

The Financial Illiteracy and Overconfidence of Margin Traders

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SUMMARY

- We use survey data from 2015 to examine the financial literacy and other characteristics of US investors with non-retirement investment accounts (both advised and self-directed) – focusing on investors who have margin approval from their brokerages or margin-trading experience (i.e., investors who have ever purchased securities on margin). We find that, on average, investors who trade using margin have lower financial literacy and understand margin trading less well than those who do not trade using margin (either because they do not have margin approval or because they choose not to borrow in margin-approved accounts). Notably, only 15% of margin traders could answer a basic question about margin correctly, compared to 31% of non-margin traders.
- Further analysis reveals that, on average, investors with margin-trading experience and approval have higher risk tolerance and confidence in their investment knowledge than those without. Overconfidence in investment knowledge appears to be a key element in explaining why lower-literacy traders gravitate toward margin.
- Our findings also suggest the need for additional research to study whether these findings generalize to other leveraged instruments or strategies.

¹ The U.S. Securities and Exchange Commission, as a matter of policy, disclaims responsibility for any private publication or statement of any of its employees. The views expressed herein are those of the author and do not necessarily reflect the views of the Commission or of the author's colleagues upon the staff of the Commission. The authors prepared this white paper as a part of the Division of Economic and Risk Analysis (DERA) White Paper series.

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I. Background

There is ongoing discussion about whether and when retail investors would benefit from increased or decreased access to risky trading strategies and instruments. One concern is that retail investors may not fully understand the risks to which they are being exposed as a result of low financial literacy, inadequate disclosure, complexity, or some combination thereof.

This white paper uses survey data of US investors with non-retirement investment accounts collected by the FINRA Investor Education Foundation in 2015 to compare the financial literacy and other characteristics of investors who have engaged in a specific leveraged trading activity – margin trading – with those of investors who have not so engaged.³ Our research question is whether or not margin traders possess both a greater understanding of the risks inherent in trading on margin and greater levels of financial literacy than other investors. The answer to this question can help to inform the debate as to whether these investors might benefit from additional protections and/or education. SEC Rule 10b-16 under the Securities Exchange Act of 1934 (Disclosure of Credit Terms in Margin Transactions) and FINRA Rule 2264 (Margin Disclosure Statement) mandate specified disclosures that broker-dealers must make to investors who open retail margin accounts. Required disclosures include the credit terms in margin transactions as well as disclosures regarding the risks of trading securities on margin. Exchange Act Rule 10b-16 is designed to parallel the scope of the Truth in Lending Act. FINRA Rule 4210 (Margin Requirements) describes the margin requirements that determine the amount of collateral customers are expected to maintain in their margin accounts. Broker-dealers that recommend margin accounts are required to comply with specified minimum professional conduct obligations. In particular, a broker-dealer’s recommendation to purchase securities on margin would be considered an investment strategy and subject to a broker-dealer’s obligation to only make suitable recommendations pursuant to FINRA Rule 2111 (Suitability).⁴ Regulations which govern retail trading in another risky instrument with embedded leverage – options – also require the broker to collect specific customer information and either approve or disapprove access to options.⁵

II. Related Literature

In studies related to ours, Heimer and Simsek (2017) and Heimer and Imas (2017) find that higher leverage is associated with losses for retail investors in the foreign exchange market. There is a large literature documenting a positive correlation between the level of financial literacy and the level of financial risk-taking. Hsiao and Tsai (2017) find that Taiwanese investors with higher financial literacy were more likely to have participated in derivatives markets. In contrast, we find that US investors who engage in certain leveraged trading strategies (i.e., margin) have lower literacy, on average, than those who do not. Cultural and institutional factors may account for the differences in findings between the Hsiao and Tsai (2017) study and ours. Yoong (2011) uses survey data from RAND’s American Life Panel

³ The FINRA Investor Education Foundation data are available here: <http://www.usfinancialcapability.org/downloads.php>.

⁴ See FINRA Rule 2111 (Suitability) FAQs Q4: <http://www.finra.org/industry/fag-finra-rule-2111-suitability-fag>.

⁵ See FINRA Rule 2360: http://finra.complinet.com/en/display/display_main.html?rbid=2403&element_id=6306.

to document that US households with greater financial literacy are more likely to participate in the US stock market. Rooij, Lusardi, and Alessie (2011) document a similar pattern in Dutch survey data. Cox, Brounen, and Neuteboom (2015) also use Dutch survey data to document that households with greater financial literacy are more likely to choose riskier alternative mortgage products. Using the same Dutch data, von Gaudecker (2015) finds that lower financial literacy is associated with under-diversification of household portfolios. However, knowledge of specific financial concepts (such as stocks and mutual funds) exhibits no statistical relation with under-diversification. Clark, Lusardi, and Mitchell (2015) find that greater financial literacy on the part of the investor is associated with: 1) higher allocation of the investor's portfolio to stocks, 2) higher portfolio expected return and volatility, and 3) lower portfolio idiosyncratic volatility within a specific employer's defined benefit retirement plan. Hilgert, Hogarth, and Beverly (2003) show that consumers with higher investment knowledge are more likely to engage in beneficial behaviors such as diversification and owning stocks, mutual funds, or investment accounts. Bateman, et al. (2014) show that experimental subjects with lower financial literacy are less likely to change investment choices in response to changes in risk disclosed in various formats.

