

Health Insurance Technology in Ethiopia: Willingness to Pay and Its Implication for Health Care Financing

Birku Reta Entele¹, Nnaemeka Vincent Emodi^{2,*}

¹Department of Technology Management, Economics and Policy Program, Room 312, Building 37, 1 Gwanak-ro, College of Engineering, Seoul National University, Seoul, 151-744, South Korea

²College of Business, Law and Governance, James Cook University, P. O. Box 6811, Cairns Qld 4870, Australia

*Corresponding author: nnaemeka.emodi@my.jcu.edu.au

Abstract Low-income households in rural areas of Ethiopia are facing catastrophic out-of-pocket health care expenditure due to lack of proper financing mechanism complemented with unexpected health related shock. However, to smooth their health care consumer spending, they need to have a cost-effective health insurance. This study analyzes' Households Willingness to Pay (WTP) for health insurance and the potential market for this cost effective health insurance products. The data used in this study was collected from rural households in East Shewa zone, Adama Woreda, which constitutes about 500 household heads respondents. The Contingent Valuation Method (CVM) with double bounded dichotomous choice (DBDC) elicitation method was used to estimate respondents WTP for proposed health insurance technology. The result of the study shows that households' average WTP (considering their ability to pay) is higher than their cost of public health care and self-treatment per year at a national level on average. Variables such as farm income, frequent visit to the health center, age, education, and insurance cost (premium) are significant determinants of households' willingness to pay. For the hypothetical health insurance scenario, households do have enough willingness to pay to cover cost for public health care consumption expenditure if the payment mode is planned, conducive and once per year. The study implies valuable information for policy makers and concerned stakeholders such as the Ministry of health and different private insurance provider in health care financing.

Keywords: Health insurance, willingness to pay, logit model, Ethiopia

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1. Introduction

In the world, particularly in the developing countries, a large number of people are suffering and dying due to lack access to even the most basic medical care. This is due to the inability of the poor, and unexpected health shock, to pay for health care services. According to the study by [1], a survey which covers about 89 percent of the world's population suggests that '150 million people suffer financial catastrophe every year due to out-of-pocket health expenditures.' Furthermore, other important issues in low-income countries are that there is spiral poverty (vicious circle) which is due to the inability to work more because of poor health regardless of such health expenditure. Although limited governments' budgets for health care are a serious problem in many developing countries, there is a mechanism to provide low-cost health insurance to low-income households which are an innovative method through which to reach health care provision and decrease out-of-pocket health expenditures.

The health insurance coverage in Ethiopia is limited to regular public and private employees which constitute only about 1.2 % of the citizens [2]. Although the

government has introduced a community-based health insurance for only 13 piloted district areas (which constitutes only about 0.96 households) in 2012 (FMH, 2014), without conducting the detail willingness to pay analysis survey, the majority of the population who are rural (farming) community and urban informal workers have no health insurance coverage. Moreover, this excluded communities are those who are less educated, engaged in risky livelihood activities, and are more vulnerable to related health problems and therefore, this study focused on the willingness to pay for proposed health insurance for the rural community of Ethiopia.

As to our knowledge, there has been no such study specifically the demand for the hypothetical compulsory or/and voluntary health insurances for rural households (which are mainly victims of healthcare expenditure catastrophe) in Ethiopia.

Therefore, this study investigates mandatory and voluntary pre-paid health insurance scheme, aiming to know the preference of the households, which is used as an input for health care policy and, perhaps, provide information for private health insurance providers for commercial purposes.

As a result, the particular objectives of this study are:

- To assess the availability of demand for compulsory and voluntary health insurance packages in Adama Woreda
- To estimate potential Willingness to pay for health insurance product in the Woreda
- To identify factors that determine households' willingness to pay for health insurance product in the area.
- To determine if health insurance healthcare financing is cost-effective or not.
- To propose health insurance related policy implication

The rest of this study is arranged as follows. Section 2 provides some insights on health expenditure and financing in Ethiopia. A review of some related literature is presented in Section 3. Section 4 describes the methodology applied to this study, which includes the data source, sampling strategy, development of the conceptual framework and model. The results of analysis, interpretations and discussions are presented in Section 5. The conclusion and policy implications are presented in Section 6, which concludes the study.

2. Health Expenditure and Financing in Ethiopia

2.1. Health Expenditure

According to the third National Health Accounts in Ethiopia, in nominal terms, national health expenditure¹ grew by more than 53%, from 2.9 billion birr (US\$356 million) to 4.5 billion birr (US\$522 million) between 1999/2000 and 2004/05. Per capita expenditure on health per capita grew from US\$5.60 in 1999/2000 to US\$7.14 in 2004/05. While these increases show that appreciable additional resource mobilization is needed to achieve the US\$15.41 per capita required to reach the MDG targets or the US\$34 per capita WHO target. Moreover, the health expenditure constituted only 5% of gross domestic product (GDP) in the period. This share is small even by the standards of some Eastern and Southern African countries (see Table 1).

