Prices or Knowledge? What Drives Demand for Financial Services in Emerging Markets?

SHAWN COLE, THOMAS SAMPSON, and BILAL ZIA[*]

ABSTRACT

Financial development is critical for growth, but its microdeterminants are not well understood. We test leading theories of low demand for financial services in emerging markets, combining novel survey evidence from Indonesia and India with a field experiment. We find a strong correlation between financial literacy and behavior. However, a financial education program has modest effects, increasing demand for bank accounts only for those with limited education or financial literacy. In contrast, small subsidies greatly increase demand. A follow-up survey confirms these findings, demonstrating that newly opened accounts remain open and in use 2 years after the intervention.

FINANCIAL DEVELOPMENT IS WIDELY recognized as an important determinant of economic growth, with a large literature examining the determinants of the supply of banking and financial intermediation services (Levine (2005)). Yet the determinants of the demand for financial services are much less well understood, particularly in emerging market countries.

An important feature of emerging markets is the size of the informal sector. Recent estimates place the size of the informal economy at 14% of GDP in China, 23% in Indonesia, and 24% in India, against 8% in the United States (Buehn and Schneider (2009)). In 76 emerging market countries, the average size of the informal sector is almost 36% of GDP.[1] Arguably, drawing these individuals and firms into the formal financial sector would be one of the fastest ways to foster financial development in emerging markets.

Two leading views may explain limited demand for formal financial services. First, because these services involve high fixed costs and hence are expensive to

[1] Our baseline surveys find that 55% of the rural sample from India has savings in a nonbank institution while 64% borrow from informal sources. Similarly, nationally representative figures from Indonesia show that 51% of the population saves in nonbank institutions and 52% borrows informally; nearly 20% of households in Indonesia borrow and save exclusively in the informal sector.

provide, it may be the case that low income individuals do not demand formal financial services at market prices. Indeed, there is evidence that informal savings, credit, and insurance markets function reasonably well in emerging markets,[2] with the benefits of formal financial market participation simply not exceeding the relatively large fixed transactions costs associated with such products (Beck, Demirguc-Kunt, and Peria (2007)). An alternative view argues that limited financial literacy serves as an important barrier to demand for services—if individuals are not familiar or comfortable with certain products, they will not demand them.

While not mutually exclusive, these two views have significantly different implications for the development of financial markets around the world, and suggest quite different actions for financial institutions, governments, and international organizations seeking to expand financial services use.

This paper aims to test the above theories. To do so, we conduct novel surveys measuring household financial literacy and demand for financial services in India and Indonesia. The survey in Indonesia represents the first nationally representative household survey on financial literacy in a developing country.

We supplement the survey data with a randomized field experiment among unbanked households in Indonesia to directly test the role and relative importance of financial literacy and prices in determining demand for banking services. An intervention offering a financial education program on bank accounts is randomly assigned to half of 564 unbanked households identified by our survey team. Orthogonal to this treatment, individuals are randomly offered small subsidies, ranging from U.S. $3 to $14, for opening a bank account. This design allows us to directly compare the effects of financial literacy education versus price subsidies.

We find that financial literacy education has no effect on the probability of opening a bank savings account for the full population, although it does have an impact among those with low initial levels of education and financial literacy. Modest financial subsidies, in contrast, have large effects, significantly increasing the share of households that open a bank savings account within the subsequent 2 months. Specifically, an increase in subsidy from $3 to $14 increases the share of households that open a bank savings account from 3.5% to 12.7%, an almost three-fold increase.

Follow-up analysis conducted 2 years after the intervention shows that bank accounts are "sticky"—those that were originally offered high subsidies are, 2 years later, significantly more likely to have used bank accounts in the past year to deposit, withdraw, send, or receive funds. These long-run findings confirm our main short-run findings: financial literacy education alone does not lead to greater demand for financial services in the general population, as the share of individuals who opened a bank account in the 2 years after the intervention is no different in the treatment group versus the control group.

The paper proceeds as follows. Section I discusses the motivation for the study and the context in which the field experiment took place. Section II

---

[2] See, for example, Besley, Coate, and Loury (1993) and Townsend (1994).

describes how we measure financial literacy and details the level of financial literacy in our samples. In Section III, we explore the factors that predict financial literacy, and in Section IV we describe how financial literacy is related to use of, and demand for, financial services. Sections V and VI describe the experiment design and results, respectively, and Section VII discusses our follow-up survey results. We conclude in Section VIII.

I. Motivation and Context

The role of financial literacy has received increasing attention in both the developed and developing world. For example, in the United States, in January 2008 the government set up the President's Advisory Council on Financial Literacy, which is charged with promoting programs that improve financial education at all levels of the economy and increase access to financial services.[3] In the developing world, the Indonesian government declared 2008 "the year of financial education" with a stated goal of improving access to and use of financial services by increasing financial literacy.[4] Similarly, in India the Reserve Bank of India launched an initiative in 2007 to establish Financial Literacy and Credit Counseling Centers throughout the country that offer free financial education and counseling to urban and rural populations.[5]

Much of this attention has been motivated by a compelling body of evidence based on household surveys in developed countries that demonstrates a strong association between financial literacy and household well-being. Households with low levels of financial literacy tend not to plan for retirement (Lusardi and Mitchell (2007a)), borrow at higher interest rates (Lusardi and Tufano (2008), Stango and Zinman (2009)), acquire fewer assets (Lusardi and Mitchell (2007b)), and participate less in the formal financial system relative to their more financially literate counterparts (van Rooji, Lusardi, and Alessie (2007), Hogarth and O'Donnell (1999)). In response to this evidence, financial literacy programs have been advanced as a low-cost intervention with the potential to improve household financial decision making and ultimately increase savings and welfare.

There is less work in emerging markets. One exception is Cole et al. (2010), who study demand for a rainfall insurance product in India. They find limited demand for the product, which, at least theoretically, appears to be quite attractive. They also find no effect of a very modest, 5-minute long financial literacy module on demand for the product.

The first substantive contribution of this paper is to measure the level and predictors of financial literacy, and the relationship between financial literacy

---

[3] See http://www.treasury.gov/offices/domestic-finance/financial-institution/fin-education/council/index.shtml (accessed February 11, 2009). As an indication of the U.S. government's resolve to improve financial literacy, it named April 2008 Financial Literacy Month.

[4] See http://www.oecd.org/document/3/0,3343,en_2649_34853_40660803_1_1_1_1,00.html (accessed February 11, 2009).

[5] See http://www.rbi.org.in/scripts/PublicationDraftReports.aspx?ID=526 (accessed February 11, 2009).

and demand for financial services, in two of the most populous countries in the world. We conduct two large household surveys in India and Indonesia and find strong relationships between financial literacy and financial behavior.

Of course, as with any observational study, it is possible that other factors explain some or all of the observed relationships. For example, individuals with lower levels of financial literacy may have lower levels of education, be less interested in financial matters, be poorer, or have different discount rates.

To measure causal relationships, we implement a field experiment in Indonesia. We study one of the most basic, but perhaps most valuable, financial services: bank savings accounts. We choose to study savings accounts for several reasons. First, for households, a bank savings account can be an efficient savings technology, secure from theft, and often paying interest, as well as a means of sending and receiving payments. A savings account also allows customers to build a relationship with the bank, potentially facilitating eventual access to credit and other financial services. This may in turn improve household welfare. Indeed, in the United States, the federal government and individual states have passed legislation intended to draw individuals into the banking system by establishing "lifeline" savings accounts and by providing incentives to retail banks to operate in underserved areas (Washington (2006)). Transactions and savings accounts are the first and most obvious way in which household participation in the formal financial sector begins.

Note that by conducting our field study in Indonesia, we consider a setting in which financial literacy may be one of the most important barriers to access. This may be explained in part by low educational expenditures: measured as a share of GDP, education expenditures in Indonesia are the lowest in the world (UNESCO (2007)). However, in contrast to many developing countries where access to banking infrastructure is difficult, the Indonesian banking system has wide geographical reach. Moreover, Indonesian banks have traditionally offered savings accounts with low minimum deposits that are designed to serve the needs of low income customers. The minimum balance in a savings account with the nation's largest bank, Bank Rakyat Indonesia (BRI), is only U.S. $0.53 and interest is paid on balances greater than $1.06.[6] This compares to a per capita income of approximately $1,918. Yet only 41% of the total population and 32% of rural Indonesian households have a bank savings account.

To evaluate the importance of financial literacy, we randomly select half of the unbanked households in our sample and offer them a 2-hour financial literacy education session on how banks work and the benefits of opening a bank savings account. To understand cost sensitivity, we offer unbanked households subsidies ranging in value from $3 to $14 if they open a bank savings account.

While financial literacy has received increasing attention worldwide, our paper is the first to systematically test the impact of a financial literacy training program in the developing world using randomized evaluation. In terms of access to financial services, Indonesia and India are fairly representative.

---

[6] See http://www.bri.co.id/english/layanan/simpanan.aspx?id=12 for terms of the savings product (accessed February 11, 2009).

According to recent estimates from Beck, Demirguc-Kunt, and Peria (2007) and Kendall, Mylenko, and Ponce (2010), India ranks 24th (out of 98 countries) in bank branch penetration, with 22.6 branches per 1,000 square km, and Indonesia ranks 38th with 10.0 branches per 1,000 square km. The United States ranks 39th with 9.81 branches per square km. In terms of value of deposits to GDP, India ranks 56th (out of 113 countries) with a 51.0% ratio, Indonesia ranks 72nd with a 41.8% ratio, and the United States ranks 73rd with a 39.8% ratio.

In the developed world, the most convincing evidence on the role of financial education using a randomized evaluation comes from Duflo and Saez (2003), who conduct an experiment at a U.S. university. The authors sent letters (at random) to staff, encouraging the staff to attend an employee benefits fair. The authors find that enrollment in retirement plans increased significantly in the departments in which letters were received. The size of the effect, however, is quite small, at an increase of approximately 1.25 percentage points. A related paper by Karlan and Valdivia (2010) studies the efficacy of offering a business training program to female microentrepreneur clients of a bank in Peru. While the content of the course falls outside the standard definitions of financial literacy, the spirit was similar: provide education for individuals making household decisions. They find that the treatment resulted in higher repayment and client retention rates but had no impact on business income or assets. Similarly, Bertrand and Morse (2010) look at the effect of financial literacy education intended to suppress demand for payday lending in the United States and find that a treatment that emphasizes the dollar cost of repeated borrowing is effective in reducing the probability that an individual renews a payday loan.

