

# HEALTH INSURANCE PARTICIPATION: EXPERIMENTAL EVIDENCE FROM KENYA

Stefan Dercon, Jan Willem  
Gunning, Andrew Zeitlin,  
Claudia Cerrone and  
Simone Lombardini

**RESEARCH**  
PAPER No. 10

JANUARY 2012

## HEALTH INSURANCE PARTICIPATION: EXPERIMENTAL EVIDENCE FROM KENYA

STEFAN DERCON,<sup>1</sup> JAN WILLEM  
GUNNING,<sup>2</sup> AND ANDREW ZEITLIN

WITH CLAUDIA CERRONE<sup>3</sup> AND  
SIMONE LOMBARDINI

### EXECUTIVE SUMMARY

This paper describes the main findings of a field experiment offering health insurance in Kenya. It offers a discussion of the participation in a composite health insurance product offered to tea farmers living in the district of Nyeri, Kenya, and belonging to the Wananchi Savings and Credit Cooperative Society. In this paper, we document several aspects of the study. First, we provide details of the population under study, with implications for the generalizations of experimental results from this to other contexts. Second, we present the design and estimated causal impacts of policy treatments that were implemented as part of a randomized, controlled trial. Third, we provide descriptive evidence of the characteristics of those who bought insurance. These latter estimates should not be interpreted as causal, but rather are informative about the incidence of benefits from microinsurance interventions. A companion paper (Dercon, Gunning, and Zeitlin 2011) develops and tests a model of limited insurer credibility as a determinant of the demand for insurance.

Wananchi members are organized into 162 tea collection centers. From these, 150 centers were selected at random for inclusion in the study. Baseline data were collected for a sample of ten Wananchi members, which include nine individuals sampled at random. These sampled individuals provide the basis for the study. Socio-economic characteristics of the study population suggest that this should be a favorable environment for the introduction of hospitalization cover: not only are the population not among the poorest part of the Kenyan population, but they also have some prior exposure to formal insurance products.

Experimental policy interventions of the study were

designed to shed light, first, on policy-amenable barriers to insurance adoption, and second, on the impacts of health insurance on health and economic outcomes. To this end, the 150 tea-collection centers were divided either into a control group, where no insurance was offered (60 centers); a basic marketing group, where information about the product was provided (30 centers); an education group, where a ten-week course on financial literacy, designed by the Swedish Cooperative Centre (SCC), was run prior to the basic marketing treatment (30 centers); and a peer-referral group, where Wananchi members had an opportunity to reduce the costs of membership by signing their peers up for participation (30 centers). To evaluate the price elasticity of insurance demand, and its potential complementarities with the above interventions, individuals in each of these three treatment arms were randomly assigned vouchers providing a discount of 0, 10 or 20 percent of the premium costs.

Across the three treatment arms, approximately 16 percent of the farmers treated in the study purchased the insurance product. Insurance demand increases substantially with the amount of the price discount offered at full price, only ten percent of farmers purchased the product, whereas this rose to 22 percent for those with a discount of 20 percent. The impacts of the two center-level treatments were surprising. Contrary to expectations, the education treatment did not have any significant effect on insurance demand. A priori, it could have been that compliance, the participation of the treated in the treatment on offer, could have affected insurance take-up. However, compliance was relatively high. The individuals attended on average 77 percent of the marketing meetings and 78 percent of the study circles sessions. The limited impact of the education treatment was not simply explained by a lack of content of the training offered: by comparing the results of a pre-intervention quiz and a post-intervention quiz, we find evidence of learning gains among those who participated in the financial literacy treatment. In short, poor compliance nor poor content of the training in relation to the product involved does not seem to be explaining the limited impact of the training.

We also find that the referral incentive has a negative influence on insurance demand relative to the basic marketing treatment. The referral incentive induces sales staff to have stronger self-interest as the expected share paid out as commission will increase with more effective sales. In practice, people appear to be less likely to buy it in that case, possibly as the sales staff becomes overly keen, causing more suspicion on the part of potential clients. The findings suggest that increased distrust of insurance sales staff

<sup>1</sup> University of Oxford

<sup>2</sup> VU University Amsterdam

<sup>3</sup> Royal Holloway

due to the specific treatment arm and other issues related to trust may well contribute to explaining lower uptake.

Baseline data also allow a comparison of the characteristics of those who purchased versus those who did not purchase insurance. This reveals that the individuals who purchased insurance have a better insurance literacy and had more experience with insurance in the past. Their access to informal insurance and their past medical expenses are instead similar to those of the rest of the treated; we do not find evidence of adverse selection along measured dimensions.

These results are policy relevant: the absence of effects from of the education treatment, despite high compliance and apparent learning impacts of the training, and the negative impact of the referral incentive suggest a role for another important barrier to insurance participation: limited trust. This issue is systematically explored further in the companion piece (Dercon et al. 2011). On the other hand, reductions in price lead to significant impacts on insurance demand. Against a backdrop of rising prices for this policy, these findings suggest that such price rises are likely to restrict insurance access even outside of the poorest parts of the informal sector.

## 1. INTRODUCTION

Households living in developing countries face serious shocks to incomes, mainly due to adverse weather, household illness, price fluctuations, unemployment, business failure. If uninsured, income shocks can translate into reduced household consumption and induce costly risk-mitigation strategies (see Morduch 1995; Dercon 2004), thus leading to welfare losses. The empirical evidence shows that poor households are unable to fully insure against income shocks by using informal insurance mechanisms, such as inter-household transfers.

