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Assessing the demand for micropensions among India's poor

Olivia S. Mitchell^a, Anita Mukherjee^{b,*}^a The Wharton School of the University of Pennsylvania, 3620 Locust Walk, 3000 Steinberg Hall-Dietrich Hall, Philadelphia, PA 19104, United States^b Wisconsin School of Business, University of Wisconsin-Madison, 5273 Grainger Hall, 975 University Avenue, Madison, WI 53706, United States

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ABSTRACT

Using new data from a field experiment in India, we test hypotheses about micropension design in a poor population. We elicit demand for the basic micropension in addition to variants with different minimum withdrawal ages, government match rates, and options for lump sum withdrawal. A majority (80%) of respondents report interest in the micropension, and the amount they are willing to contribute would be enough to cover about 40% of expected old-age consumption. We find that prospective policyholders value the inability to access the assets until a particular age. We also find that they respond positively to the government match rate.

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Introduction

Millions of unorganized and informal sector workers in the developing world are excluded from formal pension and social security systems (Rutherford, 2009; Bloom et al., 2010). Old-age economic security is a considerable problem for such populations, and providing adequate and secure income flows in the future is a formidable challenge (Bloom and Eggleston, 2014). The problem is aggravated by significant increases in life expectancy and changing social structures including the breakdown of the traditional extended family system, making today's workers vulnerable to unmitigated longevity risks, uncertain health costs, and poverty post-retirement. Further, with underdeveloped annuity markets and poor financial literacy, workers face considerable challenges in retirement planning and decision-making. These problems imply that more needs to be done to build the private old age savings. One such mechanism might be micropensions, which are defined contribution pension systems, most involving fixed voluntary contributions over a long period of time. The assets are then professionally invested and, at some predetermined age (typically 60), the funds are disbursed to the policyholder either as a lump sum or phased withdrawals.

India provides an ideal setting to study the market for micropensions because the country's new pension system is designed to reach informal sector workers. Asher (2009) noted that the need for micropensions for informal sector workers comprising more than 90 percent of the Indian economy is particularly

important in view of rising life expectancy and massive changes in migration and family characteristics. Understanding how such long-term saving products might help solve the problem of old-age income security for informal sector workers is hampered by the lack of insight into the behavioral, economic, and institutional barriers to participation.

India's economy has grown rapidly over the last two decades, but the country still faces immense challenges with regard to poverty alleviation. According to the Government of India's Planning Commission (2014), nearly 30 percent of the country's 1.2 billion population lives below the poverty line. At the same time, according to the Population Research Bureau (Scommegna, 2012) the share of India's below-poverty-line population age 60 or older is expected to increase from 8 percent in 2010 to 19 percent in 2050. Many of these older persons work in the unorganized sector, and as such, lack the identification and proof of employment documents required for accessing basic financial services. Nevertheless, current research estimates that about 80 million of these workers are capable of saving for retirement and the untapped savings are in the order of US \$2 billion (Shankar and Asher, 2011).

The present paper studies a micropension product recently offered by the National Pension System in India and provides new evidence regarding the features of micropensions that individuals value. The product's explicit goal was to provide a way for informal sector workers to save safely and routinely for old age (Sane and Thomas, 2015). The government had incentivized participation in the micropension product by offering a matching contribution scheme called Swavalamban, where it matched the first Rs. 1000 (about US \$20) of annual contribution by 100 percent.

* Corresponding author.

E-mail addresses: mitchelo@wharton.upenn.edu (O.S. Mitchell), anita.mukherjee@wisc.edu (A. Mukherjee).

The government collected contributions from participating individuals through licensed institutions that operated at the community level, and the overall operation was regulated by the Pension Fund Regulatory and Development Authority. The product allowed individuals to save their money with the government, which in exchange promised to return at least the principal payments; the money was invested in the capital market (60 percent in bonds, 40 percent in stocks) in an effort to protect policyholders from inflation risk. Policyholders could contribute to the product until age 60 and could withdraw up to 20 percent if needed for an emergency prior to that age. On the policyholder's death, any remaining funds were offered to the next of kin.¹

We show that the surveyed individuals express significant interest in the micropension product: about 80 percent express a desire to contribute an average of Rs. 1500 (US \$30) annually. Back-of-the-envelope calculations from the survey responses suggest that this savings path would provide an old age monthly consumption replacement rate of about 40% for the policyholder. We also find that our survey respondents exhibit a demand for commitment: adoption and annual willingness to contribute (WTC) both decrease when the product has early eligibility and withdrawal features. Conversely, adoption and WTC also decrease for late eligibility and the lack of early withdrawal, suggesting that there is a sensitive balance between these features. Our survey respondents reacted positively to government matching on the intensive margin: increasing the match rate from 100 to 150 percent does not affect adoption, but annual contributions would grow by over 10 percent. We find no heterogeneity by gender, suggesting that the demand for commitment is likely not driven by frictions in intra-household bargaining (Asher and Shankar, 2007).

This paper is related to a large literature on saving by the poor in developing countries. A recent review appears in Karlan et al. (2014), and an older review that emphasizes the theoretical background is provided in Deaton (1989). McConnell (2013) has a useful overview of the relevance of insights from behavioral economics as they apply to decisions related to aging. Examples of related empirical work in the literature include Ashraf et al. (2006), which explains the impact of commitment devices; Karlan et al. (2016), which examines mental accounting; and Dupas and Robinson (2013), which studies the impact of access to saving technologies. Specific to the Indian context, recent work has also examined the marketplace for defined contribution retirement schemes targeting informal sector workers (Nelson, 2012; Shankar and Asher, 2011).

Experimental design

Our experiment tested interest in the basic micropension product along with six variants of this product using a sample of below-poverty-line respondents in India. Our project design is akin to that employed in Brown et al. (2013) who tested the effect of different social security frames on hypothetical choices about claiming ages in the US context. The 770 individuals in the present study were split about equally into two groups to test responses to an array of product variants without taxing or confusing the respondents. All respondents were first asked about the basic micropension product as it was then offered in India. Immediately afterward, they were asked about adoption and willingness to contribute decisions for three additional product variants. The order in which these additional variants were presented was randomized to

avoid confounding order and product variant effects. Individuals were also informed that agents would be the primary means by which micropension deposits would be made, and by which distributions would be received.

A summary of the variants of the product covered in the experiment including the related survey questions is provided in Table 1. Group 1 was asked about variants 1B, 1C and 1D, and Group 2 was asked about variants 2B, 2C and 2D. The first variant (A) is the basic micropension product that was then on offer by the Indian government. The other variants included early withdrawal (1B), where the eligibility age was 55 instead of 60; a lower matching rate of 50 percent instead of 100 percent (1C); no early withdrawal (1D); delayed withdrawal, where the eligibility age was 65 instead of 60 (2B); a higher matching rate of 150 percent instead of 100 percent (2C); and option for full withdrawal at age 60 (2D). Since the baseline micropension product and its variants are complex financial products, they could be difficult for individuals to understand. Accordingly, the marketers were instructed to follow a tested script that clearly explained the products. On average, marketers spent about 10 minutes explaining the baseline product. The marketers also offered to re-explain this baseline product before each variant was presented.

