Demand for voluntary health insurance by the poor in developing countries: Evidence from rural Ghana

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Abstract
In recent years the number of formal risk-sharing schemes for health care services in Ghana has risen rapidly. At present about 42 out of 110 districts are operating some form of formal community-based health insurance, which are voluntary and to a greater extent integrated to health care facilities. The success of these schemes depend largely on the extent to which they directly or indirectly lessen the financial burden of people who have suffered most since the inception of economic reforms in the health sector.

The paper looked at the social inclusion aspects of the schemes by studying demand for the two oldest schemes by the poor and exploring design features that could enhance better coverage and improve financial protection for health care services. The results from this study show that the schemes perform quite well in terms of paying hospitalisation bills for beneficiaries. However the findings portray a remarkable exclusion of the poorest of the poor, even from other forms of risk-sharing arrangements in the informal sector. Apart from poverty, the analysis also reveals that high-risk households are less likely to participate fully in the insurance schemes. Among other suggestions, the study recommends that the schemes should be redesigned to benefit rural and poor households more than they do now.

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Keywords: Health sector reforms; community-based health insurance; rural health infrastructure; Ghana.

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1 Introduction

Ghana has prioritised universal coverage of health care and has therefore put in place policies and programmes to meet this goal. Even though success has been achieved in different aspects of the health sector, health care delivery remains inadequate especially for poor people and other disadvantage groups. The task confronting the health sector remains difficult; life expectancy remains low (60 years), morbidity of preventable diseases remains high; malaria, diarrhoea and other preventable diseases account for about 40% of child mortality, and maternal mortality is still high (240 per 100,000 births).

Several reasons, including financing as a major one, account for the slow pace of improvement in the health sector. In particular the reduction of public spending on health care and the introduction of user fees have created problems of inaccessibility and inequity in health care (Asenso-Okyere et al., 1998). The financing response by creation of insurance schemes suitable for poor people and other disadvantage groups remains weak due to design and implementation difficulties.

Different health insurance schemes are emerging in Ghana (Atim et al., 2001). They include market-based arrangements and many informal risk-sharing schemes[1] that present an immense opportunity to gather experience and design suitable health care financing mechanism in the long run.

To increase scope and exploit economies of scale for these schemes in developing countries, recent suggestions centre on linkages between formal and informal schemes (Criel, 1998; Morduch, 1999; WHO, 2000). There is however little information in the Ghanaian context on the effects of these schemes on beneficiaries in terms of equity in financial protection against economic cost of illness and access to health care services. This study provides further empirical details for the understanding of the issues, thereby contributing to the design and implementation of universal health insurance for Ghana. Specifically, it (i) describes risk-sharing schemes available in rural Ghana and (ii) examines the extent to which poor households use the schemes.

The paper is organised as follows. Section 2 briefly describes the emerging health insurance schemes in Ghana and comments on two issues that affect their demand, selection and poverty. Section 3 presents the analytical models, study area and the sample used. Findings are presented in section 4. Discussions on the findings, recommendations and conclusion end the paper.

[1] Informal risk sharing involves mutual support network of members of a community, extended household, or ethnic groups; among members of the same occupation; or between migrants of similar origin (Criel, 1998; Atim, 1999; World Bank, 2000). Those that provide any health related benefit is referred to as informal health insurance scheme in this paper.

By formal health insurance scheme, the paper includes private health insurance schemes, hospital-based health insurance schemes and well-organised form of group-based associations, which are primarily set-up for medical insurance.

2 Evolving health insurance schemes in Ghana and challenging design issues

2.1 Overview of health insurance schemes in Ghana

Different actors finance the health care system in Ghana; government of Ghana through direct budget allocation and local government common fund, households, non-governmental organisations (NGOs) that assist religious hospitals and clinics, and the donor community. Others include employment-based arrangements in the form of direct payment of medical bills by employers or re-imbursement after employees have paid their bills.

A sketchy overview of health insurance schemes in Ghana is shown in figure A2.1 in the appendix. Two forms of schemes are quite distinctive. These are private insurance companies in the cities and other bigger towns and hospital-based schemes in the districts. The private insurance companies are few and are patronised by employers and few individuals. With the support of development partners various forms of formal health insurance are growing in the districts (see Atim et al., 2001). At present about 42 out of 110 districts operate at least one form of district-based health insurance schemes, which are voluntary and to a greater extent integrated to health care facilities. Examples include schemes like the Dangme West District Health Insurance Scheme and Ejisu/Juaben District Health Insurance Scheme. The two oldest provider-based schemes in Ghana are the Nkoranza Community Health Insurance Scheme and the West Gonja District Health Insurance Scheme set up in 1992 and 1995 respectively (sometimes referred to as "pilot schemes"). These schemes receive financial support in the form of salaries and other administrative logistics from the state and NGOs.

The rest of the population, mainly in the informal sector have been using out of pocket payment for health care services. This form of payment is financed individually or through social networks. Under the economic reforms in the 1980s, public health care facilities instituted user charges for drugs and other supplies. From January 1992 drugs for instance were priced at 100% recovery level and in most cases the policy was implemented on cash down before service basis ("cash and carry"). Under the policy there is fee exemption for all people under 5 and above 70 years of age who use public health care facilities and also for some conditions like limited pregnancy expenses, leprosy and TB treatment.

2.2 Selection problems in health insurance schemes

Contract enforcement and asymmetric information problems in health insurance lead to behaviours on the side of consumers as well as on the side of health plans that affect the effective and efficient operation of the market. Prominent among the resulting behaviours are moral hazard and adverse selection on the demand side, and risk selection on the supply side. Moral hazard refers to the malfeasance of an individual making purchases that are partly or fully paid for by others (Cutler and Zeckhauser, 2000) and the term selection refers to actions by economic agents on either side of the market that exploit unpriced risk heterogeneity and break pooling arrangements, with the result that some consumers may not obtain the insurance they desire (Newhouse, 1996). Sometimes the term selection is also used to refer to the outcome of the actions (Van de Ven and Ellis, 2000). We discuss the issue of selection in this paper because it affects household participation in the schemes more than moral hazard does.

Most of the emerging health insurance schemes in the rural areas of Ghana are borrowing the regulatory properties of the "pilot schemes". Few have designs that are intended to use risk-adjustment mechanisms based on age. In developed nations, risk-adjustment and regulation are usually designed to provide financial access to health care for high-risk individuals. Whilst risk-adjustment provides explicit subsidies to high-risk individuals, regulating plan design creates implicit cross-subsidies from low-risk to high-risk individuals.

Although they foster risk-solidarity principle, according to a discussion by van de Ven and Ellis (2000) they lead to predictable losses for the schemes on their high-risk individuals and thereby create incentives for them to avoid them. This eventually leads to selection that adversely affects access to care, quality of care and efficiency. The selection effects arise because of two actions on both sides of the insurance markets, adverse selection and cream skimming.

The effects of adverse selection on access depend on the relative weights of contract costs and cross-subsidy that will be expected of low-risk individuals (Wilson, 1977; Newhouse, 1996). If contracting costs are relatively lower or if cross-subsidy expected from low-risk individuals are high, health insurance markets could be unstable or there could be a situation where high-risk individuals pay high premium for generous coverage and low-risk individuals pay low premium for stingy coverage. The implication for situations like the case in Ghana where various schemes are evolving is that coverage for non-affluent high-risk individuals could be reduced drastically. Low-risk individuals could also be denied of insurance coverage they wish if contracting costs were higher.

The schemes could "cream skim" or select low-risk consumers to obtain high "profits" because of regulation and high transaction costs related to premium differentiation. Experiences from advanced countries indicate that where schemes are not aware of the relevant risk factors ex-ante, they may structure their coverage for plans to appear unattractive for high-risk individuals. They could also make plans unattractive for high-risk individuals if they know the risk factors but cannot ex-ante identify the individuals with those characteristics. Even if schemes can identify unprofitable individuals based on risk factors, they will rather focus their selection strategy directly on them when they cannot use risk-adjustment mechanism to set premium. Examples of strategies used in cream skimming include providing poor quality of care or poor services to the high–risk individuals, selective advertising and contracting with providers who operate in "healthy areas" (van de Ven and Ellis, 2000). Also when the schemes are constrained in mobilising resources they may prefer to invest the limited resources in cream skimming rather than in improving efficiency. Efficient schemes that do not cream skim applicants, may loose market share to inefficient schemes that do, resulting in welfare loss to society.

2.3 Social inclusion of rural health insurance schemes

The problems of selection do not rule out formal health insurance for the poor completely because the inherent problems in self-insurance and informal insurance are equally or largely difficult to overcome. This is especially the case for Ghana because of the re-organisation of the Ghanaian economy to respond to market incentives. In the setting where poverty is pronounced the growth of formal insurance requires strong inputs from the informal economy. Robison and others (2002) emphasized this point in a discussion on the role of social capital and poverty reduction. In developing institutions like this, their argument calls for creation of formal institutions to permit strangers to exchange with each other. Also realising the role of informal institutions in organising exchanges, which require productive social capital the argument states, "… Unless the poor accept formal institutions they will be excluded from the advantages of the formal economy (p.36)... However, if formal institutions are to gain attachment values from the poor, the poor must participate in their creation and maintenance and realize some benefit from their existence (p. 18)".

