Demand for Health Insurance:
A Study on the Feasibility of Health Insurance Schemes for Community Based Groups in Addis Ababa City

Israel Fekade Zewde[1]

Abstract

This study analyzes households' willingness to pay (WTP) for a new health insurance scheme. The data was collected from a random sample of 210 households from three community-based organizations, locally known as iddirs. These iddirs were purposively selected from areas that are believed to constitute largely of the penurious and also informally employed groups of the society in the capital Addis Ababa. The study employs a contingent valuation procedure to elicit data on households' WTP. Both descriptive statistics and econometric estimation techniques are applied to analyze the data. According to the descriptive analyses about 98% of the sample households are willing to pay a certain amount of money to the proposed health insurance scheme. These households on average are willing to pay a premium amounting to 11.56 birr per month to the scheme. However, the likelihood that households are willing to pay and the amount they will pay shows significant variation among the sample households. In this respect, Tobit regression analysis indicated that household income, household size, education, health status and formal employment, all have a positive and significant effect on a household's WTP. The paper suggests the introduction of health insurance by the Ethiopian government and its provision to the urban poor so as to meet their demand for health insurance.

---
[1] Email: israelfekade@gmail.com

1.   Introduction

Ethiopia has one of the worst health problems in the world (Asfaw & Braun, 2005).The outpatient health care utilization rate is estimated to be 0.25 per person per year (Ethiopian Federal Ministry of Health [FMOH], 2013). The low utilization of health care services is determined by both demand-side and supply-side factors. On the demand side, high incidence of poverty, low levels of education, culture and religion are the main constraining factors of health care utilization. In fact, health care use is highly dependent on one's ability to pay and to access health insurance services. The access by the population is presently very low. As pointed out by FMOH (2008), the health financing practice in the country demands that part of the cost be covered through out-of-pocket user fees. This implies that the poor, who cannot afford to pay health care costs, are less likely to access needed health services to improve their health. On the supply side, the delivery of health care services in the country is restrained by limited resources. The national per capita health expenditure for Ethiopia is significantly low (16.1 USD in 2007/08) when compared to the US$44 per capita that is recommended by the World Health Organization for developing countries (FMOH, 2010 a; World Health Organization [WHO], 2010). This implies the need to add additional health resources.

In this respect, the Government of Ethiopia (GoE) has recently formulated a health insurance program to improve the functionality and performance of the health sector financing system in the country and ultimately improve the health status of the poor. In fact, several case studies from rural Ethiopia (Mariam & Brenzel, 1998; Mariam, 2002; Asfaw & Braun, 2005) indicate that there is high demand from rural households for health insurance services. In 2011 the GoE piloted community-based health insurance program in 13 rural districts located in Oromia, Amhara, SNNPR, and Tigray regions of the country and income is currently being generated from the pilot woredas. More recently, the GoE has also set a strategy to design and implement Social Health Insurance (FMOH, 2012b).

However, there is a dearth of knowledge about health insurance demand by the poor in urban areas of the country. Therefore, this study investigates households' health insurance demand using data collected from low income earning groups of the society in the capital city Addis Ababa. From the results, the amount that, these low income earning groups of the society are willing to pay shows that Community Based Health Insurance schemes *(*CBHIs) can help generate sufficient amount of resource that can finance the deficit of the health sector of the country without evicting the poor and those informally employed section of the population from the health care market.

The paper is structured as follows. Section 2 provides the related literature review followed by section 3 where the methodology is discussed. Results of the descriptive and econometric results are reported in section 4 while conclusion is given in section 5.

2. Literature Review

In the absence of real world experience, economists gauge the WTP for health insurance by means of the contingent valuation method (CVM). The number of studies in this area is rapidly growing and they provide a consistent picture. A study conducted in India by Dror et al. (2006), using a CVM found income to be positively correlated with WTP but negatively correlated when WTP is expressed as percentage of income. Another study by Binam et al. (2004) on 471 rural households in the central region of Cameroon using an ordered probit model found that the level of revenue, gender, habit of frequenting the health center, and the associative experience of the person (being a member to a community club or association, which corresponds to the *iddir* variable of this study) as well as household health status, availability of basic drugs, and regular attendance of the physician have a significant impact on WTP value.

