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Responsible microfinance bundling: Experimental evidence on separating insurance and credit offers

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RESPONSIBLE MICROFINANCE BUNDLING: EXPERIMENTAL EVIDENCE ON SEPARATING INSURANCE AND CREDIT OFFERS

For the degree of Master of Science

Is approved by the final examining committee:

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RESPONSIBLE MICROFINANCE BUNDLING:
EXPERIMENTAL EVIDENCE ON SEPARATING INSURANCE AND CREDIT
OFFERS

A Thesis

Submitted to the Faculty

of

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Vance J. Larsen

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ABSTRACT

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In recent years combining multiple financial products into one package in a process known as bundling has become more common among microfinance institutions (MFIs). While bundling can be beneficial to MFIs by cutting costs and providing protection from client default, the implications for MFI customers are less clear. Bundling the products may take advantage of the existing relationship between the financial institution and the client to expand microinsurance access and take-up, but alternatively offering too many products could lead to low client understanding and thus low take-up of the product. We conducted a randomized field experiment to determine if separating the offer of crop insurance from the loan application would result in increased rates of take-up, coverage amounts and understanding amongst potential clients in Colombia. Individuals in the control group received a voluntary, bundled credit/insurance offer at the time they were applying for a loan, while individuals in the treatment group received a separated offer for the same insurance product several weeks after the loan application process was complete. Separating the insurance offer did not have a statistically significant effect on take-up rates, coverage amounts or product understanding. These findings suggest that the voluntary bundling of microfinance products is a valid approach to expanding

outreach and increasing financial access that benefits both providers and clients.

Measures of product understanding are low, however, in both the bundled and separate offer groups, which indicates a need for responsible bundling with strong consumer protection.

CHAPTER 1. INTRODUCTION

Risk management is critical to the livelihood of many households in developing countries, who face large and varied risks. Yet poor households are often inadequately protected against these risks, despite the myriad of informal and formal tools and strategies that they rely on (Collins, Morduch, Rutherford, & Ruthven, 2009). Formal insurance products can contribute to improving poor families' risk management outcomes, particularly microinsurance products, specifically designed for and targeted to poor individuals in developing countries through low premiums, low coverage amounts, and simplified terms. Emerging microinsurance products include life insurance, credit-life insurance, health insurance, as well as rainfall insurance and other broader types of crop coverage. While the widespread availability of microinsurance products has increased over the last decade, take-up remains low (Cole et al., 2013; Eling, Pradhan, & Schmit, 2014). Many factors contribute to low take-up rates, including lack of trust in the insurance provider (H. Cai, Chen, Fang, & Zhou, 2015; Cole, 2015) and lack of familiarity with the concept of insurance or the specific product (Cole et al., 2013; Eling et al., 2014).

One approach to increasing take-up is to distribute microinsurance through MFIs, often by bundling insurance products with loans. The bundling can either be mandatory, meaning clients must accept either all products in the bundle or none of them, or

voluntary, when clients can choose which specific product(s) in a menu of available options they wish to take-up. Bundling insurance with loans presents several advantages. It builds upon an MFI's existing branch network and their relationship with the target population, allowing for higher outreach at lower distribution costs, and taking advantage of the trust that many clients have in their microfinance lender. It also helps MFIs manage their own risk by decreasing the likelihood that a client will default as a result of a dramatic event such as illness, death, accident, or crop loss (Ananth, 2005).

Mandatory bundling of microfinance products, however, also has important drawbacks. Requiring clients to purchase insurance bundled with loans has been shown to decrease loan take-up, reducing overall access to financial services (Banerjee, Duflo, & Hornbeck, 2014; Giné & Yang, 2009). Bundling may also affect clients' ability to process and retain information about insurance, a new and complex financial product, at a time when they are preoccupied with their loan application. Living in poverty has been shown to reduce individuals' ability to process and retain information, which Mullainathan and Shafir (2013) have labeled the "scarcity mindset," increasing the likelihood that individuals experience "information overload" (Eppler & Mengis, 2004) when faced with arduous decisions, such as judging the value of a bundle of complex financial products.

The existing literature, however, has only considered the effect of mandatory bundling of loans and insurance product(s). It does not address how offering insurance bundled with loans on a voluntary basis affects client ability to evaluate an insurance product and willingness to accept it. In addition, the mechanisms by which bundling leads to higher or lower take-up have not been explicitly explored. This paper contributes to the literature by addressing these issues. It asks: is bundling voluntary insurance products with loans an

effective and responsible strategy to increase take-up of insurance? The potential effects of bundling a voluntary insurance product with loans are ambiguous. On one hand, taking advantage of the point of contact between a financial institution and an individual interested in signing up for financial products could provide a unique and cost-effective way to expand microinsurance take-up and help individuals protect themselves from risks with formal financial products. On the other hand, offering too many products simultaneously in a bundle could lead to cognitive overload, low understanding of insurance, and therefore low adoption.

We test the effect of separating a bundled, voluntary microinsurance product with credit on insurance take-up, insurance coverage amount and understanding by randomly varying the time when a crop insurance product was offered to Colombian farmers applying for microcredit loans to support their agricultural activities. Additionally, we examine if those who have a greater understanding of the product are more likely to purchase. The insurance is designed to protect smallholder farmers against major natural disasters, such as flooding, drought, landslides, or frost. It is underwritten by a commercial insurer, subsidized by the government, and distributed through an MFI serving households in rural, mountainous areas of Colombia. Individuals applying for a loan from the institution between March and October 2015 were assigned to be offered crop insurance at the time of the loan application, in a voluntary bundled package (our control group), or several weeks later after their loan had been processed (our treatment group). We operationalized the treatment as a time-separated offer of the same insurance product to a statistically-similar sample of loan applicants (through the randomization), by the same sales agent (the loan officer), instead of opting for a completely independent

sales process in order to specifically capture the effect of bundling or separating the two offers, keeping all else equal as much as possible.

We find that separating the offer of insurance did not improve any of the outcomes that we measured. The take-up rate was relatively high overall (22.8 percent) but was not statistically significantly different in the bundled and separated groups (24.5 percent and 20.9 percent, respectively). Similarly, the amount of coverage purchased by individuals in the bundled group (\$1,487) was higher than those in the separate group (\$951), but again the result was not statistically significantly different.

Finally, we do not find support for the hypothesis that bundling insurance with loans leads to cognitive overload and lower levels of understanding of the product. Overall, measures of understanding indicate that many clients in both the treatment and control groups do not recall important aspects of the insurance offer, the perils covered, or even whether or not they have insurance coverage. Surveyed individuals were incorrect 38 percent of the time when asked if the insurance was required to obtain a loan, were wrong 30 percent of the time when asked whether or not they had purchased the product, and were wrong 69 percent of the time regarding what perils the insurance product protects against. We find evidence that individuals who correctly answered survey questions regarding their insurance status and the perils covered by the product had higher take-up rates. However, we do not find this same association between knowing the product was voluntary and take-up rates.

Individuals in the treatment (separated) group did not exhibit a better understanding of the insurance product than their counterparts in the bundled group, and clients reported perceiving clearly the voluntary nature of the crop insurance. On the contrary, our results

suggest that individuals in the separate sale group were more likely to answer questions about the product incorrectly than individuals in the bundled group (36 percent of the former did, versus 25 percent of the latter, but the difference is not statistically significant).

Taken together, these results indicate that voluntary bundling of insurance products with loans is a valid approach to offering microinsurance. Low overall levels of understanding and recall of insurance product characteristics, however, highlight a critical need for strong consumer protection, whether bundled or separate sales approaches are used.

