,099	386,283	692,126	98	14,522	51,751	270,884	2,761,477
North, %	38,099	52.00	49.96	–	–	–	–	–
Center, %	38,099	14.63	35.34	–	–	–	–	–
South, %	38,099	33.37	47.16	–	–	–	–	–
Fixed Income Awareness	38,099	1.84	0.72	0.00	1.25	2.00	2.00	3.00
Equity Awareness	38,099	1.12	0.76	0.00	0.50	1.00	1.50	3.00
Bank Products Awareness	38,099	1.47	0.65	0.00	1.00	1.33	2.00	3.00
Mutual Funds Awareness	38,099	0.93	0.64	0.00	0.50	0.75	1.25	3.00
Derivatives Awareness	38,099	0.21	0.53	0.00	0.00	0.00	0.00	3.00
Overall Awareness	38,099	5.56	2.61	0.00	3.83	5.08	7.17	15.00
Fixed Income Experience, %	38,099	64.05	47.98	–	–	–	–	–
Equity Experience, %	38,099	40.32	49.05	–	–	–	–	–
Bank Products Experience, %	38,099	51.83	49.97	–	–	–	–	–
Mutual Funds Experience, %	38,099	62.74	48.35	–	–	–	–	–
Derivatives Experience, %	38,099	6.00	23.75	–	–	–	–	–
Overall Experience	38,099	2.25	1.53	0.00	1.00	2.00	4.00	5.00
Economics Background, %	38,099	10.00	30.00	–	–	–	–	–
Financial Fragility, %	38,099	8.66	28.12	–	–	–	–	–
Professional Expertise, %	38,099	4.20	20.07	–	–	–	–	–
Risk Averse, %	38,099	35.39	47.82	–	–	–	–	–

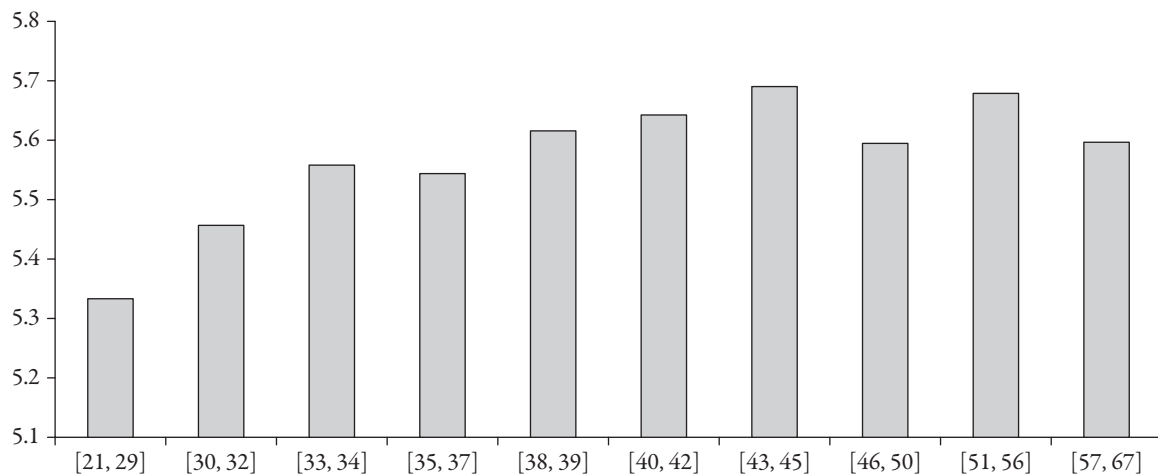
The table reports the descriptive statistics of the sample of 38,099 MiFID questionnaires. *Age* is the age of the investor; *Net Income* is the monthly net-of-taxes income of the investor; *Wealthy* is a dummy variable taking 1 if the investor does not belong to the segment «mass market» (<€100,000 financial assets); *Man* is a dummy variable taking 1 if the investor's gender is male; *Foreign* is a dummy variable taking 1 if the investor's nationality is other than Italian; *Population* is the resident population in the urban area where the bank is located (by zip code); *North* (resp., *Center* and *South*) is a dummy variable taking 1 if the bank branch is located in a region of the North (resp., Center and South) of Italy; *Fixed Income Awareness*, *Equity Awareness*, *Bank Products Awareness*, *Mutual Funds Awareness*, and *Derivatives Awareness* are financial literacy indicators and measure the degree of awareness (0 = none, 1 = low, 2 = medium, 3 = high) of fixed income instruments, equity instruments, bank products, mutual funds, and derivatives instruments, respectively; *Overall Awareness* is the sum of the single *Awareness* variables related to different asset classes; *Fixed Income Experience*, *Equity Experience*, *Bank Products Experience*, *Mutual Funds Experience*, and *Derivatives Experience* are dummy variables taking 1 if the investor has ever invested in fixed income instruments, equity instruments, bank products, mutual funds, and derivatives instruments, respectively; *Overall Experience* is the sum of the single *Experience* variables related to different asset classes; *Economics Background* is a dummy variable taking 1 if the investor has an educational background (college diploma) in a field related to economics or finance; *Financial Fragility* is a dummy variable taking 1 if the investor's financial situation does not allow for a regular monthly cash inflow (e.g., from their job); *Professional Expertise* is a dummy variable taking 1 if the investor's current or past job is related to finance or financial markets; *Risk Averse* is a dummy variable taking 1 if the investor's profile can be described as «prudent» or «cautious» (*vs.* «balanced» and «dynamic»).

(median) investor in our sample is a 41 (39) year old man, with a 1,538 (1,500) euro monthly net income. Furthermore, roughly 30 percent of individuals own asset under management worth more than €100,000 (classified as *Wealthy*), and 7.3 percent are non-Italian. As shown in the literature (Campbell, 2006; Lusardi, 2008; Lusardi and Mitchell, 2008; Jappelli and Padula, 2013), these variables are by themselves good predictors of financial literacy. Financial illiteracy is more widespread among women, immigrants, and the poor. The second group of variables describes households according to their location. Approximately half of our sample lives in the Northern (and richer) area of the country, and one-third is located the Southern part (the poorest). All these figures are in line with the actual distribution of the Italian population. The most interesting insights emerge from inspecting the third and last group of variables, reporting information from MiFID questionnaires. Our data allows to disaggregate the individual's self-reported level of financial literacy related to the five different asset classes considered into the questionnaire, i.e. fixed income, equity, bank product, mutual

