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Social Security Health Insurance for the Informal Sector in Nicaragua: A Randomized Evaluation

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Abstract

This paper evaluates a program that randomized incentives to obtain health insurance among informal sector workers in Managua, Nicaragua. In January 2007, the government of Nicaragua extended a health insurance program to informal sector workers using microfinance institutions. We randomly varied the costs of enrolling as well as randomly assigned different affiliation locations to sign up for the insurance: either at the central Social Security (INSS) office, or the participating microfinance institutions. Costs were crucial to signing up for health insurance – both monetary costs (subsidies) as well as convenience costs associated with enrollment. Approximately one year after being offered the insurance, insured individuals switched from using services at private and Ministry of Health facilities to visiting covered health facilities contracted by INSS. Total out-of-pocket expenditures were reduced among insured individuals, but the average out-of-pocket savings were lower than the equivalent unsubsidized insurance premiums. We also found very low retention rates after expiration of the subsidy, with less than 10 percent still enrolled in the insurance program after one year. In addition to the quantitative results, we present qualitative evidence that institutional and contextual factors are essential for understanding the results and limitations of this program and are important to consider for other similar insurance programs.

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1. INTRODUCTION

There is a growing interest among policy makers and academics regarding the delivery of insurance programs to poor and vulnerable populations throughout the world, as a way of increasing access to priority health services and protecting families from catastrophic health care costs. [1] There is evidence, however, that uptake of voluntary health insurance among informal and low-income workers is typically low (Behrman & Knowles, 1999; Jowett, 2003; Morduch, 1999; Chankova et al., 2008; Gine et al., 2007; Alderman & Paxson, 1992; Fafchamps, 1992). Moreover, collecting payments from this population is challenging (Abel-Smith, 1992), and there is concern that insuring the poor will attract those who are less healthy. Existing synergies between the delivery of financial and health services to clients in the informal sector have led policy makers to believe that micro-finance institutions (MFIs) may be a promising and innovative delivery agent to extend health insurance to low-income and other vulnerable groups (Matin, Hulme & Rutherford, 2002; Churchill, 2003; Churchill & Cohen, 2006), as there are economies of scale for collection of payments, particularly in settings where MFI penetration is high.

Despite the recent and increasing interest in micro-health insurance programs (Preker et al., 2002; Gumber & Kulkarni, 2000; Franco et al., 2008; Smith & Sulzbach, 2008), there is little rigorous evidence on the effectiveness of health insurance schemes targeting the informal sector, specifically regarding the potential role of MFIs in marketing and delivering the insurance products, and the schemes' ability to reduce out-of-pocket expenditures and increase utilization of quality health services. One of the main reasons for this lack of evidence is the difficulty in making causal inferences from cross-sectional or panel studies. Non-experimental studies that aim to measure the impact of having health insurance usually suffer from omitted variable bias. Typically, those who are more likely to be sick or utilize health services will also be more likely to enroll in health insurance programs. Thus comparing outcomes for those with

[1] There are a growing number of health insurance programs and academic evaluations on these programs in developing countries. See for example Abel-Smith (1992); Barros (2008); Dow and Schmeer (2003); Duflo, Banerjee, and Deaton (2004); Gakidou et. al. (2006); Gertler and Gruber (2002); Gertler and Solon (2002); GTZ, ILO and WHO (2005); Kremer et al. (2006); Miller et al. (2008); Panopoulus and Velez (2001): Pauly, Zweifel, Scheffler, Preker, and Bassett (2006); Pauly et al. (2008); Wagstaff (2007).

health insurance to those without health insurance is likely to confound these other factors that are correlated with the choice to purchase insurance, although the direction of the bias is ambiguous. Perhaps the most similar paper to this one is an evaluation of the expansion of government health insurance in Mexico in 2002 to the informal sector. Barros (2008) evaluates this roll-out finding – similar to our results – that there was a substitution of visits to service providers and a reduction in out of pocket expenditures. Our paper differs in that we have a randomized evaluation as well as in-depth qualitative results.

This paper evaluates a program that randomized incentives to obtain health insurance, enabling us to estimate the causal effects of having insurance among informal sector workers who were previously uninsured. Moreover, this study sheds light on the effectiveness of micro-finance institutions as a health insurance delivery agent as well as potential advantages or challenges to targeting MFI clients.

In January 2007, the government of Nicaragua initiated a demonstration project that extended the Nicaraguan Social Security Institute's (INSS's) health insurance program to informal sector workers using microfinance institutions (MFIs) as delivery channels. To evaluate the impact of the program on healthcare utilization and expenditures, we randomly varied the costs of enrolling in the newly-available health insurance program among a sample of market vendors (including monetary, informational, and convenience costs). To test the effectiveness of MFIs as a delivery agent, individuals were also randomly assigned to sign up for the insurance at different locations: either at the INSS central office, or at the branch offices of three participating MFIs. Approximately one year after the baseline survey, we conducted a follow-up survey among a subset of the respondents. In addition to the quantitative analysis of the demand for and effects of health insurance, we also conducted a series of focus groups and in-depth interviews to understand uptake of the insurance program and use of health services from a qualitative perspective.

An in-depth description of the take-up of insurance among the full sample of 4,000 respondents is discussed in *Randomized Evaluation of a Program Extending Social Security Health Insurance to the*

Informal Sector via MFIs in Nicaragua, Baseline Report, July 2007. In that paper, Thornton, Gonzalez and Islam find that costs are crucial to signing up for health insurance – both monetary costs as represented by the subsidies offered as well as convenience costs as represented by a direct effort to enroll individuals at their place of work. In this paper, we study approximately 2,600 informal sector workers who were interviewed at both the baseline and follow-up surveys and examine the determinants of retention in the insurance program as well as the effects of signing up for insurance on utilization of health services and health expenditures. In addition, we examine the effectiveness of MFIs in the delivery of health insurance to informal sector workers and potential differences between MFI-clients and non-MFI clients along each of these dimensions.

We find that insured individuals switched from using services at private and Ministry of Health facilities to visiting covered health facilities (including both private and public providers). However, insurance did not increase their overall utilization of services significantly. Total out-of-pocket expenditures fell when individuals were insured, but the average out-of-pocket savings were lower than the equivalent unsubsidized insurance premiums. We find very low retention rates after expiration of the subsidy, with less than 10 percent still enrolled in the insurance program after one year. The fact that insurance may only be perceived as a net gain for those who are most sick or who experience a negative health shock may explain overall low enrollment rates in insurance programs in developing countries where individuals have lower levels of discretionary income.

In this setting, MFIs were not a more effective health insurance delivery agent than the government. Take-up and retention of insurance was not higher when individuals were assigned to sign up at an MFI rather than at the INSS. Focus group discussions shed some light on this finding, with many informal sector workers suggesting that the participating MFIs had limited knowledge of health insurance, added bureaucracy to an already bureaucratic process, and were perceived to have increased the cost of the product by functioning as an intermediary. Nevertheless, some workers pointed to the convenience of MFI locations as well as easy payments as advantages of having MFIs involved in the process, and those

MFIs that made a greater effort to learn about the insurance and market it to their clients performed better in terms of uptake. Participants who were MFI clients at baseline were slightly more likely (3.3 percentage points) to enroll in the insurance; notably, they were also more likely to report diabetes, hypertension and stress -- factors that were also related to higher uptake rates of insurance. This evaluation points to a number of obstacles in working with MFIs that must be addressed, including bureaucratic and administrative challenges and those related to promotion and marketing.

The paper proceeds as follows: Section 2 presents the background and program description for the health insurance product in Nicaragua. Section 3 presents the quantitative methodology and empirical strategy, and Section 4 presents quantitative results of the evaluation. Section 5 discusses contextual findings and qualitative results, and Section 6 concludes.

2. BACKGROUND AND PROGRAM DESCRIPTION

Prior to the expansion of health insurance to informal sector workers in January 2007, only formal sector workers and government employees in Nicaragua – representing just 18.5 percent of the economically active population – were eligible for INSS health insurance and could access services at INSS contracted facilities. Individuals working in the informal sector, the self-employed, and the unemployed were not eligible. They were eligible for free care at Ministry of Health (MINSA) clinics or could pay out-of-pocket for services from private providers. However, available MINSA facilities were under-resourced and lacked the infrastructure, staff, and medications needed to respond adequately to the population's health needs. Focus groups with informal sector workers conducted in 2006 revealed that they perceived MINSA facilities as offering the lowest quality of care in comparison to INSS-contracted facilities and other private health providers. As a result, these workers, who were often too busy to wait on long lines at MINSA facilities would go directly to pharmacies for their basic care. Potentially more costly alternatives included paying private doctors or avoiding care altogether, incurring the risk of requiring more extensive and costly procedures down the line.

For a micro-entrepreneur in Nicaragua, as in many parts of the developing world, the vulnerability of her/his household and business cash flows to a family health crisis is extreme (see Dercon, 2002). Micro-entrepreneurs often must divert resources from their businesses to meet immediate health care needs at the expense of investing in their business and its future growth, which in turn can have a significant impact on future household income (McIntyre et al., 2006; Morduch & Sharma, 2002; Narayan et al., 2000; Russell, 2004). Health insurance can therefore serve a vital risk protection function for small businesses, as well as increasing access to priority health services for informal workers and their families.

