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Demand for Health Insurance in Ghana: What Factors Influence Enrollment?

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Abstract In 2003, there was a paradigm shift in Ghana's quest for a more humane, affordable and reliable mechanism of financing healthcare with the introduction of the national health insurance scheme. The scheme was to replace the hitherto obnoxious Cash and Carry System of paying for health care at the point of service, and to provide a better and much more humane financial arrangement that will enable the citizens to access health care service without having to pay at the point of service delivery and also ensure an improvement in the quality of basic health. This study employed descriptive statistics-Logit and Probit Models to investigate the factors that influence Ghanaians to enroll with the scheme. The results from the logit and probit models indicate that sex, marital status and cost of curative care were strong factors in influencing one's decision to join the scheme. Again the marginal effects and odd ratios gave a further indication that factors such as individuals' income, higher levels of education and poor ill health among others also influence Ghanaians to join the scheme. This research is of the view that any public education aimed at increasing enrollment should be guided by these factors.

Keywords: *National Health Insurance, healthcare financing, cash and carry, logit and probit, enrollmen*

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1. Introduction

One major challenge facing health delivery in Ghana is financing**.** Health financing in Ghana Prior to independence, was predominantly by out-of-pocket payments at point of service use [1]. This however changed under the First Republic, from the late 1950s up to 1966, when healthcare financing in Ghana was in line with the Socialist philosophy of the then Government, and was virtually free as was education and other social services. Following the overthrow of the government, Healthcare financing in Ghana saw a complete 'U-Turn' [2]. Under the military-cum-civilian junta of the National Liberation Council (NLC), Ghanaians were asked to pay for their healthcare. This continued till the introduction of the National Health Insurance Scheme NHIS in 2004 [3]. As at 1981, the economy of Ghana had deteriorated to such an extent that the government wandered how to find the best combination of Government-Peoples-Partnership that would meet each other part of the way and satisfy the needs and pockets of Ghanaians as well the Government's finances in the healthcare sector [4]. 'Cash and Carry' system of healthcare financing was thus introduced. Under Cash and Carry', patients were required to pay for drugs and some medical consumables, as and when they visit hospital, while the state bore all other costs including consultation, salaries and emoluments for Doctors, Nurses and other healthcare workers in state hospitals. 'Cash and Carry' also provided for free medical care for the aged above 70 years of age, children under five years and pregnant women for their ante-natal care, all under an exemption programme implemented with that system of financing. The 'Cash and Carry' system survived until 2004 when the present health insurance system came into being [5].

The National Health Insurance Scheme (NHIS) was established under Act 650 of 2003 by the Government of Ghana to provide basic healthcare services to persons resident in the country through mutual and private health insurance schemes. Act 650 of 2003 has been amended and replaced with National Health Insurance act 852 of, 2012 to cater for the inconsistencies and the legal ambiguities in the previous act. The purpose of the amendment was also to cater for the changing developmental trends in the health sector and to solidify the gains made ten years after the implementation of the scheme. The new act recognizes the existence the District Mutual, Private Mutual and Private Commercial Schemes which are regulated by the National Health Insurance Council (NHIC). Ghana introduced a national health insurance scheme (NHIS) as part of a major development policy framework-Ghana Poverty Reduction Strategy (GPRS) implemented in 2003. The aim of the NHIS was to replace the hitherto obnoxious Cash and Carry System of paying for health care at the point of service, and to provide a better and much more humane financial

arrangement that will enable the poor to access health care service without having to pay at the point of service delivery. The establishment of the scheme was also to ensure an improvement in the quality of basic health care services for all citizens, especially the poor and vulnerable. After years of being burdened under the cash and carry system the introduction of the NHIS has received loud applause especially among the poor who now find a social protection system that provided succour for their healthcare expenditure problems [6]. The National Health Insurance Scheme, which was implemented in 2004, has been accepted by Ghanaians as one of the best social intervention programs to be introduced in the country. This is because it is not one of those programs sponsored by the Donor Community or the World Bank and the International Monetary Fund. Various researches have revealed that the National Health Insurance Scheme has expanded access to healthcare for majority of the population who hitherto could not afford healthcare under the 'cash and carry' system. Ten years after its implementation, a nationwide Assessment of the scheme by the NHIA showed that only 36% are covered. Again 70% of pregnant women, children and the aged who enjoy free registration under a special program failed to renew their cards after expiry of their membership [4]. Unfortunately no attempt has been made to understand the factors that have accounted for the low coverage of the scheme or what factors motivate people to join the scheme. As at the end of December 2011, the total active membership of the scheme increased from 8.16 million in 2010 to 8.23 million in 2011 showing an increase of 0.8% over the 2010 figure and representing 33% of the population. Table 1 presents NHIS membership trend from 2005 to 2011, see Table 1.