funds, and derivatives, each of them incorporating a different degree of financial complexity. *Awareness* and *Experience* are our financial literacy variables, and they are based on different scales. In particular, *Awareness* is constructed on a four-notch scale (0 = none, 1 = low, 2 = medium, 3 = high), whilst *Experience* is a dummy variable taking the value of 1 if the individual has ever invested in a given asset class. To proxy the general financial knowledge and experience of investors we compute also two general measures (*Overall Awareness* and *Overall Experience*), cumulating *Awareness* and *Experience* across the five asset classes. *Overall Awareness* ranges from 0 to 15, and *Overall Experience* ranges from 0 to 5. Table 1 presents both cumulative measures and their breakdowns, as they provide with different information. On the one hand, cumulative figures are more robust proxies of the general financial literacy and experience of individuals. On the other hand, a deeper familiarity with some financial instruments may be a better signal of a higher financial literacy. For instance, financial derivatives are very complex instruments, and their knowledge and experience might be a strong signal of the individual ability to deal with financial problems. The breakdowns of *Awareness* and *Experience* provide interesting insights. In terms of *Awareness*, individuals appear to be more familiar with fixed income and bank products, for which the average (median) score is 1.84 (2.00) and 1.47 (1.33) (out of a maximum of 3), respectively. To the opposite end, investors display only an average (median) score of 0.21 (0.00) (out of a maximum of 3) when considering financial derivatives. Concerning *Experience*, the evidence is similar. About 64 and 63 percent of individuals have experience in trading fixed income and mutual funds, respectively, while financial derivatives show a very limited use among retail investors (only 6 percent of our sample). Finally, from inspecting the last set of variables in Table 1 we note that: *a*) 10 percent of our sample owns a college diploma in a field related to economics or finance (*Economics Background*), *b*) 8.7 percent of individuals is exposed to a risk of *Financial Fragility*, since their financial situation does not provide them with a stable monthly cash inflow, *c*) 4.2 percent has professional experience in financial-related areas (*Professional Expertise*), and *d*) 35 percent of individuals describe themselves as *Risk Averse*, classifying their investment profile as «prudent» or «cautious» (*vs.* «balanced» and «dynamic»).

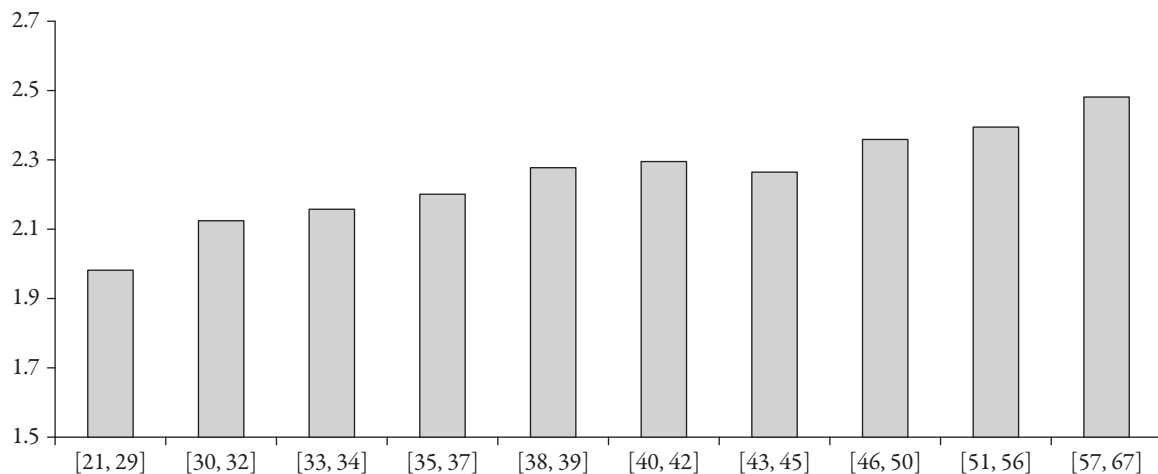
Inspecting the level of financial literacy along the age dimension is particularly important, as it has been shown in the literature (Lusardi and Mitchell, 2011b; Lusardi and Mitchell, 2014). If on the one hand we may expect that the degree of knowledge, and in particular experience, is a positive function of age, as individuals ride their learning curve over-time, on the other hand we may observe an opposite trend if over the last decades efforts have been made to enhancing financial literacy among the young.

Figure 1 and Figure 2 plot the cumulative financial literacy variables, *Overall Awareness* and *Overall Experience*, by deciles of *Age*. Interestingly, the level of awareness shows an inverse U-shaped relationship, increasing up to the seventh decile (ranging between the age of 43 to 45), to revert afterward. Even more striking, *Overall Awareness* reaches its minimum among the youngest (first decile of *Age*, i.e. between 21 and 29), for which the average score is significantly lower than the figure of the last decile (between 57 and 67). Despite the several important steps made in recent years in terms of improving financial education in Italy, this evidence suggests that further efforts in this direction – and especially among the young – are necessary. As previously suggested, a possible rationale for the increase of financial literacy over time is the experience progressively accumulated. Figure



**Figure 1:** Financial awareness as a function of age.

The chart shows the level of financial awareness as a function of age. The y-axis reports the level of *Overall Awareness*, i.e. a financial literacy variable which sums the scores of the single *Awareness* variables related to different asset classes, while the x-axis reports the deciles of *Age*.



**Figure 2:** Financial experience as a function of age.

The chart shows the level of financial experience as a function of age. The y-axis reports the level of *Overall Experience*, i.e. a financial literacy variable which sums the values of the single *Experience* variables related to different asset classes, while the x-axis reports the deciles of *Age*.

2 plots *Overall Experience* over deciles of *Age* and confirms this conjecture, as a positive trend is noticeable. The first decile exhibits an average *Overall Experience* of about 2 (out of a maximum of 5), whilst the last decile an average score of approximately 2.4.

Table 2 presents the correlation matrix of financial literacy variables. We believe that inspecting the dependence among these metrics is informative. First, we note that the correlation between awareness and experience is not as high as we might expect. Although statistically different from zero, *Overall Awareness* and *Overall Experience* are only weakly correlated (0.16). This finding is somehow surprising, as we might expect that much of the knowledge of financial instruments origins from trading experience. Instead, other sources of information acquisition (i.e., education, word of mouth, etc.) seem to be more



**Table 2:** Correlation matrix of financial literacy variables

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
#1	Fixed Income Awareness	1.0000										
#2	Equity Awareness	0.5604*	1.0000									
#3	Bank Products Awareness	0.6991*	0.6120*	1.0000								
#4	Mutual Funds Awareness	0.5238*	0.6133*	0.5873*	1.0000							
#5	Derivatives Awareness	0.2451*	0.4203*	0.3298*	0.5735*	1.0000						
#6	Overall Awareness	0.7915*	0.8357*	0.8323*	0.8322*	0.6175*	1.0000					
#7	Fixed Income Experience, %	0.0447*	0.0373*	-0.0101	0.0384*	0.0623*	0.0428*	1.0000				
#8	Equity Experience, %	0.1146*	0.3446*	0.1030*	0.2076*	0.2040*	0.3821*	1.0000	1.0000			
#9	Bank Products Experience, %	0.0042	0.0516*	0.0553*	0.0575*	0.0823*	0.0610*	0.4112*	1.0000	1.0000		
#10	Mutual Funds Experience, %	-0.0334*	0.0144*	-0.0470*	0.1050*	0.0485*	0.0189*	0.3215*	0.3701*	1.0000		
#11	Derivatives Experience, %	0.0775*	0.1958*	0.1143*	0.2540*	0.4976*	0.1565*	0.2853*	0.1789*	0.1505*	1.0000	
#12	Overall Experience	0.0537*	0.1742*	0.0509*	0.1703*	0.2047*	0.7555*	0.7215*	0.7643*	0.6907*	0.4025*	1.0000