Studies that look at the effects of health insurance on health care systems have touched on three main criteria to assess the performance of community based health financing arrangements

(Jakab and Krishnan, 2002). They are resource mobilization capacity of the schemes, social inclusiveness of the schemes and the ability to protect people against cost of illness. The extensive review by Jakab and Krishnan, using Preker and others' (2000) analytical framework, reports among other findings that the poorest of the poor and socially excluded groups are not automatically reached even though the schemes are effective in reaching a large number of low-income populations. It was also noted that high-income groups are frequently under represented relative to the entire population. The determinants of success in their review include the ability of the schemes to address adverse selection and rent-seeking provider behaviour, and purchasing mechanism instruments.

Results from case studies in Ghana (reported in Atim 2000 and also reviewed in Jakab and Krishnan, 2002) are to some extent consistent with above findings. The review also reported a finding by Arhin (1994 and 1995) that rural health insurance could serve as a viable alternative to user fees by removing the barriers to utilization of health care. These studies had relied quite heavily on data from records and also on qualitative information from focus group discussions and in-depth interviews with community leaders. This study addresses the same issues with quantitative data for insured and non-insured to address selection issues in rural health insurance.

3 Estimating demand for rural health insurance

The choice of a health insurance plan and the extent of involvement by households are driven by two sets of determinants, which are closely related, but are analytically separable - the characteristics of the plan itself, and the personal, household and community characteristics of the individual making the choice (Shaw and Ainsworth, 1995). Characteristics of plans include type of medical services offered, the degree of freedom to choose providers and the extent of compensation given (Zweifel and Breyer, 1997; Sanhueza and Ruiz-Tagle, 2002). Others are quality of care given by the chosen provider and perceived credibility of the insurer (Wiesmann and Jütting, 2001; Asenso-Okyere et al., 1997). Asymmetric information between insured and insurers and plan regulation also lead to situations where low-risk or high-risk individuals do not buy insurance, as it is socially desired.

Personal characteristics underlying the decision to opt for insurance include risk aversion, price sensitivity of medical care and health status of the individual. Explanation in Cutler and Zeckhauser (2000) shows that the value of risk spreading increases with risk aversion and variability of medical spending. Zweifel and Breyer (1997) also show that in the situation of ex-post moral hazard, full insurance coverage is sub optimal and the optimal rate of coinsurance increases if the price elasticity of demand increases.

Additionally, the necessary condition for informal risk sharing schemes to grow is the existence of voluntary reciprocity (Coate and Ravallion, 1993; Plateau, 1997). This type of exchange is sustained if discount rates of people are lower. That is if their degree of relative risk aversion is higher, and the differences between their respective incomes are larger. Other important factors are the rates at which transfers are made and the nature of risks covered under each arrangement.

3.1 Analytical models

In a cross-section study where one scheme or few schemes offer limited plans to individuals, it is difficult to incorporate plan characteristics in choice analysis that deal with actual data. Like most revealed-preference studies important decision variables such as premium and benefit

packages do not vary. In this paper only the characteristics of individuals, households and communities are used to analyse actual decisions of households concerning participation in formal and informal risk sharing schemes and their level of participation. Sanhueza and Ruiz-Tagle (2002) used a similar technique to estimate the determinants of choice for public or private health insurance in Chile[2].

Household demand for health insurance

There are two dependent variables for this part of the study, the number of people in a household that are members of hospital based health insurance schemes in the study area and the other is the number of adults in a household that belong to any association which provide health related benefits for its members. The former is referred to as formal health insurance and the latter informal health insurance. These forms of insurance are not mutually exclusive for households and there are households who belong to both. I crudely assumed that membership in informal schemes influence the demand for formal insurance but not the reverse. Even though medical insurance and health insurance refer to related but different things they are used interchangeably in the paper. The unit of analysis in the paper is the household. However when a household decides to insure some of its members but not all, the characteristics of individual members are important for the analysis and in that case the individual member of the household is used as a unit of analysis.

Case I: Household demand for formal health insurance

It is assumed that a household's demand for formal health insurance is made in two stages. At the first stage, the household decides whether to join an insurance scheme or not and at the second stage it decides how many of its members to insure. There are two regimes at the first stage, regime 1 is the ex-ante choice case where the household decides to stay out completely and hence registers none of its members. Regime 2 is the ex-post case where demand shows how many members of the household were fully registered at the end of the insurance year. The hospital insurance schemes allow households to pay individual premium by installment. However at the end of the registration period if the premium for an individual is not fully paid, that household member is considered a non-member of the scheme for that insurance year. Therefore regime 2 begins when the household decides to join the scheme and at the end of the registration period the number of fully paid members constitutes the demand for formal health insurance for the household at stage 2. The level of demand could be zero if the household is not able to pay for any members fully.

Case II: Household demand for informal health insurance

Household demand for informal insurance is formulated in a similar way as in case I. The associations or networks do not have any fixed time for membership, some have been around for so many years and others could collapse in some few months after they are set up. They are also noted for high degree of defection. At the time of the survey one could have observed a household with no adult as a member of such networks in two situations; (i) the household did not have an adult in any scheme for the reference period or (ii) some or all adults joined but all of them had stopped at the time the household was visited.

[2] In another paper by the author (forthcoming) stated-preference data is used to accommodate both types of variables through conjoint analysis. That analysis deals with decision in hypothetical situations, which incorporates quality of care, different levels of premium and different benefit packages to examine relative weights individuals give to these variables and also estimate willingness to pay for enhanced plans.

Model for case I and case II

The descriptions in the two situations can be analysed by a count data regression model, which has excess zeros. The formulation of the splitting model is as follows (see Greene, 2000):

Define	$R = 0$	if regime 1 holds (household has never joined insurance)
	$R = 1$	if regime 2 holds (household ever joined)
	y^*	be the outcome in regime 2, which is a Poisson process
	$y = R \times y^*$	be the partially observed response

The probabilities for the observed y are given as:

$$\Pr ob(y = 0) = \Pr ob(R = 0) + \Pr ob(R = 1) \times \Pr ob(y^* = 0 \mid Poisson)$$

$$\Pr ob(y = j > 0) = \Pr ob(R = 1) \times \Pr ob(y^* = j \mid Poisson)$$

And the distribution underlying the model is:

$$\Pr ob(R_i = 0) = F(x_i, \alpha)$$

$$\Pr ob(y_i = j \mid R_i = 1) = \frac{e^{-\lambda_i} \lambda_i^j}{j!}, j = 0,1,2,...$$

$$In\lambda_i = \beta' x_i$$

where R = 0 is the decision to stay out of the scheme

y = the number of household members fully registered

x = the vector of independent variables

α = the vector of coefficients in the first equation

β = the vector of coefficients in the second equation

λ = the Poisson parameter

The model is estimated with either Zero-Inflated Poisson (ZIP) or Zero-Inflated Negative Binomial (ZINB) (StataCorp., 2001; Limdep, 1999). The estimation is one of the extensions to sample selectivity in count data models. In this case the specification has binary choice variable, which represents a regime switching mechanism rather than an observation mechanism (Greene, 1997).

For a regime switching mechanism when the binary variable equals 0, the number of persons to register is always 0. When the binary is 1, a heterogeneous Poisson process, which may produce any nonnegative value, generates the number of persons to register including zero. In the case of observation mechanism, when the binary equals 1 the count variable is no more Poisson, as there will be no zero outcome.

For ZIP or ZINB, the estimation involves fitting the regime switch, that is whether the binary is always 0 or not at the first stage, and computes the probability that it is 1. This probability is then used to adjust the Poisson model at the second stage. Both stages are estimated at the same

time leading to estimation of a mixing distribution. Some programs use simulations to estimate them and others use numerical methods. Both are done internally.

The application of the model does not require the use of exclusion variables because the Poisson model assumes away individual heterogeneity (no unobserved heterogeneity in the count data) that could be correlated to the unobserved effects in a typical sample selection model. When ones suspects that in addition to the regime switching, there is effect of individual heterogeneity, then application of ZINB is required and exclusion variables may be needed.

Case III: Incomplete registration- household member to insure for formal health insurance
In West Gonja District individuals are free to register with their families or register as single members of the insurance scheme. In Nkoranza it is on paper that membership is allowed on family basis only but the survey revealed that a substantial number of households did not do complete registration. Thus in both districts one could classify the entire population into 3 groups; those that have never joined, those who joined the schemes but have dropped out and those who are still members. In going beyond the total demand by households, useful insights could be drawn from an analysis of the characteristics of individuals that fall under these categories. Multinomial discrete model using logit specification is employed for this purpose.

The model is:

$$\Pr ob(IN_i = j) = \frac{e^{\beta_j' X_i}}{\sum_{k=1}^{3} e^{\beta_k' X_i}}, \; j = 1,2,3$$

The options here are whether a household member is still insured in the scheme, whether the person is dropped from the scheme or the person has never been insured. To remove indeterminacy in the model, one of the outcomes' coefficients are normalised to zero during estimation (Greene, 2000). Personal, household and community characteristics were used for the model so a correction for heroskedasticity resulting from clustering (using multiple level analysis in the same equation) was done with the application of the Huber-White "sandwich" variance estimator in Stata statistical software (StataCorp. 2001;Waters, 1999).

3.2 Study area and sample

The main study has quite elaborate information on each individual in a typical household for two districts where formal health insurance schemes have been in operation for some time in Ghana; 10 years in Nkoranza District and 7 years in West Gonja District.