CHAPTER 2. LITERATURE AND HYPOTHESES

2.1 Microinsurance Demand and Bundling

Farmers around the world face enormous and varied risks, and there is strong evidence that these risks have immense welfare effects and constrain the investment that individuals make in their farms, suggesting great potential value for agricultural insurance products (Hill, Magnoni, & Zimmerman, 2014). Initially when launched, MFIs attempted to improve the financial lives of poor households by offer lending services, but increasingly they are extending their outreach to beyond credit, by offering microinsurance (Khavul, 2010) as well as other products and services. However, demand for formal insurance products remains low (Cole et al., 2013; Eling et al., 2014; Giné, Townsend, & Vickery, 2008; Thornton et al., 2010). In a study piloting weather based index insurance in Ethiopia, on average about ten percent of potential clients purchased the product (Hill & Robles, 2010). Even where extensive subsidies and other costly efforts are made to increase demand, take-up typically remains low. Cole et al. (2013) studied take-up of a weather index insurance product in India, and found that even with high subsidies and customized educational and marketing interventions, take-up was around 28 percent. Households that were not exposed to these interventions designed to increase demand had take-up rates near zero.

As mentioned previously, two barriers to microinsurance take-up are lack of trust in the provider and unfamiliarity with the product, or insurance in general. Cole et al. (2013) conclude that several determinants in addition to price, such as trust and familiarity, are important in determining whether or not a potential client will purchase. Giné et al. (2008) found that lack of product understanding was the most commonly given explanation by households in their decision not to purchase insurance. Both Cole (2015) and H. Cai et al. (2015) highlight the important role that trust plays in an individual's decision about whether or not to purchase a microinsurance product.

Two other main determinants that prior research has found to drive the demand for microinsurance are premium prices (Cole et al., 2013; Dercon, Gunning, Zeitlin, Cerrone, & Lombardin, 2012; Karlan, Osei, Osei-Akoto, & Udry, 2012) and liquidity constraints (Cole et al., 2013). Karlan et al. (2012) find that price is a consistent driver of the demand for rainfall index insurance in northern Ghana, while Dercon et al. (2012) use a randomized field experiment in Kenya and determined that market demand was sensitive to discounts in price, but not to financial literacy, specifically risk literacy. Additionally, Cole et al. (2013) finds that both price and liquidity play an important role in the insurance purchase decision, using findings from a series of field experiments in rural India.

One potential solution that has been put forth to increase take-up of microinsurance products is the process known as bundling. In bundling, multiple financial products are combined and offered at the same time to the same client, by the same institution. Bundling can be mandatory, in cases when clients must purchase the entirety of the bundled package to have access to the benefits of all the products and cannot opt out of

any singular piece of the bundle without losing access to all benefits, or voluntary, when clients and potential clients are offered multiple financial products at the same time but access to any component of the bundle is not contingent on the decision regarding the other product(s). Our study examines a situation of voluntary bundling, where individuals are offered, but not required to purchase, a crop microinsurance product when they apply for a loan from an MFI in Colombia.

Although the premium price for both the treatment and control groups in our research are the same, the situation regarding paying for the insurance is different for the two groups. Individuals in the bundled (control) group can finance their premiums with their loan, and make payments on a monthly basis, whereas separate (treatment) group individuals must pay up front for the insurance. It is unknown what effect if any, this difference has on take-up rates and coverage amounts.

2.2 Client Understanding

While past research suggests mixed results of how understanding interacts with the decision to purchase microinsurance, it does little to inform us if individuals in the control or treatment group of our research design would be expected to have greater understanding of the product. We examine various efforts to increase understanding of microfinance products and also review the broader literature on decision making in the context of poverty to develop a hypothesis regarding the following question: which group of individuals will display greater product knowledge as measured by responses to the survey?

Of particular relevance from the consumer perspective is client understanding of the products offered and how that understanding influences purchase decisions. Lack of sufficient understanding is sometimes cited by potential clients as a reason for not buying insurance (Giné & Yang, 2009; Takahashi, Ikegami, Sheahan, & Barrett, 2016).

Additionally, Takahashi et al. (2016) find that learning kits including comics, skit tapes, and other tools contributed to better knowledge of livestock insurance, but this knowledge did not significantly increase take-up. Understanding of a product may also lead to higher renewal rates, as it helps to avoid disappointment with the product (Platteau & Ontiveros, 2013). However, some studies conclude that providing more information about microinsurance products does not directly increase take-up, even if it produces greater client knowledge of the product (Cole et al., 2013; Schultz et al., 2013). Research has been conducted to determine if broader financial education, in contrast to information specific to the particular insurance product, can be effective in stimulating microinsurance demand. J. Cai, de Janvry, and Sadoulet (2011) find that participation in a financial education session increased take-up of a weather insurance product. Gaurav, Cole, and Tobacman (2011) find that a short insurance education module did not increase take-up, but a two-day educational program, involving games that simulate rainfall insurance, increased insurance demand by five percentage points.

We turn to the literature about decision making in the context of poverty to ascertain whether individuals in the control or treatment group would be expected to have greater understanding of the product. Mullainathan and Shafir (2013) discuss how scarcity of both time and money reduce an individual's mental bandwidth and force them to focus on the present, leaving little space for long term planning and decision-making. While

bundling the microinsurance product with a loan application may have benefits for both MFIs and consumers in terms of cost of delivery and subsequently pricing, one consequence of the bundled scenario is that the primary concern of the individual during the loan application is the acquisition of financing. This means that the offer of crop insurance is secondary, or not present at all, in the minds of control group individuals, whereas in the separate sale group, individuals have already been approved, or denied, their loan. The cognitive strain associated with being presented too much information in the face of a decision is referred to as information overload (Eppler & Mengis, 2004). The effects of information overload include stress, loss of control over information and lower decision quality. These factors may lead some consumers to avoid making financial decisions. As such, due to the mental bandwidth required to complete the loan application, we would expect individuals in the control (bundled) group to remember less about the product, and as a result perform worse on the survey. This review of interventions designed to increase understanding and the broader review of decision-making under poverty lend support to our original hypotheses, and support the following additional hypothesis:

H1: Offering the insurance separated from the loan will increase overall client understanding of the product.

One additional question which we wished to explore, unrelated to the analysis of the treatment, was regarding whether or not individuals who understood the product better were more likely to purchase the insurance product. Past studies have offered mixed results on whether or not an increased understanding of the product leads to higher take-up rates (Cole et al., 2013; Schultz et al., 2013; Takahashi et al., 2016). However, as

mentioned previously, clients often list a lack of product understanding as a reason for not buying microinsurance (Giné & Yang, 2009; Takahashi et al., 2016). As such, we formulate and test the following hypothesis:

H2: Individuals with a better understanding of the insurance product will be more likely to purchase the insurance product.

2.3 Take-Up and Coverage Amounts

Both mandatory and voluntary bundling offer MFIs a number of potential benefits. Bundling microcredit with insurance schemes can protect MFIs against client loan defaults (Banerjee et al., 2014; Mechler, Linnerooth-Bayer, & Peppiatt, 2006) or death (Kalra, 2010). Banerjee et al. (2014) also note that mandatory bundling of microfinance products can combat the problem of adverse selection among clients. Additionally, the strategy of bundling presents clear advantages in terms of reducing delivery costs and increasing outreach for the MFI. Wuebker, Baumgarten, Schmidt-Gallas, and Koderisch (2008) note that effective bundling can offer convenient, “one-stop-shop” options at a reduced cost to the client due to the savings in delivery. Offering multiple financial products to a fixed client base also provides multiple sources of revenue for institutions facing high operating costs given the low average loan sizes (Cull, Demirgüç-Kunt, & Morduch, 2009). This argument takes on additional weight in rural lending, where long distances and difficult road access to client farms add to the cost of delivering services. Evidence suggests that there can be negative consequences to making the insurance purchase mandatory as part of the bundling process (Banerjee et al., 2014; Giné & Yang, 2009). Giné and Yang (2009) found that clients offered a loan bundled with a mandatory

rainfall insurance product accepted the terms of the credit offer by 13 percentage points less than those who were offered credit with no insurance attached. This is concerning in that requiring the insurance discouraged individuals from using microfinance altogether. Banerjee et al (2014) found that requiring the purchase of health insurance with a loan decreased both loan renewal rates for existing clients and take-up rates of loans for new clients in India. This switch to mandatory insurance was so unpopular among clients that this policy was eventually abandoned by the MFI.

