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**Estimating the willingness to pay for
community healthcare insurance in
rural Nigeria**

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Abstract

Health care financing in Nigeria is dominated by private out-of-pocket payment that is not affordable to the poor. This has greatly reduced access to quality health care for the predominantly rural poor. Insurance schemes as options for increasing access to health care services have not received considerable attention in Nigeria. In this regard, a community health prepayment scheme is proposed, and the Contingent Valuation Method is used to investigate the willingness of rural households to pay for this scheme. Contributing through agricultural commodities produced statistically higher estimates than through direct cash. Also, by incorporating uncertainty in responses using the Random Valuation Model, higher contribution amounts were obtained. This provides an option for its use in healthcare contingent valuation studies where respondents are uncertain about their true responses. The groups that are willing to pay lesser amounts into the scheme as compared with their counterparts are women, the less educated, and the less wealthy households.

Keywords: Health care financing; Prepayment scheme; Contingent Valuation; Willingness to pay; Dichotomous choice; Uncertainty; Random valuation; Stochastic Payment Card.

JEL Classification: C35, D81, I10, I38

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1. Introduction

Poverty is a central theme of discourse in developing countries. Governments of these countries have sought ways to help alleviate the sufferings of their respective poor. In Nigeria for example, several initiatives and schemes have been introduced by successive governments specifically focusing on the poor. These include the Family Economic Advancement Programme (FEAP), Small Scale Credit Schemes (SSCS), Operation Feed the Nation (OFN), Better Life for Rural Dwellers, Family Support Programme (FSP), National Poverty Eradication Programme (NAPEP), National Health Insurance Scheme (NHIS), and others. However, the success of these initiatives and schemes has not been adequately felt by the poor (Osinubi, 2003). Specifically, access to affordable social services and health care services for the poor still remains a big challenge that has not been fully resolved. While the rich in urban areas of the country have access to quality health care services, the poor in the rural areas are largely deprived access to quality health care services. Infrastructures in these rural areas are also poor and a large proportion of about 65 percent of the population live in these rural areas where the standard of living is poor (WHO, 2002).

National poverty incidence in Nigeria shows that the poverty level is relatively high with about 57.8 percent of the population living below the poverty line, based on a combination of the Food Energy Intake methodology and expenditure on non-food items. While the incidence is higher in the rural areas (64.1%), the urban areas record a relatively low incidence level (35.4%). Larger family sizes are associated with poverty than are households with fewer family sizes. Disaggregating the level of poverty across gender showed that male-headed households (59.2%) are poorer than female-headed households (44%). Moving away for the consideration of poverty based on quantitative assessments, a subjective measure based on households' perception of being poor or not showed that 78 percent of households assessed themselves as being poor (FOS, 2004). This figure is therefore higher when compared with the measure based on the poverty line (FOS, 2004).

Aside from poverty, income inequality is a problem in Nigeria. The national inequality level using the Gini coefficient is 0.424 with the rural areas recording a higher Gini coefficient of 0.42 when compared with the urban areas (0.40). In terms of access to social services and health, as low as 50 percent of the entire population have access to safe drinking water while about 60 percent of the rural population have access to health care where the quality of care even remains questionable (ILO, 2001; FOS, 2004). All these are likely to limit the options of the poor, who cannot afford the basic necessities of life including health care services given their high level of poverty and inequality.

Access to quality and affordable health care services for the rural population is reduced due to the level of poverty, sanitation and health care practises, distances to be travelled to access health care, and the absence of financial protection in the form of insurance or prepayments. Sanitation and health practises among the rural population as well as the urban population are very poor. In Nigeria as a whole, only about 6 percent of the population use conventional toilet facilities with over 60 percent of the population using the pit toilet facilities. Refuse disposal system is highly unsatisfactory as the bulk (over 92%) of the refuse is dumped in unauthorized dumps as well as around dwelling compounds. Visit to the doctor is also low when compared to visits to other health care providers. Only about 22 percent of the population visits a doctor when a household member is ill (FOS, 2004).

Due to the reduced access to health care, households often resort to leave the illness untreated or resort to the use of low quality care or self-medication. In the long-run, this will further impoverish the households (OECD/WHO, 2003). When the households decide to make out-of-pocket payments for medical bills at the point of utilization of health services this is often catastrophic¹ in nature, especially for the poor. This is because health care payment is not expected to exceed a certain threshold of household income. In most circumstances, poor households face actual medical bills that exceed their earnings. This has become a major source of concern and worry for Nigeria and other similar low and middle-income countries (LMICs).

Advocates have been in favour of developing alternative financing schemes to cater to this unexpected health care expenditure such that households would not have to pay out-of-pocket at the time of utilization of health services. Where these alternative sources of financing have been instituted, they have tended to favour the higher socioeconomic groups (Ogunbekun, 1996). They are often targeted at urban areas and cities where the burden of disease is low. As a solution for the poor in rural areas where the burden of disease is high, prepayment schemes and community-based insurance schemes have been advocated (WHO, 2000; Ogunbekun, 1996; Dong *et al.*, 2003a).

In this regard, this paper explores the possibility of households making health care payments in the form of community insurance schemes. The paper thus uses the method of Contingent Valuation (CV) to examine the willingness of rural households in Nigeria to pay for a proposed 'hypothetical' community health care prepayment scheme using the Dichotomous Choice Method (DCM) with open ended follow-up questions, and the Stochastic Payment Card (SPC) formats. The paper also examines the factors that

¹ Such payments are payments in excess of $x\%$ of the household income (see Ranson, 2002). This is any payment for health care in excess of, say 10 percent of the household disposable income. This is because any payment in excess of the threshold will mean that households may not be able to spend enough on food, education and other human needs.

determine rural households' willingness to pay and the possibility of rural households paying in-kind (in the form of agricultural commodities, for example) to join in such proposed scheme.

1.1 A brief overview of Health Care Financing in Nigeria

There are varied sources of health care financing in Nigeria. These include budgetary allocations from the government at all levels of the federalism structure (local government, state, and federal); loans and grants obtained from multilateral and bilateral agencies in the form of international aid; and private sector contributions including out-of-pocket payment (WHO, 2002). In Table 1, we provide a summary of the shares of the various financing sources. From the table, private sector financing made up largely of out-of-pocket payments is large and dominant, while government funding on health has declined steadily. This has directed policy attention to the consideration of issues related to health care financing in the country. Donor funding (external resources on health) in the health sector has also declined.

Table 1. Relative shares of various health care financing mechanisms in Nigeria

Indicator	Total Health expenditure as a fraction of GDP	Government expenditure as a percentage of total health expenditure	Private sector expenditure on health as a % of total health expenditure	Private households' OOP* as a % of private sector health expenditure	Prepaid and risk-pooling plans as % of private sector expenditure on health	General government expenditure on health per capita at exchange rate	General government health expenditure as a % of general government expenditure	External resources on health as a % of total expenditure on health
1998	5.5	26.1	73.9	95.0	2.4	4	7.1	13.1
1999	5.4	29.1	70.9	94.8	3.4	5	5.4	13.8
2000	4.3	33.5	66.5	92.7	5.1	6	4.2	16.2
2001	5.3	31.4	68.6	91.4	6.5	6	3.2	5.6
2002	5.0	25.6	74.4	90.4	6.7	5	3.1	6.1
2003	5.0	25.5	74.5	91.2	6.7	6	3.2	5.3

* Out-of-pocket payment.

Source: WHO (2005), (2006).

With a high incidence of poverty and the predominance of out-of-pocket (OOP) payments, further impoverishment of households may persist if OOP payments still continue. This is because poor households may not be able to access health care services given their low level of income and vulnerability to diseases.

Various civil society organisations are also often involved in the provision of support and care for local communities in Nigeria. Such supports include expansion of family health, reproductive health and HIV/AIDS prevention services; the use of community efforts to provide support to the most vulnerable in the society; and partnership with faith-based organisations to provide care and help to their members. A recent study of these organisations operating in Nigeria show that only about 16 percent target women. The study also shows that about 20 percent of the organisations target HIV/AIDS, 14 percent are in gender related issues, 12 percent in agriculture, 11 percent in community development, 10 percent in health/health care, and 8 percent in both water and sanitation and human rights.

The remaining are in the area of governance, education, environment, skills acquisition, and micro finance (European Development Fund, 2007). Due to the presence and upsurge of HIV/AIDS, a great number of these organisations have recently sprung up to cater to those affected by the condition.

In the area of health and health care, examples of informal associations in the country that are engaged in informal health insurance or provision of support include the Country Women Association of Nigeria (COWAN) through the Health Development Fund founded in Ondo State, embracing a large spectrum of programmes including health and social services; the Jas and Lawson Community Partners for Health which forms a partnership between communities and health care providers; informal schemes in Anambra State, and the Ibughubu Improvement Union. These organisations are not only involved in the provision of health care or insurance but also other informal financial assistance in times of need. Because of the large number of activities engaged in by these associations, it is difficult to call them full-fledged community health insurance schemes.

In response to the nature of health care financing, the Nigerian government re-launched² the National Health Insurance Scheme (NHIS) in June 2005 (Nwezeh, 2005). The scheme seeks to ensure that every Nigerian has access to good and affordable health care services and that medical cost are distributed equitably among different income groups (Laws of the Federation of Nigeria Decree 35, 1999). However, the scheme is yet to be fully implemented.

The NHIS was initially designed into ten distinct programmes catering to different groups of people including the Rural Community Social Health Insurance Programme (RCSHIP), which is targeted at rural dwellers who are not in regular employment to increase their access to health care. This programme was designed to be run by community members elected by their own community. Due to the current problems in identifying beneficiaries for the various categories, the scheme was simply split into the formal and the informal insurance schemes. The formal scheme is expected to cover people in formal employment while the informal scheme will cover people who are in the informal sector. The implementation is phased such that those in the formal sector will be covered first before those in the informal sector. However, statistics show that there is a large informal sector in Nigeria much like in any other developing country, and the poor form the bulk of those working in the informal sector.

In this regard, the study serves as a basis for providing quantitative data for the setting of premiums for those in the rural communities who are predominantly farmers.