Although CBHIs are expected to develop more in cities with higher potential, studies made in Ethiopia mainly focus on the rural areas and

regional towns of Ethiopia. The surveys found that there is a higher willingness to pay than expected. For instance a study conducted in Oromiya region, and towns in SNNPR, by Haile Mariam and Brenzel (1998) revealed that 86.4% of households and 74.8% of exit interview patients were willing to join an *iddir* based health insurance scheme. In order to assess both the possible roles *iddirs* might play in providing insurance for health financing and the factors that determine willingness to join such a scheme, Damen (2002) conducted a study in 40 villages of the Amhara and Oromia regions. Results from a resulting logistic regression indicated that higher income was a determinant factor while education was not associated with willingness to join. Again another study by Asfaw and Brawn (2005) assessing the prospect of CBHIs in the rural areas of Ethiopia (Amhara, Oromiya, SNNP and Dire Dawa) selected 550 households and applied a bivariate probit model. It found being male head, larger family size, membership to iddirs and log income affect WTP positively. However, as it is demonstrated by Hanemann et al. (1984), estimating *ad hoc* expressions, such as replacing explanatory variables by their logarithms may result in a utility function which will not generate the estimated model. The calculation of mean WTP from such complicated models is also difficult in cases where the data used cannot measure the continuous risk attitude of the respondent. Irrespective of the growing consensus about the role that community based health insurance schemes can or should play in alleviating the financial crisis of the health sector in the country and in benefitting the poor, these studies did not focus on the low income earning groups which are most vulnerable to risky situations and inefficient health care services.

3.   Methodology

3.1   *Conceptual framework*

Let us consider an individual who maximizes his/her expected utility. The individual's health status is assumed to be given. Similarly, income net of any taxes is taken to be fixed. The problem of utility maximization for the individual can therefore be written as follows:

$$Max\ U(x,\ z)$$
$$S.t.\ y - Px = 0 \qquad\qquad (1)$$

where x is consumption good and z is the health status, y is the fixed income; p is a price vector of order 1Xn. Setting the first order conditions for the utility maximization problem in (1) and solving these conditions for x in terms of prices, income and health yields demand functions for goods:

$$x = x(p,\ y,\ z) \qquad\qquad (2)$$

Substituting (2) into (1) yields the indirect utility function:

$$V = V(p,\ y,\ z) = U[x\ (p,\ y,\ z)\ z] \qquad\qquad (3)$$

Inorder to illustrate the meaning of risk attitudes it is useful to consider an individual who faces an uncertain income. There are just two states of the world: the individuals' income is either high or low. Let μ_1 denote the subjective probability that the high income state occurs. The probability that the low income state occurs is therefore $\mu_2 = 1 - \mu_1$. The individual is assumed to be equipped with an indirect utility function: $V(p,\ y_i,\ z)$ for each possible state of the world where $i = 1, 2$ and in this order, y_1 is a high income and y_2 is a low income state. The expected utility of the individual is:

$$E(V) = {}_i\mu_i V(p,\ y_i,\ z) \qquad\qquad (4)$$

Where, E is the expectation operator. Expected utility is thus a weighted average of the utility attained in the different states of the world with the probabilities used as the weights. Taking partial derivatives of the utility function $V(p,\ y_i,\ z)$ with respect to income yields:

$$V(.)/\ y = V_y \qquad\qquad (5)$$

$${}^2V(.)/\ {}^2y = V_{yy} \qquad\qquad (6)$$

An individual is said to be risk-averse with respect to income risk if $V_{yy} < 0$ i.e. utility is depicted as an increasing function of income while all prices and health status are held constant. Assuming that $\mu_1 = \mu_2 = 0.5$ such an individual clearly prefers to get the expected income $y_E = 0.5(y_1 + y_2)$ rather than the 'gamble' since:

$$V(p, y_E, z) > E(V) = {}_i\mu_i V(p, y_i, z) \qquad\qquad (7)$$

Such behavior of preferring the expected value of the gamble rather than the gamble is called risk aversion and the utility function is strictly concave in income. Conversely, an individual is a risk-taker if $V_{yy} > 0$. In this case the individual may prefer a risky prospect to a certain one even if the former gives a lower expected income. The risk-taker has a utility function which is strictly convex in income while the risk neutral individual ($V_{yy} = 0$) has a utility function which is linear in income. The cost of risk bearing is the amount of money a risk-averse individual is willing to forego in order to turn a risky prospect into a certain one.

The fundamental uncertainty driving the demand for health insurance arises from the desultory and precarious nature of health status. The response of a rational consumer to illness is to seek appropriate curative medical care. This entails consumer financial risk, which can be protected if the consumer has health insurance coverage (Phelps, 2002).In any insurance scheme, moral hazard and adverse selection are perennial problems and are the main challenges influencing the sustainability of a health insurance scheme. Moral hazard arises when there is a tendency to over-utilize health services as the policy-holder has already pre-paid for them (Besley, 1995). On the other hand, adverse selection arises when individuals with relatively higher risk are more likely to be enrolled into the scheme. These behavioral problems arise because of information asymmetry between the insurance policy-holder and the insurance provider (ibid).