The table reports the pairwise correlation coefficients between financial literacy variables. *Fixed Income Awareness*, *Equity Awareness*, *Bank Products Awareness*, *Mutual Funds Awareness*, and *Derivatives Awareness* are financial literacy indicators and measure the degree of awareness (0 = none, 1 = low, 2 = medium, 3 = high) of fixed income instruments, equity instruments, bank products, mutual funds, and derivatives instruments, respectively; *Overall Awareness* is the sum of the single *Awareness* variables related to different asset classes; *Fixed Income Experience*, *Equity Experience*, *Bank Products Experience*, *Mutual Funds Experience*, and *Derivatives Experience* are dummy variables taking 1 if the investor has ever invested in fixed income instruments, equity instruments, bank products, mutual funds, and derivatives instruments, respectively; *Overall Experience* is the sum of the single *Experience* variables related to different asset classes. \* denotes statistical significance at 1 percent level.

effective in shaping the (self-declared) level of awareness. Turning our attention to the breakdown of the cumulative variables, we note that for some asset classes trading experience plays a more important role on investor's awareness, as shown by their higher correlations. For instance, awareness and experience show a 0.34 and 0.50 correlations for equity and derivatives instruments, respectively.

Also, this table helps to appreciate which of the single asset classes contributes more to each of the two cumulative measures. In other words, we now concentrate on the correlations within the two groups. As expected, the five measures are rather correlated, but with different magnitudes. Excluding financial derivatives, *Awareness* variables present figures ranging from 0.52 to 0.69, while for *Experience* the same correlations vary from 0.32 to 0.51. These results suggest that *Awareness* variables are more fungible than *Experience* indicators. This evidence is likely to be associated with the bias of self-declaration. While declaring past trading experience leaves little room to subjective self-assessment, the self-declared level of knowledge is more easily influenced by individual cognitive biases (Lusardi and Mitchell, 2014).

---

### 3 Results and Discussion

Previous literature has shown that socio-economic status (SES) largely explains the level of financial literacy (for a comprehensive review, we refer to Lusardi and Mitchell, 2014). In this section we disentangle the main determinants of knowledge and experience in trading financial instruments, both in terms of general *Awareness* and *Experience*, and more specifically with respect to each of the single financial asset classes. Since cumulative and single-asset financial literacy variables have a slightly different interpretation, their determinants merit a distinct discussion. Also, we finally aim at understanding how the (self-declared) level of risk aversion is associated with the same set of individual characteristics.

#### 3.1 Financial Awareness

Table 3 shows the marginal effects of a tobit regression, where the cumulative (overall) level of awareness is explained by socio-demographic characteristics, geographical attributes, and other individual factors<sup>1</sup>. The first model only takes into consideration the (linear) effect of SES, as well as the specialized education in financial-related subjects. In line with our expectations, wealthier, high-income, more educated men exhibit a higher financial awareness, whilst non-Italians (mostly immigrants) tend to be less financially literate. All coefficients are statistically significant and economically meaningful. Results are also robust, as shown in model 2 and model 3, where we add: *a*) the geographical origin of the household, and *b*) financial fragility and professional expertise dummies. Model 2 suggests that individuals living in more populated cities and residing in the Centre-North of Italy exhibit higher financial literacy. This finding is in line with Monticone (2010), and Fornero and Monticone

<sup>1</sup> We use tobit model as the dependent variable (*Overall Awareness*) is censored (it is limited from below by 0, and from above by 15), and employing classical OLS estimation would result in biased coefficients.

**Table 3:** Determinants of financial awareness

Dependent Variable: Overall Awareness	(1)	(2)	(3)	(4)
Age	0.0055*** (0.001)	0.0051*** (0.001)	0.0037*** (0.001)	0.0419*** (0.010)
Age Squared				-0.0004*** (0.000)
Ln(Net Income)	0.6744*** (0.074)	0.6231*** (0.075)	0.5814*** (0.074)	8.7280*** (2.894)
Ln(Net Income) Squared				-0.5382*** (0.191)
Wealthy	0.4993*** (0.031)	0.5028*** (0.031)	0.4788*** (0.030)	0.4751*** (0.030)
Man	0.2633*** (0.033)	0.2733*** (0.033)	0.2466*** (0.033)	0.1770*** (0.043)
Foreign	-0.5477*** (0.056)	-0.5818*** (0.056)	-0.5666*** (0.056)	-0.5665*** (0.056)
Economics Background	1.4811*** (0.059)	1.4690*** (0.059)	0.9001*** (0.058)	0.9088*** (0.059)
Ln(Population)		0.0344*** (0.007)	0.0289*** (0.007)	0.0291*** (0.007)
North		0.1279*** (0.032)	0.1266*** (0.031)	0.1287*** (0.031)
Center		0.2535*** (0.047)	0.2424*** (0.046)	0.2341*** (0.046)
Financial Fragility			-0.6847*** (0.050)	-0.6840*** (0.051)
Professional Expertise			1.8830*** (0.102)	1.9270*** (0.105)
Observations	33,702	33,702	33,702	33,702
Pseudo R-Squared	0.0111	0.0116	0.0166	0.0169
F-Statistic	229.07	160.16	175.15	147.33

The table shows the marginal effects of a tobit regression where the dependent variable is *Overall Awareness*, i.e. a financial literacy variable which sums the scores of the single *Awareness* variables related to different asset classes; *Age* (*Age Squared*) is the age (squared age) of the investor; *Ln(Net Income)* (*Ln(Net Income) Squared*) is the (log of the) monthly net-of-taxes income (squared log-income) of the investor; *Wealthy* is a dummy variable taking 1 if the investor does not belong to the segment «mass market» (<€100,000 financial assets); *Man* is a dummy variable taking 1 if the investor's gender is male; *Foreign* is a dummy variable taking 1 if the investor's nationality is other than Italian; *Economics Background* is a dummy variable taking 1 if the investor has an educational background (college diploma) in a field related to economics or finance; *Ln(Population)* is the (log of the) resident population in the urban area where the bank is located (by zip code); *North* (*Center*) is a dummy variable taking 1 if the bank branch is located in a region of the North (Center) of Italy; *Financial Fragility* is a dummy variable taking 1 if the investor's financial situation does not allow for a regular monthly cash inflow (e.g., from their job); *Professional Expertise* is a dummy variable taking 1 if the investor's current or past job is related to finance or financial markets. Robust standard errors are reported in parentheses. \*\*\*, \*\*, \* denotes statistical significance at 1, 5, and 10 percent level, respectively.