Table 1. Health Expenditures as Percent of GDP for Selected African Countries

Country/period	% of GDP
Zimbabwe (1999)	7.8%
South Africa (1998)	7.5%
Malawi (1998)	7.2%
Tanzania (2000)	6.8%
Zambia (1998)	6.2%
Ethiopia (2004/05)	5.6%

Source: Ethiopia's Fifth National Health Accounts, 2014 [2].

2.2. Health Financing Sources

Health services in Ethiopia are financed by four main sources. According to the 3rd NHA survey, 'these are

government (both federal and regional); bilateral and multilateral donors (both grants and loans); non-governmental organizations; and private contributions'. The government (including public enterprises) is still a major financier of health care, contributing 31% of total health expenditure. The amount of government health expenditure grew by 37% between 1999/2000 and 2004/05, increasing the share of government health expenditure from 4.4% to 5.6% of total public health expenditure. With the new initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, donors and international NGOs are becoming the main financing sources, contributing around 37%. Donor expenditures have increased by more than 2.5 times from the 1999/2000 level of 635 million birr. Moreover, although the households' share of the national health expenditure has declined from 36% in 1999/2000 to 31% in 2004/05 (Table 2), their expenditure in absolute terms has increased from 1.1 billion birr to nearly 1.4 billion birr [2].

Table 2. National Health Expenditure by Financing Source, 2014

Financing sources	US\$	Per Capita (US\$)	% of total health expenditure
Government	145,501,590.74	1.99	28%
Households	160,042,854.70	2.19	31%
Rest of the world	192,293,175.25	2.63	37%
Public enterprises	13,796,059.21	0.19	3%
Private employers	6,129,755.76	0.08	0.5%
Other private funds	3,966,145.77	0.05	0.5%
Total	521,729,581.43	7.14	100%

Source: Ethiopia's Fifth National Health Accounts, 2014 [2].

In terms of managing the resources allocated to health sector from different sources, the Ethiopian government controls half, followed by the private sector (38%) and the rest of the world (12%). With regard to private sector financing agents, households manage the appreciable majority, 80%. Health insurance is at an early stage and manages only around 3%, while local NGOs control 15%. Households themselves handle the remainder of the funds in the form of direct out-of-pocket payments to health care providers. Given the potential of disastrous out-of-pocket payments to impoverish households, there is a need to protect households through the strengthening of health insurance schemes.

3. Review of Related Literature

Many researchers have conducted study on health insurance related issues using different approaches under different scenarios. According to the study by Asfaw and Von Braun [3], they have conducted the feasibility of introducing community based health insurance schemes (CBHIS) in Ethiopia using contingent valuation survey method. The main focus of this paper was to examine the potential of CBHIS to alleviate the impacts of health related shocks due to economic reasons on poor rural households in Ethiopia. The result of the paper suggests that this type of health insurance is helpful in protecting the poor against the health related shocks.

According to study by Asenso-Okyere et al [4], survey conducted in Ghana, about 64% of respondents were willing to pay around US\$3.00 per month for a household of five members for a National Health Insurance scheme aimed at the informal sector. Study conducted by Jung and

¹National Health Expenditure (NHE) includes all expenditures whose primary purpose is to improve/maintain health status of the population. In addition to direct health expenditures, it includes health care-related services such as education and training of health personnel, research and development in the area of health, expenditures on food, hygiene, and drinking water control, as well as expenditures on environmental health.

Jialu [5], examined willingness to pay for health insurance in the informal sector workers in China, Wuhan city. The result of their study reveals that, comparing to the past health expenditures in China, the informal workers have a more willingness to pay that is higher than the estimated cost of community based health insurance.

Another study conducted by Dalinjong and Alexander [6] in Ghana focuses on the impact of national health insurance on the behaviors of health care providers in treating insured compared to uninsured patients. The study result acknowledges that national health insurance increased access to medication and resource mobilization although the providers are favoring the uninsured.

Study conducted by Panda et al. [7], used contingent valuation survey method to obtain estimates of WTP for health insurance in India. The result of their study shows that the marginalized (poor) people are willing to pay a higher percentage of their income on health insurance fee (premiums) when compared to higher income groups. Another study in rural Cameroon used contingent valuation method to estimate the demand for community based health insurance through the influence of the social capital. The findings of the study are, most of the rural households are willing to pay for community-based health insurance. And another result is that the social capital has a positive impact on the willingness to pay for community-based health insurance.

According to study by Philipa and Mossialos [8], community based health insurance provides financial protection from the cost of seeking health care. Their study focused through the theory of social capital in low income countries and then could easily finance health care expenditure.

Study conducted by Guy Carrin et al [9] shows that a community based health insurance (CBI) has a great contribution for health financing system. The study focuses on the three health financing sub functions(as outlined in the World Health Report 2000), that are revenue collection, pooling of resources and purchasing of services and finds that better financing through community based health insurance.

