Marketing Complex Financial Products in Emerging Markets: Evidence from Rainfall Insurance in India

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Abstract

Recent financial liberalization in emerging economies has led to the rapid introduction of new financial products. Lack of experience with financial products, low levels of education and low financial literacy may slow adoption of these products. This paper reports on a field experiment which offered an innovative new financial product, rainfall insurance, to 600 small-scale farmers in India. A customized financial literacy and insurance education module communicating the need for personal financial management and the usefulness of formal hedging of agricultural production risks was offered to randomly selected farmers in the state of Gujarat. The effect of the financial literacy training and three marketing treatments are evaluated using a randomized controlled trial. Financial education has a positive and significant effect on rainfall insurance adoption, increasing take-up from 8 to 16 percent. Only one marketing intervention, the money-back guarantee, has a consistent and large effect on farmers' purchase decisions. This guarantee, comparable to a price reduction of about 60 percent, increases demand by 7 percentage points.

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Introduction

Financial liberalization around the world has led to dramatic financial innovation, which holds the promise of introducing new products that significantly improve household welfare. One prominent example of this is rainfall insurance, a financial derivative whose payouts are linked to the amount of rainfall measured at designated weather stations. This insurance, unknown a decade ago, is now available in dozens of settings around the world, including in India, Africa, and several countries in East Asia.[1] Possible benefits from adoption are large because rainfall insurance protects against adverse shocks that affect many members of informal insurance networks simultaneously.

Despite this promise, available evidence suggests adoption of these products is quite slow (Giné et al. 2007, Cole at al. 2011). Beyond the standard challenges associated with introducing a new product, one may posit a range of plausible causes for slow adoption. Insurance is an intangible "credence" good, and the relationship marketing necessary to sell it may take time to develop (Crosby and Stephens, 1987). Farmers may worry the company is better informed about the weather forecasts and therefore will take advantage of their inability to correctly value rainfall insurance. Loss aversion and narrow framing may cause farmers to decline to purchase insurance because they fear that rain will be good and they will receive no benefit from the product. Finally, and perhaps most importantly, the product is complicated: it maps the distribution of rainfall over an entire growing season to a single payout number, using a metric, millimeters, which is unfamiliar to many farmers. A range of correlational evidence suggests individuals with low levels of financial literacy are less likely to participate in financial markets (Lusardi and Mitchell, 2007 and 2008).

[1] For a recent discussion of index-based insurance, which lists 36 on-going pilots, see IFAD (2010). Hazell and Skees (2006), Manuamorn (2007) and Barrett et al. (2007) have an excellent discussion on the emergence of rainfall insurance in different parts of the world and associated challenges with scale-up.

This paper reports on a marketing experiment conducted in three districts in Gujarat, India, designed to test whether education and marketing can increase purchase of rainfall insurance. In the spring of 2009, the Development Support Center (DSC), a non-profit organization well-known to farmers in the area, introduced rainfall insurance in fifteen villages. From these villages, we identified 600 households as our study sample. Half of this sample was offered a financial literacy training program, consisting of two three-hour sessions. Independent of this assignment, randomly selected farmers received one or more of the following additional treatments: a money-back guarantee for the insurance product, offering a full premium refund in case the policy did not make any payouts (MoneyBack); weather forecasts about the quality of the upcoming monsoon (Forecast); and a demonstration of the relationship between millimeters of rainfall (the metric used in insurance policies) and soil moisture (mmDemo). These treatments are described in greater detail below.

We find the following. The educational program is important. Our benchmark estimates indicate the financial education module increased demand for the insurance product by 8.1 percentage points (p-value .037). The most expensive marketing treatment, MoneyBack, increased demand for insurance by 6.9 percentage points (p-value .049), while the other two marketing interventions, Forecast and mmDemo, had small and statistically insignificant effects on demand.

This study has several implications beyond the practical lessons it provides about promoting adoption of insurance. First, it demonstrates how large-scale field experiments, most frequently used to evaluate the impact of programs, can also be used to test theories of consumer demand and to assess the cost-effectiveness of various means of marketing. Second, it presents the first compelling evidence that financial education influences financial behavior in a representative population.[2] Finally, because multiple marketing messages were also tested, the results may form

[2] Cole, Sampson, and Zia (2010) show that financial literacy education affects demand for bank accounts, but only among those with low levels of initial financial literacy.

the basis for developing a more coherent theory of how financial literacy improves financial decision-making.

Product Information

In many developing countries, households engaged in rainfed agriculture are highly susceptible to weather-related risks. In India, for example, where two-thirds of the nation's total net sown area is rain-fed, farmers' incomes are substantially exposed to variations in rainfall. Late onset of the monsoon and prolonged dry spells significantly reduce crop yields. Almost 9 out of every 10 households in a recent survey in India report that variation in local rainfall is the most important risk they face (Cole et al. 2011).

While informal risk management techniques like crop diversification and dependence on kinship and social institutions may be available to farmers, such strategies fail in the face of severe, correlated weather shocks and disastrous extreme events (Rao 2008, ICRISAT 1979). Without formal mechanisms to manage weather-related risks, agricultural households may invest less, may not adopt profitable farming innovations, and may have less access to credit (Carter 2008, Hazell and Skees 2006). Thus weather risk may retard economic development (Gaurav 2008, 2009).

Index-based or parametric weather insurance is one financial innovation that promises to strengthen the resilience of farmers to weather shocks (Skees 2003, Manuamorn 2007).[3] With this insurance product, payouts are triggered when an index correlated with adverse crop outcomes reaches a pre-specified strike point. Weather insurance has numerous theoretical advantages: it solves problems of adverse selection and moral hazard; it has low transaction costs, since there is no need to verify claims; and there is high-quality historic data which insurance companies can

[3] Turvey (2001) describes the use of weather derivatives in the United States, noting the market developed from trading by providers and consumers of energy (e.g., heating degree days), but has expanded to cover agricultural buyers as well.

use to price the product. However, despite these advantages, adoption of such products has been quite low. Cole et al. (2009) find that in India, less than 10% of their sample purchased weather insurance, despite its relatively low cost. Similarly, Giné and Yang (2008) find that among farmers in Malawi, take-up of an agricultural loan bundled with an insurance contract was 13% *lower* than the take-up of a loan without insurance.

Studies on the barriers to household risk management (Cole et al. 2011, Giné et al., 2008) indicate that rural households have a limited understanding of rainfall insurance. A lack of trust impedes take-up, though Cole et al. did not find any evidence that a short (less than five minute) financial literacy module was effective.

In this study, rainfall risk was underwritten by the Agriculture Insurance Company of India (AICIL), the largest company of its kind in the country. The insurance product provides protection against deficit rainfall from July 1 to September 30, as well as excess rainfall from September 16 to October 15. The maximum insurance payout is Rs. 6500 (USD 144), with a total premium of Rs. 800 (USD 18). This insurance product is fairly typical of weather insurance offered in other regions in India and in other developing countries. Policies designed for groundnut (peanut) or cotton were available. Web Appendix Figure 1 shows a policy term sheet for groundnut in one of our study areas.

Explaining index-based, parametric rainfall insurance to people with low literacy and minimal participation in formal financial markets is a challenge. Though farmers have an intuitive understanding of the correlation between rainfall and yield, the payout formulas for currently available rainfall insurance products are complicated.[4] Because many initial efforts to introduce rainfall insurance have been met with extremely low adoption and low re-purchase rates, the

[4] The complexity of the policies mirrors the complexity of the relationship between rainfall and crop yields. Simpler policies would be easier to explain, but also increase the basis risk faced by farmers.

Development Support Center decided to provide financial education to consumers prior to introducing the policy.

The study was motivated by the hypothesis that farmers would benefit from adoption of rainfall insurance, but information frictions suppress demand.[5] Insurance products in particular are a challenge for farmers, who cannot observe payout frequencies and may regard the premium as a waste of money in years when no payout is made (Slovic et al. 1977).

Sample

Our sample was drawn from fifteen rain-fed villages across three coastal districts of Gujarat State in India. Farmers in these villages are predominantly cash crop growers who cultivate cotton and groundnut.[6] The main crops, cotton and groundnut, are grown almost without irrigation.

Our sampling frame was restricted to households that owned land and typically grew either cotton or groundnut. From these, we selected 40 households in each village for the study. Approximately two-thirds of our sample consists of marginal, small and semi-medium farmers (average land holding of less than 4 hectares), who experience substantial risk of significantly reduced crop yield if the monsoons are poor. In the main Kharif (summer) agricultural season of 2009, our field partners decided to promote rainfall insurance for the first time in these regions, and coordinated with us to better understand the effects of financial literacy training and marketing treatments on rainfall insurance take-up.

Table 1 reports the key summary statistics from a household survey conducted at the end of the Kharif 2009 season (after the experimental interventions). The survey covered all 600

[5] In fact, as can be seen from the term sheet in the Web Appendix Figure 1, the product is complicated. At Harvard Business School, a case study based on rainfall insurance is taught in an advanced financial engineering class.

[6] The districts are Amreli, Bharuch and Bhavnagar.

participants[7] in our study, and collected data on household demographics, socio-economic conditions, livelihood, financial awareness, cognitive ability and detailed farm and agricultural information.

Our respondents are primarily male, 50 years old on average, and have an average agricultural income of Rs. 81,405 per year (about $1,800). Average monthly per capita consumption expenditure is approximately Rs. 1500 ($33), close to the price of a rainfall insurance policy.

Our sample's literacy rate of 85 percent is above the national average (74 percent, according to the 2011 Census), with 37 percent completing only primary schooling, and 41 percent completing up to lower secondary schooling. Only 7 percent graduated from high school.

Financial Literacy and Financial Literacy Education

Financial literacy is a concept similar to literacy or numeracy, and is meant to define an individual's understanding, comfort with, and ability to make financial decisions.

We used questions inspired by Lusardi and Mitchell (2007, 2008) and adapted for the emerging market context by Cole et al. (2011). These were found to have significant predictive power for financial behavior in India and Indonesia.

The questions measure understanding of interest rates, compound interest, inflation, and risk diversification. We augment these measures of financial literacy with debt literacy questions, which were adapted from Lusardi and Tufano (2008). Credit is by far the most popular financial product in our sample (75% of respondents have at least one loan outstanding), so performance on these questions reflects plausibly consequential differences in knowledge.