There are also numerous studies exploring the relation between educational attainment or cognitive ability and likelihood of stock-market participation. Haliassos and Bertaut (1995), Calvet, Campbell, and Sodini (2007, 2009a, 2009b), and Calvet and Sodini (2014) find that higher educational attainment is associated with increased stock market participation, while Christelis, Japelli, and Padula (2010) find that higher grade-school math scores are associated with higher levels of stock market investment. Grinblatt, Keloharju, and Linnainmaa (2011) also find that higher IQ is associated with greater likelihood of stock-market participation as well as with investment portfolios exhibiting greater diversification, lower risk and higher Sharpe ratios. Jorring (2017) shows that consumers who make fewer financial mistakes (as captured by paying avoidable credit card fees) have higher assets including those in investment accounts.

FINRA (2016) also uses survey data collected by the FINRA Investor Education Foundation in 2015 to provide descriptive information on US investors. The survey asks questions related to investor demographics, general financial knowledge and attitudes, and behavior related to topics such as portfolio allocation, financial advice, disclosures, and fees. FINRA (2016) finds that roughly a third of US investors have margin-approved accounts, while roughly half of approved investors have traded using margin. They also find that margin accounts are most prevalent among younger investors, aged 18 to 34. We use these same data to shed additional light on the types of investors who are most likely to trade on margin. To our knowledge, our study is the first to study the relationship between margin trading and financial literacy.

III. Data and Analysis

We analyze data from a 2015 FINRA Investor Education Foundation survey of 2,000 representative US investors with investments in non-retirement accounts. The survey includes information on investor demographics, beliefs and attitudes toward financial markets and intermediaries, trading activities and asset ownership, and types of investment accounts including margin accounts and various advised

accounts. The survey also includes a 10-question quiz covering basic investment concepts such as the general properties of stocks and bonds.⁶ Of particular interest to us is the question intended to measure an investor's understanding of margin trading. It reads:

“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?”

The survey offers five possible answers to this question (with (3) being the correct answer): (1) \$500, (2) \$250, (3) \$0, (4) Don't know, and (5) Prefer not to say. We seek to understand to what degree investors with margin-trading experience and approval understand margin. We also seek to assess whether margin investors have higher or lower financial literacy than non-margin investors.

The average respondent was only able to answer 4.4 of the 10 quiz questions correctly, resulting in an average score of 44%.⁷ Understanding of margin was even lower, with only 23% answering the margin question correctly.⁸ In Figure 1, we ask how the ability to answer the quiz questions varies with margin experience and approval. In the top panel, we find evidence that margin traders appear to understand margin *less well* than non-margin traders. In particular, only 15% of margin traders answered the margin question correctly, compared to 31% of non-margin traders. This difference is driven by incorrect answers and not by omitted answers on the part of margin traders. Only 4.3% of margin traders responded either “do not know” or “prefer not to answer” while 18.3% of non-margin traders provided either of these responses. Therefore, 81% of margin traders gave an incorrect response of either (1) or (2) to this question, while only 49% of non-margin traders provided one of these incorrect responses.

Margin traders also exhibit lower levels of overall investor literacy. On average, margin traders answered 41% of the 10 questions correctly, compared to 50% for non-margin traders. Both differences (total score and response to the margin question) between margin and non-margin traders are statistically significant at the 1% level.

The bottom panel of Figure 1 focuses on margin approval instead of margin experience. Differences in literacy between margin-approved and non-margin approved investors are not as dramatic as they are between margin users and non-users of margin. For example, margin-approved investors answered 46% of the 10 questions correctly, on average, while non-margin approved investors answered 49% correctly. This difference is still significant at the 5% level, however. In addition, 26% of margin-approved investors could answer the margin question correctly versus 28% of non-margin-approved investors. This difference is not statistically significant at the 10% level.

⁶ The FINRA Investor Education Investor Survey can be found here: <http://www.usfinancialcapability.org/quiz-literacy.php>.

⁷ Responses of “do not know” and “prefer not to say” for literacy quiz questions were scored as incorrect in accord with other survey-based studies of financial literacy.

⁸ Throughout our analysis, we use averages with weighted observation to account for statistical over- or under-representation in the sample. The two exceptions are the probit regression and correlation analyses in tables 1-3.

These patterns imply that the most interesting variation is related to the choice to utilize margin rather than the choice to obtain margin approval. This finding is not surprising given that margin approval is not necessarily an affirmative choice by investors. Some brokerage accounts feature margin approval as the default option or the only option. Therefore, investor choice plays a weaker role in margin approval than in margin trading. However, margin approval often requires a proactive request by the investor and/or certain credit-related screening by the brokerage firm. For this reason, we analyze which variables are associated with margin approval to determine which ones are related to investors' propensity to request margin approval or brokerages' propensity to grant such approval.

We next compare the confidence and risk-aversion of margin traders and non-margin traders. Our prediction is that margin traders will exhibit both higher levels of confidence and lower levels of risk aversion. The survey includes two questions that allow us to measure confidence in one's ability and knowledge as an investor:

- 1) "Over the next 12 months, how well do you expect your portfolio of investments to perform? (1) Worse than the market, (2) About the same as the market, (3) Better than the market"
- 2) "On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall knowledge about investing?"