This prior research finds that potential clients react negatively to the mandatory bundling of microfinance products, and our prior literature review regarding the association between understanding the product and the decision to purchase insurance led us to formulate the hypothesis that separating the insurance will lead to better understanding and those who understand the product will be more likely to purchase the insurance product. As such, we determine that separating the loan offer from the insurance offer in a voluntary bundle will lead to an increase in client willingness to purchase the insurance product. As such we formulate the following two hypotheses regarding insurance take-up rates and coverage amounts:

H3: Offering the insurance separated from the loan will increase take-up rates.

H4: Offering the insurance separated from the loan will increase coverage amounts.

Prior studies suggest that the mandatory bundling of microfinance products is beneficial to MFIs, but potential clients are not always receptive to accepting the terms of these packaged products. This study contributes to this growing literature by examining whether separating the insurance offer from the loan application process affects take-up,

amount of insurance purchased, and product understanding when the purchase of insurance is not necessary for obtaining the loan. By understanding the effect of the timing of the insurance offer in relation to the loan application we can gain insight into the barriers to consumer demand for the insurance product.

CHAPTER 3. INSURANCE PRODUCT AND STUDY DESIGN

3.1 Background and Product Design

The randomized field experiment was conducted in partnership with Crezcamos, an MFI based in Bucaramanga, Colombia. Crezcamos serves over 70,000 clients with individual small business and agricultural loans. Almost two thirds of their clients live in rural areas, many in remote mountainous locations. Most of the sample individuals' loans (89 percent) have terms of 12 to 24 months. In addition to loans, Crezcamos offers several insurance products. First, all Crezcamos borrowers are required to purchase a mandatory credit life policy, which pays a benefit to Crezcamos if the borrower dies before the loan is fully repaid. Second, Crezcamos also offers a number of voluntary insurance products to its clients, including life insurance, property insurance covering the home and/or business, and vehicle insurance. These products are offered as a bundle with the loan, and almost all clients purchase them.

The research we conducted took place in the departments of Santander, North Santander, and Cesar, a geographically diverse and agriculturally productive region in Colombia, South America. The region has a variety of microclimates and weather patterns that place farmers at risk to reduced yields and/or damaged plants. The region is also characterized by a highly competitive credit market; the small towns in which Crezcamos branches are

located are typically home to ten or more lenders, with clients frequently borrowing from multiple lenders. We included clients from nine Crezcamos branch offices in the research sample. A wide range of crops are grown in the region, including both permanent crops such as coffee, cocoa and citrus, as well as transitory crops, such as potatoes, rice and corn. Permanent crops are crops that do not require replanting between harvests while transitory crops require replanting after each harvest.

The crop insurance product examined in this study is underwritten by the insurer MAPRE. It was introduced by Crezcamos to clients in two of its branches in 2014, and in seven more branches as part of the study in 2015. The product is designed for smallholder farmers in Colombia, and is subsidized by the Colombian government. It covers losses from seven weather-related perils: drought, excessive rain, hail, frost, flooding, avalanches and landslides. The product is designed to offer coverage against natural disasters, not to cover all possible risks to the farmer. For example, it does not cover crop failures or losses due to pests or diseases. Additionally, it does not protect the farmer against any loss associated with a drop in the market price of their crop, or issues regarding storage or transportation of the crop after harvest.

Many, but not all, of the popular crops in the region, such as coffee, cocoa, and citrus trees are eligible for coverage. However, other common crops grown in the region, such as tomatoes, carrots, and pineapples, cannot be protected by the product. Livestock also cannot be covered by this product. Both loan applicants of Crezcamos and non-borrowers, including those denied a loan, are eligible for the product. Each policy covers only one crop; clients may purchase separate policies for multiple crops, although this rarely happens in practice.

Key elements of the insurance product differ for various crops, based on whether the crop is permanent or transitory. For permanent crops, the insurance covers the farmer's plants for one calendar year from the time of purchase. The permanent crop coverage pays out only if the weather related event permanently damages the farmer's plant, not necessarily if yields are low for a single harvest, but the plant will recover and produce the following year. By contrast, the insurance for transitory crops covers the crop yield, but only through the next harvest, not for the entire calendar year. As such, for producers of permanent crops the insurance provides a benefit for a longer period of time. Transitory crop farmers who purchase the insurance earlier in the growing cycle also enjoy the benefit of a longer period of coverage when compared to transitory crop farmers who purchase towards the end of the crop cycle.

Total premiums are based on a rate of three to eight percent of the insured amount, depending on the crop. The government subsidizes 60 to 80 percent of that premium amount, depending on the crop, the farm size, and whether clients qualify as a "small farmer," a qualification that nearly all Crezcamos clients achieve. In general, the rate is higher for individuals who choose to cover transitory crops as opposed to permanent crops. Clients can purchase a maximum amount of coverage per hectare depending on the crop covered. These maximums vary from a low of \$350/hectare to a high of \$6,667/hectare. On average, clients pay a rate of about \$1 for every \$100 of coverage after the government subsidy (further discussed later).

3.2 Study Design

To measure the causal effect of separating a bundled microfinance product, we offered a crop microinsurance product in both bundled and separated ways. Individuals applying for a loan from Crezcamos were randomly assigned to be offered the new crop microinsurance product either immediately following the loan application (control), or at a later date after the loan application had been finalized (treatment). Traditionally, Crezcamos had offered the crop microinsurance concurrently with the loan application, in a bundled way. The loan approval process includes a visit to each applicant's farm, during which the loan officer completes extensive documentation, including a risk assessment, and offers additional insurance products to the applicant.

By randomly assigning individuals drawn from the same pool of loan applicants to either the control or treatment groups, we ensure that those who experience the two different types of insurance offers are identical in expectation in terms of both socioeconomic and demographic characteristics. In addition, the logistics of the randomization, detailed below, enabled a de facto stratification by loan officer, since the randomization happened on each loan officer's smartphone with a 50 percent chance of the client being assigned to either group. This design choice implies that our separation of credit and insurance is not as complete as it could be; in our setup, all products are offered by the same agent (the loan officer) of the same organization (Crezcamos). Our results therefore may not extend to a situation where an MFI and a separate insurance company each offer their own product to the same potential client base. Operationalizing the treatment as a time-separation of the insurance offer from the loan offer but keeping both "in-house" allows us to eliminate the influences of other factors on the demand for microinsurance, such as

trust and salesmanship of the loan officer, and narrow our focus on the joining or separation of the two offers which is at the heart of the bundled approach.