3.2   Empirical approach
3.2.1   Constructing the CVM protocol

Contingent valuation method (CVM) is a technique for estimation of values of goods and services for which current markets do not exist or are functioning imperfectly. In this respect, CVM is widely used indifferent disciplines including environmental and resource economics, health economics, marketing, and agricultural economics. In CVM, needs to (1) describe the good or service which is of interest to the valuation exercise, (2) elucidate a hypothetical market through which the good or service can be bought and (3) ask the respondent to state the maximum amounts/he would be willing to pay for the good or service (Bärnighausen *et al*., 2007).A variety of different elicitation methods to measure WTP by CVM surveys exists, these are: open-ended questions, payment cards, bidding games, and the discrete choice approach: Take It Or Leave It (TIOL), each having their own strengths and weaknesses (Heinzen and Bridges, 2008). The central problem in a CVM study is to make the scenario sufficiently understandable, plausible, and meaningful to respondents (Asfaw and Braun, 2005). Johansson (1995) discusses the most well-known problems and pitfalls in using the CVM and many of the principal biases that may appear in a CVM. They are as follows:

The first is Free rider problem (strategic bias):If consumers have to pay according to their stated WTP, either they may have incentive to try to conceal their true WTP or may have an incentive to overstate their WTP in order to qualify for a lower price or secure a large supply of the (public) good.

The second bias i.e. incentives to misrepresented responses may occur if the respondent reacts positively or negatively to the fact that a particular institution is sponsoring the study. The respondent may also avoid reporting his/her true WTP in order to please the interviewer. In this study, following Johansson (1995), a question which asks what expenses the respondents' are

planning to reduce in order to be able to pay the amount of money they specified is also included. This is so that respondents will take a caution not to overstate their willingness to pay.

The third type of bias, implied value cues (Starting bid bias), is the case when a respondent may try to use some pieces of information provided by the researcher as cues to the projects correct value. This can lead to the occurrence of a starting bid bias but, this can also be controlled if care is taken at the time of the interview to let the respondents give their own maximum WTP.

3.2.2   Econometric Model Specification

In this study a single-bound, close-ended, discrete choice "yes" or "no" questions followed by open ended questions were presented to the respondents to elicit households 'WTP for the proposed health insurance scheme. Both the single bound and the open ended survey responses were analyzed by specifying the appropriate econometric models for the Probit and the Tobit model respectively.

The Tobit model

The survey responses of 197 respondents out of the 210 sample units are estimated using the Tobit model. From the excluded thirteen, six of them were invalid responses and the rest seven were incomplete responses. The willingness to pay amount is estimated under the proposed CBHIs using the Tobit model. The formulation of the model is as follows:

$$MWTP^* = \ 'X_i + \ _I \ \text{where} \ \ _i \sim N \,(0, \ \ 2) \qquad\qquad \textbf{(8)}$$

Where MWTP* is a latent variable which is observed when MWTP (the maximum willingness to pay) under the proposed scheme is greater than zero and unobserved if it is less than or equal to zero. X_i is a vector of

explanatory variables and ' is a vector of coefficients. The disturbance term $_i$ is normally distributed with mean 0 and variance ^{2}.

Probit Model Specification

Insurance works like a 'yes/no' question (Johansson, 1995). The 'closed ended' or 'discrete' (TIOL) approach, confronts each respondent with a single bid which s/he has to accept or reject. The respondent either agrees or declines to pay the specified insurance premium. We use this 'yes/no' data to arrive at a WTP measure for the proposed health insurance scheme. The typical formulation of the underlying choice problem as first presented by Hanemann *et al.*(1984) which was drawn on McFadden's (1973) random utility model ignores risk faced by the respondent. A slightly modified version incorporating risk is presented here following Johansson (1995). The indirect utility function of the respondent is assumed to be of the form:

$$V=V(\mu,y,z,e) \tag{9}$$

Where μ is the exogenous survival probability, y is income and z is the health state of the respondent and e is a random variable whose expected value is equal to zero. This equation is the same as the one specified in equation 3. The particular assumption behind this formulation is that the respondent knows his or her utility function with certainty, but from the point of view of the investigator it contains some unobservable elements. Say the respondent is offered a measure which changes the survival probability from μ_0 to μ_1 in exchange for a payment of 'A' amount of birr (the premium).

$V_i=V_i(\mu_0,y_i,z_i,e_{i0})$,the ith respondent's indirect utility before the provision of insurance,

$V_i =V_i(\mu_1,y_i-A_i,z_i,e_{i1})$the ith respondent's indirect utility after the provision of insurance.

Where e_{i0} and e_{i1} are random components of the indirect utility of individual *i* before and after the provision of a health insurance respectively.

The response probabilities related to the underlying WTP distribution are:

$$Pr(WTP = 1) = pr(WTP^* \quad A) = pr(\text{'}X_i + e \quad A)$$
$$Pr(WTP = 0) = pr(WTP^* < A) \qquad \qquad \textbf{(10)}$$

Where Pr (WTP = 1) is the probability of saying yes to the initial bid and Pr(WTP = 0) is the probability of saying no to the initial bid. Again here ' is the vector of coefficients and X_i is a vector of explanatory variables.