Table 1. Active Membership

Year	2005	2006	2007	2008	2009	2010	2011
Registered Members **(Cumulative)**	1,348,160	3,867,862	8,184,294	12,518,560	14,511,777	18,031,366	21,392,402
Active membership (Old Methodology)	**1,348,160**	**2,521,372**	**6,643,371**	**9,914,256**	**10,638,119**	14,157,708	17,518,744
Active membership (New Methodology)	n/a	n/a	n/a	n/a	n/a	**8,163,714**	**8,227,823***

*Figure is provisional
Source: NHIA, 2011

According to the National Health Insurance Authority (NHIA), the new active membership figure of 8.16 million for 2010 does not necessarily represent a drop, as there is no comparative historic data based on the new methodology of computation. While the perceived drop in active membership is largely due to the application of the new methodology for reporting, other sub-standard practices from the schemes such as the issuing of old ID cards, the granting of validity period exceeding the three months period mandated for temporary cards and the printing of temporary ID cards outside the NHIS' computerized system. This might have accounted for the lower figures for the reported new active membership data in 2010. Figure 1 shows the distribution of active members as at December 2011 by category. Children under 18 years constitute 49.7% of NHIS active members followed by the informal sector 36.4% with the SSNIT Pensioners being the least 0.3%.

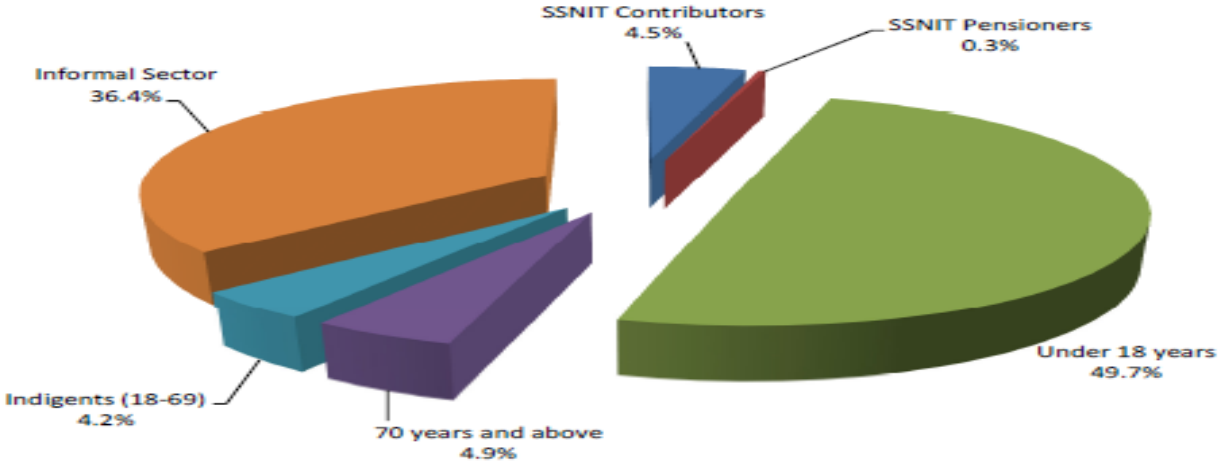

Figure 1. Active NHIS Subscribers by Category 2010

Source: NHIA, 2011

Enrolment is legally mandatory. Enforcement of this requirement however is fraught with difficulties due to the fact that it is a social policy, coupled with the given large informal sector we have in Ghana. In the absence of an accurate database that will provide information about the informal sector, the scheme is left to depend on voluntary registration of members from this sector. Effectively, with the exception of SSNIT contributors who are mostly in the formal sector, all other persons are practically voluntary. The requirements for enrolment and the conditions set in section 3 of LI 1809 allow conditions of membership to be varied at the discretion of schemes. Based on this membership contributions vary among schemes from GHC 7.2 to GHC 48 [8]. Beyond the premiums collected locally, the NHIS is financed through a 2.5% National Health Insurance Levy instituted by the Central Government. This 2.5% value added tax (VAT) is collected on most goods and services. Basic foodstuffs and goods predominantly consumed by the poor are however excluded. There is an additional 2.5% deduction of workers contribution to the Social Security and National Insurance Trust (SSNIT) fund. The rest of the funding sources include accruals from investments made by the national health insurance council (NHIC), funds allocated to the scheme by the Government of Ghana via Parliament, central exemptions fund and donor funds.