These questions also offered "do not know" and "prefer not to say" as possible responses. We create two measures of confidence based on these questions. We define *Confidence1* to be the percentile degree of outperformance expressed in question 1, measured across all respondents. This measure has a mean of 0.23 and a standard deviation of 0.31. We define *Confidence2* to be the percentile self-assessed knowledge in question 2 minus the percentile score on the 10-question quiz, which has a mean of 0.00 and a standard deviation of 0.37.⁹ Barber and Odean (2000) find empirical evidence consistent with systematic overconfidence on the part of retail discount-brokerage clients.¹⁰ Therefore, it is likely that our measures capture overconfidence on the part of retail investors. However, we cannot definitively say that the particular value of either confidence measure is excessive relative to a rational benchmark. We subsequently discuss alternative evidence consistent with overconfidence by margin traders. Regardless of which measure we use, Figure 2 reveals that investors with margin-trading experience and approval have higher levels of confidence than those without. Both differences (*Confidence1* and *Confidence2*) between margin and non-margin traders are statistically significant at the 1% level.

The survey also includes two questions intended to measure an investor's level of risk-aversion:

- 1) "Which of the following statements comes closest to describing the amount of financial risk that you are willing to take when you save or make investments? (1) Take substantial financial

⁹ Any participants who responded "do not know" and "prefer not to say" were given a missing value for all of our variables except for our investor literacy variables for which these responses were scored as incorrect.

¹⁰ Barber and Odean (2000) find that retail investors trade excessively, thereby incurring costs and underperforming the market. They conclude that these investors are overconfident in that they overestimate their ability to earn extraordinary returns from their trading.

risks, (2) Take above average financial risks, (3) Take average financial risks, (4) Not willing to take any financial risks”

- 1) “How much of your non-retirement portfolio is invested in stocks or mutual funds that contain stocks? (1) More than half, (2) Less than half, (3) None”

Again, these questions also offered “do not know” and “prefer not to say” as possible responses. Our two measures of risk-aversion, *Risk_Avers1* and *Risk_Avers2*, reflect the degree of risk-aversion indicated by responses to these two questions in percentile terms across subjects. As predicted, Figure 3 reveals that risk-aversion is lower among both margin traders and margin-approved investors than among other investors. Both differences (*Risk_Avers1* and *Risk_Avers2*) between margin and non-margin traders are statistically significant at the 1% level.

We next turn to multivariate regression analyses to shed light on which of these factors is related to margin trading and margin approval, controlling for other factors. We provide a series of probit regressions.¹¹ In Table 1, the dependent variable equals one if the investor is a margin trader; in Table 2, the dependent variable equals one if the investor is margin-approved. The set of independent variables includes dummy variables to capture gender, age, ethnicity, family structure, educational attainment, income level, and portfolio value; the measures of financial literacy, risk aversion, and confidence introduced above; and measures of optimism and trust. The measures of optimism and trust are defined in the appendix to this paper. These findings show that the following variables reliably increase the propensity to have margin approval and engage in margin trading across regressions (at the 5% significance level): being under 55, having children, risk-tolerance (the inverse of either *Risk_Avers1* or *Risk_Avers2*), investor literacy quiz score, and confidence as measured by self-assessed investment knowledge minus actual knowledge (*Confidence2*).¹²

Therefore, higher investor literacy appears to increase the propensity to possess margin approval or engage in margin trading when controlling for other factors. Further analysis indicates that overconfidence about investment knowledge (as measured by *Confidence2*) by margin traders may be a critical factor in explaining low literacy among margin traders on average. First, an investor’s score on the literacy quiz is negatively related to *Confidence2*. Table 3 shows the correlation matrix for overall and margin quiz scores and the five significant variables across regressions mentioned above (being 55 or older, having children, *Risk_Avers1*, *Risk_Avers2*, and *Confidence2*). The correlation between overall quiz score and *Confidence2* has the highest magnitude estimated coefficient of -0.64. This relation is not surprising since the two are related mechanically, i.e., *Confidence2* is computed by subtracting the quiz score in percentile terms from self-assessed investment knowledge.¹³ Margin traders also appear to

¹¹ Our findings are robust to alternative regression models such as OLS with heteroscedasticity-consistent standard errors. These results are available upon request.

¹² The effects of age and portfolio value on margin trading and approval are not surprising if these variables are positively and negatively related to risk-aversion, respectively. However, the effect of having children is a novel finding which may deserve further examination in future research.

¹³ In addition, the (unreported) regression coefficient for quiz score becomes negative and significant (at the 10% level) if *Confidence2* is removed from the probit regression with margin trading as the dependent variable. Therefore, *Confidence2* can account for the negative unconditional relationship between margin trading and literacy.

have more confidence in their understanding of margin than non-margin traders since only 3.8% of margin traders answered “I don’t know” to the margin literacy question, whereas 17.8% of non-margin traders gave this response.¹⁴ However, this pattern of responses indicates excessive confidence on the part of margin traders (relative to non-margin traders) since fewer margin traders answered this question correctly.

These findings naturally raise the question of whether they apply to other instruments and activities – particularly those with embedded leverage or other types of risk. The FINRA Investor Education Foundation survey contains some information on ownership of the following asset types: individual stocks, individual bonds, mutual funds, ETFs, annuities (fixed, indexed, or variable), whole life insurance, commodities or futures, and other (e.g., REITs, options, private placements, and structured notes). Figure 4 shows how the average literacy-quiz score differs between owners and non-owners of each these asset types. These findings suggest that literacy may be lower for ownership of commodities and futures.¹⁵ However, this finding is not statistically significant.

