FINANCIAL LITERACY, OVERCONFIDENCE

AND FINANCIAL ADVICE SEEKING

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Abstract: This study examines whether financial literacy and overconfidence relate to financial advice seeking. We use both the Dutch DNB Household Survey (DHS) and a random sample of retail investors from a large Dutch bank. The data suggest that confidence in ones' own literacy is negatively associated with asking for help, while actual expertise does *not* relate to advice-seeking. This implies a role for overconfidence. Indeed, our estimations confirm that a higher degree of overconfidence relates to lower demand for advice. These results are robust for the inclusion of various investor preferences, trust and cognitive abilities, and controlling for endogeneity of financial literacy. We confirm the role of overconfidence by showing that overconfidence only matters for male subjects. In addition, overconfidence relates to believes on benefits of financial advisors in the expected direction. More overconfident investors rate their investment skills, knowledge and information as higher compared to a financial advisor; while they perceive investing on their own as less risky with more control.

Keywords: household financial decision making, financial advice, financial literacy, overconfidence

JEL-Codes: D14, D81, D83, G11, G24.

1. Introduction

Understanding the demand for, and impact of, financial advice is an important and understudied line of inquiry. Recent studies indicate that demand for financial advice may be driven by financial literacy (Calcagno and Monticone, 2014). This is an important finding, given that financial illiteracy is widespread and adversely affects the quality of financial decision making (Lusardi and Mitchell, 2011). The use of a financial expert who provides unbiased advice may in principle ameliorate negative effects of financial illiteracy.

In reality however, two factors undermine this potential benefit. First, advisors may provide biased advice because a typical advisor's incentive structure creates a conflict of interest (Mullainathan et al., 2012). Second, some authors (Calcagno and Monticone, 2014; Collins, 2012) indicate that more literate investors demand financial advice *more*, which implies expert advice as a complement rather than a substitute for financial literacy. This latter finding is not undisputed, however. Other studies find a negative or no relationship between professional financial advice seeking and financial literacy (Hung and Yoong, 2010; Von Gaudekker, 2014). Interestingly, studies that use *measured* financial literacy typically find a positive (or no) relationship, while studies that use *self-assessed* financial literacy find a negative relationship. This could imply a role for overconfidence in advice seeking behavior (Guiso and Jappelli, 2006).

The exact relationship between various measures of financial literacy and financial advice seeking thus remains an open question that deserves more inquiry. Knowledge about this relationship gained prominence in light of recent regulatory measures in many countries to limit the possibility of misselling, which appears especially relevant for the less wary. Our study relates the choice for expert financial help to both measured and perceived financial literacy and to overconfidence, which is the discrepancy between the two. Overconfidence is typically defined as an unwarranted confidence in one's own knowledge and may therefore be especially relevant in asking for expert help when making financial decisions. Heath and Tversky (1991) posit that people are more willing to act on their own judgments when they perceive themselves as more competent.

We use two data sources. The first is based on the Dutch DNB Household Survey (DHS), which represents a representative sample of Dutch households and provides information on a broad range of financial and socio-demographic characteristics. In 2005 a special financial literacy module was added to the survey that was completed by 1,508 households (see: Van Rooij et al., 2011a). The second is based on a survey of a randomly selected, representative sample of retail investors at one of the largest Dutch banks. This survey was completed by 467 investors in 2011. We are able to combine this survey with client data registered by the bank.

Our main finding are as follows. We find a strong and significantly negative association between *self-assessed* financial literacy and the choice to ask for expert help, while we find no such relationship for *measured* financial literacy. This discrepancy between the role of actual and self-assessed financial knowledge implies a role for overconfidence. Indeed, our estimations show that more overconfident investors demand advice less. We confirm this result by presenting evidence that overconfidence matters only for males and not for females, consistent with prior evidence that overconfidence in financial matters is a typical male trait. In addition, overconfidence relates strongly to the agreement on statements about perceived benefits of advised and self-directed investing. More overconfident individuals perceive more control and less risk in self-directed investing, while they rate their investment skill, knowledge and information higher compared to a financial expert. These findings are in line with the recent study by Von Gaudekker (2014). He finds that most diversification losses are incurred by overconfident investors, i.e. investors that neither are financially literate nor turn to professional financial advice. The findings are also in line with the competence hypothesis (Heath and Tversky, 1991) which posits that people are more willing to act on their own judgments when they perceive themselves as more competent.

Our study distinguishes itself from related studies in four ways. First, we explicitly relate the discrepancy between measured and self-perceived financial literacy (which we label overconfidence) as a factor that helps to explain advice seeking behavior. Second, we focus both on general households as well as investors. Financial literacy may have different effects on behavior for those who participate in financial markets and those who don't. In addition, it makes the comparison of our two datasets more straightforward. Third, our retail bank dataset combines survey data and client data from the bank. That allows us to observe actual choices investors make (e.g. expert advice seeking), and to perform various checks on other variables (e.g. portfolio size and allocations). Fourth, we control for a plethora of controls in order to limit the possibility that our results are driven by omitted variables. Apart from the usual socio-economic characteristics, we use data on investor's preferences, trust, and cognitive abilities.

Our findings have important implications for policymaking. First, policy makers should be aware that financial expert advice cannot be treated as the sole mechanism to help those who need it the most: the low literate and overconfident individuals. Second, financial institutions should be aware that client profiling with respect to self-reported financial literacy may not capture actual financial literacy, but may rather indicate overconfidence.

2. Literature Review

Abundant evidence indicates that many households make suboptimal financial decisions. A major cause of suboptimal financial decision making is a limited degree of financial literacy. Less financial literate have been found to save less, accumulate more debt, have higher mortgage delinquency rates,

plan less for retirement, and accumulate less wealth (Lusardi and Mitchell, 2007b; Van Rooij et al., 2011b, 2012). Other researchers specifically relate financial literacy to the quality of investment decisions. Biased behaviors such as the disposition effect, low stock market participation, and insufficient diversification have been found more prevalent among those with lower financial literacy (Van Rooij et al., 2011a; Dhar and Zhu, 2006). Our study therefore uses both samples of general households as well as investors.

The use of a financial expert may in principle ameliorate the negative effects of financial illiteracy and improve financial decision making. A large fraction of retail investors rely on financial advice. In the United States, 81% of the households investing in mutual funds, outside a retirement plan, rely on a financial advisor (ICI, 2007), and 75% of them consult financial advisors before conducting stock market or mutual fund transactions (Hung and Yoong, 2010). Bluethgen et al. (2008) indicate that roughly 80% of individual investors in Germany turn to financial advice for their investment decisions, and in the Netherlands, 51% of households with an investment portfolio rely on financial advice (Millward Brown, 2010).

Two channels may drive the potential mitigation of limited financial literacy through financial assistance. First, those with lower levels of financial literacy may be more inclined to turn to financial experts. Second, if advice is of high enough quality, the impact of advice for less financially literate households may still be positive even in the case of lower demand. Whether financial expert intervention indeed benefits investors remains up for debate (Bergstresser et al., 2009; Hackethal et al., 2012; Kramer, 2012), despite some consensus that it can improve retail investor portfolio decisions if conflicts of interest are minimized (Bhattacharya et al., 2012; Hung and Yoong, 2010). Recently, regulators in various countries explicitly prohibit incentives that drive biased advice (e.g. the new legislation to prohibit commissions for brokers and advisors in the Netherlands and in the UK). Therefore, the first channel, which is the main focus of this paper, becomes of greater importance.

The relationship between advice-seeking propensity and financial literacy has recently come under the attention of academic researchers. A negative relationship follows from the assumption that low literate have a higher barrier to gather and process information, and may thus save more on information and search costs by hiring an advisor. In addition, less financially literate households may be less aware of potential conflicts of interest and therefore less hesitant to consult an advisor (Inderst and Ottaviani , 2009). Some recent empirical studies provide evidence on such a negative relationship. Hackethal et al. (2012) find that investors who rely more on financial advice perceive themselves as less knowledgeable, and in Hung and Yoong's (2010) choice experiment, less sophisticated people were more likely to take advice. Similarly, in a survey, respondents who considered themselves more financially literate preferred more autonomy in their pension decisions (Van Rooij et al., 2007). Guiso and Japelli (2006) also find that investors who spend more time acquiring financial information

delegate their financial decisions less. And, Georgarakos and Inderst (2011) suggest that advice matters most for households with low financial capability and trust in advice. Hackethal *et al.* (2012) confirm that investors who rely more on financial advice perceive less conflict of interests.

This negative relationship between advice-seeking propensity and financial literacy is not ambiguous, though. Calcagno and Monticone (2014) and Collins (2010) consider that financial literacy and financial advice are complements rather than substitutes. Bucher-Koenen and Koenen (2011) state that more literate investors make more use of advisors because they can induce advisors to provide better advice. In addition, more sophisticated investors might have higher advice-seeking propensities because of their higher opportunity costs of time. In line with this view, Van Rooij *et al.* (2011a) find that people who are less financially literate rely more on informal sources of financial advice, such as friends and family. The finding that less literate people rely less on advice also resonates with psychological literature, which indicates that less knowledgeable people lack the ability to recognize their illiteracy, leading them to overestimate their ability and not seek advice (Kruger and Dunning, 1999).