Informal sector participants' membership is based on their payment of scheme-specific premiums. Persons aged under 18, over 70, pensioners, pregnant women or persons deemed indigent (core poor) are exempt from premium payments. The National Health Insurance Authority (NHIA) mandates a pre-defined benefits package that covers 95% of the disease burden in Ghana. Services covered include outpatient consultations, essential drugs, inpatient care and shared accommodation, maternity care (normal and caesarean delivery), eye care, dental care and emergency care. The NHIS contracted accredited providers (public, private and church-based) to deliver services to its members and reimburses them after submission of claims for services. This system separates the purchasing and provision functions across different stakeholders to increase transparency. Currently the NHIS reimburses providers based on the Ghana Diagnostic Related Groupings (G-DRGs) and fee-for-service (FFS) for medicines using a medicines tariff list.

This paper, which is an exploratory study attempts to examine the factors that will influence Ghanaians to join the NHIS using the Logit and Probit Model. The study is expected to provide new information on the main determinants of demand for health insurance in Ghana. The results of the study would be useful in the formulation of practical policies for financing and providing health care in Ghana.

The next section of this research outlines the conceptual framework adopted for the study. This is followed by the methodological approach to the research. The subsequent section appraises the results from the logit and probit model which shows the factors that influences individuals to join the national health insurance scheme. The last section highlights the conclusion and policy direction which among other things stresses on the need to intensify public education on the workings of the scheme.

1.1. Conceptual and Theoretical Issues

The logit and probit models employed to analyze binary outcomes, assume that all alternatives are equally uncertain and influenced by a probability distribution. With this binary logistic regression, the dependent variable is a dummy and coded 1 or 0. This gives the respondents a clear idea to choose their relative preference between any couples of alternatives based on the inherent characteristics of the phenomenon under consideration. These models are simply a non-linear transformation of the linear regression. The logistic regression has an S-shaped distribution function and it is similar to the standard normal distribution except that the tail is considerably heavier–resembling a t-distribution. This constrains the estimated probabilities to lie between 0 and 1. The error term is assumed to have a standard logistic distribution with mean 0 and Var $(\varepsilon/x) = \prod^2/2 \approx 3.29$. The specific value assumed for the variance is arbitrary in the sense that it cannot be disconfirmed by the data used. This model is identical to probit model except that the former has logistic distribution error term. Both models prove that the predicted probability lie between 0 and 1 as discussed by [9].

Logit and probit models give different predictions when a sample contains very few responses of Y = 1 and very few responses of y = 0, and also when there are wider variations in the independent variables. These models estimate coefficient results that give 'sign' or direction of effect of change in the explanatory variable on the probability of success. Positive estimated coefficients suggest that it is more likely that an additional unit of the explanatory variable will lead to an increase in the dependent variable (dummy) under estimation whilst holding other explanatory variables constant. Negative coefficient shows that an additional unit increase in the explanatory variable considered is less likely to influence the dependent variable whilst holding other explanatory variables constant. All parameter estimates are consistent, efficient and asymptotically normal so that the analogue of the regression t-tset can be applied. To test the significance of all or a subset of the coefficients of the logit and probit models, the likelihood-ratio test is applied, whilst the pseudo R squared measures "goodness-of-fit". The pseudo R-squared is unlikely to be close to 1 when binary choices are involved [10]. The models update the starting value to a new set of coefficient estimates till 'convergence' is achieved, which signifies the elimination of multicollinearity in the estimated model. This is usually achieved via iteration.

2. Methodology

2.1. Sources of Data

Both secondary and primary sources of data were used for the research. Secondary data on health indicators, Enrollment to the NHIS, trends in government expenditure on health care, and other sources of health care financing were obtained from Ministry of Health (MOH), National Health Insurance Authority, Ghana Statistical Services (GSS), World Health Organisation (WHO), World Development Report (WDR), and the State of Ghanaian Economy. Data on the type of insurance plans offered, existing premium and benefits, and the types of sickness covered were obtained from a number health insurance schemes notably, Manhyia Sub-Metro Health Insurance Scheme, Asokwa Sub-Metro Health Insurance Scheme, Subin Sub-Metro Health Insurance Scheme and the Bantama Sub-Metro Health Insurance Scheme. Other relevant information such as criteria used to increase premium, the insured use of health facility, relationship among providers and the insurers and the insured etc were obtained through open discussion and personal interviews with top management of the health insurance schemes and health providers. On primary data, questionnaires were administered to obtain data on variables such as income, age, sex, number of years of schooling, family size, employment status, marital status, average number of times to visit hospital/clinic for medical attention per year, type of health facility mostly used, and health insurance membership. The target groups were people employed in both formal and informal sectors of the economy. The Kumasi metropolis was the study area. Four (4) main areas: Bantama, Suame Magazine, Adum and Asafo were selected based on their share of the Metropolis economic activities. The majority of the workers at Suame Magazine are employed in the informal sector, mostly spare parts dealers. Bantama and Asafo are made up of a mixture of informal and formal employees whereas formal employees dominate Adum. 60 sets of

questionnaires were administered in each area. The researchers administered 240 questionnaires. Respondents were initially briefed on the operation of health insurance, bringing out its advantages and disadvantages, how one can benefit from the scheme by paying premiums at regular intervals as at when they are due. They were then given the chance to pose questions where necessary and these were answered accordingly. Some of the respondents who had prior knowledge about health insurance were engaged in open discussion before responding to the questionnaire. The questionnaire administration took 7 weeks. Out of the total questionnaire administered, 202 workers responded and gave the necessary details. Those interviewed in the formal sector include administrators, teachers, lecturers, sales personnel, banking officials, and accountants who work with both private and government establishments. The informal sector employees interviewed included artisans, businessmen or women, petty traders, bakers/caterers, food sellers and many others.

