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IS IT ALL ABOUT MONEY? A RANDOMIZED EVALUATION OF THE IMPACT OF INSURANCE LITERACY AND MARKETING TREATMENTS ON THE DEMAND FOR HEALTH MICROINSURANCE IN SENEGAL

Jacopo Bonan,
Olivier Dagnelie,
Philippe LeMay-Boucher
and Michel Tenikue

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ABSTRACT

In Senegal mutual health organizations (MHOs) have been present in the greater region of Thiès for years. Despite their benefits, in some areas there remain low take-up rates. We offer an insurance literacy module, communicating the benefits from health microinsurance and the functioning of MHOs, to a randomly selected sample of households in the city of Thiès. The effects of this training, and three cross-cutting marketing treatments, are evaluated using a randomized control trial. We find that the insurance literacy module has no impact, but that our marketing treatment has a significant effect on the take up decisions of households.

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1. INTRODUCTION

Poor people in developing countries face expensive costs when accessing health care and need to insure themselves against these costs. However, given that formal health insurance is prohibitively expensive, they must often, with qualified success, use informal ways of insuring themselves (see among others Makinen et al. 2000, Fafchamps et al. 2003). The imperfect nature of this informal insurance entails severe consequences for their aptitudes in dealing with risk, smoothing their consumption and the formation of human capital. Indeed, health shocks lead to direct expenditures for medicine and treatment, which typically require out-of-pocket payments (OOP), but also entail indirect costs related to a reduction in productivity. One WHO study (WHO; 2007) estimates that OOP payments can often exceed 50% of total health care spending in some low-income countries and particularly for some African countries, where national health systems are still nascent at best and private health insurance is owned by only a small proportion of the population. In Senegal, recent figures indicate that OOP payments account for 44% of total health expenditures (Scheil-Adlung 2006). It has been shown that the cost of major illness has severe consequences on consumption, assets and human capital accumulation (Gertler et al. 2002). This is particularly the case for more vulnerable categories such as workers in the informal sector and rural population (Morrisson, 2002).

Public health funding in Senegal has been stable over recent years while overall per capita health expenditures have been increasing in the same period (World Bank, WDI). The shrinking of the state's ability to meet health care needs makes it unable to provide universal insurance for its population. This has led to the emergence of many community-based health insurance schemes (CBHIS) in Senegal. At the same time, the market has been ineffective in providing health insurance to low-income people even in urban environments. Private insurers are often faced with important adverse selection problems and high transaction costs. The costs of their contracts are often prohibitive. Poor people can thus only resort to punctual transfers from relatives or health insurance schemes rooted in local organizations. CBHIS are now at the core of health protection and universal coverage strategies and policies in many African countries (Diop et al. 2006). They offer a form of insurance which allows members to pay regular affordable premiums to reduce OOP payments for healthcare upon falling sick. These schemes vary in design and implementation but they are all not for-profit organizations based on voluntary participation and underpinned by concepts of mutual aid and social solidarity at the community level.

The literature analysing the factors influencing demand for such CBHIS, based on household data, has been burgeoning in recent years and Jütting (2003), Berthelet (2005), Smith et al. (2008) and Ito and Kano (2010) represent just a few empirical studies in developing countries. Our project aims to complement this literature by incorporating randomized control trials of the impact of insurance literacy and marketing options on the demand for health insurance from households.

The pilot project of 1990 in the village of Fandene (in the vicinity of Thiès), spurred the expansion of CBHIS in the region and at the national level (Jütting, 2003). CBHIS are locally known as 'mutuelles de santé' or mutual health organizations (MHO). The number of MHOs in Senegal grew from 13 in 1993 to more than 140 in 2007. Despite this growth, the overall take-up rate in 2004 in the region of Thiès was around 5%

(Smith et al. 2008). A figure corroborated by a recent study in Lépine et al. (2010). This was confirmed during our pilot study in Thiès city where we carried out informal interviews with more than a hundred randomly selected households. Results from this preliminary phase showed that although MHOs have been active for a relatively long time in the region, around eight out of ten city inhabitants were unaware of their existence. This is undoubtedly a factor in explaining low take up rates.

Recent studies have used randomized control trials to look at the role of financial literacy and marketing on rainfall insurance product uptake (Cole et al., 2009 and Gaurav et al., 2009). The main contribution of this paper is that it is one of a few to investigate the roles these have on the uptake of health microinsurance (Thornton et al. 2010 offer a randomized evaluation in Nicaragua). In particular, we investigate the roles of lack of knowledge of these MHOs, and lack of financial literacy amongst locals. We also investigate the effect of marketing techniques that alleviate the potential financial barriers to entry. This paper reports on a series of marketing experiments conducted in the city of Thiès designed to test the financial and behavioural constraints to the purchase of health microinsurance. We surveyed 360 randomly selected households across the city and from this half of the sample was offered an insurance literacy training program. Independent of this assignment, all 360 households were randomly selected to receive one of three marketing treatments. These treatments took the form of redeemable vouchers offering different monetary compensations upon joining an MHO. These vouchers are described in greater detail below. Our results tend to show that our insurance literacy module has no significant impact on the uptake whereas our marketing treatment strongly and positively influences the uptake.

The next section elaborates on various reasons explaining low take-up rates in the context of our study. Section 3 presents the supply side of health microinsurance in Thiès. Section 4 describes our survey and offers descriptive statistics and is followed by a presentation of the study design in Section 5. We then move on to introduce our empirical strategy in Section 6 and discuss our results in Section 7.

