Research Dialogue | Issue no. 157
August 2019

TIAA Institute

Financial literacy and the use of financial advice—a non-monotonic relationship

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Abstract

Professional advice is considered one remedy for financial management inefficiency resulting from financial illiteracy. However, empirical results based on 2015 National Financial Capability Study data suggest that financial advice may not necessarily serve as a substitute for financial literacy. We find that the propensity of individuals to consult financial advisors initially increases and then decreases with financial literacy level (a non-monotonic hump-shaped relationship), while the propensity for delegating investment decisions to financial advisors decreases monotonically with financial literacy. These results are robust to potential endogeneity. We develop a theoretical model in which individuals have incomplete information regarding advisor quality to explain our empirical findings. By simultaneously considering both incentives for and hurdles to investor use of financial advice—both consultation and delegation—the model successfully predicts the non-monotonic effect of financial literacy on the likelihood of consulting a financial advisor. Policy implications of the findings are discussed.

This research was supported by funding from the TIAA Institute. The content, findings and conclusions are the responsibility of the authors and do not necessarily represent the views of TIAA or the TIAA Institute.

1. Introduction

Individuals are taking greater responsibility for personal financial matters, even though financial markets and products are becoming progressively more complex. However, previous studies have indicated the prevalence of financial management inefficiency among individuals due to their low levels of financial literacy (Lusardi and Mitchell, 2014). Accessing professional financial advice is considered a remedy for this problem—if financial advice can serve as an adequate substitute, low financial literacy does not necessarily result in suboptimal financial decisions (Calcagno and Monticone, 2015). This raises two questions: Does financial advice actually serve as a substitute for self-directed financial management by individuals with low levels of financial literacy, or as a complementary information tool for use by savvy investors? What are the main drivers and hurdles for individuals to use financial advice? These questions are important for policymakers aimed at reducing the negative outcomes of financial illiteracy, as well as for financial services providers interested in building their client bases.

In this paper, we investigate the effect of financial literacy on investor choices regarding three ways of using financial advice: self-investment without using financial advice, consulting financial advisors to assist with investment decisions, or delegating investment decisions to financial advisors. We develop a theoretical model of investor choice of financial advice usage in which information on advisor quality is incomplete, that is, when investors, especially those who are less knowledgeable, cannot distinguish between high-quality and low-quality advisors. Investors who choose to consult an advisor have opportunities to collect further information on the advisor's quality, but individuals who delegate investment decisions do not. While uncertainty regarding advisor quality can discourage the use of financial advice, investors can reduce search costs of making investments by using professional advisors. For investors with low financial literacy levels, cost savings is a dominant factor in their decisions and additional communication with an advisor is not perceived as beneficial due to their inability to determine advisor quality; accordingly, they are more likely to delegate responsibility to their advisors. As investors become more knowledgeable, they are more likely to accurately identify advisor quality and consequently rely more on consultations. In contrast, the most financially literate investors are more likely to view making their own investment decisions as the least costly approach. After simultaneously considering incentives and hurdles for the use of financial advice, our model predicts that the likelihood of consulting a financial advisor initially increases and then decreases as financial literacy increases—a non-monotonic hump-shaped relationship. Delegation has a substitution relationship with financial literacy, i.e., the likelihood of delegating consistently decreases as financial literacy increases.

We use a representative U.S. dataset from the 2015 National Financial Capability Study (NFCS) to empirically test the hypotheses derived from our proposed model. We allow for a non-monotonic relationship between financial literacy and use of financial advice in our empirical analysis setup and confirm our primary hypothesis: investors who are most likely to consult with advisors have medium levels of financial literacy, and investors who are most likely to delegate responsibility for decisions to financial advisors have the lowest levels. Our findings are robust to potential endogeneity.

Results from previous empirical studies of substitutability and complementarity between financial literacy and use of financial advice are both limited and mixed. Bucher-Koenen and Koenen (2015), Hachethal et al. (2012), and Stolper (2018) identify substitutability relationships between the two factors—that is, they find that less knowledgeable individuals are more likely to use professional financial advice. Challenging the view that financial advice serves as a substitute for financial literacy, other researchers have reported complementarity between financial literacy and the use of financial advice (Bhattacharya et al., 2012; Calcagno and Monticone, 2015; Collins, 2012; van Rooij et al., 2011). However, to our knowledge no effort has been made to confirm or refute coexisting substitutability and complementarity at different financial literacy levels, likely due to the standard assumption of a monotonic

relationship between the use of financial advice and financial literacy. This study is the first attempt to examine the changing effects of financial literacy on the use of financial advice, and to offer both theoretical and empirical support for a non-monotonic relationship between them.

By adopting a representative U.S. market dataset consisting of a range of individuals making investments outside of retirement accounts, this study also contributes to the empirical literature on the relationship between financial literacy and use of financial advice. Unlike previous studies, the investors in our dataset are not restricted to specific contexts such as bank or brokerage account holders (see, for example, Bhattacharya et al., 2012; Hackethal et al., 2012). The data adopted by our study also provides a set of questions specifically targeting investment knowledge in addition to the basic financial knowledge topics such as inflation and interest rates. The dataset characteristics are appropriate for empirical tests involving the effects of financial literacy on the use of financial advice.

Efforts to develop theoretical models that rationalize the relationship between financial literacy and use of financial advice are even scarcer in previous literature. Most research frameworks assume associations between low financial literacy and higher costs for acquiring financial expertise, as well as reduced access to financial products and information. Accordingly, less knowledgeable investors have greater need for professional financial advisors—the substitutability relationship between financial literacy and use of financial advice (Bluethgen et al., 2008; Bucher-Koenen and Koenen, 2015; Georgarakos and Inderrst, 2014; Hackethal et al., 2012). It is even more challenging to rationalize a complementary relationship. Most extant studies focus on supply-side issues associated with financial advisory services—typical financial advisor incentive structures can misalign advisor interests with client interests, resulting in better advice being provided to more literate investors. For example, Calcagno and Monticone (2015) consider a model that addresses strategic interactions between investors and better-informed advisors with potential conflicts of interest due to commission-based compensation structures, and find that non-independent financial advisors tend to disclose higher-quality information only to the most knowledgeable investors, who are, therefore, more likely to consult with them. Bucher-Koenen and Koenen (2015) model interactions between financial advisors and customers with potential conflicts of interest in the form of kickbacks or bonus payment schemes, and find that clients with higher levels of financial knowledge are more likely to understand the advice they received, and consequently receive higher-quality information.

Instead of focusing on agency conflicts, our model emphasizes the demand side of advisory services to explain complementarity. In additional tests, we find that our main results hold for subsamples of investors who do not pay commissions to financial advisors, or who use financial advisors instead of stockbrokers as their information sources. We expect that investors in these subsamples would be minimally exposed to conflicts of interest inherent to the financial advisory industry, but our main results do not change. According to this finding, there is a need to provide alternative rationales behind the complementary relationship between financial literacy and the use of financial advice in addition to the agency conflicts identified by previous studies. Thus, this paper contributes to the literature by providing an alternative explanation for complementarity from the demand side of advisory services: lack of information on the quality of advisors by less knowledgeable individuals prevent them from efficiently using financial advice regardless of supply-side conflicts of interest.