[7] By the time of the survey, two of the original participants had died and one had permanently migrated out of the village, thus making our final sample size 597.

It is important to note that the cognitive ability and financial literacy module was given in June, prior to marketing or the financial literacy education treatments. Deferring these questions until after the financial literacy training would have provided a useful manipulation check, but would have also made it difficult to test whether respondents' baseline (e.g., pre-intervention) financial literacy was correlated with subsequent purchasing decisions.

Panel 2 of the Web Appendix Table 1 provides the questions used. The questions are divided into four sections. Financial aptitude questions follow Lusardi and Mitchell (2008), and test respondents' understanding of interest rates, compound interest, inflation, and risk diversification. An attractive feature of these questions is their comparability: they have been asked in surveys in India, Indonesia, South Africa, Europe, and the United States. Debt literacy questions are adapted from Lusardi and Tufano (2008), and are meant to test whether respondents appreciate how quickly debt accumulates at a compound interest rate. Web Appendix Table 8 compares results from our sample to United States samples. The third and fourth groups of questions measure basic math and probability aptitude, and we derive our cognitive ability measures from them.

Web Appendix Table 2 presents the results of our financial literacy tests.[8] Measured levels of financial literacy are very low (a common finding around the world). Splitting the sample by cognitive ability, we see some, but not all, measures of financial literacy vary by cognitive ability.

The debt literacy questions were difficult, and few answered correctly. When we construct the principal component of debt literacy and overall financial literacy for analysis, we exclude the third question, as some individuals may prefer the commitment features of a requirement to repay Rs. 100 per month.

[8] Cognitive ability is measured with the math and probability questions given in the second panel of Web Appendix Table 1. We use the first principal component of all math and probability questions to construct a cognitive ability score.

Respondents did quite well on many of the math questions, suggesting the series of quiz-type questions were indeed taken seriously, and low scores on the financial literacy questions reflect low actual levels of financial literacy. Further evidence of the value of our measures of financial literacy can be found in Web Appendix Table 7, which demonstrates systematic correlation between individual characteristics and measured financial literacy.

Description of Financial Education Intervention

In each taluka (similar to a U.S. county), two NGO employees were offered a rigorous two-day course conducted by one of the principal investigators. These employees then carried out the actual training of the farmers in their respective talukas under the supervision of our field staff. We conducted surprise visits and checks on the attendance rolls to ensure compliance and to prevent the contamination of the financial education treatment.

All village-level education sessions were completed prior to the marketing of the product in the village. The first half of each session provided general lessons on personal financial management, savings, credit management and insurance and made use of custom designed training materials: charts, posters, pamphlets, and a thirty minute video on the relevance of rainfall insurance. In the second half of the session, participants played a set of two interactive simulation games to learn about insurance mechanisms. This simulation gave the farmer firsthand experience of the benefits and limitations of insurance. One of the insurance games was an adaptation of the yield insurance education program for cotton farmers in the Pisco valley of Peru (Carter 2008). The game allows farmers to understand the power of insurance in protecting against covariate income shocks resulting from adverse weather conditions, as well as important limitations of the insurance mechanism. The second game focused on clarifying to farmers the frequency and severity of natural disasters, and the benefits and limitations of crop insurance and rainfall insurance schemes.

Feedback from the games was positive: farmers reported benefiting from the "learning by doing" feature of the game, which helped them understand probabilities of drought and payout, and the concept of basis risk.[9] They gained a sense of comfort with how the product worked. From the NGO's perspective, the games were attractive as they allowed farmers to appreciate the mechanism and complexity of the insurance business. Following our study, the NGO has incorporated the financial education module into their marketing practices.

Marketing Interventions

In addition to financial education (FE), we measure the effect of marketing visits on household purchase behavior. Each household assigned to the marketing treatment receives one or more of three different marketing messages, described below. The representative from the NGO was unaware of our hypotheses about the effectiveness of the marketing treatments.

The first message, money-back guarantee, offers clients who purchase insurance a 100% refund of the insurance premium at the expiration of the policy (approximately four months later) if the policy does not provide any payout. This is a costly offering from the viewpoint of the organization offering insurance: historic rainfall data suggests the money-back guarantee would be invoked on average 60% of the time. This intervention was motivated by two factors. First, rainfall insurance is a new and complex product. A large literature in marketing emphasizes the difficulty of persuading consumers to adopt new products. More specifically, when the vendors of a product may be better informed about the product than the consumers, a money-back guarantee may signal that the vendor is confident in the product quality (e.g., Moorthy and Srinivasan, 1995). Second, in early focus groups, clients unfamiliar with the logic of insurance

[9] Basis risk refers to the risk that weather at the rainfall gauge may be good, even if the rainfall on a particular farmer's crop is bad.

often complained that if they purchased rainfall insurance and rainfall was good, they would have "thrown away the money."

The second message, millimeter demonstration, provides prospective clients with a demonstration of how the payout trigger functions. Very few clients are familiar with the metric system. Moreover, farmers typically think of weather in terms of soil moisture, not millimeters of rainfall. The NGO representative provided visual aids to demonstrate the millimeter triggers. Literature on marketing suggests that demonstrations may increase new product acceptance because they enable consumers to learn about product benefits prior to purchase (Heiman and Muller 1996; Heiman et al., 2001). Therefore, because the demonstration reduces consumers' uncertainty about the benefits of the weather insurance, we expect this offer to increase adoption.

The third message, weather forecast (Forecast), was motivated by the intuition that "it's hard to sell rainfall insurance if it's raining." More generally, the time lag between the date the policy is priced and designed and the dates the policy becomes available for sale suggests the possibility of "temporal adverse selection" (Luo et al. (1994) discuss this in the context of crop insurance). Specifically, the price and coverage terms are set months prior to the onset of the monsoon, based on general expectations of the quality of the monsoon. Thus, a policy that was reasonably priced as of February could, in theory, be a very bad value for the farmer if new information available at the end of May suggests the start of the monsoon is imminent. The weather forecasts provided in the marketing visit covered the next ten days, the longest period for which forecasts were available. In fact, the forecasts in each village intervention did not in fact predict an early start to the monsoon. Thus we expect the weather forecasts to have a (possibly modest) positive effect on demand. Weather forecasts are available on the radio at certain times of the day, as well in newspapers, so this intervention may have limited impact. However, we note that half the households do not have either a television or a radio, and very few read newspapers, so the forecast likely provided farmers with some information.

Design and Analysis

The experimental design is depicted in Figure 1, and can perhaps most easily be explained as a 2 x 7 design. First, half of the sample (300) was selected to receive an invitation to the financial literacy education program; the other was not invited. Second, from the whole sample, we randomly selected 282 to receive marketing visits.[10] Each person receiving a marketing visit was assigned to receive one of six possible combinations of messages: MoneyBack, Forecast, mmDemo, MoneyBack & Forecast, mmDemo & Forecast, or mmDemo & Forecast & MoneyBack. Thus 282/6 = 47 people received each of these combinations. While random assignment ensures each individual had the same probability of being assigned to any particular treatment as any other individual, we chose to "over-populate" the cells "no marketing and financial education" and "no marketing and no financial education," as we were especially interested in the effects of financial education.

In fact, the experiment was conceived as a 2 (FE) x 2 (MoneyBack) x 2 (mmDemo) x 2 (Forecast) design, although two cells (MoneyBack*mmDemo) and (MoneyBack*mmDemo*FE) were intentionally left empty.[11] This paper discusses the results through the latter lens (a 2 x 2 x 2 x 2 model with two missing cells). However, for readers for whom a 2 x 7 is more intuitive, we present results in this manner in Web Appendix Table 6.

In Table 2 we provide a test of the random assignment. Panel A compares respondents assigned to financial literacy education to those who were not assigned to financial literacy education. Not surprisingly, as randomization was done at the individual level, there is no systematic difference

[10] Three people attrited from the sample: one from the financial education and weather forecast marketing condition, and two from the pure control (no financial education, no marketing).

[11] This decision was driven by budgetary concerns. Each marketing treatment involved sending a marketer from the district office into the field, locating the farmer, and delivering the message. Since we were not particularly interested in the message interactions, we decided to omit these cells.

between the two groups. Financial literacy was measured prior to the intervention. It is unlikely that our treatment affected sex, age, or household size. The housing value was based on the December estimation of the value as of June 2009. It is possible that the treatment affected risk aversion or other agricultural decisions. In practice, we find no difference across any of the variables. Panel B conducts similar tests for random assignment of marketing messages.

Factorial designs are often chosen to study interactions across various treatments. However, they also offer the virtue of increasing statistical power to test multiple main effects,[12] even in the absence of interaction effects (Duflo et. al, 2008, p. 3920.) We do not have strong theoretical predictions for the interactions, and therefore focus our analysis and discussion on the main effects.[13] In fact, a joint test of the statistical significance of the higher-order interactions cannot reject the hypothesis that they are all equal to zero ($F(9,584) = 1.10$, p-value .43)). For completeness, we do report all fourteen possible treatment effects in Web Appendix Table 3.

Random assignment to treatment groups facilitates causal interpretation of our results, and suggests a fairly simple strategy is sufficient to analyze the data. Compliance with the marketing treatments was perfect: every individual assigned to a particular treatment received a visit with the assigned message. In contrast, because the financial education events could not be made "compulsory," not all invitees attended. We follow standard practice and consider the invitation an "intention to treat" instrument, with attendance as the endogenous regressor. The invitation

[12] If treatments are free, then a balanced design maximizes statistical power; however, if, as was the case here, marketing visits are costly, optimal survey design will overweight the control group. For budgetary reasons we did not assign anyone to the mmDemo*MoneyBack cell, and reduced the size of other treatment cells from 50 to 47.

[13] This follows standard practice in economic field experiments, see Duflo et al. (2008), p. 3931, as well as Bertrand et al. (2010).

was very successful in inducing variation in attendance: on average, 75% of households invited to the financial education session attended, while only 10% who were not invited attended.[14]

We adopt a regression framework rather than ANOVA for three reasons. First, we are interested in analyzing the cost-effectiveness of the interventions, which requires effect magnitudes, making it desirable to report relevant coefficients and standard errors in tables. Second, the fact that attendance at the financial education program was not mandatory requires the use of an instrumental variables estimator to measure the effect of financial education on purchase decisions. Instrumental variable estimates "scale up" the point estimates to account for only partial compliance with a treatment.[15] Finally, ANOVA analysis would be complicated by sample sizes that are not equal across cells[16] and by the two missing cells; these issues are incorporated naturally in a regression framework. We use a linear probability model.[17] In particular this facilitates instrumental variable estimates. Results using probit are reported in the Web Appendix, and are never substantially different than the linear probability model.