² The program was first launched in 1997

However, this paper does not attempt to provide costing of the scheme per se. This study should be seen as a means of obtaining the amounts households will be willing to pay for such a scheme which is likely to be cross-subsidized by those in the formal sector. In order to obtain the amount of subsidy to augment, the quantitative data can be further compared with the actual cost of treatment. We proposed the use of the willingness to pay (WTP) analysis in obtaining these quantitative data. One of the extensions we considered as discussed in section 3 is the inclusion of uncertainty in modelling individual responses to the valuation questions in health care CV studies using the Stochastic Payment Card (SPC) design to mimic real world decision making process.

2. Theoretical and Analytical Framework

This section covers both the theoretical underpinning for the contingent valuation method and a simplified insurance theoretic model.

2.1 Contingent Valuation framework

This theoretical framework builds on the neo-classical theory of welfare economics. The method of contingent valuation (CVM)³ using the willingness to pay (WTP)⁴ or the willingness to accept (WTA)⁵ approach is often used to obtain monetary values for any change in welfare due to the availability of a specified good or, in the case of health and health care, changes in the state of health (Hanemann, 1991a; Smith *et al.*, 1999a).

The CVM was originally used in the theory of welfare economics to analyse price changes. Karl-Göran Mäler in 1974 first showed that the concept could be employed to analyse quantity changes (see Hanemann, 1991a). It is closely related to the theory of consumer demand. The maximum amount an individual is willing to pay gives the value of a health intervention aimed at improving the state of health of the individual (Donaldson *et al.*, 1998; Bala *et al.*, 1999). This amount is assumed to be additive across individuals within a certain household and community.

Let i represent the individual in the j th household and k represent the community of j households then,

$$\sum_i WTP_i = WTP_j \text{ and } \sum_j WTP_j = WTP_k \quad (1)$$

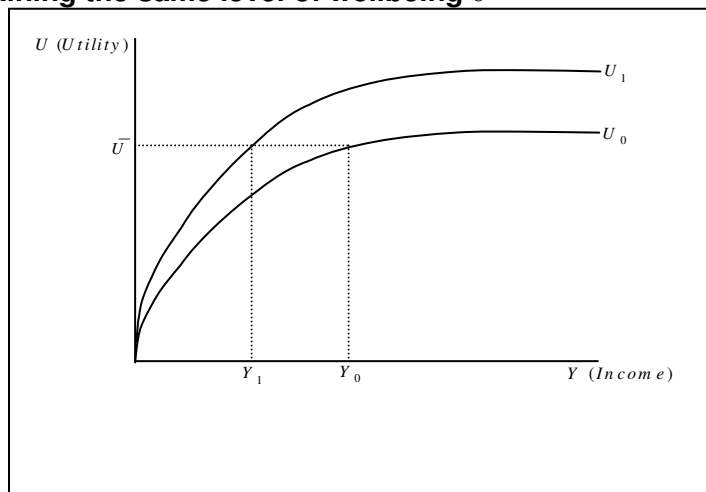
³ It is simply a survey-based device, which operates on the general assumption that one can put monetary valuation on certain classes of goods and services for which there is no market and therefore no price or compensation payment.

⁴ This is defined as the maximum amount an individual is willing to part with into the scheme. In this context, this may be referred to as *Equivalent Variation (EV)*. Smith *et al.* (1999a) favoured the use rather of this measure due to observed disparity in the WTA and WTP (WTA>WTP) following the NOAA panel's report.

⁵ This is the minimum amount an individual or household will be willing to accept to forego the initiation of the scheme. This may also be interpreted as the *Compensating Variation (CV)*.

If we further assume individuals to be *risk averse* with respect to income in demanding health care, and employing utility income mapping with the assumption that utility or well-being of an individual is dependent on income and health, the amount an individual will be willing to pay for an improvement in health (or in this case, the amount to be paid into the prepayment scheme) will be the amount of income the individual will be willing to part with while still leaving the individual on the same level of utility or well-being as before the payment.

Figure 1. The amount individuals are WTP for an improvement in health status still maintaining the same level of wellbeing \bar{U}



The maximum amount individuals are WTP for the improvement in health state as shown in **Erreur ! Source du renvoi introuvable.**, is defined as the gap between Y_0 and Y_1 measured as $Y_0 - Y_1$ where the curve U_0 denotes the original level of health status and U_1 denotes the improvement in health status. It can be immediately observed that the income level at an improved state of health is lower ($Y_1 < Y_0$) due to the payment, though the individual still maintains the same level of utility denoted by \bar{U} on an improved health state.

If the individual had to pay an amount higher than the amount $Y_0 - Y_1$, then the loss in income will more than offset the increase in well-being as a result of the increase in health status (Bala *et al.*, 1999; Johannesson, 1996). This implies that the amount an individual is WTP determines the level at which the individual values the health in relation to the income level and how serious the case of ill health may be. Since health care is not a good traded on the market as other commodities (Johannesson, 1996; Bala *et al.*, 1999), one cannot obtain valuations of WTP directly hence the use of the contingent valuation methodology (CVM).

2.2 An insurance theoretical framework

Here we present a simplified version of a health insurance theoretical framework

showing two major blocks: the insurer, and the consumer or insured⁶. For the insurer, there are many factors considered before structuring the nature of insurance plans to offer. Let the total profit for a health plan be given as p . That is the difference between the total revenue (the product of the price p_i and the number of enrollees n_i) across all the insurance products i and the total cost T_i of providing the services.

$$p = \sum_i p_i n_i - \sum_i T_i \quad (2)$$

The number of enrollees is a function of the price of the health plan (premium) p_i , other features of the health plan f_i such as the benefit package, and the prices p_c and features f_c of competing health insurance plans, if any. The total cost of providing the services is an additive function of medical cost q_i , administrative cost of maintaining the scheme a_i and other costs that are associated with ensuring internal control and product quality z_i .

$$n_i = f(p_i, f_i, p_c, f_c) \quad (3)$$

$$T_i = f(q_i, a_i, z_i) \quad (4)$$

The insurer structures the package to be attractive to the consumer so as to reduce adverse selection that escalates q_i (i.e. as a result of increased utilization) hence reducing the total cost function. Similarly, due to heterogeneity in the population, higher prices are more likely to exclude the poor who will be less willing to pay higher amounts and might also reduce the enrolment rates in case there are competing insurance plans. The insurer also takes account of the heterogeneity in the risks of the enrollees in setting the price to ensure that there is cross-subsidization of risks, where the rich cross-subsidize the poor and the healthy cross-subsidize the sick. This is related to the risk pool of the insurance plan.

For the consumer j , the decision about the choice of the health plan is based on that which maximizes the utility function of the consumer. The utility function of the consumer is a function of the net wealth level of the consumer after insurance costs are deducted $Y_j(1 - r_i)$ ⁷, the attractiveness of the insurance benefits offered $f(b_i)$, the health status H_j of the consumer, and other socio-economic, health and environmental factors z_j of the consumer.

⁶ Other complicated models may introduce the purchaser such as employer's plans where the employer is the purchaser. Such models are fairly simple extensions of the basic model provided here.

⁷ This is the same as the gap $(Y_0 - Y_1)$ in Figure 1.

$$\max U(Y_j(1 - r_i), f(b_i), H_j, z_j) \quad (5)$$

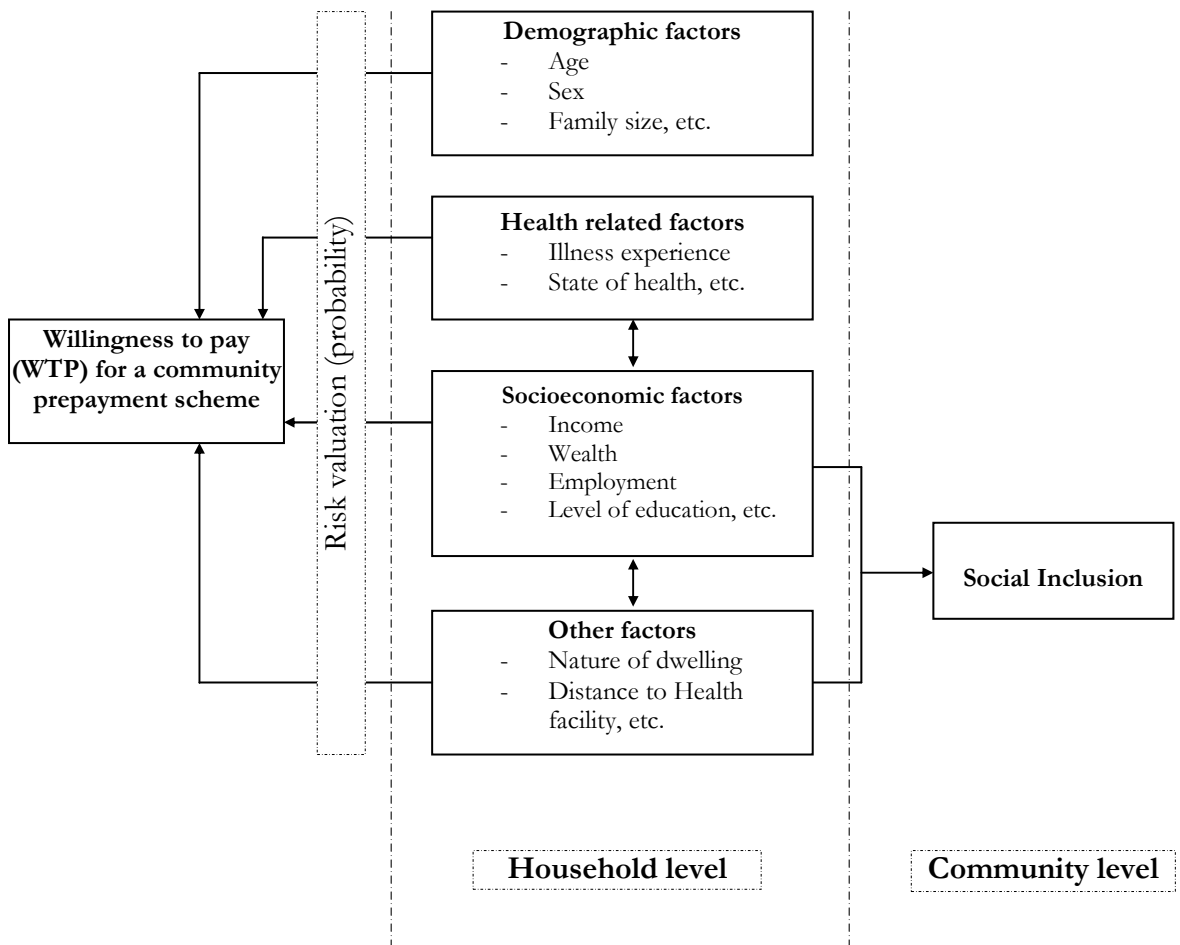
Considering the insurance market broadly, there are two main factors that motivate consumer's choice of insurance plans. The underlying preference of the consumer which guides their choice of health benefits is a key factor that determines the performance of insurers. This is linked to the basic theory of demand and supply. Most insurers take these consumer preferences into account when insurance plans are designed. For example, when the plan is targeted at rural communities, the nature of the plan varies considerably than when such a plan is targeted at the non-poor group. Also, the insurers face financial uncertainty with regard to the enrolment rate in each health plan as well as the costliness of health care utilization arising from the presence of the scheme. These considerations of high financial risk due to the heterogeneity of consumer's health status, or the uncertainty arising from the volume of information available to the insurer, the benefit structures, as well as the premiums charged, are carefully chosen and set to meet the basic requirement of health care and also reduce the overall risk facing the insurer.

