

**COMMUNITY PRE-PAYMENT OF HEALTH CARE AND ESTIMATION OF THE  
WILLINGNESS TO PAY IN CAMEROON: EVIDENCE OF RURAL HOUSEHOLDS  
IN THE CENTRE REGION**

\* Corresponding author: Joachim Nyemeck Binam; P.O.BOX 2067 Yaounde-Cameroun; Tel. (237) 223 7522/223 7434/Fax: (237) 223 7437; Email: nyemeckbjoa@yahoo.fr; b.nyemeck@cgiar.org

*Contributed Paper prepared for presentation at the Twelfth African Econometric Society  
Conference, Southern Cap Sun, Cap town, South Africa, Jul, 2007*

*Copyright 2007 by Joachim Nyemeck Binam, Diarra Ibrahim and Valère Nkelzok*

*All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

***Abstract.***

*Using the contingent valuation method, which simulates a missing market by asking people about their willingness to pay (WTP), we asked a representative sample (n=837) of the study area's population if they would be willing to pay a specific amount (bid) so that individuals could operate as member in the mutual health organization in order to receive in the future, treatment on diarrheas, malaria and antenatal care. The paper also deals with the problem of item non-response, by applying a grouped-data sample-selection estimation technique that is capable of imputing the missing values conditional upon a respondent's decision to answer a willingness to pay question. The advantage of the technique lies in its ability to utilize all the information in the sample, permitting a more efficient estimation. 33 percent of responding households stated that they would not be willing to pay anything for future treatments, although they would be willing to participate in the mutual health organization. Moreover, 67 percent of responding households were offered different bids and the bid vector range from 2400 FCFA to 12000 FCFA (US\$ 4.36 to 21.8) per individual per year. The major determinants of willingness to pay appear to be household income, education, morbidity rate, gender, community organization's experience, household's perception of the medical staff attitude, and the permanent availability of essential drugs at the health centre provider.*

*The study recommends that NGOs and government should contribute to implement mutual health organizations in the rural area in order to promote equity in health.*

**Key words:** Cameroon, equity in health, item non-response, mutual health organization, willingness to pay.

## **1. Introduction**

1.2 Health care financing is one of the fastest-growing areas in the field of public health. The last decade has witnessed a proliferation of literature in the subject. Three major publications by the World Bank seem to have been particularly influential in generating this interest. The first was “Financing health services in Developing countries: An agenda for reform” (World Bank, 1987); the second “Investing in health” in World Development Report (World Bank, 1993); and the third “Better health in Africa” (World Bank, 1994).

1.3 In the face of severe resource constraints in developing countries for increasing the coverage and improving the quality of health care and the explosion in the cost of care in the developed countries, the central question has been how additional resources can be mobilized to cover financing gap and how existing resources can be utilized much more cost-effectively. As a result, in most of the literature, especially in the context of Sub-Saharan Africa (SSA), the main effort has been directed at how to mobilize additional resources and to improve the technical and allocative efficiency of existing resources in order to increase access to, and improve quality of care. However, both country case-studies and cross-country analyses in SSA have tended to concentrate on single modes of financing at a time, such as the government budget, external aid, user fees, insurance, and related financing issues, such as equity and quality of care. Surprisingly, remarkably few attempts have been made in the literature to promote equitable health care financing in the African context in general and specifically in Cameroon.

1.5 Instead, the option of community-based health insurance (CBHI) schemes (sometimes called community pre-payment schemes or mutual health organizations) is rapidly gaining favour as the mean to enhance both vertical and horizontal equity in health, particularly, in the rural area (McIntyre et al., 2005).

There is a difference between equity in the health of population and equity in delivery of health care services. The World Health Organization (WHO, 1996), has defined equity in health as a notion where the entire population should enjoy the highest level of physical, psychological and social well-being that are permitted biological limitations. On the other hand, equity in the delivery of health care services implies that the resources and services of the health sector are distributed and delivered in accordance to the needs of the population, and that they are financed in accordance with the population’s capacity to pay. More concisely, it can be said that when one speaks to of equity in health, we refer to the levels of mortality and morbidity experienced by different social groups. Equity in the delivery of

health care services refers to the levels of access, utilization and financing of health care services experienced by different population groups.

Horizontal equity is the equal treatment of equals while vertical equity suggests an unequal treatment of unequals. For example if applied to the analysis of equity in financing, horizontal equity requires that all individuals with equal resources pay equally, whereas vertical equity requires that consideration be given to the capacity to pay, i.e. individuals with more resources contribute more to finance the system. In other words, vertical equity is related to subsidies and progressiveness in financing of the health care system (ISEGH, 2006).

From these perspectives, there are a number of reasons why it is important to focus on the issue of equity in health in developing countries and particularly in Cameroon through the CBHI as these schemes are funded by annual or more frequent contributions, but do not require payments at the time of using health services, they lower financial barriers access. There is also some degree of cross-subsidy, particularly from the healthy to the ill. From these perspectives, CBHI is preferable alternative to direct individual payments (out-of-pocket payments). CBHI is a mean of pooling risks across different population groups so that the financial burden of catastrophic illnesses is significantly reduces for the individual. Because individuals tend to be risk averse, they will be willing to pay a small amount in advance for the assurance that they will not have to pay the full cost when illness arises.

The benefit of CBHI is several-fold. Community health prepayment schemes can help improve efficiency and quality of health care services by creating greater competition among providers. In addition, they create greater access to health care, and improve equity, as benefits are provided on the basis of need rather than income level.

1.6 In the country like Cameroon where more than 57% of the population is highly affected by poverty, especially in the rural area and only 36.1% of the population is able to visit a modern health centre (DSCN, 2002), the option of community-based health insurance (CBHI) can be appropriated as the financial barriers access are lower.

To fully derive the intended benefits of the scheme, quantitative data is needed for pricing the schemes. Often, these schemes are not assessed by desk officers quantitatively before commencement either as a result of lack of appropriate skill or the lack of knowledge of existing quantitative methodologies (Fonta and Ugwuozor, 2005). In this regards, it is important to know the amount rural households are willing to pay for any such health insurance scheme on the basis of contingent valuation method (CVM).

Obtaining in monetary terms the amounts households are for such insurance scheme which is aimed at mitigating the unexpected effect of health care payments and help alleviate poverty,

will involve observation of how much individuals are willing to part with to restore their health state in event of deterioration since health is not directly tradable on the market like any other commodities. This research is hoped to provide empirical grounds in the application of CVM to studies in health care and the relative importance of the formats to be used and help broaden literature in this area.

In terms of policy relevance, results obtained from this study will therefore inform policy in: knowing the value rural households place on their health and health care needs; their willingness and readiness to participate in a community financing scheme which will form a basis for expansion of such schemes in the country.

For the rest the paper presents in section 2 an overview of the Cameroonian health system, and reviews in section 3, the existing empirical literature on health prepayment schemes in Africa with a particular example on the Mutual Society of health care in west Cameroon. In section 4, the paper describes the methodological framework and literature review on the application of CVM to health and health insurance and, in section 5 the sample survey and the estimation methodology used. In section 6 results of the analysis are presented and discussed while section 7 concludes the paper with some final remarks on the policy implications of the findings of the paper.

## **2- An overview of the Cameroonian health system**

2.1 The Cameroon health system has two important features. It is a pluralistic system because it is characterized by multiple sources of financing of health care providers. The main financing sources are government, public enterprises, foreign aid donors, private enterprises, household, religious missions and NGOs, and the providers are government health facilities, public enterprise health clinics, health facilities of religious missions and NGOs, private clinics, pharmacies and drug retailers, and traditional doctors. It is also a vertical system in the sense that financing sources deal directly with the providers without going through intermediaries or financing agents.

2.2 Cameroon's relatively good economic performance during the 1970s and the oil boom of early 1980s favored a rapid expansion of the network of health structures. With a population of 13.5 millions in 1997, the country had 1,031 government-operated health facilities which included one teaching hospital, two referral hospitals, three central hospitals, eight provincial hospitals, 38 divisional hospital, 132 district hospitals, and 847 health centres, backed up by a medical staff of 14,292 (Ministry of public health, 2001).

2.3 A number of State-owned enterprises also operate health facilities for their staff. There is an important sub-sector of private health providers who complement and often compete with government providers, consisting of non-profit religious missions and NGOs, for-profit providers, and traditional healers. The bulk of non-profit facilities are operated by the Catholic and Protestant Health services: the former operate 179 facilities (including eight hospitals) with a staff of 1,315 and the latter 122 health facilities (including 24 hospitals) with a staff of 2,633 (Ntangsi, 1998) and a few thousand traditional healers.

### **3- Existing empirical literature on health prepayment schemes in Africa**

#### ***3.1 Voluntary and non-profit health pre-payment systems.***

2.1.1 The last decade, there has been a growing interest in the introduction or expansion of solidarity-based health care financing schemes in Africa (Abel-Smith, 1986; World Bank, 1987, 1993; Vogel, 1990a, b; Shepard., et al., 1990; WHO, 1993; Ahrin, 1995; Chabot, et al., 1991; Schneider et al, 2000). The reasons invoked for encouraging health care pre-payment schemes are its potential for raising additional and stable revenue to fund cost of health care provision, its capacity to reduce financial barriers to health care utilization and its redistributive effects (Schneider et al, 2000).

