



# Financial literacy and financial planning: Evidence from India<sup>☆</sup>



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## ABSTRACT

In this study we report findings about financial literacy and financial planning behavior based on a financial advisory program in India. We evaluate survey responses to three standard questions previously used to measure financial literacy. We then break down the data across particular demographic and socioeconomic groups and compare responses. Finally, we examine the investment behavior, liability choice, risk tolerance and insurance usage of program participants. We find that the vast majority of respondents appear to be financially literate based on their answers to questions concerning interest rates (numeracy), inflation, and risk/diversification. However, we do find variation across demographic and socioeconomic groups. We are also able to obtain additional information about the financial tendencies of the program participants (including risk tolerance, investment preferences, investment goals, etc.) and to relate those tendencies to financial literacy.

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## 1. Introduction

In recent years there have been growing concerns about the financial astuteness of consumers as research suggests they often make what appear to be welfare-reducing decisions. Many individuals do not hold a checking account (Hilgert et al., 2003); have large outstanding credit card

balances when cheaper forms of credit are available (Gartner and Todd, 2005); accept payday loans with astronomical APRs even in the presence of other, cheaper, credit sources (Agarwal et al., 2009b); sub-optimally choose credit contracts (Agarwal et al., 2006); fail to refinance mortgages when it would be optimal to do so (Agarwal et al., 2008a); and fail to plan for retirement, reaching it with little or no savings (Lusardi and Mitchell, 2006). A leading explanation for this behavior is that consumers are not financially literate—they lack sufficient information about financial concepts and instruments to make informed financial decisions. A growing literature has evaluated both the state of financial literacy and the effectiveness of financial education programs aimed at improving financial decision-making.<sup>1</sup> Much of this research

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<sup>1</sup> For example, see OECD (2014), Agarwal et al. (2008b, 2009a, 2014, 2011, 2010), Lusardi (2004), Lusardi and Mitchell (2007a,b, 2014), Lusardi et al. (2009a,b), and Mitchell (1988).

analyzes mortgage market behavior because mortgage debt is typically the largest liability for most consumers and errors in decisions about this debt could have lasting implications. We add to that literature by reporting the findings of a survey concerning financial literacy and financial planning in India. Specifically, following [Lusardi and Mitchell \(2006\)](#), we ask consumers in India three basic questions about interest rates (numeracy), inflation, and risk diversification to evaluate their financial literacy and then observe how that relates to their investment, insurance and liability management decisions.

In recent years the Indian government, particularly the Reserve Bank of India, has been aggressively working to increase the financial knowledge of the general population. The goal is similar to that set out by the OECD: "...to help consumers "develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" ([OECD, 2005](#)). The concern is that India has a large population that does not have the rudimentary skills to make basic financial decisions. Nor, in many cases, do they have adequate access to financial services. It has been estimated that only about five percent of Indian villages have a commercial bank branch. Similarly, over 40 percent of the adult population have no banking account; a number which grows to over 60 percent in rural areas ([Thorat, 2007](#)). This lack of financial literacy and lack of financial access are both pressing problems for the Indian population and could lead to welfare reducing financial decisions.<sup>2</sup>

In response, the Reserve Bank of India has introduced Financial Literacy and Counseling Centers (FLCC) to provide consumers with the tools to make better credit choices ([Reserve Bank of India, 2008](#)). They have also targeted schoolchildren to cultivate financial literacy at an early stage via interactive websites ([Reserve Bank of India, 2007](#)).<sup>3</sup>

We evaluate the financial literacy of a select group of Indians that participate in an on-line investment service provided by Yogi Financial Advisory Services. We evaluate their literacy and then relate the findings to their other investment activity. In the next section we briefly review the literature on financial literacy. We then discuss the survey questions and the investment company used to collect the survey data. In Section 4 we discuss our empirical results. The final section concludes.

## 2. Review of the literature on financial literacy

Early studies to measure adult financial literacy were conducted during the 1990s on US data by private firms utilizing surveys that covered material specific to their corporate interests ([Volpe et al., 2006](#)).<sup>4</sup> Perhaps the most

useful early studies assessing overall financial literacy were those conducted on high school and college students. The Jump\$tart Financial Literacy Survey administered the same exam to randomly selected high school seniors every other school year between the 1997–98 class through 2008.<sup>5</sup> The exam included 31 questions on income, money management, saving and investment, spending and credit, and was intended to capture financial competence in a broad set of areas. Jump\$tart's findings were not encouraging: students scored an average of 57 percent in 1997–98 (with 60 percent being a passing score), and scores declined by several percentage points in subsequent years (2000–2008).

Other research evaluated financial literacy among adults in more specific contexts. For instance, there is an extensive literature on the relationship between financial literacy and planning/saving for retirement. This literature, as discussed below, yields two broad, but important findings. First, after controlling for a broad range of economic and demographic characteristics, more financially literate individuals are more likely to plan for retirement, and those who plan have greater net worth upon reaching retirement. Second, causation goes from literacy, to planning to wealth.

Individuals accrue retirement assets both individually as well as through Social Security and employer-sponsored pension programs. To figure out how much to save for retirement, individuals must know their expected dates of retirement, expected lifespan, and Social Security and/or pension entitlements. They must then take into account the expected rate of return on saving and the desired standard of living in retirement to determine the necessary savings rate. This planning process requires knowledge of Social Security and pension plan characteristics, as well as the ability to perform calculations involving compound interest and monthly accumulation. In practice, this can be a difficult process, as illustrated by [Mitchell \(1988\)](#), and [Gustman and Steinmeier \(2005\)](#).

[Mitchell \(1988\)](#) examined employee knowledge of company pensions and found that many workers were unaware of important features of the plans. She compared pension characteristics reported by individuals from the Survey of Consumer Finances (SCF) to actual administrative data. Only half of employees who were required to contribute to their pensions reported doing so, and only half of those whose employers contributed realized that they did so. Over one-third of respondents did not know about early retirement provisions and, among those who did, two-thirds described them inaccurately.

[Gustman and Steinmeier \(2005\)](#) confirm these findings using the 1992 Health and Retirement Survey (HRS), showing that a majority of those surveyed could not accurately report their Social Security or pension entitlements. Only 27 percent of respondents gave estimates within 25 percent of their actual Social Security benefits. Interestingly, only 16 percent of respondents with pensions gave estimates within 25 percent of their actual pension entitlements.

<sup>2</sup> Although it is difficult to quantify, international indices of the level of economic literacy find that the general Indian population scores relatively low in the analysis ([Jappelli, 2010](#)).

<sup>3</sup> This push for national education programs aimed at improving financial literacy has also been emphasized in other countries; see [OECD \(2014\)](#).

<sup>4</sup> This review draws on the more detailed discussion of [Agarwal et al. \(2011\)](#).

<sup>5</sup> See [Mandell \(2009\)](#) for a more detail discussion of the Jump\$tart results. In 2010, the survey was modified to strengthen the methodology. Survey responses are not directly comparable thereafter.

Perhaps most surprising, over 40 percent of respondents were unable to provide any estimate.

Even when consumers do have information about their Social Security and pension entitlements, they still have trouble performing the calculations necessary to plan for retirement. Significantly, many adults cannot correctly answer questions requiring basic financial understanding. For instance, [Lusardi and Mitchell \(2006, 2007a\)](#) find that only 18 percent of 2004 HRS respondents thought that an account initially holding \$100 and earning 20 percent compound annual interest would hold more than \$200 after five years. In particular, many respondents thought the account would hold exactly \$200, suggesting they did not understand compounding. An easier interest rate question from a three-question financial literacy module in the 2004 HRS yielded more correct responses, but it did not require respondents to understand the difference between compound and simple interest. [Lusardi and Mitchell \(2007b\)](#) found that even in the Rand American Life Panel (ALP), a sample of educated and high-earning middle-aged adults, over a quarter of respondents could not accurately answer a more difficult compound interest question.

Further research showed that familiarity with interest rates and compounding is only weakly related to age. [Lusardi et al. \(2009a\)](#) found that respondents in their twenties do about as well as respondents in their fifties. Less than one-third of young adults possess basic financial knowledge enabling them to make appropriate decision concerning interest rates, inflation and risk diversification. [Lusardi et al. \(2009b\)](#), also using data from the 2008 HRS, found older Americans were also lacking in financial aptitude. The sample of Americans over 55 did not have “a rudimentary understanding of stock and bond prices, risk diversification, portfolio choice, and investment fees.”

Studies also revealed other forms of financial illiteracy. Many consumers answered a ‘money illusion’ question incorrectly, suggesting they did not understand the consequences of inflation ([Lusardi and Mitchell, 2006, 2007b](#)). Nearly half of HRS respondents missed a ‘lottery division’ question, which amounted to a simple division problem ([Lusardi and Mitchell, 2007a](#)). In the HRS financial literacy module, only 52 percent of respondents said investing in a mutual fund was less risky than investing in a single company’s stock, indicating a misunderstanding of risk and portfolio diversification ([Lusardi and Mitchell, 2006](#)).