The experiment was conducted in conjunction with a detailed survey that may have primed respondents to consider their financial needs (Zwane et al., 2011). To mitigate this potential problem, respondents randomly received the survey either before or after the module measuring micropension demand. The survey contained a module (detailed in Adhikari et al., 2016, and requested by India's Ministry of Finance) eliciting the respondent's level of interest in a hypothetical social security scheme combining the micropension, life insurance, and health insurance products.

Hypotheses and methods

Our empirical strategy leverages the randomized experiment and focuses on two responses regarding the micropension product: "adoption", i.e., whether the respondent was interested in participating in the product, and "WTC", i.e., the amount of annual contribution that the respondent expected to make to the product.² We group all respondents together in the analysis because all expressed preferences over the baseline product, which formed the reference category in every regression. This allows us to interpret the coefficients related to the different product variants as changes relative to the baseline product (as in Brown et al. (2013), which presented different social security frames to each respondent.)

The main models take the following form, which we estimate using ordinary least squares (OLS):

$$Y_i = \alpha_i + \sum_j \beta_j \text{Variant}_j + \delta X_i + \omega \lambda_i + \epsilon_i, \quad (1)$$

where Y_i is either adoption or WTC, j represents the six product variants offering different features of the micropension features (Variant_j is an indicator variable), X is a vector of covariates, and λ is vector of experimental controls. Specifically, X includes the respondent's age, gender, occupation, number of children, amount of land owned, consumption, and several measures of human capital including education, numeracy and financial literacy. The λ vector consists of a control for whether the respondent received the survey before the micropension product presentations, along with controls for the order in which the product variants were presented. The baseline product, Variant A, is the reference category in every

¹ As of June 1, 2015, this Swavalamban scheme was replaced with Atal Pension Yojana (APY). The APY scheme, which combines both the defined contribution and defined benefit features of a pension, remains part of the National Pension System, and hence is regulated by the Pension Fund Regulatory and Development Authority.

² Both annual and monthly contribution amounts were elicited by the survey. We report the annual figures as they are likely to be more informative of retirement saving because individuals have intermittent income and are better able to estimate their incomes over a longer time horizon (Sherraden et al., 2003).

Table 1
Micropension product and experimental variants.

Variant	Survey question
A: baseline	"We would like to speak to you now about a new pension scheme that allows you to put aside money for your old age. The money you put aside until age 60 will be available for you at age 60. In other words, you pay an amount into the scheme every month or every year, the government invests your money in a safe way, and then pays all of the money plus its return to you at age 60. Once you reach the age of 60, you begin receiving a monthly payment from the scheme. The amount that you pay in every year, for the first five years, will be matched by the government if you contribute at least Rs. 1000 over the course of the year. If you choose to withdraw before age 60, you can withdraw 20 percent of the total amount that you have put side in a one-time payment with 80 percent staying in an account that will pay out at a certain amount each month after age 60. After you turn 60, you can take out up to 60 percent as a one-time payment with 40 percent staying in an account that will pay a certain amount after age 60. If you contribute to the scheme for over 20 years, you can take the money out under the same withdrawal conditions I just described, but at age 50. If you pass away, then 100 percent of the wealth can be taken out by somebody in your family, or this person can continue receiving the pension subject to certain rules."
1B: early eligibility (age 55)	"Now imagine that you can withdraw your money at age 55 instead of age 60. In other words, the original scheme allows you to access the money you've put aside at age 60- now imagine that you could access the money you've put aside at age 55."
1C: lower match (50 percent)	"Now imagine that the government matches one-half of your deposits if you contribute 1000. Hence, if you put in Rs. 1000, the government will put in Rs. 500 and you will have a total of Rs. 1500. Now remember we are talking about the original scheme where you can access the money you've put aside until age 60 at age 60."
1D: no withdrawal before age 60	"Now imagine that the product does not allow for any early withdrawal. In other words, the amount you put into the pension will only be available at age 60. If you pass away before you receive the pension, any family member you designate can still receive 100 percent of the pension."
2B: late eligibility (age 65)	"Now imagine that you cannot withdraw your money until age 65 instead of age 60. At age 65 you can access the money you have put aside until the age of 65."
2C: higher match (150 percent)	"Remember in the original product, you can withdraw at age 60 the money you have put aside since then. The withdrawal age is 60. Now imagine that the government decides to match one and a half times the amount you deposit each year for your pension if you contribute at least Rs. 1000. If you deposit Rs. 1000, the government will deposit 1000 + 1500 = Rs. 2500 for a total of Rs. 2500."
2D: full withdrawal at age 60	"Remember in the original product, the government contributes Rs. 1000 if you contribute Rs. 1000 per year. Now imagine that the product allows for withdrawal of the full amount of your deposits at or after age 60. Note that originally this was 60 percent. You can still only withdraw up to 20 percent of your deposits before age 60."

regression. Also, since each respondent provided four total responses, one about the baseline product and three variants, we cluster the standard errors at the respondent level in all regressions.

Based on our experimental framework, several hypotheses emerge regarding the sign of β_j in the regressions. These hypotheses are based on the observation that four of the variants (1B, 2B, 1D, and 2D) deal with commitment features of the product, namely the inability to access assets until a particular age and a feature that discourages early withdrawal. We expect the coefficient on the early eligibility variant, β_{1B} , to be greater than or equal to zero, unless the respondents valued the commitment feature of retirement saving. Analogously, the coefficient on late eligibility, β_{2B} , should be less than or equal to zero unless there is a value for commitment. The coefficient on the lower match rate of 50 percent, β_{1C} , should be less than or equal to zero, while β_{2C} , the coefficient on the higher match rate, should be greater than or equal to zero. Variants 1D and 2D both deal with the possibility of cash withdrawals prior to age 60. When this was not allowed, we expect β_{1D} to be less than or equal to zero because respondents could always do better by choosing not to withdraw funds early unless there were commitment frictions. We expect β_{2D} to be greater than or equal to zero, unless again, there was a demand for commitment such that respondents preferred to not have the choice of early withdrawal.