According to study conducted by Margaret E, Kruk et al [10], in forty low and middle income countries which comprises about 58 percent of the world population, about 25.9 percent of household borrowed money or sell household items to pay for health care. Furthermore, the study implies as the risk is higher among the poorest household and with country which has no health insurance.

According to the study by Macha et al [11], the poorer are excluded from access to medical care and physician examination in some African countries. This study reveals that the distribution of health care benefit is highly pro-rich and there is high health care benefit inequality's which necessitates that inclusive health insurance is very necessary to reduce the inequality.

Study by Newhouse et al [12], focused on controlled group of cost sharing in health insurance versus fully covered health insurance. The result of an experiment shows that people who fully covered by health insurance is found to spend on medical services 50 percent more than cost sharing health insurance users. The study concludes that to overcome the adverse effect problem it is better to use cost sharing health insurance scheme.

According to study conducted in Western Africa by Robyn et al [13], the community based health insurance

was introduced and the study focused on the impact of community based health insurance (insured people) on traditional self-treatment practices comparing with uninsured people. The result of the study reveals that there was no significant difference on the prevalence of traditionally self-care people between insured and uninsured but different in consumption of facility health care.

Study conducted by Liu et al [14], shows the influence of rural health insurance on health equity in health care utilization in China and Vietnam. The result of the study reveals that in Vietnam those who insured have significant utilization of health care for both outpatient and inpatient compared to China. In both countries poor people are less benefited from health insurance and there is inequality in health care utilization.

Asgary et al [15] examined willingness-to-pay for health insurance in rural Iran. Their study finding shows that households are willing to pay on average US\$2.77 per month for health insurance. Wagstaff [16] examined households' willingness to pay in rural Vietnam and the result of the study is that households' average willingness to pay is higher than the costs for public health care and self-treatment. For 70–80% of the respondents, their average WTP is sufficient enough to pay the lower range of premiums in existing health insurance programs.

According to the study by Cohodes et al [17], the effect of expansion of public health insurance on students' school completion is high in USA. Finally the study concludes that the long run impact is substantial than the short run impact.

Study conducted in Caribbean region by Adams et al [18] shows that the willingness to participate and pay for the national health insurance on average was \$28.83 per month for each person to enroll in the national health insurance plan.

Therefore, although levels are not necessarily comparable across countries and differing products, the results of literature review demonstrates that people in a variety of low-income countries would be willing to pay for low-cost health insurance schemes. Accordingly, this study focused in Adama districts of Ethiopia with compulsory and voluntary based pre-paid health insurance scenarios.

4. Methodology and Data

4.1. Data Source

This study is based on a household survey using structured survey instruments (questionnaires) to collect data and information at household levels. Also, the general information was obtained from the Woreda health office and nationally available health account document.

4.2. Sampling Strategy

A combination of both purposive and random sampling techniques was used to select Kebeles and households.

- Kebeles (small district unit) have been chosen from selected Woreda (larger district) depending on their access to public transport and representativeness to other Kebeles.
- Households were selected using systematic random sampling method from each selected

Kebeles. Approximately around 500 households from five rural Kebeles (i.e. 100 households from each kebele) were enumerated.

The contingent valuation survey tools include a description of the situation for which the individual would hypothetically pay. There is three hypothetical scenario choice set described and explained to respondents for health care financing systems.

Scenario A. No insurance (out-of-pocket model): Household pay the full cost of each visit to the district health center. A household that is not able to pay will not receive any services. The total annual cost for a home will depend on how many members will be ill and will visit the health center during the year.

Scenario B. compulsory health insurance: in this model all households are included in the program and required to pay an annual premium to a local healthcare station whenever they get money within given period. The payment will be based on how much income the households earn. The higher the income, the higher the insured is expected to pay the annual fee. Then every member of the family will get free health care services from the nearby health station. If care at a higher level is needed, the insured patient will be supported based on the cost per bed day at the district health care center.

Scenario C. voluntary health insurance: Each household can choose to pay an annual premium voluntarily to a local health care fund whenever they got money within a given period. The fee for insurance is based on the frequency of health center visit per year. All insured member of the household freely uses the health care at the nearby health station. If care at a higher level is needed, the insured patient will be supported based on the cost per bed day at the district health center.

Accordingly to the above hypothetical scenario, the respondents are asked to choose which one of these health's financing mechanism they would prefer to have in Adama. Each respondent was asked about their WTP for system A, provided that this system would be implemented in Adama Woreda, and similarly for system B and C, given that system B and C would be applied.

The second step is to identify value elicitation mechanism through designing questionnaire such as open-ended questions, dichotomous format, bidding game, etc. Accordingly in our survey, a double-bounded dichotomous choice elicitation method was used because it increases statistical efficiency gains [9]. Therefore, after identifying the initial bids, the respondents are asked whether they are willing to pay or not. For instance, if he says 'yes' to the first bid, a second higher bid will be given and if he says "No" to the first bid, the second lower bid will be asked. If he says 'no' to both the first and the second bids, then he will be asked the maximum that he is willing to pay.