(2011). Since the Northern part of the country is richer, more economically developed and industrialized, this result confirms also Jappelli (2010) on the relationship between economic literacy and economic development. Model 3 shows that professional experience in financial-related areas positively affects financial awareness, as being professionally exposed to financial problems is likely to enhance general financial literacy. *Financial Fragility* has the opposite effect, and the interpretation of this sign is less clear-cut. More financial fragile households are likely to be younger, less-educated, and less wealthy, and these characteristics negatively affect financial literacy. After controlling for SES, the role of financial fragility is less obvious. Nonetheless, the evidence shows that the negative effect persists. Model 4 incrementally includes the squared effects of *Age* and *Net Income*. As suggested by Figure 1, the young and the old are less financial knowledgeable, and this is confirmed by multivariate analysis. *Net Income* shows a non-linear effect as well. This result suggests that financial literacy increases with *Net Income* but at a decreasing pace, and for richer individuals the pattern reverts, probably because of the diminishing impact of potential mistakes caused by

**Table 4:** Determinants of financial awareness

Model:	(1)	(2)	(3)	(4)	(5)
Dependent Variable: Awareness	Fixed Income	Equity	Bank Products	Mutual Funds	Derivatives
Age	0.0128*** (0.003)	0.0177*** (0.004)	0.0057** (0.003)	0.0080*** (0.003)	0.0309*** (0.012)
Age Squared	-0.0001*** (0.000)	-0.0002*** (0.000)	-0.0001* (0.000)	-0.0001*** (0.000)	-0.0003** (0.000)
Ln(Net Income)	1.6855* (0.946)	2.8882*** (1.036)	1.5887** (0.766)	2.0351*** (0.758)	12.5040*** (3.489)
Ln(Net Income) Squared	-0.1062* (0.062)	-0.1771*** (0.068)	-0.0985* (0.050)	-0.1263** (0.050)	-0.7799*** (0.229)
Wealthy	0.2086*** (0.010)	0.1111*** (0.011)	0.0921*** (0.008)	0.0806*** (0.008)	0.2745*** (0.034)
Man	0.0180 (0.014)	0.0914*** (0.015)	0.0174 (0.012)	0.0423*** (0.011)	0.1734*** (0.049)
Foreign	-0.2161*** (0.018)	-0.1831*** (0.021)	-0.1414*** (0.016)	-0.0706*** (0.014)	-0.2181*** (0.066)
Economics Background	0.1387*** (0.017)	0.2687*** (0.017)	0.1451*** (0.014)	0.2222*** (0.016)	0.8984*** (0.053)
Ln(Population)	-0.0012 (0.002)	0.0173*** (0.003)	-0.0061*** (0.002)	0.0118*** (0.002)	0.0660*** (0.008)
North	0.0301*** (0.010)	0.0701*** (0.011)	-0.0103 (0.009)	0.0253*** (0.008)	0.2021*** (0.037)
Center	0.0403*** (0.015)	0.1273*** (0.016)	0.0060 (0.013)	0.0428*** (0.012)	0.2910*** (0.051)
Financial Fragility	-0.2764*** (0.016)	-0.2054*** (0.018)	-0.1714*** (0.014)	-0.1279*** (0.013)	0.0101 (0.056)
Professional Expertise	0.3641*** (0.028)	0.4742*** (0.028)	0.3120*** (0.024)	0.4853*** (0.028)	1.3799*** (0.075)
Observations	33,702	33,702	33,702	33,702	33,702
Pseudo R-Squared	0.0203	0.0212	0.0161	0.0302	0.0429
F-Statistic	123.80	134.12	77.59	101.76	120.12

The table shows the marginal effects of a tobit regression where the dependent variables are *Awareness* variables. *Fixed Income Awareness*, *Equity Awareness*, *Bank Products Awareness*, *Mutual Funds Awareness*, and *Derivatives Awareness* are financial literacy indicators and measure the degree of awareness (0 = none, 1 = low, 2 = medium, 3 = high) of fixed income instruments, equity instruments, bank products, mutual funds, and derivatives instruments, respectively; *Age* (*Age Squared*) is the age (squared age) of the investor; *Ln(Net Income)* (*Ln(Net Income) Squared*) is the (log of the) monthly net-of-taxes income (squared log-income) of the investor; *Wealthy* is a dummy variable taking 1 if the investor does not belong to the segment «mass market» (<€100,000 financial assets); *Man* is a dummy variable taking 1 if the investor's gender is male; *Foreign* is a dummy variable taking 1 if the investor's nationality is other than Italian; *Economics Background* is a dummy variable taking 1 if the investor has an educational background (college diploma) in a field related to economics or finance; *Ln(Population)* is the (log of the) resident population in the urban area where the bank is located (by zip code); *North* (*Center*) is a dummy variable taking 1 if the bank branch is located in a region of the North (Center) of Italy; *Financial Fragility* is a dummy variable taking 1 if the investor's financial situation does not allow for a regular monthly cash inflow (e.g., from their job); *Professional Expertise* is a dummy variable taking 1 if the investor's current or past job is related to finance or financial markets. Robust standard errors are reported in parentheses. \*\*\*, \*\*, \* denotes statistical significance at 1, 5, and 10 percent level, respectively.

financial illiteracy for these individuals. However, this evidence is mitigated by the positive and significant effect of the stock of personal wealth (*Wealthy* dummy)<sup>2</sup>.

Table 4 reports the results of the breakdown of financial awareness by single asset classes<sup>3</sup>. Most of the explanatory variables confirm their statistical significance (at 1 percent level) throughout different asset classes, providing robustness to our previous discussion. In particular, both *Age* and *Net Income* maintain their concave shape, stock of wealth,

<sup>2</sup> We are aware that *Wealth* and *Net Income* may have an endogenous effect on the level of financial illiteracy, due to a reverse causality problem (i.e., causality going from financial knowledge to wealth accumulation). However, Monticone (2010) has analyzed this potential issue for Italy, and confirmed the direct causality of wealth accumulation variables on knowledge, after instrumenting them into multivariate analysis.

<sup>3</sup> For brevity, the table only shows the full model including all regressors. Partial models, gradually incorporating regressors, produce similar results and are available upon request.

