

**UNIVERSITÀ CATTOLICA DEL SACRO CUORE  
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**Dottorato di Ricerca in Management e Innovazione**

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**S.S.D: SECS-P/11**

**THREE PERSPECTIVES ON  
FINANCIAL LITERACY**

**Tesi di Dottorato di: Milena Migliavacca  
Matricola: 4212045**

**Anno Accademico 2015/2016**



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“ ... *quattroterzipigreaerretre!* ”

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## **Introduction**

This thesis looks at financial literacy according to three different viewpoints; the first chapter looks at the determinants of financial literacy, focusing on the role of financial advisors, the second one takes a psychological perspective on the issue and the last chapter looks at poor financial literacy as a possible antecedent for behavioural biases.

Financial literacy, in its most straightforward meaning, is the assessment of an individual's financial knowledge (Kim, 2001; Bowen, 2002; Courchane and Zorn, 2005); however, in the extant literature more complex and articulated definitions are employed as well; for instance, Noctor, et al., (1992), Beal and Delpachitra, (2003) and Servon and Kaestner, (2008), among others, define financial literacy as the capability of successfully put into practice the financial theoretical information learnt. Moreover, Vitt et al., (2000) and Cude et al. (2006) add a behavioural shade to their definition of financial literacy. Over and above the technical definitions, financial literacy has been attracting the attention and concerns of scholars and policy makers over the last twenty years, and the more so after recent financial scandals, which affected individuals who were unaware of the characteristics of the financial products within their portfolios until they were hit by major losses (Bradford & Bingley's precipice and with-profit bonds mis-selling, 2004; US subprime mortgages securitizations 2007-8; UK PPI scandal, 2008; Arch Cru funds, 2009; Italian Banca delle Marche, Popolare Etruria e Lazio and Carife turmoil, 2015). The interventions put in place in order to increase investors' financial literacy have proven to be costly and most importantly ineffective, especially in the medium-long run (Lusardi, 2003; Meier and Sprenger, 2013; and Fernandes et al., 2014).

In order to provide a possible explanation to this social issue, in the first paper of this thesis I examine alternative ways to improve investors' understanding of financial fundamentals and provide empirical evidence of the educational role exerted by independent financial advisors. To do so, I employ different regression models controlling for numerous demographical, geographical and attitudinal variables and I obtain robust evidence of the positive effect of the presence of an

independent financial advisor on her clients' financial literacy degree. I deepen this analysis in the second paper, in which I focus the study on the relation between advisors and clients, in order to look for the factors that enhance the flow of knowledge between the two parties. Building on the results provided by the first paper, this study is conducted on independent financial advisors only, but might provide useful cues to improve the extant financial education programmes, as well. In this context, the length of the relationship, the cognitive trust and the willingness to learn of the clients turned out to be key factors that facilitate the knowledge transfer between advisor and client and they could be three elements worth exploiting, in order to improve the efficacy of traditional financial education programmes. I provide strong evidence of the role of the three variables by using empirical models traditionally employed in financial literature and a more flexible mediation-moderation framework, which better highlights the interaction effects among the variables of interest.

In the last paper of this thesis, the focus shifts to financial literacy and its effectiveness to avoid the most persistent financial behavioural biases, which were analysed individually, in an overall "behavioural biasness" index and in three sub-indexes, which capture the different effects of financial literacy on cognitive, emotional and loss-avoidance related biases. From the empirical analysis performed, emotional biases, such as home bias, overreaction and representativeness, do not seem to be curbed by high level of financial literacy.

In line with the financial literacy literature (Chen and Volpe, 1996, 1998; Tennyson and Chau, 2001; Bowen 2002; Beal et al., 2003; Jump\$tart Coalition, 2004; Courchane and Zorn 2005; Lusardi and Mitchell, 2006, 2008; Robb, 2008; Van Rooij et al, 2011; Calcagno and Monticone, 2014), the dataset employed for the empirical analysis consists of survey data. The questionnaire is comprised of four sections and was administered on-line mainly, using QuestionPro - The Insights Platform™ as survey tool and data collection platform, between September 2014 and February 2015. The survey was previously tested in a pilot study to refine the instruments and check for comprehension

among respondents. The European Financial Planning Association (€fpa)<sup>1</sup> and four out of the ten main Italian banks (Mediobanca, 2014) are the most relevant data sources, in order to have a widespread geographical coverage. A total of 3427 Italian financial advisors registered to €fpa were contacted and briefed on the project; they in turn sent the link to the questionnaire to their clients or delivered them a hard copy to be filled in and returned in a sealed envelope. This second method is used in order to avoid the bias found in many Internet surveys, which include computer users only (Volpe et al., 2002). A stringent privacy statement ensures the respondents' anonymity. Instead of a monetary compensation, a report with specific profiling of the Italian account-holders population, their characteristics, the behavioural biases they are most exposed to and the main drivers identified in order to improve financial literacy was given to the participants at the end of the data collection. The final sample consists of 552 retail and private banking clients, who took part in the survey and fully filled it in<sup>2</sup>.

The survey comprises four main sections: the first one gathers detailed demographic information on the respondents, the first sub-section includes gender, age, marital status, number of children, region of residence, education of the respondent and her parents', typology of degree, if any, and job. In the second part of this section respondents were asked to identify their income, financial and real estate assets among the options provided. These questions, necessary for a thorough analysis, have had significant repercussions on the response rate. Three questions connect the first section of the survey to the second one: the respondents are asked to quantify in a Likert scale ranging from null to very high the level of trust they have towards the Italian banking system and towards their bank and then to which intermediary they rely on for managing the prevailing part of their assets. The second section of the survey begins by asking the respondents whether they are supported by a financial advisor. A negative answer to this question moves the respondents to the third section; on

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<sup>1</sup> EFPA is the largest certification body for financial planners and financial advisors in Europe and was the first European financial standards association created for the purpose of increasing professionalism in the European financial services sector.

<sup>2</sup> Around 14% of the overall respondents filled in a hard copy of the questionnaire and sent it; the response rate of the on-line questionnaire is 23%.

the contrary, if the respondents declare to have a financial advisor, a detailed set of questions deepens the analysis on the respondent-advisor relationship. The respondents are then asked which typology of financial advisors supports them, the length of the relationship with the advisor and with the financial institution the advisor currently works for. Moreover, using respectively Johnson and Grayson, (2005)'s and Argote and Ingram, (2000)'s scales, cognitive trust, affective trust and the degree of knowledge transfer are measured. The second section ends with two relevant information, the number of financial intermediaries the respondents rely on and the degree of personal interest (from null to very high) towards financial and economics subjects, which proxies for the willingness to learn, according to Mandell and Klein, (2007).

The respondents at this point are asked four questions to quantify their basic financial literacy and eleven questions that measure advanced financial literacy, according to Van Rooji et al. (2011)'s scale. After completing the fourth section, the respondents are informed that it would only take two further minutes to complete the fourth and last part of the questionnaire, that should be filled in very freely, without excessively think of the answers, as there are no necessarily right or wrong options. The respondents are invited to simply pick the answers that look most reasonable to them, as this section measures the behavioural biases they display. The survey accounts for six biases; in order to measure home bias, the respondents are asked to choose between a fairly geographically diversified portfolio and one with a prevailing Italian component; in another point of the section, they are asked to order the same geographical areas used in the previous question according to their rating. Home bias occurs when a respondent does not consider Italy as the country with the highest rating, but still prefers to invest the largest share of the portfolio in her Home-country. The second bias measured is the overconfidence, the overestimation of one's ability to do well a task, according to the mainstream definition attributed to Frank, (1935). In order to create a further "*ex-post*" measure of overconfidence, the respondents are first asked whether they considers their financial knowledge higher, lower or in line with the average ("*ex-ante*" overconfidence) and then this result is compared to their actual score in both basic and advanced financial literacy; the "*ex-post*" measure allows

respondents whose financial knowledge is perceived and results to be above the average not to be considered overconfident. Overreaction is the tendency to react disproportionately to new information, especially if unexpected (e.g. macro-economic announcement). I adopt the well-known Kahneman and Riepe's (1998) simple but effective *ex-ante* method to identify the bias: the respondent is shown two random sequences of outcomes from a coin toss and is asked which one, if any, has more chance to be obtained. One of the two random frequencies looks more regular than the other and Daniel Kahneman theorised that over-reactive people tend to attribute it lower chance to happen. Representativeness is a heuristic, a mental shortcut like rules of thumb, stereotyping or intuitive judgments that decreases significantly the amount of time and of information taken into account in order to make a decision. In order to assess the presence of this bias, I use Kahneman and Tversky (1974)'s original methodology. Anchoring is the tendency, while forming estimates, to rely on an *arbitrary* piece of information (the anchor) and then adjust from it (Tversky & Kahneman, 1974; Jacowitz and Kahneman, 1995; Epley and Gilovich, 2006). Following accurately Kahneman's definition, in order to assess the presence of this bias, the respondents are shown two graphs representing two investment scenarios evolving from January to March and then asked to choose whether the final position is positive, negative or even (see Appendix I-C, 3<sup>rd</sup> paper). If respondents do not move the anchor, so if they do not show the bias, they recognise a gain in the first scenario and a loss in the second one. Disposition effect stems from Kahneman and Tversky Prospect Theory (1979); as the negative utility of losses is greater than the utility for equivalent gains, investors are eager to cash in on the amount of gains, but are willing to assume high level of risk in order to avoid the negative utility of a loss (Feng and Seasholes, 2005; Carnevale, 2008). Following, among others, Dhar and Zhu's (2006) definitions and guidelines, the presence of disposition effect is detected when the respondents do not move the reference value in case of gains (first scenario of the previous bias), but they move it in the second scenario, in order to smooth the loss perception. The survey comprises 64 questions, and the four sections are alternatively used in the three papers hereby presented.

## **Paper I**

### **Independent financial advisors as educators: an empirical analysis**

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# Independent financial advisors as educators: an empirical analysis

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## ABSTRACT

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So far, education programmes aimed at increasing financial literacy proved to be scarcely effective or to have very quick decay periods (Lusardi, 2003; Willis, 2008, 2011; Meier and Sprenger, 2013; Fernandes et al., 2014); we propose independent financial advisors as a suitable alternative to increase households' financial awareness. The main objective of this study is to assess whether and to what extent the presence of an independent financial advisor improves the financial literacy of her client. To this aim, a detailed questionnaire was designed and administered to a representative sample of Italian investors in 2015. Empirical results provide evidence of a significant educational role of independent financial advisors. We check this effect for three different measures of financial literacy. The study has potentially important policy implications, as it proposes an effective way to increase investors' financial literacy that does not affect public funds.

**Keywords** Financial Advisory; Financial Literacy; Financial Education

**JEL classification** G21 G24 I21

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## 1. Introduction

Financial literacy is commonly recognised among scholars, practitioners and policy-makers as an essential determinant of individual financial awareness and the overall stability of the financial system (OECD, 2016). The relevant literature (among others, Anthes, 2004; Lusardi and Mitchell, 2007; Gathergood and Weber, 2014) though, provides extensive evidence of widespread financial illiteracy and therefore the necessity of more effective education programmes aimed at increasing households' financial literacy is becoming impellent (Bucher-Koenen, Ziegelmeier, 2013; Cavezzali et al., 2015). The lack of convergence on financial literacy's determinants, though, might undermine these initiatives at their root. A rich body of literature provides heterogeneous insights on the possible determinants of financial literacy (Lusardi, 2008; Meier and Sprenger, 2008;

Lusardi and Mitchell, 2007c; 2008b; Monticone, 2010; Van Rooij et al. 2011, 2012; Meier and Sprenger, 2013; Sucuahi, 2013); however, to the best of our knowledge, only a handful of studies (Calcagno and Monticone, 2015, Hackethal et al., 2012; Hung and Yoong, 2013; Kramer, 2016) and with mixed results considers that often investors are assisted by financial advisors and that the latter may transfer part of their financial knowledge to the clients, in order to avoid technical misunderstanding, improve their relationship and ultimately increase clients' retention. The role of advisors within the global financial industry is gaining importance; in this regard, Italy stands out among the other European countries for the particularly high growth of both the number of certified independent financial planners and the assets under their management<sup>3</sup>. This trends combination, contextualised in the upcoming framework of the MiFID II<sup>4</sup>, put the role of financial advisors under the spotlight. The Directive introduces a number of regulations aimed at increasing protection and transparency in the interests of retail investors; in this regard, two changes are going to majorly affect Italian financial advisors. Remuneration schemes are going to depend more strictly on the fees directly paid by the clients; consequently the quality of the relationship with the clients is expected to grow in importance. Both dependent and independent financial advisory are going to expand the breadth of their services, gradually moving towards a global-wealth management business model, which requires a rather close relationship with the clients and their family units. Furthermore, the role of financial advisors is going to be affected by a higher competition among the different typologies of advisors who operate within the market mainly due to the creation of a unified bar and more rigorous product governance practices. In this changing context, an analysis of financial advisors' educational role, exploited as a strategic tool for clients' retention, is particularly timely. Devoting time to transfer part of their knowledge to customers is a particularly time-consuming activity, but it is no doubt effective for advisors to keep a solid relationship with their

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<sup>3</sup> Globally, AuM increased by 8% in 2014, the European growth is 1 percentage point higher; this growth is driven in particular by the net inflows in Spain and Italy (BCG Global Asset Management, 2015). According to Assogestioni (Assogestioni, Annual report, 2015), the AuM of the Italian industry stand at €1.584 trillion +20% from 2014, +70% over previous 30 months.

<sup>4</sup> The Directive on Markets in Financial Instruments repealing Directive 2004/39/EC and the Regulation on Markets in Financial Instruments, commonly referred to as MiFID II shall be applied by Member States as of 3 January 2018.



clients, especially during financial turmoil (Crawford and Sobel, 1982; Marsden et al., 2011). Moreover, the risk of clients to operate independently on the financial markets, once they reach a satisfying degree of financial knowledge does not represent a concrete threat for financial advisors, as the theoretical proficiency of basic financial issues helps clients to knowingly understand their advisors' decisions, but does not allow them to operate independently on the financial markets, especially in the prevailing spirit of integrated asset management. The main objective of this study is to assess whether and to what extent the presence of an independent financial advisor improves the financial literacy of the clients; this phenomenon will be referred to as 'educational role of financial advisors'. Using a unique survey carried out on Italian investors between September 2014 and February, this paper provides original empirical evidence of the educational role of semi-independent and totally-independent consultants (see section 2.2). The research, furthermore, enriches the stream of existing literature on the determinants of the financial literacy by testing the impact of three typologies of financial advisors as possible antecedent of their clients' financial knowledge, which is measured using three different financial literacy indexes (see section 2.1), computed applying an innovative weighting technique. From a policy point of view, this study prompts a potentially effective and efficient way to increase investors' financial awareness that does not require public resources. The paper is organized as follows: section 2 provides a review of the current literature on financial literacy and financial advisory, section 3 describes the survey data, provides some descriptive evidence, section 4 presents the empirical methodology and discusses the results; section 5 concludes.

## **2. Literature Review**

### *2.1 Financial Literacy: definitions and measurement techniques*

Financial literacy is often used as an umbrella term (Hung, et al., 2009) comprising a wide array of meanings ranging from purely theoretical financial knowledge (e.g. Kim, 2001; Bowen, 2002; Courchane and Zorn, 2005) - which is the definition adopted in this paper, as well - to more

complex definitions that include the ability to successfully put into practice the acquired theoretical proficiency (Noctor, et al., 1992; Beal and Delpachitra, 2003; Jumpstart Coalition, 2007 and Servon and Kaestner, 2008) or adding a behavioural facet to its connotation (Vitt et al., 2000; Cude et al. 2006; Financial literacy and education commission OECD, 2008 -16). People may also have different understandings of financial literacy depending on their country of origin; in high-income countries, for instance, in order to be financially-literate one needs to master a wide array of financial products, including fairly complex ones, such as for instance supplementary pension schemes, investment funds and mortgages. In low-income countries, on the other hand, the degree of financial literacy commonly required is much more limited, as complex financial solutions are accessible only to a negligible share of investors (Xu and Zia, 2012).

Along with the definitions, the measurement tools employed in the surveys carried out in most recent years have evolved, as well; however there is still no widely-shared, standardized scale to measure the construct. Only broad guidelines emerge from the literature, Backer and Ricciardi (2014), for instance, point out four areas of content that an effective financial literacy measure should comprise: Money basics (including time value of money, inflation effects on purchasing power, personal financial accounting concepts), Borrowing, Investing and Resources Protection (either through insurance products or other risk management techniques). Furthermore only Kim and Mueller, (1978) try to homogenise the number of items used to measure the construct by proposing, as a rule of thumb, three to five items for each domain factor. Looking at the literature, though, among other contributions, Bowen, (2002), Courchane and Zorn, (2005) and Stango and Zinman, (2007) relied just on one question, Henry et al. (2001), Lusardi (2008a), Lusardi and Mitchell (2007a, 2007c, 2008c) operationalized the financial literacy construct with three items, although, according to Houston (2010) and to the guidelines mentioned above, these measures would still appear to be unable to capture the breadth of the phenomenon. At the other extreme there are long and meticulous scales exceeding thirty items, such as the one used in OECD surveys, Tennyson and Chau, (2001) and Chen and Volpe, (1998, 2002, 2006). Scales between ten and

nineteen items are preferred in a vast number of studies, including Kim, (2001), Volpe et al., (2002), NASD Investor Literacy Research, (2003), Bankrate, (2003), Lusardi and Mitchell, (2007), Servon and Kaestner, (2008); we adopted Van Rooij, et al., 2011's, which allows differentiating between basic and advanced financial literacy using five and eleven items respectively. Furthermore, the comparability among studies is hampered by the fact that the vast majority of studies are based on country-specific survey data (e.g. Italian Survey on Household Income and Wealth, 2006; Unicredit Customers' Survey (UCS), 2007; US Health and Retirement Study (HRS), 2004; De Nederlandsche Bank (DNB) Household Survey, 2005-6; Australia and New Zealand Banking Group, 2008; Sekita, 2011 in Japan; Crossan et al., 2011 in New Zealand, Almenberg and Säve-Söderbergh, 2011 in Sweden; Beckmann and Stix, 2015 in the CEECs). To the best of our knowledge, a world-wide database does not exist, with the exception of a couple of meaningful efforts (S&P Global FinLit Survey, 2014; Global Findex database, 2014, OECD/INFE, 2015), in which financial literacy questions<sup>5</sup> were added to national surveys.

## 2.2 Financial advisory

For the purposes of this study, two main categories of financial advisors are considered: independent (IFA) and restricted advisors (RFA). When not otherwise specified, any advisor who works for a bank/financial planning firm with an open architecture or a totally-open architecture setting<sup>6</sup> is referred to as independent financial advisor. This category is furthermore split into totally-independent financial advisors (TIC) and semi-independent financial advisors (SIC), such as, for instance private bankers or financial promoters<sup>7</sup>.

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<sup>5</sup> In these studies, financial literacy is proxied by four questions on Numeracy, Compound Interest, Inflation and Risk.

<sup>6</sup> "Open Architecture" is the option offered by an investment firm to let its clients invest not only in that firm's financial products, but also in competing firms' financial products. Open architecture ensures that clients can satisfy their financial needs and that the investment firm can act in each client's best interests by recommending the financial products best suited that client, even if they aren't proprietary products. Open architecture helps investment firms to avoid the conflict of interest that would exist if the firm only recommended its own products. In this study perfect open architecture refers to totally-independent consultants, who do not have in-house products, whereas private bankers and financial promoters (semi-independent advisors) still operate in open architecture, but can advise for and sell in-house products, as well.

<sup>7</sup> The closest mainstream equivalent to the Italian *promotore finanziario* is the British financial promoter. "Legally, like the British IFA, the promotore finanziario is trained to advise on third-party products and obliged to serve the client's

The different typologies of financial advisors have been classified by taking into account the conflicts of interest they might face while advising for a financial product (Shapira and Venezia, 2001; Bolton, et al., 2007; Hackethal, 2012). To this regard, restricted advisors (i.e. bank clerks, who work for proprietary institutions and only recommend the products that their firm offers) have the strongest “selling incentive” (Inderst, and Ottaviani, 2009); on the other hand, totally-independent consultant are individuals or small/medium-sized companies that do not belong to a banking, financial planning nor insurance group. Totally-independent consultants do not have in-house products or an internal distribution network and are generally remunerated by the commissions received from third-party product providers (fee-only remuneration scheme). Between those two extreme categories, private bankers and financial promoters constitute a sort of ‘hybrid profile’ as their offering combines non-independent and independent advice within their own distribution network (these two categories will be conjointly referred to as semi-independent advisors). The conflicts of interest financial advisors face may be curbed by the reputational costs of misselling and misinforming the clients (Inderst and Ottaviani, 2009) and, in effect, they are recognized to be valuable information providers, not only in Italy (Beltratti, 2008; Calcagno and Monticone, 2015), but also in other European countries (Lusardi and Mitchell, 2011; Van Rooij et al., 2011) and in the United States (Survey of Consumer Finances, 2004; Bolton et al., 2007). In line with Bolton et al. (2007), we assume investors to be partially uninformed about the optimal solution to their financial needs; this fairly reasonable assumption allows us to introduce the conflict of interest financial advisors face while selling financial products. Traditionally, the joint assumption of partially-uninformed investors and non-completely verifiable information brings about potential conflicts of interest from the advisors’ side. The potential reputational costs associated with misselling (Inderst and Ottaviani, 2009) and misinforming, coupled with the costs the financial firm

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best interests.” Promotori finanziari “are bank representatives that offer a wide range of advice. In essence, they are trained financial advisors employed to offer whole-of-market solutions and their duties go well beyond the internal bank adviser (or restricted advisor), who generally just sells and advises on the bank’s own products.” (D. Liberto, “Advice the Italian way, Adviser, Oct 16, 2013”).

faces in order to acquire new clients (Barnes and Howlett, 1998; Roberts-Lombard et al., 2014) may help to shed light on the issue. Financial institutions, particularly private banking institutions, whose clients have relations with more than one intermediary, face considerable reputational costs for giving misleading advice. Therefore being more transparent becomes a strategic tool for relationship marketing (Crawford and Sobel 1982; Grönroos, 1996; Heffernan, 2008): financial advisors may be willing to disclose information to differentiate their advisory service and relax price competition. Coherently with this view, Bolton et al. (2007) point out that “competition among specialized financial intermediaries can lead to full credible information disclosure, even in the presence of only small reputation costs”.

Part of the tacit activities carried out by financial advisors consists in explaining and making sure that the client understands the products within her portfolio, the basic portfolio management dynamics and how the main macroeconomic variables (e.g. inflation) impact on it; this information provision sets the foundation of the advisors’ educational role, which also includes the contextualisation of the information provided, their practical implications for the client’s portfolio and a methodical clarification of the client’s doubts. This role is crucial, as the clients’ awareness regarding the characteristics of the financial products purchased and the correlated risks helps them coping, for instance, with financial turmoil, without unconditionally associating the temporarily negative results to their advisor’s poor financial capabilities, so it turns out to have a positive influence on the clients’ retention. Indeed, it is commonly recognized among both scholars and practitioners that an improvement in the relationship with already acquired customers leads to greater profitability than would do an equivalent effort aimed at attracting new customers (Rust and Zahorik, 1993; Barnes and Howlett, 1998; Roberts-Lombard et al., 2014).

### *2.3 Financial literacy and financial advisory*

The limited literature dealing with financial knowledge and financial advisory provides conflicting evidence of complementarity (Lusardi and Mitchell, 2011, Van Rooij et al., 2011; Collins, 2012;

Calcagno and Monticone, 2015), substitutability (Huang and Yoong, 2010) and non-statistically significant relation (Kramer, 2016) between the presence of a financial advisor and her clients' financial literacy.

Most of the studies showing complementarity, point out that a high level of financial literacy is associated with the presence of an advisor, without further specifying neither the causality direction, nor the typology of advisors considered; the only study of this stream that, to the best of our knowledge, takes into account a possible causal relationship is Calcagno and Monticone (2015). According to the authors, bank-clients' financial literacy influences their degree of delegation towards the restricted advisor they are relying on, but their study only considers bank-clerks that, as discussed in Section 3, may be a limitation. Furthermore, Calcagno and Monticone (2015) focus on investors' degree of delegation, rather than on the different typologies of advisors and their role in the clients' financial literacy, besides only considered at its basic level (see Appendix I).

The present study offers an interpretation of the relation between financial literacy and advisory that may merge the “substitutability” and “complementarity” approach, as the former may be the precursor of the latter. By taking into account a dynamic perspective, it is reasonable to think that initially investors turn to professional advice to bridge their own weaknesses with regard to financial literacy (substitutability) and, after some time spent with the constant presence of an advisor, their own financial knowledge increases via the educational role of advisors, here-hence the complementarity between financial literacy and advisory. This view is also compatible with a more stringent one according to which there is a self-selection bias (Bucher-Koenen and Koenen, 2010) of highly knowledgeable individuals among the IFAs' clients, because, as shown in Section 4, the financial literacy of financial advisors' clients grows over time.