As a preliminary indication of drivers of insurance demand, Table 3 reports the unconditional correlation between insurance purchase decision (take-up) and a range of individual characteristics. Those who were more financially literate (prior to the intervention), older, and had higher housing values were more likely to purchase the insurance policy. Table 3 also reports

[14] Duflo and Saez (2003), using a similar encouragement design, report 28% of university employees offered $20 to attend a benefits fair in a U.S. university in fact attended.

[15] Angrist and Pischke (2008, p.87) and Duflo, Glennerster, and Kremer (2008, p. 3937) discuss the use of instrumental variables in experimental contexts in detail. Under standard assumptions that almost surely hold in our case, instrumental variables provide estimates of Local Average Treatment Effects: the average effect of the intervention (financial education) on people for whom the invitation to attend caused them to attend.

[16] We were primarily interested in testing the four main effects against the control treatment, hence did not use a balanced design.

[17] Angrist and Pischke, 2008, section 3.4.2.

correlations of the control variables used in subsequent regressions: housing value, financial literacy, sex, age, household size, and hectares of land.

Results

Table 4 presents the first stage regression of a dummy variable for whether an individual attended, on a dummy variable for whether the individual was invited to attend (column (1)). The coefficient .659 can be interpreted as the effect of an invitation to attend on actual participation in the financial education program. Columns (2) - (4) add to the regression sequentially, the main effects of the marketing treatments (Columns 3 and 4), and household controls (Columns 2 and 4). The point estimate of the Financial Education effect does not vary across the four models.

Since the marketing messages had perfect compliance, we do not need to use an instrumental variables approach to analyze the effect of marketing messages. Hence, we do not report first stage estimates for the effect of marketing message assignment on marketing message receipt.

Columns (1)-(4) of Table 5 present reduced-form results, the effect of being assigned to financial education, or being assigned to a particular marketing message, on insurance purchase decisions. For financial education, not everyone assigned actually attended the treatment, so the coefficient for the invitation to financial education in column (1) is less than the effect of financial education itself. Instrumental variables regressions, discussed shortly, scale up the reduced form estimates to account for non-compliance. For marketing messages, since compliance is perfect, the effect of being assigned to a particular treatment is equal to the effect of actually receiving the treatment. Column (1) presents the main contrast of our paper, the effect of being invited to financial education. We find that invited households are 5.3 percentage points more likely to purchase insurance (p-value .047) than those who are not invited.

Column (3) presents the point estimates of the three main marketing interventions. Here, we find the money-back guarantee increases take-up of weather insurance by seven percentage points (p-

value .053). Column (3) includes all the main effects of interest, while column (4) includes household-level controls. As seen in column (4), results are unaffected by including controls. Column (4) does suggest that wealthier households (specifically, those with higher housing values) and older consumers are more likely to purchase insurance.

In columns (5)-(7) we present the instrumental variables equivalents of columns (1), (3), and (4) using invitation as an instrument for attendance. In column (5), the point estimate for the effect of attending financial education is .08.[18] This scaled coefficient is larger (by fifty percent) than ITT estimate in column (1), consistent with the fact that the invitation did not cause everyone to attend. Columns (6) and (7) present the instrumental variables estimates for the full model. The inclusion of the marketing treatments (which do not require instruments because of perfect compliance) does not materially affect the measured impact of financial education.

For the sake of completeness, Web Appendix Table 3 reports the model with all thirteen possible conditions (the omitted condition is the pure control). Column (1) presents results without controls, column (2) presents with controls. Instead of interactions, we report the cell-mean (e.g., in column (1), .127 indicates that of the households not assigned to financial education and assigned to weather forecast, 12.7% purchased insurance). Because only 47% of households were assigned to any marketing message, the cell sizes are quite small (see Figure 1). The results suggest the following: financial education on its own did in fact increase take-up. Marketing messages alone do not have significant effects, though some of the point estimates are economically quite meaningful. Financial Education was particularly effective when combined with the MoneyBack & Forecast treatment, and when combined with the MoneyBack & Forecast & mmDemo treatment, it increases take-up by 16.2% and 24.1%, respectively, relative to the pure controls.

[18] This is known as the Wald estimator, and is a simple ratio of difference means: ((% of invited who purchased) – (% of non-invited who purchase)) / ((% of invited who attend - % of non-invited who attend)).

We conclude the following: financial education is effective in stimulating demand. The result is quite robust across a range of estimation techniques.

Heterogeneous Effects

The previous section shows robust evidence for effects of the financial education and the money-back guarantee on average. To the extent there is variation in the effects across observable characteristics, cost-effective targeting of the interventions might be feasible. In addition, we hypothesized that (like in Cole, Sampson and Zia, 2010) the financial education would provide more novel and valuable information to respondents with lower levels of education and financial sophistication, and hence have a bigger impact on insurance adoption for those households.

In light of these considerations, we re-estimate the reduced-form regressions for several subsamples in Table 6. First, we split the sample at the medians of summary measures of cognitive ability and financial literacy.[19] We split by cognitive ability (the first principal factor from factor analysis of indicators for whether respondents correctly answered the Basic Math questions and the Probability questions in the survey), schooling, financial literacy (first principal factor of the Lusardi-Mitchell questions and Debt Literacy Questions), and a combined Cognitive Ability and Financial Literacy (combined CA/FL) first principal factor. We use factor analyses rather than raw scores because correct answers to some of these multiple choice questions were more informative than correct answers to others (not all questions had the same number of choices, and the probability questions were asked in three pairs, where the latter question in each pair was the same as the former but also included an illustrative diagram). Finally, we split the sample by the amount of land owned.

[19] When there are more than one individual with exactly the median value of a measure, we include that individual in both the "High" and "Low" regressions, so the numbers of observations sum to at least 597.

We focus on the reduced form (RF) regressions on indicators for the financial education invitation, and the MoneyBack, Forecast, and mmDemo main effects. Column (1) of Table 6 repeats the benchmark results from Table 5. Columns (3), (4), and (6) indicate that invitations to the financial education training had a significant impact (at the 10 percent level) on insurance take-up for households with relatively low cognitive ability, high schooling attainment, and high financial literacy. Column (9) indicates that respondents with below-median values of the first principal component of a combined cognitive ability and financial literacy factor analysis showed a stronger impact. The effect of the invitation to the financial education training is even more economically and statistically significant for those with high land holdings (Column (10)). Broad-based financial education of the type studied here might efficiently be targeted to people with these characteristics.

Standard errors are larger throughout the table because of the reductions in sample size. No regression has a coefficient on the invitation that differs statistically from the 5.2 percentage point baseline effect of the invitation.

We continue to estimate a positive effect of money-back guarantee on insurance adoption for all of the Table 6 subsamples. The effect is only statistically significant (at the 10% level) for the below-median financial literacy and combined CA/FL groups, but in every specification it remains comparable in size to the effect of the financial education training.

One possible explanation for this pattern is that people develop high levels of financial literacy by using financial products, and underlying variation comes from heterogeneous trust in financial institutions. Next, high-trust respondents might have adopted other products more readily, developed higher financial literacy, and been more responsive to the highly informative (and trust-reinforcing) financial education training. By contrast, low-trust and low-financial literacy

respondents might have been more responsive to a money-back guarantee that mitigated their distrust. The Forecast and mmDemo treatments were not significant for any subgroup in Table 6.

Analogous IV specifications and reduced-form specifications that include demographic controls show similar patterns and are reported in Web Appendix Tables 9-11.

Limitations

This field experiment features high-stakes decisions for a highly relevant subject pool. Along with these advantages, the setting imposes several limitations.

First, a large literature studies the effect of communication among consumers on product adoption (e.g., Mahajan et al., 1990). If individuals talk about the information obtained in the financial education (or marketing) treatments, any spillover effects should work against us, making us less likely to find statistically significant effects. In the worst case we provide an underestimate of the effect of financial education.

For several reasons we are not particularly concerned about spillovers. Villages are not small (the average population is 1,854), and are geographically spread out. Those who were invited were not encouraged to bring a friend, and attendance among the control group is low (less than ten percent). The time period between the intervention and last day of sales was about one week, during a very busy time (planting). Furthermore, the education program involved a video, visual aids, and "experiential" complex games that would be difficult for a respondent to talk about with another person without training or access to materials. In the follow-up survey we explicitly asked households if they had spoken with someone from the financial education group: only 6 of the 26 farmers in the no-financial literacy group who purchased insurance reported having had any interaction (for any reason) with someone who received financial education prior to the close of sales.

A second potential issue is the possibility that the personal interaction involved in financial education and marketing treatments may have created social pressure to purchase insurance. We think this is unlikely for several reasons. First, as an NGO, DSC did not make a normative recommendation to farmers to purchase the policy—rather, they conveyed information. Second, the visits did not involve any sales. Individuals seeking to purchase insurance traveled to the district office, typically 5-10 kilometers away, purchasing insurance from a different person than the provider of education or marketing. DellaVigna et al. (2011) provide an estimate of the cost of saying no to an NGO; they estimate it to be $3.57 in suburban Chicago, which represents about .2% of average U.S. monthly per capita expenditure.[20] In contrast, the rainfall insurance policy offered in this study represents 60% of per capita monthly household expenditure (an equivalent purchase for a U.S. consumer would cost $980.). Thus, even if social pressures are significantly larger in rural India than suburban Chicago, it is unlikely that they explain the increase in take-up.

A third concern is whether we are measuring a true effect of financial literacy education, or whether the findings could be driven by other factors, such as causing rainfall insurance to enter a farmer's consideration set (Nedungadi, 1990), or through a "foot in the door" (Freedman and Fraser, 1966). Both suggest persuasion may work in multiple stages.

The consideration set effect works by causing individuals to include a previously ignored option in their choice set when making purchasing decisions, and typically applies to brand choice. While we cannot rule this out, we think that this is precisely what financial education *should* do: cause consumers to consider a product, insurance, with which they had previously had little or no experience. We are not aware of any evidence of the importance of consideration effects for such high-stakes purchasing decisions.

[20] Mean PCE in the U.S. is $49,000, and mean household size is 2.5. The Chicago suburbs where the experiments were conducted were likely wealthier than average.

