

Platteau, Jean Philippe; Ontiveros, Darwin Ugarte

Working Paper

Understanding and information failures in insurance: Evidence from India

Development Research Working Paper Series, No. 07/2013

Provided in Cooperation with:

Institute for Advanced Development Studies (INESAD), La Paz

Suggested Citation: Platteau, Jean Philippe; Ontiveros, Darwin Ugarte (2013) : Understanding and information failures in insurance: Evidence from India, Development Research Working Paper Series, No. 07/2013, Institute for Advanced Development Studies (INESAD), La Paz

This Version is available at:

<https://hdl.handle.net/10419/106345>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Institute for Advance Development Studies



07/2013

**Understanding and Information Failures in Insurance:
Evidence from India**

by:

Jean Philippe Platteau
Darwin Ugarte Ontiveros

Development Research Working Paper Series
07/2013

November 2013

The views expressed in the Development Research Working Paper Series are those of the authors and do not necessarily reflect those of the Institute for Advanced Development Studies. Copyrights belong to the authors. Papers may be downloaded for personal use only.



Understanding and Information Failures in Insurance: Evidence from India*

by

Jean Philippe Platteau**

Darwin Ugarte Ontiveros***

November 2013

Abstract

This paper is an attempt to understand the factors behind low contract renewal rates frequently observed in insurance programs in poor countries. This is done on the basis of the experience of a microinsurance health program in India. We show that deficient information about the insurance product and the functioning of the scheme, and poor understanding of the insurance concept are the major causes of the low contract renewal rate among households which had previously enrolled into the program. A central finding is that, when a household has received a large negative payout during the preceding year, it is more inclined to opt out of the program unless it has a good understanding of what insurance means. In other words, the adverse impact of negative insurance payouts on contract renewal is conditional upon the presence of a cognitive bias which violates the expected utility theory. Moreover, trust in the insurance company has a significant positive effect, yet that effect cannot be disentangled from that of understanding ability. The policy implication of our findings is considerable since they provide a strong justification for mandatory universal health insurance.

Keywords: Microfinance, microinsurance, insurance literacy

JEL: G210, I13, O12

* We want to express our special gratitude to the Microinsurance Facility (Geneva) and the Bill and Melinda Gates Foundation which have funded this study and connected us with the local partner organization. We also want to extend special thanks to Catherine Guirkingner who provided helpful advices during the preparatory phase of the field survey, and useful comments at later stages. Moreover, we benefited from useful comments by Jean-Marie Baland, Clive Bell, Erlend Berg, François Bourguignon, Pierre-André Chiappori, Marcel Fafchamps, James Fenske, Jan Willem Gunning, Rashid Laajaj, Santiago Levy, Andreas Mandelstam, Juan-Antonio Morales, Karlyn Morsink, Simon Quinn, Pieter Serneels, Vincent Somville, and Diego Ubfal.

** Professor of Economics at the University of Oxford and the University of Namur.

*** Researcher at the University of Namur.

Introduction

In developing countries, many low income individuals cannot afford medical treatments, or finance the purchase of medicines. Therefore, health shocks dangerously threaten their lives and are actually among the most important sources of risk confronting them. Adverse effects on their consumption, productivity and human capital have been well documented in the literature and they reinforce the case for universal health coverage (Gertler and Gruber, 2002; Jutting, 2003; Dercon and Hoddinott, 2004; Leatherman et al., 2010). Because governments in most developing countries have not been able to meet the basic health needs of their poor population, the international donor community tends to think not necessarily in terms of public coverage but also in terms of public-private partnerships. Community-Based Health Insurance (CBHI) or Microinsurance programs that provide local healthcare financing options for the poor are thus increasingly considered as one of the ways available to build health coverage initiatives. Designed to provide a defined set of subsidized health benefits and services, such as hospitalization or in-patient benefits, they have expanded exponentially over the past few years.

Programs that offer more comprehensive products presenting higher value to low-income households remain rare. One exception is the CBHI program recently implemented in India by Swayam Shikshan Prayog (SSP) and Swasth India Services (SIS) and underwritten by a local insurance company called Arogya Sandhi. Aimed at going beyond basic in-patient cover and at reducing out-of-pocket health expenditures incurred by low income households, the program supplies a hybrid health insurance product in two districts of Maharashtra state. Against a fixed annual premium that varies with the size of the household, households are granted (i) free access to in-patient care provided in empanelled hospitals, up to an annual benefit of US\$667 for the whole family, and (ii) a reduction in out-patient health costs through a 50% discount on consultation fees and a 40-70% discount on the retail price of medicines. Another key feature of the program is that outpatient discounts are provided only through a specific network of community health workers, physicians, diagnostic centers, clinics, and pharmacies (coordinated by a Community Health Trust).

It may appear surprising that many of these microinsurance programs have shown disappointing performances as measured by take up and contract renewal rates (see de Bock and

Gelade, 2012, for a recent survey). Indeed, it is rather exceptional to see take up rates above 30% and quite frequent to observe rates in the range 5-20%. As for renewal rates, available data suggest that they may be even smaller: 7% in Nicaragua (Fitzpatrick et al., 2011), and 4% in India (Stein, 2011). The figure of 54% found for Burkina Faso (Dong et al., 2009) is exceptionally high in the light of most available evidence including our own. As a matter of fact, the average rate of subscription in the SSP program (2010) was less than 2% and, regarding contract renewal, more than two-thirds of the (few) subscribers decided to drop out of the program as their contract expired. Moreover, we recorded a very low rate of (new) subscriptions (around 3%) among the households which did not initially enroll into the program but had the opportunity to do so one year later inside the treatment villages.

We are thus provided with a unique opportunity to draw lessons from an experience that did not meet the expectations placed in it. Indeed, the data we have collected allow us to look systematically into the main causes behind low contract renewal.¹ We believe that such an inquiry supplies a more powerful test of the attractiveness of insurance schemes than an analysis of the determinants of initial subscription rates. This is because the ultimate test of the validity of an insurance program, or any program for that matter, ultimately rests upon its long-term sustainability. Since payment of the insurance premium has to be renewed at regular intervals (typically, every year), understanding why initial subscribers choose to renew or not to renew their contract is bound to give insights into the manner in which they assess a real instead of a prospective experience. At the time of the initial decision to enroll or not enroll into an insurance program, people may be influenced by effective (or ineffective) marketing strategies, false promises, or other factors that do not have a lasting effect.

It is common in the literature on microinsurance to distinguish between supply and demand factors. Supply-side factors that may cause problems in microinsurance programs include low quality of the services provided (for example, medical services or drugs), inappropriate characteristics of the insurance product or the contract design, ineffective marketing, etc. Demand

¹ Even though the study design allows for an impact assessment evaluation (with comparisons between treatment and control villages), the exercise would be futile: impact is bound to be very disappointing owing to low enrolment rates and low rates of use of the insurance by subscribers.

arising from poor, risk-averse villagers is normally expected to be high but may be hampered by liquidity constraints, lack of people's trust in the insurer or in certain characteristics of the product, or else a weak understanding of insurance principles (see, e.g., Jutting, 2003; Giné et al., 2007; Chankova et al., 2008; Ito and Kono, 2010; Cole et al., 2011).

The most original feature of this paper lies in its focus on, and rigorous testing of understanding and information failures. We thus follow up on the business management literature on financial literacy in developed countries, the United States in particular. Its main finding is that lack of information (and misinformation) and cognitive biases are important factors behind poor consumer financial decisions, especially when complex transactions, including insurance, are involved (Gabaix and Laibson, 2006; Lusardi and Mitchell, 2009; Lusardi et al., 2009; Carlin, 2009; Cole et al., 2011; Kunreuther et al., 2013). Our own central result that information and understanding failures are significant factors behind the low performance of a microinsurance program in a poor country appears less surprising in the light of this literature. It is also in line with the conclusion reached by Giné et al. (2007) regarding the determinants of (low) participation in rainfall insurance schemes in India ("the most common reason given by those interviewed was that they did not understand the product"), or by Cole et al. (2011) and Gaurav et al. (2009), again in the case of India, and by Pratt et al. (2010) in the cases of Ethiopia and Malawi. With respect to information, a study of health insurance in rural Senegal (Bonan et al., 2012) have found that 55% of the people justified their lack of membership in Mutual Health Organizations by an absence of information about the product offered and/or about the existence of these organizations themselves.

The central story told in the paper is the following. Insufficient information provided to subscribers determined a low rate of use of the insurance policy which itself led to a situation where many of them did not collect any payment on the insurance even though they were eligible. Combined with a poor understanding of the notion of insurance among many subscribers, which contrasts with a remarkable ability to estimate its benefits and costs, such an outcome caused a low rate of contract renewal.

The structure of the paper is as follows. In Section 2, our approach to sample design is explained and statistics are provided that describe the sample households in terms of their socio-

economic and health characteristics. Section 3 proceeds in three steps. First, we present a simple conceptual framework that will help us specify the econometric models to be estimated. We then explain what we mean by a correct or incorrect understanding of the insurance concept and by a good or bad information regarding the SSP microinsurance health program, and how we measure these two key dimensions. Finally, we supply key descriptive evidence about the importance of these two problems and the way they are related to (i) the use of the insured services, (ii) satisfaction levels and (iii) contract renewal. Section 4 also consists of three consecutive parts since, using a multivariate framework, we attempt to explain inter-household variations in the above three variables, with special attention to the role of our understanding and information measures. Section 5 summarizes the main lessons from the microinsurance program concerned, and draws some important policy implications.

2. Sample design and characteristics

The health microinsurance program supported by SSP was initiated in year 2010 in two districts of Maharashtra state (Solapur and Osmanabad). A total number of 535 subscriber households, spread over 54 villages, were initially registered, 415 of them in Solapur (in 34 villages) and 120 in Osmanabad (in 20 villages of Tuljapur council). This amounts to a low average subscription rate of 1.6%. The frequency distribution of the subscribers is negatively asymmetric with only 5 villages exhibiting a subscription rate above 5%. The initial plan was to interview 600 households in the villages in which SSP introduced the insurance microinsurance program (the treated villages), 300 subscribers and 300 non-subscribers.² Assuming that there would be at least 5% of the population subscribing, the initial intent was to interview 15 households of each type in each of 20 randomly selected treatment villages. When we realized that this assumption was over-optimistic, we had to change strategy.

The option of concentrating exclusively on villages where a sufficient number of households had subscribed was considered inappropriate, since it would cause an obvious selection bias. The

² On the other hand, 450 households were to be interviewed in control villages.

alternative of concentrating on broader areas covering a sufficiently high number of villages to yield enough subscribers was also discarded. Because a very limited number of individuals would then be coming from the low subscription villages, the selection problem would not be satisfactorily solved. Finally, a stratification strategy based on the total population of the village, which might be correlated with the total number of subscribers in the village but exogenous to the behavior under scrutiny, proved to be unfeasible: there is, indeed, no correlation between the village population and the number of subscribers (0.026).

Therefore, to avoid a sample selection process based on the behavior of the households, a two-stage random sampling procedure was followed in order to complete the sample of 300 subscribers and 300 non subscribers in treatment villages. First, a treatment village was randomly selected from the list of 54 treatment villages. Then, in case the number of subscribers was small (lower than 20 subscribers), the entire population of subscribers was included in the sample. In case the number of subscribers was larger than this threshold, 20 subscribers were randomly selected and added to the sample. This procedure was pursued by adding new randomly selected villages till the set objective of 300 subscriber households was reached. In each of these treatment villages, the number of non subscribers surveyed was equal to the number of subscribers. Our village sample was eventually made of 35 units, instead of the 20 villages initially intended.

In practice, we slightly departed from the above procedure for the following reason. Given the central purpose of the study, which is to understand contract renewal behavior among subscriber households (and later enrollment of initially non-subscribing households), two successive survey rounds were planned. The first round took place in 2010 when the program started in the study area, and the same households were re-interviewed in 2011 after one year of experience had elapsed and the decision whether to renew the contract (or whether to enroll) had just been made. Because we wanted to have at least 300 subscriber households in the second round and the risk of attrition had to be taken into account, we increased the initial sample sizes beyond the aforementioned numbers (to 315 for subscribers and 315 for non-subscribers).³ The number of households in the treatment villages that we could trace back in 2011 was 554

³ Households interviewed in 2010 in the treatment villages thus numbered 630 while those interviewed in the control villages numbered 450, making up a total of 1,080 households.

(corresponding to 2,629 individuals), consisting of 306 subscribers and 248 non-subscribers.⁴ Clearly, attrition was more important among the latter than among the former households (21.3 % as against 2.9 %), a difference that arises from the weaker motivation of non-subscriber households to be re-interviewed rather than their higher mobility.⁵ Note that the possible bias created by such a difference will not affect our results in so far as our basic econometric test will be based on the sample of initial subscriber households only. Finally, it is evident from Table 1 below that, out of the 306 initial subscribers whom we could re-interview in 2011, only 100 (less than one-third) chose to renew their insurance contract. On the other hand, only 9 out of 248 households which did not subscribe in 2010 (3.6 %) decided to enroll one year later.

Table 1: Sample of treated households as per their participation in the scheme (2010, 2011)

Subscriber households			Non-subscriber households		
Renewed contract in 2011	Dropped out in 2011	Total number	Enrolled in 2011	Stayed out in 2011	Total number
100	206	306	9	239	248

We may now turn to presenting descriptive statistics of the sample households, distinguishing between subscribers and non-subscribers. These statistics relate to their socio-economic and health characteristics (see Table 2).

Most of the sample households have a male head (91%), and the average age of the head is 44 years. It is noteworthy that heads of subscriber households are significantly younger than heads of non-subscriber households. Regarding education, the duration of schooling of the household head is 6 years on average, and 72 % of them can read and write. Households have an average of 5 members. To measure the wealth of the households, we follow two approaches depending on whether we use incomes or assets. While income is measured continuously, the asset index is constructed by considering several binary asset ownership variables (the questions are reproduced in Appendix A). The index was obtained by applying Multiple Correspondence

⁴ The number of households interviewed in 2011 in the control villages was 387.