The health insurance provided through the Nicaraguan government Social Security system (INSS) extends quality care to its formal sector subscribers, and is based on mandatory payroll and employer contributions. This health insurance was made available to informal sector workers in 2007, through a voluntary mechanism known as *Seguro Facultativo de Salud*. In this program, insured individuals and eligible dependents pay a flat monthly fee for covered services, but no co-pays at the time of service. The monthly fee is higher in the first two months, at approximately 18 dollars per month, and falls to approximately 15 dollars per month in subsequent months. If a subscriber should wish to disenroll, s/he continues to be covered during a three month grace period after s/he has stopped paying for service before the affiliation is cancelled.

INSS contracts with commercial, not-for-profit and public providers called Clinics for the Insured (formerly Empresas Médicas Previsionales and referred to in this paper as EMPs) and purchases services on a capitated basis. The INSS insurance provides all beneficiaries with a comprehensive package of preventive, diagnostic, and curative health services, including primary and specialist care, medication and laboratory exams, hospitalization, 24-hour emergency care, prenatal care, childbirth and post-natal care, infant care and vaccinations, child wellness visits through age 5, pediatric care through age 11, voluntary family planning counseling and contraception, breast and cervical cancer screenings, HIV and STD counseling, and prevention and treatment of dengue fever and malaria. In addition to the subscriber, the

subscriber's wife is eligible for maternity services, including deliveries, and dependent children up to the age of 12 are also covered.

According to our data, approximately 58 percent of small business owners in Managua have a loan, the majority with a microfinance institution. Nicaraguan policymakers wishing to extend insurance to informal workers hypothesized that it would be more convenient for them to make health insurance payments at the same time as making payments on loans at MFIs, thus the justification for initiating the demonstration project, to contract MFIs to market the insurance and collect premiums. Three MFIs were selected to participate: ACODEP, Banco ProCredit, and Findesa.[2] Each received technical assistance with management information systems, operations, and marketing, and received training to familiarize them with the process of signing up informal workers for health insurance. The MFIs signed a one-year contract with INSS in October 2006 for registering subscribers and collecting payments, and received a small fee from INSS for each enrolled worker. Beginning in January 2007, individuals could sign up for the insurance at any branch of these participating MFIs, which would send all paperwork to INSS. Monthly payments could be paid at any participating MFI as well as through most banks in the country.

Over the course of the evaluation, a number of institutional and political changes took place that influenced project implementation. Importantly, the MFI partnerships were established under the government of Enrique Bolaños, who was replaced in January 2007 by incoming President Daniel Ortega – an administration with a radically different political ideology. In October 2007 INSS chose not to renew the contracts with the three selected MFIs for registering subscribers and collecting payments. Interviews with senior INSS officials suggested that this decision was motivated by a number of factors, including a feeling by the INSS that this was a low-priority project and a political backlash against MFIs at that time, as they were being accused of predatory lending by the government. We discuss more details about these institutional changes and their implications below.

[2] The USAID-funded Private Sector Partnerships-*One* project (PSP-One) supported the INSS in coordination and training activities between July 2006 and March 2007. Initial trainings took place prior to the project's expected roll out in July/August 2006 and were replicated in October and November 2006 by the INSS. However, the project was actually rolled out in January 2007. Delays were primarily caused by the presidential elections in November 2006 and the initiation of the new administration in February 2007.

3. RESEARCH DESIGN

3.1. Data Collection and Study Design

In order to measure the determinants of insurance enrollment as well as the causal effects of having insurance, we implemented a randomized evaluation that varied the costs (financial, informational, and convenience) of signing up for health insurance. Data collection involved a baseline survey and subsidy lottery, collection of insurance affiliation data, and a follow-up survey; each is described in detail below.[3]

Between March and June 2007, a few months after the rollout of the insurance program to informal sector workers, a baseline survey was administered to a representative sample of vendors in all of the open-air markets in central Managua with at least 500 vendors. We chose to conduct our study in these markets because they were likely to contain a large population of uninsured informal sector workers who were micro-finance clients. The survey collected information on demographic characteristics; prior and current health services utilization; socio-economic characteristics; and health care expenditures. Government ID numbers were collected in order to match respondents to health insurance enrollment data that would later be provided from the government. The baseline survey was held in two rounds, in March/April 2007 and June/July 2007, respectively. The first round was held in 48 blocks of the Mercado Oriental, Managua's largest marketplace, while the second round was held in 25 blocks of the Mercado Oriental as well as all blocks of 6 smaller markets (Huembes, Iván Montenegro, Virgen de la Candelaria, Mayoreo, San Judas and Israel Lewites).

Prior to the first round of the baseline survey, a census of each booth of the Mercado Oriental was conducted in order to define the sampling frame of possible respondents.[4] Participants deemed eligible

[3] All research activities were approved by the Abt Associates Internal Review Board, and all respondents gave informed consent.

[4] In round one, we conducted a census of all of individuals who worked in a formal booth in the Oriental Market during the past twelve months. We divided the market into 98 blocks using a map of the market; 25 blocks were excluded from the sample either because they were dangerous or had no businesses. We then randomly selected eligible respondents (stratified by gender, marital status, and MFI client status). Due to a lower than expected

through the census were selected randomly and administered the full survey. Eligibility depended on age, (between ages 18 and 54), being the owner of the booth, having a government ID and a lack of current health insurance coverage.[5] Appendix A, Panel A, presents the completion rates of the baseline survey. During the first round, 1,193 market vendors were approached and 61 percent or 728 market vendors completed surveys. During the second round of the baseline survey, we broadened the scope of the study to include six additional large markets in the city and approached all booths, rather than randomly selecting respondents from a sampling frame. Of the 6,192 market vendors approached in the second round, 53 percent or 3,274 completed surveys.

Refusal rates, eligibility, or availability of respondents may affect the external validity of the study. However, in term of internal validity measuring the causal effects of having insurance, our main identification strategy relies on the fact that we randomly allocated subsidies for health insurance. We describe the randomization procedure below.

3.2 Randomization Process

At the end of the survey, participants were invited to randomly choose a lottery ticket out of a stack of unmarked, pre-sealed envelopes. The distribution of the lottery tickets is presented in Appendix A, Panel B. The first round lottery prizes included a blank lottery ticket (pure control group); an INSS brochure on the insurance product; a 2-month insurance subsidy with instructions to sign up at the INSS office; a 2-month insurance subsidy with instructions to sign up at a MFI; a 6-month insurance subsidy with instructions to sign up at the INSS office; or a 6-month insurance subsidy with instructions to sign up at a MFI office. Subsidies were all provided in the form of a voucher and told that payments would be made on their behalf directly to the INSS.

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number of MFI clients, in round one we selected all MFI clients identified in the census. In booths where there was more than one MFI client, one person was randomly selected from the booth as part of the sample.

[5] Participants were required to display their government ID cards or a legible copy of their card. Surveyors offered vendors the opportunity to bring their cards on a subsequent day if they were interested in participating and re-visited vendors three times before disqualifying them as ineligible.

Because of low rates of enrollment in the insurance after the first round of the survey and subsequent power calculations, the pure control group and the 2-month subsidy groups were eliminated in the second round of the baseline survey. In the second round, only three prizes were offered: an INSS brochure, a 6-month insurance subsidy (Instructed to sign up at INSS office), and a 6-month subsidy (Instructed to sign up at MFI).

Toward the end of the second round of the baseline survey, a random sample of 112 respondents who had been offered a 6-month subsidy and 63 respondents who had been offered no subsidy – none of whom had yet subscribed – were offered the opportunity to sign up for health insurance at their market booth. Surveyors were trained to fill out the registration forms on site and were accompanied by a photographer who took required photos. On site enrollment eliminated respondents' travel costs and reduced the time costs related to taking photographs and making copies of their ID cards. In addition, it minimized potential psychological influences on enrollment such as procrastination or imperfect recall, and addressed constraints imposed by uncertainty regarding the enrollment process.

To determine who had signed up for the insurance, the INSS provided access to data indicating which respondents signed up for insurance and the place of affiliation (INSS or a participating MFI). These data could be linked to our survey data via government ID numbers, which individuals provided during the survey and when enrolling in the insurance.

During the spring of 2008, a follow-up survey was conducted among a subset of the original survey respondents – those who had booths in the largest markets (Oriental, Huembes, and Iván Montenegro). Respondents who had randomly been allocated 2-month subsidies were not approached to be interviewed at the follow-up survey due to the relatively low rate of insurance enrollment among this group. Since the group was randomly selected at baseline, excluding this entire treatment arm does not compromise the internal validity of our experimental design. A total of 2,806 respondents were approached for the follow-up survey. Out of these, 2,608 (93 percent), completed the follow-up survey. The reasons for attrition are presented in Appendix B, Panel A with the attrition rates by randomization

group in Panel B. There is almost no difference in the completion rates among each of the treatment groups.

3.3. Sample Characteristics

For the analysis of the determinants of health insurance enrollment and the effect of having health insurance, we include in our analysis the 2,608 respondents who completed interviews at both baseline and follow-up. In addition to presenting average baseline demographic characteristics of the entire sample, we also present the average statistics separately for MFI clients and non-MFI clients. This allows for understanding the potential effectiveness of targeting MFI clients for insurance products.

