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Abstract

In the region of Thies in Senegal community-based health insurance schemes (CBHI) have been present for years. And yet despite the benefits they offer, there remain low take-up rates. Our paper measures the willingness to pay (WTP) for CBHI premiums in such context. Our results highlight the role of income, wealth and risk preferences as determinants of WTP. We also provide an analysis of the predictive power of WTP on the actual take-up of insurance following our offering of membership to a sample of 360 households. WTP has a positive and significant impact on actual take-up.

Keywords: Community-based health insurance, Willingness to pay, Africa, Senegal

JEL: D10, I13.

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1. Introduction

Health shocks in developing countries can lead to large unexpected expenditure often funded by out-of-pocket payments (OOP). They constitute the most important mechanism for financing healthcare expenditure in several developing countries (ILO, 2008; WHO, 2011) and are 'the least equitable form of health funding' (WHO, 2010) due to their regressive nature. It has been shown that the cost of major illness has severe consequences on consumption (Gertler and Gruber, 2002; Wagstaff, 2007), and may lead to impoverishment (see among others Wagstaff and van Doorslaer, 2003; van Doorslaer et al., 2007; Bredenkamp et al., 2011). This is particularly the case for more vulnerable categories: workers in the informal sector and rural areas are less likely to be involved in mandatory social security schemes as it can be the case for public servants and workers in the formal private sector.

In many developing countries the last two decades have seen stagnating, if not decreasing, budgetary support for health care services; which has led to the prevalence of low quality public health services (WHO, 2010). According to the world development indicators from the World Bank, public health funding in Senegal has been stable over recent years while overall per capita health expenditures have been increasing in the same period. The shrinking of the state's ability to meet health care needs makes it unable to provide universal insurance for its population. This has led to the emergence of many community-based health insurance schemes (CBHIS) in Senegal. At the same time, the market has been ineffective in providing health insurance to low-income people even in urban environments. Private insurers are often faced with important adverse selection problems and high transaction costs. The costs of their contracts are often prohibitive. Poor people can thus only resort to punctual transfers from relatives or health insurance schemes rooted in local organizations. CBHIS are now at the core of health protection and universal coverage strategies and policies in many African countries (Diop et al., 2006). In Senegal, they are locally known as

'*mutuelles de santé*' or mutual health organizations (MHOs). MHOs are a form of insurance which allows members to pay monthly affordable premiums to reduce health care payment at the point of service. They are not for-profit, grass-rooted organizations based on voluntary participation and underpinned by concepts of mutual aid and social solidarity. Several studies show that participation to MHOs contributes to mitigate OOP expenditure, generates an increase in modern healthcare utilization and improvements in health outcomes (Jutting, 2003; Ekman, 2004; Wang et al., 2009; Shimeles 2010).

Several papers have estimated the WTP for CBHIS and its socio-economic determinants in different developing countries (Dong et al., 2003a; Dong et al., 2005; Wang et al., 2005; Dror et al., 2006; Onwujekwe et al., 2010; Donfouet et al., 2011). Such valuations can help both policy makers and existent MHOs in better understanding the characteristics of the demand of health microinsurance products. This paper considers the role of individual and household socio-economic determinants of willingness to pay for MHOs premiums. It adds to the existing literature by providing evidence on the role of income, wealth and risk preferences on WTP. Conscious of the potential limits of our elicitation strategy, we incorporate the existent literature on the effects of preferences anomalies (Watson and Ryan, 2007) and estimate WTP accounting for structural shift in preferences (Alberini et al., 1997), anchoring effect (Herriges and Shogren, 1996) and the two effects together (Whitehead, 2002).

An additional and important contribution of our paper to the literature comes from the fact that we can assess the role of WTP in predicting the effective take-up of MHOs product. As Bhatia and Fox-Rushby (2003) emphasised, study assessing criterion validity in the health sector are scarce. They found that there was no discrepancy at aggregate level between hypothetical WTP elicited through a bidding game method and actual demand of treated mosquito nets in Gujarat, India. Ashraf et al. (2010) find a positive impact of WTP on actual purchase of drinking-water

disinfectant. To the best of our knowledge our work represents a first attempt at evaluating the predictive power of WTP on the actual take-up of health microinsurance products. In order to do so, after having measured WTP, we offer to 360 randomly selected households in the city of Thies, Senegal, the opportunity to join an MHO. This is done along a randomized field experiment that we describe in details below.

The paper proceeds as follows. After a discussion on our study design section three and four present the different techniques for eliciting WTP. Section five gives a first look at our descriptive statistics. Our results on the impact of different controls on WTP are shown in section six and section seven looks at the impact WTP has on the actual uptake of MHO. Section eight concludes.

2. Study Design

In early 2010 we developed a partnership with GRAIM (Groupe recherche d'appui aux initiatives mutualistes), a Senegalese NGO promoting the work of local MHOs active in greater Thiès. Thiès was chosen for two main reasons. Firstly, it is one of the largest cities in Senegal with a population of about 240,000 inhabitants. Secondly, some of the local MHOs are the oldest in Senegal, having been active for fifteen years; as such the city possesses a well established supply of MHOs.

We use data collected during the spring of 2010 on 360 randomly selected households across the whole territory covered by the city authorities, which represents an area of approximately 20 square km. We sampled the number of surveyed households across all fifteen Thiès neighbourhoods according to their respective share of the overall population estimates (based on the 2002 census). An official map of the city was used to select a number of streets spread across each neighbourhood. Each street was assigned a number of households according to its length and density. For every street we used a pseudo-random process by which every fifth lot according to a

specific direction was picked. Since many households live on the same lot in semi-detached rooms, enumerators randomly selected one room by lot according to a clock-wise selection varying from lot to lot. In the case where a lot was found empty or the head of household was not present, enumerators were instructed to set appointments and revisit the household later. Given the small number of households sampled from such a relatively large area, we argue that spillovers within the sample are unlikely.

Our baseline survey aimed to obtain information on each household member's religion, level of education and health problems (sickness and chronic diseases). We also gathered information from the head of household concerning work, monthly income, and a number of other factors which we describe below in greater detail. In the context of the households we surveyed, and this can safely be extended to the broader national level, the husband is generally considered to be the breadwinner and the head of the house. As such he is expected to provide insurance for the members of his household. This should provide ample justification as to why we collected these key variables affecting health insurance intake from the head. In what follows we therefore use data at the household level.