**Table 5:** Determinants of financial experience

Dependent Variable: Overall Experience	(1)	(2)	(3)	(4)
Age	0.0121*** (0.001)	0.0121*** (0.001)	0.0120*** (0.001)	0.0332*** (0.008)
Age Squared				-0.0002*** (0.000)
Ln(Net Income)	0.3738*** (0.053)	0.3485*** (0.053)	0.3442*** (0.053)	5.6808*** (2.092)
Ln(Net Income) Squared				-0.3524** (0.138)
Wealthy	0.6935*** (0.022)	0.6910*** (0.022)	0.6914*** (0.022)	0.6900*** (0.022)
Man	0.0572** (0.024)	0.0600** (0.024)	0.0558** (0.024)	0.0087 (0.031)
Foreign	-0.2880*** (0.042)	-0.3074*** (0.042)	-0.3058*** (0.042)	-0.3053*** (0.042)
Economics Background	0.3405*** (0.034)	0.3342*** (0.034)	0.2208*** (0.037)	0.2176*** (0.037)
Ln(Population)		0.0009 (0.005)	-0.0003 (0.005)	-0.0006 (0.005)
North		0.2177*** (0.023)	0.2168*** (0.023)	0.2187*** (0.023)
Center		0.3301*** (0.034)	0.3260*** (0.034)	0.3205*** (0.034)
Financial Fragility			0.0287 (0.037)	0.0292 (0.037)
Professional Expertise			0.3924*** (0.059)	0.3922*** (0.059)
Observations	33,702	33,702	33,702	33,702
Pseudo R-Squared	0.0125	0.0136	0.0140	0.0141
F-Statistic	284.99	207.06	172.69	146.75

The table shows the marginal effects of a tobit regression where the dependent variable is *Overall Experience*, i.e. a financial literacy variable which sums the values of the single *Experience* variables related to different asset classes; *Age* (*Age Squared*) is the age (squared age) of the investor; *Ln(Net Income)* (*Ln(Net Income) Squared*) is the (log of the) monthly net-of-taxes income (squared log-income) of the investor; *Wealthy* is a dummy variable taking 1 if the investor does not belong to the segment «mass market» (<€100,000 financial assets); *Man* is a dummy variable taking 1 if the investor's gender is male; *Foreign* is a dummy variable taking 1 if the investor's nationality is other than Italian; *Economics Background* is a dummy variable taking 1 if the investor has an educational background (college diploma) in a field related to economics or finance; *Ln(Population)* is the (log of the) resident population in the urban area where the bank is located (by zip code); *North* (*Center*) is a dummy variable taking 1 if the bank branch is located in a region of the North (Center) of Italy; *Financial Fragility* is a dummy variable taking 1 if the investor's financial situation does not allow for a regular monthly cash inflow (e.g., from their job); *Professional Expertise* is a dummy variable taking 1 if the investor's current or past job is related to finance or financial markets. Robust standard errors are reported in parentheses. \*\*\*, \*\*, \* denotes statistical significance at 1, 5, and 10 percent level, respectively.

schooling, and professional financial backgrounds are positively associated with financial awareness, whilst immigrants and household with unsteady cash flows are less financial knowledgeable. Finally, gender and geographical origin generally confirm their significant effects. To conclude, it is worth to note that among the five asset classes, only for mutual funds and financial derivatives regressors are all jointly statistically significant (with the exception of *Financial Fragility*). This evidence confirms the intuition that, among the considered financial instruments, mutual funds and especially derivatives possess the greater explanatory power thanks to their intrinsic complexity.

### 3.2 Financial Experience

Table 5 reports the results of tobit regressions, where we take the cumulative measure of financial experience (*Overall Experience*) as dependent variable, and the same set

**Table 6:** Determinants of financial experience

Model:	(1)	(2)	(3)	(4)	(5)
Dependent Variable: Experience	Fixed Income	Equity	Bank Products	Mutual Funds	Derivatives
Age	0.0058*** (0.002)	0.0106*** (0.002)	0.0014 (0.002)	0.0051*** (0.002)	0.0008 (0.001)
Age Squared	-0.0000 (0.000)	-0.0001*** (0.000)	0.0000 (0.000)	-0.0001** (0.000)	-0.0000 (0.000)
Ln(Net Income)	0.5362 (0.524)	2.3568*** (0.552)	1.4838*** (0.565)	-0.0705 (0.553)	0.3989 (0.278)
Ln(Net Income) Squared	-0.0327 (0.034)	-0.1469*** (0.036)	-0.0938** (0.037)	0.0055 (0.036)	-0.0239 (0.018)
Wealthy	0.1816*** (0.005)	0.1182*** (0.006)	0.1376*** (0.006)	0.1020*** (0.006)	0.0282*** (0.003)
Man	-0.0242*** (0.008)	0.0376*** (0.008)	-0.0144* (0.008)	0.0066 (0.008)	0.0077* (0.004)
Foreign	-0.0900*** (0.010)	-0.0929*** (0.010)	-0.0703*** (0.010)	0.0164 (0.010)	-0.0073 (0.005)
Economics Background	0.0110 (0.009)	0.0918*** (0.010)	0.0400*** (0.010)	0.0002 (0.010)	0.0242*** (0.006)
Ln(Population)	-0.0033** (0.001)	0.0056*** (0.001)	-0.0055*** (0.001)	-0.0019 (0.001)	0.0037*** (0.001)
North	0.0755*** (0.006)	0.0478*** (0.006)	0.0315*** (0.006)	0.0166*** (0.006)	0.0063** (0.003)
Center	0.0970*** (0.008)	0.0945*** (0.009)	0.0430*** (0.009)	0.0148* (0.009)	0.0164*** (0.005)
Financial Fragility	0.0308*** (0.009)	-0.0393*** (0.009)	0.0151 (0.009)	-0.0100 (0.009)	0.0147*** (0.005)
Professional Expertise	0.0457*** (0.014)	0.1595*** (0.015)	0.0474*** (0.015)	-0.0108 (0.015)	0.0717*** (0.010)
Observations	33,702	33,702	33,702	33,702	33,702
R-Squared	0.0558	0.0519	0.0260	0.0102	0.0154
F-Statistic	175.22	152.79	72.61	28.27	27.63

The table shows the results of a linear probability regression where the dependent variables are *Experience* variables. *Fixed Income Experience*, *Equity Experience*, *Bank Products Experience*, *Mutual Funds Experience*, and *Derivatives Experience* are financial literacy dummy variables taking 1 if the investor has ever invested in fixed income instruments, equity instruments, bank products, mutual funds, and derivatives instruments, respectively; *Age (Age Squared)* is the age (squared age) of the investor; *Ln(Net Income) (Ln(Net Income) Squared)* is the (log of the) monthly net-of-taxes income (squared log-income) of the investor; *Wealthy* is a dummy variable taking 1 if the investor does not belong to the segment «mass market» (<€100,000 financial assets); *Man* is a dummy variable taking 1 if the investor's gender is male; *Foreign* is a dummy variable taking 1 if the investor's nationality is other than Italian; *Economics Background* is a dummy variable taking 1 if the investor has an educational background (college diploma) in a field related to economics or finance; *Ln(Population)* is the (log of the) resident population in the urban area where the bank is located (by zip code); *North (Center)* is a dummy variable taking 1 if the bank branch is located in a region of the North (Center) of Italy; *Financial Fragility* is a dummy variable taking 1 if the investor's financial situation does not allow for a regular monthly cash inflow (e.g., from their job); *Professional Expertise* is a dummy variable taking 1 if the investor's current or past job is related to finance or financial markets. Robust standard errors are reported in parentheses. \*\*\*, \*\*, \* denotes statistical significance at 1, 5, and 10 percent level, respectively.

