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**Trust, ambiguity, and financial decision-making**

*Jim Engle-Warnick, Diego Pulido, Marine de Montaignac*

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# Trust, ambiguity, and financial decision-making<sup>\*</sup>

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## Abstract

This paper reports results from an on-line economics experiment with head of household participants that explores the connection between trust and investment behavior. We show that trust is correlated with both the degree to which an investor makes decisions independently and the willingness to invest in an ambiguous asset. Our experiment is the first to suggest a link between trust, ambiguity, and investor independence.

**Keywords:** trust, ambiguity, investment decisions, portfolio theory, artefactual field experiment.

**Codes JEL/JEL Codes:** C91, C93, G02, G11.

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# Introduction

It is well-known that investment behavior does not in the aggregate conform to standard modern portfolio theory. While theory, which assumes that people trade off expected return for reduced risk (Markowitz, 1952), predicts that nearly everyone should invest in risky asset markets, large numbers of people actually do not invest at all (Haliassos and Bertaut (1995)). Even among those who do invest, the rate of investment tends to be lower than expected (Haliassos and Bertaut (1995), Mankiw and Zeldes (1991)). While transaction costs (Attanasio and Paiella (2011)) can partially explain non-participation, they cannot explain why some wealthy households fail to invest (Heaton and Lucas (2000)).

Trust in financial markets, including trust in the data, information, investment firms, and people who make up institutions of investment, is integral to the decision to invest in risky assets. For example, Guiso et al. (2004) exploited the differences in trust levels between regions of Italy to find evidence consistent with the lack of trust being an important factor in explaining limited participation. Guiso et al. (2008) analyzed data across countries and found a similar result. Trust in individuals matters. Georgarakos and Pasini (2011) found that sociability has a positive effect on stock investment and that it helps to compensate for the negative effects of distrust. Using an experiment, Carlander and Johansson (2015) found evidence that trust is positively associated with the likelihood of using an advisor to make investments. The role of trust in finance has taken on more of an important role in investing following the crises and scandals of the past decade. Stix (2013) found evidence that the lack of trust in banks and experience with a banking crisis may lead people to save their money in cash, at home, instead of using a bank account. Guiso (2012) and de Meza (2010) found that insurance demand is positively associated with trust. <sup>1</sup>

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<sup>1</sup> It is also well-established that financial literacy is also important for investing, including both actual and self-assessed (see Lusardi and Mitchell (2014) for an overview). In this literature self-assessed literacy, often referred to as confidence, is prominent. For example, there is evidence that overconfident investors are more likely to over-trade (Barber and Odean (2001), Statman et al. (2006)). Parker et al. (2012) finds that people with greater values of self-assessment or confidence were more likely to report that they have planned

Ambiguity also plays an important role in financial markets. While standard portfolio theories stress the trade-off between risk and return, ambiguity is becoming increasingly important in explaining investment behavior and potentially linked to lack of participation in investment markets. Carbone et al. (2015) model an asset market using ambiguity to experimentally compare portfolio choice theory with ambiguity theory and identify rule of thumb behavior, and Bianchi and Tallon (2014) show that the effects of ambiguity aversion do not necessarily manifest themselves in the same way as risk aversion in portfolio choice. Dimmock et al. (2014) extend the inquiry to household portfolio choice. Carbone and Infante (2014) compare risk and ambiguity and rules of thumb in a life-cycle model.<sup>2</sup>

In this paper we experimentally explore the relationship between trust, ambiguity, and investment behavior. Our experimental results provide evidence for a mechanism through which trust can affect investment decisions. This paper makes two main contributions. First, it suggests a link between trust, investor independence (the degree to which an investor makes her decisions without advice or assistance), and ambiguity. Second, it establishes its results with an unusual on-line experiment with head-of-household participants of investment age. In our experiment, subjects make decisions in two different decision-making environments designed to elicit investment preferences under risk and ambiguity. Subjects also respond to a survey that contains sections on investment planning, investor independence, actual and self-assessed financial literacy, and trust.

Our results show that trust predicts behavior that primarily depends on others, while self-assessed financial literacy (and not trust) predicts behavior that depends primarily on oneself. Our experimental results show that people who trust are more likely to invest in an ambiguous, but not a risky, asset, where a risky asset has known returns with known probabilities and an ambiguous asset has unknown probabilities.

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for their retirement. Daniel et al. (1998) explains why overconfidence leads to taking more risk. De Bondt and Thaler (1995) summarizes the importance of overconfidence in financial decision making.

<sup>2</sup> An overview of this literature is contained in Guidolin and Rinaldi (2013).

Our results experimentally suggest a link between trust and ambiguity as influences in investor behavior. Specifically, the same quality of trust, within subjects, predicts both the seeking of financial advice and the willingness to invest in an ambiguous investment, while controlling for financial literacy. We thus provide the first evidence that a mechanism through which trust may work is through the desire to reduce the subjective assessment of uncertainty in ambiguous situations.

The paper is organized as follows. The next section enumerates the behavioral hypotheses of the paper. The following section presents the experimental design. Following the experimental design we present the results. The final section concludes.

## 1 Behavioral Hypotheses

Our experiment is designed to explore whether or not there is a link between trust and ambiguity in financial decision making. For our investigation, it is important to define when trust is required and when it is not required to make investment decisions. We must then model the investment. We proceed with the following three behavioural hypotheses.

There are a range of individual investing actions that an investor can take, from being able to locate an amount of money for an emergency, to having an actual emergency fund. Individual actions do not depend on others, and only require self-assessed competency to take them. This leads to Hypothesis 1.

**Hypothesis 1:** Self-assessed financial literacy predicts individual behavior that depends primarily on oneself.

There are actions an investor can take that that requires input from others, for example, inquiring as to the amount of money an investor will need upon retirement. These actions depend on trust, leading to Hypothesis 2.

**Hypothesis 2:** Trust predicts behavior that depends primarily on others.

We next model the investment. We consider two prominent types of investment models: risky and ambiguous. Risky assets have a probability distribution over known outcomes. Ambiguous assets have a probability distribution over a distribution of outcomes. Thus for an ambiguous asset, the outcomes are known but the probabilities are not. The ambiguous asset requires additional learning, as well as trust in the information required to learn about the unknown outcome probabilities. The idea here is that investors must rely on other sources for assistance with and information about ambiguity reduction, or they must trust institutional rules and features to fairly resolve the ambiguity for them. The additional requirement of trust does not exist for risk. This introduces Hypothesis 3.