### **3 Data and Methodology**

#### *3.1 The Survey*

The vast majority of financial literacy surveys in the literature are either self-assessments (e.g. Bowen 2002, Courchane and Zorn 2005) or targeted towards very specific segments of the population, such as students (Chen and Volpe, 1996, 1998; Beal et al., 2003; Reasie et al., 2001; Tennyson and Chau, 2001; Jump\$start Coalition, 2004; Robb, 2008), retired people (Lusardi and Mitchell, 2006), women (Lusardi and Mitchell, 2008b) or investors with risky assets (Calcagno and Monticone, 2015).

In this study financial literacy is examined for a sample of bank-account holders, both retail and private banking clients, covering all age groups. The sections of the survey used for the purposes of this paper (see Appendix I) are part of a more comprehensive survey on households, financial literacy and financial behaviour. The sections taken into consideration collect analytical information on the demographic characteristics of the interviewees (gender, age, schooling, type of degree if any, marital status, number of children, if any, region of residence) and their wealth (income, financial and real estate assets). The central part of the survey assesses the respondents' financial literacy; Van Rooij et al.'s questions allow to differentiate between basic and advanced financial literacy (see Section 3.2) and have been adopted, after being slightly adapted to the Italian case. In the last part of the survey respondents are asked whether they rely on a financial advisor and, if yes, which typology, how long they have been clients of the current financial firm and of the current advisor. The survey was first tested in a pilot study to refine the instruments and check for comprehension among the investors. The questionnaire was administered on-line mainly, using QuestionPro™, as survey tool and data collection platform, only fully filled in questionnaires were retained (around 23%). In order to have a broad geographical coverage and to take into account both client supported by independent and restricted advisors, the questionnaire was distributed through the European

Financial Planning Association<sup>8</sup> and four out of the ten main Italian banks (Mediobanca, 2014). 3427 Italian financial advisors registered to €fpa<sup>9</sup> were contacted and briefed on the project; they in turn sent the link to the questionnaire to their clients or delivered them a hard copy to be filled in and returned in a sealed envelope. This second method is used in order to avoid the bias found in many Internet surveys, which include only computer users (Volpe et al., 2002; 2002a). A stringent privacy statement ensures the respondents' anonymity. Instead of a monetary compensation, a report with specific profiling of the Italian account-holders population, their characteristics and the main drivers identified in order to improve one's financial literacy is given to the participants at the end of the data collection.

The final sample consists of 552 retail and private banking clients, who took part in the survey between September 2014 and February 2015; it is fairly representative of the Italian Household population, as shown by the summary statistics on individuals' demographic and socioeconomic characteristics reported in Table 1. The table shows that slightly more than half of the sample (54.71%) has an independent financial advisor, more than 60% of respondents are middle-aged married men, which is coherent with the Italian households' demographic information released by the quinquennial Istat Multipurpose Survey on Households (2011)<sup>10</sup>. The median income is €32,500, but 14% of the sample has financial assets over €500,000, the threshold to be considered a private banking client in Italy (the percentage decreases to 7% with the international €1m threshold). A minor but still significant proportion of the clients interviewed (4%) are High Net Worth Individuals (i.e. with financial assets over €1m and real estate assets over €700,000). These statistics are broadly in line with the snapshot given by the Bank of Italy Household Income and

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<sup>8</sup> €fpa (or EFPA) is the largest certification body for financial planners and financial advisors in Europe and was the first European financial standards association created for the purpose of increasing professionalism in the European financial services sector.

<sup>9</sup> For the sake of anonymity of the respondents, it was not feasible for us to match the each respondents with her financial advisors; as advisors' financial literacy degree might reasonably influence their clients', we decided to involve only EFPA certified advisors. The degree of difficulty of the certification allows us to give it for granted that the certified advisors' financial literacy knowledge exceeds the level tested in the present study, virtually ensuring that the respondents have potential access to a sample of financial advisors with a fairly homogenous degree of financial literacy.

<sup>10</sup> The Istat annual household surveys shows that men are predominantly heads of household and financial decision makers in around 70% of cases (Istat 2011).



Wealth survey (2015), which reports a mean net income of €30,500, and a mean percentage of HNWIs of 5%.

**Table 1: Summary Statistics**

	Mean %	Median	SD
Independent Financial Advisor	54.71	1	0.50
Gender (men percentage)	66.30	1	0.47
Age	43	49	1.34
Married	63.22	1	0.48
Single	15.04	0	0.36
Divorced	11.77	0	0.32
Cohabitee	9.96	0	0.30
Children (nr. of)	1.05	1	1.06
Primary/Secondary ed.	1.45	0	0.12
High School	46.38	0	0.50
College/Above	52.17	1	0.50
Employee	29.71	0	0.46
Manager	16.49	0	0.37
Self-Employed	34.42	0	0.48
Pensioner	8.15	0	0.27
Out of Labour Market	11.23	0	0.32
Income (thousands €s)	36.45	32.50	1.12
Italian private	14.31	0	0.35
<i>Obs. N</i>	552		

*Notes: the table shows the distribution of the sample (N=552) across the demographic characteristics examined*

### 3.2 Variable description

Three different typologies of financial literacy have been included in our empirical models as dependent variables – basic, advanced and overall. In order to assess basic financial literacy, Van Rooij et al. (2011)’s questions on interest compounding, inflation, time value of money and money illusion have been included in the survey. Advanced financial literacy is assessed using the eleven questions devised by Van Rooij et al. (2011), which comprise the definitions of bond, stock and secondary market, basics of portfolio diversification, the relation between risk and return and between interest rate and bonds’ prices (see Appendix I). In the previous literature, the financial literacy scores obtained by the respondents were either linearly combined or weighted by the average percentage of correct answers (as e.g. in Monticone, 2010); in a departure from the standard financial literacy literature, we use the average percentage of *wrong* answers as weights. This

technique allows the correct answers to less-commonly-known topics to weight more than the correct answers to broadly-known topics. The answers to basic and advanced financial literacy questions weighed by the percentage of wrong answers are then combined respectively in a basic financial literacy index and advanced financial literacy index. The two indexes, in turn, are included in an overall financial index, which weights the advanced financial literacy index twice as much as the basic one, in order to account for the higher complexity of the questions therein included. Finally, the scores are converted in centiles, for a better comparability across indexes. The empirical results were only marginally sensitive to other weighting techniques (see Section 4.1.2). For the sake of comparability with previous studies, Table 2 provides the scores distribution of un-weighted basic, advanced and overall financial literacy indexes.

**Table 2: Average Answers to FL Question in %**

	Basic F.L.			Advanced F.L.			Overall F.L.		
	<i>min</i>	<i>mean</i>	<i>Max</i>	<i>Min</i>	<i>mean</i>	<i>max</i>	<i>Min</i>	<i>mean</i>	<i>max</i>
Incorrect	0	27.13	100	0	30.12	100	0	29.93	100
Correct	0	72.87	100	0	69.88	100	0	70.07	100
<i>Obs.</i>		552			552			552	

*Notes: the table shows the mean percentage of correct answers to basic, advanced and overall financial literacy indexes.*

On average, respondents answered 72.87% of basic financial literacy questions correctly, the percentage decreases to 69.88% for advanced financial literacy, so overall approximately 70% of the questions assessing financial literacy were correctly answered. These scores are broadly similar to those found in the relevant literature, which adopted the same scale (such as, for example, Van Rooij et al., 2011 and Kramer, 2016). The two studies base their findings on Dutch data sources; the first one reports that 75.97% of the four basic financial literacy questions used in this study were correctly answered; this percentage sharply decreases to 53.94% for advanced financial literacy, while it seems to hold better in the Italian case. The second study performs a principal component analysis and reports a percentage of 55.4% to 70.6%, depending on the subsample, of correct answers to the resulting overall scale of financial literacy. The main explanatory variables of the

baseline model described in Section 4 are the presence of an independent financial advisor, measured with a dummy that takes the value of one if the client is backed by an independent financial advisor and zero when she can only count on a restricted bank employee as source of financial advice. The variable is further split into the three dummy variables it is comprised of, each one controlling for the presence of a totally-independent, semi-independent or restricted advisor. As, for the sake of anonymity of the respondents, we could not check the literacy of their financial advisors, which might influence the client's financial knowledge nonetheless, we decided to involve only EFPA certified advisors; the degree of difficulty of the certification allows us to give it for granted that the certified advisors' financial literacy exceeds the level tested in the present study, virtually ensuring that the respondents have potential access to a sample of financial advisors with a fairly homogenous degree of financial literacy, at least as far as the tested topics are concerned. The financial literacy measures have been linked to demographic, behavioural and financial features of the respondents, used as control variables, coherently with the extant literature (see Table A1 and A2 in Appendix II for the exact list of control variables, their definitions and correlations). The professional expertise (Barnett, 2005) and the willingness to learn (Elmer, 2004) of the respondents are two individual characteristics that go beyond the simple control variables, as well; they are two self-assessed variables that measure whether the respondent's job has increased her financial knowledge and the personal interest towards financial and economics topics respectively; along with the presence of an independent financial advisor, these two variables, only marginally considered in the extant literature, seem to explain a significant part of the financial literacy of the respondents (see Paragraph. 4). Furthermore a new control variable is introduced in the analysis: *economic grip*. It controls for specific financial cognitive abilities, adapting Christelis et al. (2010) and detects the presence of a basic logical financial reasoning (see Appendix II). The respondent is shown a graph and asked to determine whether the payoff of the investment is positive, negative or even. In this particular case, the perception of the investment to be successful or not is due to a mix of cognitive biases (or lack thereof), but not being able to answer the question or perceiving the

payoff as even implies lack of basic economic grip, and in this case the dummy variable takes the value of zero.

### *3.3 Descriptive evidence*

Table 3 reports the differences in terms of average financial literacy scores across demographic variables, Welch and Bonferroni<sup>11</sup> significance tests are used. In line with the most relevant literature, the descriptive statistics show relatively low financial literacy scores among women and respondents with lower education attainment (Lusardi and Mitchell, 2008; Van Rooij, 2011; Monticone, 2010; Kramer, 2016). Over and above the education attainment, among graduates, there seems to be a stark difference between the financial literacy level of interviewees with a degree in economics or finance and those with another degree, which confirms that financial knowledge is not widespread even among people with a superior educational attainment (Cavezzali et al., 2015). As in Monticone (2010), Italian respondents living in north-west Italy display the highest level of financial literacy and the wealth seem to be a significant determinant of basic financial literacy scores, as well. Respondents were asked whether their job contributed to their financial literacy (see “professional expertise” in Appendix I) and that seems to have a high and significant impact on the three indexes of financial literacy, with a more intense effect on advanced financial literacy, rather than on basic. Finally, the presence of a financial advisor appears to have a highly significant impact on the clients’ literacy, regardless of the index with which it is measured.

## **4. Methodology and Empirical Evidence**

Table 3 provides descriptive evidence of the positive relationship between the presence of an independent financial advisor and the degree of basic, advanced and overall financial literacy displayed by the interviewee: this effect appears sizable and in order to provide empirical support, in accordance to the most recent literature (e.g. Lusardi and Mitchell, 2006; Lusardi, 2008;

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<sup>11</sup> Because of the samples sizes’ inequality, we use a Welch’s Test to perform an ANOVA analysis, Bonferroni correction is used when multiple comparisons are required.

**Table 3: Financial Literacy scores by socio-demographic characteristics**

		<b>Basic F.L.</b>	<b>Advanced F.L.</b>	<b>Overall F.L.</b>
<b>Independent Financial Advisor</b>	No	60.12	55.56	56.17
	Yes	75.26	73.50	73.83
	<i>T-Statistic</i>	-6.16***	-7.73***	-8.04***
<b>Gender</b>	Woman	59.43	57.51	57.78
	Man	73.07	69.51	70.00
	<i>T-Statistic</i>	-5.11***	-4.65***	-5.01***
<b>Standing</b>	Retail	68.43	64.80	65.31
	Private	69.04	74.68	73.89
	<i>T-Statistic</i>	-0.12	-2.48**	-2.20**
<b>Education</b>	Primary/secondary	44.91	34.37	35.65
	High School	64.60	62.15	62.49
	Degree/postgrad	72.59 <sup>#b</sup>	69.30 <sup>#o</sup>	69.76 <sup>#o</sup>
<b>Degree</b>	Non-economic subject	63.84	59.76	60.34
	Economics	81.62	81.64	81.64
	<i>T-Statistic</i>	-7.12***	-9.67***	-9.98***
<b>Area of Residence</b>	North-west	72.03	70.64	70.83
	North-east	67.17	62.34	63.02
	Center	58.68	55.41	55.87
	South	70.27 <sup>-b</sup>	65.32 <sup>-a</sup>	66.01 <sup>-o</sup>
<b>Financial job Expertise</b>	No	56.75	50.18	51.10
	Yes	76.08	75.38	75.48
	<i>T-Statistic</i>	-7.85 ***	-11.33***	-11.63***

Table 3 Reports the average percentage of basic, advanced and overall financial literacy indexes, computed as discussed in paragraph 3.1. Welch's T-statistics and significance levels are reported; when three or more categories are compared, Bonferroni's correction for mean differences in multiple comparisons is carried out.

#b Bonferroni test for mean difference (F-Statistics): High School vs Primary/Secondary: 0.1968; Degree/Postgrad vs High School: 0.0798\*\*\*  
Degree/Postgrad vs Primary/Secondary: 0.2767\*\*

#a Bonferroni test for mean difference(F-Statistics): High School vs Primary/Secondary: 0.2684\*\*; Degree/Postgrad vs High School: 0.0727\*\*\*  
Degree/Postgrad vs Primary/Secondary: 0.341\*\*\*

#o Bonferroni test for mean difference(F-Statistics): High School vs Primary/Secondary: 0.259\*\*; Degree/Postgrad vs High School: 0.0735\*\*\*  
Degree/Postgrad vs Primary/Secondary: 0.333\*\*\*

-b Bonferroni test for mean difference (F-Statistics): only the mean differences between center vs north-west (-0.1334\*\*\*) and south vs center (0.1158\*\*) are significant

-a Bonferroni test for mean difference (F-Statistics): only the mean differences between north-east vs north-west (-0.0829\*\*), between south vs center (0.099\*) and between center vs north-west (-0.152\*\*\*) are significant

-o Bonferroni test for mean difference (F-Statistics): only the mean differences between north-east vs north-west (-0.0782\*), center vs north-west (-0.1476\*\*\*) and south vs center (0.101\*) are significant

\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%.

Monticone, 2010; Calcagno and Monticone, 2015; Kramer, 2016), a multivariate analysis has been performed.

Different specifications of ordered probit models, as exemplified in Equation 1, are employed in order to determine the impact of a set of relevant independent variables on the level of financial literacy displayed by the respondents (Terza, 1985; Boes and Winkelmann, 2006)<sup>12</sup>.

$$\begin{aligned} Pr(y_i = 1) &= 1 - \Phi[\beta X_i - u_1] \\ Pr(y_i = 2) &= \Phi[\beta X_i - u_1] - \Phi[\beta X_i - u_2] \\ Pr(y_i = n) &= \Phi[\beta X_i - u_{n-1}] \end{aligned} \quad (1)$$

$Pr(y_i=j)$  represents the probability of each financial literacy indexes to fall in the  $j^{\text{th}}$  percentile of right answers.  $\Phi [\cdot]$  is the joint cumulative distribution of the bivariate normal and  $u_1, u_2, \dots, u_n$  are the cutpoints that divide up the probability distribution. In order to be able to interpret the coefficients, the marginal effects of the explanatory variables (see equation 2) have been assessed<sup>13</sup>.

$$\Delta Pr(y_i = j) = \Phi[\beta_0 + \beta_1 + \beta_2 X_{2i} + \dots + \beta_k X_{ki}] - \Phi[\beta_0 + \beta_2 X_{2i} \dots + \beta_k X_{ki}] \quad (2)$$

The analysis focuses on the relation between the presence of an independent financial advisor (IFA) and the degree of basic, advanced and overall financial literacy of their clients. In order to assess such an effect, different specifications of the ordered probit model outlined in equation 1 have been performed. The first specification of the model (see Table 4) assesses the marginal effect of the presence of an independent financial advisor on basic (1), advanced (2) and overall (3a and 3b) financial literacy. The second specification (see Table 5) is focused on respondents supported by an IFA and allows differentiating among semi-independent consultant and totally-independent consultants. The models are overall significant and correctly specified, according to the ReSET test, the errors reported are robust to heteroskedasticity.

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<sup>12</sup> Robustness checks of this model have been run (see section 4.3) using OLS models and un-weighted financial literacy indexes.

<sup>13</sup> The marginal effect is an approximation of how much the dependent variable is expected to increase or decrease for a unit change in an explanatory variable. Equation (2) describes the marginal effect on the  $j^{\text{th}}$  category of the dependent variable when a discrete covariate value changes from  $X_{1i}=1$  to  $X_{1i}=0$ , keeping the other independent variables constant.

The results are strongly consistent among the two specifications and provide support to the set of hypotheses tested. The variables of interest and the presence of an independent advisor are positively and strongly significant across all three measures of financial literacy.

**Table 4: The presence of independent financial advisors**

	Basic Financial	Advanced Financial	Overall Financial Literacy	
	Literacy	Literacy	MAX	MIN
	(1)	(2)	(3a)	(3b)
Indep. Financial Advisor	0.166*** (0.032)	0.142*** (0.022)	0.114*** (0.018)	-0.009** (0.004)
Will. To Learn	0.046*** (0.016)	0.062*** (0.011)	0.045*** (0.009)	-0.004** (0.002)
Prof. Expertise	0.147*** (0.036)	0.144*** (0.025)	0.116*** (0.020)	-0.009** (0.004)
Gender	0.026 (0.033)	0.036 (0.022)	0.028* (0.017)	-0.002 (0.002)
Age	-0.048 (0.057)	0.004 (0.041)	-0.001 (0.031)	0.000 (0.002)
Age squared	0.020 (0.015)	0.008 (0.011)	0.008 (0.008)	-0.001 (0.001)
Marital status	-0.019 (0.017)	-0.008 (0.012)	-0.007 (0.009)	0.001 (0.001)
Children	0.025* (0.015)	0.022** (0.010)	0.018** (0.008)	-0.001 (0.001)
Education	0.015 (0.034)	0.001 (0.023)	0.002 (0.017)	-0.000 (0.001)
Eco degree	0.123*** (0.044)	0.129*** (0.030)	0.102*** (0.023)	-0.008** (0.004)
Eco. Grip	0.082** (0.037)	0.033 (0.028)	0.033 (0.021)	-0.003 (0.002)
Employee	0.081 (0.064)	0.015 (0.041)	0.018 (0.031)	-0.001 (0.002)
Manager	0.157** (0.070)	-0.010 (0.048)	0.011 (0.036)	-0.001 (0.003)
Self-Employed	0.144** (0.065)	0.081* (0.043)	0.068** (0.032)	-0.005 (0.003)
Pensioner	-0.061 (0.095)	-0.054 (0.063)	-0.045 (0.048)	0.004 (0.005)
Private	0.078* (0.042)	0.048 (0.032)	0.042* (0.025)	-0.003 (0.003)
Geographical controls	Yes	Yes	Yes	Yes
N Obs	552	552	552	552
Wald test	181.54 (0.000)	320.25 (0.000)	347.37 (0.000)	347.37 (0.000)
ReSET test	Yes	Yes	Yes	Yes

*Ordered Probit (marginal effects on conditional probabilities are reported). Standard errors reported in brackets are robust to heteroskedasticity. The ReSET test does not reject the null hypothesis for correct model specification.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%.*

Focusing the analysis on Table 4 columns 1 and 2, holding all other regressors constant at their mean value, the presence of a financial advisor increases the conditional probability of scoring the highest centile by 16.6, 14.2 and 11.4 percentage points for basic, advanced and overall financial literacy, respectively.

Consistently with the extant literature (Guiso and Jappelli, 2008; Australia and New Zealand Banking Group, 2008; Van Rooij et al., 2011), being male appears to be associated with a higher level of overall financial literacy. The marital status does not influence the financial literacy degree, but interestingly enough the presence of children does, increasing by around 2% the probability of scoring the highest centile of correct answers in the three financial literacy indexes. The education attainment does not seem to be significant across the specifications, but a degree in economics subjects, whose coefficient is always positive and strongly significant, seems to be the real education-related determinant. The impact of the variable *economic grip* is positive and significant for the basic financial literacy scores, but, reasonably, it loses both magnitude and significance as the difficulty of the financial questions increases. Being a manager has a positive impact on basic financial literacy, whereas self-employed have a sizable and positive impact on both basic and advanced financial literacy and on the overall index, as well. Aside from the specific occupation, though, having a job that is perceived to positively affect the personal degree of financial knowledge (*professional expertise*) proved to have a very strong, positive effect on financial literacy. The interest in financial and economics subjects the respondents displayed, which proxies their willingness to learn, proved to have a positive and significant impact on all of the three financial literacy indexes, as well. The professional expertise outweighs both the personal interest in financial and economics topics and the degree in economics and it results to be the second strongest driver after the presence of a financial advisor, which proves to be the strongest financial literacy channel among the regressors. The debate on the direction of the causality between personal wealth and financial literacy of account holders is still open (Bernheim and Garret, 2003; Peress, 2004; Lusardi and Mitchell, 2007; Delavande et al., 2008; Japelli and Padula, 2011); the results in Table 4



marginally contribute to this stream of literature, as the impact of the Private Client status turns out to be statistically significant and positive for basic and overall financial literacy, but does not seem to have influence on advanced financial literacy. Finally, the geographical controls do not seem to have a significant impact on the financial literacy degree, consistently with the most recent literature dealing with an Italian sample (Calcagno and Monticone, 2015).

The columns 3a and 3b compare the determinants of being part of the highest and lowest centile of the overall financial literacy distribution. The policy maker may firstly want to tackle the factors that cause people to fall in the lowest centile and only afterwards improving those that determine financial literacy excellence; this differentiation might also help in better calibrating financial education programmes. Strong drivers of financial literacy, such as the presence of a financial advisor, the degree in economics or finance, the willingness to learn and the financial expertise, appear to have a symmetrical impact on the two centiles, as expected. However, usually the positive effect these variables exert on the probability of scoring the maximum percentage of correct answers, sensibly decreases in magnitude as “inverse determinant” of a very low financial literacy score. In other words, the presence of these features has a strong impact on the probability to excel but the lack thereof has a weaker, but still significant, causal role in determining particularly low financial literacy levels. It is moreover interesting to underline that the gender has no impact on low financial literacy degree and neither have the financial wealth or being self-employed, despite their expected significant negative sign. It is interesting to notice that from the results in column 3b it is hard to pinpoint strong determinants of low financial literacy, which though should be the primary target of educational interventions.

**Table 5: Different typologies of independent financial advisors**

	Basic Financial	Advanced Financial	Overall Financial	
	Literacy	Literacy	Literacy	
	(1)	(2)	MAX (3a)	MIN (3b)
T-IC	0.030 (0.068)	0.120** (0.060)	0.085* (0.046)	-0.006 (0.005)
Rel. Length	0.013 (0.024)	0.060*** (0.017)	0.046*** (0.014)	-0.003 (0.002)
Will. To Learn	-0.009 (0.024)	0.019 (0.018)	0.011 (0.015)	-0.001 (0.001)
Prof. Expertise	0.228*** (0.052)	0.226*** (0.041)	0.197*** (0.036)	-0.014 (0.009)
Gender	0.033 (0.054)	0.056 (0.041)	0.049 (0.033)	-0.003 (0.003)
Age	-0.012 (0.088)	0.068 (0.071)	0.051 (0.057)	-0.004 (0.005)
Age squared	0.010 (0.021)	-0.011 (0.018)	-0.007 (0.015)	0.001 (0.001)
Marital status	-0.028 (0.026)	-0.044 (0.019)	-0.038*** (0.014)	0.003 (0.002)
Children	0.046** (0.022)	0.009 (0.018)	0.012 (0.014)	-0.001 (0.001)
Education	-0.048 (0.052)	-0.018 (0.044)	-0.023 (0.036)	0.002 (0.003)
Eco degree	0.203*** (0.064)	0.104** (0.053)	0.103** (0.042)	-0.007 (0.005)
Eco. Grip	0.137*** (0.047)	0.076* (0.044)	0.073** (0.035)	-0.005 (0.004)
Employee	-0.169 (0.130)	-0.079 (0.101)	-0.076 (0.081)	0.005 (0.007)
Manager	-0.059 (0.131)	-0.020 (0.102)	-0.015 (0.081)	0.001 (0.006)
Self-Employed	-0.060 (0.126)	0.027 (0.095)	0.014 (0.074)	-0.001 (0.005)
Pensioner	-0.214 (0.164)	-0.094 (0.125)	-0.082 (0.102)	0.006 (0.008)
Private	0.022 (0.057)	0.027 (0.047)	0.029 (0.039)	-0.002 (0.003)
Geographical controls	Yes	Yes	Yes	Yes
N Obs	302	302	302	
Pseudo R2	0.0784	0.0700	0.0696	
ReSET test	Yes	Yes	Yes	

*Ordered Probit (marginal effects on conditional probabilities are reported). Standard errors reported in brackets are robust to heteroskedasticity. The ReSET test does not reject the null hypothesis for correct model specification.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%.*

Table 5 confirms the main result shown in table 4 and provides further evidence of the educational role exerted by totally-independent consultants. Focusing on the dummy variables controlling for the typology of independent financial advisor, totally-independent consultants T-ICs seem to exert their educational role in a more effective way than semi-independent advisors, and the gap is

particularly strong with regard to advanced financial literacy. The fee-only remuneration scheme of T-ICs may provide them with higher incentive to build long-lasting relationships with their clients; as they need to demonstrate that their advice is of added value and worth the fee. So it is in the advisor's own interest to make sure that her clients fully understand the products they are investing in, the related risks and some portfolio management fundamentals. Investors with an extremely high degree of delegation perceive their investment as a "black box" and are more likely to point the finger towards their advisor in case of underperformance, no matter what the actual underlying causes are. The educational role of financial advisors prompts a virtuous circle between client and advisor: with an acceptable degree of financial literacy, the client can knowingly understand and accept the investment choices conjointly taken with their advisor and the solidity of their professional relationship would therefore self-reinforce. The positive and significant impact of financial expertise, economic degree and economic grip on the financial literacy degree of the respondents is confirmed by this second model, as well. The positive, rather strong and significant sign of the length of the relationship between advisor and client, is of particular interest. It not only suggests that the longer the client cooperates with her advisor, the more she benefits from the advisor's financial knowledge, but may also be interpreted as an indirect prove of the causal relationship between advisory and literacy. Even if only financially-knowledgeable clients opted for a financial advisor (as in Calcagno and Monticone, 2015), still their advanced financial literacy improves over time. Moreover it is particularly meaningful that the relationship length is not significant for basic financial literacy for which the presence itself of a totally-independent consultant does not exert a higher role compared to semi-independent advisors. According to the results shown in Table 5, the higher the independency of the advisors, the more technical the information they are going to transfer to their clients are.