We do note that two of the marketing treatments had no statistically detectable effect, suggesting that merely identifying the availability of a product (and causing it to enter a consumer's consideration set) is not sufficient to induce purchase. An important goal of future research on financial education should be to understand the exact channels through which financial behavior affects decision-making.

The "foot in the door" technique exploits individuals' desire for self-consistency. For example, attending the financial education may have caused someone to become slightly predisposed towards insurance, and the marketing visit could then have decisively pushed individuals towards purchase. We do in fact find weak evidence that the marketing messages are more effective when they follow financial education than when they are offered in isolation. However, the fact that insurance purchase required a visit to a distant office in a narrow window of time suggests that it is not a simple behavioral response. Moreover, "foot in the door" phenomena can't fully explain the effect of the financial literacy education program because the education has a large and significant effect on purchase on its own. Restricting the sample to individuals who did not receive marketing visits, the first row of Web Appendix Table 3 implies the effect of being invited to the financial education session is 6.8 percentage points (p-value 0.04), similar to our estimate for the entire sample.

Policy Implications

We highlight three important policy implications from this study.

(1) We note that twenty-eight U.S. states require financial education as part of the high school curriculum, and dozens of governments and aid organizations spend millions of dollars per year on financial education, though to date there is no evidence that any financial programs are generally effective (Cole and Shastry, 2010). This paper provides the first experimental evidence that financial education can have a meaningful impact on the average consumer's financial

decision-making. This is demonstrated for a complicated product which has very high stakes for the purchaser, and may substantially improve welfare.

(2) We carefully recorded the cost of marketing interventions, allowing us to compare the relative cost-effectiveness of the alternative marketing techniques.[21] Because the financial literacy education intervention required rental of a hall and highly trained instructors, it was relatively expensive, at $3.33 per person, or $62.83 per policy sold.[22] In contrast, the cost of a marketing visit was $2.21. Thus offering a money-back guarantee would cost of $43.62 per policy sold[23]

A non-experimental implementation could reduce the cost of financial education by perhaps 25%, by issuing general invitations (reducing outreach costs), and combining the education program with another meeting. A non-experimental implementation of money-back guarantees would have fewer economies of scale, but would still be cheaper than financial education.

These are high costs, but should be seen in the light of marketing financial services in poor, rural areas: transaction costs are roughly constant over the value of a particular product (e.g., loan or insurance policy), while the financial income from a product typically scales with its size. In all cases the cost of marketing the policy is significantly higher than the premium obtained by DSC. This does not necessarily mean that marketing the policy is socially inefficient: in the event of a severe drought both the government and DSC would likely provide relief services. Relief efforts are costly, involve significant loss to corruption as well as deadweight loss of taxation, and cannot

[21] We thank an anonymous referee for suggesting we undertake this analysis.

[22]The point estimate of the effect of a financial education invitation is .053, yielding a cost per policy sold of $3.33/.053=$62.83

[23] The point estimate of the effect of a money-back guarantee is .069. This suggests an outreach cost of $32.03 per policy sold. The cost of the money-back guarantee is as follows: the policy is expected to pay out 40% of the time, and a $2 administrative cost in case of premium refund, yields a total of $11.59 per policy sold. Thus the total marketing cost is $43.62 per policy sold.

be effectively targeted. In contrast, purchasers of weather insurance identify their vulnerability ex-ante, and the claims settlement is swift with low transactions costs. Moreover, if either or both of these marketing techniques cause consumers to continue to repurchase insurance in subsequent years, the initial marketing cost may be amortized over subsequent commissions.

While the money back guarantee is effective in a statistical sense, we do find it surprising that it increased adoption by only about 7 percentage points, even in the sample that received financial education. Villager concern about counter-party risk was likely not an issue, as DSC had a long-standing presence in these villages. This clearly suggests a free trial offer may be much more effective in promoting experience with the policy than a money back guarantee.[24] But even initial low levels of adoption may lead to greater diffusion if non-adopters observe adopters receiving payouts (Stein, 2011).

The heterogeneous effects results suggest targeted messages may be effective. Though it is not obvious how sales agents would be able to inexpensively identify individuals with differing degrees of financial literacy, we have found two easily observable variables on which to target. Households in the top half of the land-holding distribution, and households with more than a primary school education, were much more responsive than those holding less land or attaining less education. Targeting on either of these characteristics would roughly double the cost-effectiveness of a financial education invitation.

(3) Left to its own, the market may not find it profitable to offer rainfall insurance. Introducing a new financial product in isolation is not immediately profitable. The size of commission ($2) for sale of a policy pales in comparison to the cost of marketing the policy.

We note that there is a significant public goods aspect to providing financial education and marketing, as it facilitates entry of other insurance providers, and may, in the long-run, have spill-

[24] At least two subsequent studies, one in Africa, and one in India, have taken this approach.

over effects as consumers experience the product. The results suggest that in the short-term, adoption may be more cost-effectively promoted through money-back guarantees, though it remains an open question whether the financial education effect remains more durable.

More optimistically, Cole (2007) and Cole and Tufano (2007) conduct an analysis of the offering of rainfall insurance by BASIX, a large microfinance organization in southern India. Because loan officers who already make household visits to service loans sell the insurance policies, BASIX is able to offer rainfall insurance in a profitable manner, though they suffer from relatively low take-up as well.

Conclusion

This paper offers practical answers to what the International Labor Organization identifies as a critical constraint to the spread of micro-insurance: "Achieving scale through cost-effective distribution is one of the biggest challenges facing insurers in low premium environments where customers are typically unfamiliar with insurance products and often skeptical of providers" (Smith et al., 2011, p. 1.).

We describe a set of interventions designed to improve our understanding of the demand for financial risk management tools. The primary intervention, an educational module covering financial literacy and rainfall insurance specifically, has a positive and significant effect on take-up. Perhaps surprisingly, the offer of a money-back guarantee to consumers, which is extremely advantageous, has relatively limited efficacy. In fact, three of the five types of policies that were sold did not result in payouts, resulting in refunds to purchasers who had been offered a money-back guarantee. We did find some evidence that certain combinations of treatments (financial education and money-back guarantee) had even larger treatment effects, though these estimates are based on relatively small cell sizes.

Relatively low take-up rates even among the most intensely treated, combined with the high cost of the education and effective marketing intervention, suggest that substantial increases in the efficiency of delivery would be necessary for rainfall insurance to become a financially sustainable product. In addition, our results suggest that a range of apparently sensible interventions may not have an effect if offered in isolation. However, we do find robust evidence that financial education matters: despite the complexity and novelty of the product, individuals educated in financial literacy and insurance are significantly more likely to adopt rainfall insurance.

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Figure 1

STUDY DESIGN

	No marketing	MoneyBack	Forecast	mmDemo	MoneyBack & Forecast	mmDemo & Forecast	MoneyBack & mmDemo & Forecast
No Financial Education Invitation	157 [6.4%]	25 [12.0%]	21 [19.0%]	28 [10.7%]	16 [6.3%]	27 [7.4%]	24 [12.5%]
Financial Education Invitation	159 [13.2%]	22 [13.6%]	26 [3.8%]	18 [11.1%]	31 [22.6%]	20 [5.0%]	23 [30.4%]

Notes: This figure describes the experimental design, as implemented. Each cell represents a treatment condition, and the number indicates the number of individuals assigned to that condition. (For example, the top-left cell indicates 157 individuals were assigned to receive no financial education invitation and no marketing message. The bottom-right indicates 23 individuals were assigned to receive a financial education invitation, and marketing that consisted of the mm demonstration, weather forecast, and a money-back guarantee). The number in square brackets indicates the raw percentage of individuals in that particular treatment cell who purchased insurance.

The marketing messages were: a moneyback guarantee (MoneyBack); a weather forecast (Forecast); and a demonstration of millimeters (mmDemo).

No marketing visits included just MoneyBack & mmDemo, so the design has two fewer cells than a full 2 x 2 x 2 x 2 factorial design.

The 'no marketing' conditions were deliberately overweighted in the random assignment.

Table 1
SUMMARY STATISTICS

	Mean	Median	SD	N
Household Characteristics				
Monthly Consumption Expenditure (Rs.)	7937	5900	13248	597
Monthly Per Capita Consumption Expenditure (Rs.)	1500	1144	2209	597
Household Size	5.82	5	2.95	597
Respondent Characteristics				
Male	0.88	1	0.33	597
Age	49.83	50	14.38	596
Years of Schooling Completed	8.98	8	4.48	597
Able to write	0.79	1	0.41	597
Math score (Fraction Correct)	0.78	0.88	0.29	597
Probability Score (Fraction Correct)	0.80	1	0.27	597
Financial Aptitude Score (Fraction Correct)	0.33	0.25	0.23	597
Debt Literacy Score (Fraction correct)	0.18	0	0.22	597
Cognitive Ability Score (Scale 0-2)	1.58	1.67	0.44	597
Financial Literacy Score (Scale 0-2)	0.51	0.5	0.32	597
Risk Averse	0.10	0	0.31	597
Assets and Income				
Land (acres)	3.23	2.25	3.2	597
Household has electricity	0.96	1	0.19	597
Household has phone	0.68	1	0.47	597
Household has TV/Radio	0.53	1	0.5	597
Number of Bullocks Owned	1.03	1	1.01	597
Housing Value ('000,000 Rs.)	1.23	0.8	1.56	597
Annual Income				
Total Income (Rs.)	99,203	65,000	138,968	597
Own Cultivation Income (Rs.)	81,405	50,000	137,760	597
Other Agricultural Income (Rs.)	8,970	0	17,404	597
Non-Agricultural Income (Rs.)	8,827	0	21,761	597

Caste	Sample Share	N
Scheduled Caste or Scheduled Tribe	6.70%	40
Other Backward Class (OBC)	23.28%	139
Education Categories		
Completed Primary	36.85%	220
Completed Secondary	40.87%	244
Completed Beyond Secondary Education	6.87%	41
Illiterate	15.41%	92
All		597

This table reports summary statistics on household demographics and wealth among study participants, based on a survey conducted in December 2009. The sample consists of 597 farmers in Gujarat, India. Scheduled Caste and Scheduled tribe are historically disadvantaged groups. More detailed variable definitions are provided in the appendix.