This paper is also related to the literature on financial market development, surveyed in great detail by Beck, Demirguc-Kunt, and Honohan (2008). Most closely related to the present study, Beck, Demirguc-Kunt, and Peria (2007) study household and firm use of banking services around the world and find that GDP, institutional quality, and ownership structure are important predictors of the use of financial services.

II. Measuring Financial Literacy and Financial Decisions

In this section, we describe the Indonesian and Indian household surveys from which we obtain our measures of financial literacy. We describe how we measure financial literacy and present summary statistics from the surveys. Both surveys focus on households' financial sector participation and were custom designed by the authors in conjunction with partner organizations. To the best of our knowledge, the Indonesian results are the first nationally representative measure of financial literacy in a developing country.

The Indonesian data were collected as part of the World Bank's Access to Finance survey conducted in collaboration with the World Bank Jakarta office. The Access to Finance survey is a nationally representative household

survey designed to measure use of, and attitudes toward, financial services in Indonesia. Stratified sampling was used to select 112 villages, and from each village 30 households were randomly selected to participate in the survey, for a total sample size of 3,360 households. All Indonesian survey statistics reported in this paper are corrected for appropriate sampling weights. The survey took place between July and December 2007. Summary statistics are provided in the Internet Appendix.[7]

We complement the Indonesian survey results with data from India using questions from a household survey administered in the state of Gujarat in 2006. Because we designed both survey instruments, the questions are comparable across countries. Despite the strikingly different context (India is far poorer than Indonesia), we find notable similarities both in the variables that predict financial literacy and in the relationship between financial literacy and demand for financial products.

The survey in India took place in March and April 2006 as a baseline survey for a study on weather insurance. The survey covers 15 households in each of 100 villages located in three districts of India around Ahmedabad, the capital of Gujarat,[8] and focuses primarily on poor, subsistence agricultural laborers. While the sample is not representative of India or Gujarat, the selected households live in similar circumstances and have comparable educational backgrounds to households throughout much of rural India.

Both surveys use a measure of financial literacy that is very close to the work of Lusardi and Mitchell (2006), who, to our knowledge, are the first to use a large-scale survey of financial literacy. We ask four questions: (i) "Suppose you borrow Rp. 100,000 from a money lender at an interest rate of 2% per month, with no repayment for 3 months. After 3 months, do you owe less than Rp. 102,000, exactly Rp. 102,000, or more than Rp. 102,000?" (ii) "If you have Rp. 100,000 in a savings account earning 1% interest per annum, and prices for goods and services rise 2% over a 1-year period, can you buy more than, less than, or the same amount of goods in 1 year as you could today, with the money in the account?" (iii) "Is it riskier to plant multiple crops or one crop?" We also added one new question: (iv) "Suppose you need to borrow Rp. 500,000. Two people offer you a loan. One loan requires you to pay back Rp. 600,000 in 1 month. The second loan requires you to pay back in 1 month Rp. 500,000 plus 15% interest. Which loan represents a better deal for you?"[9]

Table I presents the financial literacy results. Measured financial literacy is low, especially in India. The mean share of correct answers is 52% in Indonesia and 34% in India. It should be noted that all questions were multiple choice, two with two possible answers and two with three possible answers. Thus, random

---

[7] An Internet Appendix for this article is available online in the "Supplements and Datasets" section at http://www.afajof.org/supplements.asp.

[8] The survey served as a baseline for Cole et al. (2010), who study a weather insurance intervention. The survey was conducted prior to any intervention.

[9] For the Indian survey, the amounts used were Rs. 100 for questions (i) and (ii) and Rs. 500 for question (iv).

Table I

Financial Literacy, Cognitive Ability, and Discount Rates

This table reports levels of financial literacy among household survey respondents in India and Indonesia. The Indonesian sample is nationally representative. The means are given for households above and below the median per capita expenditures, and for households above and below the median cognitive ability. The column to the right of the comparison columns indicates whether the difference in means is statistically significant. *** indicates that the difference is statistically significant at the 1% level, ** at the 5% level, and * at the 10% level.

| | | India | | | | | Indonesia | | | | |
| | | All | Per Capita Expenditure | | Cognitive Ability | | All | Per Capita Expenditure | | Cognitive Ability | |
			Below Median	Above Median	Below Median	Above Median		Below Median	Above Median	Below Median	Above Median
Compound interest	% Correct	59%	55%	63%***	33%	80%***	78%	69%	86%***	56%	89%***
	% Do not know	30%					15%				
If savings earns 1% and inflation is 2%, after 1 year is buying power greater, less, or the same?	% Correct	25%	21%	28%***	14%	33%***	61%	51%	70%***	37%	74%***
	% Do not know	38%					16%				
Is one crop safer than multiple crops?	% Correct	31%	30%	32%	26%	34%***	28%	24%	31%***	23%	30%***
	% Do not know	6%					4%				
Borrowing 500,000, repaying 600,000 versus paying 15 % interest	% Correct	24%	24%	23%	11%	34%***	44%	39%	49%***	30%	52%***
	% Do not know	24%					14%				
All questions taken together	% Correct	34%	33%	36%***	21%	45%***	52%	46%	59%***	37%	61%***
All questions taken together	Avg. Score (out of 4)	1.38	1.31	1.45***	0.83	1.80***	2.10	1.83	2.36***	1.46	2.45***
N		1,496	749	747	622	843	3,360	1,680	1,680	1,412	1,948

guessing would yield an average score of 42%, which is in fact higher than the average score in India, where many respondents answer "do not know" rather than guess. The percentage of "do not know" responses ranges from 6% to 38% in India and from 4% to 16% in Indonesia. The inflation question elicits the most "do not know" responses in both countries. Looking at individual questions, a majority of people in both surveys respond correctly to the compound interest question (59% in India and 78% in Indonesia). Discerning interest rate versus lump sum loan repayments seems to be most difficult for Indian respondents (only 24% correct), whereas the diversification question is difficult to answer in both settings (31% correct in India and 28% in Indonesia).

In terms of the distribution of scores, in India 26% of respondents do not answer a single question correctly, 29% answer one question correctly, 29% answer two questions correctly, 13% answer three questions correctly, and only 3% answer all questions correctly. The comparative figures from the Indonesia survey are 12%, 21%, 32%, 28%, and 7%, respectively. In the United States, the average score on the first three questions is 65%. The corresponding scores for India and Indonesia are 38% and 55%, respectively. Throughout the paper, we use the total score from all four questions as our measure of financial literacy; the variable thus ranges from zero to four.

In addition to financial literacy, the surveys capture other household characteristics that may be important determinants of financial behavior. Cognitive ability is evaluated using a series of eight mathematics questions: the mean share answered correctly is 81% in Indonesia and 62% in India.[10] Almost all respondents correctly answer the simplest question ("what is 4+3") while many have difficulty with multiplication ("3 times 6") and division ("one-tenth of 400"). Because respondents were not allowed to ask their friends or neighbors for help, it is reasonable to think that in situations in which collaboration is possible, they would perform better when answering these questions. While these exact questions have not been asked in the United States, Lusardi (2008) finds similar abilities in the United States: 84% of U.S. respondents perform a percentage calculation correctly, while 56% correctly divide proceeds from a lottery among five winners.

We proxy for household discount rates by eliciting the minimum amount a household would be willing to accept in 1 month in lieu of a Rp. 80,000 payment today.[11] Consistent with other evidence, respondents report relatively high discount rates: the average elicited monthly discount rate is 36% in Indonesia and 21% in India. To measure risk aversion, we follow Binswanger (1980) and use actual lotteries for real amounts of money. In Indonesia, respondents were offered a choice between receiving Rp. 2,000 for certain or playing a lottery that paid Rp. 5,000 with probability $\frac{1}{2}$ and Rp. 0 with probability $\frac{1}{2}$.

---

[10] We do not distinguish between cognitive ability and numeracy skills in our analysis. See Lang et al. (2005), Dohmen et al. (2010), and Gerardi, Goette, and Meier (2010) for survey questions that can separate the two measures.

[11] We calculate discount rates using answers to hypothetical questions of the form: "Would you prefer to receive Rp. 80,000 today, or Rp. X in 1 month." For India, the ordering was reversed and respondents were asked to choose between Rs. X today and Rs. 10 in 1 month.

Thirty-six percent of households choose the safe bet. We code these households as risk averse.[12] In India, respondents are coded as risk averse if they opt to receive Rs. 2 for certain rather than play a lottery that paid Rs. 5 with probability $\frac{1}{2}$ and Rs. 0 with probability $\frac{1}{2}$. Nineteen percent of Indian households meet this definition of risk aversion.[13]

The surveys also allow us to proxy for the extent to which respondents view events as outside of their control. For Indonesia, we measure fatalism as the proportion of the following statements with which the respondent either agrees or strongly agrees: (i) "I have little control over what will happen to me in my life." (ii) "Good things tend to happen to other people, not to me or my family." (iii) "I have a hard time saving money, even though I know I want to save money." The average value of fatalism is 60%. For India, we measure fatalism using the extent to which respondents agreed with the first two of these statements. The average value is 53%.

Finally, the surveys collect standard data on household demographics and expenditures. While household wealth is an important concept, in practice it is difficult to measure using household surveys, particularly among low-income households whose main assets (real estate, livestock) may not be easy to price. Accordingly, we follow the standard convention and focus on measured per capita household expenditures. The Internet Appendix demonstrates that the Indian sample is more rural, less educated, and much poorer than the Indonesian sample. The average household size in the Indian sample is 5.9, twice as large as in Indonesia. Further, in India the entire sample is rural, compared to 58% in Indonesia. Though low by developed country standards, the Indonesian sample also exhibits substantially higher levels of education than the Indian sample. For instance, 80% of respondents in Indonesia completed primary school compared to 41% in India. In the Indian sample, mean monthly per capita household expenditures (which includes consumption, but not investment spending) is less than one-third of the Indonesian level, while average annual reported household income is $674 in India and $1,315 in Indonesia.