Additional examples of financial illiteracy are also found in mortgage markets. For example, many individuals who hold adjustable rate mortgages (ARMs) exhibit shocking ignorance of their mortgage terms. [Bucks and Pence \(2008\)](#) document this by comparing the distribution of household-reported mortgage characteristics in the Survey of Consumer Finances to distributions in three lender-reported datasets. They found that ARM borrowers could not provide basic information about their own loans.<sup>6</sup> When ARM borrowers did report their loan characteristics, they often got them wrong, typically

underestimating their risks and potential liabilities. [Agarwal et al. \(2014\)](#) corroborate this evidence with data from a mandatory loan counseling program for high-risk mortgage applicants in Chicago. According to a summary of counselor assessments of the program, the ‘overwhelming majority’ of ARM applicants were unaware that their interest rate was not fixed for the life of the mortgage.

In summary, the bulk of the financial literature suggests that many consumers are not financially literate. In the next session we take some of the methodology used in previous studies and apply it to a data sample from India.

### 3. Data and survey

The data for our empirical analysis were provided by InvestmentYogi Financial Advisory Services. The firm is based in Hyderabad, India and has information on customers who are interested in improving their personal finance decisions. The founder of the company, Mamtha Banerjee, describes InvestmentYogi as a personal finance portal that helps Indians manage their investments, taxes and finances by providing high quality content and tools including online financial planning, online tax preparation, online budgeting and mutual fund research. The company was the first to introduce online financial software in India.

One of the more important services provided by InvestmentYogi is financial planning. The firm offers planning services via a web-based platform where the customer inputs his or her monthly income, demographic information, current investments, current liabilities, insurance policies, risk tolerance, and the financial goals they would like to achieve. In addition, at our request, InvestmentYogi inserted three financial literacy questions on interest rates (numeracy), inflation, and risk diversification into the platform’s data-gathering module. To avoid identifying individual clients, they sanitized any identifying characteristics in the data and provided all remaining information.

The three questions were the same as those posed by [Lusardi and Mitchell \(2006\)](#) except for the units of currency used. More specifically, the questions were:<sup>7</sup>

- (1) Suppose you had Rs. 1000 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: More than \$102? Exactly \$102? Less than \$102? (Numeracy Question.)

<sup>6</sup> Thirty-five percent did not know the per-period cap on interest rate changes; 41 percent did not know the maximum interest rate allowed; and 20 percent did not know the initial interest rate.

<sup>7</sup> These questions have been used in numerous studies and across numerous countries to gauge participants’ level of financial literacy. In addition to the Lusardi and Mitchell analysis, a non-exhaustive list of other studies using the questions includes [de Bassa Scheresberg \(2013\)](#), USA; [Alessie et al. \(2011\)](#) and [Van Rooij et al. \(2011\)](#), the Netherlands; [Fornero and Monticone \(2011\)](#), Italy; [Bucher-Koenen and Lusardi \(2011\)](#), Germany; [Almenberg and Save-Soderbergh \(2011\)](#), Sweden; [Klapper and Panos \(2011\)](#), Russia; [Crossan et al. \(2011\)](#), New Zealand; [Sekita \(2011\)](#), Japan; [Brown and Graf \(2013\)](#), Switzerland; [Agnew et al. \(2013\)](#), Australia; [Arrondel et al. \(2013\)](#), France; [Beckmann \(2013\)](#), Romania; [Atkinson and Messy \(2011\)](#), a cross country comparison; and [Lusardi and Mitchell \(2011\)](#), which review much of the cross sectional research.

**Table 1**

Participant general demographic information.

	N	% of Sample		N	% of Sample
Number of observations:	1694				
Countries with multiple participants: <sup>*</sup>			Education level		
India	1438	97.2%	High school	28	1.8%
United Arab Emirates	9	0.6%	Graduate	691	45.4%
Iraq	4	0.3%	Post graduate	718	47.2%
Singapore	3	0.2%	Doctorate	34	2.2%
Countries w/2 people	8	0.5%	Other	50	3.3%
			Risk profile		
			Low: conservative growth	409	26.8%
			Medium: balanced growth	822	53.9%
			High: aggressive growth	293	19.2%
			Married		
Top 5 Indian States: <sup>*</sup>			Single	351	23.1%
Maharashtra	372	25.6%	Married	1158	76.3%
Karnataka	241	16.6%	Other	9	0.6%
Andhra Pradesh	170	11.7%	Number of children		
Tamil Nadu	140	9.6%	No children	615	43.1%
Delhi	90	6.2%	One child	527	36.9%
Top 5 Indian Cities: <sup>*</sup>			Two children	270	18.9%
Bangalore	229	15.6%	Three children	13	0.9%
Mumbai	207	14.1%	Four children	3	0.2%
Hyderabad	119	8.1%	Gender		
Pune	119	8.1%	Male	1399	91.8%
Chennai	118	8.1%	Female	125	8.2%

<sup>\*</sup> Countries, states or cities in which Yogi Financial program participants reside.**Table 2**

Overview of survey participant financial positions.

	Number of observations	Average	Standard deviation	Median	Sum <sup>*</sup>
Net salary	1524	104,448	281,779	46,000	–
Total expenses	1524	38,629	578,085	18,252	–
Number of goals	1452	2.79	2.10	2	4047
Total amount required for goals	1446	14,848,900	33,827,939	7,000,000	–
Number of insurance policies	1085	2.36	1.97	2	2556
premium amount	1083	308,590	8,104,782	35,000	–
Sum assured	1083	29,609,674	890,178,042	800,000	–
Number of investments	1309	3.66	2.47	3	4787
Investment amount	1307	511,068,575	18,442,268,614	110,000	–
Investment current value	1305	71,251,632	2,460,572,951	525,000	–
Number of liabilities	965	1.67	0.98	1	1613
Total amount of liabilities	965	3,530,881	25,360,878	1,475,040	–
Total monthly payments (EMI)	965	35,214	66,946	20,319	–

<sup>\*</sup> Sums are provided only for relevant measures discussed in the text.

- (2) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy: More than today? Exactly the same? Less than today? (Inflation Question.)
- (3) Do you think the following statement is true or false? Buying a single company stock usually provides a safer return than a stock mutual fund. (Diversification Question.)

Basic information about the surveyed consumers is provided in Tables 1 and 2. From Table 1, there are 1694 customers interested in financial planning that completed the survey. The vast majority of the participants were from India (97%), male (92%) and married (76%). The average level of education attained by the reporting participants

is significantly higher than the general population of India, with 45% having graduated college and 47% having some post graduate education. Only 2% of individuals in our sample have a high school degree as their highest educational level and 2% have a doctorate. 43% of participants have no children and 37% have one child. Finally, 54% of the sample self-identify as being investors with a medium risk profile seeking a balanced growth rate of return, while 27% are considered high risk, aggressive growth individuals. The rest have conservative growth objectives and are not aggressive risk takers.

Table 2 reports additional summary statistics about the participants. The average salary of the participant is Rs. 104,448 a month. Their average monthly expenses are Rs. 38,629. Since the data are very noisy with high standard deviations, it is more interesting to look at median values.

The median monthly salary is Rs. 46,000 and the median expenses are Rs. 18,252. While the median numbers are less than half of the means, the ratio of about 38% of monthly income going to cover monthly expenses is preserved. While they did not provide information on all aspects of the investments questionnaire, they typically did provide information on the basic financial literacy question and, therefore, in the results that follow we are able to relate their responses to their investment behavior.

We caution the reader to not draw overly broad conclusions from this survey. The sample is not random – these are the people who were seeking personal financial advice and used the internet portal of InvestmentYogi. Hence, we would expect the people surveyed to be of higher socio-economic status and be able to use the internet. Consequently, our results are better suited to assessing the level of financial literacy in the subset of Indian population that shares socio-economic characteristics of survey participants. Caution should be taken in drawing broad causal inferences.

#### 4. Empirical findings

##### 4.1. The literacy questions

The responses to the three literacy questions are presented in Table 3. On the interest rate question, 81% correctly answered that they would have more than Rs. 1020 if they left the money to grow. About 14% gave an incorrect answer, with about half thinking they would have exactly Rs. 1020 and half thinking they would have less than Rs. 1020 (results not presented in the table). 4% of participants responded that they did not know the answer to the question.

Responses to the inflation question are also shown in Table 3. 79% of participants correctly responded that they would have less purchasing power in the example when the inflation rate exceeded the savings rate. 10% gave incorrect responses, with 6% thinking they would have more purchasing power in the example and 4% thinking it would

be exactly the same. However, a full 10% of the sample indicated that they did not know the answer to the question. The high percentage of respondents that correctly answered the question most likely results from a history in India of non-trivial rates of inflation—rates of 5–6% have not been uncommon in the recent past.

For the third question on risk diversification, some 79% of participants correctly answered the question (Table 3). This high correct response rate may occur because the respondents, by expressing an interest in participating in the advisory services, have indicated an interest in investments. Nevertheless, 6% of participants thought a single company stock would provide a safer return than would a stock mutual fund. Additionally, 16% indicated that they were sufficiently unsure and admitted to not knowing the answer.

The lower panel of Table 3 provides information on aggregate performance on the three questions. For example, 60% of participants correctly answered all three questions. Turning to the other extreme, 5% of respondents provided no correct answers at all. A small number of individuals indicated they did not know the correct answer to any of the questions. Table 4 provides Spearman rank correlations between the correct answers to the questions. The cross correlations are all positive and statistically significant. The correlation for the correct answers to the inflation and diversification question is somewhat higher than that between the correct answers for the inflation and interest question or for the interest and diversification question. Importantly, literacy in one aspect of financial astuteness appears to be positively related to knowledge in other areas.