Insurance could offer an alternative, but the emergence of an insurance market, targeting the poor, has been limited to date. To address this gap, microinsurance initiatives are taking place all over the world. The evidence available suggests however that the demand for both indemnity and index-based insurance products remains low (Dercon and Kirchberger 2009). Recent research has identified a number of potential barriers to higher up-take. Among them, liquidity constraints, basis risk, financial illiteracy, lack of trust, and risk aversion are emerging as possible explanations (Cole, Giné, Tobacman, Topalova, Townsend, and Vickrey 2009). However, policymakers lack clear and credible answers regarding the effectiveness of interventions that seek

to address these barriers, and this dearth of evidence is particularly striking in the geographic context of Sub-Saharan Africa and the policy context of indemnity insurance for health.

This paper addresses this gap by reporting on a new field experiment offering a bundled health insurance product in Kenya. In particular, this paper studies the participation in a composite health insurance product, Bima ya Jamii, offered by the Cooperative Insurance Company (CIC) of Kenya to tea farmers belonging to the Wananchi Savings and Credit Cooperative Society in Nyeri, Kenya. The product costs KShs 3,650 per year (approximately USD 50) and combines public and private insurance. It comprises: in-patient hospital cover (NHIF), funeral insurance, disability and lost income during hospitalization stays for the household head.

At face value, health insurance of the type offered would seem a sensible product to deal with a real problem. The baseline data revealed that the heads of the households in the tea farming community in this area are mainly composed by male individuals in their fifties. Tea picking attracts specific medical problems, often linked to untreated cuts on legs and hands. Approximately 60% of the target households experienced a medical emergency in the past year, and about 40% of them sustained medical expenses. Most of them do not report any problem in their daily activities, nor any pain or discomfort, but they expect to sustain substantial medical expenses.

Another feature is that education levels are reasonably high in this part of rural Kenya, possibly helping with understanding the virtues and complexities of insurance. Almost all of them attended school (usually, only primary education). Insurance is not totally new here: about 37% of the population sampled reportedly purchased insurance in the past, and almost 30% of them purchased health insurance. On average, they scored reasonably well on cognitive ability tests, financial literacy and insurance comprehension. Present-day Kenyans often score low on trust; in the survey, they were in any case found to have low trust and most of them reported specifically that do not trust insurance companies. They reported to rely on mainly informal insurance mechanisms, as most of them belong to groups or associations in the community or elsewhere, and report to be able to support the other members and be supported by them in case of need (mainly for funerals, but at times also for medical emergencies). Still, in practice, health shocks were perceived as a problem: about half expected to face hospitalization costs, on average about 500 USD, and well above what their informal insurance mechanisms could provide. In short, this provides a setting with a need for some form of

insurance, but whether this can translate in an actual demand for a formal insurance product remained to be seen, and the field experiment set out to investigate this.

Wananchi members are organized into 162 tea collection centers. We randomly select 150 centers and conduct a series of randomized, controlled trials to identify the main barriers to a widespread insurance participation. In each center, we sample ten members: the delegate, i.e. an elected representative to Wananchi's board, and nine randomly selected ordinary members. The field experiment design is factorial: it combines the experimental variation in premium costs with cluster-randomized marketing and learning treatments. More specifically, we randomly assign the tea centers in our sample either to the control group or to one of three treatment arms: one in which only marketing is offered (as the product is generally not at all known in the area), one in which marketing is augmented with a particular and intense educational intervention using study circles and one in which marketing is combined with sales agents having a stronger incentive to sell, as they collect commission from clients that bought the product on recommendation and referral by clients that had directly sold to. This allows us to evaluate the impact of education, information and financial literacy on insurance demand, as well as the consequences of keener insurance sales agents. Moreover, some individuals outside the control centers are randomly allocated vouchers that reduce premium costs by 0, 10% or 20%. This allows us to study the price sensitivity of insurance demand.

We find that approximately 16% of the farmers treated bought the product. Contrary to expectations, the education treatment does not have any significant influence on insurance demand, while the peer referral incentive has a negative influence. Insurance demand linearly increases with the price discount amount of the price offered. In this paper, we discuss these results in more detail and explore possible reasons of the observed effects. In a companion paper by Dercon, Gunning and Zeitlin (2011) a more analytical approach is taken to explore the relatively low uptake.

The paper is organized as follows. The next section presents in more detail the main characteristics of the target population prior to intervention. Section 3 describes the insurance product on offer and the experimental design. Section 4 presents the key results: the baseline characteristics of the treated individuals who purchased insurance and the correlates of insurance demand, the impact of the different insurance treatments on insurance demand, and the implementation of the insurance treatments. Section 5 concludes, providing further interpretation, policy

implications and scope for research from these findings.

## 2. SURVEY DATA AND DESCRIPTIVE STATISTICS

This section presents a descriptive analysis of the target population, focusing on the characteristics which are more likely to influence individuals' insurance decisions, i.e. their health status, their expected hospitalization costs, their possible previous experiences with insurance and their expectations relative to insurance before the intervention. The summary statistics based on the baseline survey are reported in table 1, table 2 and table 3.

These data suggest a setting with a potential demand for health insurance. First, the target group is not particularly rich but also not destitute, and has reasonable education and financial literacy. Second, the target population had some experience with insurance in the past. Third, hospitalization costs are perceived to be important and many farmers expect to face them. The target group has some informal insurance systems, but the coverage these can give seems well below what is required for health costs. To summarize, we deal with people who could need health insurance and may well be able to afford and understand it. Therefore, the insurance product on offer can potentially thrive in this area.

Table 1 includes the demographic characteristics of the target population, their wealth and consumption, and their education and financial literacy. We focused on households with tea farmers linked to Wananchi. Primary respondent are not necessarily heads of households, but those involved in harvesting and selling the tea at the tea centers. By design they all belong to different households. However, since the insurance policy covers all the members in the household, we report information referring to the head of the household. The average age of the head is 56 years of age. Most of them are male, but a sizeable group, 30%, are female. They are almost all Christian, with 60% Protestants and 30% Catholic.

