The Power of a Financially Literate Woman in Intra-Household Financial Decision-Making *

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Abstract

Using India's national benchmark survey for financial literacy and inclusion, we observe a step change in financially literate women, who possess higher levels of sole and joint responsibility with their spouse to manage their households' finances. Considering ownership information in eighteen different financial products, alternative investments (such as gold, property) and informal banking (such as savings at home, loans from moneylenders), we find that household product holdings are greatest where the husband and wife are jointly responsible for financial decision-making, and in particular where the wife is financially literate. Such households benefit from men's preference for higher risk-return products, whilst also holding security-focused products, such as savings and insurance products, favored by women. The findings emphasize the importance of financial literacy and spousal teamwork in intra-household financial decision-making.

JEL Classification: J16, J15, D14, O16

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1 Introduction

Historically, inequality in income and education meant that intra-household decision-making roles for men and women remained segmented. However, in recent times women are increasingly more active in the workforce and have become greater contributors to household income. For instance, women own 27 percent of global wealth, with the highest annual growth observed in Asia (excluding Japan), reaching nearly 30 percent in 2009 (Damisch et al., 2010). This means that there is a growing interest in understanding the financial outcomes of households when intra-household financial decision-making is shared between husband and wife, rather than one spouse.

However, recent worldwide evidence shows that it is men who tend to be responsible for important financial decisions within households. A recent survey conducted by UBS Global Wealth Management reveals that the majority of women worldwide leave investing and financial planning decisions to their spouse. Less than one-in-four women (23 percent) are involved in making long-term planning decisions within their households (UBS, 2019). This leaves women exposed to significant financial risks when faced with unexpected family crises, unless they respond with investing in financial knowledge (Hsu, 2016). There could be several reasons for women leaving financial decision-making responsibilities to their spouse. For example, recent studies document that women's influence in intra-household financial decision-making is constrained by the social contexts households operate in and implicit gender norms differentiating men's and women's roles within households (Ke, 2021; Guiso and Zaccaria, 2021). A skills-based explanation is that women possess lower levels of financial literacy than men (Lusardi and Mitchell, 2008; Bucher-Koenen et al., 2017; Hasler and Lusardi, 2017) and therefore may be unwilling to take on the responsibility of financial decision-making.

In this paper, we use information on women and men's financial decision-making levels (either sole or joint decision-making with spouse), financial literacy scores of these decision-makers, and granular ownership information on a large set of financial and alternative instru-

ments, to investigate two unanswered questions. First, what is the role of financial literacy in empowering women to be involved in intra-household decision-making and in turn, leading their households to participate in different types of financial products and services? A priori, it is likely that the balance sheets of households led by financially literate female and male decision-makers will look different. For instance, since women tend to be more risk-averse, they may prefer holding a safer household financial portfolio, as compared to households led by men. This leads us to investigate the second important question: is there a material difference in portfolio holdings when a husband-and-wife team is jointly making financial decisions, over when one spouse takes sole responsibility in managing household finances? The findings contribute to the understanding of financial (non-) participation rates of households with different financial management structures.

We utilize India's first nationally representative survey for financial literacy and inclusion fielded in 2015, with granular information on financial responsibility levels, and financial portfolio holdings information of around 60,000 Indian households. We observe three levels of decision-making responsibility among respondents: (i) solely responsible for making the household financial decisions; (ii) jointly responsible with spouse; or (iii) no responsibility for financial decision-making. For each household, the survey records whether or not they hold financial and alternative instruments from six different product categories, including savings schemes, investment products, stocks, insurance products, loans and credit cards, and alternative investment products. We take into account the ownership decisions of eighteen different financial products within the six different product categories, including recurring and fixed deposits, post office savings schemes, Kisan Vikas Patra, public provident fund, mutual funds, bonds, stocks, life insurance, health insurance, home insurance, cattle and crop insurance, personal loans, (subsidized) credit cards, loans from microfinance institutions, chit-funds, collective investment schemes, investment in gold/silver, and investment in property. We also consider participation in informal banking activities, including saving money at home, saving money informally, and holding loans from money lenders.

The descriptive evidence from the Indian sample of households shows that 27 percent of men and 19 percent of women are solely responsible for financial decision-making. A greater percentage of women (20 percent) than men (16 percent) share their financial decision-making responsibility with their spouse and, as expected, a higher percentage of women as compared to men are not involved in financial decision-making. As an initial investigation, we use an ordered probit model to gauge the gendered nature of the financial responsibility levels. In line with previous studies, we find that, while women generally have a significantly lower probability of taking on joint and sole responsibilities as compared to men, the findings reverse for the case of financially literate women. That is, we observe that financially literate women are more likely to be either solely or jointly responsible for managing their household finances. The financial literacy marginal effects are around 37-38% more for financially literate women than for financially literate men. This is expected, as men tend to be on average more financially literate and tend to hold greater levels of financial responsibility, given the gender norms in intra-household decision-making (Baluja, 2016; Baker et al., 2020). The findings corroborate with the evidence in the literature that financial literacy provides the knowledge, skills and confidence for women to be involved in household financial planning and decision-making (Xu and Zia, 2012; Lusardi and Mitchell, 2014; Agarwal et al., 2015; Bucher-Koenen et al., 2017).

Motivated by these preliminary results, we proceed to study the differentials in portfolio holdings of households solely or jointly run by financially literate men and women decision-makers, which is the main goal of the paper. For this analysis, we estimate a structural model, jointly modeling the ordered responsibility levels and the probability of holding financial instruments as a system of equations. The estimation seeks to capture the influence of financial literacy on an individual's financial responsibility levels within their household, and conditional on the responsibility levels, their probability of owning different types of financial products and services. The structural model estimation enables us to accommodate for any endogenous treatment effects arising from the fact that both financial responsibility levels

and the decision to own financial products can be influenced by financial literacy and thereby confound our findings.

The results of the structural model reveal the following: First, we find greater marginal effects for responsibility levels consistently among financially literate female decision-makers as compared to male decision-makers, with the largest financial literacy marginal effects especially for women jointly responsible with their spouse. This indicates that financially literate women have a greater probability of jointly leading household money matters with their husband. When we study participation in informal banking activities, such as saving money at home and borrowing money from moneylenders, we observe that both financially literate men and women tend to possess significantly lower levels of responsibility for money matters in such households.

Secondly, once we model the effects of individuals' financial literacy on responsibility levels in the first stage of the structural model, we find that greater levels of financial responsibility (either joint or sole responsibility) do not have any significant relationship for financial product ownership decisions. This means that possessing increased levels of responsibility in itself is not significantly related to increased financial product holdings and what matters for participation in financial markets is the financial literacy levels of decision-makers. Interestingly, we find that respondents who take on more responsibility for household finances tend to hold more in alternative products, such as chit funds, gold or silver, and property.

Thirdly, a series of interesting findings emerge when evaluating the cross-marginal effects of the changes in financial literacy on the likelihood of holding financial products, for different responsibility levels among men and women. The key findings are summarised below:

- We firstly consider individuals taking sole responsibility. Financially literate male decision-makers display significantly greater holdings in the product areas with higher risk-return, such as investment products and stocks. In contrast, female decision-makers, who are known to be more risk-averse, show a greater focus on security by investing more in savings schemes, insurance products and alternative investments.

Further, households solely led by financially literate women participate less in informal banking activities, including saving money at home, saving money informally and taking loans from moneylenders.

- When we consider households where financially literate women are jointly responsible with their spouse for financial decision-making, the addition of the husband in financial decision-making has significant effects on financial holdings across the board. The greatest effects among women are seen for investment products and stocks – a holdings increase of around 88% for women jointly making decisions with their husbands, as opposed to women acting alone. This shows that joint decision-making with spouse not only helps financially literate women to benefit from men's preference for higher risk-return products, but also it emboldens women to play to their strengths by investing even more in the security-focused products, such as savings and insurance products, favored by women

- Among financially literate male decision-makers, the addition of their wives in financial decision-making likewise results in increased product holdings, albeit to a lesser extent. The greatest influence is seen on their holdings of insurance products and savings schemes, as well as a lower participation in informal banking activities. This indicates that the financially literate men also benefit from involving their wives, who naturally focus on security. Interestingly, the inclusion of women to jointly lead with male decision-makers does not reduce the product holdings that men prefer, such as investment products and stocks.

The above results suggest that financial literacy interventions targeting women can empower them to take on higher levels of financial responsibility within their households and help reduce the gender gap observed in financial market participation. Moreover, the household as a whole benefits from the addition of a financially literate woman in a husband-and-wife decision-making team, with such households displaying greatest holdings in financial

products across the board, and least participation in informal banking practices. The results substantiate the important role of financial literacy in reducing the barriers to owning financial products, as also documented by previous studies (see, for example, Van Rooij et al., 2011, 2012; Almenberg and Dreber, 2015; Balloch et al., 2015; Lusardi and Mitchell, 2017). Additionally, the results highlight the benefits accrued from holding a diversified portfolio for a financially literate household (Reinholtz et al., 2021).

Next, we study the importance of financial literacy on portfolio choices for decision-makers who belong to different castes. India's caste hierarchy consists of four major groupings in order of privilege, namely General, Other Backward Caste (OBC), Scheduled Caste (SC) and Scheduled Tribe (ST). A respondent's caste defines their social status and can define the implicit responsibility boundaries drawn between men and women within households. Recent literature documents that social identity grouping and gender norms play an important role in the level of responsibility women take on within their households (Guiso and Zaccaria, 2021; Ke, 2021). Historically, Indian women's economic mobility and participation in household decisions has been dictated by social rules and norms within their caste networks (Deshpande, 2000; Munshi and Rosenzweig, 2006). Therefore, considering the caste of decision-makers, we study the marginal effects of financial literacy on the likelihood of holding different financial products for four different types of intra-household decision-making arrangements, including (i) where men are solely responsible, (ii) where women are solely responsible, (iii) where men are jointly responsible with their wives, and (iv) where women are jointly responsible with their husbands.