Table 2

TESTS OF RANDOM ASSIGNMENT

Panel A: Financial Education

	Not Invited	Invited	p-value
Financial Literacy	0.01	-0.01	0.82
Cognitive Ability	0.00	0.00	0.92
Male	1.14	1.10	0.17
Age	49.68	49.98	0.80
Household Size	5.80	5.85	0.84
Home Value (June 2009, Rs. 100,000)	1.14	1.32	0.16
Drought Experience	2.22	1.93	0.08
Ha. Of Land	3.30	3.15	0.58
Risk Averse	0.09	0.11	0.43
Years of Schooling	9.00	8.96	0.91
N=597	298	299	

Panel B: Marketing Messages

	No Marketing	MoneyBack & Forecast & mmDemo	MoneyBack & Forecast	MoneyBack	Forecast	mmDemo	Forecast & mmDemo	F-Statistic	p-value
Financial Literacy	0.003	0.003	0.070	-0.091	0.056	-0.120	0.057	0.686	0.661
Cognitive Ability	-0.008	-0.103	0.123	-0.195	0.191	0.112	-0.073	1.103	0.359
Male	1.142	1.085	1.106	1.085	1.106	1.152	1.064	0.930	0.473
Age	49.524	53.872	49.021	49.170	49.894	48.391	50.702	0.809	0.563
Household Size	5.734	6.191	6.149	5.681	6.043	5.283	6.170	0.766	0.597
Home Value (June 2009, Rs. 100,000)	1.151	1.378	1.329	1.659	1.224	1.158	1.109	0.728	0.627
Drought Experience	2.165	1.957	2.362	1.362	1.745	2.370	2.085	2.161	0.045
Ha. Of Land	3.259	3.620	2.801	3.153	2.741	3.582	3.261	0.730	0.625
Risk Averse	0.098	0.106	0.085	0.128	0.128	0.130	0.085	0.213	0.973
Years of Schooling	9.171	8.553	8.234	8.426	10.021	8.391	8.936	1.065	0.382
N=597									

This table provides a test of randomization for a field experiment on financial education and marketing interventions among farmers in Gujarat, India. Panel A tests whether individuals invited for financial education were different than those not invited for financial education. The p-values in the last column of Panel A reports the statistical significance of a test for the difference in means of those invited to financial education and those that were not. Panel B reports the average respondent characteristics by original marketing assignment. The F-Statistic and p-value columns correspond to a test of the joint hypothesis that there is no difference in means across the groups. ***p<0.01,**p<0.05,*p<0.10

Table 3

UNIVARIATE CORRELATIONS BETWEEN RAINFALL INSURANCE PURCHASE AND OTHER VARIABLES

	Bought Insurance	Fin Literacy	Cog. Ability	Male	Age	Household Size	June '09 Home Value	Drought Experience	Ha. of Land	Risk Averse	Per cap. cons.
Bought Insurance	1										
Financial Literacy	0.07 *	1									
Cognitive Ability	0.02	0.12 ***	1								
Male	0.01	0.07 *	0.15 ***	1							
Age	0.08 *	0.02	-0.10 **	0.17 ***	1						
Household Size	0.05	0.01	0.06	-0.04	-0.06	1					
June '09 Home Value	0.13 ***	0.05	0.05	-0.06	-0.02	0.03	1				
Drought Experience	0.02	0.07	0.12 ***	0.16 ***	0.13 ***	-0.13 ***	-0.07 *	1			
Ha. of Land	0.05	0.01	0.10 **	0.01	0.01	0.14 ***	0.08 **	-0.07 *	1		
Risk Averse	0.05	0.04	-0.09 **	-0.06	-0.01	-0.01	-0.01	-0.15 ***	0.01	1	
Per capita consumption	0.12 ***	0.02	0.09 **	-0.05	-0.10 **	0.40 ***	0.21 ***	-0.26 ***	0.22 ***	0.05	1

This table describes the pairwise correlation between rainfall insurance take up and other variables used in the paper, along with a pairwise correlation matrix. Drought experience is the number of years out of the past five that the respondent reports having suffered because of drought. Land holdings, drought experience, risk aversion, and per capita consumption refer to values measured in December 2009, after the intervention was complete. ***p<0.01,**p<0.05,*p<0.10

Table 4

FIRST STAGE: EFFECT OF INVITATION ON ATTENDANCE

	OLS (1)	OLS (2)	OLS (3)	OLS (4)
Invited to Financial Education	0.659 ***	0.663 ***	0.66 ***	0.664 ***
	(0.030)	(0.030)	(0.030)	(0.030)
Money-back Guarantee			-0.001	-0.007
			(0.040)	(0.039)
Weather Forecast			0.008	0.018
			(0.039)	(0.039)
mm Demonstration			0.031	0.021
			(0.039)	(0.039)
June '09 Home Value		0.013		0.013
		(0.010)		(0.010)
Financial Literacy Factor		-0.019		-0.019
		(0.025)		(0.025)
Male		0.056		0.058
		(0.049)		(0.049)
Age		0.001		0.000
		(0.001)		(0.001)
Household Size		-0.001		-0.001
		(0.004)		(0.004)
Ha. of land		0.016 ***		0.016 ***
		(0.005)		(0.005)
Constant	0.094 ***	-0.057	0.084 ***	-0.065
	(0.017)	(0.089)	(0.021)	(0.090)
R-squared	0.444	0.462	0.445	0.462
N	597	596	597	596

Column (1) presents a regression of a dummy variable indicating whether an individual attended financial literacy education on an indicator variable for whether the individual was invited for financial education. Column (3) adds dummy variables indicating whether an individual received a particular marketing message. For a household receiving both MoneyBack and Forecast, both dummies would be "switched on." Columns (2) and (4) include individual-level controls. ***p<0.01,**p<0.05,*p<0.10

Table 5

REDUCED FORM AND INSTRUMENTAL VARIABLES ESTIMATES

	OLS	OLS	OLS	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Invited to Financial Education	0.053 **	0.05 *	0.052 **	0.049 *			
	(0.026)	(0.025)	(0.026)	(0.026)			
Attended Financial Education					0.081 **	0.078 **	0.074 *
					(0.039)	(0.039)	(0.038)
Money-back Guarantee			0.069 *	0.062 *		0.069 **	0.062 *
			(0.036)	(0.036)		(0.035)	(0.035)
Weather Forecast			0.001	-0.003		0.001	-0.004
			(0.034)	(0.035)		(0.034)	(0.034)
mm Demonstration			0.014	0.014		0.012	0.012
			(0.036)	(0.035)		(0.034)	(0.034)
June '09 Home Value		0.025 **		0.023 **			0.022 **
		(0.010)		(0.010)			(0.010)
Financial Literacy Factor		0.035		0.036			0.037
		(0.024)		(0.024)			(0.023)
Male		0.008		0.013			0.009
		(0.041)		(0.041)			(0.040)
Age		0.002 *		0.002 *			0.002 *
		(0.001)		(0.001)			(0.001)
Household Size		0.005		0.004			0.004
		(0.004)		(0.004)			(0.004)
Ha. of land		0.003		0.003			0.002
		(0.004)		(0.004)			(0.004)
R-squared	0.005	0.026	0.01	0.028	0.034	0.038	0.053
N	597	596	597	596	597	597	596

This table presents the reduced form and instrumental variables estimates of the effects of financial education and marketing messages on individuals' decision to purchase insurance. The dependent variable equals one if the individual purchases insurance, 0 otherwise. Column (1) regresses purchase on a dummy variable indicating whether an individual was invited for financial education. Column (3) adds dummy variables indicating whether an individual received a particular marketing message. For a household receiving both MoneyBack and Forecast, both dummies would be "switched on." Columns (2) and (4) include individual-level controls. Columns (5), (6), and (7) present the corresponding instrumental variables estimates, where the invitation for financial education serves as an instrument for the endogenous dummy variable indicating whether the individual attended the financial education course. ***p<0.01,**p<0.05,*p<0.10

Table 6

HETEROGENEOUS EFFECTS, REDUCED FORM REGRESSIONS

	Entire Sample (1)	High Cog. Ability (2)	Low Cog. Ability (3)	High Schooling (4)	Low Schooling (5)	High Financial Literacy (6)	Low Financial Literacy (7)	High Combined CA/FL (8)	Low Combined CA/FL (9)	High Land Amount (10)	Low Land Amount (11)
Invited to Financial Education	0.052 **	0.041	0.061 *	0.067 *	0.035	0.068 *	0.041	0.041	0.062 *	0.1 **	0.001
	(0.026)	(0.037)	(0.037)	(0.038)	(0.036)	(0.040)	(0.034)	(0.038)	(0.035)	(0.040)	(0.033)
Money-back Guarantee	0.069 *	0.072	0.068	0.087	0.053	0.055	0.086 *	0.06	0.08 *	0.081	0.061
	(0.036)	(0.055)	(0.047)	(0.057)	(0.046)	(0.054)	(0.048)	(0.056)	(0.046)	(0.052)	(0.051)
Weather Forecast	0.001	-0.003	0	-0.004	0.009	-0.012	0.006	-0.008	0.004	-0.014	0.017
	(0.034)	(0.048)	(0.050)	(0.053)	(0.044)	(0.051)	(0.046)	(0.050)	(0.048)	(0.049)	(0.049)
mm Demo	0.014	-0.026	0.051	0.056	-0.02	0.046	-0.008	0.006	0.026	0.028	0
	(0.036)	(0.049)	(0.051)	(0.059)	(0.043)	(0.056)	(0.045)	(0.053)	(0.048)	(0.053)	(0.045)
R-squared	0.016	0.014	0.025	0.03	0.009	0.016	0.023	0.009	0.029	0.03	0.012
N	597	300	297	285	312	300	297	300	297	301	296

This table provides reduced form analysis of the effect of financial education and marketing messages on individuals' decision to purchase insurance. Column (1) reproduces the baseline result, while columns (2)-(11) split the sample at the median of the variable indicated at the top of the column. ***p<0.01,**p<0.05,*p<0.10

THE FOLLOWING MATERIAL IS THE WEB APPENDIX AND IS NOT INTENDED FOR

Web Appendix Figure 1
RAINFALL INSURANCE SAMPLE TERM SHEET

WEATHER BASED CROP INSURANCE SCHEME (KHARIF 2009)
TERM SHEET

State: **GUJURAT** District: **Bhavnagar** Tehsil: **Ghogha & Talaja**

Crop:	Groundnut	Reference Weather Station:	Respective GSDMA	Unit:	PER ACRE

1. DEFICIT RAINFALL

1 A. RAINFALL VOLUME

	PHASE - I		PHASE - II	
PERIOD	1-Jul	to 31-Jul	1-Aug	to 31-Aug
	Cummulative sum of RF on Rainy days			
TRIGGER I (<)	60	mm	60	mm
TRIGGER II (<)	30	mm	30	mm
EXIT	0		0	
Fixed1	150		150	
RATE I (Rs./ mm)	15		15	
Fixed2	600		600	
RATE II (Rs./ mm)	30		47	
Max. Payout (Rs.)	1500		2000	

PHASE - III: 1-Sep to 30-Sep

Phase - III	Phase - II	Phase - I	Payout
< 35	< 60	< 60	2000
< 35	> 60	< 60	1000
< 35	< 60	> 60	1000
< 35	> 60	> 60	500

TOTAL PAYOUT (Rs.)	5500

Note: Rainfall of less than 3.0 mm in a day shall not be considered as a rainy day

2.