In summary, the exact relationship among financial literacy and the propensity to seek professional financial advice is still unclear. Part of the explanation for the ambiguous results, may lay in the proxy for financial literacy. Studies that use *self-assessed* financial literacy typically find a negative relationship with advice seeking, while those that use *measured* financial literacy report a positive or no relationship. This discrepancy between the role of self-assessed and measured financial literacy implies a role for overconfidence. Some authors indeed relate overconfidence to financial advice seeking. The model from Guiso and Japelli (2006) predicts that overconfident investors are less willing to rely on information provided by financial advisors, banks or brokers and more likely to collect information directly because they believe that self-collected information is of better quality than it actually is. As a result overconfident investors perform less. In the recent study by Von Gaudekker (2014) most losses from insufficient diversification are obtained by overconfident investors, which neither are financially literate nor go to financial advisors.

3. Data and Methods

3.1. The DNB Household Survey

We use the data from a special financial literacy module that was added to De Nederlandsche Bank (DNB) Household Survey (DHS) in 2005. DHS is a representative panel of Dutch households that contains more than 2,000 households. It provides detailed information of financial and demographic characteristics. In 2005 an extra module was added to the survey containing a set of financial knowledge questions. 1,508 households responded to these financial literacy questions, which implies a response rate of 74%. In Van Rooij et al., (2011a) this dataset is extensively discussed.

The dataset is considered as of high quality. Attrition is dealt with by biannual refreshment of participants. Surveys take place through the internet. Although the Netherlands has one of the highest internet access rates in the world, potential bias may result from lack of internet access. Households that have no internet connection are provided with a set-top box for a television.

Our final sample consists of 1,276 households. These are households that both participated in the literacy survey and for which professional advice seeking propensity is known. To be better able to compare the DHS sample with our second sample (discussed in the next section), we also provide statistics and analysis on the subset of households that hold risky assets (stocks, bonds and/or mutual funds), throughout this paper. We refer to this subset as investors. This procedure dramatically reduces the sample size to 354 households.

3.2. The Retail Bank Sample

To construct our retail bank sample, we used two data sources. First, we obtained detailed information about a randomly selected sample of retail investors from a large Dutch bank. The bank provided us with information about each client's financial assets, and type of investment service chosen (execution only, investment advice, or delegated portfolio management). Second, we surveyed these investors with an e-mailed questionnaire, sent in October 2011 and then repeated after two weeks for investors who had not responded. If investors had no e-mail address listed, we sent them an invitation to participate through postal mail[2], sent on the same day as the e-mail invitation but without any reminder. Of the 4,586 randomly selected investors, 251 could not be reached due to e-mail bounces. We received completed surveys from 467 investors, for a net response rate of 10.8%.

The bank that provided the data is one of the largest retail banks in the Netherlands. Many services are sold through account managers, private bankers, retail advisors, or the internet. Its services and products include checking accounts, savings, mortgages, insurance, business loans, investments, private equity, leasing, and pensions. Because we obtained data from just one retail bank, we took great caution to ensure that our sample of respondents was both internally and externally valid.

Table I provides an overview of some key statistics for both samples. The average age in the DHS sample is almost 51 years, and a little older (54 years) for investors, similar to the retail bank sample. A little more than half the respondents in the DHS and almost 70% of the subset of investors are male. In the retail bank sample, males comprise an even larger fraction (73%) , especially so for respondents (79%). The amount of liquid assets (which consist of checking, savings and investment accounts) are almost €30,000 for DHS respondents, and more for the investor subsample (over €75,000). Investors

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[2] For both e-mail and postal invitations, participants answered the questions in a web-based environment. Stanton and Rogelberg (2001) warn that web-based surveys may suffer from the so-called digital divide, in that some groups have much less Internet access. The Netherlands has one of the highest Internet access rates in the world, so it is unlikely to be a problem.

at the retail bank have lower liquid assets (€66,000), but this statistic is likely downward biased, given that people may have liquid assets at other banks too. Comparing some broad portfolio allocation statistics, we note that in our samples between 22%-30% is allocated to individuals stocks, 9%-17% to bonds, and 47%-49% to mutual funds.

We observe some significant differences in the investor and portfolio characteristics between respondents and non-respondents in the retail bank data, and between our full retail bank sample the full DHS sample. However, we do not believe that our primary results are driven by sample selection bias for two reasons. First, our main results are consistent for all our samples and the DHS sample has been designed as to provide an accurate representation of the Dutch population. Second, as a robustness test for the retail bank sample we also estimated all our models using post stratification weighting on age, gender and portfolio value. Also then, all reported findings in this study remain intact.

[TABLE I HERE]

3.3. Construction of Key Variables

3.3.1. Financial Expert Advice Seeking

DHS Sample

Our main dependent variable is whether or not households seek out professional financial advice. We created a dummy variable based on the following question: "*What is the most important source of advice when you have to make important financial decisions for the household?*". We assigned a [1] to those who answered "*Professional financial advisors*", and [0] to all others. In our sample 375 respondents (29.4%) indicated professional advisors as their main source of advice. Other frequently mentioned advice sources include: parents, friends and acquaintances (17%) and the internet (15%).

Retail Bank Sample

The retail bank organizes its investment services as follows: All investors may open an execution-only account after establishing the legally required client profile. The execution-only channel implies that investors do not receive any advice; they have their trades executed by means of internet or telephone. Clients may receive a warning though, when a proposed trade is not in line with their client profile, but can still have the trade executed.

Clients with less than €20,000 available for investments have only the execution-only option. Those with more than €20,000 available may choose: they opt for execution-only, or for some sort of financial expert assistance: either by means of financial advice or delegated portfolio management. This choice is registered by the bank, and clients can only trade through the department of this registered choice. We construct our advice seeking dummy from this information: we assign a [1] to

those investors who opt for some sort of expert assistance, and [0] for those who in the execution-only channel. Given that investors that have less than €20,000 available can trade only though the execution-only channel, we excluded them from our survey. Some execution-only investors in our sample indicated to receive professional financial advice from another retail bank. We added them to the expert advice seeking group, rather than the execution-only group. Our final sample consist of 320 respondents (68.5%) that received professional financial advice, and 147 (31.5%) that opted for execution-only.

3.3.2. Measurement of Financial Literacy and Overconfidence

Measured Financial Literacy
The DHS contains 16 questions to assess financial literacy. The 5 basic questions relate to financial numeracy while the 11 more advanced questions relate to knowledge of financial instruments and concepts (Von Gaudekker, 2014). Given our focus on financial knowledge, we focus on the 11 advanced questions only. The questions relate to important elements of adequate investment decision making: the differences between saving accounts, stocks, and bonds, the function of the stock market, the relationship between interest rates and bond prices, how diversification works, and the use of mutual funds. Please refer to appendix A for the exact wording of the literacy questions.

In table II we provide an overview of the distribution of correct answers. The average respondent answered approximately 6 questions correctly (55% of all questions). The group that used professional financial advisors as their main source of information scored almost identical than other households (6.10 vs 6.06 correct answers). Not surprisingly, the subsample of investors performed much better with on average about 7.5 correct answers (68% of all questions).

In our retail bank survey we use the same advanced questions from the DNB Household Survey. However, to keep the survey at a manageable length, we exclude three questions that require very similar knowledge. These eight remaining questions have been well validated as having good internal consistency and test–retest reliability (Hung et al., 2009). The retail bank respondents performed remarkably similar to the investors of the DHS sample. Both advised and self-directed investors provided correct answers to approximately 70% of the literacy questions on average (see Table II).

[TABLE II HERE]

To obtain a score on financial literacy for each respondent, we perform a factor analysis similar to van Rooij et al., (2011a) on both our datasets. We also use information contained in the difference between incorrect answers and "don't know" answers. Lusardi and Mitchell (2007b) show that those who answer "don't know" are different from other respondents: They are less likely to plan and succeed in a planning effort, even compared with those who give an incorrect answer. We therefore constructed

two dummies for each of the questions. The first dummy indicates whether the question was answered correctly, and the second refers to "don't know" responses. From a factor analysis of these dummies, we retained one key factor underlying the level of financial literacy. The Kaiser-Meyer-Olkin test of sampling adequacy (Kaiser, 1970) returned a value of 0.923 for the DHS sample and 0.823 for our retail bank sample, which indicates that factor analysis was appropriate. The use of a single factor to indicate literacy also was confirmed by a scree plot, which displays a point of inflexion after one factor for both samples (Field, 2005). We use the Bartlett (1937) method to determine factor scores for each respondent in our sample, which indicate their measured financial literacy. Please refer to Appendix B for an overview of factor loadings for both samples.

Self-Assessed Financial Literacy
Instead of measuring literacy by means of knowledge questions, some authors rely on self-assessed financial literacy. People may not be able to assess their actual financial knowledge and thus base their decisions on how much they think they know. If they think they know more than they actually do, people exhibit a tendency toward overconfidence. Hung et al., (2009b) find that self-assessed literacy better predicts financial behaviors than measured financial literacy and Graham et al. (2009) relate perceived competence to trading behavior and the home bias.