⁵ In a significant number of cases, indeed, non-subscribers gave us a wrong phone number so as to prevent us from contacting them again.

Analysis (MCA)⁶. Both measures of wealth describe a negative asymmetric shape, and display a linear correlation of 0.39. While the average income in the sample is 2,820 Rupees, the median income is only 708 Rupees. Subscriber households do not significantly differ from non-subscriber households in terms of incomes and wealth.

The incidence of health shocks has been measured both before the start of the program (with the label *sick_member_past*) and toward the end of the first year after the contract had to be renewed (with the label *sick_member_present*). Table 2 shows that health shocks affecting a family member are quite frequent in the sample: in 89% of the households, at least one member fell sick during the year covered by our survey (2010-2011), testifying to the high incidence of health risks in the study area. However, we cannot reject the null hypothesis that the probability of a health event is identical between the two subgroups of households. This observation is important since it is preliminary evidence that moral hazard behavior should not be a serious concern in the case under study. Moreover, the absence of difference in the incidence of health events between subscribers and non-subscribers is also confirmed when we consider the year preceding the start of the program. This suggests that one important source of adverse selection (people with more fragile health are more prone to take up health insurance) is not likely to be present. Note that the same conclusions are obtained if, instead of measuring health shocks by a binary variable (whether at least one member of the household has been sick during the period considered), we use a continuous measure indicating the number of illnesses inside a household.

Another variable that we have measured twice along the time scale is the so-called prevention index. It is based on variables measuring the knowledge of households regarding basics in health care, personal hygiene, nutrition, sanitation, and water handling (the questions are reproduced in Appendix A). This information was combined through a MCA to form a single index. The resulting multimodal behavior expresses a strong heterogeneity in preventive behavior in the sample. The average value of this index, when measured at the end of the first year of the program (denoted by *prevention_index_present*), is larger for subscribers (0.19) than for non-subscribers (-0.06), and the difference is strongly significant. When measured before the start of

⁶ Note that MCA is a generalization of the classic Principal Component Analysis (PCA) where the variables to be analyzed are categorical, not continuous.

the program (and denoted by *prevention_index_past*), the index value is again larger for the subscribers yet the gap between them and the non-subscribers appears to be much wider.⁷ Households which enrolled into the program in 2010 were therefore significantly more health-and-hygiene conscious than others. The strong presence of health-conscious heads among the subscriber population could suggest that, since they represent good risks, they are more risk-averse than other heads (otherwise they would not have enrolled into a program which includes households more prone to health risks). For this interpretation to be valid, however, good risks should expect the risk premium to be higher owing to the presence of bad risks, which is far from evident in our setting. Moreover, it is not clear that more health-conscious households represent significantly better risks insofar as they do not appear to be more successful in avoiding health shocks: the correlation between the health event variable (measured for the year 2010-2011) and the prevention index (measured either for the current year or the past year) is very low, and this is confirmed when we regress the former on the latter and introduce a variety of controls.

⁷ A plausible explanation behind the narrowing down of the gap between the two successive years is the following: since the initial level of preventive knowledge was much higher among subscribers, further progress was more difficult to achieve.

Table 2: Personal, health and socio-economic characteristics of the sample households

	Treatment villages	Subscriber households	Non-subscriber households	Difference in means
Gender of head	0.913 (0.282)	0.902 (0.298)	0.927 (0.260)	0.0255 [1.06]
Age of head	44 (10.49)	42.68 (9.576)	45.63 (11.33)	2.957*** [3.33]
Schooling of head	6.375 (4.605)	6.275 (4.553)	6.500 (4.674)	0.225 [0.57]
Literacy	0.724 (0.448)	0.693 (0.462)	0.762 (0.427)	0.0693* [1.82]
Size of household (Nr of members)	4.749 (1.721)	4.650 (1.551)	4.871 (1.907)	0.221 [1.50]
Monthly income	2.820 (10.07)	3.175 (12.84)	2.382 (4.805)	-0.793 [-0.92]
Asset index	0.180 (0.940)	0.215 (0.921)	0.138 (0.962)	-0.0769 [-0.96]
Sick_member_present	0.892 (0.311)	0.908 (0.289)	0.871 (0.336)	-0.0375 [-1.41]
Sick_member_past	0.863 (0.344)	0.863 (0.345)	0.863 (0.345)	0.0002 [0.01]
Prevention index_present	0.0765 (0.943)	0.191 (0.924)	-0.064 (0.948)	-0.256*** [-3.20]
Prevention index_past	-0.081 -1.073	0.154 -1.073	-0.371 -1.001	-0.525*** [-5.89]
Nr of households	554	306	248	554

Standar deviation in parentheses (), t-statistics in brackets []

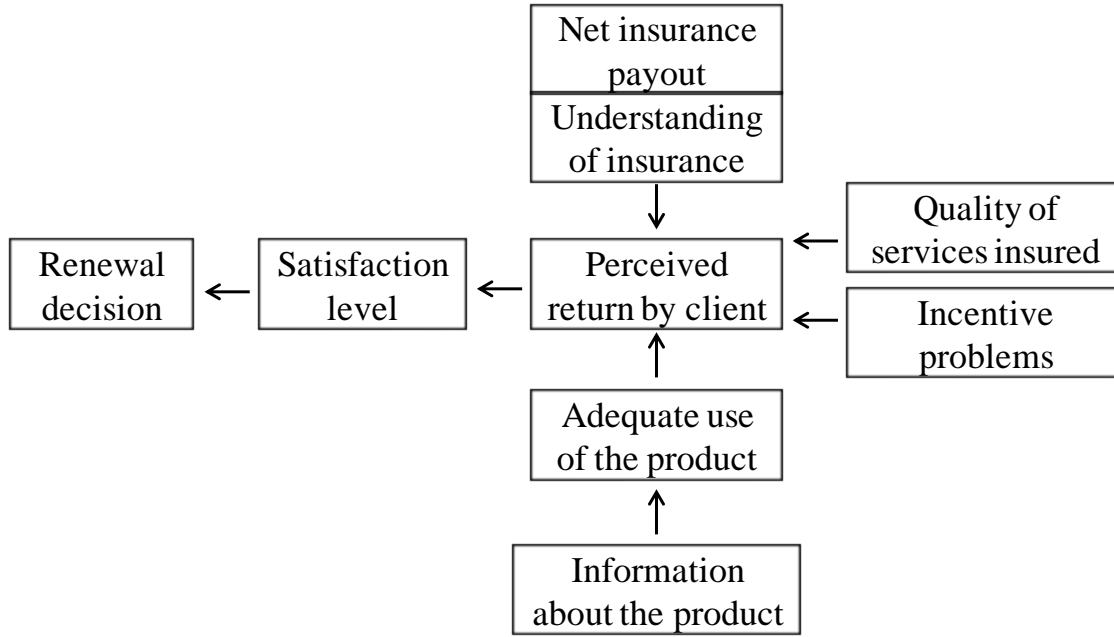
* p<0.10, ** p<0.05, *** p<0.01

3. Methodological approach and key descriptive evidence

3.1 *Conceptual framework*

Figure 1 depicts the manner in which the contract renewal decision is determined. Users decide to renew their contract when they are satisfied with the product as they have experienced it in the (recent) past. Satisfaction depends on the perceived return which is itself influenced by several key factors. First, clients need to be well informed about the insurance product in order to be able to make an appropriate use of it when a (health) shock hits them. Second, it is also important that they have a good understanding of the notion of insurance, lest they should become discouraged if their net insurance payout turns out to be negative. To indicate the expected interaction between the level of understanding and the size of the (negative) payout, the two corresponding boxes have been clubbed together. Third, incentive problems, moral hazard in particular, have to be kept under control so as to persuade participants that they are not ‘exploited’ by opportunists. Lastly, the quality of (health) services delivered must be of a sufficient quality. Trust in the insurer is not mentioned as its effect is plausibly mixed up with the effects of information and understanding.

Figure 1: Determinants of contract renewal behavior



To verify the role of the above determinants, we intend to test three relationships econometrically. The most important one aims at explaining variations in contract renewal decisions, an objectively measurable outcome variable. The second, closely related relationship should explain variations in satisfaction levels, a subjective measure. Finally, we want to assess the influence of the level of subscribers' information on actual use of the insurance policy. Whether the quality of the services provided or the existence of incentive problems affects contract renewal (or satisfaction level) is assessed with the help of descriptive statistical evidence. Regarding incentive problems, we have already noted in Section 2 that moral hazard behavior does not seem to be a major issue in the SSP program. In addition, the fact that households with a relatively high level of health and hygiene consciousness were more likely to enroll into the program suggests that they do not fear being 'exploited' by higher-risk households.

In the remainder of this subsection, we review the different economic theories available to explain behavior toward risk with a special emphasis on their capacity to explain contract renewal decisions. In the next subsection, we will then turn to discussing the measures chosen for our three key independent variables –the degree of understanding of the notion of insurance, the

degree of information regarding the insurance product and functioning of the scheme, and the net insurance payout—, and we provide the corresponding statistics. Finally, we present additional relevant statistical evidence.

A central intuition behind the present attempt -the idea that people, especially in poor village societies, are subject to a strong cognitive bias that precludes them from correctly grasping the concept of insurance- has been discussed and illustrated by Platteau (1997) in the case of Senegal. Based on anthropological evidence from mutual sea rescue groups in fishing villages, he argues that people interpret insurance in terms of their traditional logic of balanced reciprocity. This implies, in particular, that the insurance premium (or the labor contribution toward helping a fellow fisherman) is conceived as a payment that must be compensated for within a reasonable span of time. If it is not, they think that they have the right to leave the insurance group and to have the (cash) premium returned to them. Revealingly, when confronted with such a demand, other members of the group considered it legitimate and complied. Evidence from Uganda (Basaza et al., 2008) bear out the view of insurance as credit, which is reflected in the expressed belief that, if an individual has not received any payout during the past year, he (she) ought not to pay the (health insurance) premium for the subsequent year. In India, a rainfall index insurance program had to be redesigned and restarted “after there were massive cancellations of contracts by farmers disappointed by the lack of payments in a normal year” (Carter et al., 2008: 1). A randomized experiment carried out in Ghana shows that the lack of insurance payments during the previous year has the effect of reducing insurance uptake (Karlan et al., 2013).

In the same line, Kunreuther et al. (2013) have noticed the pervasive existence in developed countries of what they call an “underpurchase demand-side anomaly”: after maintaining insurance coverage for several years and never submitting a claim, many individuals choose to cancel their policy (e.g., in the US market for flood insurance). They explain such failure to maintain coverage by the fact that consumers treat insurance as a short-term investment so that, if they have not collected on their policy over several years, they feel that the premiums paid have been wasted (pp. 104-105, 117-18).

Clearly, the above views violate the prediction of expected utility theory which assumes that a risk-averse individual is interested in protection against the *prospect* (and not the actual

occurrence) of a shock and its damaging consequences. An insurance transaction therefore implies that income is not only redistributed intertemporally (like in the case of a credit or investment) but also redistributed from lucky to unlucky members inside the risk-pooling scheme. New theories of behavior toward risk have emerged during the last decades, and it is useful to inquire into whether they are able to account for the aforementioned behavior anomalies. These theories include the prospect theory (Kahneman and Tversky, 1979), regret theory (Loomes and Sugden, 1982; Bell, 1985; Braun and Muermann, 2004), ambiguity aversion theory (Ellsberg, 1961), loss aversion theory (Kunreuther et al., 2013: 96-101; Stein, 2011), the “hot-hand effect” theory (Gilovich et al., 1985), or the “status-quo bias” theory (Samuelson and Zeckhauser, 1988; Cai et al., 2011).

Regret theory assumes that the psychological experience of pleasure or displeasure associated with a particular result of an act of choice (assuming that the result is determined by the state of nature that is realized) will depend not only on the result itself but also on the alternative outcomes that would have arisen had other states of nature been realized. Thus, if it appears *ex post* that the individual has taken the best decision, he experiences rejoicing while in the opposite cases he is subject to regret feelings. Since people may be able to anticipate feelings of regret, they may decide to avoid entering into an insurance contract that seems attractive in terms of conventional expected utility theory. As pointed out by Thaler (1991), regret theory offers an intuitively plausible explanation of why people may well choose not to choose or to restrict the choice set in advance since this would suppress the possibility of experiencing regret and the associated painful feelings of guilt and responsibility (p. 16). However, the question remains as to why people are then unwilling to avoid an even more serious regret, that of experiencing a significant loss which they could have insured against but chose not to. For regret theory to explain reluctance to insure against a (low probability) shock, it must be the case that individuals narrowly frame short-term results so that they focus attention on the most frequent situations where the shock does not occur. Then, the problem of contract renewal does not arise. If, on the other hand, the narrow framing effect is not at play, individuals purchase the insurance policy and the *ex post* revelation that the shock did not occur should not prompt them to revise their initial decision.