**Hypothesis 3:** Trust and self-assessed financial literacy affect investment in an ambiguous risky, asset. Self-assessed financial literacy affects investment in a risky asset.

These hypotheses together provide a plausible mechanism through which trust may operate on investing behavior. If trust predicts investor non-independence, and investor non-independence predicts investment levels, then an additional, as yet unexplored, association between trust and ambiguity preferences would suggest that trust is associated with a willingness to engage in the complex environment of investing.

## 2 Experimental Design and Procedures

### 2.1 Overview

The on-line experiment consisted of a series of individual choice tasks and a survey. The following two subsections present the tasks reported in this paper and the survey. The third sub-section details experimental procedures.

## 2.2 Experimental Tasks

There were two experimental tasks designed to reveal investment choices. In the first task, subjects made nine independent decisions with a risky investment. In each of nine sequential periods, subjects were allocated \$3 and then required to split the amount between cash and an investment. The investment was a lottery that returned either 250% with probability 0.35, or -100% with probability 0.65. Each period was independent of previous periods, with earnings added together for total earnings, but final cash balances in a period were not carried over to subsequent periods. Subjects moved a slider between cash and the investment on their computer screen to register their decisions.

In the second task, subjects made nine independent decisions with an ambiguous investment. In each of nine sequential periods, subjects were allocated \$3 and then required to split the amount between cash and an investment. The investment was a lottery that returned either 250% with an unknown probability, or -100% with probability 1 minus the probability of the positive return. Each period was independent of previous periods, with earnings added together for total earnings, but final cash balances in a period were not carried over to subsequent periods. Subjects moved a slider between cash and the investment on their computer screen to register their decisions.<sup>3</sup>

## 2.3 Survey

After the experiment, subjects completed a survey. The first of three survey sections elicited information with which to build a financial planning index and an investor independence index. The second section covered self-assessed and actual financial literacy. The third

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<sup>3</sup> Subjects also played a version of this game where their investment decisions were valid for three periods instead of one. These games were used to test for myopic loss aversion, which is outside the scope of this paper. There was also a section on revealed risk, ambiguity, prudence, and temperance preferences which were used to validate the “Know-your-client” form used in financial advising in Canada, which is also not reported in this paper.

section contained questions whose responses formed a trust index.<sup>4</sup>

In the first section, three survey questions inquired about individual financial planning habits. The first of these questions asked the participants if they had savings for the future. The second question asked if they had a rainy day or emergency fund. The third question asked how easy would it be for the participants to find \$3000 to pay for an unforeseen expense.

Also in the first section, for investor independence when making financial decisions, we asked two questions. The first question asked about the the degree of involvement of a financial advisor for investment decisions. We used the response from this question to determine the degree to which the subjects make independent investment and savings decisions. A second question about investor habits asked if the subjects had inquired about the amount of resources that they would need at retirement.

In the second survey section we elicited self-assessed and actual knowledge of financial literacy. Self-assessment involved two questions. First, we asked the subjects to self-assess their knowledge of finance. Second, the subjects were also asked about their beliefs about their ability to make investments when compared with other investors.

For actual financial knowledge we included five questions, all used extensively measure financial literacy in various studies conducted around the world.<sup>5</sup> The first question measured numeracy by asking a question that required knowledge of compound interest. Specifically it asked what would be the value of an investment of \$100 after leaving the money 5 years in an account that earns 2%, per year. The possible answers were less, equal or more than \$110.<sup>6</sup> The second question involved real vs. nominal interest rates, asking whether a person could

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<sup>4</sup> An additional survey section elicited attitudes toward financial risk, replicating the “Know-Your-Client” form that every investor is required to answer when opening an investment account in Canada. These questions, not discussed here, were included for the purpose of validating the form with behavior in the experiments.

<sup>5</sup> The financial literacy questions are from van Rooij et al. (2011).

<sup>6</sup>We changed the amount in the original question from \$102 to \$110 because of the high level of literacy of our sample making the question more challenging.

buy more, less, or the same amount of goods with money left in an account that yields 1%, per year, if the inflation rate is 2%. Alternative responses were more, the same or less than today. The third question revealed whether or not the subject understood the definition of a diversified investment. The fourth question asked what is normally a safer investment: a stock mutual fund or the stock of a single company. The fifth question asked about the relationship between the interest rate and the price of a bond. This question was the most difficult and was aimed to identifying the participants with high financial literacy.

The third survey section contained three questions about trust. Each question made reference to trust in a different context. The first question asked if, generally speaking, one would say that most people can be trusted or that one needs to be very careful in dealing with people. The second question asked the participants if they trust their bank official or financial advisor. The third question asked the participants to rate, on a scale from 1 to 7, how much they trust that the chances of winning were set fairly in the experiments in which they participated.

## **2.4 Experimental Procedures**

To participate in the experiment, subjects logged on to a secure website with a unique URL to participate. Subjects agreed to an on-line consent form and were informed that they had forty-eight hours to complete the experiment. Subjects who exceeded this time limit were blocked from completing the experiment. Following the consent form were the on-line experimental instructions. After reading the instructions, the experimental tasks were presented. Subjects were compensated according to the results of one randomly-chosen decision in the experiment. After completing the experiment, subjects completed the survey, for which they were paid \$10, which included questions about investing and socio-demographics. Two-hundred and four people participated in the on-line experiment earning an average of \$58 for their participation.

We recruited a specific group of people likely to be active saving and investing for our experiments. We limited participation to people between the ages of thirty and fifty. People in this age range are likely to have substantial working, saving, and investing experience. They were also likely to still be in the accumulation phase of their life cycle, i.e., they had not reached retirement. The average age of the participants was thirty-seven.

We required the income of the participants to be between \$45,000 and \$120,000. People with very low income have limited room to save or invest, while people with a very high income are very likely to be different in their investment behavior than people in the middle class. We evenly sampled between men and women. We asked participants if they considered themselves to be investors, sampling evenly from investors and non-investors.