Measured and perceived financial literacy are generally (moderately) positively correlated (Hung et al., 2009b), and both have some predictive power for estimating stock market participation (Van Rooij et al., 2011a). Because self-assessed literacy may be more related to actual advice seeking behavior than our measure of financial literacy, we also asked about perceived literacy to test our predictions. Specifically, we measure perceived financial literacy using the following questions: "*How knowledgeable do you consider yourself with respect to financial matters?*" (DHS survey) and *"How would you assess your own financial knowledge?"* (Retail bank survey) and Please refer to appendix A for more information on the exact wording of these survey questions.

Overconfidence
Overconfidence has been put forward as an explanation for various household behaviors. Odean (1999) and Barber and Odean (2000) relate overconfidence to excessive trading, excessive risk taking, and under diversification. Overconfidence relates to various concepts. The miscallibration type of overconfidence refers to a systematic overestimation of the precision of one's own knowledge. A typical finding in miscallibration studies is that people set too narrow confidence intervals for knowledge questions. The better than average type of overconfidence refers to the phenomenon that most people rate themselves as better than average individual. A frequently cited example is Svenson (1981), who shows that 82% of drivers rate themselves in the top 30% of the distribution. Many studies report similar findings on intelligence, social and leadership skills.

Our proxy of overconfidence refers mostly to miscallibration. It measures the degree of self-perceived literacy that is not explained by actual financial literacy and thus refers to the degree of misjudgment of one's own financial knowledge. Specifically, we regress our measure of self-assessed literacy on the financial literacy index and take the residual as our overconfidence measure. This overconfidence measure thus indicates whether confidence, conditional on actual knowledge, is higher or lower than the average individual. In line with previous studies (e.g. Hung and Yuoong, 2010), we find that although measured financial literacy relates significantly and positively to self-assessed financial literacy, it only explains a fraction (approximately 20%) of the variation in self-assessed literacy. It should be noted that our overconfidence measure captures both underconfidence and overconfidence.

3.3.3. Control Variables

Guiso and Japelli (2006) indicate that men are less willing to delegate their portfolio decisions, which may relate to their higher level of confidence in financial matters (Barber and Odean, 2000) or their generally higher degree of financial literacy (Van Rooij et al. 2011b). Hackethal et al. (2012) indicate that age relates positively and being married negatively to advice seeking. Older investors may opt for financial advice to compensate for their cognitive aging (Korniotis and Kumar, 2013) and married couples have their spouse as a sounding board in financial matters. Hung and Yoong (2010) however, find that being married increases the propensity to seek advice. Hackethal et al. (2012) also find investment experience relates positively to advice seeking. Elmerick et al. (2002) find that the likelihood of using a financial planner relates positively income, and wealth. High income households likely have higher opportunity costs of time, which induces them to ask for assistance, and high wealth households have the means to pay for professional assistance. The authors also find that the likelihood of using a financial planner relates positively to educational achievement, arguably because education increases the awareness for complexity of financial products.

Based on the short discussion above, we decided to include the following socio-economic variables as controls in our multivariate analysis: gender, age, educational achievement, occupation, household composition, income, wealth and investment experience.

4. Results

4.1. Financial Literacy, Overconfidence and Financial Advice Seeking: Univariate Results

In Table III we provide an overview of the propensity to seek professional financial advice for various groups based on financial literacy, overconfidence and socio-economic variables.

[TABLE III HERE]

Panel A of table III shows that differences in advice seeking are only small when our samples are spit in quartiles based on measured financial literacy. The quartile of most literate households in the DHS

sample have an insignificant 1.6% higher propensity to seek advice compared to the quartile of lowest literate (column 1), while the subset of high literate investors have a 2.4% lower propensity than the group of low literate investors (column 2). A similar pattern is visible in our retail bank sample. An interesting observation is that advice seeking is much more prevent in the retail bank sample. This is mainly attributable to our variable construction. In the DHS sample the advice seeking measure is based on households that indicate professional financial advice as their *main* source of advice, which by no means implies that other households do not make use of a financial advisor. In the retail bank sample the advice seeking measure is based on investors that actually choose to consult an advisor in their investment decisions.

Panel B of table III splits our sample into groups based on self-assessed financial literacy. Households and investors that rate their financial literacy high, exhibit a dramatically lower propensity to seek out advice, especially so for investors. Investors that rate their literacy as high, have a 17.5 (DHS) or a 22 (Retail Bank) percentage point lower advice seeking propensity than those who rate their literacy as low. This finding is a first indication that confidence in one's knowledge matters more than actual knowledge.

In panel C we split our samples into overconfidence quartiles. Although we observe no difference in advice seeking behavior between quartile 1 and 4 for all households in the total DHS sample (Column 1), overconfident investors (Column 2 and 3) seek out advice less. Specifically, the quartile of most overconfident investors in both samples, exhibits a 14 to 15 percentage point lower propensity to seek expert financial advice.

Panels D to H of Table III present advise seeking behavior of various socio-economic groups. Panel D shows that male investors exhibit a lower tendency to consult an advisor, while Panel E presents evidence that higher educated seek out advice more often. Panel F partitions respondents based on household income. For general households (Column 1), those with high incomes seek out expert advice more that the low income group (38% vs 21%). For the two investor samples (Column 2 and 3), income is much less related to advice seeking. In Panel G we split our samples in age groups. Only in the retail bank sample a significant effect is observable: 75% of the investors above 60 years old consult an advisor, compared to 53% of those aged 40 or below. Panel H indicates the importance of wealth. Households in the highest wealth quartile, exhibit a much higher advice seeking propensity than those in the lowest quartile (40% vs 17%). A similar pattern is visible for the too samples of investors.

4.2. Financial Literacy, Overconfidence and Financial Advice Seeking: Multivariate Results

To determine whether financial literacy and overconfidence relate to the propensity to seek expert help conditional on many other characteristics, we estimated various linear probability models[3]. Table IV, reports the results of our baseline estimations. The most important result is that *measured* financial literacy is unrelated to financial advice seeking in all our samples (columns 1, 4, and 7), while *self-assessed* financial literacy is strongly negatively associated (column 2, 5 and 8). It appears that how much people think they know matters more than how much they actually know, which may imply a role for overconfidence in advice seeking. Indeed, our estimations (column 3, 6, and 9) confirm that the degree of overconfidence is significantly negatively associated with advice seeking behavior. Specifically, a one standard deviation change in the degree of overconfidence relates to a 3%, 8% and 7% lower propensity to seek advice for all households in the DHS, investors in the DHS and investors in bank sample), respectively. These results, in conjunction with the average advice seeking propensity of 29.4% (all households, DHS sample), 30.1% (investors only, DHS sample) and 68.5% (retail bank sample), show that the degree of overconfidence is an important aspect to clarify the demand for financial advice. People that overrate their own financial knowledge compared to others, thus rely more on non-financial expert advice sources, and opt more frequently for execution-only trading. Abstracting from causality concerns here, our first results imply that those that are most prone to make suboptimal financial decisions (low financially literate and overconfident individuals), are not, or even less inclined to have their behavior corrected by a financial expert.

Furthermore, table IV confirms some results from prior studies on advice seeking (e.g., Bhattacharya et al., 2012; Bluethgren *et al.*, 2008; Hackethal et al., 2012). In the retail bank sample (Column 7-9), less educated investors have a significantly lower propensity to seek advice; while investors older than 60 years seek advice more often. Wealth relates positively to advice seeking, although significantly so only in some of the specifications.

[TABLE IV HERE]

4.3. Robustness Checks

4.3.1 Additional controls

Advice seeking behavior thus bears zero association with actual financial literacy and a strong negative association with (over)confidence. Thus far, we have not taken heterogeneity in preferences, trust and cognitive abilities into consideration, though these may have significant effects on choice

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[3] A probit model is usually preferred for a bivariate dependent variable. We reestimated all equations using a probit model and achieved qualitatively and quantitatively similar results. The use of linear probability models is advocated with an instrumental variables technique that we employ later on in this paper (Freedman and Sekhon ,2010). The error term of a linear probability may suffer from heteroskedasticity. Therefore, we used heteroskedastic-robust standard errors in all reported estimations.

behavior (Christelis *et al.,* 2010). Excluding them from our estimations may lead to incorrect inferences as a result of omitted variables bias.

Dohmen et al., (2011) documents large heterogeneity in the willingness to take risk across people. For our purpose it is especially relevant to note that advised investors tend to be more risk averse than non-advised investors (Bluethgen et al., 2008; Gerhardt and Hackethal, 2009). Risk aversion can be determined in various ways. Dohmen *et al.,* (2010) use a survey question to measure risk aversion and show that it predicts behavior especially well when asked in reference to specific domains, such as financial matters. Lönnqvist et al. (2014) find the survey measure more reliable than a lottery choice task to assess appetites for risk. For our retail bank sample we therefore used the survey measure from Dohmen *et al.,* (2011), measured on a seven-point scale: "*How would you rate your willingness to take risks in financial matters?*". For the DHS sample we created a risk aversion measure from a factor analysis on six questions that ask for the willingness to take financial risks (please refer to Appendix A for the exact wording of these questions). We believe this measure captures risk aversion adequately as it correlates strongly and significantly with stock market participation (ρ=0.30, p-value=0.00).