Our findings have important implications for policymakers and financial services providers. They indicate that the most common method among U.S. investors for using financial advice today is via consultations rather than complete delegation of decision-making responsibilities to professionals, and that investors with the least knowledge—that is, those in the greatest need of assistance—do not use such services to a larger extent than investors with medium level of financial literacy. As our model suggests, lack of information on advisor quality can hinder the use of financial advice by low-literate investors, meaning that such advice may be

insufficient for counteracting the negative effects of low financial literacy in the current financial environment. Our results suggest that policy promoting a more established system to screen the quality of financial advisors should be encouraged, and the financial advisory industry could uphold professional standards and promote professionalism among practitioners. Meanwhile, even in the presence of qualified financial advisors, financial education is still necessary to assist investors in identifying good advisors and make self-directed decisions when the advice they receive is suboptimal.

The rest of this paper is organized as follows: Section 2 describes the development of the theoretical model; Section 3 presents a description of the data, empirical strategies, main results and robustness tests; Section 4 presents a discussion of the findings; and Section 5 contains our conclusion.

2. Analytical framework and hypotheses

2.1. Set-up

Investors are assumed to have three options for using financial advice to assist with investment decisions: self-investing without advice (S), consulting financial advisors to help with investment decisions (C), and delegating investment decisions to financial advisors (D). Investor financial literacy level is denoted by l; we assume $l \in [\underline{l}, \bar{l}]$.

Autonomous investors incur $k(l)$ search costs when searching for investment information and opportunities. Investors with higher l values are presumed to incur lower search costs, therefore, at the highest literacy level $\bar{l}, k(\bar{l}) = 0$. The expected payoff for investing autonomously is $v(l)$, which increases in l because investors with greater literacy levels are capable of making better investment decisions. Accordingly, the expected self-investment utility is expressed as

$$U^S(l) = v(l) - k(l) \quad (1)$$

Advisors working with consulting or delegating investors may be high (H) or low quality (L). We assume that high-quality advisors will be better informed than their clients, the expected investor payoff from working with a high-quality advisor is $v_H = v(\bar{l})$; a low-quality advisor cannot improve an investor's performance, the expected payoff from working with a low-quality advisor is $v_L = v(\underline{l})$. The assumed probability of meeting a high-quality advisor is $\mu = 1/2$,[1] with advisor quality not directly observed by the investor.

Since no search costs are incurred by investors who delegate, the expected utility for delegating is

$$U^D(l) = \mu v_H + (1-\mu)v_L - F^D \quad (2)$$

where F^D is the fee paid to the advisor.

It is possible for consulting investors to gather information on advisor quality and to reject suboptimal advice. Although initially the investor is assumed to believe that an advisor is high-quality at a probability of μ (similar to the delegation case above), unlike delegating investors, a consulting investor can observe an additional signal $\eta \in \{\eta_H, \eta_L\}$ indicating advisor quality. We assumed that is η distributed according to advisor's true type, with the conditional distribution

$$\Pr(\eta = \eta_H | H) = \beta(l), \Pr(\eta = \eta_L | H) = 1 - \beta(l),$$

$$\Pr(\eta = \eta_L | L) = \beta(l), \Pr(\eta = \eta_H | L) = 1 - \beta(l),$$

where $\beta(l) \in \left[\frac{1}{2}, 1\right]$, implying an informative signal. In other words, $\beta(l)$ is the probability that an investor observes the true quality type of an advisor, with higher $\beta(l)$ values indicating more informative signals. Thus, when $\beta(l) = 1$, advisor quality type is fully learnt by the investor, and when $\beta(l) = 1/2$, the signal is completely non-informative. Our assumption is that $\beta(l)$ increases in l—that is, investors with higher financial literacy levels recognize more accurate signals. We also assume $\beta(\underline{l}) = 1/2$ and $\beta(\bar{l}) = 1$—that is, in consultations, investors with

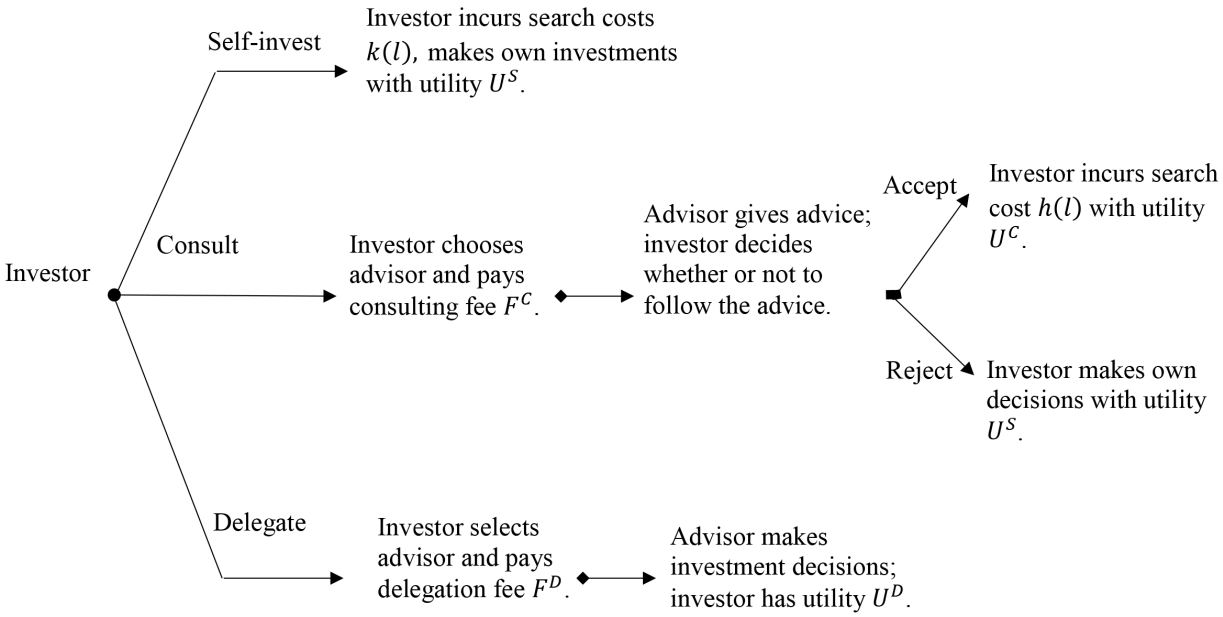
[1] For a more general setup, consider a case in which μ depends on l—that is, the probability of working with a good advisor may increase with an investor's financial literacy level. For example, a more knowledgeable investor is expected to be more capable of determining advisor quality by checking credentials and past performance. In such cases, μ can increase in l, and the slopes of both $U^D(l)$ and $U^C(l)$ become steeper. However, this kind of setting does not alter the key difference between consulting and delegation as discussed in this paper: by consulting with a financial advisor, an investor can gather additional signals regarding advisor quality, and perhaps use it to reject poor-quality information. Such opportunities are not available to investors who select the delegation option.

the lowest literacy levels do not receive additional information from obtained signals, while investors with the highest literacy levels are capable of fully identifying advisor's quality type.

After consulting with a financial advisor, an investor can either accept and follow the offered advice, or ignore it and invest autonomously after observing η. Upon accepting the advice, investors incur $h(l)$ search costs that we assume as being lower than those incurred by investors who self-invest based on investment information and opportunities provided by their advisors. For investors with the highest literacy levels, $h(\overline{l}) = 0$. Investors who choose to ignore advice and invest autonomously have utility $U^S(l)$ (as defined in Eq. 1) and pay consulting fee F^C. In a later section we will discuss our solution for the expected utility derived from consulting, denoted as $U^C(l)$.

The timing of the proposed model is described in Figure 1.

Figure 1. Timing in model set-up



We assume large search costs for investors with low literacy levels and low search costs for investors capable of making good investment decisions on their own. Accordingly, we make the following assumptions on search costs:

Assumption 1: $k(\underline{l}) > h(\underline{l}) - \frac{1}{2}(v_H - v_L) + F^C$.