Education levels are reasonably high. Almost all the household heads, 92%, attended school, but only 38% of them had post primary education, while 70% of the household heads report that at least a member of the household had post primary education. To test their mathematical and financial literacy, farmers were asked seven questions and got a score for each correct answer: their average score is 3.7 out of 7. Thus, farmers are expected to have at least a basic understanding of insurance mechanisms and benefits. Within the context of Kenya, these are reasonably comfortable farmers in terms of wealth and

consumption, although by no means rich, and they definitely depend on physical labor. Average household consumption in the last month equals approximately KShs 42,982, which corresponds to USD 588 (USD 168 per capita), while the average value of household assets equals approximately KShs 75,935 (approximately USD 1040). Almost none of the individuals consider themselves to be rich or very

rich, nor destitute: 9% of them report to be poor, almost all the remaining individuals report to be in a medium wealth condition. Therefore, in case the farmers sampled perceived to be exposed to risk, they could afford to spend on protective measures such as insurance.

**Table 1. Summary statistics: demographics, wealth, education**

	Mean	Std. Dev.	Min.	Max.	N
Demographic characteristics					
1[HH head female]	0.31	0.463	0	1	1488
age, HH head	55.274	14.163	9	105	1457
HH size	3.528	1.73	1	12	1525
1[HH head protestant]	0.611	0.488	0	1	1471
1[HH head monogamous]	0.688	0.463	0	1	1525
Wealth and consumption					
HH cons, KShs/last month	42.982	96.936	390	826.534	1488
value HH assets, KShs	75.935	135.013	0	2023.500	1484
Education and financial literacy					
1[HH head had education]	0.924	0.266	0	1	1472
1[HH head had post primary education]	0.377	0.485	0	1	1468
1[any HH member had post primary]	0.706	0.456	0	1	1486
Average score, math questions	1.949	1.041	0	3	1489
Average score, financial questions	1.749	1.051	0	4	1489
Average score, math and fin questions	3.698	1.869	0	7	1489

Table 2 describes the population's insurance experience and their subjective perception of insurance. Contrary to the expectations of the research team (and the collaborating NGO), there is some insurance penetration: approximately 38% of households reported that they had purchased insurance in the past (27% of them had purchased some form of health insurance), and 84% of those households that had ever purchased insurance report being covered by insurance at the time of the survey. Almost half of the households know someone who bought insurance.

Households are asked two questions to evaluate their understanding of the insurance policy: the first question is about the insurance premium and the second one is about the renewal cost of the insurance policy. 75% of the households answered correctly to the first one, 57% answered correctly to the second one. They are also asked other five questions to evaluate their

perception of insurance: most of them disagree with the statements that insurance should be purchased only by those who are already ill or who are rich, and that there is no need to insure against emergencies. In sum, these appear to be people that appreciate the role of insurance. However, most of them report not to trust insurance companies: only 42% of the farmers agree or strongly agree with the statement that insurance companies can be trusted.

Since informal insurance, if present, could have a positive or negative influence on the demand for formal insurance, households are also asked questions about the people they can rely on for financial or in-kind support. It appears that such systems are present. The farmers sample can rely on average on five people (generally relatives and/or people living in the same village). 49% of them received support from any of these people in the past 12 months, while 30% gave support to any of these people. 74% of the

household heads is member of at least an informal association or group (on average, between three and four groups) in their community or elsewhere. Such groups offer support mostly in case of funeral (for 90% of the farmers) and in case of medical emergencies (for 65% of the farmers). The average support given to a group member for a funeral is KShs 9,838 (approximately USD 136), while for a medical emergency is KShs 6,285 (approximately USD 86). As we will observe in the next table, medical emergencies costs are well above what these groups and associations can provide. Therefore, there is scope for formal insurance product to be offered. The way

households contribute to their groups is heterogeneous: some of them contribute regularly in cash, others only when asked or when an emergency or a funeral occurs. The average regular contribution per member is KShs 293 (approximately USD 4). Finally, households are asked questions about people belonging to their social network. 65% of them report to be able to ask those people for help in case of need, and above 30% of them actually received help from people in their network in the past. This mechanism seems to be mutual.

**Table 2. Summary statistics: Insurance**

	Mean	Std. Dev.	Min.	Max.	N
Insurance experience					
1[ever bought insurance]	0.376	0.484	0	1	1484
1[ever bought health insurance]	0.28	0.449	0	1	1524
1[still insured]	0.84	0.367	0	1	557
1[know other bought insurance]	0.447	0.497	0	1	1484
Insurance comprehension and perception					
1[correct answer premium question]	0.732	0.443	0	1	1524
1[correct answer renewal cost question]	0.562	0.496	0	1	1524
1[disagree insurance meant for ill only]	0.824	0.381	0	1	1524
1[disagree insurance meant for rich only]	0.741	0.438	0	1	1524
1[disagree no need to insure]	0.657	0.475	0	1	1524
1[trust insurance companies]	0.419	0.446	0	1	1524
Informal insurance and social networks					
number people HH can rely on	4.997	13.331	0	200	1482
1[received support from them]	0.495	0.5	0	1	1229
1[gave them support]	0.299	0.458	0	1	1227
1[respondent belongs to group]	0.745	0.436	0	1	1483
number of groups respondent belongs to	2.543	8.642	1	135	1103
1[group offers funeral support]	0.903	0.296	0	1	1103
1[group offers med. emergencies support]	0.652	0.477	0	1	1103
funeral support, KShs	9851.025	15500.76	0	200000	719
medical emergency support, KShs	6292.826	7826.581	0	90000	719
regular contribution to group per member, KShs	292.355	1188.482	0	20000	719
1[can ask help to social network]	0.652	0.476	0	1	1367
1[had help from social network]	0.317	0.465	0	1	1367
1[were asked help from social network]	0.635	0.482	0	1	1367
1[gave help to social network]	0.201	0.401	0	1	1367