**Table 4**  
Spearman rank correlations of correct responses.

	Interest	Inflation	Diversification
Interest	1.00		
Inflation	0.26	1.00	
Diversification	0.18	0.37	1.00

**Table 3**  
Distribution of responses to financial literacy questions.

	Correct	Incorrect	Explicitly Said 'I Do Not Know'
Numeracy (interest) question	81%	14%	4%
Inflation question	79%	10%	10%
Risk diversification question	79%	6%	16%
% of Households			
Answered all three questions correctly	60%		
Correctly answered numeracy question only	6%		
Correctly answered inflation question only	2%		
Correctly answered diversification question only	3%		
Correctly answered numeracy and inflation question	9%		
Correctly answered numeracy and diversification question	7%		
Correctly answered inflation and diversification question	9%		
Correctly answered none of the questions	5%		
At least one, 'I do not know'	21%		
All answers are 'I do not know'	2%		

Note: Sample size = 1707.

Totals may not sum to 100% because of rounding, and a small fraction of participants (less than 0.5%) did not answer specific questions.



**Table 5**

Financial literacy and socioeconomic variables.

	Number of observations	Relative frequency	Interest <sup>a</sup>		Inflation <sup>a</sup>		Diversification <sup>a</sup>		All 3 <sup>a</sup>	
			Correct (%)	DNK (%)	Correct (%)	DNK (%)	Correct (%)	DNK (%)	Correct (%)	1 + DNK <sup>a</sup> (%)
<i>Age</i>										
25 and younger	41	5.5	82.9	2.4	85.4	7.3	82.9	14.6	68.3	17.1
25–30	240	32.1	83.3	3.8	81.3	8.8	81.7	12.5	65.8	17.1
30–35	254	34.0	83.9	4.3	83.9	7.5	79.9	15.0	64.2	18.1
35–40	122	16.3	83.6	4.1	85.2	7.4	86.1	8.2	71.3	11.5
Older than 40	90	12.0	82.2	4.4	91.1	4.4	84.4	11.1	71.1	14.4
<i>Gender</i>										
Male	692	92.6	84.1	3.9	84.7	7.2	83.5	11.6	68.4	15.3
Female	55	7.4	74.5	5.5	78.2	10.9	65.5	25.5	49.1	27.3
<i>Marital status</i>										
<i>Male</i>										
Married	65	30.7	82.9	4.6	84.2	7.9	83.2	11.8	67.4	15.7
Single	143	67.5	88.8	1.4	86.0	4.9	84.6	10.5	71.3	14.0
Other	4	1.9	75.0	0.0	100.0	0.0	75.0	25.0	75.0	25.0
<i>Female</i>										
Married	39	70.9	82.1	5.1	79.5	10.3	69.2	23.1	53.8	25.6
Single	15	27.3	53.3	6.7	73.3	13.3	53.3	33.3	33.3	33.3
Other	1	1.8	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
<i>Education</i>										
Completed high school	18	2.4	66.7	11.1	61.1	5.6	50.0	33.3	44.4	33.3
Graduate	324	43.4	83.3	4.3	81.8	9.6	78.1	17.0	63.3	21.6
Post graduate	364	48.7	84.1	3.3	86.8	5.8	87.9	7.7	70.6	11.0
Doctorate	18	2.4	94.4	0.0	94.4	0.0	83.3	5.6	83.3	5.6
Other	23	3.1	78.3	8.7	87.0	13.0	73.9	17.4	65.2	17.4
<i>Income</i>										
1st quartile	166	25.4	84.3	6.0	78.9	10.2	74.7	16.3	63.9	19.3
2nd quartile	180	27.5	80.6	3.9	82.8	8.9	85.6	11.1	63.3	16.7
3rd quartile	156	23.9	84.0	3.8	91.0	3.8	86.5	10.9	74.4	12.8
4th quartile	152	23.2	84.9	2.0	86.2	7.2	86.8	9.9	70.4	14.5
<i>Risk tolerance</i>										
Aggressive	204	27.3	85.3	2.9	91.7	4.4	89.7	7.8	76.0	10.3
Balanced	389	52.1	85.3	3.1	87.7	5.7	86.9	8.5	70.7	12.6
Conservative	154	20.6	76.0	7.8	65.6	16.2	60.4	29.2	45.5	33.1

<sup>a</sup> 'Interest', 'inflation', 'diversification' and 'All 3' refer to the three literacy questions. '1 + DNK' refers to one or more 'do-not-know' responses.

We can also analyze the responses on the basis of participant characteristics—see Table 5. Summarily, we find that the number of correct responses across age groups is remarkably stable. However, we do see significant differences across gender, as a higher proportion of male respondents answered each of the individual questions correctly. Males were also more likely to answer all three questions correctly (68% compared to 49%). There is also a greater tendency for married females (but not married males) to correctly answer each of the individual questions and to answer all three correctly. This is particularly pronounced in the share answering all three questions correctly (54% for married females and 33% for single females). Somewhat surprisingly, there is not a significant difference across income groups within our sample. This may result from the fact that the average program participant's income is considerably higher than that of the typical Indian citizen, and differences in financial literacy may be expected to diminish once a certain income threshold is achieved. With the exception of the risk question, the share of correct answers across education levels varied as

expected; higher levels of education result in more correct answers.<sup>8</sup> For the risk question, the number of correct responses initially rises with education, but then falls off somewhat for participants having obtained a doctorate.

Finally, we were also able to derive the relationship between correct responses to the questions and the level of 'risk tolerance' for program participants from their responses. From Table 5, we see that investors that classified themselves as aggressive were more likely to correctly answer each of the three individual questions (or all three questions) than were the less aggressive 'balanced' investors. Similarly the 'balanced' investors were more likely to correctly answer the questions than were conservative investors. Some of the differences are quite large. The higher investors' self-reported risk tolerance, the more likely they were to correctly answer the questions.

<sup>8</sup> Although the terminology is common in India, the education breakdown may not be familiar to the non-Indian reader. Graduate is similar to the US attainment of a high school education and post-graduate to a college degree. The doctorate degree is common terminology.

**Table 6**  
Investment behavior.

	Number of observations	Average	Standard deviation	Median
<i>Panel A: by risk tolerance</i>				
Number of investments				
Aggressive	346	4.18	2.53	4
Balanced	690	3.71	2.48	3
Conservative	203	2.84	2.23	2
Interest rate				
Aggressive	346	1.48	2.72	0
Balanced	687	1.69	2.99	0
Conservative	203	1.28	2.47	0
Investment amount				
Aggressive	346	938,756	1,887,741	161,000
Balanced	690	791,083	1,793,717	95,000
Conservative	203	718,577	1,702,916	50,000
<i>By investment type</i>				
Debt				
Aggressive	317	2.3	1.66	2
Balanced	628	2.21	1.68	2
Conservative	185	1.85	1.43	1
Equity				
Aggressive	273	1.27	0.83	1
Balanced	461	0.99	0.86	1
Conservative	85	0.6	0.79	0
Gold				
Aggressive	46	0.14	0.35	0
Balanced	91	0.14	0.36	0
Conservative	10	0.05	0.22	0
Real estate				
Aggressive	121	0.46	0.73	0
Balanced	203	0.36	0.64	0
Conservative	43	0.29	0.62	0
<i>Panel B: by education level</i>				
Number of investments				
Graduate	563	3.64	2.49	3
Post-graduate	590	3.78	2.46	3
Doctorate	32	4	2.65	4
Interest rate				
Graduate	563	1.44	2.74	0
Post-graduate	587	1.69	2.92	0
Doctorate	32	1.5	2.85	0
Investment amount				
Graduate	563	758,573	1,619,549	105,000
Post-graduate	590	848,653	1,902,286	95,000
Doctorate	32	975,764	1,907,507	258,500
<i>By investment type</i>				
Debt				
Graduate	509	2.12	1.64	2
Post-graduate	543	2.23	1.62	2
Doctorate	28	2.53	2.12	3
Equity				
Graduate	375	1.01	0.85	1
Post-graduate	397	1.02	0.88	1
Doctorate	20	0.91	0.82	1
Gold				
Graduate	63	0.11	0.32	0
Post-graduate	75	0.13	0.35	0
Doctorate	5	0.16	0.37	0
Real estate				
Graduate	164	0.37	0.67	0
Post-graduate	177	0.38	0.66	0
Doctorate	11	0.41	0.61	0

Next, we expand the analysis to study the financial planning behavior of respondents. From Table 1, we have 1694 customers interested in financial planning. Their individual planning goals range from a desire to buy or lease a car, save for retirement, fund a marriage for their

children, buy a house, or provide education for their children or themselves. The goals are the most populated section of the data, with only 242 individuals not providing any goal information. Below we provide information on how goals relate to participant behavior.

**Table 7**

Liability behavior.