2.1.2 There is evidence that the introduction of national compulsory health financing schemes in Sub-Saharan Africa is neither an equitable nor efficient financing policy option in contexts where only a small part of the population in many cases formal sector employees would be covered. Vogel has carried out an overview of health financing systems in 23 countries in Sub-Saharan Africa and concluded that they did not promote greater equity in access to health services by the poor (Vogel, 1990b). Moreover, the forms of health financing adopted do not encourage efficiency in a context where these systems often are heavily subsidized by general taxes. Gruat (1990) confirmed this assessment when analyzing the trends and problems with social security schemes in Africa

2.1.3 There has been a growing literature on voluntary non-profit health pre-payment schemes in recent years, attesting to increasing academic and policy interest in this area. This interest has been propelled in part by recognition that user fees adversely affect important health care policy goals of equity and extension of access to the poor (Gilson, 1988; De Bethume, et al., 1989; Waddington and Enyimayew, 1989; Abel-Smith, 1993; Criel, Van der Stuyft, and Van Lerberghe, 1999; Schneider et al, 2000).

2.1.4 De Ferranti (1985) examined the feasibility of payments by users of health services in Africa. His paper foreshadowed the new directions in health care financing policy that have

become commonplace today on the Africa health policy landscape, especially with regard to user fees. De Ferranti (1985) considered that user contributions to the costs of health services could take the form not only of user fees at the point of receiving the services but also of prepayments for future services. The latter, he stated, had a high cost recovery potential because relatively modest coverage charges, spread across the entire participating population could have substantial revenue.

215 Extending this theme, Carrin (1987) examined the appropriateness for Sub-Saharan Africa of a system of community financing of health care, by which households in rural areas or distinct urban communities contribute to the financing of their health services either directly at the point of services (user fees) or by some form of prepayments or local health insurance insisted however that community financing always implied “a certain involvement of the population in the organization of the financing scheme”. He highlighted two advantages of such decentralized scheme of communizing financing. One was that the local control of revenues might have a positive effect on the incentive of health workers to collect revenues; while the local retention of such revenues might have the effect of making the health workers even more committed to the financing scheme. The second advantage was that such a scheme might be more responsive to the preferences and demands of the local population, which in turn would facilitate acceptance of the cost recovery measures.

2.16 Kutzin and Barnum examined the effects of health financing programs on developing country health systems through a review of the key institutional characteristics of four schemes including the Bwamanda Hospital Community Financing Health Scheme in ex-Zaire and an assessment of their impact on efficiency and equity in the health sector (Kutzin and Barnum, 1992). The review concludes that the Bwamanda scheme achieved its purpose of increasing resources mobilization for the health services in that region but that the principal drawback of the voluntary insurance approach of the scheme was that it involved inequitable access to health care between insured and non-insured. Moreover, there was convincing evidence of *moral hazard*, i.e. the tendency of the insured persons to use the services more intensively because the cost of doing so is much less to them than for the non-insured. It was also possible that *adverse-selection* existed, i.e. a greater tendency for those who are ill or more prone to be ill to enroll on the scheme, compared to healthier persons.

2.17 A recent study by Creese and Bennett goes as far as to question whether rural risk-sharing schemes such as those discussed by Atim (1999) are really capable of raising significant amounts of revenue for the health sector or to enhance equity in health care access, two of the reasons to promoting such schemes (Creese and Bennett 1997). Based on the

world-wide survey of studies of non-profit financing schemes, most voluntary in character the authors conclude that schemes in low income countries have generally only limited coverage, low cost recovery rates and little ability to protect the poorest society. The authors attenuate this pessimistic view by noting that many of the schemes studied were poorly designed. Consequently, it was possible that with better design and wider dissemination of lessons from experience, many of the problems identified could be resolved.

2.18 Elsewhere, the studies conducted by Schneider et al (2000) on the development and the implementation of prepayment schemes in Rwanda showed that prepayment scheme appears to be a viable tool for improving financial autonomy of health centers, thereby contributing to quality and efficiency improvement. Secondly, appears to be a viable tool for the improvement of equity of access to quality health services for the rural population.

### ***3.2 Typology of voluntary, non-profit financing schemes***

2.2 At least five types of voluntary non-profit health financing schemes are discernible in Africa from literature and observation. First, there is the *traditional social solidarity networks* based on a narrow (clan or ethnic) definition of the target group as described above, but these can be and are often based in urban areas as typified by the Cameroonian case study in Atim (1999). Secondly, there are the more *inclusive mutual health association or movements* which are based on rural or urban communities, enterprises, trade unions, professional associations, etc., and with a mass base unrestricted by ethnicity or similar factors. Thirdly, there is the “*simple*” or *low participation model of community financing*, usually organized by a health care provider in the context of cost recovery and in which participation by the insured in the running of the scheme is low or sometimes non-existent. The fourth type is the “*complex*” or *high participation community financing model* in which the community participates in managing, at least, the first level of health care (health centres), usually in partnership with the health provider, through participatory structures. The fifth and final type is the “*Medical Aid Societies*”. There are arguably the most advanced and highly developed variant of the mutual aid social movement, organized on such a big scale, in terms of members, that is usually involves professional staff and some techniques of management borrowed from private commercial insurance to run it. There are generally found in Zimbabwe and South Africa (Atim, 1998).

### ***3.3 An example: the Mutual society of health care in west Cameroon***

Micro-insurance is a relatively new event for rural households in Cameroon. Since 2005 a SAILD (Service d'Appui aux Initiatives Locales de Developpement) project facilitates the establishment of CBHI in some villages located in west Cameroon. Members contribute 500 FCFA (less than \$2) a month, which is deposited in a centralized account of the Mutaul. The exact amount contributed varies from group to group depending on the benefiting dependants (spouses, children and parents) as well as on the health care package. In general, these schemes cover the cost of the primary health care, laboratory investigation and treatment. With assistance from the back-stopping local consultant, each group makes an agreement with one specific health care provider in its neighborhood, who provides the required services at agreed prices.

Beneficiaries are only entitled to treatment upon presentation to the health care provider of a special identity card and the so-called sick sheet which needs to be endorsed by the group leader. This procedure ensures that only the community health prepayment schemes' members have access to health care. Group bills are paid to each health care provider by the Mutual central office on a monthly basis; appropriate deductions are then made from the group's total contribution. With the assistance of the local consultant, the Mutual central office then checks the costs and appropriateness of treatment, before effecting the payment. Other information, such as the disease pattern and cost trends, is analyzed on a quarterly basis and feedback is provided to the provider and the groups. While the Mutual maintains an account for each group, the same maintains a mirror account showing contributions and expenditures.

As a requirement, a group has to mobilize at least 25 contributing members, and make a one-month collection before access to services is granted. The whole process of sensitization to accessing services takes about three months. These schemes now have a permanent office and recruit an administrative assistant/accountant; some donors agreed to pay her salary for one year. It is estimated that with the extension of the schemes to more groups, they can finance their own overhead costs.

The great advantage of the schemes is that they provide access to quality health care at affordable cost. This is achieved through negotiations with carefully screened private sector health care providers on price and quality, the result of which is then reflected in contracts.

Shortcomings of these schemes are that providers occasionally prescribe drugs other than those in the World Health Organization list of essential drugs. A general problem is that contributions are dependent on season and are often irregularly paid, especially by the smaller

groups that have weak managerial structures. In addition, some providers cannot dispense all of the needed drugs, and beneficiaries are still forced to pay for them out of their own pockets. The Ministry of Public Health is now conducting feasibility studies in different regions of Cameroon, to investigate whether some elements of the west Cameroon community health prepayment schemes can be replicated. It would like to install a prepayment scheme that would finance part of the public health care services in these regions. Knowing what rural populations are willing to pay for improving health care access is essential if community prepayment schemes programmes are to take place in the centre region of Cameroon.

#### 4- Theoretical framework and literature review

##### 4.1 Theoretical framework

From the neo-classical theory of welfare economics point of view, which incorporates the preference of individual/households, where interest lies in obtaining monetary values for any changes in welfare (gain or lost) due to the availability of a specific public good, or in case of health and health care, changes in the states of health led to the use of the willingness to pay (WTP)<sup>1</sup> and willingness to accept (WTA)<sup>2</sup>, which are often referred to as methods of contingent valuation (CVM)<sup>3</sup> (Bala et al., 1999). Originally used in the theory of welfare economics to analyze price changes, Karl-Goran (cited by Hanneman, 1991) first showed that the concept could be employed to analyze quantity changes. Closely related to the theory of consumer demand, the maximum amount an individual is WTP gives the value of a health intervention aimed at improving the state of health of the individual (Bala et al., 1999).

3.3 The demand-theoretic basis of CVM is fairly simple and straightforward. Suppose utility  $U$  for a consumer is derived from the consumption of a public good  $E$  that is not priced, along with a vector of privately supply goods  $X$  such that  $U=(X, E)$ . The corresponding expenditure function,  $Y^*(p, E_0; U^*)=min\{p.X/U(X, E_0) \geq U^*\}$  is defined as the minimum consumer expenditure required to achieve utility  $U^*$  given an amount  $E_0$  of the corresponding good and vector  $p$  of private good prices. If the quantity of the good increase to  $E_1$ , then the WTP for the implied good is defined by  $WTP=Y^*(p, E_0; U^*)-Y^*(p, E_1; U^*)$ , that is, the reduction in expenditure on the market goods required to offset exactly the gain in utility from the increased provision of the mentioned public good.  $U^*$  is not directly observable. But it can be shown to be a function  $v(p, E_0, Y_0)$

---

<sup>1</sup> Defined as the maximum amount an individual is willing to part with to have the scheme initiated

<sup>2</sup> The minimum amount an individual or household will be willing to accept to forgo the initiation of the scheme.