Simonson (1992) indicates a strong correlation between regret and responsibility. We consider advice seeking a responsibility-shifting mechanism that helps the investor protect against the feelings of regret. Shefrin (2002) argues that handholding is the one of the most important services an advisor provides; if the investment decision turns out poorly, investors have the option of blaming the advisor. Therefore, in our retail bank survey, we included a question to assess the degree of regret aversion on a seven-point scale: "*Image that your zip code wins a large price in the zip code lottery, how much regret would you feel if you did not purchase a lottery ticket?*". In the DHS sample we do not have a measure for regret aversion.

Time preference may drive advice-seeking too. On the one hand, impatient people may be more likely to invest through an execution-only platform, because its barriers to executing investment decisions are lower, compared with contacting a financial advisor first, discussing the proposed trade, and then having it executed. On the other hand, advisors may serve as a self-control mechanism for impatient investors. To keep the retail bank survey length acceptable, we used only one time preference trade-off as a rough approximation of the degree of impatience. Frederick (2005) found a large intergroup difference for the choice between €3.400 this month or €3.800 next month; both amounts and the difference between them were considerable, but there is also a clearly rational choice, such that the impatient choice implies an annual discount rate of 280%. Our measure of impatience is only available in our retail bank sample.

Guiso, Sapienza and Zingales (2008) show that the level of trust affects economic decisions in general; Georagakos and Inderst (2011) specifically indicate that trust in financial advice affects stock market participation, especially for less literate investors. Trust therefore may directly affect the decision to ask for help. Indeed, Guiso and Japelli (2006) find that trust is positively associated with portfolio delegation. We include two trust variables in our analysis, adapted from the World Values Survey. Specifically, we asked about respondents' degree of agreement with two statements: (1) "*Most people can be trusted*" (which we label "Trust General") and (2) "*Most financial advisors can be trusted*" ("Trust Advice"). Also, our measures of trust are only available in our retail bank sample.

In Table V we provide the results for our estimations, after adding the preference and trust controls. Risk tolerance is significantly and negatively associated with advice-seeking behavior, but only so in the retail bank sample (columns 7-9). Time preference shows a positive association, although the relationship is not significant at conventional levels. Trust in general bores no relation to the propensity to ask for help, whereas trust in advisors indicated a significant positive association as expected. Causality may run in both directions though: People who place more trust in advisors may be more inclined to hire one, and having an advisor may increase trust. Our main findings remained unaltered, however: measured financial literacy is unrelated to professional advice seeking, while (over)confidence in financial matters relates to a lower propensity to ask for expert assistance.

[TABLE V HERE]

In addition to preferences and trust, cognitive ability may drive advice seeking behavior. Cognitive ability relates to various cognitive domains, such as numerical and verbal skills and memory functioning (Christellis et al., 2010). On the one hand, those with better mental ability have lower search costs, and may thus be less in need of assistance. On the other hand, evidence from the psychological literature indicates that individuals with lower cognitive abilities, are less aware of their limitations, and may thus believe they do not need expert help (Kruger and Dunning, 1999). Measuring cognitive ability by means of a lengthy standard IQ test is not feasible in a survey. We therefore rely on crude proxies for cognitive ability.

In the DHS, 5 financial literacy questions are included that capture very basic numerical skills, and may thus serve as a proxy for cognitive ability (please refer to Appendix A for an exact wording of these five questions). Similar to Van Rooij, et al. (2011a) we performed a factor analysis on these questions, and use the score of each respondent as our cognitive ability measure. In our retail bank survey, we included the three-question cognitive reflection test (CRT) proposed by Frederick (2005). The CRT is attractive because it demands a limited amount of time and correlates sufficiently with the scores on other IQ tests. It ranked as the best or second-best predictor across four decision-making domains in a comparison with other tests (Fredrick, 2005). Please refer to Appendix A for more detail on the questions. The noninvestment nature of these questions however deviates considerably from

the rest of the survey and may make respondents suspicious. Therefore, we framed the CRT-questions as a contest, in which participants could win one of two €50 prizes. A moderate proportion of 93 respondents (20%) opted not to participate in the contest, so our sample size drops when we include cognitive ability in our analysis. Both advised and self-directed investors participated equally.

[TABLE VI HERE]

The first interesting observation from Table VI, is that cognitive ability is not significant in all our specifications. Again, and most importantly, our main results remain unaffected: we observe no relationship between measured financial literacy and the propensity to seek professional financial advice and a significantly negative relationship with (over)confidence.

4.3.2 Endogeneity of Financial Literacy

In estimating the relationship between advice seeking and financial literacy, we must consider the possibility that measured financial literacy is in fact endogenous. We should therefore be careful in interpreting our OLS estimates. Although, by including many demographic controls, preferences, trust and cognitive ability we limit the possibility that our results are driven by omitted variables bias, we cannot rule it out. In addition, our estimations may suffer from reversed causality. The choice to hire an advisor may impact the degree of financial literacy. The sign of this relationship is not clear a priori. Both advised and non-advised households may increase their literacy from interacting with financial markets; the effect even may be greater for non-advised households, who deal with financial markets directly, find information themselves, and decide on their own which investments to pursue. Alternatively, advised households may learn from their interactions with their financial advisor, who teaches them about risk, return, and diversification.

To address causality concerns, we use additional information that is available in our retail bank survey. One questions asks about the amount of education respondents received on economics before they entered the job market, which should be before they started to invest. Economic education probably correlates positively with current financial literacy but will not depend on having a financial advisor and thus resolves our reversed causality concerns (see also Van Rooij et al., 2012 for a similar solution). Specifically, we asked respondents: "*How much of your formal education was devoted to economics?*" using a seven-point scale ranging from "*very little*" to "*very much*". We then created two dummies: one for respondents who indicated to have had some economic education (score of 3–5) and one for respondents who indicated to have had a lot of economic education (score of 6–7). Those with little economic education (score of 1–2) constitute the benchmark group.

In appendix C we present the results of the first stage regression on measured financial literacy. It shows that our instruments are positively correlated with measured financial literacy, and highly

significant. The estimates of our second stage regression in table VII show that the relationship between financial literacy and expert advice seeking remains insignificant. The Hansen J-test indicates that the over-identifying restrictions are not rejected, while also the exogeneity test is not rejected. The F-statistic of the first stage regression is high enough to avoid the weak instrument problem. These results imply that measured financial literacy bears no causal relationship with financial advice seeking. From a policy makers' perspective, this is an valuable finding. Financial advice cannot be treated as a substitute for limited financial knowledge, which paves the road for other solutions such as financial education, choice architecture or regulation.

[TABLE VII HERE]

4.3.3. An Alternative Proxy for Over- and Underconfidence

An important finding thus far, is the negative relationship between (over)confidence and advice seeking. Overconfident individuals have been shown to make the biggest mistakes in financial decision making. In our main specifications we proxy overconfidence as the residual of regressing self-assessed financial literacy on measured financial literacy. As a robustness test, we create an overconfident and underconfident dummy. We proceed as follows: we first split our samples in 4 quartiles of measured financial literacy, and in 4 groups based on self-assessed financial literacy. For the DHS sample these 4 groups equal the answer categories (1-4) of the question that was introduced in section 3.3.2. For the retail bank sample we create 4 quartiles of self-assessed literacy. Then, we label respondents who rank themselves in the highest of the four self-assessed literacy groups, but reside in the lowest measured financial literacy quartiles as overconfident. We label respondents who rank themselves in the lowest of the four self-assessed literacy groups, but reside in the highest of the measured financial literacy quartiles as underconfident. Both variables are dummies taking the value of 1 if the respondent is overconfident or underconfident, and zero otherwise.

Table VIII present the results using our alternative overconfidence proxy. Although, underconfidence is positively related to advice seeking, it is only marginal significant for all households in the DHS sample (column 1), and the investors of our retail bank sample (column 3). Our overconfidence dummy however relates strongly to asking for expert help. Being overconfident lowers the advice seeking propensity by approximately 30 percentage points both in the full sample of the DHS and the retail bank sample.

[TABLE VIII HERE]

4.3.4. Overconfidence and Gender

Our multivariate regressions show a strong negative relationship between overconfidence and advice seeking behavior. We cannot interpret this finding as a causal effect, however, unless one assumes that

overconfidence is an stable personality trait with biological roots, and thus exogenous. Although some evidence points at a genetic basis for various investor behaviors (e.g. Barnea, *et al.,* 2010), one could also argue that the relationship is driven by an additional omitted variable, measurement error, or reversed causality. In Gervais and Odean (1998) for example investors become overconfident after interpreting financial successes and failures in a self-serving fashion. This assessment of their own financial skill may depend on whether or not someone is assisted by a professional. Someone that uses an advisor, may have more opportunity to blame some else for mistakes.