Assumption 2: $k(\underline{l}) > F^D - \frac{1}{2}(v_H - v_L)$.

Assumption 3: $h(\underline{l}) > F^D - F^C$

Assumption 4: $h(l') < F^D - F^C$, where l' is implicit in $U^C(l') = U^S(l')$.

The model is solved in the following section.

2.2. Analysis

Investors choose the best option in a $\{S,D,C\}$ set of options. Choices are expressed as $x(l) = arg \max_{x\in\{S,D,C\}} U^x(l)$.

In section 2.1, Equations (1) and (2), we showed that

$U^S(l) = v(l) - k(l)$,

$U^D(l) = \frac{1}{2}v_H + \frac{1}{2}v_L - F^D \equiv U^D$.

Calculating $U^C(l)$ entails the following assumption:

Assumption 5: $U^{S'}(l) > \beta'(l)(v_H - v_L) - h'(l)$

Suggesting that as financial literacy level increases, the self-investment payoff increases sufficiently fast compared to payoffs resulting from accepting and following financial advice. The reason is that increasing financial literacy only alters consulting payoffs by impacting the probability of identifying high-quality advisors. However, it can directly affect the ability of investors to make good investment decisions, meaning that the impacts of increasing literacy levels are greater for self-investors.

Lemma 1 derives $U^C(l)$, the expected utility from consulting:

Lemma 1: If Assumption 3 holds, there exists $\hat{l}^C \in (\underline{l}, \bar{l})$, such that

$$U^C(l) = \begin{cases} U^S(l) + \frac{1}{2}\left[W_{\eta_H}(l) - h(l) - U^S(l)\right] - F^C & if \quad l \in [\hat{l}^C, \bar{l}] \\ \frac{1}{2}(v_H + v_L) - h(l) - F^C & if \quad l \in [\underline{l}, \hat{l}^C] \end{cases}$$

The proof for this lemma is shown in Appendix A.

A kink in $U^C(l)$ exists at $\hat{l}^C$. Investors whose financial literacy levels exceed $\hat{l}^C$ follow financial advice only if $\eta = \eta_H$; all investors whose financial literacy levels are below $\hat{l}^C$ follow the advice regardless of the signal η value, since they do not consider signals as informative when $\beta(l)$ is low. Since the self-investment utility is very low at low levels of literacy, such investors never choose the self-investment option.

Lemma 1 also implies $U^{C'}(l) > 0 = U^{D'}(l)$. When $l < \hat{l}^C$, the utility of the consulting option increases in l because the search cost $h(l)$ decreases in l. When $l > \hat{l}^C$, then $U^{C'}(l) > 0$ holds for two reasons: the search cost decreases in l, and the probability that investors can identify high-quality advisors increases as l increases. Compared to investors who delegate, investors who consult have an advantage in terms of opportunities to avoid any suboptimal advice they detect. Hence, the consulting option becomes more attractive to investors with higher literacy levels.

Formally, the following proposition shows our main predictions:

Proposition 1: *If Assumptions 1-5 hold, there exist two cutoffs—l, l_1 and $l_2 \in (\underline{l}, \bar{l})$—that satisfy $l_1 < l_2$, such that*

(1) an investor chooses to delegate if and only if $l < l_1$.

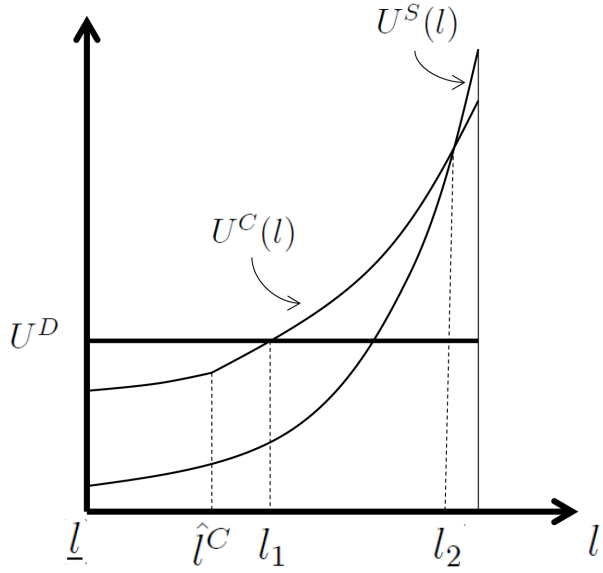
(2) an investor chooses to consult if and only if $l \in [l_1, l_2]$.

(3) an investor chooses to self-invest if and only if $l > l_2$.

A proof for this proposition is shown in Appendix A.

Proposition 1 is depicted in Figure 2. As shown, when $l < l_1$, delegation is preferable to self-investment and consulting. Search costs for investors with low literacy levels are high if they choose to invest autonomously or to consult; delegation helps to reduce those costs. Investors with low literacy levels perform poorly by investing autonomously. Consequently, it follows that $U^S(l) < U^D(l)$. In addition, advantages from consulting rather than delegating are limited among low-literacy investors because their skills for accurately identifying financial advisor quality are weak; in particular, when $l < l^C$, investors always follow the advice they receive regardless of the signals they observe but consulting is associated with higher search costs compared to delegation. As a result, it follows that $U^C(l) < U^D(l)$.

Figure 2. Depiction of model prediction



The consulting option is chosen when $l \in [l_1, l_2]$, with $U^C(l) > U^D(l)$ and $U^C(l) > U^S(l)$. Consulting is preferred to delegation due to the increased capability and additional opportunities for identifying high-quality financial advisors. Investors with moderately high literacy levels generally cannot achieve self-investment success, but they are capable of identifying high-quality advisors. Consequently, $U^C(l) > U^S(l)$ holds.

Last, self-investment is chosen when $l > l_2$, with $U^S(l) > U^D(l)$ and $U^S(l) > U^C(l)$. Financially sophisticated investors are capable of making efficient investment decisions with low search costs, resulting in self-investment utility exceeding delegation utility. Further, since a significantly positive consulting fee exists even if the utility from consulting $U^C(l)$ increases in l, potential search cost savings from consulting become negligible for financially sophisticated investors. Thus, $U^S(l) > U^C(l)$ when l is sufficiently high.

According to Proposition 1, low-literacy investors are more likely to choose delegation, high-literacy investors are more likely to choose self-investment, and investors with moderately high literacy levels are more likely to choose consulting. Based on this background, the main hypotheses regarding the relationship between financial literacy and the use of financial advice are expressed as

H1: The probability of consulting initially increases but then decreases as financial literacy level increases (a hump-shaped relationship).

H2: The probability of delegating investment decisions to a financial advisor decreases as investor financial literacy increases.

3. Empirical analysis

3.1. Data and descriptive statistics

3.1.1 Dataset

Two datasets commissioned by the Financial Industry Regulatory Authority (FINRA) Investor Education Foundation are used in this analysis: the National Financial Capability Study (NFCS) 2015 State-by-State Survey and the NFCS 2015 Investor Survey. The purpose of the State-by-State survey with a nationally representative sample of 27,564 Americans aged 18 and older is to assess the financial capability of the national population. Collected data includes information on demographic and financial characteristics such as age,

gender, marital status, income, ethnicity and educational attainment (Applied Research & Consulting LLC, 2015a). To provide additional insights on individual investment decisions outside of retirement accounts, a follow-up Investor Survey was distributed to 2,000 State-by-State respondents who reported having investments outside of retirement accounts (Applied Research & Consulting LLC, 2015b). The Investor Survey gathered data on perceptions, attitudes, experiences and behaviors associated with a wide variety of investment-related topics. In particular, respondents were asked about their use of financial advice and their investment knowledge was evaluated. Unique respondent IDs were used to link the State-by-State and Investor Surveys. Our theoretical model and empirical analysis are designed to reflect the fact that all individuals in the sample have investments outside of retirement accounts.