In the Internet Appendix, we present summary statistics on households' use of financial services. Bank accounts are uncommon in both locations. Only 12% of Indian and 41% of Indonesian households report having a bank account. In the United States, in contrast, approximately 88% of adults have a bank account (FINRA (2009)). However, 29% of Indonesian households that do not report having a bank account indicate that they did have an account

---

[12] This test is also a test of a behavioral anomaly, namely, "small-stakes risk aversion" described by Rabin and Thaler (2001).

[13] These methods of eliciting time and risk preferences have received some validation. Chabris et al. (2008), for example, find that elicited time preferences weakly predict individual behaviors such as exercising and smoking. Binswanger et al. (1980) report that elicited measures of risk aversion correlate well with agricultural risk-taking in a sample quite similar to our Indian sample. It must be acknowledged, however, that these measures are not perfect; in particular, limited financial literacy may confound the measure if individuals do not, for example, have a firm understanding of probability.

at some point in the past. Approximately half (51%) of Indonesian households have savings with a nonbank institution, but only 13% have advanced savings instruments such as certificates of deposit or mutual funds. In total, 68% of Indonesian households own a savings product of some form.

On the loan side, 25% of Indonesian households have a formal sector loan, while only 13% of Indian households have such a loan. Informal credit is more common in both countries, with 64% of Indian households and 52% of Indonesian households having loans from microfinance institutions, moneylenders, or other informal sources. The most common source of informal loans in Indonesia is family and friends.

One surprising result is the familiarity with, and use of, insurance in the Indian sample. Two-thirds of households have some form of insurance policy. This is likely attributable to the fact that SEWA, a local microfinance institution in Gujarat oriented toward helping poor women, makes health insurance policies available to its members. In contrast, crop insurance, which must be separately obtained, is comparatively rare. Even in Indonesia, almost half of the households report having an insurance policy. One-third of the population has health insurance, while 26% has asset or homeowner's insurance.

III. What Predicts Financial Literacy?

A breakdown of financial literacy performance by household expenditures and cognitive ability is given in Table I. Within samples, the share of the population answering each question correctly shows substantial variation by per capita expenditures and cognitive ability. Splitting the samples by household per capita expenditures we see that households with high per capita expenditures do significantly better than households with low per capita expenditures on most questions. Similarly, dividing the samples by cognitive ability, we find that the upper half of the distribution does significantly better on all questions. In fact, the differences between the low and high cognitive ability subsamples are on average more than twice as large as the differences based on per capita expenditures, suggesting that cognitive ability may play an important role in determining financial literacy. This finding is consistent with Cole and Shastry (2009), who find close relationships between cognitive ability and financial behavior in the United States.

While the connection between household expenditures and financial literacy has been long documented, the relationship between cognitive ability and financial literacy, though not surprising, is less well understood. Christelis et al. (2006) describe the relationship between cognitive ability and portfolio choice in European households, and find that higher cognitive ability households are more likely to invest directly in stocks.

In Table II, we take a more systematic approach and regress our measure of financial literacy on a variety of individual characteristics. The regression confirms that both greater per capita expenditures and higher human capital, as measured by level of schooling or cognitive ability, are associated with significantly higher levels of financial literacy in Indonesia. We also find that rural

Table II
Predictors of Financial Literacy

This table reports the results from OLS regressions predicting measured financial literacy among household survey respondents in India and Indonesia. Financial literacy is measured by a series of questions about compounding, interest rates, and risk diversification. The Indonesian sample is nationally representative and weighted by sampling weights. The Indian regressions are unweighted. Only select coefficients are shown here; full regression results are available in the Internet Appendix. Standard errors, clustered at the village level, are given in parentheses beneath each point estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

					Financial Literacy Score			
		India				Indonesia		
Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Per capita expenditure	0.073*	0.079*	0.080*	0.051	0.074*	0.087**	0.071*	0.100**
	(0.040)	(0.041)	(0.041)	(0.043)	(0.040)	(0.042)	(0.042)	(0.047)
Rural household					-0.152***	-0.195***	-0.196***	
					(0.051)	(0.053)	(0.053)	
Female	-0.077	-0.090	-0.096	-0.074	-0.110**	-0.123**	-0.130**	-0.135***
	(0.059)	(0.061)	(0.061)	(0.061)	(0.050)	(0.052)	(0.051)	(0.051)
Age	0.022**	0.027**	0.027**	0.020*	0.021**	0.020**	0.022**	0.012
	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
HH has nonfarm enterprise	-0.065	-0.040	-0.041	-0.096	0.112**	0.129**	0.136***	0.114**
	(0.105)	(0.108)	(0.107)	(0.108)	(0.051)	(0.052)	(0.050)	(0.054)
Married	-0.030	-0.040	-0.046	-0.032	-0.079	-0.111	-0.094	-0.075
	(0.080)	(0.082)	(0.083)	(0.080)	(0.076)	(0.079)	(0.076)	(0.077)
Muslim	0.048	0.076	0.074	0.187*	-0.073	0.010	0.010	-0.104
	(0.094)	(0.096)	(0.097)	(0.104)	(0.102)	(0.109)	(0.106)	(0.155)
Completed primary school	-0.007	-0.034	-0.035	0.143*	0.165**	0.127*	0.128*	0.070
	(0.063)	(0.064)	(0.064)	(0.068)	(0.067)	(0.068)	(0.068)	(0.071)
Completed high school	0.201	0.254	0.253	0.148	0.022	-0.019	-0.020	-0.072
	(0.228)	(0.243)	(0.239)	(0.196)	(0.066)	(0.071)	(0.069)	(0.071)
Cognitive ability	0.223***	0.226***	0.225***	0.187***	0.234***	0.233***	0.224***	0.191***
	(0.013)	(0.013)	(0.013)	(0.014)	(0.017)	(0.018)	(0.019)	(0.019)
Risk averse			-0.037	0.026			-0.075	-0.062
			(0.068)	(0.065)			(0.055)	(0.056)
Interested in financial matters							0.022	0.050
							(0.062)	(0.062)
Saves enough (self-reported)							-0.057	-0.101*
							(0.050)	(0.052)
Village fixed effects	No	No	No	Yes	No	No	No	Yes
N	1,450	1,369	1,369	1,369	3,057	2,818	2,818	2,818

households and households with a female head exhibit lower levels of financial literacy, while households that own a nonfarm enterprise have higher financial literacy. With respect to age, financial literacy is quadratic and peaks at around 40 years old. Neither discount rates nor risk aversion predict financial literacy.

Household per capita expenditures and cognitive ability are also positively correlated with financial literacy in India, but, surprisingly, there is no systematic relationship between education and financial literacy. As in Indonesia, age is quadratic and peaks at around 45 years old.

One striking result is that households with a more fatalist worldview exhibit consistently lower financial literacy, both in India and Indonesia, even after controlling for a host of other characteristics. This result, found as well in the United States (Cole and Shastry (2009)), may suggest that households who believe that outcomes are predetermined feel less motivated to invest in understanding how to make decisions that improve their well-being.

The regressions also allow us to quantify and compare the effects of per capita expenditures and cognitive ability, two of the most important predictors of financial literacy. The estimates from Column 2 indicate that in our Indian sample, a 1-standard-deviation increase in household per capita expenditures predicts a 0.05-standard-deviation increase in the financial literacy score. In contrast, a 1-standard-deviation increase in cognitive ability is associated with a 0.50-standard-deviation increase in the financial literacy score. In Indonesia, the corresponding magnitudes, based on the estimates in Column 6, are 0.05 and 0.37 standard deviations, respectively. In both samples, cognitive ability has a substantially stronger association with financial literacy than does household expenditures.

IV. What Does Financial Literacy Predict?

A compelling body of evidence demonstrates a strong association between financial literacy and household well-being in developed countries. The Internet Appendix shows how use of financial services varies with household characteristics in our Indian and Indonesian samples. Higher household expenditures predicts greater use of bank accounts and formal credit in both countries, but predicts greater use of informal credit and insurance in Indonesia only. The results for human capital are mixed. Education is positively associated with the use of bank accounts and formal credit in both countries and with insurance in Indonesia, but is negatively associated with informal credit use in both countries. Higher cognitive ability predicts greater insurance use in both countries and greater use of formal credit in Indonesia, but is otherwise insignificant.

In both countries, none of the household preference indicators consistently predict the use of financial services. In Indonesia, a high discount factor is associated with lower use of both formal and informal credit, while risk averse households are more likely to have a bank account or a formal loan. Fatalism is associated with lower use of bank accounts in Indonesia, but higher use of insurance in India.

Higher financial literacy is significantly associated with greater use of bank accounts in Indonesia and insurance in India, even after including a host of controls. The coefficients on the borrowing regressions are positive but insignificant. Although financial literacy is a significant predictor of the use of bank accounts in Indonesia, the magnitude of the estimates suggests it is a less important predictor than expenditure levels. The estimates from Column 2 indicate that a 1-standard-deviation increase in financial literacy is associated with a 2.2-percentage-point increase in the probability of having a bank account, while a 1-standard-deviation increase in household expenditures is associated with a 14.9-percentage-point increase.

A. Demand for Financial Products

While much has been written on the impact of financial repression on financial development (e.g., La Porta et al. (1998)), many countries around the world are liberalizing financial markets. However, mere entry may not be sufficient to spur financial development if demand for the products is very limited. In this section, we present some of the first survey evidence on demand for a range of financial products.