IV. Conclusion

Our analysis has uncovered a marked lack of financial literacy and understanding of margin by retail margin traders. It also suggests that overconfidence in financial knowledge is a key factor in driving low literacy investors to pursue higher-risk leveraged trading strategies. Additional research is needed to determine whether investors in other leveraged instruments and strategies exhibit different literacy and understanding of the associated risks as compared to investors who don’t engage in these risks.

¹⁴ As mentioned previously, the percent of margin traders who answered both “I don’t know” and “I prefer not to answer” is 4.3% versus 18.3% for non-margin traders.

¹⁵ Figure 3 indicates that investor literacy is significantly lower for owners of insurance-related investment products (i.e., whole life insurance and annuities).

V. Appendix

We measure optimism using the percentile across respondents of the sum of the responses to the following two questions:

- 1) “How confident are you that U.S financial markets offer good long-term opportunities for investors?” (responses on 1-10 scale)
- 2) “What do you expect the approximate average annual return of the S&P 500 stock index to be over the next 10 years (without adjusting for inflation)? (responses on 1-6 scale ranging from <0% return to >20% return).

We include three measures of trust in our regression analyses.

Trust1 captures the degree of perceived fairness in financial markets and is measured by the response to the following question, as a percentile across respondents:

“How confident are you that U.S financial markets... - Are fair to all investors?” (responses on 1-10 scale)

Trust2 captures the degree of concern about financial fraud and is measured by the response to the following question, as a percentile across respondents:

“How strongly do you agree or disagree with the following statement? – I am worried about being victimized by investment fraud?” (responses on a 1-7 scale, transformed so that 1 represents the most worry)

Trust3 captures the degree of confidence in regulators and is measured by the sum of the responses to the following three questions, as a percentile across respondents:

- 1) “How confident are you that... - U.S. financial markets are effectively regulated to protect investors from fraud and abusive sales practices?” (responses on 1-10 scale)
- 2) “How confident are you that... - U.S. financial regulators are able to keep up with new market developments, investment vehicles and investment technologies?” (responses on 1-10 scale)
- 3) “How confident are you that... - The regulators of U.S. financial markets are looking out for ordinary investors?” (responses on 1-10 scale)

Our measures treat “do not know” and “prefer not to say” responses as missing observations.

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Figure 1: Investor Literacy by Margin Trading and Approval

The bar charts below show weighted averages for the following two variables: *Inv_Lit_Total* refers to the average fraction of the 10 total quiz questions answered correctly, while *Inv_Lit_Margin* refers to the fraction of respondents who answered the margin question correctly.

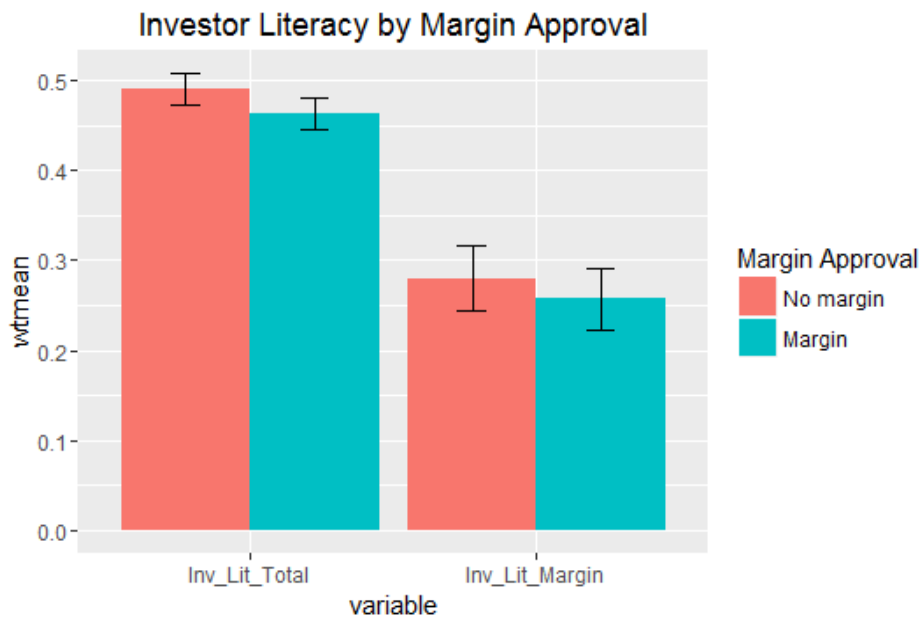
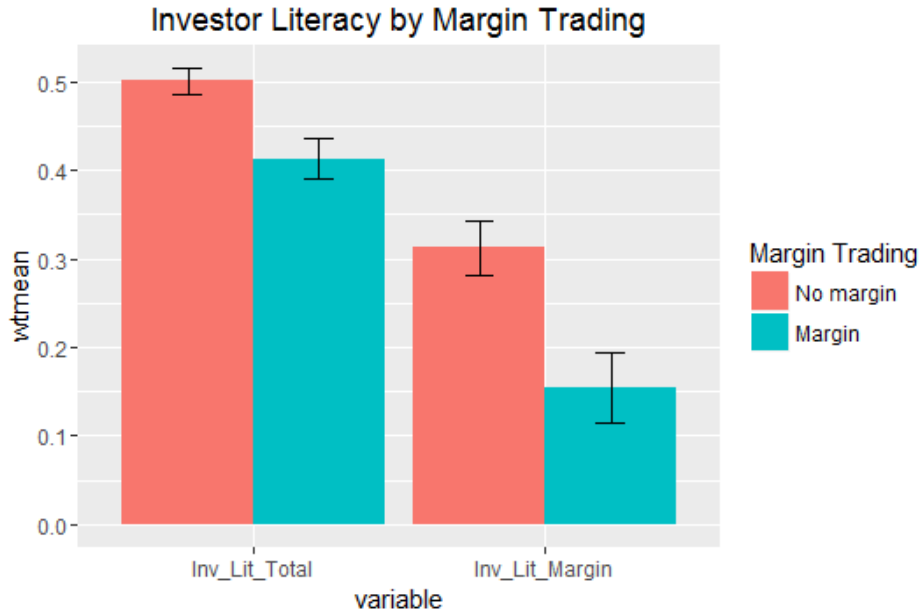