	Number of observations	Average	Standard deviation	Median
<i>Panel A: by risk tolerance</i>				
Number of liabilities				
Aggressive	256	1.75	1.04	1
Balanced	527	1.66	0.94	1
Conservative	153	1.67	1.05	1
Outstanding amount				
Aggressive	256	2,930,744	3,402,490	1,776,472
Balanced	527	2,720,239	4,454,509	1,573,040
Conservative	153	7,819,613	62,992,420	1,000,000
Monthly payment amount				
Aggressive	256	38,809	61,368	23,573
Balanced	527	33,964	49,442	21,000
Conservative	153	37,167	116,241	17,459
Average rate				
Aggressive	256	10.25	2.51	10.50
Balanced	527	33.62	367.20	10.50
Conservative	153	17.47	77.63	10.25
<i>By liability type</i>				
Personal loans				
Aggressive	61	0.32	0.67	0
Balanced	138	0.34	0.64	0
Conservative	42	0.34	0.62	0
Personal loans monthly payments				
Aggressive	61	19,994	77,193	8500
Balanced	138	11,027	11,800	8000
Conservative	42	40,306	136,103	8243
Home loans				
Aggressive	200	0.95	0.66	1
Balanced	407	0.91	0.62	1
Conservative	115	0.90	0.68	1
Home loan monthly payments				
Aggressive	200	38,465	51,159	27,900
Balanced	407	36,305	51,916	23,383
Conservative	115	29,509	92,352	19,000
Car loans				
Aggressive	102	0.45	0.61	0
Balanced	207	0.41	0.52	0
Conservative	54	0.41	0.60	0
Car loans monthly payments				
Aggressive	102	10,024	9858	7293
Balanced	207	7628	8913	5715
Conservative	54	10,928	24,489	6364
<i>Panel B: by education</i>				
Number of liabilities				
Graduate	416	1.7	1.0	1
Post-graduate	457	1.7	1.0	1
Doctorate	21	1.4	0.7	1
Outstanding amount				
Graduate	416	2,390,040	4,281,190	1,321,575
Post-graduate	457	3,086,991	4,678,524	1,854,400
Doctorate	21	4,865,680	8,952,301	980,000
Monthly payment amount				
Graduate	416	32,070	62,522	19,000
Post-graduate	457	37,340	65,264	25,000
Doctorate	21	54,514	89,654	10,500
Average rate				
Graduate	416	16.5	73.3	10.5
Post-graduate	457	33.7	392.9	10.5
Doctorate	21	14.0	18.1	10.5
<i>By liability type</i>				
Personal loans				
Graduate	115	0.37	0.70	0
Post-graduate	112	0.31	0.61	0
Doctorate	3	0.14	0.36	0

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**Table 7** (continued)

	Number of observations	Average	Standard deviation	Median
Personal loans monthly payments				
Graduate	115	14,931	55,769	8000
Post-graduate	112	16,926	57,787	8500
Doctorate	3	8079	6490	9850
Home loans				
Graduate	318	0.90	0.64	1
Post-graduate	360	0.95	0.65	1
Doctorate	15	0.81	0.60	1
Home loan monthly payments				
Graduate	318	32,272	55,687	21,000
Post-graduate	360	37,569	63,080	26,464
Doctorate	15	67,412	96,252	30,000
Car loans				
Graduate	156	0.41	0.57	0
Post-graduate	188	0.44	0.56	0
Doctorate	6	0.33	0.58	0
Car loans monthly payments				
Graduate	156	8587	16,804	5392
Post-graduate	188	8689	8065	7000
Doctorate	6	18,230	15,605	11,590

Apart from the goals, we have significant information on current investments with 1309 customers reporting investment information. On average, each of these held just under four investments, providing us information on 4787 actual investments held. Information was provided on the type of investment – debt, equity, gold, and real estate – as well as on the characteristics of the investments – interest rate, amount invested and the initial value of the investment. Insurance information is less populated in our data base, with only about two third of participants reporting insurance information. Despite that, we still have 1085 individuals providing insurance information, with over 2500 policies. Policies include not only life and health insurance, but money back, endowment and pension policies. For these we have information about premiums, maturity date, and the amount insured. Just over half of the participants report having loans; providing information on 1613 total loans. Those who did report loan information averaged 1.67 loans per survey participant. We also have information about the purpose of the loan – personal use, home loan, car loan – as well as the amount, interest rate and scheduled monthly payment. Again, below we relate this investment and insurance behavior to participant characteristics and behavior.

#### 4.2. Investment behavior

Table 6 reports the investment behavior of the survey participants. We break the summary statistics by risk tolerance (Panel A) and education level (Panel B), and find some rather interesting results. The more risk tolerant a person, on average, the more investments that individual has – with aggressive risk individuals holding one more investment, on average, than conservative risk individuals. Restricting investment size to Rs. 10,000,000 we see that the average amount invested is 31% larger for aggressive growth individuals than for conservative individuals. Viewing the ratio of total investments to income, we see that the median conservative individual has 0.9 months

worth of salary in investments, while aggressive growth individuals have 2.4 months worth in investments.

Not only are the number and size of investments different across risk tolerance groups, but the composition of investments also differ. Each investment in the database is classified as debt, equity, gold, or real estate, and investment shares can be calculated from Table 6 Panel A. While self-proclaimed risky and conservative individuals have similar distributions of gold and real estate, risky individuals have 30.3% of their investments in equities as opposed to only 21.2% for conservative individuals. This results in debt comprising 55.0% and 65.2%, respectively, for risky and conservative investors. Without knowing more about the investments and assuming equity investments tend to be riskier than debt investments, this appears to be consistent with the self-reporting of risk categories.

Looking at an individual's educational attainment (Table 6 Panel B), we see that the number of investments increase with education, with the more highly educated individuals having lower shares of equities in their portfolios. While we do not see a strong relationship between education and interest rates in the weighted returns, the interest rates un-weighted by investment amount appear to show that higher educated individuals seek out investments with higher returns.

#### 4.3. Liability behavior

Table 7 reports information on the liabilities held by the participants. Once again, Panel A reports the liabilities by risk tolerance and Panel B by education levels. We have 965 individuals that report having liabilities, with 16%, 60% and 27% being conservative, moderate, and aggressive in terms of risk tolerance (calculations from Table 7). We see that the aggressive risk individuals appear to have more liabilities than their more conservative counterparts with the average aggressive risk individual holding 1.75 liabilities. Not only does the aggressive growth individual

**Table 8**

Insurance behavior.

	Number of observations	Average	Standard deviation	Median
<i>Panel A: by risk tolerance</i>				
Number of policies				
Aggressive	298	2.61	2.08	2.00
Balanced	567	2.40	2.04	2.00
Conservative	171	1.98	1.60	1.00
Premium amount				
Aggressive	298	66,849	198,882	35,000
Balanced	566	63,775	81,900	37,715
Conservative	171	1,616,299	20,394,769	30,000
Assured amount				
Aggressive	298	3,060,510	12,224,984	1,200,000
Balanced	566	1,784,113	2,677,474	760,000
Conservative	171	175,835,695	2,240,016,049	500,000
<i>By insurance type</i>				
Endowment				
Aggressive	98	0.49	1.10	0.00
Balanced	198	0.55	1.14	0.00
Conservative	49	0.40	0.75	0.00
Health				
Aggressive	25	0.09	0.32	0.00
Balanced	39	0.07	0.28	0.00
Conservative	11	0.08	0.31	0.00
Money back				
Aggressive	99	0.46	0.78	0.00
Balanced	168	0.40	0.72	0.00
Conservative	52	0.36	0.61	0.00
Pension				
Aggressive	27	0.09	0.30	0.00
Balanced	55	0.11	0.38	0.00
Conservative	18	0.12	0.39	0.00
Term				
Aggressive	126	0.59	0.85	0.00
Balanced	181	0.44	0.75	0.00
Conservative	43	0.47	1.09	0.00
Unit				
Aggressive	116	0.57	0.90	0.00
Balanced	193	0.47	0.77	0.00
Conservative	38	0.30	0.68	0.00
Unit pension				
Aggressive	23	0.09	0.33	0.00
Balanced	52	0.12	0.42	0.00
Conservative	4	0.02	0.15	0.00
Life				
Aggressive	42	0.19	0.54	0.00
Balanced	72	0.18	0.55	0.00
Conservative	24	0.18	0.49	0.00
<i>Panel B: by education</i>				
Number of policies				
Graduate	478	2.42	2.09	2.00
Post-graduate	487	2.41	1.95	2.00
Doctorate	27	2.07	1.36	2.00
Premium amount				
Graduate	478	63,030	97,310	36,000
Post-graduate	486	65,490	162,209	35,632
Doctorate	27	62,439	79,119	40,000
Assured amount				
Graduate	478	63,686,332	1,339,759,464	655,000
Post-graduate	486	1,998,149	2,727,808	900,000
Doctorate	27	2,606,708	3,345,207	850,000
<i>By insurance type</i>				
Endowment				
Graduate	159	0.53	1.13	0.00
Post-graduate	162	0.51	1.06	0.00
Doctorate	11	0.52	0.70	0.00

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**Table 8** (continued)

	Number of observations	Average	Standard deviation	Median
Health				
Graduate	35	0.08	0.31	0.00
Post-graduate	35	0.08	0.28	0.00
Doctorate	2	0.11	0.42	0.00
Money back				
Graduate	154	0.42	0.69	0.00
Post-graduate	149	0.43	0.78	0.00
Doctorate	3	0.11	0.32	0.00
Pension				
Graduate	47	0.11	0.38	0.00
Post-graduate	48	0.11	0.34	0.00
Doctorate	4	0.19	0.48	0.00
Term				
Graduate	150	0.47	0.87	0.00
Post-graduate	177	0.51	0.82	0.00
Doctorate	12	0.63	0.84	0.00
Unit				
Graduate	163	0.50	0.86	0.00
Post-graduate	167	0.47	0.77	0.00
Doctorate	6	0.26	0.53	0.00
Unit pension				
Graduate	37	0.10	0.41	0.00
Post-graduate	39	0.09	0.34	0.00
Doctorate	2	0.07	0.27	0.00
Life				
Graduate	62	0.16	0.45	0.00
Post-graduate	66	0.18	0.52	0.00
Doctorate	2	0.19	0.68	0.00

have a larger number of liabilities, but they also have a larger debt-to-income ratio. The median aggressive growth planner tends to have nearly 26 months' worth of salary in outstanding liabilities, opposed to conservative and moderate planners that hold around 22 and 24 months worth of salary, respectively. However, looking at the monthly payments across the different risk group we see that the higher the risk tolerance, the larger the monthly payments compared to the outstanding balance. Despite higher risk tolerance individuals having higher monthly payments, we see the monthly payments, as a fraction of income, is slightly lower for the high risk and low risk individual (median: 34%) compared to the medium risk individual (median: 36%).