It is difficult to recruit subjects with this profile in the typical pool of volunteers from a university-based experimental economics lab, where the primarily university student participants have little experience with finance. We thus used the recruiter “Asking Canadians”, which has a subject pool of participants who regularly participate in on-line surveys and focus groups. Ours was the first incentivized experiment run with this group of participants.

## **3 Experimental Results**

### **3.1 Subject Characteristics**

Among our 204 participants, 59.3% were women, 71% were married or had a common-law marriage, 22% were single, and 7% were divorced or separated. Just under 2% of the participants reported that they were in poor health, 41.2% reported fair or good health, and 56.9% reported excellent health. On average, a participant’s household consisted of two adults and just a bit less than one child. Educational achievement was high. The modal response for the highest level of educational achievement was completed college, reported by 30.4% of the participants, 5.4% completed high-school, 26% reported completed bachelor

degree, 18.6% have some college or university experience, and 17.6% have at least some graduate education. Two percent of the participants reported that either they did not have a high school degree or that they had a different education level.

On average, participants reported household income of \$82,000 and a net worth of \$213,000. Additionally, when asked about the stability of their income, 4.9% responded that they considered it unstable, 38.2% somewhat stable and 56.9% stable. When asked about their financial situation, 4.4% reported they had no savings and significant debt, 18.1% little savings and a fair amount of debt, 39.2% some savings and some debt, 27.4% some savings and little or no debt, and 10.8% significant savings and no debt. A full 76.5% were homeowners. Among the homeowners, 80.1% had a mortgage that, on average, was 54.7% unpaid. Employment was high: 95% were employed and four were students. Fourteen participants had worked in the financial sector.

## **3.2 Indices**

### **3.2.1 Planning Index**

Individual planning habits responses: 88.2% of participants said yes to having savings for the future; 60.8% reported a rainy day fund; 4.4% reported that they would not be able to find \$3K, 8.3% said probably not, 27.5% said probably yes, and 59.8% said certainly yes. From these questions we constructed a planning index, where responses to each question received a zero or a one depending on whether the response indicated no planning or some level of planning. The distribution of this index among the participants is presented in Figure 1, where more than 55% of the subjects reported all three planning activities.

### **3.2.2 Investor Independence Index**

Investor independence responses: 4.5% of the participants believed they should let an advisor decide everything with regard to investment decisions, 17.6% reported that the investors

should rely mainly on the advisor for making investment decisions, 39.2% responded that the investor should consider the advisors' proposal before deciding, 26.5% said that investors should tell the advisor how they intend to invest and ask their opinion before deciding, and 12.2% that the investors decide completely by themselves, and the advisor simply executes their decisions. On a second question, 46% reported that they have inquired about resources they will need at retirement. We used these responses to compute an index of investor independence, the distribution of which is presented in Figure 2. The figure reveals a fairly symmetrical distribution with its mode in the middle between low and high.

### **3.2.3 Financial Literacy Indices: Self-Assessed and Actual**

Self-assessed financial literacy responses: 46.1% of the participants believed that they have very little knowledge, 48.5% moderate knowledge and 5.4% extensive knowledge. On a second question about investing ability, 20.1% considered their ability much lower when compared with other investors, 29.4% slightly lower, 25% about the same, and 25.5% slightly or much superior. We constructed a self-assessed financial literacy index from the first question, and a self-assessed investing ability from the second question. Figure 3 shows that the majority of subjects consider themselves to have very little or moderate financial literacy, skewing the distribution to the left. Figure 4, the distribution of self-assessed investing ability, is also skewed in the direction of less investing ability, but less so than is Figure 3.

Actual financial literacy responses: 71.1% of the participants correctly computed the amount of money available in five years earning compound interest; 66% understood the ramifications of a negative real interest rate; 70% of the participants identified the definition of a diversified investment; 67.6% could identify the safer of two investments; only 32.8% understood the relationship between the interest rate and the price of a bond. From these questions we constructed a financial knowledge index, where responses to each question received a zero or a one depending on whether the response indicated knowledge or no

knowledge of finance. The value of the index thus ranges from zero to five. The distribution of the index is presented in Figure 5, where the modal number of correct answers to the five financial literacy questions is four.

### **3.2.4 Trust Index**

Trust responses: 72.5% of the participants responded that one needs to be very careful when deciding to trust another person, 24.5% that most people can be trusted, and 3% that they don't know. With regard to banking, 4.4% said that they trust their bank official very little, 23% little, 61,8% enough, and 10.8% a lot. On a scale from 1 to 7, that the chances that winning in the experiment was set fairly, the average reported belief was 4.5.

From these questions we constructed a trust index. Responses that most people can be trusted in the first question, and that participants trust enough or a lot in the second question contributed a one to the index and zero otherwise. A response of four or greater on the third question received a one, and a zero otherwise. The distribution of the index, which ranges from zero to three, is presented in Figure 5. The distribution is skewed to the right, towards trusting behavior.

## **3.3 Indices and Trust**

At this point it is useful to check whether indices computed from the data are correlated with trust in a sensible manner. In this section we show that the financial planning and investor independence indices do make sense with regard to trust, before going on to test the behavioral hypotheses.

### **3.3.1 Literacy Self-Assesment Predicts Planning**

Table 1 presents the results of ordered logit regressions that investigate the predictors of financial planning using the planning index as the dependent variable. Each of the seven

columns of the table presents a model, and each row represents an independent variable. The independent variables include socio-demographics (first four rows), the indices for trust, self-reported and actual financial literacy follow along with self-reported financial ability. Some models include a dummy variable if the subject is a professional investor, a variable for current income, and the three variables that comprise the trust index broken out individually.

The results are easy to interpret. Self-assessment, and not trust, has a positive affect on financial planning. In all models, the economic situation has a significant and positive effect on the planning index. In all models in which self-reported literacy and ability are reported, they are also positive and significant. As expected, being a professional investor has a positive effect on financial planning. Two things are missing: trust and actual financial literacy.

### **3.3.2 Trust and Literacy Self-Assessment Predict Investor Independence**

Table 2 presents the results of ordered logit regressions that investigate the predictors of investor independence using the independence index as the dependent variable. The table consists of the identical seven models presented and previously described in Table 1.