The ‘hyperbolic discounting’ component of prospect theory (time-inconsistent preferences) may explain why, when confronted with the request of an immediate payment of a premium, people may shun away from an actuarially fair insurance contract. Therefore, the question of contract renewal is not addressed. The same holds true of the ambiguity aversion theory according to which people dislike uncertainty about the likelihood with which events occur, and not only uncertainty about the events themselves. Since they assume that the worst conceivable probability distribution is the true one when they evaluate their choice, they tend to be pessimistic (Bryan, 2010).⁸ The case that this sort of pessimism may limit the uptake of insurance is most persuasively made when ambiguity aversion is combined with compound lottery aversion such as may easily happen with index insurance (Elabed and Carter, 2013). Reluctance to purchase the policy then comes from farmers who give much weight to the worst scenario, in which they have a low individual output while the average output (on the basis of which the basis risk is computed) is sufficiently large to be above the indemnity threshold.⁹

More directly relevant to our concern in this paper is the theory of (myopic) loss aversion, which assumes that individuals experience more disutility from a loss than they experience utility from a gain of the same amount (the ‘value function’ component of prospect theory) (see

⁸ The “hot-hand effect” theory also focuses on the role of people’s perception of risks. Such perception is seen as influenced by the frequency and intensity of past shocks. The prediction resulting from this theory is ambiguous, though. On the one hand, the experience of a shock can make the risk more salient and induce the individual to overestimate the true probability of a new shock. On the other hand, if he (she) believes that it is unlikely that several (independent) shocks will occur in a short period, the true probability of a new shock could also be underestimated (de Bock and Gelade, 2012). To give an example, “some individuals may treat a string of flood-free years as evidence that the probability of a future flood in their area is now lower than immediately after a flood occurred. But this view is fallacious because, in reality, the risk of damage remains the same as before the flood occurred...” (Kunreuther et al., 2013: 118). The “hot-hand effect” theory is related to what has been called the “availability bias”: people tend to assess the probability of an event “by the ease with which instances of occurrence can be brought to mind” (p. 110).

⁹ If there is no compound risk, the worst conceivable scenario is that in which the shock occurs and the individual is not insured. Ambiguity aversion should then encourage rather than discourage insurance take-up.

Benartzi and Thaler, 1995).¹⁰ Loss averse individuals thus dislike experiencing the cost of the accumulated insurance premiums and the additional out-of-pocket cost of the deductible. The theory explains why subscribers who obtain an insurance payout are more likely to renew their contract than those who do not, since they enjoy the feeling that a loss of a certain amount has been avoided, and the payment of the premium is therefore less painful. However, it may explain why an individual who did not collect on the insurance policy is reluctant to renew the contract, and would like to have the premium returned, it is less clear why other members of the risk-pooling group should comply with such a request.

An interesting implication of the loss aversion theory is that an insurance contract that offers low deductibles and rebates if one does not suffer a loss would be more attractive to loss-averse people, yet less profitable in financial terms. As a matter of fact, with the value function assumed in prospect theory, the negative value of the additional premium caused by eliminating the deductible is very small relative to the very large reduction in negative value caused by lowering the deductible to zero. An even better contract for an insurer is to offer a rebate from which claims are deducted rather than a deductible, since this would encourage insured individuals to avoid making claims. Insurance with a rebate should be more attractive than an equivalent but less expensive policy with a deductible because the negative value of the deductible is perceived as much greater than the positive value of the rebate, or the perceived benefits of the rebate exceed the perceived cost of the extra premium that lowers the deductible to zero (Kunreuther et al., 2013: 100, 119). Controlled experiments actually suggest that individuals prefer policies with rebates even if the value of such a policy is lower than one in which there is no cash return at the end of the period covered (Johnson et al., 1993).¹¹

¹⁰ Note that the theory of the ‘status quo bias’ refers to the fact that people are reluctant to depart from the status quo even though there may be substantial benefits to them from doing so. This behavior can be partially explained by loss aversion.

¹¹ In this experiment, students from University of Pennsylvania were offered the choice between the two following insurance policies: *Policy One*, which costs \$1,000 and has a \$600 annual deductible which will be subtracted from the total annual claims against the policy, and *Policy Two*, which costs \$1,600 and has no deductible but will give a rebate of \$600 at the end of the year minus any claims paid by the insurer (should the claims exceed \$600, the insurer would give no rebate but will pay the claims). Although Policy Two is obviously less financially attractive than Policy One, since the rebate is essentially a \$600 interest-free loan to the insurer, it was chosen by a majority of respondents.

A major lesson from the above discussion is that most explanations for behavior anomalies regarding insurance decisions, whether to purchase a policy or to renew the contract, assume a specific type of narrow framing or myopia. This is also true of the cognitive bias that underpins the view of insurance as credit or investment.

3.2 *Measures of key independent variables*

In the light of the above discussion, we have gained a precise sense in which the concept of insurance can be deemed to be misunderstood. The three following questions, in particular, seem to be well-designed to gauge people's understanding of insurance principles:

- (1) If the discounts obtained turn out to be smaller than the premium paid, should the insurer reimburse (part of) the premium?
- (2) Is it unfair that everybody pays the same premium whether falling sick or not?
- (3) Is it shocking that other people benefit from the premium that you have paid because they have been sick?

Understanding of the insurance concept should be reflected in negative answers to each question. It is striking that only 30% of the sample subscriber households answered no to either the first or the second question (29% for the first and 31% for the second). In addition, less than half of them (47%) answered negatively to the third question. On the basis of the answers to these three questions, we can construct three alternative binary measures of understanding: a dummy equal to one if the household has answered correctly (that is, negatively) to the three questions (UND_1), reflecting a very good understanding of what insurance is about; a dummy equal to one if the household has answered correctly to at least two questions (UND_2); a dummy equal to one if the household has answered correctly to at least one question (UND_3). We find that $UND_1 = 1$ for only 7.5 % of the subscriber households, $UND_2 = 1$ for 35.3%, and $UND_3 = 1$ for 74.5% of them. It could be argued that a positive answer to the second question does not necessarily point to bad understanding of insurance because the respondent may believe that a deductible would precisely have the effect of varying the cost between sick and healthy insured individuals. The measure UND_1 would then appear to be too requiring and UND_2 preferable. As will be seen later, it is the latter measure that will be actually adopted in our econometric estimations.

It is important to note at this stage that, if the above evidence clearly testifies to a problem of understanding among many villagers, it does not allow us to rigorously identify the theory that best explains their underlying behavior. The normative character of the questions and the elusiveness of fairness judgments leave room for uncertainty regarding the correct theoretical interpretation, in particular whether the theory of credit/investment, regret, or (myopic) loss aversion provides the best clue to the low level of understanding that we have observed.

As we know from a number of studies, deficient information may be a serious cause of low participation in insurance programs. To measure the level of information, we use the following questions:

- (1) Do you know the discounts provided by the insurance scheme?
- (2) Do you know the health facilities in which you can obtain the discounts provided by the insurance?
- (3) Do you know how to renew the contract?

Good information is reflected in positive answers to these questions. The data reveal that only one-fifth of the subscriber households could provide the correct details of the discounts offered by the SSP scheme. A little more than one-third of them (34%) knew that discounted prices can only be obtained in a limited number of health facilities, which they were able to identify. Finally, two-fifths of them knew how to renew their insurance contract. On the basis of answers to the above three questions, we construct three alternative binary measures of information: a dummy equal to one if the household has answered correctly to the three questions (INFO_1), reflecting very good information about the product and the functioning of the scheme; a dummy equal to one if the household has answered correctly to at least two questions (INFO_2); a dummy equal to one if the household has answered correctly to at least one question (INFO_3). From our dataset, it is evident that $INFO_1 = 1$ for less than one-tenth of the subscriber households (8.8%); $INFO_2 = 1$ for about 23% of them; and $INFO_3 = 1$ for about 62%.

Unsurprisingly, a significant correlation exists between understanding and information, yet this correlation is far from perfect.¹² Much less expected is the finding that the level of understanding of the household head is not correlated with personal characteristics such as schooling, literacy, assets, income, health awareness, participation in self-help groups, and occurrence of sickness.¹³ Note carefully that the questions used to measure information and understanding have been raised at the time of the re-survey of the households. The idea was to ensure that respondents ponder over their answers in the light of actual involvement in the SSP program.

Our third key variable, the net insurance payout, is also constructed on the basis of data collected at the time of the re-survey, since it is calculated by using the 2010-2011 period as reference. To derive it, we have subtracted the premium from the cost-savings realized in health expenditures as a result of the discounts provided by the insurance scheme.¹⁴ For almost 86% of the subscriber households in our sample, the net insurance payout has been negative during the 2010-2011 period. The mean value of the net payout is -227 Rs while the median value is -450 Rs. (The gross payout is 1,227 Rs, on an average, for those households which actually used the insurance services, while the median value is 660 Rs). When we ask the subscriber households whether they perceive that their net payout has been positive or negative, we find that 85% of them believe that they have incurred a loss from participating in the insurance scheme.

¹² When we compare measures of similar order, for example, UND_3 with INFO_3, we have that: out of 228 households for which UND_3=1 (low level of understanding), 157 (68.9%) also have a low level of information (INFO_3=1); out of 108 households for which UND_2=1, 73 (67.5%) have an intermediate level of information (INFO_2=1); and out of 23 households for which UND_1=1, 20 (86.9%) are well informed (INFO_1=1).

¹³ We carried out statistical tests of difference-in-means comparing households for which UND_2=1 with those for which UND_2=0. The only significant difference (at 90% confidence level only) is observed for income but its sign is opposite to intuition: poorer households have a slightly higher level of understanding. Yet, this result is not very robust. Indeed, when we run a regression of income on the dummy UND_2 (so that the constant is the income when UND_2=0, and the coefficient is the difference), and we use clusterized standard errors, the difference is not significant anymore. On the other hand, there is no evidence of inter-village differences in understanding levels.

¹⁴ We have not followed the alternative method consisting of computing the ratio of cost savings to the amount of the premium. This is because there would then be many zero values that would unnecessarily complicate the econometric analysis.

Comparing perceptions with actual facts gives an idea about the degree of distortion of these perceptions. The outcome of such a comparison is presented in Table 3.

It is apparent that the great majority of subscribers (86.6%) have a correct perception about the sign of the net insurance payout. The remaining 13.4% are either too optimistic (they think that the net insurance payout has been positive while it has been actually negative) or too pessimistic (in the converse case). The degree of distortion in the subscribers' perception is therefore quite low, much smaller than we could have expected given the complexity of the calculations involved (recording the discounts and adding them up). This remarkable ability to estimate costs and benefits from the health insurance program singularly contrasts with the widespread lack of understanding of the functioning mechanism of insurance and its implications.

Table 3: Comparison between perceptions and facts regarding the sign of the net insurance payout (sample subscribers)

	Freq.	Percent
Think correctly that the net insurance payout has been negative	247	80.72
Think correctly that the net insurance payout has been positive	18	5.88
Think incorrectly that the net insurance payout has been negative while it has been actually positive (pessimistic belief)	26	8.5
Think incorrectly that the net insurance payout has been positive while it has been actually negative (optimistic belief)	15	4.9
Total	306	100

The fact that so many subscribers incurred a net loss over the first year of the program begs an explanation, especially so because we know that more than 90% of them have had a health shock during that year. The clue behind this puzzle lies in a low use of the insurance by many subscribers. It is thus noticeable that, out of 278 households which suffered some health problem during the period 2010-2011, as many as 216 households (77%) did not actually make use of their insurance! In other words, the net insurance payout reaches its maximum negative value not only for the few households which did not need to call for health services but also for those numerous households which needed the insurance but could not take advantage of it.

3.3 *Additional key descriptive statistics*

The main factor behind the low rate of use of insurance is poor information. Thus, we find that, among the subscribers who did not use the insurance services while being sick, the fraction of those ignoring the discounts offered by the SSP program was considerably higher (90%) than among the subscribers who did use their insurance (42%). Albeit somewhat less marked, the contrast is also observed when we compare the proportions of subscribers who ignored that discounts are only provided in a limited number of health facilities: 70% for those who did not use their insurance as against 53% for those who did use it.

A large majority (74%) of the subscriber households expressed disappointment or strong disappointment with the SSP program (their number being equally shared among those disappointed and those strongly disappointed). By contrast, only 6% were very satisfied while the remaining 20% were satisfied. Interestingly, 56% of satisfied (or very satisfied) households chose to renew their contract compared to only 25% for the disappointed (or very disappointed) households. There is thus a strong yet far from perfect correlation between satisfaction and the contract renewal decision. On the other hand, 61% of the households which actually used their insurance expressed satisfaction (or great satisfaction) as against 16% only for those which did not. Again, the contrast is marked but actual use does not fully explain satisfaction about the insurance scheme.

Our data moreover show that the quality of the services covered by the insurance, as well as the claiming and contract renewal procedures, are quite satisfactory so that they may not explain the low contract renewal rate in the SSP program. As a matter of fact, nine-tenths of the households which did use their insurance considered it useful and rather easy to handle. Moreover, among the households which perceived a negative return from the program, only 21% deemed the premium expensive and hard to finance. When queried about the rationale behind their decision not to renew their insurance contract, the majority of the households concerned mentioned either a lack of information about how and where to use the insurance and how to renew it (33%+15%), or the absence of benefits and the lack of need for an insurance given the non-occurrence of illness problems (28%+15%). Barely 9% of the households mentioned the level of the premium and less than ½% the low quality of the services covered.

Revealingly, not a single head complained about the risk premium being too high owing to the presence of opportunists, even among the subsample of relatively health-conscious households. In point of fact, the problem of moral hazard has never been alluded to in our interviews with the subscriber households. This is not really surprising inasmuch as they do not seem to imagine that incentive problems (whether of the adverse selection or the moral hazard kinds) are taken into account by the insurance company while setting the level of the insurance premium. We can therefore rule out the possibility that either the low quality of the health delivery services or problems of moral hazard arising from negligence or strategic manipulation account for low contract renewal among the sample subscriber population.