Interestingly, in the case of all product markets, the highest marginal effects for the probability of holding the products in household portfolios are observed when financially literate women are jointly leading financial decisions with their husbands. In fact, the lowest probability of owning investment products and stocks is seen among women who are sole decision-makers in households. The results highlight that the benefits of husband-and-wife teamwork in financial decision-making apply universally across the different castes. How-

ever, noticeably, the magnitude of the marginal effects for financial literacy decreases as we move down the caste hierarchy from General to other castes, especially the two lowest castes, Scheduled Castes and Scheduled Tribes. The findings highlight the greater focus on tradition and wariness toward changing societal norms among decision-makers belonging to the lower castes. Thus, government interventions to increase financial literacy levels should consider the caste hierarchy and in particular take policy steps to reduce the participation gap observed across the lower castes.

Our study contributes both to the existing academic literature as well as informing recent policy discussions on the gender gap in financial literacy and participation in financial products (Lusardi and Mitchell, 2008, 2014; Bönte and Filipiak, 2012). Further, it contributes to the recent strand of literature on the gendered nature of intra-household financial decision-making (Agarwal et al., 2018; Ke, 2018, 2021) and how empowering women changes the financial decision-making dynamics within households (see Duflo, 2012; Jensen, 2012; Fonseca et al., 2012; Bertrand et al., 2015; Almås et al., 2018). Our findings firstly demonstrate that women with higher levels of financial literacy have more dominant roles in household financial decision-making. Secondly, both male and female decision-makers who are financially literate actively participate in financial markets, by being more likely to hold formal financial products and less likely to engage in informal banking activities. Thirdly, conditional on the decision-maker being financially literate, active participation increases when husband and wife jointly manage their household finances. However, when it is the woman who is financially literate in this husband-and-wife team, we observe the highest positive gains in terms of participation in financial products: the likelihood of participation in all types of financial products is significantly higher. The advantage of such decision-making terms over financially literate women acting alone is particularly pronounced for investments and stocks, which are more appealing to men. Similarly, when financially literate men lead with their spouse, as opposed to acting alone, we observe higher probabilities of participation in savings schemes and insurance products, which are more favored by women. In both

cases, joint leadership in managing household finances, where at least one spouse is financially literate, significantly reduces the likelihood of engaging in informal banking practices. Finally, there is a noticeable hierarchy in the marginal benefits derived from financial literacy for women, which declines as we move down the social hierarchy defined by caste. However, among all castes, when financially literate women are jointly making financial decisions with their spouse, we observe the greatest participation rates in financial products and services. Our results are therefore of particular relevance to the policy discussions concerning empowering women with financial literacy to reduce the gender gap in financial product holdings and increase household participation in financial product markets. The financial education treatment effects on behavior changes in the area of personal finance are confirmed by recent studies (Kaiser et al., 2020). Moreover, the growing longevity gap between males and females in India implies that India's older adult population is growing increasingly female (Agarwal et al., 2020). This means India faces an increasingly female and disproportionately financially vulnerable aging population, highlighting the need for policy makers to target financial education interventions for women.

2 Data and variables

2.1 Data and sample characteristics

Our primary data source is the nationally representative survey of financial literacy and inclusion in India from the National Centre for Financial Education (NCFE). The survey uses a multistage cluster sampling design and records responses from face-to-face interviews conducted in 2015. The sample used in this study consists of 59,405 respondents, representing the diverse demographic and socio-economic profiles in India, and covers all 28 states and 7 union territories. We remove respondents who are single and students from the sample. The respondents in the sample are aged 18-80 years, with the majority of respondents (64%) belonging to the age group 25-49 years. This reflects the young demographic profile of India.

Table 1 presents the descriptive characteristics of the sample according to gender. Men constitute 54% of the sample and women 46% (reflecting the higher proportion of men to women in the country as a whole). The survey captures each respondent's responsibility level in financial decision-making within their household. The responses elicit whether a respondent is solely responsible in making financial decisions, jointly responsible with their spouse for financial decisions, or not responsible at all in financial decision-making within their household. The sample statistics of financial responsibility considered according to the gender of respondents show that 27% of men and 19% of women are solely responsible for financial decision-making in their households. 20% of women share joint responsibility for financial decision-making, which is higher than in the case of men (16%).

We measure the financial attitude of respondents, which captures their attitude towards money and planning for the future. We use the three survey instruments following OECD (2016) – "I tend to live for today and let tomorrow take care of itself", "I find it more satisfying to spend money, than to save it for the long term" and "Money is there to be spent". The instruments capture respondents' preferences for short-term versus long-term security. We create a financial attitude score by averaging the responses to these three questions. In our sample, we observe that both men and women have similar levels of financial attitude (average score of 0.65), depicting the general preference towards savings and the 'savings culture' seen among Indian households.

To understand the level of access to formal financial services, the survey captures whether respondents have access to Banking Correspondents in their neighborhood. Banking Correspondents are agencies and individuals appointed by banks, under the guidelines set out by the Reserve Bank of India, to provide basic banking services in locations where there is limited access to bank branches and ATMs. The Banking Correspondents model was rolled out by the Reserve Bank of India in 2006 to target the 65% unbanked or underbanked households in the country. In our overall sample, 4% of men and 3% of women report having access to Banking Correspondents. These respondents will be located in regions where there

are limited numbers of bank branches. As a second measure of financial access, we consider bank branch density at the district-level, which is calculated as the total number of bank branches per thousand households within a district. Both male and female respondents have around 2 bank branches per thousand households in our sample.

In terms of socio-economic characteristics, the average age of the respondents is 41 years, men have a higher average number of years of schooling (10.42 years) as compared to women (8.45 years), and more men than women are employed, with 67% of the women acting as housewives. The average income distribution of men and women reflects their employment status, with a larger proportion of women not employed. A larger proportion of our respondents live in nuclear families consisting of parents and children, followed by joint family structures. The Indian caste system still persists as an important determinant of social identity, dividing Indian households into four mutually exclusive hereditary groups, ranked by ritual status. The survey covers respondents from all four castes, namely General, Other Backward Caste, Scheduled Caste and Scheduled Tribe, accounting for 50%, 26%, 12% and 12% of the sample, respectively. The sample is also spatially diverse, with an urban-rural split of 48% to 52%, and covers all six subnational administrative zones. This shows that the sample accommodates for the geographical and administrative diversity within the country. There is also a gender balance seen in the survey design when we consider the sampling distribution according to caste and geographical characteristics.

2.2 Measuring financial literacy

To measure the financial literacy levels of respondents, the survey adopts the guidelines of OECD (2016) and uses seven survey questions eliciting the respondents' comprehension of basic financial concepts, encompassing time value of money, interest paid on loan, simple interest, compound interest, risk and return, diversification and understanding of inflation. The actual wordings of the survey questions along with the response choices to each of the questions are reported in Appendix A. To measure the overall financial literacy level of a

respondent, we consolidate their responses on the seven financial literacy questions through a weighted average score. The weight for each question is derived from the difficulty level of that question, which is based on how many respondents within the sample correctly answered the question. Appendix B outlines the methodology used in the score construction.

Table 2 reports the responses of men and women on the different financial literacy questions. Across all the seven questions, the percentage of correct responses from women is significantly lower than from men. This is in line with previous global evidence of a gender gap in financial literacy (see, for example, Lusardi and Mitchell, 2008; Bucher-Koenen et al., 2017). All respondents find the question on compound interest calculation most difficult. Only 29% of women correctly answer the question on compound interest calculation, as compared to 32% of male respondents. We observe that there are more women than men in the survey who got none of the questions correct – 9% of men and 8% of women answer all the seven questions correctly, while 6% of women and 5% of men get all seven questions wrong. The financial literacy average score of men is calculated to be 0.32, while for women it is 0.30. Further, we see that more women than men tend to choose "don't know" as their responses to all the financial literacy questions asked (Klapper and Lusardi, 2020; Bucher-Koenen et al., 2021). This is typically the case, as women are less over-confident than men (Barber and Odean, 2001).

3 Empirical analysis

3.1 Gender differences in financial responsibility levels in households

The first component of our investigation is a respondent's degree of responsibility in managing their household finances and the presence of any gender-associated differences. Our main interest is to evaluate whether the strength and direction of the above relationship is moderated by individuals' financial literacy. Due to distinctive preferences and cultural

orientations, men and women may have varying degrees of willingness to take on the responsibility of managing their households' money matters. We use ordered probit regressions, where the latent continuous variable captures the underlying ordinal responses observed on responsibility levels. The full model specification is as follows:

$$\begin{aligned} Responsibility_i^* = \alpha_0 + \alpha_1(FinLit_i \times Men_i) + \alpha_2(FinLit_i \times Women_i) \\ + \alpha_3 Women_i + \beta' Controls_i + \lambda_S + \varepsilon_i, \end{aligned} \tag{1}$$

$$Responsibility_i = \begin{cases} 1 & \text{if } -\infty < Responsibility_i^* \leq C_1 \\ 2 & \text{if } C_1 < Responsibility_i^* \leq C_2 \\ 3 & \text{if } C_2 < Responsibility_i^* < \infty \end{cases}$$

where $FinLit_i$ is the financial literacy score of individual i; $Women_i$ is the gender indicator variable equal to 1 for female respondents, and 0 otherwise; $Controls_i$ include the respondent's financial attitude score, access to Banking Correspondents in their neighborhood, bank branch density at the district-level, age, years of schooling, employment status, occupation type, income, family structure, caste classification and location (rural or urban); and λ_S stands for state fixed effects. $Responsibility_i$ takes the values 1, 2, or 3, corresponding to the three levels of financial responsibility, with ranking 1 for no responsibility, 2 for joint responsibility with spouse and 3 for sole responsibility. Appendix D reports the exact definitions of all the independent variables. Our key variables of interest are $Women_i$ and its interaction with $FinLit_i$, which enables us to measure any gender differentials in the degree of responsibility and the associated moderating effects of financial literacy.