In Panel A of Table III we explore demand for financial products. Data for this section and the remainder of the paper are available for the Indonesian sample only. We ask respondents if they are interested in three financial products that have been identified as potentially beneficial in increasing household savings. First, we ask about a commitment savings product similar to the one described in Ashraf, Karlan, and Yin (2006a). This product allows clients to deposit money at any time, but to withdraw only after a certain savings target has been met or a specified time period has passed. Christmas savings clubs in the United States are one example of this product. Approximately 43% of households express interest in such a product. Second, we ask whether the household is interested in deposit collection services. Deposit collection services have been shown to increase savings in the Philippines (Ashraf, Karlan, and Yin (2006b)). Interest in this product is lower, at 25%. Finally, we ask if households are interested in retirement savings accounts. We find that 50% of households express interest in such products.

To better understand barriers to the use of bank accounts, we ask respondents whether they would open a bank account if account fees were reduced. Of the unbanked, 37% report that they would open a bank account if fees were halved; that figure rises to 58% if fees were eliminated. These responses are particularly striking given that the basic account (described in Section V.A below) offered by a government-owned bank charges no fees, suggesting that households have a limited understanding of banking services.

Panel B of Table III explores which household characteristics predict interest in the three financial products we consider. Interest in all three products is increasing in financial literacy and household expenditures, even after including a range of household controls and village fixed effects. Financial literacy is therefore a strong and consistent predictor of demand for financial services.

Table III

Demand for Financial Products, Indonesia

This table reports demand for financial products by household survey respondents in Indonesia. The sample is nationally representative. Panel A gives average reported demand for each service, while Panel B reports OLS regressions relating individual characteristics to product demand. Only select coefficients are shown here; full regression results are available in the Internet Appendix. Standard errors, clustered at the village level, are given in parentheses beneath each point estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Panel A: Summary Statistics

		Indonesia	
	Sample	Mean	N
Demand for savings products			
Interested in commitment savings product	All	43%	3,360
Interested in using deposit collector	All	25%	3,359
Interested in retirement savings product	All	50%	3,360
Open account if fees cut 50%	No bank account	37%	2,153
Open account if fees cut 100%	No bank account	58%	2,153
Would attend financial literacy training	No bank account	74%	2,153

Panel B: Determinants of Demand for Financial Products

	Commitment Savings		Deposit Collector		Retirement Savings		Literacy Training	
Demand for:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial literacy score	0.028***	0.025**	0.024***	0.026***	0.037***	0.033***	0.019*	0.014
	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)	(0.011)	(0.010)	(0.011)
HH has bank account	−0.012	−0.018	−0.051**	−0.065***	0.087***	0.074**		
	(0.026)	(0.026)	(0.020)	(0.021)	(0.025)	(0.029)		
Per capita expenditure	0.058***	0.043***	0.030**	0.025	0.073***	0.067***	0.061***	0.051**
	(0.015)	(0.016)	(0.014)	(0.015)	(0.017)	(0.019)	(0.021)	(0.021)

(continued)

Table III—*Continued*

Panel B: Determinants of Demand for Financial Products

Demand for:	Commitment Savings		Deposit Collector		Retirement Savings		Literacy Training	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	0.007	0.009	−0.021	−0.013	0.031	0.030	−0.022	−0.025
	(0.019)	(0.021)	(0.018)	(0.017)	(0.020)	(0.019)	(0.019)	(0.020)
Age	0.005	0.005	0.003	0.004	0.003	0.002	0.010**	0.007*
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
HH has nonfarm enterprise	0.012	0.010	0.025	0.021	−0.044**	−0.048**	−0.022	−0.025
	(0.020)	(0.020)	(0.018)	(0.019)	(0.018)	(0.02)	(0.022)	(0.021)
Married	0.091***	0.085***	−0.014	−0.034	0.005	−0.008	0.029	0.021
	(0.024)	(0.024)	(0.026)	(0.028)	(0.025)	(0.024)	(0.034)	(0.035)
Muslim	0.025	0.021	−0.020	−0.008	0.038	0.049	−0.042	−0.050
	(0.049)	(0.047)	(0.036)	(0.036)	(0.046)	(0.046)	(0.059)	(0.052)
Completed primary school	0.027	0.029	0.015	0.011	0.021	0.022	0.024	0.017
	(0.025)	(0.025)	(0.024)	(0.025)	(0.028)	(0.027)	(0.025)	(0.025)
Completed high school	−0.017	−0.023	−0.057**	−0.066**	0.008	−0.006	0.028	0.015
	(0.024)	(0.025)	(0.026)	(0.026)	(0.026)	(0.026)	(0.030)	(0.032)
Cognitive ability	0.007	0.002	−0.007	−0.010	−0.006	−0.012*	0.005	0.003
	(0.006)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)
Risk averse		−0.037*		−0.027*		−0.030		−0.038
		(0.020)		(0.016)		(0.023)		(0.024)
Interested in financial matters		0.121***		0.096***		0.154***		0.070*
		(0.026)		(0.023)		(0.024)		(0.033)
Saves enough (self-reported)		0.097***		0.102***		0.108***		0.092***
		(0.022)		(0.020)		(0.024)		(0.021)
Village fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,057	2,818	3,057	2,818	3,057	2,818	1,876	1,737

There is no evidence of a robust effect of human capital on interest levels for any of the three products. Households that have a bank account are less interested in deposit collection services and more interested in retirement savings, but their interest in the commitment savings product is not significantly different. Demand for the commitment savings and deposit collector products is higher among households that are more patient and not risk averse. Demand for all three products is higher for households that have a fatalistic outlook, are interested in financial matters, and report saving enough for the future.

In the Internet Appendix, we examine self-reported attitudes toward the use of financial services. The most common reasons cited for having a bank account are: for security (53%), for predicted future needs (42%), for money transfers (37%), and emergency needs (31%). Only 17% of respondents see having a transactions account as a step toward borrowing from the bank.

When asked their reasons for not having a bank account, 92% of unbanked households report that they do not have enough money. The second-most common answer, not knowing how a bank operates, is cited only by 32% of households. Interestingly, 29% of currently unbanked households report having had an account at some point in the past. Among these households, 71% report that they stopped using the account because they did not have enough money.

Just over half of households (54%) report that they are saving enough for the future. Of those who answered "no," lack of money is the most frequently cited reason for insufficient savings (76%), with irregular income (31%) and failure to control spending (23%) the second- and third-most common reasons.

We also ask about household demand for insurance. Among those without insurance, not enough money is again the most frequent reason given (59%), followed by not knowing about any insurance products (38%). Only 6% of households indicate that they do not have insurance because premiums are too expensive.

Finally, we ask households to describe the three most important financial risks they face. Illness is the most common risk (79%), followed by loss of employment (56%) and loss of dwelling (33%). Conditional on owning a nonfarm enterprise, 52% of households report concerns about business risk. Interestingly, many of the reported risks (health, property loss, death, and vehicle damage) are insurable, though most households choose not to insure them.

The data in Table III and the Internet Appendix provide support for the notion that a financial literacy training intervention could increase the share of households possessing a bank account. Lack of knowledge of how a bank works is the second-most common reason for not having a bank account and is cited by approximately one-third of households. The fact that only 31% of the population reports knowing the requirements to open a bank account suggests that knowledge may be a barrier to opening an account. Finally, 74% of households without a bank account express interest in attending a free financial literacy training session.

A challenge in interpreting observational regressions is that variables may be collinear and hence causal links are not clear. This important caveat applies

to much of the literature on financial literacy. To draw out causal relationships, we design a field experiment.

V. Experiment Design

This section describes the intervention we conducted in Indonesia to test whether financial literacy acts as a barrier to opening a bank account. The results of the experiment are analyzed in Section VI.

A. *Financial Literacy Intervention*

To study whether financial literacy training could stimulate demand for financial services, we worked with an international nonprofit organization in Jakarta, Microfinance Innovation Center for Resources and Alternatives (MICRA). MICRA provides consulting and training programs to banks and microfinance organizations in Indonesia.

MICRA developed a customized training session on bank accounts using material adapted from a curriculum developed by the consortium consisting of Microfinance Opportunities, Citigroup Foundation, and Freedom from Hunger. The curriculum was designed for unbanked individuals, with the specific goal of teaching households about bank accounts.

A challenge with financial education is that household preferences and circumstances vary, and not everyone may benefit from a particular financial behavior, making prescriptive education difficult (Lyons and Neelakantan (2008)). To address this concern, our intervention focuses on a behavior that carries almost no cost: Bank Rakyat Indonesia, the country's largest bank, offers a "SIMPEDES" account that, at the time of our intervention, requires a minimum deposit of only Rp. 5,000 ($0.53) and charges no fees as long as an individual deposits or withdraws money no more than four times per month. This account pays no interest for deposit levels below Rp. 10,000 ($1.06), and pays increasing interest rates for balances higher than this amount. Indonesian depositors enjoy deposit insurance from the government.

Of course, if households have highly productive investment opportunities, they may be loathe to save. Work by Rampini and Viswanathan (2010) suggests that those who are capital constrained may in fact have less of an incentive to manage risk than those who are somewhat wealthier. However, the value of a buffer stock savings would certainly be high to extremely poor individuals (as consumption approaches zero), particularly given the high cost of moneylender credit. Recall as well from the baseline that 58% of households reported they would open a bank account if there were no fees.

Moreover, while evidence suggests that some poor households have access to high-return projects, it is also true that many poor households, and even poor entrepreneurs, demonstrate quite low returns to capital (de Mel, McKenzie, and Woodruff (2008)). Finally, we note that, even in a setting with high returns to capital, access to savings technology could facilitate making lumpy investments. In related work, Dupas and Robinson (2009) report a

randomized evaluation of savings accounts among a much poorer sample of individuals in Kenya. Despite the fact that the terms offered in the Kenyan bank were much less favorable than those found in Indonesia (e.g., withdrawal fees), Dupas and Robinson (2009) find that savings accounts improved investment levels of self-employed individuals.

Working with MICRA, we identified individuals to serve as trainers who had previous experience in financial sector work or education. The trainers were given 2 days of specialized training related to the curriculum prior to the start of the experiment. MICRA provided the training for the trainers. The salary offered to the trainers was relatively high (200,000 Rp./hour); thus, the quality of this intervention's delivery is likely to be as good as or better than that of any other large-scale intervention.