Working Hypotheses

The choice of explanatory variables was guided by economic theory, empirical literature and field observation. Economic theory postulates that demand for health insurance is a function of the price of the premium, income, risk aversion, perceived risk of injury/illness, and extent of perceived loss caused by illness/injury of the person (Santerre & Neun, 1996). In addition to the socio-demographic factors that affect one's attitude towards risk, predisposition factors generally arise from the socio-cultural environment of the respondent. This is concerned with the local mutual help tradition (associative experience) (Binam et al., 2004). Using insurance theory, assuming a decreasing marginal utility of income, it follows that the higher the degree of risk aversion, the higher will people tend to pay when all else is equal. This is also the case for the perceived extent of the loss incurred by illness or injury. Some of the factors that are expected to determine the WTP amount, the effect on the degree of risk aversion and the perceived extent of the loss incurred by illness with the other predisposition factors are explained below.

Monthly income of the household: it is hypothesized that, the higher the income of a household, the higher the households' WTP for the proposed health insurance scheme. While results of interval regression from randomly

selected households in Vietnam by Lofgren et al.(2008) showed a positive and significant effect of income on WTP for a health insurance, only nominal income was positively correlated with WTP in the case of Dror et al.(2006). WTP decreased as a percentage of income in the latter case. Similarly, Asfaw et al.(2009) using the Double Bounded Contingent Valuation method (DBCV) found income being statistically insignificant although those in the richest quintile were willing to pay more than double as compared to those in the poorest quintile.

Sex of the respondent: Females are regarded to be more vulnerable to diseases than men because of burdens such as child bearing and other needs for healthcare. Therefore, female household heads are expected to pay more than their male counterparts.

Age of the respondent: Age is one of the variables that will affect risk aversion. It is assumed that the degree of risk aversion increases with age, as does the perceived extent of the loss. Thus, the older the respondent is, the higher the perceived risk will be for him/her, causing an expected higher WTP for older respondents.

Education of the respondent: education is the other variable that will affect risk aversion. The more educated a person is the more value that they will assign for their and their family's health. The education dummy is categorized into four parts. The first category represents those who can only read and write or are illiterate. The second represents those who had a primary education, which is grade1- grade 8.Those with education of grade 9 to grade 12 are categorized under secondary education and above that are categorized under tertiary education. Donga et al.(2003) analyzed the feasibility of CBHI in the rural areas of Burkina faso and found age, sex and education have a positive and significant effect on WTP. While education also has a significant and positive effect in many studies, including Lofgren et al., 2008,Asfaw et al.,2009, and Onwujekwe *et al*., 2009the effect of age

differs as it is the younger who are willing to pay more (Lofgren et al., 2008; Asfaw et al.,2009).

Respondent's status in the household: the decision of the household's WTP is affected by the one who is regarded as the household head. The household head is the breadwinner in the family and has a greater decision making power. Thus household heads are expected to be more willing to pay than the other members. Interviewers restricted themselves to interviewing the head of the household if this person was at home at the time of the interview and the spouse if he/she was not.

Household size: The proposed scheme is the one which covers the health care cost of each and every member in the household. Thus, households with a larger size are expected to be willing to pay more for the proposed scheme since the scheme will insure more members in the household.

Case of chronic diseases in the household: The presence of one or more family members in the household with chronic diseases is assumed to increase the perceived extent of the loss, as well as the perceived risk of sickness in the household. This should increase the WTP.

Health care need within the last one year: Utilization of health care within the last year can be an indicator of greater awareness of what might happen in case of illness/injury. A study from Cameron by Binam et al.(2004) found health status a determining factor for WTP.

Marital status of respondent: People are likely to be more risk averters by the time they start a family than they were single and thus are expected to be more willing to pay for the proposed scheme than unmarried people.

Occupation of the head: Informally employed heads usually earn a more unstable income than formally employed groups, thus the higher the

probability that they will be reluctant to be involved in schemes that require fixed and continuous payments.

Any type of insurance coverage in the household: It is expected that household heads with any insurance coverage will have a better awareness about the benefits of the scheme and thus will be willing to pay higher amounts. Dror et al., 2006; Onwujekwe et al., 2009 found higher WTP among insured while those with a prior experience of out of pocket expenditure were willing to pay less.

Number of *iddirs*: many respondents in the pre survey gave their membership for more than one *iddir* as a reason for their reluctance in accepting the proposed bid since they would be obliged to additional payments. Consequently, the variable indicating membership to more than one *iddir* is included in the model with the expectation of decreasing WTP. In this regard, Lofgren eta al. (2008) point out the importance of social determinants in the form of social capital as they significantly affect households' preferences for health insurance. Binam et al. (2004) found the variable representing the associative experience (having membership to a community club or association) positively related to the WTP amount.