Table 3 reports the coefficient estimates and the marginal effects for the key variables of interest. In column (1), we consider the baseline specification, where the financial literacy and gender of respondents are entered separately, before interacting these variables. We find a positive and strongly significant coefficient for financial literacy, indicating that individuals with higher financial literacy levels are more likely to have greater levels of responsibility

in managing their household finances. When we consider gender, we find a negative and significant coefficient for female respondents as compared to male respondents in the reference category. That is, as responsibility levels rise from no responsibility to sole responsibility, there is a fall in the number of women who are involved in their household's financial decision-making. This evidence is similar to that found in developed countries, where men are observed to take on higher financial decision-making responsibilities than women in their households (Bucher-Koenen et al., 2017).

Next, we augment the baseline specification with the interaction between financial literacy and gender to see whether the results alter for financially literate women. The ordered probit regression estimates in column (2) indicate that financially literate women show higher levels of responsibility in managing their household finances than financially literate men, with the coefficient estimates for women strongly significant and higher than those of men. In this regression, the indicator variable for women remains negative and significant. The results indicate that overall, women as compared to men are less involved in making household financial decisions; however, when women are financially literate, the gender difference is reversed, with women now significantly more responsible for making financial decisions in the household, as compared to financially literate men. To gauge the economic magnitude differences in responsibility levels for financially literate men and women, we report marginal effects in Panel B. First, both men and women with financial literacy have a negative likelihood of having no responsibility in their households' money matters: –23.4% for women versus –17.1% for men. Second, financially literate women have greater joint and sole responsibility levels, as compared to financially literate men, with the highest difference for being solely responsible. This indicates that financially literate women are often solely, than jointly responsible for their household money matters, as compared to financially literate men. Therefore, in summary, there is a significant relationship between financial literacy levels among women and a narrowing of the gender difference observed in terms of financial decision-making responsibility levels within households.

3.2 Financial portfolios holdings of households led by men and women

Having established that financial literacy has a positive relation with women taking on higher levels of responsibility in managing their household finances, we test whether this translates into better portfolio choices for these households. That is, is there a difference in the financial portfolio holding of households led by financially literate men and women, either individually or jointly?

We use the respondents' survey records on their portfolio holdings (i.e. whether or not they own products) for a large set of eighteen mainstream financial products and alternative investment products, which can be broadly classified into six financial product categories, namely (i) savings schemes, including recurring and fixed deposits, post office savings schemes and Kisan Vikas Patra; (ii) investment products, including public provident fund, mutual funds and bonds/debentures; (iii) stocks; (iv) insurance products, including life insurance, health insurance, home insurance, cattle and crop insurance; (v) loans and credit cards, including personal loans, (subsidized) credit cards and loans from microfinance institutions; and (vi) alternative investment products, including chit-funds, tment schemes, investment in gold/silver, and investment in property. Additionally, we consider the respondents' informal banking activities using survey questions that ask whether they save money at home, whether they save money informally and whether they have loans from moneylenders. Using this financial portfolio information, we examine the relationship between financial literacy and the probability of owning financial products for households led by women (i.e. a woman is solely responsible), by men (i.e. a man is solely responsible) and those jointly-led with spouse (i.e. husband-and-wife teams are jointly responsible). For the case of joint responsibility, in the survey we observe respondent-level information, but we are not given any information on the spouse.

To investigate the research question, it is important that we jointly model the ordered responsibility levels and the probability of holding financial products in a structural model.

This is to ensure that the results are not driven endogenously, since the probability of holding financial products is conditional on the level of responsibility taken by individuals, which is in turn strongly correlated with their financial literacy. Additionally, jointly modelling the responsibility levels and portfolio holdings enables us to gauge whether it is the financial literacy levels in individuals or the increased level of responsibility in managing household finances that is significantly associated with increased ownership of financial products.

Therefore, we estimate the following structural model:

$$\begin{aligned} Responsibility_i^* &= \gamma_0 + \gamma_1(FinLit_i \times Men_i) + \gamma_2(FinLit_i \times Women_i) \\ &\quad + \gamma_3 Women_i + \beta' Controls_i + \lambda_S + \varepsilon_i, \qquad (2) \\ Holdings_i^* &= \delta_0 + \delta_1 Responsibility_i + \delta_2 Women_i + \beta' Controls_i + \lambda_S + \nu_i, \qquad (3) \\ \text{where,} \quad (\varepsilon_i, \nu_i)' &\sim N\Big(0, \Sigma\Big) \quad \text{and} \quad \Sigma = \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}, \end{aligned}$$

where Equation (2) is an ordered probit specification, with $Responsibility_i$ taking the values $r = 1, 2, 3$ as described in the previous section. Here, the latent continuous responsibility variable is a function of Financial literacy scores for men and women. Equation (3) is a standard probit model, where Holdings is a dichotomous variable taking the value of 1 if the respondent holds at least one product in the particular financial product category being considered, and zero otherwise:

$$Holdings_i = \begin{cases} 0 & \text{if } -\infty < Holdings_i^* \leq 0 \\ 1 & \text{if } 0 < Holdings_i^* < \infty \end{cases}$$

The two equations are related to each other in a triangular system, with $Responsibility_i$ as an independent variable in the second equation. This makes the system identifiable. The error terms in the system are parametrized as a multivariate normal distribution with covariance matrix, Σ. The joint estimation of the error terms accounts for the presence of

endogeneity in the relationship between holdings and responsibility. We consider the holdings information on the six different financial product categories discussed above and respondents' involvement in informal banking activities. Controls includes the demographic and financial access variables as in the previous section and λ_S denotes the state fixed effects.[1]

Our main interest is to compute the expected (average) marginal effects of financial literacy on product holdings through the channel of financial responsibility levels respondents possess within households and gauge the differences between men and women. For this, we calculate the cross-marginal effects from Equations (2) and (3) to study the effect of changes in the propensity to own a financial product ($\hat{\Pr}(Holdings_i = 1)$) when the financial literacy scores ($FinLit$) increase for both men and women. In the above system of equations, the cross-marginals are the product of two marginals: first, the effect of increasing financial literacy on the propensity for greater levels of responsibility ($\hat{\Pr}(Responsibility_i = r)$) within the household, i.e., sole responsibility ($r = 3$) or joint ($r = 2$) responsibility; and second, the effect of changes in responsibility levels on the probability of holding particular types of financial products.

The first average marginal effects are obtained from Equation (2) for the case of female respondents as:

$$E_W\left(\widehat{MR}_r^{(1)}\right) \equiv \frac{1}{\#women} \sum_{i=1}^{\#women} \frac{\partial \hat{\Pr}(Responsibility_i = r)}{\partial FinLit_i}. \tag{4}$$

Analogously, we define $E_M\left(\widehat{MR}_r^{(1)}\right)$ for men. Panel A of Table 4 reports the average marginal effects for changes in responsibility levels of male and female respondents, for the case of different financial product categories. A few noticeable observations are as follows. First, we find that, for both male and female respondents, the financial literacy marginal effects are positive and significant, which holds for all six categories of financial products. Secondly, for financially literate respondents, the probability of jointly leading household

[1]We estimate the system of equations using the command eprobit, which is part of the suite of extended regression methods in the Stata 16 software package Roodman (2011); StataCorp (2019).

money matters with their husband or wife is greater than that of taking sole responsibility. And finally, we see that both financially literate men and women possess significantly lower levels of responsibility in households that are participating in informal banking activities.

Next, we consider the second average marginal effects, which is the increase in responsibility levels on the propensity to own a financial product. We calculate the marginal effects for women from Equation (3) as:

$$E_W\left(\widehat{MR}_r^{(2)}\right) \equiv \frac{1}{\#women}\sum_{i=1}^{\#women}\frac{\partial\hat{\Pr}(Holdings_i=1)}{\partial\hat{\Pr}(Responsibility_i=r)}. \tag{5}$$

Similarly, we define $E_M\left(\widehat{MR}_r\right)$ for men. Panel B of Table 4 reports the average marginal effects of the changes in ownership with respect to changes in the responsibility levels of male and female respondents for the different financial product categories. We find that, for both male and female respondents, the average marginal effects are insignificant for all the categories of formal financial products. The results indicate that additional levels of financial responsibility per se have no significant relationship with the increased probability of holding formal financial products. Interestingly, we find that respondents who take on more responsibility for household finances tend to invest more in alternative investment products, such as investing in chit funds, investing in gold or silver, or investing in property.

Finally, we calculate the cross-marginal effects of changes in the probability of owning a financial product for changes in financial literacy scores. For female respondents, this is defined as:

$$\begin{aligned}
&E_W\left(\widehat{MR}_{FinLit_i}|Responsibility_i=r\right)\\
&\equiv\frac{1}{\#women}\sum_{i=1}^{\#women}\frac{\partial\hat{\Pr}(Holdings_i=1|Responsibility_i=r)}{\partial FinLit_i}\\
&=\frac{1}{\#women}\sum_{i=1}^{\#women}\frac{\partial\hat{\Pr}(Holdings_i=1)}{\partial\hat{\Pr}(Responsibility_i=r)}\frac{\partial\hat{\Pr}(Responsibility_i=r)}{\partial FinLit_i}.
\end{aligned} \tag{6}$$

In a similar way, we define $E_M\left(\widehat{MR}_{FinLit_i}|Responsibility_i=r\right)$ for men. The aver-

age cross-marginals of Holdings with respect to Finlit is the "covariance" of marginals of Responsibility with respect to FinLit and the marginals of Holdings with respect to Responsibility. We separately estimate the cross-marginals for different responsibility levels to examine whether men and women are better as sole decision-makers or whether they benefit from being jointly responsible and working together in managing their household finances. The differences in marginal effects between sole ($Responsibility_i = 3$) and joint ($Responsibility_i = 2$) responsibility levels for women are estimated as:

$$\frac{E_W\left(\widehat{MR}_{FinLit_i}|Responsibility_i = 2\right) - E_W\left(\widehat{MR}_{FinLit_i}|Responsibility_i = 3\right)}{E_W\left(\widehat{MR}_{FinLit_i}|Responsibility_i = 3\right)}. \tag{7}$$

Analogously, we estimate the differences in marginal effects for men. Panel C of Table 4 reports the results for the cross marginal effects for the different financial product categories, separately for men and women. For all six product categories, the marginal effect of financial literacy on product holdings is positive and statistically significant at the one percent level, whether the respondent is male or female, assumes sole responsibility or shares joint responsibility with their spouse in financial decision-making. This shows that the probability of holdings is higher for those with financial literacy. In the area of informal banking activities, we find there is a consistent decrease (again statistically significant at the one-percent level) across all types of respondent, when they are financially literate. This finding is entirely to be expected, since informal banking activities such as saving money at home or saving informally is an insecure form of saving that effectively – when we account for inflation – brings depreciation in value; hence we would expect financially literate decision-makers to hold their money in more formal banking products and services. The uniform increase in holdings of every other product type shows that this is indeed the case. Overall, we conclude that, for every product type, equipping the decision-maker(s) with financial literacy has significant marginal gains on their likelihood of holding such products.