The financial literacy experiment took place in the 64 Access to Finance survey villages on the island of Java. Thirty households were sampled in each village, for a total of $64 \times 30 = 1,920$ households. Of these, 1,173 households did not have a bank account at the time of the survey. After completing the Access to Finance survey, each of these unbanked households was offered an opportunity to participate in the experiment. If a respondent agreed to participate, he or she was subsequently randomly assigned a financial incentive level and a financial literacy training invitation status. The financial incentives offered were Rp. 25,000, Rp. 75,000, and Rp. 125,000, with equal probability, for opening a bank account within 2 months of the intervention. To receive the incentive, the household was required to fill out a postage-paid mail-in form indicating the participant's name and bank account number. Upon receipt of this card, the survey firm transferred the appropriate incentive amount to the respondent's account.

Independent of the incentive level, households were assigned to either treatment or control for the financial literacy training program. Treatment households received from the surveyor a written invitation to attend a 2-hour financial literacy training session to be held in the village on a weekend. Households that did not agree to participate in the experiment were eligible to receive invitations to the financial literacy training, but, because we do not know if these households decided to open a bank account, they do not form part of our experimental sample. Half of the households (again randomly assigned) receiving a financial literacy invitation were allowed to invite a friend to accompany them to the session.[14]

In each of the 64 villages, a financial literacy training session was held within 1 month of the date the survey was conducted. Invited households were reminded about the training the day before it occurred.

Unfortunately, 23 villages had to be dropped from the sample because of evidence that the surveyors were collaborating with households to ensure

---

[14] The experimental plan initially called for a range of invitations designed to elicit the importance of peer effects. Operational limitations precluded any peer invitations in the first 14 villages surveyed. In the subsequent villages, half of the treatment sample was offered an invitation for a friend.

households received high incentives.[15] This left a sample of 1,230 households, of which 736 did not have bank accounts. Panel A of Table IV illustrates the experiment sample composition.

The outcome of interest is whether a household opened a bank account. We measure this based on financial incentive claims. After verifying the identity of the claimant and the existence of a bank account, we were left with 49 claims that came from eligible households that had indeed opened a bank account.

B. Summary Statistics and Checks of Randomization

Summary statistics for the experimental group are presented in the Internet Appendix. Results are reported separately for all unbanked households who agreed to participate in our experiment and for all unbanked households who declined to participate. While, of course, we could not compel participation, the take-up rate is relatively high, at 77%: 564 out of 736 households without bank accounts choose to participate in the experiment. Households made this decision prior to learning the precise details of the survey, including the size of the incentive and whether they would receive a literacy invitation. We find that rural households and older and unmarried respondents are less likely to participate in the experiment, whereas respondents that are more educated, more financially literate, and more interested in financial matters are more likely to participate.

Turning to the summary statistics in the Internet Appendix, slightly more than half of our experiment sample households are rural and half are female headed. Further, respondents are, on average, in their early 40s, are over-whelmingly married, and have attended some school. About 70% are employed and 70% own their homes. The average financial literacy score, as measured by questions asked in the Access to Finance Survey, is 50%, though 70% of the sample claim they are interested in financial matters.

Panel B of Table IV provides a test of the randomization. We first present mean differences between those invited to financial literacy training (274 out of 564) and those who were not (290 out of 564), and then for those who were offered the low (170), middle (190), or high (204) incentive. Column 3 tests the hypothesis of equality of means between the invited and noninvited groups, while Column 7 tests for equality of means across the assigned incentives. By and large, the randomization appears successful as baseline characteristics do not vary systematically by treatment status.

---

[15] The survey was conducted in two waves. During wave one, which covered 48 villages, the size of the incentive for participating households was chosen by the surveyor drawing one of three colored balls from a bag. For four surveyors, a Pearson χ^2 test rejects the hypothesis that the allocation of incentives was random. The 23 villages visited by these survey-ors have been dropped from the sample. During wave two, incentive amounts were pre-assigned to households. There is no evidence that the incentive amount affected households' participation decisions.

Table IV

Experimental Sample, Indonesia

This table reports sample composition and tests of random treatment assignment for an experiment testing the effect of offering financial literacy training and financial incentives on respondents' decision to open a bank account. Panel A gives sample size and the mean of the outcome group by treatment status. Panel B provides tests of random assignment. The *p*-values in column (3) report the statistical significance of a test for difference between the mean of invited and noninvited individuals; the *p*-values in column (7) correspond to a joint test of significant differences between medium and low, and high and low, incentive categories. Standard errors are adjusted for clustering at the village level. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Panel A: Sample Composition

			Opened Bank Account	
	N	Percent	N	Percent
	(1)	(2)	(3)	(4)
Surveyed individuals	1,230			
Of whom, no bank account	736	60%		
Of whom, participated in experiment	564	77%	49	9%
Incentive treatment				
Low incentive ($3)	170	30%	6	4%
Medium incentive ($8)	190	34%	17	9%
High incentive ($14)	204	36%	26	13%
Literacy treatment				
Invited to financial literacy training	274	49%	21	8%
Not invited to financial literacy training	290	51%	28	10%

(continued)

Table IV—*Continued*

Panel B: Test of Random Assignment

	Invited (1)	Not Invited (2)	p-value (3)	Low (4)	Medium (5)	High (6)	p-value (7)
Rural household	0.58	0.53	0.053*	0.57	0.53	0.55	0.591
Female	0.55	0.50	0.287	0.54	0.50	0.53	0.681
Age	41.84	40.55	0.302	40.76	40.72	41.95	0.554
Married	0.87	0.85	0.529	0.88	0.86	0.85	0.710
Muslim	0.97	0.99	0.102	0.99	0.98	0.98	0.662
Family size	2.73	2.82	0.446	2.73	2.76	2.82	0.756
Attended school	0.90	0.90	0.916	0.89	0.93	0.88	0.134
Log of consumption expenditure	17.26	17.32	0.332	17.18	17.33	17.35	0.213
Employed	0.68	0.69	0.792	0.65	0.67	0.72	0.367
Financial literacy score	0.46	0.51	0.039**	0.49	0.49	0.48	0.821
Cognitive / math skills score	0.79	0.80	0.408	0.78	0.80	0.79	0.727
Believe household saves enough	0.43	0.49	0.101	0.45	0.47	0.47	0.846
Interested in financial matters	0.72	0.72	0.867	0.69	0.73	0.73	0.626

Table V

**Experimental Results: The Effect of Financial Literacy Education
and Incentives on Bank Account Opening**

This table reports the results from a randomized experiment measuring the effect of offering
financial literacy training and financial incentives on respondents' decision to open a bank account.
The dependent variable is an indicator for whether the respondent opened a bank account. A linear
probability model is used. Standard errors, clustered at the village level, are given in parentheses
beneath each point estimate. *** indicates statistical significance at the 1% level, ** at the 5% level,
and * at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
Financial literacy invitation	−0.020	−0.022			0.022	0.029
	(0.027)	(0.028)			(0.028)	(0.034)
Incentive = 75,000			0.054**	0.048*	0.065*	0.066*
			(0.024)	(0.026)	(0.036)	(0.037)
Incentive = 125,000			0.092***	0.088***	0.136***	0.137***
			(0.026)	(0.029)	(0.036)	(0.033)
(Incentive = 75,000) * Financial literacy invitation					−0.021	−0.036
					(0.047)	(0.052)
(Incentive = 125,000) * Financial literacy invitation					−0.090	−0.101
					(0.057)	(0.062)
Constant	0.097***	−0.444	0.035**	−0.447	0.024	−0.455
	(0.017)	(0.306)	(0.014)	(0.308)	(0.017)	(0.303)
Household controls		Yes		Yes		Yes
Observations	564	564	564	564	564	564
R^2	0.001	0.068	0.018	0.082	0.023	0.089

VI. Experimental Results

The main experimental results are presented in Table V. Because the assign-
ment of incentives and invitations to financial literacy training were randomly
determined, unbiased estimates of the causal impact of each can be obtained
by estimating the following equation:[16]

$$Open_i = \alpha + \beta * LitInvite_i + \varepsilon_i, \tag{1}$$

where $Open_i$ is a dummy variable indicating whether a household has opened a
bank account and $LitInvite_i$ is a dummy variable for whether the household was
invited to attend the training session. We focus initially on the reduced-form
relationship because it is difficult to compel people to attend a training session;
thus, the intention-to-treat estimate may be of greatest interest. Equation (1)
is therefore the reduced form.

The point estimate on $LitInvite_i$ in equation (1) is −0.02, with a standard
error of 0.027. Thus, the financial literacy program we offered appears to have
no effect on the likelihood that a client opens a bank account. Column 2 presents

---

[16] We chose a linear probability model because the coefficients are simple to interpret. We obtain
very similar results from a marginal effects probit model.

the same results, but includes a set of household controls available from our survey.[17]

Similarly, to determine the effect of incentives on opening an account, we estimate

$$Open_i = \alpha + \gamma_M * MidPay_i + \gamma_H * HiPay_i + \varepsilon_i, \tag{2}$$

where $MidPay_i$ indicates whether the household received an incentive of Rp. 75,000 and $HiPay_i$ indicates whether the household received an incentive of Rp. 125,000. The omitted category is the small incentive of Rp. 25,000. Standard errors in all specifications are clustered at the village level.

The point estimates on $MidPay_i$ and $HiPay_i$ in equation (2) are large and statistically significant. These estimates suggest that incentives have a large effect on households' decision to open a bank account. A household receiving the middle incentive is 5.4 percentage points more likely to open a bank account than a household receiving a low incentive. This represents a 150% increase over the group offered the low incentive, of whom only 3.5% open accounts. The effect of $HiPay$ is even greater: the point estimate of 9.2 percentage points represents a 260% increase in the probability of opening a bank account compared to the group receiving Rp. 25,000.

This effect is large. For example, we saw in Table V that a 1-standard-deviation increase in log household expenditures is associated with a 14.9-percentage-point increase in the likelihood of having a bank account. Moving from the low to the high incentive has an effect equivalent to increasing household expenditures by two-thirds of a standard deviation.