<sup>3</sup> It is simply a survey-based device, with 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.

of  $E_0$ ,  $p$  and initial income  $Y_0$  (that is, the indirect utility function), allowing the WTP for the above good improvement to be rewritten in terms of observable variables as  $WTP = Y_0 - Y^*[p, E_1, v(p, E_0, Y_0)]$ . It is also clear from this definition that WTP will be positive, unless the marginal utility of  $E$  is zero (the consumer no longer value the good) or  $E$  does not appear in the utility function. Zero WTP responses, however, are not uncommon in contingent valuation surveys and must be appropriately taken into account in estimating WTP (Carson and Mitchell, 1993).

3.4 In the light of the preceding discussion, a missing WTP response arises only if a survey respondent does not answer the WTP question posed in the survey. The common procedure to handle such missing data is either to simply ignore the sample observations corresponding to the missing responses from further analysis, or to assign values equal to sample or sub-sample means and medians, using observations corresponding to the observed responses only. Alternatively, the assigned values may be imputations generated by a model based on the curtailed sample. None of these procedures is statistically satisfactory if there are systematic differences between survey respondents who answer the WTP question and those who do not. Systematic differences between respondents and non-respondents with respect to a particular WTP question are bound to arise if the decision to respond to the WTP itself depends upon the size of WTP amount. If such a correlation between the response rate and the size of WTP amount can not be a priori ruled out, simply ignoring observations corresponding to missing WTP values will introduce sample-selection bias in the estimates as respondent with very low or very high WTP will self-select themselves into the sample, making it less representative of the underlying population. On the other hand, using value assignments based on the curtailed sample will generate inconsistent estimates of the average WTP amount, because one would be implicitly assuming that the underlying decision model is the same for respondents and non-respondents, and this may not be tenable. Moreover, discarding observations will reduce the efficiency of the estimates in both cases as full use cannot be made of the information contained in the sample, particularly which related to the other observed characteristics of the non-respondent which may have a bearing on the WTP. In any case, discarding observations may even be a viable option if the survey sample is not sufficiently large (Messioinier et al., 2000).

A few of the previous contingent valuation studies have suggested means to deal with some or all problems described above. To avoid discarding observations, for example, Carson and Mitchell (1993) impute the missing data for their study using a non parametric technique known as CART (Classification And Regression Trees). Whitehead et al. (1993) and Messioinier et al. (2000), on the other hand, use models which are variants of Heckman's (1979) two-step procedure to detect and correct for sample-selection bias in the context of referendum-style, or dichotomous-choice, CVM. The technique used in the present paper follow a similar process to avoid losing observations and to adjust for sample-selection bias, but is better suited to a bidding game contingent valuation survey. A better appreciation of how this is achieved, however, requires an understanding of the design of our survey and the nature of contingent valuation questions posed therein.

3.1 The WTP approach or the contingent valuation method (CVM) has been increasingly used in the recent past to measure health benefits. The technique is prospective and determines WTP contingent upon hypothetical market presented to the respondent and is essentially experimental (Onwujekwe, 2001). In essence, WTP is the maximum amount of income an individual is willing to give up ensuring that a proposed service or good is available. There are various methods for eliciting WTP using CVM: these methods include open-ended questions, close-ended binary questions, close-ended polychotomous questions, bidding game, card technique, binary with follow-up, and polychotomous with follow-up (Onwujekwe, 2001; Klose, 2002). Each of these methods has merits and demerits, and should be used depending on the context and relevance. It must be mentioned that there are still views that argued that WTP may not be as useful as it is made out to be, essentially because it is not income-neutral (Olsen, 1997). The argument is that WTP varies among individuals depending of their ability to pay.

#### ***4.2 Review of the application of CVM to health and health insurance valuations***

WTP for health and health related interventions by households and individuals is related to factors such as household demographic factors (age, gender, family size, etc); socioeconomic factors (income, wealth, level of education, etc); and health and health related factors (state of health, illness experiences, etc) among others (Bala et al., 1999; Dong et al., 2003a, 2003b; Asgary et al., 2004; Olsen et al., 2004). In eliciting WTP amounts in contingent valuation studies, the household rather than the individual have been adjudged to be a better enrolment Unit (Dong et al., 2005) because most of decision on consumption and expenditure in a household is done via the family as a collective group.

The guideline and methodology of contingent valuation through originally applied in the field of environmental economics (O'Brien and Gafni, 1996) has been used for years in valuing health benefits and dates back to 1970s (Asgary et al., 2004). Its use, through not only limited to developed countries, is relatively few in the area of health insurance in developing countries. The use of the CVM, which has become increasingly popular notably, in health sector, is supported by a substantial body of theoretical and empirical literature (Hanneman, 1984; Carson and Mitchell, 1993; Foreit and Foreit, 2002; Raylynn, 1994; Bratt et al, 1998; Frick et al, 2003; Rheingans et al., 2004; Morey and Sharma, 2001; Forsythe et al, 2002; Yasunaga et al., 2006; 2003; Lewallen et al, 2007; Cookson, 2003; Carlsson et al, 2004; Klose, 2002).

Most of the studies carried out in the field of health economics have focused on evaluating specific benefits from health care interventions and programs using the WTP approach. Some of such recent studies included Owujekwe et al. (2005) in south-eastern Nigeria valuing retreatment of mosquito nets with insecticide in four communities, and also valuing community-based ivermectin distribution; Potiere et al. (2004) valuing the WTP for three health care programs (more heart operations, a new breast cancer treatment and a helicopter ambulance service) testing specifically for the impact of variation in information; Walraven (1996) valuing WTP for health services in a district hospital in Tanzania; Weaver et al. (1996) valuing the WTP for child survival in Central Africa Republic; Habbani et al. (2006) in Khartoum-Sudan valuing the willingness of the respondents to pay for good quality public health services, which can be used as a means of setting fees to support cost recovery; Mataria et al. (2006) valuing the impact of impoverishment on patients' preference with respect to improving the quality of health care.

In the area of health insurance and community-prepayment schemes, studies carried out include Dong et al. (2003a) in Burkina Faso estimating WTP for community based-insurance; Dong et al. (2004) also in Burkina Faso analyzing the differences in WTP of household heads for community-based health insurance premiums for themselves and other members of the household; Asfaw and von Braun (2004) investigating into the plausibility of community health insurance on poor rural households of Ethiopia. These studies conducted to obtain WTP amounts in the area of health insurance have adopted various method of elicitation of WTP responses ranging from *take-it-or-live-it* process of the simple dichotomous choice method (Dong et al., 2004; Asfaw and von Braun, 2004); iterative bidding game process (Asgary et al., 2004; Dong et al., 2005); open-ended method to a more or less informal elicitation mechanism such as the combined use of focus group discussions, in depth interviews, and a general assessment mechanism of whether households are willing to join in this scheme or not (Asenso-Okyere et al., 1997). Other techniques such as the payment ladder approach, the more recent structured haggling technique (Onwujekwe et al., 2005) and the stochastic payment card approach (Wang and Whittington, 2005) have not been found in the literature to be used for eliciting WTP insurance based responses from respondent.

Among the variables identified to influence the payment decision of the respondents is age; Asenso-Okyere (1997) and Asgary et al. (2004) found that older respondents are more willing to pay higher amounts than do younger household respondents while Dong et al., (2004) found the reverse. Income was also reported as a major variable which explains the payment decision of households as Dong et al. (2003a), Olsen et al. (2004) and Asgary et al. (2004)

found that richer households/individuals are more willing to pay higher amounts than poorer households/individuals. Distance to the nearest health facility also plays an important role in the payment decisions of households as Asgary et al. (2004) reported a positive relationship. Most of these studies have produced plausible results where the introduction of such schemes can help to protect the poor and vulnerable against the adverse effect of out-of-pocket payments for health care. Asgary et al. (2004) obtained results that were found to be relatively adequate in catering for the average household expenditure on health care in rural Iran. Despite the low level of resource generation, it is possible for these schemes to generate some resources that can be helpful in curbing the adverse financial effects of ill health especially during the time of occurrence and immediate sourcing of funds is difficult (Asfaw and von Braun, 2004). Since the payment for health care is usually forced payment (Whitehead et al., 2001) especially in the absence of insurance.

As lacunae, in most contingent valuation studies, protest votes as non-response WTP have traditionally been omitted from analysis, which may result in biases of various forms. In most of the literature estimating the WTP for community health care financing, analyses has been based on the non-protesters without taking into account the non-respondent observations as has been noted in most survey based elicitation (Strazzera et al., 2003). There is thus a need to go beyond much of the published literature by using the WTP methodology that takes into account the missing WTP response.

## **5- Sample survey and the estimation methodology**

### **5.1- Sample survey**

The survey was conducted in the rural area of the Nyong and Kelle with village populations located in the centre province of Cameroon. The population of Nyong and Kelle consists primarily of small farmers who cultivate cocoa, cassava, cocoyams, plantain, yams. Few people have regular wage employment, and remittances from relatives and friends living abroad or in the cities are common. A total of 900 questionnaires were administered through face-to-face interviews among the randomly selected household family's member over than 15 years age. After discarding a few incomplete record data, a total of 837 questionnaires remain for the analysis.