Liability behavior can also be examined as a function of educational differences. We see that individuals with college degrees tend to have fewer liabilities than those with graduate or post-graduate degrees. This holds true when looking at those that report any liabilities, as well as when you assume that those that did not report information on liabilities actually held no liabilities. Looking at the distribution of loans within each education group suggests that home loans are the most popular, with all categories having more than 50% of loans in home loans. Respondents with doctorates have 59% of their loans in home loans. Those with post-graduate education have the highest concentration of car loans with 26% and college graduates have the most personal loans as a share of all liabilities, with 22%.

#### 4.4. Insurance behavior

Table 8 reports the insurance behavior of the responders by risk tolerance (Panel A) and education levels (Panel B).

Looking at insurance behavior by risk group we find some unexpected results. We see that aggressive growth individuals tend to have the greatest number of insurance policies, with 2.61 policies on average. Balanced growth investors have 2.40 policies and conservative risk investors have 1.98 policies. Although higher risk individuals have more policies, they seem to find lower cost coverage. The median high risk individual has a 2.9% premium to insurance ratio, compared to 5.0% for balanced growth individuals, and 6.0% for conservative growth individuals.

Looking at insurance behavior by educational attainment, we see that post-graduate participants have the fewest number of insurance policies compared to college graduates and participants with doctorate degrees. This result holds whether or not we assume that individuals that do not provide information about insurance actually have no coverage. We see that the median post-graduate educated individual has a lower premium to insured balance ratio compared to college and doctorate individuals, despite a similar distribution of policy types. Even stronger, post graduates have the lowest (median) premium payments and the most insurance coverage.

#### 4.5. Investment goals

Finally, Table 9 reports information on the overall goals of the responders by risk tolerance (Panel A) and education levels (Panel B). Looking at the distribution of goals by risk tolerance we see that the number of goals increases with risk tolerance. For example, the median conservative and balanced planner has two goals and the aggressive growth planner has three. If we limit the analysis to only those reporting goals, we see the number of goals is 2.6, 2.8

**Table 9**

Goal behavior.

	Number of observations	Average	Standard deviation	Median
<i>Panel A: by risk tolerance</i>				
Number of goals				
Aggressive	372	3.12	2.41	3.00
Balanced	738	2.80	1.83	2.00
Conservative	223	2.57	2.48	2.00
Amount required				
Aggressive	372	16,344,093	28,937,366	9,875,000
Balanced	738	13,819,991	27,096,435	7,000,000
Conservative	223	15,476,208	52,229,936	4,701,515
Percent achievable				
Aggressive	372	37%	43%	0%
Balanced	738	33%	43%	0%
Conservative	223	31%	43%	0%
<i>By goal type</i>				
Short term				
Aggressive	183	0.73	0.89	0.00
Balanced	395	0.75	0.85	1.00
Conservative	124	0.79	0.87	1.00
Mid term				
Aggressive	274	1.44	1.63	1.00
Balanced	507	1.30	1.33	1.00
Conservative	130	1.13	1.50	1.00
Long term				
Aggressive	204	0.95	1.13	1.00
Balanced	363	0.74	0.92	0.00
Conservative	84	0.65	1.09	0.00
Car				
Aggressive	115	0.32	0.49	0.00
Balanced	254	0.36	0.51	0.00
Conservative	68	0.33	0.53	0.00
Education				
Aggressive	213	0.78	1.12	1.00
Balanced	360	0.64	0.85	0.00
Conservative	84	0.60	1.24	0.00
House				
Aggressive	210	0.60	0.58	1.00
Balanced	404	0.56	0.53	1.00
Conservative	119	0.61	0.76	1.00
Retirement				
Aggressive	235	0.65	0.51	1.00
Balanced	417	0.58	0.53	1.00
Conservative	106	0.50	0.54	0.00
Marriage				
Aggressive	137	0.44	0.65	0.00
Balanced	241	0.38	0.60	0.00
Conservative	41	0.21	0.47	0.00
Holiday				
Aggressive	59	0.16	0.39	0.00
Balanced	96	0.14	0.39	0.00
Conservative	36	0.20	0.54	0.00
Other				
Aggressive	48	0.16	0.48	0.00
Balanced	78	0.12	0.39	0.00
Conservative	18	0.09	0.30	0.00
Spouse retirement				
Aggressive	3	0.01	0.09	0.00
Balanced	6	0.01	0.11	0.00
Conservative	7	0.04	0.21	0.00
<i>Panel B: by education</i>				
Number of goals				
Graduate	612	2.79	2.13	2.00
Post-graduate	626	2.96	2.20	3.00
Doctorate	29	2.66	1.54	3.00
Amount required				
Graduate	612	14,974,909	34,094,764	7,000,000
Post-graduate	626	13,817,867	21,082,075	7,900,758
Doctorate	29	34,529,134	122,049,562	8,500,000

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**Table 9** (continued)

	Number of observations	Average	Standard deviation	Median
Percent achievable				
Graduate	612	32%	43%	0%
Post-graduate	626	36%	43%	0%
Doctorate	29	47%	46%	40%
<i>By goal type</i>				
Short term				
Graduate	321	0.75	0.86	1.00
Post-graduate	331	0.75	0.86	1.00
Doctorate	12	0.55	0.78	0.00
Mid term				
Graduate	410	1.25	1.39	1.00
Post-graduate	437	1.41	1.56	1.00
Doctorate	22	1.34	0.97	1.00
Long term				
Graduate	290	0.79	1.07	0.00
Post-graduate	318	0.80	0.99	1.00
Doctorate	15	0.76	0.87	1.00
Car				
Graduate	200	0.34	0.51	0.00
Post-graduate	211	0.35	0.51	0.00
Doctorate	7	0.24	0.44	0.00
Education				
Graduate	286	0.64	0.98	0.00
Post-graduate	329	0.72	1.07	1.00
Doctorate	18	0.72	0.65	1.00
House				
Graduate	311	0.54	0.62	1.00
Post-graduate	371	0.62	0.55	1.00
Doctorate	12	0.41	0.50	0.00
Retirement				
Graduate	356	0.60	0.53	1.00
Post-graduate	349	0.58	0.53	1.00
Doctorate	19	0.66	0.48	1.00
Marriage				
Graduate	182	0.34	0.57	0.00
Post-graduate	209	0.40	0.63	0.00
Doctorate	12	0.48	0.63	0.00
Holiday				
Graduate	94	0.17	0.45	0.00
Post-graduate	88	0.15	0.40	0.00
Doctorate	2	0.07	0.26	0.00
Other				
Graduate	67	0.13	0.43	0.00
Post-graduate	65	0.12	0.39	0.00
Doctorate	2	0.07	0.26	0.00
Spouse retirement				
Graduate	7	0.01	0.13	0.00
Post-graduate	6	0.01	0.12	0.00
Doctorate	0	0.00	0.00	0.00

and 3.1, respectively, for conservative, balanced, and aggressive growth planners. This tendency for higher risk tolerant individuals to have more goals seems to be driven by them having more long term goals than their more risk adverse counterparts – with 30% of their goals being long term, opposed to 25% and 26% for conservative and balanced growth planners, respectively.

While the balanced growth individuals have a middle of the road number of goals (2.8), the average goal size is the lowest of the three risk groups with Rs. 4.6 million opposed to Rs. 5.2 and Rs. 6.0 million for aggressive and conservative growth planners, respectively. This means that balanced growth individuals plan to spend the least (Rs. 13.8 million), with aggressive growth individuals planning to spend the most (Rs. 16.3 million) and the conservative

growth individuals planning to spend something in between the two extremes (Rs. 14.6 million).

Looking at the distribution of goals across levels of education attainment, we see that individuals with doctorates have fewer goals than graduate and post-graduates, but plan on spending the most of any education group. Looking at the distribution of goals, we see that as the education level increases, the fraction of education goals to total goals increases – that is, the importance of education apparently increases. Graduate planners have 22.9% of goals directed to education, post-graduated has 24.5% and participants with doctorate degrees have 27.3%.<sup>9</sup>

<sup>9</sup> This relationship holds when looking at median goal amounts as opposed to the average number of goals.