These results are also easy to interpret. Trust is important in predicting the degree to which an investor makes decisions independently of outside advice. In all models in which it is included, the trust index is negatively and significantly correlated with investor independence. Again, self-reported literacy and ability are positively and significantly correlated. When the components of the trust index are split out and run separately (models 5-7), trust in the financial advisor dominates in explaining investor independence.

### 3.4 Hypothesis 1: Self-Assessment Predicts Behavior that Depends on Self

Table 3 presents the results of ordered logit regressions that investigate the predictors of the ability to find \$3K using the answer to this question as the dependent variable. The table consists of the identical seven models presented and previously described in Table 1. Once again, the results are clear and easy to interpret. In every model in which they are included, both the self-assessed and actual financial literacy ability are positively and significantly correlated with the dependent variable. The trust index does not significantly enter the regression. The reported economic situation is also positively and significantly correlated with the ability to locate \$3K.

Table 4 presents the results of logit regressions that investigate the predictors of the existence of an emergency fund using the answer to this question as the dependent variable. The table consists of the identical seven models presented and previously described in Table 1. In this case, it is confidence in the form of self-reported literacy and ability that positively affect the existence of the fund. Neither trust nor actual financial literacy do so.

Table 5 presents the results of logit regressions that investigate the predictors of the existence of future savings using the answer to this question as the dependent variable. The table consists of the identical seven models presented and previously described in Table 1. In this case both actual and self-reported literacy enter into the regression positively and significantly. Trusting a financial advisor is also important, not surprising as future savings require additional planning beyond an emergency fund or access to a fixed amount of money. All of these results, robust across model specifications, provide support for Hypothesis 1.

### **3.5 Hypothesis 2: Trust Predicts Behavior that Depends on Others**

Table 6 presents the results of logit regressions that investigate the predictors of whether or not the subject has inquired about the amount of funds they will need for retirement, using the answer to this question as the dependent variable. The table consists of the identical seven models presented and previously described in Table 1.

Trust is positive and significant in every model specification. When broken out by its components, trust in a financial advisor is the relevant component (model 7). Confidence measured by self-reporting operate similarly in every specification. The implication is that confidence and trust work together to take the fairly large step of depending on someone for savings and investment. The financial situation and whether or not one is a professional investor also have a positive effect. All of these results, robust across model specifications, provide support for Hypothesis 2.

### **3.6 Hypothesis 3: Trust Predicts Investment in Ambiguous but not Risky Investments**

Table 8 presents results from the nine-period risky investment game. The dependent variable in the random effect Tobit regressions is the average amount invested in the risky asset over the entire game. The table consists of the identical seven models presented and previously described in Table 1. In this case, only socio-demographic variables appear to help to explain decisions in the experiment, with education and economic situation being negatively correlated with risky investment. None of the behavioral indices have an effect.

Table 9 presents results from the nine-period ambiguous investment game. The dependent variable in the random effect Tobit regressions is the average amount invested in the ambiguous asset in the entire game. The table consists of the identical seven models pre-

sented and previously described in Table 1.

In contrast with the results in Table 8, Table 9 is striking. In every specification, trust is positively associated with investment in the ambiguous asset. Neither confidence nor literacy are significant. With regard to socio-demographics, in addition to education and economic situation, as in the risky investment game, female participants invest less in the ambiguous asset. All of these results, robust across model specifications, provide support for Hypothesis 3.

## 4 Conclusion

This paper reported results from an on-line economics experiment with heads of households that explores the connection between trust, self-assessed financial literacy, and investment behavior. Heads of households responded to a financial and socio-demographic survey, and played repeated investment games to reveal their preferences regarding risky and ambiguous investments.

We formulated indices of financial planning, investor independence, actual and self-assessed financial literacy, and trust. The planning index was predicted well by self-confidence in financial ability, and investor independence was predicted by trust and confidence. These intuitive results served to validate the important indices in the experiment.

We then found that actual financial literacy and confidence strongly predict behavior that depends on oneself. These behaviors include the ability to locate \$3K in an emergence, the existence of an emergency financial fund, and the existence of future savings. By contrast, trust predicts behaviors that depend on others. Specifically, trust is correlated with the action of inquiring about the amount of money needed for retirement.

The key finding of the paper, and the missing link in the current literature, is the positive effect of trust on the decision to invest in the ambiguous asset in the experiment. Since trust

is implicated in investor independence, i.e., in the decision to use a financial advisor, and in the decision to make the ambiguous investment, in the same way, our paper provides the first suggestion of a link between ambiguity and financial advice.

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Table 1: Determinants of Planning Index

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	0.1041 (0.349)	0.0964 (0.354)	0.1675 (0.359)	0.3892 (0.372)	0.3294 (0.371)	0.3175 (0.373)	0.3264 (0.376)
Age	-0.0404 (0.034)	-0.0398 (0.034)	-0.0403 (0.034)	-0.0557 (0.037)	-0.0345 (0.036)	-0.0632* (0.037)	-0.0344 (0.037)
Economic Situation	0.9043*** (0.198)	0.9156*** (0.193)	0.9214*** (0.195)	0.8287*** (0.192)	0.8767*** (0.196)	0.9423*** (0.189)	0.8739*** (0.200)
Education	-0.0740 (0.196)	-0.0841 (0.201)	-0.1051 (0.204)	-0.0627 (0.206)	-0.0555 (0.200)	-0.0717 (0.196)	-0.0438 (0.201)
Trust		0.2440 (0.210)	0.2536 (0.213)	0.2768 (0.205)	0.2826 (0.216)	0.2946 (0.213)	
Literacy			0.1357 (0.126)				
Self-Literacy				1.1896*** (0.333)			
Self-Ability					0.4451*** (0.158)		0.4600*** (0.163)
Investor						0.8418** (0.379)	
Trust Experimenters							-0.0121 (0.116)
General Trust							-0.0368 (0.415)
Trust Financial Advisor							0.4349 (0.276)
Observations	184	184	184	184	184	184	184
ll_0	-122.2	-122.2	-122.2	-122.2	-122.2	-122.2	-122.2
ll	-109.1	-108.4	-107.9	-101.2	-104.3	-105.9	-103.7
p	0.000224	9.48e-05	0.000292	5.19e-06	1.85e-05	1.20e-05	0.000214

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 2: Determinants of Investor Independence