Defnition Of excess Rainfall:		
	Stage I	Stage II
Daily RF Greater Than	60	40
Cosecutive Two days Sum Greater Than	80	60

Cummulative Deviation Unit

	Stage I		Stage II	
PERIOD	16-Sep	to 30-Sep	1-Oct	to 15-Oct
TRIGGER I (>)	30			
TRIGGER II (>)	120			
EXIT	120			
Fixed1	100			
RATE I (Rs./ mm)	10			
Fixed2	1000			
RATE II (Rs./ mm)	0			
Max. Payout (Rs.)	1000			

TOTAL PAYOUT (Rs.)	1000

TOTAL SUM INSURED (Rs.)	6500
PREMIUM (Rs.)	800
PREMIUM %	12.31%

Notes: This is the term sheet for one of the regions in our study.

Web Appendix Table 1
DESCRIPTION OF VARIABLES

Dependent Variables	
Purchased Rainfall Insurance	Dummy Variable =1 if respondent purchased rainfall insurance in Kharif 2009 agricultural season
Treatments	
Invited to Financial Education	Dummy Variable =1 if received invitation to attend financial literacy training; 0 otherwise
Attended Financial Education	Dummy Variable=1 if attended financial literacy training; 0 otherwise
Marketing Visit Treatments	
Money-back Guarantee (MB)	Dummy Variable =1 if received money-back guarantee treatment; 0 otherwise
Weather Forecast (WF)	Dummy Variable =1 if received weather forecast treatment; 0 otherwise
mm Demo (MM)	Dummy Variable =1 if received demonstration on millimeter (mm); 0 otherwise
Controls	
Log Consumption Expenditure	Log of Monthly Consumption Expenditure
MPCE	Monthly Per Capita Consumption Expenditure (Rs.); Based on 30 day recall
Household Size	Number of members residing in the same house and sharing the kitchen
Age	Respondent's Age
Sex	Dummy Variable=1 if respondent is Male; 0 otherwise
Writing Ability	Individual can write a formal letter in Gujarati language
Ha. of land	Cultivable land holdings during Kharif 2009 agricultural season in hectares
Housing Value, June 2009	Estimated sale value of house as of June 2009 (question asked during follow-up survey), in '000,000 Rs.
Years of Schooling	Years of Schooling completed by respondent
Financial Literacy Score	Sum of two variables 'finaptscore' and 'debtlitscore' [minimum value=0 and maximum value=2] where 'finaptscore' is the average score on 4 questions on financial aptitude and 'debtlitscore' is the average score on 3 questions on debt literacy [each correct answer is scored as 1 and wrong answers/no response is scored as 0]. These questions are presented in Table 2.
Cognitive Ability	Sum of two variables 'mathscore' and 'probscore' [minimum value= 0 and maximum value =2] where 'mathscore' is the average score on 8 math skills questions and 'probscore' is the average score on 6 probability and cognitive ability questions [each correct answer is scored as 1 and wrong answers/no response scores 0]
Risk Averse	A dummy variable = 1 if the household turns down a 50-50 lottery for Rs. 5 or Rs. 0, in favor of Rs. 2 with certainty.
Fatalism	Average of two scaled responses (1-10) on self-perceived notions of control in one's life and subjective evaluation of good things happening to others
Caste	Categorical Variable =1 if respondent is a member of Scheduled Caste (SC) group; 2 if respondent is a member of Scheduled Tribe (ST) group; 3 if respondent is a member of Other Backward Class (OBC) group; 4 if respondent is a member of General Caste Category.
Have Loans Outstanding	Dummy Variable =1 if Respondent (family) has formal loans outstanding; 0 otherwise
Have Savings	Dummy Variable =1 if Respondent (family) has formal savings ; 0 otherwise
Have Life Insurance	Dummy Variable =1 if Respondent (family) has life insurance; 0 otherwise
Have Other Insurance	Dummy Variable =1 if Respondent (family) has non-life insurance/general insurance; 0 otherwise

Web Appendix Table 1, Continued

QUESTIONS USED TO CONSTRUCT FINANCIAL LITERACY SCORES

Financial Aptitude Score (Mean=0.33)

1 Suppose you borrowed Rs. 100 from a moneylender, and the rate of interest was 2% per month. If you made no repayment for three months, how much would you owe: Less than Rs. 102, exactly Rs. 102, or more than Rs. 102?

2 Suppose you need to borrow Rs 500. Two people offer you a loan. One loan requires you pay back Rs. 600 in one month. The second loan also requires you pay back in one month, Rs. 500 plus 15 percent interest. Which loan represents a better deal for you?

3 Imagine that you saved Rs. 100 in a savings account, and were earning an interest rate of 1% per year. If prices were increasing at a rate of 2% per year, after one year, would you be able to buy more than, less than, or exactly the same amount as today with the money in the account?

4 Do you think the following statement is 'true' or 'false': Planting one crop is usually safer than planting multiple crops?

Debt Literacy Score (Mean=0.19)

1 Suppose you owe Rs. 1,000 from a bank and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?

2 You borrow Rs. 3,000 from a money lender. You pay a minimum payment of Rs.30 each month. If the annual interest rate was 12% , how many years would it take to eliminate your debt if you borrowed no additional money?

3 You purchase a T.V. which costs Rs.1, 000. To pay for this, you are given the following two options:
a) Pay 12 monthly installments of Rs.100 each;
b) Borrow at a 20% annual interest rate and pay back Rs.1, 200 a year from now.
Which is the more advantageous offer?

Math Score (Mean=0.78)

1 How much is 7+ 9

2 If half acre of land requires one 450gram packet of Bt cotton seed, how many packets of seed would a 15 acre plot need?

3 How much is 88 – 35?

4 If you have Rs. 48 and someone gives you Rs. 58, how much money do you have?

5 Suppose you want to buy sweets that cost Rs.37. You only have one Rs100 note. How much change will you get?

6 What is 3 times 6?

7 If you have four friends and you would like to give each one four sweets, how many sweets must you have to give away?

8 What is one one-tenth of 700?

Probability Score (Mean=0.80)

1 Suppose we have two bags. A red bag has two black marbles and 5 white marbles. A blue bag has 2 black marbles and 10 white marbles. If you shake the bag and take a marble from the bag without looking, from which bag are you more likely to draw a black marble?

2 If you take a marble from the bag without looking, from which bag are you more likely to draw a black marble?

3 Suppose we have two bags. A yellow bag has two black marbles and 20 white marbles. A green bag has 3 black marbles and 40 white marbles. If you take a marble from the bag without looking, from which bag are you more likely to draw a black marble?

4 If you take a marble from the bag without looking, from which bag are you more likely to draw a black marble?

5 Suppose we have two bags. A pink bag has 3 black marbles and 45 white marbles. An orange bag has 4 black marbles and 70 white marbles. If you take a marble from the bag without looking, from which bag are you more likely to draw a black marble?

6 If you take a marble from the bag without looking, from which bag are you more likely to draw a black marble?

Web Appendix Table 2
FINANCIAL LITERACY AND COGNITIVE ABILITY

	Entire Sample	Low Cognitive Ability	High Cognitive Ability	P-value of difference
Financial Literacy (% Answering Correctly)				
Simple interest calculation	0.41	0.32	0.50	0.00
Compound interest	0.14	0.12	0.15	0.31
Inflation	0.27	0.25	0.28	0.40
Diversification	0.49	0.39	0.58	0.00
First principal component	0.00	-0.06	0.06	0.03
Debt Literacy (% Answering Correctly)				
How long does it take Rs. 1,000 loan to double at 20% annual interest rate?	0.32	0.29	0.35	0.14
If you borrow Rs. 1,000 at 12% per year and repay Rs. 30 per month, how long would it take to pay off the debt?	0.12	0.11	0.14	0.23
You purchase a Rs. 1,000 TV. Which is more advantageous, 12 monthly repayments of 100, or a repayment of 1,200 one year from now?	0.11	0.11	0.10	0.66
First principal component	0.00	-0.01	0.01	0.06
Selected Cognitive Ability Questions				
What is 7+9?	0.90			
If you have Rs. 48 and receive Rs. 58, how much do you have?	0.80			
What is one-tenth of 700?	0.70			
Suppose we have two bags, a red bag with two black marbles and five white marbles. A blue bag has two black marbles and ten white marbles. From which bag are you more likely to draw a black marble?	0.85			

This table reports measures of financial education, for the entire sample and broken down for low and high cognitive ability households.