2.3 Analytical Framework

Figure 2 presents a simplified framework for the analysis. The various blocks representing the links between variables and factors identified to influence households' willingness to participate in the health prepayment schemes are presented. From the figure, three basic divisions or levels are identified – the community, the household (or individual), and the 'product' of the interaction between the individual and the community which produces the valuation of interest.

Within these divisions, various blocks are presented as well as the manner by which they are possibly interlinked. From the household level, the various blocks – demographic factors, health related factors, socioeconomic factors, and other factors – influence the amount households are willing to pay for the establishment of the community prepayment scheme. These factors have to be evaluated by the household based on certain probabilistic statements such as the number of household members, the state of health of household members, level of income/wealth, experience with other forms of prepayment schemes, level of education attained, experiences with illness, certainty about the scheme and so on. Based on these, the household produces their valuation and it also incorporates the nature of the good under valuation.

Figure 2. Basic framework of analysis



The socio-economic and rural characteristics of households identify them within the community they live. This implies that these characteristics give the household social inclusion within the community. The tendency to maintain the social status and still gain community inclusion also affects households' stated amount to pay. Interactions also occur between rural characteristics and socioeconomic factors. This is because the choice of dwelling is sometimes dependent on the nature of employment and even to a greater extent on the earnings of the household. Similarly, socioeconomic factors such as income, employment level, and level of education influence the health status of household members. This is because the rich can easily afford better health care services than the poor. Therefore, the poor suffer more from ill health than the non-poor. More educated individuals are likely to know the benefits from investing in health care than the less educated, and they are likely to enjoy a better health status. Health status can also affect the productivity of

households by either limiting it during ill-health or increasing it in the absence of ill-health.

In the analysis, factors that influence the amounts households are willing to pay are explored. This implicitly incorporates households' probabilistic valuation to determine the nature of the relationships among the factors and which of the factors have a significant impact on the amounts households are willing to pay. From these factors, the average amounts households will be willing to pay will be obtained through the use of appropriate statistical analysis.

In the analysis of WTP data, probit or logistic regressions are often used when the responses are binary but Fonta (2006) noted some practical limitations with the use of these models for analysis. These limitations include the issue of censoring, non-response problems, sample selection problems, and uncertainty in the economic valuation process. In this regard, the next section of the paper proposes models for analysing the WTP data.

3. Brief review of CVM in Health and Health Insurance Valuations and Uncertainty in Contingent Valuation

3.1 CVM in Health and Health Insurance Valuations

The approach of Willingness to Pay has been used extensively in valuing specific benefits from health care interventions and programmes. These benefits include the initiation of an immunization programme, malaria prevention options, etc.

Recent studies in health insurance and community pre-payment schemes using the WTP approach include: Dong *et al.* (2003a; 2003b; 2004a; 2004b; 2005) in Burkina Faso estimating WTP for community-based insurance, comparing gender effects for a community-based health insurance scheme, and also analysing the differences in WTP of household heads for community-based health insurance premiums; Binam *et al.* (2004) in rural Cameroon valuing the WTP for a community prepayment scheme; and Asenso-Okyere *et al.* (1997) using the large informal sector of Ghana to value WTP for health insurance. Other studies include Mathiyazhagan (1998) in rural India valuing the willingness of rural households to pay for community health insurance arrangements through community involvement and participation; Jiang *et al.* (2004) in China estimating the willingness to pay for the Rural Cooperative Medical Scheme (RCMS); Asgary *et al.* (2004) in Iran estimating rural household's WTP for health insurance; and Asfaw & von Braun (2004) investigating the plausibility of community health insurance on poor rural households of Ethiopia.

These studies used various methods of eliciting WTP responses including the take-it-or-leave-it process, the iterative bidding game process, and the open-ended method. Other techniques such as the payment ladder approach, structured haggling technique (Onwujekwe *et al.*, 2005) and the *stochastic payment card* (SPC) approach (Wang, 1997b;

Wang *et al.*, 2004; Wang & Whittington, 2005) have not been found in the literature as being used for eliciting WTP insurance-based responses from respondents for health insurance.

For these studies, variables identified to influence the payment decisions of the respondents include age, income, gender, and distance to the nearest health facility. The summary amounts respondents are willing to pay include: Asgary *et al.* (2004) in Iran - US\$ 2.77 per household per month translating to US\$8.31 per quarter for enrolment; Asenso-Okyere *et al.* (1997) in Ghana - (64th percentile) of about US\$3.03 per month per household translating to US\$9.09 per quarter per household; Binam *et al.* (2004) in Cameroon - between US\$10.91 and US\$13.15 per person per year; Dong *et al.* (2003a; 2004a) in Burkina Faso - a range between US\$3.17 and US\$4.25 per individual per annum, and between US\$8.6 and US\$13.03 per household per annum.

In most of these CV studies, protest responses have traditionally been omitted from analysis *a priori*, which may likely bias the results as observed in most survey-based elicitations (see for example, Strazzera *et al.*, 2003; Calia & Strazzera, 2001) especially when these groups of protesters and non-protesters differ considerably in terms of observables and unobservables. Also, the method of payment that has been used in traditional analyses in health insurance CVM studies has been in direct monetary terms. Preker *et al.* (2001); Dave (1991); and Toonen (1995) have found out that in the Philippines, India and Bolivia, payment in-kind (community labour, agricultural commodities, etc.) have been accepted for some community-based health financing schemes, which have increased access to health care.

Based on these, the study extends its analysis to consider payment in-kind (agricultural commodities)⁸. The study also tests for the presence or otherwise of sample selection bias rather than estimating the model based only on the non-protesters *a priori*.

3.2 Uncertainty in contingent valuation

Decision of a respondent in a CV study is usually associated with uncertainty (Wang & Whittington, 2005). The various sources of this uncertainty include the nature of the good under study such as health and health care, the characteristics of the market that provides the good, the socio-economic and demographic characteristics of the respondents, the respondent's preferences (Wang *et al.*, 2004) and also as a result of the researcher (Li and Mattson, 1995). Various methods have arisen to handle mainly the uncertainty about the consumers' preferences (Hanemann, 1994), the uncertainty induced by the researcher, and the uncertainty in specifying a single bound value (see Wang and Whittington, 2005).

Applications of CV surveys that incorporate uncertainty into an individual's valuation

⁸ This does not include perishable commodities.

decision process are mainly inspired by the work of McFadden (1973) using a random utility maximization (RUM) framework (see Shaikh, et al., 2005). Authors such as Ready et al. (1995), Wang (1997a & 1997b), Welsh and Poe (1998), Wang and Whittington (2005), Fonta (2006) and Ichoku et al. (2007), were among the recent studies that attempted to account for uncertainty by using elicitation formats that indicate elements of randomness in the valuation process using various models.

This paper applies the Stochastic Payment Card design originally proposed by Wang (1997a) to handle uncertainty in responses arising from stating a single value as the maximum amount households are willing to pay. In this regard, this is among the first of its kind applied to the field of health insurance valuation.

4. Methodology

“Rather than suggesting that there is one universally correct approach to eliciting WTP-values, we would hold that it is the issue and the policy context that should determine the chosen approach” (Olsen et al., 2004: 226). In this regard, we proposed to use the stochastic Payment Card (SPC) design alongside the traditional Dichotomous Choice (DC) Format with open-ended questions to account for uncertainty in respondents’ responses. The DC method simply involves presenting to a typical respondent an amount which is randomly selected from a vector of prices and the respondent providing a dichotomous response (yes/no). An open ended follow-up question involves asking the respondent to provide the maximum amount he/she is willing to pay. The SPC design is simply another method of eliciting the amount respondents are willing to pay based on probability distribution over the vector of prices presented to the respondent on a card. We also proposed to use payment in kind in the form of agricultural commodities based on the policy context where the rural community is predominantly agrarian.

4.1 Study Population and Design

The study population for the research is rural households in the Nsukka Local Government Area (LGA) of Enugu State in Nigeria, which has a population of 309,633. About 52 percent of the population are females based on the 2006 National Populations Census (NBS, 2007). Nsukka LGA is located in the northern part of Enugu State, in southeastern Nigeria. It consists of 15 communities: Anuka, Okutu, Ibagwa-agu, Okpuje, Ibagwa-ani, Okpaligbo, Obukpa, Alor-uno, Edem, Obimo, Lejja, Ede-oballa, Opi, Ehalumona and, Nsukka. In 2003, there were two general hospitals run by the Enugu State Government, 20 primary health clinics run by the Nsukka Local Government, 20 private and mission hospitals, 25 private maternity centres, 11 private clinics and, a medical centre which is located in the University of Nigeria (Ichoku & Leibbrandt, 2003). The choice of the study area is purposively based on the researcher’s prior knowledge of and familiarity with

Nsukka, which according to Deaton (1997), enhances the accuracy of the econometric estimates to be obtained thereof, at least to a certain degree. It also strengthens the efficiency of the statistical inferences to be drawn about the study population. The study is purely a cross-sectional design.