of regressors as before<sup>4</sup>. Findings suggest that financial awareness and experience share most of their determinants. In particular, trading experience in financial instruments is positively associated with wealth, geographical origin, and schooling and professional financial background, and negatively depends on the status of immigrants. *Age* and *Net Income* confirm their concave relationship, *Man* is moderately significant, while financial fragility turns to be statistically insignificant. Overall, results are in line with those presented in Table 3, but weaker along some dimensions. We argue that the financial experience is mainly driven by the combined effect of financial literacy and financial provision. Since financial experience is based on past trading activity, it is natural to ar-

<sup>4</sup> Models reported in Table 5 trace those reported in Table 3, incrementally introducing SES, geographical information, financial fragility, professional experience, and non-linear effects of age and income, respectively.

gue that more dynamic households have relied on accumulated wealth to support their financial investments, other than being more financial knowledgeable to understand different investment opportunities.

In line with these arguments, inspecting the determinants of financial experience for the different asset classes is potentially insightful (Table 6). In fact, if for less sophisticated financial products we might expect the dominance of proxies of financial knowledge over capital availability (*Wealth* and *Net Income*), for more complex instruments we postulate the opposite relation. This supposition is generally confirmed if we look at Table 6. Less complicated instruments like bonds, bank products, and stocks are explained by indirect proxies of financial knowledge (SES, geographical origin, schooling and professional financial background), as well as wealth and income. More complex products, as mutual funds and to a higher degree financial derivatives, show that only few determinants are relevant in explaining the past trading experience, with *Wealth* driving most of the regression significance.

Along these lines, it is natural to consider the *Awareness* variable as a purer proxy of financial literacy. A final interesting insight is offered investigating whether *Awareness* is affected by *Experience*, as considering individual's trading experience as an exogenous factor implies some form of learning and successive *Awareness*.<sup>5</sup> Therefore, we regress *Overall Awareness* on *Overall Experience*, and we employ regression residuals as the dependent variable to replicate the models of table 3. In so doing, we remove from *Overall Awareness* the consequences of individual's *Overall Experience*. The results (unreported) confirm that all covariates maintain their sign and statistical significance as in Table 3.

### 3.3 Risk Aversion

In this section we aim at shedding light on the main drivers for household to describe their level of risk aversion. The MiFID questionnaire requires investors to categorize themselves within four possible investment profiles, that is «prudent,» «cautious,» «balanced» or «dynamic». These definitions embrace progressively higher risk attitude.<sup>6</sup> To understand the determinants of a more prudent *vis-à-vis* a more aggressive investment goal, we construct a dummy variable (*Risk Aversion*), that takes the value of 1 if investors describe themselves as «prudent» or «cautious», and 0 otherwise.

In Table 7 we run a linear probability model for *Risk Aversion* on SES, geographical origin, financial fragility, and the two cumulative measures of financial literacy as explanatory variables<sup>7</sup>. Model 1 to 3 progressively add regressors, but they jointly suggest that risk aversion is explained by the same determinants of financial literacy, with the opposite

<sup>5</sup> We would like to thank an anonymous referee for suggesting this interpretation and the related robustness test.

<sup>6</sup> More precisely, the questionnaire defines the four categories in terms of objective expected return and downside risk as follows: *a*) very high return with potential large risk of downside («dynamic»), *b*) high return with potential medium-sized downside risk («balanced»), *c*) moderate return with potential modest downside risk («cautious»), and *d*) low return with potential small risk of downside («prudent»).

<sup>7</sup> We use linear probability models because table 7 includes squared effects of *Age* and *Net Income* in all models, and average marginal effects for quadratic variables would not be disentangled from their linear counterparts using standard qualitative response models (such as, logit or probit).

**Table 7:** Determinants of risk aversion

Dependent Variable: Risk Aversion	(1)	(2)	(3)	(4)	(5)
Age	-0.0064*** (0.002)	-0.0064*** (0.002)	-0.0064*** (0.002)	-0.0042** (0.002)	-0.0049*** (0.002)
Age Squared	0.0001*** (0.000)	0.0001*** (0.000)	0.0001*** (0.000)	0.0000** (0.000)	0.0001*** (0.000)
Ln(Net Income)	-1.3405** (0.540)	-1.3209** (0.543)	-1.2053** (0.540)	-0.7481 (0.519)	-0.9207* (0.531)
Ln(Net Income) Squared	0.0834** (0.036)	0.0822** (0.036)	0.0750** (0.036)	0.0468 (0.034)	0.0573 (0.035)
Wealthy	-0.0982*** (0.006)	-0.0980*** (0.006)	-0.0917*** (0.006)	-0.0667*** (0.005)	-0.0574*** (0.006)
Man	-0.0340*** (0.008)	-0.0344*** (0.008)	-0.0334*** (0.008)	-0.0242*** (0.008)	-0.0326*** (0.008)
Foreign	0.0656*** (0.010)	0.0694*** (0.010)	0.0674*** (0.010)	0.0378*** (0.010)	0.0527*** (0.010)
Economics Background	-0.0567*** (0.008)	-0.0559*** (0.008)	-0.0309*** (0.009)	0.0161* (0.009)	-0.0208** (0.009)
Ln(Population)		-0.0027** (0.001)	-0.0027** (0.001)	-0.0012 (0.001)	-0.0028** (0.001)
North		-0.0196*** (0.006)	-0.0199*** (0.006)	-0.0131** (0.006)	-0.0092 (0.006)
Center		-0.0178** (0.008)	-0.0192** (0.008)	-0.0069 (0.008)	-0.0031 (0.008)
Financial Fragility			0.1874*** (0.010)	0.1516*** (0.009)	0.1881*** (0.009)
Professional Expertise			-0.0896*** (0.013)	0.0093 (0.013)	-0.0707*** (0.013)
Overall Financial Awareness				-0.0525*** (0.001)	
Overall Financial Expertise					-0.0605*** (0.002)
Observations	33,702	33,702	33,702	33,702	33,702
R-Squared	0.0186	0.0192	0.0327	0.1085	0.0681
F-Statistic	84.15	63.27	90.94	362.89	199.63