2.2. Model Specification and Data Analysis

The analyses of data involved the investigation of the factors influencing health insurance membership and non-health insurance membership. Descriptive analysis, using logit and probit analyses using STATA have been employed to analyze the data. The models report logs likelihood function, which is inversely related to iteration. The likelihood function increases at each level of iteration up to a final value, where P-value is zero, indicating log-transformation of variables that assume a better fit. The marginal effect is obtained by finding the derivative of the probability of success with respect to one element of the independent variables whilst holding other explanatory variables constant. The marginal effect has been captured using probit model, which is identical to the logit model. This identifies how significant the influencing factors can predict individuals' demand for health insurance. The functional form of the demand for health insurance equation is presented as; Hm = g (Age, Agesq, Sex, Ms, Nys, Inc, Es, Hs Hfm, Sf, Cuc, Pre, IB).

Where:

g = log likelihood, Hm = health insurance membership, Age = Age, Agesq = Age squard, Sex = Sex (Male = 1, Female = 0), Ms = Marital status. (Maried = 1, Single/others = 0), Nys = Number of years of schooling, Inc = Income of the individuals, Es = Employment status. (Private-sector employee = 2, Government employed = 1 Self-employed/Informal sector-employee = 0), Hs = Health status.

Hfm = Health facility mostly attended. (Private Hosp/Clinic = 1, Government/others = 0), Sf = Size of the family, Cuc = Current expenditure Medical care. (Curative care plus preventive care), Pre = Premium or price of insurance and IB = Insurance benefit.

The dependent variable-health insurance membership (dummy variable), takes the value of 1 if one is a member of health insurance scheme and 0 otherwise. The logit model, which is based on probability distribution, is expressed as;

$$M_i = E(Y = \frac{1}{Xi}) = \frac{1}{1+e^{-(B_1+B_2X_i)}} \quad (1)$$

Where e = 2.71828

Put differently,

$$Mi = \frac{1}{1+e^{-z_i}} \quad (2)$$

Where

$$Zi = B_1 + B_2X_i \quad (3)$$

Zi ranges from - ∞ to ∞ and Mi ranges from 0 to 1. Xi is a vector of factors (explanatory variables) that influence enrolment into health insurance. The probability of having health insurance is given by;

$$Mi = \frac{1}{1+e^{-z_i}} \quad (4)$$

Equations 1 to 4 represent a situation where individuals have preconceived idea about payment of premium that will permit them to enjoy medical cover.

The probability of having no health insurance is also given by;

$$1 - Mi = 1 - \frac{1}{1+e^{-z_i}} = \frac{e^{-z_i}}{1+e^{-z_i}} \quad (5)$$

Equation 5 is individuals are assumed to have no insurance cover. Under such a situation, the best option is to maximize expenditure on preventive efforts.

Therefore, the probability of having health insurance cover divided by the probability of no insurance cover is expressed as:

$$\frac{Mi}{1-mi} = \frac{1}{1+e^{-z_i}} * \frac{1+e^{-z_i}}{e^{-z_i}} = \frac{1}{e^{-z_i}} = e^{z_i} \quad (6)$$

Taking the natural logarithm of the odd ratios, the result is given by

$$Li = \ln(\frac{Mi}{1-Mi}) = Zi = B_1 + B_2X_i \quad (7)$$

The left hand side of the equation is the log odds ratio, or 'logit'.

$\frac{Mi}{1-Mi}$ is the odd ratio of the probability of individual having health insurance to the probability of not having health insurance. Ui is the error term. This model can be estimated in STATA, SPSS and LINDEP. In STATA, the logistic regression use MLE to generate the logit (logistic regression coefficient, which corresponds to the Natural log of the Odds Ratios (ORs) for each one-unit increase in the level of the regressed variable. The interpretation of the logit coefficients is made more intuitive by using the ORs. The ORs measures the probability of the event occurring divided by the probability of the nonevent. In a more technical term, Odds ratio is the exponential of the (B). The odds ratio indicates conditional probability of random responses falling into one of the two categories of the variables of interest. Odds ratios equaling 1 means that there is 50/50 chance that the event will occur with a small change in the independent variable. Negative coefficients lead to odds ratios less than 1, implying that the partial effect of the independent variable on the dependent variable will be less in explaining the outcome. The odds

ratios analyze the dependent variable as a function of the independent variables. This indicates the conditional probability of random responses used to analyze the relationship between the dependent variable and the independent variables under investigation.