When comparing the holdings of financially literate men and women who are solely responsible for their household financial decisions (rows FinLit → Holdings (Sole responsible)), we observe different levels for different product types. More specifically, men display greater holdings in the product areas with higher risk-return, namely, investment products and stocks, while women, who are known to be more risk-averse (Jianakoplos and Bernasek, 1998; Bertocchi et al., 2011; Säve-Söderbergh, 2012; Almenberg and Dreber, 2015), show a greater focus on security by investing more in savings schemes, insurance products and alternative investments. Also, we see that financially literate women participate less in informal banking activities, including saving money at home, saving money informally and taking loans from moneylenders.

When we consider the results where financially literate men and women are jointly responsible for financial decision-making, in the majority of cases, the addition of a spouse in financial decision-making has a statistically significant effect on financial holdings (see row Differences in marginals). We observe that, in general, men and women who are jointly responsible are more likely to hold the various products than those with sole responsibility. The results are consistently significant for women, but not always significant for men. The only exception concerns stocks and shares, with a marginal decrease in holdings by men who are jointly responsible with their wives as compared to men acting alone, though this decrease is not statistically significant. Interestingly, for the case of informal banking activities, when men and women are jointly responsible for financial decisions, they are considerably less likely to engage in such practices than those who act alone, with results statistically significant at the one-percent level. Overall, it seems then that, when equipped with financial literacy, working as a husband-and-wife team is more beneficial in financial decision-making than acting alone, both in terms of holding more profitable products and of reducing engagement in informal banking.

There is a further point to be noted, concerning the extent of the impact of husband-and-wife teamwork as compared to men acting alone and women acting alone. We observe

that, with the exception of informal banking, the addition of a financially literate spouse in decision-making has a greater effect on financially literate women than it does on financially literate men, with statistical significance in differences in marginals for women invariably at the one-percent level. Perhaps unsurprisingly, the greatest effects among women are seen for the products where financial literacy is more significant with men than with women: investment products (an increase of 88.42% for women acting jointly with their husbands as opposed to women acting alone) and stocks and shares (an increase of 87.07%). However, even when we turn to products where financial literacy is more significant among women than among men – savings schemes, insurance products and alternative investments – we find that the difference in marginals for women acting jointly with their spouse as opposed to assuming sole responsibility are greater than those for the sole/joint comparison among men. For instance, the effect on holding savings products is particularly pronounced: an increase of 39.86% among women as opposed to 22.39% among men. It appears that jointly leading financial decision-making responsibilities with their husbands not only helps financially literate women to benefit from men's preference for higher risk-return products, but also emboldens them to play to their strengths and maintain a balance by investing even more in the security-focused products favored by women.

Among financially literate male respondents, the addition of their wives in financial decision-making has the greatest influence on their holdings of insurance products (an increase of 25.6%, statistically significant at the one-percent level) and savings schemes (an increase of 22.39%, statistically significant at the one-percent level), and reducing their engagement in informal banking practices (a decrease of 33.76%, again statistically significant at the one-percent level). Hence the addition of their wives in financial decision-making allows financially literate men to benefit from women's focus on security. However, interestingly and as a contrast, the influence of women on men decision-makers is insignificant for products that men prefer, such as investment products and stocks. This shows that men – who traditionally would take on the primary role of financial decision-maker – exert a greater

influence in financial decision-making on their wives than vice-versa.

Overall, we draw the following main conclusions. Firstly, financial literacy invariably results in significantly greater holdings of all types of financial product as well as significantly lower involvement in informal banking activities such as saving money at home/informally and borrowing from money lenders. Secondly, for the financially literate working jointly with a spouse, as opposed to making financial decisions alone, these results are magnified: their holdings of most products increase, while they engage significantly less in informal banking. Moreover, the advantages of husband-and-wife teamwork go above and beyond simply benefiting from each other's strengths – a preference for higher risk-return products among men and security-focused products among women. The strength of working as a team almost invariably emboldens them to take on more of the advanced financial products and to engage less in informal banking. This effect of teamwork is particularly pronounced when comparing financially literate women acting alone versus jointly with their husbands, indicating that men – who traditionally would take on the role of financial decision-maker and are moreover more likely to be financially literate on average – still exert a greater influence in financial decision-making on their wives than vice-versa.

3.3 Gender differences across caste identity groupings

The caste hierarchy in India is most influential in defining one's social status and governs the implicit division of responsibilities between men and women within households. Recent papers document that gender norms play an important role in household decision-making (Guiso and Zaccaria, 2021; Ke, 2021). In this section, we explore the gender differences in financial product holdings and in the importance of financial literacy across the various social identity groupings in India, where we take into account the caste profiles of respondents (Bönte and Filipiak, 2012). India's caste hierarchy consists of four major groupings in order of privilege, namely General Caste, Other Backward Caste, Scheduled Caste and Scheduled Tribe. To assess the marginal effects of financial literacy on the probability of owning

financial products for men and women across various castes, we calculate the cross marginal effects defined in Equation (6) separately for the different caste groupings.

Figure 1 plots the cross-marginal effects of financial literacy on the likelihood of holding different types of financial products and services. We have four categories of respondents according to their gender and financial responsibility levels: men who are solely responsible, women who are solely responsible, men who are jointly responsible with their wives, and women who are jointly responsible with their husbands. Several interesting observations emerge. Firstly, the marginal effects of financial literacy on product holdings monotonically decrease as we go down the caste hierarchy from General Caste to Scheduled Tribe. The financial literacy marginal gains are higher for General Caste, with little variation among the other castes when we consider holdings in savings products, investment products and the stock market. The Scheduled Tribe has the lowest marginal gains for participation in insurance products and alternative investments. These marginal effects control for supply-side factors, and individual- and household-level demographic characteristics, hence the results reflect the variation in societal norms among the different castes. Secondly, when we consider the four different types of decision-makers' portfolio holdings, the highest marginal effects for the probability of holding products are observed when financially literate women are jointly leading financial decisions with their husbands. This is very interesting since it indicates that the maximum gains can be derived from targeting financial literacy programs to female decision-makers. Thirdly, in the participation of informal banking activities, we observe negative marginal effects of financial literacy across the various castes. What is interesting, however, is that across all castes and irrespective of the gender of the decision-maker, the addition of a spouse in financial decision-making invariably results in a statistically significant decrease (mostly at the one-percent level) in being involved in informal banking activities. This again confirms the significant benefits of women's involvement in intra-household financial decision-making, and the benefits of teamwork.

Table 5 reports the statistical significance of the financial literacy marginals for women

who are jointly responsible for household finances versus other types of decision-making arrangements. We find that the marginal gains for financially literate women jointly managing household finances with their husbands is significantly higher (mostly at the one-percent level) than when financially literate women are solely responsible or when financially literate men are jointly responsible with the wives. The result holds across all the castes and the various product holdings. The results confirm that husband-and-wife teamwork in intra-household financial decision-making generates gains universally when the wife is financially literate and jointly involved in making financial decisions.

4 Conclusion

Recent surveys highlight that globally women play a marginal role in financial decision-making within households, especially in the case of investment decisions for the future and making long-term planning decisions. At the same time, studies have documented lower levels of financial literacy among women than men. Given the above, this paper sets out to investigate the role of financial literacy in empowering women to actively participate in intra-household financial decision-making. Our granular cross-sectional data is from India's national benchmark survey for financial literacy and inclusion, covering 59,405 respondents. We observe three levels of financial responsibility that a respondent can take on when managing their household finances, namely sole responsibility for making financial decisions, joint responsibility with spouse, and no responsibility at all. Using this information, we also investigate the portfolio holdings of households that are run by male and female sole financial decision-makers and those that are run by husband-and-wife teams jointly responsible for making their households' financial decisions.

As expected, women are observed to take on lower levels of responsibility than men on average; however, this pattern reverses for financially literate women. We find that financially literate women have a significantly greater likelihood of possessing higher levels of respon-

sibility in managing their households' financial matters. Additionally, the increased level of responsibility for managing finances by financially literate women translates to higher participation of households in financial products, with marginal gains greater than for men. When we consider households where financially literate men and women are jointly responsible with their spouse for financial decision-making, the probability of holding financial products increases even further, particularly where it is the wife who is known to be financially literate.

In this regard, we study households' holdings in eighteen different financial products, which are classified into six different product categories, including savings schemes, investment products, stocks, insurance products, loans and credit cards and alternative investment products. We also take into account households' informal banking activities; that is, whether they save money at home, save money informally and have borrowed from money lenders. The findings reveal that financially literate female decision-makers have a higher probability of investing in security-focused products such as savings schemes, insurance products and alternative investments, and are less involved in informal banking activities, while financially literate male decision-makers have a higher probability of holding higher risk-return products such as investment products and stocks. When financially literate women are jointly responsible with their spouse for managing their households' finances, we observe the highest participation rates in all financial products and the least engagement with informal banking practices. Thus, encouraging financially literate women to be jointly responsible in managing household finances with their spouse is optimal in enhancing participation in financial product markets markets and reducing informal banking practices.