## 4.1 Causality and Robustness checks

### 4.1.1 Financial advisors and financial literacy: causality test

The strong and significant impact of the presence of an independent advisor on her clients' financial literacy shown in section 3.3 and 4 does not necessarily provide evidence of the direction of the causality between the variables of interest. Furthermore, comparable studies, such as Calcagno and Monticone (2015), show that financial-literate individuals tend to rely more on financial advisors compared to account holders with a low degree of financial literacy<sup>14</sup>. Coherently with the approach used, among others, by Calcagno and Monticone (2015), in order to rule out any possibility for the results to be affected by reverse causality, the base-line model's variables of interest have been instrumented and the model estimated by the Generalized Method of Moments (GMM) outlined in equation 3.

$$\begin{aligned} P_{(H_{FL})} &= \beta_1 X_1 + \gamma I.F.A. + u_1 \\ P_{(FA=1)} &= \beta_1 X_1 + \gamma F.L. + v_2 \end{aligned} \quad (3)$$

$X_1$  represents the same vector of control variables employed in the base-line model (eq. 1), whereas IFA and FL are instrumented with two exogenous variables each and regressed against each other. The GMM is a method to obtain parameter estimates when one or more regressors might be endogenous. In the linear two-step efficient GMM presented in Table 6, L ( $L > K$ ) variables were used to instrument the presence of an independent financial advisor, the typology of financial advisor and the three typologies of financial literacy. When estimating a model of the kind of  $y = X\beta + u$ , the GMM allows to find a vector  $\beta$  that solves the moment condition  $E[Z'(y - X\beta)] = 0$  where Z is a matrix of L instruments and  $E[Z'u] = 0$ .

The independent variable *Independent financial advisor* has been instrumented with the variables *Distrust in Banking System* and *Fidelity* (see Table A1). The two variables are highly and strongly

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<sup>14</sup> Calcagno and Monticone (2015) findings should be compared with caution to the results presented in this paper because the authors assess the impact of financial literacy on the degree of delegation (no-delegation, advice and full-delegation) only towards restricted advisors. Furthermore a different financial literacy scale and different target respondents have been employed.

correlated with the presence on an independent financial advisor, who seems to be perceived as a substitutable alternative to restricted advisors and the banking system in general; whereas the second instrument indicates that the client had followed the advisor when she moved from a financial institution to another one, as it takes the value of one if the customer has a longer relationship with the independent consultant than with the financial institution the advisor currently works for. On the other hand, the three measures of financial literacy, dependent variables in the main model, are instrumented with two dummy variables, as the model requires: the first one detects the combination of living in northern Italy and being highly educated (college or above), the second one controls for the respondent being able to correctly order according to their rating U.S.A, the European Union, Italy and Developing Countries (MINT: Mexico, Indonesia, Nigeria and Turkey) (see Table A1). The gap between Northern and Southern regions in Italy does not solely involve financial literacy, but it is also captured by several economic indicators, such as per capita income, employment rates and overall education attainment (Monticone, 2010; Istat 2011, Multipurpose Survey on Households). Whereas assessing the correct rating order proxies the respondents' financial knowledge without correlating with the decision of relying on an independent financial advisor. The goodness of these instruments is supported by the results of the Hansen's test that does not reject the null of instrument validity (see Table 6).

**Table 6: Causality direction between the presence of an independent financial advisor and financial literacy**

	First stage Dependent: BFL	Second stage Dependent: IFA	First stage Dependent: AFL	Second stage Dependent: IFA	First stage Dependent: OFL	Second stage Dependent: IFA
Independent F. A.	11.526 (8.059)		29.879*** (7.016)		27.582*** (6.593)	
Financial Literacy		-0.005 (0.004)		-0.011 (0.013)		-0.010 (0.010)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N Obs	552	552	552	552	552	552
Hansen J	1.155	1.389	1.543	1.224	0.915	1.272
Hansen J p value	0.2824	0.2386	0.2142	0.2686	0.3400	0.2594

*Linear model estimated by GMM. Regressors not reported are the same as in the base-line model (Table 4). Standard errors in brackets are robust to heteroskedasticity. The Hansen'J test for over-identification does not reject the null hypothesis of instruments' validity. \* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1% level.*

Table 6 shows that, after controlling for the string of variables used in the baseline model, the hypothesis of reverse causality between the presence of an independent financial advisor and her clients' advanced and overall financial literacy degree is rejected. Interestingly, the causal relationship between the presence of an independent advisor and the basic financial literacy degree of the client cannot be evaluated, as the two variables are statistically insignificant when instrumented and used as respective regressors, in line with Kramer (2016). Apparently independent financial advisors manage to transfer technical knowledge regarding financial notions, such as the definitions of bonds and stocks, the role of the financial markets and of secondary market, the relation between risk and return and interest and bonds' price, basics of portfolio management and diversification, but do not affect the basic financial literacy. According to the scale employed, basic financial literacy includes interest compounding, the role of inflation, the time value of money and money illusion, very basic concept that possibly people deciding to entrust their savings to a professional advisor have already had the chance to familiarise with. The descriptive statistics in Table 7 shows that the presence of a financial advisor among young people is quite low, as expected, and on the contrary relatively high among middle age and elderly people; it is, then, reasonable to assume that other entities, different from financial advisors, are expected to lay the foundation of investors' basic financial knowledge. Schools and universities, for instance, are more likely to convey the basic financial skills on which people can build more refined level of financial literacy over the years. Independent financial advisors take practical financial choices, talk to their customers about financial instruments and deal with the basics of portfolio management but do not focus on rather theoretical notions such as the difference among interest compounding regimes or temporal discount analysis. That could be a reason why basic financial literacy benefits from the presence of an independent advisor (see results in Tables 4 and 5), but the causal relationship is not statistically neat (see results in table 6).

**Table 7: Descriptive evidence: age and presence of independent financial advisors**

	Mean presence of IFA	18-24	25-34	35-44	45-54	55-64
18-24	0.2667					
25-34	0.3243	0.0576				
35-44	0.5780	0.3113***	0.2536*			
45-54	0.5867	0.3201***	0.2624**	0.0087		
55-64	0.5645	0.2978***	0.2402	-0.0135	-0.0222	
>65	0.7317	0.4650***	0.4074***	0.1537	0.1450	0.1672

Table 7 reports the average presence of independent financial advisors among different age ranges. Bonferroni's test for mean difference is carried out and the F-statistics, with their significance are reported.

\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1% level.

#### 4.1.2 Robustness checks

This section reports in Table 8 two robustness checks of the baseline model. Columns 1-3 show the results of an OLS model and the dependent variables are respectively the basic, advanced and overall financial literacy indexes assessed by weighting the single scores by the mean percentage of *wrong* answer to each question, as in the baseline model. Whereas, columns 4-6 report an OLS model where the dependent variables are the three financial literacy *un-weighted* indexes.

The results are qualitatively comparable to those presented in Table 4.

**Table 8 Robustness Checks: The presence of independent financial advisors**

	Weighted BFL index	Weighted AFL index	Weighted OFL index	Un-weighted BFL index	Un-weighted AFL index	Un-weighted OFL index
	(1)	(2)	(3)	(4)	(5)	(6)
Indep. Financial Advisor	0.136*** (0.027)	0.459*** (0.068)	2.250*** (0.439)	0.447*** (0.088)	1.125*** (0.220)	2.697*** (0.484)
Will. To Learn	0.040*** (0.013)	0.194*** (0.034)	1.280*** (0.229)	0.147*** (0.043)	0.640*** (0.114)	1.427*** (0.254)
Prof. Expertise	0.122*** (0.031)	0.487*** (0.080)	2.662*** (0.525)	0.354*** (0.100)	1.331*** (0.262)	3.016*** (0.581)
Gender	0.028 (0.028)	0.111 (0.071)	0.766 (0.480)	-0.001 (0.089)	0.383 (0.240)	0.765 (0.520)
Age	-0.019 (0.047)	0.038 (0.133)	0.159 (0.828)	-0.050 (0.155)	0.080 (0.414)	0.109 (0.904)
Age squared	0.010 (0.012)	0.021 (0.034)	0.168 (0.214)	0.035 (0.039)	0.084 (0.107)	0.203 (0.234)
Marital status	-0.014 (0.014)	-0.015 (0.036)	-0.020 (0.234)	-0.047 (0.045)	-0.010 (0.117)	-0.066 (0.254)
Children	0.015 (0.012)	0.065** (0.031)	0.192 (0.202)	0.049 (0.038)	0.096 (0.101)	0.241 (0.216)
Education	0.004 (0.030)	-0.029 (0.075)	0.362 (0.490)	0.010 (0.100)	0.181 (0.245)	0.372 (0.536)
Eco degree	0.092*** (0.035)	0.415*** (0.091)	2.337*** (0.565)	0.350*** (0.115)	1.169*** (0.283)	2.687*** (0.620)
Eco. Grip	0.067** (0.032)	0.101 (0.092)	1.648*** (0.636)	0.199* (0.103)	0.824*** (0.318)	1.847*** (0.685)
Employee	0.068 (0.055)	0.057 (0.138)	0.463 (0.861)	0.173 (0.184)	0.231 (0.431)	0.636 (0.938)
Manager	0.130** (0.059)	-0.010 (0.158)	-1.064 (1.001)	0.344* (0.198)	-0.532 (0.500)	-0.720 (1.079)
Self-Employed	0.117** (0.056)	0.234* (0.142)	1.449* (0.876)	0.347* (0.184)	0.725* (0.438)	1.796* (0.945)
Pensioner	-0.022 (0.080)	-0.159 (0.205)	-1.144 (1.309)	-0.141 (0.260)	-0.572 (0.655)	-1.285 (1.440)
Private	0.056* (0.033)	0.164* (0.097)	1.475** (0.617)	0.239** (0.103)	0.738** (0.309)	1.715** (0.669)
Cons	1.592*** (0.299)	2.394*** (0.707)	6.381*** (1.503)	0.315*** (0.092)	0.661*** (0.220)	4.789*** (1.414)
Geo. Controls	Yes	Yes	Yes	Yes	Yes	Yes
N Obs	552	552	552	552	552	552
R <sup>2</sup>	0.275	0.442	0.410	0.277	0.410	0.431

*OLS models. Columns 1-3 report the OLS model and the financial literacy indexes are weighed by the average number of wrong answers to each questions, as in the baseline model. Columns 4-6 report n OLS model and the three indexes are un-weighted. Standard errors reported in brackets are robust to heteroskedasticity.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%.*

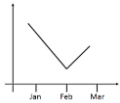


## **5 Conclusive remarks**

Using a unique survey carried out on Italian investors between September 2014 and February 2015, this paper provides original evidence on the effect of the presence of three typologies of financial advisors (restricted, semi-independent and totally-independent) on the financial literacy degree of their clients. In order to assess the financial literacy level of the respondents, three different indexes have been employed: basic financial literacy (aimed at assessing numeracy, interest compounding, inflation, time value of money and money illusion), advanced financial literacy (focused on technical aspects of unsophisticated financial instruments and fundamentals of portfolio management theory and markets functioning) and overall financial literacy (this index weights advanced financial literacy correct answers twice as much as the basic financial literacy ones). The empirical findings show that the degree of financial literacy is positively and significantly influenced by the presence of an independent financial advisor, the lower the conflict of interest the advisor faces while choosing between in-house or whole-market financial products, the stronger her educational role becomes. This dynamic finds its rationale in the different incentives the three categories of advisor have to build a long-lasting relationship with the clients. The compensation structure varies sensibly among the advisors typologies on a continuum from fee-only of totally-independent consultants to the flat salary of restricted advisors; reasonably the more related the wage of the advisor is to the customer satisfaction, the stronger the incentive to cultivate a strong, long-lasting relationship becomes. In order to avoid unpleasant misunderstanding and the consequent disappointment from the client's side, it is in the advisor's own interest to make sure that the investor fully understands the characteristics of the product in her portfolio and accepts the related risks. This educational role proves to be particularly effective for advanced financial literacy, whereas basic financial literacy might work as a prerequisite. The analysis carried out in this study is relevant to both scholars and policy makers because it addresses timely policy issues and contributes to the literature on the determinants of financial literacy. The world-wide shared concerns about the poor financial literacy of investors might be less worrying if investors' financial

literacy can be improved by professional advice coming from qualified and independent financial advisors. These practitioners may be a suitable connecting link between financial information providers and investors; given the constant presence of financial advisors in their clients' life, the meetings between advisors and clients might provide a suitable way to convey constant, gradual financial training to investors. This relation might help avoiding the quick decay period traditional finance courses face, as, among others, Lusardi (2003) and Fernandes et al. (2014) findings point out; according to Fernandes et al. (2014): "Even large interventions with many hours of instruction have negligible effects on behaviour 20 months from the time of intervention". The research findings have meaningful managerial and policy implications, as well. From a managerial point of view, as the positive impact of the presence of an advisor is brought to light, the educational role of the financial advisors can be exploited as an important tool for relational marketing (Grönroos, 1995, 1996) and this awareness may enhance the customer/advisor relationship quality and may have a positive impact on customer retention, as well. Given their expertise and financial knowledge, independent advisors may become themselves a suitable target for more structured financial education programs, which would in turn reach the investors via the educational role exerted by their advisors. The results suggest that by reducing the conflicts of interest between intermediaries and investors, financial advisors could spontaneously exert an educational role towards their clients. From a policy point of view, then, encouraging the presence of qualified independent financial advisory may result in lower expenses for spot financial education programmes targeted towards retail investors, whose efficacy and decay period have proven to be disappointing (Lusardi, 2003; Willis, 2008, 2011; Meier and Sprenger, 2013; Fernandes et al., 2014).

## APPENDIX I: Wording of Survey Questions

<b>Independent and Control Variables</b>	
Gender	Gender of the respondent
Marital Status	Marital Status of the respondent
Children	Number of children
Age	Age of the respondent [18-24; 25-34; 35-44; 45-54; 55-64; 65-75; >75]
Job	[Employee; Manager; Professional; Entrepreneur; Out of labour market; Other (please specify)]
Professional Expertise	Has your job somehow improved your financial skills/knowledge? [Yes=1; No=0]
Educational attainment	Highest Educational attainment of the respondent
Degree in economics/finance	[Economic sciences=1; Other=0]
Region of residence	Region of residence of the respondent
Total real estate assets	[€0-200,000; €200,000-350,000; €350,000-700,000; €700,000-1,5m; €1,5m-3m; €3m-5m; €5m-10m; >€10m]
Total financial assets	Total amount of liquidity, and financial assets (e.g. government bonds, bonds, stocks) [< €50,000; €50,000-100,000; €100,000-250,000; €250,000-500,000; €500,000-1m; €1m-5m; €5-10m; €10-30m; €30m-50m; > €50m]
Advisor typology	Are you supported by a private banker, financial promoter or independent consultant?[No; Yes, by a financial promoter; Yes, by an independent consultant; Yes, by a private banker]
Advisor Rel. length	How long have you been assisted by your current advisor?[0 -6 m; 7 m-1 y, 1-3 y; 3-5 y; > 5 y]
Fin. Intermediary Rel.Length	How long is it that you have a bank account by your current financial intermediary? [0 -6 months; 7 months-1 year, 1-3 years; 3-5 years; > 5 years]
Fin. System Trust	<i>How trustworthy do you think the Italian banking system is?</i> [Not trustworthy at all; Slightly trustworthy; Neutral; Very trustworthy; Extremely trustworthy]
Willingness to Learn	How interested are you in economic and financial topics?[Not interested at all; Slightly interested; Somewhat interested; Moderately interested; Extremely interested]
Rating	Which is the most plausible combination of countries if you had to order Euro Area, Italy, Emerging Countries and U.S.A according to their rating? (from the highest to the lowest?) [Italy – Euro Area – U.S.A. – Developing C.; Developing C. – U.S.A – Euro Area – Italy; Euro Area – U.S.A. – Italy – Developing C.; U.S.A – Euro Area – Italy – Developing C.]
Economic Grip	Please consider the underlying scenario; say you invested your money in January and that the value of that investment have changed over time according to the graph. What would you say with regard to your investment on March?[I'm gaining; I'm losing; I'm at break-even; I don't know]
	
<b>Financial Literacy: Basic and Advanced financial literacy; All questions included the options “All of the above” and “I don't know”</b>	
BFL_1	Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? [More than €110; Exactly €110; Less than €110]
BFL_2	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account? [More than today; Exactly the same; Less than today]
BFL_3	Assume a friend inherits h10,000 today and his sibling inherits h10,000 3 years from now. Who is richer because of the inheritance? [My friend; His sibling; They are equally rich]
BFL_4	Suppose that in the year 2010, your income has doubled and prices of all goods have doubled too. In 2010, how much will you be able to buy with your income? [More than today; The same as today; Less than today]
AFL_1	Which of the following statements describes the main function of the stock market?[The stock market helps to predict stock earnings; The stock market results in an increase in the prices; The stock market brings people who want to buy with people who wants to sell stocks]
AFL_2	Which of the following statements is correct? If somebody buys the stock of firm B in the stock market [He owns a part of firm B; He has lent money to firm B; He is liable for firm B's debts]
AFL_3	Which of the following statements is correct? [One cannot withdraw money invested in a mutual fund during the first year; Mutual funds can invest in several assets, for example invest in both stocks and bonds; Mutual funds pay a guaranteed rate of return which depends on the past performance]
AFL_4	Which of the following statements is correct? If somebody buys a bond of firm [He owns a part of firm B; He has lent money to firm B; He is liable for firm B's debts]
AFL_5	Consider a long time period (for example 10 or 20 years), which asset normally gives the highest return? [Saving accounts; Bonds; Stocks]
AFL_6	Normally, which asset displays the highest fluctuation over time?[Saving accounts; Bonds; Stocks]
AFL_7	When an investor spreads his money among different assets, does the risk of losing money [Increase; Decrease; Stay the same]
AFL_8	If you buy a 10-year bond, it means you cannot sell it after five years without incurring a major penalty, even with an efficient secondary market. [True; False]
AFL_9	Stocks are normally riskier than bonds [True; False]
AFL_10	Buying a company stock usually provides a safer return than a stock mutual fund [True; False]
AFL_11	If the interest rate falls, what should happen to bond prices? [Rise; Falls; Stay the same]

## APPENDIX II: Variable definitions and Correlation

**Table A1: Variables definitions**

Variable	Definition
<i>Dependent Variables</i>	
Basic Financial Literacy	Sum of the correct answers to four questions devised to measure BFL weighted by the percentage of medium incorrect answers, in centiles
Advanced Financial Literacy	Sum of the correct answers to eleven questions devised to measure AFL weighted by the percentage of medium incorrect answers, in centiles
Overall Financial Literacy	Sum of basic and advanced financial literacy indexes, with advanced financial literacy weighted twice as much as basic financial literacy, expressed in centiles
<i>Explanatory Variables</i>	
Independent financial advisor (IFA)	Dummy variable taking the value of 1 if the respondent is assisted by an independent financial advisor (both T-IC and S-IC), 0 otherwise
T-IC	Dummy variable taking the value of 1 if the respondent is assisted by a totally independent financial advisor, 0 otherwise
S-IC	Dummy variable taking the value of 1 if the respondent is assisted by a semi-independent advisor, 0 otherwise
RA	Dummy variable taking the value of 1 if the respondent is assisted by a restricted advisor, 0 otherwise
Professional Expertise	Dummy variable taking the value of 1 if the respondent perceives her job to positively affect her financial knowledge, 0 otherwise
Willingness to learn	The self-reported interest towards financial and economics subjects (measured on a Likert scale from 1 -not interested at all- to 5 -extremely interested)
<i>Control Variables</i>	
Gender	Dummy variable taking the value of 1 for male 0 for female investors
Age	Seven intervals covering from 18 to over 75 years old (question A2, appendix I-A).
Marital status	Categorical variable controlling for being married, separated/divorced, cohabitant and single (question 6 Appendix I-A)
Children	Number of dependent children
Residence area	Five dummy variables controlling for the respondent living in North-West, North-East, Centre and South (including Isles).
Education	Scale ranging from 1 Primary/Secondary education to 3 Degree or Postgraduate title
Economics degree	Dummy variable taking the value of 1 if the respondents have a degree in economics or finance, 0 otherwise.
Job	Eight dummy variables controlling for the respondent's job (see Appendix I-A)
Income	Seven gross annual income intervals covering from < €25,000 to over €500,000
Real estate assets	Eight intervals covering from < € 200,000 to over € 10millions
Financial patrimony	Ten intervals covering from < €50,000 to over € 50millions assessing the overall value of cash, bond, stocks, mutual funds and insurance policies, in Euros.
Private	Dummy variable taking the value of 1 if the respondents has a financial patrimony over € 500,000, zero otherwise
Economic grip	A dummy variable that takes the value of 1 if the respondents chose either the first or the second answer to question C9 (see Appendix I-C), zero otherwise.
<i>Instrumental Variables</i>	
Distrust System	Reverse coding of the answers to question C6, Appendix I-C
Fidelity	Dummy variable which takes the value of 1 if the customer has a longer relationship with the consultant, than with the financial institution the advisor currently works for
North-Educated	Dummy variable that takes the value of 1 if the respondent lives in northern Italy and has a higher education degree
Rating	Dummy variable taking the value of 1 if the respondent assessed the correct rating order of USA, European Union, Italy and Developing Country, zero otherwise (see question C8 Appendix I-C)

*Notes: the table provides brief definitions of the variables reported in the descriptive and empirical evidence*