2. EXPLAINING LOW TAKE-UP RATES

Our sample of 360 heads of households shows that 32% of them have health insurance, of various forms, for all or a fraction of their members (on average 73% of all household members). The largest share (19%) represents households which have health insurance compulsorily

provided by their employer in both public and private sectors. Only 3% of the households subscribe to a private health insurer while membership in MHOs remains relatively modest at 10%. The next section elaborates on each of these health microinsurance products.

Such low take-up rates of health insurance are expected to have effects on the use of health facilities. Scheil-Adlung et al. (2006), referring to Senegal, report that most people (85%) in the poorest income quintile state that economic constraints are the main reason for not seeking care, while unavailability of health services and facilities is secondary. This may at least partly explain why health providers using modern medical means often compete against the relatively cheaper services provided by traditional healers (marabou). Indeed, 45% of respondents in our sample declared to consult traditional healers (but non-exclusively) for minor health problems such as headaches, stomach ache or toothache. Conversely, a little over 55% declared to make use of modern medicine only. There appears to be an overall willingness to use modern means on the part of the heads of households as they are widely perceived as more efficient. To the question: 'in case of health problem related to malaria in your household, how much are you likely, out of ten, to use the services of a traditional healer?', only 11% gave 6 or more as an answer. Despite this, and the relatively high costs of modern medical means, we find a low MHO take up rate. In our sample, the justifications mentioned for lack of membership to MHOs were linked to the following: lack of information about the product they offer and their existence (70% of cases); lack of financial means (16%); lack of interest (5%); and lack of trust and confidence (2%). Our investigation focuses on what appears to be the two important reasons at play, in our context, in explaining low take-up rates. Our cross-cutting treatments (discussed in detail in Section 5) are designed and implemented accordingly.

(a) Lack of information

Cai et al. (2009) highlight that many farmers in China refuse to purchase heavily subsidized insurance, and that this might be due to the fact that not all farmers are aware of the insurance program. Jutting (2003), whose evidence is drawn from a rural region surrounding Thiès, states that the concept of insurance is alien to a large proportion of people. He also notes that an information campaign would probably be useful in this respect. Related to this is the lack of knowledge and understanding of insurance principles (Chankova et al. 2008). Referring to rainfall insurance in India, Giné et al.

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(2007) report that 'the most common reason given by those interviewed was that they did not understand the product'. Limited understanding of rainfall insurance mechanisms in rural India is also highlighted by Cole et al. (2009) and Gaurav et al. (2009). Pratt et al. (2010) show similar evidence with their sample of observations on Ethiopian and Malawi farmers.

(b) Lack of Means

Whether poor populations can afford microinsurance schemes is a crucial question. Jutting (2003) finds that the poorer segment of the population is represented to a lesser extent than people with an average or high income in MHOs. Chankova et al. (2008) find similar results using data from Ghana, Mali and Senegal. Giné et al. (2008) also show that take-up rate of rainfall insurance increases with household wealth in rural Andhra Pradesh. Cole et al. (2009) explain low take-up rates of rainfall insurance by, among others, the fact that the insurance is expensive.

In our case, the fact that lack of means is mentioned by only 16% of individuals as the reason for their non-membership does not come as much of a surprise if we compare their willingness to pay (WTP) to the actual premiums imposed by MHOs. Based on the same dataset used for this paper, Bonan (2011) uses the contingency valuation method to measure the uninsured respondents' WTP for MHOs' premiums, and for how many individuals they are willing to insure inside their household at that price. With an average of about 300FCFA, WTP is similar to the average premiums of a subset of prevailing MHOs for which we have information.

(c) Lack of Trust

Trust can also play an important role in individual insurance decision-making. Cai et al (2009) show that very low take-up of insurance for sows by Chinese farmers which is sponsored by the government may be explained, among other reasons, by the lack of trust toward governmental institutions. Cole et al. (2009) show that endorsement from a third party make people 40% more likely to purchase rainfall insurance.

Trust is likely to play an important role in the sustainability of MHOs and in their capacity to attract new members. Recent history in Thiès has shown that some rare MHOs have ceased their activities or been temporarily unable to provide their members with insurance (Ferrera-Domingo 2002 lists some cases of defaulting MHOs). As claimed by Karlan (2005),

answers on trust in General Social Surveys have predictive power on financial decisions at household level, such as repayment rates and saving patterns, and are a good proxy of capacity to enter into binding relationships. We included two questions in our questionnaire related to this issue. We asked individuals to weight their trust on different items by putting aside marbles out of a maximum of ten on an increasing scale. We rescaled each answer respectively with respect to the trust given in the mother and in the family. For the sample of non-members aware of the existence of MHOs we find that in both cases the median relative trust on MHOs given was eight out of ten. This tends to show that these grassroots movements benefit from a largely positive a priori from locals and appear as trustworthy. This might explain why trust does not seem to be an important factor in explaining the low take-up rates we observe.

3. THE SUPPLY SIDE

Health care in Thiès, a city located 60km to the east of the capital city of Dakar, is organised according to a tiered system consisting of health huts (staffed by community health workers), health posts (staffed by nurses and certified midwives), and health centres (staffed by medical doctors, nurses, and certified midwives). The health district of Thiès has one regional public hospital and one privately run mission hospital (St-Jean de Dieu). Data for this region shows that the ratio of inhabitants to health centres is seven times greater than WHO standards, while the ratio of inhabitants to health posts is in line with international norms (ANSD, 2008).