Are health problems and costs a concern? Table 3 presents information about the population's health status, both objective health conditions (health history and past medical expenses) and subjective health conditions (perceived health status and expected future medical expenses, with a focus on expected

hospitalization costs, since they are covered by the insurance product on offer). Illness and injury is relatively common but does not seem excessive: in the past three months, 15% of the household heads suffered from fever and only 2% suffered from injury or accident; about the half of them were unable to

work because of that. Most relevant for us, in the past year 3% of the household heads spent some time as an in-patient in hospital or clinic (on average, 20 days for the most recent episode), while 10% reported that at least one member of their household spent some time in the hospital. In the past three months, 19% of the household heads received out-patience care. Overall, 42% of the households faced medical expenses in the past year. The average household medical expenditure in the past year was approximately KShs 4,300 (USD 60). Average household total in-patient costs were approximately KShs 3080, total out-patient costs were KShs 1200 and traditional medicine costs KShs 17. The latter are unconditional values, i.e.

computed over the whole sample. Since in-patient hospitalizations costs are particularly relevant to us (the insurance product includes in-patient hospitalization cover), we calculate also the respective conditional values (i.e. the expenses conditional on having experienced positive expenses), in order to have a more informative idea about the amount of in-patient costs experienced. Average conditional in-patient costs are approximately KShs 30,600. Finally, 4% of the households experienced at least one death. Also this is relevant for us, since the insurance product covers also funeral expenses.

**Table 3. Summary statistics: Health**

	Mean	Std. Dev.	Min.	Max.	N
Health history and past medical expenditure					
1[if HHH had fever, past 3 months]	0.15	0.36	0	1	1463
1[if HHH had accident, past 3 months]	0.02	0.15	0	1	1472
1[if HHH spent time in hospital, past year]	0.03	0.16	0	1	1476
No. days hospital HHH, past event	20	27	0	125	40
1[if any in HH spent time in hospital, past year]	0.10	0.30	0	1	1480
1[if HHH had outpatient care, past 3 months]	0.19	0.393	0	1	1463
1[HH medical expenditure, past year > 0]	0.42	0.494	0	1	1485
HH medical expenditure, past year, KShs	4309	25547	0	500000	1485
HH in-patient costs, KShs	3084	23191	0	500000	1485
HH out-patient costs, KShs	1207	10373	0	342260	1485
HH traditional medicine costs, KShs	17	431	0	15000	1485
HH in-patient costs, conditional, KShs	30618	67249	0	500000	150
1[if death in the HH]	0.04	0.19	0	1	1485
Perceived health status and expected medical expenditure					
1[problem walking]	0.19	0.40	0	1	1481
1[problem carrying water weights]	0.25	0.43	0	1	1481
1[problem daily activities]	0.22	0.41	0	1	1481
1[pain or discomfort]	0.73	0.45	0	1	1481
perceived health status, average score	66.1	20.9	0	100	1480
Pr[hospital cost > 0]	0.46	0.25	0	1	1468
E[hospitalization costs], KShs	36581	95276	0	1655400	1416

We also explored people's perceptions of likely hospitalization costs in the next year and compared them with actual values. We find that 45% of the farmers expect themselves or somebody in their household to require hospital treatment in the next year, and thus to experience hospitalization costs. Expected conditional hospitalization costs are on average KShs 36,507 (USD 500), so they are consistent with recently experienced conditional hospitalization costs. Despite not being excessively high, these values reflect a subjective sense of

exposure to hospitalization costs and are considerably higher than what people report their informal group based schemes could cover.

Finally, farmers are asked questions about how they perceive their current health. In particular, they are asked whether they suffer from any pain or discomfort, and whether they experience any problem (either a complete disability or only some difficulties) walking, carrying weights or carrying out their usual daily activities. 19% of them report problems walking,

25% report problems carrying weights, 22% report problems in their daily activities and 72% report some pain or discomfort. The latter are relatively high values, thus suggesting that the target population expect to be needing health care and is therefore likely to purchase an health insurance product. Moreover, farmers are asked to score four possible health states using numbers between 0 and 100, and then, on the base of the subjective health scale thus provided, score also their current health status. The average score they gave themselves to describe their health status in the past month is 66. It is difficult to judge whether this value is high or low. However, it seems to confirm a subjective sense of exposure to health risks.

To summarize, we are dealing with an area in which health insurance could thrive. The target farmers are reasonably comfortable and have a reasonable level of education and financial literacy, hence are expected to be able to afford and understand the insurance product on offer. They experienced insurance in the past and they seem to understand insurance mechanisms and value its benefits. Thus, the new comprehensive insurance product offered is likely to be successfully purchased. They can avail themselves of informal insurance systems: most of the farmers belong to a group or association and/or can rely on other people in case of need. However, informal insurance networks might only offer protection in case of small costs, they are unable to protect farmers from any shock they may face. Finally, the target group experienced medical emergencies and expenses, and expect to experience them also in the future. Actual and likely hospitalization costs are not excessively high, but they are still too high to be covered by informal insurance systems. Moreover, farmers' perceptions about their own health conditions reflect a subjective sense of exposure to health risks. Therefore, the target farmers are expected to be willing to insure themselves against health shocks. In the next section, we explain the experimental design.