Interviews took place in January 2004. Before launching the final study, a pilot study was conducted. It had two aims: (i) to test the design of the questionnaire (comprehensibility, acceptability of the questions, etc) and (ii) to obtain information about the relevant bid vector (where ideally everyone would be willing to pay the lowest bid none the higher bid).

Following that, we made some changes in the ordering of questions and the wording of some questions.

It was explained that the designed community pre-payment scheme or the mutual health organization will contribute to improve the accessibility of the household to health care services by providing the coverage of malaria treatment, antenatal care and diarrheas in the beginning. It was also explained that the community pre-payment scheme will be managed by a committee of people from the region and that, this committee will be chosen by the people of the region. Some NGOs decided to help the region by implementing the mutual health organization and the committee will decide the least amount each household will have to pay to operate as a member.

The study also includes focus group discussions with community leaders and members about the feasibility of community health prepayment scheme.

## 5.2- The estimation methodology

4.1.1. The sample survey described in the preceding section suggests that efficiency estimation of the WTP for better access in PHC via the community pre-payment schemes demands that we simultaneously explain both the decision to respond to the contingent valuation question and the size of WTP amount, fully accounting for the possibility of correlation between the two. Bhat (1994) furnished the methodology of the task, developed specifically for dealing with missing categorical data in survey where a respondent's decision to reveal information on a particular variable-income in the original illustration by Bhat-may depend upon the size of the variable itself. In the present context, let the binary variable  $D_i$  represents the  $i$ th individual observed response to the general contingent valuation question ( $D_i = 1$ , indicating answers the question,  $D_i = 0$ , indicating no response), and the variable  $W_i$  be the WTP amount category chosen by the individual. Bath's technique then involves the simultaneous estimation of the following two equations:

$$D_i^* = \beta'_d X_{di} + \varepsilon_{di} \quad \begin{array}{l} D_i = 1 \quad \text{if} \quad D_i^* > 0 \\ D_i = 0 \quad \text{if} \quad D_i^* \leq 0 \end{array} \quad (1)$$

$$W_i^* = \beta'_w X_{wi} + \varepsilon_{wi} \quad W_i = j \quad \text{if} \quad a_j \leq W_i^* < a_{j+1} \quad (2)$$

where  $i = 1, 2, \dots, N$  et  $j = 1, 2, \dots, J$ .  $N$  is the total number of respondents and  $J$  the number of WTP amount groups or categories used in the survey instrument, including the implied zero option. The two  $\beta$ 's are the unknown coefficient vectors.

In the manner analogous to Heckman's two-step procedure, the variable  $D_i^*$  is an unobserved continuous index assumed to determine the observed response to the general WTP question in terms of vector of exogenous variables  $X_{di}$ . In particular, the respondent will choose to answer the question ( $D_i = 1$ ), if the index  $D_i^*$  turns out to be positive. On the other hand, a non positive  $D_i^*$  implies that the question will not be answered ( $D_i = 0$ ), generating a missing response with regard to the individual's WTP amount. Similarly,  $W_i^*$  is the logarithm of the true, but unobserved continuous WTP amount, determined by the set of exogenous variables,  $X_{wi}$ . the  $a_j$ 's represent the limits of the various WTP amount categories such that the  $i$ th respondent chooses the  $j$ th category if his/her true WTP satisfies the condition  $a_j \leq W_i^* < a_{j+1}$ . That is, the respondent chooses the  $j$ th category if his/her true WTP is at least the amount associated with that group and strictly less than the amount indicated by the following group (Brox et al., 2003). Finally,  $\varepsilon_{di}$  and  $\varepsilon_{wi}$  are random error terms that may be correlated. In the light of the discussion above, a nonzero correlation is the result of dependence of  $D_i^*$  on the respondent true willingness to pay,  $W_i^*$ . A positive correlation between  $\varepsilon_{di}$  and  $\varepsilon_{wi}$  indicates that individuals with greater WTP are more likely to answer the question. A negative correlation suggests the opposite. In other words, a positive correlation indicates that missing responses are more likely to come from those with lower WTP categories and a negative correlation implies that the missing WTP observations stem largely from the higher WTP categories.

4.2.2 The reduce form simultaneous-equation model (1) and (2) may be viewed as an extension of the single-equation grouped data models of Stewart (1983) and Stern (1991) to allow for self-selection in the choice of survey respondents to answer a particular WTP question. The resultant simultaneity of the decision to respond and the true WTP amount also allows for more efficient parameter estimation by enabling a better utilization of the sample information than that permitted by considering just the observations for which WTP responses are registered. More specifically, it makes use of the entire sample by also including, in the estimation, information on the set of exogenous variables, even for observations for which

WTP is not observed. An additional advantage of the technique is that it permits the relaxation of Stern's limiting assumption of unitary variance in  $W_i^*$ .

For estimation purposes, we assume that the random errors  $\varepsilon_{di}$  and  $\varepsilon_{wi}$  are jointly distributed for each  $i$  as bivariate normal, with zero means and variances of 1 and  $\sigma_w^2$  respectively, and a cross-equation correlation coefficient of  $\rho$ . Consequently, the probability that  $W_i$  is observed and falls in category  $j$  is:

$$\text{Prob}(D_i = 1, W_i = j) = \Phi_2\left(\frac{a_{j+1} - \beta'_w X_{wi}}{\sigma_w}, \beta'_d X_{di}, -\rho\right) - \Phi_2\left(\frac{a_j - \beta'_w X_{wi}}{\sigma_w}, \beta'_d X_{di}, -\rho\right) \quad (3)$$

where  $\Phi_2$  is the cumulative distribution function of bivariate standard normal. The above derivation assumes that the two error terms are independent across observations.

If we now define another set of dummy variables  $M_{ij}$  for the observed WTP amounts only such that  $M_{ij} = 1$ , if  $W_i = j$ , and zero otherwise, the likelihood function for estimation of the  $\beta$  parameters may be written as

$$\mathcal{L} = \prod_{i=1}^N [1 - \Phi(\beta'_d X_{di})]^{1-D_i} \times \left[ \prod_{j=1}^J \left( \Phi_2\left(\frac{a_{j+1} - \beta'_w X_{wi}}{\sigma_w}, \beta'_d X_{di}, -\rho\right) \right)^{M_{ij}} \right]^{D_i} \quad (4)$$

where  $\Phi$  is the cumulative distribution function of the univariate standard normal. Maximizing (4) by one of the known techniques generates the required parameter estimates—the estimates of  $\beta$ 's as well as those of  $\rho$  and  $\sigma_w$ . Now following Bhat, and defining the following quantities with the help of the estimated parameters,

$$m = \frac{a_{j+1} - \hat{\beta}'_w X_{wi}}{\hat{\sigma}_w} ; \quad k = \frac{a_j - \hat{\beta}'_w X_{wi}}{\hat{\sigma}_w} ; \quad g = \frac{\hat{\beta}'_d X_{di} + k\hat{\rho}}{\sqrt{1 - \hat{\rho}^2}} ; \quad h = \frac{\hat{\beta}'_d X_{di} + m\hat{\rho}}{\sqrt{1 - \hat{\rho}^2}}$$

$$r = \frac{k + \hat{\beta}'_d X_{di}\hat{\rho}}{\sqrt{1 - \hat{\rho}^2}} ; \quad \text{et } s = \frac{m + \hat{\beta}'_d X_{di}\hat{\rho}}{\sqrt{1 - \hat{\rho}^2}},$$

We can write the predicted  $W_i^*$ 's for the observed and missing WTP responses respectively as

$$\hat{W}_i^* | (X_{di}, X_{wi}, D_i = 1, W_i = j) = \hat{\beta}'_w X_{wi} + \hat{\sigma}_w \frac{\phi(k)\Phi(g) - \phi(m)\Phi(h) + \hat{\rho}\phi(-\hat{\beta}'_d X_{di})[\Phi(g) - \Phi(r)]}{\Phi_2(\hat{\beta}'_d X_{di}, m, -\hat{\rho}) - \Phi_2(\hat{\beta}'_d X_{di}, k, -\hat{\rho})} \quad (5)$$

$$\text{and } \hat{W}_i^* | (X_{di}, X_{wi}, D_i = 0) = \hat{\beta}'_w X_{wi} - \hat{\rho} \hat{\sigma}_w \left( \frac{\phi(\hat{\beta}'_d X_{di})}{1 - \Phi(\hat{\beta}'_d X_{di})} \right) \quad (6)$$

where  $\phi$  is the normal probability density function. In the special case where the two decisions (the decision to respond and the true WTP amount category) are independent, the estimated value of  $\rho$  is zero a priori, and thus the predicted value of  $W_i^*$ 's are the same as those generated by the Stewart and Stern models. However, in more general case of nonzero  $\rho$ , equations (5) and (6) generate consistent estimates of the  $W_i^*$ 's, conditional on all the available information. That is, given the likelihood function (4), estimating the coefficient of the system, and calculating the individual estimated values of  $W_i^*$  from either equation (5) or equation (6) as appropriate, permit full-information maximum likelihood estimation. The additional advantages of the present simultaneous equation procedure stem from its ability to test and correct simultaneously for the presence of sample-selection biases caused by missing responses in accord with whether or not the respondent has answered the WTP question. In the next section, we describe the implementation of the model.