Figure 2: Confidence by Margin Trading and Approval

The bar charts below show weighted averages for the following two variables: *Confidence1* is the percentile degree of outperformance predicted for one's portfolio across respondents, while *Confidence2* is the percentile of one's self-assessed investment knowledge minus the percentile score on the quiz.

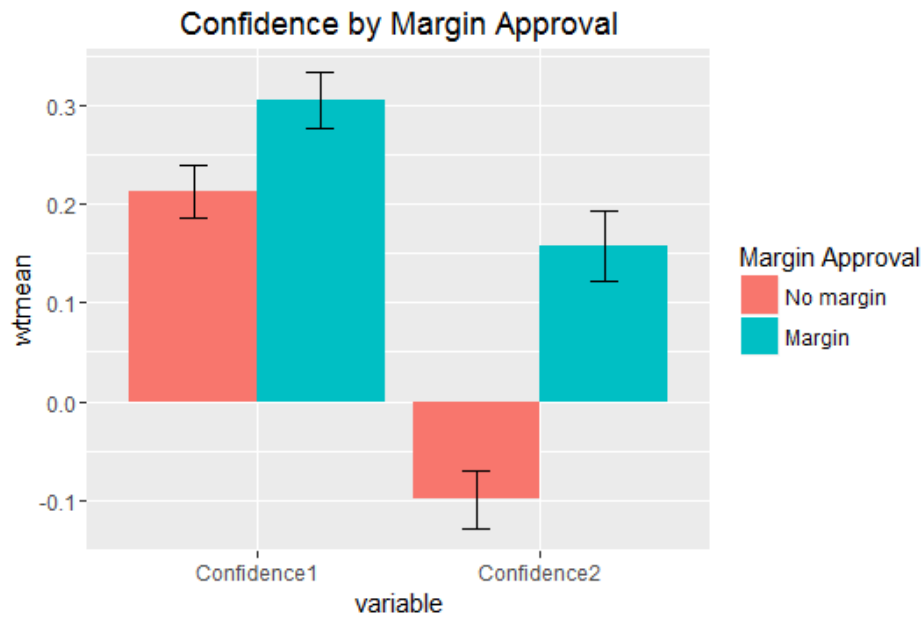
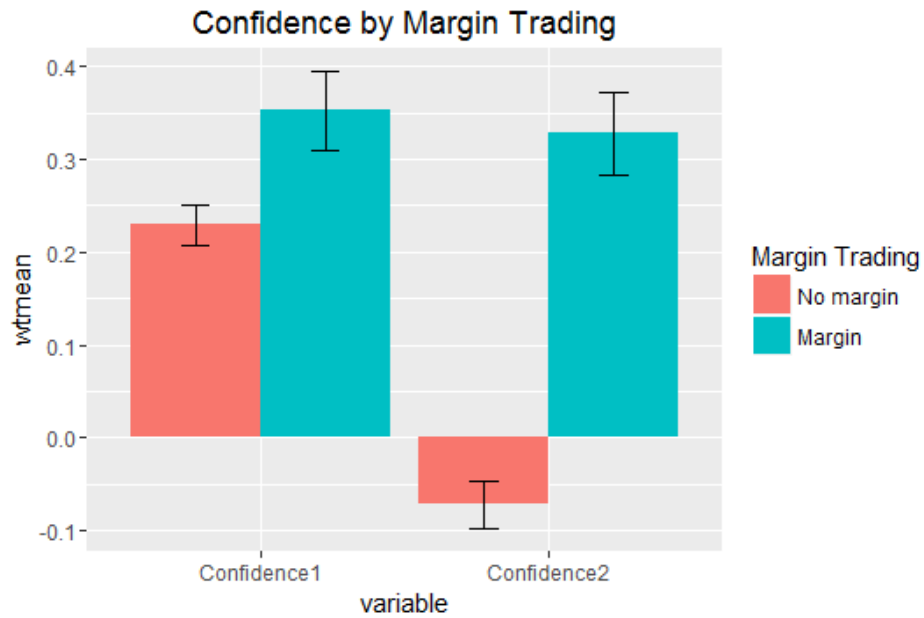


Figure 3: Risk Aversion by Margin Trading and Approval

The bar charts below show weighted averages for the following two variables: *Risk_Avers1* is the investor's stated unwillingness to take risks in percentile terms across respondents, while *Risk_Avers2* is the investor's approximate avoidance of stocks in her non-retirement portfolio in percentile terms.