Starting bid: the starting bid is the monthly fee proposed to the respondents for them to accept it as a premium price. This variable is included in the regression to check if a starting bid bias exists. The setting of starting bids was revised for the main survey after a pilot survey which used the market premium prices that prevailed at the time. Later, the bids were revised according to the WTP of the majority of the households of the pilot survey who regarded the market premiums unaffordable. Consequently the starting bids used in the main survey are 10 birr, 15 birr and 20 birr and these prices were distributed equally and randomly among respondents.

Sampling procedure and data

This study was conducted in Addis Ababa. The surveyed households were members of indigenous funeral associations found in Ethiopia which are known as *iddirs*. Although these are traditional associations which use indigenous voluntary assurance schemes to cope with financial shocks associated to funerals, their functioning resembles that of insurance schemes (Dercon, 2004).Three *iddirs* were purposively chosen from Arada and Kirkos sub districts of Addis Ababa. These districts are known for constituting the low income and informally employed groups of the society. In particular, the sampled *iddirs* included '*Hibrete Selam Yemeradaja iddir*' from *Kirkos* sub-district; '*Adawa Godana Afewerk Menged Yemot Meredaja iddir*' from *Arada* sub-district and '*Wereda 14 Kebele 07 iddir*' from *Arada* sub-district. At the time of field survey of this study *Hibrete Selam Yemeradaja iddir, Adawa Godana Afewerk Menged Yemot Meredaja iddir and Wereda 14 Kebele 07 iddir had* 204, 99, and 400 members, respectively. The members in the three *iddirs* add up to 703 members.

In each *iddir the* up-to-date list of the total 703 members were obtained from *iddir* leaders. Using a systematic random sampling procedure, 30% (210) respondents were selected out of the total population. The first household was randomly picked and then each nth household was selected from the membership list of each iddir. Allocating the 30% proportionately for each sampling frame of the three *iddirs* resulted in 61, 30 and 119 households to be selected from the *iddirs* that constituted 204, 99 and 400 members respectively. The empirical data used for this paper were thus obtained from these 201households who were chosen using a systematic random sampling procedure, with sample sizes proportional to the membership size of the *iddirs*.

The primary data collection was conducted in 2010 using a structured household questionnaire and face-to-face personal interviews with heads of sampled households or their spouses. Four enumerators and two supervisors

including the researcher participated in the data collection process. The employed enumerators and supervisor were given the appropriate training for the survey. The survey instrument was pre-tested to improve its clarity and content prior to the main survey. Adjustments to the bid prices and restructuring of the questionnaire were done accordingly.

The household questionnaire was structured into three main sections. The first section was devoted to eliciting data on respondents and their households' socioeconomic and demographic characteristics. The second section was designed for recording data on health status and health care seeking behavior of respondents and their households. The third section described a hypothetical health insurance scheme for which respondents were asked whether they would be willing to pay premiums for the scheme. The proposed amount of annual coverage of health expenses (1500 birr)in the following hypothetical scenario was the minimum coverage available by the side of the insurance companies.

The CBHIs hypothetical scenario:

Let us assume that there is an insurance company which can cover the health care expenses of each family member in a household whenever one or more family members are faced with sickness. The annual insurance coverage of health care expense of a member amounts up to 1,500 birr. And the provision of such a scheme would require a monthly fee (premium) that would be contributed by the household.

Following this, the respondent's willingness to join the scheme, willingness to accept the proposed bid and their maximum willingness to pay were elicited.

4.   Results and Discussion

4.1.   *Descriptive Analysis of the Survey Data*

Out of the total 210 sampled households who were asked whether they would be willing to participate in the study, 197 of them consented to participate. The numbers of questionnaires that were incomplete or unacceptable for data analysis were 13.Seven of these were classified as incomplete responses, and the remaining six were protest zeros due mostly to respondents giving up in the middle of the survey. This left us with a response rate of 93.8%.

The respondents from the three *iddirs* have a total of 855 household members. Table 1 presents descriptive characteristics of the sample households. On average, sampled households have 4.3 household members (minimum=1, maximum=12). Of the total respondents, 130 (66 %) were females and nearly 61% were household heads. The mean age of respondents was 57 years (minimum= 28 years; maximum=90).

Among the surveyed households, about 56.8% were male headed and the remaining (43.2%) were female headed. The sample households have limited access to formal employment - only 23.85 % of the heads of households in the sample have formal employment whereas the remaining (76.14%) are workers in the informal sector.

About 98 % of the respondents reported that they would be willing to pay some amount of money to the proposed health insurance scheme. Those unwilling to join the scheme preferred to face financial risks that may arise due to the precarious nature of health, than to be insured. More specifically, households who responded affirmatively to the CVM question were willing to pay an average of about 11.56 Ethiopian birr (minimum=3birr; maximum=40birr) per month to the scheme.

Table 1: Socio-Economic, Demographic Characteristics and Health Status of Households.