The random assignment of farmers to treatment (separate offer) or control (bundled offer) groups took place in the field with the use of a smartphone app. All loan officers are provided with a smartphone by Crezcamos for calling clients or their manager. The randomization app was loaded on the phone and used as part of the loan application process to determine whether to offer the crop insurance during that visit (bundled) or separately. In effect, the use of the phone app in the field stratified our randomization by loan officer, ensuring that all loan officers managed loan applicants assigned to both treatment and control groups. Individuals assigned to the control group were offered the crop insurance immediately after the loan application process (and after other insurance products had been offered). For individuals assigned to the treatment condition, the loan officers met with them again approximately three weeks following the decision to approve or deny the loan, and offered the insurance at that time.¹ Table 3 reports the averages of client and loan characteristics. The profile of individuals assigned to the treatment and control groups are very similar, and none of the differences are statistically significant. In addition, an F test of the joint significance of all the variables listed in Table 3 in a regression where the treatment assignment is the dependent variable returns a value of 1.19 ($p=0.292$), showing that the randomization was successful.

Our intervention included developing a standardized sales protocol and new sales tools, in collaboration with Crezcamos. The protocol included a precise script that loan officers

¹ Individuals whose loan application was denied were offered the crop insurance product, although none of them decided to purchase it.

used to describe the product, an explanatory video and current client testimonial that they showed loan applicants on their company-provided smartphone, as well as prepared answers to common questions. The protocol served two purposes. First, the protocol and associated tools supported loan officers in selling a complex new product both effectively and responsibly. One particular point of emphasis was to ensure that the clients understood that purchase of the crop insurance product was entirely voluntary, and would not have any effect on whether or not they would be approved for the loan. Additionally, we also wanted to ensure that loan officers were not pressuring individuals into purchasing the insurance product. Only a small proportion, 3.8 percent, of surveyed individuals reported in a follow-up survey that they felt pressured to purchase the insurance. Second, standardization helped to ensure loan officers took a consistent approach to each sale, allowing us to isolate the effect of our intervention.

CHAPTER 4. DATA SOURCES AND DESCRIPTIVE STATISTICS

4.1 Data Sources

We relied on four sources of quantitative data. The first was data on the random assignment from the smartphone app. This included descriptive data, such as client name, loan officer name, client identification number, and whether the client was assigned to the treatment or the control group. The second was administrative data from Crezcamos on all loan applicants and loans disbursed during the study. This data includes demographic information, information about the client's farm and other economic activities, loan amount and loan term. Third, we use records of which clients purchased the crop insurance product from the underwriting insurer. For those who purchased the insurance, this data also provides details of the amount of coverage purchased and premium paid. Finally, we conducted a short telephone survey of clients to measure their understanding and recall of the insurance product. We focus on measures of (i) whether the client understood that the insurance was voluntary, and wouldn't affect loan approval (ii) whether the client reported purchasing the crop insurance product, (iii) whether the client knew the perils covered by the product, and (iv) whether the client felt pressured by the loan officer to purchase the insurance.

During our study period of March 10 to October 31 of 2015, the randomizing app was used 426 times. Of the 426 total uses of the randomizing app, 58 were dropped from the

analyses, for reasons detailed below, so that our analysis sample includes 368 loan applicants who were assigned to either the treatment or the control group. First, 16 clients were mistakenly visited twice; in all analyses we consider the earlier assignment, and the second app use was removed. Second, we removed 16 app uses that did not match with a loan application in the lender's database; these individuals approached loan officers about a loan, and were processed in the app, but decided not to continue their loan application for various reasons. Lastly, we removed 26 app uses for individuals who did not cultivate an insurable crop and were not eligible for the insurance. For these clients, the app should not have been used by the loan officer.

Of the 368 individuals in our analysis sample, 154 responded to the phone survey, for a response rate of 42 percent. About 40 percent of the individuals who did not answer the survey refused to participate, while we were unable to contact the remaining 60 percent after multiple attempts. Quality control calls, to which our short survey was very similar, are common in Colombia, which explains why some individuals refused to participate in the survey. Table 2 presents data on survey respondents and non-respondents. It shows that respondents were not significantly different from non-respondents in their demographic and socioeconomic characteristics. Respondents were, however, more likely to have purchased insurance than non-respondents (28 percent of respondents purchased insurance, versus 19 percent of non-respondents). In addition, of those who purchased insurance, survey respondents bought larger amounts of coverage and as such had higher premiums than non-respondents. These differences inform our findings about the effect of the treatment on knowledge and understanding of the product, but we cannot control for them in our statistical analyses.

4.2 Descriptive Statistics

Table 1, Panel A, shows detailed descriptive statistics on clients in our sample. On average, individuals were 45 years old, were predominantly male (75 percent) and married (68 percent).² Almost all individuals had some form of formal education, although rarely beyond the primary school level. The average number of economic activities, defined as the number of sources of income, including different crops, was 2.4; by drawing on various sources of income, households informally insure against risks to any one source. Of the 368 individuals who applied for a loan, 329 were approved (89 percent). The average loan amount was US\$1,268 and the average loan term was 20 months.

In regard to the insurance product, 84 individuals opted to purchase, for an overall take-up rate of 23 percent. The average amount of coverage was US\$1,257, with a large range (from US\$167 to US\$8,333). As mentioned before, the premium is subsidized at various rates depending on the crop. The average total premium before subsidy was US\$44, ranging from US\$5 to US\$329 and the average total premium actually paid (after the subsidy) was US\$14, ranging from US\$2 to US\$129. This results in an average rate of US\$1 per US\$100 of coverage.

² For our analysis, we considered individuals who stated they were “married” and individuals who stated they were “living with their partner” as married persons.

CHAPTER 5. RESULTS

5.1 Summary Statistics – Survey Measures

In addition to the information on demographics, loan characteristics, and insurance purchase, we have telephone survey responses for 154 individuals. Details about survey responses are listed in detail in Table 4, Panel B. Of the 154 respondents, 43 individuals (28 percent) purchased insurance and 111 did not. 30 percent of individuals were incorrect about whether or not they purchased insurance. Mostly these individuals stated that they purchased insurance, when in fact they had not. This is troubling in that it indicates that people were misinformed about their insurance status, the question was poorly phrased, or survey participants were not providing reliable answers.

Of the survey respondents, 38 percent of individuals incorrectly reported that purchasing the insurance product was required in order to get a loan. Crezcamos, along with many other MFIs, mandates the purchase of credit-life insurance with loans, and this may have contributed to the misunderstanding. Interestingly, however only 3.8 percent of survey respondents stated that they felt pressure to purchase the crop insurance by the loan officer. A majority of individuals (69 percent) either did not know the perils the insurance product covered or incorrectly listed an event that they believed was covered by the insurance product. Overall, knowledge was worse than expected, indicating the need to

tailor products so they are easy to understand and maximize efforts to increase client product understanding.

5.2 Bivariate Analyses

Because of the successful random assignment of individuals to treatment and control groups, simple comparisons of means in the two groups reveal the causal effect of separating the crop insurance offer from the loan application on the outcomes of interest. We present such comparisons in Table 4, before turning to multivariate analyses in order to increase the precision of our estimates and test their robustness.

Table 4 highlights three main findings. First, separating the offer of insurance from the loan application process did not lead to an increase in take-up of the insurance. On the contrary, the rate of insurance purchases was slightly higher in the bundled group (25 percent) than in the separate group (21 percent), although the difference is not statistically significant.

Second, while take-up rates were statistically equivalent in the two groups, the data provide suggestive evidence that separating the offer of insurance led to a decrease in the amount of coverage purchased. Individuals in the separate group purchased a lower average amount of coverage (US\$951) than individuals in the bundled group (US\$1,487). This lower coverage amount also means that total premiums before the subsidy and the premium the clients actually pay (after subsidy) are lower for the treatment group.