Finally, we explore the possibility of an interaction between financial literacy training and financial incentives with the following regression:

$$\begin{aligned} Open_i = {} & \alpha + \beta * LitInvite_i + \gamma_M * MidPay_i + \gamma_H * HiPay_i \\ & + \theta_M * (MidPay_i * LitInvite_i) + \theta_H * (HiPay_i * LitInvite_i) + \varepsilon_i. \end{aligned} \tag{3}$$

Columns 5 and 6 of Table V report results. We find no interaction effect: the interaction point estimates are relatively imprecisely estimated but statistically indistinguishable from zero. The main effect of incentives is unchanged.

Although our experiment results are quite strong when comparing low to high incentives, the overall take-up of bank accounts is fairly low—among all households who were offered an incentive, fewer than 10% open a bank account. Hence, other constraints, possibly social and behavioral barriers, may be present. Cole et al. (2010), for example, find that lack of trust in financial service providers acts as a barrier to take-up for insurance. However, trust may not be as important in this setting as the survey company was well known. The initial survey itself involved small payments to participants and the intervention was conducted in cooperation with the local government.

---

[17] The controls include household/respondent location, gender, age, marital status, religion, family size, schooling, consumption, employment status, financial literacy score, cognitive ability, and expressed interest in financial matters.

A. Heterogeneous Treatment Effects

While there is no effect on the general population, it is possible that financial literacy training is effective for particular subsets of the population. Because the experiment was conducted in conjunction with the survey, we did not stratify by education or levels of financial literacy when assigning treatment levels. However, there is strong reason to believe that the effects of financial education may vary based on individuals' characteristics. Limited financial literacy is likely a larger constraint for households with low levels of formal or financial education, as information acquisition may be costlier or more difficult for those who cannot read. Similarly, because the program was designed for individuals with low levels of financial literacy, it may have been most effective among this group. As can be seen in the Internet Appendix, both financial literacy and education levels are positive predictors of having a bank account. This implies that financial literacy training may have greater effects on individuals who are less educated and less financially literate.

To test the above prediction, in Table VI we split the sample and explore the possibility of heterogeneous treatment effects. In Columns 1 and 2, we interact $LitInvite_i$, $MidPay_i$, and $HiPay_i$ with a dummy variable indicating whether the respondent reports having no formal schooling:

$$
\begin{aligned}
Open_i = {} & \alpha + \delta * NoSchool_i + \beta * LitInvite_i + \theta * (NoSchool_i * LitInvite_i) \\
& + \gamma_M * MidPay_i + \gamma_H * HiPay_i + \kappa_M * (NoSchool_i * MidPay_i) \quad (4) \\
& + \kappa_H * (NoSchool_i * HiPay_i) + \varepsilon_i.
\end{aligned}
$$

We find, as before, that for literate households, the invitation has no effect: the point estimate of β is indistinguishable from zero at -0.032. However, for households that report having received no schooling, we find that the financial literacy training program has a substantial effect: the sum $\beta + \theta$ is equal to 12.3 percentage points (Column 1); an F-test for the joint significance of $\beta + \theta$ yields a p-value of 0.07. Approximately one-tenth of the sample is illiterate. The coefficients κ_M and κ_H are negative, with κ_M weakly statistically significant. The hypotheses $\gamma_M + \kappa_M = 0$ and $\gamma_H + \kappa_H = 0$ cannot be rejected at standard levels of significance, suggesting that for this subgroup, financial incentives are not important determinants of behavior.

As a second way of cutting the data, we test whether the effect varies with initial levels of financial literacy. Columns 3 and 4 estimate equation (4) with a main effect and interactions for whether an individual obtained a score below the median score in the baseline financial literacy test replacing the schooling terms. The point estimate of the effect of an invitation on those with above-average financial literacy is negative but statistically indistinguishable from zero at -4.9 percentage points. The estimate of the effect of the program on low financial literacy households $\beta + \theta$ is 5.1%. The hypothesis that this sum is zero can only be rejected at the 15% level of

Table VI

Experimental Results: Heterogeneous Effects of Financial Literacy Education and Incentives on Opening of Bank Accounts

This table reports the results from a randomized experiment measuring the effect of offering financial literacy training and financial incentives on respondents' decision to open a bank account. The dependent variable is an indicator for whether the respondent opened a bank account. Columns (1) and (2) include main effects and interaction terms for households with no formal schooling. Columns (3) and (4) include main effects and interaction terms for households who initially scored below the median level of financial literacy. A linear probability model is used. Standard errors, clustered at the village level, are given in parentheses beneath each point estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1)	(2)	(3)	(4)
Financial literacy invitation	−0.032	−0.031	−0.049	−0.048
	(0.029)	(0.030)	(0.034)	(0.036)
Incentive = 75,000	0.061**	0.057**	0.06	0.051
	(0.028)	(0.029)	(0.039)	(0.040)
Incentive = 125,000	0.099***	0.091***	0.1***	0.098***
	(0.027)	(0.030)	(0.030)	(0.034)
Unschooled	−0.055	−0.067		
	(0.050)	(0.068)		
Unschooled * Financial literacy invitation	0.155**	0.139*		
	(0.068)	(0.071)		
Unschooled * Incentive = 75,000	−0.135*	−0.131*		
	(0.071)	(0.072)		
Unschooled * Incentive = 125,000	−0.062	−0.036		
	(0.084)	(0.093)		
Below-median financial literacy			−0.076**	−0.056
			(0.037)	(0.050)
			(0.044)	(0.043)
Below-median financial literacy * Incentive = 75,000			−0.016	−0.008
			(0.060)	(0.058)
Below-median financial literacy * Incentive = 125,000			−0.024	−0.031
			(0.049)	(0.055)
Constant	0.05**	−0.377	0.067**	−0.377
	(0.020)	(0.325)	(0.027)	(0.331)
Household controls		Yes		Yes
Observations	564	564	564	564
R^2	0.029	0.09	0.03	0.089

significance. The incentives have an effect for both subgroups: the point estimate of the sum $\gamma_H + \kappa_H$ is 7.6 percentage points, significant at the 10% level.

These results suggest that an intervention delivered to the general population will not produce significant effects. However, a training program that targets individuals with low levels of education and financial literacy can increase demand for financial services.

B. Treatment on Treated

Approximately 69% of respondents invited to attend the program do in fact attend the training. An alternative method of estimating equation (1) is to use the invitation for the program as an instrument for the endogenous indicator of whether the individual attended.[18] Under reasonable assumptions, this provides the effect of treatment on the treated, also known as the local average treatment effect (Imbens and Angrist (1994)). These results are reported in Table VII.

Given that there is no reduced-form relationship between the training invitation and opening a bank account (Table V), it is not surprising that the instrumental variable estimate of the effect of training is also zero (Columns 1 and 2). The size of the standard error increases somewhat, but we can still comfortably rule out an effect size equivalent to the large incentive. Columns 3 and 4 examine heterogeneous treatment effects using *Invited* as an instrument for attending and *Invited∗Unschooled* as an instrument for *Attended∗Unschooled*. The treatment effect for unschooled is still positive, though no longer statistically significant. In Columns 5 and 6, we repeat this exercise for respondents below the median level of financial literacy. Here, we continue to find that the financial literacy intervention has a large effect on households with low initial financial literacy. Respondents with below-median financial literacy are 20% more likely to open a bank account within 2 months if they attended the financial literacy training session.

VII. Follow-Up Results

In January 2010, approximately 2 years after our intervention, we conducted a brief follow-up survey to investigate whether households still had their bank accounts open, and whether households had improved their savings habits. In this section, we study whether these behaviors were correlated with any of our treatments.

A. Follow-Up Sample Characteristics

Our primary purpose of conducting a follow-up survey was to verify whether households who opened bank accounts immediately following our initial intervention were still using them 2 years later, or whether they had simply allowed them to lapse after collecting the subsidy. While it would have been preferable to visit all households, budget constraints prevented this. As a compromise, we conducted brief interviews of all households in villages in which at least one household had opened a bank account in response to our initial study. Thus, from the baseline sample of 564 households in 40 villages, our follow-up

---

[18] There is no need to instrument the incentives offered as there was no endogenous take-up of the incentives.

Table VII

Instrumental Variable Estimates of Experiment and Heterogeneous Treatment Effects

This table reports instrumental variable estimates of the effect of offering financial literacy training and financial incentives on respondents' decision to open a bank account. The dependent variable is an indicator for whether the respondent opened a bank account. Financial literacy attendance is instrumented for with the assignment of a financial literacy invitation. Columns (1) and (2) include main effects. Columns (3) and (4) include main effects and interaction terms for households with no formal schooling. Columns (5) and (6) include main effects and interaction terms for households who initially scored below the median level of financial literacy. A linear probability model is used. Standard errors, clustered at the village level, are given in parentheses beneath each point estimate. *** indicates statistical significance at the 1 % level, ** at the 5% level, and * at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
Attended financial literacy program	−0.033	−0.036	−0.056	−0.059	−0.081	−0.078
	(0.049)	(0.051)	(0.050)	(0.053)	(0.056)	(0.057)
Incentive = 75,000	0.053**	0.047*	0.06**	0.051*	0.057	0.049
	(0.024)	(0.025)	(0.027)	(0.029)	(0.039)	(0.038)
Incentive = 125,000	0.092***	0.088***	0.099***	0.089***	0.103***	0.101***
	(0.026)	(0.027)	(0.026)	(0.029)	(0.030)	(0.034)
Unschooled			−0.159	−0.166		
			(0.154)	(0.153)		
Unschooled * Attended financial literacy program			0.544	0.489		
			(0.468)	(0.403)		
Unschooled * Incentive = 75,000			−0.168	−0.149		
			(0.113)	(0.103)		
Unschooled * Incentive = 125,000			−0.199	−0.149		
			(0.125)	(0.107)		
Below-median financial literacy					−0.115**	−0.084
					(0.058)	(0.060)
Below-median financial literacy * Attended financial literacy program					0.206**	0.172*
					(0.104)	(0.094)
Below-median financial literacy * Incentive = 75,000					−0.013	−0.006
					(0.059)	(0.056)
Below-median financial literacy * Incentive = 125,000					−0.027	−0.032
					(0.053)	(0.056)
Constant	0.05**	−0.404	0.058**	−0.426	0.077**	−0.391
	(0.024)	(0.312)	(0.026)	(0.331)	(0.032)	(0.317)
Household controls		Yes		Yes		Yes
Observations	564	564	564	564	564	564

sample comprises 394 households from 27 of the 40 villages.[19] Because the initial treatments were randomly assigned within the village, we are assured (and we confirm) that we achieve a balanced sample in the follow-up: treatment status is not correlated with observable socio-economic or demographic characteristics.[20]

In the 27 follow-up villages, we were able to re-interview 349 out of the 394 households. The attrition is not correlated with any of the treatments or with whether a bank account was opened previously. In addition, no attrition was due to household refusal to answer. Rather, 85% of the attrition occurred because the household had moved permanently, while the remainder was due to death or debilitating illness. It is unlikely that our intervention affected mortality rates.