### 3. EXPERIMENTAL DESIGN

#### 3.1 PRODUCT DESCRIPTION

Bima ya Jamii is a composite health insurance product offered by the Cooperative Insurance Company (CIC) of Kenya. The product combines public and private insurance: it includes in-patient hospitalization cover, provided by the National Hospital Insurance Fund to all public-sector employees, funeral insurance and cover for not working during hospitalization. It costs KShs 3,650 per year (approximately USD 50). Hence, the premium is not high relative to the expected loss (as discussed in the previous section, average

unconditional hospitalization costs are approximately KShs 3,000).

CIC markets this product to the informal sector through the use of cooperative societies and other financial intermediaries. In this project, we study the demand for the product among tea farmers living in Nyeri District, Kenya, and belonging to the Wananchi Savings and Credit Cooperative Society. Wananchi's members are divided into 162 tea-collection centers, which are in turn grouped into 12 administrative zones. As part of their membership in Wananchi, members have bank accounts, through which they receive payments from the Kenya Tea Development Agency for their tea harvest. Wananchi members are also eligible for various types of loans from this SACCO, including loans for tea production but also for certain types of emergencies.

#### 3.2 FIELD EXPERIMENT

Among the 162 tea centers belonging to the Wananchi cooperative, we selected a representative sample of 150 tea centers.<sup>4</sup> In each of these centers, we randomly selected 9 tea farmers and the delegate who represents them for inclusion in the study population. The field experiment then provided variation along two dimensions: a center-level marketing treatment, and a price discount, as described below.

First, out of the 150 tea centers in our sample, we assigned 60 tea centers to the control status, and 30 tea centers each to one of three treatment arms. The individuals in the control group received no information about the insurance product and no price discounts; none of them purchased insurance, as expected.

On the contrary, all the individuals in the treated groups received meetings from April to September 2010, during which they were given information about the product by marketing agents from CIC and a representative from Wananchi. Given that changes in the policy required Wananchi members to make insurance decisions by August of 2010, and given that a substantial portion of tea farmers' income arrives as a bonus payment in October, marketing agents also offered Wananchi members to purchase insurance against future tea earnings in all of these groups. Thirty of the treated centers received only these meetings—these constitute the marketing only treatment.

---

<sup>4</sup> Sampling of centers was conducted with probabilities proportional to size, so that the study population is representative of the broader population of Wananchi members.

In the study circles treatment arm, 30 tea centers received financial literacy training. Wananchi delegates were trained by the Swedish Cooperative Center (SCC), an international NGO, to lead regular study groups for their peers.<sup>5</sup> The topics covered in the study groups were designed by SCC and Microfinance Opportunities, an NGO specialized in financial literacy training, and focused mainly on indemnity insurance and health shocks. The course was composed by 10 modules and held on a weekly basis before the marketing intervention. Relative to other financial literacy interventions that have been studied, two features of this approach are important to note: first, the financial literacy training was general and made no direct mention of the particular product under study; second, the training did not involve any direct contact between insurers and clients, so is unlikely to have built trust between these parties. The remaining thirty centers received, besides the marketing visits, an incentive for motivating their peers to purchase insurance (peer referral treatment): individuals in this treatment arm received an incentive equal to the 10% of the policy cost for each member of the same center who purchased the insurance product under their suggestion. This treatment was added to evaluate CIC's interest in the use of peer-to-peer marketing techniques as a means to change the selection profile of insurance holders.

As a second dimension of the experiment, Wananchi members in treated centers were randomly allocated vouchers that would reduce the premium costs by 0, 10% or 20%, through a public lottery conducted during the marketing meetings. Since not all the farmers sampled attended the marketing meetings, vouchers were randomly assigned with the same probabilities to farmers who did not attend these meetings. We adopted a factorial design: the randomized variation in premium costs was combined with the cluster-randomized marketing and learning treatments.

The resulting number of survey respondents, by center-level treatment and discount voucher received, is displayed in table 4.

---

5. Study circles both for sampled and non sampled members in their center but the other 9 sampled members were included in the first study group they led.

**Table 4. Experimental design**

Centre-level treatment	Individual premium vouchers		
	No Discount	10% discount	20% discount
Control (60)	597	0	0
Marketing only (30)	105	90	102
Marketing + study circles (30)	108	91	100
Marketing + peer referral incentive (30)	98	94	103

Notes: This table displays the number of survey respondents, by center-level treatment arm and discount voucher received. The number of tea centers assigned to each treatment is reported in parentheses.

**Table 5. Insurance purchase rates, by treatment**

Control	0
Marketing only	0.19
Marketing + peer referral incentive	0.11
Marketing + study circles	0.17
All intervention centres	0.16

Notes: This table displays the percentage of individuals who purchased insurance, by center-level treatment received.

## 4. RESULTS

In this section we discuss three results. First, we provide reduced-form evidence of the impact of the experimental treatments. These results provide evidence of substantial price sensitivity of demand. Impacts of the center-level treatments are surprising: we find no effect of financial literacy training, and a statistically significant, negative effect of the peer referral treatment. Second, to understand the (non)effect of financial literacy, we report descriptive evidence of the implementation of this intervention, showing that attendance rates were high in the study circles, and we provide suggestive evidence that responses to financial literacy questions improved among individuals who attend the financial literacy training. Third, we show how insurance demand varies with observed household characteristics in each treatment arm. This last part of the analysis informs the question of benefit incidence.