Table 1, Panel A presents some key demographic characteristics of the sample. The average age was 38 years old with 35 percent of respondents being male. These individuals had approximately 9.3 years of education on average and 70 percent were married or had a common-law spouse. This is higher than country-wide figure of 56 percent (ENDESA household survey, Nicaragua, 2006). The average number of children was 2 while two-thirds had at least one child under 12 – the maximum age for coverage of dependents by the INSS health insurance. Only 3 percent of the sample was pregnant or had a spouse who was pregnant.

There were some differences in basic demographic characteristics between MFI clients and non-MFI clients. In particular, MFI clients are just over 2 years older on average and are more likely to be female; only 28 percent of the MFI clients were male as opposed to almost 40 percent of the non-MFI clients. In addition, MFI clients had slightly more children. There were no differences in years of education, or in the likelihood of being married or pregnant.

Table 1, Panel B presents economic characteristics of our sample at baseline. Respondents had an average monthly income of US$238.[6] This is significantly higher than the reported national average household income of approximately US$140 per month, according to survey data reported from the

[6] Reported income for respondents and their spouse was reported in Nicaraguan Cordoba was converted to US Dollars at the rate of US$1 = 18.7 NIO.

Central Bank of Nicaragua (2006). Average monthly disposable income after business and household expenses was reported at US$25, with an average current savings balance of US$146. However, only 29 percent of the sample declared having disposable income at month end. Almost 58% had an outstanding loan, while one-third of the sample surveyed had a loan with an MFI. On average, total expenses for health over the prior year for the respondent and children under 12 were quite substantial at US$88, while for the respondent him or herself only the amount was approximately half that amount.

There were some socioeconomic differences between MFI clients and non-MFI clients. MFI clients reported higher monthly income (by approximately 38 dollars) and they were 6 percentage points more likely to own their home. MFI clients were no more likely to have savings and there was no difference in the savings balance, consistent with a lower need for precautionary savings among individuals with access to credit. MFI clients spent about 7 dollars more on their total health care costs for themselves.

Health information was also reported at baseline and is presented in Table 2, Panel A. Eighty percent of those surveyed reported being sick in the past year, with a mean value of 2.6 days and a maximum value of 72 days. On average respondents waited just over 4 days before visiting a provider, although many (45 percent) visited a provider after one day of being sick. Many respondents reported chronic or common recurring conditions such as kidney problems, diabetes, hypertension, respiratory problems, vision or hearing problems, stress, headaches, or allergies. In addition, 60 percent reported suffering from flu symptoms in the previous year.

Table 2, Panel B summarizes information on the last illness respondents reported experiencing in the previous 12 months. Almost half of illnesses are related to allergies or respiratory illnesses such as cold or flu. Other illnesses relate to diabetes or renal infections, circulatory problems, and digestive problems. The majority of reported illnesses are minor conditions. Only 11 percent missed more than a week of work due to their last illness and the majority (57 percent) missed zero days of work.

There were some health status differences between MFI clients and non-MFI clients. MFI clients

are slightly more at risk of diabetes, suffer stress, and suffer from hypertension. On the other hand, they are less likely to report smoking. While these differences exist, there are few other baseline differences between MFI clients and non-MFI clients that are either large in magnitude or statistically significant. In addition, there are no significant differences between MFI clients and non-MFI clients in terms of last illness experienced. Hence, our data do not point to any significant advantage of targeting MFI clients for micro-insurance programs because they are healthier.

Table 3 presents health facility utilization and expenditures. The survey found that pharmacies were the most visited of any health facility; 72 percent of survey respondents visited a pharmacy on average 3 times in the past year. Private sector facilities were utilized more than public sector facilities. In the previous year, 28 percent visited private doctors and 14 percent visited private clinics/hospitals, compared to 16 percent visiting public health centers and 9 percent visiting public hospitals. Only 1 percent of survey respondents reported visiting an INSS clinic (EMP) in the year prior to the baseline survey.[7]

The high representation of pharmacy visits is especially notable because public health centers and hospitals are supposed to provide medication free of charge, but anecdotally lack inventory on a regular basis. Results from focus group discussions confirmed this finding. Busy market workers often do not bother to attend a free clinic, where waiting times to see a doctor can vary between 2 and 6 hours, only to risk finding out that their medication is not available. Instead, they frequently prefer to go to a pharmacy, where a pharmacist might also recommend a medication and provide it immediately, and pay for the service.

While MFI clients and non-MFI clients are broadly similar in terms of health service utilization, there are a few notable differences. MFI clients are 8 percentage points more likely than non-MFI clients to visit a private doctor. In addition, among those who had at least one visit, the number of visits to private providers including pharmacies, private doctors, and private clinics/hospitals are also higher for

[7] EMPs primarily provide services to those eligible for INSS health insurance, although many offer services to noninsured paying customers as well.

MFI clients. This is possibly related to higher levels of income as we saw in Table 1; MFI clients may be able to afford more frequent and more costly care provided by private providers and pharmacies. Alternatively, the higher fraction of women and children in the sample of MFI clients may be driving the difference in visits.

The baseline data provide information on both total out-of-pocket health expenditures over the previous twelve months per individual and family as well as how much these participants spent on their last illness. Respondents reported OOP expenses in both public and private facilities. Total expenses over the prior year for the respondent and dependent children were US$88 (Table 1, Panel B), and expenses for the respondent alone were US$42. Women reported spending more on health (US$53.5) than men (US$37.5) over the last year. These expenditures are substantially higher than OOP family health costs in the general population (US$28) according to the 2003 National ENDESA survey in Nicaragua, even considering an additional $12 adjustment for inflation over the period. However, these expenditures are less than the equivalent unsubsidized cost of the insurance over a year (US$176).

Respondents' expenses reported at individual facilities also match the utilization findings. Costs were lowest at subsidized public health centers; respondents spent an average of US$0.26 at public health centers (N=407). The bulk of expenditures were incurred at pharmacies. Of those who attended a pharmacy during the past year (N=1,862), respondents reported spending on average US$43.1 at a pharmacy. Of those attending a private doctor (N=709), respondents reported spending US$0.94 per year. This low cost may reflect the prevalence of non-governmental organizations (NGOs) that provide health services at subsidized costs for low income groups in Nicaragua as well as individual private doctors and nurses that practice out of their homes. Similarly, of those attending each of the respective facilities, respondents spent US$25 at private hospitals (N=363), and US$2.33 at public hospitals (N=227). It is useful to note that the median amount spent at each facility was substantially lower than the average, indicating that some individuals had rather high expenses.

It is important to note that reported out-of-pocket medical expenses for participants and their

children under 12 years ($88) were on average less than the equivalent unsubsidized cost of the INSS' health insurance premiums, which is approximately US$176 per annum. This indicates potentially low willingness-to-pay for a health insurance plan among this population given that for many individuals, premiums cost more than their expected OOP expenses. Those who spent more than $176 per year on themselves and children under 12 years represented only 13 percent of the respondents. This could also be one reason for the low retention we later find for the insurance product.[8]

Baseline differences between MFI clients' and non-MFI clients' health expenditures were quite small overall. MFI clients reported higher health care expenditures (approximately 7 dollars more; Table 1 Panel B) and laboratory costs were significantly higher among MFI clients. This is likely to be due to the higher income levels of MFI clients rather than higher levels of sickness as the difference in health expenditures are eliminated after controlling for income.

These findings show that MFI clients are less likely to use public facilities than non-MFI clients, and spend slightly more out of pocket on health. Part of the INSS' expectation was that as informal businesses signed up for INSS insurance, they would free up public Ministry of Health resources and allow the public sector to focus its limited resources on the extreme poor. Even prior to the program, it seems there was already segmentation between groups, with MFI clients preferring to replace some public services for private.

We next turn to estimating the determinants of enrollment, retention, and the effects of having insurance on utilization of health services and on out of-pocket health expenditures. To begin, we outline our empirical strategy to estimate causal effects.

4. EMPIRICAL STRATEGY

Most cross-sectional or panel studies that examine the impact of having health insurance suffer from

[8] The low cost of private and public sector providers being sought out by these respondents, and the OOP costs below the cost of INSS insurance suggests that respondents are combining available services more efficiently than the INSS in terms of pricing. Further analysis could be done that evaluates the quality of the services they are using and whether a more efficient "package" can be offered by the INSS or other insurers.

potential omitted variable bias, in which an individual's unobservable propensity to purchase insurance is related to her underlying health profile or risk preferences. This makes causal inference of the impact of health insurance on health and related outcomes difficult – typically, those who need the insurance due to greater risk of illness are more likely to sign up, and because they are more likely to be sick, the observed impact of having insurance is biased. A randomized study design such as that utilized in this evaluation reduces biases in analysis due to possible selection effects by guaranteeing that, in expectation, comparison groups are composed of the same underlying types. Appendix C provides evidence to suggest balanced randomization on observable baseline characteristics. There are some differences between insurance subsidy and control groups; however, these differences are small in magnitude. The results are similar across MFI clients and non-MFI clients (results not shown).