Description of the nature of the proposed community health pre-payment scheme (Contingent Market)

Most of the time when people fall ill, they tend to adopt various ways of coping with such an event: selling off personal belongings like animals, electronic gadgets, and if the illness is intense, even land and landed property. Other times, households also tend to resort to borrow money from their neighbours, the church or religious organizations, or friends. This is because there is always a desire to get better again and if possible, quickly. If the individual or household fails in obtaining financial help, oftentimes the sick individual has no option than to remain in the state and begin to deteriorate. Others decide at this point to go for cheaper alternatives which might not be efficacious such as the use of traditional healers and medical practitioners. The scenario is also worse if the family finally obtains financial assistance only to discover that the sick individual has died.

With the nature of health care financing and the increased burden of diseases facing the rural poor in Nigeria, a [*hypothetical*⁹] non-governmental organisation (NGO) is proposing a community health pre-payment scheme to the rural dwellers. The scheme, which will have designated public health centres as points of utilization, will be managed by several committees¹⁰ comprising members selected from the community. The bulk of the premiums which are paid at the beginning of every quarter of the year is kept in the bank and managed by the financial committee while part of the premiums paid will be retained to serve for immediate payments for items such as transportation, drugs, and laboratory tests. To ensure financial accountability, the committee will from time to time give an up-to-date financial situation to the community. To further ensure the success of the scheme, a community health worker (CHW) will be stationed at each of the designated health centres to ensure that only those who contribute to the scheme receive their benefits.

To be eligible, a household is expected to pay a specified amount (premium) quarterly for a year to be able to receive health services for the period of one year. Once a member of a household (usually the household head¹¹) has paid into the scheme, all household members will be given a membership card that identifies them with all personal information and the same membership number for the household. This then entitles them to

⁹ The term hypothetical is used to signify the contingent nature of the market construct.

¹⁰ The committees include the financial and management committees, emergency committee, etc.

¹¹ Here, household head is the adult individual who is directly responsible for the household's financial decision.

benefits¹² that include consultations, diagnosis and laboratory tests, maternity, antenatal and postnatal care, family planning, cost of prescribed drugs under the Essential Drugs List (EDL), minor accidents, treatment of snake bites, cost of in-patient days for up to 30 days for any member of the household, and minor surgeries such as appendectomy and caesarean sections (but excludes heavy cost treatment such as plastic surgery) at any of the designated public health centres. Any other services not covered by the scheme will be borne by the household. The main idea is to cover the basic health care needs of the rural community, which include malaria and typhoid fever, tuberculosis, and diarrhoea.

This will help to increase access to health care services at the time of need and also to increase productivity of rural workers (including farmers), reducing the effect of sick days and the need to look after the sick rather than engaging in productive activities.

4.2 Willingness to Pay Estimation Technique

The likelihood of sample selection problems have called for the use of sample selection models¹³ over the Ordinary Least Squares. This is initially used to detect the presence or absence of sample selection bias. If sample selection bias is present, the use of OLS is no longer appropriate as the non-selected sample differs considerably from the sample used for analysis¹⁴ (Strazzera *et al.*, 2003). In estimating the sample selection model, the Heckman's 2-step procedure was employed. The first step of the estimation involved estimating the decision of households to participate by making payments through a probit model, while the second step involves an estimation of the maximum amount households are willing to pay on covariates including the Inverse Mills' Ratio (IMR) obtained from the first step. The second step estimation involves only those observations that have 'non-negative' willingness-to-pay amounts. These are individuals who are actually willing to make payments into the scheme. This procedure was followed in order to obtain summary statistics that reflect the population from which the sample was drawn to determine if there is presence of sample selection bias. The non-significance of the IMR introduced into the

¹² These benefits were initially chosen to be similar to those proposed for the RCSHIP to ensure that the amounts to be elicited do not vary from those intended for the scheme.

¹³ The sample selection model framework takes into account the fact that the value elicited from individuals is a result of two separate but possibly correlated stochastic processes. This is interpreted as: the individual assigning a value to the good under consideration according to some underlying choice model, and also decides whether to disclose such assigned value (which in this case is the reservation price or the maximum amount the individual is willing to pay) or not according to another choice model (Strazzera *et al.*, 2003; see also Heckman, 1979). This implies the estimation of two separate but linked equations which can be termed the selection or participation, and the valuation or outcome equations.

¹⁴ Initially sample selection models were estimated for the presence of sample selection bias but this bias was absent hence the sample selection models were omitted.

second step model signifies the absence of sample selection bias hence the estimation was performed on the sample of respondents with non-negative WTP amounts¹⁵.

In order to obtain the factors that determine the choice of participating in the scheme, simple probit estimation was performed. These are also the results of the first step of the sample selection model. The OLS estimation technique was then used to estimate the valuation equation and obtain the factors that affect household's WTP.

Let Y_2 represent the revealed amount from the follow-up WTP question that asks the respondent the maximum amount he/she will be willing to pay. Let z also represent the vector of covariates (socio-economic and health characteristics, etc.) on the respondent generated through the questionnaire and Y_1 denote a dichotomous variable which assumes the value of unity if we have information pertaining to the respondent's true WTP and 0 if otherwise. We specify the willingness to pay or valuation model using the Ordinary Least Squares method of estimation as:

$$E(\ln Y_{2i} | z_i, Y_{1i} = 1) = z_i \phi \quad (6)$$

Estimating the parameters of the valuation equation with any of the standard econometric software, in this case, Stata 9.2, we obtain the mean and median WTP as shown in equations 7 and 8. This is because of the lognormal distribution of the variable Y_2 with parameters $z \phi$ and s (see Strazzera et al., 2003).

$$\text{Mean} = E(Y_2) = \exp(z \phi + s^2/2) \quad (7)$$

$$\text{Median} = \exp(z \phi) \quad (8)$$

Where s is the standard error of the estimate.

For analyses, the wealth measure was divided into three categories as shown in Table 2 and is used as a categorical variable in order to assess how willing the 'very poor' are relative to the 'less poor'¹⁶.

¹⁵ See appendix III for the results of the sample selection model

¹⁶ The categorization is simply used to group the respondents relative to themselves. Therefore, the 'very poor' and the 'less poor' are not necessarily linked to any specific poverty line.

Table 2. Categorization of the wealth measure

Categories	Wealth measure (₦) (annual)
Wealthmeasure1	< 60,000
Wealthmeasure2	60,000 – 120,000
Wealthmeasure3	>120,000
Total	

* Number of observations.

4.3 The Random Valuation Model for the SPC Design

This model assumes that the value placed by individuals on a good or service is a random variable with an underlying distribution rather than a single point valuation (Wang, 1997b; Wang & Whittington, 2005). Under this design, each respondent (a utility maximizer) is presented on a ‘card’ with numerical likelihood corresponding to some qualitative likelihood references such as ‘definitely yes (100%)’, ‘probably yes (75%)’, ‘not sure (50%)’, ‘probably no (25%)’, and ‘definitely no (0%)’ that the respondent will agree to pay a specified amount for the scheme from an array of prices¹⁷. If a utility maximizer offers answers to at least some of the prices, a likelihood matrix can be observed. This likelihood matrix is then interpreted as a record of the individual’s cumulative valuation distribution function or the individual’s probabilities of accepting different proffered payments (Wang et al. 2004; Wang & Whittington, 2005).

The use of the SPC approach allows the respondent to randomly assign probability values over a range of prices. In this case, the level of certainty in the prices presented to the respondent becomes obvious. A respondent who provides a probability value close to unity for any price on the card is more certain about paying the price than respondents who state a lower probability value. Theoretically, the use of dichotomous responses may induce the respondent to provide a negative response when actually there is an underlying level of certainty for the response. However, the response provided may not necessarily mean a zero probability value. Under the dichotomous model for example, if a respondent is presented with X naira as the bid, based on her underlying preference structure, she may turn down the bid by giving ‘no’ as a response. For the SPC design, however, the respondent is presented the same bid and she may state a probability value of 0.5 (‘not sure’) or even 0.75 (‘probably yes’). In this way, the level of uncertainty in the responses based on the preference of the respondent is obtained and analysed statistically.

In the SPC design, the probability that a utility maximizer with a cumulative valuation distribution function $F[g]$ would accept the offer presented on the card design at price of T , is given as:

$$\Pr(Yes) = \Pr[v(Y - T, p, H^1, e) > v(Y, p, H^0, e)]$$

¹⁷ This is contained in appendix I.

$$\begin{aligned}
&= \Pr[v(Y - T, p, H^1, e) > v(Y - WTP, p, H^0, e)] \\
&= \Pr[WTP > T] \\
&= 1 - F[T]
\end{aligned} \tag{9}$$

Where v represents an indirect utility (i.e., utility at given prices and income); Y the consumer's income; p the price vector faced by the consumer; H^0 and H^1 are the alternative health states where $H^1 \neq H^0$; WTP is the respondent's true value for the scheme while T is the offered start price in the CVM design.

From equation (9), the cumulative valuation distribution function $F_i[g]$, the valuation probability density function, as well as the mean and variance of the probability function, can be estimated with the likelihood matrix data obtained using the SPC approach. From equation (9), the valuation distribution is estimated as follows:

$$P_{ij} = 1 - F_i[T_{ij}] \tag{10}$$

Where, P_{ij} is individual i 's probability of agreeing to pay the price of T_{ij} indicated at the j^{th} payment point; and $F_i[g]$ is his/her cumulative valuation distribution function. Under the assumption that $F_i[g]$ is normally distributed we have:

$$\begin{aligned}
P_{ij} &= 1 - F\left(\frac{m_i - T_{ij}}{s_i}\right) \\
T_{ij} &= m_i + s_i F^{-1}(1 - P_{ij})
\end{aligned} \tag{11}$$

Then, with each individual's set of T_{ij} 's and P_{ij} 's contained in the likelihood matrix obtained using the SPC design, simple regression can be used to estimate the mean and variance (m_i, s_i) of each individual's valuation distribution. Subsequently, regressions can be conducted to obtain the determinants of mean and variance. However, for some individuals, mean and variance valuation cannot be observed¹⁸. These cannot be excluded from the analysis on an *ad hoc* basis, hence preliminary sample selection models are also used to statistically test for the significance of their exclusion¹⁹. In actual estimation of the mean and variance functions, the values 0.001 and 0.999 were used in place of 0 percent and 100 percent respectively as suggested by Wang *et al.* (2004).