As mentioned above, in the absence of universal public health care1, only three forms of health insurance are present in our sample. The first, and of relatively little importance, is offered by private insurers. They provide insurance according to different scales and often require their clients to open a saving account within their own institution (PAMECAS, SALAMA and Crédit Mutuel du Sénégal). The second type refers to compulsory insurance provided by employers of a minimal size (with a minimum number of employees). Employees are this way contributing a fraction of their wage to their firms' health fund known as Institution de Prévoyance Maladie (IPM). This fund is then used to partially cover employees when health problems occur. Public servants have access to a more generous type of IPM where they, their spouse, and often up to two children (under 18), are partially insured in case of health related expenditures. The third type consists of

MHOs. Their appeal lies in the fact that they require the payment of affordable monthly premiums, mostly ranging from 150 to 350 FCFA per person covered.2 MHOs are particularly attractive to the large numbers of self-employed and informal sector workers who are price discriminated by private insurers. The MHOs we surveyed declared not operating any selection amongst potential candidates. The only screening that is involved takes the form of a 'period of observation' that is imposed by all MHOs. Once new members have paid their membership fees they are asked to contribute for three months during which they are not entitled to any claim. This three-month period is there to minimise adverse selection by checking if new members can stick to a strict monthly schedule of contributions. Any arrears on premiums can lead an MHO to exclude a member from coverage. Rules are strict but the administrators of some MHOs have admitted allowing for some flexibility. These not-for-profit grassroot schemes are managed by a non remunerated governing body headed by a president and have written rules. Members are expected to pay their premiums with a monthly visit to the finance officer who occasionally organises a collection for members who are late in their payment. Upon entry, new members must pay fixed membership fees covering the costs of registering, which includes a booklet listing all household members being registered. This acts as an official document when visiting a health provider.

The oldest MHO was founded in 1990 with the support of the St-Jean de Dieu hospital and aims at mainly covering inpatient care. Most schemes now cover primary care offered at health huts, posts and centres (Diop, 2005). Data from 2004 show that MHOs covered approximately 62000 individuals or 4.8% of the whole region of Thiès population (Smith et al. 2008). The different MHOs covering the city are relatively well spread across its territory so that most neighbourhoods have access to one. There is no obligation to join the closest MHO and one can opt for the MHO of one's choice. Differences with respect to their insurance schemes are minor. For these reasons we consider distance to the headquarters of the closest MHO as unlikely to have explanatory power.

Once insured by one of the three schemes described above, members can directly access specified health facilities and are required to pay a fraction of the fees. The remainder of the fees are covered by the insurer. Such transactions have at their core agreements (or conventions) negotiated between each respective health provider (huts, posts or the two centres) and MHOs operating in Thiès. As such the agreement of the insurer, prior to a consultation or the treatment of a particular patient, is not required. The array of interventions covered and the extent of the coverage varies from one MHO to the other. However they generally cover 25-75% of consultation costs and between 50-100% of medical exams, hospitalizations, and various inpatient cares fees at both the regional and St-Jean de Dieu hospitals.

As IPMs do not offer full coverage for consultation and inpatient care fees, and do not cover all members of a household, there is ample scope to complement this coverage with that of an MHO. Twenty one households (9% of the all households exposed to the marketing treatment) responded positively to our marketing treatment even if they already had a form of health insurance (see section 6 for more details on this). This suggests the existing intention to either complement existing means of insurance or to cover additional members of the household or kin or both. In particular, out of those 21 households seven complemented an IPM insurance, 11 an existing MHO insurance and three another private form of health insurance.

4. OUR SURVEY

In early 2010 we developed a partnership with GRAIM (Groupe recherche d'appui aux initiatives mutualistes) a Senegalese NGO promoting the work of local MHOs active in greater Thiès. GRAIM was initiated by the Ministry of Health and Prevention as part of the Ministry's first program to support MHOs. As such, GRAIM acts as a regional coordinator and the intermediary for most MHOs in negotiating conventions with health providers. This partnership meant we could draw on its knowledge to design and deliver our educational modules, and on its staff to hire our team of enumerators. Thiès was chosen for two main reasons. Firstly, it is the second most important city in Senegal with a population of about 240,000 inhabitants (2002 census). Secondly, some of the local MHOs are the oldest in Senegal, having been active for fifteen years, and as such the city possesses a well established supply of MHOs.

Table 1. Summary Statistics

	Mean	s.d.
Head is male	0.733	0.443
Head lives in couple	0.817	0.387
Head attended primary school	0.2	0.401
Head attended secondary school or more	0.461	0.499
Household size	6.731	3.212
Already insured	0.325	0.469
Insurance score	2.250	2.440
Head is public employed	0.197	0.398
Head is self employed	0.428	0.495
Durables	6.597	3.109
1st Income quintile	0.211	0.409
2nd Income quintile	0.242	0.429
3rd Income quintile	0.169	0.376
4th Income quintile	0.178	0.383
5th Income quintile	0.200	0.401
Saving device	0.569	0.496
Reported sickness	0.669	0.471
Strongly risk averse	0.561	0.497
Patient	0.414	0.493
N	360	

We use data we collected during the spring of 2010 on 360 randomly selected households across the whole territory covered by the city authorities, which represents an area of approximately 20 km square. Our baseline survey aimed at obtaining information on each household member's religion, level of education and health problems (sickness and chronic diseases). We also gathered information from the head of household concerning work, income, and a number of other factors pertaining to trust, risk aversion, and discount rate evaluation, which we describe below in greater detail. In the context of the households we surveyed, and this can safely be extended to the broader national level, the husband is generally considered to be the breadwinner and the head of household and as such is expected to insure the members of his household. This is why we collected these key variables affecting health insurance intake from the head. In what follows we therefore use data at the household level.