The table shows the results of a linear probability regression where the dependent variables is *Risk Aversion*, i.e. a dummy variable taking 1 if the investor's profile can be described as «prudent» or «cautious» (vs. «balanced» and «dynamic»). *Age* (*Age Squared*) is the age (squared age) of the investor; *Ln(Net Income)* (*Ln(Net Income) Squared*) is the (log of the) monthly net-of-taxes income (squared log-income) of the investor; *Wealthy* is a dummy variable taking 1 if the investor does not belong to the segment «mass market» (<€100,000 financial assets); *Man* is a dummy variable taking 1 if the investor's gender is male; *Foreign* is a dummy variable taking 1 if the investor's nationality is other than Italian; *Economics Background* is a dummy variable taking 1 if the investor has an educational background (college diploma) in a field related to economics or finance; *Ln(Population)* is the (log of the) resident population in the urban area where the bank is located (by zip code); *North* (*Center*) is a dummy variable taking 1 if the bank branch is located in a region of the North (Center) of Italy; *Financial Fragility* is a dummy variable taking 1 if the investor's financial situation does not allow for a regular monthly cash inflow (e.g., from their job); *Professional Expertise* is a dummy variable taking 1 if the investor's current or past job is related to finance or financial markets. *Overall Awareness* is a financial literacy variable which sums the scores of the single *Awareness* variables related to different asset classes; *Overall Experience* is a financial literacy variable which sums the values of the single *Experience* variables related to different asset classes. Robust standard errors are reported in parentheses. \*\*\*, \*\*, \* denotes statistical significance at 1, 5, and 10 percent level, respectively.

sign. Some of these findings are largely expected and in line with previous studies (Morin and Suarez, 1983; Vissing-Jørgensen, 2002; Calvet *et al.*, 2007; Guiso and Paiella, 2008). For instance, risk aversion is decreasing with wealth and income (although the second derivative is positive, but insignificant in the last two models), and increasing with less steady income (*Financial Fragility*). Also, socio-demographic characteristics are important, as older men, with a background in economics or finance, and professional expertise in the same field, are less risk averse, while immigrants exhibit higher risk aversion. That women are more risk averse than men is a common result in most studies (see Eckel and Grossman, 2008). Overall, these results suggest a negative correlation between financial



literacy and (self-declared) risk aversion. In other words, a lower level of financial literacy, keeping everything else constant, makes households more cautious when it comes to take investment decisions. To disentangle the effect of financial literacy from that explained by SES attributes, model 4 and model 5 include the two cumulative measures of knowledge (*Overall Awareness*) and experience (*Overall Experience*). As expected, financial knowledge is negatively associated with risk aversion, and absorbs most of the significance of the other regressors. Risk tolerance remains importantly explained by wealth (but not income), and financial solidity, and is still positively associated with *Age* and the *Foreign* dummy. The inclusion of *Financial Experience* produces similar effects, being negatively associated with risk aversion, and absorbing the explanatory power of some other regressors. Unlike results shown in model 4, after controlling for past trading experience, schooling and professional financial background are still important drivers in reducing investor's risk aversion.

---

#### 4 Concluding Remarks

The growing sophistication of international financial markets, along with the general low level of financial literacy among the individuals, raises concerns on the rationality of household's financial decisions. Financial illiteracy hinders the «fully informed and rational investors» paradigm. At aggregate level, the sum of individual financial decisions affects household welfare, economic growth, and the stability of financial markets. While the level of financial literacy is low in general, geographical and socio-demographic attributes are important in explaining cross-sectional differences.

In this paper we have investigated the determinants of financial literacy in Italy, a country which exhibits a particularly low level of it. Leveraging on about 38,000 MiFID questionnaires provided to us by an Italian primary bank, we have studied self-assessed individual financial literacy and past experience in trading bonds, stocks, mutual funds, bank products, and financial derivatives. Also, we have related financial literacy to individual risk preferences. Our results offer various interesting insights.

On a four-notch scale (i.e., «none,» «low,» «medium,» and «high»), the median financial awareness in Italy can be described as «low,» and the median Italian household has never traded 3 out of the 5 asset classes. In terms of socio-demographic attributes, both financial awareness and trading experience increase with age, wealth, income, and a specific economic educational background, or explicit professional financial expertise. Age and income have a quadratic effect, and financial illiteracy reaches its maximum among the young and the poor. Financial literacy depends on geographical origin of individuals, as households living in the Northern or Central areas of the country, or in more densely populated cities, are more financially knowledgeable. Also, financial literacy and risk aversion are negatively related. Households with poor financial literacy avoid riskier financial instruments, and are *de facto* precluded most of portfolio diversification strategies.

Jointly considered, these results deliver direct policy implications, as the young, the less wealthy, and households living in the Southern area of the country are particularly exposed to sub-optimal economic decisions and potential financial mistakes.