Third, and connected to the lack of effect on take-up, separating the insurance offer did not significantly increase measures of understanding of the insurance product. In the treatment group, 35 percent of individuals were incorrect about whether the insurance

was required, compared to 40 percent in the control group (not statistically significant). In regards to individuals incorrectly reporting whether or not they had purchased insurance, 36 percent of separate (treatment) group individuals were wrong about this question and only 25 percent were incorrect in the bundled (control) group, although these differences are not statistically significant. The majority of individuals in both groups were incorrect about the perils the product protected against, with 68 percent of the treatment group getting this question incorrect compared to 69 of the control group (not statistically significant). Finally, a small percentage of both groups reported that they felt pressured by the loan officer to purchase the insurance product, with 4.8 percent of the treatment group saying they felt pressure compared to 2.9 percent of the control group (not statistically significant).

Overall, while the results do not point to clear, statistically significant differences in product understanding between the two groups, the available evidence provides some suggestion that separating the insurance offer led to *lower* understanding of the product, contrary to our first hypothesis. More individuals in the treatment group were incorrect about whether or not they actually purchased insurance. This finding that separating the insurance offer from the loan does not lead to improved understanding can help to alleviate the consumer protection concerns of practitioners and researchers who worry that the voluntary bundling of microfinance products may have negative consequences for MFI clients.

5.3 Multivariate Analysis of Take-Up

Next, we ran a series of OLS regressions to determine if separating the insurance offer led to a higher rate of insurance purchase. We implement the following regression model to measure the intent-to-treat effect of our treatment on the take-up of insurance:

$$Y_i = \alpha + \beta T_i + \theta X_i + \delta Z_i + \varepsilon_i \quad (1)$$

where i indexes the individual loan applicants, Y is a binary variable equal to 1 if the individual purchased crop insurance and 0 otherwise, T is a binary variable equal to 1 if the individual was assigned to the treatment group and 0 if they were assigned to the control group. X is a vector of controls including applicants' number of economic activities, number of dependents, age, gender, marital status, education status, home ownership, loan amount, nature of the crop insured (permanent or transitory), and Z is a series of binary variables for each Crezcamos loan officer who participated in the study and for the month in which the app was used. We implement this model as linear probability models rather than as probits because some loan officers processed very few loan applications and did not sell any insurance policies. As such being assigned to one of these loan officers would perfectly predict not purchasing insurance and the corresponding observations would drop from the probit sample. We ran probit regressions to test the robustness of our findings, and results are qualitatively similar to the linear probability models (not shown). In all analyses, we cluster standard errors at the branch level. The coefficient of interest is β .

In all of the regressions using the insurance purchase decision as the dependent variable, all of the coefficients of interest are negative, but not statistically significant. This provides evidence that separating the insurance offer from the loan application does not

improve take-up rates, failing to support our Hypothesis 3. In column (1), we include only the control variables for loan officer and app use month (Z) and then measure the intent-to-treat effect. This analysis shows that being assigned to receiving the insurance offer separately (treatment) from the loan application process was associated with a 7.4 percentage point decrease in the likelihood to purchase the insurance, although the coefficients are not statistically significant.

In column (2) we include the additional control variables as specified in vector X in the model above. These results show a similar, but still insignificant, result. Columns (3) and (4) exclude individuals who do not cultivate a permanent crop, to see if there was a treatment effect for only these individuals. We see similar results for those who only have permanent crops, although again the treatment is not statistically significant.

In columns (2) and (4) when using the variable regarding loan amount, we denote individuals who were denied a loan to have receive a loan amount of \$US0.01, so that they are not excluded from the regression and we can still take the log of loan amount for the analysis. Without making this adjustment, we would lose individuals who were denied a loan from the analysis, both reducing our total number of observations for the regressions and causing us to not consider denied individuals in our analysis. It is worth noting that no one who was denied a loan by Crezcamos purchased the crop insurance product. Eliminating denied individuals from the analysis does not result in significant differences between the take-up rates of the two groups.

In Table 6 we investigate the heterogeneity of our main result. We run our main regression on sub-samples of the data according to loan size, gender, and age of the borrower. For all sub-samples, take-up was lower in the treatment group than in the

control group, but not statistically significantly so in any sub-sample. Columns (1) and (2) separate individuals based on the size of their loan, using US\$1,000, which is the median loan amount, as the cutoff point. Columns (3) and (4) run the analysis separately for men and women. Columns (5) and (6) separate individuals into young and old, based on the median age (44) of individuals.

Our analysis of the insurance take-up rate found no significant effect of receiving the offer separately on probability of insurance purchase. It is worth noting that while not significant, the coefficients for the treatment were negative in all of the regressions. This finding provides evidence against Hypothesis 3 and suggests that separating the insurance sale from the loan application has no, or possibly a negative, effect on the decision to purchase insurance when compared to a voluntary, bundled offering.

5.4 Extended Bivariate and Multivariate Analysis of Insurance Coverage

By performing a series of analyses regarding how the treatment affects the coverage amount individuals elect to purchase, we find suggestive evidence that separating the insurance offer from the loan actually decreases the amount of coverage people buy, particularly for men, younger individuals, and individuals with large (greater than or equal to US\$1,000) loans. This strengthens the preliminary analysis using two-sided t-tests which showed some indication that individuals who purchased insurance in the bundled group bought higher amounts of coverage than the separate group, contradicting Hypothesis 4. One limitation to this analysis is that there were only 84 individuals who purchased insurance, and thus our sample size is much smaller than the previous analysis of take-up rates. As such, we first conduct a series of t-tests, divided into subgroups, to

examine the effect of the treatment on coverage amount. Detail from these tests can be found in Table 7.

As mentioned previously, when examined overall, individuals in the treatment group purchase a lower amount of coverage on average (US\$951) than those in the control group (US\$1,487), a difference that is statistically significant at the 10 percent level. In all of the subgroups, individuals in the control group (bundled) purchased more coverage than individuals in the treatment (separated) group, although some subgroups exhibit more stark contrasts than others. Individuals with large loans purchased an average of US\$1,685 of coverage if assigned to the control group and only US\$1,010 if assigned to the treatment. Men in the control group purchased US\$1,757 dollars of coverage compared to US\$1,080 if in the treatment. Young individuals also purchased more coverage if they were in the control group, with coverages amounts on average being US\$1,821 compared to US\$946 if they were assigned to the treatment.

Since the overall difference in coverage is significant at the 10 percent level, we analyze coverage within a regression framework. We use the same regression model described in equation 1 above, but now use the amount of coverage as the dependent variable (Y_i). The results of the regression analysis suggest that being assigned to the treatment led to lower amounts of coverage, although the coefficient of interest is not significant at the 5 percent level or below in any of the analyses. Since premiums are calculated based on coverage amounts, this analysis also shows us that individuals in the treatment group have lower premiums, both before and after the government subsidy. Detailed results of our multivariate analysis of coverage amount can be found in Table 8.

The coefficients on the treatment variable in columns (1) and (3) suggest that being offered insurance separately from the loan application process had a negative effect on the amount of coverage purchased by US\$165 and US\$246 for all crops and only permanent crops, respectively. These regressions control for loan officer and the month app was used (vector Z variables), but do not include the other control variables described in vector X; in column (1) the sample includes all loan applications, in column (3) the sample is restricted to applicants with a permanent crop. When the X vector control variables are included the coefficients on the treatment indicator remain negative, but not statistically significant at the 5 percent level. Columns (2) and (4) are for the full sample and applicants with permanent crops only, respectively.

Based on the analysis of the coverage variable, there appears to be suggestive evidence that individuals who received the treatment had significantly lower amounts of coverage than individuals who did not. This contradicts Hypothesis 4, and lends evidence to support the fact that separating the insurance product from the loan may lead to decreases in coverage amounts.