In order to obtain information on WTP, we follow the bidding game strategy, as in other works aimed at eliciting WTP for MHOs (Dong et al., 2005; Dror et al., 2006; Onwujekwe et al., 2010). A discussion on the different techniques for eliciting WTP follows this section. We propose to all head of household surveyed an hypothetical health insurance product covering 80 per cent of consultations at health posts and 50 per cent of expenses at hospital or health centre.[1] Such contractual conditions are similar to those proposed by most MHOs present in the city with some slight variations.[2] We ask how much the household head would be willing to pay for a monthly per capita premium for such a product. Starting bids are randomly assigned[3] in order to mitigate the risk of starting point bias (Mitchell and Carson, 1989; Onwujekwe and Nwagbo, 2002). The amount of

increments/decrements is 50 FCFA; no upper or lower limits to the possible bids are introduced. We adopt follow up questions with two degrees of certainty 'definitely sure' and 'probably sure'. This approach has been shown to remove the hypothetical bias both in laboratory and field experiment (Blumenschein et al., 1998, 2002, 2008). We limit our attention only to 'definitely sure' answers. Out of our sample of 360 households 36 were already member of an MHO at the moment of the survey and were consequently excluded from the sample. The following analysis is thus based on a sample of 324 households.

3. Eliciting WTP

As we mention above, to obtain the WTP of household heads we employ the contingent valuation (CV) method, through an elicitation method called 'bidding game'. The use of stated-preferences methods through contingent valuation is common in studies aiming at identifying the value of health products and outcomes, public goods and environmental amenities (see Dror et al., 2006 for a list of papers). Despite its pervasive use, CV method, in its simpler version[4], presents several limitations. The major problem comes from incentive compatibility in telling the truth due to hypothetical bias with the consequence that hypothetical responses overestimate real decisions[5] (Cummings et al., 1995; Johannesson et al., 1997, 1998; Harrison and Rutström, 2008). As a response to this problem, several strategies have been proposed in order to align hypothetical and real decision. First, the use of dichotomous choice, for example asking 'Are you willing to pay XY for this particular item?', gives more consistent results as compared to open-ended questions and payment scale formats (Donaldson et al., 1997; Frew et al., 2004). Second, among dichotomous choice contingent valuation methods, there are 'take-it-or-leave-it' and bidding games methods. In the first case the respondent is asked to answer 'yes' or 'no' to a proposed price, whereas in the second format if the interviewee agrees upon a certain price, the interviewer increases the bid of a certain amount up to the point the respondent says 'no'. WTP is estimated to correspond to the last

amount before the ‘no’. If the respondent says ‘no’ to the first bid, the interviewer decreases the following bid and stops when the respondent says ‘yes’. WTP corresponds to the amount the individual agrees upon.

The advantage of the bidding game approach lays in the possibility to obtain more precise and reliable estimates of WTP (Dong et al., 2003). Moreover, such approach is suggested in context where prices are variable (McNamee et al., 2010), as it is the case for MHOs.

The bidding game approach can be considered within the context of multiple bounded contingent valuation methods. Several limits to this class of elicitation approaches have been pointed out by the literature as a consequence of the introduction of follow-up questions. First, the presence of a proposed initial bid may hinder one’s true answers, leading to biased WTP elicitation, due to starting point bias (Mitchell and Carson, 1989). The respondent may consider the initial proposed bid as informative of the value of the good and may 'anchor' his answers accordingly (Herriges and Shogren, 1996). Second, agents may not report true WTP due to incentive incompatibility so that stated values after the first bid might be shifted systematically by a certain parameter (Alberini et al., 1997). Intuitively, this may occur if the respondent thinks to be in a bargaining context or has the feeling to possibly lose the good, once an agreement of a price is reached (through a yes-response to the first answer). This 'preference anomaly' (Watson and Ryan, 2007) may lead to an optimal no-response to the follow-up questions (negative shift). However, it can also be the case that the shift is positive, due to yea-saying behaviour (Kanninen, 1995). Whitehead (2002) suggests that the phenomena of shift (incentive incompatibility) and anchoring (starting point bias) need to be considered together. Furthermore, the consistency of the elicitation method is threatened by the possibility that responses to the first and following questions are drawn from different distributions (Cameron and Quiggin, 1994; McFadden, 1994). We consider these potential problems in our estimations.

4. Theoretical Framework and Empirical Strategy

4.1 Theoretical framework

WTP is elicited through a series $t = 1, 2, \dots, T$ of questions proposing an amount A_t. The respondent answers 'yes' if $WTP_t \geq A_t$ and 'no' otherwise. By stating this, we assume that WTP does not change with follow-up questions, i.e. $WTP_1 = WTP_2 = \cdots = WTP_T$. However, this assumption is violated in case of structural shift and anchoring problems due to incentive incompatibility and starting point bias.

According to the model introduced by Alberini et al. (1997), answers to follow-up questions may be untrue due to incentive incompatibility. In particular, true WTP, that we assume to correspond to the ones elicited at the first bid WTP_1, is shifted by a structural parameter δ:

$$WTP_{t>2} = WTP_1 + \delta$$

The sign of δ may lead to different possible explanations. In particular, a negative value of δ means that the respondent is less likely to accept the second bid, so that final WTP might be underestimated. On the one hand, a negative structural shift is consistent with theoretical and behavioural models such as prospect theory (DeShazo, 2002), incentive incompatibility (Carson and Groves, 2007) and 'guilt and indignation' (Bateman et al., 2001). On the other hand, a positive δ can be explained by yea-saying behaviour (Kanninen, 1995) leading to upward biased estimations. Some intuitive explanations of the issues are presented in Carson and Groves (2007).

Herriges and Shogren (1996) claim that WTP elicited with follow-up questions may suffer of an anchoring effect. Respondents reveal a WTP which is the average of the starting bid and the true (initial) WTP. This is equal to:

$$WTP_{t>2} = (1-\gamma)WTP_1 + \gamma A_1$$

With $0 \leq \gamma \leq 1$. For every given follow-up question A_t, the respondent accepts the bid if $(1-\gamma)WTP_1 + \gamma A_1 \geq A_t$. Therefore, a yes response is expected if:

$$WTP_1 \geq \frac{A_t - \gamma A_1}{1-\gamma}$$

Consequently, in the presence of anchoring ($\gamma > 0$), after an initial yes response, hence with $A_t > A_1$, the likelihood of accepting the second bid decreases. This is due to the fact that the prior on WTP has changed due to the information provided by the initial bid. This results in underestimation of true WTP. Conversely, after an initial no response ($A_t < A_1$), anchoring leads to higher probability of accepting the second bid, with consequent overestimation of WTP. The choice of initial bids is thus crucial at determining WTP over/underestimation.

Whitehead (2002) integrates the two previous models, considering the case where structural shift and anchoring to the initial bid hold together. Answers to follow-up questions follow:

$$WTP_{t>2} = (1-\gamma)WTP_1 + \gamma A_1 + \delta$$

And will be 'yes' if

$$WTP_1 \geq \frac{A_t - \gamma A_1 - \delta}{1-\gamma}$$

This results in an amplified effect of anchoring if $\delta < 0$, whereas no clear prediction arises if $\delta > 0$.