3.1.2. Variables and descriptive statistics

We create a "use of financial advice" variable to identify the three main investor choices of financial advice use, with a value of 1 denoting investors who make their own decisions ("self-invest"), 2 those who obtain help from brokers or advisors before making investment decisions ("consult"),[2] and 3 those who delegate all decisions to brokers or advisors ("delegation"). Survey questions used to construct the main variables are presented in full in Appendix B. As shown in Table 1 Panel A, 41% of all investors in the sample make investment decisions on their own, 42% ask for some degree of professional advice, and 17% delegate all of their investment decisions to brokers or professional advisors.

Table 1. Descriptive statistics

Panel A: Summary statistics	No. of obs.	Mean	Median	S.D.	Min.	Max.
Choice of financial advice use						
Self-invest	1,972	41.28%			0	1
Consult	1,972	41.68%			0	1
Delegate	1,972	17.04%			0	1
Financial literacy score	2,000	4.66	5	2.23	0	10
Basic financial literacy score	2,000	2.99	3	1.00	0	4
Risk preference	1,994	6.29	7	2.29	1	10
Invested in stocks	1,812	95.03			0	1
Panel B: Distributions	**Total no. of obs.**		**No. of obs.**		**Percentage (in %)**	
Male (yes=1, no=0)	2,000		1,101		55.05	
Age	2,000					
18-24			64		3.20	
25-34			259		12.95	
35-44			286		14.30	
45-54			346		17.30	
55-64			445		22.25	
65 and higher			600		30.00	
Ethnicity: white (yes=1, no=0)	2,000		1,606		80.30	

[2] The survey asked respondents to state whether they used "broker" or "professional advisor" services. In the interest of simplicity, we use the term "financial advisor" in this paper.

Table 1. Descriptive statistics (continued)					
Educational attainment	2,000				
Did not complete high school			5		0.25
High school graduate			149		7.45
High school graduate (GED or other)			65		3.25
Some college, no degree			383		19.15
Associate degree			178		8.90
Bachelor degree			695		34.75
Post-graduate degree			525		26.25
Married (yes=1, no=0)	2,000		1,371		68.55
Household income	2,000				
$15,000 or lower			34		1.70
$15,000 - 25,000			80		4.00
$25,000 - $35,000			114		5.70
$35,000 - $50,000			192		9.60
$50,000 - $75,000			470		23.50
$75,000 - $100,000			423		21.15
$100,000 - $150,000			420		21.00
$150,000 or higher			267		13.35
Non-retirement account wealth	1,894				
$2,000 or lower			96		5.07
$2,000–$5,000			81		4.28
$5,000–$10,000			109		5.76
$10,000–$25,000			139		7.34
$25,000–$50,000			154		8.13
$50,000–$100,000			285		15.05
$100,000–$250,000			377		19.90
$250,000–$500,000			302		15.95
$500,000–$1,000,000			199		10.51
$1,000,000 or higher			152		8.03%

Note: Panel A shows the statistics of respondents' choices of financial advice use, financial literacy scores, risk preference and whether respondents invested in stocks in the sample. Panel B shows the statistics of respondent demographic and financial characteristics.

Two financial literacy scores are constructed: "financial literacy score" and "basic financial literacy score." The Investor Survey contains a unique set of ten investment knowledge questions about stocks, bonds, return and risk tradeoffs, returns associated with various investment vehicles, return measures, margin trading, and short selling. Following Calcagno and Monticone (2015) and Tang and Baker (2016), we calculate the number of correct answers to the ten questions and use it as "financial literacy score." The State-by-State Survey also includes questions designed to gather data on basic financial knowledge. We construct the "basic financial literacy score" indicating the number of correct answers to four basic financial literacy questions involving

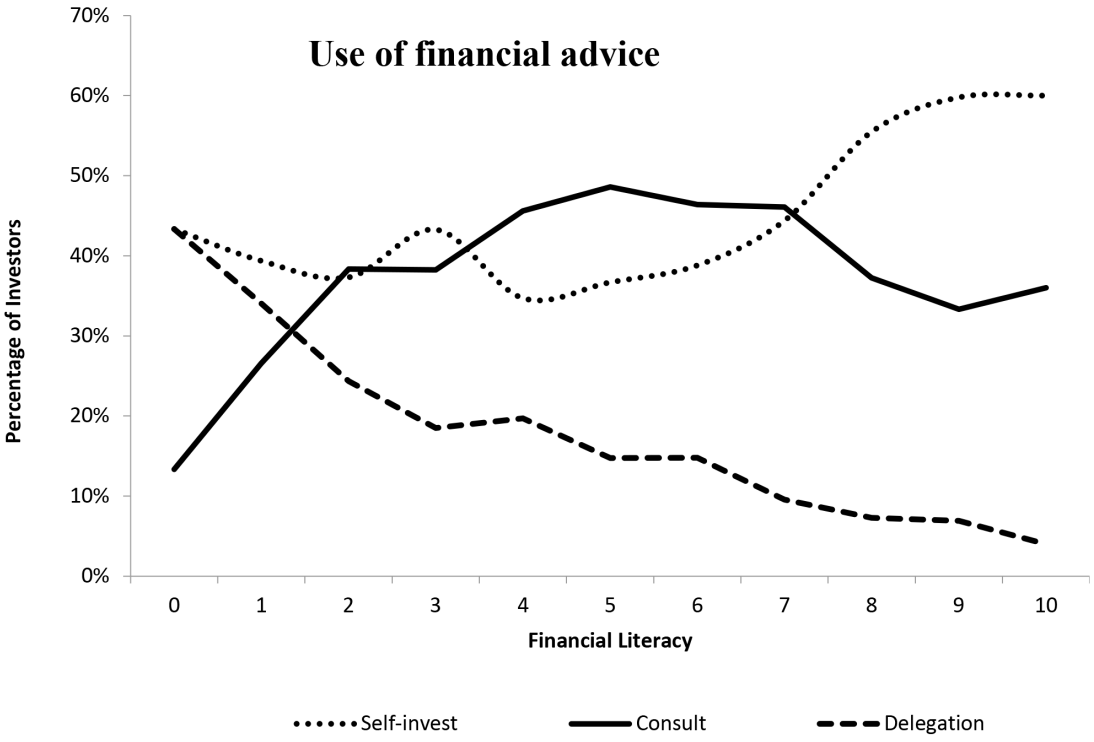
compounding, inflation, and mortgages. It is important to note that even though these questions have been shown to distinguish between financially knowledgeable and naive respondents (Lusardi and Mitchell, 2008; 2011), they might not be good financial literacy measures when studying individual investment decisions. For example, individuals capable of calculating compound interest may not have sufficient knowledge to make independent investment decisions. According to van Rooij et al. (2011), households with higher "advanced financial literacy" specifically measuring financial knowledge related to investment and portfolio choice are more likely to use professional advice, but a similar pattern has not been identified by using "basic financial literacy" measure covering topics on interest rates, interest compounding, inflation, discounting, and nominal versus real values. In this study, "financial literacy score" is used as an investment knowledge measure, and "basic financial literacy score" as an instrumental variable for investigating the potential endogeneity of financial literacy. As shown in Table 1 Panel A, a mean of 4.66 out of 10 (median of 5) is observed for the respondents' financial literacy scores, and a mean of 2.99 out of 4 for their basic financial literacy scores.