In considering the contingent valuation method limitation of starting point bias, this study reduces this (bias) by using the four different starting bids. Focus groups and pre-tests were conducted to set the bid amounts applied in the final survey. The initial bids are the following amounts: 20, 25, 40, and 50 USD per year and this bid are being randomly assigned to the respondents as adopted by [9]. Then following the first answer, the second bid amount will be reduced by half if respond in the first bid is "No" and doubled if the answer

for the first bid is "Yes." For example, a person who is stating "yes" to 20 USD was asked whether he would pay 40 USD for the second round. Finally, our survey included questions regarding (socio-economic) characteristics of the respondents as well as questions which relate to the product i.e. health insurance.

4.3. Conceptual Framework and the Model

The theoretical model we employed is the utility maximization derived from adopting new technology. The model stems from the assumption that the rational people compare their services from the proposed new health insurance product with the current situation and decide whether to accept or reject the new technology assuming other variables are constant [19]. Hence, suppose the indirect utility function of buying health insurance and without buying health insurance is as follows:

$$U(h^{yes}, Y - WTP, X, \pi) + \varepsilon_1 \quad (1)$$

$$U(h^{no}, Y, X, \pi) + \varepsilon_0 \quad (2)$$

Where, h^{yes} & h^{no} are level of utility which shows with and without health insurance scheme respectively, Y-level of income, WTP is amount of money individuals are willing to pay for health insurance premium, X are vector of other socio economic characteristics (age, education, sex, health condition, etc.) that directly or indirectly influence the preference of people, π shows the perceived risk/probability of getting sick and ε captures unobservable factors. The error terms in both equations i.e. ε_1 and ε_0 are assumed to be i.i.d. (which is identically & independently distributed) with zero mean.

Therefore, the individual will buy the proposed health insurance policy comparing the above-mentioned utility that is when $U[h^{yes}, Y - WTP, X, \pi] + \varepsilon_1 \geq U[h^{no}, Y, X, \pi] + \varepsilon_0$. When the utility derived from buying health insurance is greater than the utility without buying health insurance, then individual can adopt the proposed health insurance product. To generalize the WTP suppose that the actual willingness to pay of individual i for the health insurance product is given by:

$$WTP_i^* = X_i\beta + \varepsilon_i \quad (3)$$

Where X is a vector of explanatory variables, β is a vector of coefficients to be estimated, ε is an error term assumed to be independently and randomly distributed with mean zero and constant variance, σ^2 . In our study, we applied the double bounded dichotomous choice elicitation method², which the WTP* value is not directly observed, instead it is obtained from a range of WTP values from the survey response. Under this method, each respondent is given two bids, the starting bid (Pf) and the follow up higher (PH) or the follow-up lower (PL) bids, depending whether the individual response 'yes' or 'no' to the starting bid. This means that we have the following four possible outcomes for each respondent:

². We used the double-bounded elicitation method instead of triple or quadruple methods because the additional efficiency gain from adding third or fourth follow-up question is relatively small and it can increase the chance of inducing response effects [20].

$D_i^{11} = 1$ if respondent i says ‘yes’ and ‘yes’ to the 1st and 2nd higher bids, respectively

$D_i^{10} = 1$ if respondent i says ‘yes’ and ‘no’ to the 1st and 2nd higher bids, respectively

$D_i^{01} = 1$ if respondent i says ‘no’ and ‘yes’ to the 1st and 2nd lower bids, respectively &

$D_i^{00} = 1$ if respondent i says ‘no’ and ‘no’ to the 1st and 2nd lower bids, respectively.

Then, the mean WTP is estimated by maximizing the following log-likelihood function [21,22]³.

$$\ln L = \left\{ \begin{array}{l} \sum_{i=1}^N D_i^{11} \ln \left[1 - \Phi \left(\frac{P_i^H - X_i \beta}{\lambda} \right) \right] \\ + D_i^{10} \ln \left[\left(\frac{P_i^H - X_i \beta}{\lambda} \right) \right] \\ + D_i^{01} \ln \left[\Phi \left(\frac{P_i - X_i \beta}{\lambda} \right) \right] + D_i^{00} \ln \left[\Phi \left(\frac{P_i^L - X_i \beta}{\lambda} \right) \right] \end{array} \right\}$$

Where $\Phi (\cdot)$ is the standard normal cumulative distribution function and the parameter β and λ is to be estimated.

If the response to the follow-up bid is independent of the response of the starting bid, then it is possible to estimate each response independently. However, a lot of studies have shown that the follow-up response is more likely to be dependent on the starting response [23]. Therefore, in a double-bounded dichotomous choice approach, the use of bivariate normal probability function is the better specification to estimate consistent mean values⁴. The mean WTP can then be computed based on the method suggested [23] procedure assuming the estimated WTP may not be necessarily linear.