4.2 Empirical strategy

We estimate WTP under the assumption of WTP distribution consistency across responses, meaning that respondents react the same way to bids, having in mind the same underlying WTP. This assumption implies perfect correlation and absence of systematic errors across responses to different bids. This is a standard assumption in the literature that focuses on the determinants of WTP for health microinsurance (see among others Dong et al., 2003). This allows us to employ the OLS estimator below as in McNamee et al. (2010). We first estimate a base model as follows:

$$WTP_i = \alpha + \beta A_{1i} + \boldsymbol{X}_i\gamma + \varepsilon_i$$

where WTP_i is the final elicited value of individual i, A_{1i} is the initial bid, $\boldsymbol{X}_i$ is a vector of individual and household characteristics, ε_i is an individual error term. The presence of a structural shift in WTP is estimated as follows:

$$WTP_i = \alpha + \beta_1 A_{1i} + \beta_2 D_i + \boldsymbol{X}_i\gamma + \varepsilon_i$$

Where D is a dummy variable which is equal to zero when the respondent answered only one follow-up question, meaning that either accepted the first bid and refused the second one or rejected the first bid and accepted the second. D is equal to 1 otherwise. This variable allows us to identify whether there exist structural differences among those responding to one or more follow-up questions. The anchoring effect in follow-up questions is accounted for by the interaction term of D

multiplied by A_1. If anchoring is present, β_3 is expected to be significant. Finally, the shift and anchoring model allows the possibility of two effects driving WTP:

$$WTP_i = \alpha + \beta_1 A_{1i} + \beta_2 D_i + \beta_3 D_i * A_{1i} + \boldsymbol{X}_i\gamma + \varepsilon_i$$

We obtain estimates both in log and level terms.

5. A look at the descriptive statistics

Table 1 reports summary statistics for the socio-economic characteristics we consider in our study and which will be included in our specifications as controls (in $\boldsymbol{X}$ the vector of individual and household characteristics). Most of the heads of household are male. The average size of a household is more than six members. 45 per cent of household heads attended secondary school or higher levels of education (above six years of schooling), 19 per cent have only primary education, 36 per cent never went to school. Monthly head's income added to other members' monthly income is used as a proxy for households' economic conditions and term 'household income'. It represents the sum of all sources of monthly income (labour income or wage, rent and received transfers) across all members of the household. Due to the sensitivity of questions related to income, and the reticence to provide exact amounts, answers were, in most cases (68% of all answers), collected according to intervals. An aggregated measure of income was constructed at individual level by adding intervals' midpoint values for the ten income intervals or exact values when given to rents and transfers nominal values. We then categorized in quintiles. We also computed a synthetic measure of assets owned by the households as proxy for wealth (which we denote as 'durables'). It is simply the sum of a list of items comprising among others a series of kitchen and home appliances, mobile phone, bicycle, motorcycle, car, sewing machine, different pieces of furniture

and so forth. For robustness purposes, we also use alternative ways of expressing wealth that we discuss below.

INSERT TABLE 1 HERE

As a proxy for income stability we use a dummy identifying if the head of households is working for a public institution or not. We also include a dummy for self-employed or not (the benchmark group are employed by private firms). The intuition is that with respect to wage earned in informal activities (petty retailing, craftsmen, transport and so forth.), public servants are likely to have a steadier stream of revenues. 19 per cent of heads in our sample work for the state. We also measure with dummy variables if households are using one of three saving devices: ROSCAs, banks or microfinance institutions. Having access to a saving device might help a household to buffer health shocks by alleviating credit constraints and may render MHOs less attractive. Alternatively, it may help households to pay for membership fees and premiums and make MHOs membership more likely. Also being a member of a ROSCA may imply some discipline in saving which could in turn help an individual in committing to an MHO's premiums. Concerning the health status of the household, 67 per cent of heads reported one of their household members having been sick in the previous twelve months. More sickness is likely to lead to greater demand for health care and hence for health insurance.

Two additional dummies were added as controls in our regressions. The first variable takes a value of one if the household head is strongly risk averse. That is if he/she always opted for the certain outcome when presented with a set of choices between gambles and certain gains and losses using a similar methodology as Voors et al. (2012). In this part of our survey, each individual had to choose between certain outcomes (gain/loss of 200, 250 and 300 CFA francs) and simple gambles with probability 1/4 to win/lose 1000 CFA francs and probability 3/4 to win/lose nothing. We also ran

this exercise with the same amounts multiplied by a factor of ten. Before answering this set of 12 questions, each household head was informed that, after completion of this section, a lottery would be picked out, amongst the ones offering potential gains, by the enumerator who, in accordance with the preference of the player, would either give the certain outcome or play the selected lottery for real money. We also turned to the methodology put forward in Voors et al. (2012) to elicit discount factors. In this case, household heads had to choose, from a list of different amounts to be received in one month, the one making them indifferent from receiving 10000 CFA francs today. The list of amounts used in this question is the following: 10500, 11000, 12500, 15000, 17500, 20000, 25000, 30000, representing the respective discount factors at one month: 5 per cent, 10 per cent, 25 per cent, 50 per cent, 75 per cent, 100 per cent, 150 per cent, 200 per cent. We then generated a binary variable taking a value of one when the individual belonged to the more impatient half of our sample. We discuss below our results when using different definitions of time and risk preferences. The variable 'knowledge of insurance principle' represents the number of right answers to a series of seven true or false questions on the nature of insurance. The more knowledgeable a household is of basic insurance principles the higher our variable score is. Household total expenditure on health is the sum of payments for treatments, drugs, consultations and hospitalization for both recurrent and chronic illness, across all household members for the last twelve months[6].

We also use a dummy variable 'already insured' which takes the value one if the head has already health insurance. Only two forms of health insurance are present in our sample of 324 households. The first, and of relatively little importance (subscribed by 3.4% of households), is offered by private insurers. They provide insurance according to different scales and often require their clients to open a saving account within their own institution (PAMECAS, SALAMA and Crédit Mutuel du Sénégal). The second type (21.3%) refers to compulsory insurance provided by employers of a minimal size (with a minimum number of employees). Employees are this way contributing a

fraction of their wage to their firms' health fund known as *Institution de Prévoyance Maladie* (IPM). This fund is then used to cover employees when health problems occur. Public servants have access to a more generous type of IPM where they, their spouse, and often up to two children (under 18), are insured in case of health related expenditures. Comparatively, the appeal of MHOs lies in the fact that they require the payment of affordable monthly premiums, mostly ranging from 150 to 350 FCFA per person covered. MHOs are particularly attractive to the large numbers of self-employed and informal sector workers who are price discriminated by private insurers. Also, as IPMs and private insurers do not offer full coverage for consultation or inpatient care and do not cover all members of a household, there is ample scope to complement this coverage with that of an MHO. We discuss this in more details below.