Unfortunately we do not have valid instruments available in both our samples. To give some guidance on whether overconfidence drives advice seeking, we rely on prior evidence that overconfidence in financial matters is a typical male trait. Barber & Odean (2000) show that especially males exhibit investment behavior that can be attributed to overconfidence.

We therefore partition our samples in male and female respondents in Table IX. Interestingly, it appears that our results on overconfidence are fully driven by male respondents. All three estimations using subsamples of males (column 1,3, and 5), indicate that overconfidence is strongly and negatively related to advice seeking, while we find no effect at all in the subsample of female respondents (column 2, 4 and 6). Although this gender partition does not really solve our endogeneity concerns, we do believe it enhances the plausibility of a causal relationship between overconfidence and asking for expert help.

[TABLE IX HERE]

4.3.5. Overconfidence and Opinions of Advice Seeking and Self-Directed Investing

To provide further evidence on the drivers of our overconfidence result, we make use of additional information in our retail bank survey of opinions on financial advisors. We use statements that have been related to overconfidence in prior literature, such as the illusion of control, excessive risk taking, and the illusion of superior investment skill, superior information and superior knowledge.

Specifically we use the degree of agreement (on a 7 point scale) on the following 6 statements:

1) *"Investing on your own (compared to investing using a financial advisor) gives more control"*
2) *"Investing on your own (compared to investing using a financial advisor) leads to more investment mistakes."*
3) *"Investing on your own (compared to investing using a financial advisor) leads to more risks."*
4) *"A financial advisor (compared to investing on your own) makes better investment decisions."*
5) *"A financial advisor (compared to investing on your own) possesses more investment information."*

6) *"A financial advisor (compared to investing on your own) knows less on investing."*

We then regress the degree of agreement on these statements using an ordered probit model on our measure of overconfidence and all other controls. Table X presents the results. The main finding here is that overconfidence significantly relates to the degree of agreement with all 6 statements in the expected direction. The findings imply that more overconfident people believe self-directed investing provides more control, while they agree less that self-directed investing leads to more investment mistakes or increased risk. Overconfident people neither believe that advisors make better decisions, nor have more information, while they do agree more that advisors knowing less on investing. These results show that overconfidence relates significantly to believes that are likely drivers in the choice to hire an advisor or not.

[TABLE X HERE]

5. Conclusion and Discussion

Many households make poor financial decisions that result from low financial literacy. Various remedies, such as financial education and choice architecture, have been proposed both by academics and policy makers. The focus of this paper is on the provision of guidance by an financial expert. Households may profit from economies of scale in information acquisition and possible superior financial skills of advisors. The quality of advice, however, may be hampered by incentive structures that create a conflict of interest between the financial advisor and the client. Indeed, Mullanaithan et al., (2012) showed that advisors tend to support strategies that result in more transactions and higher fees. This tendency urged some countries to propose new legislation in order to prevent biased advice. In the Netherlands, for example, advisors are now prohibited to receive commissions for the products they sell. Such regulation makes sense given the evidence that, once conflicts of interest are minimized, advisors do improve financial decision making (Bhattacharya et al, 2012; Hung and Yoong, 2010).

In light of these regulatory measures to limit the possibility of misselling especially to the less wary, the relationship between financial literacy and advice seeking becomes more prominent. For those in favor of financial advice as a remedy for poor decision making, it would be helpful to find that households with low financial literacy are more inclined to consult a professional advisor. This paper, however, provides evidence that any causal relationship between the level of financial literacy and the propensity to seek advice is absent. This finding in itself does not imply that financial advice can be of no help. Those with low financial literacy that do seek assistance could still benefit, if one is willing to assume a larger and beneficiary advisory impact for less knowledgeable. Still, our findings show that professional advice can at best be only a partly solution.

Our evidence actually points at the crucial role of (over)confidence in advice seeking behavior. Households that are more (over)confident about their own financial knowledge are less inclined to consult an advisor. This is a worrisome conclusion, given the evidence that especially overconfident individuals are most at risk to make costly mistakes (Von Gaudekker, 2014).

For policy makers, our findings have several relevant implications. First, financial advice appears to be an inadequate mechanism to assist those who need it the most. Individuals that are prone to make the biggest financial mistakes (low literate and overconfident individuals) are not more (or even less) likely to have their suboptimal behavior corrected by a financial advisor. Second, financial institutions must be cautious in using self-assessed literacy to determine suitability of retail financial products. Many client profiling surveys include questions on ones 'one assessment of financial knowledge. Our findings show that answers to these questions should be treated with skepticism, given its weak correlation with actual financial knowledge.

Although, more research is needed to fully understand the relationships between financial literacy, financial advice, and financial decision making, evidence thus far points at a limited effectiveness of advice. We believe promising routes for policy makers that deserve further inquiry are both choice architecture and financial education. Evidence on the causal effects of financial training on financial behavior so far is ambiguous, so additional experimental work is needed here.

Choice architecture relates to the creation of a decision context that uses departures from full rationality of decision makers to their own advantage. Choice architecture has been shown to deliver good results in some areas. The Save More Tomorrow plan that was proposed by Thaler and Benarti (2004), for example, uses loss aversion, money illusion, status quo bias, and inconsistent time preferences to have people save more for retirement. In addition, policy makers could stimulate the development of simple to understand, transparent, and low cost financial products

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Table I. Sample Validity

This table provides and overview of summary statistics of the DHS and the Retail bank sample. In the DHS sample "Investors Only" refers to the subset of households that own stocks, bonds, and/or mutuals funds.Within the Retail Bank sample survey respondents and non-respondents are compared. *Liquid assets* refers to the summ of checking and savings accounts and investments in stocks, bonds and mutual funds. *Portfolio Value* refers to the sum of investments in stocks, bonds and mutual funds. *Equity, Individual Stocks*, *Bonds* and *Mutual funds* refer to the average portfolio allocation to these asset classes. *Options* refers to the percentage of portfolios that hold options. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively

	DHS Sample		Retail Bank Sample			
	Full sample	Investors only	Full sample	Respondents (Resp)	Non-Respondents (Non-Resp)	Difference (Resp-Non-Resp)
Age	50.8	53.8	54.2	58.4	53.7	4.7***
Male (%)	51.5	69.5	73.1	79.0	72.4	6.6%***
Liquid Assets (€)	29,727	75,718	66,170	95,675	66,142	29.533***
Portfolio Value (€)	12,493	42,457	59,709	79,970	57,263	22.707*
Equity (%)			70.8	69.7	71.0	-1.31
Individual stocks (%)		29.8	22.8	21.6	23.0	-1.4
Bonds (%)		9.1	10.1	16.8	9.3	7.5***
Mutual Funds (%)		49.0	46.9	47.8	46.8	1.0
Options (% of portfolios)			2.8	4.7	2.5	2.2**
N	1,276	354	4,335	467	3,868	

Table II. Financial Literacy Score

This tables reports the distributions of the number of correct answers for the 11 (Dutch Household Survey, DHS) and 8 (Retail Bank sample) financial literacy questions. The DHS sample is split in households that indicated professional financial advice as their main source of information and others. In the DHS sample "Investors Only" relates to the subset of households that own stocks, bonds, and/or mutuals funds. The Retail Bank sample is split in advised and self-directed investors.

| | DHS | | | | Retail Bank | |
| | All Households | | Investors Only | | | |
	Use Professional Advisors	Other Sources of Advice	Use Professional Advisors	Other Sources of Advice	Advised Investors	Self Directed Investors
None Correct	6.4	6.1	2.8	1.7	3.8	3.4
1 Correct	2.4	4.7	0.0	0.8	3.8	2.7
2 Correct	3.7	5.2	1.9	0.4	5.0	2.0
3 Correct	5.3	5.4	3.8	3.0	7.2	8.8
4 Correct	8.8	6.0	3.8	1.7	5.3	8.2
5 Correct	9.1	9.0	5.7	7.2	10.9	15.0
6 Correct	11.7	12.9	11.3	13.9	16.9	17.0
7 Correct	13.3	14.4	15.1	14.4	24.7	22.4
8 Correct	14.7	12.8	19.8	16.5	.	.
9 Correct	15.2	12.3	20.8	18.6	.	.
10 Correct	7.2	9.3	10.4	18.1	.	.
All (11 or 8) Correct	2.1	1.9	4.7	3.8	22.5	20.4
Mean # correct	6.20	6.06	7.33	7.59	5.65	5.63
Mean % correct	56.3%	55.0%	66.6%	69.0%	70.6%	70.4%
N	375	901	106	237	320	147

Table III: Financial Advice Seeking Propensity, Univariate statistics

This table present average advice seeking propensity over measured financial literacy, perceived financial literacy, and overconfidence quartiles and several socio-economic variables. In the DHS sample "Investors Only" relates to the subset of households that own stocks, bonds, and/or mutuals funds.