¹⁸ These individuals include: (1) those whose probability for all the offered prices/bids are the same irrespective of how high it is, (2) Individuals who provide inconsistent probabilities for the offered bid on the card.

¹⁹ The result of the sample selection model shows that sample selection bias is absent. These results are presented in appendix III.

4.4 Data Requirements and Sources

Contingent valuation studies of this nature require the use of primary data. These data are usually obtained through interviewer-administered structural questionnaires (see Smith *et al.*, 1999b) rather than through the use of mails or self-administered questionnaires. Information elicited from rural household heads includes information on health variables, socio-economic characteristics, environmental and dwelling characteristics, and the WTP question (both the dichotomous choice and the stochastic payment card)²⁰. For the willingness-to-pay analysis using the dichotomous choice method with follow-up questions, data requirements include eliciting the maximum amounts households are willing to pay (cash and/or commodities)²¹ and using debriefing questions to identify protest responses. These are respondents who do not provide a positive response to the valuation question. For the stochastic card design, in addition to the socio-economic, health and demographic data, probability values are also elicited for constructing the likelihood matrices of respondents.

A two-stage selection procedure was used to select the sample of 380 households for administering the questionnaire. The first stage randomly selects five out of the 15 communities in Nsukka LGA namely; Obukpa, Edem, Nsukka, Ibagwa-Ani and Ehalumona. From these five communities, the enumeration listing booklet of the Federal Office of Statistics (FOS) - now the National Bureau of Statistics (NBS) - was used to select four Enumeration Areas (EAs) from each of the five communities. In the second stage, a simple systematic random sampling technique was used to select 19 households from each of the EAs.

The sample of households was appropriately weighted during analysis²². Under the weighting, each household selected from each enumeration area (EA) is weighted to make it representative of the entire EA such that the sum of the weights for each EA should equal the approximate number of households in that EA.

4.5 Data Collection Tool and Description of the Sample

The data collection tool is a structured questionnaire, administered by trained enumerators to household heads in the local language (Ibo language) of the community. It is divided into two broad sections. The first section comprises questions on general household and personal information including demographic characteristics, health, assets, housing and wealth information, and willingness of community participation. The second section, which is

²⁰ See Table 3 for description of the variables elicited.

²¹ For the use of commodities, the current market prices of the commodities were used as weights attached to the various commodities before aggregation.

²² In stata, this is implemented using the `aweight` option, though this was not available for the 2-step estimation.

the crux of the questionnaire, administers the contingent valuation questions (the dichotomous choice with follow-up question and the SPC design) after presenting to the respondent a description of the proposed hypothetical scheme. The interview schedule was structured to start with easy and 'less-threatening' questions linked to the study, followed by questions which enhanced the confidence of the respondent. This provides the context for the valuation questions that follow immediately.

The elicitation formats used are the Dichotomous Choice (DC) with open-ended follow-up questions²³ and with debriefing questions²⁴, and the Stochastic Payment Card approach. The DC elicitation format was chosen because of its incentive-compatibility²⁵ feature compared to other formats (Mitchell & Carson, 1989). Similarly, Dong *et al* (2004b) noted that the DC format is appropriate and more feasible if literacy level is quite low, as in the case of the rural study population under consideration. The open-ended question format was therefore avoided because it is less reliable (Hanemann, 1991b) and lacks incentive compatibility even though the open-ended format is recommended by Smith *et al.* (1999b). The Stochastic Payment Card was used to incorporate uncertainty in CV responses.

The scenario of the pre-payment scheme (the hypothetical scheme) is described in detail to the respondent. This includes the nature of the scheme, the organisation, the membership criteria, and the expected benefits. The bid amounts used for the DC approach involved five prices – ~~N200~~, ~~N400~~, ~~N600~~, ~~N800~~ and ~~N1000~~ (See Appendix I for a sample of the DC design). These bids were based on an earlier pilot study or pre-testing in the language of Bonato *et al.* (2001) and the amounts paid by households who are members of any form of pre-payment schemes that were not necessarily health care pre-payment schemes. These prices were assigned randomly and roughly proportionately to the number of households in the study sample. For the Stochastic payment Card design, the bid vector used include ~~N0~~, ~~N200~~, ~~N400~~, ~~N600~~, ~~N800~~ and ~~N1000~~ with the following assigned probability values for each of the bid amounts '0% (definitely no)', '25% (probably no)', '50% (not sure)', '75% (probably yes)', and '100% (definitely yes)'. See appendix II for the sample of the stochastic payment card design.

²³ Follow-up involves asking the respondents the maximum amounts they are willing to pay for the scheme.

²⁴ These debriefing questions are asked of respondents who are not willing to pay any amount, to obtain likely reasons for not willing to pay. This is important for analysis in differentiating true zeros from protesters

²⁵ This is also known as truth-telling or self-selection.

Table 3. Description of the variables used in analysis

Variable	Definition	Description
Male	Gender variable 1 = male and 0, otherwise	Dichotomous
Educ	Highest attained level of formal education 0 = no schooling; 1 = primary school; 2 = secondary school and 3 = tertiary schooling	Categorical
Knowinsurance	Knowledge of what health insurance or any form of insurance is all about or the basic concept of insurance 1 = know and 0, otherwise	Dichotomous
Floormaterial	Nature of floor material 1 = cement/tiles/concrete and 0, otherwise	Dichotomous
Toilet	Ownership of toilet facility 1 = own and 0, otherwise	Dichotomous
Bathroom	Ownership of bathroom 1 = own and 0, otherwise	Dichotomous
Numrooms	The total number of rooms in the occupied building excluding the living/dining room, kitchen, toilets and bathrooms	Discrete (count)
Wealthmeasure	Proxy measure for income level of households. This includes considering durable assets, household building materials, ownership of livestock, economic trees, etc. which are further converted into their current market value using current market prices. The market prices used were obtained as the amount it will cost the household to sell the items.	Continuous
Bid	Start prices presented to the respondents Ranging from 200, 400, 600, 800 to 1000 Naira	Categorical
WTPamount	The maximum amount the respondent is willing to pay into the scheme measured in Naira	Continuous
Age	The Age of the respondent at the last birthday (in years)	Continuous
HHnumber	Total number of household members living together usually as a nuclear family unit (Household size)	Discrete (count)
Sick	Indicating whether or not any household member fell ill in the past two weeks prior to interview 1 = sick and 0, otherwise	Dichotomous
WTP	Dichotomous variable indicating whether or not the individual accepts the offered Bid 1 = accept and 0, otherwise	Dichotomous
Employed	Whether the respondent is employed or not both in the formal and informal sector. 1 = employed and 0, otherwise	Dichotomous
Participation	Indicating whether or not the respondent or any household member has participated in any health insurance scheme before or are currently enrolled in one 1 = participated/participating and 0, otherwise	Dichotomous
Hstate	The general state of health of the respondent at the time of interview 1 = Poor; 2 = Fair; 3 = Good; 4 = Very good; 5 = Excellent	Categorical
Meanstreat	The general and often 'usual' means of seeking treatment when any member of the household falls ill 1 = orthodox and 0, otherwise	Dichotomous
QHcentre	The general rating of the quality of the health centres nearest to the respondent 1 = Poor; 2 = Fair; 3 = Good; 4 = Very good; 5 = Excellent	Categorical
Dwelling	Nature of dwelling defined by the building and construction materials used 1 = cement/concrete; 2 = thatched; 3 = wooden structure	Categorical
Trust	Indicating the level of confidence in any community trust fund or where funds are pooled together and managed by the community 1 = Highly distrust; 2 = Distrust; 3 = Trust; 4 = Highly trust	Categorical
Treatamount	Amount spent on treatment of any household member during the past four weeks. This includes the quantifiable indirect and direct costs measured in Naira.	Continuous
Borrowedamount	Amount borrowed for the treatment of any household member during the past four weeks where any household member has fallen sick. This also includes the monetary worth (measured in Naira) of sold items.	Continuous
Distance	The distance from the household to the nearest health centre measured to the nearest Kilometres.	Continuous

The variables used in the analyses are contained in Table 3. This also includes how they are measured.

5. Results and Discussion

In Tables 4 and 5, we provide the summary statistics describing the sample population. The average and median household size is 6 members living in an average of 4 rooms. Over 95 percent of these households have bathrooms, and only about 46 percent have toilet facilities. Most of the household heads interviewed (99%) are either employed in the formal sector by the Local Government Authority (though mainly as menial labourers and clerks) or the informal sector as craftsmen, petty traders, and farmers. Most of the respondents were engaged in farming, which may not necessarily be as a full time occupation. This limited the direct observation of household income. Based on the pilot testing, a proxy measure²⁶ of wealth was adopted as also suggested by Fonta (2006).

On the average, ₦121,714.20 (US\$936.26)²⁷ is a household's wealth per annum or ₦10,142.85 per month. From the sample, 63 percent of the respondents are male household heads while only 37 percent are female household heads, which is typical of most African household setting. This is also reported in the National Living Standard Measurement Survey in Nigeria where there were about 18 percent female rural household heads (FOS, 2004). The average and median age of household heads that participated in the survey is about 52 years and 51 years, respectively. This result also conforms to the national averages obtained by the National Bureau of Statistics from the National Living Standard Survey. The survey reports the national median/mean age of respondents to be between 45 years and 49 years while the median/mean is between 50 years and 54 years for Enugu State, which is the State of study (FOS, 2004). The median and average distance from households to the nearest health centre is about 3km and 3.3km respectively, with the maximum being about 10km.

Table 4. Summary statistics of the variables elicited

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
Male	0.63	1	0.48	0	1
Knowinsurance	0.11	0	0.31	0	1
Floormaterial	0.82	1	0.39	0	1
Toilet	0.46	0	0.50	0	1
Bathroom	0.96	1	0.19	0	1
Numrooms	4.13	4	1.61	1	11
Wealthmeasure [*]	121714.20	82600	114741.20	5000	810700
Wealthmeasure1	0.36	0	0.48	0	1
Wealthmeasure2	0.24	0	0.43	0	1
Wealthmeasure3	0.40	0	0.49	0	1
Bid	598.71	600	283.30	200	1000
Age	51.69	51	12.56	18	99
HHnumber	6.10	6	3.09	1	25

²⁶ See Table 3 for a brief description of how the variable - Wealthmeasure was measured. Another method used in some empirical studies is asset indices.