To measure the determinants of signing up for insurance, including the amount of subsidy received and the assigned location for enrollment, we estimate the following regression equation:

$$(1) \quad Insurance_i = \alpha + \beta_1 Information_i + \beta_2 6Months(INSS)_i + \beta_3 6Months(MFI)_i + \beta_4 OnSite_i + \beta_5 6Months * OnSite_i + X_i'\mu + \varepsilon_i$$

where "*Insurance*" is an indicator if respondent 'i' signed up for health insurance. "*Information*", "*6Months(INSS)*", "*6Months(MFI)*", "*OnSite*", and "*6Months*OnSite*" are indicators of the randomized lottery received, thus the pure control group is the omitted category (recall that we do not examine those receiving two-month subsidies as this group was not interviewed in the follow-up survey). A vector of controls is included such as age, age squared, gender, years of education, an indicator if married, and market fixed effects. We cluster standard errors by market in each specification. In some specifications we also control for baseline health expenditures and health status indicators. Data are pooled from Round I and Round II baseline surveys and round fixed effects are included. To measure how MFI clients may respond differentially to the random assignment of affiliation, we also estimate equation (1) separately by MFI client status.

In the second stage, we evaluate the effects of health insurance on health care utilization and expenditures. The randomized first stage predicting health insurance enrollment (specification (1) above)

allows for an instrumental variables analysis of the effects of insurance. In the second stage we estimate:

(2) $Y_i = \alpha + \beta_1 Insurance_i + X_i'\mu + \varepsilon_i$

where "*Y*" is the outcome variable of interest (health expenditures or number of health care visits at follow-up) and "*Insurance"* enrollment is instrumented with the vector of treatment indicators (whether received each of the four incentives to enroll). The F-statistic of the excluded instruments is large, at 147.4.

To estimate the determinants of retention, we re-estimate (1), with the dependent variable indicating whether the respondent was still paying for health insurance at the follow-up survey and only include the 530 individuals who had enrolled in the health insurance program. We examine both the impact of receiving an insurance subsidy as well as potential differential effects of being an MFI client. For several specifications, because of the small sample size of individuals who were in the control or information-only treatment arms, we eliminate all but the 6-month subsidy groups (and eliminate the "on-site" affiliation group) to study differential effects of signing up at an MFI on retention. While signing up at an MFI was randomized, estimating the effects of place of affiliation on retention is complicated by the fact that this specification is estimated only among those who chose to sign up for insurance – which is endogenously determined.

5. RESULTS

5.1 Take-up of Insurance

Overall, 20.3% of our sample signed up for insurance. Table 4 presents the OLS regression results predicting take-up of insurance. There is no statistically significant difference in take-up between those receiving an informational brochure and the control group (Column 1). Those receiving a 6-month subsidy and assigned to register at the INSS office are 33 percentage points more likely to take up insurance than the control group receiving no information, and those receiving a 6-month subsidy and assigned to register at a participating MFI are 28 percentage points more likely to sign up for insurance

than the controls. The difference in uptake between those assigned to enroll at INSS vs. an MFI is statistically significant (p-value = 0.002). Section 6 below summarizes the results of focus group interviews held in 2008 which also suggest that many survey respondents did not understand the purpose of the MFI serving as an agent for the insurance, preferring to go directly to INSS to sign up.[9] There were also reports of coordination problems between central MFI management and MFI branches about the process for signing up individuals for the insurance product.

Providing respondents the convenience of signing up for insurance directly from their market stall (on site enrollment) also had a large effect on enrollment rates. Signing up for insurance at either the INSS central office or at an MFI required the informal sector workers to gather their government identification card, make a photocopy of the card, obtain two passport size photos of themselves, and gather birth certificates of beneficiaries, as a requirement for registration. The workers also had to fill out a form and then had to travel to the INSS or MFI office and wait on a line to register in person. According to our survey, this process took about a day's time, a substantial time cost for small business owners who would need to find someone to watch their market booth or forego a day's revenues. The on-site enrollment reduced the opportunity costs of going to an office to sign up for the insurance. Providing on-site enrollment and information alone (without a subsidy) increased enrollment rates by 17 percentage points compared to controls. Adding the 6-month subsidy increased take-up by an additional 14 percentage points. In sum, simply reducing the time costs of going to an office to sign up had about half the effect as offering a 6-month subsidy worth approximately $100.[10]

[9] In some cases, the INSS reported that some respondents assigned to sign up at MFIs attempted to first sign up at INSS but were turned away and told that their lottery award was only valid at an MFI, suggesting that, were clients able to enroll at either location, the difference between MFI and non-MFI assignment may disappear.

[10] The impressive 52 percent take up of lottery winners who were approached in their booths suggests that this and similar project interventions that target this population may be underestimating the value of their time or the range of factors inhibiting enrollment, or overestimating the perceived benefit of the service. The average income for the participants and spouses sampled was US$238 per month, suggesting that daily income is somewhere near $10 (roughly assuming a 6-day work week and one-income family). The cost of having a photo taken is about $2 and the cost to copy an ID card can be about $0.50. Travel costs average around $2.00 for those entrepreneurs who have the furthest distance to go to sign up for insurance. An estimated dollar cost of signing up can thus be about $24.50, or in the case of this study, about one quarter of the value of the total prize. This may be on the high range because we have seen anecdotally that an entrepreneur will rarely shut down her/his booth to do this transaction, but instead,

Men were slightly less likely to sign up than female respondents; there was no significant difference in take-up between married and unmarried respondents. Controlling for the total number of children in the family, having children under the age of 12 (the age of eligible dependents) increased the likelihood of take-up by 3.3 percentage points; however the total number of children was negatively related to uptake. Other factors that were found not to be statistically significant in explaining insurance take-up include age (not shown) and education.

Surprisingly, baseline health expenditures and utilization of health care had very little predictive power in determining enrollment. Similarly, income had no statistically significant effect on insurance take-up, controlling for all other factors. This may reflect the high degree of correlation between income and other household characteristics. Having a chronic or commonly recurring disease, such as diabetes or hypertension, was positively associated with higher rates of uptake, increasing the likelihood of enrollment by 4.4 percentage points. This may have important implications for adverse selection in this type of voluntary insurance program.

Certain markets were associated with significantly higher take-up than others. Compared to the Oriental market, those working in Huembes market had higher take-up rates, while those working in Virgen de la Candelaria, Mayoreo, and Israel Lewites markets had lower take-up rates (not shown). These market effects are significant despite controlling for the respondents' own income for the subsidy. Some non-income differences in markets, such as their social characteristics, may contribute to these differences. Huembes market, for instance, is quite stable; vendors tend to stay for longer periods of time than vendors in some of the other markets in Managua. This is partly due to the better conditions, greater safety, and more "upscale" clientele, including tourists. Additionally, Huembes market is anecdotally associated with a greater level of formalization (more officially registered businesses) than some of the other markets.

The basic patterns in uptake are relatively similar between MFI clients and non-MFI clients.

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ask friends, family and neighbors to sit in for them. There may be other related costs that are also not fully captured by dollar amounts, such as uncertainty regarding insurance or subsidy eligibility.

Subsidies and on-site affiliation are the most important determinants of take-up. Having children under 12 was a more important determinant among MFI clients than among non-MFI clients. Baseline costs of healthcare also seem to have opposite relationships with take-up between MFI clients and non-MFI clients. However, these differences are small in magnitude and may be merely a reflection in the small sample size of the two groups rather than differences between these groups.

5.2 Place of affiliation

Overall, individuals adhered to their randomly assigned location for affiliation. Of the 17 who just received the informational brochure, 15 signed up at the INSS office (88 percent). Of those offered 6-month subsidies to sign up at INSS, almost all who signed up (98 percent) did in fact sign up at the INSS. Similarly, of those who were offered 6-month subsidies to sign up at a participating MFI, 99 percent of those who signed up did so at an MFI. Of those choosing to sign up at an MFI, 47 percent signed up at ProCredit, 15 percent signed up at Findesa, and 37 percent signed up at ACODEP.[11]

The higher uptake for ProCredit clients is likely influenced by several factors. The first is that ProCredit has a large and convenient branch located near the Oriental Market where many respondents worked. Second, uptake of the insurance corresponds approximately with the level of effort that each MFI committed to participating in the demonstration project, according to key informant interviews and our monitoring of the MFIs' activities related to the program. Third, according to the original feasibility study presented to INSS, in late 2005 ProCredit had 14,529 clients in Managua; ACODEP had 15,500 in Managua and Findesa had 7,567 in Managua (Magnoni et al. 2005). ProCredit also showed the greatest effort in training its staff in offering the INSS insurance to its clients and in arranging a series of events to market the program to its clients. Interviews with Findesa suggest that they made only minimal efforts to market insurance to their clients. Fourth, administrative problems may also have influenced the results.

[11] Of those who were clients of a participating MFI, the majority of those receiving the 6 month subsidy and who were told to sign up with an MFI, signed up at their own institution (77 percent of ACODEP clients, 57 percent of Findesa clients, and 85 percent of Procredit clients). Of those who were a client of a different MFI or who were not a MFI client, affiliation was fairly evenly split at ACODEP and Procredit, with low affiliation rates at Findesa.

While ACODEP had a marketing effort in place, we learned that its branch manager in the Oriental Market was changed shortly after our baseline survey and that the new manager was not informed of either the demonstration project nor of the MFI's commitment to sign up survey respondents. As a result, many people were turned away when they tried to sign up.

5.3 Effect of Insurance: Utilization and Expenditures

We next examine the effects of being insured on health care utilization and expenditures after one year. We analyze the effects of being insured (for 6 months)[12] by instrumenting insurance enrollment with specification (1) above; that is, having been offered a monetary (6-month subsidy) or convenience (on-site enrollment) subsidy, or both. Table 5 presents the results of these instrumental variables regressions.