Table 1 reports summary statistics for the main socio-economic characteristics we consider in our study and which will be included in our specifications. Most of the heads of household are male and live in a couple. The average size of a household is more than six members. 46% of household heads attended secondary school or higher levels of education (above six years of schooling). Head's income is used as a proxy for households' economic conditions. It represents the sum of all sources of monthly income (labour income or wage, rent and received transfers). Due to the sensitivity of questions related to income, and the reticence to provide exact amounts, answers were in most cases (68% of all answers) collected according to intervals. An aggregated measure of income was constructed by adding intervals' midpoint values for the ten income intervals or exact values when given to rents and transfers nominal values. We then categorized in quintiles. Another variable (household's income) was similarly computed by adding spouse's income. Our results do not change if we use this variable instead. We also computed a synthetic measure of durable assets owned by the households as proxy for wealth. It is simply the sum of a list of items comprising among others a series of kitchen and home appliances, mobile phone, bicycle, motorcycle, car, sewing machine, different pieces of furniture, etc. As a proxy for income stability we use a dummy identifying if the head of households is working for a public institution or not. We also include a dummy for self-employed or not (the benchmark group are employed by private firms). The intuition is that with respect to wage earned in informal activities (petty retailing, craftsmen, transport, etc.), public servants are likely to have a steadier stream of revenues and find it easier to commit to the payment of monthly premiums. Around 20% of heads in our sample work for the state. We also measure with dummy variables if households are using one of three saving devices: ROSCAs, banks or microfinance institutions. Having access to a saving device might help a household to buffer health shocks and may render MHOs less attractive. Alternatively

being a member of a ROSCA may imply some discipline in saving which could in turn help an individual in committing to an MHO's premiums. Concerning the health status of the household, 67% of heads reported one of their household members having been sick in the previous twelve months. More sickness is likely to lead to greater demand for health care and hence for health insurance.

5. STUDY DESIGN

Treatment was randomly assigned at the household level. Half of the 360 households were invited to attend an insurance literacy module to be held on a non-working day in the city centre and held before our marketing treatment went ahead. The module consisted of a three-hour educational presentation offered by the GRAIM on health microinsurance, MHOs functioning and a general lesson on personal financial management, savings and the concepts of risk and insurance. Sessions were given to groups with a maximum of 20 individuals at a time. GRAIM has been running a training program on demand for several years for small communities eager to set up their own MHO and so was well placed to run this module. It was thus slightly modified in order to be presented to randomly selected households. The same individual was in charge of running all the sessions during which interactions with the participants were encouraged. Since the city covers a sizable area, we reimbursed transportation costs for all individuals that attended, to minimize disincentives to attend. The comparison group of 180 households received nothing. This randomization allows us to measure the causal impact of the effect of insurance literacy training on the purchase of insurance with MHOs. This way we can assess the module's impact while screening out other effects such as each individual's inherent propensity to opt for insurance.

Independent of this assignment, the 360 households were split into three randomly chosen sub samples (of 120 households each) and each subsample received an additional marketing treatment in the form of one of three vouchers. Voucher 2 offered a full refund of membership fees in an MHO and voucher 3 a full refund of membership fees plus a refund of 3000FCFA covering fees linked to the observation period. Voucher 1 had no monetary value attached to it and represented a simple invitation to the GRAIM in case the household was willing to know more about MHOs and their insurance product. The recipients had a period of two months to redeem the voucher by visiting the GRAIM and filling in an application form to join the

MHO of their choice. To ensure that our dependent variable was correctly constructed we phoned all households who did not redeem their voucher one month after the redemption date to ask them if in the meantime they had joined an MHO but not used their voucher. This way we accounted for the membership of two additional households.

Table 2. Random Assignment of Treatments

	Not Invited		Invited			Voucher 1		Voucher 2		Voucher 3		
	Mean	s.d.	Mean	s.d.	Difference	Mean	s.d.	Mean	s.d.	Mean	s.d.	F-test*
Head is male	0.750	0.434	0.717	0.452	0.033	0.758	0.430	0.700	0.460	0.748	0.436	0.510
Head lives in couple	0.844	0.363	0.789	0.409	0.056	0.792	0.408	0.825	0.382	0.840	0.368	0.650
Head attended primary school	0.2	0.401	0.2	0.401	0	0.166	0.374	0.215	0.412	0.218	0.415	0.62
Head attended sec. school or more	0.489	0.501	0.433	0.497	0.056	0.517	0.502	0.400	0.492	0.471	0.501	1.560
Household size	6.533	2.903	6.928	3.490	-0.394	7.100	3.460	6.350	3.143	6.748	3.009	1.610
Already insured	0.406	0.492	0.244	0.431	0.161**	0.358	0.482	0.300	0.460	0.319	0.468	0.430
Insurance score	2.550	2.529	1.950	2.317	0.600**	2.417	2.410	2.067	2.445	2.286	2.474	0.570
Head is public employed	0.233	0.424	0.161	0.369	0.072*	0.208	0.408	0.200	0.402	0.185	0.390	0.090
Head is self employed	0.433	0.497	0.422	0.495	0.011	0.425	0.496	0.413	0.494	0.445	0.499	0.13
Durables	7.078	3.262	6.117	2.878	0.961***	6.717	3.131	6.358	2.961	6.731	3.251	0.530