The two districts (in two different regions) surveyed are divided into zones for health care delivery purposes. Each district has a Catholic Hospital at the district capital, which also runs the formal health insurance as a separate department. The district capital and the neighbouring villages serve as one health zone. The other zones have health centres or community clinics that are run by the Ministry of Health.

Six communities from three health zones in Nkoranza district and 4 communities from two health zones in West Gonja district were selected for the study. The selection of the health zones and the communities were done in conjunction with the schemes' managers by

considering how effective the schemes cover people in those communities. The capital zones were both taken as better served zones and the other zones, poorly served in relative terms.

In order to capture all possible transfers, lists of members of the organisations were not used as sampling frames. Rather, systematic samples of houses in the selected communities were chosen for household interviews. Also a list of households was not available for any community so each community was divided into five blocks (five interviewers were used throughout) and within each block a systematic selection of the houses was done. When the houses had more than one household the first willing household in a house was interviewed. A household is defined as the number of people who live and eat together since the last three months preceding the interview.

Four types of interviews were done; in-depth interviews with managers of the formal schemes, organizational interviews with leaders of informal associations, ten community interviews with opinion leaders and household interviews. Most of the questions in the household interviews were posed to the head of the household. However sections of the questionnaire that could be answered by different members were referred to those members. Female members answered most of the questions that relate to health seeking behaviour. In all 485 households were interviewed comprising 302 from Nkoranza District and 183 from West Gonja District. The total number of people counted in all the households was 2394.

The characteristics of the sample are presented in table 3.1. Further detailed information for each of the communities is available in the appendix (table A5). The samples from the two districts are similar in terms of age composition of households and also in terms of the relationship of household head to other household members.

However the samples differ on the size of the household, education of adults, religion and migration status of the head. Households in the West Gonja sample are relatively bigger in size having nearly half of them containing six or more people as compared to about a third of the households in Nkoranza sample with that size. Also the households in the Nkoranza sample are predominantly Christians and the sample from West Gonja has more migrants.

It was noted after the interviews that the insured was about 54% in the sample from Nkoranza District and about 40% in the sample from West Gonja District, exceeding the actual percentages of insured in the districts. This arose because the district capitals were included in the sample; the district capitals host the schemes and are better covered than the other towns and villages. The sample therefore is not correctly representative of the districts. To correct for this in making inferences from the results, choice based estimation was done.

Registration data from the Nkoranza District was well disaggregated by health zones so it was possible to calculate the ratio of actual insurance coverage to the sample figures. This ratio was used as weights in the choice based estimation. The sample from West Gonja District was not weighted in estimation because such disaggregated data was not available. Nevertheless one can apply the results to any area in the districts, which bears close similarities to the sample described in table 3.1 because the estimations with the weights did not yield significantly different results from those without the weights.

Table 3.1 Characteristics of sample

Characteristics	Nkoranza District	West Gonja District
Population*	128,960	139,329
% Insured in formal scheme**	37.2	13.1
Sample		
Number of households	302	183
Number of persons	1,368	1,026
% Insured in formal scheme	53.9	39.5
Age composition		
% 0-4 years	13.7	11.6
% 5-17 years	32.9	34.9
% 18-59 years	49.9	47.9
% 60+ years	3.5	5.6
% Females	52.1	51.2
Relationship to head		
% Head	22.1	17.8
% Spouse	13.9	15.5
% Son/daughter	52.2	55.4
% Other people	11.8	11.3
Household size		
% 1 person	13.3	6.6
% 2-5 persons	52.6	45.9
% 6+ persons	34.1	47.5
Ave household size	4.5	5.61
Education of adults (years completed)		
% 0	21.1	54.5
% 1-5	6.3	3.1
% 6-10	56.9	22.4
% 11+	15.7	20.0
Primary occupation of adults (age>=18)		
% Farming	37.9	27.0
% Trading	16.1	23.3
% Office work	4.8	7.7
% Artisan/construction	12.5	4.6
% Other	7.1	2.9
% Not working	21.6	34.5
% With additional jobs	29.1	7.8
Characteristics of household head		
% Female	25.1	19.3
% Married	76.2	81.4
% Christian	79.4	20.3
% Migrant	22.3	48.1
Primary occupation of head		
% Farming	44.0	38.8
% Trading	14.6	14.7
% Office work	8.6	18.0
% Artisan/construction	17.6	7.1
% Other	7.6	5.5
% Not working	7.6	15.9

* Population figures were obtained from the 2000 Population and Housing Census Report (Ghana Statistical Service, 2002)

** Figures for the number of people insured were obtained from the insurance offices.

4 Findings

4.1 Basic features of informal schemes

The study used two sources of information to understand features of informal risk-sharing schemes in the districts. The first is information concerning informal groups every member in a household joins. This was compiled from the household questionnaire and the information for adults aged 18 years and above is given in tables 4.1, 4.2 and 4.3. Additionally leaders of 37 identifiable groups in the study area and community leaders were interviewed using an organisational questionnaire to study the characteristics of the groups.

It was noticed from the organisational interviews that none of the informal groups in the sample is used solely for health care financing and that none of them is primary set up for that purpose. Interviews with opinion leaders in the communities and managers of the formal schemes also showed that this observation applies to the districts. The informal groups cover a wide range of issues; farm labour, funeral donations, savings and credit arrangements, and other social functions. All, except 2 stated that members could fall on the schemes in case of need for part payment of their health care expenses. Most of them give financial assistance for only severe cases that may lead to hospitalisation or very expensive cost of care. In all cases the support is given directly to the members but not to health care providers. The groups for farmers also help their sick members with farm labour. The groups vary in size; they range from 6 to 400 individuals. Most of the schemes are relatively new; 17 out of the 37 groups were formed after 1996 and 10 were formed between 1990 and 1995.

On relationship with the formal insurance schemes, all the informal groups said they do not have any strong links with the schemes. However some said that occasionally contact persons for the formal schemes join their meetings to convince members and collect premium from their registered members. None of the informal schemes interviewed had a group-based registration with the formal schemes. However one scheme in West Gonja District, a group of women that advocate for exclusive breast-feeding mentioned that all their 27 members are registered with the formal scheme[3].

4.2 Coverage of informal schemes

To analyse the extent to which households use the informal groups, membership of adults in groups that give or are expected to give them health care benefits is used. About two-thirds (66.9%) of all adults in the sample from West Gonja District do not join such groups and a little over 4 in 10 adults (43.6%) from the Nkoranza sample also do not join any informal group. Most of those who are members join only one group in West Gonja. In Nkoranza about a third (31.4%) of those who join the groups belong to two or more groups (table 4.1).

The groups were classified into five. They are occupation based associations, savings and credit associations, hometown or tribal based associations, religious based groups and other social groups like women associations, youth clubs or those that are organised for limited number of friends. The results indicate that about a quarter (25.6%) of all adults in the sample are members of at least one religious based associations, about 13.4% are members of occupation related associations and about 9.7% of adult women are members of women's groups (table 4.2). Savings and credit associations have the smallest share of adults in the sample (2.5%).

[3] Other details of the informal schemes concerning set up, registration with local authority, financing, membership, external support and etc. are available from the author.

Table 4.1 Number of informal groups joined by adults (%)

Number groups	Total sample	Nkoranza sample	West Gonja sample
0	53.6	43.6	66.8
1	33.5	38.7	26.6
2	8.9	12.2	4.6
3	3.0	4.0	1.6
4	0.7	1.1	0.2
5	0.3	0.4	0.2
Number of adults	1280	731	549

Table 4.2 Type of informal groups joined by adults

Type of group	Number of adults	% of adults in sample (N=1280)
Occupation based association	171	13.4
Savings and credit association	32	2.5
Hometown/tribal based association	66	5.2
Religious based association	328	25.6
Other social group	110	8.6
		% of women (N=673)
Women's group	65	9.7

The study also estimated the size of the informal groups, periodicity of contribution and the value and nature (loan or not) of assistance from the groups using the groups respondents of the interviews join. The results are shown in table 4.3. Many of the groups do not have more than 50 members. For example about two-thirds of the respondents in the religious groups (66.2%) and almost the same percentage in hometown or tribal based groups (68%) gave the sizes of the groups as less than 50. The minimum was 7 and the maximum was 1200. Most of them pay their contributions on monthly basis and very few of the respondents (16%) had received monetary assistance from the groups since the last two years for health care.

Table 4.3 Size of group, contribution period and value of benefits, respondents only

		Type of informal risk-sharing group				
		Occupation	Savings and credit	Hometown /tribe	Religion	Other
% of total respondents		18.8	2.7	5.2	32.2	12.8
Size of group (%)						
<50		38.3	23.1	68.0	66.2	37.9
51-100		27.2	7.7	16.0	19.2	22.4
101-200		4.9	7.7	0	11.3	13.8
201-1200		12.4	38.5	0	0.7	6.9
Don't known		17.2	23.0	16.0	2.6	19.0
N		81	13	25	151	58
Contribution period (%)						
Daily		1.2	0	4.4	0	1.5
Weekly		14.5	27.3	34.8	8.6	12.6
Monthly		75.9	45.5	52.2	79.3	74.8
Annually		1.2	9.1	0	5.2	6.7
Other (harvest, etc.)		7.2	18.2	8.7	6.9	4.4
N		83	11	23	58	135
Value of assistance (¢)*						
Loan	Min	90,000	124,000	50,000		4,000
	Max	247,000	2,500,000	50,000		50,000
	N	8	2	1		3
Not loan	Min	1,500		30,000	1,000	7,000
	Max	303,000		282,000	352,000	124,000
	N	11		5	42	8
5% winsorized mean value for all benefits is ¢75,328.34**						

* Assistance from the groups is generally multi-purpose but in this case they were received for only health care purposes. The figures are expressed in real terms using the medical component of consumer price index for Ghana (December 2001=1).