Returning to our key variables, first note the presence of a significant correlation between understanding and the renewal decision, whichever is the question considered to measure the level of understanding. The correlation is especially strong when the second question is considered: 78% of the households which dropped out (as against 50% of the households which did not) consider it unfair to have paid the premium while they did not fall sick. Likewise, there is a statistically significant relationship between contract renewal behavior and the answers given to each of the questions used to measure the level of information.¹⁵

Before embarking upon the econometric analysis, it is worth pointing out that, while 71% of the households which renewed their insurance contract had a negative net insurance payout during the period 2010-2011, the proportion is as high as 92% among those which dropped out of the program. The average net insurance payout is +350 Rs for the former but only -509 Rs for the latter. Finally, the average value of the insurance premium paid by all the sample subscriber households (582 Rs) greatly exceeds the average value of the (gross) insurance benefits (352 Rs).¹⁶

¹⁵ Thus, as many as 87% of the households which dropped out did not know the amount of the discount granted by the insurance scheme, while 69% of them did not know how to renew their contract, and 78% of them expected to receive discounts in any health facility. By contrast, the proportions for households which did renew their insurance contract are 65%, 36%, and 42%, respectively.

¹⁶ According to expected utility theory, risk-averse people are willing to pay a premium greater than the expected value of losses from the insured risky events. However, the gap between the average insurance premium and the average benefits recorded for our sample subscriber households is too large to be

4. Econometric Evidence

4.1 Methodology

We now want to check whether the above relationships continue to hold when we use a multivariate framework. Since some of our variables are significantly correlated, it is important to verify that they have a separate influence on the dependent variables. In particular, we want to know (1°) whether the level of understanding of the insurance concept influences contract renewal behavior (and satisfaction) once we control for the level of information about the insurance product, and for the value of the net insurance payout, and (2°) whether the level of understanding helps to mitigate the presumably negative impact of the net insurance payout. To answer the latter question, we will have to test for the impact of the corresponding interaction term.

In estimating regression equations to explain variations in the actual use of insurance services, satisfaction levels and contract renewal decisions, we use two different econometric models and two different datasets. The first model is a simple linear probability model based on data related to subscriber households only. The second model is a Heckman Probit model that includes a first-stage selection equation to determine entry into the microinsurance program. It therefore uses the complete sample of households interviewed in the treatment villages, whether subscribers or not. The advantage of estimating this second model is not only that it provides a robustness check for the results obtained with the standard OLS model, but also that it sheds light on the determinants of the subscription decision in addition to those of the renewal decision. The first-stage equation therefore presents an interest in itself. A natural concern is related to the assumption of normality of the error term that characterizes the Heckman selection model. To address this aspect, we also applied the semi-nonparametric selection model of Gabler et al. (1993), which relaxes the Gaussian distributional assumption by specifying the likelihood

accounted for in terms of this standard explanation only. The abnormally low rate of use of the insurance policy appears to be the main factor behind such a gap.

function semi-parametrically. The results obtained (not shown), which are similar to those found with the Heckman model, suggest that our findings are not influenced by distributional assumptions.

In the following, we first present the models that we estimate to find out the determinants of actual use of the insurance, we define the variables included in the regressions, discuss the related methodological issues, show the results and comment on them. Then, we repeat the same procedure for the regressions used to explain variations in contract renewal decisions and satisfaction levels.

4.2 Determinants of actual use of insurance services

The first model used to explain variations in actual use of insurance services is the following linear probability model:

$$Use_{iv} = \alpha + \beta Info_{iv} + \gamma SHG_{iv} + \delta Controls_{iv} + \mu Villages + \varepsilon$$

The dependent variable Use_{iv} is a dummy with value one when household i of village v has actually used its insurance during the period 2010-2011. The first independent variable, $Info_{iv}$, is our measure of the household's level of information, whether INFO_1, INFO_2, or INFO_3. The second independent variable, SHG_{iv} , is a dummy with value one if the household belonged to a self-help group before the start of the microinsurance program. We also have a set of controls, $Controls_{iv}$, which includes the age, gender and education level of the household, its size, its income, wealth, health status during the current year and level of health-consciousness. Age (labeled *age*) is measured continuously while *gender* is a dummy with value one when the household head is a man. The size of the household (*hholdsize*) corresponds to the number of members of all ages in the household. Education is measured in two different ways. We use a dummy (*literacy*) equal to one if the household can read and write, and a continuous variable (*schooling*) that indicates the number of years of schooling at any level (primary, secondary, and higher). To test for the concavity of the schooling variable, we add a square term, *schooling2*. Health status (denoted by *sick_member_present*) is a dummy indicating whether any member in the household was sick during the period 2010-2011. The household's level of health-

consciousness, or awareness about the importance of prevention, is measured by a composite index that we have explained earlier and named prevention index (henceforth labeled *prevention_index_present*). Finally, *lnincome* is income measured in logarithmic terms while wealth is captured by a composite index denoted by *asset_index* (see Section 2).

Endogeneity of information to actual use because of simultaneous/reverse causality is hardly a possibility. It is, indeed, difficult to believe that a household did not want to use services covered by an insurance to which it subscribed (at a positive cost) and, therefore, chose not to acquire the necessary information. Much more realistic is the possibility that the occurrence of a health event influences effort to obtain such information. Because these two variables figure out on the RHS of the above equation, we should observe multicollinearity. Our data nevertheless show that this correlation does not actually exist: households which had a sick member during the period 2010-2011 are not better informed than the other households. This is an important finding since it strongly suggests that information failures arise from the supply rather than the demand side. Such a conclusion is borne out when we consider the correlation between the health prevention index and information, based on the idea that people who are more health conscious should strive to get more information about the insurance scheme if they have subscribed. What we find is that this correlation is surprisingly low (0.11), much smaller than the correlation between the prevention index and income (0.23), or between the prevention index and education measured by the number of years of schooling (0.24) or the literacy dummy (0.18).

The second model is the selection model. It has the following form:

$$\begin{aligned} Use_{iv}^* &= \alpha + \beta Info_{iv} + \gamma SHG_{iv} + \delta Controls_{iv} + \mu Villages + \varepsilon \\ S_{iv}^* &= \theta P_{iv} + \gamma' SHG_{iv} + \delta' Controls_{iv} + \mu' Villages + \eta \\ Use_{iv}^* &= \begin{cases} Use_{iv} & \text{if } S_{iv}^* = 1 \\ NA & \text{if } S_{iv}^* = 0 \end{cases} \end{aligned}$$

The selection equation explains the unobservable propensity to subscribe to an insurance, S_{iv}^* , as a function of a set of instruments, P_{iv}^* , and the independent variables included in the second-stage equation. The dependent variable use_{iv} is observed only when $S_{iv}^* = 1$. The two instruments that we use are (1°) the prevention index of the household as measured historically

(prior to the start of the SSP program), which is labeled *prevention_index_past*, and (2°) a dummy (labeled *aware*) indicating whether the household was aware of the existence of the SSP program when it was launched or before.¹⁷ We expect the exclusion restriction to be satisfied for the first instrument since actual use of the insurance is liable to be influenced by the household's level of health and hygiene consciousness during the year 2010-2011, and not by the same variable measured for the previous year which should have influenced the subscription decision instead.¹⁸ In other words, it is reasonable to assume that the prevention index value prior to the start of the program influences actual use of insurance services only through the channel of the subscription decision. Regarding the second instrument, we cannot be entirely certain that the exclusion restriction is theoretically satisfied, yet this is quite likely because we control for information. Finally, we need to mention that, in both the LP and the selection models, the standard errors are clustered at the village level.

In Table 4, results of the LP model and the Heckman probit selection model (with average marginal effects) are displayed, successively. In this table, the estimates of six different regressions are shown, depending on which information variable we use and on whether we add village fixed effects or not. The first-stage selection equation is reported in the last column of the table. For the selection model, we only show the results obtained in the absence of village fixed effects. What we see is that whichever is the information variable used the impact on actual use is positive and statistically significant at 99% confidence level. Moreover, when using the LP model, the size of the coefficient decreases monotonously as the intensity of information declines (being the highest for *Info=INFO_1* and the lowest for *Info=INFO_3*). Two additional results deserve to be singled out. First, according to intuition, the household is more likely to actually use the insurance services when at least one of its members has fallen sick during the current period (2010-2011). Second, membership in a self-help group also increases the likelihood that

¹⁷ In the light of our findings reported in Table 2, there was no hope that the health status of the household before the program started (whether at least one its members fell sick during the period 2009-2010) could prove to be a valid instrument.

¹⁸ This implies that our set of controls is not exactly identical between the first and the second stage equations. Indeed, the health status variable, which is present in both equations, refers to the state of health pertaining to two different periods of time (2009-2010 or 2010-2011) depending on which equation is considered.

these services are taken advantage of, thus suggesting that members of such groups are better aware of the need to consult with a specialist in the event of a health problem.

Regarding the selection equation, the results are as follows. To begin with, the two instruments are statistically significant with a positive sign: enrolment into the program is more likely if the household possessed a higher level of preventive knowledge prior to the start of the insurance program, and if it was aware about the existence of the SSP program beforehand. When we test for the validity of the instruments by re-estimating the second-stage equation with the instruments included in the list of regressors, we find that none of them turns out to be statistically significant.¹⁹ Second, female heads were more likely to subscribe to the insurance than male heads. Third, a household had stronger incentive to enroll if it participated in a self-help group (SHG) prior to the start of the program. This finding is not surprising since the organization in charge, SSP, used the pre-formed SHG as a lever to propagate the idea of health insurance and canvass for customers. (Bear in mind that the level of information, like that of understanding, was measured only at the time of the re-survey). It is worth noting that the SHG variable is strongly significant even in the presence of *aware*, itself strongly significant. Fourth, richer households (in terms of wealth) were more willing to get insured than poorer ones. If, instead of measuring assets and incomes continuously, we use the tertile distributions, we now find that households belonging to the lowest tertile for both the income and the asset distributions are less likely to have enrolled into the insurance program, testifying to its exclusionary character vis-à-vis the poorest households (effects significant at the 95 percent confidence level —results not shown). Excluded households turn out to be very poor since the threshold marking the lowest tertile of the distribution (median value = 260 Rs) is significantly smaller than the poverty line in India (equal to 673 Rs).²⁰

¹⁹ No other test is available because the endogenous explanatory variables are constant for the observed values of the dependent variable in the second-stage equation.

²⁰ Since the median income in our sample is around 700 Rs, the implication is that at least half of the sample population can be considered as poor, by Indian standards. Moreover, using tertile dummies instead of continuous measures of incomes and assets in the selection equation does not affect the estimates obtained in the second stage (whether in terms of statistical significance of the coefficients of the various regressors or in terms of their size). This holds true not only for the present but also for the following regression estimates (in Tables 5 and Appendix B —results not shown).

Table 4: Determinants of actual use of insurance services

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OLS	OLS	OLS	OLS	OLS	OLS	Heckman	Heckman	Heckman	Probit
Gender	0.08 (0.09)	0.12 (0.10)	0.05 (0.09)	0.09 (0.10)	0.09 (0.08)	0.10 (0.09)	0.06 (0.08)	0.06 (0.09)	0.06 (0.08)	-0.08** (0.04)
Age	-0.01** (0.00)	-0.01* (0.00)	-0.01** (0.00)	-0.01* (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.01** (0.00)	-0.01** (0.00)	-0.00* (0.00)	-0.00* (0.00)
Schooling	-0.03 (0.02)	-0.04 (0.02)	-0.03 (0.02)	-0.03 (0.02)	-0.03* (0.02)	-0.04* (0.02)	-0.02 (0.02)	-0.03 (0.02)	-0.03 (0.02)	0.01 (0.01)
Schooling2	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Literacy	0.05 (0.06)	0.06 (0.07)	0.08 (0.05)	0.08 (0.06)	0.08 (0.05)	0.09 (0.06)	0.03 (0.05)	0.05 (0.05)	0.07 (0.05)	-0.05 (0.04)
Hholdsize	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.02* (0.01)	0.01 (0.01)	0.01 (0.01)	0.02* (0.01)	0.00 (0.01)
lnIncome	0.02 (0.02)	0.02 (0.02)	0.03 (0.02)	0.04* (0.02)	0.04** (0.02)	0.04** (0.02)	0.02 (0.02)	0.03 (0.02)	0.05** (0.02)	0.01 (0.01)
Asset_index	0.01 (0.02)	0.02 (0.03)	0.01 (0.03)	0.03 (0.04)	0.01 (0.03)	0.02 (0.03)	0.01 (0.02)	0.01 (0.03)	0.01 (0.03)	0.03** (0.01)
Sick_member_present	0.25*** (0.06)	0.23*** (0.06)	0.27*** (0.07)	0.25*** (0.07)	0.25*** (0.05)	0.21*** (0.06)	0.23*** (0.05)	0.24*** (0.04)	0.23*** (0.04)	
Prevention_index_present	-0.00 (0.02)	-0.00 (0.02)	-0.00 (0.02)	0.00 (0.02)	0.01 (0.02)	0.01 (0.03)	-0.00 (0.02)	-0.00 (0.02)	0.01 (0.02)	
Prevention_index_past										0.02** (0.01)
Aware										0.83*** (0.03)
SHG	0.16*** (0.05)	0.19*** (0.05)	0.16*** (0.05)	0.18*** (0.05)	0.14*** (0.04)	0.16*** (0.04)	0.15*** (0.05)	0.15*** (0.04)	0.12*** (0.04)	0.11*** (0.03)
INFO_1	0.51*** (0.07)	0.45*** (0.07)					0.41*** (0.07)			
INFO_2			0.34*** (0.06)	0.29*** (0.05)				0.26*** (0.04)		
INFO_3					0.25*** (0.05)	0.21*** (0.06)			0.27*** (0.06)	
Village dummies		Yes		Yes		Yes				
Constant	-0.15 (0.18)	-0.28 (0.19)	-0.29 (0.20)	-0.48** (0.21)	-0.42* (0.21)	-0.61*** (0.22)				
Observations	306	306	306	306	306	306	554	554	554	554
R-squared	0.24	0.34	0.24	0.34	0.20	0.31				

Robust standard errors in parentheses

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

4.3 Determinants of contract renewal and satisfaction level

In this subsection, since the list of the independent variables is identical in both cases, we discuss the regressions intended to explain variations in contract renewal and satisfaction level

together, but primary emphasis is put on the former. The first model that we estimate to explain such variations is the following linear probability model:

$$\begin{aligned} \text{Dependent}_{iv} = & \\ & \alpha + \beta \text{Info}_{iv} + \lambda \text{Und}_{iv} + \sigma \text{Payout}_{iv} + \omega \text{Und}_{iv} \times \text{Payout}_{iv} + \gamma \text{SHG}_{iv} \\ & + \delta \text{Controls}_{iv} + \mu \text{Villages} + \varepsilon \end{aligned}$$

The dependent variable is either *renewal*_{iv}, a dummy equal to one if the household has chosen to renew its insurance contract, or *satisfaction*_{iv}, another dummy equal to one if the household has expressed (strong) satisfaction about the program and to zero if it has expressed (strong) disappointment. Compared to the model presented in the previous subsection, three new independent variables appear in the above model. The first one is *Und*_{iv}, our measure of the household's level of understanding of the insurance concept, whether UND_1, UND_2, or UND_3. The second variable is *payout*_{iv}, which measures the amount of the net insurance payout accrued to the household at the end of the period 2010-2011. We use different versions of this variable, such as a continuous variable constructed in such a way that all values equal to or higher than zero are set to zero (to prevent the mixing up of positive and negative values that complicates the interpretation of the interaction term mentioned below), a binary variable with value one if the net insurance payout has been negative (and zero if it has been positive or nil), a binary variable with value one if the net payout has been lower than the median value (equal to -450 Rs), and value zero if it has been higher, or similar variables in which the threshold is different from the median (for example, a critical value corresponding to the first tertile of the distribution so that value one is assigned to any household belonging to the one-third of households exhibiting the lowest values of the negative net payout). Finally, the third new independent variable is the interaction between *Und*_{iv} and *payout*_{iv}, which provides a critical test of the hypothesis at the core of this paper. We expect that the signs of β , λ , and ω are positive, and the sign of σ is negative.