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	-0.0744 (0.292)	-0.1280 (0.290)	-0.0387 (0.300)	0.0554 (0.305)	0.0296 (0.317)	-0.0845 (0.317)	0.0377 (0.316)
Age	0.0007 (0.026)	0.0062 (0.028)	0.0054 (0.027)	0.0010 (0.029)	0.0112 (0.028)	0.0036 (0.029)	0.0090 (0.028)
Economic Situation	0.0173 (0.180)	-0.0202 (0.178)	-0.0277 (0.180)	-0.1289 (0.190)	-0.0634 (0.177)	-0.0215 (0.178)	-0.0355 (0.178)
Education	0.1401 (0.180)	0.1383 (0.181)	0.1176 (0.178)	0.1358 (0.198)	0.1591 (0.185)	0.1378 (0.182)	0.1597 (0.193)
Trust		-0.5418*** (0.155)	-0.5513*** (0.158)	-0.5594*** (0.157)	-0.5430*** (0.153)	-0.5344*** (0.153)	
Literacy			0.1680 (0.111)				
Self-Literacy				0.7315*** (0.274)			
Self-Ability					0.2285* (0.134)		0.2408* (0.130)
Investor						0.1367 (0.296)	
Trust Experimenters							-0.1323* (0.079)
General Trust							-0.3732 (0.310)
Trust Financial Advisor							-0.5175** (0.206)
Observations	204	204	204	204	204	204	204
ll_0	-289.7	-289.7	-289.7	-289.7	-289.7	-289.7	-289.7
ll	-289.1	-283.1	-281.7	-278.6	-281.3	-283.0	-280.6
p	0.905	0.0146	0.0188	0.00429	0.0168	0.0266	0.0291

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3: Determinants of Find 3000

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	-0.2987 (0.340)	-0.2983 (0.341)	-0.1494 (0.348)	-0.1898 (0.346)	-0.0098 (0.355)	-0.2635 (0.340)	0.0144 (0.359)
Age	-0.0330 (0.031)	-0.0331 (0.031)	-0.0329 (0.031)	-0.0347 (0.030)	-0.0221 (0.031)	-0.0359 (0.032)	-0.0216 (0.030)
Economic Situation	1.0180*** (0.177)	1.0184*** (0.177)	1.0056*** (0.173)	0.9517*** (0.183)	0.9457*** (0.176)	1.0115*** (0.178)	0.9320*** (0.179)
Education	0.0942 (0.162)	0.0942 (0.162)	0.0379 (0.164)	0.0878 (0.165)	0.1221 (0.166)	0.0892 (0.161)	0.1234 (0.170)
Trust		0.0099 (0.189)	0.0070 (0.193)	0.0047 (0.192)	0.0364 (0.185)	0.0200 (0.189)	
Literacy			0.2852** (0.112)				
Self-Literacy				0.5089* (0.287)			
Self-Ability					0.4542*** (0.159)		0.4587*** (0.163)
Investor						0.1491 (0.312)	
Trust Experimenters							0.0978 (0.108)
General Trust							-0.1792 (0.352)
Trust Financial Advisor							-0.2310 (0.280)
Observations	204	204	204	204	204	204	204
ll_0	-205.4	-205.4	-205.4	-205.4	-205.4	-205.4	-205.4
ll	-182.5	-182.5	-179.2	-180.8	-177.3	-182.4	-176.2
p	2.63e-07	8.20e-07	4.13e-08	3.90e-07	6.53e-09	2.06e-06	6.38e-08

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 4: Determinants of Emergency Fund

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES							
Female	-0.1884 (0.334)	-0.1885 (0.334)	-0.1260 (0.338)	0.0219 (0.342)	0.0782 (0.356)	0.0034 (0.344)	0.0766 (0.356)
Age	-0.0570* (0.031)	-0.0570* (0.031)	-0.0577* (0.031)	-0.0666** (0.032)	-0.0511 (0.033)	-0.0724** (0.032)	-0.0504 (0.033)
Economic Situation	0.8258*** (0.187)	0.8259*** (0.186)	0.8172*** (0.186)	0.7235*** (0.191)	0.7596*** (0.189)	0.8126*** (0.184)	0.7592*** (0.192)
Education	0.1332 (0.180)	0.1332 (0.180)	0.1170 (0.180)	0.1339 (0.178)	0.1711 (0.181)	0.1258 (0.175)	0.1767 (0.180)
Trust		0.0035 (0.199)	0.0050 (0.201)	0.0072 (0.194)	0.0306 (0.202)	0.0651 (0.208)	
Literacy			0.1198 (0.113)				
Self-Literacy				0.9560*** (0.298)			
Self-Ability					0.4453*** (0.147)		0.4520*** (0.149)
Investor						0.7513** (0.347)	
Trust Experimenters							-0.0329 (0.106)
General Trust							-0.1303 (0.381)
Trust Financial Advisor							0.1654 (0.240)
Observations	204	204	204	204	204	204	204
ll_0	-136.6	-136.6	-136.6	-136.6	-136.6	-136.6	-136.6
ll	-120.9	-120.9	-120.4	-115.6	-116.2	-118.5	-115.9
p	4.65e-05	9.05e-05	0.000205	1.84e-05	2.60e-06	3.60e-05	2.56e-05

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 5: Determinants of Future Savings

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES							
Female	-0.2728 (0.536)	-0.2913 (0.537)	-0.0755 (0.561)	-0.1007 (0.538)	-0.0672 (0.543)	0.1064 (0.580)	-0.0312 (0.557)
Age	-0.0764* (0.042)	-0.0800* (0.043)	-0.0824* (0.043)	-0.0923* (0.048)	-0.0732* (0.044)	-0.1071** (0.046)	-0.0586 (0.045)
Economic Situation	1.2384*** (0.263)	1.2490*** (0.265)	1.2446*** (0.270)	1.1075*** (0.272)	1.1838*** (0.281)	1.1874*** (0.279)	1.3105*** (0.328)
Education	-0.0663 (0.249)	-0.0628 (0.248)	-0.1960 (0.272)	-0.1282 (0.257)	-0.0214 (0.247)	-0.1162 (0.261)	-0.0193 (0.257)
Trust		0.1989 (0.265)	0.1849 (0.286)	0.1620 (0.286)	0.2453 (0.266)	0.3059 (0.249)	
Literacy			0.4108** (0.199)				
Self-Literacy				1.5948*** (0.560)			
Self-Ability					0.3537 (0.235)		0.3462 (0.255)
Investor						1.9586*** (0.678)	
Trust Experimenters							-0.2845 (0.184)
General Trust							-0.1581 (0.575)
Trust Financial Advisor							0.8446** (0.350)
Observations	204	204	204	204	204	204	204
ll_0	-73.89	-73.89	-73.89	-73.89	-73.89	-73.89	-73.89
ll	-61.39	-61.13	-58.50	-56.44	-59.76	-55.07	-56.47
p	3.03e-05	9.81e-05	1.16e-05	5.14e-05	4.43e-05	0.000217	3.49e-06