### 5.2- The determinants of the WTP

The maximum-likelihood estimation method described in the preceding section has been implemented by utilizing the sample-selection part of grouped-data procedure in the LIMDEP econometric package (Greene, 1995). For each contingent valuation question,  $D_i$  is equal to unity if the  $i$ th respondent answered the WTP questions, and zero otherwise. Also, for each contingent valuation question,  $W_i$  equals  $j$ , the number of the chosen category defined by the limits,  $a_j$  to  $a_{j+1}$ . In addition to  $D_i$  and  $W_i$ , the estimation procedure requires data on the components of vectors  $X_{di}$  and  $X_{wi}$ , the exogenous or explanatory variables. These explanatory variables are classified into two more distinct categories. The first category includes mainly the specific characteristics of the respondent which are the usual socio-economic variables of contingent valuation studies, namely, income, gender, age, education, community experience, the health status, etc. the second category consists of health centres-related variables that describe the respondent's perception of the quality of the health centres and health care delivered by the centres. Table 1 gives the description of explanatory variables to be used for the analysis.

Table 1: Description of socio-economic and cultural variables used for the regression model

<b>Variable</b>	<b>Description of the variable</b>	<b>Values</b>
GENDER	A categorical variable representing the gender of the respondent	1 for the male; 0 otherwise
AGE	Age of the respondent	Number of years old
MASTAT	A Dummy variable representing the marital status	1 if married; 0 otherwise
EDUC	A categorical variable representing the average educational level of the respondent	1 if the respondent has at least 4 years of schooling; 0 otherwise
ASSEXP	A categorical variable representing membership to a community club or association	1 if yes; 0 otherwise
CONFIDENCE	A categorical variable representing the tradition of use of the health facility of the locality	0 if yes; 0 otherwise
REVENUE	Monthly revenue of the respondent	In CFA francs
FHEALTH	Variable representing the health status of the household	Percentage of individuals in the household who were ill from 6 to 12 months prior to the survey as proxy of household Family illness rate in percentage
STAFF ATTITUDE	A composite index representing the attitude of the staff the waiting time, and the property of the health centre	In percentage <sup>a</sup>
DRUGS	A categorical variable representing the availability of basic drugs at the health service center	1 if yes; 0 otherwise

<sup>a</sup> This percentage is obtained by assessing the mean value of scores obtained from these three characteristics (e.g if one respondent answers by yes for both characteristics, the total score value are 3, i.e., 1 for each characteristic, and the mean value will be  $3/3 = 1$ , thus 100 percent). Alternatively, if one responses no, for one characteristic, the total score will be 2, (i.e., 1+1+0) and the percentage will be 67 or 0.67.

## **6 Results and discussion**

### ***6.1 Descriptive statistics***

#### *6.3.1- Bid structure of WTP in current survey*

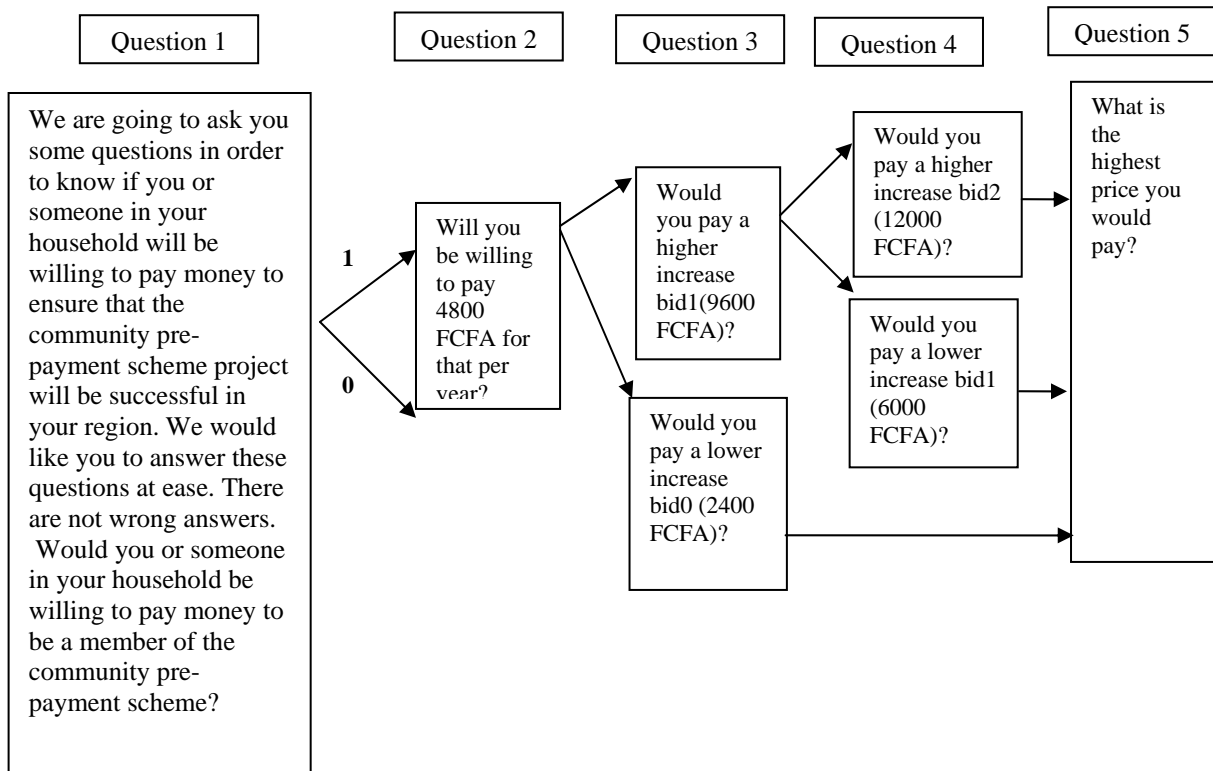
About 900 questionnaires were completed in the village. Our impression from sitting on many of the household's interview is that respondents took the contingent valuation questions, and indeed the entire interview, quite seriously.

The section on WTP begins with a simple question, which was whether the individual was willing to pay out of pocket for the community pre-payment scheme, and therefore a set of questions related to the willingness to pay amounts.

Based on the pretest, we felt that the bidding game question format worked better than the direct, open-ended questions. People generally felt more comfortable with the bidding games, and, in fact, our interviewers remarked that the bidding game format was very familiar and easily understood because it was similar to the ordinary kind of bargaining that goes on in the local market in rural Cameroon particularly. Hence we used only the bidding game format. Figure 1 gives the sequence of WTP questions.

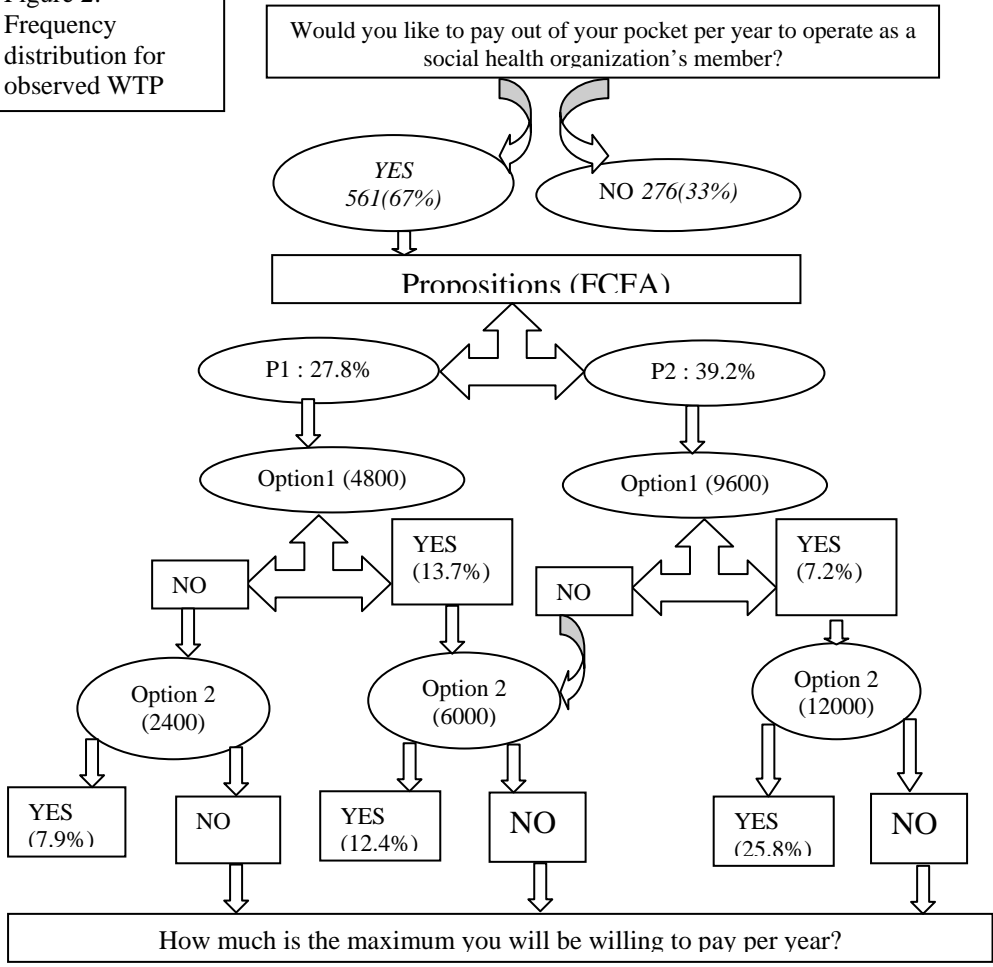
The bids were structured so that if the response to the first level was negative, a lower amount question was asked; else a higher amount question was asked. The answer of this set of questions revealed in a way their true willingness to pay for the community pre-payment scheme. The bid structures are presented in figures 1-2, along with the responses.