B. Long-Run Effects

Regression results from the follow-up survey are reported in Tables VIII through X. Table VIII investigates whether those households that reported opening a bank account following our intervention still have their accounts open 2 years later. The results show that households that received the highest incentive are significantly more likely to still have their accounts open compared to those that received the lowest incentive. These results are statistically indistinguishable from the short-run results. Further, survey questions reveal that of the households that still have their accounts open, 62% have used their account in the last year to deposit, withdraw, send, or receive money.

A necessary feature of our study is that the subsidy payment offered for opening a bank account following the study be time-limited. In a separate set of regressions, we use as a dependent variable whether the household opened a bank account at any point in time during the 2 years between the initial treatment and the follow-up survey. The point estimates on financial literacy invitation range from 1 percentage point to 7.6 percentage points, but are not statistically significant (results available in the Internet Appendix).

Table IX next measures whether the heterogeneous effects of bank account opening are present in the long run. We find that the impact of financial literacy training invitation remains significant for households below the median level of initial financial literacy.[21] The results based on schooling status are no longer significant, though the point estimates are for the most part similar to the short-run estimates. In this regression, the coefficient on *Unschooled∗HighPay* is negative and statistically significant even with household controls,[22] suggesting that uneducated households simply take

---

[19] Much of the cost of surveying is the fixed travel and accommodation of visiting a village, and thus it made sense to interview all study households in villages that were visited.

[20] In an estimation model of bank accounts with village fixed effects, the 13 omitted villages would not contribute to the identification of any parameters of interest.

[21] The *F*-test of the sum of *LitInvite* and *Below Median Financial Literacy * LitInvite* is significant at the 10% level for the specification without household controls.

[22] The *F*-test of the sum of *HighPay* and *Unschooled * HighPay* is not statistically significant.

Table VIII
Follow-Up Results: The Long-Run Persistence of Financial Literacy Education and Incentives on Bank Account Opening

This table reports results from a follow-up survey 2 years after the financial literacy education and incentives intervention, conducted among participants in villages where a household opened a bank account immediately after the intervention. The dependent variable is an indicator for whether a respondent opened a bank account immediately after the intervention and still has the bank account 2 years later. The sample includes all households that were successfully interviewed in the follow-up survey. A linear probability model is used. Standard errors, clustered at the village level, are given in parentheses beneath each point estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
Financial literacy invitation	−0.041	−0.044			0.011	0.019
	(0.028)	(0.029)			(0.032)	(0.041)
Incentive = 75,000			0.043	0.058*	0.063	0.09*
			(0.031)	(0.034)	(0.048)	(0.048)
Incentive = 125,000			0.092***	0.088**	0.127***	0.123***
			(0.032)	(0.035)	(0.046)	(0.047)
(Incentive = 75,000) * Financial literacy invitation					−0.041	−0.068
					(0.069)	(0.074)
(Incentive = 125,000) * Financial literacy invitation					−0.083	−0.086
					(0.061)	(0.068)
Constant	0.094***	−0.831**	0.028*	−0.872***	0.021	−0.866***
	(0.019)	(0.319)	(0.015)	(0.300)	(0.021)	(0.300)
Household controls		Yes		Yes		Yes
Observations	349	349	349	349	349	349
R^2	0.006	0.1	0.02	0.111	0.028	0.119

advantage of the financial incentive and subsequently close their bank accounts. This result has important implications for the desirability of subsidies as a tool to expand financial access: financial incentives alone may not be sufficient to draw uneducated households into the financial system as these households may simply claim the incentives without actually using the financial services.

C. Effect on Savings Decision

An advantage of examining banking status is that it is easy to measure. However, financial education often promotes asset accumulation as well. In fact, one of the key messages in our financial literacy seminars is the importance of savings for future expected and unexpected needs.

Our follow-up analysis examines household savings behavior. We elicit this information by asking the question "Do you currently have any savings?" We also ask households to report the level of savings. The latter variable, however,

Table IX

Long-Run Persistence: Heterogeneous Effects of Incentives and Financial Literacy Education on Bank Account Opening

This table reports results from a follow-up survey 2 years after the financial literacy education and incentives intervention, conducted among participants in villages where a household opened a bank account immediately after the intervention. The dependent variable is an indicator for whether a respondent opened a bank account immediately after the intervention and still has the bank account 2 years later. Columns (1) and (2) include main effects and interaction terms for households with no formal schooling. Columns (3) and (4) include main effects and interaction terms for households who initially scored below the median level of financial literacy. The sample includes all households that were successfully interviewed in the follow-up survey. A linear probability model is used. Standard errors, clustered at the village level, are given in parentheses beneath each point estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1)	(2)	(3)	(4)
Financial literacy invitation	−0.042	−0.038	−0.076*	−0.071*
	(0.03)	(0.03)	(0.04)	(0.04)
Incentive = 75,000	0.05	0.065*	0.055	0.058
	(0.04)	(0.04)	(0.05)	(0.05)
Incentive = 125,000	0.103***	0.096***	0.082**	0.073*
	(0.03)	(0.04)	(0.04)	(0.04)
Unschooled	−0.006	0.003		
	(0.05)	(0.06)		
Unschooled * Financial literacy invitation	0.1	0.058		
	(0.07)	(0.07)		
Unschooled * Incentive = 75,000	−0.125	−0.101		
	(0.08)	(0.09)		
Unschooled * Incentive = 125,000	−0.158**	−0.122*		
	(0.06)	(0.07)		
Below-median financial literacy			−0.081*	−0.106*
			(0.04)	(0.06)
Below-median financial literacy * Financial literacy invitation			0.14**	0.114*
			(0.06)	(0.06)
Below-median financial literacy * Incentive = 75,000			−0.056	−0.018
			(0.06)	(0.06)
Below-median financial literacy * Incentive = 125,000			−0.003	0.009
			(0.06)	(0.07)
Constant	0.045*	−0.793**	0.072**	−0.733**
	(0.02)	(0.31)	(0.03)	(0.32)
Household controls		Yes		Yes
Observations	349	349	349	349
R^2	0.037	0.119	0.044	0.126

is reported with significantly more noise (and refusals to answer) than the simple question of whether the household has any savings.

Regression results in Table X show that, while there is no direct effect of the financial literacy invitation, there is also no direct effect of the subsidies,

Table X

Long-Run Effects of Financial Literacy Education and Incentives on Savings

This table reports results from a follow-up survey 2 years after the financial literacy education and incentives intervention, conducted among participants in villages where a household opened a bank account immediately after the intervention. The dependent variable is an indicator for whether the household currently has any savings. The sample includes all households that were successfully interviewed in the follow-up survey. A linear probability model is used. Standard errors, clustered at the village level, are given in parentheses beneath each point estimate. *** indicates statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)
Financial literacy invitation	0.008	0.041			−0.104	−0.037
	(0.040)	(0.044)			(0.064)	(0.061)
Incentive = 75,000			0.031	−0.011	−0.023	−0.016
			(0.060)	(0.059)	(0.068)	(0.069)
Incentive = 125,000			0.007	−0.03	−0.105	−0.116
			(0.057)	(0.061)	(0.083)	(0.078)
(Incentive = 75,000) * Financial literacy invitation					0.092	0.013
					(0.094)	(0.100)
(Incentive = 125,000) * Financial literacy invitation					0.231**	0.205**
					(0.116)	(0.105)
Constant	0.311***	−0.888	0.303***	−0.851	0.362***	−0.92
	(0.047)	(0.590)	(0.053)	(0.586)	(0.070)	(0.612)
Household controls		Yes		Yes		Yes
Observations	349	349	349	349	349	349
R^2	0.000	0.177	0.001	0.176	0.011	0.188

suggesting that (relatively small) "high subsidies" were dissaved by households over the 2 years between the experiment and the follow-up survey. However, the interaction between the high incentive and the financial literacy invitation is large and statistically significant. Compared to households that received the low incentive and no financial literacy invitation, households receiving both a high incentive and a financial literacy invitation are more than 20 percentage points more likely to report having savings. However, summing the relevant coefficients (on invitation, high incentive, and the interaction) yields a reported fraction of household saving of 38.5%, only 2.2 percentage points higher than the mean for the households who received no invitation and the low incentive (36.2%). An *F*-test of this sum cannot reject the hypothesis that it is zero.[23] While this result shows some promise for our financial literacy program, we do not have sufficient statistical power to detect an overall net effect on savings. In particular, the sum of all relevant coefficients, although positive, is not statistically significant.

Of the households that reported savings, 61% reported that they were saving for emergencies, 34% for school fees, and 12% for business investment.

---

[23] The *F*-test of joint significance has a *p*-value of 0.79.

VIII. Conclusion

Using new surveys from two of the most populous countries in the world, this paper presents compelling evidence that financial literacy is an important predictor of financial behavior in emerging market countries. These correlations, well documented in developed countries, have spurred governments, nonprofits, and firms to promote financial literacy as a means of expanding the depth and breadth of the financial system.

The benefits of better financial literacy may be great. On a personal level, individuals may save more, and better manage risk, by purchasing insurance contracts. There may even be general equilibrium effects: increased demand by households for financial services may improve risk-sharing, reduce economic volatility, improve intermediation, and speed overall financial development. In turn, this could facilitate competition in the financial services sector and, ultimately, more efficient allocation of capital within society.