## References

- Abreu M. and Mendes V. (2010) 'Financial Literacy and Portfolio Diversification', *Quantitative Finance*, 10 (5), pp. 515-528.
- Agarwal S., Skiba P.M. and Tobacman J. (2009) 'Payday Loans and Credit Cards: New Liquidity and Credit Scoring Puzzles?', NBER Working Paper No. 14659.
- Agnew J.R. and Szykman L.R. (2005) 'Asset Allocation and Information Overload: The Influence of Information Display, Asset Choice and Investor Experience', *Journal of Behavioral Finance*, 6 (2), pp. 57-70.
- Agnew J.R., Bateman H. and Thorp S. (2013) 'Financial Literacy and Retirement Planning in Australia', *Numeracy*, 6 (2), article 7.
- Alessie R., van Rooij M. and Lusardi A. (2011) 'Financial Literacy and Retirement Preparation in the Netherlands', *Journal of Pension Economics and Finance*, 10 (4), pp. 527-545.
- Allgood S. and Walstad W.B. (2012) 'The Effects of Perceived and Actual Financial Knowledge on Credit Card Behavior', SSRN Working Paper.
- Allgood S. and Walstad W.B. (2013) 'Financial Literacy and Credit Card Behaviors: A Cross-Sectional Analysis by Age', *Numeracy*, 6 (2), article 3.
- Arrondel L., Debbich M. and Savignac F. (2013) 'Financial Literacy and Financial Planning in France', *Numeracy*, 6 (2), article 8.
- Behrman J.R., Mitchell O.S., Soo C.K. and Bravo D. (2012) 'How Financial Literacy Affects Household Wealth Accumulation', *American Economic Review*, 102 (3), pp. 300-304.
- Bernheim D. (1995) 'Do Households Appreciate their Financial Vulnerabilities? An Analysis of Actions, Perceptions, and Public Policy', *Tax Policy and Economic Growth*, American Council for Capital Formation, Washington, DC, pp. 1-30.
- Bucher-Koenen T. and Lusardi A. (2011) 'Financial Literacy and Retirement Planning in Germany', *Journal of Pension Economics and Finance*, 10 (4), pp. 565-584.
- Calcagno R. and Monticone C. (2015) 'Financial Literacy and the Demand for Financial Advice', *Journal of Banking and Finance*, 50, pp. 363-380.
- Calvet L., Campbell J. and Sodini P. (2007) 'Down or Out: Assessing the Welfare Costs of Household Investment Mistakes', *Journal of Political Economy*, 115 (5), pp. 707-747.
- Calvet L., Campbell J. and Sodini P. (2009) 'Measuring the Financial Sophistication of Households', *American Economic Review*, 99 (2), pp. 393-398.
- Campbell J.Y. (2006) 'Household Finance', *Journal of Finance*, 61 (4), pp. 1553-1604.
- Christelis D., Jappelli T. and Padula M. (2010) 'Cognitive Abilities and Portfolio Choice', *European Economic Review*, 54 (1), pp. 18-38.
- Clark R.L., Morrill M.S. and Allen S.G. (2012) 'Effectiveness of Employer-Provided Financial Information: Hiring to Retiring', *American Economic Review*, 102 (3), pp. 314-318.
- Cole S., Paulson A. and Shastry G.K. (2014) 'Smart Money? The Effect of Education on Financial Outcomes', *Review of Financial Studies*, 27 (7), pp. 2022-2051.
- Dohmen T., Falk A., Huffman D., Sunde U., Schupp J. and Wagner G.G. (2011) 'Individual Risk Attitudes: Measurement, Determinants, and Behavioral Consequences', *Journal of the European Economic Association*, 9 (3), pp. 522-550.
- Eckel C.C. and Grossman P.J. (2008) 'Differences in the Economic Decisions of Men and Women: Experimental Evidence', in *Handbook of Experimental Economics Results*, Plott C. and Smith V. (Ed.), New York: Elsevier.
- Fornero E. and Monticone C. (2011) 'Financial Literacy and Pension Plan Participation in Italy', *Journal of Pension Economics and Finance*, 10 (4), pp. 547-564.
- Gathergood J. (2012) 'Self-Control, Financial Literacy and Consumer Over-Indebtedness', *Journal of Economic Psychology*, 33 (3), pp. 590-602.
- Gerardi K., Goette L. and Meier S. (2010) 'Financial Literacy and Subprime Mortgage Delinquency: Evidence from a Survey Matched to Administrative Data', Federal Reserve Bank of Atlanta Working Paper, No. 2010-10.

- Guiso L. and Paiella M. (2008) 'Risk Aversion, Wealth and Background Risk', *Journal of the European Economic Association*, 6 (6), pp. 1109-1150.
- Guiso L. and Jappelli T. (2009) 'Financial Literacy and Portfolio Diversification', Working Paper, Centre for Studies in Economics and Finance, Naples, Italy.
- Hastings J.S. and Tejada-Ashton L. (2008) 'Financial Literacy, Information, and Demand Elasticity: Survey and Experimental Evidence from Mexico', NBER Working Paper No. 14538.
- Hastings J.S. and Mitchell O.S. (2011) 'How Financial Literacy and Impatience Shape Retirement Wealth and Investment Behaviors', NBER Working Paper No. 16740.
- Jappelli T. (2010) 'Economic Literacy: An International Comparison', *Economic Journal*, 120 (548), pp. F429-F451.
- Jappelli T. and Padula M. (2013) 'Investment in Financial Literacy and Saving Decisions', *Journal of Banking and Finance*, 37 (8), pp. 2779-2792.
- Klapper L., Lusardi A. and Panos G.A. (2013) 'Financial Literacy and Its Consequences: Evidence from Russia during the Financial Crisis', *Journal of Banking and Finance*, 37 (10), pp. 3904-3923.
- Korniotis G.M. and Kumar A. (2010) 'Tall Versus Short, Height, Lifelong Experiences, and Portfolio Choice', Working Paper.
- Lusardi A. (2008) 'Household Saving Behavior: The Role of Financial Literacy, Information, and Financial Education Programs', NBER Working Paper No. 13824.
- Lusardi A. and Mitchell O.S. (2007) 'Baby Boomer Retirement Security: The Roles of Planning, Financial Literacy, and Housing Wealth', *Journal of Monetary Economics*, 54 (1), pp. 205-224.
- Lusardi A. and Mitchell O.S. (2008) 'Planning and Financial Literacy: How Do Women Fare?', *American Economic Review*, 98 (2), pp. 413-417.
- Lusardi A. and Mitchell O.S. (2009) 'How Ordinary Consumers Make Complex Economic Decisions: Financial Literacy and Retirement Readiness', NBER Working Paper No. 15350.
- Lusardi A. and Mitchell O.S. (2011a) 'Financial Literacy and Retirement Planning in the United States', *Journal of Pension Economics and Finance*, 10 (4), pp. 509-525.
- Lusardi A. and Mitchell O.S. (2011b) 'Financial Literacy around the World: An Overview', *Journal of Pension Economics and Finance*, 10 (4), pp. 497-508.
- Lusardi A. and Mitchell O.S. (2014) 'The Economic Importance of Financial Literacy: Theory and Evidence', *Journal of Economic Literature*, 52 (1), pp. 5-44.
- Lusardi A. and Tufano P. (2009) 'Debt Literacy, Financial Experiences, and Overindebtedness', NBER Working Paper No. 14808.
- Monticone C. (2010) 'How Much Does Wealth Matter in the Acquisition of Financial Literacy?', *Journal of Consumer Affairs*, 44 (2), pp. 403-422.
- Morin R.A. and Suarez F. (1983) 'Risk Aversion Revisited', *Journal of Finance*, 38 (4), pp. 1201-1216.
- Parker A.M., Bruine de Bruin W., Yoong J. and Willis R. (2012) 'Inappropriate Confidence and Retirement Planning: Four Studies with a National Sample', *Journal of Behavioral Decision Making*, 25 (4), pp. 382-389.
- Santos E. and Abreu M. (2013) 'Financial Literacy, Financial Behaviour and Individuals' Over-Indebtedness', Working Paper, Technical University of Lisbon, Portugal.
- Sekita S. (2011) 'Financial Literacy and Retirement Planning in Japan', *Journal of Pension Economics and Finance*, 10 (4), pp. 637-656.
- Stango V. and Zinman J. (2009) 'Exponential Growth Bias and Household Finance', *Journal of Finance*, 64 (6), pp. 2807-2849.
- van Rooij M., Lusardi A. and Alessie R. (2011) 'Financial Literacy and Stock Market Participation', *Journal of Financial Economics*, 101 (2), pp. 449-472.
- Vissing-Jørgensen A. (2002) 'Towards an Explanation of Household Portfolio Choice Heterogeneity: Nonfinancial Income and Participation Cost Structures', NBER Working Paper No. 8884.