²⁷ As of the time of survey, the exchange rate stood at US\$1 \cong ₦130.

Sick	0.40	0	0.49	0	1
WTP	0.59	1	0.49	0	1
Employed	0.99	1	0.11	0	1
Participation	0.03	0	0.18	0	1
Meantreat	0.55	1	0.50	0	1
Dwelling	0.85	1	0.36	0	1
Treatamount*	763.35	0	2611.61	0	25000
Borrowedamount*	666.36	0	3250.75	0	32000
Distance	3.33	3	2.09	1	10
Total	309	309	309	309	309

* Measured in Naira

Also, about 40 percent of the respondents indicated a household member falling sick within the last two weeks prior to the interview. The cost of treatment is high for the rural poor. On the average, rural households spend ₦763 (\$5.87) across the whole sample of respondents within four weeks. The amount borrowed for treatment including money obtained from the sale of valuable assets and property averaged across the entire respondents is about ₦666. This figure makes up over 87 percent of the amount spent on treatment averaged across the total respondents. It shows the huge financial burden created by ill health and the poverty implications of health care payments when households have to borrow to finance health care payments. This burden is created because health care payments are usually forced payments since there is the desire to get well immediately. The knowledge of health insurance or any other form of insurance is quite low among the sample of respondents. This will not be any different from the general population of rural dwellers as only about 11 percent of the respondents claimed knowledge of what insurance is all about. These respondents are mainly those who live close to the urban town of Nsukka. Similarly, only 3 percent of the respondents claimed to have participated in any form of insurance (not necessarily health-related) in the past or at present.

In Table 5, literacy level of the respondents is low. Over 77 percent of the respondents have not had more than seven years of formal education. This also characterizes the rural population in Nigeria as over 88 percent of the country's rural population have not been formally educated beyond the secondary school level. This statistics is as high as 95 percent for Enugu State (FOS, 2004). Confidence in the community scheme where funds are pooled together and managed by the community as expressed show that about 78 percent of the respondents are confident with such schemes, which gives a high indication of credibility for establishing such a scheme.

Table 5. Proportions of categorical variables used in analysis

Variable	Category	Proportion (%)	Cumulative proportion (%)
Educ1	No schooling	42.72	42.72
Educ2	Primary School	34.30	77.02
Educ3	Secondary School	14.56	91.58
Educ4	Tertiary School	8.41	100
Hstate1	Poor	6.80	6.80
Hstate2	Fair	33.01	39.81
Hstate3	Good	46.60	86.41
Hstate4	Very Good	13.59	100
Hstate5	Excellent	0.00	100
Qhcentre1	Poor	4.21	4.21
Qhcentre2	Fair	36.57	40.78
Qhcentre3	Good	46.60	87.38
Qhcentre4	Very Good	12.62	100
Qhcentre5	Excellent	0.00	100
Trust1	Highly Distrust	3.56	3.56
Trust2	Distrust	18.45	22.01
Trust3	Trust	43.69	65.70
Trust4	Highly Trust	34.30	100
Bid	200 naira	24.00	24.00
	400 naira	23.00	47.00
	600 naira	19.00	66.00
	800 naira	18.00	84.00
	1,000 naira	16.00	100

Over half (60.2%) of the household heads reported health status above 'Good' as of the time of interview. Similarly, over half (55%) of the respondents seek health care from orthodox²⁸ health care providers while 45 percent patronize herbalists, traditional healers, and most especially patent medicine stores as has been identified by Brieger (2002) and Ogunbekun *et al.* (1999). Some of the respondents that claimed to visit the formal providers likely do so mainly as a result of complications and further deterioration of health and the perceived quality of care at these health centres. More than half (59%) of the respondents adjudged the quality of the health care centres nearest to them as at least 'Good'.

For the DC questions, the number of respondents accepting the bid amount declined with increasing bid amount as shown in Table 5. This is typical of any 'normal' good with an inverse demand function.

Table 6. Distribution and categorization of responses

Category	Cash		Commodities		SPC Design	
	OBS	%	OBS	%	OBS	%
Valid responses	235	61.8	246	64.7	267	70.3
Protest zeros	30	7.9	63	16.6	39 ^x	10.3
Internally inconsistent responses	44	11.6	–	–	–	–
Refusal	71	18.7	71	18.7	74	19.4
TOTAL	380	100.0	380	100.0	380	100.0

²⁸ Orthodox providers are categorized as clinics, maternity centres, dispensaries, and hospitals. The unorthodox providers are categorized as patent medicine stores, traditional healers and herbalists, etc.

^x Of the 39 respondents categorized as invalids, 12 provided probability of 100% for all bid amounts, 8 provided 75% for all bid amounts, 1 provided 50% for all the bid amounts, 10 provided 25% for all the bid amounts, 3 provided 0% for all the bid amounts, while 5 provided inconsistent responses.

In Table 6, the distribution and characterization of the responses is presented. *Protest responses* are identified as the group of respondents who protested against contributing (either in cash or in kind) to support the proposed scheme. Generally, this group of *Protest responses* are further divided into two – *The protest zeros* and the *internally inconsistent responses*. True zeros, which are categorized as valid responses, are those who place zero value on the scheme because they cannot genuinely afford payment in cash or in kind. Internally inconsistent responses as used here imply respondents who either (1) accept the initial bid offered and give, as the most they are willing to pay, an amount that is at least 10 percent lower than the offered bid; or (2) accept the initial bid and offer to pay an amount greater than 10 percent of income measure (this is to guard against *catastrophic health care payments*). Valid responses²⁹ for the use of cash, commodities and the SPC design were 62 percent, 65 percent and 70 percent of the sample of respondents, respectively. The invalid or protest responses for the use of cash, commodities and the SPC design are 19.5 percent, 16.6 percent and 10.3 percent respectively. Those categorized as refusals are those who did not provide answers to the valuation questions and those who could not be interviewed by the enumerators. These account for 18.7 percent in both the use of cash and commodities and 19.4 percent in the SPC design.

Attempts were made to reduce the refusals through the use of call-back cards especially for those who were not available for interview. Since the principle of freedom of response was being observed, the enumerators could not persuade the respondents who refused to provide answers to the valuation questions. In order to reduce this, where the respondent is not clear on the nature of the scheme, a repeat was done to ensure that the response provided corresponds to the true WTP as much as possible.

As a preliminary test for the presence of sample selection bias, a simple comparison of the difference in the means of the covariates of the two groups (protesters and non-protesters) is performed. There were observed statistical differences in some of the variables, which suggested the need for a more formal test. However, the formal test using the Heckman's approach showed that sample selection bias is not a serious issue. The results are presented in appendix III.

5.1 Covariates of rural households' decision to prepay

In Table 7 we present the results for the selection or participation equation specified as a probit equation of participation on various household covariates. These are the factors that influence the probability of the respondent in reporting a positive WTP (i.e. the probability of participating). They may be used as a means of understanding the self-

²⁹ The reader may note that valid and invalid responses are synonymous to non-protesters and protesters respectively.

selection induced by differences in responses to the WTP question posed to the respondent (McClelland *et al.*, 1993). Among these factors for the use of cash are gender, distance to the nearest health facility, number of rooms in the dwelling, wealth, and the initial bid amount. Male-headed households are more willing to pay than female-headed households; wealthy households are also more willing to pay than less wealthy households and this has been reported by previous studies such as Dong *et al.* (2003a) Binam *et al.* (2004) and Asenso-Okyere *et al.* (1997). Households faced with higher bids are less willing to pay than those faced with lower bid amounts. Households that have to travel long distances to access health care are more willing to pay than households that have to travel less distances.

Table 7. Probit estimation of participation

Parameter	Cash		Commodity		SPC [Mean Eqn]	
	Est.	S. Err.	Est.	S. Err.	Est.	S. Err.
Constant	6.915	1.492***	-2.970	1.435**	0.237	1.555
Male	0.794	0.202***	-0.009	0.211	0.176	0.216
Age	-0.007	0.008	0.008	0.009	-0.003	0.009
Sick	0.270	0.192	-0.438	0.200**	-0.074	0.203
LDistance	0.457	0.160***	0.840	0.182***	0.145	0.165
Toilet	-0.004	0.223	-0.405	0.239*	-0.433	0.241*
Bathroom	0.179	0.445	0.523	0.465	0.770	0.496
Numrooms	0.148	0.065**	0.088	0.064	-0.146	0.066**
Wealthmeasure1	-0.706	0.252***			0.468	0.288*
Wealthmeasure2	-0.077	0.251	0.252	0.307	0.118	0.242
Wealthmeasure3			0.038	0.240		
LBid	-1.105	0.203***	0.084	0.186	0.053	0.189
Educ1	-0.036	0.323	0.333	0.372	0.443	0.391
Educ2	-0.121	0.315	0.552	0.371	0.161	0.371
Educ3			0.093	0.374	0.230	0.391
Educ4	0.089	0.385				
Qhcentre1					0.550	0.670
Qhcentre2	-0.189	0.495	1.599	0.459***	0.019	0.314
Qhcentre3	-0.283	0.495	1.461	0.454***	0.423	0.297
Qhcentre4	-0.177	0.546	1.243	0.495**		
Trust1	0.296	0.518	0.223	0.480		
Trust2					-0.147	0.526
Trust3	-0.108	0.250	-0.088	0.268	-0.013	0.518
Trust4	0.145	0.276	0.325	0.295	0.076	0.504
Log likelihood		-127.90		-110.76		-103.38
LR chi-squared		84.39***		91.03***		26.73*
% correctly predicted		82%		84%		87%

, **, *** Significant at 10%, 5% and 1% levels respectively.

For the use of commodities, factors that predict probability of participation include: recent experience of sickness, distance to the nearest health centre, ownership of toilet, and the perceived quality of service at the health care centre. Households that have to travel longer distances to access health care are more willing to pay than those who have to travel lesser distances. Also, households that perceive the quality of health centre services as good are more willing to pay than those that perceive the quality as lesser. Households that own toilet facilities are less willing to pay and this could be as a result of the nature of toilet

facilities owned by rural dwellers (these are mainly pit toilets, as has been observed in national surveys such as the National Living Standard Survey, 2004). Households that have recorded a household member sick are less willing to pay than their other counterparts and this could be as a result of the correlation between poverty and burden of illness.