**Table A2: Correlation Matrix**

	Basic F.L.	Advanced F.L.	Overall F.L.	IFA	wtl	prof_fin	gender	Age	age^2	Marital sts	children	Edu	eco. degree	logic_b	employee	manager	self employed	pensioner	northeast	northwest	South	
Basic F.L.	1																					
Advanced FL	0.5721*	1																				
Overall F.L.	0.6712*	0.9919*	1																			
IFA	0.2646*	0.3201*	0.3300*	1																		
Wtl	0.3111*	0.4343*	0.4392*	0.0438	1																	
prof_fin	0.3240*	0.439*	0.4462*	-0.0095	0.4818*	1																
Gender	0.1698*	0.1885*	0.1965*	0.1137*	0.1773*	0.1246*	1															
Age	0.0496	0.0732	0.0742	0.1777*	-0.2527*	-0.1085*	0.0182	1														
Age^2	0.0113	0.0431	0.0409	0.1432*	-0.2383*	-0.1029*	-0.0121	0.9445*	1													
marital sts	-0.1104*	-0.0786	-0.0872*	-0.1097*	0.1281*	0.0377	-0.0361	-0.3844*	-0.266*	1												
Children	0.1187*	0.1227*	0.1290*	0.1497*	-0.0984*	-0.0139	-0.0093	0.2356*	0.1200*	-0.4225*	1											
Edu	0.1566*	0.1628*	0.1710*	0.0400	0.1426*	0.0637	0.0316	-0.1325*	-0.154*1	-0.0875*	0.0769	1										
eco. Degree	0.2672*	0.3432*	0.3519*	0.0479	0.2743*	0.2727*	0.0366	-0.0531	-0.0803	-0.0269	-0.036	0.5517*	1									
logic_b	0.1173*	0.1118*	0.1187*	-0.1813*	0.2660*	0.1486*	0.1232*	-0.0962*	-0.1101*	0.0426*	-0.042	0.04600	0.0548	1								
Employee	-0.1459*	-0.1796*	-0.1850*	-0.165*	-0.1304*	-0.1098*	-0.1572*	-0.0456	-0.1094*	-0.1004	0.0324	-0.1215*	-0.1492*	-0.0283	1							
Manager	0.1114*	0.0241	0.0399	-0.0175	0.0444	0.0477	0.1515*	0.0430	-0.0223	-0.0792	0.1167*	0.1742*	0.1719*	-0.0086	-0.2889*	1						
self employed	0.2151*	0.2808*	0.2860*	0.2379*	0.1558*	0.1147*	0.1696*	-0.0199	-0.086*	-0.0747	0.0587	0.1200*	0.1373*	0.0791	-0.4710*	-0.3219*	1					
Pensioner	-0.091*	-0.0722	-0.0792	0.1115*	-0.2231*	-0.1126*	-0.0958*	0.4907*	0.6397*	-0.0833	-0.0579	-0.1608*	-0.1006*	-0.1255*	-0.1937*	-0.1324*	-0.2158*	1				
Northeast	-0.0218	-0.0560	-0.0536	0.0057	-0.0465	-0.0383	-0.0434	0.0858*	0.0741	-0.1043*	0.0346	0.0862*	0.1273*	-0.0720	0.0111	0.0266	0.0166	0.0116	1			
Northwest	0.0242	0.0657	0.0636	-0.1071*	0.0328	0.0161	-0.0141	-0.1851*	-0.1337*	0.1196*	0.0817	0.1571*	0.0819	0.0687	-0.0547	0.0893*	-0.0867*	-0.0586	-0.3447*	1		
South	0.0280	-0.0013	0.0030	0.0568	-0.0132	0.0641	0.1071*	-0.0003	-0.0039	0.0096	-0.0165	-0.0246	-0.0371	0.0015	-0.0079	-0.0375	0.0622	-0.024	-0.2252*	-0.2982*	1	
ita_private	0.0890*	0.1143*	0.1178*	0.1848*	-0.0674	0.0112	-0.0261	0.1389*	0.1531*	-0.0050	0.0779	-0.0497	0.0181	-0.171*	-0.1638*	-0.0561	0.1503*	0.1429*	0.1493*	-0.0196	-0.0403	

*Notes: the table shows the correlations among the regressors of the models and between the regressors and the dependent variables*

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## **Paper II**

### **The moderating and mediating effects on the relationship between financial advisory and financial literacy**

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# The moderating and mediating effects on the relationship between financial advisory and financial literacy

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ARTICLE INFO	ABSTRACT
<b>JEL classification</b> <b>G21</b> <b>G24</b> <b>I21</b>  <b>Keywords</b> Financial Advisors Financial Literacy Financial Education	<p>This paper looks at the antecedents that foster the ‘educational role of independent financial advisors’. To this purpose, a detailed questionnaire was designed and administered to a sample of Italian investors in 2015. Empirical results confirm that being assisted by a financial advisor significantly increases the literacy degree of the clients. They also provide evidence of the role played by cognitive trust, willingness to learn and length of the relationship between investor and advisor in enhancing the knowledge transfer. We check these mediation and moderation effects for three different measures of financial literacy, identified using Van Rooij et al., (2011)’s methodology. The study has potentially important policy implications, given the social impact a poor financial literacy has recently proven to have on retail investors.</p>

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## 1. Introduction

The stream of literature that provides insights on the determinants of financial literacy (FL) is particularly rich (e.g. Lusardi, 2008; Lusardi and Mitchell, 2008; Meier and Sprenger, 2008; Monticone, 2010; Sucuahi, 2013); to the best of our knowledge, however, little attention has been devoted to the role that financial advisors play in their clients’ financial literacy and overall the results appear mixed (Calcagno and Monticone, 2014; Dhar and Zhu, 2006; Kramer, 2016; Migliavacca, 2017). Moreover, the studies supporting the hypothesis that the presence of a financial advisor increases the financial literacy level of their clients, do not provide evidence of *the way* this educational role is exerted. Understanding the channels that enhance the knowledge transfer from advisor to client may provide more awareness of the financial advisors’ relevance to the industry. Moreover, understanding how financial advisors succeed where most structured financial education programmes failed, may provide useful suggestions on how to improve such interventions. For the

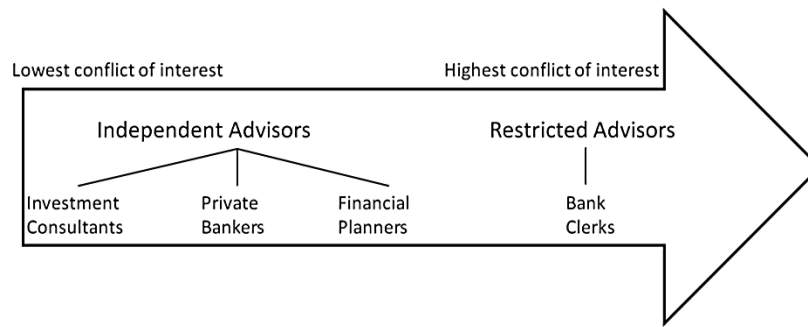
sake of this analysis, two main categories of advisors have been considered: independent (IFAs) and restricted advisors. The first category comprises investment consultants (ICs), private bankers (PBs) and financial planners (FPs), whereas the second category identifies bank clerks (BCs). The four different typologies of advisors – even though bank clerks cannot truly be referred to as financial advisors – have been ordered according to the conflicts of interest they might face while advising for and selling financial products (see Figure 1).

Bank clerks work for proprietary institutions and only recommend the products provided by their firm, so they have the maximum “selling incentive” possible towards in-house products. On the other hand, investment consultants do not belong to a banking or insurance group and do not have in-house products. They work in perfectly open-architecture, in other words they can virtually advise for and sell any financial product present in the market. Open architecture ensures that the financial advisors pursue their client’s best interests, disregarding the provider of the financial products and avoids the conflict of interest that would exist if the firm only recommended its own products. Private bankers (PBs) and financial promoters (FPs) constitute a sort of ‘hybrid profile’, their offer includes both non-independent and independent advice, so their clients can invest in their firm’s financial products and in third-parties’ financial products, as well and are still considered IFAs<sup>15</sup>. We focus our analysis on the clients supported by financial advisors who offers a consultancy service (ICs, PBs ad FPs) and not purely financial products, as restricted advisors (BCs) do, because the discontinuity that characterizes the interaction between bank clerks and the clients they deal with combined with the lack of incentives to invest time and effort in their relation (Hausman, 2001) do not allow the two parties to have a stable relationship on which to investigate, in order to understand the relational antecedents of the advisors’ educational role.

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<sup>15</sup> “Legally, like the British IFA, the *promotore finanziario* is trained to advise on third-party products and obliged to serve the client’s best interests.” *Promotori finanziari* “are bank representatives that offer a wide range of advice. In essence, they are trained financial advisors employed to offer whole-of-market solutions and their duties go well beyond the internal bank adviser (or restricted advisor), who generally just sells and advises on the bank’s own products.” (D. Liberto, “Advice the Italian way, Adviser, Oct 16, 2013”).

**Figure 1: Financial Advisors Typologies**



*Notes: financial advisors are ordered from investment consultants with the lowest conflict of interest with the clients to restricted advisors with the strongest “selling incentives”; private bankers and financial promoters stand in between with an hybrid offer of in house and third-parties’ products.*

The main objective of this study is to shed light on *the way* the presence of an IFA improves her clients financial literacy; it investigates the mechanisms that enable these clients to have a higher financial literacy, compared to the respondents who do not benefit from a systematic consultancy service, *ceteris paribus*. To this purpose, a detailed questionnaire was designed and administered to a representative sample of Italian investors between September 2014 and February, 2015 and an articulated empirical analysis has been carried out.

Our empirical findings highlight that the effect of the presence of an IFA on their clients’ financial literacy is driven by the degree of knowledge transfer (KT) between them (Argote & Ingram, 2000). The extent of the knowledge transfer’s effect on the clients’ FL degree, though, is moderated by the investors’ trust towards their advisors’ competences (as in Johnson and Grayson, 2005) and the investors’ willingness to learn (thereby confirming Mandell and Klein, 2007’s prediction). Furthermore, this study evaluates whether the financial literacy degree of the clients supported by IFAs increases over time and, if so, to what extent. As any educational path, the increase in financial literacy degree due to the presence of an IFA is expected to marginally decrease over time. This research enriches the stream of existing literature on the determinants of financial literacy, by testing the impact of three typologies of IFAs as possible antecedent of their clients’ financial knowledge. Furthermore, the analysis attempts to determine the channels through which the presence of an IFA affects the financial literacy of her clients. To this purpose, for the first time, the

role of knowledge transfer, cognitive and affective trust and willingness to learn – jointly referred to as “*relational determinants*” – has been applied to this stream of literature, looking at their effect on FL individually and in an integrated framework, in which the variables of interest are interconnected through mediation/moderation effects.

The research findings have meaningful managerial and policy implications, as well. The empirical evidence of this paper, provides practitioners with precise recommendations on the relational features that optimise their educational role. Moreover, traditional educational interventions aimed at improving financial literacy around the world have proven to be extremely costly and poorly effective, especially in the medium-long term (Lusardi, 2003; Meier and Sprenger, 2013; Fernandes et al. 2014). Therefore, being aware of the relational determinants that enhance the IFAs’ educational role, may help to orient and better target future educational treatments.

The paper is organized as follows: section 2 provides a review of the current literature on financial literacy, Section 3 describes the survey data, defines the variables and present the methodology. Section 4 presents and discusses the empirical results and Section 5 concludes.

## **2. Literature Review**

The term financial literacy encompasses a wide range of meanings from financial knowledge (e.g. Kim, 2001; Courchane and Zorn, 2005; Van Rooij et al., 2011) to more complex definitions that include the ability to successfully put into practice the acquired theoretical proficiency or even adding a behavioural facet its connotation (Noctor, et al., 1992; Beal and Delpachitra, 2003; Jumpstart Coalition, 2007; Servon and Kaestner, 2008; Huston, 2010; OECD, 2016). The social context may influence the understanding of financial literacy, as well; for instance, Xu and Zia, (2012) highlight that the amount of financial knowledge required to be financially-literate in developing countries is lower compared to developed countries, depending on the complexity of the financial environment. Regardless of the exact definition, financial literacy is assessed via surveys typically at national level (for instance, Beal and Delpachitra, 2003 and Nielsen, 2008 for Australia;

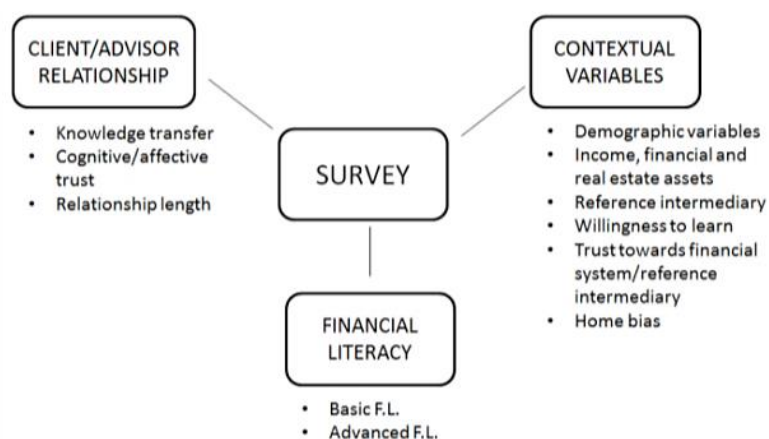
Van Rooij et al., 2011 for The Netherlands; Bankrate, 2003; US Health and Retirement Study (HRS), 2004 and Lusardi and Mitchell, 2007a for the USA; Monticone, 2010 for Italy) with the exception of a couple of meaningful effort to create a more extended database on financial literacy (Lusardi and Mitchell, 2011; Klapper et al., 2014; OECD/INFE, 2015). In order to be able to use compact and objective measurement scales, we opt for the most straightforward definition of financial literacy that mainly focuses on the theoretical knowledge displayed by the respondents. The extant literature provides a wide array of scales and tools to measure financial literacy, as well. Bowen, (2002), Courchane and Zorn, (2005) and Stango and Zinman, (2009), among others, rely just on one question, whereas Lusardi (2008) and Lusardi and Mitchell (2007, 2007b,) operationalize the financial literacy construct with three items. At the other extreme, there are long complex scales exceeding thirty items, such as the one used by the OECD surveys, Tennyson and Nguyen (2001), Volpe et al., (1996, 2002, 2006). We adopted a rather compact one, in line with the vast majority of the authors (e.g. Kim, 2001; Volpe et al., 2002; Lusardi and Mitchell, 2007; Servon and Kaestner, 2008; Van Rooij et al., 2012) that has the additional advantage to distinguish between basic and advanced financial literacy (Van Rooij et al., 2011).

### **3 Data and Methodology**

#### *3.1 Survey data and variables description*

Coherently with the extant financial literacy literature (Lusardi, Van Rooij et al., 2011, Calcagno and Monticone, 2014), we designed a survey in order to gather the information we need to address our research question. In particular, a three-module multiple-choice questionnaire (see Figure 2) was designed and targeted towards Italian account-holders. The survey first circulated in a pilot version and was then administered in its final version between September 2014 and February 2015, mainly on-line using QuestionPro™ platform but hard copies to be filled in and returned in a sealed envelope were sent, as well to avoid the potential sample selection bias found in surveys, which include only computer users (Volpe et al., 2002).

**Figure 2: Survey Design**



*Notes: For the sake of this study, we used three sections of a more comprehensive survey carried out among Italian account holders between September 2014 and February 2015. The sections assess respectively the financial literacy of the respondents, the variables we referred to as ‘relational antecedents’ (knowledge transfer, cognitive and affective trust, relationship length) and the demographic and patrimonial variables we controlled for in the empirical models.*

In order to guarantee the sample representativeness of the Italian account-holder population, the 3427 members of the European Financial Planning Association (EFPA<sup>16</sup>) were contacted and briefed on the project; they in turn sent the link to the questionnaire to their clients or delivered them a hard copy of it<sup>17</sup>. To be able to reach account-holders who only rely on restricted advisory, instead, we involved four out of the ten main Italian banks, according to Mediobanca, (2014) report. A stringent privacy statement ensures the respondents’ anonymity. Instead of a monetary compensation, a report with specific profiling of the Italian account-holders population, their characteristics and the main drivers identified in order to improve one’s financial literacy is given to the participants at the end of the data collection.

The final sample consists of 552 retail and private banking clients, who fully filled in the survey questionnaire. The survey gathers three sets of information: the first one (see Appendix I-A) includes detailed demographic questions employed in our empirical model as control variables (gender, age, marital status, number of children, if any, education attainment, typology of degree, if

<sup>16</sup> EFPA is the largest certification body for financial planners and financial advisors in Europe and was the first European financial standards association created for the purpose of increasing professionalism in the European financial services sector.

<sup>17</sup> Around 14% of the overall respondents filled in a hard copy of the questionnaire and delivered it; the response rate of the on-line questionnaire is 23%.



any, job, region of origin, income and financial assets). Summary statistics on individuals' demographic and socioeconomic characteristics are reported in Table 1. The data shows that more than half of the sample (55%) has an IFA and more than 60% of respondents are middle-aged married men. The median income, is between € 25,000 and € 50,000 and 14% of the sample has financial assets are over € 500,000, the threshold to be considered a private banking client in Italy. The sample is fairly representative of the Italian population, as the mean composition is in line with the results of the quinquennial Istat Multipurpose Survey on Households (2011)<sup>18</sup>.

**Table 1: Summary Statistics**

	Mean %	Median	SD
Financial Advisor	55	1	0.5
Gender (men percentage)	66	1	0.47
Age	43	49	1.34
Married	63	1	0.48
Single	15	0	0.36
Divorced	12	0	0.32
Cohabitee	10	0	0.3
Children (nr. of)	1.05	1	1.06
Primary/Secondary ed.	1	0	0.12
High School	46	0	0.5
College/Above	52	1	0.5
Employee	30	0	0.44
Manager	16	0	0.37
Self-Employed	34	0	0.47
Pensioner	08	0	0.27
Out of Labour Market	11	0	0.29
Income (thousands €s)	36.45	32.50	1.12
Italian private	14	0	0.25
<i>Obs. N</i>	552		

*Notes: Respondents' distribution among demographic control variables*

Among the controls we introduced a new variable, *Economic Grip*, which detects the presence of a basic logical financial reasoning (see Appendix I-A); the respondent is shown a graph and asked to determine whether the payoff of the investment is positive, negative or even. In this particular case, the perception of the investment to be successful or not is due to a mix of cognitive biases (or lack

<sup>18</sup> The Istat annual household surveys shows that men are predominantly heads of household and financial decision makers in around 70% of cases (Istat 2011). In 2013, the mean household income of families, whose main earner is a person between 55 and 64 years old is € 35.414 (Istat 2014).

thereof), but not being able to answer the question or perceiving the payoff as even implies lack of basic economic grip, and in this case the dummy variable takes the value of zero.

The second section of the survey assesses the degree of both *basic* and *advanced financial literacy*, the dependent variables of our models. We employ the scale devised by Van Rooji, Lusardi and Alessie (2011), comprised of five items to measure basic financial literacy and eleven items to assess advanced financial literacy (see Appendix I-B for the exact wording of the questions). The answers to the two financial literacy sections are linearly combined in a basic financial literacy index (BFL Index), an advanced financial literacy index (AFL Index) and an overall financial index (OFL Index), which weights the correct answers to advanced financial literacy questions twice as much as the basic ones. For the sake of a more straightforward interpretation and as the empirical results were only marginally sensitive to other specifications, unweighted scores are used and reported in the descriptive and empirical evidence provided below.

On average, respondents answered to 68% of the basic financial literacy questions correctly, the percentage decreases to 65.46 for advanced financial literacy, so an overall 66.2% of the questions assessing financial literacy were correctly answered. The scores vary less between basic and advanced financial literacy, compared to those in Van Rooij et al., (2011, 2012); in their study on financial literacy and stock market participation in the Netherlands, the authors find that 75.97% of the four basic financial literacy questions used in this study were correctly answered, percentage that decreases sharply to 53.94% for advanced financial literacy. For the sake of anonymity of the respondents, it was not feasible for us to check the literacy of the financial advisors, which, though, might influence the knowledge transfer between advisor and client. In order to – at least partially – control for this possible distortion, we decided to involve only EFPA certified financial advisors because the degree of difficulty of the certification allows us to give it for granted that the certified advisors' financial literacy exceeds the level tested in the present study. As the respondents were asked which typology of financial advisors supports them, we were able to distinguish the

educational role of ICs, PBs and FPs against restricted advisors (BCs) and test the first set of three hypotheses H1:

- **H1a:** Investment Consultants have a more pronounced educational role than restricted advisors
- **H1b:** Private bankers have a more pronounced educational role than restricted advisors
- **H1c:** Financial promoters have a more pronounced educational role than restricted advisors

The third section of the survey (see Appendix I-C for the exact wording of the questions) collects information regarding a set of variables that, to the best of our knowledge, has not been tested in the context of financial literacy literature before, as they are usually employed in psychology and management studies. We hypothesised that the educational role of IFAs stems from the flow of information between advisor and client, which is formalized by the variable *knowledge transfer* (KT). Ko et al., (2005) define it as “the communication of knowledge from a source so that it is learned and applied by a recipient”; this variable fits particularly well our analysis, because the authors focus on the KT from consultants to clients, even though in a slightly different context from ours. Further studies (e.g. Modi and Mabert, 2007; Easterby-Smith et al., 2008; Li et al., 2012) analyse the same bilateral dynamic in supplier-customer relationship and provide empirical evidence that a successful transfer of knowledge between the two parties leads to improved suppliers’ performance. Building on this stream of literature, we formulate hypothesis 2 as follows.

- **H2:** The Knowledge Transfer between IFA and client increases the clients’ financial literacy

The second variable of this set is the trust between advisor and client, identified in the extant literature as a catalyst of the KT (e.g. Kaye and Hamilton, 2004; Ko et al., 2005). Within the supplier/customer trust literature, there is a limited number of studies that focus on individual client/financial advisor relationship (Kaye, and Hamilton,2004; Barnette-White, 2005; Ennew and Sekhon, 2007; Heffernan et al., 2008; Roberts-Lombard et al., 2014) and none of them differentiate between *cognitive* and *affective trust*, as we decided to do. Cognitive trust (CT) is the customer’s confidence on a service provider’s technical skills and competence (Rempel et al., 1985; Moorman et al., 1992, Johnson, D., & Grayson, K. (2005). This typology of trust is salient within the

investor/advisor relationship, as it has often been pointed out that the current complexity of financial products and market dynamics reduce the ability of customers to objectively assess the quality of the service received (Alford and Sherrell, 1996; Monticone, 2010). In contrast, the affective trust (AT) is fuelled by the level of care and concern the advisor demonstrates towards the client. Affective trust may play an important role in the financial context as well, as the rather low degree of financial literacy displayed by the investors and the opaqueness, risk and complexity of the financial environment prevent them from knowingly assessing from a technical point of view the decisions taken by their advisor. For this reason, financial advisors, also referred to as “relationship managers” (Gronros, 1996; Ravald and Grönroos, 1996; Hefferman et al., 2008), often turn to relationship marketing in order to ensure a long-lasting relationship with their customers, rather than relying solely on their technical skills. Differentiating between affective and cognitive trust (Johnson and Grayson, 2005), we test for hypotheses 3a and 3b:

- **H3a:** The Cognitive Trust between IFA and client increases the clients’ financial literacy
- **H3b:** The Affective Trust between IFA and client increases the clients’ financial literacy

We furthermore test whether the investors’ motivation (Mandell and Klein, 2007) plays a role in the knowledge transfer; to this end, the self-reported interest towards economic and financial subjects is used as a proxy of the client’s willingness to learn (WtL), as in Bowman and Herzog, (2014).

- **H4:** The Willingness to learn displayed by the respondent increases her financial literacy

Furthermore, this study evaluates whether the financial literacy degree of the clients supported by IFAs increases over time and, if so, to what extent.

- **H5:** The length of the relationship between IFA and client increases the clients’ financial literacy

The Table 2.A.1 (Appendix 2) summarizes the variables described in section 3.1., whereas the exact wording of the survey questions can be found in Appendix I.

### 3.2. Methodology

In order to provide empirical evidence of the dynamics underlying the educational role of financial advisors, we proceed as follows. The first model upholds the presence of such a role and assesses the educational role of the three different categories of IFAs considered (see Figure 1), compared to BCs. The second model deepens the analysis and looks at the psychological channel that allows IFAs' clients to have a higher financial literacy, *ceteris paribus* compared to investors supported only by restricted advisors. Finally we look at the joint effect of the “relational drivers” on financial literacy by assessing the mediation and moderation interactions among the variables.

In order to test hypotheses 1 to 5 and in line with the most recent stream of literature (e.g. Lusardi and Mitchell, 2007; Lusardi, 2008; Monticone, 2010; Calcagno and Monticone, 2014), a multivariate empirical analysis has been performed.

Different specifications of ordered probit models, as generalised in equation 1, are employed to determine the impact of the set of relevant independent variables on the level of financial literacy displayed by the respondents.

$$\begin{aligned} Pr(y_i = 1) &= 1 - \Phi[\beta X_i - u_1] \\ Pr(y_i = 2) &= \Phi[\beta X_i - u_1] - \Phi[\beta X_i - u_2] \\ Pr(y_i = n) &= \Phi[\beta X_i - u_{n-1}] \end{aligned} \quad (1)$$

$Pr(y_i=j)$  represents the probability of each financial literacy index to have  $j$  right questions out of the total.  $\Phi [\cdot]$  is the joint cumulative distribution of the bivariate normal and  $u_1, u_2, \dots, u_n$  are the cut-points that divide up the probability distribution. In order to be able to interpret the coefficients, the marginal effects of the explanatory variables (equation 2) have been assessed<sup>19</sup> (see Table 5 in the result section).

$$\Delta Pr(y_i = j) = \Phi[\beta_0 + \beta_1 + \beta_2 X_{2i} + \dots \beta_k X_{ki}] - \Phi[\beta_0 + \beta_2 X_{2i} \dots \beta_k X_{ki}] \quad (2)$$

---

<sup>19</sup> The marginal effect is an approximation of how much the dependent variable is expected to increase or decrease for a unit change in an explanatory variable. Equation (2) describes the marginal effect on the  $j^{\text{th}}$  category of the dependent variable when a discrete covariate value changes from  $X_{1i}=1$  to  $X_{1i}=0$ , keeping the other independent variables constant. The marginal effects presented have been assessed assuming that the factor variables are accumulated by weighting them by the number of observations in each category.

In order to rule out any possibility for the results obtained to be affected by reverse causality, the variables of interest have been instrumented and model (1) is estimated again by GMM (see Appendix II-B). The GMM is a method to obtain parameter estimates when one or more regressors might be endogenous. In the linear two-step efficient GMM<sup>20</sup> presented in Table 6, L (L>K) variables were used to instrument the presence of a financial advisor, the typology of financial advisor and the financial literacy degree of the clients.