1st Income quintile	0.139	0.347	0.283	0.452	-0.144***	0.208	0.408	0.217	0.414	0.202	0.403	0.150
2nd Income quintile	0.244	0.431	0.239	0.428	0.006	0.233	0.425	0.242	0.430	0.244	0.431	0.000
3rd Income quintile	0.161	0.369	0.178	0.383	-0.017	0.142	0.350	0.167	0.374	0.202	0.403	0.670
4th Income quintile	0.222	0.417	0.133	0.341	0.089**	0.217	0.414	0.167	0.374	0.160	0.368	0.730
5th Income quintile	0.233	0.424	0.167	0.374	0.067	0.200	0.402	0.208	0.408	0.193	0.397	0.040
Saving device	0.617	0.488	0.522	0.501	0.094*	0.600	0.492	0.525	0.501	0.588	0.494	0.730
Reported sickness	0.700	0.460	0.639	0.482	0.061	0.675	0.470	0.658	0.476	0.681	0.468	0.070
Strongly risk averse	0.567	0.497	0.555	0.498	0.011	0.608	0.490	0.479	0.502	0.596	0.493	2.50*
Patient	0.383	0.487	0.444	0.498	-0.061	0.391	0.490	0.463	0.501	0.386	0.489	0.90
N	180		180			120		121		119		

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Table 2 shows the tests for random assignments of treatments across samples. Randomization with respect to voucher assignment appears satisfactory. However, as can be seen there are a number of significant differences between the invited and not invited samples. Heads of households that have not been invited to the module are on average richer (smaller proportion in the first quintile of income and larger proportion in the fourth quintile) and wealthier according to the number of durables owned. Non-invited individuals also appear to be significantly more likely to be employed by a public institution and more knowledgeable about insurance and its basic concepts, as their insurance score testifies (a series of seven true or false questions on the nature of insurance). Finally, the sub-sample of not invited is significantly more insured against health expenditures (through MHOs, IPMs, public employer insurance and private insurance). The reason why we observe these significant differences and why our design gave those results is unclear to us. We discuss below the potential impact of these differences on our econometric results.

6. A FIRST LOOK AT THE EXPERIMENTAL OUTOCOMES

Table 3 decomposes the number of uptakers according to our various types of treatment: educational and marketing. One notices that our compliance rate for the educational treatment is relatively low with only 105 out of 180 (58%) invited, actually attended the module. It also shows that the difference in terms of uptakers between those who attended the insurance literacy training and those who did not is negligible (24 versus 17). The table shows that voucher 1 had almost no impact on increasing the number of uptakers, with 89 out of 91 new uptakers being generated by either voucher 2 or 3. It is also interesting to note that 21 out of 91 uptakers already possessed some form of health insurance (11 MHO, 7 IPM and 3 private insurers) indicating that MHO membership can complement existing health insurance by covering additional members or by topping up existing insurance.

Table 3. Uptake Distribution across Treatments

	N	Number of Uptakers (n)	Take up rate % (n / N)	Take up rate % (n / 360)
Already had some form of insurance	117	21	18	6
MHO members	37	11	30	3
IPM members	69	7	10	2
Other forms*	11	3	27	1
Educational treatment				
Invited to Educational Session	180	41	23	11
Attendants	105	24	23	7
of which already insured	27	6	22	2
Non-Attendants	74	17	23	5
of which already insured	17	4	24	1
Not Invited to	180	50	28	14
of which already insured	73	11	15	3
Marketing treatments				
Voucher 1	120	2	2	1
of which already insured	43	0	0	0
Voucher 2	121	38	31	11
of which already insured	36	8	22	2
Voucher 3	119	51	43	14
of which already insured	38	13	34	4
Voucher 2+3	240	89	37	25
of which already insured	74	21	28	6
Whole Sample (#obs)	360	91	25	25

7. EMPIRICAL SPECIFICATION

To access the impact of our two different treatments we use the following model:

$$M_i^* = X_i' \beta + \alpha E_i + \delta Voucher_i + \varepsilon_i$$

$$M_i = 1 \ if \ M_i^* > 0 \ and \ M_i = 0 \ otherwise$$

M is a dummy variable which takes the value one if the household subscribes to an MHO following one of our treatments. E is a dummy variable which equals one if the household was invited to the insurance literacy module. Voucher is a dummy variable which equals one if the household was given either voucher 2 or 3. X is a vector of other covariates which contains: household heads' characteristics (gender, education, income, and employment status), an indicator of household wealth, and two proxies for the status of the household's health, and the household's level of insurance literacy. The index i identifies households.

The coefficients of interest are   and   . They respectively measure the effects of attending the educational module and of receiving a voucher that alleviates the financial barriers to entry, on the probability of joining an MHO. In this context E does not measure the effect of actual participation at the educational module, but rather the effect of being invited to attend. This is known as the intention-to-treat effect. We discuss below our results from the average treatment effect.

Table 4 shows the results of our estimated OLS model with the marginal effect of covariates on the probability of take-up. Results obtained with a probit model are similar. Columns 1, 3 and 5 show that our dummy 'voucher', which takes the value one if a household receives either voucher 2 or 3, has a significant positive impact on the probability of take-up. This result shows that providing financial incentives to households increases the demand for health microinsurance. Receiving vouchers 2 or 3 increases the probability of uptake by around 35 percent. As we can see in columns 2, 4 and 6 the decomposed effects by vouchers show that voucher 3 has a greater and significantly higher impact than that of voucher 2.