Table 1 also presents summary statistics for other control variables used in our analysis. As shown, 55% of all respondents are male, more than half are 55 years of age or older, with bachelor's degrees or higher, have annual household incomes above $75,000 or non-retirement wealth above $100,000; 80% are white and 69% married. Mean risk preference level is identified as 6.29 (range of 1-10). The large majority (95%) reported investments in stocks in their non-retirement accounts. Again, we wish to emphasize that our sample only includes individuals with investments outside of retirement accounts. Therefore, our selected sample consists of older married white individuals with more years of education and higher household incomes than the typical NFCS survey respondent. This is consistent with previous findings in the literature (van Rooij et al., 2011).

3.2. Baseline analysis

To begin, we calculate the percentages of self-investing, consulting, and delegating investors according to financial literacy levels ranging from 0 to 10. As shown in Figure 3, a non-monotonic relationship is observed between financial literacy and the use of financial advice, with a substantial difference noted between consulting and delegating investors. Our data indicates that the probability of consulting increases with financial literacy level for low financial literacy individuals (< the median of 5), but decreases with financial literacy level for high financial literacy individuals (>5), resulting in a non-monotonic relationship. A completely different pattern is found for delegating investors: those with higher financial literacy levels are less likely to delegate investment decisions. Overall, investors in the sample are more likely to self-invest when their financial literacy levels are high (>5), but this positive relationship is less significant for low financial literacy individuals.

Figure 3. Relationship between financial literacy and the use of financial advice



Next, a multinomial probit regression is used to examine the effects of financial literacy on the use of financial advice:

$$p_{i,j} = p(y_i = j) = \Phi\left(X'_{i,j}\beta\right), j = 1,2,3 \quad (3)$$

where Y_i denotes investor i's choice to use financial advice (y_i = 1 for self-invest, y_i= 2 for consulting, and y_i= 3 for delegation), Φ is a standard normal cumulative distribution function, and X is a vector of explanatory variables including financial literacy, gender, age, ethnicity, education attainment, marital status, risk preference, household income, non-retirement account wealth, and whether an individual has investments in stocks outside of retirement accounts.

Column (1) in Table 2 shows the marginal effects of the explanatory variables on financial advice use decisions. As shown, financial literacy exerts a significantly positive effect on the probability of self-investment and a significantly negative effect on the probability of delegating those decisions to an advisor. However, the effect of financial literacy on consulting with a financial advisor is negative and statistically non-significant. For example, one additional correct answer to an investment knowledge question increases the probability of self-investment by 2.94% and decreases the probability of delegation by 2.93%. In this empirical analysis, in which the non-monotonic effect of financial literacy on the use of financial advice is not considered, financial advice is found to be a substitute for financial literacy—the greater the literacy, the less likely a respondent is to seek advice. This finding is consistent with those previously reported by Bucher-Koenen and Koenen (2015), Hachethal et al. (2012), and Stolper (2018). Further, our findings underscore the importance of distinguishing between the two types of financial advice use (consulting and delegation) when analyzing the effects of financial literacy. To our knowledge, Calcagno and Monticone (2015) is the only study to separately consider consulting and delegation when examining the effects of financial literacy.

Table 2. Effect of financial literacy on the use of financial advice

	(1) Whole sample			(2) Financial Literacy <5			(3) Financial Literacy ≥5		
	Self-invest	Consult	Delegate	Self-invest	Consult	Delegate	Self-invest	Consult	Delegate
Financial literacy	0.0294***	-0.0001	-0.0293***	-0.0201	0.0488***	-0.0288**	0.0605***	-0.0332***	-0.0273***
	(0.0058)	(0.0060)	(0.0042)	(0.0163)	(0.0167)	(0.0118)	(0.0112)	(0.0117)	(0.0079)
Male	0.0780***	-0.0957***	0.0177	0.0547	-0.0497	-0.0050	0.0973***	-0.1351***	0.0378*
	(0.0242)	(0.0246)	(0.0165)	(0.0340)	(0.0344)	(0.0257)	(0.0340)	(0.0349)	(0.0201)
Age	-0.0231***	-0.0136	0.0367***	-0.0335***	-0.0193	0.0528***	-0.0139	-0.0049	0.0188**
	(0.0088)	(0.0091)	(0.0066)	(0.0123)	(0.0127)	(0.0097)	(0.0126)	(0.0128)	(0.0086)
Ethnicity	-0.0208	0.0008	0.0201	-0.0057	-0.0163	0.0220	-0.0430	0.0220	0.0210
	(0.0294)	(0.0299)	(0.0200)	(0.0401)	(0.0411)	(0.0307)	(0.0427)	(0.0429)	(0.0257)
Education	-0.0187**	0.0099	0.0089	-0.0288**	0.0128	0.0160*	-0.0122	0.0060	0.0062
	(0.0084)	(0.0086)	(0.0059)	(0.0115)	(0.0118)	(0.0088)	(0.0123)	(0.0125)	(0.0079)
Married	0.0121	-0.0191	0.0070	0.0094	-0.0005	-0.0088	0.0189	-0.0430	0.0241
	(0.0270)	(0.0276)	(0.0187)	(0.0395)	(0.0404)	(0.0302)	(0.0366)	(0.0374)	(0.0224)
Risk Preference	0.0230***	-0.0119**	-0.0111***	0.0207***	-0.0063	-0.0144**	0.0242***	-0.0165**	-0.0077
	(0.0055)	(0.0056)	(0.0037)	(0.0078)	(0.0079)	(0.0056)	(0.0077)	(0.0079)	(0.0048)
Household income	-0.0094	0.0096	-0.0003	0.0078	0.0018	-0.0097	-0.0278**	0.0212*	0.0065
	(0.0087)	(0.0089)	(0.0061)	(0.0124)	(0.0128)	(0.0094)	(0.0120)	(0.0123)	(0.0078)
Wealth	-0.0395***	0.0313***	0.0082**	-0.0354***	0.0222***	0.0132**	-0.0439***	0.0396***	0.0043
	(0.0056)	(0.0059)	(0.0041)	(0.0079)	(0.0083)	(0.0062)	(0.0078)	(0.0082)	(0.0052)
Invest in stocks	-0.1508***	0.1624***	-0.0116	-0.1878***	0.1563**	0.0315	-0.0468	0.1608*	-0.1140
	(0.0539)	(0.0513)	(0.0358)	(0.0662)	(0.0627)	(0.0437)	(0.0953)	(0.0906)	(0.0783)
Observations	1,730			799			931		
Log Likelihood	-1606			-762			-823		
Wald chi^2	207.82			113.21			117.64		

Note: Estimated marginal effects from multinomial probit regressions. Standard errors are shown in parentheses. Dependent variable is investor's choice of financial advice use: self-invest, consult, and delegate. Column (1) includes the whole sample, column (2) includes low-literacy investors (financial literacy<5) and column (3) includes high-literacy investors (financial literacy>=5).

*, **, *** denote 10%, 5%, 1% significance levels, respectively.