5.1 WTP and starting point bids

Given that most MHOs charge 200 FCFA for premium we decided to distribute our initial bids from 100 to 300 FCFA so that we have an equal difference above and below that true market price. Table 2 shows the random assignment of initial bids across household characteristics. One can notice an uneven distribution of initial bids: 42.9 per cent received an initial bid less than 200 FCFA (corresponding to the amount of 100 and 150), 34 per cent received an amount superior 200FCFA (250 and 300). However, our randomization appears satisfactory across most of household characteristics. We measure the success of randomization through the F-test of joint significance of coefficients in a regression with the household characteristic as dependent variable and four dummies (out of a total of five categories) for different starting bids as regressors. Significant differences in means across starting bids arise for already insured, durables (however not for alternative indexes), education and income (but total expenditure on health for the last twelve months shows otherwise). We control for all these variables in our estimations for WTP and when predicting effective purchase of MHOs insurance premiums.

INSERT TABLE 2 HERE

Table 3 shows the response pattern to the initial question on WTP, by starting bid. As expected, the proportion of individuals saying yes to the first offer is decreasing in the amount of the first bid: 91 per cent of respondents declared to be willing to pay at least 100 FCFA, 73 per cent at least 200 FCFA and only 38 per cent stated a final WTP greater than 300 FCFA. This is consistent with a downward sloping demand curve. However, there seem to be no clear pattern for the follow-up answers. On average 24 per cent of household heads answered only two questions. The average final elicited WTP is superior to the initial proposed bid, except for those who were offered 300 FCFA who, on average, declared to have a WTP of 299 FCFA. The role of initial bids on final WTP will be taken into more consideration in the analysis that follows.

INSERT TABLE 3 HERE

Around a fifth of all individuals (22.5%) declared a WTP corresponding to the average actual market value. On average, these respondents reached the value of 200 FCFA after two bids. Around 40 per cent of respondents declared WTP between 150 and 250 FCFA. Figure 1 shows the distribution of the final WTP, by initial bid. All five formats seem to have similar patterns: spikes are concentrated at 100, 200 and 500 FCFA across the initial bids.

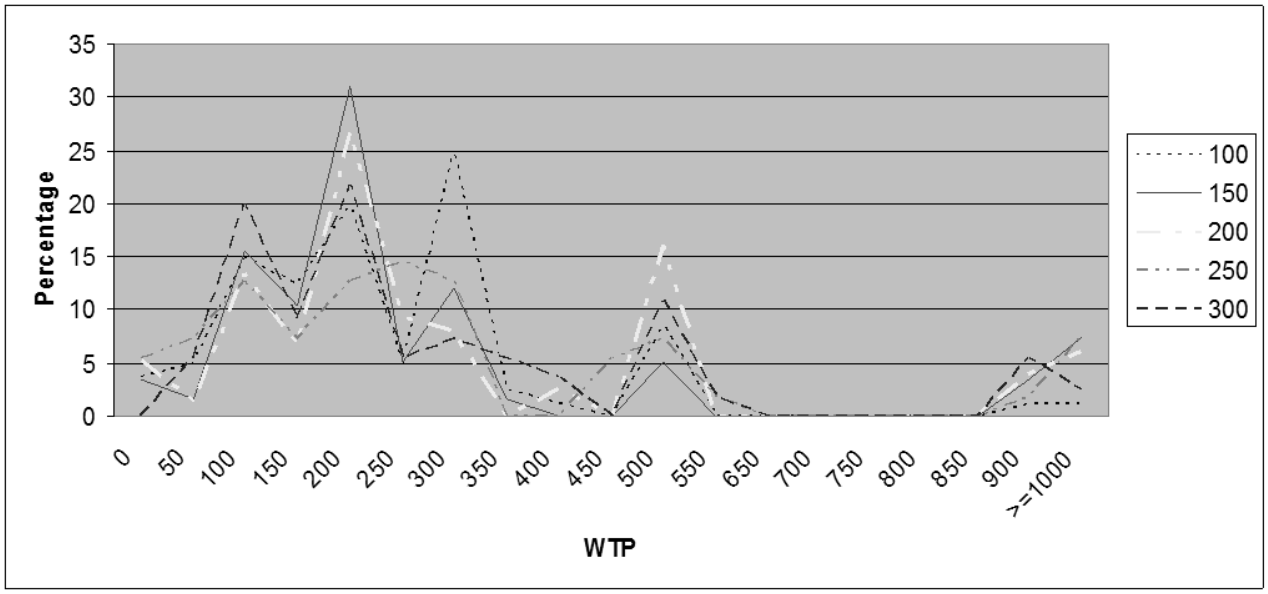

Figure 1. WTP distribution by starting bid.

6. Determinants of WTP

Tables 4 shows the results of WTP estimates using OLS for the different models described above (McNamee et al., 2010 use a similar estimation strategy). Our Tobit estimates (not shown, but available upon request) are qualitatively similar. We show the results in levels, however using logarithms holds similar results. Column 2 highlights the presence of a positive and significant shift parameter, suggesting that those with more follow-up bids had a higher final WTP. Results in column 3 indicate the presence of anchoring; the fact that the coefficient of the interaction term is statistically significant suggests that the response to the follow-up questions is anchored in some way to the initial bid. However, this result may be biased due to omitted variables, as the shift parameter is not included, although significant. Indeed, there seem to be a loss in the goodness of fit of the anchoring model, compared to the shift model as signalled by R-squared. Column 4 shows the result of a model encompassing both shift and anchoring effects. In both specifications the latter model seems to fit data better, as depicted by the slight improvement in R-squared. The positive shift is confirmed and becomes even stronger. The anchoring effect remains statistically significant,

but turns negative, which still shows the presence of anchoring of follow-up questions to the initial bid. The negative sign suggests that overall there seems to be a dominant effect through which WTP is anchored to initial bids which are predominantly lower than final bids. This can be seen in table 3 where a majority of 67% answered 'yes' to the initial bid. The amount of the starting bid does not play a significant role in predicting WTP in the first two columns. It has a differentiated impact for model 3 and 4: for *D* equals to zero it has an overall negative impact (model 3) or positive impact (model 4). For those who answered more than one follow-up questions (*D* = 1) its overall impact is not significantly different from zero in both models.

INSERT TABLE 4 HERE

Income has somehow a positive and statistically significant impact on the WTP. This is shown by the coefficient attached to the fifth household income quintile (the first quintile is the omitted category). Household wealth is positively and significantly related to WTP, as indicated by the coefficient of our index for wealth (number of durables).[7] Households with larger number of children younger than 5 years are more willing to pay. Heads reporting episodes of sickness over the last twelve months appear not to have a larger WTP (the coefficient of 'reported sickness' is not significant). This suggests that more exposed to illness households are not willing to pay more to be insured. That is somehow surprising results. We would expect such households to be more willing to purchase insurance in the face of health expenditures. Risk averse individuals have a significantly greater WTP. Our variable related to discount factor (impatient) appears to have no significant impact across models.[8] The variable ‘already insured’ which takes the value one if the head has health insurance (IPM or private) appears to have no significant impact. This is not surprising if we consider, as mentioned above, that IPMs and private insurers do not offer full coverage for consultation and inpatient care fees and do not cover all members of a household. There is thus scope to complement this coverage with that of an MHO (for more on this see Bonan et al., 2012).