Table 4. Determinants of Insurance Take-up

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
Invited to the module	-0.0500	-0.0494	-0.0699	-0.0695	-0.0700	-0.0702
	(0.0424)	(0.0422)	(0.0447)	(0.0446)	(0.0453)	(0.0453)
Voucher	0.354***		0.361***		0.364***	
	(0.0334)		(0.0346)		(0.0352)	
Gender (Male=1)			0.0984*	0.0940*	0.0973*	0.0941*
			(0.0517)	(0.0510)	(0.0525)	(0.0516)
Head attended primary school			-0.0320	-0.0361	-0.0325	-0.0366
			(0.0619)	(0.0613)	(0.0618)	(0.0613)
Head attended secondary school or more			-0.0464	-0.0534	-0.0440	-0.0508
			(0.0616)	(0.0615)	(0.0623)	(0.0622)
Household size			0.0124*	0.0117*	0.0116*	0.0111*
			(0.00641)	(0.00646)	(0.00644)	(0.00648)
Already insured			-0.0902	-0.0899	-0.0947	-0.0932
			(0.0608)	(0.0599)	(0.0603)	(0.0595)
Knowledge of insurance principle			0.0142	0.0133	0.0144	0.0134

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	(0.0102)	(0.0103)	(0.0103)	(0.0103)
Head is public Employed	0.0974	0.101	0.0939	0.0975
	(0.0662)	(0.0668)	(0.0662)	(0.0668)
Head is self employed	0.0615	0.0567	0.0632	0.0595
	(0.0490)	(0.0489)	(0.0500)	(0.0500)
Durables	0.00533	0.00482	0.00409	0.00371
	(0.00804)	(0.00804)	(0.00821)	(0.00819)
1st income quintile	0.232***	0.224***	0.229***	0.223***
	(0.0794)	(0.0791)	(0.0795)	(0.0795)
2nd income quintile	0.241***	0.232***	0.238***	0.231***
	(0.0707)	(0.0707)	(0.0709)	(0.0709)
3rd income quintile	0.189***	0.180**	0.193***	0.184**
	(0.0710)	(0.0717)	(0.0711)	(0.0719)
4th income quintile	0.152**	0.151**	0.156**	0.154**
	(0.0627)	(0.0621)	(0.0631)	(0.0625)
Saving device	0.0238	0.0197	0.0283	0.0240
	(0.0510)	(0.0508)	(0.0513)	(0.0511)
Reported sickness over the year	-0.0404	-0.0402	-0.0368	-0.0372
	(0.0454)	(0.0453)	(0.0456)	(0.0455)

Voucher 2		0.298***	0.309***		0.313***	
		(0.0439)	(0.0452)		(0.0465)	
Voucher 3		0.412***	0.412***		0.412***	
		(0.0471)	(0.0474)		(0.0476)	
Strongly risk averse				0.0422	0.0331	
				(0.0438)	(0.0440)	
Impatient				0.00474	0.0106	
				(0.0457)	(0.0456)	
Constant	0.0417	0.0413	-0.316***	-0.290**	-0.335***	-0.308***
	(0.0260)	(0.0259)	(0.115)	(0.115)	(0.118)	(0.118)
Observations	360	360	360	360	360	360
R-squared	0.151	0.162	0.209	0.219	0.212	0.220

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The intention-to-treat effect of insurance literacy training is not significant. This is surprising given that most households we surveyed (70 % of non MHO members) noted that the lack of information and knowledge was the reason they had not joined an MHO. This suggests that improving insurance literacy in the context of this study would not improve the take-up of health microinsurance through an MHO. The related literature provides mixed results on the effect that improving financial literacy has on take-up. Cole et al. (2009) find no significant effect (and surprisingly negative coefficients) from attending an educational module, on rainfall insurance take-up in India. On the contrary, Gaurav et al. (2009) find that their educational module treatment on a similar product in the state of Gujarat in India improves take-up by 5.3%. With data from the same country Giné et al. (2007) emphasize the role of insurance literacy for rainfall insurance take-up. Several reasons may explain the lack of a significant effect in our context. One could be that contrary to what we write above insurance literacy was already sufficiently high and that most people in our sample grasp the basic concepts and the need for health microinsurance. It could also be that the product offered by MHOs is easy enough to understand without the need for training. Indeed, the complexity of rainfall insurance marketed by Gaurav et al. (2009) makes it more likely to benefit from an insurance literacy module. The quality of the educational module could also have had a role. For that matter we did not test participants' financial literacy after their exposure to the module and are thus unable to formally test this. However, we know that the person in charge of organizing the module was competent and had been running several dozen similar programs over recent years. The interaction term of having been invited to the insurance literacy module and having received either voucher 2 or 3 (so the variable 'invited to the module' times the variable 'voucher') is not added in our various models simply because of its fully predictive power: no households which were invited to the education module and received voucher 1 took up the insurance.

Being educated has no effect on MHO take-up: households whose heads have attended primary school, secondary school, or more, are not more likely to join an MHO than those who have never attended school. If there is any impact from the education variable it is likely to come indirectly through income earned. Results show that earned income is an important determinant of take-up and has a positive and significant coefficient. This result is in line with other related papers on the determinants of participation to MHOs (notably Jütting, 2003 and Jowett, 2003). Poor households from the first income quintile are less likely to take-up MHO insurance

than richer households. This result reinforces the idea that having enough financial resources helps households in joining an MHO and that the poorest are more likely to remain excluded. Once a member of an MHO, one has to consistently pay the premium in order to preserve its benefits. However, whether a head of household is self employed or works as a public servant, has no significant impact (the benchmark group is to be employed by a private firm). This seems to indicate that whether one has an unstable source of income is irrelevant. Male headed households, as well as bigger households, are more likely to join MHOs. We also included a dummy variable 'already insured' which takes the value one if the head has health insurance (IPM, MHO or private). This variable appears to have no significant impact. This is not surprising if we consider the discussion at the end of Section 3. Most IPMs, MHOs and private insurers do not offer full coverage for consultation and inpatient care fees and do not cover all members of a household. There is thus scope to complement this coverage with that of an MHO. Ahuja et al. (2004) suggest that some market imperfections such as credit or borrowing constraints suppress poor households' demand for microinsurance. Related to this we use the dummy 'saving device'. This way we can measure the impact on uptake of having access to financial institutions which can offer credit. Our results show that this variable has no significant impact. We also included a variable for the willingness to pay (see Bonan, 2011, for an analysis of WTP based on the same dataset), for which the results are not shown. It has a significant impact in some of our various specifications.