Next, we investigate the potential non-monotonic effect of financial literacy on the use of financial advice. Based on the preliminary results shown in Figure 3, we create two subsamples: low (financial literacy score <5) and high literacy investors (≥5). We rerun the multinomial probit regressions (Eq.3) for each subsample. Column (2) of Table 2 shows the marginal effects of financial literacy on use of financial advice decisions among low financial literacy investors. It is found that a one-unit increase in financial literacy results in a 4.88% increase in the probability of consulting with a financial advisor and a 2.88% decrease in the probability of delegating decisions to a financial advisor; the effect of financial literacy on self-investment probability is non-significant. As shown in column (3) of Table 2 for high financial literacy investors, a significant change is noted between them and low financial literacy investors. For high financial literacy investors, the probability of using a financial advisor for consulting or delegation decreases with each unit increase in financial literacy score. In both cases, the marginal effects are significant at 1% (-3.32% for consulting and -2.73% for delegation). Last, we find that the probability of self-investment increases significantly as financial literacy score increases.

The results in Table 2 underscore the importance of examining the non-monotonic financial literacy effects on the use of financial advice. Previous studies have generally assumed a monotonic relationship between the two. If we used the same empirical methods, we would not have observed the changing effects of financial literacy on consulting and self-investment decisions. By allowing for non-monotonic effects, we find that the investors who have the greatest propensity to consult with financial advisors are not the ones with the highest or lowest financial literacy levels, but those with medium levels. The results shown in the last two columns of Table 2 confirm our primary hypothesis.

3.3. Potential endogeneity of financial literacy

Our findings above do not necessarily imply the direction of the causality, with potential endogeneity of financial literacy possibly resulting in a spurious relationship between financial literacy and the use of financial advice. For example, investors who use professional financial advice may have more opportunities to acquire investment knowledge from multiple sources, especially when an investor chooses to consult a financial advisor, resulting in a positive relationship between financial literacy and the use of financial advice. Other unobserved factors may also influence both the willingness to acquire financial literacy and pursue financial advice, leading to a spurious positive relationship between the two (Calcagno and Monticone, 2015).

Following Calcagno and Monticone (2015), we use the control function approach described by Rivers and Vuong (1988) and Wooldridge (2010) to examine the potential impacts of endogeneity of financial literacy. Specifically, we use basic financial literacy scores as an instrument variable for financial literacy. We expect that these scores (based on knowledge of basic financial concepts such as compounding, inflation, and mortgages, but not investing) will affect the use of financial advice only through investment knowledge, as determined by our "financial literacy score" measure. We observe a statistically significant relationship between basic financial literacy and financial literacy score, but not between basic financial literacy score and the use of financial advice. Table 3 Panel A shows results from the first stage regression of financial literacy score on basic financial literacy score (all other control variables identical to those in Table 2). It is found that basic financial literacy score exerts a significantly positive effect on financial literacy score. In the second stage we add the first stage residuals to the multinomial probit regression shown in Equation (3). We follow Wooldridge (2010) and report the marginal effects with bootstrapped standard errors (200 repetitions). According to the results shown in Table 3 Panel B, the effects of financial literacy on self-investment (financial literacy <5 and ≥5), consulting (financial literacy <5) and delegation (financial literacy ≥5) are the same as in our baseline analysis, and the effects of financial literacy on delegation (financial literacy <5) and consulting (financial literacy ≥5) are non-significant, although with the same signs. In all cases, the non-significant marginal effects of fitted residuals support null hypothesis of exogenous financial literacy.

Table 3. Control function analysis: effect of financial literacy on the use of financial advice

	(1). Financial Literacy <5			(2). Financial Literacy ≥5		
Panel A. First stage–dependent variable: financial literacy						
Basic financial literacy	0.2151***			0.4140***		
	(0.0369)			(0.0549)		
Observations	804			934		
F statistic	5.28			17.44		
R-squared	0.0624			0.1589		
Panel B. Second stage–dependent variable: use of financial advice						
	Self-invest	**Consult**	**Delegation**	**Self-invest**	**Consult**	**Delegation**
Financial literacy	-0.1123	0.1599**	-0.0477	0.1118**	-0.0372	-0.0745**
	(0.0782)	(0.0808)	(0.0620)	(0.0473)	(0.0483)	(0.0294)
Residuals	0.0959	-0.1157	0.0198	-0.0543	0.0041	0.0502
	(0.0808)	(0.0827)	(0.0636)	(0.0490)	(0.0494)	(0.0307)
Observations	799			931		
Log likelihood	-761			-821		
Wald chi^2	152.67			132.9		

Note: Panel A shows estimated results from the first stage linear regression of financial literacy score on basic financial literacy score. Regressors not reported are the same as in Table 2. Standard errors are shown in parentheses. Panel B shows the marginal effects from the second stage multinomial probit model that controls for financial literacy endogeneity via control function approach. Bootstrapped standard errors (200 repetitions) are shown in parentheses. Regressors not reported are the same as in Table 2. Column (1) includes low-literacy investors (financial literacy<5) and column (2) includes high-literacy investors (financial literacy>=5).

*, **, *** denote 10%, 5%, 1% significance levels, respectively.

4. Discussion

4.1. Effects of agency conflicts

Our theoretical model considers factors such as search costs, financial advice service costs, and capability to identify high-quality advisors. While it is difficult, if not impossible, to incorporate all potential factors influencing decisions to use financial advice into a single model, here we will briefly discuss other potential factors that can alter the effect of financial literacy on the use of financial advice, and consider ways they may have influenced our results.

Agency conflicts have been widely used in previous models to explain complementarity between financial literacy and the use of financial advice. Several studies have addressed the potential for biased financial advice and the idea that superior financial advice is more likely to be provided to individuals with high levels of financial literacy, who in turn are more likely to use it. For example, based on their stylized model of strategic interaction between investors and better-informed advisors with potential conflicts of interest stemming from commission-based compensation schemes, Calcagno and Monticone (2015) find that advisors provide better information to sophisticated investors, who anticipate this and are more likely to use those advisors for consultation. Bucher-Koenen and Koenen (2015) find that more knowledgeable investors tend to receive higher-quality advice due to their greater awareness of the potential for misalignment between their interests and those of their financial advisors. Their predictions are confirmed using data on private pension decisions made by German households.

Instead of considering agency conflicts in our theoretical model, we focus on the ability of investors to identify high-quality advisors as an explanation for complementarity between financial literacy and the use of financial advice. We now use the data for U.S. investors to test whether agency conflicts serve as the main driver of our empirical findings regarding complementarity. We follow Stolper (2018) and construct investor subsamples in which the potential agency conflicts are mitigated and check for changes in our empirical conclusions. In one subsample we exclude investors who pay commissions when they use financial advisors as an information source. As documented by Calcagno and Monticone (2015) and Bucher-Koenen and Koenen (2015), bonuses or "kick-backs," which are similar to commissions, are major sources of misaligned interests between advisors and investors; accordingly, we try to limit the influence of agency conflicts by excluding investors who participate in such compensation systems. We then rerun multinomial probit regressions for investors with low and high financial literacy levels. As shown in Table 4 panel A, the effects of financial literacy on the three types of financial advice usage do not change.

Table 4. Effect of financial literacy financial advice usage type – subsamples analysis

	(1). Financial Literacy <5			(2). Financial Literacy≥5		
	Self-invest	Consul	Delegate	Self-invest	Consul	Delegate
Panel A. Investors paying commissions excluded						
Financial literacy	-0.0216	0.0476**	-0.0260*	0.0723***	-0.0455***	-0.0268***
	(0.0197)	(0.0196)	(0.0151)	(0.0136)	(0.0138)	(0.0100)
Observations	531			615		
Log likelihood	-516			-538		
Wald chi^2	70.83			82.63		
Panel B. Investors using stockbrokers excluded						
Financial literacy	0.0008	0.0390**	-0.0398**	0.0677***	-0.0359***	-0.0318***
	(0.0198)	(0.0198)	(0.0154)	(0.0130)	(0.0131)	(0.0094)
Observations	536			684		
Log likelihood	-533			-599		
Wald chi^2	58.48			86.09		

Note: Estimated marginal effects from multinomial probit regressions. Standard errors are shown in parentheses. Dependent variable is investor's choice of financial advice use: self-invest, consult, and delegate. Regressor not reported at the same as in Table 2. Panel A excludes investors who pay commissions when they use financial advisors as an information source. Panel B excludes investors who identify stockbrokers as their information sources when making investment decisions. Column (1) includes low-literacy investors (financial literacy<5) and column (2) includes high-literacy investors (financial literacy>=5).