In an alternative specification of the above model, we test whether the contract renewal decision or satisfaction with the program is influenced by a peer effect.²¹ Toward that purpose,

²¹ Indeed, many insurance decisions appear to be based “on what other people are doing or on what those who one respects believe is an appropriate action to take” (Kunreuther et al., 2013: 107).

we define a new independent (binary) variable indicating the presence of a relative or friend who has opted out of the program, denoted by $peer_effect_{iv}$. In a manner analogous to that mentioned above, we then also add an interaction term between Und_{iv} and $peer_effect_{iv}$. We expect the sign of $peer_effect_{iv}$ to be negative and that of the new interaction term to be positive.

We do not believe that endogeneity of the information and understanding variables caused by simultaneous/reverse causality is a real problem in the context of this study. Beginning with understanding, it is difficult to imagine that households planning to renew their insurance contract would make special effort to acquire a better grasp of insurance. This is particularly evident in the light of recent evidence attesting that levels of understanding are not easily raised. In Kenya, a training program has been experimentally added to a health insurance scheme yet no perceptible impact on enrollment rates could be observed (Dercon et al., 2012). The same conclusion was reached in another randomized control trial carried out in Senegal: participation in a literacy module on insurance principles and mutual health organizations had no significant impact on the demand for microinsurance (Bonan et al., 2012). Finally, a study based on an online lab experiment and focused on the choice between term and whole life insurance products in India concluded that messages designed to correct cognitive biases have no impact (Anagol et al., 2013).²² Combined with the aforementioned works pointing to poor financial literacy even in highly developed countries, the above studies suggest that the pervasive cognitive bias in matters of complex financial transactions is quite “sticky”. Evidence from our own data reinforces the case for the exogeneity of the understanding variable. We thus find that insured individuals confronted with at least one health shock do not exhibit a higher level of understanding than the others while this could have helped them to better counter the shock. For example, the proportion of households with at least one health event during the year 2010-2011 for which $UND_2=1$ does not significantly differ from the proportion of those with no health event.²³

²² Carter et al. (2010) reached more encouraging conclusions from dynamic field experiments in Morocco, Kenya, and Peru, yet their so-called comprehension index only partly includes aspects related to insurance.

²³ In the absence of reliable instruments, we have tested for the endogeneity bias by using as excluded restrictions a set of internally generated instruments, following the approach recently proposed by Lewbel (2012). The results obtained are similar in size and significance to those presented in this section.

Regarding information, we already know that failures are essentially driven by problems on the supply side: we found no correlation between health status or health prevention index, on the one hand, and information, on the other hand, suggesting that additional information could not be acquired by household heads even if they wanted to. Moreover, one may wonder why they would seek to enhance their knowledge once they have subscribed and the decision before them is contract renewal, unless fresh information was provided at that time. Causality could then work in the direction opposite to the one we hypothesize: household heads who chose to renew their contract received more information. In our instance, however, this alternative story cannot be given credibility because the procedure of renewal consisted of simply approaching a clerk dedicated to the purpose without any further information or training meeting. As hinted at earlier, information was essentially supplied through local self-help groups whereas SSP did not manifest itself on the ground to provide systematic information and training, or to ensure a modicum of follow up action. It is no exaggeration to say that SSP's role was mainly played out when it helped form the self-help groups.

Despite these factual considerations, the hypothesis of exogeneity of information is better put to test. To do this, we replace the information variable by the use of insurance dummy in our regression estimates. The latter variable, indeed, is not susceptible of endogeneity yet is strongly correlated with information.²⁴ The robustness of our other results, particularly those related to the role of understanding and the insurance payout, can thus be checked. Unfortunately, the alternative solution consisting of maintaining an explicit role for the information variable by using it as an instrument for the use of insurance variable in a 2SLS model is not feasible.²⁵ This is because there is no theoretical ground for including understanding, a key explanatory variable in the second-stage equation, into the first-stage equation (if the level of understanding may

²⁴ As a matter of fact, it is hard to believe that subscribers chose to use their insurance because they decided to renew their contract.

²⁵ The exclusion restriction seems to be satisfied since it is reasonable to think that the level of information influences contract renewal behavior only through the channel of the experience of actually using the policy, as suggested in Figure 1. Bear in mind our earlier observation that, when insured individuals (hit by a health shock) have actually used their insurance policy, their probability of being more happy about participation in the SSP scheme is considerably higher.

clearly influence contract renewal behavior, it is hard to see how it could affect the use of the insurance policy), which is why it does not figure out in Table 4.

Finally, we estimate a Heckman selection model and the first-stage equation is identical to the one used for explaining variations in the use of insurance. This model is therefore the same as the second model presented in Subsection 4.1, except for the fact that there are now three additional independent variables in the second-stage equation. In both the LP and the selection models, the standard errors are clustered at the village level.

In Table 5, we show the results of the LP and the selection models when the dependent variable is *renewal* and, in Table 6, when the dependent variable is *satisfaction*. Each table contains ten columns corresponding to different specifications. In columns (1) and (2), we show the results for the LP model without and with village fixed effects when the *payout* variable and the corresponding interaction term are omitted. In columns (3) and (4), the same exercise is repeated but we now add these two variables. In columns (5) and (6), instead of *payout*, we use the *peer_effect* variable and the corresponding interaction, again without and with village fixed effects. In columns (7), (8), and (9), we follow the same procedure while estimating the selection model, but we give the results only when village fixed effects are omitted. Note, finally, that all the results are based on the following definitions for the information and understanding variables: *Info*=*INFO_2*, and *Und*=*UND_2*, implying that the reference category consists of households which answered incorrectly to two or three questions raised to them. (Using the highest, rather than the intermediate, levels of understanding and information is not a good option because the corresponding subscribers are quite few and the interaction term would therefore concern an even smaller group). Estimates based on alternative definitions of these variables have been run but are not shown.

The rationale behind the choice of *UND_2* in the regressions displayed in Table 5 (and Table 6) is as follows. Let us re-define our measure of understanding by using three dummy variables that must be used simultaneously: *UND_A*=1 if the household has answered correctly to one question, *UND_B*=1 if it has answered correctly to two questions, and *UND_C*=1 if it has answered correctly to the three questions (so that *UND_C* is identical to *UND_1*), so that the reference category consists of households which answered incorrectly to the three questions.

When we analyze the effects of these variables on contract renewal (without *payout* and the interaction term), we find that the coefficient of *UND_A* is not statistically different from zero while the coefficients of both *UND_B* and *UND_C* are strongly significant. Moreover, and as expected, the coefficient of *UND_C* is much higher than the coefficient of *UND_B* (see Appendix B, columns (3), (4), and (6), depending on which estimating model is used and whether village fixed effects are added or not).²⁶ In words, the households which answered correctly to only one of the three questions do not behave differently from those which incorrectly answered to all three questions. We are therefore justified in clubbing together the households for which *UND_B=1* and *UND_C=1*, which is done when using *UND_2*. Note that we find exactly the same results for the information variable, thus justifying our use of *INFO_2* (see Appendix B, columns (1), (2), and (5)).

We first consider the results in Table 5. The central assumptions behind this paper stand confirmed. Better information about the insurance product and the scheme, as well as better understanding of the insurance concept, have a positive impact on the probability of renewing the contract. The effects are strongly significant regardless of the specification used. When we use the LP model while omitting the *payout* or the *peer_effect* variables (and ignoring village fixed effects), we find that the probability of renewal is increased by 38% if the household improves its level of information (from ignoring the correct answers to all three key questions or knowing the correct answer to only one question to knowing the correct answers to at least two questions), and by 20% if it improves its level of understanding (with improvement defined in the same manner as for the information variable). It is important to stress that the effect of a reasonably good understanding of the insurance notion remains even after controlling for the measure of information and for education. It is also noteworthy that the significance of the effects of *Info* and *Und* persists when we change the definitions of these two variables using almost all conceivable combinations. Moreover, when we use *INFO_3*, which corresponds to the lowest level of information (except for complete ignorance), the size of the coefficient β decreases (0.14) whereas if we use *INFO_1*, corresponding to the highest level of information, the effect is larger (0.60). Similar results are obtained when we change the definition of the understanding variable.

²⁶ With the LP model and village fixed effects, the coefficient of *UND_C* is 0.46 compared to 0.16 for *UND_B*.

Moreover, when we start estimating the models with *UND_2* as the only explanatory variable and then add other independent variables in a stepwise manner, we find that the coefficient of *UND_2* is always strongly significant (but its size may be reduced).

The next results appear in columns (3) to (6) and concern the effects of *payout*, *peer_effect*, and the interaction terms. The variable *payout*, as measured here by the median dummy (equal to one for households with a net payout smaller than the median), has a significant negative effect on the renewal probability even when we control for the levels of information and understanding. In other words, having had a comparatively low net insurance payout during the current period (2010-2011) reduces the likelihood of contract renewal. Interestingly, the threshold (median) value used, equal to -450 Rs, is not very different from the average or median value of the insurance premium paid by the sample households (average: 582 Rs; median: 600 Rs). Remember our previous finding that the average net payout is -509 Rs for the households which did not renew their contract (as against + 350 Rs for those which did). In other words, a household which did not renew its contract is one which roughly paid the average premium and did not obtain discounts (generally because, owing to a lack of information, it did not actually use the insurance).²⁷

In addition, the effect of the interaction between net payout and understanding is statistically significant and positive. This means that the negative influence of having had a net negative payout (below the median value) on the probability of contract renewal is dampened when the household has a better understanding of the insurance concept. Both the significance and the size of the coefficients of *payout* and *payoutxUnd* are barely affected when we use *INFO_1* (the highest level of information) instead of *INFO_2* as our measure of the household's information level. When the definition of either *payout* or *Und* is modified, the effect of the interaction term ceases to be significant in many cases, yet it is worth emphasizing that the sign of coefficient ω always remains positive. Note, in particular, that when the net insurance payout is measured

²⁷ As a matter of fact, we did not use a measure of actual use of the insurance contract as a regressor because it is too much correlated with the net payout variable. The correlation between the dummy measuring whether the insurance was actually used and the *Payout* variable measured by the median dummy is quite strong since 51.6 percent of the households which did not actually use the insurance received a net payout smaller than the median. By contrast, 72.6 percent of those which used it received a net payout higher than the median.

subjectively (using a dummy equal to one when the household perceives to have earned a negative net payout), the effect of the interaction term is not significant, yet is positive. The message of all these estimates is therefore double. For one thing, households respond differently to a negative net payout depending on the size of the loss: when the negative payout is not too large, meaning that it is on average smaller than the (average) risk premium, their renewal decision is not influenced by the loss incurred. For another thing, the negative impact (on contract renewal) of the loss is mitigated when the household head has a better understanding of the insurance concept.

The latter conclusion is confirmed when we drop the *payout* variable and measure the benefits from insurance (or the lack of them) differently. The three following variables have been considered and interacted with our understanding variable: (i) a dummy equal to one if the household has visited a health facility (any one of them, covered or not by the scheme) fewer than three times during the year 2010-2011 (the dummy is labeled *low_visit_frequency*), thus reflecting a lack of benefits, (ii) a continuous variable corresponding to the number of illnesses suffered by the household (labeled *nr_illnesses*), reflecting potential benefits, and (iii) the dummy *sick_member_present*, which again reflects potential benefits. It is evident from Appendix C where these results are reported that the interaction term is always strongly significant and that the sign of its coefficient always points to a mitigating impact of a good understanding of the notion of insurance. As a matter of fact, the sign is always the opposite of the sign of the isolated variable used to measure either the importance or the lack of benefits from insurance.