One caveat in interpreting results on the commitment-related variants is the possibility that this could be confounded with conflicts in intra-household bargaining (Ashraf, 2009; Schaner, 2015; Anderson and Baland, 2002). For example, if a female respondent exhibited a lower demand for a product when the money was payable at age 55 instead of 60, her preference may be based on the fear that her husband (or other family member) would use the money for purposes inconsistent with her preferences. This is especially a concern in countries like India, where women live much longer than men and therefore value saving for widowhood (Liebig and Rajan, 2003). Distinguishing between the demand for commitment and conflict in intra-household bargaining is outside the scope of our survey, but one way to test whether this was a

confound is to interact the various frames with whether the respondent was female. The intuition is that women may have been more likely to fear issues of intra-household bargaining than men, a plausible condition for poor women living in rural India.

In this case, our estimating equations follow the same structure of Eq. (1):

$$Y_i = \alpha_i + \sum_j \beta_j \text{Variant}_j + \sum_j \gamma_j \text{Variant}_j \cdot \text{Female}_i + \delta X_i + \omega \lambda_i + \epsilon_i, \quad (2)$$

where the covariate vector X is the same as in Eq. (1) and includes an indicator for whether the respondent is female. If the "commitment" demand was completely explained by intra-household bargaining concerns for the different micropension variants, then β_j will be zero and γ_j will be in the direction of commitment for the commitment-related variants. Specifically, γ_{1B} and γ_{2D} would be greater than or equal to zero, γ_{1D} and γ_{2B} should be less than or equal to zero. Our presumption for this test is that if commitment was a factor, both men and women would demand it equally. Conversely, if only women demanded it, then it would reveal more about intra-household bargaining than an actual demand for commitment.

Robustness

Before turning to results, we also note that we compare results from linear regression models as well as nonlinear models, since the latter may provide better fits of the adoption and WTC data. Specifically, we use a Probit model for the adoption outcome, given the binary nature of the dependent variable:

$$\text{Adoption}_i = \Phi \left(\sum_j \beta_j \text{Variant}_j + \delta X_i + \omega \lambda_i \right). \quad (3)$$

We expect the marginal effects of the Probit regression estimates to be similar to the linear probability model estimates from Eq. (1), because the mean of the dependent variable across all

product variants is 0.60, which is within the region of probabilities where the linear probability model typically produces consistent and unbiased estimates. Because respondent WTC is a latent variable, it is positive only if the respondent is interested in adoption. Thus, there is a large mass at zero since 20 percent of the respondents indicated they were not interested in adoption. To address this censoring at zero of the WTC measure, we also estimate a Tobit regression model:

$$WTC_i^* = \sum_j \beta_j \text{Variant}_j + \delta X_i + \omega \lambda_i + \epsilon_i, \quad (4)$$

where the dependent variable is a latent index and $\epsilon_i \sim N(0, \sigma^2)$.³ A Tobit model is frequently used in the analysis of censored measures such as those for willingness to contribute or pay (e.g., Showers and Shotick, 1994).

Finally we estimate fixed effect regressions to control for unobservable respondent characteristics in the decisions for adoption and WTC. The estimating equation is the same as in Eq. (1), except we estimate a fixed effect n_i instead of including X_i and λ_i for each respondent. A fixed effect specification is appealing because the survey elicits imperfect measures of income, assets, and wealth, which are fixed for the respondent but difficult to observe. We report these as robustness checks but not as main results because the fixed effect regressions do not allow us to estimate the effect of several covariates of key interest to micropension design.

Data and summary statistics

Our experiment was conducted in two of the 71 districts in Uttar Pradesh: Fatehpur and Siddharthnagar. Together, these districts represent 2.7 percent of the state's total population and are among the more economically disadvantaged areas within the poor state. Within these two districts, we randomly selected 15 villages that contained at least 50 below-poverty-line households. To examine the demand for micropension among these respondents, we used detailed roster sheets of households provided by the Uttar Pradesh Nodal Agency used to determine whether a household qualified for programs like ration cards for low cost food or government subsidized health care. The survey districts were areas that the Nodal Agency indicated were to be targeted for micropension marketing in the next year.

After the study villages were selected, the implementation team used the roster sheets to identify households with a household head under age 60 (only these individuals were eligible to contribute to a micropension product.) This list of all eligible households was then randomized to select 55 in each village to be contacted. In total, the survey team reached 770 out of the potential 825 respondents. The survey was conducted in Hindi and administered by trained surveyors in June and July of 2012.

The survey collected detailed data on the respondent's household composition, demographic information, consumption, assets, liabilities, and trust in government programs.

Modules measuring numeracy and financial literacy of the household respondent were also included based on prior literature showing that these affect saving decisions (e.g., Lusardi and Mitchell, 2014). Numeracy was measured by asking respondents to subtract the number seven from 100 in five sequential steps, a measure used in the Health and Retirement Study (Levy et al., 2014). The specific survey questions were as follows:

"Now I am going to ask you some questions about subtraction.

³ The log likelihood function for the Tobit regression is $\ln L = \sum_{i=1}^N [d_i (-\ln \sigma + \ln \phi(\frac{y_i - X_i \beta}{\sigma})) + (1 - d_i) \ln (1 - \Phi(\frac{X_i \beta}{\sigma}))]$, where the first term corresponds to the ordinary regression of uncensored observations, and the second term corresponds to the relevant probabilities that an observation is censored.

Table 2
Summary statistics by group.

	(1) All	(2) Group 1	(3) Group 2	(4) t-Statistic
<i>Demographics</i>				
Male	0.65	0.67	0.64	(0.66)
Age ÷ 100 of HH head	0.43	0.42	0.43	(-0.38)
Household head	0.78	0.80	0.77	(0.94)
Number of children	2.87	2.77	2.98	(-1.61)
Landowner	0.95	0.95	0.94	(0.38)
<i>Occupation</i>				
Farmer	0.37	0.42	0.38	*(2.54)
Agricultural laborer	0.34	0.32	0.36	(-0.97)
Non-agricultural laborer	0.15	0.14	0.15	(-0.42)
<i>Consumption and assets</i>				
Consumption-30 days (000)	4.98	5.05	4.91	(0.44)
Has saving account	0.55	0.55	0.59	*(-2.14)
Formal saving (000)	3.18	3.17	3.18	(-0.02)
Has any insurance	0.19	0.21	0.18	(1.02)
<i>Human capital</i>				
Numeracy	0.37	0.38	0.36	(0.60)
Financial literacy	0.24	0.25	0.24	(0.14)
Can read and write	0.38	0.40	0.36	(0.96)
No schooling	0.60	0.59	0.62	(-0.80)
Schooling: <5 years	0.14	0.15	0.12	(1.36)
Schooling: 5–10 years	0.21	0.21	0.22	(-0.41)
Schooling: >10 years	0.05	0.05	0.05	(0.43)
Observations	770	389	381	770

Notes: This table serves as a randomization check because the analysis relies on the assumption that Groups 1 and 2, which were randomly drawn from the full household roster list, are comparable. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

1. One hundred minus seven equals what?
2. And seven from that amount?" [Repeat second question four times]

For the analysis, we compute the fraction of correct responses for all five subtractions. Column 1 of Table 2 shows that respondents were able to make 2–3 of these computations correctly for an average score of 37 percent. The three financial literacy questions are taken directly from Lusardi and Mitchell (2008, 2011) but adapted for the currency unit in India:

1. What is 8 percent of 100?
2. Suppose you invest Rs. 100 in an account that pays 2 percent interest rate. At the end of the year, do you have less than Rs. 102, Rs. 102 exactly, or more than Rs. 102? (Choices: less than Rs. 102, Rs. 102 exactly, more than Rs. 102, do not know, refuse to answer.)
3. Suppose you need to borrow Rs. 1000. Two people offer you a loan. One requires you to pay back Rs. 1200 in one month. The second requires you to pay back Rs. 1000 plus 15 percent interest [in one month]. Which would you prefer? (Options: Rs. 1200, Rs. 1000 + 15 percent interest, do not know, refuse to answer.)