### 4.1 IMPACT OF EXPERIMENTAL TREATMENTS ON INSURANCE DEMAND

Table 6 presents estimates of the reduced-form impact of our experimental treatments on the decision to purchase insurance. We estimate a linear probability model, whose dependent variable is a binary variable which equals 1 if insurance is purchased and 0 otherwise. The first column in shows results for the basic effects of our experimental treatments, while the second column considers also interactions between different treatments. The coefficients on the treatments measure the impact of offering insurance treatments on the probability of purchasing insurance. Treatment is assigned at the tea center level, thus leading to spatial correlation among farmers belonging to the same tea center. Therefore, we report standard errors clustered at the tea center level (Moulton 1986).

**Table 6. Impact of price and marketing treatments on insurance demand**

	(1)	(2)	(3)
voucher 10%	0.0666** (0.03)	0.0622 (0.05)	0.0734** (0.03)
voucher 20%	0.109*** (0.03)	0.127** (0.06)	0.11*** (0.03)
peer referral incentive	-0.0742** (0.04)	-0.0636 (0.04)	-0.0740** (0.04)
study circles	-0.0179 (0.04)	-0.0141 (0.05)	-0.2133 (0.04)
voucher 10%; marketing + referral incentive		-0.00756 (0.06)	
voucher 20%; marketing + study circles		0.0205 (0.07)	

voucher 20%; marketing + referral incentive			-0.0244	(0.07)		
voucher 20%; marketing + study circles			-0.0296	(0.07)		
Constant	0.132***	(0.03)	0.127***	(0.04)	-0.0801	(0.15)
Individual characteristics	no		no		yes	
Obs	928		928		884	
(i): F stat (p value)	0.248	(0.62)				
(ii): F stat (p value)			0.154	(0.961)		

Notes: Linear probability model, with robust standard errors clustered at tea-center level. Dependent variable is an indicator of insurance purchase (it equals 1 if respondent completed application). F-statistics and associated p-values shown for tests of hypotheses that (i) probability of purchase is a linear function of price (i.e. coefficient on voucher of 20% is twice coefficient on voucher of 10%); and (ii) interaction effects between price and marketing treatments are jointly insignificant

**Table 7. Study circles attendance rates**

	Mean	Std. Dev.	N
1[attended session 1]	0.069	0.254	290
1[attended session 2]	0.536	0.5	291
1[attended session 3]	1	0	294
1[attended session 4]	0.405	0.492	296
1[attended session 5]	0.932	0.252	281
1[attended session 6]	1	0	303
1[attended session 7]	1	0	303
1[attended session 8]	1	0	303
1[attended session 9]	1	0	303
1[attended session 10]	1	0	303
total number of sessions attended	7.812	0.768	303

**Table 8. Financial literacy quiz outcomes**

Timing Sample	(1)		(2)	
	Pre-intervention		Post-intervention	
	All	Study circles only	All	Study circles only
	Mean	Std. Dev.	Mean	Std. Dev.
1[correct answer to premium question]	0.73	(0.44)	0.82	(0.39)
1[correct answer to renewal costs question]	0.56	(0.50)	0.77	(0.42)
1[correct answer to fin. lit. q1]	0.37	(0.48)	0.44	(0.50)
1[correct answer to fin. lit. q2]	0.63	(0.48)	0.64	(0.48)
Obs	1525		486	

Notes: Column (1) summarizes quiz outcomes for full sample, using baseline survey data. Column (2) summarizes quiz outcomes for the study circles treatment arm only, using data collected at end of study circles intervention but before insurance marketing activities.

Table 9. Correlates of insurance purchase decisions

	(1)	(2)	(3)
	marketing	study circles	peer referral
voucher	0.000634* (0.00)	0.000511* (0.00)	0.000793*** (0.00)
1[primary respondent female]	0.387* (0.20)	0.315 (0.26)	-0.126 (0.28)
age, primary respondent	-0.000516 (0.00)	0.0022 (0.01)	0.0143** (0.01)
ln(HH size)	-0.316 (0.23)	0.399** (0.19)	0.0612 (0.23)
any HH member post-primary education	0.393 (0.27)	-0.195 (0.21)	0.22 (0.27)
ln HH consumption, KShs/month	-0.00556 (0.09)	0.0306 (0.07)	-0.189* (0.11)
degree, self-reported support network	-0.0129 (0.01)	0.00287 (0.01)	0.000442 (0.01)
1[HH medical expenditure, past year > 0]	-0.145 (0.57)	-0.0264 (0.57)	0.702 (0.66)
ln HH medical expenditure, past year	0.057 (0.08)	0.00353 (0.08)	-0.143 (0.10)
1[ever bought insurance]	0.115 (0.20)	0.13 (0.28)	0.191 (0.26)
quiz: insurance questions	0.584*** (0.22)	0.047 (0.25)	0.352 (0.29)
quiz: financial literacy questions	0.122 (0.21)	0.137 (0.22)	0.205 (0.24)
Constant	-1.66 (1.02)	-2.153* (1.16)	-1.03 (1.20)
Observations	289	291	291

Notes: Dependent variable takes value of one if respondent purchased insurance, or zero otherwise. Probit coefficients reported, with robust standard errors clustered at tea center level. Column (1) estimates model for marketing only treatment; column (2) estimates model for study circles (financial literacy) treatment; column (3) estimates model for peer referral treatment.

The peer referral incentive has a significant negative impact on the probability of purchasing insurance. Sales agents with more incentive to sell may well have displayed behavior that made farmers more skeptical about the insurance policy itself. However, we still do not have post-intervention survey data that can confirm this, so we will primarily focus on the study circles treatments and the price discounts. Surprisingly, the study circles have no significant impact on insurance demand. The possible reasons of this will be extensively discussed in the next section, which

analyzes the implementation of the insurance interventions.