** The symbol ¢, stands for Ghana currency, cedi; ¢7000=1US$ at the time of the survey.

4.3 Basic features of formal schemes

The two formal schemes are similar in terms of design and ownership. The West Gonja scheme, set up in 1995 was almost a replicate of the scheme at Nkoranza, which has been used as a pilot for most hospital-based schemes in Ghana. The schemes were both backed by international church-related NGOs financially and technically for the first years of their operation and they also receive donation from other NGOs. Memisa in Holland backed the scheme in Nkoranza District while the scheme in West Gonja District got assistance from Misereor in Germany. At the moment the Danish Government through DANIDA is supporting the schemes and similar ones throughout the country with administrative and technical logistics.

The initial rationale for the set-up of the schemes was to solve the rising debts of patients, which were threatening the financial position of the hospitals and also increase accessibility of inpatient care to the population of the districts. Government of Ghana pays the salaries of regular staff members of the schemes. Other support staff are either supported by donors or paid through commission on the premium they collect.

The schemes pay for almost all costs associated with hospitalization and outpatient (OPD) costs for snakebites. Other OPD cases are not covered. The exceptions for hospitalization costs are ailments

related to alcoholism and complications arising from criminal abortions. Normal deliveries are also not covered in both schemes. Members who are referred from the insurance hospitals to other hospitals outside the districts are paid a sum equivalent to the average inpatient cost for the month that the referral took place, minus expenses already incurred at the insurance hospitals. Provider payment is by fee-for-service.

In practice subscription to the schemes are on individual or family basis even though on paper the Nkoranza scheme accepts only family registration. The schemes have relatively higher premium for new subscribers than old ones. Both are community rated. The new members' premium was about $2.57 per annum for an individual in Nkoranza and about $2.29 in West Gonja using the exchange rate at the time of the survey (¢7000 to 1US$). The premium for new registrants represents about 2 days average agricultural wage for men in the communities. On average the premium was about 60.9% of expected value of benefits for one admission at the Nkoranza hospital and 44.8% at the Damango hospital (see table 4.4).

Table 4.4 Relationship between premium and expected value of benefits

	Nkoranza District	West Gonja District
Premium for new members (2001 insurance year)*	¢12,500	¢8,000
Severe OPD cases, last 6 months (insured only)		
Probability of using service	0.357	0.291
5% winsorized mean treatment cost	¢65,050.13	¢76,211.29
Expected treatment cost	¢23,418.05	¢22,101.27
Premium/expected cost (%)	53.83	36.07
Admission cases, last 1 year (insured only)		
Probability of using service	0.083	0.081
5% winsorized mean treatment cost	¢247,967.90	¢219,081.20
Expected treatment cost	¢20,523.80	¢17,851.06
Premium/expected cost (%)	60.90	44.82

* Corresponding premium for old members were ¢10,500 and ¢7,500 respective

Also the premium for new members expressed in terms of cost incurred at the OPD by one episode of "patient-perceived" severe illness is about 54% at the insurance hospital in Nkoranza District and 36% in West Gonja District. These figures indicate that the premium for the schemes do not cover even what will be considered as actuarially fair premium[4] and show that beneficiaries receive high subsidies for health care financing.

4.4 Coverage of formal schemes

The major difference between the schemes is the extent of coverage in the respective districts. Nkoranza scheme covers about 37.2% (47,989 persons in 2001) of the district total population while West Gonja covers just about 13.1% (18,261 persons in 2001) of its target population. The main reason given for the low coverage by the latter is the relatively poor economy, poor road network, long distances between the hospital and the communities it serves, and lack of effective communication opportunities like access to local FM radio station to disseminate and receive information quickly and cheaply. The extent of use by households is shown in table 4.5.

[4] An insurance premium is actuarially fair if the premium is equal to the net premium; that is if there are no administrative expenses embedded in it.

In all a little over one third of households in the sample (36.2%) do not belong to the schemes at all and almost the same percentage (35.3%) have registered all their members. About one fifth (20.7%) do have mixed membership. They select some of the members to insure and the others are either dropped from previous registration or not registered at all. In about 8% of the households some members joined the schemes the previous periods but none in the households are now fully paid members. This picture of coverage is quite different when the figures for the two schemes are compared. In the case of West Gonja the households, which do not have complete registration (29.7%) are more than those who have paid for all their household members (21.4%) whereas the opposite is the case in Nkoranza. This could be explained partially by the family registration policy in Nkoranza District. Another possible reason is that family sizes at West Gonja were estimated to be a little bit higher than the households at Nkoranza hence the economic burden could be higher in West Gonja.

Table 4.5 Extent of coverage of formal health insurance schemes and related household characteristics.

Formal insurance status	Description	% of all households	Ave. number of persons insured	>=1 adult join informal group (%)	Ave. number of persons per household
Total sample					
Insured	All hh members are insured	35.33	4.74	73	5.00
	Some hh members are insured	20.66	2.80	65	5.66
Non-insured	Some hh members joined but stopped	7.85	-	63	4.58
	All hh members never joined	36.16	-	49	4.53
Total		100.00	4.02	62	4.94
Nkoranza sample					
Insured	All hh members are insured	43.71	4.45	79	4.61
	Some hh members are insured	15.23	2.74	78	5.50
Non-insured	Some hh members joined but stopped	9.60	-	66	4.62
	All hh members never joined	31.46	-	57	3.92
Total		100.00	4.01	71	4.53
West Gonja sample					
Insured	All hh members are insured	21.43	5.72	51	6.31
	Some hh members are insured	29.67	2.85	54	5.80
Non-insured	Some hh members joined but stopped	4.95	-	56	4.44
	All hh members never joined	43.96	-	39	5.26
Total		100.00	4.04	47	5.61

The other interesting finding is the apparent positive relationship between informal insurance and the use of formal health insurance. It can be seen from table 4.5 that the households with

higher number of adults in health related informal groups in both districts tend to buy more formal health insurance.

4.4 Effects of risk-sharing schemes on payment of medical bills

Table 4.6 shows how households financed their medical bills during the last 6 months preceding the interviews for outpatient cases and the last 2 years for in-patient cases. The figures are percentages of cases for each source of finance but not percentages of amount paid. The results indicate that a little over one-half (52.3%) of all in-patient cases in the sample from Nkoranza District for the last two years had their bills paid by the insurance scheme while about one-third (32.6%) of in-patient cases in the sample from West Gonja District had their bills paid by the West Gonja scheme. Estimates from records provided by the schemes show that the schemes paid the bills of about 57% of all in-patient cases at the Nkoranza Hospital and about 39% at the Damango Hospital. The estimates from records refer only to those who went to the insurance hospitals, which from our sample constitute about 80% and 70% of all in-patient cases in Nkoranza District and West Gonja District respectively.

Table 4.6 Form of payment for medical bills (%)

	Nkoranza District		West Gonja District	
Form of payment	OPD cases*	In-patient cases*	OPD cases*	In-patient cases*
Household cash only	89.1	31.1	70.8	35.8
Insurance only	0.7	52.3	0.7	32.6
Sale of household assets	0.7	3.0	11.1	15.8
Friend/Relative	3.2	9.1	4.8	7.4
Others***	6.2	4.5	12.5	8.4
N	403	132	271	95
Cases covered by Insurance hospital (%)	32.7	79.5	21.0	69.5
Sample size	1368	1368	1026	1026

*Last 6 months **Last 2 years ***Combinations of above and/or others not mentioned in table

The results also show that the insurance hospitals cover about 33% and 21% of OPD cases in the two districts respectively. Since the schemes are mainly set-up for in-patient care they cover very little of the cases at the outpatient department. For the last 6 months preceding the survey both schemes paid the bills for less than one-tenth (0.7%) of all OPD cases in their respective districts.

It was difficult to isolate the effects of the informal schemes alone because the respondents that benefited from the informal schemes financed their health care together with other sources of funds. All of them are lumped into the other category in table 4.6, which represents combinations of different sources of finance. The shares for that category are small as compared to those for formal schemes. Also the value of benefits, 5% winsorized mean from table 4.3 for informal schemes is about one-third of those for formal schemes in table 4.4. This implies that the role of informal schemes is much smaller than the hospital-based schemes.