Table 2 shows the summary statistics for the full sample and also for our two Groups.⁴ There are 770 respondents but because each variant is considered to be an observation, the total sample size is 3080 observations. To accommodate for the fact that respondent responses are correlated, we cluster all our analyses at the respondent level. The results show that in only two cases were the means marginally different at conventional levels of significance, suggesting that the randomization strategy was effective and carried out properly.

⁴ Table A.1 shows the summary statistics by district.

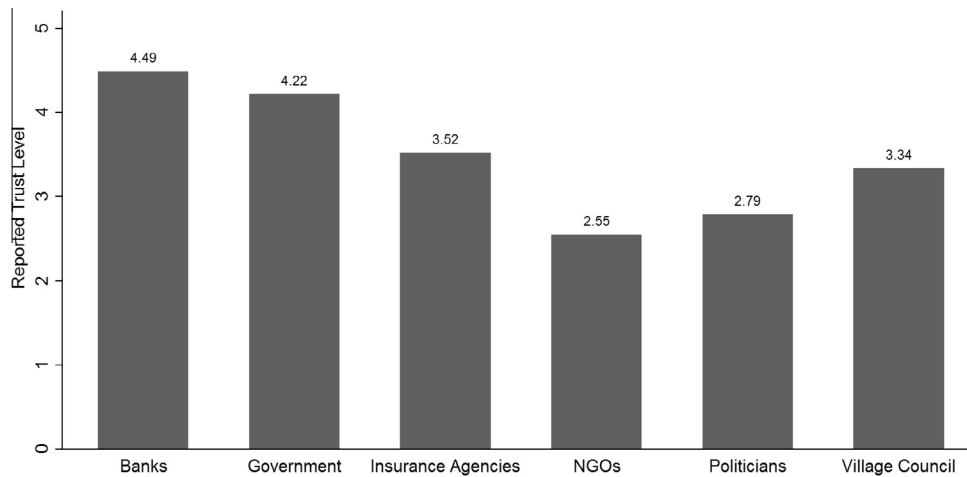


Fig. 1. Respondent reported levels of trust, by type of institution. Figure shows reported levels of trust in different institutions, with 1 indicating complete lack of trust and 5 indicating very high trust.

Overall, the statistics are comparable to those of below-poverty-line populations (Pal and Palacios, 2011). The average survey respondent was 43 years old, owned land, illiterate, and had minimum schooling. The two most common livelihood activities that the respondents engaged in were farming via cultivation of one's own land (37 percent), and agricultural labor supplied to non-owned farms (34 percent). With respect to educational attainment, over 60 percent had never attended school, while 21 percent had 5–10 years of formal schooling. Only 38 percent of respondents reported being able to both read and write. Insurance access among the respondents was low, at 20 percent of the total sample population, but 66 percent of the respondents held a life insurance policy. Saving penetration was relatively high, with 55 percent of the sample having access to a formal saving account. Respondents that saved had an average balance of Rs. 3000 (about US \$65) in their saving accounts.

Trust is a central requirement in formulating a successful financial product, and the survey included a series of questions on trust in institutions. Respondents were asked to rank their levels of trust in six institutions on a scale from 1 to 5, with a level of 1 indicating a complete lack of trust and a level of 5 representing a very high level of trust. Fig. 1 displays the full results: respondents reported the highest level of trust in banks (4.49) and the government (4.22), while NGOs (2.55) and village councils (3.34) were regarded as relatively less trustworthy. These results are informative about whether microfinance institutions or local governments are likely to be successful intermediaries in the micropension product. Since the government was viewed as a trusted entity, having government support for the micropension surely helped boost adoption and contributions. One caveat is that among a broader population in India, the government is likely to be regarded as less trustworthy. Perhaps the reason that our respondents were more trusting of the government is because they had a positive experience with it via ration cards.

Fig. 2 shows how interest in obtaining a micropension varies with demographic characteristics, showing cumulative distribution plots of the likelihood of adoption by age, land holding, number of children, and total savings. There does not appear to be a significant difference between adopters and non-adopters by age, although older respondents were less likely to report interest in the micropension. We also find that respondents with more land and fewer children were slightly less likely to adopt the micropension, and respondents with formal saving were more likely to choose the micropension. Fig. 3 further shows the correlation

between the amount of formal saving and desired willingness to contribute in the micropension, which appears to be positive.

Our survey also included several questions not reported in Table 2, but detailed in Adhikari et al. (2016). For example, 74 percent of the respondents' formal saving was held at a national bank, indicating that respondents trusted the government to hold money securely. Respondents also reported that their main reasons for saving were to meet expenses related to health, weddings, and household items. Informal loans taken from relatives and neighbors were also popular methods used to meet these expenses. When asked how they expected to support themselves in old age, almost 90 percent of respondents suggested that they would rely on their children to provide for them. On average, respondents reported that they believe that individuals should begin saving for old age at age 28; most reported that it is not beneficial to save after age 58.

Multivariate results and discussion

Fig. 4 shows how adoption rates differed depending on product features. We find that about 80 percent of respondents reported an interest in the baseline micropension product, and on average, they were willing to contribute Rs. 1282 (about US \$26) to the micropension. This amount is not trivial: given the 100 percent government match, the total contribution would amount to Rs. 2564 per year. Moreover, the average respondent would save for approximately 17 years, yielding a total contribution of Rs. 28,204 by age 60.⁵ Since surveyed respondents reported household consumption of approximately Rs. 5000 for eight people, the average monthly consumption per person generated is about Rs. 625. Even if the government only provided inflation protection and the micropension-holder lived until age 70, the monthly benefit would be Rs. 235 per month. We estimate this would cover about 40 percent of needs according to consumption levels indicated at the time of the survey.