Despite the potential benefits of financial literacy, to date there is no credible evidence on the effects of financial literacy programs. This paper reports the first randomized evaluation of a carefully designed and delivered financial literacy training program. We find that the education program has modest effects, stimulating demand for bank accounts among uneducated and less financially literate households. A second intervention providing small subsidies for opening an account demonstrates that, given proper incentives, many individuals would open accounts even without financial literacy training. A follow-up study conducted 2 years after the initial intervention shows that those who were originally offered the high incentives are significantly more likely to have used bank accounts in the past year to deposit, withdraw, send, or receive funds.

Where does this study leave us? On the one hand, the survey data from Indonesia and India demonstrate that financial literacy is an important correlate of household financial behavior and well-being. Indeed, it is one of the strongest and most consistent predictors of demand for financial services. These results provide evidence that financial literacy is important and that educated consumers make better financial decisions. In addition, we find that demand for financial education is quite high: 69% of those invited choose to attend the course.

On the other hand, our experimental results show that this financial education program is not an effective tool for promoting the use of bank accounts. It is useful to think about a simple cost-benefit analysis. Even if targeted to those for whom the intervention is most effective, the program is not cost effective. The literacy training costs approximately U.S. $17 per head to deliver. Among those with low levels of initial financial literacy (i.e., below-median score on baseline financial literacy assessment), the training program increased the share of households opening a bank savings account by approximately five percentage points. Thus, inducing the opening of one bank account cost $17/0.05 = $340. In contrast, for this same subsample, increasing the subsidy from $3 to $14 led to a 7.6% increase in the probability of opening a bank savings account, suggesting a cost per bank savings account opened of

$11/0.076 = $145. Thus, subsidies are almost 2.5 times more cost effective than financial literacy education.

Of course, financial literacy may have additional value if it promotes asset accumulation; a buffer stock of savings may be far more important than simply having a bank account. Nevertheless, our evidence does not support the view that low financial literacy is a severe impediment to demand for formal financial services. Our study clearly demonstrates that prices matter both for opening of bank accounts and for savings, and that individuals who open bank accounts in response to incentives tend to keep them open for the long term. This finding is consistent with the common practice in U.S. banks whereby banks offer cash incentives or other gifts to those opening a new account.

The financial literacy program we evaluated was based on global best practices, using experienced, highly educated facilitators, and likely represents a higher quality intervention than could be delivered on a mass scale. Nevertheless, we acknowledge that it was a short program, and that many respondents reported in the baseline that they did not previously open a bank account because they had insufficient funds. The point estimate on the impact of financial literacy on savings decisions is positive though statistically insignificant. We, of course, cannot rule out the possibility that a more comprehensive and better targeted education program could have positive, measurable impacts on individuals' lives.

Ultimately, however, our results suggest that financial deepening may be more easily achieved through measures designed to reduce the price of financial services, for example, by promoting competition or low-cost technological solutions such as mobile banking, rather than through large-scale financial literacy education. A carefully designed and targeted financial literacy program that is more cost effective than a large-scale effort may serve as a valuable complement to such financial reform.

REFERENCES

Ashraf, Nava, Dean Karlan, and Wesley Yin, 2006a, Tying Odysseus to the mast: Evidence from a commitment savings product in the Philippines, *Quarterly Journal of Economics* 121, 635–672.

Ashraf, Nava, Dean Karlan, and Wesley Yin, 2006b, Deposit collectors, *Advances in Economic Analysis & Policy* 6, 1–22.

Beck, Thorsten, Asli Demirguc-Kunt, and Patrick Honohan, 2008, *Finance for All? Policies and Pitfalls in Expanding Access* (World Bank, Washington, DC).

Beck, Thorsten, Asli Demirguc-Kunt, and Maria Soledad Martinez Peria, 2007, Reaching out: Access to and use of banking services across countries, *Journal of Financial Economics* 85, 234–266.

Bertrand, Marianne, and Adair Morse, 2010, Information disclosure, cognitive biases and payday borrowing, Working paper, University of Chicago Booth School of Business.

Besley, Timothy, Stephen Coate, and Glenn Loury, 1993, The economics of rotating savings and credit associations, *American Economic Review* 83, 792–810.

Binswanger, Hans P., 1980, Attitudes toward risk: Experimental measurement in rural India, *American Journal of Agricultural Economics* 62, 395–407.

Binswanger, Hans, Dayanatha Jha, T. Balaramaiah, and Donald Sillers, 1980, The impacts of risk aversion on agricultural decisions in semi-arid India, Working paper, ICRISAT.

Buehn, Andreas, and Friedrich Schneider, 2009, Shadow economies and corruption all over the world: Revised estimates for 120 countries, *Economics: The Open-Access, Open-Assessment E-Journal* 1, 1–53.

Chabris, Christopher F., David Laibson, Carrie L. Morris, Jonathon P. Schuldt, and Dmitry Taubinsky, 2008, Individual laboratory-measured discount rates predict field behavior, *Journal of Risk and Uncertainty* 37, 237–269.

Christelis, Dimitris, Tullio Jappelli, and Mario Padula, 2006, Cognitive abilities and portfolio choice, Discussion paper no. 5735, CEPR.

Cole, Shawn, Xavier Giné, Jeremy Tobacman, Petia Topalova, Robert Townsend, and James Vickery, 2010, Barriers to household risk management: Evidence from India, Working paper, Harvard Business School.

Cole, Shawn, and Kartini Shastry, 2009, Smart money: The effect of education, cognitive ability, and financial literacy on financial market participation, Working paper no. 09-071, Harvard Business School.

de Mel, Suresh, David McKenzie, and Christopher Woodruff, 2008, Returns to capital in microenterprises: Evidence from a field experiment, *Quarterly Journal of Economics* 123, 1329–1372.

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde, 2010, Are risk aversion and impatience related to cognitive ability? *American Economic Review* 100, 1238–1260.

Duflo, Esther, and Emmanuel Saez, 2003, The role of information and social interactions in retirement plan decisions: Evidence from a randomized experiment, *Quarterly Journal of Economics* 118, 815–842.

Dupas, Pascaline, and Jonathan Robinson, 2009, Savings constraints and microenterprise development: Evidence from a field experiment in Kenya, NBER Working paper no. 14693, University of California.

FINRA Investor Education Foundation, 2009, *Financial Capability in the United States*, http://www.finrafoundation.org/resources/research/p120478, accessed April 1, 2010.

Gerardi, Kristopher, Lorenz Goette, and Stephan Meier, 2010, Financial literacy and subprime mortgage delinquency: Evidence from a survey matched to administrative data, Working paper no. 2010-10, Federal Reserve Bank of Atlanta.

Hogarth, Jeanne M., and Kevin H. O'Donnell, 1999, Banking relationships of lower-income families and the governmental trend toward electronic payment, *Federal Reserve Bulletin* 86, 459–473.

Imbens, Guido W., and Joshua D. Angirst, 1994, Identification and estimation of local average treatment effects, *Econometrica* 62, 467–475.

Karlan, Dean, and Martin Valdivia, 2011, Teaching entrepreneurship: Impact of business training on Microfinance clients and institutions, *The Review of Economics and Statistics*, 93, 510–527.

Kendall, Jake, Nataliya Mylenko, and Alejandro Ponce, 2010, Measuring financial access around the world, Policy research working paper no. 5253, World Bank.

La, Porta Rafael, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert Vishny, 1998, Law and finance, *Journal of Political Economy* 106, 1113–1155.

Lang, Frieder R., Dorothee Hahne, Stefanie Gymbel, Stefan Schroepper, and Katharina Lutsch, 2005, Erfassung des kognitiven leisungspotenzials und der "Big Five" mit computer-assisted-personal-interviewing (CAPI): Zur reliabilitaet und validitaet zweier ultrakurzer tests und des BFI-S, DIW Research Note, German Institute for Economic Research.

Levine, Ross, 2005, Finance and growth: Theory and evidence, in Philippe Aghion and Steven Durlauf, eds. *Handbook of Economic Growth* (Elsevier Science, The Netherlands).

Lusardi, Annamaria, 2008, Financial literacy: An essential tool for informed consumer choice? Working paper, Dartmouth College.

Lusardi, Annamaria, and Olivia S. Mitchell, 2006, Financial literacy and planning: Implications for retirement well-being, Working paper no. 1, Pension Research Council.

Lusardi, Annamaria, and Olivia S. Mitchell, 2007a, Financial literacy and retirement preparedness: Evidence and implications for financial education, *Business Economics* 42, 35–44.

Lusardi, Annamaria, and Olivia S. Mitchell, 2007b, Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth, *Journal of Monetary Economics* 54, 205–224.

Lusardi, Annamaria, and Peter Tufano, 2008, Debt literacy, financial experience and over-indebtedness, Working paper, Dartmouth College and Harvard Business School.

Lyons, Angela, and Urvi Neelakantan, 2008, Potential and pitfalls of applying theory to the practice of financial education, *Journal of Consumer Affairs* 42, 106–112.

Rabin, Matthew, and Richard Thaler, 2001, Anomalies: Risk aversion, *Journal of Economic Perspectives* 15, 219–232.

Rampini, Adriano, and S. Viswanathan, 2010, Collateral, risk management, and the distribution of debt capacity, *Journal of Finance* 65, 2293–2322.

Stango, Victor, and Jonathan Zinman, 2009, Exponential growth bias and household finance, *Journal of Finance* 64, 2807–2849.

Townsend, Robert, 1994, Risk and insurance in village India, *Econometrica* 62, 539–591.

UNESCO, 2007, *Global Education Digest*, http://www.uis.unesco.org, accessed May 1, 2009.

van Rooij, Maarten, Annamaria Lusardi, and Rob Alessie, 2007, Financial literacy and stock market participation, NBER Working paper no. 13565, Dartmouth College.

Washington, Ebonya Lia, 2006, The impact of banking and fringe banking regulation on the number of unbanked Americans, *Journal of Human Resources* 41, 106–137.