Overall, enrolling in health insurance did not lead to an increase in the probability of seeking any health care from a provider. There was, however, fairly substantial substitution away from use of public and private facilities into EMP facilities covered by the INSS insurance. Those who were insured were 37.6 percentage points more likely to have attended an EMP in the past year, 11.1 percentage points less likely to have visited a private clinic, and 9.4 percentage points less likely to have visited a public health center than the uninsured. There is no difference between MFI and non-MFI clients in this pattern of substitution. Importantly, although pharmaceuticals were covered under the INSS insurance and could be obtained for free from EMPs, there was no reduction in visits to pharmacies.[13] Having health insurance increased the total number of health care visits by 1.06 visits per respondent per year, but this was not statistically significant [standard error 0.969]. There is a similar amount of substitution away from visits to public and private providers into free EMP visits and the results are similar for questions about the provider consulted for the last illness (not shown). For MFI and non-MFI clients, the patterns are quite similar: visits to the EMP increase, with a decrease in use of private and public health facilities.

[12] Note that almost all of the individuals in the analytic sample with insurance were those who had received a 6-month subsidy. The winners of the 2-month subsidy were not interviewed during the follow-up survey.
[13] The survey did not identify the ownership of pharmacies. Most pharmacies are independent private facilities, but respondents may have included some on-site EMP pharmacies within this category.

In addition to overall utilization of services, an additional outcome of interest for this project was the association between insurance enrollment and utilization of reproductive health and family planning (RH/FP) services, especially at INSS-contracted EMP facilities. At baseline, 74.8 percent of the respondents had been sexually active in the previous 6 months and 74.3 of those (or 66 percent of the total sample) were using some form of family planning. While there was a slight increase in FP use between baseline and follow-up, there was no difference in the increase between those who enrolled in insurance and those who did not, and no significant change in use of EMPs as a source for the most recent family planning method – although less than one percent reported receiving information or contraceptives at an EMP (results not shown). Insurance did not significantly increase the likelihood of using reproductive health services (defined to include antenatal care, delivery in a health facility, or receipt of RH screening tests; IV results not shown). There were 220 individuals in the sample who had been pregnant or had a pregnant partner in the 12 months prior to the follow-up survey. Among these individuals, there were no significant differences according to insurance status on the likelihood of receiving prenatal care, receiving multi-vitamins, or having an ultrasound, although rates of these services were already high. However, more insured individuals received most of their prenatal attention from EMPs (28 percent of the insured individuals versus 7 percent of the uninsured). In addition, deliveries among insured women were more likely to have taken place at an EMP (28 percent of the insured versus 8 percent of the uninsured). These statistics should be viewed with caution given the small sample size of women who were pregnant or who had a birth.

There was no impact of being insured on the utilization of preventive tests such as pap smears, prostate exams, mammograms, HIV tests, colonoscopy, vision, hearing, dental exams, blood pressure, overall checkups, pregnancy tests, or malaria tests. There was also no impact on the likelihood of hospitalization (results not shown).

Health expenditure patterns mirror some of the changes in utilization patterns. Enrolling in health insurance led to a 32% decline in total out-of-pocket expenditures for respondents, although this is not

statistically significant (standard error of 0.30). There were large reductions in expenditures at private clinics (particularly among non-MFI clients), laboratories, and pharmacies. As there was no corresponding change in the use of pharmacies, it appears that some pharmacy visits were covered by the INSS insurance, which is included in coverage through in-house pharmacies. Services from pharmacies, laboratories, and private clinics are among the most costly and frequent that informal sector workers pay for out of pocket. The INSS coverage of these services represents a clear benefit to these workers. It should be noted, however, that the total health expenditures were far below the equivalent unsubsidized yearly insurance premium.

We find no significant effects on any measures of health status including any type of sickness such as flu, fever, diarrhea, or on measures of length of time sick – for example, the number of days of missed work the last time the respondent was ill. This is consistent with finding no significant effect of being insured on the likelihood of receiving shots or antibiotics at the time of last illness. We also find no significant effect of being insured on perceived health or perceived life expectancy (results not shown).

5.4 Retention

Overall retention rates in the program were very low after the expiration of the subsidy. At the follow-up survey, respondents reported if they were still affiliated with the program and if they were paying for it. Less than 10 percent of those in our sample who enrolled were still paying for insurance at the time of the follow-up survey. Table 6 presents OLS regressions predicting retention rates among those who had signed up for insurance. First, those receiving the largest subsidies to sign up for health insurance were least likely to be retained over time, which makes sense if the subsidy encouraged those with low willingness-to-pay to enroll as expected. Those with no subsidy were significantly more likely to be retained in the insurance program. Other baseline measures of health care costs had no significant impact on the likelihood of still being insured (Column 2). Smokers and those who had any chronic or recurring disease were less likely to be retained.

We find generally the same pattern of determinants of retention comparing MFI clients and non-MFI clients. Given the small sample size of those who signed up for insurance (especially, for example, among those receiving the informational brochure only), we restrict the sample to only those who were offered 6 month subsidies (Columns 3-5) in order to test whether there were differences in retention by assignment to enroll at MFIs or at the INSS. MFI clients who signed up at an MFI branch were 5.8 percentage points more likely to be retained in the insurance program (Column 4) than those registering at the INSS. This might suggest that the convenience of MFIs as payment channels made MFI clients more likely to retain insurance. However, we should note that while place of affiliation was randomized, these estimates are conditional on having signed up for any insurance at all, which is endogenous. In Section 7 below, we elaborate on the implementation problems that make interpretation of this result difficult. Other notable correlates of retention among MFI clients are that men were less likely to stay in the program while smokers were more likely to be retained.

6. QUALITATIVE RESEARCH AND CONTEXTUAL CONSIDERATIONS

Individual interviews and focus group discussions provided contextual information that enriched our understanding of the quantitative survey results as well as elucidating problems with program implementation. In July 2007, individual interviews were conducted with 40 randomly selected subsidy winners in the Huembes market who had not signed up for INSS insurance. These interviews functioned as audits to ensure the rigor of local surveyors. They also contributed to a deeper understanding of reasons for non-enrollment. We also used individual interviews to understand whether EMPs participating in the program were meeting the standards necessary to attract and retain subscribers and provide appropriate services to the informal sector. In September 2007, a subsequent sample of 20 survey participants who had registered for insurance was interviewed to understand whether these participants were utilizing health services and investigate their experiences with the program.

In September and October 2008, we conducted nine focus group discussions with market vendors

that had participated in our baseline and follow-up quantitative surveys. Five strata of participants were defined, according to MFI client status, receipt of a subsidy, and enrollment in the insurance:

	Won subsidy		**No subsidy**
	Enrolled	**Did not enroll**	**Did not enroll**
MFI client	Stratum 1	Stratum 3	Stratum 5
Non-MFI client	Stratum 2	Stratum 4	

With the exception of stratum 5, two focus group discussions were organized for each stratum, one each with vendors from the Oriental and Huembes markets.[14] In total, 73 market vendors participated in the discussions. Selected qualitative findings, grouped by theme, are discussed below.

Time and convenience costs: Interviews with the 40 randomly selected survey winners in the Huembes market who had not signed up for INSS insurance after winning a six-month subsidy showed that 25 of 38 who verified having won the prize intended to sign up. Half of these, however, explained they had not had the time to do so. Other reasons given for not signing up included that they had trouble obtaining all of the required documentation (photos, copy of ID card, children's birth certificates, and subscription forms) and that they did not fully understand the affiliation process.

Information*:* Few participants in our focus group discussions had heard of the INSS insurance program for informal workers prior to the baseline survey. There was confusion about what benefits the insurance covered; specifically, some participants thought that it would provide benefits during old age. INSS formal sector coverage bundles pension, health and worker's compensation into one package, which may explain the confusion. Discussants noted difficulties obtaining clear information about the program, particularly from the MFIs; 12 MFI clients noted that they had never received any information about the program from their MFI. A few were skeptical of the program and its legitimacy, and worried that they

[14] Respondents that had provided telephone numbers during the follow-up survey were selected randomly within each stratum. Researchers first contacted potential participants via telephone, and followed up with an in-person visit to the market stall to administer an informed consent protocol to those who agreed to participate. Despite confirming their consent to participate, some did not attend. Only 2 out of 30 recruited Stratum 5 participants in the Oriental market showed up as planned, so that discussion was cancelled. Focus group discussions were held at quiet locations near each market. All participants were paid a transportation stipend of approximately 5 dollars. A professional facilitator recruited the participants and moderated each discussion. All discussions were tape recorded and transcribed.

might get "trapped" into paying for the insurance after the subsidy expired. Among the key recommendations suggested by participants was better provision of information about what benefits were covered, how to enroll, what fees would be charged, and how to make payments.