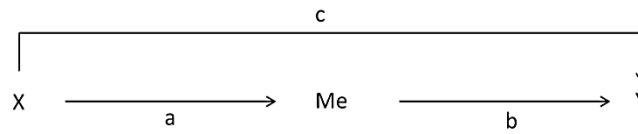
The second part of the empirical analysis describes the mediation (Baron and Kenny, 1986), moderation, mediated moderation (Muller et al., 2005) and moderated mediation (Muller et al., 2005 and Preacher et al., 2007) framework developed in order to get a better grip of the role played by the “relational drivers” on financial literacy displayed by the respondents (see Table 3).

A mediator is a variable that interacts with an independent variable, such that it absorbs part of or its entire effect on the dependent variable; in other words, the independent variable affects the dependent one partially (partial mediation) or exclusively (total mediation) because it affects the mediator, and the mediator, in turn, affects the dependent variable. According to the most stringent definition (Baron and Kenny, 1986), four conditions are necessary to establish mediation: (1) the independent and dependent variables must be significantly related; (2) the independent variable and the mediator must be significantly related; (3) the mediator and dependent variable must be significantly related; and (4) the relationship between the independent variable and dependent variable should be non-significant or weaker when the mediator is added to the model, as illustrated in Figure 3. A moderator, instead, is a variable involved in an interaction with an independent variable, such that the effect of the independent variable on the dependent variable depends upon the value of the moderator. Muller et al. (2005)'s define the moderational analyses as an “attempt to identify individual difference or contextual variables that strengthen and/or change the direction of the relationship between the treatment variable and the dependent variable”.

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<sup>20</sup> When estimating a model of the kind of  $y = X\beta + u$ , the GMM allows to find a vector  $\beta$  that solves the moment condition  $E[Z'(y - X\beta)] = 0$  where Z is a matrix of L instruments and  $E[Z'u] = 0$ .

**Figure 3: Mediation effect**



Step	Analysis	Visual description
1	The independent and dependent variables must be significantly related	
2	The independent and mediating variables are significantly related	
3	The mediator and dependent variable must be significantly related	
4	The relationship between the independent variable and dependent variable is non-significant or weaker when the mediator is added to the model	

Notes: Figure 3 shows a step-by-step representation of the mediation effect, as defined by Baron and Kenny, 1986.

A mediated moderation takes place whenever the moderator does not affect directly the effect of an independent variable on the dependent one, but only indirectly via a third variable (the mediator of the moderation).

Lastly, moderated mediation is present when the indirect effect of the independent variable on the dependent one via the mediator, differs in strength across different levels of the moderating variable. This is known as a conditional indirect effect, as the value of the indirect effect (the mediation effect) is conditional upon the value of the moderator variable. The core condition to assess moderate mediation requires that the strength of the mediation effect differs across the levels of the moderator (Preacher et al., 2007).

#### 4. Empirical Evidence

##### 4.1 Financial literacy, Financial advisors and relational drivers: baseline model

The first specification of the model outlined in equation 1 tests the first set of hypotheses (1a, 1b, 1c). The results reported in Table 2, models 1-3 allow ordering the magnitude of the educational role of investment consultants, private bankers and financial promoters against bank clerks with regard to basic (1), advanced (2) and overall (3) financial literacy.

The results of the second set of hypotheses (2, 3a, 3b, 4 and 5) are reported in Table 2 specifications 1a-3a, which introduce the role of the relational drivers of the advisors' educational role. The main results of the first set of hypotheses (columns 1-3) are strongly consistent among the specifications; coherently with the conflict of interests theory introduced in Section 1, CIs PBs and FPs have a higher educational role than restricted advisors (the reference category, dropped in the regression). This result can be explained by the higher conflict of interest bank clerks might have, compared to independent financial advisors. A more careful analysis among the three categories of IFAs shows different results for basic and advanced financial literacy: any typology of advisor, without strong distinctions, increases the level of basic financial literacy. On the contrary, investment consultants have a significant role on advanced financial literacy, which sensibly decreases for private bankers and financial promoters. The fee-only remuneration scheme of fully-independent consultants may provide them with higher incentives to build long-lasting relationships with their clients; for instance, they need to demonstrate to their clients that their advice is of added value and worth the fee. On the other hand, the main difference between PBs and FPs may lie on the minimum threshold of acceptance for new portfolios, considerably higher for private bankers; the marginal cost of a dissatisfied private banking client is higher and so is the incentive for the advisor not to let technical misunderstandings undermine their relationship.

Consistently with the extant literature (among others, Lusardi, 2003; Monticone, 2010; Van Rooij et al., 2011), although not for basic financial literacy, being a man appears to be associated with a higher level of financial literacy. A degree in the economic area, whose coefficient is always strongly positive and significant, seems to be the real education-related determinant of a high financial literacy. Alongside with a degree in economics, the economic grip displayed by the respondents has a strong impact on the three financial literacy indexes. Being self-employed increases the probability of having a high score in all the financial literacy indexes, compared to be out of the labour market, whereas being a manager has a positive impact on basic financial literacy,



**Table 2: Financial literacy, financial advisors and relational drivers**

	Basic Financial Literacy (1)	Advanced Financial Literacy (2)	Overall Financial Literacy (3)	Basic Financial Literacy (1a)	Advanced Financial Literacy (2a)	Overall Financial Literacy (3a)
IC	0.208*** (0.061)	0.213*** (0.047)	0.156*** (0.034)			
PB	0.232*** (0.050)	0.112*** (0.035)	0.097*** (0.026)			
FP	0.165*** (0.037)	0.103*** (0.024)	0.084*** (0.018)			
Consultant				0.018 (0.035)	0.042 (0.026)	0.032 (0.020)
Relationship Length				0.009 (0.024)	0.034** (0.017)	0.025* (0.014)
Knowledge Transfer				0.004 (0.028)	0.053*** (0.021)	0.034** (0.016)
Willingness to Learn				-0.010 (0.024)	0.019 (0.023)	0.010 (0.019)
Affective Trust				-0.060* (0.032)	-0.028 (0.024)	-0.026 (0.020)
Cognitive Trust				0.047 (0.031)	0.067*** (0.024)	0.057*** (0.019)
Gender	0.015 (0.032)	0.053** (0.022)	0.037** (0.016)	0.016 (0.053)	0.076** (0.038)	0.063** (0.030)
Age	-0.045 (0.059)	-0.022 (0.039)	-0.018 (0.029)	0.032 (0.091)	0.032 (0.062)	0.023 (0.049)
Age squared	0.020 (0.015)	0.013 (0.010)	0.011 (0.008)	0.002 (0.022)	0.000 (0.016)	0.001 (0.013)
Marital status	-0.018 (0.017)	-0.003 (0.011)	-0.004 (0.008)	-0.036 (0.026)	-0.028* (0.017)	-0.027** (0.013)
Children	0.020 (0.016)	0.011 (0.010)	0.009 (0.007)	0.046** (0.022)	0.006 (0.017)	0.009 (0.013)
Education	-0.000 (0.035)	0.024 (0.023)	0.019 (0.017)	-0.062 (0.053)	0.031 (0.040)	0.018 (0.032)
Eco degree	0.171*** (0.037)	0.143*** (0.029)	0.109*** (0.022)	0.239*** (0.064)	0.096** (0.047)	0.094** (0.037)
Eco. Grip	0.109*** (0.037)	0.116*** (0.027)	0.089*** (0.021)	0.142*** (0.048)	0.114*** (0.040)	0.099*** (0.032)
Employee	0.045 (0.065)	0.011*** (0.039)	0.010 (0.029)	-0.171 (0.134)	-0.048 (0.090)	-0.044 (0.072)
Manager	0.123* (0.073)	-0.054 (0.044)	-0.026 (0.033)	-0.016 (0.141)	-0.086 (0.096)	-0.058 (0.077)
Self-Employed	0.122* (0.066)	0.079** (0.040)	0.063** (0.030)	-0.057 (0.131)	0.036 (0.087)	0.025 (0.069)
Pensioner	-0.121 (0.096)	-0.096 (0.062)	-0.077 (0.047)	-0.191 (0.165)	-0.068 (0.111)	-0.065 (0.090)
Professional Expertise	0.181*** (0.033)	0.179*** (0.023)	0.138*** (0.019)	0.216*** (0.052)	0.141*** (0.038)	0.130*** (0.032)
Private	0.061 (0.047)	0.057 (0.036)	0.047* (0.027)	0.025 (0.060)	0.006 (0.047)	0.019 (0.038)
Geographical controls	Yes	Yes	Yes	Yes	Yes	Yes
N Obs	552	552	552	302	302	302
Pseudo R squared	0.1148	0.1075	0.08/7	0.1255	0.1369	0.1056
Wald test	178.97 (0.000)	283.71 (0.000)	309.57 (0.000)	101.89 (0.000)	212.54 (0.000)	225.54 (0.000)
ReSET test	Yes	Yes	Yes	Yes	Yes	Yes

*Model: Ordered Probit, marginal effects on conditional probabilities are reported. Specification 1-3 are run on the whole sample, specifications 1—3a are referred to the subsample of respondents supported by an IFA; the variable Consultant orders the three typologies of IFAs according to the magnitude of their coefficients in Specification 2. Standard errors reported in brackets are robust to heteroskedasticity. The ReSET tests do not reject the null hypothesis for correct model specification.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%.*

only. Aside from the specific occupation, though, the financial vocation of the respondents' job proved to have a very strong, positive, consistent effect on the three indexes. The geographical controls do not seem to have a sizable impact on the financial literacy degree, consistently with the most recent literature dealing with an Italian sample (Calcagno and Monticone, 2014). The debate on the direction of the causality between personal wealth and financial literacy of account holders is still open (Bernheim and Garrett, 2003; Lusardi and Mitchell, 2007; Delavande et al., 2008; Van Rooij et al., 2011); the results in Table 2 only marginally contribute to this stream of literature, as being private banking clients has a positive impact on overall financial literacy only.

In order to address the second set of hypotheses, we focused the analysis on the subsample of clients supported by IFAs. As bank clerks do not nurture a long-term relationship with their clients, it would have not been possible to assess the drivers that qualify the relationship with their clients.

This further analysis is aimed at understanding the mechanisms through which the presence of investment consultant, private bankers and financial promoters improves their clients' literacy.

The ordered probit model devised for these purposes includes a set of variables (relationship length, knowledge transfer, client's willingness to learn and two qualitatively different measures of trust) never tested before, specifically aimed at shedding light on the features of the relationship between advisor and client that allow the latter to have higher financial literacy than the investors only supported by restricted advisors (see Table 2.A.1 for a brief definition of the variables and Appendix I-C for the exact wording of the questions).

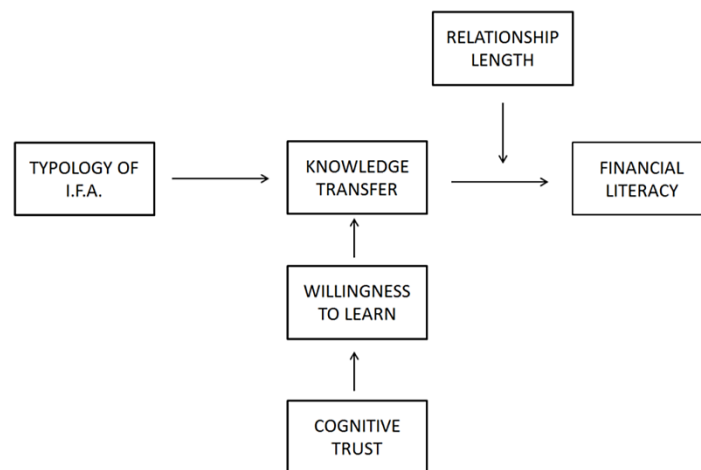
The variable "Consultant" used in the specifications 1a-3a, Table 2 is obtained by ordering the three typologies of IFAs according to the magnitude of their educational role, as in specification 2. Once the set of relational drivers is taken into account, the variable *consultant* loses its significance; this

implies that one or more “relational drivers” fully absorb the effect of this variable, acting as a full mediator. The knowledge transfer is positive and strongly significant with regard to advanced financial literacy. The degree of knowledge transfer loses gradually power and significance when it comes to overall and basic financial literacy. This result can be interpreted as follows: the support of a financial expert is not required to achieve basic financial literacy, as it is mostly based on mathematical and logical questions. Whereas, the technical knowledge necessary to attain the highest degree of advanced financial literacy requires expertise and possibly the presence of a financial expert, who can explain and provide support while dealing with topics such as the role of the secondary market, basic portfolio diversification, the characteristics of bonds, stocks, investment funds and so on (see Appendix I-B). Two different measures of trust, the cognitive and the affective one, have been evaluated. They have completely different impact on the indexes of financial literacy: cognitive trust has a strong, statistically significant effect on advanced and overall financial literacy. Affective trust, on the other hand, takes an unexpected negative sign, rather weak both in magnitude and significance, as if they were substitute goods; in other words, investors who have mainly trust in the “good faith” of their advisors but not necessarily in their technical expertise, do not have any incentive or possibility to improve their own financial knowledge, as well. In line with this interpretation, it does not even affect advanced financial literacy. The length of the relationship between advisor and client positively affects advanced financial literacy and provides partial further evidence of the causal direction between the presence of an independent financial advisor and the degree of financial literacy displayed by the clients. The variable is clearly cross-sectional, but still points out that the longer the relationship between the advisor and the client, the higher her degree of advanced financial literacy, keeping all other controls constant. So, no matter the initial level of financial literacy of the client, it grows in time in its advanced component, if there is the support of a professional financial advisor. The set of control variables is the same as the one employed in the previous specification of the model (columns 1-3) and leads qualitatively to the same conclusions.

#### 4.2 Financial literacy, financial advisors and relational drivers: interactive model

As the variable *Consultant* in specifications 1a-3a (Table 2) is no longer significant, once the “relational drivers” are taken into account, instead of assessing the effect of the single variables, keeping all the others constant, we proceed with a mediation/moderation framework that allows us to have an overall picture of the interactions among the relational variables. Figure 4 sketches the way the relation between *Consultant* (main explanatory variable) and *Financial literacy* (the dependent variable) is mediated by the *Knowledge transfer* (Mediator) between advisor and client. The effect of the knowledge transfer on the respondents’ financial literacy degree grows over time (Moderator of the mediation) and for increasing degree of *Cognitive trust* (Moderation). Finally, the cognitive trust positively affects the knowledge transfer because it increases the *Willingness to learn* (Mediator of the moderation) of the clients, which in turn positively affects the knowledge transfer. Empirical evidence of the interactions reported in Figure 4 is given in Tables 3 to 6.

**Figure 4: The relational drivers of IFAs’ educational role**



The model illustrated in Figure 4 hypothesizes that “knowledge transfer” mediates the relationship between the typology of independent advisor and the financial literacy displayed by the client (see Table 3) and that this indirect effect is in turn moderated by the length of the relationship between advisor and client (see Table 4). The level of cognitive trust the client feels towards her advisor mediates the effect of knowledge transfer on the degree of financial literacy (see Table 5), but this moderating effect is partially mediated by the client’s willingness to learn (see Table 6).

In order to empirically test the model sketched in Figure 4, the four effects – mediation, moderated mediation, moderation and mediated moderation – are separately tested. Table 3 shows the mediating effect of knowledge transfer on the relationship between the variable *Consultant* and the

level of basic, advanced and overall financial literacy displayed by the clients, according to the four steps identified by Baron and Kenny, 1986 (see Figure 3)<sup>21</sup>.

**Table 3: Mediation: Knowledge Transfer**

		Basic Financial Literacy	Advanced Financial Literacy	Overall Financial Literacy	Knowledge Transfer
(1)	Consultant	0.018 (0.035)	0.048* (0.026)	0.035* (0.020)	
(2)	Consultant				0.018* (0.009)
(3)	Knowledge Transfer	0.006 (0.030)	0.056*** (0.021)	0.037** (0.016)	
(4)	Consultant	0.018 (0.035)	0.042 (0.026)	0.032 (0.020)	
	Knowledge Transfer	0.004 (0.028)	0.053*** (0.021)	0.034** (0.016)	
	Controls	Yes	Yes	Yes	Yes

*Model: Ordered Probit. The results should be read horizontally, each row reports the result of the corresponding step devised by Baron and Kenny, (1986) which tests the significance of the relation respectively between: (1) independent and dependent variable, (2) independent variable and mediator, (3) mediator and dependent variable. Step 4 verifies that the relation tested in step (1) is weaker or no longer significant, once the mediator is included in the equation.*

*The regressors and control variables not reported are the same as in table 2(1a-3a).*

*Standard errors in brackets are robust to heteroskedasticity.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1% level.*

As anticipated by the results shown in Table 2 (columns 1a-3c), the basic financial literacy degree of the clients does not seem to be affected by the knowledge transfer. More relevant conclusions can be drawn, however, by looking at the advanced and overall level of financial literacy. The results reported in Table 3 show that the typology of consultant (1) and the knowledge transfer (3) separately tested increase the clients' advanced and overall financial literacy. The typology of advisor affects the amount of knowledge transferred (2), but does not seem to have a role in the literacy displayed by the respondents after controlling for the knowledge transfer (4). This indicates a total mediation; in other words, the typology of IFA affects the clients' advanced and overall financial literacy because it affects the presence and the magnitude of the knowledge transfer between advisor and client, which in turn increases the clients' financial literacy. In a nutshell, the

<sup>21</sup> Robustness checks have been run using Structural Equation Modelling and the KHB method

presence of an advisor increases the financial literacy of the client not *per se*, but via the knowledge transfer. The relation above identified is globally moderated by the length of the relationship between financial advisor and client, which means that the longer the relationship is, the more intense the effect of the knowledge transfer is, as reported in Table 4.

**Table 4: Moderated Mediation: Relationship Length**

Relationship length	Basic Financial Literacy (1)	Advanced Financial Literacy (2)	Overall Financial Literacy (3)
Low level	0.036 (0.027)	0.127* (0.076)	0.290 (0.178)
Mean level	0.027 (0.018)	0.147** (0.073)	0.322* (0.162)
High level	0.019 (0.017)	0.168*** (0.081)	0.354** (0.176)
Controls	Yes	Yes	Yes

*Model: linear structural equation modelling. The control variables not reported are the same as in table 2(1a-3a). The mean level of the variable relationship length is 4 years, low and high level are obtained respectively by subtracting and adding a standard deviation (1.08 years) to the mean value.*

*Standard errors in brackets are robust to heteroskedasticity.*

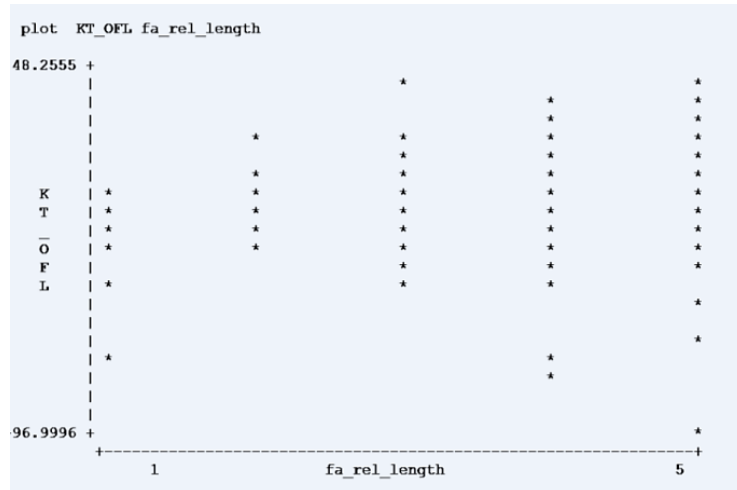
*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1% level.*

The moderated mediation affects the indirect effect of the knowledge transfer in mediating the relationship between the typology of advisor and the level of financial literacy displayed by the client. Keeping in mind that the data are cross-sectional, this moderated mediation can be interpreted as follows: the advanced and overall financial literacy of the clients grow over time because the importance of the knowledge transfer between advisor and client increases. This is a further indirect proof of the causality direction between the presence of an advisor and the financial literacy of the client: if no educational role was exerted by the advisor, the financial literacy of the client - no matter its initial level was - would not increase over time.

It is, furthermore, interesting to investigate the shape of the moderated mediation role exerted by the length of the relationship, as shown in Figure 5. As in any learning process, the effect of the knowledge transfer on the financial literacy – always positive *per se* – grows during the first phases of the relationship and then settles when the maximum level of knowledge has been transferred. In

this specific case, the indirect effect of the knowledge transfer on the relationship between the typology of advisor and the client’s financial literacy seems to rapidly grow at the beginning of the relationship between client and advisor and then it settles between the fourth and the fifth year.

**Figure 5: Moderated Mediation growth pace**



Source: STATA elaboration. Figure 5 reports the dynamics between the indirect effect of knowledge transfer on overall financial literacy and the length of the relationship between advisor and client, expressed in years.

Table 5 shows the positive moderating effect exerted by the cognitive trust; the higher the cognitive trust between client and advisor, the higher the effect of knowledge transfer on the advanced and overall financial literacy degree displayed by the client. The more the client trusts the professional expertise of her financial advisor, the more effective the knowledge transfer among the two seems to be. The link between the level of cognitive trust and the flow of knowledge is the willingness to learn of the client, as shown in Table 6. In other words, the more the clients trust their advisor, the more they are willing to learn from her and this positive predisposition enhances the flow of financial knowledge. The relationship among cognitive trust, willingness to learn and knowledge transfer described above is a mediated moderation.

**Table 5: Moderation: Cognitive Trust**

	Basic Financial Literacy (1)	Advanced Financial Literacy (2)	Overall Financial Literacy (3)
Consultant	0.020 (0.035)	0.044* (0.026)	0.033* (0.020)
Knowledge Transfer	0.005 (0.028)	0.056*** (0.021)	0.036** (0.016)
Cognitive Trust	0.048 (0.031)	0.069*** (0.024)	0.059*** (0.006)
K.T. * CT	0.009 (0.015)	0.018** (0.008)	0.013** (0.006)
Controls	Yes	Yes	Yes
N Obs	302	302	302
Pseudo R squared	0.1259	0.1388	0.1071
Wald test	103.18 (0.0000)	219.42 (0.0000)	230.44 (0.0000)
ReSET test	Yes	Yes	Yes

*Model: Ordered Probit. Regressors and control variables not reported are the same as in table 2(1a-3a).*

*. Standard errors in brackets are robust to heteroskedasticity.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1% level.*

**Table 6: Mediated Moderation: Willingness to Learn**

	Knowledge Transfer	Willingness to Learn	N. Obs	Pseudo R2	Wald test
(1) Cognitive trust	0.046*** (0.010)		302	0.1117	152.97 (0.0000)
(2) Cognitive trust		0.032*** (0.009)	302	0.1132	241.91 (0.0000)
(3) Willingness to Learn	0.040*** (0.009)		302	0.1064	187.19 (0.0000)
(4) Cognitive trust	0.035*** (0.010)		302	0.1169	185.53 (0.0000)
Willingness to Learn	0.025*** (0.009)				
Controls	Yes	Yes			

*Model: Ordered Probit. The results should be read horizontally, each row reports the result of the corresponding step devised by Baron and Kenny, (1986), which tests the significance of the relation respectively between: (1) independent and dependent variable, (2) independent variable and mediator, (3) mediator and dependent variable. Step 4 verifies that the relation tested in step (1) is weaker or no longer significant once the mediator is included in the equation.*

*The regressors and control variables not reported in the table are the same as in table 5(1a-3a). Standard errors in brackets are robust to heteroskedasticity.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1% level.*

*Robustness checks have been run using Structural Equation Modelling and the KHB method*

Table 6 shows a partial mediation of the willingness to learn towards the effect of the cognitive trust on the knowledge transfer; cognitive trust remains significant but loses magnitude when the willingness to learn of the client is accounted for (compare the coefficients of model (1) and (4))



from Table 6). The same conclusions can be drawn with the KHB method or SEM<sup>22</sup>: according to the latter methodology, 22.89% of the effect of the global cognitive trust on the knowledge transfer is mediated by the client's willingness to learn.

The empirical evidence reported in Tables 2 to 6 proves that financial advisors exert an educational role towards their clients; as a matter of fact, the presence of a financial advisor increases the financial literacy of her clients via the knowledge transfer between them. This flow of information increases its effect on financial literacy over time up to a period of about four years. The more trustworthy the client is toward her advisor's technical skills, the higher the willingness to learn of the client is and consequently the higher the effectiveness of the knowledge transfer between them on the financial literacy degree becomes.