It was expected that more knowledgeable heads of households would be more likely to join an MHO. Our results indicate that this is not the case as their insurance score testifies (a series of seven true or false questions on the nature of insurance). Finally, in a region prone to various chronic and recurrent diseases such as malaria, it was expected that households who host unhealthy members would be more likely to join an MHO. However, the results indicate that households who reported recent episode of sickness are not more inclined to join MHOs. This tends to indicate that adverse selection is not likely to be an issue in the context of this study.

Two additional dummies were added as controls in our regressions. The first variable takes a value of one if the household head is strongly risk averse, i.e. always opted for the certain outcome when presented with a set of choices between gambles and certain gains and losses using a similar methodology as Voors et al. (2010). In this part of our survey, each individual had to choose between certain outcomes (gain/loss of 200, 250 and

300 CFA francs) and simple gambles with probability 1/4 to win/lose 1000 CFA francs and probability 3/4 to win/lose nothing. We also ran this exercise with the same amounts multiplied by a factor of ten. Before answering this set of 12 questions, each household head was informed that, after completion of this section, a lottery would be picked out, amongst the ones offering potential gains, by the enumerator who, in accordance with the preference of the player, would either give the certain outcome or play the selected lottery for real money. We also turned to the methodology put forward in Voors et al. (2010) to elicit discount factors. In this case, household heads had to choose, from a list of different amounts to be received in one month, the one making them indifferent from receiving 10000 CFA francs today. The list of amounts used in this question is the following: 10500, 11000, 12500, 15000, 17500, 20000, 25000, 30000, representing the respective discount factors at one month: 5%, 10%, 25%, 50%, 75%, 100%, 150%, 200%. We then generated a binary variable taking a value of one when the individual belonged to the more patient half of our sample. Both the risk aversion variable and the time preference variable appear not to significantly influence uptake of our microinsurance product.

Because our compliance rate was not perfect (58% of people invited turned up to the offer of insurance literacy training) we also estimate the average treatment effect of insurance literacy on the probability of take-up using an IV model. Given that households self select in attending the training session it becomes necessary to correct for such a problem. The random assignment to the education module is used as the instrument for attending the module. Results are similar to the ones derived with the intention-to-treat effect. The educational module has no effect on take-up but, on the contrary, vouchers 2 and 3 have a large and significant impact on take-up.

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Table 5. Determinants of Insurance Take-up

VARIABLES	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
Invited to the module	-0.0699	-0.0634	-0.0700	-0.0637	-0.0668
	(0.0447)	(0.0449)	(0.0453)	(0.0455)	(0.0451)
Voucher	0.361***	0.196***	0.364***	0.199***	0.315***
	(0.0346)	(0.0594)	(0.0352)	(0.0603)	(0.0466)
Gender (Male=1)	0.0984*	0.0943*	0.0973*	0.0930*	0.101*
	(0.0517)	(0.0519)	(0.0525)	(0.0528)	(0.0523)
Head attended primary school	-0.0320	-0.0283	-0.0325	-0.0284	-0.0319
	(0.0619)	(0.0626)	(0.0618)	(0.0626)	(0.0617)
Head attended secondary school or more	-0.0464	-0.0420	-0.0440	-0.0392	-0.0415
	(0.0616)	(0.0620)	(0.0623)	(0.0627)	(0.0623)
Household size	0.0124*	0.0132**	0.0116*	0.0124*	0.0114*
	(0.00641)	(0.00653)	(0.00644)	(0.00655)	(0.00646)
Already insured	-0.0902	-0.0952	-0.0947	-0.0999	-0.0908
	(0.0608)	(0.0613)	(0.0603)	(0.0609)	(0.0606)
Knowledge of insurance principle	0.0142	0.0147	0.0144	0.0150	0.0145
	(0.0102)	(0.0104)	(0.0103)	(0.0106)	(0.0103)

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Head is public Employed	0.0974	0.0940	0.0939	0.0904	0.0888
	(0.0662)	(0.0661)	(0.0662)	(0.0661)	(0.0667)
Head is self employed	0.0615	0.0635	0.0632	0.0652	-0.0123
	(0.0490)	(0.0488)	(0.0500)	(0.0498)	(0.0375)
Durables	0.00533	0.00507	0.00409	0.00389	0.00400
	(0.00804)	(0.00803)	(0.00821)	(0.00822)	(0.00812)
1st income quintile	0.232***	0.0596	0.229***	0.0560	0.235***
	(0.0794)	(0.0591)	(0.0795)	(0.0600)	(0.0804)
2nd income quintile	0.241***	0.0633	0.238***	0.0628	0.239***
	(0.0707)	(0.0496)	(0.0709)	(0.0500)	(0.0715)
3rd income quintile	0.189***	0.0883	0.193***	0.0878	0.191***
	(0.0710)	(0.0670)	(0.0711)	(0.0685)	(0.0716)
4th income quintile	0.152**	0.0484	0.156**	0.0564	0.156**
	(0.0627)	(0.0483)	(0.0631)	(0.0506)	(0.0631)
1st income quintile * Voucher		0.248**		0.249***	
		(0.0958)		(0.0954)	
2nd income quintile * Voucher		0.262***		0.258***	
		(0.0883)		(0.0890)	
3rd income quintile * Voucher		0.149		0.155	