Clearly, the above finding –understanding of insurance influences contract renewal even after controlling for the benefits obtained– cannot be explained by the belief updating process posited in the classical Bayesian model.²⁸ Bearing in mind that we explain variations in contract renewal rather than subscription behavior, it makes sense to conclude that people with the same prior belief have different capacities to interpret the signal that has been sent them during the period preceding the renewal decision. The signal is that the insurer subsidized the health expenditures that arose (controlling for the level of information which determines use of insured services), yet in most cases, because few health shocks occurred, the net insurance payout turned

²⁸ We thank Rachid Laajaj for having clarified this point for us.

out to be negative and people are aware of this (bear in mind that perceptions in this respect tend to coincide with reality). Two interpretations of this signal are then possible conditional upon understanding capacity. On the one hand, individuals with a good (implicit) understanding of the expected utility theory (those who consider lifetime wealth rather than changes in wealth from a given reference point) do not judge that the signal contains negative information, quite the contrary. It is in fact reassuring that the insuring company does what it is expected to do since the net (current) insurance payout could then well be positive some time in the future. On the other hand, individuals who do not reason in expected utility terms are disappointed by the information provided by the signal and, consequently, they respond to it by revising their expectations of the future benefits of insurance in a pessimistic direction. Or, to put it in another way, these individuals narrowly frame the short-term result constituted by the signal.

Turning now to the influence of the peers, we see that the coefficient of *peer_effect* is significant and negative, indicating that households are influenced by the dropping-out behavior of close acquaintances. Interestingly, the interaction between *peer_effect* and *Und* is also significant and the sign of the coefficient is positive. Again, the negative influence of peers on contract renewal decision is mitigated as the level of understanding of the household is improved. It bears emphasis that the mitigating effect of a good understanding of insurance is quite strong. While it almost exactly compensates the (negative) effect of withdrawing peers – see columns (5) and (6) –, it largely outweighs the effect of a (sufficiently large) negative payout, – see columns (3) and (4), and Appendix C. Furthermore, if we estimate the model by including both *payout* and *peer_effect* together with their respective interaction terms, all the results stand except for the fact that the coefficient of the understanding variable (λ) is no more significant. Finally, from columns (7) to (9), it is evident that similar results are obtained with the selection model.²⁹

²⁹ Bearing in mind that the marginal effect of a change in the interacted variables is not equal to the marginal effect of a change in the interacted term, we have estimated the marginal effects following the method proposed by Ai and Norton (2003). Thus computed as the cross derivative of the expected value of the dependent variable (instead of the derivative of the interaction), the marginal effects are 0.20^{**} and 0.30^{**} for columns (8) and (9), respectively. Caution is nevertheless needed when considering the results of the selection model. Indeed, when we re-estimate the second-stage equation with the two instruments included in the list of regressors, we find that only one of them (*aware*) is statistically insignificant. As pointed out before, no other test of the validity of our instruments is available.

Note that, when we replace INFO_2 by *use*, the dummy equal to one if the household has actually used the insurance policy, the results stand essentially unchanged (see Appendix D). In other words, our key results do not appear to be biased by the possible endogeneity of information.

We can now turn to other interesting results coming out of Table 5. To begin with, belonging to a self-help group before the start of the insurance program has a positive effect not only on the probability to enter into that program (see Subsection 4.1) but also on the probability to renew the insurance contract. Yet, this effect is not observed when village fixed effects are added, indicating that villages differ with respect to the presence of self-help groups. The effect of participation to self-help groups on both initial take-up and renewal behavior is a priori ambiguous. This is because the informal-sharing mechanism possibly offered by such groups may be either a substitute for, or a complement to, the more formal insurance products provided under the insurance program. The complementary effect exists not only if the two schemes supply insurance against different risks, but also if the household wants to diversify its insurance portfolio. On another plane, there is the possibility that the people who have self-selected into self-help groups are also more keen to take their life into their own hands rather than passively submitting to their fate. Involvement with these groups can also give them more self-confidence in their ability to deal with external agents and claim their due. Our results show that the complementarity effects dominate the substitution effect.

The next result concerns the impact of wealth: less wealthy households appear to be more likely to renew their contract although, in the presence of village fixed effects, the impact of wealth seems to vanish or almost vanish. However, if we replace the continuous measure of the asset index by tertile dummies, we find that households belonging to the lowest tertile have a higher probability to renew their contract compared to the other two tertiles. This finding is especially relevant when put into the perspective of an earlier result derived from the selection equation: if the poorest households are less likely to enroll into the insurance program, they are

more likely to stay on once they have experimented with it.³⁰ It may be noted, moreover, that when the lowest tertile dummy is interacted with our understanding variable (after removing the interaction term between the net payout and *UND_2*), the effect does not turn out to be significant. Lastly, when we replace the continuous measure of income (which has no significant effect on contract renewal) by the corresponding tertile dummies, no dummy appears with a coefficient statistically different from zero.

Another clear result that comes out of Table 5 is the positive influence on contract renewal of the amount of preventive knowledge that a household possesses in matters of health and hygiene. Thus, households exhibiting higher values of the preventive index are more likely not only to enroll into the insurance program but also to renew their contract after one year of experience. Such kind of confirmation is not reached, however, when the gender variable is considered. Indeed, while we have learned earlier that female heads are more likely to enroll into the program, they now appear to be less prone to renew the insurance contract. We have no ready explanation for this contrasted result.

A factor whose role is often discussed in the literature on microinsurance is trust in the insurance company (see, e.g., Cai et al., 2009; Dercon et al., 2012). Our measure of trust is rather crude since it is a simple binary variable (named *trust*) equal to one when the household has answered positively to the following question: “Do you fully trust the Arogya Sandhi program”? Nonetheless, whenever this variable is added to our list of regressors, it always comes out with a positive and significant coefficient, as expected (results not shown). The only qualification is that both the size and the statistical significance of this coefficient are reduced when village fixed effects are added, suggesting that trust tends to spread locally. Equally noticeable is the observed decrease in the size of the coefficient of *UND_2* when *trust* is present. This reflects the significant correlation between the two variables: while more than 57% of household heads with a good understanding of insurance (*UND_2*=1) confessed complete trust in the program, the

³⁰ We have also queried about the occupations of the household heads. We are thus able to differentiate households (i) in which the head receives a wage income, (ii) is involved in a non-agricultural business or receives remittances or transfers, and (iii) whose incomes entirely depend on agriculture. Using (iii) as the reference category, we define two binary variables indicating whether the household belongs to category (i) or to category (ii), respectively. These variables are omitted from the tables displayed because their coefficients are never statistically different from zero.

proportion falls to barely 22% for those with a poor understanding. The effect of trust is therefore partly confounded with the effect of understanding, a finding that deserves to be carefully pondered by policy makers. It indeed means that an effective way to enhance trust among potential clients consists of improving their grasp of the very concept of insurance.³¹

To complete our review of the results emerging from Table 5, attention must finally be paid to the role of literacy and formal education. The effects are surprisingly contrasted. More precisely, if being literate increases the propensity to renew the contract, the effect of schooling measured continuously is non-monotonous: it is negative in the first years and becomes positive once a sufficient level of education (computed to be as high as nine years) has been achieved.³² Bearing in mind that we control for the level of understanding of insurance, these results point to the existence of a different channel through which learning influences contract renewal decisions. And this channel must operate in such a way that learning encourages (or discourages) contract renewal but not insurance subscription (since we know from the selection equation that the latter effect does not exist). On the other hand, the opposite effects of literacy and formal schooling make sense only because the two variables are imperfectly correlated: schooling does not necessarily imply literacy –people who did attend school sometimes confessed to be illiterate– and, less surprisingly, people who did not go to school sometimes stated an ability to read and write.³³

How can we account for the paradoxical finding that formal education, well into the secondary school, tends to discourage contract renewal all else being equal (including the level of understanding)? The most plausible explanation is based on the field observation that information deficiencies gave rise to a climate of frustration and even anger in the treatment villages. To the extent that schooling imparts habits of criticism and abilities to articulate opinions and express

³¹ When *trust* is interacted with *UND_2*, the associated coefficient is not significantly different from zero. This is also true when *SHG* is interacted with *UND_2* on the ground that membership in a self-help group might be a proxy for trust (results not shown).

³² When we interact the education measures, either literacy or formal schooling, with the understanding variable, the effect is never statistically significant.

³³ It must be borne in mind that our question was framed as follows: “can you read and write properly?”, so that explicit room was left for a subjective appreciation of the skills involved.

grievances, we expect educated subscribers to be especially disgruntled about the lack of information and ready to react aggressively against the organization in charge. It is, therefore, not surprising that they are also more loth to renew their insurance contract than other subscribers. Beyond a critical level of schooling, however, this “assertion effect” is dominated by another counteracting effect, perhaps identical to that underlying the role of literacy: learning stimulates contract renewal whether insurance is adequately understood or not, say because the transaction cost of renewing the contract is smaller for literate people.

Table 5: Determinants of contract renewal

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	Heckman	Heckman	Heckman
Gender	0.15** (0.07)	0.19** (0.08)	0.15** (0.06)	0.19*** (0.07)	0.18*** (0.07)	0.19** (0.08)	0.17** (0.07)	0.16** (0.06)	0.19*** (0.07)
Age	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Schooling	-0.06*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)	-0.06*** (0.01)	-0.06*** (0.02)	-0.05*** (0.02)	-0.06*** (0.02)	-0.06*** (0.01)
Schooling2	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)
Literacy	0.25*** (0.06)	0.16*** (0.06)	0.28*** (0.06)	0.19*** (0.06)	0.26*** (0.06)	0.17*** (0.06)	0.24*** (0.06)	0.27*** (0.06)	0.25*** (0.06)
Hholdsize	-0.02** (0.01)	-0.01 (0.01)	-0.02* (0.01)	-0.01 (0.01)	-0.02* (0.01)	-0.01 (0.01)	-0.03* (0.02)	-0.02 (0.01)	-0.02 (0.02)
lnIncome	0.00 (0.02)	-0.01 (0.02)	0.01 (0.02)	-0.01 (0.02)	0.01 (0.02)	-0.00 (0.02)	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
Asset_index	-0.08*** (0.03)	-0.04* (0.02)	-0.07*** (0.03)	-0.04 (0.02)	-0.07*** (0.03)	-0.05** (0.02)	-0.07*** (0.02)	-0.07*** (0.02)	-0.08*** (0.02)
Sick_member_present	0.09 (0.06)	0.05 (0.07)	0.11* (0.06)	0.08 (0.07)	0.07 (0.06)	0.06 (0.07)	0.10 (0.07)	0.12* (0.06)	0.09 (0.07)
SHG	0.14** (0.06)	0.06 (0.06)	0.13** (0.06)	0.06 (0.06)	0.13** (0.06)	0.08 (0.06)	0.13*** (0.05)	0.13** (0.05)	0.12** (0.05)
Prevention_index_present	0.05** (0.03)	0.05** (0.03)	0.05** (0.03)	0.06** (0.03)	0.05** (0.03)	0.05** (0.03)	0.04* (0.02)	0.05* (0.03)	0.04* (0.02)
INFO_2	0.38*** (0.07)	0.32*** (0.07)	0.39*** (0.06)	0.33*** (0.07)	0.37*** (0.07)	0.32*** (0.07)	0.30*** (0.05)	0.31*** (0.04)	0.29*** (0.04)
UND_2	0.20*** (0.04)	0.17*** (0.03)	0.10** (0.05)	0.08** (0.04)	0.15*** (0.04)	0.14*** (0.05)	0.19*** (0.03)	0.09** (0.04)	0.14*** (0.03)
Payout			-0.13** (0.06)	-0.09* (0.05)				-0.11** (0.05)	
Payout x UND_2			0.23** (0.11)	0.19** (0.09)				0.23** (0.09)	
Peer_effect					-0.23*** (0.07)	-0.20** (0.08)			-0.36*** (0.13)
Peer_effect x UND_2					0.26** (0.10)	0.19* (0.10)			0.40*** (0.15)
Village dummies		yes		yes		yes			
Observations	306	306	306	306	306	306	554	554	554

Robust and clustered standard errors in parentheses

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

If the above story about frustration being higher among more educated people (up to a certain level) is true, it should show up in our last set of estimations aimed at explaining satisfaction about the program (see Appendix E). What we see is that the effects of *schooling* and *schooling2* are no more statistically significant yet, if we drop the square term, the coefficient of *schooling* is negative and almost significant (at the 90% confidence level) while the coefficient of

literacy remains positive and strongly significant (results not shown). In other words, being more formally educated has the effect of raising the probability of being dissatisfied with the insurance program. Inspection of the same table also reveals that, as expected, the effects of information and understanding are positive and highly significant. In addition, households which participated to a self-help group prior to the start of the program are more likely to be satisfied.³⁴

5. Conclusion and policy implications

The basic story told in this paper to explain the low rate of contract renewal in an Indian microinsurance health program can be neatly summarized as follows. Insufficient information provided to subscribers determined a low rate of use of the insurance policy which itself led to a situation where many of them did not collect any payment on the insurance even though they were eligible. Combined with a poor understanding of the notion of insurance among many subscribers, which contrasts with a remarkable ability to estimate its benefits and costs, such an outcome caused a low rate of contract renewal. Clearly, the existence of a significant interaction between the cognitive bias and sufficiently negative net insurance payouts cannot be explained by the belief updating process posited in the classical Bayesian model. It rather requires a framework in which agents with identical prior beliefs interpret a given message differently depending upon their understanding capacity or their ability to reason in expected utility terms (that is, to compare the cost of premium with the expected loss). If it is not possible to determine which of the

³⁴ Compared to Table 5, the payout and peer effect variables, as well as the corresponding interaction terms, are no more statistically significant. Also insignificant are the effects of household wealth and preventive knowledge. As for the influence of health events (see *sick_member_present*), it cannot be established in a robust manner, yet the sign of the coefficient is consistently negative throughout all regression estimates. Finally, if we add the dummy *use* (whether the insurance was actually used or not) to the list of explanatory variables, its coefficient is positive and highly significant but the coefficient of the information variable then ceases to be significant (as expected, the two variables are strongly correlated). Other results essentially stand. In particular, the understanding variable remains strongly significant. Moreover, the variable indicating whether a household member was sick or not becomes more strongly significant than before (at the 99% confidence level), and the sign of its coefficient remains negative (results not shown).

available alternative theories offers the best interpretation of our central finding, subscribers with a low understanding seem to narrowly frame short-term results. In addition, there is evidence that, if trust in the insurance company matters, its effect cannot be (entirely) disentangled from that of a good understanding of insurance. The policy implication is that improving people's grasp of the notion of insurance is a privileged way of enhancing trust and, thereby, increasing take-up and contract renewal rates.