Web Appendix Table 3
GROUP MEANS FOR FACTORIAL MODEL

Financial Education	**Marketing**	**Respondent Characteristics**	Reduced Form (1)	Reduced Form (2)
No	None			
Yes	None		0.068 **	0.063 **
			(0.033)	(0.032)
No	Money-back Guarantee		0.056	0.058
			(0.068)	(0.069)
No	Weather Forecast		0.127	0.12
			(0.088)	(0.088)
No	mm Demonstration		0.043	0.045
			(0.062)	(0.062)
No	Money back and Forecast		-0.001	-0.014
			(0.064)	(0.068)
No	Forecast and mm Demo		0.01	0.004
			(0.054)	(0.052)
No	Money back and Forecast and mm Demo		0.061	0.035
			(0.070)	(0.072)
Yes	Money back		0.073	0.051
			(0.076)	(0.078)
Yes	Forecast		-0.025	-0.032
			(0.042)	(0.044)
Yes	mm Demo		0.047	0.056
			(0.077)	(0.074)
Yes	Money back and Forecast		0.162 **	0.155 **
			(0.078)	(0.076)
Yes	Forecast and mm Demo		-0.014	-0.023
			(0.052)	(0.052)
Yes	Money back and Forecast and mm Demo		0.241 **	0.23 **
			(0.098)	(0.094)
		June '09 Home Value		0.023 **
				(0.010)
		Fin. Lit. Principal Component		0.041 *
				(0.023)
		Male		0.006
				(0.039)
		Age		0.002
				(0.001)
		Household Size		0.004
				(0.004)
		Ha. of land		0.004
				(0.004)
	R-squared		0.014	0.033
	N		597	596

This table provides group means for every cell in the 2 x 7 design matrix, estimated with linear regression. The dependent variable is an indicator variable for whether the household purchased insurance. The right-hand side variables are dummy variables for each cell, e.g., "Yes - None" is equal to one if the household received an invitation to financial education, and received no marketing, and zero otherwise. The omitted cell did not receive marketing or a financial education invitation and had a take-up rate of 6.4%, so the coefficients in Column (1) can be read as the differences between the raw take-up rates in Figure 1 and 6.4%. Column (2) includes household characteristics as controls. ***p<0.01,**p<0.05,*p<0.10

Web Appendix Table 4

PROBIT FIRST STAGE REGRESSIONS: EFFECT OF INVITATION ON ATTENDANCE

	Probit (1)	Probit (2)	Probit (3)	Probit (4)
Invited to Financial Education	0.659 ***	0.676 ***	0.661 ***	0.678 ***
	(0.030)	(0.030)	(0.030)	(0.030)
Money-back Guarantee			-0.003	-0.012
			(0.061)	(0.062)
Weather Forecast			0.008	0.023
			(0.061)	(0.063)
mm Demo			0.055	0.04
			(0.063)	(0.065)
June '09 Home Value		0.022		0.022
		(0.017)		(0.017)
Financial Literacy Factor		-0.031		-0.032
		(0.040)		(0.041)
Male		0.097		0.1
		(0.078)		(0.078)
Age		0.001		0.001
		(0.002)		(0.002)
Household Size		-0.003		-0.003
		(0.008)		(0.008)
Ha. of land		0.024 ***		0.024 ***
		(0.008)		(0.008)
N	597	596	597	596

Column (1) presents a probit regression of a dummy variable indicating whether an individual attended financial literacy education on an indicator variable for whether the individual was invited for financial education. ***p<0.01,**p<0.05,*p<0.10

Web Appendix Table 5
REDUCED FORM ESTIMATES, PROBIT

	Probit (1)	Probit (2)	Probit (3)	Probit (4)
Invited to Financial Education	0.053 **	0.049 **	0.05 *	0.048 *
	(0.026)	(0.025)	(0.026)	(0.025)
Attended Financial Education				
Money-back Guarantee			0.066 *	0.061 *
			(0.037)	(0.037)
Weather Forecast			0.002	-0.003
			(0.034)	(0.033)
mm Demo			0.013	0.011
			(0.035)	(0.034)
June '09 Home Value		0.017 ***		0.016 **
		(0.006)		(0.006)
Financial Literacy Factor		0.033		0.035
		(0.022)		(0.022)
Male		0.009		0.014
		(0.040)		(0.039)
Age		0.002 *		0.002 *
		(0.001)		(0.001)
Household Size		0.005		0.004
		(0.004)		(0.004)
Ha. of land		0.003		0.003
		(0.004)		(0.004)
Pseudo R-squared	0.005	0.027	0.01	0.031
N	597	596	597	596

This table presents the reduced form probit estimates of the effects of financial education and marketing messages on individuals' decision to purchase insurance. The dependent variable equals one if the individual purchases insurance, 0 otherwise. Column (1) regresses purchase on a dummy variable indicating whether an individual attended financial literacy education on indicator variables for whether the individual was invited for financial education. Column (3) adds dummy variables indicating whether an individual received a marketing message that included the MB, WF, or MM message. For a household receiving both MM and WF, both dummies would be "switched on." Columns (2) and (4) include individual-level controls. In all cases, marginal effects are reported.
***p<0.01,**p<0.05,*p<0.10

Web Appendix Table 6

ALTERNATIVE PRESENTATION OF REDUCED FORM RESULTS (2 x 7 DESIGN)

	OLS (1)	OLS (2)	OLS (3)	OLS (4)	OLS (5)	OLS (6)
Invited to Financial Education	0.053 **		0.050 *	0.048 *	0.068 **	0.063 *
	(0.026)		(0.026)	(0.025)	(0.034)	(0.033)
MoneyBack & Forecast & mmDemo		0.115 *	0.115 *	0.100	0.061	0.035
		(0.062)	(0.062)	(0.061)	(0.071)	(0.073)
MoneyBack & Forecast		0.072	0.064	0.058	-0.001	-0.014
		(0.058)	(0.057)	(0.057)	(0.064)	(0.069)
MoneyBack		0.030	0.031	0.024	0.056	0.058
		(0.052)	(0.052)	(0.053)	(0.069)	(0.071)
Forecast		0.008	0.006	0.002	0.127	0.12
		(0.048)	(0.050)	(0.050)	(0.089)	(0.089)
mmDemo		0.011	0.016	0.022	0.043	0.045
		(0.049)	(0.049)	(0.049)	(0.062)	(0.063)
Forecast & mmDemo		-0.034	-0.030	-0.035	0.010	0.004
		(0.040)	(0.040)	(0.039)	(0.055)	(0.053)
Inv. Fin Lit*(MoneyBack & Forecast & mmDemo)					0.111	0.132
					(0.123)	(0.123)
Inv. Fin Lit*(MoneyBack & Forecast)					0.095	0.107
					(0.103)	(0.105)
Inv. Fin Lit*(MoneyBack)					-0.052	-0.07
					(0.105)	(0.107)
Inv. Fin Lit*(Forecast)					-0.220 **	-0.215 **
					(0.101)	(0.101)
Inv. Fin Lit*(mmDemo)					-0.064	-0.053
					(0.101)	(0.101)
Inv. Fin Lit*(Forecast & mmDemo)					-0.092	-0.09
					(0.078)	(0.077)
June '09 Home Value				0.024 **		0.023 **
				(0.010)		(0.010)
Financial Literacy Factor				0.036		0.041 *
				(0.024)		(0.024)
Male				0.010		0.006
				(0.041)		(0.040)
Age				0.002 *		0.002
				(0.001)		(0.001)
Household Size				0.004		0.004
				(0.004)		(0.004)
Ha. of land				0.003		0.004
				(0.004)		(0.004)
R-squared	0.005	0.004	0.008	0.027	0.014	0.033
N	597	597	597	596	597	596

This table presents an alternative analysis of the experiment, following the 2 x 7 design interpretation (see Figure 1). Column (5) and (6) are equivalent to columns (1) and (2) in Table 7: the Table 7 coefficients may be recovered as linear combinations of coefficients in this table.

***p<0.01,**p<0.05,*p<0.10

Web Appendix Table 7

PREDICTORS OF FINANCIAL LITERACY

Dependent Variable	Univariate Correlation	*Financial Literacy Score OLS*
Fin Lit Score	(1)	(2)
Consumption Expenditure	-0.044 **	-0.034
	(0.022)	(0.022)
Household Size	-0.002	-0.001
	(0.005)	(0.005)
Gender	-0.043	-0.068 *
	(0.041)	(0.040)
Age	0.0005	0.000 ***
	(0.0003)	(0.000)
Education	0.002	0.002
	(0.003)	(0.003)
Writing Ability	0.115 ***	0.154 ***
	(0.037)	(0.038)
Ha. Of Land	0.008 ***	0.010 **
	(0.004)	(0.004)
General Caste	0.005	0.004
	(0.028)	(0.029)
R-squared		0.062
N		596

Column (1) presents univariate correlations between our measure of financial literacy and respondent characteristics. Columns (2) presents a regression model of multivariate correlations.

***p<0.01,**p<0.05,*p<0.10

Web Appendix Table 8
COMPARING MEASURES OF FINANCIAL AND DEBT LITERACY

Financial Literacy Questions

Lusardi and Mitchell (2008)	% Correct	Our Questions	% Correct
Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: more than $102, exactly $102, less than $102?	61.9	Suppose you borrowed Rs. 100 from a moneylender, and the rate of interest was 2% per month. If you made no repayment for three months, how much would you owe: Less than Rs. 102, exactly Rs. 102, or more than Rs. 102? i) Less Than RS. 102 ii) Exactly RS. 102 iii) More Than RS. 102 iv) Don't now	13.57
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, exactly the same as, or less than today with the money in this account?	70.6	Imagine that you saved Rs. 100 in a savings account, and were earning an interest rate of 1% per year. If prices were increasing at a rate of 2% per year, after one year, would you be able to buy more than, less than, or exactly the same amount as today with the money in the account? i) Rs. 600 in one month ii)Rs. 500 + 15% interest iii) Don't know	26.80
Do you think that the following statement is true or false? Buying a single company stock usually provides a safer return than a stock mutual fund.	47.6	Do you think the following statement is 'true' or 'false'? Planting one crop is usually safer than planting multiple crops? i) True ii) False iii) Don't know	48.91
		Suppose you need to borrow Rs 500. Two people offer you a loan. One loan requires you pay back Rs. 600 in one month. The second loan also requires you pay back in one month, Rs. 500 plus 15 percent interest. Which loan represents a better deal for you? i) Rs.600 in 1 month ii) Rs.500 + 15% interest; Don't Know	40.87