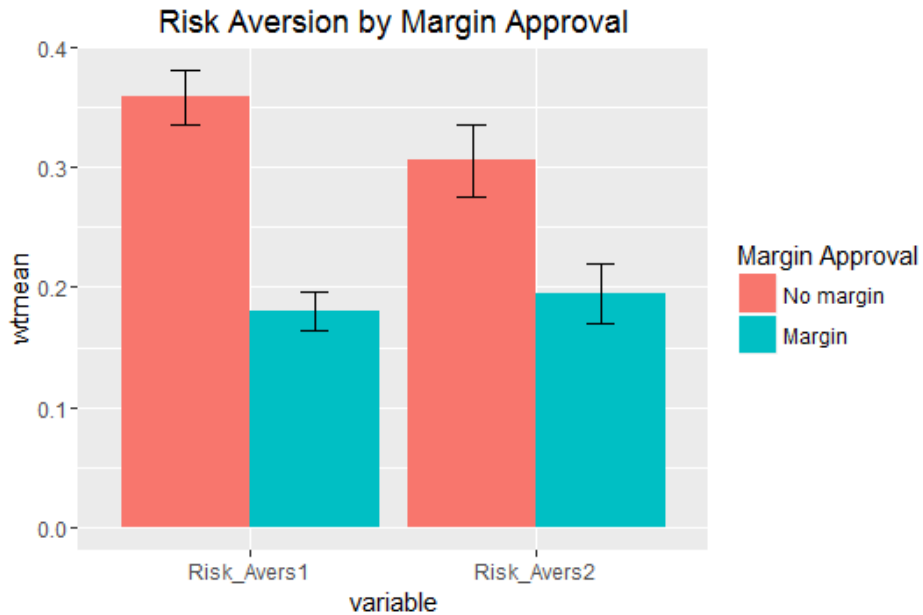
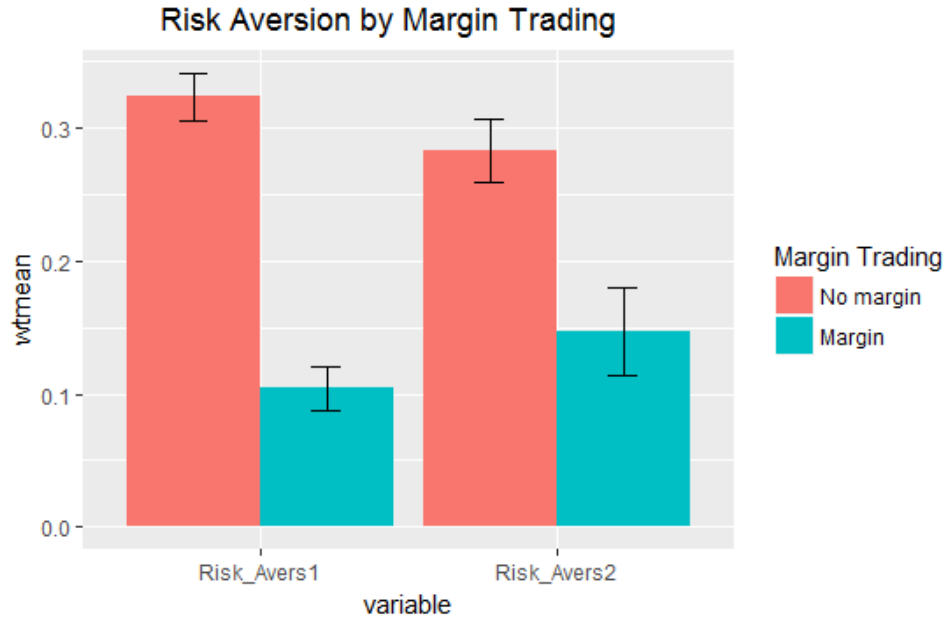


Figure 4: Investor Literacy by Ownership Across Types of Assets

The bar chart below shows weighted averages for *Inv_Lit_Total*, which is the fraction of the 10 quiz questions answered correctly. The “Other” category below includes REITS, options, private placements, and structured notes.