Socio - economic status	Mean/Percent	Std. dev
House hold size	4.34	0.17
Age	56.72	0.83
Household head (% male)	56.80	0.03
Respondents sex (% female)	65.98	0.03
Respondents status (% head)	60.91	0.03
Primary education	44.67	0.03
Secondary education	21.32	0.03
Tertiary education	13.71	0.02
Occupation (% formal employment)	23.85	0.03
Monthly income (in birr)	634.04	24.5
WTP amount (in birr)	11.59	0.51
Accepted the bid (%)	50.25	0.03
Bid price (in birr)	14.97	0.29
Insurance member is affected by chronic diseases=1)Household head (male = 1)	4.56	0.01
Health status		
A household member needed a health care at least once in last 12 months (%)	61.42	0.08
Chronic disease (% - at least one member is affected by chronic diseases)	57.36	0.03

Source: own survey, 2010

Of the sampled households 61% of them had one or more members who sought and utilized a health care service within the last 12 months prior to the survey and 57% of the respondents reported either one or more family members with chronic diseases. The chronic diseases reported by respondents mainly included heart related problems, diabetes, blood pressure, mental problems and similar illnesses. Regarding the management of health care financing, the majority (66%) of the households asserted that they had borrowed the last two or three times they needed a health care service while 30% of them used their own income. The remaining 4%

claimed they used free health care provision. Unsurprisingly, it was only 9 of the household heads (5%) that had health insurance coverage (either provided by employer companies, due to participation in the Korean War or from a local insurance provider).

4.2.   *Estimation results*

All estimations were carried out using Stata software. Before estimation of the models, the problem of multicollinearity was tested and no variables were highly correlated. To account for problem of heteroskedasticty, standard errors of the parameter estimates are computed based on the Huber-White "Sandwich" estimator. The starting bid was also included as an explanatory variable in the model to check if a starting bid bias exists.

The estimated results of the Tobit and Probit models are presented in Table 2. Results from the Tobit model regression (column 1); show that the household average monthly income approximated by household expenditure has a significant positive impact on how much the household is willing to pay. The provision of such schemes by any insurance companies thus should consider the paymentability of the low income earning households while setting premiums. Education has a significant effect on the understanding of the safety and security that insurance brings into one's life. This is shown as households with better educational status were willing to pay more than those with no or little education and this is indicated by the significance of the secondary and tertiary education dummies. Being the head of the household has also a significant and positive impact on WTP amount. This may be because household heads are more concerned about their families health status as much of the responsibility falls on them when a member of the family gets sick.

WTP is higher for households that have at least one member with a chronic disease and this is a significant positive relation. This might be due to the fact that these households have a greater perception of the extent of the loss whenever a health care service is needed by a member with a chronic

disease. This results in their higher WTP for the proposed CBHIs. This result may indicate the existence of adverse selection in the surveyed area. However, if the risk can be pooled, adverse selection would not be as much of a severe problem. The size of the household is positively and significantly related to willingness to pay amount. The proposed scheme covers the health related expenses of each and every member within a household. So, because larger households will have larger number of members to be covered, they will likely be willing to pay more. The occupation of the head is a significant determinant as those formally employed are willing to pay more. Indeed having unsustainable income was one of the reasons given by respondents for their lower amount of willingness to pay during the survey. The bid variable is positively related with the households' willingness to pay but insignificant at 10%. Thus the bid price is not a major determinant of the household's willingness to pay amount and a starting bid bias is not a problem. This could be due to the caution given at the time of the interview to let the respondents give unbiased answers.

The estimated results of the Probit[2] model from (Table 2) show that income has a strong positive effect on the probability of accepting the bid. Being older also increases the chances of accepting the bid. In addition to this, those households who needed health care within a year prior to the survey by one or more of their members also had a higher probability of accepting the bid. The existence of one additional member in the household and occupation of the household head were also significant factors in affecting acceptance of the bid. Consistent with the theory of demand, the response of households is sensitive to the bid levels as shown by the negative and significant coefficient of the bid.

---

[2]The computed value of the LRI for the Probit model shows that 75.74 percent of the variation in the dependent variable is explained by the variation in the explanatory variables of the model

Table 2: Estimation Results of the Tobit and Probit Models.

Explanatory variables	Tobit model (1)	Probit model (2)
	Coefficient	Marginal effects
Sex	0.2901643(0.7377)	0. 206787(0.13596)
Age	0.00488(0.02995)	0.017720***(0.00633)
id price	4845 0.123594(0.09018)	-0.141429***(0.02866)
Primary education	1.565948(0.99582)	0.019627(0.23097)
Secondary education	2.398193**(1.25143)	0.203554(0.2222)
Tertiary education	3.766015**(1.73353)	0.081891(0.30756)
Married	1.100423(0.729086)	0.309118**(0.16645)
Household head	1.515736**(0.760975)	0.263111*(0.15942)
Income	0.007602***(0.001768)	0.001550***(0.00043)
Health care need	0.7142254(0.795511)	0.342216***(0.14155)
Chronic diseases	1.545296*(0.84813)	0.172848(0.14697)
Any insurance coverage	0.101465(1.32637)	0.251938(0.24113)
Household size	0.594064***(0.18170)	0.0842133***(0.02972)
Occupation	1.851789**(0.82829)	0.489424***(0.125420)
Associative experience	-0.6950974(0.69768)	-0.0650484(0.14797)
Constant	-2.997346	
Number of observations	197	197
	LR chi2$_{(15)}$ = 202.84	LR chi2$_{(15)}$ = 205.76
	Prob> chi2 = 0.0000	Prob> chi2 = 0.0000
	Pseudo R2= 0.1574	

*** Significant at 1%, ** significant at 5%, * significant at 10%.

Figures in bracket are standard errors.