Debt Literacy Questions

Lusardi and Tufano (2008) questions	%Correct	Our Questions	% Correct
Suppose you owe $1,000 on your credit card and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double? (i) 2 years; (ii) less than 5 years; (iii) 5 to 10 years; (iv) more than 10 years; (v) Do not know; (vi) Refuse to answer.	35.88	Suppose you owe Rs. 1,000 from a bank and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double? i) 1 years; ii) 2 years; iii)Less than 5 years; iv)5 to 10 years; v)More than 10 years; Don't Know-999	32.16
You owe $3,000 on your credit card. You pay a minimum payment of $30 each month. At an Annual Percentage Rate of 12% (or 1% per month), how many years would it take to eliminate your credit card debt if you made no additional new charges? (i) Less than 5 year; (ii) Between 5 and 10 years; (iii) Between 10 and 15 years; (iv) Never, you will continue to be in debt; (v) Do not know; (vi) Prefer not to answer.	35.41	You borrow Rs. 3,000 from a money lender. You pay a minimum payment of Rs.30 each month. At an Annual Percentage Rate of 12% (or 1% per month), how many years would it take to eliminate your debt if you made no additional new charges? i) Less than 5 years; ii) Between 5 and 10 years; iii) Between 10 and 15 years; iv) Never, you will continue to be in debt; Don't Know -999	12.40
You purchase an appliance which costs $1,000. To pay for this appliance, you are given the following two options: a) Pay 12 monthly installments of $100 each; b) Borrow at a 20% annual interest rate and pay back $1,200 a year from now. Which is the more advantageous offer? (i) Option (a); (ii) Option (b); (iii) They are the same; (iv) Do not know; (v) Prefer not to answer.	6.00	You borrow Rs. 3,000 from a money lender. You pay a minimum payment of Rs.30 each month. At an Annual Percentage Rate of 12% (or 1% per month), how many years would it take to eliminate your debt if you made no additional new charges? i) 1 year; ii) 2 years; iii) Less than 5 years; iv) 5 to 10 years; v) More than 10 years; Don't Know-999	10.89

Web Appendix Table 9

HETEROGENOUS EFFECTS BY COGNITIVE ABILITY AND FINANCIAL LITERACY, IV ESTIMATES

Panel A: Heterogeneous effects by cognitive ability

	Full Sample	High Math	Low Math	High Cognitive Ability	Low Cognitive Ability	High Schooling	Low Schooling	High Land Amount	Low Land Amount
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Attended Financial Education	0.078 **	0.051	0.106 *	0.06	0.096 *	0.102 *	0.053	0.153 **	0.001
	(0.039)	(0.052)	(0.059)	(0.054)	(0.057)	(0.057)	(0.054)	(0.060)	(0.049)
Money-back Guarantee	0.069 *	0.091 *	0.052	0.071	0.069	0.086	0.054	0.083 *	0.061
	(0.035)	(0.055)	(0.042)	(0.054)	(0.045)	(0.055)	(0.046)	(0.050)	(0.050)
Weather Forecast	0.001	-0.007	0.001	-0.006	0.004	0.000	0.006	-0.014	0.017
	(0.034)	(0.047)	(0.048)	(0.048)	(0.048)	(0.051)	(0.044)	(0.047)	(0.049)
mm Demo	0.012	-0.02	0.049	-0.025	0.043	0.054	-0.022	0.022	0.000
	(0.035)	(0.045)	(0.054)	(0.049)	(0.049)	(0.057)	(0.042)	(0.051)	(0.045)
R-squared	0.044	0.038	0.054	0.035	0.058	0.069	0.028	0.073	0.012
N	597	328	269	300	297	285	312	301	296

This table provides IV estimates of the effect of financial literacy education and marketing interventions, splitting the sample by household characteristics. The total sample size is 597, but in cases where the there are multiple observations at the median, these observations are included in both the "high" and "low" group. In columns (2)-(5), the spilt is according to the first principal component of a series of questions on the indicated subject.

Panel B: Heterogeneous effects by financial literacy

	Baseline	High Lusardi-Mitchell	Low Lusardi-Mitchell	High Financial Literacy	Low Financial Literacy	High Combined CA/FL	Low Combined CA/FL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Attended Financial Education	0.078 **	0.093 *	0.067	0.112 *	0.058	0.06	0.097 *
	(0.039)	(0.049)	(0.064)	(0.065)	(0.047)	(0.056)	(0.054)
Money-back Guarantee	0.069 *	0.074	0.063	0.058	0.085 *	0.059	0.081 *
	(0.035)	(0.048)	(0.052)	(0.053)	(0.047)	(0.055)	(0.044)
Weather Forecast	0.001	0.032	-0.04	-0.018	0.008	-0.009	0.007
	(0.034)	(0.047)	(0.048)	(0.051)	(0.045)	(0.050)	(0.046)
mm Demo	0.012	-0.019	0.058	0.039	-0.007	0.005	0.02
	(0.035)	(0.043)	(0.059)	(0.054)	(0.045)	(0.053)	(0.046)
R-squared	0.044	0.068	0.031	0.053	0.045	0.032	0.06
N	597	332	265	300	297	300	297

This table provides IV estimates of the effect of financial literacy education and marketing interventions, splitting the sample by household characteristics. The total sample size is 597, but in cases where the there are multiple observations at the median, these observations are included in both the "high" and "low" group. ***p<0.01,**p<0.05,*p<0.10

Web Appendix Table 10

HETEROGENEITY BY COGNITIVE ABILITY, REDUCED FORM ESTIMATES WITH CONTROLS

	Full Sample (1)	High Math (2)	Low Math (3)	High Cognitive Ability (4)	Low Cognitive Ability (5)	High Schooling (6)	Low Schooling (7)	High Land Amount (8)	Low Land Amount (9)
Invited to Financial Education	0.049 *	0.035	0.067 *	0.041	0.058	0.062	0.03	0.101 ***	-0.011
	(0.026)	(0.035)	(0.037)	(0.037)	(0.037)	(0.038)	(0.035)	(0.039)	(0.031)
Money-back Guarantee	0.062 *	0.074	0.058	0.051	0.069	0.087	0.037	0.078	0.064
	(0.036)	(0.056)	(0.043)	(0.056)	(0.047)	(0.057)	(0.048)	(0.054)	(0.050)
Weather Forecast	-0.003	-0.001	-0.011	0.000	-0.01	-0.013	0.011	-0.018	0.007
	(0.035)	(0.049)	(0.049)	(0.050)	(0.051)	(0.055)	(0.043)	(0.051)	(0.049)
mm Demo	0.014	-0.024	0.053	-0.017	0.048	0.053	-0.019	0.038	0.009
	(0.035)	(0.046)	(0.055)	(0.050)	(0.051)	(0.058)	(0.041)	(0.053)	(0.043)
June '09 Home Value	0.023 **	0.03 **	0.009	0.027 **	0.015	0.016	0.028 **	0.005	0.038 ***
	(0.010)	(0.013)	(0.014)	(0.013)	(0.016)	(0.015)	(0.013)	(0.014)	(0.011)
Financial Literacy Factor	0.036	0.017	0.07	0.046 *	0.019	0.027	0.041	0.039	0.032
	(0.024)	(0.027)	(0.048)	(0.028)	(0.046)	(0.034)	(0.034)	(0.030)	(0.036)
Male	0.013	0.011	0.024	-0.024	0.031	-0.064	0.059	0.059	-0.007
	(0.041)	(0.070)	(0.052)	(0.069)	(0.054)	(0.068)	(0.052)	(0.071)	(0.043)
Age	0.002 *	0.002	0.002	0.002	0.001	0.001	0.003 *	0.003 *	0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Household Size	0.004	0.006	0.002	0.004	0.005	0.004	0.006	-0.001	0.009
	(0.004)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Ha. of land	0.003	0.005	0.000	0.006	0.001	0.001	0.005	-0.001	0.043
	(0.004)	(0.006)	(0.005)	(0.007)	(0.005)	(0.007)	(0.006)	(0.006)	(0.032)
R-squared	0.045	0.056	0.049	0.06	0.037	0.043	0.068	0.052	0.079
N	596	327	269	299	297	285	311	301	295

This table provides reduced form estimates of the effect of financial literacy education and marketing interventions, splitting the sample by household characteristics. The total sample size is 597, but in cases where the there are multiple observations at the median, these observations are included in both the "high" and "low" group. In columns (2)-(5) the split is according to the first principal component of a series of questions on the indicated subject. ***p<0.01,**p<0.05,*p<0.10

Web Appendix Table 11

HETEROGENEITY BY FINANCIAL LITERACY, REDUCED FORM ESTIMATES WITH CONTROLS

	Full Sample (1)	High Lusardi-Mitchell (2)	Low Lusardi-Mitchell (3)	High Financial Literacy (4)	Low Financial Literacy (5)	High Combined CA/FL (6)	Low Combined CA/FL (7)
Invited to Financial Education	0.049 *	0.065 **	0.041	0.054	0.034	0.042	0.056
	(0.026)	(0.032)	(0.042)	(0.039)	(0.032)	(0.038)	(0.035)
Money-back Guarantee	0.062 *	0.072	0.042	0.016	0.091 *	0.039	0.081 *
	(0.036)	(0.049)	(0.051)	(0.053)	(0.047)	(0.057)	(0.045)
Weather Forecast	-0.003	0.035	-0.054	-0.008	0.007	-0.008	-0.001
	(0.035)	(0.048)	(0.048)	(0.051)	(0.045)	(0.052)	(0.048)
mm Demo	0.014	-0.033	0.055	0.039	-0.033	0.014	0.022
	(0.035)	(0.044)	(0.059)	(0.054)	(0.043)	(0.054)	(0.047)
June '09 Home Value	0.023 **	-0.004	0.04 **	0.044 ***	-0.021 **	0.025 *	0.02
	(0.010)	(0.010)	(0.012)	(0.013)	(0.008)	(0.013)	(0.017)
Financial Literacy Factor	0.036	0.002	0.089 **	0.125 **	-0.064	0.059 **	-0.006
	(0.024)	(0.039)	(0.043)	(0.060)	(0.055)	(0.029)	(0.043)
Male	0.013	0.086	-0.106 **	-0.044	0.064	-0.02	0.033
	(0.041)	(0.054)	(0.043)	(0.059)	(0.053)	(0.072)	(0.052)
Age	0.002 *	0.002 *	0.001	0.001	0.004 **	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Household Size	0.004	0.002	0.007	0.001	0.009	0.004	0.005
	(0.004)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Ha. of land	0.003	0.013 **	-0.012 **	0	0.012 **	0.002	0.006
	(0.004)	(0.007)	(0.005)	(0.005)	(0.006)	(0.006)	(0.005)
R-squared	0.045	0.069	0.098	0.086	0.085	0.053	0.047
N	596	332	264	299	297	299	297

This table provides IV estimates of the effect of financial literacy education and marketing interventions, splitting the sample by household characteristics. The total sample size is 597, but in cases where the there are multiple observations at the median, these observations are included in both the "high" and "low" group. In columns (2)-(7) the split is according to the first principal component of a series of questions on the indicated subject. ***p<0.01,**p<0.05,*p<0.10