The values of the Odds ratios are more useful in terms of the statistical and substantive interpretations of the results of the variables. They are robust and inform us of whether the classification across an independent variable is useful or not. These are analogous to the partial slope in the multivariate regression because it represents the influence of predictors (independent variables) on the dependent variable. The odds ratio is a summary statistic (expected B) that measures the effect of and a test for significance of a given independent variable on the dependent variable while holding other independent variables in the model constant [10]. According to them it is advantageous to use odds ratio since statistic cannot be obtained for a given probably, as it is impossible to summarize the impact of a unit change in predictor of interest on the probability in question. They conclude that this is because the probabilities are non-additive due to non-linearity of logit and probit models. The ORs are MLEs of the uniform effect across strata of the model covariates. They are pooled (uniform, common) estimates and thus are adjusted for all regressors included in the model. In effect, the logistic regression yields odds ratios, while the 'logit command in stata yields the actual beta coefficients. There is a direct relationship between the coefficients produced by logit and the odds ratios produced by the logistic. A logit is the log base (e) of the odds, i.e, logit (p) = log (odds) = log (p/q). Logistic regression in reality is ordinary regression using the logit as the response variable, i.e, logit(p) = $B_1 + B_2 X$ = log (p/q) = $B_1 + B_2 X$. This means that the coefficients in losgistic regression are in terms of the log odds. (Http//www.stata.com, www.ats.ucla.edu, www.ats.ucla.edu/stat/stata).

The values of the logit (Li) and the values of the Xi are needed to enable us estimate the model is presented as;

$$Hm = B_1 + B_2 Age + B_3 Agesq + B_4 Sex + B_5 Ms + B_6 Nys + B_7 Inc + B_8 Es + B_9 Hs + B_{10} Hfm + B_{11} Sf + B_{12} Cuc + B_{13} \Pr e + B_{14} IB + U$$

The equation is in Natural logs.

Where:

Age = Age.

Agesq = Age squard.

Sex = Sex (Male = 1, Female = 0).

Ms = Marital status. (Maried = 1, Single/others = 0).

Nyc = Number of years of schooling.

Inc = Income of the individuals.

Es = Employment status. (Private-sector employee = 2, Government employed = 1 Self-employed/Informal sector-employee = 0).

Hs = Health status.

Hfm = Health facility mostly attended. (Private Hosp/Clinic = 1, Government/others = 0).

Sf = Size of the family.

Cuc = Current expenditure Medical care. (Curative care plus preventive care).

Pre = Premium or price of insurance.

IB = Insurance benefit.

Table 2. Result of Logit model

Logit-Hm, Age, Agesq, Sex, Ms, Nys, Inc, Es, Hs, Hfm, Fs, Cuc

Iteration 0: log likelihood = -126.50805

Iteration 1: log likelihood = -79.597246

Iteration 2: log likelihood = -73.970236

Iteration 3: log likelihood = -73.199774

Iteration 4: log likelihood = -73.173191

Iteration 5: log likelihood = -73.173147

Logit estimates — Number of obs = 201; LR chi2 (11) = 106.67; Prob > chi2 = 0.0000

Log likelihood = -73.173147 Pseudo R2 = 0.4216

Hm	Coef.	Std. Err.	z	P > |z|	[95% Conf. Interval]	
Age	.2283701	.301246	0.758	0.448	-.3620612	.8188015
Agesq	-.0 023783	.0035823	-0.664	0.507	-.0093995	.0046428
Sex	.5367221	.4596649	1.168	0.243	-.3642045	1.437649
Ms	.2052806	.7288372	0.282	0.778	-1.223214	1.633775
Nys	.1891872	.0874636	2.163	0.031	.0177618	.3606127
Inc	.0710624	.0234043	3.036	0.002	.0251909	.1169339
Es	2.11551	.3960072	5.342	0.000	1.339351	2.89167
Hs	.1658239	.1246306	1.331	0.183	-.0784476	.4100954
Hfm	-.3709987	.5414888	-0.685	0.493	-1.432297	.6902998
Fs	-.0346086	.2106841	-0.164	0.870	-.4475418	.3783246
Cuc	-5.86e - 07	1.89e - 07	-3.101	0.002	-9.57e - 07	-2.16e - 07
_cons	-12.33946	5.849603	-2.109	0.035	-23.80447	-.8744462

Hm = -12.33946 + .2283701 Age -.0 023783 Agesq +. 5367221 Sex + .2052806 Ms + .1891872 Nys + .0710624 Inc + 2.11551 Es + .1658239Hs - .3709987 Hfm -.0346086 Fs -5.86e-07 Cuc

3. Results and Analysis

This section estimates the factors that will motivate people to enroll with the NHIS in the selected areas of the study. Because of the difficulties in obtaining the entire insured monthly or yearly premium and their corresponding benefits, this research has omitted the actual premium paid and insurance benefit in the model estimation.