Source: Own survey, 2010

4.3. *Feasibility of the scheme*

One of the ways that poor communities manage health risks, in combination with publicly financed health care services, are community based health insurance schemes. These schemes can bring an equitable and efficient

health care service provision for those who are informally employed and mainly in the low income earning groups of the society. However, the effective introduction and implementation of such schemes cannot be achieved if the current pricing system is going to be employed without considering the paying ability of these low income and informally employed groups of the society.

In Table 3 total WTP amount from the survey is compared with the total amount of revenue that should be collected if the scheme is to be provided based on the average premium prices that prevailed in the insurance market at the time of the survey. While the surveyed households are willing to pay 11.56 birr on average for the hypothetically proposed insurance scheme, the average individual premium price in the market calculated after gathering data from the insurance companies was 18 birr per person. Accordingly, taking the average number of members among the surveyed households (4.3 members) and multiplying it by the individual market premium price set by the insurance companies (18 birr), will give us the average premium price for a household which is 77.4 birr. Thus, these low income earning households are willing to pay only 15% of what is required by the insurance companies.

Table 3: Comparison of Households WTP Amounts to that of Premium Price charged in the Insurance Market

	Premium Price(in birr)
Average WTP from the survey (per household)	11.56
Average premium price in the market (per household)	77.4[*]

Source: Survey data and data from insurance companies, 2010.

This means that the remaining 85% of the cost should be subsidized either by the government or donors if the provision of CBHIs is to be introduced and implemented for these low income earning groups. Tabor (2005) underlines that government, and its development partners, should support the growth of CBHIs by ensuring that there is a satisfactory supply of appropriate health services and by subsidizing start-up costs and the

premium costs of the poor. This can also be done by assisting CBHIs to build technical and managerial competence, by helping to foster development of CBHI networks, and by assisting CBHIs to establish and strengthen links with formal financial institutions and health care providers to better manage covariate shocks and catastrophic health risks. However the actuarial premium price of insurance companies also needs a revision since subsidy by itself cannot provide perpetual support for the scheme.

5.   Conclusion

To assure sufficient coverage and reasonable quality of health service it is necessary to introduce a system that will spread the financial burden arising from higher health service costs. Such a risk sharing system is expected to make health service affordable at the time of sickness, thereby reducing the financial barrier associated with higher user fees. In this regard the provision of community based health insurance for the majority of urban residents in the informal sector as well as the majority of Ethiopians in the rural farming and livestock rearing economy has a manifold benefit. This comes by financing the health sector and raising affordability of the service at the same time diminishing the precarious health care costs. In the meantime, the setting of premium prices should include consideration of the ability and the willingness to pay of households so as to assure the sustainable provision of the scheme. The premium price that prevailed in the insurance market at the time of survey was beyond the ability to pay for the majority of the poor. While many of the surveyed respondents' accede to participate in the proposed CBHIs, income was a significant determinant of WTP. Many of the respondents (78%) lacked conception on how a health insurance scheme functions. Thus public awareness should be adequately enhanced on the functioning of the schemes and also the benefits that can be gained from it so that the service can insure a wider coverage. There is a need to create awareness on the use of insurance to protect against expenditure fluctuations. What is tantamount is the creation of managerial and technical efficiency of

the scheme so as to be able to mitigate potential problems such as adverse selection and moral hazard once it is established.

References

Akalu, T. (2008). "Economic Burden of Health Care at Household Level: Examination of Out of -Pocket Expenditure on Sexual and Reproductive Health Care including HIV/AIDS in Butajira District", MPH thesis, School of Public Health, Addis Ababa University.

Allegri, M. D., Sauerborn, R., Kouyate, B. and Flessa, S. (2009). "Community health insurance in sub-Saharan Africa: What operational difficulties hamper its successful development?" *Tropical Medicine and International Health*, 14: 586- 596.

Asfaw, A., and Braun, J. V. (2005). "Innovations in Health Care Financing: New Evidence on the Prospect of Community Health Insurance Schemes in the Rural Areas of Ethiopia", *International Journal of Health Care Finance and Economics*.