The willingness to pay for health insurance product is determined by not only the price of the insurance premium, but also the respondent's degree of risk aversion, perceived magnitude of the loss caused by illness, perceived risk of injury/illness, and their income.

From the above conceptual framework (Figure 1), we have drawn some hypothesis as follows:

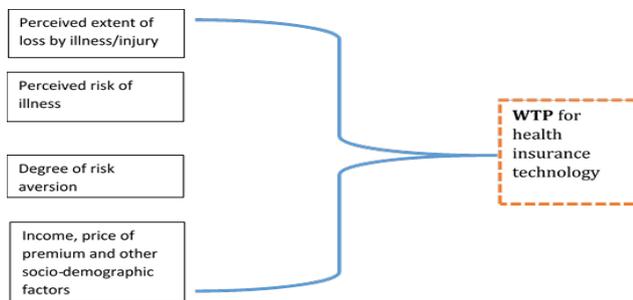


Figure 1. Conceptual framework for WTP model

³ This model can be estimated using standard econometrics packaged interval logit or bivariate Probit algorithms such as those offered in the STATA software.

⁴ In exceptional cases where the correlation coefficient between the error terms of the first and the second response equations is zero, the two responses are independent, and if the correlation is 1, the two responses are primarily the same. In both cases, the bivariate probit specification is not appropriate.

H1: the older the respondent, the higher the perceived risk and the higher the degree of risk aversion and hence the more WTP for health insurance scheme.

H2: regarding the occupation of our respondents, the farmers may be more vulnerable than other occupational groups, and hence the more WTP for health insurance.

H3: educated respondents are expected to pay more for WTP for health insurance than less educated respondents.

H4: a family with more numbers of children and elderly people are more WTP for health insurance than others perceiving higher risk in a household.

H5: the number of household members and the number amongst them with chronic diseases may increase the perceived extent of the loss, as well as the perceived risk. And hence the more WTP for health insurance scheme.

H6: women have a higher degree of risk aversion than men and more WTP for health insurance scheme

H7: the higher the income of the households, the higher the WTP for health insurance scheme.

5. Results of the Study

5.1. Descriptive Analysis

Of the total household interviewed 39.7% of the households do have voluntarily willingness to pay for health insurance to smoothly finance their health care expenditure. It implies that more of the sampled population are in need of health protection through a voluntary willingness to contribute money to fund it. About 19% of the sampled households need to join health insurance if it is happening under a compulsory scheme. The remaining 27.7% of the respondents prefer out of pocket health care financing mechanism. Table 3 shows the descriptive summary of each model as follows.

Table 3. Descriptive summary for Voluntarily Willingness to pay model (n=198)

Variables	Mean	Std. Dev.	Minimum	Maximum
VWTPH_yes	15.97	7.888	2.5	50
VWTPH_no	30.84	14.47	10	100
insurancce~t	30.92	11.19	20	50
Age of head	36.96875	10.11893	22	80
farm income	1,041.73	935.97	0	6,176.5
Livestock size	629.34	706.56	0	4,272.25
Education of head	2.418607	2.130715	0	13
Family size	4.90625	1.604313	1	10
Illness	0.28125	0.4513758	0	1
Visited health centre	.359375	.4817026	0	1
childt5	1.171875	.879418	0	3
elderlygt65	.0390625	.194505	0	1
Orthodox	.578125	.4957993	0	1
Oromo	.9609375	.194505	0	1
male1	.78125	.415023	0	1
Farmer	.9140625	.281373	0	1
havinsuran~b	.9765625	.1518829	0	1

* VWTPH_yes –is the range of the amount that Households are voluntarily WTP for health insurance.

* VWTPH_no –is the range of amount that Households are unable to pay for Voluntary health insurance

Table 3 above shows the average amount a Households are willing to pay for voluntary health insurance is about US\$16 and the average price they are unable to pay about US\$30 per year. On average the insurance premium they are asked to pay is 30.92 USD per year ranging from 20

minima to 50 USD maximum. The mean average age, farm income, livestock size, mean education, family size and the number of children under five years, of the respondents, are 36.97, \$1,041.73, 629.34, 2.42, 4.9 and 1.17 respectively. The other variables are illness, used to show whether there is a chronic disease within that household or not. HC_visited shows whether anyone of the household member has visited a health center in last year or not. Elderly greater than 65 illustrates the number of household member above 65 years. The others are the dummy for religion, ethnicity, and occupation and have insurance experience or not. Table 4 below shows the descriptive statistics of the mandatory willingness to pay model.