	Professional Financial Advice seeking propensity				Professional Financial Advice seeking propensity		
	DHS		Retail Bank N=467		DHS		Retail Bank N=467
	All Households N=1,276	Investors Only N=343			All Households N=1,276	Investors Only N=343	
	(1)	(2)	(3)		(1)	(2)	(3)
Panel A: Measured Financial Literacy Quartiles				**Panel E: Education**			
1 (Low)	27.6%	32.1%	70.1%	Primary / Preparatory intermediate vocational	24.6%	31.0%	54.2%
2	28.0%	34.5%	61.5%	Intermediate vocational	32.5%	30.3%	77.8%
3	32.7%	27.3%	71.8%	Higher secondary education / Secondary pre-university	31.4%	31.3%	66.7%
4 (High)	29.1%	29.8%	70.6%	Higher vocational / University	29.1%	32.2%	68.6%
Difference 4-1	1.6%	-2.4%	0.5%				
				Panel F: Annual Household Income			
Panel B: Self-Assessed Financial Literacy Groups				Q1	20.6%	38.9%	73.0%
1 (Low)	29.1%	33.3%	76.6%	Q2	26.5%	29.1%	67.3%
2	29.8%	35.2%	67.2%	Q3	31.9%	29.7%	66.4%
3	29.9%	25.0%	72.1%	Q4	38.0%	36.7%	70.5%
4 (High)	20.0%	15.8%	54.6%				
Difference 4-1	-9.1%	-17.5%	-22.0%	**Panel G: Age**			
				<40	29.1%	32.3%	52.9%
Panel C: Overconfidence Quartiles				40-49	32.1%	31.8%	62.7%
1 (Low: Underconfident)	29.5%	36.0%	78.0%	50-59	28.8%	27.6%	61.8%
2	31.3%	33.7%	67.0%	>60	28.1%	32.0%	74.6%
3	27.3%	32.2%	66.0%				
4 (High: Overconfident)	29.5%	21.4%	64.0%	**Panel H: Wealth**			
Difference 4-1	0.0%	-14.6%	-14.0%	Q1	17.1%	33.3%	53.8%
				Q2	22.5%	16.0%	65.3%
Panel D: Gender				Q3	34.9%	30.6%	70.7%
Female	28.8%	33.7%	75.9%	Q4	39.8%	41.5%	84.5%
Male	29.8%	29.7%	66.3%				

Table IV: Financial Literacy, Overconfidence and Financial Advice Seeking, Baseline Results

This table presents coefficient estimates of various linear probability models on measures of financial literacy and overconfidence. The dependent variable in the DHS sample is a dummy where 1 corresponds to households that indicated "professional financial advice" as their main source of advice when making financial decisions; for the retail bank sample 1 corresponds to investors that make use of a financial advisor at the retail bank of our sample or at any other bank, and 0 otherwise. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. P-values based on robust standard errors in parentheses.

	DHS						Retail Bank Sample		
	All households			Investors only					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Measured Financial Literacy	-0.01			-0.07			-0.03		
	(0.68)			(0.19)			(0.32)		
Self-Assessed Financial Literacy		-0.05**			-0.12***			-0.06***	
		(0.02)			(0.00)			(0.00)	
Overconfidence			-0.03**			-0.08***			-0.05***
			(0.03)			(0.01)			(0.00)
Education (base group: higher vocational or University)									
Primary or preparatory intermediate vocational	-0.04	-0.03	-0.03	0.04	0.01	0.02	-0.20***	-0.22***	-0.20***
	(0.49)	(0.50)	(0.54)	(0.71)	(0.91)	(0.87)	(0.00)	(0.00)	(0.00)
Higher secondary education or secondary pre-university	0.02	0.02	0.02	0.04	0.00	0.00	-0.02	-0.03	-0.03
	(0.62)	(0.66)	(0.64)	(0.66)	(0.98)	(0.96)	(0.81)	(0.74)	(0.70)
Intermediate vocational	0.01	0.02	0.02	0.02	-0.01	-0.00	0.09	0.09*	0.10*
	(0.81)	(0.76)	(0.75)	(0.85)	(0.94)	(0.96)	(0.13)	(0.09)	(0.07)
Age (Base group: age<40)									
Age 40-49	0.01	-0.00	0.00	-0.13	-0.15*	-0.15	0.08	0.07	0.05
	(0.80)	(0.99)	(1.00)	(0.16)	(0.10)	(0.11)	(0.54)	(0.59)	(0.67)
Age 50-59	-0.01	-0.02	-0.02	-0.13	-0.16*	-0.16*	0.08	0.08	0.07
	(0.73)	(0.60)	(0.59)	(0.15)	(0.07)	(0.07)	(0.50)	(0.49)	(0.53)
Age >=60	0.01	-0.01	-0.01	-0.09	-0.16	-0.16	0.23*	0.23**	0.23*
	(0.87)	(0.93)	(0.91)	(0.36)	(0.12)	(0.12)	(0.06)	(0.05)	(0.05)
Income (base group: Q1)									
Income (Q2)	0.03	0.03	0.03	-0.05	-0.06	-0.07	-0.11	-0.10	-0.11
	(0.48)	(0.51)	(0.54)	(0.69)	(0.64)	(0.60)	(0.12)	(0.15)	(0.11)
Income (Q3)	0.01	0.01	0.01	-0.07	-0.09	-0.10	-0.11	-0.09	-0.12
	(0.87)	(0.83)	(0.87)	(0.59)	(0.48)	(0.45)	(0.17)	(0.23)	(0.13)
Income (Q4)	0.01	0.02	0.01	-0.03	-0.04	-0.04	-0.06	-0.03	-0.04
	(0.89)	(0.78)	(0.82)	(0.86)	(0.80)	(0.77)	(0.41)	(0.74)	(0.61)
Wealth (base group: Q1)									
Wealth (Q2)	0.05	0.05	0.05	-0.10	-0.09	-0.10	0.10	0.10	0.09
	(0.19)	(0.20)	(0.22)	(0.56)	(0.65)	(0.63)	(0.15)	(0.12)	(0.15)
Wealth (Q3)	0.19***	0.19***	0.19***	0.09	0.13	0.12	0.14**	0.12*	0.12*
	(0.00)	(0.00)	(0.00)	(0.62)	(0.53)	(0.57)	(0.04)	(0.07)	(0.08)
Wealth (Q4)	0.24***	0.25***	0.24***	0.22	0.26	0.24	0.27***	0.27***	0.25***
	(0.00)	(0.00)	(0.00)	(0.23)	(0.21)	(0.24)	(0.00)	(0.00)	(0.00)
Retired	-0.03	-0.03	-0.03	0.01	0.03	0.04	-0.09	-0.10	-0.10
	(0.57)	(0.59)	(0.60)	(0.93)	(0.75)	(0.72)	(0.22)	(0.15)	(0.16)
Self-employed	0.15*	0.14*	0.14*	-0.05	-0.05	-0.05	-0.10	-0.10	-0.11
	(0.07)	(0.08)	(0.08)	(0.76)	(0.76)	(0.77)	(0.23)	(0.20)	(0.18)
Employee	0.02	0.03	0.03	-0.01	-0.01	-0.01	0.00	-0.00	-0.00
	(0.53)	(0.50)	(0.50)	(0.91)	(0.94)	(0.95)	(1.00)	(0.97)	(0.97)
Kids	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	-0.05	-0.04	-0.03
	(0.78)	(0.78)	(0.80)	(0.99)	(0.85)	(0.88)	(0.35)	(0.46)	(0.49)
Married	0.05	0.06*	0.06*	-0.08	-0.04	-0.05	0.06	0.05	0.06
	(0.11)	(0.07)	(0.07)	(0.25)	(0.55)	(0.54)	(0.27)	(0.36)	(0.32)
Male	-0.01	-0.01	-0.01	-0.03	-0.02	-0.03	-0.07	-0.05	-0.08
	(0.67)	(0.80)	(0.73)	(0.62)	(0.73)	(0.62)	(0.20)	(0.34)	(0.16)
Experienced							0.00	0.03	0.02
							(0.98)	(0.59)	(0.76)
Constant	0.12*	0.22***	0.12*	0.47**	0.73***	0.48*	0.58***	0.77***	0.59***
	(0.06)	(0.00)	(0.06)	(0.04)	(0.00)	(0.05)	(0.00)	(0.00)	(0.00)
Number of observations	1095	1095	1095	308	308	308	453	453	453
R^2	0.053	0.058	0.057	0.078	0.097	0.094	0.116	0.140	0.137

Table V: Financial Literacy, Overconfidence and Financial Advice Seeking, Adding Preferences and Trust

This table presents coefficient estimates of various linear probability models on measures of financial literacy and overconfidence while also controlling for various preferences and trust. The dependent variable in the DHS sample is a dummy where 1 corresponds to households that indicated "professional financial advice" as their main source of advice when making financial decisions; for the retail bank sample 1 corresponds to investors that make use of a financial advisor at the retail bank of our sample or at any other bank, and 0 otherwise. Please refer to appendix A for the exact definition of all variables. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. P-values based on robust standard errors in parentheses.