Table 3. Result of probit model

Probit-Hm, Age, Agesq, Sex, Ms, Nys, Inc, Es, Hs, Hfm, Fs, Cuc
Iteration 0: log likelihood = -126.50805
Iteration 1: log likelihood = -78.665868
Iteration 2: log likelihood = -74.594707
Iteration 3: log likelihood = -74.354182
Iteration 4: log likelihood = -74.352425
Iteration 5: log likelihood = -74.352425
Probit estimates Number of obs = 201
LR chi2 (11) = 104.31
Prob > chi2 = 0.0000
Log likelihood = -74.352425 Pseudo R2 = 0.4123

Hm	Coef.	Std. Err.	z	P > |z|	[95% Conf. Interval]	
Age	.107796	.1740228	0.619	0.536	-.2332823	.4488743
Agesq	-.0011728	.0020771	-0.565	0.572	-.0052438	.0028982
Sex	.1954477	.2525539	0.774	0.439	-.2995489	.6904443
Ms	.1909129	.4288694	0.445	0.656	-.6496556	1.031481
Nys	.1049973	.0482895	2.174	0.030	.0103516	.1996429
Inc	.0360188	.012576	2.864	0.004	.0113703	.0606673
Es	1.14205	.2000757	5.708	0.000	.7499087	1.534191
Hs	.0884729	.0657924	1.345	0.179	-.0404779	.2174237
Hfm	-.2356303	.3043725	-0.774	0.439	-.8321894	.3609287
Fs	-.0095211	.1257917	-0.076	0.940	-.2560683	.2370261
Cuc	-3.03e - 07	1.04e - 07	-2.912	0.004	-5.06e - 07	-9.90e - 08
_cons	-6.300264	3.331929	-1.891	0.059	-12.83072	.2301963

The models are free from multicollinearity since the iteration ends at 5. Also Prob > chi2 = 0.0000 reports a null hypothesis of no monotonic association between health insurance membership and the explanatory variables, which shows that the F-test has a probability value of (0.0000). The value of the log likelihood function when all coefficients are zero is -73.173147 and -74.352425 for the logit and probit respectively, which justify better fit for the log transformation of variables estimated by the models. The interpretation of the logit and probit models are very important in terms of the direction of effect of the coefficients estimates, marginal effects and the odds ratios [11].

3.1. Coefficients of Logit and Probit Models

The coefficient estimates measure the values that maximize the log likelihood function of health insurance membership. Both logit and probit models show that age, sex, marital status, number of years of schooling, employment status and ill-health were positively related to demand for health insurance. Age squared health facility mostly attended, family size and cost of medical care were inversely related to the demand for health insurance. The ages of respondents ranged from 22 to 56 and showed a positive relationship with health insurance membership. However the coefficient of age squared was negative. This shows that the demand for health insurance was more likely to increase at a decreasing rate as people's age attain a maximum limit (which is dependent on the individuals' judgment), after which the demand falls with increasing age. The implication is that policy makers and insurers could target the youth for any form of health insurance packages. Sex being positive implies that males are more likely to buy health insurance than females. This may probably be due to the fact that men normally were the breadwinners of their families in Ghana, hence they insure in order to concentrate on other expenses. Married couples patronized the health insurance policy than non-married people, which may result from the many responsibility the former has over the latter. The results also showed that people with higher levels of education also enrolled with the scheme on the grounds that they may probably understand the scheme better. Health facility mostly attended and family size registering negative coefficients imply that, private hospital and large family are less likely to influence individuals to buy health insurance. With the exception of health facility mostly attended, family size, and cost of medical care, all the other influencing factors specified in the models conform to the expected values.

3.2. Marginal Effects

The marginal effect which is analogous to the elasticity gives the percentage change in the probability of a success in response to a percent change in the explanatory variable [11]. The marginal effect and odds ratios have been estimated to assess how the influencing factors will predict individuals' choices to enroll with the national health insurance. Using a linear extrapolation of the estimated coefficients, a 10% increase in individuals' age below the maximum limit will contribute to 0.32% increase in the probability of being a health insurance member whilst holding other explanatory variables fixed. However the interpretations of the dummy explanatory variables are different. A change from 0 to 1 or 1 to 0 represents 100% change in probability. Hence if the number of married couples increase by 100% (married = 1, unmarried/single = 0) it will probably lead to 5.3% increase in health insurance membership. The same 100% increase will lead to 7.1% decrease in the probability that health facility mostly attended will influence health insurance. This could also be interpreted as; equal expansion or improvement in private and government hospitals will lead to 7.1% decrease in the probability that

an insured will attend private hospital. This holds in the sense that if the quality of health care delivery is the same in private and government hospitals, people will prefer government hospital where fees charged tend to be relatively moderate.