Summary statistics on adoption by product variant also indicate differential responses to commitment and government matching. Respondents seemed more averse to a 50 percent reduction in matching rate (variant 1C) compared to an equivalent increase

⁵ For the first five years, the policyholder contributes Rs. 1282 and receives a 100% match from the government, hence saving Rs. 12,820. For each of the 12 years afterward, the policyholder contributes Rs. 1282, resulting in a saving of Rs. 15,384. In total, for the 17 years, the policyholder saves Rs. 28,204.

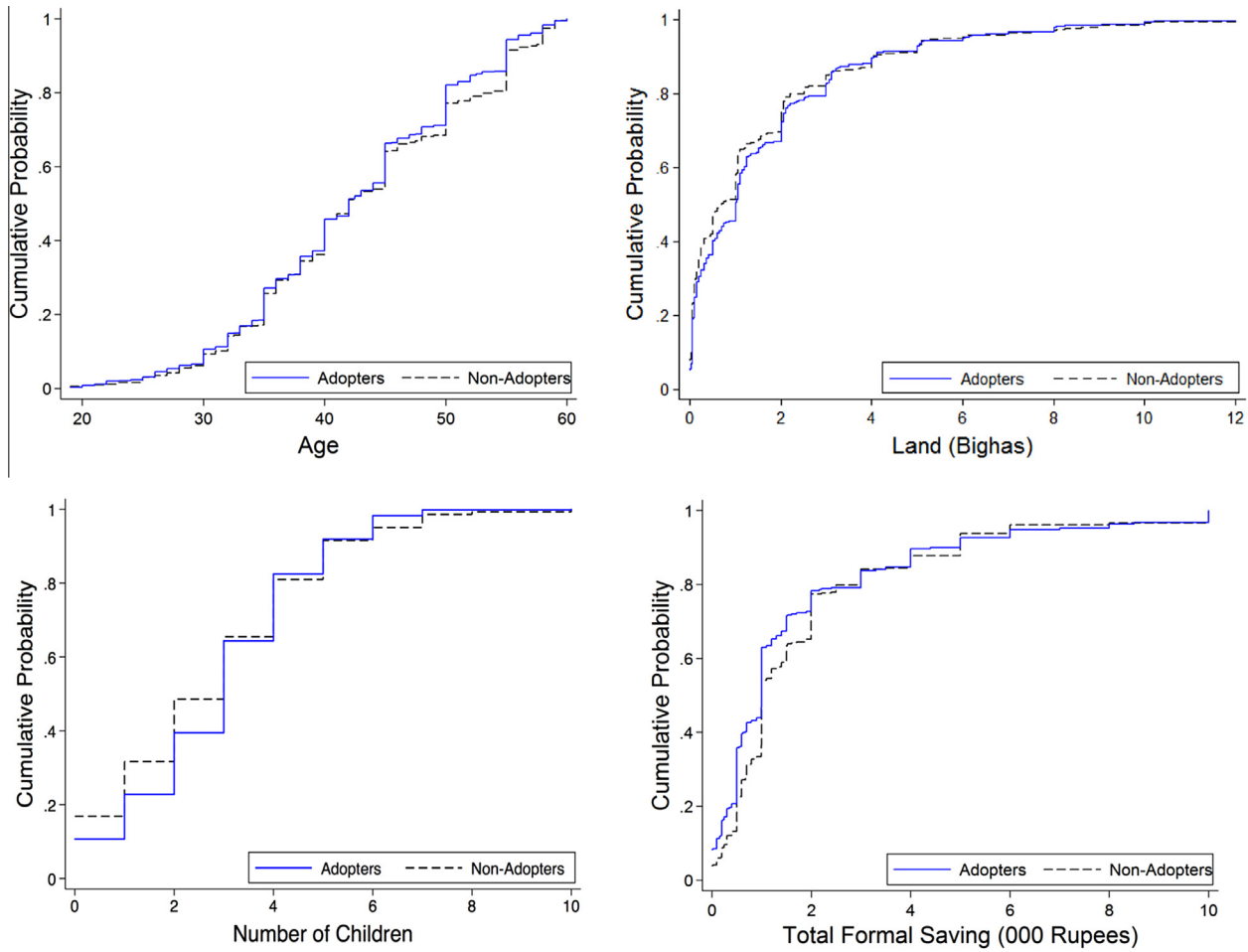


Fig. 2. Cumulative density functions of micropension adoption interest by attribute. Figure shows the cumulative density function plots of various covariates by whether the respondent decided to (hypothetically) participate in the micropension product. The respondent is an “Adopter” if he or she expresses a desire to take-up the micropension product.

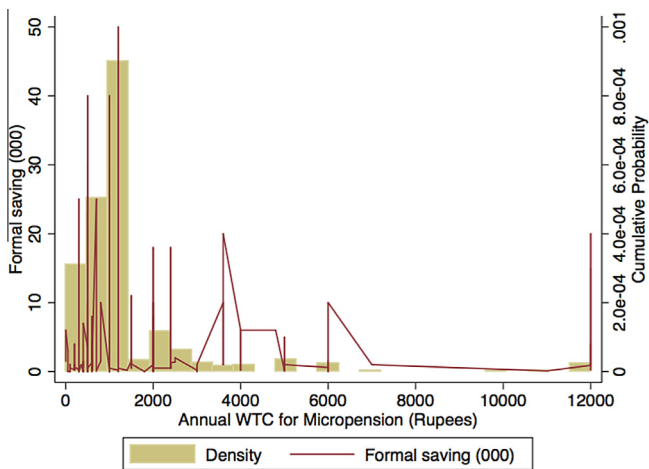


Fig. 3. Annual willingness to contribute and formal saving. Figure shows a histogram of respondents’ annual willingness to contribute to the micropension product, overlaid with a line graph illustrating the raw relationship between total formal saving (measured in 000 rupees) and annual WTC for the micropension.

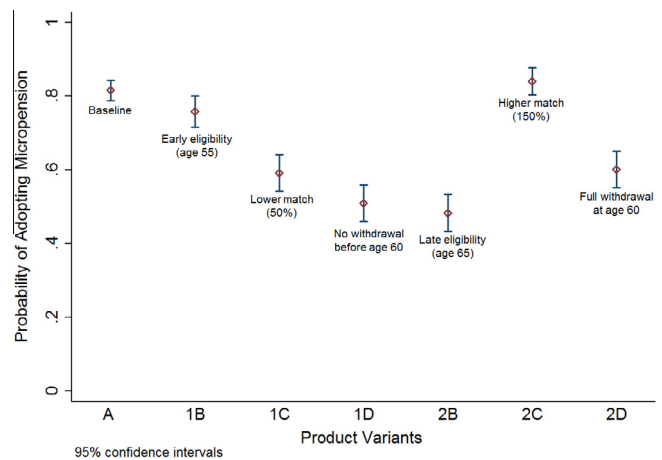


Fig. 4. Micropension adoption rates by product variant. The respondent is an “Adopter” if he or she expresses a desire to take-up the micropension product. See Table 1 for a full description of the product variants.