		(0.117)		(0.118)	
4th income quintile * Voucher		0.153		0.146	
		(0.104)		(0.106)	
Saving device	0.0238	0.0247	0.0283	0.0291	0.0291
	(0.0510)	(0.0511)	(0.0513)	(0.0516)	(0.0513)
Reported sickness over the year	-0.0404	-0.0435	-0.0368	-0.0403	-0.0428
	(0.0454)	(0.0467)	(0.0456)	(0.0469)	(0.0456)
Strongly risk averse			0.0422	0.0414	0.0435
			(0.0438)	(0.0448)	(0.0438)
Impatient			0.00474	0.00449	0.00441
			(0.0457)	(0.0461)	(0.0455)
Head is self employed * Voucher					0.115*
					(0.0672)
Constant	-0.316***	-0.209*	-0.335***	-0.227*	-0.306***
	(0.115)	(0.113)	(0.118)	(0.117)	(0.116)
Observations	360	360	360	360	360
R-squared	0.209	0.220	0.212	0.222	0.215

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Two interesting results can be highlighted from Table 5. We measure the impact of the variable voucher for different levels of income by interacting it with income quintiles. Columns 2 and 4 show that there is an additional positive and significant effect only for the first and second quintiles. Moreover, column 5 shows that voucher appears to also have an additional positive impact for the self-employed. This shows that vouchers 2 and 3 appear to have an additional impact on poorer households and those that are self-employed (i.e. have no access to IPM insurance). Results not shown indicate that no significant effects were found from the interaction of income variables with the invitation to the educational module.

(a) Further Discussion

It is possible that our result regarding the insurance literacy treatment is biased by the significant differences we highlighted for some variables across samples in Table 2 under the columns 'not invited' and 'invited'. Households not invited to attend the insurance literacy training appear to be significantly richer, more likely to be employed by a public institution and to have health insurance and more knowledgeable about insurance and its basic concepts. However if anything these biases would lead to an over-estimation of the effect of the treatment. Our educational module is more likely to impact positively on the take-up rate if addressed to less insured and knowledgeable agents. Thus, our finding which shows that the educational module has no significant impact on take-up rates is likely to hold despite these sample differences.

One puzzling fact to us was that out of the 180 invited households only 105 (58%) attended our educational module. This despite the fact that invitations where directly handed to heads of household and we followed them up by calling to further advertise the module. We look at the determinants of attendance at our educational module (the independent variables include all control variables from Table 4 except voucher variable) and find that the variables related to head's employment type, income, household's size and health status are not significant. Surprisingly, the more knowledgeable a household is of basic insurance principles (the higher our variable insurance score is), the more likely it is to attend the module.

8. CONCLUSION

This paper has looked at the context of health insurance in Thiès. In the absence of universal coverage or any credible public initiative to offer extensive health insurance, there exists a supply of health insurance products. We have put particular emphasis on MHOs which are local grassroots movements with more than twenty years of community involvement in the region. Nevertheless, they remain largely unknown in Thiès. Indeed, our initial findings pointed toward the lack of knowledge in explaining the low take-up rates we observed. We devised and offered a customized insurance literacy module communicating the need for and benefits from personal health insurance and the functioning of the MHOs to randomly selected households in the city of Thiès. At the same time we aimed at measuring the effect of three cross-cutting marketing treatments using a randomized control trial.

Our findings show that the insurance literacy module has no significant impact on health insurance take-up while our marketing treatments have a large and positive significant impact on the households' purchase decisions. What is striking is that out of the 60 households who were invited to the module and received voucher 1 (with no monetary compensation attached) none took up the product. What appears from our various descriptive statistics, and results from our econometric analysis, is that the crucial element driving new membership is the allocation of either voucher 2 or 3. These two vouchers are the only two attached to a monetary compensation. Crudely interpreted these results suggest that what really matters is not education but rather compensations in the form of reduced fees relating to membership and the period of observation. If the state or the city authorities wanted to increase take-up rates the most efficient way would be to alleviate the financial barriers to entry. Educating the population about the potential benefit of this product is unlikely to produce any significant outcome. We nevertheless remain cautious of such results by emphasising that they are based on a relatively small sample. Unfortunately, our study does not touch upon the critical issue of membership sustainability over time once membership has been acquired. It would be of interest to follow-up on the 91 households who redeemed their vouchers and took up health insurance.

Apart from the work of GRAIM which has succeeded in providing technical assistance, federating most of the MHOs in Thiès, and in helping them negotiate conventions with the different health providers, there has been no government led inititative in the region to establish new groups or even to help scale-up existing ones. Nevertheless MHOs could represent a unique way to reach relatively poor people and informal workers which do not have access to an IPM (Poletti

et al., 2007). The networks they represent in those districts should be considered a serious asset. Because they are well established and experienced institutions, they are likely to reach underprivileged households at a relatively low cost. What our results also suggest is that projects favouring the establishment of new insurance services, or expanding existing ones, should only require payments of low entry fees if they are to be accessible to the poor. This way the neediest could be reached and MHOs would be able to raise the relatively low level of participation that we observed. Increasing membership size could in turn bring positive side effects: pooling the risk of more individuals is likely to lead to a reduction in premiums and potentially to an improvement in the extent of insurance provided.

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ENDNOTES

1. This is not exactly true as there exists an ill-functioning insurance for individuals aged higher than 60. Various reports from users and hospital workers have indicated that this programme, know as CESAME, is delivering very little results.

2. Out of the 37 households already member: monthly contribution to MHOs amounts to 1.2% of the head of household's income