Similarly for the SPC mean equation shown in Table 7, we have ownership of toilet, number of rooms in the dwelling, and the measure of wealth. Households who own toilet facilities are less willing to pay than those who do not. The more the number of dwelling rooms, the less households are willing to pay and this could be linked to the problems of larger family sizes for rural households. This is because households with larger household sizes are more likely to be poorer than those with smaller household sizes and this has been supported by national studies such as the National Living Standard Survey (FOS, 2004). As a measure of model selection and predictive power, we employed the percentage of correctly predicted probabilities for the probit model as discussed in Wooldridge (2002).

In Table 8 we present the results of the valuation or WTP equations for the use of cash and commodities as the payment vehicle as well as for the SPC design. For the use of cash, this is the result of the estimation of the maximum WTP amount of households on the other covariates including the household socioeconomic, demographic and health characteristics. For the use of commodities, the maximum amount is replaced with an amount based on the commodities while the SPC design simply used the distribution based on equation (11) to obtain the means. The means are then regressed against the other covariates. Because of the absence of sample selection problem for all the analyses³⁰, the Least Squares specification was used.

Table 8. Willingness to pay equations for the use of cash, commodities and SPC

Parameter (1)	VALUATION EQUATION					
	Cash as payment vehicle		Commodities as payment vehicle		SPC	
	OLS		OLS		Mean Equation – OLS	
	Est. (2)	S. Err. (3)	Est. (4)	S. Err. (5)	Est. (6)	S. Err. (7)
Constant	4.285	0.613***	7.064	0.368***	5.769	0.197***
Male	0.048	0.094	0.195	0.085**	0.114	0.063*
Hhnumber	0.017	0.015	-0.027	0.013**	0.017	0.010*
Educ1	-0.443	0.179***	-0.083	0.164		
Educ2	-0.442	0.175***	0.118	0.162	0.111	0.073
Educ3	-0.197	0.193	-0.148	0.193	0.238	0.096**
Educ4					0.565	0.118***
Hstate1			0.083	0.170		
Hstate2	-0.176	0.198			0.192	0.129
Hstate3	-0.460	0.206**	0.206	0.108*	0.114	0.130
Hstate4	-0.194	0.226	0.168	0.148	0.079	0.150
Qhcentre1	0.023	0.210				
Qhcentre2	0.239	0.103**	-0.855	0.293***	-0.112	0.149

³⁰ The result of the sample selection model is presented in Appendix III

Qhcentre3			-0.610	0.299**	-0.221	0.149
Qhcentre4	0.224	0.138*	-0.633	0.315**	-0.071	0.166
Trust1			-0.044	0.255	-1.429	0.166***
Trust2	-0.152	0.241	-0.166	0.124	-0.317	0.082***
Trust3	-0.190	0.234	-0.210	0.098**	-0.068	0.071
Trust4	-0.138	0.234				
Numrooms	0.061	0.028**	0.053	0.027*	0.025	0.020
Ldistance	-0.043	0.021**	0.058	0.020***	0.001	0.015
Wealthmeasure1	-0.293	0.111***	-0.166	0.101*		
Wealthmeasure2	-0.072	0.103	-0.196	0.099**	0.177	0.075**
Wealthmeasure3					0.221	0.077***
LBid	0.037	0.077***				
Adj. R-Squared	0.27		0.30		0.36	
F - Ratio	5.62***		6.76***		9.43***	

, **, *** Significant at 10%, 5% and 1% levels respectively.

In Table 8, **LBid** is positive and statistically significant for the use of cash implying the presence of starting point bias³¹. This bias Mitchell & Carson (1989) explained as occurring when the respondent's WTP amount is influenced by the value introduced in the scenario and the respondent may regard the proposed amount as conveying an approximate value of the good's true value, hence anchoring her stated amount on the start price. However, no specific method was used to compensate or adjust for starting point bias as Mitchell & Carson (1989) have also noted.

Another very important variable that influenced the amount households are WTP is the measure of wealth. The less wealthy are willing to pay lesser amounts compared with the wealthy. This signifies that richer households accept to pay higher amounts than poorer households. The economic intuition behind this suggests that income is very important in determining the demand behaviour for any good. This finding with respect to income is a debate and argument about the WTP approach in healthcare valuation. This is because the amount respondents are WTP is an increasing function of their ability to pay (ATP) (see Smith *et al.*, 1999a:12)³². This also means that poorer households who are less able to finance health care payments are more likely to suffer from ill-health that will also create poverty burden on the households. If households are not able to finance health care payments, they may resort to borrowing or even leaving the illness untreated until it further deteriorates.

Health status of the household head is another important factor that affects how much households are willing to pay. For the use of cash, respondents with better health

³¹ This procedure of testing for starting point bias is a modification of Thayer (1981) discussed in Mitchell & Carson (1989). For further investigation into the nature of this bias, see Mitchell & Carson (1989); Cummings *et al.* (1986).

³² See Smith *et al.* (1999a) for a detailed argument. They raised some potential reactions to this issue. (i) If the current income or wealth distribution is optimal, then those with greater command over resources should have greater influence on the way resources are allocated; and (ii) If the distribution is sub-optimal, redistribution will not involve tampering with the results but rather by the use of direct redistribution measures of taxation and subsidy.

status are willing to pay lesser amounts when compared with respondents with poorer health status. However, the reverse is the case for the use of commodities and the SPC format even though the results for the SPC format are not significant.

The educational level of the respondent determines the amounts they are WTP. For the use of cash, household heads who are less educated are WTP lesser amounts than those who are highly educated. This bears correlation with the level of income because the non-poor are more likely to be more educated than the poor. The same result is observed for the SPC design. Educational attainment is however not significant for the use of commodities. The distance to the nearest health facility is also a major determinant of the amounts households are willing to pay. For the use of cash, there is a negative relationship and this relationship is positive for the use of commodities and the SPC design even though it is not significant for the latter. Male-headed households are more willing to pay higher amounts than their female counterparts which might be a result of cultural reasons, where the males are responsible for most financial decisions within the household. This is also reported in a similar study by Dong *et al.* (2003b). Other important variables include the household size, and the number of rooms in the household.

Table 9. Willingness to pay equations for the SPC design
SPC VARIANCE EQUATION

Parameter (1)	OLS	
	Est. (2)	S. Err. (3)
Constant	4.895	0.200***
Male	-0.232	0.074***
Hhnumber	-0.009	0.011
Educ1		
Educ2	0.125	0.085
Educ3	0.017	0.112
Educ4	0.036	0.138
Hstate1		
Hstate2	-0.065	0.150
Hstate3	0.076	0.152
Hstate4	-0.035	0.175
Qhcentre1	0.188	0.174
Qhcentre2		
Qhcentre3	0.178	0.084**
Qhcentre4	0.048	0.122
Trust1	0.301	0.193
Trust2	0.334	0.096***
Trust3	0.185	0.083**
Trust4		
Numrooms	0.034	0.024
Ldistance	-0.006	0.018
Wealthmeasure1	0.133	0.090
Wealthmeasure2	0.145	0.086*
Wealthmeasure3		
Adj. R-Squared	0.12	

*, **, *** Significant at 10%, 5% and 1% levels respectively.

Table 9 presents the variance equation results. The factors that account for variations in the WTP of households include gender. There is less variability in the amounts male-headed households are WTP as there is in the female headed households. This could be attributed to large variability in income distribution for the female-headed rural households. Also, there is more variability among respondents with less trust and confidence in the scheme than there is with respondents with a high level of trust. Similarly, there is more variability in amounts poorer households are willing to pay than there is among 'the wealthier' households. The perceived quality of the health centre also accounts for the variability in amounts households are WTP.

Estimation of the willingness of rural households to pay for a community prepayment scheme

After estimating the parameters for the various models of the valuation equation, we obtain estimates of the mean and median quarterly WTP amounts for the proposed scheme as shown in Table 10.

Table 10. Summary of estimated mean and median quarterly WTP amount (in Naira)

	Cash			Commodities			SPC	
	OBS	Median	mean	OBS	median	Mean	OBS	mean
⁽¹⁾ All	309	200.00	392.20	309	550.00	788.09	306	479.40
⁽²⁾ OLS (non-protesters)	235	416.77	509.94	246	852.03	1010.48	267	543.17

Number of observations.

Row (1) shows estimates using the raw values for all the observations including the protesters (excluding refusals). Row (2) presents the estimates based on the least squares estimator using only the non-protesters. The corresponding confidence intervals for the estimates are also presented in Table 11.

Table 11. Confidence intervals for the estimated mean and median WTP (in Naira)

	Cash		Commodities		SPC
	CI median	CI mean	CI median	CI mean	CI mean
⁽¹⁾ All	200.0-400.0	337.0-447.5	488.4-700.0	703.3-872.9	405.8-553.0
⁽²⁾ OLS (non-protesters)	396.5-437.1	485.1-534.8	806.3-897.8	956.2-1064.7	523.8-562.5

From Table 12, it becomes clear that the choice of payment method and elicitation format can significantly affect the estimates of the mean and median WTP amounts. This is also statistically true as shown in Table 12.

Table 12. Summary of test of significance between means of the various methods

Test	T-statistic
Mean (Commodities) > Mean (Cash)	16.04***
Mean (SPC) > Mean (Cash)	2.00**
Mean (Commodities) > Mean (SPC)	16.49***

***, ** Significant at 5% and 1% levels respectively

As noted by Smith *et al.* (1999a), for aggregation and policy purposes, the WTP values obtained can only be used and applied to the specific circumstance for which it was elicited; hence its use will be limited to the rural Nsukka community. Also, the estimates provided do not include the cost of running the ‘hypothetical’ scheme including the cost of management. This is because the essence of the use of CVM in this case is to obtain the reservation price or the amounts households are willing to pay as premiums for the scheme. This is important for the government to set premiums that will not exceed the amount households can afford to pay. The scheme, which is part of a comprehensive National Health Insurance Scheme (NHIS), will not be solely financed by the community’s contributions. There is provision for cross-subsidization where those in the formal sector cross-subsidize the poor in the informal sector.