When we consider marginal gains of financial literacy across the caste hierarchy, which captures the social norms in India, the General Caste (highest on the hierarchy) have higher participation gains in savings products, investment products and the stock market, as compared to the other castes. The Scheduled Tribe (lowest on the hierarchy) is observed to have the lowest financial literacy marginal gains for participation in insurance products and alternative investments. These results show unequal participation in the different castes and are

an important aspect to consider by policy makers designing financial literacy interventions to increase the uptake of various financial products and services. When studying the different intra-household decision-making arrangements, across all castes, the highest marginal effects for the probability of holding financial products are observed when women are financially literate and jointly leading financial decisions with their husbands.

Overall, this paper documents that empowering decision-makers with financial literacy has the potential for improving households' financial decision-making abilities and can also serve as an important intervention tool to increase gender equality and social parity.

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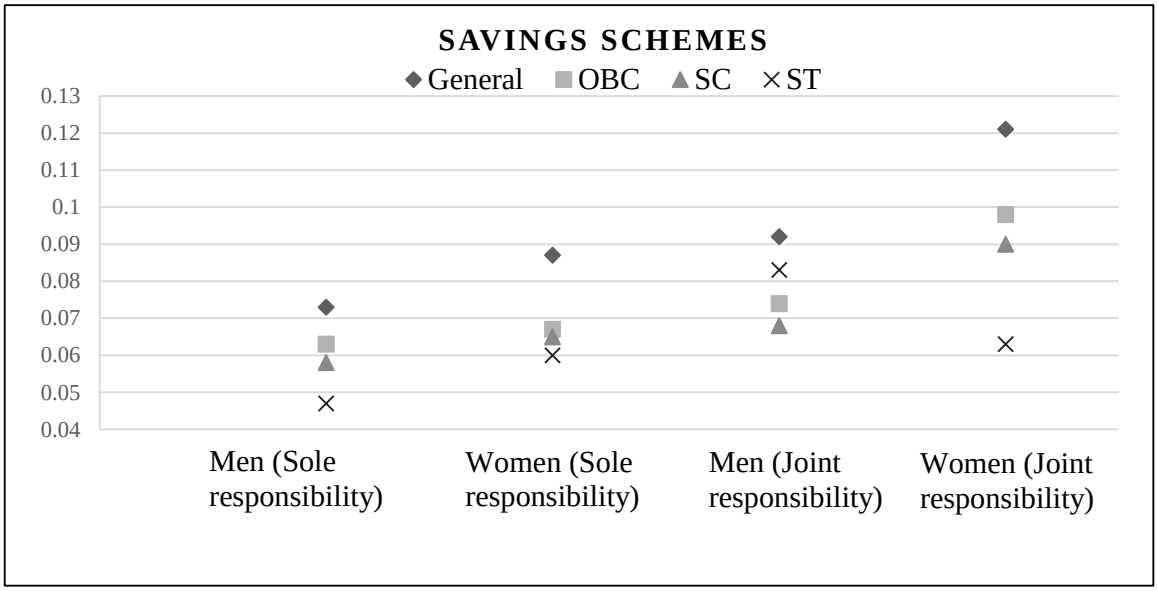
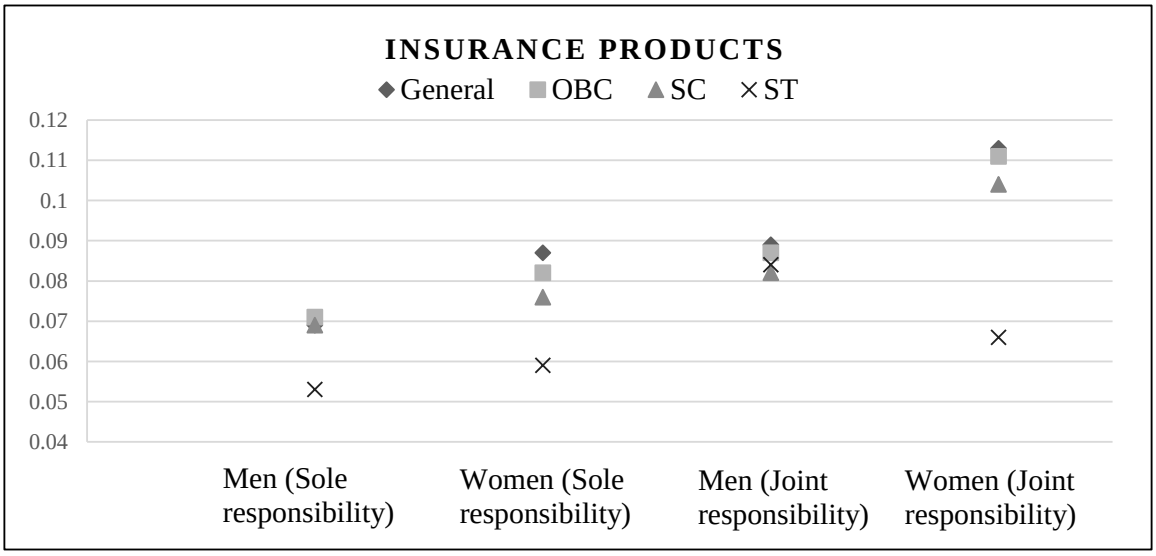
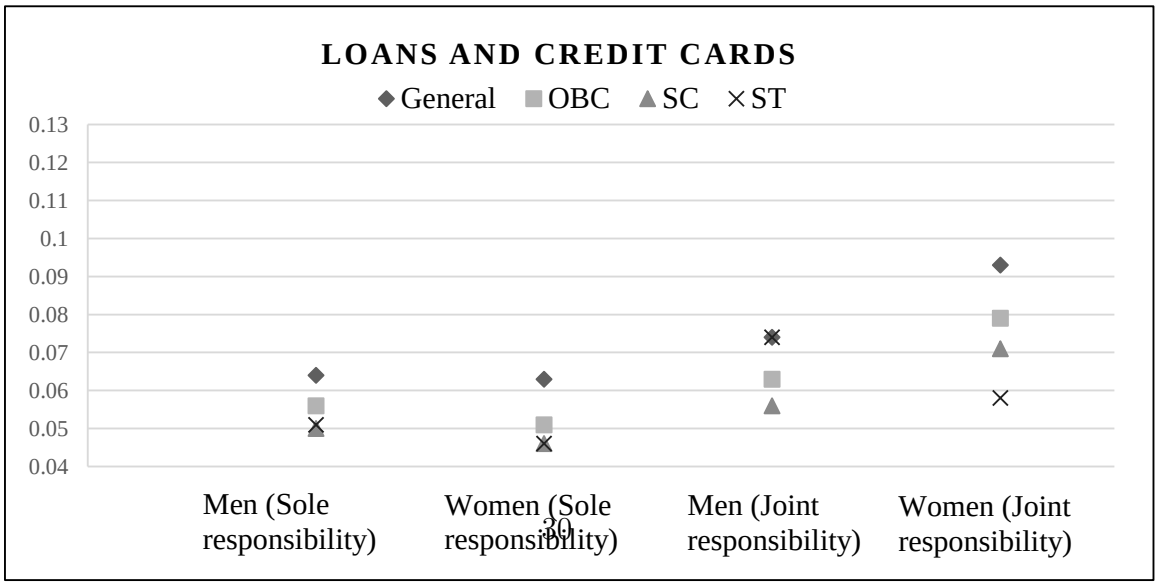
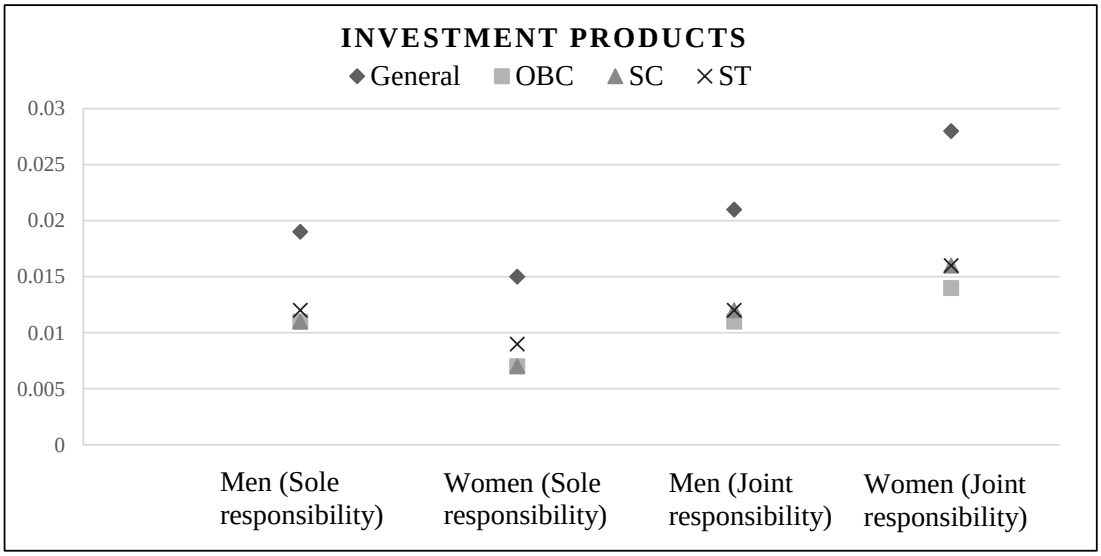
Figure 1: **Financial literacy marginal effects across gender, responsibility levels and caste.** The figure plots cross-marginal effects of financial literacy on the likelihood of holdings a particular financial product, for different responsibility level and caste of respondent. Each plot is different regressions for the seven different types of products.