Table 4. The result of Marginal Effects

Probit-Hm, Age, Agesq, Sex, Ms, Nys, Inc, Es, Hs, Hfm, Fs, Cuc

Hm	dF/dx	Std. Err.	z	P > |z|	x-bar	[95% C.I.]	
Age	.0317227	.051173	0.62	0.536	35.8955	-.068575	.13202
Agesq	-.0003451	.0006113	-0.56	0.572	1345.88	-.001543	.000853
Sex*	.0567176	.0724081	0.77	0.439	.587065	-.0852	.198635
Ms*	.0534367	.1140974	0.45	0.656	.820896	-.17019	.277063
Nys	.0308991	.0139285	2.17	0.030	16.0299	.0036	.058198
Inc	.0105998	.0037199	2.86	0.004	18.7799	.003309	.017891
Es	.3360877	.0553875	5.71	0.000	.925373	.22753	.444645
Hs	.0260362	.0192785	1.34	0.179	4.48756	-.011749	.063821
Hfm*	-.0713699	.0933567	-0.77	0.439	.666667	-.254346	.111606
Fs	-.0028019	.0370015	-0.08	0.940	3.801	-.075324	.06972
Cuc	-8.91e-08	3.08e-08	-2.91	0.004	2.2e + 06	-1.5e - 07	-2.9e - 08

obs. P. .3233831, pred. P. .2176692 (at x-bar)

(*) dF/dx is for discrete change of dummy variable from 0 to 1
z and P > |z| are the test of the underlying coefficient being 0

Table 5. The result of Odds Ratios of the logit model

Logit-Hm, Age, Agesq, Sex, Ms, Nys, Inc, Es, Hs, Hfm, Fs, Cuc

Hm	Odds Ratio	Std. Err.	z	P > |z|	[95% Conf. Interval]	
Age	1.25655	.3785308	0.758	0.448	.6962397	2.26778
Agesq	.9976245	.0035738	-0.664	0.507	.9906446	1.004654
Sex	1.710391	.7862067	1.168	0.243	.6947491	4.210783
Ms	1.22787	.894917	0.282	0.778	.2942828	5.12318
Nys	1.208267	.1056794	2.163	0.031	1.01792	1.434208
Inc	1.073648	.025128	3.036	0.002	1.025511	1.124045
Es	8.293818	3.284411	5.342	0.000	3.816564	18.02339
Hs	1.180365	.1471096	1.331	0.183	.9245505	1.506961
Hfm	.6900448	.3736515	-0.685	0.493	.2387598	1.994313
Fs	.9659834	.2035173	-0.164	0.870	.6391975	1.459837
Cuc	.9999994	1.89e - 07	-3.101	0.002	.999999	.9999998

3.3. Odds Ratios

The Odds Ratios (ORs) show that age, sex, marital status, income, employment status, health status and number of years of schooling were all more than 1. This implies that, a change in any of these variables was more likely to influence people's ability to join the national health insurance. The result shows that, a unit increase in age will increase the demand for health insurance by 25% up to a maximum limit beyond which health insurance membership will fall approximately by 0.24% assuming that respondents hold other explanatory variables constant. This is in conformity with [12] and [14] postulation that individuals demand for health insurance tends to fall above a maximum age limit. Sex registering 1.710391 odds ratio implies that males (1) were 70% more likely to join the health insurance than females (0) when other independent variables remain the same for both sexes. Furthermore, married couples were about 23% more likely to patronize health insurance than unmarried individuals. People with longer years of schooling were also 21% more likely to insure against sickness than people with lower years of schooling if other explanatory variables remain unchanged. This confirms the expectation that people with higher education tended to understand the operation of health insurance schemes and register. The result also shows that respondents' earning higher incomes were on the average 7% more likely to take up health insurance than respondents' with low income. On the issue of health status, the model predicts that respondents who on the average more frequently visit their doctors for medical attention will be 18% more likely to insure than respondents who less frequently seek for medical care, other variables remaining stable. Health facility mostly attended (private hospital = 1, Government/others = 0) has odds ratio of 0.6900448 indicating that respondents who attended government hospital are 31% more likely to insure if quality of health care in the two hospitals are upgraded equally. Put differently, if quality of health care perceived by individuals is the same for both private and government hospitals, then the insurer will expect 31% shift of their clients from private health providers to government health providers. Health insurance providers could then contract more government hospitals or physicians in their network system. This could reduce premium contributions by the insured if other influencing factors of the scheme remain unchanged. This could be deduced from respondents, who reported that fees charged in the government hospitals are relatively moderate than in private hospitals.