5.5 Multivariate Analysis of Product Understanding

In terms of understanding of the product as measured by our survey, we expected the separation of the insurance offer and loan application to increase understanding by combatting the problem of information overload, and as a result of this, we hypothesized that take-up rates and coverage amounts would increase. However, in the face of the finding that the treatment did not improve take-up or coverage, we examine the survey data to determine if the treatment improved measures of understanding independent of

the take-up and coverage results, and find no support for our third hypothesis regarding product understanding alone. We measured how accurately clients answered survey questions to test understanding of the product across the two groups. Three of the four survey measures were insignificant, and there is evidence that client knowledge about whether or not they had purchased the insurance product was actually better in the bundled (control) offering.

The previous multivariate analyses of both take-up rates and coverage amounts yielded no evidence that separating the insurance sale from the loan application led to any increase in take-up rates or coverage amounts. In regards to survey responses, we also examined individuals answers to see if those in the treatment (separate) group had greater knowledge of the product than those in the control (bundled) group. We focused on the same four main variables as were mentioned in the bivariate analysis section regarding survey answers for the analysis: (i) whether the client understood that the insurance was voluntary, and wouldn't affect loan approval (ii) whether the client reported purchasing the crop insurance product, (iii) whether the client knew the perils covered by the product, and (iv) whether the client felt pressured by the loan officer to purchase the insurance. We used the same regression model as in the previous two analyses. The only difference from the previous analysis is that now Y_i is now a binary measure of each of the four survey responses measured. For dependent variables (i) (ii) and (iii) specified above, incorrect responses to these questions coded as 1 and correct answers were recorded as 0. For dependent variable (iv), the response was coded as 1 if the individual felt pressure to buy the insurance, and 0 if they reported they did not feel pressure.

Detailed results of the multivariate analysis of the survey measures can be found in Table 9. Again, all results shown are OLS regressions, because probit regressions drop certain observations for loan officers who only had a few uses of the app, and thus would perfectly predict the binary outcome variables. Columns (1) and (2) show a regression of the treatment on whether or not the individuals were incorrect about whether or not the insurance purchase was required in order to get a loan (which it was not). In Column (1), where there were control variables for both the loan officer and month the app was used (vector Z). The coefficient is negative, meaning that individuals in the treatment group were 9 percentage points less likely to state that the insurance was required, however, the results for this question were not statistically significant. Column (2) also has controls for the loan officer and month, but also includes the control variables in vector X . This regression also shows a negative, but not statistically significant, relationship between the treatment and respondents answers to whether or not the insurance purchase was required.

Columns (3) and (4) use whether or not the individual was incorrect when they were asked the question “Did you purchase the crop insurance product”. Surprisingly, 30 percent of survey respondents got this question wrong, and individuals in the treatment (separate) group were *more* likely to get this question incorrect by 19.5 and 28.4 percentage points, respectively. The treatment coefficient in column (3) is significant at the 10 percent level, while the treatment is significant at the 1 percent level in column (4). This finding is contrary to our Hypothesis 1, and provides evidence that individuals in the bundled (control) group actually recall their ownership status of the insurance product *better* than individuals in the separate (treatment) group.

Columns (5) and (6) use individuals being incorrect about the perils the product covers as the dependent variable. The results from these analyses show that individuals in the treatment group are slightly less likely to be incorrect about the perils covered by the product, although these figures are not statistically significant. Columns (7) and (8) use the individuals feeling pressured to purchase the product from the loan officer as the dependent variable. While this is not directly a question about knowledge of the insurance product, it is important from a consumer protection standpoint. If an individual felt more pressure to purchase in one of the two scenarios, that would be a major consideration. Being assigned to the treatment group increased the likelihood individuals reported being pressured into buying the insurance by 5.5 and 6.9 percentage points, respectively, in columns (7) and (8). However, the effect of the treatment was not statistically significant.

While the direction of the association is mixed for our four different measures of understanding and pressure to purchase in this analysis, there is no evidence to support the fact that separating the sale of the insurance product from the loan application increases understanding, contrary to our Hypothesis 1. There is also suggestive evidence that individuals assigned to the treatment group are worse at understanding whether or not they purchased the insurance product.

In addition to our main focus on the effect of the treatment on take-up rates, coverage amounts, and levels of understanding, our Hypothesis 2 aimed to ascertain whether higher understanding of the product was associated with higher take-up rates. We found evidence that individuals who understand the perils covered by the product and individuals who knew whether or not they had bought the insurance product had higher

take-up rates than individuals who were incorrect on these two survey measures, but we found no association between understanding about the voluntary nature of the product and take-up rates.

For this analysis, we compared survey respondents' understanding of the product by analyzing answers to the following questions: (i) whether the client understood that the product was not required (i) whether the client reported purchasing the crop insurance product and (ii) whether the client knew the perils covered by the product. To conduct our analysis, we implement the following regression model:

$$Y_i = \alpha + \beta S_i + \theta X_i + \delta Z_i + \varepsilon_i \quad (2)$$

where i indexes the individual loan applicants, Y is a binary variable equal to 1 if the individual purchased crop insurance and 0 otherwise, S is a binary variable equal to 1 if the individual was correct for the survey question being analyzed and 0 if they were not. X and Z are the same vector of variables as described in the previous regression analyses. A detailed breakdown of this analysis can be found in Table 10.

Looking first at the regression analyzing whether or not clients understood that the product was not required, we see that individuals who incorrectly answered this question were not statistically more or less likely to purchase the product. However, in examining the next column we see that individuals who were correct about their insurance purchase status had significantly higher take-up rates than individuals who were incorrect (an increase of 32 percentage points). This is due to the fact that most individuals who answered this survey question incorrectly stated that they purchased insurance, when they in fact had not purchased insurance and very few individuals who purchased the product incorrectly stated they had not purchased. Of surveyed individuals who did not buy the

insurance product, 40 percent incorrectly stated that they had purchased insurance, while only 5 percent of individuals who purchased the product incorrectly stated they had not purchased.

Another measure we examined was individuals recall of whether or not understanding the perils covered by the product increased the likelihood of purchase. As we can see, individuals who understood which perils were covered by the product correctly had take-up rates 24.5 percentage points higher than those who got the survey question wrong, and this result is statistically significant.

Of the three survey variables we analyzed to determine if understanding was associated with an increased likelihood of insurance purchase, two returned positive, significant results. This provides evidence that individuals who understand certain features of the product better are more likely to purchase the product, and supports our Hypothesis 2.

CHAPTER 6. DISCUSSION AND CONCLUSION

We investigate the effect of separating a voluntary bundle of credit and insurance on the demand for and understanding of insurance products. Applicants for agricultural microcredit loans in Colombia were randomly assigned to be offered voluntary crop microinsurance either together with their loan application, or a later date. While bundling can help MFIs and insurers expand outreach and lower costs and prices, it may also confuse borrowers who are focused on their loan application, and lead to lower take-up. Our results show that bundling financial products for low-income individuals in developing countries, in a voluntary manner, is a valid strategy for increasing financial access at the lowest cost. Individuals offered a loan and a crop microinsurance product in a bundled manner did not exhibit lower levels of understanding of the product, and were not less likely to choose to purchase the insurance. On the contrary, we found suggestive evidence that bundling led to better understanding of the insurance and higher coverage purchased. Additionally, in our analysis of how understanding of the survey affected take-up rates, we found some evidence that those who understood the product better were more likely to purchase insurance.