> *" I think that is the reason that most people don't pay into the insurance, we don't know where to do it or with whom to do it. I think there needs to be more publicity …"*
>
> *–MFI client who won a subsidy but did not enroll [Huembes market]*

Eight participants reported that they never received any proof of their enrollment in the insurance from INSS. This led to confusion about whether the program was "real," whether they were indeed covered, and when they could start using services.[15]

> *"I was told that … they would notify me when I could use the insurance, a thing that never happened. After a week passed, then two weeks, I said that it was a real joke because they never notified me. Then 8 months later, a statement arrived that owed two months of insurance payments."*
>
> *– Non-MFI client that enrolled [Oriental market]*

Attitudes toward MFIs as insurance intermediaries*:* In contrast to researchers' expectations, focus group discussants expressed a preference for enrolling in the insurance directly with INSS, rather than through intermediary MFIs. INSS was perceived as a more stable institution, whereas MFIs were potentially vulnerable to bankruptcy and possibly less trustworthy. Respondents noted that health insurance was the regular "business" of INSS, whereas MFIs were not experts in health or health insurance:

> *"INSS knows the benefits, what's not covered, while the MFI is a lending institution and doesn't understand [health]. Health is not its specialty; its thing is money."*
>
> *– MFI client that enrolled [Oriental market]*

Several discussants expressed concern that MFIs were liable to charge hidden fees or interest for providing insurance services. However, other participants expressed a preference to make routine payments at banks and MFIs, and noted that there were long waiting lines at the INSS office. Three

[15] Another potential source of confusion about enrollment derived from the failure of INSS to delivery of monthly billing statements. Under the traditional INSS (formal sector) insurance scheme, couriers on motorbikes hand-deliver monthly statements to each employer's office; this system was administratively burdensome for the dispersed informal sector workers. While some workers received their statements, this was not always reliable and this may have caused more confusion.

participants suggested that INSS should open more branch offices throughout Managua to make it easier to register, since the INSS office is not easily accessible from the markets.

As described above, approximately 10 months into the program, the INSS chose not to renew their contracts with the participating MFIs. While the MFIs were engaged during the first phase of the pilot and evaluation, once it became clear that INSS' contracts with MFIs would not be renewed, MFIs halted their efforts to market the voluntary program and discontinued offering payment services on behalf of INSS. They no longer had a contractual basis for doing so, and no longer received any remuneration from INSS for providing these services. The change in the process, and the accompanying lack of information, was likely to have been a source of confusion among participants who had signed up with an MFI, especially when subsidies expired and there was a need to pay for insurance. In the follow on survey, 62% of participants claimed they did not know where to make insurance payments..

Role of EMPs: The individual interviews with 20 selected survey participants who had registered for insurance indicated that a small number of EMP clinics were aggressively encouraging subsidy winners to enroll in the insurance and register with their clinic. Indeed, two small EMPs had over 40 percent of the market share. However, these EMPs had not provided enrollees with sufficient information to understand when they could begin to utilize services, and there was widespread dissatisfaction with the clinics' customer service and willingness to serve demonstration project participants. Although no evidence of explicit fraud was found, testimonials suggested that poor customer service had discouraged future utilization.

Use of insurance for RH/FP services: Generic contraceptives and sterilization as well as family planning counseling are covered in the INSS insurance package. However, the majority of focus group discussants who responded mentioned that they had not received family planning counseling at EMPs. Local NGO clinics such as IXCHEN, ProMujer and Profamilia were mentioned as popular providers of family planning services in general, along with Ministry of Health facilities.

Willingness to pay for insurance: Speaking generally, most focus group participants felt that it

was "worth it" to pay for health insurance, but almost all indicated a preference for an insurance product with a lower price tag. Those who enrolled in the demonstration project and had young children indicated that obtaining coverage for their children under 12 was a key motivating factor. Other reasons for enrollment were ensuring access to regular medical checkups and getting protection in case of future emergencies or surgeries. Those who received a subsidy but did not enroll cited reasons such as having children who were too old to be eligible; acknowledging that they were more likely to visit a pharmacy rather than a doctor for most health care because it was faster and more convenient; concern that the premium was too high to afford after the subsidy expired; and the time costs and inconvenience associated with the enrollment process.

The challenges of a program fundamentally based on a public/private partnership cannot be underestimated. Two important constraints can be highlighted. First, it is challenging to coordinate programs between institutions that have substantial differences in culture, management styles and processes. These differences can lead to miscommunication and frustration among personnel on both sides and require significant coordination and transparency and commitment from senior management. Second, a lack of trust between INSS and the MFIs about incentives for participating in the program tainted the partnership. INSS's suspicion that MFIs would unfairly profit from the program appears to have been unfounded, according to our interviews with MFIs. The initial investment by MFIs in operations, training and marketing for the program were significant, and low volumes of sales meant that MFIs recovered few of their costs. INSS argued that MFIs would gain financially by having healthier clients who then repaid their loans more steadily, but given that MFIs already had strong portfolio quality (with 90-day portfolio at risk at about 3%) at the time of the program's launch, there was in reality little room for improvement in repayment rates.[16]

MFIs did have incentives to participate in the program, however. According to our interviews, they saw the INSS insurance as a marketable complement to their existing credit services. Strong

[16] In 2007 and 2008, 90-day Portfolio at Risk (PAR) at MFIs began to increase moderately, and became a more significant problem for MFIs by the end of 2008.

competition in the microfinance sector in Nicaragua drives MFIs to seek new products that would give them a competitive advantage. In the case of ProCredit Bank, which also provided savings accounts, the product was even more complementary as it allowed clients to use their existing deposit accounts to make automatic deductions for monthly health insurance premiums. In addition, the MFIs' sense of social mission played an important role in their decision to participate. MFIs were aware that their clients lacked access to quality health care and saw the INSS product as a cost-effective solution to improve this access. The incentives faced by individual MFI staff members to support the demonstration project, however, were less clear. Loan officers who were charged with selling the product found that closing a "sale" of insurance could take two visits and over an hour. In two of the institutions, where loan officers worked on commissions, they had little incentive to sell insurance instead of offering loans, which were quicker to sell and paid higher commissions. On the other hand, the MFI that did not offer loan officers commission, and also put the most effort into marketing the insurance, ProCredit Bank, also had the highest take up. This marketing effort was a direct result of a clear objective that management defined prior to participating in the demonstration project.

7. CONCLUSIONS

This report presents the results from a randomized evaluation of a program extending social security health insurance to the informal sector via MFIs in Nicaragua. The findings in this study provide insights on the delivery and effects of voluntary health insurance, and the program has a number of implications for policy makers and similar programs in other countries. While flawed in its implementation, the INSS' demonstration project represents an important first step toward broadening access to health insurance in the informal sector.

We find that subsidies (of both price and "convenience") could play an important role in bringing informal sector workers into an insurance scheme. Both monetary and time costs were important for Nicaraguan informal sector workers considering signing up for health insurance, and similar subsidies

may be necessary for launching a new health insurance program, both to bring the program to scale and broaden the risk pool. However, subsidies had no impact on long-term retention, suggesting that once a worker was in the program, factors other than the initial subsidy influenced her/his retention; these considerations would be vital for the success of a program that incorporated subsidies to encourage enrollment.

In general, streamlined, efficient administrative processes are essential for distribution of insurance to informal workers. Our surveys and focus group discussions indicated a strong preference for a transparent and convenient registration process. Time constraints were cited as an important reason for not enrolling in the insurance, even when it was free. Participants also criticized slow, ineffective distribution of billing statements. There appears to be scope to test automated registration procedures through PDAs and other remote devices, as well as paperless billing through mechanisms such as SMS messages on cell phones. Payment systems themselves could potentially bypass the MFI or bank if sufficient technology is integrated into the process. Confusion about the location of payments and billing problems also affected the retention of survey respondents who signed up for insurance.

To ensure retention in an unsubsidized insurance program, benefits packages must be designed to balance informal workers' preference for convenience and quality of care with their limited disposable income. These should prioritize client needs vs. broad coverage in order to keep costs low. Qualitative interviews suggested that respondents were concerned with convenient care that covered young children and provided insurance for costly services such as emergencies and surgery. Quantitative results show a preference for private providers, particularly among MFI clients. While drug coverage was an appealing component of the insurance, it adds significantly to its cost. Visits to pharmacies did not increase as a result of having health insurance. The high OOP expenses for drugs may be better tackled through efforts to promote generic drug usage and pharmacy discounts than through direct coverage. Education about the specific coverage and value of insurance as a risk mitigation tool may also help increase the willingness of informal sector workers to sign up and pay into a program, as they may not fully understand the risk

management benefits of the protection included in insurance against the high cost of rare accidents or illnesses.

The theory that the INSS health insurance would free up Ministry of Health resources may not have been founded. At baseline, informal sector workers in our sample were already more likely to use private sector providers than public providers. Enrolling in INSS health insurance resulted in significant switching out of use of *both* public and private facilities into EMP services. Programs seeking to reduce the burden on public sector resources of public health facilities should consider that informal sector workers in Nicaragua spend significantly more out-of-pocket on health care than the overall population and may not be among those placing the greatest burden on public resources. Segmentation of the informal sector may identify the lower-income brackets most likely to use public sector resources. These lower income workers may not otherwise be able to pay for comprehensive private services, but may be able to pay smaller premiums for complementary insurance or for basic pre-paid private service packages in convenient locations. For those workers on the higher end of the income spectrum, who are already using private health facilities and pharmacies, insurance programs need to take great care to differentiate themselves in terms of price, convenience, and quality in order to ensure retention. In addition, trust and procedural transparency appear to be important factors for guaranteeing successful implementation of a micro-health insurance scheme.