The odds ratio for family size was 0.9659834 showing that people with large family sizes were less likely to buy health insurance in the study areas. As the size of the family increases, heads of the family will be 3.4% less likely to be insured. The result can also mean that there is approximately 49/51 chances that respondents with large family sizes will buy a health insurance package. The opposite reveals that there is 51/49 chances that people with smaller family sizes will insure when other explanatory variables are held constant. Large family sizes expose family heads to many responsibilities. In the instances where partners are unable to support their

spouses financially, family responsibilities such as provision of food, children's education among others add to the burden of these heads, which may constrain them to take up health insurance. Cost of medical care (both preventive and curative cares from the past one year to the date of interview) gave odd ratios of 0.9999994 indicating that individuals who incur more medical care on their family is 0.00006% less likely to be insured. This deviates from the expected value. However, using the bivariate correlation, the Pearson 2-tailed test established that curative care was significant at 1%, but preventive care was neither significant at 1% nor 5% level. The effect of the cost of preventive care could account for the deviation.

3.4. Respondents Views on Health Insurance

This portion solicited individuals' opinion and ascertains their perception about the health insurance scheme. This gives some ideas about how to assess the effectiveness of shifting medical care to the insurer as outlined in the objectives of the national health insurance scheme. About 95% of the respondents concluded that the health insurance was good and a reliable means for replacing the cash and carry system or financing of health care if managed properly. In a focus group discussion, a 38 year old worker had this to say: *"Health care and treatment has become easily and readily available especially if one is insured thereby making financing easy: -Individuals who cannot afford high cost of care associated with diseases receive treated when they are enrolled on a health insurance scheme. Also, those with low income who may face financial difficulties in paying for their medical care are also treated when they pay their regular premium by renewing their membership"*. A manager of one the national health insurance schemes selected for the study opined "Quality of health care has improved the pool of funds from premium payments make it easy to embark on long term development in the health sector such as building of infrastructure, buying equipment and enhancement of human capital, among others". Corroborating this assertion, another scheme manager explained that the regular premium contribution has promoted health consciousness among people and this has facilitated education on preventive health care.

4. Conclusion and Policy Recommendations

Generally, the national health insurance has reduced the burden that household heads or family heads face. At least one can plan ahead and also use part of their income for other developmental projects. Once there was an assurance of medical cover, one could tackle other family issues such as children's education, housing projects and other pressing issues. A top official at the NHIA summed up the benefits of joining the national health insurance scheme by saying that it is the best substitute for the "Cash and Carry" system. One does not pay for medical care directly at the point of service. An agency takes care of that and that hiccup of making down payment before treatment is carried out is reduced or eliminated. This has relieved people from making instant payment when they are sick. However, the greatest challenge is the sustainability of high claims payment, corruption and political interference. On the whole, majority of the respondents support the view of the health insurance as a means of covering medical care. Insurers and policy makers should bring out health insurance packages and policies that will induce individuals to enroll or enjoy medical cover. Creating people's awareness about the existence and the operation of health insurance is very crucial. People should be enlightened through the mass media on the operation of the insurance scheme.

5. Limitations of the Study

The study was conducted in the Kumasi Metropolitan Area of Ghana which is the second largest metropolis after Accra, the capital city. The restricted study area may limit the universal applicability of the results especially in terms of national generalization. Secondly, the study used both secondary and primary data that posed some limitations. There was inadequate information on premium payments and insurance benefits enjoyed by individuals, especially those under employers' medical cover. Hence the researcher omitted these two variables when estimating the demand for health insurance. Furthermore, because the study used data collected from the field, the sample size may be biased. Furthermore, the analyses of data involved pure descriptive statistics, using logit and probit models to report the findings of the study. This may thus make the interpretation of the results too technical.

Despite these limitations, we believe that the results of the study will generally be useful to policy makers, insurance companies, communities, individuals and those in academia on the factors that influence demand for health insurance.

5.1. Further Research

We suggests that further research needs to be carried out in other parts of Ghana to unearth many other factors that are likely to determine the demand for health insurance. Again, other issues that could be given considerations in future research are issues on sustainability, political developments and equity. Finally further research is needed to assess both insure and insured satisfaction of the scheme.

5.2. Ethical Principles

Scientific research requires that researchers conduct themselves according to ethical principles. Consent was therefore obtained from the Metropolitan Assembly to carry out the research in the metropolis. Permission was also sought from the National Health Insurance Authority to carry out the study in the selected health insurance schemes chosen for the study. The purpose of the study was explained to each participant and their consent sought before they were recruited into the study. Respondents were also assured of strict confidentiality and data collected have been handled as such.

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