4.5 Coverage of risk-sharing schemes by poverty status

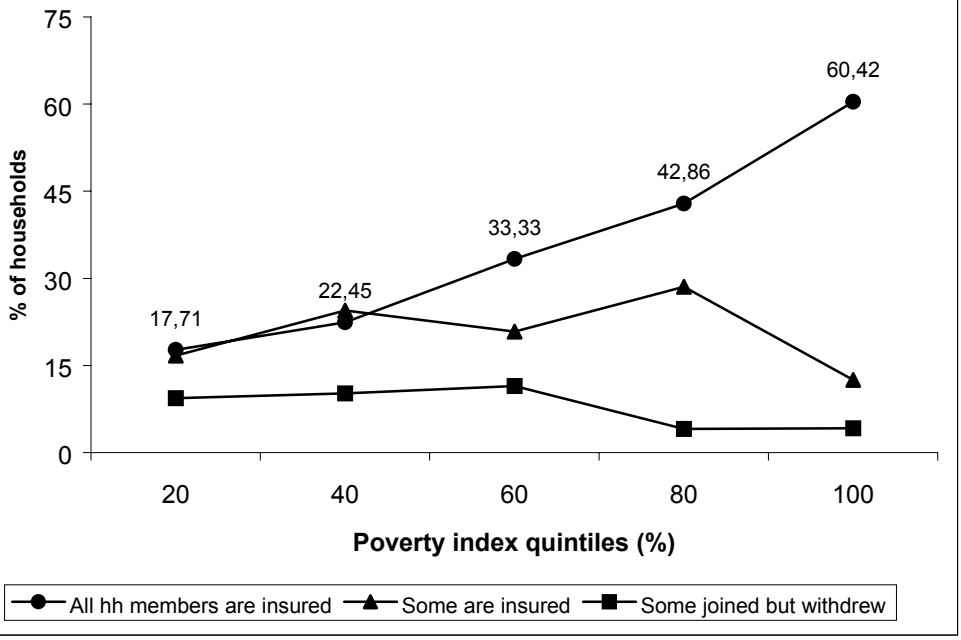
The study used a non-money metric indicator of welfare to classify households. The use of either income or consumption expenditures, the usual approach for money metric measurements, as welfare indicators was avoided because it would have been too expensive to

collect the data. The study rather used an index that was derived from multi-dimensional aspects of livelihood, which opinion leaders from the survey area had mentioned as most of the things people look at when they judge the relative deprivation of a household. In all, 22 aspects (under broad groupings of durable assets, living conditions, form of savings, and educational level) of the household were used as components of the index. The index was constructed by using maximum likelihood factor analysis to obtain the weights for each component. Stifel and Sahn (2000) constructed a similar index and found that the rank correlation between reported expenditures and the index was low for Ghana. However when it was used to explain nutrition outcomes the Spearman rank correlation between measured and predicted height for age scores indicated that it did not matter whether expenditure values or the index was used as the welfare measure (see also Oduro et al., 2002 for similar application).

The observations were ranked first into five equal groups in each district. Later they were regrouped into three for the regression analysis where the bottom third was referred to as "very poor", the middle third as "poor" and the top third was classified as "non-poor".

As can be seen from figure 4.1 and appendix table A2, poverty status is negatively related to the demand for the hospital-based schemes. Only 17.7% of the bottom deprived quintile of households as compared to 60.4% of the upper quintile registered all their household members. More than half of the deprived households (56.3%) in both districts have never joined the schemes. The situation is more pronounced in West Gonja District where over 7 in every 10 deprived households we interviewed have never joined. The middle quintile groups 40th, 60th and 80th, in West Gonja in particular, tend to have incomplete insurance for their households.

Figure 4.1: Coverage of formal insurance schemes by poverty status



Similar profile was done for informal insurance. The frequency analysis shows that there appears to be differences among the poverty groups concerning the number of adults who belong to informal associations that provide some sorts of health related benefits (see appendix table A3). This is clear with the sample from West Gonja for which membership in informal groups falls consistently with increase in poverty status. For example about 58% of the

households in the upper quintile have at least one adult member with informal insurance but only 33% of the households in the lower quintile have such membership. The corresponding percentages for the Nkoranza sample are higher. The percentage for the lower quintile in Nkoranza is even higher than the percentage for the upper quintile in West Gonja.

4.6 Estimated household demand for health insurance

The results from the household demand model for formal and informal health insurance are presented in this section. The table pertaining to the other model, the multinomial logit for the choice of formal insurance for an individual is given in the appendix (table A4). However the results are used for interpretation or discussion of the first two models.

Household demand for formal health insurance

The household demand model for formal insurance captures two things from the left hand side simultaneously; the probability of staying out of the scheme and the number of people fully registered in a household. The independent variables used in the estimation of the first regression analysis are shown in table 4.7.

Table 4.7: Mean of independent variables used by formal health insurance status

	Insured		Non-insured		Mean test
Variable	**Mean**	**Std**	**Mean**	**Std**	**t-statistic**
Household size	4.246	2.472	4.540	2.661	3.020***
Head is married	0.842	0.365	0.699	0.460	3.801***
Head is a migrant	0.246	0.431	0.408	0.493	-3.857***
Adults with additional jobs	0.706	0.834	0.305	0.563	6.020***
Health risk factors					
Number of persons (0-4yrs)	0.680	0.822	0.568	0.766	1.535
Number of persons (>=60yrs)	0.188	0.468	0.263	0.538	-1.648*
Number of females	2.776	1.555	2.225	1.715	3.697
Number reported ill (last 6 months)	1.772	1.623	1.427	1.447	2.434**
Poverty index					
Lower □	0.239	0.427	0.451	0.499	-5.031***
Middle □	0.349	0.478	0.385	0.488	-0.810
Upper □ (reference category)	0.412	0.493	0.164	0.371	6.094***
Adults with informal insurance					
Number with >=6 years of education	0.779	0.869	0.432	0.695	4.764***
Number with < 6 years of education	0.313	0.627	0.286	0.605	0.463
Location					
Distance to insurance hospital	14.985	30.723	35.605	41.584	-6.278***
Community is rural	0.397	0.490	0.549	0.499	-3.369***
District is Nkoranza	0.654	0.476	0.582	0.494	1.630
Sample size	272		213		

*** p<0.01 ** p<0.05 * p<0.10

The variables are grouped as follows; poverty status, risk factors, location, and other socio-economic characteristics of the household. Household size was used to control for the unequal sizes of the households in the analysis. The risk factors are age and sex composition in the household and number of people who reported illness or injury in the households during the last 6 months preceding the survey.

The first model was analysed with zero-inflated regression model, using the same set of independent variables for the two stages. The use of the same set of regressors allowed for different roles of each of the variables to be estimated. Zero-inflated Poisson (ZIP) and zero-inflated Negative Binomial (ZINB) models were both tried with logit and probit specification for the switching probability. A test of individual heterogeneity using a likelihood ratio statistics was done to choose between the two. The appropriateness of the splitting mechanism was also assessed using Vuong test statistic with the Stata 7.0 program (StataCorp., 2001). The final model chosen is the zero-inflated Poisson and it is presented in table 4.8 with the overall marginal effects evaluated at the means of the independent variables.

Table 4.8 Estimates of Zero-Inflated Poisson model: demand for formal health insurance

Variable	Logit P(0/1)=0 Coeff.	Robust std err	Poisson for y Coeff.	Robust std err	Marginal effect
Household size (log)	0.6695	0.4758	1.2491***	0.0848	1.9432
Head is married	0.0626	0.4414	0.1359	0.0923	0.2107$^{\forall}$
Head is a migrant	1.7113***	0.3433	0.0109	0.0649	-0.9987$^{\forall}$
Number with additional jobs (>=15yrs)	-0.6529***	0.2226	0.0468	0.0358	0.4529
Health risk factors					
Number of persons (0-4yrs)	0.0625	0.1743	-0.0038	0.0293	-0.0422
Number of persons (>=60yrs)	0.4238	0.2889	0.0808*	0.0452	-0.0877
Number of females	-0.1421	0.1271	-0.0584**	0.0225	-0.0286
Number reported ill (last 6 months)	-0.0867	0.0928	-0.0455***	0.0170	-0.0364
Poverty index					
Lower □	1.1752***	0.4202	-0.0665	0.0822	-0.7974$^{\forall}$
Middle □	0.7218*	0.3992	-0.0303	0.0599	-0.4693$^{\forall}$
Upper □ (reference category)					
Adults with informal insurance					
Number with >=6 years of education	-0.2924	0.1833	0.0074	0.0254	0.1778
Number with < 6 years of education	0.1711	0.2141	-0.0313	0.0346	-0.1541
Location					
Distance to insurance hospital	0.0267***	0.0049	-0.0053***	0.0013	-0.0248
Community is rural	0.6281*	0.3391	-0.1489**	0.0710	-0.6244$^{\forall}$
District is Nkoranza	1.6954***	0.4352	0.0964	0.0615	-0.6619$^{\forall}$
Constant	-4.1808***	0.9041	0.1565***	0.1565	

		Stat	p-value
LogL	-630.6515	588.49	0.0000
Vuong test: ZIP vs. Poisson		9.44	0.0000
Vuong test: ZINB vs. Negative Binomial		12.94	0.0000
LR test: ZINB vs. ZIP		2.8e-05	0.4979
Sample size	485		485

($^{\forall}$) Effect of discrete change of dummy variable from 0 to 1

***p<0.01 ** p<0.05 * p<0.10

On interpretation of the model, a positive sign in the first equation (logit model) shows a high likelihood for the choice of no formal health insurance, whereas a positive sign in the second equation (Poisson model) shows that demand for a formal health insurance rises with that variable.

The results indicate that probability of membership depends on poverty status, employment status, migration status and the location of the households relative to the location of the schemes. Households with adults who have additional jobs are more likely to join the scheme whilst the very poor, migrant households or households that are far from the hospitals hosting

the schemes are less likely to subscribe any of their members. Households in rural areas, irrespective of the distance from the district capitals are also less likely to register their members than households in urban areas. The risk factors are not significant for explaining the likelihood of joining the schemes and the signs for age variables are different from the other risk factors. Whereas the number of children under 5 years and the number of the aged influence the likelihood of joining the insurance scheme negatively, the effects are higher in households with more females or households with higher probability of reporting illness.