*, **, *** denote 10%, 5%, 1% significance levels, respectively.

In a second test we exclude investors who identify stockbrokers as their information sources when making investment decisions. Although stockbrokers and financial advisors are the two most common providers of financial advice in the U.S., there are significant differences in their professional codes and compensation methods. Stockbrokers follow suitability rules and usually charge commissions, while financial advisors may be subject to fiduciary standards, charge fixed fees or a percentage of assets under management, or receive commissions. We assume that the effects of agency conflicts will be weaker for advice given by financial advisors compared to that provided by stockbrokers. Results from a separate multinomial probit regression after excluding stockbrokers as information sources are consistent with those from our baseline analysis (Table 4, panel B).

Combined, results from the two additional tests indicate no changes in our primary conclusions after mitigating the influence of agency conflicts—that is, misaligned interests between investors and advisors, and investor awareness of such problems, are not the main determining factors for our empirical results. These findings support our decision to emphasize the capabilities of investors to identify high-quality advisors rather than agency conflicts when establishing our theoretical model.

4.2. Policy implications

Bucher-Koenen and Koenen (2015) describe the acquisition of professional advice from "independent, well-meaning and knowledgeable" financial advisors as a solution to inefficiencies resulting from widespread financial illiteracy. Professional financial advice is considered an effective alternative to financial education programs, especially when investments and other complex financial decisions are involved (Willis, 2011). However, other research identifies a tendency among a significant percentage of individuals, including those with low levels of financial literacy, to reject or ignore professional financial advice, even when offered for free (Bhattacharya et al., 2012).

Previous studies have focused on the supply-side aspects of advisory services, noting that misaligned interests between individuals and financial advisors tied to compensation practices can inhibit the use of financial advice. Accordingly, these findings call for interventions aimed at reducing conflicts of interest between intermediaries and clients—for example, subsidizing access to independent advice (Calcagno and Monticone, 2015).

Our theoretical and empirical evidence emphasizes a different hurdle: lack of information for identifying high-quality advisory service, which can stop less knowledgeable investors, in particular, from making the effort to find and consult with reputable advisors. Furthermore, when choosing the form of financial advice use, the belief that delegation precludes further review of advisor quality makes it more likely for investors to consult with advisors rather than delegate.

A system for accessing reliable information on the quality of advisors would encourage individuals to use professional advisory services and aid with selection of high-quality advisors. Possible solutions include existing and new professional credentials such as Certified Financial Planners (CFP), public information on advisor backgrounds and compensation arrangements, and the enforcement of practice standards such as fiduciary rules for certain types of financial advisors.

We also acknowledge the utility of well-planned and executed financial education programs aimed at training individuals in financial self-management and in selecting high-quality advisory services. Combined, these interventions and education programs can give financial advisory service providers access to a larger pool of potential clients.

Our results regarding the non-monotonic relationship between financial literacy and financial advice provide new insights regarding the demand for financial advisory services. It has been assumed that such services are most preferred by individuals with either the lowest or highest levels of financial literacy, but our present results

indicate that those with the mid-level of financial literacy are the most likely to use such services and most likely to do so in a consultative manner. This finding has important implications for identifying potential clients and understanding how they prefer to work with an advisor.

5. Conclusion

In this paper we investigate the influences of investor financial literacy level on the use of financial advice, and the nature of that use. A unique dataset of U.S. investors allows us to explore the non-monotonic relationship between financial literacy and financial advice usage, while controlling for other characteristics that affect decisions made by individuals to use financial advice. We find that the likelihood of consulting financial advisors initially increases, and subsequently decreases with financial literacy (a non-monotonic hump-shaped relationship), while the likelihood of delegating investment decisions to financial advisors decreases monotonically with financial literacy level. This finding underscores the importance of considering the potential non-monotonic relationship between financial literacy and the use of financial advice when designing empirical studies. It also points out that financial literacy exerts significantly different influences depending on how investors use financial advice: consultation or delegation.

We also develop a theoretical model to explain our empirical findings, one that differs from previous literature in its emphasis on the demand-side aspects of financial advisory services, as well as its simultaneous consideration of investor incentives for and hurdles to using them. Among low literacy investors, high search costs associated with a self-investment approach can serve as motivation for seeking financial advice, but self-awareness of low financial literacy and concerns about delegation can hinder their capabilities and opportunities for identifying high-quality advisors. These demand-side factors offer a foundation for a coexisting substitution-complementarity relationship between financial literacy and the use of financial advice. As predicted by our model, investors with extremely low literacy levels are more likely to delegate their decisions to professionals, while investors with medium literacy levels are more likely to consult financial advisors. This finding has important implications for policymakers and the professional financial advisory community: to overcome the reluctance of individuals to use financial advisory services, effort is required to create or strengthen means for delivering information on financial advisor qualifications, and to make such information more accessible to a larger investor population.

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Appendix A. Proofs

A.1. Proof of *Lemma 1*

Consider the subgame of consulting financial advisor. Upon observing η_H, an investor expects that an advisor is a high-quality type with probability

$$\Pr(\mathrm{H}|\eta_H) = \frac{\mu\beta(l)}{\mu\beta(l)+(1-\mu)(1-\beta(l))} = \beta(l).$$

Upon observing η_L, an investor expects that an advisor is a high-quality type with probability

$$\Pr(\mathrm{H}|\eta_L) = \frac{\mu(1-\beta(l))}{\mu(1-\beta(l))+(1-\mu)\beta(l)} = 1-\beta(l).$$

$W_\eta(l) = \Pr(\mathrm{H}|\eta)v_H + (1-\Pr(\mathrm{H}|\eta))v_L$, with $W_\eta(l)$ the expected investment payoff from following advice after observing $\eta \in \{\eta_H, \eta_L\}$. Accordingly,

$$W_{\eta_H}(l) = v_L + \beta(l)(v_H - v_L)$$
$$W_{\eta_L}(l) = v_L + (1-\beta(l))(v_H - v_L)$$

$W_{\eta_H}(l)$ therefore increases and $W_{\eta_L}(l)$ decreases in l.

If an investor consults the financial advisor, after observing signal η, she needs to decide whether or not to follow offered advice. The investor strategy is to map the signal space to the set {F, NF}, where F indicates "follow" and NF "not follow." That is,

$$\sigma: \{\eta_H, \eta_L\} \to \{\mathrm{F}, \mathrm{NF}\}$$

The investor follows the given advice if and only if $W_\eta(l) - \mathrm{h}(l) \geq U^S(l)$, $\eta = \mathrm{H}, \mathrm{L}$.

At $l = \underline{l}$, $W_{\eta_H}(\underline{l}) = W_{\eta_L}(\underline{l}) = v_L + \frac{1}{2}(v_H - v_L)$, and $U^S(l) = v_L - c(\underline{l})$. Apparently, for $\eta = \eta_H, \eta_L$, $W_\eta(\underline{l}) - h(\underline{l}) = v_L + \frac{1}{2}(v_H - v_L) - h(\underline{l}) > v_L - \mathrm{k}(\underline{l}) = U^S(\underline{l})$. At $l = \bar{l}$, $W_{\eta_L}(l) = v_L$ and $W_{\eta_L}(\bar{l}) - h(\bar{l}) = v_L < v_H = U^S(\bar{l})$; $W_{\eta_H}(\bar{l}) - h(\bar{l}) = v_H = U^S(\bar{l})$.