Table 4. Descriptive summary for mandatory Willingness to pay for health insurance (n=95)

Variable.	Mean	Std. Dev.	Min	Max
MWTPH_yes	19.27	8.4	10	40
MWTPH_No	37.27	16.16	15	80
insurancec~t	34.77	12.2	20	50
Age of head	39.31111	9.233886	22	62
Relationship	1.177778	.3866458	1	2
farm income	975.18	759.65	223.06	3127.75
Livestock size	461.42	415.96	0	1541.15
Education	3.044365	1.671455	0	6.714286
Family size	5.4	1.586878	2	9
Illness	.3111111	.4681794	0	1
Visited health center	.5111111	.505525	0	1
Child under five	1.155556	.9034166	0	3
Elder above 65	.0444444	.2084091	0	1
Orthodox	.6666667	.4767313	0	1
Oromo	.9555556	.2084091	0	1
male1	.8222222	.3866458	0	1
Farmer	.8888889	.3178209	0	1
havinsuran~b	.9777778	.1490712	0	1

* MWTPH_yes – minimum amount Households are WTP under compulsory (mandatory) for health insurance

* MWTPH_No –is the amount for which households are unable to pay for health insurance under compulsory scheme.

Table 6. Reason for no-no response for both follow up WTP questions by gender

Sex	has no money	project has no value	government should pay	no need for insurance	project is not clear
Female	9	0	9	3	0
Male	32	0	19	11	0
Percentage	49.3%		33.8%	16.9%	

Those who responded no-no for both follow-up questions were because of different reasons. Of the total protests, 41 households (49.3%) responded "no-no" because they have no money to pay the amount they are

Table 5. Out of pocket expenditure (n=207)

Variable	Mean	Std. Dev.	Min	Max
insurancec~t	38.46	11.48	20	50
Age of head	39.66154	12.6803	24	80
Relationship to head	1.2	.4031129	1	2
Farm income	633.21	647.90	0	3977.25
Livestock size	359.8	451.59	0	2018.5
Education	1.915934	1.817964	0	8
Family size	4.584615	1.793149	1	9
Illness	.3076923	.4651303	0	1
Visited health center	.3384615	.4768688	0	1
Child under five	1.092308	.8610146	0	3
Elderly above 65	.0923077	.2917125	0	1
Occupation	1.061538	.2421856	1	2
Religion	1.538462	1.001201	1	4
Ethnicity	1.061538	.2421856	1	2
Insurancei~b	.9846154	.1240347	0	1

The Table 4 shows the average amount a Households are WTP under compulsory (mandatory) health insurance is about 19.27 USD, and the average price they are unable to pay is about 37.27USD per year. On average the insurance premium they are asked to pay is 34.77 USD per year ranging from 20 USD minimum to 50 USD maximum. The mean average age, farm income, livestock size, mean education, family size, and children less than five years, of the respondents, are 39.3, \$975.18, 461.42, 3.04, 5.4 and 1.15 respectively. The other variables are in dummy form. The third option is status quo, those who are willing to join both voluntarily and mandatory health insurance scheme, who prefer direct out of pocket payment (Table 5).

Under this section, it's about 41% of the respondents who are not willing to join any form of health insurance rather they prefer to finance their health care expenditure through out of pocket. The average insurance cost they are asked to pay to join the insurance is about 38.46 USD with minimum 20 and maximum 50 USD. The possible reason for no-no response is as follows (Table 6).

asked to pay. Of this 78% are male, and 22% are female. The others 33.8% and 16.9% were responded no-no because the government should have to pay and no need for insurance respectively.

Table 7. Reason for no-no response with number of HH with illness and health care visited.

Scenario	has no money	project has no value	government should pay	no need for insurance	project is not clear
Illness	Yes	9	0	7	4
	Percentage	10.8%	0	8.4%	4.8%
Visited HC	Yes	9	0	9	4
	Percentage	10.8%	0	10.8%	4.8%

Table 7 (above) reveals that there are people responding no-no for a particular insurance cost having a chronic disease and past year health care visiting. Some respondents are poor and cannot pay for the offered insurance cost. For instance, about 10.8% of people those who have Illness and has visited health care in the previous year are unable to pay because they have no money. About 8.4% who have an illness and 10.8% who

has visited healthcare the previous year think that the government should have to pay and the remaining 4.8% for both group thinks that no need to have insurance.

5.2. Econometric Analysis

The interval data logit estimation techniques were applied to identify the determinant factors affecting households WTP. It was also used to determine how much

they are willing to pay to join either voluntary or compulsory health insurance. Using interval data logit model we have estimated two models i.e. one for

voluntary WTP and the other is for compulsory WTP health insurance (Table 8).