## **5 Conclusive remarks**

Using a unique survey carried out in Italy between September 2014 and February 2015, this paper provides original evidence on the relational drivers of independent financial advisors' educational role. The presence of an IFA improves her clients' financial literacy, particularly their advanced financial literacy, which measures the knowledge degree of simple financial instruments and fundamentals of portfolio management theory and markets. The relational drivers of the IFAs' educational role do not seem to have a significant effect on the basic financial literacy; given the logical and mathematical nature of the questions included in the BFL index, basic financial literacy might reasonably work as a prerequisite for advanced literacy. Possibly schools and universities, might be more suitable to convey the basic financial skills, on which people can build more refined level of financial knowledge, whereas financial advisors are more likely to deal with technical

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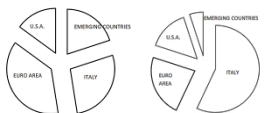

<sup>22</sup> As robustness checks, we tested the same non-linear model with the KHB method (Karlson, Holm and Breen, 2010) and a linear relationship among the three variables with SEM (Structural equation modelling). KHB method allows unbiased decompositions of the total effect of a variable into a direct and an indirect (spurious) effect; it is unaffected by the rescaling or attenuation bias that arises in cross-model comparisons in nonlinear models. It recovers the degree to which a variable, mediates or explains the relationship between an independent variable and a latent outcome variable, underlying a nonlinear probability model. SEM is a powerful and flexible multivariate statistical technique that allows the analysis of the network of relationships between one or more independent variables and one or more dependent variables (measured variables or latent constructs).

issues. The empirical evidence presented in the paper, shows that IFAs' educational role is exerted via the knowledge transfer between advisor and investor. The degree of trust investors have towards the advisor's technical skills enhances the knowledge transfer between the parties, both directly and indirectly via the clients' willingness to learn. Finally, longer relations with an advisor lead to higher financial literacy, suggesting that the educational role of advisors increases over time.

The analysis carried out in this study is relevant to practitioners, policy makers and scholars. From the industry's perspective, knowing that the cognitive trust, the willingness to learn of the clients and the length of the relationship between client and advisor enhance the advisors' educational role may raise awareness about the IFA's educational role. This may help in better calibrating their approach to the clients and increase the overall added value of brokerage firms' advisory services. Moreover, this study addresses in a comprehensive way timely policy issues; the consequences of a poor level of financial literacy in Europe, became apparent after the burst of a number of financial scandals involving retail investors, who did not pay attention to and fully understand the actual composition of their portfolios, until they were hit by major financial damage. Traditional educational interventions aimed at improving financial literacy proved to be extremely costly and to have a worryingly short decay period worldwide (Lusardi, 2003; Meier and Sprenger, 2013; Fernandes et al. 2014), so a more gradual and constant form of financial education would be much needed. Being aware of the relational determinants that enhance the IFAs' educational role, may help to orient and better target future educational treatments.

From a technical point of view, this study contributes to the literature on the determinants of financial literacy by testing a novel set of variables, referred to as "*relational determinants*". Finally the paper presents an interactive framework, which better explains how these variables operate by applying the "moderation/mediation framework" to a stream of literature that does not usually look for the multiple interactions occurring among the variables of interest.

## APPENDIX I

<b>Section A: Independent and Control Variables</b>	
Gender	Gender of the respondent
Marital Status	Marital Status of the respondent
Children	Number of children
Age	Age of the respondent [18-24; 25-34; 35-44; 45-54; 55-64; 65-75; >75]
Job	[Employee; Manager; Professional; Entrepreneur; Out of labour market; Other (please specify)]
Professional Expertise	Has your job somehow improved your financial skills/knowledge? [Yes=1; No=0]
Educational attainment	Highest Educational attainment of the respondent
Degree in economics/finance	[Economic sciences=1; Other=0]
Region of residence	Region of residence of the respondent
Total real estate assets	[€0-200,000; €200,000-350,000; €350,000-700,000; €700,000-1,5m; €1,5m-3m; €3m-5m; €5m-10m; >€10m]
Total financial assets	Total amount of liquidity, and financial assets (e.g. government bonds, bonds, stocks) [< €50,000; €50,000-100,000; €100,000-250,000; €250,000-500,000; €500,000-1m; €1m-5m; €5-10m; €10-30m; €30m-50m; > €50m]
Financial Advisor	Are you supported by a private banker, financial promoter or independent consultant?[No, I'm only supported by a bank clerk; Yes, by a financial promoter; Yes, by an independent consultant; Yes, by a private banker]
Advisor Rel. length	How long have you been assisted by your current advisor?[0 -6 m; 7 m-1 y, 1-3 y; 3-5 y; > 5 y]
Fin. Intermediary Rel.Length	How long is it that you have a bank account by your current financial intermediary? [0 -6 months; 7 months-1 year, 1-3 years; 3-5 years; > 5 years]
Fin. System Trust	<i>How trustworthy do you think the Italian banking system is?</i> [Not trustworthy at all; Slightly trustworthy; Neutral; Very trustworthy; Extremely trustworthy]
Willingness to Learn	How interested are you in economic and financial topics?[Not interested at all; Slightly interested; Somewhat interested; Moderately interested; Extremely interested]
Rating	Which is the most plausible combination of countries if you had to order Euro Area, Italy, Emerging Countries and U.S.A according to their rating? (from the highest to the lowest?) [Italy – Euro Area – U.S.A. – Developing C.; Developing C. – U.S.A – Euro Area – Italy; Euro Area – U.S.A. – Italy – Developing C.; U.S.A – Euro Area – Italy – Developing C.]
Home bias	Which of the two portfolio allocation is the safest in your opinion? Allocation 1      Allocation 2 
Economic Grip	Please consider the underlying scenario; say you invested your money in January and that the value of that investment have changed over time according to the graph. What would you say with regard to your investment on March?[I'm gaining; I'm losing; I'm at break-even; I don't know] 
<b>Section B: Trust and Knowledge transfer scales</b>	
Cognitive trust Given by financial adviser's track record...	<b>CT1</b> ... I have no reservations about acting on his or her advice; <b>CT2</b> ... I have good reason to doubt his or her competence. (reversed); <b>CT3</b> ... I can rely on my financial adviser to undertake a thorough analysis of the situation before advising me; <b>CT4</b> ... I have to be cautious about acting on the advice of my financial adviser because his or her opinions are questionable. (reversed); ... <b>CT5</b> ...I cannot confidently depend on my financial adviser since he/she may complicate my affairs by careless work. (reversed). [strongly agree; somewhat agree; neither agree nor disagree; somewhat disagree; strongly disagree]
Affective trust	<b>AT1</b> I would feel a sense of personal loss if I could no longer use my financial adviser; <b>AT2</b> I would feel a sense of personal loss if I could no longer use my financial adviser; <b>AT3</b> My financial adviser displays a warm and caring attitude towards me; <b>AT4</b> I can talk freely with my financial adviser about my problems at work and know that he or she will want to listen; <b>AT5</b> My financial adviser is only interested in selling me products (reversed). [strongly agree; somewhat agree; neither agree nor disagree; somewhat disagree; strongly disagree]
Knowledge transfer The interaction with my financial advisor has increased...	<b>KT1</b> ... my understanding of the basic rational underlying the construction of a portfolio; <b>KT2</b> ... my capability of asking coherent and constructive questions regarding the financial strategies my advisor suggests; <b>KT3</b> ... my knowledge on financial instruments' characteristics; <b>KT4</b> ... my understanding of diversification and relative implications; <b>KT5</b> ... my understanding of compound interest rate; <b>KT6</b> ... my awareness on the impact inflation has on the value of my portfolio. [strongly agree; somewhat agree; neither agree nor disagree; somewhat disagree; strongly disagree]
<b>Section C: Financial Literacy: Basic and Advanced financial literacy; All questions included the options "All of the above" and "I don't know"</b>	
BFL_1	Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? [More than

BFL_2	€110; Exactly €110; Less than €110] Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account? [More than today; Exactly the same; Less than today]
BFL_3	Assume a friend inherits h10,000 today and his sibling inherits h10,000 3 years from now. Who is richer because of the inheritance? [My friend; His sibling; They are equally rich]
BFL_4	Suppose that in the year 2010, your income has doubled and prices of all goods have doubled too. In 2010, how much will you be able to buy with your income? [More than today; The same as today; Less than today]
AFL_1	Which of the following statements describes the main function of the stock market?[The stock market helps to predict stock earnings; The stock market results in an increase in the prices; The stock market brings people who want to buy with people who wants to sell stocks]
AFL_2	Which of the following statements is correct? If somebody buys the stock of firm B in the stock market [He owns a part of firm B; He has lent money to firm B; He is liable for firm B's debts]
AFL_3	Which of the following statements is correct? [One cannot withdraw money invested in a mutual fund during the first year; Mutual funds can invest in several assets, for example invest in both stocks and bonds; Mutual funds pay a guaranteed rate of return which depends on the past performance]
AFL_4	Which of the following statements is correct? If somebody buys a bond of firm [He owns a part of firm B; He has lent money to firm B; He is liable for firm B's debts]
AFL_5	Consider a long time period (for example 10 or 20 years), which asset normally gives the highest return? [Saving accounts; Bonds; Stocks]
AFL_6	Normally, which asset displays the highest fluctuation over time?[Saving accounts; Bonds; Stocks]
AFL_7	When an investor spreads his money among different assets, does the risk of losing money [Increase; Decrease; Stay the same]
AFL_8	If you buy a 10-year bond, it means you cannot sell it after five years without incurring a major penalty, even with an efficient secondary market. [True; False]
AFL_9	Stocks are normally riskier than bonds [True; False]
AFL_10	Buying a company stock usually provides a safer return than a stock mutual fund [True; False]
AFL_11	If the interest rate falls, what should happen to bond prices? [Rise; Falls; Stay the same]

## APPENDIX II

### Section A \_ Table 2.A.1: Variables definitions

Variable	Definition
<i>Dependent Variables</i>	
Basic Financial Literacy Index	Sum of the correct answers to four questions devised to measure BFL
Advanced Financial Literacy Index	Sum of the correct answers to eleven questions devised to measure AFL
Overall Financial Literacy	Sum of basic and advanced financial literacy indexes, with advanced financial literacy weighted twice as much as basic financial literacy scores.
<i>Explanatory Variables</i>	
Independent Financial Advisor (IFA)	Dummy variable taking the value of 1 if the respondent is assisted by an independent financial advisor, 0 otherwise
Restricted Advisor (RA)	Dummy variable taking the value of 1 if the respondent is assisted by a restricted advisor also referred to as Bank Clerk (BC), 0 otherwise
Investment Consultant (IC)	Dummy variable taking the value of 1 if the respondent is assisted by an investment consultant, 0 otherwise
Private Banker (PB)	Dummy variable taking the value of 1 if the respondent is assisted by a private banker, 0 otherwise
Financial Promoter (FP)	Dummy variable taking the value of 1 if the respondent is assisted by a financial promoter, 0 otherwise
Consultant	Categorical variable taking value of 0 if the respondent is assisted by a BC, 1 by a FP, 2 by a PB and 3 if she is assisted by an IC.
F.A. relationship length	See question C2, Appendix I-A
Professional Expertise	Dummy variable taking the value of 1 if the respondent's job has positively affected

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Economic Grip	her financial knowledge, 0 otherwise A dummy variable that takes the value of 1 if the respondents chose either the first or the second answer to question C9 (see Appendix I-A), zero otherwise.
Affective Trust (AT)	Standardised level of care and concern perceived by the client on behalf of the advisor, measured on a 5-item Likert scale (see Appendix I-B).
Cognitive Trust (CT)	Standardised trust displayed towards the advisor's technical skills, measured on a 5-item Likert scale (see Appendix I-B).
Willingness to Learn (WtL)	Standardised self-reported interest towards financial and economics subjects (measured on a Likert scale from 1 -not interested at all- to 5 -extremely interested)
Knowledge transfer (KT)	Standardised Likert-scale measure of the perceived contribution on behalf of the financial advisor to the client's financial knowledge on six topics (see Appendix I-B)
Relational drivers	The way knowledge transfer, willingness to learn, relationship length and cognitive/affective trust are jointly referred to.

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*Control Variables*

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Gender	Dummy variable taking the value of 1 for male 0 for female investors
Age	Seven age intervals covering from 18 to over 75 years old (see D2, Appendix I-A)
Marital status	Four dummy variables controlling for being married, separated/divorced, cohabitant and single (question D3 Appendix I-A)
Children	Number of dependent children
Residence area	Five dummy variables controlling for the respondent living in North-West, North-East, Centre and South (including Isles).
Education	Scale ranging from 1 Primary/Secondary education to 3 Degree or Postgraduate title
Economics degree	Dummy variable taking the value of 1 if the respondents has a degree in economics or finance, 0 otherwise.
Job	Eight dummy variables controlling for the respondent's job (see Appendix I-A)
Private	Dummy variable taking the value of 1 if the respondents has a financial patrimony over € 500,000, zero otherwise

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*Instrumental Variables*

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Distrust System	Reverse coding of the answers to question C6, Appendix I-A
Fidelity	Dummy variable which takes the value of 1 if the customer has a longer relationship with the consultant, than with the financial institution the advisor currently works for
North-Educated	Dummy variable that takes the value of 1 if the respondent lives in northern Italy and has a higher education degree
Home Bias	Dummy variable that takes the value of 1 if the respondent does not choose option 1 in "Rating" question, but still prefers Allocation 2 in "Home Bias" question

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## **Section B\_ Financial advisors and financial literacy: causality tests**

The evidence of a strong and significant impact of the presence of an independent advisor on the financial literacy scores does not necessarily provide evidence of the direction of the causality between the variable of interest. Furthermore, Calcagno and Monticone (2014) show that financially-literate investors tend to delegate more their financial decisions compared to individuals with a low degree of financial literacy<sup>23</sup>. In order to rule out any possibility of reverse causality

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<sup>23</sup> Calcagno and Monticone (2014) findings should be compared with caution to the results presented in this paper because the authors assess the impact of financial literacy on the degree of delegation (no-delegation, advice and full-delegation) of investors with risky assets only towards restricted advisors. Furthermore, a different financial literacy scale has been employed.

between the presence of a financial advisor and financial literacy, the relationship is estimated by the Generalized Method of Moments (GMM). In order to do so, the four typologies of financial advisors have been ordered in the variable *consultant* (see Table 2) according to the degree of discretion they have while choosing the financial instruments that best suit a client's interest; in the case of advanced financial literacy, this order coincides with the magnitude of the educational role exerted by the advisors. The same model presented in table 2 is estimated instrumenting the variable *consultant* with the degree of distrust in the banking system and the dummy variable *fidelity* (see Table 2.B.1). This variable indicates that the client had followed the advisor when he or she moved from a financial institution to another one. The variables *basic*, *advanced* and *overall* financial literacy, dependent in the main model, are instrumented and tested as regressors of the variable *consultant*, in order to fully control for endogeneity. The financial literacy indexes are instrumented with two dummy variables: the first one detects the combination of living in northern Italy and being highly educated (college or above), the second one controls for home bias (see Table 2.A.1). The gap between northern and southern regions in Italy involves financial literacy, but it is also captured by several economic indicators, such as per capita income, employment rates and overall education attainment. Whereas the lack of home bias, that is the tendency for investors to prefer domestic investments, despite no actual economic or financial considerations would lead to such a decision, proxies the respondents' financial knowledge (e.g. the benefits of diversifying) without correlating with the decision of relying on a financial advisor. The instruments of financial literacy have no statistically significant impact on the choice of being assisted by any of the four categories of financial advisors, combined in the categorical variable *Consultant*. The goodness of these instruments is supported by the results of the Hansen's test that do not reject the null of instrument validity (see Table **2.B.1**).

**Table 2.B.1**  
**Causality direction between the presence of an advisor and financial literacy**

<b>Basic Financial Literacy</b>			
	First stage Dependent: BFL		Second stage Dependent: Consultant
Consultant	0.267* (0.139)	Basic F. L.	-0.341 (0.289)
Controls	Yes	Controls	Yes
N Obs	552		552
Hansen J	0.807		1.599
Hansen J p value	0.3691		0.2061
<b>Advanced Financial Literacy</b>			
	First stage Dependent: AFL		Second stage Dependent: Consultant
Consultant	0.700* (0.403)	Advanced F. L.	-0.232 (0.196)
Controls	Yes	Controls	Yes
N Obs	552		552
Hansen J	2.306		0.789
Hansen J p value	0.1289		0.3744
<b>Overall Financial Literacy</b>			
	First stage Dependent: OFL		Second stage Dependent: Consultant
Consultant	1.691** (0.850)	Overall F. L.	-0.087 (0.072)
Controls	Yes	Controls	Yes
N Obs	552		552
Hansen J	1.5288		0.9747
Hansen J p value	0.2163		0.3235

*Linear model estimated by GMM. The control variables not reported are the same as in table 5. Standard errors in brackets are robust to heteroskedasticity. The Hansen 'J' tests for over-identification does not reject the null hypothesis of instruments' validity.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1% level.*

Table 2.B.1 reports the estimates from a two-stage regression and provides evidence of the causal relationship between the presence of an independent advisor and the financial literacy indexes. In each table, the variable *Consultant* (duly instrumented) is significant and positive in explaining the degree of basic, advanced and overall financial literacy. On the contrary, neither basic, nor advanced or overall financial literacy have a significant impact on the choice among restricted advisors, financial planners, private bankers or independent consultant.

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## **Paper III**

### **Are financially literate investors immune to behavioural biases? An empirical analysis**

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# Are financially literate investors immune to behavioural biases? An empirical analysis

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## ABSTRACT

In recent years, the topic of financial literacy has received the attention of scholars, practitioners and policy-makers, who agree on the necessity of more effective education programmes aimed at increasing financial awareness. The debate on whether and to what extent investors' financial literacy can improve in practice their investment behaviour, though, is still open. Using Italian survey data, this paper assesses whether a high degree of financial literacy smooths the presence of behavioural biases by testing them individually, in a composite index of "biasness" and in three sub-indexes. Results show that investors' financial literacy decreases the presence of cognitive biases, but does not have a significant effect on emotional biases.

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## 1. Introduction

The complexity of the financial world has dramatically increased over the last two decades and pervasive intervention aimed at increasing financial literacy seemed a common sense measure to create more financially-aware investors. A recent meta-analysis study (Fernandes et al., 2014), though, provides evidence that interventions to improve financial literacy only explain 0.1% of the variance in financial behaviours. We address the potential detachment between educational interventions, financial literacy degree and actual financial behaviours by taking into account both the possible distortive effect of financial advisors' presence on the downstream behaviour of individuals and the presence of financial behavioural biases. As we investigate the financial behaviour at the individual-investor level, it is reasonable to highlight that a fair share of financial decisions are not individually made, but turn out to be mediated by an advisor; the downstream investors' financial behaviour is therefore affected by the financial advisors' intermediation,

according to the degree of delegation they benefit from. As far as we are aware, virtually no studies that address the impact of financial literacy on financial decision-making and investment behaviour take into account that not every investment decision displayed “*ex-post*” on the financial market is a faithful representation of the investors’ decision making process, but in a fair share of cases, they are affected by an advisor’s mediation. For this reason, we decided to look for an “*ex-ante*” cause that may affect investors’ financial behaviours, regardless of their actual financial portfolios; behavioural biases seem to well serve this purpose.

The behavioural finance literature offers a wide variety of examples on how behavioural biases cause significant deviation in fundamental values via limited-rational decisions and provides evidence of the positive effect of cognitive ability on psychological biases (e.g. Benjamin et al., 2013; Argawal et al., 2013). For guidance on this, economists turn to the extensive experimental evidence provided by cognitive psychologists on the frequent presence of biases in a financial decision-making process. The aim of this paper is to assess whether and to what extent financial literacy decreases the presence of six behavioural biases - home-bias, overconfidence, overreaction, representativeness, anchoring and loss avoidance. In order to disentangle the effect of the mediation of a financial advisor, the biases are not derived by backwards looking at the portfolio choices of the investors, but are assessed “*ex-ante*” with a set of questions well-established in the literature and specifically-designed to this purpose. To this end, a detailed questionnaire was administered to a sample of Italian account-holders between September 2014 and February 2015. This paper contributes to both financial literacy and behavioural finance literatures, by looking at an *ad-hoc* measure of financial awareness (financial literacy) as a possible way to smooth the presence of sub-optimal financial behaviour. To the best of our knowledge, this is the first empirical attempt to explain the presence of such behavioural biases or the lack thereof by looking at the investors’ degree of financial literacy. We evaluate two different scales of financial literacy, basic and advanced, following Van Rooij et al., (2011) and a further set of innovative explanatory variables, such as the presence of a financial advisor, the willingness to learn and the financial expertise of the

respondents, over and above the demographic control variables traditionally employed in the literature. Using the survey data collected and different specifications of logistic and ordered logit models, these variables were regressed against the six behavioural biases considered by testing them individually, in a composite index of “biasness” and in three sub-indexes. The empirical evidence shows that respondents’ financial literacy decreases the presence of cognitive biases (e.g. the ones included in the overconfidence and loss avoidance sub-indexes), but does not have a significant effect on emotional biases, such as home bias and representativeness. The presence of these biases, though, seems to be tempered by personal interest in economics and finance, specific training and practical financial expertise. The research question contributes to filling the gap between financial literacy and behavioural finance streams of literature; as a matter of fact, it is the first attempt to directly assess the relevance of financial literacy with reference to a number of behavioural biases, taken into account singularly but most importantly jointly in a “Behavioural-Biasness Index” and in three sub-indexes. From a policy perspective, the identification of specific typologies of individual investors that are more susceptible to certain biases and the inability of theoretical financial proficiency to neutralise emotional biases have relevant welfare and regulatory implications. Educational interventions aimed at increasing financial awareness should take care of such behavioural considerations in order to provide effective programmes.

The paper is organized as follows: section 2 provides a review of the extant literature on financial literacy and the behavioural biases considered. Section 3 describes the survey data and the methodology, Section 4 presents and discusses the results and Section 5 concludes.

## **2. Literature Review**

This paper assesses the relationship between financial literacy and financial behavioural biases. In order to take into account that financial advisors, whose presence is becoming pervasive in Italy<sup>24</sup>,

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<sup>24</sup> In Nov. 2015, the total AuM of the industry was 1.84 trillion (+15.55% in 12 months, Assogestioni, A.R., 2014, 2015).

may influence the investors' downstream financial choices and behaviour, we relied on well-established *ex-ante* methodologies to measure the behavioural biases.

## 2.1 Financial Literacy

The term “financial literacy” in the extant literature, comprises a wide range of meanings; financial literacy collapses often into financial knowledge, that is the understanding of key financial terms and concepts (Bowen, 2002; Courchane and Zorn, 2005). Some authors identify financial literacy as the ability to make informed judgments and to take effective decisions regarding the use and management of money (Noctor et al.'s (1992) definition used by Beal and Delpachitra (2003) and in a recent Australian survey, ANZ (2008)) or as a person's ability to understand and make use of financial concepts (Jumpstart Coalition, 2007; Servon and Kaestner, 2008), so stressing not only the knowledge-related connotation, but also the ability to successfully put into practice the acquired theoretical proficiency. It is, however, important to emphasize that regardless of the scale used, a measure of financial literacy identifies only the human capital necessary to undertake potentially correct financial behaviours, but it does not guarantee that this will happen, since the mediation of a financial advisor or behavioural distortions may interfere. The OECD defines Financial Literacy as the “combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing” (OECD/INFE, 2012), adding a behavioural facet to the previous connotations. In order to capture such complex connotations, long scales are needed; the specific number of items primarily depends on an adequate representation of each dimension, but Kim and Mueller, (1978) proposed a rule of thumb of three to five items for each domain factor.

We adopt the most straightforward definition of financial literacy as theoretical financial knowledge, because it lends itself to a more objective measurement. In line with the vast majority of empirical studies<sup>25</sup> that use compact measurement scales with ten to nineteen items, we employ

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<sup>25</sup> e.g. Volpe, et al., 1996, 2002, 2006; Kim, 2001; Bowen, 2002; Lusardi and Mitchell, 2008a; Servon and Kaestner, 2008; Van Rooij et al., 2012.

Van Rooij et al. (2011)'s scale, which furthermore allows differentiating between basic and advanced financial literacy.

## 2.2 Behavioural Biases

A behavioural bias is a systematic distortion in an individual's decision making process (Chira et al., 2011; Shefrin, 2007) caused by both cognitive and emotional interferences. The extant literature that looks at the determinants of behavioural biases mainly focuses on cognitive abilities, demographic characteristics or educational attainment (e.g. Frederick, 2005; Dohmen et al., 2010; Beauchamp et al. 2011; Chira et al., 2011). In this study, instead, we focus on the effect of financial literacy on the six financial behavioural biases described below (see Appendix I-C for the translation of the questions used to assess the biases).

**Overconfidence** This bias was one of the first to be formalized; the first definition is attributed to Frank (1935), who maintains that "people overestimate their ability to do well on tasks and these overestimates increase with the personal importance of the task". The core of this definition was confirmed in the reference works on overconfidence (e.g. Odean, 1998; Graham et al., 2009), according to which this bias captures the tendency of people to over-estimate the precision of their knowledge. Starting from Taylor and Brown (1994) and coherently with the latest OECD/INFE International survey of adult financial literacy competences (2015), we evaluate the presence of *ex-ante* overconfidence by assessing whether individuals see themselves as a better than the average person, regarding their financial literacy degree. An "*ex-post*" measure was created, as well by comparing the respondents' self-assessment with their basic and advanced financial literacy scores. The *ex-post* overconfidence variables (*Overconfidence BFL* and *Overconfidence AFL*) take the value of one if the actual degree of basic/advanced financial literacy is lower than the self-assessed one and zero otherwise. We think that the latter overconfidence measure is more accurate, as it allows to avoid attributing the overconfidence bias to those respondents, who correctly estimated their financial knowledge to be above the average.