#### 4.6. Financial literacy and financial planning

We find that the vast majority of respondents appear financially literate – they answer the numeracy, inflation, and diversification questions correctly. However, we also observe that there are significant variations across demographic groups. For example, the young and the old tend to get more correct answers compared to the middle age group. Also, males tend to fare better than females. Finally, responders with doctorate degrees tend to provide the most correct answers and responders with high school degrees tend to get them wrong more often.

Correlating the financial literacy questions with the risk profile (Fig. 1) we see that responders with conservative growth plans tend to get the answers wrong more often than the responders with aggressive and balanced growth plans. The next four figures (Figs. 2–5) correlate the response to the financial literacy questions to the

investment goals, number of investments, number of insurance policies, and number of liabilities. We see that responders tend to answer the financial literacy questions correctly the more the number of goals, investments, insurance policies, and liabilities they have. However, there is a non-linear pattern – when they have too many goals, investments, insurance policies, and liabilities they tend to get the answers incorrect.

Looking at risk tolerance by gender, we see that men tend to be more tolerant of risk than females with 28% of males (11% of females) being categorized as aggressive growth. This is mirrored on the conservative returns side with 18% of males being conservative compared to 36% of females. The women in the sample also appear to have more education, with 62% of women having more than a graduate education and only 48% of men having a similar degree. Contrasting salary with risk and education levels, we see that higher income individuals tend to be more educated and seek aggressive growth portfolios.

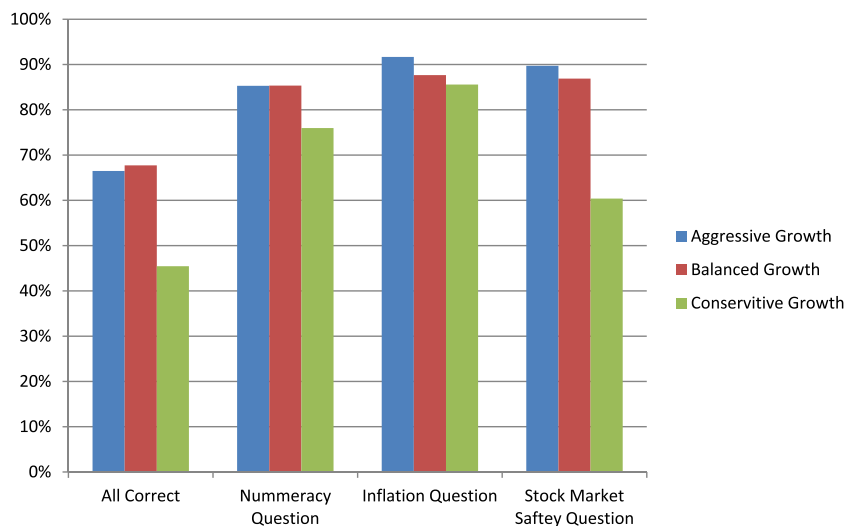


Fig. 1. Correct responses by risk profile.

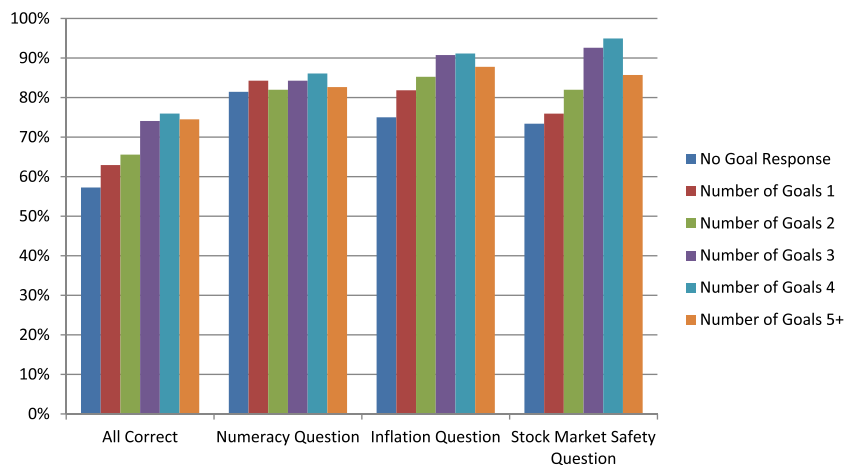


Fig. 2. Correct response by number of goals.



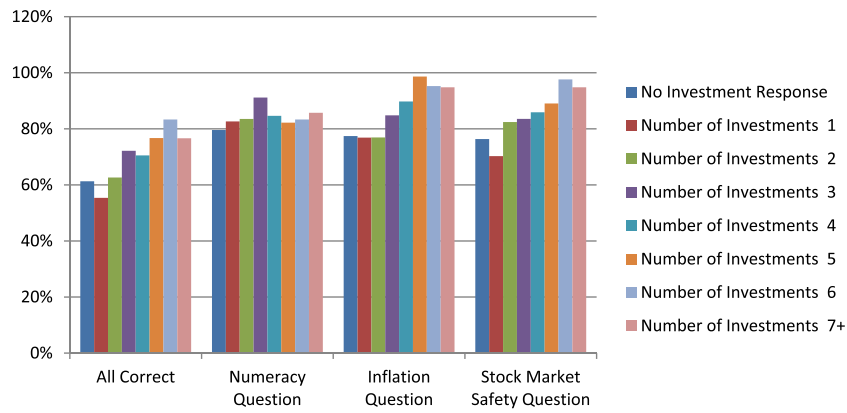


Fig. 3. Correct response by number of investments.

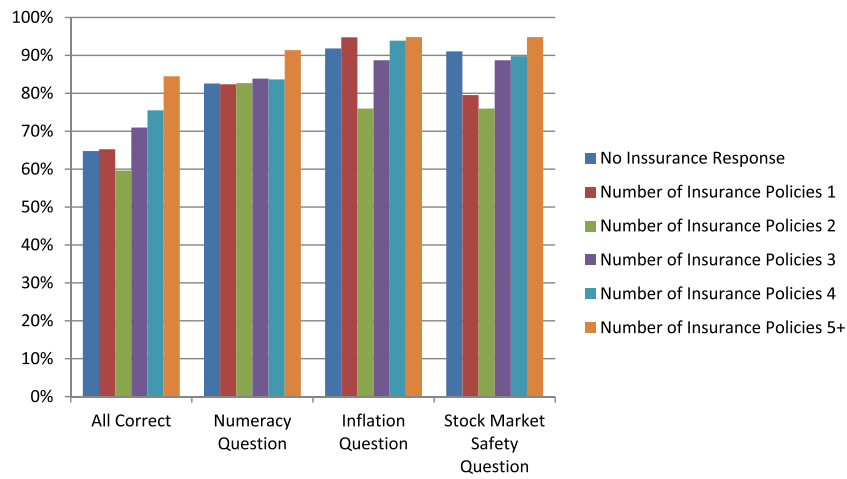


Fig. 4. Correct response by number of insurance policies.

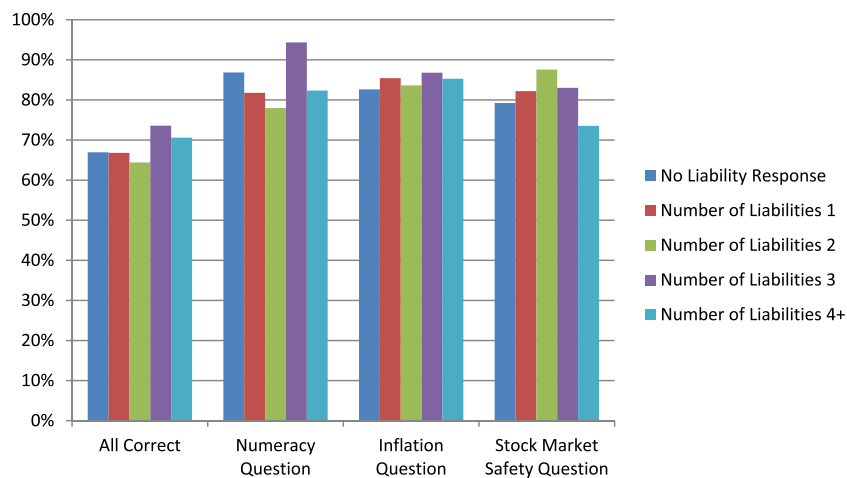


Fig. 5. Correct response by number of liabilities.

**Table 10**

Linearized predictions of financial status variables.