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 6: Determinants of Inquiry About Retirement Needs

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES							
Female	-0.0699 (0.315)	-0.0666 (0.316)	-0.0556 (0.321)	0.1890 (0.329)	0.1761 (0.333)	0.2636 (0.338)	0.1765 (0.340)
Age	0.0005 (0.028)	-0.0016 (0.028)	-0.0017 (0.028)	-0.0100 (0.030)	0.0067 (0.028)	-0.0248 (0.031)	0.0114 (0.030)
Economic Situation	0.4799*** (0.158)	0.5049*** (0.156)	0.5034*** (0.156)	0.3625** (0.164)	0.4171*** (0.160)	0.5006*** (0.159)	0.4049** (0.167)
Education	0.1471 (0.186)	0.1464 (0.187)	0.1436 (0.189)	0.1332 (0.183)	0.1735 (0.181)	0.1375 (0.191)	0.1975 (0.184)
Trust		0.3670** (0.175)	0.3675** (0.176)	0.4106** (0.185)	0.4145** (0.187)	0.4997*** (0.181)	
Literacy		0.0205 (0.111)					
Self-Literacy				1.1590*** (0.284)			
Self-Ability					0.4244*** (0.143)		0.4572*** (0.145)
Investor						1.1969*** (0.348)	
Trust Experimenters							0.0521 (0.104)
General Trust							-0.3689 (0.371)
Trust Financial Advisor							0.8326*** (0.242)
Observations	204	204	204	204	204	204	204
ll_0	-140.8	-140.8	-140.8	-140.8	-140.8	-140.8	-140.8
ll	-134.0	-131.9	-131.9	-123.2	-127.2	-125.4	-123.2
p	0.0188	0.00455	0.00968	5.49e-06	0.000448	0.000139	0.000166

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 7: Determinants of Risky Investment

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES							
Female	-0.0117 (0.039)	-0.0114 (0.038)	-0.0182 (0.039)	-0.0048 (0.039)	-0.0163 (0.040)	-0.0080 (0.040)	-0.0145 (0.040)
Age	-0.0051 (0.004)	-0.0053 (0.004)	-0.0052 (0.004)	-0.0055 (0.004)	-0.0054 (0.004)	-0.0055 (0.004)	-0.0053 (0.004)
Economic Situation	0.0350* (0.019)	0.0359* (0.019)	0.0373** (0.019)	0.0308 (0.020)	0.0381** (0.019)	0.0354* (0.019)	0.0350* (0.020)
Education	-0.0362* (0.022)	-0.0361* (0.021)	-0.0342 (0.022)	-0.0368* (0.021)	-0.0366* (0.021)	-0.0362* (0.021)	-0.0364* (0.022)
Trust		0.0233 (0.022)	0.0233 (0.022)	0.0236 (0.022)	0.0228 (0.022)	0.0244 (0.022)	
Literacy			-0.0130 (0.014)				
Self-Literacy				0.0308 (0.033)			
Self-Ability					-0.0084 (0.016)		-0.0088 (0.016)
Investor						0.0125 (0.039)	
Trust Experimenters							0.0124 (0.012)
General Trust							-0.0135 (0.043)
Trust Financial Advisor							0.0166 (0.027)
Observations	1,836	1,836	1,836	1,836	1,836	1,836	1,836
Number of subject	204	204	204	204	204	204	204
ll_0							
ll	-519.9	-519.3	-518.9	-518.9	-519.2	-519.3	-519.0
p	0.181	0.192	0.213	0.214	0.262	0.276	0.427

Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 8: Determinants of Ambiguous Investment

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female	-0.0930** (0.038)	-0.0925** (0.037)	-0.0951** (0.038)	-0.0935** (0.038)	-0.0786** (0.038)	-0.0968** (0.039)	-0.0803** (0.038)
Age	-0.0039 (0.003)	-0.0041 (0.003)	-0.0041 (0.003)	-0.0041 (0.003)	-0.0036 (0.003)	-0.0038 (0.004)	-0.0036 (0.003)
Economic Situation	0.0548*** (0.018)	0.0562*** (0.018)	0.0567*** (0.018)	0.0569*** (0.019)	0.0499*** (0.019)	0.0568*** (0.018)	0.0491*** (0.019)
Education	-0.0464** (0.021)	-0.0464** (0.021)	-0.0457** (0.021)	-0.0463** (0.021)	-0.0450** (0.021)	-0.0463** (0.021)	-0.0465** (0.021)
Trust		0.0396* (0.021)	0.0396* (0.021)	0.0396* (0.021)	0.0411* (0.021)	0.0383* (0.021)	
Literacy			-0.0051 (0.013)				
Self-Literacy				-0.0045 (0.032)			
Self-Ability					0.0236 (0.016)		0.0217 (0.016)
Investor						-0.0154 (0.038)	
Trust Experimenters							0.0088 (0.012)
General Trust							0.0563 (0.041)
Trust financial Advisor							0.0007 (0.026)
Observations	1,836	1,836	1,836	1,836	1,836	1,836	1,836
Number of subject	204	204	204	204	204	204	204
ll_0							
ll	-186.9	-185.1	-185.1	-185.1	-184.0	-185.1	-184.6
p	0.00153	0.000703	0.00149	0.00159	0.000575	0.00149	0.00391

Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Figure 1: Planning Index

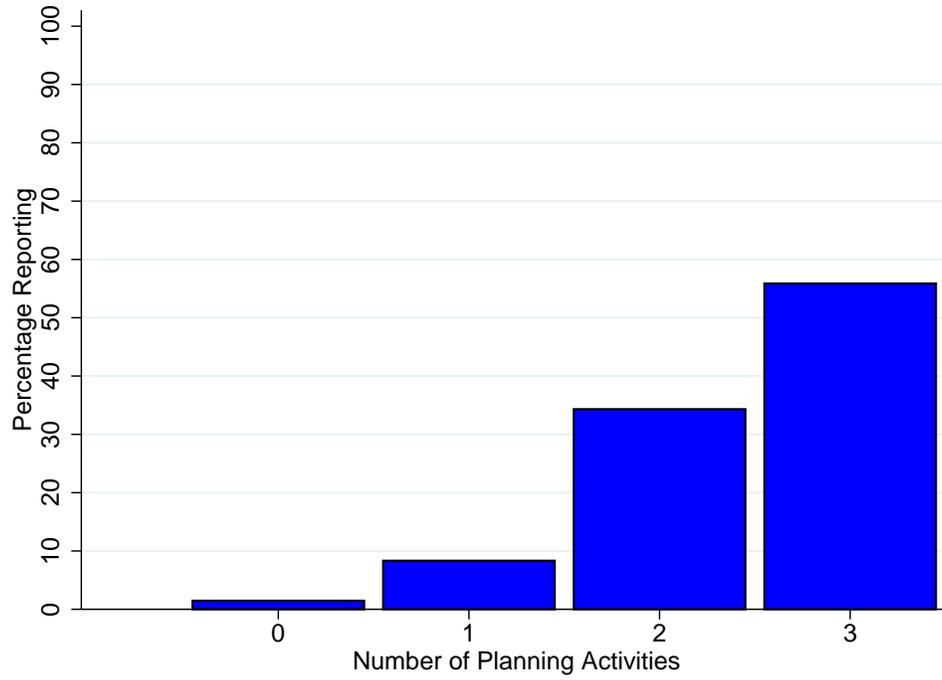


Figure 2: Investor Independence Index

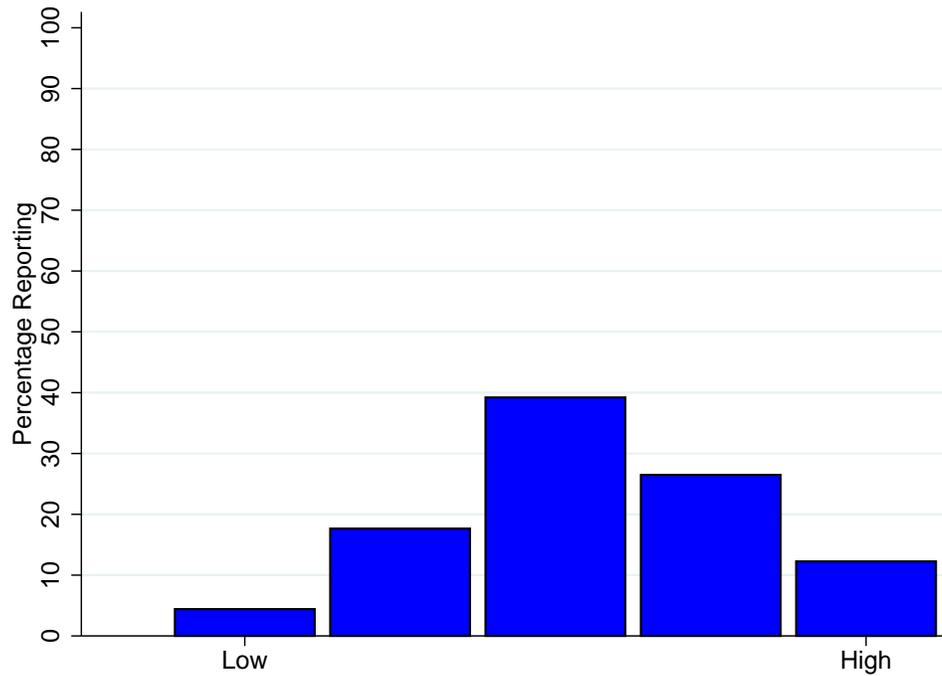


Figure 3: Self-Assessed Financial Literacy

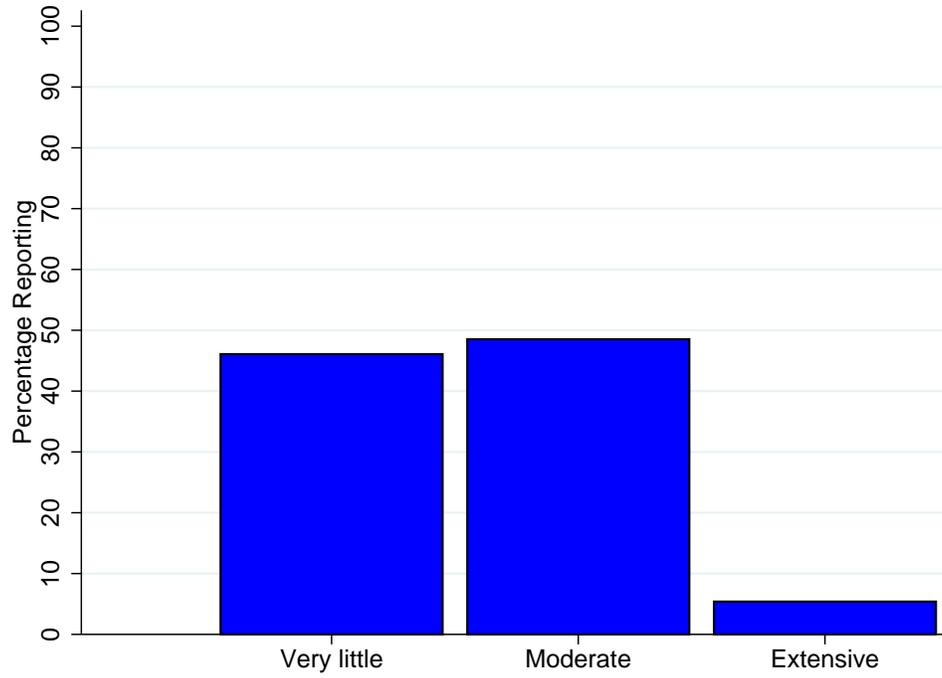