Figure 1: sequence of willingness to pay (WTP questions)



As figure 1 shows, respondents were asked if they would be willing to pay 4800 Cameroonian CFA francs per year (approximately US\$ 9.5) with responses coded as “yes”, “no”. If the answer was “no” the interviewer proceeded to the lower bid (i.e. 2400 FCFA), if the respondent answered in the affirmative, they were subsequently asked if they would be willing to pay a higher increase bid1; where  $bid1 > 4800$  FCFA. Conversely, if the participant responded negatively to the question, they were subsequently asked if they would be willing to pay a lower increase bid1; where  $bid0 < bid1$ , etc.

Figure 2:  
Frequency  
distribution for  
observed WTP



The survey revealed a relatively high willingness to operate as the mutual health organization's member; 67 percent of all respondents wanted to have health access facility, indicating a relatively high willingness to operate as the mutual health organization's member figure 2). As it appears in figure 2, about one-third of the respondents who would be willing to operate as member in the future mutual health organization would not have been willing to pay anything for it. Approximately, 7.9% of the respondents were willing to pay only 2400 FCFA per year (about 200 FCFA per month), with almost the same proportion being willing to pay 9600 FCFA, while 25.8 %, 12.4% and 13.7% were willing to pay 12000 FCFA, 6000 FCFA and 4800 FCFA respectively. The mean observed value was, 8025 FCFA with median of 6000 FCFA (table 2).

Table 2: Descriptive statistics of the willingness to pay survey

Bids (CFA francs)	Cameroun	
	Frequency	Percentage
0	276	33.0
2400	66	7.9
4800	115	13.7
6000	104	12.4
9600	60	7.2
12000	216	25.8
N	837	100
Mean (S.Dev.)	8.025 (3.600)	
Median	6.000	

## 6. 2 Econometrics results

### 6.2.1 The willingness to pay question

The set of estimations involved doing a probit analysis on whether or not a person willing to pay and the second involved using the sample selection procedure on the amount of the WTP. The final results of this exercise are displayed in tables 3 and 4 and discussed below.

Table 3: Determinants of the WTP Decision: the Binary Variable  $D_i^*$  (1 if yes; 0 if no)

Variables	Mean (st. dev.)	Coefficients	z-statistics
Constant	-	0.7217	3.956***
GENDER	61% (49)	0.0976	1.023
AGE	37 years (14)	-0.0006	-1.721*
STATMAT	57% (49)	-0.3470	-3.757***
EDUC	48% (50)	0.0209	0.655
SANIEXP	44% (49%)	-0.0912	-1.014
ASSOEXP	43% (47%)	-0.0191	-2.003**
FHEALTH	19% (13%)	-0.0164	-4.927***
LREVENUE	70,380 FCFA (57.407)	0.0002	0.671
TATTENTE	72 minutes (112 )	0.0018	2.964***
DRUGS	20% (40)	0.2719	1.759*
STAFF ATTITUDE	0.65 (0.48)	0.1700	1.276

\* =  $P < 0.1$ ; \*\* =  $P < 0.05$ ; \*\*\* =  $P < 0.01$ .

52.2 We begin our discussion with some general remarks. On examining the results displayed in tables 3 and 4, it is quite apparent that there exist significant differences between the determinants of the decision to respond to a WTP question and those of the corresponding WTP amounts, indicating that the respondents are generally able to distinguish between them and to bring different considerations to bear upon their responses.

5.2.3 Next, we note that the estimated  $\rho$ , the cross-equation correlation coefficient, negative. This implies that respondents with higher WTP generate a lower response rate and thus missing WTP responses stem largely from the higher WTP categories.

5.2.4 Turning now to the specific determinants of an individual's to respond to the WTP question, as reported in table 3. We notice that the age of the respondent, the marital status, the community experience and the morbidity status are the significant respondent's determinants affecting the willingness to pay decision. The results show that a change in these variables reduces the likelihood of the response. Next we find that the health centre related variable such as the waiting time, and the availability of drugs increase and play a significant role in the determination of the response rate, while variables like the respondent's perception of the medical staff attitudes do not play a significant role.

Table 4: Determinants of the WTP amount: The variable  $W_i^*$  simultaneous-equation

Variables	Coefficients	z-statistique
Constant	8.5216	90.860***
GENDER	0.1052	2.182**
AGE	0.00001	0.529
STATMAT	0.0210	0.460
EDUC	0.0352	2.191**
SANIEXP	-0.0384	-0.844
ASSOEXP	0.1322	2.676***
FHEALTH	0.0109	6.008***
LREVENUE	0.003	2.91**
TATTENTE	-0.00009	-0.372
DRUGSAVAIL	0.1896	2.385**
STAFF ATTITUDE	0.2200	3.209***
$\sigma_w$	0.5803	21.063***
$\rho$	-0.8451	11.768***

\* =  $P < 0.1$ ; \*\* =  $P < 0.05$ ; \*\*\* =  $P < 0.01$ .

5.1.5 Considering the results of WTP amount, as displayed in table 4, we notice that some respondent related variables and, those of the health centre significantly affect the willingness to pay amount.

#### 6.2.2- Respondent related Characteristics

5.1.6 The results reported in table 4 show that variables such as gender (GENDER), the community organization experience (ASSEXP), the educational level (EDUC) and the household health status (FHEALTH) significantly affect the willingness to pay amount. According to the results of the regression, the variables GENDER, STATSAN, EDUC, REVENUE and ASSEXP have a positive and significant impact on willingness to pay. In order words, being a family head increases the likelihood of paying by about 10%, educated

respondents by about 4%, member of the community social movement by 13%, and the availability of drugs at the health centre could contribute to increase the respondents likelihood of paying by 22%.

5.1.7 A positive and significant coefficient of ASSEXP shows the predominant role of cultural movements with regard of socials' risk-sharing such as the community pre-payment scheme care in the rural area. In addition, the positive and significant relationship between the household's health status variable and the willingness to pay value shows that families in which the morbidity rate is quite high are more willing to participate in a health care prepayment system.

Variable SANIEXP was found to have a positive and statistically significant connection with the willingness to pay value.

### *6.2.3- Health centre related Characteristics*

5.2.1 These are variables related to the respondent's household perception of the medical staff attitudes vis-à-vis to the patient (STAFF ATTITUDE) and the permanent availability of essential drugs in the health centre (DRUGSAVAIL).

According to the results reported in table 4, it appears that, both variables have a positive and highly significant impact on the willingness to pay.

These results pointed out the fact that people give a particular importance to the quality of service provided by the health centers.

### **6.3- Prediction of the WTP amounts**

5.3.1 As mentioned previously, the parameters estimated discussed above can be used to predict the true WTP amount for each household in the sample, conditional upon whether the household has answered the contingent valuation question under consideration. Table 6 reports the resulting mean WTP amount and its standard error, for each scenario. For comparison with the full simultaneous-equation model estimates, we also present the single-equation estimates implied by the results displayed in table 5.

Table 5: Determinants of the WTP amount: the variable  $W_i^*$  single-equation model

Variables	Coefficients	z-statistique
Constante	8.42768	97.872***
GENDER	0.129568	2.697***
AGE	-0.00007	-0.505
STATMAT	-0.0135	-0.304
EDUC	0.0271	1.735*
SANIEXP	-0.0735	-1.641
ASSOEXP	0.1234	2.574**
STATSAN	0.0047	2.637***
LREVENUE	0.00007	0.531
TATTENTE	0.0001	0.575
Drugsavail	0.2154	2.799***
STAFFAT ATTITUDE	0.2339	3.556***
$\sigma_w$	0.5176	33.496***

\* =  $P < 0.1$ ; \*\* =  $P < 0.05$ ; \*\*\* =  $P < 0.01$ .

5.3.2 A few observations are noteworthy. First, the single-equation estimate is relatively lower than that of the simultaneous-equation model for the WTP. In view of the estimated negative cross-equation model for the WTP, implying that the missing observations largely originate in the higher WTP amount categories, this indicate that the single-equation estimates for the WTP amounts are biased downwards. The average WTP amount from simultaneous-equation model exceeds that for the single-equation at the 1% level of significance.

Table 6: the estimated willingness to pay

Single equation	Simultaneous equation model		
	$E[\hat{W}^*   (X_{di}, X_{wi}, D_i = 1)]$	$E[\hat{W}^*   (X_{di}, X_{wi}, D_i = 0)]$	Mean
7155 (1030)	7190 (1240)	10410 (3190)	9840 (4440)

*Variables in parenthesis are standard errors.*

## **7. Conclusion, recommendations and limits of the study**

6.1 The study looked at the willingness to pay for community pre-payment scheme in the rural area in the centre province of Cameroon and its sociodemographic and facility related determinants. In this paper, we have illustrated the use of a grouped-data, sample-selection estimation technique to deal with the problem of missing WTP responses in contingent valuation method surveys employing the bidding game method by analysing contingent valuation questions posed in a survey aimed at gauging the WTP for the community pre-payment scheme.