Asfaw, A., Gustafsson, E., and Gaag, J. V. (2009). "Willingness to Pay for Health Insurance: An Analysis of the Potential Market for New Low Cost Health Insurance Products in Namibia", *Amsterdam Institute for International Development.*

Bärnighausen, T., Liu, Y., Zhang, X. and Sauerborn, R. (2007). "Willingness to pay for social health insurance among informal sector workers in Wuhan, China: a contingent valuation study", *BMC Health Services Research*.

Besley, T. (1995), "Nonmarket Institutions for Credit and Risk Sharing in Low-Income Countries", *Journal of Economic Perspectives*, 9(3): 115-127.

Binam, J. N., Nkama, A. and Nkendah, R. (2004). "Estimating the willingness to pay for community health prepayment schemes in rural area: A case study of the use of contingent valuation surveys in Central Cameroon", http:// www.csae.ox.ac.uk/conferences/2004-GPRaHDiA   /papers/4h-Binam-CSAE2004.pdf (accessed December 21, 2010).

Dercon, S. (2009). "Designing Insurance for the Poor", in Braun, J. V. and Hill, R. V. (eds.), *The Poorest and Hungry: Assessments, Analyses, and Actions,* International Food Policy Research Institute, pp.321-328.

Dercon, S. and Krishnan, P. (2000). "Vulnerability, Seasonality and Poverty in Ethiopia", *Journal of Development Studies*, 36(6).

Donga, H., Kouyate, B., Cairns, J., Mugisha, F., and Sauerborn, R. (2003). Willingness to-pay for community-based insurance in Burkina Faso", *Health Economics*, John Wiley and Sons, Ltd, 12: 849–862.

Dror, D. M., Radermacher, R. and Koren, R. (2006). Willingness to pay for health insurance among rural and poor persons: Field evidence from seven micro health insurance units in India, *Health Policy.*

FMOH. (2006). "Ethiopia's Third National Health Accounts 2004/05", Planning and Programming Department, The Partners for Health Reform plus Project, Abt Associates Inc.

_____. (2008). "National Strategy for Health Insurance in Ethiopia", Planning and Programming Department, Addis Ababa: Federal Ministry of Health.

_____. (2010a). "Ethiopia's Fourth National Health Accounts 2007/08", Addis Ababa: Federal Ministry of Health, April, 2010.

_____. (2012b). HSDP IV Annual Performance Report 2011/2012, Version 1. Addis Ababa: Federal Ministry of Health.

_____. (2013). Health sector: Fact sheets, http://www.moh.gov.et/English/Pages/index.aspx, (accessed August 20 2013).

Gaag, J. V. (2009). "Health Care for the World's Poorest: Is Voluntary (Private) Health Insurance an Option?", in J. V. Braun, R. V. Hill, and R. P. Lorch, *The Poorest and Hungry: Assessments, Analyses, and Actions, IFPRI,* pp. 584.

Haile Mariam, D. (2002). "Ethiopia: Potential of Traditional Social Insurance for Supporting Health Care", Washington DC: IK Notes.

Haile Mariam, D. (2003). "Indigenous social insurance as an alternative financing mechanism for health care in Ethiopia (the case of iddirs)", *Social Science and Medicine*.

Haile Mariam, D. and Brenzel, L. (1998). "Study on the Feasibility of Community-based Health Insurance in Ethiopia", Addis Ababa.

Hanemann, M., Loomis, J. and Kanninen, B. (1984). "Statistical Efficiency of Double-Bounded Dichotomous Choice Contingent Valuation" *American Journal of Agricultural Economics*, 1255-1263.

Heinzen, R. R. and Bridges, J. F. (2008). "Comparison of four contingent valuation methods to estimate the economic value of a pneumococcal vaccine in Bangladesh" *International Journal of Technology Assessment in Health Care.*

Johansson, P. O. (1995). *Evaluating Heath Risks: An Economic Approach,* Cambridge University Press.

Lofgren, C., Thanh, N. X., Chuc, N. T., Emmelin, A. and Lindholm, L. (2008). "People's Willingness to pay for health insurance in rural Vietnam", *Cost Effectiveness and Resource Allocation.*

Onwujekwe, O., Okereke, E., Onoka, C., Uzochukwu, B., Kirigia, J., Petu, A. (2009). "Willingness to pay for community-based health insurance in Nigeria: do economic status and place of residence matter?" *Health Policy and Planning*, Oxford University Press in association with The London School of Hygiene and Tropical Medicine.

Phelps, C. (2002). *Health Economics.* New York: Addison Wesley.

Santerre, R. and Neun, S. (2004). *Health Economics: Theories, Insights and Industry studies,* Thomson South - Western.

Tabor, S. R. (2005). "Community-Based Health Insurance and Social Protection Policy", the World Bank, Washington DC.

WHO. (2010). "Exploring the thresholds of health expenditure for protection against financial risk",World Health Report, Background paper, 19, Health System Financing. World Health Report, Health systems finacing"