Figure 4: Self-Assessed Investing Ability Index

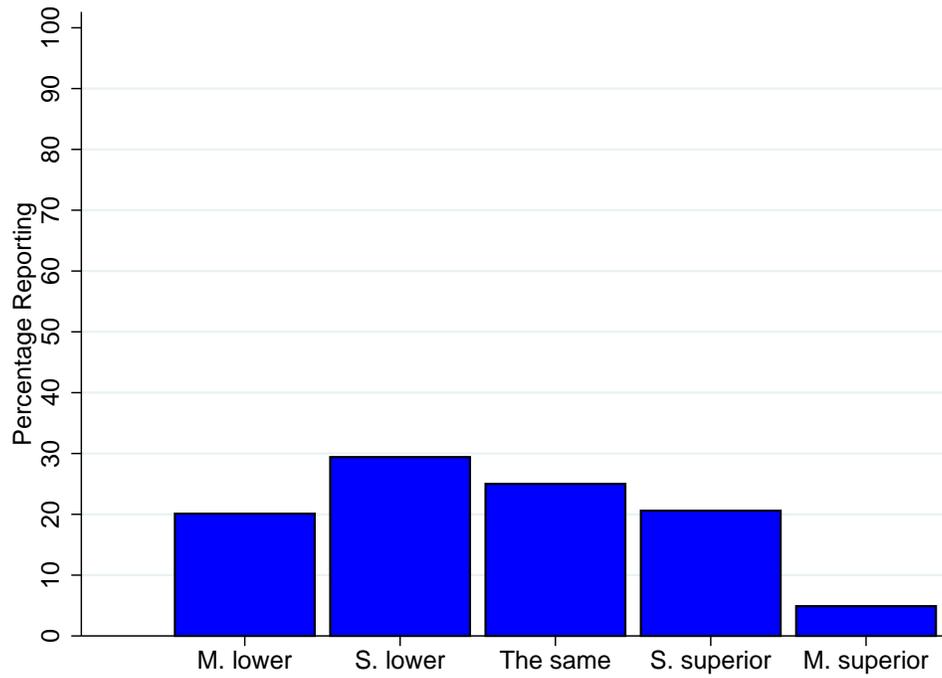


Figure 5: Financial Literacy Index

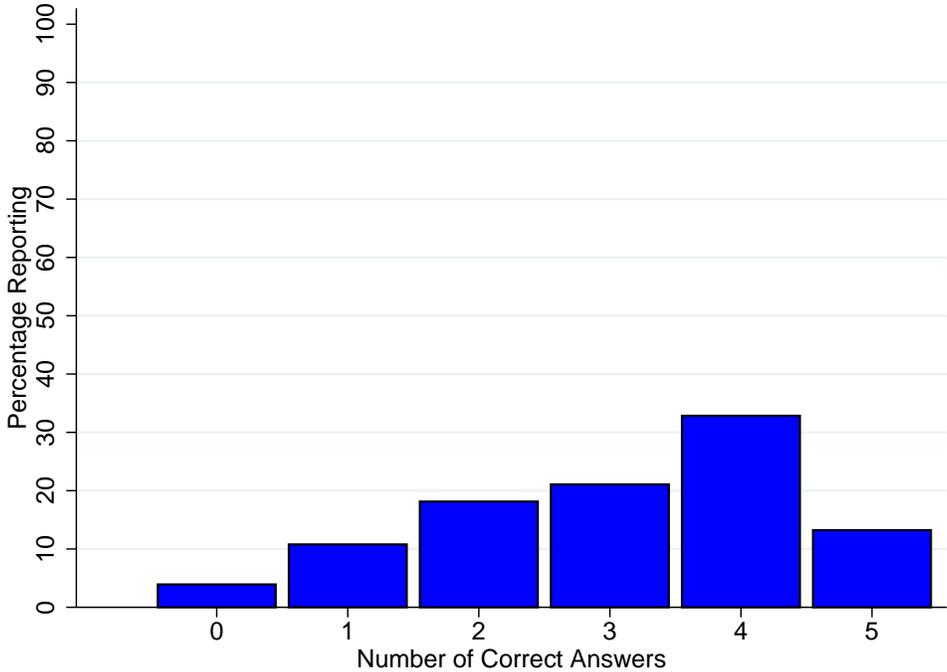
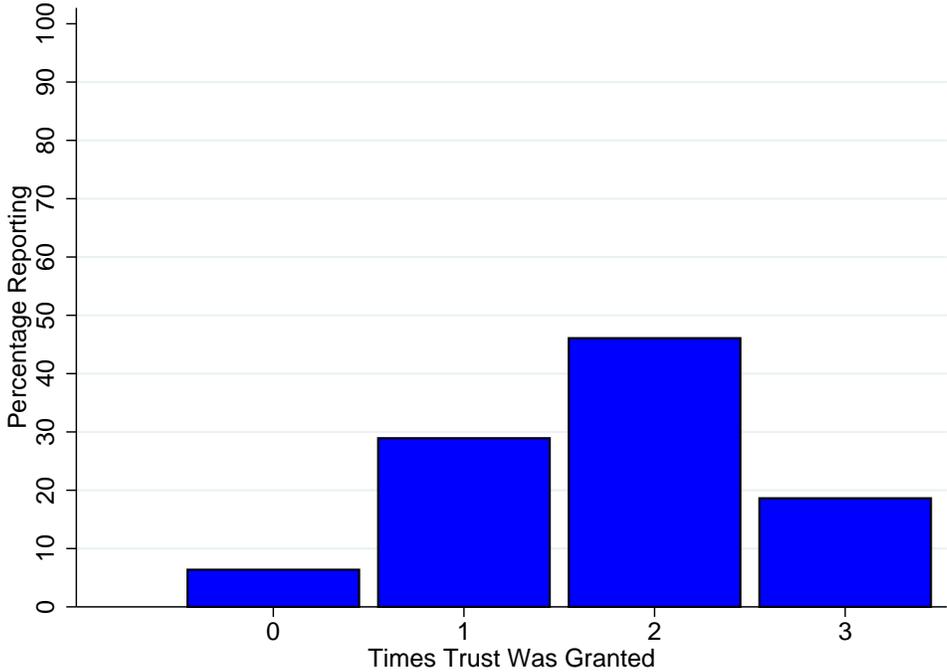


Figure 6: Trust Index





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