	DHS						Retail Bank Sample		
	All households			Investors only					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Measured Financial Literacy	-0.01			-0.06			-0.01		
	(0.42)			(0.21)			(0.86)		
Self-Assessed Financial Literacy		-0.06**			-0.12***			-0.03**	
		(0.01)			(0.00)			(0.04)	
Overconfidence			-0.04**			-0.08***			-0.03**
			(0.01)			(0.01)			(0.04)
Risk Tolerance	0.01	0.01	0.01	-0.05	-0.04	-0.05	-0.06***	-0.05***	-0.05***
	(0.59)	(0.49)	(0.52)	(0.18)	(0.27)	(0.25)	(0.00)	(0.00)	(0.00)
Time Preference							0.14	0.13	0.13
							(0.13)	(0.13)	(0.16)
Regret Aversion							-0.01	-0.01	-0.01
							(0.40)	(0.42)	(0.43)
Trust General							-0.00	-0.00	-0.00
							(0.96)	(0.97)	(0.99)
Trust Advice							0.04**	0.04**	0.04**
							(0.03)	(0.04)	(0.05)
Constant	0.12*	0.24***	0.12*	0.30	0.55**	0.32	0.59***	0.68***	0.58***
	(0.08)	(0.00)	(0.08)	(0.19)	(0.03)	(0.21)	(0.00)	(0.00)	(0.00)
Number of observations	1018	1018	1018	299	299	299	422	422	422
R^2	0.054	0.060	0.059	0.087	0.106	0.103	0.164	0.173	0.172
Socio-economic controls (see table IV)	yes	yes	yes	yes	yes	yes	yes	yes	yes

Table VI: Financial Literacy, Overconfidence and Financial Advice Seeking, Adding Cognitive Abilities

This table presents coefficient estimates of various linear probability models on measures of financial literacy and overconfidence while also controlling for cognitive abilities. The dependent variable in the DHS sample is a dummy where 1 corresponds to households that indicated "professional financial advice" as their main source of advice when making financial decisions; for the retail bank sample 1 corresponds to investors that make use of a financial advisor at the retail bank of our sample or at any other bank, and 0 otherwise. Please refer to appendix A for the exact definition of all variables. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. P-values based on robust standard errors in parentheses.

	DHS						Retail Bank Sample		
	All households			Investors only					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Measured Financial Literacy	-0.01			-0.09			-0.01		
	(0.54)			(0.13)			(0.84)		
Self-Assessed Financial Literacy		-0.06**			-0.12***			-0.04**	
		(0.01)			(0.00)			(0.05)	
Overconfidence			-0.04**			-0.08***			-0.04**
			(0.01)			(0.01)			(0.05)
Cognitive Abilities	-0.01	-0.01	-0.02	0.05	0.02	0.01	0.01	0.02	0.01
	(0.62)	(0.54)	(0.44)	(0.36)	(0.72)	(0.84)	(0.66)	(0.51)	(0.61)
Number of observations	1018	1018	1018	299	299	299	296	296	296
R^2	0.054	0.060	0.059	0.090	0.106	0.103	0.194	0.206	0.204
Socio-economic controls (see table IV)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Preferences controls (see table V)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Trust controls (see table V)	no	no	no	no	no	no	yes	yes	yes

Table VII. Financial Literacy and Financial Advice Seeking, IV Estimation

This table presents coefficient estimates of an instumental variables regression of advice seeking on measured financial literacy. Financial literacy is instrumented using the the amount of economics education before entering the stock market. The dependent variable is a dummy where 0 corresponds to investors that invest by means of execution-only, and 1 to investors that ask for financial expert-help at the bank of our sample or at any other bank. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. P-values in parentheses based on robust standard errors.

	Retail Bank Sample
	(1)
Measured Financial Literacy	-0.17
	(0.42)
Other controls (see table V)	yes
R^2	0.088
Number of observations	430
F-Statistic First Stage Regression	8.87
Hansen J test p-value	0.39
Exogeniety test p-value	0.42

Table VIII: Overconfidence and Financial Advice Seeking, Confidence dummies

This table presents coefficient estimates of various linear probability models on confidence dummies. *Underconfidence* is a dummy where 1 corespondends to households/investors that assessed their own financial literacy as low, while scoring high on measured financial literacy, and 0 otherwise. *Overconfidence* is a dummy where 1 corespondends to households/investors that assessed their own financial literacy as high, while scoring low on measured financial literacy, and 0 otherwise. Please refer to Appendix A for more detail on construction of the variables. The dependent variable in the DHS sample is a dummy where 1 corresponds to households that indicated "professional financial advice" as their main source of advice when making financial decisions; for the retail bank sample 1 corresponds to investors that make use of a financial advisor at the retail bank of our sample or at any other bank, and 0 otherwise. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. P-values based on robust standard errors in parentheses.

	DHS		Retail Bank Sample
	All households	Investors Only	
	(1)	(2)	(3)
Underconfidence Dummy	0.13*	0.02	0.11*
	(0.08)	(0.91)	(0.06)
Overconfidence Dummy	-0.32***	-0.19*	-0.30***
	(0.00)	(0.09)	(0.01)
Number of observations	1018	299	422
R^2	0.060	0.082	0.138
Other controls (see table V)	yes	yes	yes

Table IX Overconfidence and Financial Advice Seeking, Gender Split

This table presents coefficient estimates of various linear probability models on overconfidence split in male and female respondents. The dependent variable in the DHS sample is a dummy where 1 corresponds to households that indicated "professional financial advice" as their main source of advice when making financial decisions; for the retail bank sample 1 corresponds to investors that make use of a financial advisor at the retail bank of our sample or at any other bank, and 0 otherwise. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. P-values based on robust standard errors in parentheses.

	DHS				Retail Bank Sample	
	All households		Investors only			
	Males	Females	Males	Females	Males	Females
	(1)	(2)	(3)	(4)	(5)	(6)
Overconfidence	-0.06***	-0.00	-0.12***	0.01	-0.05***	-0.05
	(0.00)	(0.93)	(0.00)	(0.93)	(0.01)	(0.10)
Number of observations	593	425	211	88	326	96
R^2	0.071	0.081	0.177	0.331	0.135	0.225
Other controls (see table V)	yes	yes	yes	yes	yes	yes

Table X Overconfidence and Opinions on Financial Advice and Self-Directed Investing

This table presents results on the impact of overconfidence on perceptions about execution-only and financial advice using ordered probit regressions. The dependent variable is the degree of agreement on 6 different statements that highlight various (dis)advantages of investing by means of execution-only or by making use of a financial adviser using a 7-point scale from (1) "Totally Disagee to (7) "Totally Agree". The exact wording and the univariate statistics of the statements are given in Appendix C. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. P-values based on robust standard errors in parentheses.

	Investing on your own (compared to investing using a financial advisor)…			A financial advisor (compared to investing on your own)…		
	…gives more control	…leads to more investment mistakes	…leads to more risks	…makes better investment decisions	…possesses more investment information	…knows less on investing
	1	2	3	4	5	6
Overconfidence	0.12*	-0.21***	-0.18***	-0.23***	-0.21***	0.12*
	(0.08)	(0.00)	(0.01)	(0.00)	(0.00)	(0.08)
Number of observations	388	385	404	403	414	404
Pseudo R^2	0.019	0.024	0.026	0.041	0.030	0.039
Other controls (see table V)	yes	yes	yes	yes	yes	yes