**Representativeness** is a heuristic, a mental shortcut like rules of thumb, stereotyping or intuitive judgments that decreases significantly the amount of time and of information taken into account in order to make a decision. Instead of rationally evaluating the set of information available, the decision is taken relying on past similar experiences, common sense or stereotyping. In order to assess the presence of this bias *ex-ante* we used Kahneman and Tversky (1974)'s original methodology (see Appendix I-B).

**Anchoring** is the tendency, while forming estimates, to rely on an arbitrary piece of information (the anchor) and then adjust from it (Tversky & Kahneman, 1974; Jacowitz and Kahneman, 1995; Epley and Gilovich, 2006). Following accurately Kahneman's definition, in order to assess the presence of this bias, the respondents were shown two graphs representing two investment scenarios evolving from January to March and they were asked to choose whether the final position was positive, negative or even (see Appendix I-C). The variable takes the value of one if the respondent arbitrarily "moves the anchor" from the first reference point in order to assess the final outcome of the investment.

**Disposition effect** is a bias that stems from Kahneman and Tversky *Prospect Theory* (1979); as the negative utility of losses is greater than the utility for equivalent gains, people tend to realize gains too soon (typical risk-averse behaviour) and hold on to losing financial instruments for too long (risk-seeker behaviour). In other words, investors are eager to cash in on the amount of gains, but are willing to assume high level of risk in order to avoid the negative utility of a loss (Feng and Seasholes, 2005; Carnevale, 2008). As it would be impossible for us to assess the actual investor's behaviour on the financial markets and to disentangle a possible financial advisor's mediation effect, we assess the presence of disposition effect when the investor does not move the reference value in case of gains (scenario A, see Appendix I-C), but she moves it in scenario B, in order to smooth the loss perception, following, among others, Dhar and Zhu, (2006) definitions and guidelines.

**Home bias** is a specific case of familiarity bias; the preference of people to invest in a financial

instrument issued in their own country, all things being equal (e.g. French and Poterba, 1991; Lewis, 1999; Huberman, 2001 and Mishra, 2015). Overweighting domestic financial instruments and underweighting international ones leads to less-than-optimal diversification, when an investor is not supported by a financial advisor<sup>26</sup>. The respondents were asked to choose between a fairly geographically diversified portfolio and one with a prevailing Italian component; in another section of the survey, they were asked to order the same geographical areas used in the previous question according to their rating. Home bias occurs when a respondent does not consider Italy as the country with the highest rating, but still prefers to invest the largest share of the portfolio in her Home-country.

**Overreaction** is the tendency to react disproportionately to new information, especially if unexpected (e.g. macro-economic announcement). We adopt the well-known Kahneman and Riepe's (1998) simple but effective *ex-ante* method to identify the bias: the respondent is shown two random sequences of outcomes from a coin toss and is asked which one, if any, has more chance to be obtained (see Appendix I-C for the results' interpretation).

### 3. Survey and Methodology

#### 3.1 Survey and Variables

Typically financial literacy surveys require respondents to self-assess their knowledge level (Bowen, 2002; Courchane and Zorn, 2005) or involve only very specific segments of the population (e.g. students, (as in Chen and Volpe, 1998; Beal et al., 2003; Tennyson and Nguyen, 2001), women (Lusardi and Mitchell, 2008) or pensioners (Lusardi and Mitchell, 2006)).

In this study, financial literacy is examined for a sample of investors covering all age groups, as Toshino and Suto (2004) recommend and using the scale devised by Van Rooji, Lusardi and Alessie (2011), which allows to distinguish between two different types of financial literacy: basic, more focused on logical and mathematical questions, and advanced, aimed at assessing technical

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<sup>26</sup> Coval and Moskowitz 2001, Vissing-Jørgensen, 2004 tried to explain the home bias puzzle by taking into account information costs; however, Lewis, 1999, Benartzi 2001 and Huberman 2001 among others, provide evidence that the puzzle cannot be fully explained by the transactional costs thesis.

financial rudiments. The scales have been linked to the demographic, behavioural and financial features of the respondents. In particular, a three-module multiple-choice questionnaire was designed and administered to Italian investors between September 2014 and February 2015. The survey was previously tested in a pilot study to refine the instruments and check for comprehension among the respondents; it was administered on-line mainly, using QuestionPro™, but was also delivered with a hard copy to be filled in and returned in a sealed envelope, to avoid the bias found in many internet surveys, which include only computer users (Volpe et al., 2002).

In order to have a widespread geographical coverage, we circulated the questionnaire among the clients of the European Financial Planning Association (EFPA)<sup>27</sup> and of four out of the ten main Italian banks, according to the Mediobanca report *Le principali società italiane*, 2014. The final sample consists of 552 retail and private banking clients, who took part in and fully completed the survey. The questionnaire comprises three modules. The first section of the survey (see Appendix I-A) is designed to provide analytical information on the demographic characteristics of the interviewees (gender, age, schooling, type of degree, if any, marital status, number of children, if any, region of residence), their wealth (income, financial and real estate assets) and the typology of financial advisor, if any; the summary statistics of these variables are reported in Table 1. Table 1 shows that half of the sample (55%) has a financial advisor; more than 60% of respondents are middle-aged married men. The mean income is approximately €36,000, 14% of the sample has financial assets over €500,000, the threshold to be considered a private banking client in Italy. Overall, the composition of the sample is representative of the Italian population, as it is in line with the quinquennial Istat Multipurpose Survey on Households (2011)<sup>28</sup>.

The first section of the questionnaire comprises three further variables of interest that represent an innovation in this stream of literature. *Financial Expertise* controls for the financial knowledge

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<sup>27</sup> EFPA is the main certification body for financial planners and financial advisors in Europe and was the first European financial standards association created for the purpose of increasing professionalism in the European financial services sector.

<sup>28</sup> The Istat annual household surveys shows that men are predominantly heads of household and financial decision makers in around 70% of cases (Istat 2011). In 2013, the mean household income of families, whose main earner is a person between 55 and 64 years old is € 35,414 (Istat 2014).

**Table 1: Summary Statistics**

	Mean %	Median	SD
Financial Advisor	55	1	0.5
Gender (men percentage)	66	1	0.47
Age	43	49	1.34
Married	63	1	0.48
Single	15	0	0.36
Divorced	12	0	0.32
Cohabitee	10	0	0.3
Children (nr. of)	1.05	1	1.06
Primary/Secondary ed.	1	0	0.12
High School	46	0	0.5
College/Above	52	1	0.5
Employee	30	0	0.44
Manager	16	0	0.37
Self-Employed	34	0	0.47
Pensioner	08	0	0.27
Out of Labour Market	11	0	0.29
Income (thousands €s)	36.45	32.50	1.12
Italian private	14	0	0.25
<i>Obs. N</i>	552		

*Notes: This table indicates, where not otherwise specified, in mean and median percentages out of the 552 respondents, the composition of the sample. The column SD shows the standard deviation of the variable considered.*

acquired on the field; it is a self-assessed dummy variable, that takes the value of one if the respondent's job has positively affected her financial knowledge. We expect that learning by doing, together with the theoretical knowledge captured by the degree of financial literacy, might help avoiding behavioural biases. We furthermore control for the presence of a *Financial Advisor* and the *Willingness to Learn*, that captures the self-reported interest towards economics and finance (Mandell and Klein, 2007). The central section of the survey assesses the respondents' financial literacy using Van Rooij et al. (2011)'s scales (see Appendix I-B for the translation of the questions). Both basic and advanced financial literacy are measured; basic financial literacy assesses the respondents' knowledge on interest compounding, inflation, time value of money and money illusion, whereas advanced financial literacy is assessed adjusting the eleven-question scale devised by Van Rooij et al. (2011), which measures the respondents' competence on the definitions of stocks, bonds and secondary market, basics of diversification and portfolio management and on

the relation between risk and return or interest rates and prices concerning bonds. The score to each question is linearly combined in an index (*basic financial literacy* and *advanced financial literacy*, respectively), which is in turn standardized, for the sake of comparison.

The last section of the survey has been designed to assess the presence of the behavioural biases described in section 2.2 (see Appendix I-C for the translation of the questions). Table 2 shows the presence and the distribution in the sample of the behavioural biases analysed.

**Table 2: Average presence of Behavioural Biases**

	N	Mean (%)	SD
Home bias	552	0.28	0.45
Overconfidence BFL	552	0.26	0.44
Overconfidence AFL	552	0.29	0.45
Overreaction	544	0.3	0.46
Representativeness	544	0.48	0.5
Anchoring	552	0.24	0.43
Disposition Effect	552	0.15	0.35

*Notes: The table reports the average presence of the biases across the sample*

In order to assess the joint impact of the behavioural biases we performed a principal component analysis, following Angelopoulou et al., 2012; as the biases are dummy variables, there is no need to standardize them for the principal component computation. Three components of the variance-covariance matrix of the seven biases considered (home bias, representativeness, anchoring, overreaction, ex-post overconfidence - towards both basic and advanced financial literacy - and disposition effect) had an Eigenvalue higher than one and were therefore retained to construct the *Behavioural Biasness Index* (BB-Index). The three principal components were linearly combined and weighted by the share of total variability individually explained, the resulting index was then divided by the share of total variance explained (61.89 %). The BB-Index is expressed in deciles.

Furthermore three sub-indexes are computed by looking at the loadings of the single biases: the two overconfidence measures neatly load on one component, so they were linearly combined in the sub-index *Overconfidence*; home bias, overreaction and representativeness load on a single factor, which seems to include the most unsophisticated, emotional biases, the three biases are therefore

combined in the second sub-index *Emotional biases*. Finally, anchoring and disposition effect load on the third factor; both biases stem from the prospect theory's different mental weighting of losses and gains and therefore the respective sub-index has been called *Loss avoidance*. Brief definitions of the variables described above are provided in Appendix II, Table A.1 .

### 3.2. Hypotheses and Methodology

The three sets of variables described above, behavioural biases, financial literacy and demographic characteristics, are respectively the dependent, main independent and control variables used to test the following hypotheses:

**HP1a:** The higher the degree of Basic Financial Literacy (BFL), the lower the presence of behavioural biases

**HP1b:** The higher the degree of Advanced Financial Literacy (AFL) degree, the lower the presence of behavioural biases

**HP2:** The investors' Financial Expertise diminishes the presence of behavioural biases

**HP3:** The presence of a financial advisor diminishes the presence of behavioural biases

**HP4:** The investors' Willingness to learn diminishes the presence of behavioural biases

These hypothesis have been tested on the single biases, on the overall BB-index and on the three sub-indexes described in section 3.1. using different specifications of logistic and ordered logit models (generalized in equation 1).

The impact of the main explanatory variables – basic and advanced financial literacy – and of three further variables of interest – the presence of a financial advisors, the professional expertise and the willingness to learn of the respondents – is tested controlling for a set of standard demographic variables commonly used in the relevant empirical literature (e.g. Barber and Odean, 2001; Graham et al., 2009).

$$Z_i = \sum_{k=1}^K \beta_k X_{ki} = E(Y^*_i) \quad (1)$$

$Y^*i$  is the continuous latent variable and  $k = (1 \dots K)$  are the thresholds that divide up the probability distribution. In the baseline model we use an ordered logit regression to assess the impact of the two different measure of literacy on the comprehensive BB-Index (see table 5, column 1); the three components of the index are then tested separately (see table 5, columns 2-4). In order to be able to interpret the coefficients, the marginal effects of the explanatory variables have been assessed and reported in Table 5. Ordered probit models have been run as robustness tests, giving qualitatively the same results (see Section 4.1).

The single biases were then separately considered in order to estimate the impact of the independent variables on each of them; in this case, we use a logistic model, the response variable  $y_i$  is binary, assuming the value one if the bias is present, and zero otherwise (as shown in equation 2).

$$y_i = \begin{cases} 1 & \text{if the } i\text{-th respondent presents the bias} \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

The  $y_i$  variable is the realization of the random variable  $Y_i$  that can take the values zero and one with probabilities  $\pi_i$  and  $1 - \pi_i$  respectively, according to a Bernoulli distribution, as in equation 3.

$$Pr\{Y_i = y_i\} = \pi_i^{y_i}(1 - \pi_i)^{1-y_i} \quad (3)$$

In this case, the odds ratios<sup>29</sup> of the explanatory variables are reported in Table 6.

#### 4. Results and discussion

In order to test the hypotheses presented in paragraph 3.2, both descriptive and empirical evidence is provided. Using Welch and Bonferroni significance tests, Table 3 reports the differences in terms of average presence of the biases across the main explanatory variables of the model (basic and advanced financial literacy), two further variable of interest (the presence of a financial advisor and the professional expertise of the respondents) and the main control variables (gender, standing, typology of degree and occupational status).

Belonging to the 75<sup>th</sup> percentile of the distribution of both basic and advanced financial literacy or

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<sup>29</sup> With an odds ratio lower than zero, the probabilities of the dependent variable to be equal to one decrease, when the odds ratio are positive, on the other hand, the probabilities increase.

above, decreases significantly the presence of overconfidence, by definition, overreaction and anchoring; the results on anchoring bias are in line with Bergman et al., 2010. Interestingly, the presence of a financial advisor acts like high financial literacy, mainly decreasing the presence of anchoring, overconfidence and overreaction. It is meaningful to highlight that being supported by a financial advisor seems to reduce overconfidence, as if the assistance of a professional advisor increased both financial literacy and awareness. Together with high financial literacy and the presence of a financial advisor, a degree in economics or finance and financial professional expertise seem to significantly curb anchoring bias; self-employed people tend to incur in this bias less than other categories of workers, as well. Home bias affects around 30% of the sample and is fairly stable across socio-demographic characteristics. Disposition effect is not common in the sample and rather stable across socio-demographic characteristics, but it is interestingly associated with wealthy investors. Both representativeness and overreaction are fairly common in the sample and do not seem to be affected by the demographic characteristics of the respondents; specific training, though, appears to have a positive impact as both biases are less common among people with financial expertise and a degree in economics or finance. It is particularly meaningful to compare the overconfidence bias computed in the mainstream way with the *ex-post* bias we created. The *ex-post* overconfidence variable, regarding both basic and advanced financial literacy, takes the value of one only if the actual degree of basic or advanced financial literacy respectively is lower than the self-assessed one. In line with the most relevant literature (e.g. Barber and Odean, 2001; Niederle and Vesterlund, 2007), the *ex-ante* overconfidence bias appears to be significantly higher among men; having a degree in economics or finance, a financial job expertise and being self-employed seems to increase the degree of overconfidence, as well. The *ex-post* overconfidence bias shows deeply different if not opposite results. The gender is no longer a discriminating factor, so apparently, on average, men not only consider themselves to have an above-the-average financial knowledge, but they actually have it (this conclusion is in line with e.g. Lusardi and Mitchell, 2008 Van Rooij, 2011 and Monticone, 2010).



**Table 3: Financial Literacy scores by socio-demographic characteristics**

		Anchoring	Home Bias	Disposition Effect	Ex-ante Over confidence	Ex-post Over confidence BFL	Ex-post Over confidence AFL	Overreaction	Representativeness
<b>Basic F.L.</b>	25 <sup>th</sup>	52.63	38.6	12.28	24.56	0.65	0.58	43.64	58.18
	75 <sup>th</sup>	17.62	27.64	14.36	44.72	0	16.26	25.34	44.90
	T-Stat	0.35***	-0.11	0.02	0.20**	-0.56***	-0.42***	-0.18**	-1.28
<b>Advanced F.L.</b>	25 <sup>th</sup>	0.48	39.40	15.16	33.33	45.45	63.63	46.88	56.25
	75 <sup>th</sup>	13.85	23.85	11.54	51.92	9.23	1.54	20.00	43.53
	T-Stat	-0.35***	-0.16	-0.036	0.186	-0.36***	-0.62***	-0.27***	-0.13
<b>Financial advisor</b>	No	31.2	27.2	13.2	39.2	34.8	34.4	30.24	48.79
	Yes	18.54	28.48	16.23	42.05	18.87	24.5	30.41	47.3
	T-Stat	3.43***	-0.33	-1.00	-0.68	4.23***	2.53***	-0.04	0.34
<b>Financial Expertise</b>	No	30.87	41.93	17.05	28.11	35.94	43.78	44.13	55.4
	Yes	20	18.8	13.13	48.96	19.7	19.4	21.45	43.2
	T-Stat	2.84***	5.81***	1.24	-5.08***	4.14***	6.08***	5.54***	2.79***
<b>Gender</b>	Woman	27.95	33.49	18.82	20.43	26.34	28.49	34.43	49.18
	Man	22.4	27.59	12.57	51.09	25.96	29.23	28.25	47.37
	T-Stat	1.4	0.22	1.86*	-7.75***	0.09	-0.18	1.45	0.4
<b>Standing</b>	Retail	24.95	26.43	12.9	40.59	27.9	29.39	29.76	46.68
	Private	20.25	36.71	25.32	41.77	15.19	26.58	33.77	55.84
	T-Stat	0.94	-1.77*	-2.41**	-0.19	2.79***	0.52	-0.69	-1.49
<b>Degree</b>	Non-eco subj.	27.38	29.09	14.18	33.74	30.56	33.01	35.98	51.36
	Economics	15.38	24.47	16.08	60.84	13.29	17.48	14.18	38.3
	T-Stat	3.20***	1.09	-0.54	-5.74***	4.73***	3.93***	5.74***	2.72***
<b>Occupational Status</b>	Employee	32.92	26.83	14.02	34.76	35.98	39.02	33.13	45.4
	Manager	20.88	30.77	16.48	46.15	17.58	32.96	35.95	49.44
	Self-Employed	16.31	24.21	14.73	51.05	17.37	18.94	25.81	42.47
	Pensioner	24.24	40	24.44	18.89	26.67	31.11	31.11	66.67
	Out of labour market	30.64 <sup>b</sup>	29.03 <sup>c</sup>	6.45 <sup>d</sup>	25.81 <sup>e</sup>	38.71 <sup>f</sup>	25.80 <sup>g</sup>	27.87 <sup>h</sup>	55.74 <sup>i</sup>

Table 3 reports the average percentage of the behavioural biases. The T-statistic and its significance is reported under any dual comparison; when three or more categories are compared, Bonferroni's test for mean difference is carried out.

<sup>a</sup> Bonferroni test for mean difference (F-Statistics): only the differences between self-employed and employees (-62.10\*) and self-employed and pensioner (-22.33\*\*) are significant

<sup>b</sup> Bonferroni test for mean difference (F-Statistics): only the differences between self-employed and employees (16.61\*\*\*) is significant

<sup>c, d, h</sup>; none of the differences are significant according to Bonferroni test

<sup>e</sup> Bonferroni test for mean difference (F-Statistics): only the differences between self-employed and employees (16.30\*\*), pensioner (22.16\*) and people out of the labor market (25.25\*\*\*\*) are significant

<sup>f</sup> Bonferroni test for mean difference (F-Statistics): the difference between: employees and managers (18.39\*\*), employees and self-employed (18.61\*\*\*), manager and people out of labor market (21.12\*\*) and self-employed and people out of labor market (21.34\*\*\*\*) are significant

<sup>g</sup> Bonferroni test for mean difference (F-Statistics): only the differences between employees and self-employed (20.07\*\*\*\*) is significant ; <sup>i</sup> Bonferroni test for mean difference (F-Statistics): only the differences between self-employed and pensioners (24.19\*\*) is significant

Respondents with a degree in economics are expected to have a higher financial knowledge and indeed they correctly assess their financial literacy degree to be above the average. This consideration is supported by the descriptive statistics reported in Table 3, as respondents without a degree in economics or finance seem to be more overconfident about their financial knowledge, according to our *ex-post* measure and is coherent with the OECD/INFE, 2015 report findings. Finally, financial expertise, as well, seems to have an opposite impact if overconfidence is measured *ex-post*; controlling for the respondents' actual financial literacy level, people without professional financial expertise seem to be more overconfident than interviewees who perceive that their job positively influence their financial literacy. In order to provide empirical evidence of the trend identified in Table 3, two different specifications of ordered logit (Table 4) and logistic regression (Table 5) have been performed, according to the models outlined in section 3.2.

Table 4 shows that overall the presence of the biases is dampened by both basic and advanced financial literacy, with a stronger role of the latter. For one unit increase in the basic and advanced financial literacy scores (the variables have been standardized with mean zero and standard deviation of one for the sake of comparison), the probability for the BB-index to be in the highest decile decreases respectively by 0.029 and 0.061, keeping the other variables constant. Unexpectedly the presence of an independent financial advisor have a significant and positive impact on the overall presence of cognitive biases, but it is interesting to notice how this effect vanishes when the index is broken up into its components. The variable willingness to learn takes the expected significant negative sign, it proxies the personal interest toward economics and financial subjects and it is valuable to notice that it plays a positive role in contrasting the presence of behavioural biases over and above the theoretical knowledge captured by the two financial literacy measures. Moreover, it turns out to be a more significant determinant than a degree in economics or finance. Among the traditional demographic control variables, being male increases the probabilities of displaying behavioural biases; there is almost no attempt in the literature to assess the presence of such numerous biases, but this result is still coherent with the extant literature

looking at the determinants of single behavioural biases (e.g. Bengsston et al., 2005; Beckman et al., 2008; Croson et al., 2009). A ten-year increase in the respondents' age causes an increase of 1.5% in the probability of falling in the highest decile of the BB-Index. Finally, the respondents' wealth seems to have a relevant role in the overall presence of behavioural biases, with a very significant and quite sizable positive marginal effect. The BB-Index comprises rather heterogeneous behavioural biases (home bias, overconfidence, overreaction, representativeness, anchoring and disposition effect) and the principal component analysis performed confirms the presence of at least three different typologies of biases within the index: overconfident behaviour, emotional biases and loss avoidance behaviour. We therefore decomposed the comprehensive index into three sub-indexes expecting partially different results concerning their determinants. According to columns 2-4, Table 4, the BB-Index results are overall driven by the overconfidence and loss avoidance sub-indexes, which reacts to relative change in basic and advanced financial literacy, age and willingness to learn in a qualitatively similar way. The magnitude of these variables, though, is in both cases sensibly higher. Once again being male has a quite sizable, significant and positive impact on the Overconfidence sub-index, coherently with the extant literature (e.g. Barber and Odean, 2001, Yang and Zu, 2016). Being wealthy, on the other hand, increases substantially the probability of displaying Loss avoidance behaviours, such as anchoring and disposition effect. When the most emotional component of the index is taken into account, though, the explicative variables change dramatically: the literacy level is no longer significant. This is a very meaningful result; the theoretical knowledge of financial products, basics of portfolio behaviour and the relation between fundamentals do not seem to prevent investors from overreacting, overweighting the share of their portfolio invested in the domestic market nor falling into the representativeness heuristic. Three strong determinants, though, seem to dampen these biases: the investor's personal interest in economic and financial subjects, her financial professional expertise and being self-employed; these results seem to suggest that the emotional biases can be contrasted only by "practical field-experience", rather than by mastery of theoretical financial notions.

**Table 4: Behavioural biasness and Financial Literacy**

	BB-Index (1)	Overconfidence (2)	Emotional Biases (3)	Loss Avoidance (4)
Basic F.L.	- 0.029*** (0.008)	- 0.122*** (0.011)	0.004 (0.009)	- 0.053** (0.023)
Advanced F.L.	- 0.061*** (0.011)	- 0.121*** (0.010)	- 0.009 (0.009)	- 0.103*** (0.025)
Professional Expertise	- 0.025 (0.016)	0.003 (0.022)	- 0.040** (0.017)	0.044 (0.045)
Financial Advisor	0.030** (0.014)	0.022 (0.020)	0.006 (0.015)	- 0.021 (0.042)
Willingness to Learn	- 0.015* (0.008)	0.013 (0.011)	- 0.052*** (0.010)	- 0.064*** (0.024)
Gender	0.024* (0.014)	0.090*** (0.021)	0.011 (0.015)	- 0.029 (0.042)
Age	0.015** (0.007)	0.020** (0.010)	0.010 (0.009)	0.046** (0.022)
Marital status	- 0.003 (0.006)	- 0.002 (0.009)	0.003 (0.006)	0.022 (0.020)
Education	- 0.011 (0.016)	0.010 (0.021)	- 0.021 (0.016)	0.009 (0.045)
Economics degree	0.018 (0.018)	0.036 (0.025)	- 0.008 (0.020)	0.054 (0.057)
Employee	- 0.008 (0.023)	0.045 (0.035)	-0.048* (0.026)	0.079 (0.081)
Manager	0.017 (0.025)	- 0.018 (0.040)	- 0.005 (0.031)	0.016 (0.091)
Self-Employed	- 0.012 (0.022)	-0.000 (0.036)	- 0.046* (0.027)	0.013 (0.084)
Pensioner	- 0.037 (0.038)	- 0.057 (0.060)	- 0.058 (0.039)	- 0.048 (0.115)
Private	0.055*** (0.020)	0.030 (0.023)	0.024 (0.021)	0.117** (0.059)
N Obs	544	552	544	552
Pseudo R squared	0.0840	0.3547	0.0802	0.1195
Wald test	151.62 (0.000)	110.93 (0.000)	111.46 (0.000)	73.41 (0.000)

*The table reports the marginal effect of the ordered logit regression coefficient. The dependent variable BB-index (1), computed with the pca includes all the biases considered; Overconfidence(2) is the sub index including BFL and AFL ex-post overconfidence; Emotional Biases (3) is the sub-index including home bias, over-reaction and representativeness; Loss Avoidance (3) combines anchoring and disposition effect.*

*Standard errors are reported in parentheses and robust to heteroskedasticity.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%*

Table 5 reports the results of the string of independent and control variables previously tested, this time regressed against each single bias. Coherently with the expected result and in line with Yang and Zu, (2016), the two overconfidence biases are negatively influenced by the financial literacy typology they are referred to and it is respectively 2.4 and 3.2 times more likely for men to display these biases than for women. The probability of displaying high overconfidence towards advanced

financial literacy increases by 1.4 times every ten years, according to the results. Being particularly wealthy, moreover, has a sizable impact of this bias. Table 8 compares the two ex- post overconfidence indicators with the ex-ante one; the latter has the advantage of not being constructed by taking into account the financial literacy indexes used as independent variables in the model but, as discussed in section 2.2, it is a less precise indicator of overconfidence compared to the *ex-post* ones.