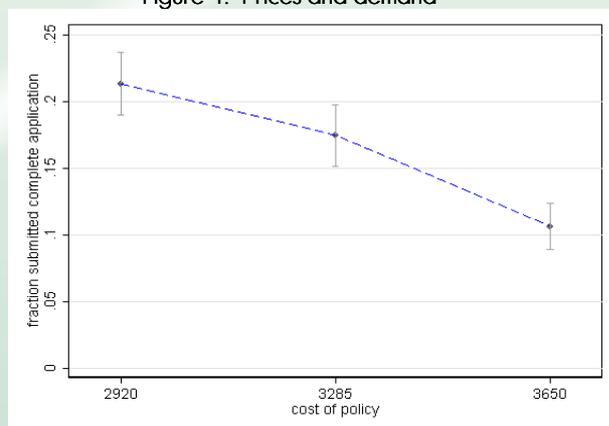
Price discounts have a positive influence on demand. This is consistent with the standard theories about insurance demand. We test the hypothesis that the probability of purchase is linear in the amount of the price discount offered. The hypothesis is accepted, since the coefficient on the 20% voucher is twice the coefficient on the 10% voucher. Then we test the hypothesis that the interactions between vouchers and treatments are all zero. Also this hypothesis is accepted; all the coefficients on the interaction terms

are not significant. This implies that the effectiveness of price discounts in increasing demand is no stronger or weaker across our center-level treatments. The resulting demand function, averaged across marketing treatments is displayed in Figure 1

As previously observed, despite the fact that the experiment was randomized, insurance demand could still be partly influenced by individual characteristics. For instance, richer individuals are expected to purchase insurance more than individuals who are liquidity constrained. Therefore, in order to verify the robustness of the experiment and to better evaluate the impact of the insurance treatments on insurance demand, we repeat the estimation controlling for some individual characteristics: respondent age and gender, household size, household wealth and whether any household member has post-primary education. We will not include the interaction terms between vouchers and treatments, since they have been shown not to be significant.

As Table 6 shows, by introducing these individual-level controls, the results do not change substantially: the price discounts still have a positive impact on insurance demand, despite slightly higher; the peer referral incentive still has the same negative impact as before and the coefficient on the study circle is still not significant.

Figure 1. Prices and demand



## 4.2 INTERVENTION IMPLEMENTATION

The impact of the different treatments on insurance demand might have been influenced by the participation of the treated individuals in the treatments offered. Therefore, in order to correctly evaluate the barriers to insurance demand, we also have to analyze the implementation of the three insurance interventions.

As mentioned above, the study circles seem not to influence insurance demand. It could be supposed that this is due to a lack of attendance, but, as Table 7 shows, the attendance rate is high: the individuals who were offered education attended on average 7.8 sessions out of 10.

Another possible explanation for the non-impacts of the education intervention is that the study circles did not effectively impart financial knowledge. In order to test this, we conduct a post-intervention quiz. The quiz is composed of four questions that were also asked to the farmers before the intervention, the first two about insurance comprehension and the last two about financial literacy. This suggests that by comparing the results of the two quizzes, we can provide suggestive evidence of whether the treated individuals benefited from the courses or not.

Caution is required in interpreting these results as the causal, learning effects of the study circles intervention, for two reasons. First, because similar quiz data are not available for other treatment arms, it is possible that scores on these tests would have increased even in the absence of the financial literacy treatment—for example, due to repetition of the questions alone. Second, there is substantial attrition in these quiz data, which are answered only by a subset of study circle attendees in the last session. It is therefore possible that selective attrition could give the appearance of learning gains.

With these caveats, Table 8 and Table 9 shows that in the post-intervention quiz 81% of the treated answered correctly to the insurance premium question and 77% to the costs of policy renewal question; in the pre-intervention quiz the correct answers were, respectively, 73% and 56%. The questions about financial literacy were correctly answered by 44% and 64% of the treated; before the intervention, respectively 37% and 62% of the farmers answered correctly. This means that the treated individuals actually benefited from the training, especially in their understanding of insurance mechanisms. The reason why the performance in the insurance questions was overall better than that in the financial literacy questions is probably that the training offered to the farmers focused mainly on insurance literacy.

The above results lead to interesting observations. If the treated farmers, despite acquiring financial knowledge and familiarizing with the insurance product, decided not to purchase it, then it suggests that limited financial literacy is not the main barrier to insurance participation and cannot therefore fully explain why insurance demand keeps so low. We should therefore focus on other barriers, which are able to limit demand even when the individuals are

educated and informed about the insurance product. One of them is plausibly limited trust; this is the focus of Dercon et al. (2011).

### 4.3 PROFILE OF INSURANCE DEMAND

Aggregate take-up rates provide only a partial answer to the question of the effectiveness of this program in providing insurance to the poor. Taken by themselves, these average effects do not show how demand covaries with socio-economic characteristics, and they do not show whether the different marketing approaches achieve distinct profiles of participating households. We take up these questions in the present section.

To do so, we separately estimate models of insurance demand for each of our treatment arms. The coefficients of these (probit) models are informative about the pattern of benefit incidence within that particular treatment arm. With the exception of the voucher amounts, these coefficients should not be interpreted as causal, since variation in the remaining explanatory variables is purely observational. But differences in the coefficients can be given a (suitably nuanced) causal interpretation: these differences tell us the change in the profile of participants that results from a change in marketing regime.

We focus in this analysis in several broad categories of explanatory variables, which correspond to welfare and policy considerations. We begin with simple demographic and economic characteristics, including the gender of the Wananchi member contacted, their age, household size, and education. We find that female Wananchi members are significantly more likely to purchase insurance in the marketing treatment; a similar point estimate obtains in the study circles treatment, but women are if anything less likely to purchase insurance in the peer referral treatment. We find evidence that older respondents are more likely to purchase insurance in the peer referral treatment, and larger households are more likely to take up insurance in the study circles treatment.