On the level of demand for the formal health insurance schemes, location variables are also significant but quite a different set of additional variables came out as significant factors. The risk factors, the number of people who reported ill during the last 6 months, the number of females and the number of adults aged 60 years or more were the additional significant factors. For those that join the schemes household with aged people register more individuals but households with high frequency of reported illness and more females are more likely to register fewer individuals.

The directions of effects for the risk factors differ in the two equations. For number of children (under 5 years) the effects are similar, more children under 5 years lead to less probability of registering at least a member and less number of people being registered. However having more adults over 60 years leads to less probability of joining the schemes but leads to more number of people being registered. The opposite is the case for households with more number of females or number of people reporting illness. Such households are more likely to join the schemes but they register less number of persons. When the effects of the 2 equations are combined the overall marginal effects of the risk factors are all negative implying that high-risk households do not get the desired number of formal insurance.

It is also interesting to note that once households join the schemes their economic status relative to other households in their villages do not determine the number of household members to register. The implication is that rich or poor, the households do incomplete registration. When the two effects are combined the marginal effects indicate that the less deprived households register more people in the communities.

Household demand for informal health insurance

The estimation of the household demand model for informal health insurance followed the same procedure for previous one and the results are presented in table 4.9 and table 4.10. The number of adults in a household instead of household size is used as a control variable.

The results indicate that households in the middle poverty ranking as compared to the upper and lower groups are more likely to join informal risk-sharing schemes. However the number of adults in a household who join the schemes is higher for the upper group than the other groups. The overall marginal effect of the poverty dummies show that if less deprived households register 1000 adults in informal schemes, the middle group will register 270 adults less whereas the lower group will register about 189 adults less in the study area.

The results also show that Christians dominate the informal groups and the groups are mainly based in the district capital. Households with high-risk individuals (more number of people who reported ill during the last 6 months) and the number of people with 6 years or more education are more likely to join the informal schemes.

Table 4.9 Mean of independent variables used by informal health insurance status

	Insured		Non-insured		Mean test
Variable	**Mean**	**Std**	**Mean**	**Std**	**t-statistic**
Number of adults	2.666	1.352	2.597	1.505	0.523
Number reported ill (last 6 months)	1.796	1.675	1.339	1.298	3.176***
Adults with >=6 yrs of education	2.057	1.410	1.323	1.187	5.918***
Adults with additional jobs	0.645	0.820	0.344	0.588	4.362***
Head is primarily a farmer	0.411	0.493	0.435	0.937	-0.522
Head is a Christian	0.676	0.469	0.392	0.490	6.356***
Head is a migrant	0.311	0.464	0.328	0.471	-0.389
Poverty index					
Lower □	0.291	0.455	0.398	0.491	-2.440**
Middle □	0.344	0.476	0.398	0.491	-1.186
Upper □ (reference category)	0.365	0.482	0.204	0.404	3.781***
Location					
Distance to district capital	16.298	31.469	36.488	42.319	-6.004***
Community is rural	0.428	0.496	0.522	0.501	-2.010**
District is Nkoranza	0.712	0.453	0.478	0.501	5.304***
Sample size	299		186		

*** p<0.01 ** p<0.05 * p<0.10

Table 4.10 Estimates of Zero-Inflated Poisson model: demand for informal health insurance

	Logit P(0/1)=0		Poisson for y		Marginal
Variable	**Coeff**	**Robust std err.**	**Coeff.**	**Robust std err.**	**effect**
Number of adults	2.3392***	0.7391	0.0667	0.0458	0.0618
Number reported ill (last 6 months)	-4.7765**	2.2015	-0.0009	0.0252	-0.0009
Number with >=6 years of education	-2.1641**	0.8947	0.0949**	0.0393	0.0879
Number with additional jobs (>=15yrs)	-0.0307	0.7286	0.0096	0.0568	0.0089
Head is primarily a farmer			0.1656*	0.0909	0.1557$^{\forall}$
Head is a Christian	-20.3654***	3.2736	0.2697**	0.1117	0.2462$^{\forall}$
Head is a migrant			0.0332	0.0956	0.0310$^{\forall}$
Poverty index					
Lower □	-2.8532	1.8448	-0.2105*	0.1141	-0.1886$^{\forall}$
Middle □	-17.5249***	5.7181	-0.3025***	0.1046	-0.2702$^{\forall}$
Upper □ (reference category)					
Location					
Distance to district capital	0.9543**	0.0376	-0.0039**	0.0018	-0.0037
Community is rural	0.7750	1.3718			-0.0001$^{\forall}$
District is Nkoranza	-0.5163	1.6962	-0.2535*	0.1419	-0.2430$^{\forall}$
Constant	-3.6004	2.2256	-0.2239	0.1725	
		Stat	p-value		
LogL	-252.39124	92.88	0.0000		
Vuong test: ZIP vs. Poisson		3.77	0.0001		
Predicted P(0)	0.3958				
Sample size	485		485		

($^{\forall}$) Effect of discrete change of dummy variable from 0 to 1
*** p<0.01 ** p<0.05 * p<0.10

5 Discussions, recommendations and conclusion

5.1 Methods

The sampling method applied in this study makes generalisation of the results to all the rural health insurance schemes in Ghana quite difficult. Ideally more of the schemes with different design features should have been studied to see which institutional characteristics could serve the interest of the poor better. The other schemes have not existed for long and the time frame for this study was too short to do extensive sampling. Despite this fact, the findings are relevant for most districts in Ghana that have borrowed or will be borrowing this form of rural health insurance.

5.2 Rural households and demand for formal health insurance

The two location variables, distance to the insurance hospital and whether the household lives in a rural area happen to be the only variables that significantly affect both the probability of joining a formal health insurance scheme and the level of demand. The overall marginal effect of the rural variable for example indicates that on average rural households register 0.624 persons less than urban households, implying that if households in urban areas register 1000 people, households in rural areas will register about 376 people. This is expected particularly because of the distribution of health care facilities in rural areas and the benefit package of the schemes. The closest health care facilities for the rural households are the health centres, which most of them use as first contact points. These facilities are usually run by medical assistants and do not have simple equipment for laboratory investigations. Most of the cases they handle are primary health care and hence patients do not spend as much as people who utilise the hospitals, even though the ailments could be similar.

The implication is that the expectations about costs of care for rural households are much lower. A related disincentive factor for households in distant locations is the restriction to use only the insurance hospitals at the district capital. The insurance schemes do not pay for any costs at the health centres even if the costs are higher. Thus whilst the use of primarily health care facilities is good for gate-keeping purposes for the insurance schemes, at same time they reduce the perception about the usefulness of the schemes for the rural households. Also as hospitalisation insurance policy, most of the costs incurred at the outpatients department of the insurance hospitals are pushed to the households, making the total benefit package less attractive.

The solution to this problem is not simple. Expansion of the benefit package could lead to higher premium if the pool is not large enough and external health care facilities could also abuse this option if proper control or appropriate contracting instruments are not put in place. Other deterring factors include initial cost of expansion. Setting up laboratory facilities in rural areas for example, need state or NGO support since that could be difficult for the schemes to do. However with the growth of insurance for government and other formal sector workers, the subsidies formal sector workers used to get in urban areas could be channelled to develop rural health infrastructure and at least improve the quality of care in such areas. For ailments that end up at the insurance hospitals there should be a consideration to cover the costs of at least laboratory investigations at the OPD level. As provider-based schemes with semi-autonomous functions it would be less difficult for the schemes to control abuses by patients and hospital staff. Demand side cost sharing will be needed with the suggested expansion in benefit to minimise moral hazard.

5.3 Selection problems in emerging health insurance schemes

The results also indicate that there is high degree of selection. High-risk households do not get the desired level of insurance. It is a bit more complicated to explain the source of this selection. Information asymmetry between consumers and the insurers cannot be main reason for this selection problem and hence it could be far from correct to say that the pool of the schemes is small because of high degree of adverse selection. In that case one would have expected low-risk households to buy less insurance. The results of the demand for informal schemes and the individual demand model confirm this point; the high-risk households are more likely to join informal health insurance schemes and an individual is more likely to be withdrawn from the formal scheme the higher the number of high-risk individuals the household has (see tables 4.10 and appendix table A4).

Even though the schemes cover all hospitalisation costs one could argue that the schemes are to some extent stingy for high-risk households. Hospitalisation is a low-frequency event; in the two districts the probability for it is about 8% for all insured (see table 4.4). Most OPD costs are excluded and there are reasons to believe that the schemes do cream skim for low-risk individuals; the premium is low, they do not have any risk-adjustment mechanism and they are not allowed to institute co-payments to control moral hazard. So one of the ways for the managers to sustain the pool without external assistance is to employ techniques to discourage high-risk individuals or to focus their attention on attracting only low-risk individuals. Most respondents were particularly against the idea of detaining patients at the recovery ward for almost 23 hours and asking them to go home and come for review later.