(variant 2C). Yet in both cases, adoptions rates move in the expected direction. Regarding commitment, respondents appeared to dislike early eligibility (variant 1B) and the option for full withdrawal at age 60 (variant 2D), although they also disliked being

unable to withdraw anything prior to age 60 (variant 1D) as well as late eligibility (variant 2B). Plots of the annual WTC by product variant in Fig. 5 illustrates the same story. Respondents’ annual WTC was significantly lower for the early eligibility variant, and it dropped to about half of the baseline WTC for the other variants; the only exception is the variant offering a 150 percent match.

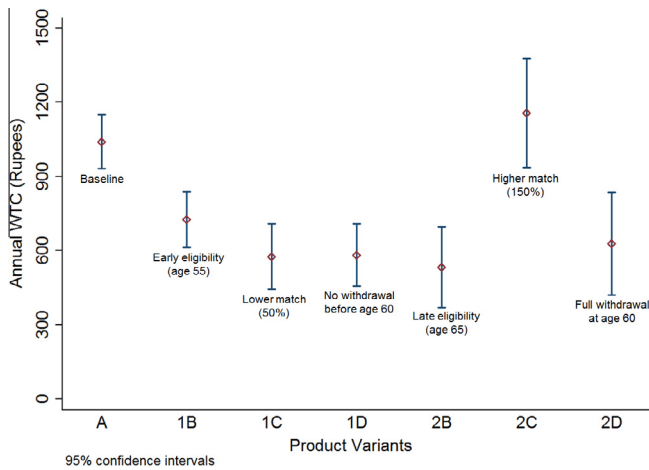


Fig. 5. Annual willingness to contribute by product variant. Figure shows the annual willingness to contribute (in rupees) by product variant. Respondents not wishing to adopt the micropension product are assigned a value of zero for annual willingness to contribute. See Table 1 for a full description of the product variants.

The linear probability and Probit coefficient estimates on the probability of adoption appear in Table 3. Respondents were significantly less willing to adopt any variant compared to the baseline product, with the exception of the one promising a higher match

rate (2C). Results corroborate the findings in Fig. 4, though only three covariates are significant. The age of the household head is negatively correlated with interest in the micropension, though the point estimate is small: an additional year of age is associated with a 0.24 percent reduction in the probability of micropension adoption. Perfect scores on the numeracy and financial literacy modules are associated with a 1 and 3 percent increase in adoption, respectively, echoing other research on this relationship (Lusardi and Mitchell, 2011, 2014). Our findings are also consistent with the determinants of microinsurance demand in Eling et al. (2014).

Our OLS estimates of the determinants of respondent WTC appear in Table 4. We find that respondents are sensitive to the different product variants. On average, respondents reported a much lower WTC in every frame except for the one that promised a higher match rate; in that case, variant 2C, respondents said they would contribute nearly 10 percent more annually. Interestingly, respondents did not show a preference for the high match rate in the extensive margin of micropension adoption; the only effect of this frame comes through on the annual WTC. Effects of the other variants are also large: early eligibility decreased the annual WTC by Rs. 163, which represents an effect size of over 13 percent. The lower match rate decreased annual WTC by almost Rs. 350, or nearly 30 percent—part of this effect is likely due to loss aversion, since the baseline product offered a match rate.

The other covariates studied in Table 4 are also important. Farmers and respondents with formal saving accounts said they

Table 3
Determinants of micropension adoption (OLS and probit).

Estimation model	Linear probability (OLS)			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
1B: early eligibility	-0.05** (0.03)	-0.06** (0.03)	-0.05** (0.03)	-0.07** (0.03)	-0.08** (0.03)	-0.07** (0.03)
1C: lower match rate	-0.22*** (0.03)	-0.23*** (0.03)	-0.22*** (0.03)	-0.25*** (0.03)	-0.26*** (0.03)	-0.27*** (0.03)
1D: no early withdrawal	-0.31*** (0.03)	-0.31*** (0.03)	-0.31*** (0.03)	-0.33*** (0.03)	-0.35*** (0.03)	-0.35*** (0.03)
2B: late eligibility	-0.33*** (0.03)	-0.33*** (0.03)	-0.33*** (0.03)	-0.36*** (0.03)	-0.36*** (0.03)	-0.37*** (0.03)
2C: higher match rate	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.04 (0.03)	0.04 (0.03)	0.04 (0.03)
2D: early withdrawal	-0.22*** (0.03)	-0.22*** (0.03)	-0.22*** (0.03)	-0.25*** (0.03)	-0.25*** (0.03)	-0.26*** (0.03)
Age ÷ 100		-0.24** (0.10)	-0.24** (0.10)		-0.27*** (0.10)	-0.28*** (0.11)
Male		-0.01 (0.02)	-0.02 (0.02)		-0.01 (0.02)	-0.02 (0.02)
Number of children		-0.01 (0.01)	-0.01 (0.01)		-0.01 (0.01)	-0.01 (0.01)
Farmer		0.09*** (0.02)	0.08*** (0.02)		0.09*** (0.02)	0.09*** (0.02)
Financial literacy		0.03*** (0.01)	0.03** (0.01)		0.04*** (0.01)	0.03** (0.01)
Numeracy		0.01** (0.00)	0.01** (0.00)		0.01** (0.00)	0.01** (0.00)
Land (bighas)			0.00 (0.00)			0.00 (0.00)
Has saving account			0.13*** (0.02)			0.14*** (0.02)
Constant	0.82 (0.02)	0.76 (0.23)	0.84 (0.23)	-	-	-
Has any insurance			0.02 (0.02)			0.03 (0.02)
R-squared	0.09	0.10	0.12	-	-	-
Observations	3080	3080	3080	3080	3080	3080
Additional controls		✓	✓		✓	✓

Notes: Marginal effects are reported for columns 4–6. Additional controls include household size; number of household members above age 55; number of household members below age 18; whether the respondent can read and write; amount of land (in bighas); consumption in the past 30 days (measured in rupees); and whether the respondent holds any insurance policy. Robust standard errors are in parentheses and are clustered at the respondent level (770 clusters). *p < 0.10, **p < 0.05, ***p < 0.01.

Table 4
OLS estimates of annual willingness to contribute.