Table 8. Interval regression estimation results

Variables	Voluntary WTP model			Compulsory WTP model		
	Coef.	Z	P> z	Coef.	Z	P> z
insurancec~t	-1.1796417 (.0657465)	-2.73	0.006	-.0992276 (.0136234)	-7.28	0.008
Age of head	1.204403 (2.45484)	0.49	0.624	11.16575 (5.162716)	2.16	0.031
Farm income	.0018623 (.0008383)	2.22	0.026	.0035763 (.0018013)	1.98	0.042
Livestock income	-.0088277 (.003258)	-2.71	0.003	.001604 (.0011216)	1.43	0.077
Education	14.31745 (8.191969)	1.75	0.081	46.38221 (27.96974)	1.66	0.097
family size	-2.563495 (12.4552)	-0.21	0.837	-7.970217 (23.81121)	-0.33	0.738
Chronic illness	3.611343 (0.7461)	4.84	0.020	73.65104 (23.34611)	3.15	0.033
Visited HC	28.80256 (54.36757)	0.53	0.596	2.614122 (75.93156)	0.03	0.973
Orthodox	-5.930649 (49.9093)	-0.12	0.905	-16.49183 (93.36563)	-0.18	0.860
Oromo ethnic	35.91174 (81.06905)	0.44	0.658	80.75739 (170.6468)	0.47	0.636
Female head	59.0516 (30.38806)	1.94	0.054	84.58755 (96.08419)	0.88	0.379
havinsuran~b	75.25726 (92.17608)	0.82	0.414	-5.67469 (159.5687)	-.04	0.972
Child under 5	11.10774 (5.4555)	2.036	0.040	59.08026 (30.24115)	1.96	0.046
Elder above 65	-210.8988 (94.0574)	-2.24	0.025	-53.21768 (210.3359)	-0.25	0.800
Farmer	27.43856 (11.4562)	2.39	0.032	32.76806 (15.0089)	2.18	0.048
_cons	105.9866 (150.6518)	0.70	0.482	-196.6339 (296.2263)	-0.66	0.507
/lnsigma	4.896458 (.0811112)	60.37	0.000	4.71214 (.173064)	27.23	0.000
Sigma	133.815 (10.85389)			111.2901 (19.2603)		
Observations	198			95		
Log likelihood	-117.1509			-31.1324		
LR chi-sq	47.478			30.44		
Prob>chi2	0.0001			0.00334		
MacfaddenR2	0.1685			0.3283		
Fitted value(predicted WTP)	438.319			520.45		

5.2.1. Interpretations and Discussions

The results of estimations indicate that the determinants of WTP for health insurance in this study are mostly in line with our expectations. To explain them one by one, let's begin from insurance premium (cost). In both model (voluntary and compulsory) the result shows as an insurance premium (price) increases, the respondents are less willing to pay to join insurance. It is logical to say the demand for the natural product decreases as its prices going up. Hence, the initial insurance cost significantly affects the respondent's WTP. Age of household head(respondents) have a positive impact on WTP to join for health insurance substantially in the case of compulsory WTP model but insignificant in the case of voluntary WTP model. Hence, the hypothesis is rejected for the voluntary health insurance and accepted for mandatory health insurance model at 5 % significance level. The reason for this may be because if the insurance is compulsory to join and so as the age of the respondent

increases, the more they are getting weaker and the less healthy they are. Also, the more they need protection and hence more willing to pay to join insurance unless his/her health is not certainly at risk.

Farm income positively influences WTP for health insurance in both models. It implies that the higher the income, the more they are willing to pay as far its general right. But livestock size shows in this reverse in the case of voluntary insurance probably, showing respondents are using livestock as a backup to overcome when they face health problem. So the more livestock they have, the less they are willing to pay to join health insurance in rural areas. It is prevalent in some rural areas of Ethiopia. The mean education shows that as average education increases, the respondents are more willing to pay for health insurance in both cases. i.e. the more educated, the more need to finance health care through insurance and so the more willing to join insurance. Hence, the hypothesis is accepted for both models at 10% significant level. But family size has a negative impact on household's

willingness to pay; this may be because the higher the family size, the lesser per capita income is, and hence the less they are willing to pay. Therefore, its hypothesis is rejected even at 10% significance level. These results are the almost same result with the study done in rural Vietnam on health insurance except the sign of family size where it has a positive impact on WTP. It is not controversial because a household with large family size and have higher income will have higher willingness to pay and household with lower income with larger family size will have lesser willingness to pay.

Another interesting variable in this study is whether a household has chronic disease or not. The results show as the family does have a chronic illness so that they have more willing to join health insurance in both cases. It is because if they perceive there is high risk (chronic disease) then there WTP will be higher to reduce the problem and the hypothesis is confirmed to be accepted at 5 % significance level. A variable health center visited in the last year was also included in the model, and it shows a family with last year health center visited do have more willing to pay to join health insurance that other family who didn't visit health center, although it's insignificant.

A female-headed household do have more willingness to pay than a male-headed household because females are more vulnerable to risks, and the extent of risk perception is great so that they prefer to pay more to protect

themselves in the case of voluntary health insurance scheme. A household with a higher number of children under five years, do have more risk and need much health care, are more willingness to join health insurance than otherwise in both models and hence the hypothesis is confirmed to be accepted at 5% significance level. But as the number of elderly people above 65 years increases in the household, the less they are willing to pay to join insurance because they are already getting older. Their impact on WTP for health insurance is opposite although both variables are in the risk group.

Lastly, but not least, farmers do have more willingness to join health insurance than people with other occupation (non-farmers/employees) in rural areas. This may be because of, majorities of the respondents are farmers (unbalanced data) and still need further study for why farmers are more willing to pay than others, perhaps, attributed to ability to pay or perceived risk of illness.