INVESTMENT PRODUCTS
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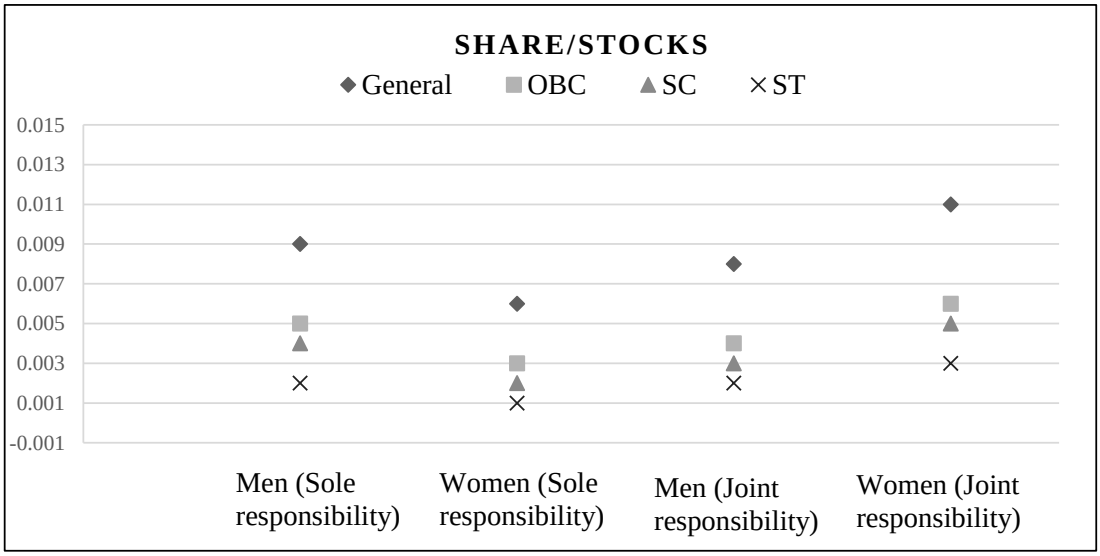
Men (Sole responsibility)
Women (Sole responsibility)
Men (Joint responsibility)
Women (Joint responsibility)


SHARE/STOCKS
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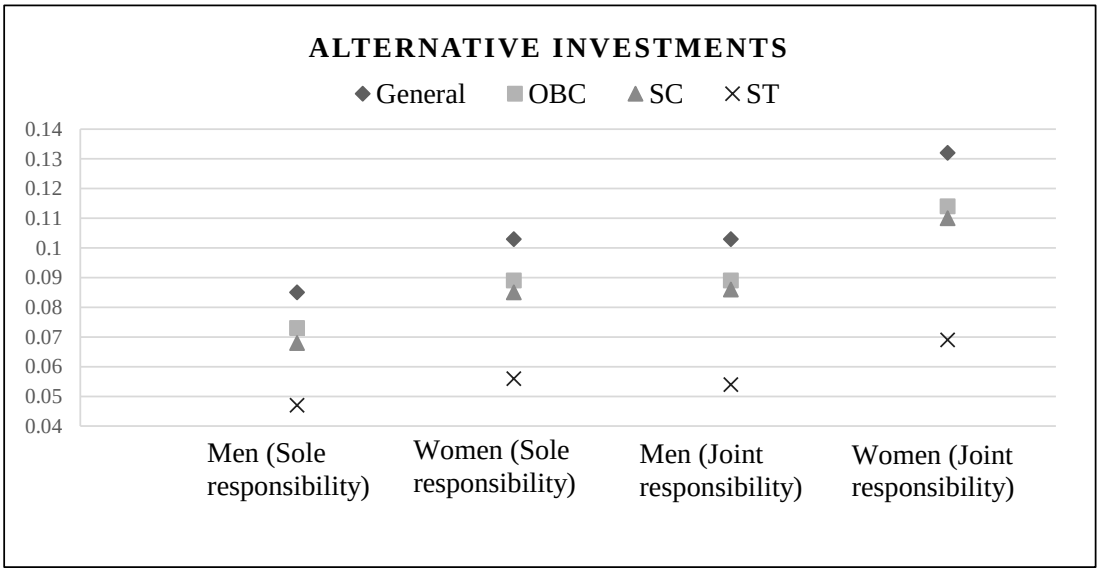
Men (Sole responsibility)
Women (Sole responsibility)
Men (Joint responsibility)
Women (Joint responsibility)


ALTERNATIVE INVESTMENTS
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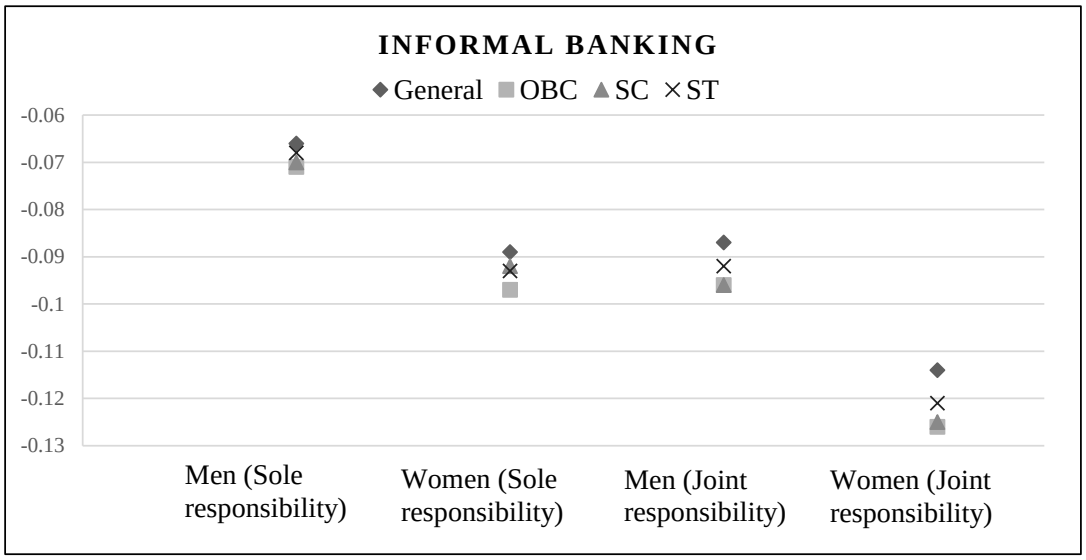
Men (Sole responsibility)
Women (Sole responsibility)
Men (Joint responsibility)
Women (Joint responsibility)


INFORMAL BANKING
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Men (Sole responsibility)
Women (Sole responsibility)
Men (Joint responsibility)
Women (Joint responsibility)

5 Tables

Table 1: **Summary statistics.** This table reports the sample means of individual- and household-level characteristics in our database.

	Men	Women	Full sample
Financial responsibility			
Sole responsibility	0.27	0.19	0.23
Joint responsibility with spouse	0.16	0.20	0.18
No responsibility	0.57	0.61	0.59
Financial Attitude			
Financial attitude score	0.64	0.65	0.64
Financial access			
Access to banking correspondent	0.04	0.03	0.03
Bank branches per thousand households	1.66	1.67	1.66
Age	41.42	41.21	41.33
Years of schooling	10.42	8.45	9.52
Employed	0.91	0.32	0.64
Occupation			
Self-employed	0.43	0.11	0.28
Housewife	-	0.67	0.31
Labourers	0.18	0.09	0.14
Salaried	0.31	0.11	0.22
Retired	0.08	0.02	0.05
Annual income in Rupees			
$\leq$ 10,000	4.72	2.24	6.96
10,001-50,000	16.38	6.10	22.48
50,001-200,000	21.33	5.19	26.52
200,001-500,000	7.16	1.73	8.89
500,001-10,00,000	1.46	0.27	1.73
$\geq$ 10,00,001	0.28	0.04	0.32
No income	2.92	30.17	33.09
Family structure			
Nuclear family	0.46	0.51	0.49
Nuclear family with elders	0.11	0.11	0.11
Joint family	0.43	0.37	0.40
Caste			
General Caste	0.51	0.49	0.50
Other Backward Caste	0.26	0.25	0.26
Scheduled Caste	0.11	0.12	0.11
Scheduled Tribe	0.11	0.13	0.12
Rural	0.53	0.52	0.52
Total number of respondents	32,236	27,169	59,405

Table 2: **Financial literacy differences according to gender.** This table reports male and female respondents' levels of financial literacy as percentages. Seven survey questions capture the comprehension of basic financial concepts, encompassing time value of money, interest paid on loan, simple interest, compound interest, risk and return, diversification and understanding of inflation. Appendix A provides the detailed wording of the survey questions.

	Correct (in %)			Don't know (in %)		
	Men	Women	t-value	Men	Women	t-value
Panel A: Comparison of responses across different financial literacy questions						
Time value of money	41.20	37.23	9.89***	27.93	31.34	-9.06***
Interest paid on loan	76.16	74.73	4.03***	15.01	16.38	-4.56***
Simple interest calculation	56.80	51.76	12.26***	30.29	35.36	-13.11***
Compound interest calculation	31.74	29.01	7.21***	42.08	46.66	-11.20***
Risk and return	59.32	56.26	7.54***	21.51	24.84	-9.57***
Diversification	59.56	56.58	7.32***	22.02	24.76	-7.84***
Understanding of inflation	63.81	59.94	9.68***	21.97	25.88	-11.13***
Panel B: Comparison of aggregate responses						
	Men		Women		t-value	
All the seven questions are correct	9.39		7.80		6.92***	
None of the seven questions are correct	5.22		6.26		-5.45***	
Average financial literacy score (count)	3.89		3.66		14.31***	
Average financial literacy score (FinLit)	0.32		0.30		14.30***	

Table 3: **Financial responsibility and financial literacy.** This table reports the ordered probit regression results for the relationship between levels of financial responsibility and financial literacy. The dependent variable is an ordered response variable taking the values of 1, 2 or 3, corresponding to the respondent's level of responsibility in managing their household's finances, namely, no responsibility, joint responsibility or sole responsibility, respectively. Control variables include respondent's financial attitude score, access to Banking Correspondents in their neighborhood, bank branch density at the district-level, age, years of schooling, employment status, occupation type, income, family structure, caste classification and location (rural or urban). Definitions of all variables are provided in Appendix D. State fixed effects are included in the regressions. Panel B reports the marginal effects using the estimated model in column (2). Robust standard errors are provided in parentheses. ***, ** and * indicate statistical significance at 1, 5 and 10 percent, respectively.