From Table 13, assuming that 65 percent of the entire population of Nsukka is rural, comparing the per capita rural community annual WTP (which is the quarterly mean WTP amounts adjusted on a per capita annual basis, with the per capita rural community annual health expenditure³³ obtained from the 2004 National living Standard Survey across the relevant population) the use of cash could only cover 33 percent of the annual cost of health care. The use of commodities provides an amount that covers over 66 percent of household annual health care expenditure in rural Nsukka. The Stochastic Payment Card design produced slightly higher results of about 35 percent of the annual cost of health care when compared with 33 percent for the use of cash. This shows that the scheme is likely to require additional funding to compensate for the difference. Also, the use of other forms of payment like the use of commodities that poorer households can afford could be a better alternative to financing such a scheme.

Table 13. Comparison of WTP with the actual cost of treatment

	Cash	Commodities	SPC
(1) Per capita annual rural WTP	₦340	₦674	₦362
(2) Per capita annual rural health expenditure	₦1,027.67	₦1,027.67	₦1,027.67
(3) Per capita rural community annual WTP	₦73,363,368.00	₦145,374,389.33	₦78,144,057.33
(4) Per capita rural community annual health expenditure	₦221,770,754.40	₦221,770,754.40	₦221,770,754.40
% of WTP in annual health expenditure	33.08%	65.55%	35.24%

Comparing the results obtained from the SPC design and the DCM for the cash analysis as shown in Table 12, the SPC design produced higher estimates which are statistically different from those obtained from the DCM. The SPC design – which takes into account uncertainty in responses as is usually the case in most economic decision processes and everyday life - therefore provides valuable and insightful results for its use in

³³ The median per capita annual health expenditure (₦1,027.67) from the NLSS (2004) was used to extrapolate to the relevant population.

eliciting WTP for health care CVM studies. These results further imply that higher confidence which is associated with reduced uncertainty may have accounted for the higher estimates obtained from the SPC design. Lower estimates may be expected if the level of trust and confidence in such schemes is low. The use of cash did not take this explicitly into its analysis as it ignores the possibility of uncertainty in responses. It assumes that the respondent, as a utility maximizer, knows with certainty the exact amount she is WTP for the scheme. The SPC design that assumes that the respondent has a valuation distribution over the entire bid amounts as opposed to a point estimate of the DC method may be preferred judging from the empirical results provided in the research. This is also because the respondent may not know with certainty, the exact maximum amount she will be WTP.

Beyond the general consideration of uncertainty in terms of the respondents' responses, health and health care is besieged with uncertainty in terms of recovery from an illness or the outcome of a particular treatment option or therapy. If health and ill health are stochastic and not directly predictable, there is therefore a stronger justification for health care CV studies to incorporate uncertainty in valuation using the SPC design or other similar uncertainty incorporating methods in eliciting respondents' preferences rather than the traditional DCM, the open-ended format or the ordinary payment card or bidding game techniques suggested by Smith *et al.* (1999b).

From the study, as shown in Table 13, it was also found that payment via commodities resulted in a higher amount that is also statistically different from that obtained from the use of cash. This gives valuable insight to the importance of making context specific contributions to rural financing schemes. Dave (1991), Toonen (1995) and Preker *et al.* (2001), have noted that the use of in-kind contributions to community finance schemes will increase community participation through ownership and increasing willingness to participate. Such context-specific payments may include resources that are locally generated and available within the local population such as the use of agricultural commodities in agrarian communities, the use of hand-crafted materials, and labour hours where these resources may be more abundant.

This study is therefore one of the foremost applications of CVM to value the willingness of rural households to pay for community health insurance using commodities. However, it has been noted that in most community-based health insurance schemes (CBHIS), payments in-kind are rarely allowed (Atim 1998; Bennett *et al.*, 1998; and Musau 1999). These authors have been sceptical about the possibility of generating adequate and sufficient resources to cover for treatment. However, few studies (see for example Toonen, 1995; Dave, 1991; Preker *et al.*, 2001) have shown cases where such schemes exist successfully with in-kind payments. Therefore, as shown in this study, the use of agricultural

commodities as a form of payment in a rural community setting where agriculture is one of the major activities is likely to increase the volume of resources available to the scheme as households are willing to pay higher amounts.

6. Recommendations and Conclusion

The recent move by the government of Nigeria to institute the National Health Insurance Scheme is a very important initiative that is likely to improve the health of the population. However, the nature of implementation pursued by the government requires that those in the formal sector be covered first before those in the informal sector can be brought into the scheme. While it is easier and accessible to get to those in formal employment, the large volume of the rural/informal sector would still suggest the need for urgent attention. This calls for innovative means to protect the poor such that in the short-run, the rural poor will have access to affordable health care services while in the long-run, they can save and invest from their meagre resources that will help them gradually opt out of poverty.

The findings from the research show that female-headed households, the educationally disadvantaged, and the poor are among the disadvantaged groups in health financing as these groups were willing to pay lesser amounts when compared to their other counterparts. With regard to policy, therefore, such an insurance scheme may employ selective targeting so as to increase access to health care services for the disadvantaged. This is because the vulnerable population has been identified to be excluded from health care utilization at the time of need (Ichoku, 2005). As a policy option, the government may ensure the use of payment by agricultural commodities, which should be affordable to the rural population. This will increase access to health care services and will further increase the enrolment rate as well as increase the resource envelope of the scheme.

The lack of knowledge of health insurance among the rural population could be linked to lack of access to information and public enlightenment. In this regard, public enlightenment campaigns may be intensified to increase rural communities' access to information. This may even help them engage in healthy practises and also reduce their chances of falling ill.

The use of the stochastic payment card design shows the importance of considering uncertainty in economic valuation and analysis using the CVM. Using such elicitation formats will thus prove insightful when policy decisions are to be based on the results of the CVM study as opposed to formats that do not consider uncertainty in responses. This is evidenced by the higher amounts reported, which were statistically significant, for the use of the stochastic design when compared to the traditional dichotomous design. Given the amounts households are willing to pay, where there are shortfalls in the resources available to the

scheme, the government may decide to augment in order to further protect the poor and the vulnerable.

In conclusion therefore, community insurance schemes can form an important source of health financing especially for the poor and rural population. This serves to mitigate the financial and sometimes psychological burden associated with the payment for health care out-of-pocket during times of need and utilization. Since the implementation of the National Health Insurance Scheme is phased to begin with the formal sector, there should be interim arrangements, such as community health insurance schemes for the rural poor. This is particularly important as there is a large proportion of the rural population mainly engaged in the informal sector of the economy.

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Appendices

Appendix I: Sample of the dichotomous choice design

Considering the importance of the scheme mentioned, will your household be willing to pay ___ Naira quarterly to obtain the prescribed minimum benefits of the scheme? (Yes/No)

What is the most your household can afford quarterly for the scheme? _____

Start Prices will be: (200, 400, 600, 800, and 1,000) Naira.

If no WTP amount is reported, why will your household not be WTP for the scheme?

- i) The programme has no value to my household
- ii) We cannot afford to pay
- iii) Government should pay for such a programme
- iv) Other members of the society should pay
- v) Out-of-pocket payment is better
- vi) I am not clear about the proposed programme³⁴
- vii) I am not comfortable with this particular question
- viii) Other (specify)

If there is an option of paying in kind (commodities), will your household contribute? (Yes/No)

If yes, what quantity of yam, rice, beans, cassava, etc can your household afford quarterly? _____

Appendix II: Sample of the Stochastic Payment Card (SPC) Design

Now consider your monthly income and your expenditure before you vote for a particular price. If the price you are going to choose will re-arrange your expenditure pattern, probably by increasing it, how probable are you to pay each of the following prices quarterly in order to obtain the benefits of the scheme in the community?

Quarterly cost to the household in Naira	Definitely no	Probably no	Not sure	Probably yes	Definitely yes
0	0%	25%	50%	75%	100%
200	0%	25%	50%	75%	100%
400	0%	25%	50%	75%	100%
600	0%	25%	50%	75%	100%
800	0%	25%	50%	75%	100%
1000	0%	25%	50%	75%	100%

³⁴ Such respondents are re-explained the scheme again in order for them to fully understand the scheme before providing answers.

Appendix III: Heckman's 2-step WTP Valuation Results

Parameter (1)	Cash		Commodities		SPC	
	Est. (2)	S. Err. (3)	Est. (4)	S. Err. (5)	Est. (6)	S. Err. (7)
Constant	4.071	0.602***	-2.970	1.435**	5.765	0.195***
Male	0.037	0.090	0.211	0.086**	0.114	0.061*
Hhnumber	0.016	0.014	-0.031	0.012**	0.017	0.009*
Educ1	-0.437	0.171***	-0.001	0.168		
Educ2	-0.445	0.166***	0.228	0.168	0.111	0.070
Educ3	-0.221	0.184	-0.162	0.191	0.240	0.093***
Educ4					0.567	0.115***
Hstate1			0.123	0.162		
Hstate2	-0.158	0.189			0.192	0.124
Hstate3	-0.445	0.197**	0.232	0.104**	0.112	0.126
Hstate4	-0.173	0.216	0.182	0.139	0.077	0.146
Qhcentre1	0.056	0.203				
Qhcentre2	0.241	0.098**	-0.589	0.325*	-0.113	0.144
Qhcentre3			-0.372	0.320	-0.221	0.144
Qhcentre4	0.217	0.132*	-0.431	0.325	0.069	0.160
Trust1			-0.043	0.251	-0.143	0.160***
Trust2	-0.086	0.232	-0.202	0.125*	-0.317	0.079***
Trust3	-0.129	0.225	-0.260	0.102**	-0.068	0.069
Trust4	-0.091	0.224				
Numrooms	0.061	0.027**	0.062	0.028**	0.024	0.020
Ldistance	-0.146	0.060**	0.288	0.096***	0.006	0.043
Wealthmeasure1	-0.305	0.106***	-0.165	0.101*		
Wealthmeasure2	-0.077	0.098	-0.166	0.102*	0.176	0.072**
Wealthmeasure3					0.221	0.074***
LBid	0.388	0.075***				
λ (IMR)	0.171	0.139	0.460	0.270*	0.007	0.182
r	0.292		0.756		0.016	
Wald chi-squared	118.93***		112.54***		180.2***	

*, **, *** Significant at 10%, 5% and 1% levels respectively.