5.2.2. Total Willingness to Pay for both Health Insurance

One of the objectives of this study is to know whether households' willingness to pay is sufficient enough to cover the cost of health care or not. To understand this, we need to know the mean and median willingness to pay for each model using the Krinsky and Robb [23] procedure as follows (Table 9).

Table 9. Krinsky and Robb (95 %) Confidence Interval for WTP measures (Nb of reps: 5000), mean and median of WTP

Measures	Voluntary WTP(\$)					compulsory WTP(\$)				
	WTP	LB	UB	ASL*	CI/MEAN	WTP	LB	UB	ASL*	CI/MEAN
Mean	22.88	10	33.31	0.0000	1.87	26.1	10	40	0.0000	1.15
Median	17.70	9	24.70	0.0000	0.85	20.3	9.63	25.3	0.0000	0.77

*: Achieved Significance Level for testing H0: WTP<=0 vs. H1: WTP>0 LB: Lower bound; UB: Upper bound.

The mean and median willingness to pay in case of compulsory health insurance is greater than that of voluntary insurance. Based on this mean/median willingness to pay, the total amount of households WTP for the survey area is calculated by multiplying the number of households in the Woreda by the estimated median WTP (Table 10).

Table 10. Median and Total WTP for health insurance in the Woreda (district)

Models	Median	Total WTP* per year
Voluntary WTP	\$17.70	\$ 510,500 ⁵
Compulsory WTP	\$20.31	\$586,106

*Total WTP= is median WTP times the number of households living in the sampled area (Woreda). Total households in Adama Woreda is 28,858. (Source: Woreda finance and economic development office)

Table 10 (above) shows that there is an enormous potential market for health care financing such that if the households in Adama Woreda. They were included in the proposed hypothetical voluntary insurance and contributed up to \$ 510,500 per year. Under compulsory health insurance, they have the potential to provide up to \$586,106 to finance their health care consumption per year. But by 2013/14, according to the third national health account (NHA) survey result, the total health expenditure per year per person in Ethiopia was \$ 16.1.

⁵ In measuring the willingness to pay, the respondents were informed to consider their ability to pay besides to their basic daily expenditure. So that the willingness to pay amount roughly implies ability to pay. However, this doesn't mean that the paper has exactly measured respondents' true pay because of presence of uncontrolled biases.

The household's out of pocket contribution constitutes about 37% which means about \$ 5.95 per person per annual. Therefore comparing with the above expenditure, this⁶ study shows that the amount households are WTP for health insurance can sufficient enough to finance health care consumption expenditure. Because the median willingness to pay for voluntary and compulsory health insurance is \$17.70 and \$20.31 per year per person but the health care cost per year per person was \$16.1.

6. Conclusion and Policy Implications

The goal of the Ethiopian government is to increase health insurance coverage for all citizens within a coming five years strategic plan. One way to achieve this objective is through conducting research to assess the willingness to pay for the targeted community. This entail the government to know how much people are willing to sacrifice other expenditure so that they can be insured or, put another way, what value they place on insurance. According to the study results about 58.76% of sampled households are preferred to join health insurance than direct out-of-pocket financing mechanism. The amount people are willing to pay could sufficiently able to finance health care expenditure when compared to the current national health care per capita spending. Therefore, from a

⁶ This study was conducted in 2014 G.C, and every data(including prices) is correct as of 2013/14.i.e When 1 USD=20 Ethiopian birr.

normative perspective point of view, the voluntary or mandatory health insurance in a rural community is most likely to increase majority's social welfare.

Another finding of the study is that Willingness to pay falls with increasing age and rise with more education. Older people may be less inclined to undergo changes and, therefore, less ready to support a new, unknown system. Individuals with higher education may be more confident in adjusting to, and trusting a new regime. These results are encouraging because they highlight the potential for information policy scheme where should have to be focused.

Traditionally having a large size of livestock is usually considered as a social status and even perceived as a backup for health related problem as the study findings show. But this does not reduce the catastrophic out-of-pocket expenditure. Therefore, rising awareness has to be done to smooth their health care consumer spending.

Finally, the policy implications are that, there are a lot to be done on population for health insurance expansion, particularly among the old, those having large livestock size and those with relatively little education. Since average household willingness to pay in the year 2014 (\$17.70 for voluntary and \$20.31 for mandatory health insurance scheme) is greater than that of health expenditure per capita per annual(\$16.1), it's better to provide a national health insurance scheme either voluntary or mandatory due to cost-effective health care financing. Frankly speaking, mandatory health insurance scheme can generate more resources than voluntary health insurance. Hence, the implication of this figure may call an invitation for either public or private insurance provider for health insurance commercialization.

Lastly, but not least, the adverse selection is likely to be a significant problem for the insurer and hence the health insurance providers needs to have a cost-sharing mechanism to control this issue.

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