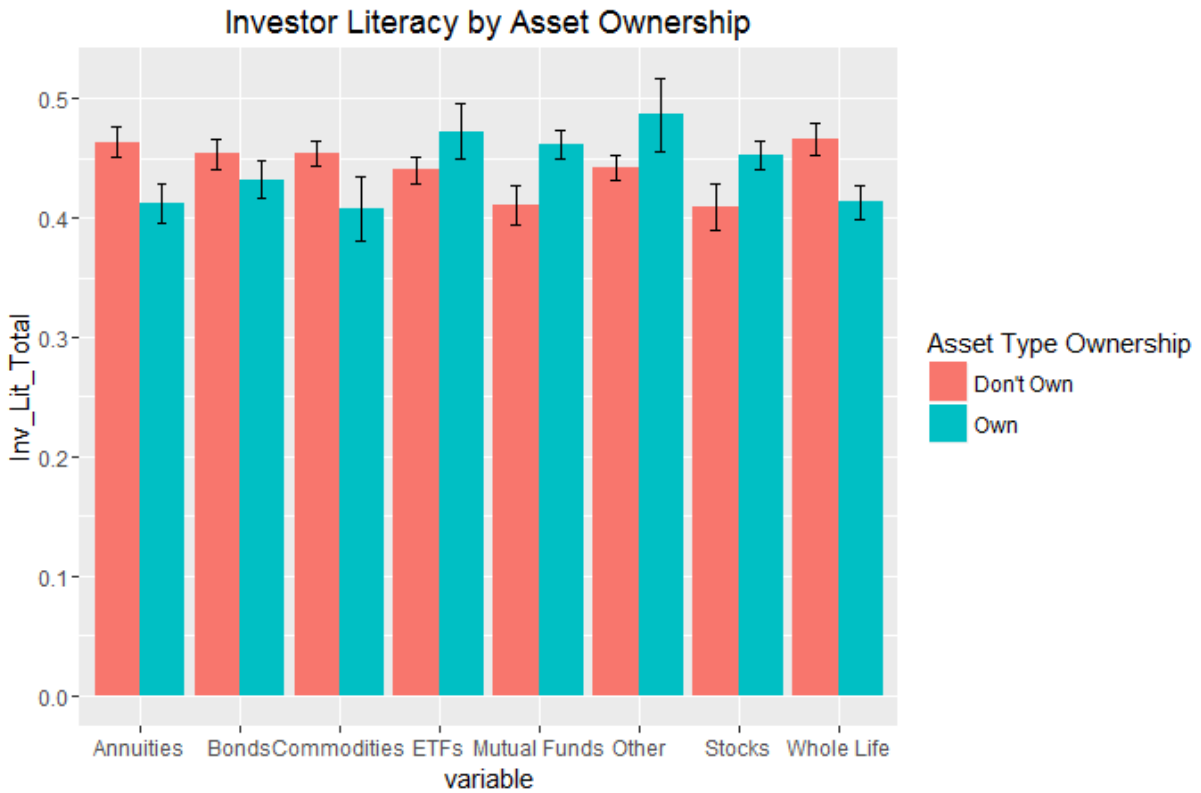


Table 1: Margin Trading and Investor Characteristics

The table reports the coefficient estimates and p-values from probit regressions of indicators for margin trading versus the following investor characteristics: indicator variables for being female; being a college graduate; non-white ethnicity; being married; being aged 35-54 years; being aged 55 years or older; having children; household income of \$50-100K; income of \$100K or greater; portfolio value of \$50-200K; portfolio value of \$200K or greater; residing in the Midwest, South, and West regions; *Inv_Lit_Total* (the fraction of the 10 total quiz questions answered correctly); *Inv_Lit_Margin* (an indicator for answering the quiz question on margin correctly); *Risk_Avers1* (the stated unwillingness to take risks as a percentile); *Risk_Avers2* (allocation to non-equity securities as a percentile); *Trust1* (the investor's trust in financial markets and institutions as a percentile); *Trust2* (the lack of worry about fraud as a percentile); *Trust3* (confidence in regulators as a percentile); *Confidence1* (degree of outperformance predicted for the investor's portfolio as a percentile); *Confidence2* (self-assessed investment knowledge as a percentile minus quiz score as a percentile). (**), (*), and (·) indicate statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

| | Estimate | p-value | Estimate | p-value |
|------------------------------|-----------|---------|-----------|---------|
| Female | 0.007 | 0.950 | -0.026 | 0.819 |
| Age: 35-54 | -0.286** | 0.043 | -0.265* | 0.060 |
| Age: 55 and up | -0.462*** | 0.005 | -0.429*** | 0.009 |
| Income: \$50-\$100K | -0.218 | 0.184 | -0.211 | 0.194 |
| Income: >\$100K | -0.295 | 0.110 | -0.260 | 0.156 |
| College Grad | 0.240** | 0.041 | 0.272** | 0.019 |
| Non-white | 0.086 | 0.467 | 0.072 | 0.542 |
| Married | 0.041 | 0.738 | 0.026 | 0.832 |
| Children | 0.212*** | 0.000 | 0.206*** | 0.000 |
| Midwest Region | 0.069 | 0.661 | 0.043 | 0.781 |
| South Region | 0.021 | 0.888 | 0.007 | 0.961 |
| West Region | 0.140 | 0.340 | 0.131 | 0.370 |
| Portfolio Value: \$50-\$200K | 0.356** | 0.014 | 0.368** | 0.011 |
| Portfolio Value: >\$200K | 0.286* | 0.069 | 0.312** | 0.046 |
| <i>Inv_Lit_Total</i> | 0.829** | 0.030 | | |
| <i>Inv_Lit_Margin</i> | | | 0.038 | 0.765 |
| <i>Risk_Avers1</i> | -1.623*** | 0.000 | -1.755*** | 0.000 |
| <i>Risk_Avers2</i> | -0.648*** | 0.000 | -0.672*** | 0.000 |
| Optimism | -0.080 | 0.747 | -0.025 | 0.921 |
| <i>Trust1</i> | 0.387 | 0.169 | 0.381 | 0.173 |
| <i>Trust2</i> | -0.583*** | 0.003 | -0.543*** | 0.005 |
| <i>Trust3</i> | 0.308 | 0.228 | 0.315 | 0.218 |
| <i>Confidence1</i> | 0.272* | 0.083 | 0.300* | 0.054 |
| <i>Confidence2</i> | 1.170*** | 0.000 | 0.871*** | 0.000 |
| (Intercept) | -1.358*** | 0.001 | -0.956*** | 0.008 |
| Number of Observations | 1016 | | 1016 | |