Using MFIs as delivery channels may be useful when government programs have limited outreach and infrastructure. In Nicaragua, MFIs saw the INSS insurance as a marketable complement to their existing credit services that helped them achieve their social missions. However, it is important not to underestimate the complexity involved in working with MFIs. Suspicion about possible profit-oriented motivations of MFIs in Nicaragua damaged the tone of their working relationship with INSS. Strong strategic leadership and commitment are needed within both sectors to ensure that the operational arrangements are clear and incentives are well aligned. Administrative procedures for both affiliation and payments need to be easy and accessible, regardless of location. Being able to sign up at an MFI is not

sufficient to bring workers in the door. Government-run health insurance programs can have many advantages, including their broad risk pools, ability to generate confidence and trust in the population, and ability to manage provider costs and supervise quality of service. Legal and political constraints, however, often make it difficult for public sector health programs to meet the needs of all citizens, including informal sector workers, thus leaving room for private sector actors to take on the role of agent and/or provider. This project is an important first step in increasing the participation of the private sector to extend health insurance coverage to Nicaragua's informal sector workers.

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Table 1: Baseline Sample Characteristics

Panel A:	All (N=2,608)		MFI Client (N=1,013)		Non-MFI Client (N=1,595)		Difference
Demographic Characteristics	Mean	SD	Mean	SD	Mean	SD	
Age	37.80	9.36	39.04	8.65	36.95	9.69	2.08***
Male	0.35	0.48	0.28	0.45	0.39	0.49	-0.11***
Years Education	9.30	4.20	9.25	4.15	9.27	4.27	-0.02
Married	0.70	0.46	0.70	0.46	0.70	0.46	0.00
Number of Children	2.04	1.52	2.22	1.52	1.93	1.52	0.29***
With under 12 Children	0.66	0.47	0.66	0.48	0.67	0.47	-0.01
Pregnant	0.03	0.18	0.03	0.18	0.03	0.17	0.00

Panel B:	All		MFI Client		Non-MFI Client		Difference
Economic Characteristics	Mean	SD	Mean	SD	Mean	SD	
Monthly Income	237.59	366.11	297.20	404.10	258.80	363.50	38.4***
Proportion with Savings	0.29	0.46	0.28	0.45	0.30	0.46	-0.02
Monthly Savings	25.11	158.45	23.40	157.90	26.20	158.90	-2.8
Last Year's Savings Balance	145.67	574.84	141.50	609.70	148.50	551.90	-7.00
Owns home	0.76	0.42	0.80	0.40	0.74	0.44	0.06***
Total household health care costs	88.27	176.80	92.29	179.11	85.21	174.13	7.10
Total health care costs for respondent	41.61	103.57	45.86	111.46	38.91	98.16	6.95*
Last visit cost for respondent	18.24	60.39	21.25	82.25	16.34	40.75	4.9
Proportion MFI Clients	0.38	0.48					

Notes: This table presents sample statistics from 2,608 respondents baseline survey data. The last column presents differences in means of each variable between MFI Clients and non-MFI clients.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2: Baseline Health Characteristics

	All (N=2,608)	MFI Client (N=1,013)	Non-MFI Client (N=1,595)	Difference
Panel A: Health Characteristics		Mean		
Ever sick in 2007	0.80	0.80	0.80	0.01
Times sick in 2007	2.57	2.59	2.55	0.08
Days waited to see doctor	4.32	4.75	4.04	0.70
Smokes	0.15	0.14	0.16	-0.03*
Diabetes	0.06	0.07	0.05	0.02**
Hypertension	0.19	0.21	0.17	0.03**
Heart Problems	0.06	0.06	0.05	0.01
Respiratory Problems	0.14	0.13	0.14	-0.01
Physical Limitations	0.01	0.01	0.01	0.00
Sight/Hearing Limitations	0.25	0.27	0.24	0.03
Stress	0.15	0.17	0.14	0.03**
Kidney Problems	0.25	0.27	0.24	0.02
Cancer	0.01	0.01	0.01	0.00
Headaches	0.40	0.40	0.40	0.01
Skin Problems	0.08	0.08	0.08	0.00
Allergies	0.15	0.14	0.15	0.00
Flu	0.60	0.60	0.60	0.00
Fever	0.32	0.31	0.33	-0.03
Vomiting	0.08	0.08	0.09	-0.02
Diarrhea	0.10	0.10	0.09	0.00
Cough	0.19	0.18	0.19	-0.02
Chest pains	0.15	0.14	0.15	-0.01
Back pains	0.26	0.28	0.26	0.02
Dizziness	0.17	0.15	0.18	-0.03**
Panel B: Last illness				
Allergies or Respiratory Illness	0.49	0.46	0.50	-0.04
Renal infection or diabetes	0.14	0.16	0.13	0.03
Circulatory problems	0.07	0.08	0.07	0.01
Diarrhea or Digestive problems	0.05	0.05	0.05	0.00
Arthritis	0.04	0.05	0.04	0.01
Gynocology visit	0.03	0.03	0.03	0.00
Dengue or Malaria	0.02	0.01	0.02	-0.01
Skin infection	0.01	0.01	0.02	0.00
Other	0.14	0.14	0.14	0.00

Notes: This table presents sample statistics from 2,608 respondents baseline survey data. The last column presents differences in means of each variable between MFI Clients and non-MFI clients.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Health Facilities Visited in the Past Year at Baseline

	Visited		Number of Visits		Expenditure		
Panel A: All (N=2,608)	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Median
Pharmacy	0.72	0.45	3.21	4.15	42.66	91.22	16.04
Private doctor	0.28	0.45	2.18	2.64	0.91	2.36	0.34
Laboratory	0.26	0.44	2.09	2.78	25.67	61.93	13.40
Social Security Health Clinic (EMP)	0.01	0.08	3.88	5.45	14.88	47.25	28.90
Private clinic/hospital	0.14	0.35	2.31	2.17	24.04	73.63	7.50
Public (MINSA) health center	0.16	0.36	2.80	3.10	0.26	2.00	2.40
Public (MINSA) hospital	0.09	0.28	2.79	5.20	2.33	16.22	12.00

	Visited		Number of Visits		Expenditure		
Panel B: MFI Clients (N=1,013)	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Median
Pharmacy	0.73	0.45	3.47	4.78	45.19	89.49	16.04
Private doctor	0.32	0.47	2.38	3.52	0.98	3.05	0.34
Laboratory	0.26	0.44	2.06	1.89	32.03	85.81	13.37
Social Security Health Clinic (EMP)	0.01	0.10	3.80	6.11	24.33	60.98	28.88
Private clinic/hospital	0.15	0.36	2.57	2.52	26.11	84.59	7.49
Public (MINSA) health center	0.14	0.35	2.58	2.81	0.34	2.38	2.41
Public (MINSA) hospital	0.09	0.28	2.45	2.45	3.32	19.24	12.03

	Visited		Number of Visits		Expenditure		
Panel C: Non-MFI Clients (N=1,595)	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Median
Pharmacy	0.72	0.45	3.03	3.69	41.05	92.31	16.04
Private doctor	0.26	0.44	2.03	1.68	0.85	1.65	0.34
Laboratory	0.27	0.44	2.10	3.19	21.84	41.02	13.37
Social Security Health Clinic (EMP)	0.00	0.07	4.00	4.83	1.38	3.64	28.89
Private clinic/hospital	0.14	0.35	2.13	1.88	22.61	65.14	7.49
Public (MINSA) health center	0.17	0.37	2.92	3.24	0.21	1.76	2.41
Public (MINSA) hospital	0.09	0.28	3.00	6.35	1.70	14.01	12.03

Note: This table presents sample statistics from 2,608 respondents baseline survey data. Proportion of the respondents who visited each provider in the past year. Number of respondent total visits and amount the respondent spent includes only those who actually went to that facility. Amount spent is presented in dollars.

Table 4: Determinants of Insurance Enrollment

Dependent variable: Signed up for Insurance (0/1)	All		MFI Client	Non-MFI Client
	(1)	(2)	(3)	(4)
Information only	-0.041*	-0.048*	-0.041	-0.086**
	[0.023]	[0.028]	[0.041]	[0.041]
6 month subsidy-INSS	0.328***	0.330***	0.379***	0.268***
	[0.028]	[0.033]	[0.050]	[0.046]
6 months subsidy-MFI	0.277***	0.274***	0.307***	0.222***
	[0.028]	[0.033]	[0.048]	[0.047]
On site	0.172***	0.191***	0.170*	0.210***
	[0.056]	[0.060]	[0.094]	[0.077]
6 months subsidy * On Site	0.139*	0.154**	0.179	0.126
	[0.071]	[0.076]	[0.114]	[0.100]
Male	-0.025*	-0.025	-0.012	-0.031
	[0.015]	[0.017]	[0.029]	[0.021]
Education	0.001	0.002	0.000	0.003
	[0.002]	[0.002]	[0.003]	[0.002]
Married	0.012	0.022	0.002	0.032
	[0.016]	[0.018]	[0.029]	[0.023]
MFI client	0.033**	0.029*		
	[0.014]	[0.016]		
Number of children	-0.014***	-0.011*	-0.032***	0.003
	[0.005]	[0.006]	[0.010]	[0.008]
Has children under 12	0.033**	0.037**	0.108***	-0.011
	[0.017]	[0.019]	[0.030]	[0.024]
Log income		0.009	0.006	0.01
		[0.008]	[0.015]	[0.009]
Has any savings		0.013	0.011	0.008
		[0.017]	[0.028]	[0.022]
Smokes		0.009	-0.033	0.032
		[0.021]	[0.031]	[0.027]
Any chronic disease		0.044**	0.034	0.054**
		[0.017]	[0.027]	[0.023]
Ever sick		-0.009	-0.045	-0.025
		[0.058]	[0.097]	[0.072]
Log costs of healthcare		0.00	-0.012	0.008
		[0.005]	[0.008]	[0.006]
Number of visits to provider		0.000	0.000	-0.001
		[0.001]	[0.001]	[0.001]
Any visit to provider		0.031	0.183*	-0.029
		[0.067]	[0.110]	[0.083]
Constant	-0.003	-0.109	-0.433*	0.039
	[0.116]	[0.135]	[0.240]	[0.165]
Observations	2608	2215	867	1348
R-squared	0.24	0.26	0.33	0.24