As we can see from table 4, our results hold if we use different specifications of preferences anomalies and estimation strategy. Using our different models we obtain predicted median values of WTP. There is evidence of slight underestimation of the median WTP if preferences anomalies are not taken into consideration. However, the extent of such difference appears not relevant: less than 5 per cent difference with respect to the full model in the model estimated in log (from 242 to 253 FCFA), less than 3 per cent when estimated in levels (from 293 to 306 FCFA).

Table 4 shows that income and risk preferences are key variables in explaining WTP. As an additional check we look at the correlation of each of these controls with WTP. Tables 5 and 6 show that WTP is positively related to the level of income, calculated both at individual head and household level. In both cases, WTP in the fifth quintile is significantly higher and that in the first quintile is significantly lower. No significant difference arises between the second and third income quintile. Similarly, a positive and significant relationship is found between WTP and level of wealth (durables). Moreover, risk preferences are related to WTP. Strongly risk averse individuals declared a significantly higher WTP than less risk averse agents.

INSERT TABLES 5 AND 6 HERE

6.1 Discussion

The presence of a positive and significant shift parameter leads to reject the hypothesis of incentive incompatibility (Alberini et al., 1997) and suggests the presence of yea-saying behaviour (Kanninen, 1995). In column four, the marginal effect of *D* on WTP is decreasing in starting bid but remains always positive. Similar results can also be found in McNamee et al. (2010). In the fields of psychology and sociology yea-saying is known as response acquiescence and implies the tendency to agree with questions regardless of content. Mitchell and Carson (1989), in the context of CV

methods, define yea-saying as “the tendency of some respondents to agree with an interviewer's request regardless of their true views”.[9]

Overall, our estimation results on the determinants of WTP are in line with the existent literature. In particular, the positive effect of income is confirmed in other studies as Dror et al. (2007), Wang et al. (2005), Prabhu (2010) and Donfouet et al. (2011). The coefficient for risk aversion conforms with standard expected utility model of choice under risk. The positive coefficient linked to the number of children in the household, together with a negative of household size, may suggest that in many cases insurance is conceived as a form of protection for the members of the household most at risk with their health. In our sample, among those who are already members of MHOs (36 out of the 360 households surveyed), slightly less than 50 per cent of heads insured the entire family (100% of members). Moreover, at the question ‘who would you buy the health insurance for, at that price’, around 60 per cent of heads claimed to be willing to cover all members of the household. In many cases the head states to prioritize the coverage of young children, leaving out himself and the spouse. Finally, despite evidence of preference anomalies in the form of positive structural shift in preferences, the distribution of estimated WTP does not change significantly across specifications.

Several concerns may be expressed on the exercise of eliciting WTP. One reason why an agent may respond untruthfully to hypothetical questions lies in the belief that answers may potentially influence the actions of rulers or policymaker. The consequence is strategic answering aimed at maximizing agent welfare (Carson and Groves, 2007). To minimize this impact our enumerators emphasised that the survey was not done on behalf of a public agency and was also not linked to a public campaign designed to increase insurance coverage. Households were told that answers provided would not bear any consequence on their access to MHOs insurance.

Another concern which may lead to misreporting of true values lies in the possible misunderstanding of the question by the respondent. This is frequent in the case of non-marketed and hypothetical goods (Carson and Groves, 2007). However, our question on WTP refers to a product which is already present in the market and can be understood easily with basic insurance principles. It is known that familiarity with the proposed good induces well-formed preferences (McCollum and Boyle, 2005). In the case where respondents have little or no experience and knowledge they may provide invalid responses. For that matter we control for respondents' knowledge of insurance and it remains non-significant in all our models. This can indicate that in our sample there is a minimum understanding of the product so that households provide a valid WTP.

7. Predictive power of WTP on actual take-up

Upon entry, new members must pay fixed membership fees covering the costs of registering. This includes receipt of a booklet listing all household members being registered which acts as an official document when visiting a health provider. MHOs are not-for-profit grassroots schemes managed by a non-remunerated governing body headed by a president and have written rules. The MHOs we surveyed did not operate any selection amongst potential candidates. The only screening involved takes the form of a 'period of observation' that is imposed by all MHOs. New members are asked to contribute for three months, during which they are not entitled to any claim. This three-month period is designed to minimize adverse selection by testing if new members can commit to a strict monthly schedule of contributions. Members are expected to pay their premiums during a monthly visit to the finance officer.[10] Once insured by an MHO, members can directly access specified health facilities (health huts, posts and centres) and are required to pay a fraction of the fees. The remainder of the fees are covered by the insurer. The array of interventions covered and the extent of the coverage varies from one MHO to the other. However they generally cover 25-

75% of consultation costs (at health huts, posts and centres) and between 50-100% of medical exams, hospitalizations, and various inpatient care fees at health centres (the regional and St-Jean de Dieu hospitals).

During a first visit to households we gather information on household characteristics and obtain their WTP. During our second visit we carried out a randomized controlled trial to test the impact of two different treatments. The first one consisted in an insurance literacy module, communicating the benefits from health microinsurance and the functioning of MHOs, to a randomly selected sample of households. 163 of the 324 households were invited to attend an insurance literacy module to be held on a non-working day in the city centre before our second treatment went ahead. Invitations were directly handed to heads of household. The module consisted of a three-hour educational presentation on health microinsurance and specifically on MHOs functioning (including the differences across various active MHOs in the city of Thies). A lesson on personal financial management exploring the notions of savings, risk and insurance was also given. Case studies of different MHO member and non-member households were given to illustrate the different concepts introduced. Sessions were given to groups with a maximum of 20 individuals at a time. The comparison group of 161 households received nothing. This randomization allows us to measure the causal impact of the effect of insurance literacy training on the purchase of insurance with MHOs. This way we can assess the module's impact while screening out other effects such as each individual's inherent propensity to opt for insurance. Additional details on this treatment can be found in Appendix 1.