Our work suffers from two main limitations. First, we do not consider the actuarial value and relevance of the product to participants, either real or perceived. The research design

is internally valid regardless of product characteristics, but such characteristics do influence potential clients' decision to purchase as well as the broad understanding of the research results. The cost of the insurance (the average rate actually paid was \$1 for every \$100 of coverage) suggests that the insurance would be actuarially fair for clients exposed to losses with a probability of happening during the policy period equal to or greater than 1 percent. While we are aware of no research that provides probabilities of small-scale farmers in mountainous Colombia experiencing losses from one or more of the event(s) covered by this product, Colombia was ranked as one of the 20 countries most vulnerable to extreme weather risks as a result of climate change (Wheeler, 2011). In addition, Dietrich and Ibanez (2015) found that more than 80 percent of tobacco farmers in the same department of Colombia where this research was conducted, Santander, reported a shock in 2009-2010, which were mainly weather related in nature. Beyond the question of actuarial fairness, we do not know whether the product actually helps its customers manage (and ideally reduce) the risks that they face. Further research on the portfolio of risk management tools that small holder farmers use could provide such evidence.

Second, separating the offer of crop insurance from the loan application process has two implications for the potential client. The client receives the insurance offer at a separate time from the loan application and additionally, the client is not able to finance their insurance premiums with their loan payments, and individuals in the bundled group were. This means that individuals in the separate sale group must pay for the insurance upfront, while individuals in the bundled group can pay for their insurance in increments as they make their loan payments. Our experiment does not measure both of these differences

individually. However, since our treatment was designed to measure the effect of separating the insurance offer from the voluntary bundle, it is appropriate that we did not isolate these effects individually, as both the timing of the offer and financing differences are aspects of the bundling process. Future research could aim to test individually how changing the timing or altering the ability of clients to finance their premiums affects microinsurance take-up.

Despite these limitations, our work highlights the need for strong consumer protection measures in microinsurance. Understanding of the insurance product was low in both bundled and separate offer groups, suggesting that information and consumer protection around the offer of insurance products is key. Failing to understand basic elements of the product will prevent clients from utilizing the insurance effectively and may cause disappointment. When clients do not know they have coverage, they may fail to make a claim in the event of a loss unless reminded. If they do not understand the policy terms or have unrealistic expectations of the payout, they may experience an unintentional lapse in coverage or have misconceptions about how they will manage their finances in the event of a loss. Our finding that individuals had low overall knowledge of the product highlights the necessity for MFIs and other providers of microinsurance to improve efforts to make products understandable and ensure ongoing access to information to clients and potential clients.

Table 1 – Descriptive and Summary Statistics

	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>Standard dev.</i>
Panel A – Client characteristics				
1 if assigned to separate sale (treatment)	368	46.7	0	0.5
# of economic activities	368	2.4	2	1.044
# of children	359	2.9	3	2.166
# of economic dependents	359	1.1	1	1.393
Age	359	45	44	13
% female	368	25.3	0	0.435
% married	359	67.7	1	0.468
% with any formal education	358	92.7	1	0.26
% own home	368	69.8	1	0.46
Panel B – Loan and insurance characteristics				
Purchased insurance	368	22.8	0	0.42
Loan term (months)	368	20.1	24	6.9
Loan amount (USD)	325	1,267	1,000	904
Insurance coverage purchased (USD)	84	1,257	666	1412
Total premium (USD, before subsidy)	84	43.65	19.95	58.56
Premium actually paid (USD)	84	13.51	7.48	19.2
Insurance rate (per \$100 of coverage)	84	1.01	0.75	0.579
Percent of max coverage	83	25.1	16.7	25.6

Note. The sample includes 368 individuals offered insurance, 84 of whom chose to purchase. Percent of max coverage is calculated by dividing the maximum amount of coverage the client was eligible to purchase by the amount of coverage they actually purchased. The insurance rate is the average amount paid, after the government subsidy, for US\$100 of insurance coverage.

Table 2 – Differences in Surveyed and Non-Surveyed Individuals

	<i>N</i>	<i>All</i>	<i>Not Surveyed</i>	<i>Surveyed</i>	<i>P-Value</i>
% assigned to the treatment group	368	46.7	48.1	44.8	0.529
# of Economic Activities	368	2.4	2.4	2.4	0.736
# of children	359	2.9	2.8	3.0	0.609
# of dependents	359	1.1	1.1	1.1	0.984
Age	359	45	44	46	0.101
% female	368	25.3	25.2	25.3	0.984
% married	359	67.7	67.1	68.5	0.794
% any formal education	358	92.7	92.3	93.3	0.735
% homeowners	368	69.8	68.7	71.4	0.574
Loan term (months)	368	20.1	19.7	20.6	0.185
Loan amount (USD)	325	1,268	1,227	1,320	0.358
Coverage (USD)	84	1,257	933	1,567	0.039
Total premium (USD)	84	43.7	30.5	56.2	0.044
Premium paid (USD)	84	13.5	9.4	17.4	0.056
Insurance rate (per \$100 of coverage)	84	1.01	0.96	1.07	0.385
Percent of max coverage	83	25.1	20.8	29.1	0.140
Insured	368	22.8	19.2	27.9	0.048

Table 3 – Randomization Check – Bundled Vs. Separate Characteristics

	<i>N</i>	<i>Total</i>	<i>Bundled</i>	<i>Separate</i>	<i>P-Value</i>
# of economic activities	368	2.4	2.4	2.3	0.422
# of children	359	2.9	2.8	3.0	0.643
# economic dependents	359	1.1	1.2	1.0	0.114
Age	359	44.6	43.9	45.4	0.275
% female	368	25.3	28.6	21.5	0.121
% married	359	67.7	68.8	66.5	0.641
% any formal education	358	92.7	94.1	91.2	0.280
1 if own home	368	69.8	68.9	70.9	0.670
Loan amount (USD)	325	1,268	1,314	1,217	0.335
Loan term (months)	368	20.1	20.4	19.7	0.364
Permanent crop (%)	368	86.1	84.7	87.8	0.417

Table 4 – Outcome Variables Separated by Treatment

	<i>N</i>	<i>Total</i>	<i>Bundled</i>	<i>Separate</i>	<i>P-Value</i>
1 if bought insurance	368	22.8	24.5	20.9	0.418
Insurance coverage purchased (USD)	84	1,257	1,487	951	0.085
Insurance coverage purchased / loan amount	84	1.10	1.21	0.95	0.316
Total premium (before subsidy)	84	43.65	55.02	28.48	0.039
Premium actually paid	84	13.51	16.98	8.88	0.055
Insurance rate (per \$100 of coverage)	84	1.01	1.09	0.91	0.173
Percent of max coverage	83	25.1	26.9	22.8	0.471
Wrong about insurance required	152	37.5	39.8	34.8	0.531
Wrong about whether they had insurance	154	29.9	24.7	36.2	0.122
Wrong about the perils the insurance product protects against	154	68.8	69.4	68.1	0.864
Felt pressure to buy the insurance	131	3.8	2.9	4.8	0.566

Note. The insurance rate is the amount an individual paid for \$100 of insurance coverage. While this amount looks slightly larger for the control group, this is due to the fact that individuals who insure transitory crops pay a higher insurance rate than those who insure permanent crops. Very few individuals (4 of the 84 purchasers) who purchased insurance did so for transitory crops, and all of them were in the control group. These 4 individuals had an average rate of \$3.11, while purchasers of permanent crops had a rate of \$0.91. Consequently, if you examined the rates of only permanent crop purchasers and compared them across the control and treatment groups, you would find the average rate for both groups to be \$0.91. Percent of max coverage is representative of how much insurance individuals purchased as a percentage of how much they could have purchased, calculated by dividing the amount of coverage they purchased by the maximum amount they were allowed to purchase.