Our estimation reveals that the determination of the decision to respond to a particular contingent valuation question and the resultant WTP amount are likely to be correlated, implying that the use of single-equation methods and restricting the sample to only observed WTP responses would lead to biased and inconsistent estimates of the true WTP amounts. The sign of the estimated correlation indicates the direction of the bias. In fact, about 33% of the respondents decided to not answer to the WTP question, while 67% gave a positive answer. The model of our study can be used to predict the number and amount that households in a community which will need health care access facilities if various prices were charged. Since the interval for each category is known, the category into which household falls may be predicted. Summing the number of respondents in each category in the villages yields the demand schedules. Such demand schedules are precisely the kind of information needed by planners to make sound project decisions, and we believe this methodology, estimated with WTP bids obtained from a contingent valuation survey, is a promising approach to modelling village health demand relationship.

The mean affordable annual premium was 9,840 FCFA (\$1.5 per month) per individual. About 75 % of the respondents in the household survey preferred a monthly payment arrangement and only 15 % preferred an annual payment arrangement.

A premium level that is more than 6,000 FCFA (about \$11) per year would not be affordable by 67 % of the household respondents. 75 % of the household respondents would not afford a premium of 9,600 FCFA (\$ 17) per year. This shows that there is a need for an initial subsidization of schemes by government and or other donor agencies to establish these CBHI. Alternatively, the government could subsidize the cost of the very poor into community-based insurance systems.

6.5 The results of this study suggest that it is possible to do a contingent valuation survey among a very poor population and obtain reasonable, consistent answers. There appear not to be a major problem with starting point bias. From this research we cannot, of course, judge

whether individuals in the villages would in fact pay the amounts they indicated in the survey if the NGOs tried to collect the money. Nevertheless, we believe that results of this research strongly suggest that contingent valuation surveys are a feasible method for estimating individual's willingness to pay for mutual health organizations in rural Cameroon. This has important policy implications for rural health pre-payment scheme projects because it seems to show that going into a village and conducting a relatively simple survey can yield reliable information on the population's willingness to pay. The implication of these findings is not, however, limited to the rural health sector. Our research suggests that contingent valuation surveys may prove to be a viable method of collecting information on individual's willingness to pay for a wide range of public infrastructure projects and public services in Cameroon and other developing countries.

#### *Recommendations on possible pilot community-based health insurances*

The study has clearly pointed out the interest of the respondents community members to participate in possible community health prepayment scheme. This was shown by the fact that 67 % of the household respondents were willing to join such schemes. Based on this high willingness to participate in schemes at the community level and the proposed amounts they are willing to pay, the community-based health insurances seem to be feasible in the study areas.

Pilot schemes could be initiated in a selected area and lessons learned from experience of this pilot can be applied to other localities. The objectives of the CBHI should be to improve the quality of care and efficiency of service delivery, to generate additional income; and to increase the ability of households to finance their health care through prepayment.

Technical support in managing and running such schemes can be provided by the government and NGOs and where possible, train the local population to carry out some basic procedures such as the community health workers. This can be used to strengthen the capacity of these schemes. Such support and training can also be extended to communities wishing to establish such schemes. Government should therefore ensure that an umbrella body or organization is instituted which comprises the government, civil NGOs and representatives of these schemes which aims at reshaping, monitoring, reforming and where possible, regulating the operations of the schemes especially when these schemes are to be reproduced in various parts of the country.

The study findings have a few limitations. We had surveyed only some villages in the centre province of Cameroon. Therefore, the generalization of results is difficult to establish. We did not examine the

effect of family size on willingness to pay amount. It may be possible that households with less number of members (particularly children) may be willing to pay more for their members than households with large number of members (children) as it has been shown in other studies in the area of health insurance and community-prepayment schemes (Ataguba et al., 2007). We did not also analyze the effect of knowledge of health insurance on the households' willingness to pay. Households who know what health insurance is could willing to pay higher amounts because of the prepayment function, than those with no knowledge of health insurance as can be observed for the use of cash (Ataguba et al., 2007). Finally, we did not distinguish public and private health care providers in the willingness to pay questions could probably be the major limitation of the. Further research should take care of the bids proposed for private and public health care providers separately. This study should then be regarded as an exploratory study to examine households' willingness to pay for community healthcare insurance schemes in rural Cameroon.

### **Acknowledgement**

The authors are sincerely grateful to the African Economic Research Network (AERC) for funding the fieldwork exercise; the Economic Analysis and Development Network (AED-AUPELF-UREF) for the opportunity to participate in various programs and for the funding and research grants received. The authors also acknowledge the comments made by the GDN resource persons and other colleagues that helped to shape the work.

## References

- Abel-Smith, B. (1986). Health insurance in developing countries: lessons from experience. *Health policy and Planning*, 7(3), 215-226.
- Abel-Smith, B. (1993). Financing health services in developing countries: the options. *NU Nytt om U-landshälsard*, 2/93, vol. 7.
- Ahrin, D.C. (1995). Health insurance in rural Africa. *The Lancet* 345, 44-45.
- Asenso-Okyere, W.K., Osei-Akoto, I., Anum, A. and Appia, E.N. (1997). Willingness to pay for health insurance in developing economy. A pilot study of the informal sector in Ghana using contingent valuation. *Health Policy* 42: 223-237
- Asfaw, A. and von Braum, J. (2004). Can community health insurance schemes shield the poor against the downside health effects economic reforms? The case of rural Ethiopia. *Health policy* 70: 97-108
- Asgary, A., Willis, K., Taghavei, A.A. and Raffeian, M. (2004). Estimating rural willingness to pay for health insurance. *European Journal of Health Economics* 5: 209-215
- Ateguba, J.T., Ichoku, H.E. and Fonta, W.M. (2007). An estimation of the willingness to pay for community healthcare insurance scheme in rural Nigeria. Research Report presented at the 6<sup>th</sup> Poverty and Economic policy (PEP) Research Network General Meeting, Sheraton Lima Hotel, Paseo de la Republica 170. Lima, Peru.
- Atim, C., 1998. *The Contribution of Mutual Health Organisations to Financing, Delivery and Access to Health Care: Synthesis of Research in Nine West and Central African Countries*. Abt Assocs/PHR, Bethesda, MD.
- Atim, C., 1999. Social movements and health insurance: a critical evaluation of voluntary, non-profit insurance schemes with case studies from Ghana and Cameroon. *Social Science and Medicine* 48, 881-896.
- Bala, M.V., Mauskopf, J.A., and Wood, L.L. (1999). Willingness to pay as a measure of health benefits. *Pharmacoeconomics* 15 (1): 9-18.
- Bhat, C.R. 1994. Imputing a continuous income variable from grouped and missing income observations. *Economics Letters* 46: 311-319.
- Bratt, J.H., Foreit, J. and De Vargas, T., (1998): Three Strategies to promote sustainability of CEMOPLAF clinics in Ecuador. *Study in Family Planning* 29 (1): 58-68.
- Brox, J.A., Kumar, R.C., et Storelly, K.R., (2003). Estimating willingness to pay for improved water quality in the presence of item nonresponse bias. *American Journal of Agricultural Economics* 85(2): 414-428.
- Carrin, G. (1987). community financing of drugs in Sub Saharan Africa. *International Journal of Health Planning and Management*, 2, 125-145.

- Carson, R.T., and Mitchell, R.C., (1993). The value of clean water: The public willingness to pay for boatable, fishable and swimmable quality water. *Water Resources Research* 29: 2445-2454.
- Chabot, J., Boal, M., Da Silva, A., 1991. National Community health insurance at village level: the case from guinea Bissau. *Health Policy and Planning* 6 (1), 46-54.
- Collins, D., Quick, J.D., Musau, S.N. et al., (1996). The fall and rise of cost sharing in Kenya: the impact of phase implementation. *Health Policy and Planning* 11: 52-63.
- Cookson Richard (2003): Willingness to Pay Methods in Health Care: A scetical View. *Health Econ* 12:891-894 (2003). Published online in Wiley InterScience ([www.interscience.wiley.com](http://www.interscience.wiley.com)).
- Creese, A., and Bennett, S. (1997). Rural Risk-Sharing Strategies in Health. *Paper presented to an International Conference sponsored by the World Bank, Innovations in Health Care Financing*, March 10-11, Washington, D.C.
- Criel, B., Van der Stuyft, P., Van Lerberghe, W., 1999. The Bwamanda hospital insurance scheme: effective for whom? A study of its impact on hospital utilization patterns. *Social Science and Medicine* 48, 897-911.
- De Bethume, X., Alfani, S., Lahaye, J.P., 1989. The influence of an abrupt price increase on health service utilisation : evidence from Zaire. *Health Policy and Planning* 4 (1), 76-81.
- De Ferranti, D. (1985). Paying for Health Services in Developing Countries. An overview. *World Bank Staff Working Paper*, No. 721.
- Dong , H., Kouyate, B., Cairns, J., Mugicha, F., and Sauerborn, R. (2003a). Willingness to pay for community-based insurance in Burkina Faso. *Health Economics* 12: 849-862.
- Dong , H., Kouyate, B., Snow, R., Mugicha, F., and Sauerborn, R. (2003b). gender effect on willingness to pay for community-based insurance in Burkina Faso. *Health Policy* 64: 153-162.
- Dong , H., Kouyate, B., Cairns, J. and Sauerborn, R. (2005). Inequality in willingness to pay for community-based insurance. *Health Policy* 72: 149-156
- Fonta, M.W., and Ugwuozor, N. (2005). An assessment of the willingness to participate in a community-health financing arrangements for poverty alleviation schemes in Nigeria: a case study of the Ajouna-Obukpa community in Nsukka local government area Enugu State, Technical report prepared for Poverty in Africa Alternative (Povinaa), and Educational Cooperative Society (ECS), Lagos Nigeria.
- Foreit, K.G., and Foreit, J.R. (2002): Willingness to pay survey for setting prices for reproductive health products and services: A User's Manual. The Population Council.