	#Financial goals	#Investments	#Liabilities	#Insurance policies
Log income	0.319*** (0.0949)	0.0628 (0.102)	0.0471 (0.0467)	−0.0771 (0.0780)
Female	−0.436 (0.381)	0.144 (0.390)	0.352** (0.163)	0.216 (0.290)
Married	0.453 (0.378)	0.25 (0.364)	0.421*** (0.139)	0.219 (0.299)
Has children	0.175 (0.308)	0.13 (0.288)	−0.279** (0.120)	−0.00631 (0.238)
Aggressive risk	0.482* (0.282)	0.482* (0.279)	−0.0358 (0.103)	0.328 (0.239)
Conservative risk	0.0261 (0.301)	−0.215 (0.343)	−0.0808 (0.110)	−0.209 (0.208)
Less than 25	0.71 (0.513)	−1.640*** (0.430)	−0.402* (0.222)	−1.176*** (0.309)
Between 25 and 30	0.873*** (0.270)	−0.239 (0.311)	−0.172 (0.112)	0.0075 (0.219)
Between 35 and 40	0.118 (0.333)	0.405 (0.396)	−0.00874 (0.154)	0.47 (0.329)
Older than 40	0.475 (0.396)	1.008** (0.485)	0.141 (0.170)	0.593 (0.541)
Doctorate	−0.372 (0.939)	−0.318 (0.735)	0.0891 (0.368)	−1.099*** (0.346)
Post graduate	−0.0839 (0.357)	−0.431 (0.424)	0.22 (0.211)	0.476 (0.538)
High school	−0.648 (0.403)	−1.257*** (0.420)	0.2 (0.210)	−0.701*** (0.263)
Other education	0.00111 (0.249)	−0.0408 (0.258)	0.0474 (0.0928)	−0.0271 (0.189)
Num fin goals		0.382*** (0.0676)	0.0113 (0.0162)	0.103*** (0.0358)
Constant	1.378 (1.135)	−2.99 (1.705)	0.537 (0.676)	0.281 (1.260)
Observations	519	519	519	519
R-squared	0.0676	0.2316	0.1393	0.1174

*p*-Values in parentheses.\*\*\* *p* < 0.01.\*\* *p* < 0.05.\* *p* < 0.1.

Looking at family size, there does not appear to be a strong correlation between education and number of dependents. However, looking at risk profiles we see that lower risk planners tend to have smaller families. The average number of dependents low risk planners is 1.16 opposed to 1.33 for aggressive planners.

Combining information about goals, investments, liabilities and insurance policies we can discern some patterns in the raw data. As the number of goals increases, we find an increase in the number of financial instruments, i.e., an increase in the number of investments, liabilities and insurance policies, with investments showing the largest increase as the number of goals increase. Looking at the distribution of products as a function of the number of investments is also interesting. We find that aggressive growth individuals tend to have more insurance policies. This increase appears to be correlated with the increase in the number of investments, suggesting that the insurance policies may not be as conservative as they initially appear.

We also analyze the determinants of participant behavior with respect their number of goals, number of investments, number of liabilities and number of insurance policies. Results for these multivariate analyses are

presented in Table 10.<sup>10</sup> Controlling for the additional variables, the number of goals is found to be positively related to income levels and the investment aggressiveness of the survey participants. We also find, not surprisingly, that individuals in the 25–30 year age group (younger, but of income generating age) are pursuing more financial goals. Findings in the above univariate analysis mostly hold true when controlling for these additional influences. Both the number of investments and number of insurance policies are positively related to the number of financial goals people have.

Finally, to more formally evaluate financial literacy, we analyze the probability of getting the answers to all three literacy questions correct in a multivariate framework. With alternative specifications, we evaluate the potential for getting all three questions correct while simultaneously

<sup>10</sup> Since we are working with count data (integer values) we also conducted additional analysis using the Poisson model—see Bergkvist and Westin (1997) and Cameron and Trivedi (2013) for a discussion of econometric issues associated with count data. Our results were nearly identical to the OLS results presented here. Additionally, these are single equation estimates, thus there could be endogeneity issues and a more thorough analysis might address simultaneity bias via estimation of a simultaneous system of equations.

**Table 11**

Linearized probability of getting all 3 Financial IQ Questions correct.

	All three correct	All three correct
Log income	–0.00376 (0.0241)	–0.0077 (0.0243)
Female	0.209** (–0.102)	0.216* (–0.102)
Married	0.0908 (0.0652)	0.0964 (0.0656)
Has children	0.0414 (0.0495)	0.0375 (0.0507)
Aggressive risk	0.0336 (0.0455)	0.0289 (0.0463)
Conservative Risk	–0.0827 (0.0545)	–0.0728 (0.0547)
Less than 25	0.158 (0.130)	0.166 (0.131)
Between 25 and 30	–0.0021 (0.0504)	–2.8E–05 (0.0506)
Between 35 and 40	–0.101* (0.0562)	–0.103 (–0.0576)
Older than 40	0.0461 (0.0762)	0.0524 (0.0763)
Doctorate	–0.153 (0.122)	–0.155 (0.128)
Post graduate	0.0477 (0.0813)	0.0508 (0.0817)
High school	–0.0679 (0.102)	–0.0721 (0.104)
Other education	–0.0288 (0.0411)	–0.0307 (0.0411)
Accounting for the number of:		
Goals	no	yes
Insurance policies	no	yes
Investments	no	yes
Liabilities	no	yes
Constant	0.189 (0.273)	0.181 (0.271)
Observations	519	519
R-squared	0.0350	0.0388

See footnote 10.

*p*-Values in parentheses.\*\*\* *p* < 0.01.\*\* *p* < 0.05.\* *p* < 0.1.

controlling for the characteristics discussed above and a number of additional characteristics. Results from this analysis are presented in Table 11. Results from the second column control for the same factors as shown in column 1, plus the number of investment goals, insurance policies, investments, and liabilities. The results from either specification suggest that the probability of getting all three literacy questions correct is lower for females and for investors that report a more conservative investment strategy. The probability of getting all three questions correct also increases if an investor has a doctorate degree—a result that is not statistically significant once the number of goals, investments, liabilities and insurance policies are accounted for in Column 2.

## 5. Conclusions

Financial literacy, and means to both improve it and enable households to make sound financial decisions, has been a topical area of research in recent years. Much of

this, but not all, has concentrated on mortgage market behavior because mortgage debt is typically the largest single liability for most consumers. Errors in mortgage related decision could have significant adverse implications for consumer well-being.

We expand upon this research in financial literacy. We evaluate the financial literacy of a select group of residents in India that participated in an on-line investment service provided by Yogi Financial Advisory Services. The findings on financial literacy are further related to self-reported information on the respondents' other investment activity. We find that the participants are generally financially literate based on their responses to survey questions previously used in a number of studies to gauge financial literacy; more so than found in studies of other countries. We find a number of relationships between literacy and socioeconomic variables; notably, the probability of getting all the survey questions correct increases with education level, the aggressiveness of the investor and whether the participant is male. More broadly, we find financial literacy is associated with better financial planning.

Our results align closely with previous studies in certain respects, but not others. As in other studies, literacy is higher among respondents with higher education and with married respondents. It is also much lower among women. However, unlike previous studies, we do not find higher literacy measures among middle-aged respondents. Additionally, we do not find literacy to vary by income. These differences may partially result from sample selection issues—the participants are people who were actively seeking financial advice. Thus, our results are better suited to assessing the level of financial literacy in the subset of Indian population that shares socio-economic characteristics of the survey participants. Care should be taken in drawing causal inferences.

As mentioned earlier, there are concerns across numerous countries—including India—about how best to respond to financial illiteracy. What form of education and/or financial market regulation helps avoid poor (and costly) financial decisions?<sup>11</sup> OECD (2014) found better results from educational programs when there was an explicit commitment at the national level to incorporate financial literacy into a broader educational strategy. However, even with such a commitment, the value of school programs have been questioned—see Mandell and Klein (2009). Similarly, Lusardi et al. (2014) found educational programs were more effective when provided to older individuals (over 20 years of age), instead of to grammar or high school students. This suggests that educational programs provided closer to the actual time of the financial decision may be preferred. However, analysis of a mandatory counseling program for mortgage applicants by Agarwal et al. (2014) found the educational value of the program to be rather limited. Instead, they found counseling programs that were broad

<sup>11</sup> In the U.S., significant regulatory reform—2010 Dodd-Frank Wall Street Reform and Consumer Protection Act—was introduced following the financial crisis to (among other things) help consumers make better financial decisions and protect them from questionable market practices. For a discussion and critique of the goals and impact of the Act see Evanoff and Moeller (2014).

based (more than based on a single financial decision) and longer term, to be more effective—see Agarwal et al. (2010). This is obviously an important area for future research.