Table 5 – Effect of separating the offer of insurance on take-up rates

	(1) All Crops	(2) All Crops	(3) Perm Crops	(4) Perm Crops
treat	-0.074 (0.088)	-0.076 (0.093)	-0.078 (0.094)	-0.081 (0.096)
1 if permanent crop		0.057 (0.071)		
# of economic activities		0.004 (0.011)		0.016 (0.016)
# of dependents		-0.020* (0.010)		-0.014 (0.012)
age		-0.000 (0.001)		0.000 (0.001)
1 if female		0.073 (0.056)		0.085 (0.059)
1 if married		0.032 (0.061)		0.005 (0.060)
1 if any formal ed.		0.043 (0.058)		0.068 (0.054)
1 if own home		-0.005 (0.036)		0.001 (0.042)
Ln(loan amount)		0.035* (0.015)		0.035* (0.017)
Constant	0.126 (0.203)	0.008 (0.124)	0.222 (0.166)	-0.024 (0.225)
Observations	368	356	317	306
R-squared	0.389	0.424	0.383	0.416

Note. Standard errors clustered at the branch level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Includes control variables for loan officers and month of app use. All regressions are OLS. Column (1) is an regression of insurance purchase on the treatment including controls for each loan officer and the month in which the app was used. Column (2) is similar to (1) but with additional control variables. Columns (3) and (4) are the same as (1) and (2), except that Columns (1) and (2) use all of the crops for analysis while regressions (3) and (4) use only permanent crops.

Table 6 – Effect of separating the offer of insurance on take-up rates, subgroups

	(1) Small Loan	(2) Large Loan	(3) Men	(4) Women	(5) Young	(6) Old
treat	-0.043 (0.082)	-0.104 (0.081)	-0.064 (0.065)	-0.010 (0.153)	-0.089 (0.078)	-0.101 (0.121)
Observations	163	201	275	93	186	173
R-squared	0.437	0.467	0.372	0.589	0.462	0.432

Note. Standard errors, clustered at the branch level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Includes control variables for loan officer and month of app use. All of the above regressions are OLS.

Table 7 – Coverage Amounts separated by treatment, with subgroups

	<i>N</i>	<i>All</i>	<i>Control</i>	<i>Treatment</i>	<i>P-Value</i>
Overall	84	1,257	1,487	951	0.085
Small	31	1,048	1,184	833	0.429
Large	53	1,380	1,685	1,010	0.111
Men	56	1,443	1,757	1,080	0.102
Women	28	887	1,037	617	0.313
Young	46	1,498	1,821	946	0.109
Old	38	967	977	956	0.925

Note. Data in the all, control, and treatment group columns are averages, for the entire sample of insurance buyers (first line) and for various subgroups. All averages are denominated in USD.

Table 8 – Effect of separating the offer of insurance on coverage amount

	(1) All Crops	(2) All Crops	(3) Perm Crops	(4) Perm Crops
treat	-165.278 (264.060)	-168.956 (94.970)	-245.971 (290.553)	-174.244* (78.797)
1 if permanent crop		1,726.561*** (125.843)		
# of economic activities		-181.398* (79.256)		-172.082* (80.021)
# of dependents		-323.449*** (37.041)		-325.566*** (37.974)
age		-4.765 (4.097)		-2.827 (3.693)
1 if female		-140.082* (71.348)		-135.119 (79.569)
1 if married		143.773 (315.967)		159.379 (313.655)
1 if any formal ed.		-69.971 (273.790)		-64.851 (328.911)
1 if own home		195.445 (119.061)		176.762 (121.787)
Ln(loan amount)		575.978** (224.872)		549.774* (235.499)
Constant	879.179 (501.839)	2,010.993** (663.837)	5,158.382*** (279.046)	429.229 (389.794)
Observations	84	84	80	80
R-squared	0.640	0.741	0.651	0.734

Note. Standard errors, clustered at the branch level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Includes control variables for loan officers and month of app use. All of the above regressions are OLS. Columns (1) and (2) include all crops, with additional control variables as listed in column (2). Columns (3) and (4) are for permanent crops only.

Table 9 – Effect of separating the offer of insurance on knowledge of the product

	(1) Required	(2) Required	(3) Bought	(4) Bought	(5) Perils	(6) Perils	(7) Pressure	(8) Pressure
treat	-0.090 (0.109)	-0.055 (0.125)	0.195* (0.104)	0.284*** (0.076)	-0.005 (0.038)	-0.010 (0.068)	0.055 (0.038)	0.069 (0.057)
1 if permanent crop		0.228 (0.147)		0.069 (0.079)		0.154 (0.100)		-0.054 (0.173)
# of economic activities		-0.064 (0.037)		-0.079** (0.026)		-0.019 (0.048)		0.025 (0.030)
# of dependents		0.048 (0.030)		-0.009 (0.027)		0.058* (0.028)		-0.010 (0.017)
age		0.008* (0.004)		0.001 (0.004)		0.002 (0.005)		0.002 (0.002)
1 if female		0.072 (0.097)		0.135 (0.135)		-0.077 (0.162)		0.061 (0.101)
1 if married		0.214** (0.089)		-0.031 (0.070)		-0.015 (0.086)		-0.009 (0.028)
1 if any formal ed.		-0.174 (0.242)		-0.247* (0.126)		0.320 (0.301)		0.084 (0.067)
1 if own home		-0.070 (0.106)		0.014 (0.048)		-0.014 (0.105)		-0.004 (0.057)
Ln(loan amount)		-0.004 (0.045)		0.013 (0.062)		0.039 (0.035)		0.021 (0.025)
Observations	152	147	154	149	154	149	131	128
R-squared	0.341	0.456	0.403	0.465	0.225	0.283	0.226	0.291

Note. Standard errors, clustered at the branch level, in parentheses. ***p<0.01, **p<0.05, *p<0.1. Columns (1) and (2) use individual was wrong about whether or not insurance was required to get a loan as dependent variable. (3) and (4) use individuals was wrong about whether or not they purchased the insurance product. (5) and (6) use incorrect about the perils covered by the product. (7) and (8) use felt pressure to buy the insurance product. Control variables for loan officers and month app were included in all regressions, not shown. Control variables as specified by vector X included in even numbered columns only.

Table 10 – Insurance Take-Up by Correct Survey Answers

	(1) Required	(2) Bought	(3) Perils
Correct about Insurance Required	-0.020 (0.073)		
Insurance Purchased		0.323*** (0.067)	
Perils Covered			0.245*** (0.058)
1 if permanent crop	0.113 (0.116)	0.122 (0.107)	0.165 (0.103)
# of economic activities	0.007 (0.064)	-0.019 (0.058)	-0.001 (0.053)
# of dependents	-0.013 (0.029)	-0.018 (0.030)	0.002 (0.023)
age	0.002 (0.003)	0.002 (0.003)	0.003 (0.002)
1 if female	0.218 (0.177)	0.235 (0.134)	0.196 (0.162)
1 if married	0.004 (0.109)	0.010 (0.102)	-0.004 (0.101)
1 if any formal ed	0.132** (0.057)	0.045 (0.079)	0.178 (0.112)
1 if own home	0.008 (0.041)	0.013 (0.042)	-0.005 (0.037)
Ln(loan amount)	0.057* (0.027)	0.053*** (0.013)	0.069* (0.031)
Constant	-0.725** (0.259)	-0.904*** (0.261)	-1.007*** (0.249)
Observations	147	149	149
R-squared	0.511	0.572	0.554

Note. Standard errors, clustered at the branch level, in parentheses.

*** p<0.01, ** p<0.05, * p<0.1. Dependent variable is insurance take-up rate.

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