	Dependent variable: annual WTC (rupees)		
	(1)	(2)	(3)
1B: early eligibility	–163.00*** (29.88)	–168.12*** (29.44)	–164.97*** (29.12)
1C: lower match rate	–347.43*** (29.88)	–352.55*** (29.44)	–349.40*** (29.12)
1D: no early withdrawal	–291.20*** (29.88)	–296.32*** (29.44)	–293.17*** (29.12)
2B: late eligibility	–333.52*** (30.09)	–328.30*** (29.64)	–331.51*** (29.32)
2C: higher match rate	135.74*** (30.09)	140.97*** (29.64)	137.75*** (29.32)
2D: early withdrawal	–285.73*** (30.09)	–280.51*** (29.64)	–283.72*** (29.32)
Age ÷ 100		–394.47*** (101.45)	–348.57*** (101.42)
Male		–34.14 (20.85)	–35.11* (20.76)
Number of children		–24.05*** (8.14)	–24.27*** (8.08)
Farmer		88.52*** (18.43)	104.29*** (19.00)
Financial literacy		53.44*** (12.11)	50.18*** (12.06)
Numeracy		4.50 (4.91)	3.62 (4.87)
Land (bighas)			–10.61*** (3.39)
Has saving account			119.60*** (17.57)
Has any insurance			58.70*** (22.09)
Constant	685.68*** (17.31)	768.49*** (242.55)	795.58*** (240.53)
R-squared	0.114	0.143	0.164
Observations	3080	3080	3080
Additional controls		✓	✓

Notes: Additional controls include household size; number of household members above age 55; whether the respondent can read and write; and consumption in the past 30 days (measured in rupees). Robust standard errors are in parentheses and are clustered at the respondent level (770 clusters). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

would contribute nearly 10 percent more than their counterparts, while respondents with insurance policies and high level of financial literacy sought to contribute five percent more. Desired contributions were also lower for older and male respondents. Landholding and the number of children appear to serve as substitutes for old-age saving, since each was associated with significantly lower levels of annual WTC.⁶ Tobit estimates of the WTC determinants (Table 5) are similar to those in the OLS regressions, though the marginal effects are higher. For example, the OLS coefficients suggest that for each additional year in the age of the respondent, the desired annual WTC decreases by Rs. 350 (column 3 of Table 4); the Tobit marginal effects suggest that this number is about Rs. 520. A difference in this direction is expected, as the Tobit estimates shed light on the effect of a particular variable on the WTC for individuals who *choose to participate* in the micropension, weighed by the probability that this occurs. The OLS estimates, by comparison, shed light on the average individual in our survey, many of whom indicated that they would not contribute to the micropension.⁷

⁶ In Table A.2, we find heterogeneity by gender only for the WTC for the variants related to the government match rate. Women do not decrease their annual WTCs if the match rate is 50 percent instead of 100 percent, but they do indicate a 20 percent higher annual WTC if the match rate is increased to 150 percent.

⁷ The fixed effect regression estimates in Table A.3 are remarkably similar to the OLS regressions for both adoption and annual WTC.

Table 5
Tobit estimates of annual willingness to contribute.

	Dependent variable: annual WTC (rupees)		
	(1)	(2)	(3)
1B: early eligibility	–244.66*** (45.43)	–252.11*** (44.64)	–245.62*** (44.08)
1C: lower match rate	–504.95*** (46.48)	–512.59*** (45.70)	–505.03*** (45.13)
1D: no early withdrawal	–482.53*** (46.95)	–488.30*** (46.14)	–481.24*** (45.58)
2B: late eligibility	–551.17*** (47.73)	–541.94*** (46.92)	–548.30*** (46.41)
2C: higher match rate	148.42*** (44.73)	157.05*** (43.92)	151.40*** (43.37)
2D: early withdrawal	–474.57*** (47.25)	–465.22*** (46.43)	–471.21*** (45.91)
Age ÷ 100		–556.02*** (155.66)	–520.74*** (155.44)
Male		–53.85* (32.32)	–59.77* (32.15)
Number of children		–32.28*** (12.50)	–32.13*** (12.40)
Farmer		148.78*** (28.28)	160.86*** (29.03)
Financial literacy		78.58*** (18.46)	69.95*** (18.39)
Numeracy		1.04 (7.60)	2.76 (7.54)
Land (bighas)			–8.49* (5.12)
Has saving account			203.86*** (27.22)
Has any insurance			75.00** (33.60)
Constant	609.28*** (25.88)	661.80* (371.42)	753.39** (367.88)
Observations	3080	3080	3080
Additional controls		✓	✓

Notes: Marginal effects are reported for all columns. Additional controls include household size; number of household members above age 55; whether the respondent can read and write; and consumption in the past 30 days (measured in rupees). Robust standard errors are in parentheses and are clustered at the respondent level (770 clusters). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

An important drawback of a survey of this sort is that the estimated adoption and WTC patterns may be biased upward due to the hypothetical nature of the experiment. Studies examining the degree to which hypothetical and actual survey measures differ have yielded mixed results.⁸ In our experimental setting, we believe that the poor respondents provided reliable estimates of their willingness to pay for two reasons. First, respondents were made aware that the micropension product was actually available and could be purchased, so it was not purely hypothetical (Loomis et al., 1996). Second, about 15 percent of respondents knew that the marketers sold real life insurance products and were employed by the Life Insurance Corporation of India. As a result, these marketers were associated with real financial products, so respondents understood that they could get help purchasing the product if they expressed interest. Nevertheless, there could be a discrepancy between stated and actual willingness to contribute for below-poverty-line respondents inasmuch as their incomes are volatile, making it hard for them to determine the amount of regular contribution they could feasibly honor.

⁸ Blumenschein et al. (2001) find that actual willingness to adopt a health insurance product is about one-third of the hypothetical willingness to adopt the same product. Carlsson and Martinsson (2001) employ an experimental design and find no difference in the hypothetical and actual willingness to pay for environmental amenities.

Conclusions

An effective retirement saving device for the poor must consider cash flow needs, income seasonality, competing spending priorities, and alternative investment options. The respondents in our study were among the poorest in their communities and relied heavily on agricultural income to finance their consumption. Previous studies on the financial lives of the poor have documented that their incomes are irregular and highly seasonal (Banerjee and Duflo, 2007). As a result, requiring them to pay significant sums in just a few payments could significantly reduce demand for the pension product. For this reason, offering frequent opportunities for such individuals to contribute can be critical to the scheme's success. This ability to contribute frequently to an agent visiting door-to-door may also help explain why individuals express an interest in micropensions, even when fixed deposits at Indian banks offer high annual returns.

Our initial hypothesis in designing this survey experiment was that some respondents would exhibit a preference between early or late eligibility for withdrawal, and that we would be able to identify the heterogeneity driving these decisions. Instead, we found that with the exception of the high match variant, respondents were less willing to adopt or contribute to the alternatives to the baseline micropension product. We attempted to identify subgroup heterogeneity by interacting the experimental variants with financial literacy and numeracy, but observed mixed results: these interactions were significant for some, but not all, variants. Similarly, we were unable to find consistent results when interacting our experimental variants with other covariates including respondent occupation, number of children, having a savings or insurance account, and amount of land owned, but much of our lack of findings can be attributed to low statistical power. We encourage future researchers to delve further into these interactions to test whether financial sophistication or other observable traits explains patterns in micropension demand.