Care should be taken in drawing implications from the results concerning selection problems. The fact that high-risk households do not register more people does not mean that high-risk individuals are not registered. For example results from table A4 in the appendix indicate that at the individual level households with more females or those with high frequency of reporting illness are more likely to withdraw members but females in general are less likely to be withdrawn or stay out of the schemes. What can be deduced from here is that high risk-households register less people but those they register are more likely to be high-risk individuals. This happens because of the difficulty the schemes face to implement family registration.

Possible remedies to minimise the selection problems include applying simplistic risk-adjustment to set premium, using risk-sharing mechanism on the supply side of the market and varying the insurance plans they sell for people with different health risks. In particular, one way to enforce family registration is to design a basic plan for all household members that register but allow the households to have generous but subsidised plans for high-risk individuals. These issues need further investigation.

5.4 Poverty and demand for rural health insurance

The estimated marginal effects shown in table 4.8 imply that on average the very poor households register about 0.797 less individuals than the non-poor. This means that if the non-poor households register 1000 individuals in the surveyed communities, the very poor households will register only 203 individuals. This is mainly because many of the poor households do not register at all. Even for participation in the informal schemes, the results from the demand for informal health insurance (see table 4.10) indicate that for every 1000 individuals registered in non-poor households the corresponding figure for very poor and poor households will be 812 and 730 respectively. This finding implies a remarkably poor social inclusion of the hospital-based schemes, especially in rural areas and it is understandable why

in total many people in the districts are not covered by the schemes. Particularly notable is the case in West Gonja District, which is situated in the rural Savannah ecological zone where poverty is more pronounced in Ghana (Ghana Statistical Service, 2000).

Perhaps the most challenging issue is how to include the poorest of the poor in such schemes. Several suggestions have been put forward; setting aside health fund to pay premium for the poor, exempting the aged from paying premium, encouraging the poor to use informal schemes and others. Experience in Ghana show that exemptions do not work well mainly because it is often difficult to identify the poor and central government delays a lot in reimbursing providers who exempt them (Asenso-Okyere et al., 2000; Atim et al., 2001). How the informal schemes operate now does not favour the poor, but if they are organised well they could be used as a medium of identifying the poor for state support. Currently, church groups dominate them and they are predominantly urban based (see table 4.10).

5.5 Linking informal schemes to formal schemes

The study could not draw any conclusions on the displacement of informal schemes with formal ones. The informal schemes covered here are as new as the formal ones, they are multi-purpose and have relatively little role for payment of medical bills than formal schemes. The results rather show positive relationship between them; the informal schemes complement the role of formal health insurance schemes. This is the case for high-risk households; they tend to register less number of people for formal schemes but are more likely to join informal schemes than low-risk households.

The role of informal health insurance on formal health insurance is more pronounced on the effects on probability of joining the schemes than the level of demand. The nature of the relationship depends on the level of education of those who belong to the informal groups in the household. Even though they were not significant (at 10%), the parametized effects of informal insurance show that probability of joining formal insurance increases with number of adults in informal groups who have at least 6 years of education and decreases with those who have less than 6 years of education. This is expected as informal groups made up of more educated people will tend to have more of "a linking or a bridging social capital" than the others and hence will be in a position to be functional and better used by the formal insurance schemes (e.g. group-based registration).

The implication is that large church based schemes and groups that cut across different social groups should be encouraged to liase with the formal schemes, perhaps for group registration and dissemination of information. Discussions with the managers of the hospital-based schemes however revealed the frustrations they have gone through in trying to organise them for group membership. One of the managers put it this way "these groups are interest catching schemes, when the interest dies the groups die. The politicians have spoilt them. They used to channel political promises through them and when their parties are no longer in power they become dormant."

5.6 Other motives for joining rural health insurance schemes

The study identified migration status as a very significant determinant of demand for rural health insurance. This observation needs considerable attention in further studies where migration decisions are captured quite extensively. The migrants in the survey area were more likely to stay out of the formal schemes as compared to non-migrants in both the household and individual level demand models. The same variable had very little or no contribution in the

explanation of the demand for informal schemes so it cannot be said that migrants prefer informal schemes to formal schemes.

The only explanation that can be given in this study is the sense of ownership the people have for the schemes. Throughout the survey period the team observed that people who consider themselves as indigenes of the two districts (both insured and non-insured), were proud to refer to their districts as "pioneers" for a concept that is going to be nationally used. The limitation in the study that can easily be corrected in further studies is an omission of length of stay in the district as a variable. That was not captured explicitly in the questionnaire. Households that have been leaving in the districts for less than 6 months were rather excluded from the interviews. To attract migrants the periodic advertisements should go a little bit beyond ownership and explain to inhabitants that insurance is important for everyone so far as the person is expected to stay in the district even one day after the waiting period between registration and eligibility for benefits is over.

5.7 Conclusion

The study looked at the demand for two rural health insurance schemes that are voluntary and to a greater extent integrated to health care facilities. It examined how the schemes cover people who need the advantages of insurance most; poor people and high-risk individuals, who would have found it difficult to pay for health care services in the absence of insurance.

The results from this study and records from the schemes indicate that they perform quite well in terms of paying hospitalisation bills for beneficiaries. However the findings portray a remarkable exclusion of the poorest of the poor, even from other forms of risk-sharing arrangements in the informal sector. Apart from poverty, the analysis also reveals that high-risk households are less likely to participate fully in the insurance schemes suggesting limitations in the design of the schemes. Among other suggestions, the study recommends that the schemes should be redesigned to benefit rural and poor households more than they do now.

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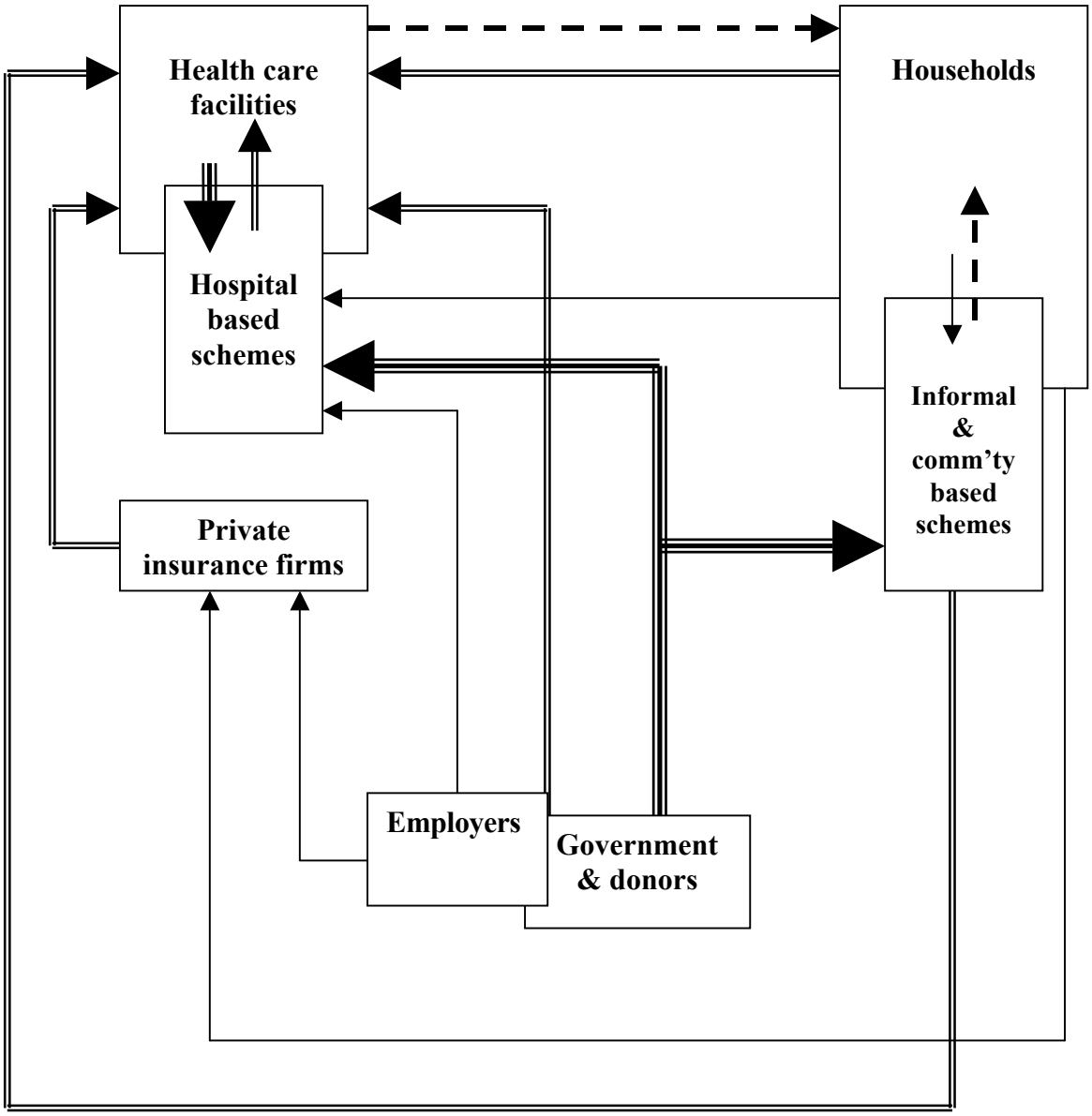
Appendix