Appendix A: Wording of Survey Questions and Key Variables Construction

Financial Advice Seeking	**- DHS Sample:** Dummy variable indicating [1] when household answered "Professional financial advisers" to the following question: "What is the most important source of advice when you have to make important financial decisions for the household?", and [0] otherwise '**- Retail Bank Sample**: Dummy variable indicating [1] when an investors is registered as client of the financial advisory or delegated portfolio management department at the bank that provided us the data, or if investors indicated using an financial adviser at another bank, and [0] otherwise.
Measured Financial Literacy	Score obtained from a factor analysis on the first 8 [Retail Bank Sample] or all 11 [DHS sample] of the following financial literacy questions: [All questions also included a "don't know" and a "refusal" option]. 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 price of stocks; The stock market brings people who want to buy stocks together with those who want to sell stocks; None of the above.] 2) Which of the following statements is correct? [Once one invests in a mutual fund, one cannot withdraw the money in 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 their past performance; None of the above.] 3) If the interest rate falls, what should happen to bond prices? [Rise; Fall; Stay the same; None of the above.] 4) True or false? Buying a company stock usually provides a safer return than a stock mutual fund. [True; False]. 5) True or false? Stocks are normally riskier than bonds. [True; False]. 6) Considering a long time period (for example 10 or 20 years), which asset normally gives the highest return? [Savings accounts; Bonds; Stocks]. 7) Normally, which asset displays the highest fluctuations over time? [Savings accounts; Bonds; Stocks]. 8) When an investor spreads his money among different assets, does the risk of losing money: [Increase; Decrease; Stay the same]. 9) Which of the following statements is correct? If someone buys the stock of firm B in the stock market: [He owns part of firm B; He has lent money to firm B; He is liable for firm's debt, None of the above] 10) Which of the following statements is correct? If someone buys a bond of firm B: [He owns part of firm B; He has lent money to firm B; He is liable for firm's debt, None of the above] 11) True or false? If you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a major penaly.[True; False].
Self-Assessed financial literacy	**- DHS Sample**: A score ranging from [1] "not knowledgeable" to [4] "very knowledgeable" on the following question: "How knowledgeable do you consider yourself with respect to financial matters? **- Retail Bank Sample:** A score ranging from [1] "very low" to [7] "very high" on the following question: "Financial knowledge varies from person to person. How would you assess your own financial knowledge?"
Overconfidence	The residual taken from a regression of the standarizeded score of Self-Assessed Financial Literacy on the standarized score of Measured Financial Literacy.
Overconfidence dummy	**- Retail Bank Sample**: dummy indicating [1] if respondents ranked high in self-assesed financial literacy (specifically: 6 or 7), while their measured financial literacy ranked below the median, and [0] otherwise. **- DHS Sample:** dummy indicating [1] if respondents ranked high in self-assesed financial literacy (specifically: 4), while their measured financial literacy ranked below the median, and [0] otherwise.
Underconfidence dummy	**- Retail Bank Sample**: dummy indicating [1] if respondents ranked low in self-assesed financial literacy (specifically: 1 or 2), while their measured financial literacy ranked above the median, and [0] otherwise. **- DHS Sample:** dummy indicating [1] if respondents ranked low in self-assesed financial literacy (specifically: 1), while their measured financial literacy ranked above the median, and [0] otherwise.
Risk Tolerance	**- Retail Bank Sample:** Score based the following question: "How would you rate your willingness to take risks in financial matters?" based on Dohmen et al. (2011), [1="totally not prepared" to 7="totally prepared"] **- DHS Sample:** Factor score based on agreement (ranging from 1 (totally disagree) - 7 (totally agree)) on the following 6 questions: (1) I think it is more important to have safe investments and guaranteed returns, than to take a risk to have a chance to get the highest possible returns, (2) I would never consider investments in shares because I find this too risky, (3) If I think an investment will be profitable, I am prepared to borrow money to make this investment, (4) I want to be certain that my investments are safe, (5) I get more and more convinced that I should take greater financial risks to improve my financial position, (6) I am prepared to take the risk to lose money, when there is also a chance to gain money.
Time Preference	- Only in Retail Bank Sample: Dummy variable on impatience, indicated as 1 if people choose the first option in the following question: "Image you have to make a choice between the receiving €3,400 right away, or €3,800 in one month from now, which choice would you make?", and 0 otherwise.
Regret Aversion	- Only in Retail Bank Sample: Based on "Image that your zip code wins a large price in the Zip Code Lottery [1,] how much regret would you feel if you did not purchase a lottery ticket?" using a seven-point scale [1 = "totally no regret to 7 = "a lot of regret"]. [1]The Dutch Zip Code Lottery provides a unique platform to measure regret. Even if people do not buy a lottery ticket, they receive a lottery number (i.e., their zip code). Thus people know the outcome of their decision, even if they do not participate, which may induce feelings of regret.

Trust General	- Only in Retail Bank Sample: Based on the degree of agreement on the following statement using a seven-point scale [1 = "totally disagree" to 7 = "totally agree"]: "Most people can be trusted".
Trust Advice	- Only in Retail Bank Sample: Based on the degree of agreement on the following statement using a seven-point scale [1 = "totally disagree" to 7 = "totally agree"]: "Most financial advisors can be trusted".
Cognitive Abilities	-**DHS Sample**: score baased on a factor analysis on the follwing 5 basic literacy questions: [All questions also included a "don't know" and a "refusal" option]. 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 €102; Exactly €102; Less than €102] 2) Suppose you had €100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total? [More than €200; Exactly €200; Less than €200]. 3) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? [More than today; Exactly the same; Less than today] 4) Assume a friend inherits €10,000 today and his sibling inherits €10,000 3 years from now. Who is richer because of the inheritance? [My friend; His sibling; They are equally Rich] 5) 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; Less than today] - **Retail Bank Sample**: Number of correct answers [ranging from 0 - 3] on the Cognitive Reflection Test [CRT] from Fredrick (2005). Specifically, the CRT ask the following 3 questions: 1) A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents. 2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes. 3) In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days.
Education	Highest attained educational degree of respondent
Age	Age of the respondent
Income	Gross annual household income
Wealth	**DHS Sample:** summ of savings accounts, amount invested in stocks, bonds and mutual funds, and house value **Retail Bank Sample:** portfolio value
Retired	Dummy indicating [1] if respondents are retired and [0] otherwise.
Self-employed	Dummy indicating [1] if respondents are self-employed and [0] otherwise.
Employee	Dummy indicating [1] if respondents work as an employee and [0] otherwise.
Kids	Dummy indicating [1] if respondents have kids and [0] otherwise.
Married	Dummy indicating [1] if respondents are maried and [0] otherwise.
Male	Dummy indicating [1] if respondents are male and [0] for female.
Experienced	Retail Bank Sample only: dummy indicating [1] if respondents have more than 5 year investment experience and [0] otherwise
Opinions on Financial Advice and Self-Directed investing (Table X)	- Only in Retail Bank Sample: Dependent variables are equal to the degree of agreement on the following 6 statements using a seven-point scale [1 = "totally disagree" to 7 = "totally agree"]: 1) Investing on your own (compared to investing using a financial advisor) gives more control 2) Investing on your own (compared to investing using a financial advisor) leads to more investment mistakes 3) Investing on your own (compared to investing using a financial advisor) leads to more risks 4) A financial advisor (compared to investing on your own) makes better investment decisions 5) A financial advisor (compared to investing on your own) possesses more investment information 6) A financial advisor (compared to investing on your own) knows less on investing

Appendix B. Factor Loadings Financial Literacy Questions

Question	Answer	DHS Factor Loadings	Retail Bank Sample Factor Loadings
1. Which statement describes the main function of the stock market?	Correct	0.6058	0.605
	Don't Know	-0.7215	-0.708
2. Which statement about mutual funds is correct?	Correct	0.6467	0.646
	Don't Know	-0.7667	-0.754
3. What should happen to bond prices if interest rates fall?	Correct	0.3102	0.469
	Don't Know	-0.689	-0.599
4. Buying a company stock usually provides a safer return than a stock mutual fund that invests worldwide?	Correct	0.4664	0.699
	Don't Know	-0.7607	-0.666
5. Stocks are normally safer than bonds, true or false	Correct	0.2997	0.674
	Don't Know	-0.7488	-0.688
6. Considering a long time period, which asset normally gives the highest return?	Correct	0.5074	0.538
	Don't Know	-0.7503	-0.526
7. Normally, which asset displays the highest fluctuations over time?	Correct	0.644	0.675
	Don't Know	-0.7758	-0.636
8. What happens to the risk of losing money when an investors spreads money among different assets?	Correct	0.5597	0.541
	Don't Know	-0.7524	-0.599
9. Which of the following statements is correct? If someone buys the stock of firm B in the stock market:	Correct	0.4287	
	Don't Know	-0.6099	
10. Which of the following statements is correct? If someone buys a bond of firm B:	Correct	0.6118	
	Don't Know	-0.7539	
11. If you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a major penaly, true or false?	Correct	0.4747	
	Don't Know	-0.5259	

Appendix C. First Stage Regression on Measured Financial Literacy

This table presents coefficient estimates of the first stage regression of financial literacy on various control variables and two dummies that represent the level of numeracy (DHS) or the amount of economics education obtained before entering the stock market (Retail Bank Sample). ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. P-values based on robust standard errors in parentheses.

	Retail Bank Sample
Instruments (Base Group: Little Economics Education)	
A lot of Economics Education	0.27***
	(0.00)
Some Economics Education	0.15*
	(0.09)
Education (base group: higher vocational or University)	
Primary or preparatory intermediate vocational	-0.59***
	(0.00)
Higher secondary education or secondary pre-university	0.09
	(0.50)
Intermediate vocational	-0.14
	(0.21)
Age (Base group: age<40)	
Age 40-49	0.34
	(0.10)
Age 50-59	0.16
	(0.41)
Age >=60	0.19
	(0.37)
Income (base group: Q1)	
Income (Q2)	0.30*
	(0.06)
Income (Q3)	0.49***
	(0.00)
Income (Q4)	0.15
	(0.42)
Wealth (base group: Q1)	
Wealth (Q2)	0.20*
	(0.06)
Wealth (Q3)	0.14
	(0.25)
Wealth (Q4)	0.38***
	(0.00)
Retired	-0.07
	(0.68)
Self-employed	0.09
	(0.62)
Employee	-0.03
	(0.89)
Kids	-0.06
	(0.51)
Married	-0.18
	(0.11)
Male	0.44***
	(0.00)
Experienced	0.32***
	(0.01)
Risk Tolerance	0.15***
	(0.00)
Time Preference	0.25
	(0.19)
Regret Aversion	-0.00
	(0.89)
Trust General	-0.02
	(0.55)
Trust Advice	0.06
	(0.10)
Constant	-1.73***
	(0.00)
Number of observations	430
R^2	0.385
F-Statistic	8.87