Notes: Standard errors in brackets. This table presents OLS regressions on signing up for health insurance. Each column also includes market fixed effect (location of work for the respondent) and round fixed effects as well as controls for age and age squared. "Any chronic disease includes diabetes, hypertension, cardiac problems, physical disability, psychological problems, kidney problems, and cancer. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Effect of Having Insurance on Health Care Utilization and Expenditures

	Visited		Number of Visits		Ln(Amount spent)	
Panel A: All (N=2608)	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Pharmacy	-0.026	[0.042]	0.30	[0.390]	-0.705**	[0.331]
Private doctor	0.011	[0.035]	0.034	[0.117]	0.149	[0.244]
Laboratory	-0.068	[0.051]	-0.047	[0.241]	-1.011***	[0.347]
EMP	0.376***	[0.028]	1.334***	[0.138]		
Private clinic/hospital	-0.111**	[0.046]	-0.498***	[0.165]	-0.762**	[0.323]
Public (MINSA) health center	-0.05	[0.046]	-0.442*	[0.247]	0.012	[0.034]
Public (MINSA) hospital	-0.094**	[0.039]	-0.05	[0.177]	-0.007	[0.030]
All/Any	-0.015	[0.034]	1.059	[0.969]	-0.320	[0.303]
	Visited		Number of Visits		Ln(Amount spent)	
Panel B: MFI Clients (N=1,013)	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Pharmacy	-0.029	[0.062]	0.384	[0.643]	-0.808	[0.497]
Private doctor	-0.008	[0.053]	-0.080	[0.153]	-0.130	[0.361]
Laboratory	-0.097	[0.077]	0.195	[0.504]	-0.911*	[0.526]
EMP	0.387***	[0.040]	1.502***	[0.211]		
Private clinic/hospital	-0.076	[0.071]	-0.612**	[0.264]	-0.646	[0.484]
Public (MINSA) health center	-0.026	[0.067]	-0.268	[0.299]	0.020	[0.020]
Public (MINSA) hospital	-0.134**	[0.058]	-0.160	[0.261]	-0.046	[0.032]
All/Any	-0.009	[0.046]	1.010	[1.649]	-0.490	[0.433]
	Visited		Number of Visits		Ln(Amount spent)	
Panel C: Non-MFI Clients (N=1,595)	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Pharmacy	-0.029	[0.062]	0.288	[0.499]	-0.585	[0.443]
Private doctor	0.018	[0.047]	0.101	[0.165]	0.307	[0.332]
Laboratory	-0.04	[0.068]	-0.212	[0.211]	-0.941**	[0.466]
EMP	0.370***	[0.038]	1.202***	[0.180]		
Private clinic/hospital	-0.139**	[0.061]	-0.428**	[0.215]	-0.850*	[0.434]
Public (MINSA) health center	-0.074	[0.062]	-0.645	[0.398]	0.007	[0.056]
Public (MINSA) hospital	-0.053	[0.052]	0.034	[0.249]	0.022	[0.048]
All/Any	-0.017	[0.047]	1.021	[1.226]	-0.186	[0.416]

Note: This table presented the impact of having health insurance on having visted each health provider, the number of visits to that health provider (unconditional on any visit) and the log expenditures at that provider (unconditional on any visit) at the follow-up survey. Having insurance is instrumented with the randomization arm and is equivalent to the specifications in table 5; controls for the baseline visits or expenditures are also included. Each coefficient is from a separate regression and standard errors are in brackets.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Determinants of Insurance Retention

Dependent variable: Still enrolled in Insurance program at follow-up (0/1)	All		6 Month Subsidy Only		
			All	MFI Client	Non-MFI Client
	(1)	(2)	(3)	(4)	(5)
Information	-0.632**	-0.637**			
	[0.263]	[0.276]			
6 month subsidy-INSS	-0.910***	-0.927***			
	[0.044]	[0.069]			
6 months subsidy-MFI	-0.895***	-0.924***	0.006	0.058	-0.03
	[0.049]	[0.071]	[0.031]	[0.050]	[0.038]
On site	-0.267	-0.282			
	[0.269]	[0.276]			
6 months subsidy * On Site	0.193	0.218			
	[0.270]	[0.278]			
Male	0.001	0.016	0.012	-0.099	0.055
	[0.027]	[0.029]	[0.034]	[0.061]	[0.041]
Years of Education	0.010***	0.009**	0.007*	0.015**	0.001
	[0.003]	[0.004]	[0.004]	[0.006]	[0.006]
Married	0.026	0.027	0.031	0.008	0.033
	[0.025]	[0.027]	[0.032]	[0.051]	[0.040]
MFI client	0.016	-0.003	-0.007		
	[0.026]	[0.028]	[0.033]		
Number of children	-0.007	-0.006	-0.006	-0.002	-0.005
	[0.012]	[0.013]	[0.014]	[0.023]	[0.018]
Has children under 12	-0.018	0.004	-0.018	0.019	-0.038
	[0.030]	[0.034]	[0.038]	[0.060]	[0.052]
Log income		-0.003	0.007	0.036	0.004
		[0.016]	[0.020]	[0.028]	[0.030]
Has any savings		0.019	0.014	-0.045	0.047
		[0.029]	[0.036]	[0.049]	[0.048]
Smokes		-0.035	-0.03	0.101	-0.056
		[0.036]	[0.045]	[0.098]	[0.046]
Any chronic disease		-0.032			
		[0.029]			
Ever sick		0.002			
		[0.041]			
Log costs of healthcare		0			
		[0.000]			
Number of visits to provider		0.002			
		[0.002]			
Any visit to provider		0.038			
		[0.041]			
Observations	530	470	387	157	230
R-squared	0.07	0.11	0.04	0.14	0.05

Notes: Standard errors in brackets. This table presents OLS regressions on still paying for health insurance at the follow-up survey. Each column also includes market fixed effect (location of work for the respondent) and round fixed effects as well as controls for age and age squared. "Any chronic disease includes diabetes, hypertension, cardiac problems, physical disability, psychological problems, kidney problems, and cancer. The sample includes only those respondents who had enrolled in insurance. * significant at 10%; ** significant at 5%; *** significant at 1%

Appendix A: Sample and Random Assignment

Panel A: Completion rates of baseline survey		Number	Percent
Round 1	Away	225	19%
	Refused	114	10%
	Not Eligible	124	10%
	Other	2	0.2%
	Completed	728	61%
Round 2	Away	1732	28%
	Refused	21	0.3%
	Not Eligible	1065	17%
	Other	38	1%
	Completed	3274	53%

Panel B: Random Assignement (Round 1 and Round 2)	Number	Percent
Pure Control	125	3%
Informational brochure only	1211	30%
2 month subsidy, enroll at INSS	123	3%
2 month subsidy, enroll at MFI	123	3%
6 month subsidy, enroll at INSS	1137	28%
6 month subsidy, enroll at MFI	1107	28%
6 month subsidy, on site enrollment	112	3%
Informational brochure only, on site enrollment	63	2%
Total	4001	

Appendix B: Attrition and Completion of Follow-up Survey

	All	
Panel A: Follow-up status	Number	Percent
Moved/Temporarily away	26	1%
Hospitalized	8	0.3%
Deceased, Refused, Other	163	6%
Completed	2609	93%
Total	2806	

Panel B: Follow-up Survey Completion Rate	All	
	Number	Percent
Nothing	119	93%
Information	1138	93%
6 month subsidy, enroll at INSS	702	94%
6 month subsidy, enroll at MFI	673	93%
6 month subsidy, on site enrollment	112	92%
Informational brochure only, on site enrollment	62	98%
Total	2806	93%

Appendix C: Baseline Characteristics by Treatment Status

	Control	Info only	6 Month - INSS	6 Month - MFI	On site enrollment
	(1)	(2)	(3)	(4)	(5)
Age	38.45	37.30	38.11	37.82	38.56
Male	0.38	0.34	0.36	0.35	0.34
Years of Education	8.56	9.30	9.20	9.30	9.90
Married	0.78	0.71	0.69	0.68	0.69
Number of Children	2.16	2.00	2.20	2.04	1.80
Smokes	0.18	0.16	0.14	0.15	0.16
Income	224.96	221.50	260.90	229.65	287.20
MFI Client	0.50	0.38	0.37	0.37	0.35
Observations	111	1051	659	623	164

Notes: This table presents baseline statisics by randomized treatment status for all 2,608 respondents.