## References

- Agarwal, Sumit, Amromin, Gene, Ben-David, Itzhak, Chomsisengphet, Souphala, Evanoff, Douglas D., 2010. Learning to cope: voluntary financial education programs and loan performance during a housing crisis. *Am. Econ. Rev.* 100 (2), 495–500.
- Agarwal, Sumit, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, Douglas Evanoff, 2014. “The Effectiveness of Mandatory Mortgage Counseling: Can One Dissuade Borrowers from Choosing Risky Mortgages?” NBER Working Paper, No. 19920, February.
- Agarwal, Sumit, Amromin, Gene, Ben-David, Itzhak, Chomsisengphet, Souphala, Evanoff, Douglas, 2011. Financial counseling, financial literacy, and household decision making. In: Mitchell, O., Lusardi, A. (Eds.), *Financial Literacy: Implications for Retirement Security and the Financial Marketplace*. Oxford University Press, New York.
- Agarwal, Sumit, Souphala Chomsisengphet, Chunlin Liu, and Nicholas Souleles, 2006. “Do Consumers Choose the Right Credit Contracts?” Working Paper, Federal Reserve Bank of Chicago, 2006–11.
- Agarwal, Sumit, John Driscoll, and David Laibson, 2008a. “Optimal Mortgage Refinancing: A Closed Form Solution” (with Driscoll, J., and D. Laibson), NBER Working Paper #13487.
- Agarwal, Sumit, John Driscoll, Xavier Gabaix, and David Laibson, 2008b. “Learning in the Credit Card Market,” NBER Working Paper #13822.
- Agarwal, Sumit, Driscoll, John, Gabaix, Xavier, Laibson, David, 2009a. The age of reason: financial decisions over the life-cycle and implications for regulation. *Brookings Pap. Econ. Act.* 2009 (2), 51–117.
- Agarwal, Sumit, Skiba, Paige, Tobacman, Jeremy, 2009b. Payday loans and credit cards: new liquidity and credit scoring puzzles? *Am. Econ. Rev.* 99 (2), 412–417.
- Agnew, Julie R., Bateman, Hazel, Thorp, Susan, 2013. Financial literacy and retirement planning in Australia. *Numeracy* 6 (2), article 7.
- Alessie, Rob, Van Rooij, Maarten, Lusardi, Annamaria, 2011. Financial literacy and retirement preparation in the Netherlands. *J. Pension Econ. Finan.* 10 (4), 527–545.
- Almenberg, Johan, Save-Soderbergh, Jenny, 2011. Financial literacy and retirement planning in Sweden. *J. Pension Econ. Finan.* 10 (4), 585–598.
- Arrondel, Luc, Debbich, Majdi, Savignac, Frederique, 2013. Financial literacy and financial planning in France. *Numeracy* 6 (2), article 8.
- Atkinson, Adele, Messy, Flore-Anne, 2011. Assessing financial literacy in 12 countries: an OECD/INFE international pilot exercise. *J. Pension Econ. Finan.* 10 (4), 657–665.
- Beckmann, Elisabeth, 2013. Financial literacy and household savings in Romania. *Numeracy* 6 (2), article 9.
- Bergkvist, Erik and Lars Westin, 1997. “Estimation of Gravity Models by OLS Estimation, NLS Estimation, Poisson and Neural Network Specifications.” Centre for Regional Science (CERUM) Working Paper Series. #1997-6, Umea University, Umea, Sweden.
- Brown, Martin, Graf, Roman, 2013. Financial literacy and retirement planning in Switzerland. *Numeracy* 6 (2), article 6.
- Bucher-Koenen, Tabea, Lusardi, Annamaria, 2011. Financial literacy and retirement planning in Germany. *J. Pension Econ. Finan.* 10 (4), 565–584.
- Bucks, Brian, Pence, Karen, 2008. Do homeowners know their house value and mortgage terms? *J. Urban Econ.* 64 (2), 218–233.
- Cameron, A. Colin, Trivedi, Pravin K., 2013. *Regression Analysis of Count Data*, second ed., *Econometric Society Monograph* No. 53. Cambridge University Press, Cambridge.
- Crossan, Diana, Feslier, David, Hurnard, Roger, 2011. Financial literacy and retirement planning in New Zealand. *J. Pension Econ. Finan.* 10 (4), 619–635.
- de Bassa Scheresberg, Carlo, 2013. Financial literacy and financial behavior among young adults: evidence and implications. *Numeracy* 6 (2), article 5.
- Fornero, Elsa, Monticone, Chiara, 2011. Financial literacy and pension plan participation in Italy. *J. Pension Econ. Finan.* 10 (4), 547–564.
- Evanoff, Douglas D., Moeller, William F. (Eds.), 2014. *Dodd-Frank Wall Street Reform and Consumer Protection Act: Purpose, Critique, Implementation Status and Policy Issues*. NOW Publishers Inc, Boston, MA.
- Gartner, Kimberly and Richard M. Todd, 2005. “Effectiveness of Online ‘Early Intervention’ Financial Education for Credit Cardholders”. Federal Reserve Bank of Chicago, available at: [www.chicagofed.net/digital\\_assets/others/events/2005/promises\\_and\\_pitfalls/paper\\_intervention.pdf](http://www.chicagofed.net/digital_assets/others/events/2005/promises_and_pitfalls/paper_intervention.pdf).
- Gustman, Alan L., Steinmeier, Thomas L., 2005. Imperfect knowledge of social security and pensions. *Ind. Rel.* 44 (2), 373–397.
- Hilgert, Marianne A., Hogarth, Jeanne M., Beverly, Sondra, 2003. Household financial management: the connection between knowledge and behavior. *Fed. Reserve Bull.* 89 (7), 309–322.
- Jappelli, Tullio, 2010. Economic literacy: An international comparison. *The Econ. J.* 120, F429–F51.
- Klapper, Leora, Panos, Georgios A., 2011. Financial literacy and retirement planning: the Russian case. *J. Pension Econ. Finan.* 10 (4), 599–618.
- Lusardi, Annamaria, 2004. Saving and the effectiveness of financial education. In: Mitchell, O., Utkus, S. (Eds.), *Pension Design and Structure: New Lessons from Behavioral Finance*. Oxford University Press, pp. 157–184, Reprinted in the *Journal of Financial Transformation*, Issue on Wealth, vol. 15, December 2005.
- Lusardi, Annamaria, and Olivia S. Mitchell, 2006. “Financial Literacy and Planning: Implications for Retirement Wellbeing.” Pension Research Council Working Paper No. 1.
- Lusardi, Annamaria, Mitchell, Olivia S., 2007a. Baby boomer retirement security: the roles of planning, financial literacy, and housing wealth. *J. Monetary Econ.* 54, 205–224.
- Lusardi, Annamaria, and Olivia S. Mitchell, 2007b. “Financial Literacy and Retirement Planning: New Evidence from the Rand American Life Panel.” Michigan Retirement Research Center WP 2007-157.
- Lusardi, Annamaria, Mitchell, Olivia S., 2011. Financial literacy around the world: an overview. *J. Pension Econ. Finan.* 10 (4), 497–508.
- Lusardi, Annamaria, Mitchell, Olivia S., 2014. The economic importance of financial literacy: theory and evidence. *J. Econ. Lit.* 52 (1), 5–44.
- Lusardi, Annamaria, Olivia S. Mitchell and Vilsa Curto (2009a). ‘Financial Literacy Among the Young: Evidence and Implications for Consumer Policy.’ Pension Research Council Working Paper No. 2009-09. Philadelphia, PA: The Pension Research Council.
- Lusardi, Annamaria, Olivia S. Mitchell and Vilsa Curto, 2009b. “Financial Literacy and Financial Sophistication Among Older Americans.” NBER Working Paper No. 15469, November.
- Lusardi, Annamaria, Anya Savikhin Samek, Arie Kapteyn, Lewis Glinert, Angela Hung, Aileen Heinberg, 2014. “Visual Tools and Narratives: New Ways to Improve Financial Literacy.” NBER Working Paper, No. 20229, June.
- Mandell, Lewis, 2009. *The Financial Literacy of Young American Adults: Results of the 2008 National JumpStart Coalition Survey of High School Seniors and College Students*, Washington, D.C.: Jumpstart Coalition, [[http://www.jumpstartcoalition.org/upload/2009\\_FinLit-Mandell.pdf](http://www.jumpstartcoalition.org/upload/2009_FinLit-Mandell.pdf)].
- Mandell, Lewis, Klein, Linda Schmid, 2009. The impact of financial literacy education on subsequent financial behavior. *J. Finan. Couns. Plan.* 20 (1), 15–24.
- Mitchell, Olivia S., 1988. Worker knowledge of pension provisions. *J. Labor Econ.* 6, 21–39.
- OECD, 2005. “Recommendation of the Council on Principles and Good Practices for Financial Education and Awareness.” Decisions, Recommendations and other Instruments of the Organisation for Economic Co-Operation and Development. 22 June 2005 - C(2005)55/REV1, available at <http://webnet.oecd.org/oecdacts/Instruments/ShowInstrumentView.aspx?InstrumentID=77&Lang=en&Book=False>.
- OECD, 2014. *PISA 2012 Results: Students and Money: Financial Literacy Skills for the 21st Century* (Volume VI). OECD Publishing, PISA.
- Reserve Bank of India, 2008. “Financial Literacy and Credit Counseling Centres.” Concept Paper, RBI, April, available at <http://www.rbi.org.in/scripts/PublicationDraftReports.aspx?ID=526>.
- Reserve Bank of India, 2007. “Reserve Bank of India’s Financial Education Initiative.” Financial Education and RBI November 14, available at <http://rbi.org.in/financialeducation/home.aspx>.
- Sekita, Shizuka, 2011. Financial literacy and retirement planning in Japan. *J. Pension Econ. Finan.* 10 (4), 637–656.
- Thorat, Usha, 2007. “Financial Inclusion – the Indian Experience”, speech delivered at the HMT-DFID Financial Inclusion Conference, London, 19 June, available at <http://www.bis.org/review/r070626f.pdf>.
- Volpe, Ronald P., Chen, Haiyang, Liu, Sheen, 2006. An analysis of the importance of personal finance topics and the level of knowledge possessed by working adults. *Finan. Serv. Rev.* 15, 81–96.
- Van Rooij, Maarten, Lusardi, Annamaria, Alessie, Rob, 2011. Financial literacy and stock market participation. *J. Finan. Econ.* 101 (2), 440–472.