After the insurance literacy training was completed and independent of this assignment, the households were split into three randomly chosen sub samples and each subsample received an additional marketing treatment in the form of one of three vouchers. So for the 163 households invited to attend the insurance literacy module: 53 received voucher 1, 55 voucher 2 and 55 voucher

3 (a similar distribution applies for the 161 households who did not received an invitation to the module). Voucher 2 offered a full refund of membership fees in an MHO. That represented on average an amount of 1750 CFA (membership fees for the MHO joined by vouchers holders ranged from 1000 to 3000 CFA). Voucher 3 provided a full refund of membership fees (equivalent to voucher 2) plus a refund of 250 CFA/months per new member covering fees linked to the observation period of three months (refund was made for each new member for up to 3000 CFA which is the equivalent of three months' premium for four people at 250 CFA/month). The refunds offered with voucher 2 and 3 were such that respondents did not have to pay cash up-front and then wait for a reimbursement. The vouchers actually reduced the initial cash outlay as these refunds were directly transferred to MHOs treasuries. Voucher 1 had no monetary value attached, instead representing a simple invitation to the GRAIM in the event that the household was keen to know more about MHOs and the insurance products offered. The recipients had a period of two months to redeem the voucher by visiting the GRAIM and filling in an application form to join the MHO of their choice.[11]

In our analysis a household thus subscribes if it simply redeems its voucher. We could not collect information on how long households stayed member once they redeemed their voucher. Subscription is thus not measured in terms of how long they remained enrolled for. To ensure that our dependent variable was correctly constructed we phoned all households who did not redeem their voucher one month after the redemption date to ask them if in the meantime they had joined an MHO but not used their voucher. This way we accounted for the membership of two additional households.

The determinants of the decision to subscribe to MHOs are analysed through an OLS estimate run on those who are not yet member of MHOs (n=324). It is important to note that the focus of this paper is not on the impact of our randomized treatments but rather on the influence WTP has on the

take-up of MHOs memberships. Due to space restriction we refer the reader to an extensive discussion on these treatments and their impacts in Bonan et al. (2012). What follows thus focuses on the impact of WTP on the purchase or not of actual health insurance.

In order to evaluate the effect of elicited WTP on the effective purchase of a health microinsurance product, we estimate the following model:

$$Y_i = \alpha + \beta_1 WTP_i + \boldsymbol{X}_i\gamma + \beta_2 E_i + \beta_3 Voucher_i + \varepsilon_i$$

where Y is a dummy variable equal to one if the head of household i has decided to subscribe the household to a MHO. The index *i* identifies households. *X* is a vector of covariates which contains: household heads' characteristics (gender, education, income, employment status, if (s)he is impatient and strongly risk averse), size of the household, an indicator of household wealth, if the household has already health insurance, a dummy if the household uses a saving device (rosca, bank, MFI), one proxy for the status of the household's health (using either: total household health expenditures during the last year or if the household reported sickness during the last year) and the household's level of insurance literacy. *E* is a dummy variable which equals one if the household was invited to the insurance literacy module. *Voucher* is a dummy variable which equals one if the household was given either voucher 2 or 3 (we find similar results if we use two dummies for voucher 2 and 3 separately).

INSERT TABLE 7 HERE

Table 7 shows our results using OLS estimation techniques. Our results are similar if we use probit technique. Contingent valuation of WTP has an intuitive positive effect on uptake. The result is significant, at 10 per cent confidence level, for all specifications. In particular, it is robust to

different variables indicating household income and wealth (number of durables or DHS wealth index). It is worth emphasising that even after controlling for household and individual characteristics and for our two treatments we find a significant impact coming from WTP. We discuss in details the impact of our different controls and two treatments (*voucher* and *invitation to insurance literacy module*) in Bonan et al. (2012). We do not find any heterogeneous effect of WTP when combined with our two treatments.

7.1 Discussion

WTP appears to be a key variable in predicting the effective purchase of the product and is informative of individual behaviour. Our estimation results indicate that WTP, when we control for our different treatments and a series of other variables, remains an important predictor of actual purchase. As such this result presents some evidence for the validity of WTP. We also find that 62 per cent of heads who opted for MHOs insurance had a WTP larger or equal to the contribution actually charged by the MHO they selected. This proportion is in line with Bhatia and Fox-Rushby (2003). They find that 66 per cent of agents have a WTP larger or equal to the value of the treated mosquito net that they actually bought. Such similarities are interesting to notice given that the contexts are different. Bednets, a one-off expenditure, is not comparable to the health microinsurance product we offer which requires monthly contributions. However, as Bhatia and Fox-Rushby (2003) emphasise, such study assessing criterion validity in the health sector are scarce and our results bring some interesting evidence.

Finally, the different MHOs covering the city are relatively well spread across its territory so that most neighbourhoods have access to one. There is no obligation to join the closest MHO and one can opt for any MHO. Differences with respect to their insurance schemes are minor. For these reasons we consider distance to the headquarters of the closest MHO as unlikely to have explanatory power over uptake. Also, access to basic health services is likely not to be an issue in

our case. Health huts and posts are evenly distributed across neighbourhoods and remain within a short distance from all households' residences we surveyed. Furthermore, all are located within two kilometres from either one of the two health centres (regional public hospital and the mission hospital St-Jean de Dieu). Nevertheless, we somewhat control for possible heterogeneity across neighbourhoods by introducing neighbourhood fixed effects.

8. Conclusion

WTP valuations can help both policy makers and MHOs in better understanding the characteristics of the demand of microinsurance products. This paper measures different individual and household socio-economic determinants of WTP for a health microinsurance product. We find that richer, wealthier and more risk-averse head of households are more likely to have a higher WTP for health microinsurance. Conscious of the potential limits of our elicitation strategy (bidding game), we incorporate the existing literature on the effects of 'preferences anomalies' (Watson and Ryan, 2007). We estimate WTP accounting for structural shift in preferences, anchoring effect and the two effects together. We find evidence of slight underestimation of the median WTP if preferences anomalies are not taken into consideration. However, the size of these differences appears irrelevant. Our results on the determinants of WTP are robust to the effect of such preference anomalies.

We also size the influence of WTP in predicting the effective take-up of MHOs product. To do so we offer to 324 randomly selected households the opportunity to join an MHO. This is done along a randomized field experiment. We find that contingent valuation of WTP has a positive and significant effect on subscription. In particular, it is robust to different variables indicating household income and wealth. This suggests that contingent valuation of WTP is a relevant measure to use in analysing the demand for health microinsurance products in developing contexts.

Appendix 1. Survey methodology: Insurance Literacy Module

GRAIM acts as a regional coordinator and the intermediary for most MHOs in negotiating conventions with health providers. Our partnership meant we could draw on its knowledge to design and deliver our educational modules. GRAIM has been running a training program on demand for several years for small communities eager to set up their own MHO and was thus in a position to run the information module. It was thus slightly modified in order to be presented to randomly selected households. The same individual was in charge of running all the sessions during which interactions with the participants were encouraged.

Since the city covers a sizeable area, we reimbursed transportation costs for all individuals who had attended in order to minimize disincentives to attend. We gave 1000 CFA to every individual, which in Thies, is the exact return fare for a taxi journey from any corner of the city to where the meetings were held. Households were informed that transportation costs would be covered at the time of the invitation. We made sure that the individuals who got their transportation reimbursed did actually pay for transport. We have thus no evidence that opportunism can explain participation in the session (that is individuals attending just to obtain a little additional income).