- Forsythe Steven, Gilly Arthur, Ngatia Gilbert, Mutemi Roselyn, Odhiambo Joseph and Gilks Charles (2002): Assessing the cost and willingness to pay for voluntary HIV counselling and testing in Kenya. *Health Policy and Planning*; 17(2): 187-195. Oxford University Press.
- Frick D. Kevin, Lynch Matthew, Wset Sheila, Munoz Beatriz and Mkocho A. Harran (2003): Household Willigness to Pay for Azithromycin Treatment for Trachoma Control in the United Republic of Tanzania. *Bulletin of the World Health Organization* 2003, 81 (2).
- Gilson, L., 1988. Government Health Care Charges: Is Equity Being Abandoned? *EPC publication* No. 15. London.
- Greene, W.H., (1995). *LIMDEP-Version 7*. Econometric Software Inc.
- Gruat, J.V. (1990). Social security systems in Africa: current trends and problems. *International Labour Review*, 129 (NE4), 405-421.
- Habbani, K., Groot, W. and Gelovac, I. (2006). Household health-seeking behaviour in Khartoum, Sudan: the willingness to pay for public health services if these services are of good quality. *Health Policy* 75: 140-158
- Hanemann, W.M. 1984. Welfare evaluations in contingent valuation experiments with discrete responses. *American Journal of Agricultural Economics* 66: 332-341.
- Hanneman, W.H. (1991). Willingness to pay and willingness to accept: by how much do they differ? *The American Economic Review* 81 (3):635-647.
- Heckman, J.J., (1979). Sample selection-bias as a specification error, *Econometrica* 47: 153-161.
- International Society for Equity in Health. 2006. Equity and health sector reform in Latin America and the Carribean from 1995 to 2005. Approaches and limitations.
- Klose, T., (2002): The contingent valuation method in health care. *Health policy* 47: 97-123.
- Kutzin, J., and Barnum, H., (1992). Institutional features of health insurance programs and their effects on developing country health systems. *International Journal of health Planning and Management*, 7, 51-72.
- Lewallen, S., Geneau, R., Mahande, M., et al. (2007). Willingness to pay for cataract surgery in two regions of Tanzania, *Ophthalmol* 90: 11-13.
- Mataria, A., Giacaman, R., Khatib, R. and Moatti, J-P. (2006). Impoverishment and patients' willingness and ability to pay for improving the quality of health care in Palestine: an assessment using the contingent valuation method. *Health Policy* 75: 312-328
- McIntyre, D., Gilson, L., and Mutyambizi, V., (2005). *Promoting equitable health care financing in Africa context: current challenges and future prospects*, Regional Network for Equity in Health in Southern Africa (EQUINET) Working Paper 27.

- Messonnier, M.L., Bergstrom, C.M., Cornwell, R.J.T., et Cordell, H.K., (2000). Survey response-related biases in contingent valuation: Concepts, remedies, and empirical application to valuing Aquatic Plant Management. *American Journal of Agricultural Economics* 83: 438-450.
- Ministry of Public Health (2001). *Stratégie sectorielle de la santé*, République du Cameroon.
- Morey R. Edward, Sharma R. Vijaya and Mills Anne (2001): Estimating Malaria Patients' Household Willingness to Pay for Health Care Proposals in Rural Nepal. Discussion Paper, University of Colorado.
- Ntangsi, J., (1998). *An analysis of health sector expenditure in Cameroon using a national health accounts framework*, World Bank Resident Mission in Cameoon.
- Nyonator, F.K., Awoonor-Williams, K., James, F., et al;, (2005). The Ghana community-based health planning and services initiative for scaling up service delivery innovation, *Health Policy and Planning* 20: 25-34.
- O'Brien, B., Gafni, A. (1996). Whwn do the dollars make sense?: Toward a conceptual framework for contingent valuation studies in health care. *Medical Decision Making* 16: 288-299
- Olsen, J.A. (1997). Aiding priority setting in health care: is there a role for the contingent valuation method? *Health Economics* 6: 603-612.
- Olsen, J.A., Kidholm, K., Donaldson, C. and and Chackley, P. (2004). Willingness to pay for public health care: a comparison of two approaches. *Health Policy* 70: 217-228
- Onwujekwe, O., (2001): Searching for the better willingness to pay elicitation method in rural Nigeria: the binary question with follow-up method versus the bidding game technique. *Health Economics* 10: 147-158.
- Onwujekwe, O., Fox-Rushbi, J. and Hanson, K. (2005). Inter-rater and test-retest reliability of three contingent valuation questions format in south-east Nigeria. *Health Economics* 14(5): 529-536
- Protiere, C., Luchini, S., Moatti, J.P. and Shackley, P. (2004). The impact of information on new-health attributes on willingness to pay for multiple health care programs. *Social Science & Medicine* 58: 1257-1269
- Raylynn, O., (1994): The effect of the quality, price, and availability of family planning on contraceptive use in Ghana. Living Standard Measurement Working Paper, World Bank. African Technical and Policy Research Department. Washington, D.C.
- Republic of Cameroon (1992). *Statement of sectorial health policy*, Ministry of Public Health, Yaounde
- Rheingans D. Richard, Haddix C. Anne, Messonnier L. Mark, Meltzer Martin, Mayard Gladys and Addiss G. David (2004): Willingness to pay for prevention and treatment

of lymphatic filariasis in Leogane, Haiti. *Filaria Journal* 2004. 3:2  
(<http://www.filariajournal.com/content/3/1/2>).

- Schneider, P., Diop, F.P., and Bucyana, S. (2000). *Development and Implementation of Prepayment Schemes in Rwanda*. Technical Report No. 45. Bethesda, MD: Partnerships for Health Reform (PHR) Project.
- Shepard, D., Vian, T., and Kleinau, E.F. (1990). Health insurance in Zaire. *Policy, Research and External Affairs Working Papers*. WPS 489. Africa Technical Department. The World Bank. Washington.
- Stern, S., (1991). Imputing a continuous income variable from a bracketed income variable, with special attention to missing observations, *Economics Letters* 37: 287-291.
- Stewart, M.B., (1983). On least squares estimations when the dependent variable is grouped. *Review of Economic Studies*, 737-753.
- Strazzeria, E., Genius, M., Scarpa, R. and Hutchinson, G. (2003). The effect of protest votes on the estimates of willingness to pay for use values of Recreational Sites. *Environmental and Resource Economics* 25: 461-476
- Tshinko, B. L., Constandriopoulos, A. P., Fournier, P., 1995. Plan de paiement Anticipé des Soins de Santé de Bwamanda (Zaire). Comment a-t-il été mis en place . *Social Science and Medicine* 40 (8), 1041-1052.
- Vogel, R.J., (1990 b). health insurance in sub-saharan africa: a survey and analysis: a survey and analysis. *Policy, Research and External Affairs Working Papers*. WPS 476. Africa Technical Department. The World Bank, Washington.
- Vogel, R.J., (1990a). An Analysis of three national health insurance proposals in Sub-Saharan Africa. *International Journal of Health Planning and Management*, 5, 271-285.
- Waddington, C.J., and Enyimayew, K.A. (1989). A price to pay. Part 1: the impact of user charges in Ashanti-Akim District, Ghana. *International Journal of Health Planning and Management* 5, 287-312.
- Walraven, G. (1996). Willingness to pay for district hospital services in rural Tanzania. *Health Policy and Planning* 11: 428-437
- Wang, H. and Whittington, D. (2005). Measuring individuals' valuation distribution using a stochastic payment card approach. *Ecological Economics* 55: 143-154
- Weaver, M., Ndamobissi, R., Kornfield, R., Blewane, C., et al. (1996). Willingness to pay for child survival: results for the national survey in Central Africa Republic. *Social Science & Medicine* 43(6): 985-998
- Whitehead, J.C., Groothuis, P.A. et Blomquist, G.C. 1993. Testing for non-response and sample selection bias in contingent valuation. *Economics Letters* 41: 215-230.
- Whitehead, M., Dahigren, G. and Evans, T. (2001). Equity and health sector reforms: can low-income countries escape the medical poverty trap? *The Lancet* 358: 833-836

- World Bank (1987). *Financing the Health Sector: an Agenda for Reform*, The World Bank, Washington.
- World Bank (1993). *A framework and indicative cost analysis for better health in Africa*, The World Bank Africa Technical Department, Human resources and poverty division, Technical Working paper 8.
- World Bank (1994). *Better health in Africa, experience and lessons learnt*, World Bank, Washington, DC.
- World Health Organization (1993). *Planning and Implementing Health Insurance in Developing Countries: Guiding Principles. Macroeconomics*. Health and Development Series: Geneva.
- World Health Organization (1996). *Equity in health and health care: WHO/SIDA Initiative*. Geneva
- Yasunaga Hideo, Ide Hiroo, Imamura Tomoaki et Ohe Kazuhiko (2006) : Willingness to pay health care services in common cold, retinal detachment and myocardiac infarction : an internet survey in Japan. <http://www.biomedcentral.com/1472-6963/6/12>