	(1)	(2)
Panel A: Estimation results		
FinLit	0.531***	
	(0.028)	
FinLit × Men		0.455***
		(0.037)
FinLit × Women		0.625***
		(0.040)
Women	−0.115***	−0.169***
	(0.015)	(0.022)
Controls	Yes	Yes
State fixed effects	Yes	Yes
Financial responsibility ≥ 1	0.673***	0.649***
	(0.088)	(0.089)
Financial responsibility ≥ 2	1.196***	1.173***
	(0.088)	(0.089)
Observations	59,405	59,405
Pseudo R-squared	0.025	0.025
Panel B: Marginal effects		
FinLit × Women → No Responsibility		−0.234***
		(0.015)
FinLit × Men → No Responsibility		−0.171***
		(0.014)
FinLit × Women → Joint Responsibility		0.051***
		(0.003)
FinLit × Men → Joint Responsibility		0.037***
		(0.003)
FinLit × Women → Sole Responsibility		0.184***
		(0.012)
FinLit × Men → Sole Responsibility		0.134***
		(0.011)

Table 4: **Joint modeling of responsibility levels and portfolio holdings** This table reports the marginal effects estimated from Equation (2) in Panel A and from Equation (3) in Panel B. The dependent variable in Panel A is an ordered response variable taking the values of 1, 2 or 3, corresponding to the respondent's level of responsibility in financial and money management of the family, namely, no responsibility, joint responsibility or sole responsibility, respectively. The dependent variable in Panel B is a dichotomous variable taking the value of 1 if the respondent holds at least one product in the particular financial product category being considered, and zero otherwise. Holdings information on six different financial products categories and informal banking products are considered separately. All regression models include the following Control variables: respondent's financial attitude score, access to Banking Correspondents in their neighborhood, bank branch density at the district-level, age, years of schooling, employment status, occupation type, income, family structure, caste classification and location (rural or urban). Definitions of all variables are provided in Appendix D. State fixed effects are included in the regressions. Panel C reports the cross-marginal effects of financial literacy on product holdings, for different responsibility levels. The Differences are the relative percentage differences in marginals and the stars in square brackets report the significance levels for the differences in marginals. Standard errors of marginal effects are reported in parentheses. ***, ** and * indicate statistical significance at 1, 5 and 10 percent, respectively.

Panel A: Marginal effects of financial literacy on the predicted responsibility levels

	Savings schemes		Insurance products	
	Men	Women	Men	Women
FinLit → Sole responsibility	0.062***	0.082***	0.066***	0.085***
	(0.005)	(0.006)	(0.005)	(0.005)
FinLit → Joint responsibility	0.080***	0.105***	0.085***	0.109***
	(0.006)	(0.007)	(0.006)	(0.006)
Observations	59,405	59,405	59,405	59,405
	Loans and credit cards			
	Men	Women		
FinLit → Sole responsibility	0.051***	0.064***		
	(0.005)	(0.005)		
FinLit → Joint responsibility	0.065***	0.082***		
	(0.005)	(0.006)		
Observations	59,405	59,405		
	Investment products		Stocks	
	Men	Women	Men	Women
FinLit → Sole responsibility	0.012***	0.016***	0.005***	0.007***
	(0.002)	(0.003)	(0.001)	(0.002)
FinLit → Joint responsibility	0.016***	0.021***	0.006***	0.008***
	(0.002)	(0.002)	(0.001)	(0.001)
Observations	59,405	59,405	59,405	59,405
	Alternative investments		Informal banking	
	Men	Women	Men	Women
FinLit → Sole responsibility	0.071***	0.092***	-0.069***	-0.091***
	(0.008)	(0.010)	(0.005)	(0.006)
FinLit → Joint responsibility	0.088***	0.113***	-0.092***	-0.121***
	(0.008)	(0.010)	(0.007)	(0.008)
Observations	59,405	59,405	59,405	59,405

Panel B: Marginal effects of predicted responsibility on product holdings

	Savings schemes		Insurance products	
	Men	Women	Men	Women
Sole responsibility → Holdings	0.011	0.002	0.012	0.003
	(0.019)	(0.016)	(0.023)	(0.020)
Joint responsibility → Holdings	0.025	0.009	0.027	0.009
	(0.013)	(0.011)	(0.014)	(0.012)
Observations	59,405	59,405	59,405	59,405
	Loans and credit cards			
	Men	Women		
Sole responsibility → Holdings	0.014	0.004		
	(0.021)	(0.014)		
Joint responsibility → Holdings	0.024	0.007		
	(0.014)	(0.010)		
Observations	59,405	59,405		
	Investment products		Stocks	
	Men	Women	Men	Women
Sole responsibility → Holdings	-0.001	-0.001	0.003	0.001
	(0.009)	(0.009)	(0.015)	(0.006)
Joint responsibility → Holdings	0.0002	0.0002	0.003	0.001
	(0.006)	(0.006)	(0.009)	(0.004)
Observations	59,405	59,405	59,405	59,406
	Alternative investments		Informal banking	
	Men	Women	Men	Women
Sole responsibility → Holdings	0.043***	0.031**	0.012	0.017
	(0.013)	(0.012)	(0.029)	(0.029)
Joint responsibility → Holdings	0.045***	0.029**	0.006	0.018
	(0.010)	(0.009)	(0.016)	(0.016)
Observations	59,405	59,405	59,405	59,405

Panel C: Cross-marginal effects of financial literacy on product holdings, for different responsibility levels

	Savings schemes		Insurance products	
	Men	Women	Men	Women
FinLit → Holdings (Solely responsible)	0.066***	0.076***	0.067***	0.081***
	(0.005)	(0.006)	(0.005)	(0.005)
FinLit → Holdings (Jointly responsible)	0.080***	0.106***	0.085***	0.108***
	(0.006)	(0.007)	(0.006)	(0.006)
Differences (Joint–Sole)	22.39% [***]	39.86% [***]	25.60% [***]	33.90% [***]
Observations	59,405	59,405	59,405	59,405
	Loans and credit cards			
	Men	Women		
FinLit → Holdings (Solely responsible)	0.059***	0.056***		
	(0.005)	(0.005)		
FinLit → Holdings (Jointly responsible)	0.067***	0.084***		
	(0.005)	(0.006)		
Differences (Joint–Sole)	13.12% [***]	50.51% [***]		
Observations	59,405	59,405		
	Investment products		Stocks	
	Men	Women	Men	Women
FinLit → Holdings (Solely responsible)	0.015***	0.011***	0.007***	0.004***
	(0.003)	(0.002)	(0.002)	(0.001)
FinLit → Holdings (Jointly responsible)	0.016***	0.021***	0.006***	0.008***
	(0.002)	(0.002)	(0.001)	(0.001)
Differences (Joint–Sole)	3.80% []	88.42% [***]	-13.09% []	87.07% [***]
Observations	59,405	59,405	59,405	59,405
	Alternative investments		Informal banking	
	Men	Women	Men	Women
FinLit → Holdings (Solely responsible)	0.076***	0.091***	-0.068***	-0.092***
	(0.008)	(0.010)	(0.005)	(0.006)
FinLit → Holdings (Jointly responsible)	0.091***	0.116***	-0.091***	-0.119***
	(0.008)	(0.010)	(0.007)	(0.007)
Differences (Joint–Sole)	19.91% [***]	27.73% [***]	33.76% [***]	29.66% [***]
Observations	59,405	59,405	59,405	59,405

Table 5: **Differentials in the financial literacy marginals for women jointly responsible with spouse.** This table reports the the statistical significance in the difference of the financial literacy marginals for women who are jointly responsible of household finances versus other types of decision-making arrangements. The caste hierarchy consists of four major groupings in order of privilege, namely General Caste, Other Backward Caste, Scheduled Caste and Scheduled Tribe. The stars in square brackets report the significance of differences between marginals. ***, ** and * indicate statistical significance at 1, 5 and 10 percent, respectively.