The information failure could have been avoided because it is supply-driven. The organization in charge of explaining the program to willing subscribers has actually failed to ensure enough physical presence and staff availability on the field. It is reassuring that those households which have actually used the insurance are generally satisfied with the program and that very few households have complained about the level of the premium, the quality of the health services delivered, or incentive problems. The understanding failure is obviously harder to overcome since the underlying cognitive bias has been shown to be "sticky" and hard to correct. Optimism regarding the impact of financial training sessions or dynamic learning effects is unwarranted.

To surmount the above problem, two pathways are available. The first option consists of designing the insurance products in such a way that people unaccustomed to the complex meaning of insurance can most easily perceive their value for them. Possible solutions consist of offering rebates to households which did not reap benefits (Kunreuther et al., 2013: 99-100), or mixing up a variety of risks so that the probability of receiving an indemnity in a rather short time span is sufficiently high for each and every household (Platteau, 1987, 1991, 1997; Udry, 1990, 1993, 1994). The main problem with this approach is the efficiency cost involved: insurance policies offering rebates or low deductibles, for example, are not as profitable as standard policies,³⁵ and the (majority of) households which prefer the former over the latter contract would therefore suffer financial losses. These losses would not vanish over time because dynamic

³⁵ Note that, when many risks are packaged together, the temptation to impose large deductibles is stronger (Rabin and Thaler, 2001).

learning effects are unlikely given the “stickiness” of the cognitive bias behind the contract choice.

The second pathway takes the evidence provided in this paper as well as evidence of poor consumer financial decisions (when transactions are complex) in developed countries themselves as justifying a paternalistic approach to insurance. If the government wants to protect people against health risks, for example, it should make subscription to the standard, optimal insurance policy mandatory for everybody. Here, the problem is enforceability: while it is easy to impose the efficient contract on employees of the formal sector (premiums can be automatically subtracted from gross salaries), dealing with informal workers may prove much harder. We cannot, therefore, rule out the possibility that enforcement costs exceed the efficiency gains, making the first, optional approach more cost-effective overall.

The above is the essential message that we draw from our study. But there are a number of side results worth pondering. The first one is the positive effect of participation in self-help groups on both subscription to the insurance and contract renewal. Had these groups been more widespread and the support provided to them by the insurance provider more serious and systematic, the implementation of the microinsurance health scheme would have been more effective. Second, literacy positively influences contract renewal and the same can be said of people’s training in matters of basic health care and hygiene, which increases the likelihood of not only renewal but also the initial take-up rates significantly. Finally, there is the effect of wealth: poorest households are less likely to enroll into the microinsurance program yet, once they have experimented with it and other things being equal (occurrence of sickness, understanding and information levels, etc.), they have a higher probability to renew their contract than other households. This is an encouraging finding suggesting that campaigning efforts ought to be concentrated on the poorest segment of the population since it appears to draw comparatively large benefits from health microinsurance when the circumstances are favorable.

References

- Ai, C., and E. Norton, 2003. "Interaction Terms in Logit and Probit Models". *Economics Letters*, Vol. 80, pp. 123–129.
- Anagol, S., S. Cole, and L. Litvine, 2013, "Overcoming Sub-Optimal Consumer Financial Decisions Using Behavioral 'Nudges': Experiments on the Life Insurance Purchase Decisions of Indian and US Workers", Research Paper, Microinsurance Innovation Facility, International Labour Office, Geneva.
- Basaza R., B. Criel, and P. Van der Stuyft, 2008. "Community Health Insurance in Uganda: Why Does Enrolment Remain Low? A View from Beneath", *Health Policy*, Vol. 87, pp. 172-184.
- Bell, D.E., 1985. "Disappointment in Decision Making Under Uncertainty", *Operations Research*, Vol. 33, pp. 1-27.
- Benartzi, S., and R. Thaler, 1995. "Myopic Loss Aversion and the Equity Premium Puzzle", *Quarterly Journal of Economics*, Vol. 110, pp. 73-92.
- Bonan, J., O. Dagnelie, P. Lemay-Boucher, and M. Tenikue, 2011, "The Impact of Insurance Literacy and Marketing Treatments on the Demand for Health Microinsurance in Senegal: A Randomized Evaluation", Working Paper N° 2012-03, CEPS, Luxemburg.
- Braun, M., and A. Muermann, 2004. "The Impact of Regret on the Demand for Insurance", *Journal of Risk and Insurance*, Vol. 71, pp. 737-767.
- Bryan, G., 2010. "Ambiguity and Insurance", mimeo, London School of Economics.
- Cai, H., Y. Chen, H. Fang & Zhou, L., 2009, "Microinsurance, Trust and Economic Development: Evidence from a Randomized Natural Field Experiment", NBER Working Paper No. 15396.
- Cai, J., A. de Janvry, A., and E. Sadoulet, 2011. "Social Networks and Insurance Take-up: Evidence from a Randomized Experiment in China", ILO Microinsurance Innovation Facility Research Paper, Geneva.
- Carlin, B., 2009, "Strategic Price Complexity in Retail Financial Markets", *Journal of Financial Economics*, Vol. 91, pp. 278-287.
- Carter, M.R., C.B. Barrett, S. Boucher, S. Chantarat, F. Galarza, J. McPeak, A. Mude, and C. Trivelli, 2008. "Insuring the Never Before Insured: Explaining Index Insurance Through Financial Education Games", *Basis Brief*, October, pp. 1-8.

- Chankova, S., S. Sulzbach, and F. Diop, 2008, “Impact of Mutual Health Organizations: Evidence from West Africa”, *Health Policy and Planning*, Vol. 23, N°4, pp. 264-276.
- Cole, S., X. Giné, J. Tobacman, P. Topalova, R. Townsend, and J. Vickery, 2011, “Barriers to Household Risk Management: Evidence from India”, Mimeo, Harvard Business School.
- De Bock, O., and W. Gelade, 2012. “The Demand for Microinsurance: A Literature Review”, ILO Microinsurance Innovation Facility Research Paper, Geneva.
- Dercon, S. and J. Hoddinott, 2004, “Health, Shocks, and Poverty Persistence”. In: Dercon (Ed.), *Insurance against Poverty*, Oxford University Press, pp. 124-136.
- Dercon, S., J.W. Gunning, A. Zeitlin, C. Cerrone, and S. Lombardini, 2012, “Health Insurance Participation: Experimental Evidence from Kenya”, Research Paper N° 10, Microinsurance Innovation Facility, International Labour Office, Geneva.
- Dong, H., M. De Allegri, A. Souares, and R. Sauerbon, 2009. « Drop-out Analysis of Community-Based Health Insurance Membership at Nouna, Burkina Faso”. *Health Policy*, Vol. 92, pp. 174–179.
- Elabed, G., and M. R. Carter, 2013. “Basis Risk and Compound-Risk Aversion: Evidence from a WTP Experiment in Mali”, Working Paper, University of Davis, California.
- Ellsberg, D., 1961. “Risk, Ambiguity, and the Savage Axioms”, *Quarterly Journal of Economics*, Vol. 75, pp. 643-669.
- Fitzpatrick, A., B. Magnoni, and R.L. Thornton, 2011. “Microinsurance Utilization in Nicaragua: A Report on Effects on Children, Retention, and Health”. ILO Microinsurance Innovation Facility Research Paper.
- Gabaix, X., and D. Laibson, 2006, “Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets”, *Quarterly Journal of Economics*, Vol. 121, N° 2, pp. 505-540.
- Gabler, S., F. Laisney, and M. Lechner, 1993. “Semi-nonparametric Estimation of Binary Choice Models with an Application to Labor-Force Participation”. *Journal of Business and Economic Statistics*, Vol. 11, pp. 61–80.
- Gaurav S., S. Cole, and J. Tobacman, 2010, “A Randomized Evaluation of the Impact of Financial Literacy on Rainfall Insurance Take-up in Gujarat”, ILO Microinsurance Innovation Facility Research Paper No.1, International Labour Office, Geneva.
- Gertler, P., and J. Gruber, 2002, “Insuring Consumption against Illness”, *American Economic Review*, Vol. 92, N°1, pp. 50–70.

- Gilovich, T., R. Vallone, and A. Tversky, 1985. "The Hot Hand in Basketball: On the Misperception of Random Sequences", *Cognitive Psychology*, Vol. 17, pp. 295-314.
- Giné, X., R. Townsend, and J. Vickery, 2007, "Statistical Analysis of Rainfall Insurance Payouts in Southern India", *American Journal of Agricultural Economics*, Vol. 89, N°5, pp. 1248-1254.
- Giné, X., R. Townsend, and J. Vickery, 2008, "Patterns of Rainfall Insurance Participation in Rural India", *World Bank Economic Review*, Vol. 22, N°3, pp. 539–566.
- Ito, S., and H. Kano, 2010, "Why Is the Take-Up of Microinsurance so Low? Evidence From A Health Insurance Scheme In India", *The Developing Economies*, Vol. 48, N°1, pp. 74-101.
- Johnson, E.J., J. Hershey, J. Meszaros, and H. Kunreuther, 1993. "Framing, Probability Distortions and Insurance Decisions", *Journal of Risk and Uncertainty*, Vol. 7, pp. 35-51.
- Jutting, J., 2003, "Do Community-based Health Insurance Schemes Improve Poor People's Access to Health Care? Evidence from Rural Senegal", *World Development*, Vol. 32, N° 2, pp. 273-288.
- Kahneman, D. and A. Tversky, 1979. "Prospect Theory: An Analysis of Decision under Risk", *Econometrica*, Vol. 47, pp. 263-91.
- Karlan, D., R. Osei, I. Osei-Akoto, and C. Udry, 2013. "Agricultural Decisions after Relaxing Credit and Risk Constraints", Mimeo.
- Kunreuther, H.C., M.V. Pauly, and S. McMorro, 2013, *Insurance and Behavioral Economics — Improving Decisions in the Most Misunderstood Industry*, Cambridge: Cambridge University Press.
- Leatherman S., L. Jones, and J. Holtz C., 2010. "Innovations and Barriers in Health Microinsurance", ILO Microinsurance Innovation Facility Research Paper, Geneva.
- Lewbel A., 2012. "Using Heteroskedasticity to Identify and Estimate Mismeasured and Endogenous Regressor Models". *Journal of Business and Economic Statistics*, Vol. 30, pp. 67-80.
- Loomes, G., and R. Sugden, 1982. "Regret Theory: An Alternative Theory of Rational Choice under Uncertainty", *Economic Journal*, Vol. 92, pp. 805-24.
- Lusardi, A., and O.S. Mitchell, 2009, "How Ordinary Consumers Make Complex Economic Decisions: Financial Literacy and Retirement Readiness", Working Paper, Dartmouth College, USA.

- Lusardi, A., O.S. Mitchell, and V. Curto, 2009, "Financial Literacy and Financial Sophistication among Older Americans", Working Paper, Dartmouth College, USA.
- Lybbert, T.J., F. Galarza, J. McPeak, C.B. Barrett, S. Boucher, M.R. Carter, S. Chantarat, A. Fadlaoui, and A. Mude, 2010. "Dynamic Field Experiments in Development Economics: Risk Valuation in Morocco, Kenya, and Peru", *Agricultural and Resource Economics Review*, Vol. 39, N° 2, pp. 1-17.
- Platteau, J.-P., 1997. "Mutual Insurance as an Elusive Concept in Traditional Rural Communities", *Journal of Development Studies*, Vol. 33, pp. 764-796.
- Platteau, J.-P., 1991, "Traditional Systems of Social Security and Hunger Insurance: Past Achievements and Modern Challenges", in E. Ahmad, J. Drèze, J. Hills and A.K. Sen (eds.), *Social Security in Developing Countries*, Clarendon Press, Oxford, pp. 112-170.
- Platteau, J.-P., 1987, "An Inquiry into Quasi-credit Contracts: The Role of Reciprocal Credit and Interlinked Deals in Small-scale Fishermen Communities", (with A. Abraham), *Journal of Development Studies*, Vol. 23, N° 4, pp. 461-90.
- Pratt, A.G., P. Suarez, and U. Hess, 2010, "How Do Smallholder Farmers Understand Insurance, and How Do They Want It? Evidence from Africa", *Global Environmental Change*, Vol. 20, N°1, pp. 153-161.
- Rabin, M., and R. Thaler, 2001. "Anomalies: Risk Aversion", *Journal of Economic Perspectives*, Vol. 15, pp. 219-232.
- Samuelson, P., and R. Zeckhauser, 1988. "Status Quo Bias in Decision Making", *Journal of Risk and Uncertainty*, Vol. 1, pp. 7-59.
- Stein, D., 2011. "Paying Premiums with the Insurer's Money: How Loss Aversion Drives Dynamic Insurance Decisions", Working Paper, London School of Economics and Centre for Research in Economic Development (CRED), University of Namur.
- Thaler, R., 1985. "Mental Accounting and Consumer Choice", *Marketing Science*, pp. 199-214.
- Udry, C., 1990, "Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy", *World Bank Economic Review*, Vol. 4, N° 3, pp. 251-69.
- Udry, C., 1993, "Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy", in Hoff, K., A. Braverman, and J.E. Stiglitz (eds), *The Economics of Rural Organization*, Oxford: Oxford University Press (Published for the World Bank), pp. 87-108.
- Udry, C., 1994, "Risk and Insurance in a Rural Credit Market: An Empirical Investigation in Northern Nigeria", *Review of Economic Studies*, Vol. 61, pp. 495-526.