[1] Health care in Thiès is organised according to a tiered system consisting of health huts (staffed by community health workers), health posts (staffed by nurses and certified midwives), and health centres (staffed by medical doctors, nurses, and certified midwives). The health district of Thiès has one regional public hospital and one privately run mission hospital (St-Jean de Dieu). Data for this region shows that the ratio of inhabitants to health centres is seven times greater than WHO standards, while the ratio of inhabitants to health posts is in line with international norms (ANSD, 2008).
[2] For example, An Fagaru, a popular MHO in Thies, proposes the following coverage: 80 per cent of consultation at health posts, 50 per cent of expenses at health centre and hospitals (regional hospital and Saint Jean de Dieu hospital). The monthly per capita premium is 200 FCFA.
[3] Starting bids are randomly drawn among 100, 150, 200, 250, 300 FCFA.
[4] The simpler way of eliciting WTP with CV method is an open question asking the maximum amount one is willing to spend for a real (hypothetical) product.
[5] The reason why one may overestimate the willingness to pay in a hypothetical context, compared to a real one, lies in the fact that proposing large WTP increases the perceived likelihood of provision, irrespectively of one's preferences towards this good.

[6] We could not incorporate the opportunity cost of labour as the information on missed working-days due to illness was not consistent across our sample.

[7] We also use alternative ways of expressing wealth: 1) the DHS Wealth Index (Filmer and Pritchett, 2001; Rutstein and Johnson, 2004) which is a synthetic index obtained by the first principal component derived from the principal component analysis on the answers on housing and dwellings; 2) quintiles of the DHS Wealth Index. Our results hold when we use either one of these measures.

[8] These results are robust to different definitions of time and risk preferences. For risk preferences we consider the sub samples of risk averse agents (always opting for the certain amount) for small and large stakes, for gains and losses. For time preferences we employ different time horizons and stakes, namely we elicit two days, two weeks, one month and six months discount factors for small (1000 CFA) and large (10000 CFA) stakes and we construct a dummy taking a value of one when the individual belonged to the more patient half of our sample for each time horizon. We use these different combinations of time and risk variables. Results are not shown, but are available upon request.

[9] One may argue that enumerators' ability in conducting the survey and personal characteristics may drive part of such results. However, when we include enumerators fixed effects, the previous results do not change. Moreover, the dummies identifying each enumerator are jointly not significant.

[10] Any arrears on premiums can lead to exclusion for that member from coverage by the MHO. Whilst the rules are strict, the administrators of some MHOs have admitted allowing for a degree of flexibility.

[11] Tests for random assignments of treatments across samples are provided in Bonan et al. (2012). Randomization with respect to voucher assignment appears satisfactory. Some significant differences between the invited and not invited samples are discussed in this paper.

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Table 1. Summary Statistics

	Mean	s.d.
Head is male	0.74	0.44
Head attended primary school	0.19	0.39
Head attended secondary school or more	0.45	0.50
Household size	6.77	3.25
Number of children younger than 5 years	0.64	0.96
Already insured	0.25	0.43
Knowledge of insurance principle	1.99	2.41
Head is public employed	0.19	0.39
Head is self employed	0.42	0.49
Saving device	0.55	0.50
Durables	6.53	3.20
Household income, in 1000 FCFA	22.65	19.67
Head income, in 1000 FCFA	12.94	10.33
Household total expenditure on health, in 1000 FCFA (last 12 months)	10.18	10.33
Reported sickness (last 12 months)	0.67	0.47
Strongly risk averse	0.57	0.50
Patient	0.41	0.49
Final WTP (in FCFA)	304.4	299.3
N	324	

Table 2. Random assignment of starting bids, by household characteristics

Starting bid (in FCFA)	100		150		200		250		300		
VARIABLES	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	F-test
Gender (Male=1)	0.69	0.46	0.69	0.47	0.75	0.44	0.84	0.37	0.75	0.44	1.10
Head attended primary school	0.14	0.34	0.29	0.46	0.13	0.34	0.18	0.39	0.22	0.42	1.90
Head attended secondary school or more	0.47	0.50	0.29	0.46	0.47	0.50	0.56	0.50	0.45	0.50	2.24*
Already insured	0.15	0.36	0.26	0.44	0.29	0.46	0.36	0.49	0.20	0.40	2.50**
Knowledge of insurance principle	1.93	2.39	2.24	2.44	1.91	2.41	2.22	2.50	1.69	2.37	0.53
Household size	6.65	3.42	6.64	2.97	6.73	3.52	6.71	3.42	7.18	2.74	0.28
number of children younger than 5 years	0.69	1.08	0.64	1.02	0.60	0.81	0.58	0.96	0.65	0.91	0.14
Head is public Employed	0.14	0.34	0.14	0.35	0.21	0.41	0.25	0.44	0.24	0.43	1.26
Head is self employed	0.49	0.50	0.43	0.50	0.37	0.49	0.42	0.50	0.36	0.49	0.80
Saving device	0.53	0.50	0.50	0.50	0.55	0.50	0.65	0.48	0.55	0.50	0.78
Household total revenues, in 10000 FCFA	16.52	11.56	23.73	22.86	22.12	21.85	25.56	22.94	22.47	17.98	2.15*
Durables	5.79	2.91	6.55	3.13	6.55	3.26	7.53	3.72	6.58	2.85	2.47**
DHS Wealth Index	-0.47	2.02	0.01	2.06	0.09	2.32	0.56	2.92	-0.09	2.05	1.76
Reported sickness (last 12 months)	0.70	0.46	0.50	0.50	0.67	0.47	0.65	0.48	0.73	0.45	2.10*
Household total expenditure on health, in 10000 FCFA (last 12 months)	12.37	22.37	8.69	21.51	12.58	28.70	6.17	8.43	9.27	19.16	0.99
Strongly risk averse	0.54	0.50	0.62	0.49	0.64	0.48	0.55	0.50	0.45	0.50	1.36
Impatient	0.33	0.47	0.43	0.50	0.48	0.50	0.45	0.50	0.38	0.49	1.05
N	81		58		75		55		55		
Out of 324 observations (%)	(25)		(17.9)		(23.2)		(17)		(17)		