	Caste	Differences in women jointly responsible and men jointly responsible	Differences in women jointly responsible and women solely responsible
Savings schemes	General Caste	0.029***	0.034***
	Other Backward Caste	0.024***	0.031***
	Scheduled Caste	0.022***	0.025***
	Scheduled Tribe	0.020***	0.023***
Insurance products	General Caste	0.024***	0.027***
	Other Backward Caste	0.024***	0.029***
	Scheduled Caste	0.023***	0.028***
	Scheduled Tribe	0.018***	0.025***
Loans and credit cards	General Caste	0.019***	0.030***
	Other Backward Caste	0.016***	0.027***
	Scheduled Caste	0.015***	0.025***
	Scheduled Tribe	0.015***	0.027***
Investment products	General Caste	0.007***	0.012***
	Other Backward Caste	0.003***	0.008***
	Scheduled Caste	0.004***	0.009***
	Scheduled Tribe	0.004***	0.008***
Stocks	General Caste	0.003***	0.005***
	Other Backward Caste	0.001***	0.003**
	Scheduled Caste	0.001***	0.003***
	Scheduled Tribe	0.0008***	0.002***
Alternative investments	General Caste	0.029***	0.029***
	Other Backward Caste	0.025***	0.025***
	Scheduled Caste	0.024***	0.025***
	Scheduled Tribe	0.015***	0.014***
Informal banking	General Caste	-0.027***	-0.025***
	Other Backward Caste	-0.030***	-0.029***
	Scheduled Caste	-0.030***	-0.033***
	Scheduled Tribe	-0.029***	-0.028***

A Financial knowledge questions

No.	Question	Question wording	Responses
1	Time value of money	Imagine if someone has to wait for one year to get a sum of ₹50,000 and inflation stays at 5%. In one year's time will he be able to buy fewer things than he can buy it today?	Yes No Don't know/ Can't say
2	Interest paid on loan	You lend ₹50,000 to your brother one evening and he gives you ₹50,000 back the next day. Did he pay any interest on this loan?	Yes No Don't know/ Can't say
3	Simple interest calculation	Suppose you put ₹1,000 into a deposit account with a guaranteed simple interest rate of 10% per year. You don't make any further payments into this account and you don't withdraw any money. How much would there be in the account at the end of the first year, including interest?	More than ₹1,100 Exactly ₹1,100 Less than ₹1,100 Don't know/ Can't say
4	Compound interest calculation	Suppose you put ₹1,000 into a deposit account with a guaranteed compound interest rate of 10% per year. You don't make any further payments into this account and you don't withdraw any money. How much would there be in the account at the end of the fifth year, including interest?	More than ₹1,500 Exactly ₹1,500 Less than ₹1,500 Don't know/ Can't say
5	Risk and return	True or False – An investment with a high return is likely to be of high risk.	True False Don't know/ Can't say
6	Diversification	True or False - It is better to invest your money in more than 1 financial product for safety.	True False Don't know/ Can't say
7	Understanding of inflation	True or False – High inflation means that the cost of living increases.	True False Don't know/ Can't say

B Construction of the financial literacy score

We outline the methodology for constructing the financial literacy score for each respondent, derived from their responses to the seven financial knowledge questions outlined in Appendix A. We consider knowledge as a continuous latent random variable α_q distributed as $F_q(\alpha)$ for each question $q = 1, .., Q$, where in this case $Q = 7$; we also assume that the random variables α_q are independent. A respondent n answers question q correctly if their knowledge level crosses the threshold $\underline{\alpha}_q$. We assign such respondents a value of 1, and 0 otherwise. Therefore, the answer vector is $A^n = (a_1^n, .., a_Q^n)$, where $a_q^n = I(\alpha_q^n > \underline{\alpha}_q)$. The probability of a correct answer is then given by $p_q = Pr(a_q^n) = 1 - F(\underline{\alpha}_q)$.

We define the financial literacy score of respondent n with the response set A^n as the sum of all the minimum knowledge thresholds $\underline{\alpha}_q$ corresponding to each question q:

$$FinLit^n = \frac{1}{Q} \sum_{q=1}^{Q} \underline{\alpha}_q a_q^n, \ \forall\, n = 1, 2, \ldots, N. \tag{8}$$

Assuming that α_q has an exponential distribution, it is easy to show that $\underline{\alpha}_q = -\log(p_q)$. If we use other distributional assumptions, the ordering of the scores across respondents will not alter. In the actual construction of the score, we replace p_q with its sample equivalent,

$$\hat{p}_q = \frac{1}{N} \sum_{n=1}^{N} a_q^n, \qquad \forall\, q = 1, 2, \ldots, Q.$$

Therefore, the financial literacy score of respondent n is calculated as:

$$FinLit^n = -\frac{1}{Q} \sum_{q=1}^{Q} \log(\hat{p}_q) a_q^n, \ \forall\, n = 1, 2, \ldots, N. \tag{9}$$

C Glossary of financial products considered

Product name	Product description
Savings schemes	
Recurring deposit/fixed deposit	Recurring deposit is a term-deposit that allows to make regular deposits and earn returns on the savings. A fixed deposit is an savings instrument locking funds for a fixed duration yielding guaranteed returns on a pre-agreed interest rate.
Post office savings scheme	Post office savings schemes are popular among small investors as it suits their risk-free and relatively high rate of interest earning needs.
Kisan Vikas Patra	Kisan Vikas Patra is a low-risk small savings scheme available at India Post Offices in the form of certificates. The scheme encourages individuals to save small amounts of money for long-term.
Public provident fund	Public provident fund is a savings-cum-tax savings instrument offered by the Government of India.
Insurance products	
Life insurance	The insurance industry of India has 57 insurance companies out of which 24 are in the life insurance sector. The money-back policies are the most popular life insurance policies in India.
Health insurance	The health insurance industry in India has evolved in recent years with double digit growth. Currently, roughly 25% of the population have a health insurance coverage.
Home insurance	Home insurance is optional in India, however, it is mandatory for individuals wanting to buy a house with a home loan.
Cattle insurance/crop insurance	Cattle insurance is optional in India, but it is mandatory for bank-financed cattle. For crop insurance, the government of India provides subsidies, however, it is optional for farmers to own one.
Loans and credit cards	
Personalized loans	Personalized loans are individual loans taken out for reasons such as medical emergency, education, wedding expenses, vehicle, home improvements, etc.
Loans from microfinance institution	Microfinance institutions (MFIs) are popular in India with wide coverage across the 36 states of India. According to the Microfinance Institutions Network, in 2020 the MFI loan portfolio stood at ₹2.32 trillion, serving 58.9 million unique borrowers.
Credit cards/subsidized credit cards	Credit cards such as Artisan CC, Laghu Udyami Card, Swarojgar CC, Weaver's Card, and Kisan Credit Card. According to Reserve Bank of India, there are around 57 million credit card users in India, recently witnessing a double digit growth year-on-year.

Investment products	
Mutual funds	Mutual funds in India are popular among retail investors. According to the Association of Mutual Funds in India, the assets under management stood at ₹31.43 trillion as of March 2021, with 97.9 million total accounts.
Bonds/debentures	Retail investors are advised to buy bonds or debentures based on the companies' credit ratings. Debenture Trustees (DTs) licensed by the Securities and Exchange Board of India (SEBI) play the role of a monitor on behalf of the investors.
Stocks	
Shares/stocks	Stocks are traded on two exchanges in India, namely, the National Stock Exchange and the Bombay Stock Exchange. According to SEBI, in recent years large number of India's retail investors are switching from the popular mutual funds to stock markets seeking higher returns.
Alternative investments	
Chit-fund investment	Chit fund is a savings instrument as well as a borrowing scheme for its members, which provides reliable access to money in times of emergency. Group of individuals contribute to the fund for a predetermined time period. Open auctions allow members to bid for the chit fund value. The size of the organised chit fund industry is close to ₹600 billion.
Collective investment schemes	Collective investment schemes are offered by companies, under which the contributions are pooled together for investing in a particular asset and later sharing the returns from the investment as per the agreement.
Gold and silver investment	Gold and silver are among the most preferred investments in India. Apart from cultural reasons, the high liquidity and inflation hedging property attract investors to buy physical gold and silver as an instrument of saving.
Property investment	Investment in property, other than main residence. Indian property market provides a good return on investment for those seeking long-term gains.

D Variable definitions

Variable	Variable definition
Responsibility	Role of respondent in household financial decision-making on an ordered scale, which takes the value of 3 for sole responsibility, 2 for joint responsibility and 1 for no responsibility.
FinLit	Financial literacy weighted average score of respondent from seven financial literacy questions (see Appendix A for list of questions). The weight for each question is derived from the difficulty level of that question, which is based on how many respondents within the sample correctly answered the question. Appendix B outlines the methodology used in the score construction.

Control variables

Financial attitude score	Financial attitude score averages the responses to the three questions: "I tend to live for today and let tomorrow take care of itself", "I find it more satisfying to spend money, than to save it for the long term" and "Money is there to be spent".
Access to banking correspondent	Dummy takes the value of 1 if the respondent has access to a banking correspondent in their neighborhood, and 0 otherwise.
Bank branches per thousand households	Average number of bank branches per thousand households in the respondent's district.
Age	Log median year of the reported age group of respondents.
Women	Dummy takes the value of 1 if the respondent is female, and 0 otherwise.
Years of schooling	Minimum number of years of schooling required to attain the degree. That is, Illiterate (=0), Primary (= 5), Upper Primary (=8), Secondary (=10), Senior Secondary (=12), Diploma (=14), Graduate and above (=17).
Employed	Dummy takes the value of 1 if the respondent is employed part time or full-time, and 0 otherwise.
Self-employed	Dummy takes the value of 1 if the respondent is self-employed, and 0 otherwise.
Housewife	Dummy takes the value of 1 if the respondent is a housewife, and 0 otherwise.
Labourers	Dummy takes the value of 1 if the respondent is a (non-agricultural or agricultural) labourer, and 0 otherwise.
Salaried	Dummy takes the value of 1 if the respondent is a salaried professional (in the public or private sector with a regular salary), and 0 otherwise.
Retired	Dummy takes the value of 1 if the respondent is retired, and 0 otherwise.
Income	Log median income of the reported income groups of respondents, we consider income 1 Rupees for the respondents who reported their yearly income as zero.
Nuclear family	Dummy takes the value of 1 if the respondent lives in a nuclear family, and 0 otherwise.
Nuclear family with elders	Dummy takes the value of 1 if the respondent lives in a nuclear family with elders, and 0 otherwise.
Joint family	Dummy takes the value of 1 if the respondent lives in a joint family, and 0 otherwise.
General Caste	Dummy takes the value of 1 if the respondent belongs to General caste, and 0 otherwise.
Other Backward Caste	Dummy takes the value of 1 if the respondent belongs to Other Backward Caste, and 0 otherwise.
Scheduled Caste	Dummy takes the value of 1 if the respondent belongs to Scheduled Caste, and 0 otherwise.

Scheduled Tribe	Dummy takes the value of 1 if the respondent belongs to Other Scheduled Tribe, and 0 otherwise.
Rural	Dummy takes the value of 1 if the respondent lives in a rural area, and 0 otherwise.