Appendix A

Table A-1 Variables used for the prevention index

	Yes	No
Did any member of your family participate during last year in any training session discussing basics in health care: personal hygiene, water, nutrition, sanitation, or HIV/AIDS ?	51%	49%
Do you boil water in order to consume it?	5%	95%
Do you use chlorine tablets?	26%	74%
Do you use water filters?	6%	95%
Do you know the importance of eating fruits and vegetables?	82%	18%
Do you wash your hands before eating?	98%	2%
Do you use mosquito nets?	11%	89%
Do you wash your hands after toilet?	96%	4%
Do you know how to prevent HIV/AIDS?	46%	54%
Do you know the reasons for the spreading of diarrhea?	53%	47%
Do you know the reasons for the spreading of malaria?	73%	27%
Do you know the importance of immunizing children?	66%	34%

Table A-2 Variables used for the asset index

	Yes	No
Did you buy a new asset during last year?	43%	57%
Do you have a TV set in your house?	76%	24%
Do you have a fridge in your house?	14%	86%
Do you have a two wheeler vehicle?	31%	69%
Do you have a four wheeler vehicle?	5%	95%
Does someone have a mobile phone in your house?	89%	11%
Do you have TVcable?	32%	68%
Do you have a computer in your house?	2%	98%
Do you own a plot of land?	57%	43%
Do you own livestock?	19%	81%
Do you own this dwelling unit?	93%	7%
Are there more than two persons sleeping in same room?	56%	44%
Use one of the following fuels for cooking: LPG, BIO gas, electricity, or kerosene	37%	63%
Is electricity the main source of lighting?	79%	21%
Where does the drinking water come from?		
Tap	58%	
Well or hadpump	27%	
Tank, pond, river, lake	16%	
The structure of the house is		
Katcha	15%	
Semi pucca	43%	
Pucca	42%	
What do you use as a latrine?:		
Go to open	45%	
Soak pit	15%	
Septic tank	15%	
Community latrine	13%	
No latrine and other	12%	

Appendix B

Determinants of contract renewal

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	Heckman	Heckman
Gender	0.16*	0.21**	0.18**	0.22**	0.15*	0.18**
	(0.08)	(0.09)	(0.08)	(0.09)	(0.08)	(0.07)
Age	-0.00	0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Schooling	-0.06***	-0.06***	-0.06***	-0.06***	-0.06***	-0.05***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
Schooling2	0.00***	0.00***	0.00**	0.00**	0.00***	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Literacy	0.20***	0.12*	0.27***	0.18***	0.20***	0.24***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.06)
Hholdsize	-0.02*	-0.02	-0.03**	-0.02	-0.03*	-0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
lnIncome	-0.02	-0.03	0.01	-0.01	-0.02	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Asset_index	-0.07***	-0.03	-0.08**	-0.05*	-0.06***	-0.08***
	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)
Sick_2010-11	0.11*	0.08	0.01	-0.02	0.11	0.01
	(0.06)	(0.07)	(0.08)	(0.09)	(0.07)	(0.08)
SHG	0.12*	0.05	0.17**	0.09	0.13**	0.16***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Prevention_index	0.04**	0.04	0.07**	0.07**	0.03**	0.06***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)
INFO_A	0.05	-0.01			0.04	
	(0.06)	(0.06)			(0.05)	
INFO_B	0.33***	0.26***			0.25***	
	(0.09)	(0.09)			(0.07)	
INFO_C	0.76***	0.60***			0.75***	
	(0.07)	(0.10)			(0.15)	
UND_A			-0.08	-0.07		-0.09
			(0.06)	(0.06)		(0.06)
UND_B			0.22***	0.16**		0.20***
			(0.07)	(0.07)		(0.07)
UND_C			0.48***	0.46***		0.41***
			(0.09)	(0.07)		(0.08)
Village dummies		Yes		Yes		
Constant	0.19	0.09	0.12	0.07		
	(0.28)	(0.26)	(0.31)	(0.24)		
Observations	306	306	306	306	947	947
R-squared	0.33	0.55	0.25	0.52		

Robust standard errors in parentheses

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

Appendix C

Effects of insurance benefits on contract renewal

	(1)	(2)	(4)	(5)	(6)	(7)	(3)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	Heckman	Heckman	Heckman
Gender	0.16** (0.06)	0.19*** (0.07)	0.18*** (0.07)	0.20*** (0.07)	0.15** (0.07)	0.19*** (0.07)	0.18*** (0.06)	0.20*** (0.06)	0.17** (0.07)
Age	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Schooling	-0.06*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)	-0.05*** (0.02)	-0.06*** (0.02)	-0.05*** (0.02)
Schooling2	0.00** (0.00)	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00*** (0.00)	0.00** (0.00)
Literacy	0.27*** (0.06)	0.18*** (0.06)	0.26*** (0.06)	0.17*** (0.06)	0.26*** (0.06)	0.17*** (0.06)	0.25*** (0.06)	0.25*** (0.06)	0.24*** (0.06)
Hholdsize	-0.02* (0.01)	-0.01 (0.01)	-0.02* (0.01)	-0.01 (0.01)	-0.03* (0.01)	-0.01 (0.01)	-0.02 (0.02)	-0.02 (0.02)	-0.03* (0.02)
lnIncome	0.00 (0.02)	-0.01 (0.02)	0.00 (0.02)	-0.01 (0.02)	0.00 (0.02)	-0.01 (0.02)	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
Asset_index	-0.07*** (0.03)	-0.04 (0.02)	-0.07*** (0.03)	-0.04 (0.02)	-0.07*** (0.02)	-0.04* (0.02)	-0.07*** (0.02)	-0.07*** (0.02)	-0.07*** (0.02)
SHG	0.14** (0.06)	0.06 (0.06)	0.14*** (0.05)	0.06 (0.05)	0.15*** (0.05)	0.07 (0.06)	0.13*** (0.05)	0.13*** (0.05)	0.14*** (0.05)
Prevention_index	0.05* (0.03)	0.06** (0.03)	0.05* (0.03)	0.05* (0.03)	0.05** (0.03)	0.05* (0.03)	0.04* (0.02)	0.05* (0.02)	0.05** (0.02)
INFO_2	0.36*** (0.06)	0.30*** (0.07)	0.37*** (0.06)	0.30*** (0.07)	0.37*** (0.06)	0.31*** (0.07)	0.29*** (0.05)	0.29*** (0.04)	0.29*** (0.04)
UND_2	0.50*** (0.10)	0.52*** (0.10)	0.13*** (0.04)	0.11*** (0.04)	0.30*** (0.07)	0.25*** (0.07)	0.59*** (0.13)	0.12*** (0.04)	0.28*** (0.05)
Sick_member_present	0.21*** (0.06)	0.20*** (0.06)					0.30*** (0.11)		
UND_2 x Sick_member_present	-0.33*** (0.11)	-0.38*** (0.11)					-0.42*** (0.15)		
Low_visit_frequency			-0.10** (0.05)	-0.05* (0.03)				-0.11** (0.05)	
UND_2 x Low_visit_frequency			0.21** (0.09)	0.16* (0.09)				0.20** (0.08)	
Nr_illnesses					0.04** (0.02)	0.01* (0.01)			0.04*** (0.02)
UND_2 x Nr_illness					-0.06* (0.03)	-0.05* (0.03)			-0.06** (0.03)
Observations	306	306	306	306	306	306	554	554	554

Robust Standard errors in parentheses

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

Appendix D

Determinants of contract renewal

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	Heckman	Heckman	Heckman
Gender	0.18** (0.07)	0.20** (0.08)	0.17** (0.07)	0.20** (0.08)	0.21*** (0.07)	0.22*** (0.08)	0.21*** (0.07)	0.20*** (0.07)	0.23*** (0.07)
Age	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Schooling	-0.05*** (0.02)	-0.05*** (0.02)	-0.06*** (0.02)	-0.05*** (0.02)	-0.06*** (0.02)	-0.05*** (0.02)	-0.05*** (0.02)	-0.06*** (0.02)	-0.05*** (0.01)
Schooling2	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)	0.00** (0.00)	0.00*** (0.00)
Literacy	0.25*** (0.06)	0.17*** (0.06)	0.28*** (0.07)	0.19*** (0.07)	0.26*** (0.06)	0.17*** (0.06)	0.25*** (0.06)	0.27*** (0.07)	0.25*** (0.06)
Hholdsize	-0.03** (0.01)	-0.02 (0.01)	-0.03** (0.01)	-0.02 (0.01)	-0.02* (0.01)	-0.01 (0.02)	-0.03* (0.02)	-0.03* (0.02)	-0.03* (0.02)
lnIncome	0.00 (0.02)	-0.01 (0.02)	0.00 (0.02)	-0.01 (0.02)	0.01 (0.02)	-0.01 (0.02)	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
Asset_index	-0.08** (0.03)	-0.04 (0.03)	-0.08** (0.03)	-0.04 (0.03)	-0.08** (0.03)	-0.04 (0.03)	-0.08*** (0.03)	-0.08*** (0.03)	-0.08** (0.03)
Sick_2010-11	-0.04 (0.10)	-0.05 (0.11)	-0.01 (0.10)	-0.03 (0.10)	-0.04 (0.11)	-0.05 (0.11)	-0.04 (0.10)	-0.02 (0.09)	-0.04 (0.10)
SHG	0.14** (0.06)	0.07 (0.06)	0.13** (0.06)	0.07 (0.06)	0.13** (0.06)	0.06 (0.06)	0.13** (0.05)	0.12** (0.05)	0.12** (0.05)
Prevention_index	0.06** (0.03)	0.06* (0.03)	0.07** (0.03)	0.07** (0.03)	0.06** (0.03)	0.06** (0.03)	0.06** (0.03)	0.06** (0.03)	0.06** (0.02)
USED	0.20*** (0.06)	0.10** (0.05)	0.20*** (0.06)	0.10** (0.05)	0.18*** (0.06)	0.08* (0.05)	0.16*** (0.05)	0.17*** (0.05)	0.14*** (0.05)
UND_2	0.26*** (0.05)	0.23*** (0.04)	0.16*** (0.06)	0.16*** (0.05)	0.20*** (0.06)	0.19*** (0.06)	0.24*** (0.04)	0.15*** (0.05)	0.18*** (0.05)
Payout			-0.10* (0.06)	-0.05 (0.05)				-0.08 (0.05)	
Payout x UND_2			0.21* (0.11)	0.15* (0.09)				0.20** (0.09)	
Peer_effect					-0.24*** (0.07)	-0.22*** (0.07)			-0.38*** (0.13)
Peer_effect x UND_					0.28** (0.11)	0.22* (0.12)			0.43*** (0.15)
Village dummies		yes		yes		yes			
Observations	306	306	306	306	306	306	554	554	554

Robust and clustered standard errors in parentheses

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

Appendix E

Determinants of satisfaction level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OLS	OLS	OLS	OLS	OLS	OLS	Heckman	Heckman	Heckman
Gender	-0.01 (0.06)	-0.01 (0.06)	-0.00 (0.06)	-0.01 (0.06)	-0.00 (0.06)	-0.01 (0.06)	0.01 (0.06)	0.01 (0.06)	0.01 (0.06)
Age	-0.00** (0.00)	-0.01** (0.00)	-0.01** (0.00)	-0.01** (0.00)	-0.00** (0.00)	-0.01** (0.00)	-0.00* (0.00)	-0.01** (0.00)	-0.00** (0.00)
Schooling	0.02 (0.02)	0.01 (0.03)	0.02 (0.02)	0.01 (0.03)	0.02 (0.02)	0.01 (0.03)	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)
Schooling2	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Literacy	0.16** (0.07)	0.17** (0.07)	0.16** (0.06)	0.17** (0.07)	0.17** (0.07)	0.17** (0.07)	0.15*** (0.05)	0.16*** (0.06)	0.15*** (0.05)
Hholdsize	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
lnIncome	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)
Asset_index	0.02 (0.03)	0.03 (0.03)	0.02 (0.03)	0.03 (0.03)	0.02 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)
Sick_member_present	-0.12* (0.07)	-0.12 (0.08)	-0.13 (0.08)	-0.12 (0.08)	-0.12* (0.07)	-0.12* (0.07)	-0.11* (0.06)	-0.11* (0.06)	-0.11* (0.06)
SHG	0.13*** (0.03)	0.14*** (0.04)	0.14*** (0.03)	0.14*** (0.04)	0.13*** (0.03)	0.14*** (0.04)	0.12*** (0.03)	0.12*** (0.03)	0.12*** (0.03)
Prevention_index_present	0.02 (0.02)	0.00 (0.03)	0.02 (0.02)	0.00 (0.03)	0.02 (0.02)	0.00 (0.03)	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)
INFO_2	0.16*** (0.06)	0.17*** (0.06)	0.16*** (0.06)	0.17*** (0.07)	0.16*** (0.06)	0.17*** (0.07)	0.12*** (0.05)	0.12*** (0.05)	0.12*** (0.05)
UND_2	0.34*** (0.06)	0.31*** (0.07)	0.36*** (0.07)	0.30*** (0.08)	0.34*** (0.07)	0.30*** (0.07)	0.28*** (0.04)	0.29*** (0.05)	0.27*** (0.05)
Payout			0.03 (0.05)	-0.01 (0.07)				0.02 (0.06)	
Payout x UND_2			-0.03 (0.10)	0.01 (0.12)				-0.01 (0.08)	
Peer_effect					-0.01 (0.06)	-0.02 (0.06)			-0.03 (0.08)
Peer_effect x UND_2					0.02 (0.11)	0.03 (0.11)			0.03 (0.10)
Village dummies		yes		yes		yes			
Observations	306	306	306	306	306	306	554	554	554

Robust and clustered standard errors in parentheses

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