**Table 5: Behavioural biases and Financial Literacy**

	Overc. Bfl (1)	Overc. Afl (2)	Represent. (3)	Overreact. (4)	Home-Bias (5)	Disp. Effect (6)	Anchoring (7)
Basic F.L	0.076*** (0.028)	0.804 (0.158)	1.05 (0.119)	1.015 (0.131)	1.131 (0.138)	0.959 (0.139)	0.759** (0.097)
Advanced F.L.	0.911 (0.169)	0.094*** (0.029)	1.076 (0.131)	0.711** (0.101)	0.861 (0.114)	0.626*** (0.097)	0.755** (0.108)
Fin Expertise	1.131 (0.420)	0.964 (0.306)	0.864 (0.197)	0.825 (0.207)	0.438*** (0.106)	0.834 (0.245)	1.446 (0.365)
Financial Adv.	1.167 (0.367)	1.467 (0.436)	0.936 (0.184)	1.294 (0.292)	1.04 (0.227)	1.245 (0.354)	0.742 (0.173)
Will. To Learn	1.132 (0.7185)	1.158 (0.179)	0.629*** (0.073)	0.549*** (0.079)	0.645*** (0.088)	1.21 (0.207)	0.579*** (0.079)
Gender	2.429*** (0.821)	3.226*** (1.099)	1.122 (0.227)	0.936 (0.212)	1.325 (0.308)	0.668 (0.188)	1.13 (0.267)
Age	1.158 (0.162)	1.359** (0.203)	1.131 (0.120)	1.17 (0.140)	1.086 (0.130)	1.201 (0.179)	1.184 (0.150)
Marital Status	0.962 (0.137)	1.004 (0.148)	1.223** (0.113)	0.928 (0.098)	0.952 (0.098)	0.847 (0.107)	1.270** (0.133)
Education	1.221 (0.395)	1.264 (0.391)	0.598** (0.131)	0.993 (0.223)	1.094 (0.261)	0.804 (0.238)	1.275 (0.299)
Economics Degree	1.103 (0.437)	1.803 (0.689)	1.074 (0.294)	0.484** (0.165)	1.352 (0.398)	1.801* (0.623)	0.864 (0.291)
Employee	1.269 (0.685)	2.347 (1.302)	0.591 (0.211)	0.732 (0.306)	0.543 (0.223)	2.000 (1.151)	1.226 (0.482)
Manager	0.413 (0.276)	1.132 (0.719)	0.872 (0.355)	1.296 (0.623)	0.686 (0.313)	2.22 (1.351)	0.774 (0.357)
Self-employed	0.689 (0.389)	1.235 (0.690)	0.619 (0.227)	0.839 (0.373)	0.533 (0.217)	2.154 (1.221)	0.739 (0.310)
Pensioner	0.421 (0.366)	0.58 (0.515)	0.837 (0.466)	0.307* (0.187)	0.605 (0.358)	2.042 (1.428)	0.501 (0.301)
Private	0.989 (0.323)	2.389*** (0.764)	1.199 (0.313)	1.258 (0.390)	1.604* (0.429)	2.379*** (0.760)	1.062 (0.375)
Constant	0.048*** (0.044)	0.017*** (0.017)	1.584 (0.909)	0.455 (0.455)	0.533 (0.354)	0.099** (0.091)	0.089*** (0.057)
Obs.	552	552	544	544	552	552	552
Pseudo R2	0.490	0.453	0.067	0.145	0.092	0.070	0.127

The table reports the logistic regression results expressed in odds ratios. The dependent variables of the seven equations are reported in each column. Definitions of the variables are provided in table 3. Standard errors are reported in parentheses below the odds ratios and are adjusted for heteroskedasticity; \* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%

Looking at the results reported in columns 3-5, Table 5, the willingness to learn reduces the presence of representativeness, overreaction and home bias, as expected from the aggregated results in Table 4. The demographic controls, though, seem to play a different role on the biases; education reduces the probability for investors to display representativeness bias, as advanced financial literacy and a degree in economics or finance do for overreaction. The odds of displaying home bias, instead, seem to be strongly reduced by the respondents' financial expertise but increased by their wealth. Only advanced financial literacy seems to be able to dampen the presence of the disposition effect, which is fostered by the respondents' wealth and unexpectedly by an economic degree (even though the coefficient is barely significant). The odds of displaying anchoring, in the end, is significantly lower for respondents with a high level of basic or advanced financial literacy and willingness to learn. In the end, a more "stable and binding" personal relationship (captured by the marital status variable) shows a significant and positive impact with regards to both anchoring and representativeness biases.

To conclude, Table 6 summarises the most relevant trends emerging from the analyses discussed above. Analysing the behavioural biases individually is important to better address future corrective actions, but it is also relevant to keep in mind that hardly ever investors presents one bias at a time.

**Table 6: Behavioural biases and their determinants: main trends**

	Over-Confidence	Representativeness	Over-Reaction	Home Bias	Disposition Effect	Anchoring
Financial Literacy	▼		▼		▼	▼
Willingness to learn		▼	▼	▼		▼
Financial expertise				▼		
Education/Economics degree		▼	▼		▲	
Gender	▲					
Marital status		▲				▲
Wealth	▲			▲	▲	

*The table reports the main variables that exacerbate ▲ and temper ▼ the presence of behavioural biases*

#### 4.1 Robustness checks

In order to test the robustness of the empirical findings presented in Table 4, the baseline model outlined in equation 1 has been rerun using ordered probit models. The results presented in Table 7 lead qualitatively to the same conclusions as the ones presented in section 4.

**Table 7 Robustness check: Behavioural biasness and Financial Literacy**

	BB-Index (1)	Overconfidence (2)	Emotional Biases (3)	Loss Avoidance (4)
Basic F.L.	- 0.026*** (0.008)	- 0.108*** (0.011)	0.007 (0.009)	- 0.054** (0.023)
Advanced F.L.	- 0.061*** (0.011)	- 0.115*** (0.011)	- 0.013 (0.010)	- 0.105*** (0.025)
Professional Expertise	- 0.028* (0.016)	0.005 (0.024)	- 0.044** (0.018)	0.048 (0.045)
Financial Advisor	0.027* (0.014)	0.019 (0.021)	0.009 (0.016)	- 0.021 (0.042)
Willingness to Learn	- 0.014* (0.008)	0.016 (0.011)	- 0.054*** (0.010)	- 0.064*** (0.024)
Gender	0.023 (0.014)	0.082*** (0.022)	0.014 (0.016)	- 0.031 (0.042)
Age	0.016** (0.007)	0.017* (0.010)	0.013 (0.009)	0.047** (0.022)
Marital status	- 0.004 (0.006)	- 0.004 (0.010)	0.005 (0.007)	0.022 (0.020)
Education	- 0.013 (0.015)	0.017 (0.021)	- 0.021 (0.017)	0.013 (0.045)
Economics degree	0.020 (0.017)	0.026 (0.025)	- 0.011 (0.022)	0.051 (0.057)
Employee	- 0.006 (0.024)	0.042 (0.038)	-0.055* (0.029)	0.077 (0.078)
Manager	0.020 (0.026)	- 0.022 (0.040)	- 0.009 (0.033)	0.012 (0.088)
Self-Employed	- 0.007 (0.023)	-0.004 (0.037)	- 0.053* (0.030)	0.011 (0.080)
Pensioner	- 0.041 (0.038)	- 0.065 (0.062)	- 0.065 (0.042)	- 0.050 (0.112)
Private	0.060*** (0.019)	0.035 (0.023)	0.029 (0.022)	0.119** (0.058)
N Obs	544	552	544	552
Pseudo R squared	0.0830	0.3383	0.0803	0.1202
Wald test	156.93 (0.000)	121.69 (0.000)	115.16 (0.000)	81.62 (0.000)

*The table reports the marginal effect of the ordered probit regression coefficient. The dependent variable BB-index (1), computed with the pca includes all the biases considered; Overconfidence(2) is the sub index including BFL and AFL ex-post overconfidence; Emotional Biases (3) is the sub-index including home bias, over-reaction and representativeness; Loss Avoidance (3) combines anchoring and disposition effect.*

*Standard errors are reported in parentheses and robust to heteroskedasticity.*

*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%*

Table 8 provides evidence of the difference between *ex-ante* (column 1) and *ex-post* (columns 2 and 3) overconfidence measures. The majority of control variables affect the three measures in fairly similar ways; the main differences lie in the financial literacy indexes, the willingness to learn and the degree in economics or finance. Differently from the *ex-post* models, the three variables have a significant and positive impact on the respondents' perception to have an above-the-average financial literacy (*ex-ante* overconfidence). These three results in particular may be interpreted as further evidence of the spurious measure of the overconfidence bias provided by the *ex-ante* measure; possibly the belief of the respondents with high advanced financial literacy, high willingness to learn and a degree in economics or finance to have a higher-than-average financial literacy is well-founded and not upwards distorted by the presence of a bias.

**Table 8: Overconfidence and Financial literacy**

	Ex-ante Overconfidence (1)	Overconfidence BFL (2)	Overconfidence AFL (3)
Basic F.L	1.011 (0.162)	0.076*** (0.028)	0.804 (0.158)
Advanced F.L	1.328* (0.226)	0.911 (0.169)	0.094*** (0.029)
Professional Exp	1.660 (0.525)	1.131 (0.420)	0.964 (0.306)
Fin Advisor	1.019 (0.305)	1.167 (0.367)	1.467 (0.463)
Will. To Learn	1.334* (0.213)	1.132 (0.185)	1.158 (0.179)
Gender	4.065*** (1.171)	2.429*** (0.821)	3.226*** (1.099)
Age	1.410** (0.212)	1.158 (0.162)	1.359** (0.203)
Marital Sts	1.047 (0.147)	0.962 (0.137)	1.004 (0.148)
Education	0.986 (0.324)	1.221 (0.395)	1.264 (0.391)
Eco Degree	2.909** (1.464)	1.103 (0.437)	1.803 (0.689)
Employee	1.824 (0.839)	1.269 (0.685)	2.347 (1.302)
Manager	0.560 (0.313)	0.413 (0.276)	1.132 (0.719)
Self-Employed	1.233	0.689	1.235



	(0.627)	(0.389)	(0.690)
Pensioner	0.344	0.421	0.580
	(0.234)	(0.366)	(0.515)
Private	1.569	0.989	2.389***
	(0.742)	(0.323)	(0.764)
Constant	0.870	0.048***	0.017***
	(0.708)	(0.044)	(0.017)
Pseudo R <sup>2</sup>	0.202	0.490	0.453
N	552	552	552

*The table reports the logistic regression results in odds ratios. The dependent variables of the three equations are reported in each column. Definitions of the variables are provided in table 3. Standard errors are reported in parentheses below the odds ratios and are adjusted for heteroskedasticity; an odd ratio lower than one indicates a negative effect of the independent variable on the dependent one, the opposite holds true for positive coefficients.*



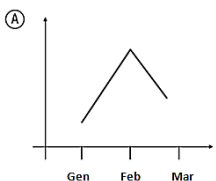
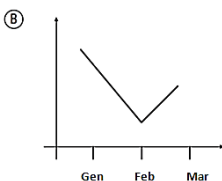
*\* statistical significance at 10% level, \*\* statistical significance at 5% level, \*\*\* statistical significance at 1%*

## 5. Conclusive remarks

Financial literacy has polarised the attention of scholars, practitioners and policy-makers, who agree on the necessity of more effective education programmes aimed at increasing financial awareness. It is still unclear, though, whether and to what extent the investors' financial literacy can improve in practice their behaviour on the financial markets and in particular whether financial knowledge smooths the presence of behavioural biases. To this end, a detailed questionnaire was designed and administered to a sample of Italian investors in order to assess the degree of basic and advanced financial literacy, identified using Van Rooij et al. (2011)'s methodology and the "ex-ante" presence of six behavioural biases. This unique survey allows us to test contemporarily for the presence of multiple biases and their combinations. Empirical results show that respondents' financial literacy decreases the presence of cognitive biases (e.g. overconfidence, anchoring and disposition effect), but does not have a significant effect on emotional biases, such as overreaction home bias, and representativeness. The presence of these biases, though, seems to be tempered by specific training and practical experience.

## APPENDIX I: Questionnaire

<b>APPENDIX I-A: Independent and Control Variables</b>	
Gender	Gender of the respondent
Marital Status	Marital Status of the respondent
Age	Age of the respondent [18-24; 25-34; 35-44; 45-54; 55-64; 65-75; >75]]
Job	[Employee; Manager; Professional; Entrepreneur; Out of labour market; Other (please specify)]
Professional Expertise	Has your job somehow improved your financial skills/knowledge? [Yes=1; No=0]
Educational attainment	Highest Educational attainment of the respondent
Degree in economics/finance	[Economic sciences=1; Other=0]
Region of residence	Region of residence of the respondent
Private banking client	Total amount of liquidity, and financial assets (e.g. government bonds, bonds, stocks) [< €50,000; €50,000-100,000; €100,000-250,000; €250,000-500,000; €500,000-1m; €1m-5m; €5-10m; €10-30m; €30m-50m; > €50m]. Private banking client =1 if tot. fin assets > €500,000; = otherwise.
Financial advisor	Are you supported by a private banker, financial promoter or independent consultant?[No; Yes]
Willingness to Learn	How interested are you in economic and financial topics?[Not interested at all; Slightly interested; Somewhat interested; Moderately interested; Extremely interested]
<b>Appendix I-B: Financial Literacy:</b> Basic and Advanced financial literacy; All questions included the options “All of the above” and “I don’t know”	
BFL_1	Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? [More than €110; Exactly €110; Less than €110]
BFL_2	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account? [More than today; Exactly the same; Less than today]
BFL_3	Assume a friend inherits h10,000 today and his sibling inherits h10,000 3 years from now. Who is richer because of the inheritance? [My friend; His sibling; They are equally rich]
BFL_4	Suppose that in the year 2010, your income has doubled and prices of all goods have doubled too. In 2010, how much will you be able to buy with your income? [More than today; The same as today; Less than today]
AFL_1	Which of the following statements describes the main function of the stock market?[The stock market helps to predict stock earnings; The stock market results in an increase in the prices; The stock market brings people who want to buy with people who wants to sell stocks]
AFL_2	Which of the following statements is correct? If somebody buys the stock of firm B in the stock market [He owns a part of firm B; He has lent money to firm B; He is liable for firm B’s debts]
AFL_3	Which of the following statements is correct? [One cannot withdraw money invested in a mutual fund during the first year; Mutual funds can invest in several assets, for example invest in both stocks and bonds; Mutual funds pay a guaranteed rate of return which depends on the past performance]
AFL_4	Which of the following statements is correct? If somebody buys a bond of firm [He owns a part of firm B; He has lent money to firm B; He is liable for firm B’s debts]
AFL_5	Consider a long time period (for example 10 or 20 years), which asset normally gives the highest return? [Saving accounts; Bonds; Stocks]
AFL_6	Normally, which asset displays the highest fluctuation over time?[Saving accounts; Bonds; Stocks]
AFL_7	When an investor spreads his money among different assets, does the risk of losing money [Increase; Decrease; Stay the same]
AFL_8	If you buy a 10-year bond, it means you cannot sell it after five years without incurring a major penalty, even with an efficient secondary market. [True; False]
AFL_9	Stocks are normally riskier than bonds [True; False]
AFL_10	Buying a company stock usually provides a safer return than a stock mutual fund [True; False]
AFL_11	If the interest rate falls, what should happen to bond prices? [Rise; Falls; Stay the same]

<b>Appendix I-C: Behavioural Biases</b>	
Representativeness	Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. Which is more probable? [Linda is a bank teller; Linda is a bank teller and is active in the feminist movement]
Home bias	<p>1. Which geographic allocation would you prefer your portfolio to have, because presumably safer?</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>2. <i>in another point of the survey/</i> Which is the most plausible combination of countries if you had to order Euro Area, Italy, Emerging Countries and U.S.A according to their rating? (from the highest to the lowest?) [Italy – Euro Area – U.S.A. – Developing C.; Developing C. – U.S.A – Euro Area – Italy; Euro Area – U.S.A. – Italy – Developing C.; U.S.A – Euro Area – Italy – Developing C]</p>
“Ex-ante” overconfidence	In your opinion, your financial knowledge is ... [average; above the average; below the average]
Overreaction	Which of the two sequences is more likely to be obtained by tossing a coin? (H= head T=tail) [HHHTTT; HTHTHHT; It is the same]
Anchoring	<p>Please consider the underlying scenario; say you invested your money in January and that the value of that investment have changed over time according to the graphs. What would you say with regard to your investment on March? [I’m gaining; I’m losing; I’m at break-even; I don’t know]</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p><i>Applying Tversky &amp; Kahneman, (1974)’s definition and Dhar and Zhu, (2006) and Lippi (2013)’s guidelines, the Anchoring bias is detected as follows: the unbiased answers in scenario A is “I’m gaining”, because starting from the initial amount invested, the balance is positive on March. The respondent should not take as an arbitrary reference point the peak the investment reached in February. The same rationale holds true for scenario B: the balance is negative on March, and the negative peak of February should not be taken as a reference point, as any other point between January and March. The variable Anchoring takes the value of one if in both cases the respondent moves arbitrarily the reference term (January).</i></p>
Disposition Effect	The variable Disposition effect takes the value of one if the respondent assesses correctly the positive balance in scenario A, but avoid to recognise the negative balance in scenario B and moves the anchor to February, in order to have an illusory positive outcome in the second representation, as well.

## APPENDIX II: Variables definitions

**Table A.1: Variables definitions**

Variable	Definition
<i>Dependent Variables</i>	
Home bias ( <i>ex-post</i> )	Preference for national investments even without financial motivation backing the choice
Overconfidence ( <i>ex-ante</i> )	To assess personal skills to be systematically above the average
Overconfidence BFL	Dummy variable taking the value 1 if the respondent states her financial literacy to be higher than the actual basic financial literacy score
Overconfidence AFL	Dummy variable taking the value 1 if the respondent states her financial literacy to be higher than the actual advanced financial literacy score
Overreaction	Tendency to react disproportionately to new information
Representativeness	Instead of rationally evaluating the set of information available, the decision is taken relying on past similar experiences, common sense or stereotyping.
Anchoring	Tendency, while forming estimates, to rely on the first arbitrary piece of information available and then adjust from it
Disposition Effect	Tendency to realize gains too soon but to assume high level of risk in order to avoid the negative utility of a loss.
OVERCONFIDENCE	Sub-index including overconfidence towards Basic F.L. and Advanced F.L.
EMOTIONAL BIASES	Sub-index including Home bias ( <i>ex-post</i> ), Overreaction and Representativeness
LOSS AVOIDANCE	Sub-index including Anchoring and Disposition Effect
BB-Index	Global Behavioural Biasness index
<i>Explanatory Variables</i>	
Basic Financial Literacy	Share of correct answers to four questions devised to measure BFL, standardized
Advanced Financial Literacy	Share of correct answers to eleven questions devised to measure AFL, standardized
Professional Expertise	Dummy variable that takes the value of 1 if the respondent's job has positively affected her financial knowledge, 0 otherwise
Willingness to Learn	The self-reported interest towards financial and economics subjects (measured on a Likert scale from 1 -not interested at all- to 5 -extremely interested)
Financial Advisor	Dummy variable that takes the value of 1 if the respondent is supported by a financial advisor, 0 otherwise
<i>Control Variables</i>	
Gender	Dummy variable taking the value of 1 for male 0 for female investors
Age	Seven age intervals covering from 18 to over 75 years old (question D2, Appendix I-A).
Marital status	Four dummy variables controlling for being married, separated/divorced, cohabitant and single (question D3 Appendix I-A)
Education	Scale ranging from 1 Primary/Secondary education to 3 Degree or Postgraduate title
Economics or finance degree	Dummy variable taking the value of 1 if the respondents has a degree in economics or finance, 0 otherwise.
Job	Five dummy variables controlling for the respondent's job (see Appendix I-A)
Private	Dummy variable taking the value of 1 if the respondents has a financial patrimony over € 500,000, 0 otherwise

*The table reports brief definitions of the variables employed in the descriptive and empirical evidence provided in the paper.*

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## Conclusion

This thesis aims at investigating the financial literacy through three different perspectives by analysing the data gathered from an *ad-hoc* survey carried out in Italy between September 2014 and February 2015. The sample of account-holders involved comprises the clients supported by an EFPA-certified financial advisor, or who hold a bank account with four out of the ten main Italian banks, according to Mediobanca, (2014) report. We involved only EFPA certified advisors because, in order to ensure the respondent's anonymity, we could not control for their advisors' financial literacy degree, which could influence the clients' knowledge degree, though. The difficulty of the EFPA certification allows us to give it for granted that the certified advisors' financial literacy exceeds the level tested in the present study. In this way, we are able to virtually ensure that the respondents have potential access to a sample of financial advisors with a fairly homogenous degree of financial literacy, at least as far as the tested topics are concerned. Instead of a monetary compensation, a report with specific profiling of the Italian account-holders population, their characteristics, the behavioural biases they are most exposed to and the main drivers identified in order to improve their financial literacy was given to the participants at the end of the data collection. The final sample consists of 552 retail and private banking clients, who took part in the survey and fully filled it in either on-line or on a hard copy.

The first chapter looks at the determinants of financial literacy, focusing on the role of financial advisors, as a possible antecedent. The empirical findings show that, holding all the other explicative variables constant, the presence of a financial advisor increases the conditional probability of scoring the highest centile of the basic, advanced and overall financial literacy distribution by 16.6, 14.2 and 11.4 respectively. In particular, the effect of independent consultants on their clients' advanced financial literacy is quite sizable. The lower the conflict of interest the advisors face while choosing between in-house or whole-market financial products, the stronger their educational role seems to become.

The second paper takes a more psychological perspective on the issue and deepens the analysis by looking at the factors that enhance the independent advisors' educational role towards their clients. The empirical evidence reported in the paper confirms that financial advisors exert an educational role towards their clients; more specifically, the presence of an independent financial advisor increases the advanced financial literacy of her clients via the knowledge transfer between them. This flow of information increases its effect on advanced financial literacy, in particular, over time up to a period of about four years. The more trustworthy the client is toward her advisor's technical skills, the higher the willingness to learn of the client is and consequently the higher the effectiveness of the knowledge transfer between them on the financial literacy degree becomes.

Finally, the last chapter looks at poor financial literacy as a possible antecedent for behavioural biases. According to the estimates presented, respondents' financial literacy decreases the presence of cognitive biases (e.g. overconfidence, anchoring and disposition effect), but does not have a significant effect on emotional biases, such as overreaction home bias and representativeness. The presence of these biases, though, seems to be tempered by specific training and practical experience. This thesis addresses in a comprehensive way a timely policy issue; the consequences of a poor level of financial literacy, became apparent worldwide after the burst of a number of financial scandals involving retail investors, who did not pay attention to and fully understand the actual composition of their portfolios, until they were hit by major financial damage (e.g. Bradford & Bingley's precipice and with-profit bonds mis-selling, 2004; US subprime mortgages securitizations 2007-8; UK PPI scandal, 2008; Arch Cru funds, 2009; Italian Banca delle Marche, Popolare Etruria e Lazio and Carife turmoil, 2015). Traditional educational interventions aimed at improving financial literacy proved to be extremely costly and to have a worryingly short decay period worldwide, so a more gradual and constant form of financial education would be much needed. Being aware of the relational channels that enhance the independent financial advisors' educational role, may help to orient and better target future educational treatments, bearing in mind, though, that the theoretical proficiency does not ensure unbiased financial behaviours.