Table 2: Margin Approval and Investor Characteristics

The table reports the coefficient estimates and p-values from probit regressions of indicators for margin account approval versus the following investor characteristics: indicator variables for being female; being a college graduate; non-white ethnicity; being married; being aged 35-54 years; being aged 55 years or older; having children; household income of \$50-100K; income of \$100K or greater; portfolio value of \$50-200K; portfolio value of \$200K or greater; residing in the Midwest, South, and West regions; *Inv_Lit_Total* (the fraction of the 10 total quiz questions answered correctly); *Inv_Lit_Margin* (an indicator for answering the quiz question on margin correctly); *Risk_Avers1* (the stated unwillingness to take risks as a percentile); *Risk_Avers2* (allocation to non-equity securities as a percentile); *Trust1* (the investor's trust in financial markets and institutions as a percentile); *Trust2* (the lack of worry about fraud as a percentile); *Trust3* (confidence in regulators as a percentile); *Confidence1* (degree of outperformance predicted for the investor's portfolio as a percentile); *Confidence2* (self-assessed investment knowledge as a percentile minus quiz score as a percentile). (**), (*), and (·) indicate statistical significance at the 0.01, 0.05 and 0.10 levels, respectively.

| | Estimate | p-value | Estimate | p-value |
|------------------------------|-----------|---------|-----------|---------|
| Female | 0.006 | 0.951 | -0.024 | 0.799 |
| Age: 35-54 | -0.294** | 0.034 | -0.289** | 0.037 |
| Age: 55 and up | -0.430*** | 0.005 | -0.413*** | 0.006 |
| Income: \$50-\$100K | 0.187 | 0.179 | 0.202 | 0.144 |
| Income: >\$100K | 0.140 | 0.369 | 0.176 | 0.256 |
| College Grad | 0.121 | 0.218 | 0.154 | 0.115 |
| Non-white | 0.317*** | 0.004 | 0.314*** | 0.005 |
| Married | -0.008 | 0.942 | -0.014 | 0.892 |
| Children | 0.161*** | 0.002 | 0.157*** | 0.002 |
| Midwest Region | -0.070 | 0.601 | -0.077 | 0.563 |
| South Region | -0.160 | 0.201 | -0.165 | 0.187 |
| West Region | 0.055 | 0.663 | 0.049 | 0.695 |
| Portfolio Value: \$50-\$200K | 0.054 | 0.658 | 0.065 | 0.590 |
| Portfolio Value: >\$200K | 0.273** | 0.037 | 0.297** | 0.022 |
| Inv_Lit_Total | 1.033*** | 0.001 | | |
| Inv_Lit_Margin | | | 0.241** | 0.018 |
| Risk_Avers1 | -0.941*** | 0.000 | -1.065*** | 0.000 |
| Risk_Avers2 | -0.456*** | 0.002 | -0.478*** | 0.001 |
| Optimism | 0.447** | 0.031 | 0.507** | 0.014 |
| Trust1 | -0.176 | 0.450 | -0.177 | 0.445 |
| Trust2 | -0.332** | 0.041 | -0.311* | 0.055 |
| Trust3 | 0.114 | 0.594 | 0.129 | 0.543 |
| Confidence1 | 0.200 | 0.153 | 0.223 | 0.111 |
| Confidence2 | 1.005*** | 0.000 | 0.722*** | 0.000 |
| (Intercept) | -0.770** | 0.029 | -0.361 | 0.257 |
| Number of Observations | 1025 | | 1025 | |

Table 3: Correlations between Literacy and Investor Characteristics

This table reports correlations across investors for the following variables: *Inv_Lit_Total* (the fraction of the 10 total quiz questions answered correctly), *Inv_Lit_Margin* (an indicator for answering the margin question correctly), *Risk_Avers1* (the stated unwillingness to take risks as a percentile across respondents), *Risk_Avers2* (approximate allocation to non-equity securities as a percentile), *Confidence2* (percentile self-assessed investment knowledge minus the percentile score on the quiz), and indicators for the investor having children and being 55 years or older. (**) and (***) indicate statistical significance at the 0.01 and 0.05 levels, respectively.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|--------------------------|-------|----------|----------|-----------|-----------|-----------|-----------|
| 1. <i>Inv_Lit_Total</i> | 1.000 | 0.538*** | 0.151*** | -0.642*** | -0.091*** | -0.129*** | -0.199*** |
| 2. <i>Inv_Lit_Margin</i> | | 1.000 | 0.090*** | -0.384*** | -0.067*** | -0.050** | -0.084*** |
| 3. Age: 55 or Older | | | 1.000 | -0.278 | -0.455*** | 0.295*** | 0.071*** |
| 4. <i>Confidence2</i> | | | | 1.000 | 0.225*** | -0.195*** | 0.074*** |
| 5. Children | | | | | 1.000 | -0.189*** | -0.065*** |
| 6. <i>Risk_Avers1</i> | | | | | | 1.000 | 0.241*** |
| 7. <i>Risk_Avers2</i> | | | | | | | 1.000 |