With Assumption 5,

$$U^{S'}(l) > \beta'(l)(v_H - v_L) - h'(l) > -\beta'(l)(v_H - v_L) - h'(l),$$

implying that $W_{\eta_L}(l) - \mathrm{h}(l) - U^S(l)$ decreases in l. Hence, upon observing a low signal, there exists $\hat{l}^C \in [\underline{l}, \bar{l}]$ such that the investor, therefore, decides to not follow the advice if and only if $l > \hat{l}^C$.

With Assumption 5, $[W_{\eta_H}(l) - \mathrm{h}(l)] - U^S(l)$ decreases in l. Since $W_{\eta_H}(\underline{l}) - \mathrm{h}(\underline{l}) - U^S(\underline{l}) > 0$ and $W_{\eta_H}(\bar{l}) - h(\bar{l}) - U^S(\bar{l}) = 0$, $W_{\eta_H}(l) - \mathrm{h}(l) - U^S(l) \geq 0$ for all $l \in [\underline{l}, \bar{l}]$. Hence, an investor will always follow offered advice upon observing a high signal.

Accordingly, when $l \leq \hat{l}^C$, the expected utility is $U^C(l) = \mu v_H + (1-\mu)v_L - \mathrm{h}(l) - F^C$.

When $l \geq \hat{l}^C$, the investor will observe a high signal with probability $\mu\beta(l) + (1-\mu)(1-\beta(l)) = 1/2$, follow the advice, and expect a utility (conditional to a high signal) of $W_{\eta_H}(l) - \mathrm{h}(l) - F^C$. At a probability of $\mu(1-\beta(l)) + (1-\mu)\beta(l) = 1/2$ she observes a low signal and chooses to make her own investment decisions, thereby deriving a utility of $U^S(l) - F^C$—that is,

$$
\begin{aligned}
U^C(l) &= \left[\mu\beta(l) + (1-\mu)\left(1-\beta(l)\right)\right]\left[W_{\eta_H}(l) - \mathrm{h}(l) - F^C\right] \\
&\quad + \left[\mu(1-\beta(l)) + (1-\mu)\beta(l)\right]\left[U^S(l) - F^C\right] \\
&= U^S(l) + \frac{1}{2}\left[W_{\eta_H}(l) - \mathrm{h}(l) - U^S(l)\right] - F^C
\end{aligned}
$$

A.2. Proof of *Proposition 1*

As we have shown in the proof of Lemma 1, according to Assumption 5, $U^C(l) - U^S(l)$ decreases in l. In addition, $U^C(\bar{l}) = v_H - F^C < v_H = U^S(\bar{l})$, and (according to Assumption 1)

$$U^C(\underline{l}) = \frac{1}{2}v_H + \frac{1}{2}v_L - h(\underline{l}) - F^C > v_L - \mathrm{k}(\underline{l}) = U^S(\underline{l}).$$

Define l_2 as the l satisfying $U^S(l_2) = U^C(l_2)$, with a unique l_2. Hence, $U^S(l) > U^C(l)$ if $l > l_2$.

Since $h(\underline{l}) > F^D - F^C$ (Assumption 3), $U^C(\underline{l}) = \mu v_H + (1-\mu)v_L - \mathrm{h}(l) - F^C < U^D$. Further, $U^C(\bar{l}) = v_H - F^C > U^D$. Since $U^{C'}(l) > 0$, there exists l_1 such that $U^D > U^C(l)$ if $l < l_1$. Specifically, l_1 is determined by $U^C(l_1) = U^D$.

This proof is completed by showing that $l_1 < l_2$. Since $U^{C'}(l) > 0$, we only need to show $U^C(l_2) > U^D$. Note that if $F^D - F^C > \mathrm{h}(l_2)$ (Assumption 4), then

$$U^C(l_2) \geq \frac{1}{2}v_H + \frac{1}{2}v_L - h(l_2) - F^C > \frac{1}{2}v_H + \frac{1}{2}v_L - F^D = U^D.$$

Appendix B. Survey questions for main variables

Use of financial advice

Which of the following best describes your current investment style?
I make all my investment decisions on my own without the help of a broker or professional adviser.....1
I make some decisions on my own and some with the help of a broker or professional adviser 2
I let my broker or professional adviser make all my decisions for me 3
Don't know 98
Prefer not to say 99

Financial literacy questions (correct answers in bold)

1. If you buy a company's stock
You own a part of the company.....1
You have lent money to the company.....2
You are liable for the company's debts 3
The company will return your original investment to you with interest.....4
Don't know 98
Prefer not to say 99

2. If you buy a company's bond
You own a part of the company 1
You have lent money to the company 2
You are liable for the company's debts 3
You can vote on shareholder resolutions.....4
Don't know 98
Prefer not to say 99

3. If a company files for bankruptcy, which of the following securities is most at risk of becoming virtually worthless?
The company's preferred stock 1
The company's common stock.....2
The company's bonds.....3
Don't know 98
Prefer not to say 99

4. In general, investments that are riskier tend to provide higher returns over time than investments with less risk.
True 1
False.....2
Don't know 98
Prefer not to say 99

5. Over the last 20 years in the U.S., the best average returns have been generated by:

Stocks 1
Bonds 2
CDs 3
Money market accounts 4
Precious metals 5
Don't know 98
Prefer not to say 99

6. What has been the approximate average annual return of the S&P 500 stock index over the past 20 years (not adjusted for inflation)?

-10% 1
-5% 2
+5% 3
+10% 4
+15% 5
+20% 6
Don't know 98
Prefer not to say 99

7. Which of the following best explains the distinction between nominal returns and real returns?

Nominal returns are pre-tax returns; real returns are after-tax returns 1
Nominal returns are what an investment is expected to earn; real returns are what an investment actually earns 2
Nominal returns are not adjusted for inflation; real returns are adjusted for inflation 3
Nominal returns are not adjusted for fees and expenses; real returns are adjusted for fees and expenses 4
Don't know 98
Prefer not to say 99

8. Which of the following best explains why many municipal bonds pay lower yields than other government bonds?

Municipal bonds are lower risk 1
There is a greater demand for municipal bonds 2
Municipal bonds can be tax-free 3
Don't know 98
Prefer not to say 99

9. You invest $500 to buy $1,000 worth of stock on margin. The value of the stock drops by 50%. You sell it. Approximately how much of your original $500 investment are you left with in the end?

$500 1
$250 2
$0 3
Don't know 98
Prefer not to say 99

10. Which is the best definition of "selling short?"
Selling shares of a stock shortly after buying it. 1
Selling shares of a stock before it has reached its peak 2
Selling shares of a stock at a loss 3
Selling borrowed shares of a stock 4
Don't know 98
Prefer not to say 99

Basic financial literacy questions (correct answers in bold)

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 1
Exactly $102 2
Less than $102 3
Don't know 98
Prefer not to say 99

2. 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....1
Exactly the same 2
Less than today....3
Don't know 98
Prefer not to say 99

3. Suppose you owe $1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?
Less than 2 years 1
At least 2 years but less than 5 years....2
At least 5 years but less than 10 years 3
Don't know 98
Prefer not to say 99

4. A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.
True 1
False....2
Don't know 98
Prefer not to say 99

About the authors

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