The low levels of numeracy and financial literacy demonstrated here highlight the need to provide the micropension in conjunction with a financial literacy program. Sending clear “price” signals (e.g., suggested contribution amounts) in the form of anchors could serve as another way to boost adoption. Since most respondents stated that they planned to rely mostly on their children for old age support, targeting information to younger household members

may also be an effective marketing strategy. We also found that respondents with formal saving accounts were more likely to express interest in both adopting and contributing to the micropension product, suggesting possible synergies between traditional banking and delivery of the micropension scheme.

The sparse research on micropensions to date suggests many areas of future work, since our study is based on only 770 household representatives living in poor Indian districts. First, the demand for commitment saving needs to be better understood. If most poor individuals save for the purposes of weddings, health shocks, and household items, then a micropension runs the risk of being used for this end. Second, the Indian micropension has elements of life insurance, since the balance is transferred to the next of kin on the death of the micropension policyholder. Offering death benefits is expensive to the government because it disallows cross-subsidizing households. Nevertheless, understanding the importance of bequest motives for driving micropension demand may help improve the product's ability to meet the needs of the aging poor.

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Appendix A

Table A.1
Summary statistics by district.

	1 Combined	2 Fatehpur	3 Siddharthnagar	4 t-Statistic
<i>Demographics</i>				
Male	0.65	0.70	0.61	*(2.49)
Age (HH head)	42.67	42.85	42.54	(0.44)
Household head	0.78	0.84	0.72	***(-3.61)
Number of children	2.87	2.75	2.98	(-1.71)
Landowner	0.95	0.93	0.98	**(-3.04)
<i>Occupation</i>				
Farmer	0.37	0.25	0.49	***(-6.84)
Agricultural laborer	0.34	0.42	0.26	***(-4.59)
Non-agricultural laborer	0.15	0.20	0.10	***(-3.71)
<i>Consumption and assets</i>				
Consumption-30 days (000)	4.97	4.77	5.13	(-1.08)
Has saving account	0.55	0.48	0.60	**(-3.23)
Formal saving (000)	3.18	3.62	2.94	(1.05)
Has any insurance	0.19	0.19	0.20	(-0.63)
<i>Human capital</i>				
Numeracy	0.37	0.39	0.36	(1.16)
Financial literacy	0.24	0.26	0.23	(1.18)
Can read and write	0.38	0.41	0.36	(1.46)

(continued on next page)

Table A.1 (continued)

	1 Combined	2 Fatehpur	3 Siddharthnagar	4 t-Statistic
No schooling	0.60	0.56	0.63	*(-2.04)
Schooling: ≤5 years	0.13	0.15	0.13	(0.60)
Schooling: 5–10 years	0.21	0.23	0.20	(1.21)
Schooling: ≥10 years	0.05	0.06	0.04	(1.36)
Observations	770	378	392	770

Notes: See notes for Table 2. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2

OLS Estimates of Heterogeneity by Gender in Adoption and WTC.

	Dependent Variable: Adoption			Dependent Variable: WTC		
	(1)	(2)	(3)	(4)	(5)	(6)
1B: early eligibility	-0.06*	-0.06*	-0.06*	-188.26***	-191.85***	-188.72***
	(0.03)	(0.03)	(0.03)	(36.56)	(36.19)	(35.74)
1C: lower match rate	-0.25***	-0.26***	-0.25***	-362.84***	-366.44***	-363.30***
	(0.03)	(0.03)	(0.03)	(36.56)	(36.19)	(35.74)
1D: no early withdrawal	-0.32***	-0.32***	-0.32***	-317.07***	-320.66***	-317.52***
	(0.03)	(0.03)	(0.03)	(36.56)	(36.19)	(35.74)
2B: late eligibility	-0.31***	-0.31***	-0.31***	-330.78***	-326.98***	-330.29***
	(0.03)	(0.03)	(0.03)	(37.25)	(36.86)	(36.41)
2C: higher match rate	0.00	0.00	0.00	123.30***	127.10***	123.78***
	(0.03)	(0.03)	(0.03)	(37.25)	(36.86)	(36.41)
2D: early withdrawal	-0.20***	-0.20***	-0.20***	-285.31***	-281.51***	-284.83***
	(0.03)	(0.03)	(0.03)	(37.25)	(36.86)	(36.41)
1B × female	0.01	0.01	0.01	71.96	69.48	69.65
	(0.06)	(0.06)	(0.06)	(62.90)	(62.23)	(61.46)
1C × female	0.08	0.08	0.08	107.35*	104.86*	105.03*
	(0.06)	(0.06)	(0.06)	(62.90)	(62.23)	(61.46)
1D × female	0.03	0.03	0.04	73.76	71.28	71.45
	(0.06)	(0.06)	(0.06)	(62.90)	(62.23)	(61.46)
2B × female	-0.05	-0.05	-0.06	-4.23	-2.22	-2.07
	(0.06)	(0.06)	(0.06)	(62.68)	(62.02)	(61.25)
2C × female	0.04	0.04	0.03	110.66*	112.68*	112.83*
	(0.06)	(0.06)	(0.06)	(62.68)	(62.02)	(61.25)
2D × female	0.00	0.00	-0.00	2.29	4.30	4.45
	(0.06)	(0.06)	(0.06)	(62.68)	(62.02)	(61.25)
Female	-0.05	-0.02	-0.03	-107.63***	-72.27*	-74.76**
	(0.03)	(0.04)	(0.03)	(36.24)	(37.40)	(37.01)
R-squared	0.086	0.100	0.117	0.123	0.144	0.167
Observations	3080	3080	3080	3080	3080	3080
Additional controls		✓	✓		✓	✓

Notes: In addition to the variables shown, all controls are the same as in Table 4—i.e., variables such as age and financial literacy are controlled as part of “Additional controls”. Robust standard errors are in parentheses and are clustered at the respondent level (770 clusters): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3

Fixed effect OLS regressions.

	Adoption (1)	WTC (2)
1B: early eligibility	-0.05**	-169.92***
	(0.02)	(24.98)
1C: lower match rate	-0.22***	-332.68***
	(0.02)	(24.98)
1D: no early withdrawal	-0.31***	-298.12***
	(0.02)	(24.98)
2B: late eligibility	-0.33***	-326.46***
	(0.02)	(25.24)
2C: higher match rate	0.01	168.63***
	(0.02)	(25.24)
2D: early withdrawal	-0.20***	-278.66***
	(0.02)	(25.24)
Constant	0.82***	685.68***
	(0.01)	(12.55)
Observations	3080	3080

Notes: Constant term denotes the average value of the individual fixed effects. Robust standard errors are in parentheses and are clustered at the respondent level (770 clusters): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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