Table 3. WTP by initial starting bid

Starting bid (in FCFA)	100	150	200	250	300	Average
Said "yes" to the first bid (%)	91.35	79.31	73.33	54.54	38.18	67.34
Number of bids (%)						
Two bids	19.75	25.86	33.33	27.27	12.73	24.07
Three bids	16.05	32.76	22.67	20.00	27.27	23.15
Four bids	19.75	8.62	9.33	12.73	12.73	12.96
Five bids	4.94	12.07	5.33	7.27	20.00	9.26
Six	24.69	1.72	2.67	10.91	16.36	11.73
More than six	14.81	18.97	26.67	21.82	10.91	18.83
Total	100	100	100	100	100	100
Final average elicited WTP (FCFA)	241.97	352.58	324.66	323.63	299.09	304.4
Distribution per final bid:		# of obs (% wrt to N)				Total
0	3 (3.7)	2 (3.5)	4 (5.3)	3 (5.5)	-	12 (3.7)
50	4 (4.9)	1 (1.7)	1 (1.3)	4 (7.3)	3 (5.5)	13 (4)
100	12 (14.8)	9 (15.5)	10 (13.3)	7 (12.7)	11 (20)	49 (15.1)
150	10 (12.3)	6 (10.3)	5 (6.7)	4 (7.3)	5 (9.1)	30 (9.3)
200	16 (19.8)	18 (31)	20 (26.7)	7 (12.7)	12 (21.8)	73 (22.5)
250	4 (4.9)	3 (5.2)	7 (9.3)	8 (14.6)	3 (5.5)	25 (7.7)
300	20 (24.7)	7 (12.1)	6 (8)	7 (12.7)	4 (7.3)	44 (13.6)
350	2 (2.5)	1 (1.7)	-	-	3 (5.5)	6 (1.9)
400	1 (1.2)	-	2 (2.7)	-	2 (3.6)	5 (1.5)
450	-	-	-	3 (5.5)	-	3 (0.9)
500	7 (8.6)	3 (5.2)	12 (16)	4 (7.3)	6 (10.9)	32 (9.9)
550	-	-	-	1 (1.8)	1 (1.8)	2 (0.06)
900	1 (1.2)	2 (3.5)	3 (4)	1 (1.8)	3 (5.5)	10 (3.1)
1000	1 (1.2)	4 (6.9)	4 (5.3)	6 (10.9)	2 (3.6)	17 (5.2)
1500	-	1 (1.7)	1 (1.3)	-	-	2 (0.06)
3000	-	1 (1.7)	-	-	-	1 (0.03)
N	81	58	75	55	55	324

Number of observations = 324

Table 4. OLS Estimates of WTP (in levels), under different models

	(1) WTP	(2) WTP (Shift)	(3) WTP (Anchoring)	(4) WTP (Shift and anchoring)
Starting bid	0.06	0.06	-0.45**	0.68***
	(0.204)	(0.198)	(0.200)	(0.252)
D		150.00***		295.77***
		(22.421)		(74.233)
Starting bid * D			0.63***	-0.77**
			(0.114)	(0.369)
Gender (Male=1)	15.77	22.94	19.89	24.88
	(26.804)	(26.282)	(26.350)	(26.320)
Head attended primary school	31.99	32.07	31.56	32.67
	(40.667)	(39.367)	(39.849)	(39.191)
Head attended secondary school or more	-20.14	-18.95	-21.71	-15.88
	(37.269)	(36.549)	(36.669)	(36.971)
Household size	-7.87*	-6.85	-7.70*	-6.06
	(4.378)	(4.230)	(4.279)	(4.205)
Already insured	35.31	17.93	17.96	22.22
	(52.798)	(51.433)	(52.037)	(52.204)
Knowledge of insurance principle	7.23	6.88	6.48	7.45
	(6.773)	(6.321)	(6.422)	(6.365)
Head is public Employed	1.01	-7.88	-8.89	-4.43
	(66.584)	(65.567)	(65.851)	(65.063)
Head is self employed	8.89	-2.03	-2.24	0.95
	(35.573)	(35.269)	(35.598)	(35.170)
Saving device	38.15	38.02	39.72	35.98
	(38.943)	(37.582)	(38.004)	(37.608)
Impatient	-2.07	12.86	11.51	10.79
	(34.063)	(33.365)	(33.729)	(33.618)
number of children younger than 5 years	21.34	22.38*	25.45*	18.36
	(13.807)	(13.174)	(13.234)	(13.600)
Reported sickness (last 12 months)	-31.87	-30.61	-30.24	-31.38
	(28.675)	(27.874)	(28.016)	(27.938)
Strongly risk averse	65.00**	72.00**	71.71**	70.60**
	(29.217)	(28.613)	(28.801)	(28.593)
2nd household income quintile	72.94**	48.83	57.85*	43.83
	(30.230)	(29.883)	(30.037)	(29.888)
3rd household income quintile	60.40	27.15	35.60	25.13
	(40.813)	(40.119)	(40.391)	(39.984)
4th household income quintile	73.83	50.32	64.68	38.65
	(46.074)	(43.929)	(44.377)	(45.046)
5th household income quintile	165.17**	119.96*	132.48**	115.94*
	(65.296)	(64.317)	(65.407)	(63.464)
Durables	20.71***	22.22***	22.21***	21.85***
	(7.354)	(6.963)	(7.051)	(7.029)
Constant	52.89	-58.95	59.83	-176.11**
	(70.187)	(70.533)	(68.303)	(71.587)
Observations	324	324	324	324
R-squared	0.196	0.238	0.226	0.243
F-statistic	4.331***	5.697***	4.890***	6.008***
predicted median WTP	293.6	304.9	300.8	306.8

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 5. Comparison of WTP across household total income, head income and wealth quintiles

Household total income			Head income			Durables		
Quintile (n)	Mean WTP	se	Quintile (n)	Mean WTP	se	Quintile (n)	Mean WTP	se
1 (n=72)	172.92	(13.91)	1 (n=72)	209.72	(16.30)	1 (n=91)	234.62	(20.89)
2 (n=68)	272.06	(26.60)	2 (n=78)	254.49	(27.88)	2 (n=49)	260.20	(27.15)
3 (n=58)	279.31	(31.39)	3 (n=55)	256.36	(23.67)	3 (n=86)	266.86	(25.51)
4 (n=62)	338.71	(32.71)	4 (n=56)	334.82	(36.54)	4 (n=45)	300.00	(32.59)
5 (n=64)	476.56	(58.46)	5 (n=63)	489.68	(59.08)	5 (n=53)	530.19	(68.85)
F-test	10.34***		F-test	9.84***		F-test	10.48***	

Table 6. Comparison of WTP across risk preferences

Strongly risk averse	Mean WTP	se
0 (n=141)	253.90	(16.50)
1 (n=183)	343.44	(26.19)
F-test	7.26***	

Table 7. The role of WTP in predicting effective purchase

	(1)	(2)	(3)	(4)
Dependent variable = 1 if household subscribe to an MHO, = 0 otherwise.	Take-up (non-members of MHO)			
WTP, in 1000 FCFA	0.15*	0.16*	0.19**	0.20**
	(0.083)	(0.083)	(0.092)	(0.091)
Voucher	0.36***	0.36***	0.35***	0.35***
	(0.038)	(0.038)	(0.038)	(0.038)
Invitation to insurance	-0.07	-0.07	-0.08	-0.08
literacy module	(0.050)	(0.050)	(0.050)	(0.050)
Household controls	Yes	Yes	Yes	Yes
Household income quintiles	Yes	Yes	No	No
Household income in FCFA	No	No	Yes	Yes
Durables	Yes	No	Yes	Yes
DHS wealth index	No	Yes	No	No
Neighbourhood F.E.	Yes	Yes	Yes	Yes
Observations	324	324	324	324
R-squared	0.242	0.241	0.211	0.285

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

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