Turning to household consumption, our chief measure of poverty, we find no association between monthly consumption and insurance demand in the marketing or study circles treatments, but a negative association between consumption and demand in the peer referral arm. Again, this is perhaps surprising, since the peer referral arm couples the insurance purchase with an additional opportunity to offset the costs. However, it may be the case that higher-income individuals have a greater network of contacts to tap into for purpose of selling the insurance, such that this intervention arm is relatively appealing to the less well off.

While we find no effect of post-primary education on insurance purchase decisions across any of our treatment arms, we do find some evidence of the importance of prior insurance understanding in the marketing-only treatment. The variable quiz: insurance questions indicates the fraction of the questions on the mechanics of insurance premiums and payments that the respondent correctly answered in the baseline study. It should be noted that, although the associations in other treatment arms are not statistically significant, point estimates are positive and similar in magnitude. These results are suggestive that individuals with greater knowledge of the functioning of insurance products are more likely to purchase insurance. Particularly in light of the absence of any impact of the financial (and insurance) literacy intervention, however, this association should be treated just as such: because other characteristics may covary with insurance literacy, we cannot infer that this positive association is manipulable by interventions that promote financial literacy. The experimental evidence presented in the preceding subsections suggests otherwise.

A common concern in the marketing of health insurance on an opt-in basis, outside of the formal sector of developing countries, is one of adverse selection. Anecdotal descriptions from CIC suggested that Bima ya Jamii clients, in marketing groups outside of Wananchi, were disproportionately likely to give birth in hospital during their membership. Similarly, in the absence of restrictions on prior conditions, one might be concerned that the Bima clients would be drawn disproportionately from the chronically ill. From a welfare perspective, while such patterns of selection are likely to drive premium increases in the long run, this concern is counterbalanced by the goal of getting insurance products into those who will have occasion to benefit from hospital cover. However, we find no evidence that clients are drawn disproportionately from those with illnesses in the household in the past year. Similarly, stated expectations of hospital expenditure in the year of potential membership bear no association with membership decisions.

To summarize, we find only moderate evidence either that there is systematic selection into insurance purchase on observable measures of policy-relevant dimensions, or that these patterns are amenable to intervention through alternative marketing treatments.

## 5. CONCLUSIONS

The empirical evidence shows that, despite recent growth of insurance markets in developing countries, demand for insurance products among the poor remains low. According to the literature on

microinsurance, the main barriers to insurance participation are liquidity constraints, basis risk, financial illiteracy, limited trust and risk aversion.

This paper studies household participation in a composite health insurance product, Bima ya Jamii, offered by the Cooperative Insurance Company (CIC) of Kenya to tea farmers living in the district of Nyeri and belonging to the Wananchi Savings and Credit Cooperative Society.

We conduct a randomized experiment to identify the main barriers to widespread household participation in the health insurance product on offer. The tea centers sampled are randomly allocated to one of four treatment arms: 60 centers in the control group, 30 centers in the marketing only treatment group, 30 centers in the marketing and education treatment group and the remaining 30 in the marketing and referral incentive treatment group. To evaluate price elasticity of insurance demand, individuals in the treated centers are randomly assigned vouchers of 0, 10, or 20% of the premium.

The insurance product was purchased by 16% of farmers to whom it was offered. The peer referral incentive has a significant negative impact on the probability of purchasing insurance, while the study circles have no significant impact. The probability of purchase is linear in the amount of the price discount offered.

The non-impact of the study circle financial literacy intervention is a puzzling result. In fact, the study circles attendance rate is high and a post-intervention quiz shows that the treated actually benefited from the learning treatment. Therefore, it is surprising that education and financial literacy did not influence demand. This result suggests that limited education is not the main barrier to insurance participation and cannot therefore fully explain the low insurance uptake. We should therefore focus on other barriers, which are able to limit demand even when the individuals are educated and informed about the insurance product. It is plausible to believe that one of these barriers is limited trust. If individuals consider the insurer not to be credible or the product not to be

helpful, they will not purchase the insurance policy even if they are fully informed about it and provided with the necessary financial literacy to fully understand the insurance mechanism. The negative impact on insurance demand of the peer referral incentive seems to confirm that trust is limited.

The literature on microinsurance has already suggested a role for limited trust in insurance participation. However, it is complicated to properly measure trust, which is potentially related not only to generalized attitudes, but also to legal protections, as well as social and economic background. Therefore, future research on microinsurance could focus on modeling limited trust within the standard insurance demand model and developing alternative ways to measure trust and test its impact on insurance demand. We take up this issue in Dercon, Gunning, and Zeitlin (2011).

## 6. REFERENCES

- Cole, S., Giné, X., Tobacman, J., Topalova, P., Townsend, R. & Vickrey, J. (2009), 'Barriers to household risk management: Evidence from India', Harvard Business School, Working Paper 09-116.
- Dercon, S. (2004), *Insurance against Poverty*, Oxford University Press.
- Dercon, S., Gunning, J. W. & Zeitlin, A. (2011), 'The demand for insurance under limited credibility: Evidence from Kenya', Unpublished, University of Oxford.
- Dercon, S. & Kirchberger (2008), 'Literature review on microinsurance'.
- Morduch, J. (1995), 'Income smoothing and consumption smoothing', *The Journal of Economic Perspectives* 9, 103-114.
- Multon, B. R. (1986), 'Random group effects and the precision of regression estimates', *Journal of Econometrics*, Volume 32, Issue 3, 385-397.