Figure A2.1 Evolving health insurance schemes in Ghana



Legend for lines

Services
Payment for services
Premium contribution
Financial & other support

Table A1 Estimated standardized coefficients of the components for poverty index

	Standardized Scoring Coefficient	
Variable	Nkoranza	West Gonja
HH owns motorized transport (car or motor cycle)	0.06513	0.07588
HH owns bicycle	0.08806	0.02371
HH owns television set	0.21982	0.17758
HH owns radio/cassette recorder	0.09152	0.10302
HH owns refrigerator	0.22283	0.13675
HH owns pressing iron	0.18730	0.15589
HH owns sewing machine	0.06540	0.09676
HH owns watch/clock	0.10853	0.09499
HH owns cooking stove	0.06638	0.12280
HH owns electricity generator	0.00471	0.03686
HH owns video recorder	0.07932	0.13873
HH owns tractor	0.02895	0.01534
HH has cash savings	0.09712	0.11519
HH owns cattle	0.01824	0.03208
HH owns sheep/goat	0.01023	0.03292
HH owns chicken	0.02989	0.02230
Number of persons per room	-0.02008	-0.01369
HH lives in a house with poor roof or poor floor*	-0.04712	-0.06098
HH's main source of drinking water is poor**	-0.04035	-0.02082
HH uses mainly KVIP/WC for toilet	-0.05467	0.03464
HH uses mainly firewood for cooking	-0.10358	-0.03945
% of household members with >=6 yrs of education	0.04628	0.05664
Squared multiple correlations of variables with factor	0.84167	0.88191

HH Stands for household
* House either has thatch roof or the floor is not cemented
** Main source of drinking water is not pipe, borehole or covered well

Table A2 Coverage of formal health insurance by poverty status

	Insured		Non-insured	
Poverty Status	All hh members	Some hh members	Some joined before	All never joined
Total sample				
Lower 20%	17.71	16.67	9.38	56.25
40%	22.45	24.49	10.20	42.86
60%	33.33	20.83	11.46	34.38
80%	42.86	28.57	4.08	24.49
100%	60.42	12.50	4.17	22.92
Total	35.33	20.66	7.85	36.16
Nkoranza sample				
Lower 20%	21.67	18.33	13.33	46.67
40%	26.23	21.31	14.75	37.70
60%	43.33	6.67	15.00	35.00
80%	50.82	22.95	3.28	22.95
100%	76.67	6.67	1.67	15.00
Total	43.71	15.23	9.60	31.46
West Gonja sample				
Lower 20%	11.11	13.89	2.78	72.22
40%	16.22	29.73	2.70	51.35
60%	16.67	44.44	5.56	33.33
80%	29.73	37.84	5.41	27.03
100%	33.33	22.22	8.33	36.11
Total	21.43	29.67	4.95	43.96

Table A3 Coverage of informal health insurance by poverty status

Poverty Status	At least one adult belongs to an informal group (%)	Ave. number of adults in an informal group	Ave. number of adults per household
Total sample			
Lower 20%	52	0.75	2.53
40%	60	0.86	2.69
60%	55	0.82	2.47
80%	66	1.07	2.67
100%	74	1.14	2.80
Total	62	0.93	2.63
Nkoranza sample			
Lower 20%	63	0.83	2.37
40%	74	0.98	2.51
60%	60	0.83	1.98
80%	72	1.07	2.41
100%	83	1.27	2.83
Total	71	1.00	2.42
West Gonja sample			
Lower 20%	33	0.61	2.81
40%	38	0.65	3.00
60%	47	0.81	3.28
80%	57	1.08	3.11
100%	58	0.92	2.75
Total	47	0.81	2.99

Table A4 Multinomial logit estimates, household member to insure for formal health insurance

Variable	Prob(IN=withdrawn)+ Coeff.	Robust std err	Prob(IN=never insured)+ Coeff.	Robust std err
Individual characteristics				
Sex	-0.2421*	0.1339	-0.1585**	0.0707
Age (0-4 years =1)	-0.3633	0.2821	0.0433	0.1467
Age (5-17 years =1)	0.2266	0.1766	-0.0231	0.1218
Age (60+ years =1)	0.5791	0.3810	-0.4628**	0.1913
Household size (log)	-1.4975***	0.4179	-0.2241	0.3368
Head is married	0.5292	0.4304	-0.2623	0.2844
Head is a migrant	-0.7211***	0.2636	-0.5361***	0.1815
Number with additional jobs (>=15yrs)	0.8446***	0.4257	1.5123***	0.3020
Health risk factors				
Number of persons (0-4yrs)	-0.3058	0.2423	0.1695	0.1310
Number of persons (>=60yrs)	-0.1937	0.3574	0.3347	0.2320
Number of females	0.4982***	0.1400	-0.0435	0.1019
Number reported ill (last 6 months)	0.3167***	0.0872	0.0125	0.0794
Poverty status				
Lower □	0.8276	0.5974	1.1196***	0.3665
Middle □	1.1131**	0.4840	0.6467*	0.3449
Upper □ (reference category)				
Adults with informal insurance				
Number with >=6 years of education	-0.0536	0.1845	-0.2225	0.1362
Number with < 6 years of education	0.0310	0.2816	0.0655	0.1704
Location				
Distance to district capital	0.0187**	0.0076	0.0274***	0.0041
Community is rural	0.8539**	0.3954	1.0220***	0.2835
District is Nkoranza	1.6007**	0.6295	0.6466**	0.3218
Constant	-4.0971***	1.0359	-1.6408***	0.5893
		Stat	p-value	
LogL	-1618.6449	209.65	0.0000	
Sample size (2394)				

\+ Reference category is insured *** p<0.01 ** p<0.05 * p<0.10

Table A5 Characteristics of towns and villages surveyed

Characteristics	Nkoranza District						West Gonja District			
	Nkoranza	Akuma	Akumsa-Dumase	Bodom	Brahoho	Yefri	Damongo	Buipe	Kablipe	Larabanga
Population	21,715	3,030	4,374	819	2,028	1,679	14,442	7,563	454	2,971
Distance to insurance hospital (km)	0	11.2	3.2	17.6	9.6	14.0	0	104	80	15
Distance to health center/clinic	0	0	0	3.2	1.6	0	0	0	15	9.6
Distance to a drug store	0	0	0	3.2	0	0	0	0	15	0
Number of associations	65	17	19	5	20	18	12	9	3	1
Distance to tarred road	0	5m	0	11m	4m	4m	0	0	0	56m
Access to motorable road	√	√	√	√	√	√	√	√	√	√
Utilities										
Piped water	√	No	No	No	No	No	√	No	No	No
Number of boreholes	3	1	2	2	2	6	4	4	0	0
Electricity	√	No	√	√	√	√	√	√	No	√
Telephone	√	No (2m)	No (2m)	No (2m)	No (1m)	No (9m)	√	√	No(9m)	No (15m)
Services										
Post office	√	No (7m)	No (2m)	No (2m)	No (6m)	√	√	No (55m)	No(56m)	No (15m)
Bank	√	No (7m)	No (2m)	No (11m)	No (1m)	No (9m)	√	√	No (9m)	No (15m)
Agricultural extension officer	√	√	√	No (11m)	No (1m)	No (9m)	√	√	√	√
Veterinary Officer	√	√	No (2m)	No (11m)	No (1m)	No (9m)	√	√	√	No (15m)
Primary school	√	√	√	√	√	√	√	√	√	√
Junior secondary school	√	√	√	√	√	√	√	√	√	√
Senior secondary school	√	No (7m)	No (2m)	No (11m)	No (6m)	No (9m)	√	No (65m)	No(50m)	No (15m)
Vocational school	No (18m)	No(21m)	No (16m)	No (19m)	No (20m)	No (27m)	√	No (65m)	No(56m)	No (15m)
Koranic school	√	No (7m)	No (2m)	No (19m)	No (6m)	No (9m)	√	√	No(9)	√
Adult literacy school	√	√	√	√	√	√	√	√	√	√
Occupation										
Farmer	√	√	√	√	√	√	√	√	√	√
Teacher	√	√	√	√	√	√	√	√	√	√
Nurse	√	√	√	No	No	√	√	√	No	No
Trader	√	√	√	√	√	√	√	√	√	√
Carpenter	√	√	√	√	√	√	√	√	√	√
Metal work	√	No	√	No	No	√	√	√	No	No
Hairdresser	√	√	√	√	√	√	√	√	√	√

Characteristics	Nkoranza District					West Gonja District				
	Nkoranza	**Akuma**	**Akumsa-Dumase**	**Bodom**	**Brahoho**	**Yefri**	**Damongo**	**Buipe**	**Kablipe**	**Larabanga**
Seamstress	√	√	√	√	√	√	√	√	√	√
Driver	√	√	√	√	√	√	√	√	√	No
Car repairer	√	No	√	No	No	No	√	√	No	No
Electrical repairer	√	No	√	No	No	No	√	√	No	No
Traditional birth attendant	√	√	√	No	No	√	√	√	√	√
Carver	√	No	√	No	No	No	√	No	√	No
Baker	√	√	√	No	√	√	√	No	No	No
Kenkey seller	√	√	√	√	√	√	√	√	√	√
Other food producer	√	√	√	√	√	√	√	√	No	√
Chop bar operator	√	√	√	√	√	√	√	√	√	√
Labourer	√	√	√	√	√	√	√	√	√	√

√ Service, utility or someone involved in that activity is available in the town or village
Distance (miles) to the nearest village or town with the service or utility is in parentheses