Health Insurance and Vulnerability to Health Shocks in Ghana

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ABSTRACT

The economic impact of diseases in terms of healthcare cost and reduced productivity is enormous and affects both the household and the economy as a whole. From the perception of an adverse health situation, to the decision to seek care, up to the coping mechanisms that a household will adopt, the entire burden of illness stretches the resources of households and the economy as a whole. Over the past two or so decades, health insurance has emerged as an important mediating factor in providing succour to households hit by illness requiring substantial health expenditures. Since then, there has been considerable research on the link between illness and poverty, and the role of health insurance in mitigating the effects of healthcare expenditures on the household. The evidence however has not often informed policy much, because poverty is an expost measure of the outcome of a health shock. It should be interesting and more policy relevant to study, ex ante, the implication of health shocks on households and the role of health insurance in mitigating or preventing the fall into poverty. Studies of this nature have received less attention especially in developing countries. This paper delves into this area by investigating the mediating role of health insurance on vulnerability to health shocks, and identifies areas that policy intervention will most likelv make significant difference. a

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1 Introduction

Over the past 20 years Ghana made tremendous progress in economic growth and poverty reduction. Poverty dropped quite significantly by 11% from 39.5% to 28.5% and the proportion of the population living in extreme poverty also declined from 26.8% to 18.2% between 1998/99 and 2005/06 (GSS, 2007). This represents about 50.1% decline in the incidence of extreme poverty over the period 1991/92 to 2005/2006, and makes Ghana the first sub-Saharan African country to achieve the MDGs target of reducing by half the proportion of the population in extreme poverty well ahead of the target date of 2015 (NDPC, 2009a). Ghana however faces a crucial challenge of sustaining this trend and ensuring that people never fall back into extreme poverty. One of the key areas capable of sabotaging poverty reduction efforts is health shocks.

The health system of Ghana is still in a transitory stage, and hence is fragile. Currently, it is in the process of being fully transformed from the former "cash-and-carry" (a system of full cost recovery based on a pay-for-access basis) to the newly implemented health insurance system. Health expenditure in Ghana is still high and out-of-pocket (OOP) payment for health care in relation to incomes and the total household expenditure budget is catastrophic. In 2005, the percentage of expenditures paid out of pocket in Ghana amounted to 79.1% of the total private expenditure on health, which forms 65.9% of the country's total expenditure on health (WHO, 2008). The economic burden of specific diseases such as malaria in terms of healthcare cost and reduced productivity is well documented (Akazili, 2002; Asante and Asenso-Okyere, 2003). The burden is enormous and affects both the household and the economy as a whole.

Over the years, health policies aimed at protecting households, especially poor households, from suffering severely the effect of high medical cost have been implemented. Some of these policies include fee exemptions for some category of people, provision of preventive health care services such as immunisation and vaccination to children and mothers, malaria control programmes among others. However weak economies of sub-Saharan African countries make it essentially much difficult for governments to sustain adequate relief packages in the health sector for the population. Private out-of-pocket spending on health care becomes widespread resulting in exposure to medical vulnerability. Recent studies indicate that health shocks are still frequent; availability and access to health are facilities are still constrained by distance and medical cost; and health inequalities continue to be widespread. The contemporary belief is that governments should strive to promote equitable access to health services by providing a sustainable health care financing arrangement with a broad-based risk-pooling mechanism (in the form of health insurance), that will reduce the chances of health expenditure influencing poverty and vulnerability.

Ghana implemented a national health insurance scheme in 2004 with the aim of containing the perverse impact of high health expenditures that continue to be financed largely from out-of-pocket expenditures by households. The belief, as always, is that health insurance is the most viable and veritable health financing system that meets the needs of the health system and at the same time provides a less hurting health care payment system for households. It is further believed that health insurance is an important health policy tool that protects households and

especially the poor from the catastrophic burden of out-of-pocket health care expenditure and reduces a household's probability of being exposed to health shock vulnerability. Since the introduction of the programme, there has been considerable amount of research work on participation of households and coverage of the scheme across the country. We find very little work that empirically discusses the extent to which participation in the insurance scheme reduces a household's chance of depleting its consumption budget expenditure due to health shocks.

The rest of the paper is structured as follows: the next section presents a review of the relevant literature and raises the key research issues that arouse this research interest. Section 3 presents definitional and conceptual issues. Section 4 provides the source of the data and the methodology for the study, whilst section 5 presents descriptive results of the key issues (variables) studied. Section 6 discusses the results and the policy implications of improving health insurance coverage for certain category of households, whilst section 7 carries the concluding remarks to the study findings.

2 Literature review and research issues

The relationship between health, and poverty and development is critical. This emphasis has been established in several earlier studies and global reports and captured eloquently in the UN Millennium Development Goals (MDGs). In 2000, the global community made an historic commitment: to eradicate extreme poverty and improve the health and welfare of the world's poorest people, thus emphasizing the crucial role of health in the poverty and development nexus. This declaration provided an overarching framework for development efforts, and set benchmarks against which to review success or otherwise of states. From the perspective of health, the MDGs are critically important in several ways. The MDGs recognize the role of health as a critical priority for addressing poverty. Health is represented in three of the eight goals, and makes a pronounced contribution to the achievement of all the other goals (WHO, 2005). This unprecedented level of attention is expected to bring both political momentum and focus to development efforts. However, after nearly a decade, health issues continue to be a threat to the realisation of poverty reduction globally and more severely in developing countries.

According to the WHO (2005) five identifiable challenges constrain or limit the achievement of the health goals: weak health systems; prioritising health issues within overall development and economic policy framework; developing health strategies that respond to the diverse and evolving needs of countries; mobilizing resources for health in poor countries; and improving the of quality of data from countries. Of all these challenges, prioritizing health issues within the overall development and economic policy framework requires looking beyond the health system and addressing the broad determinants of ill-health, health expenditure as well as raising the profile of health within national poverty reduction and governments' reform processes (WHO, 2005). In essence this means achieving two things: enhancing the performance of healthcare systems by promoting equitable access to preventive and curative health services that are affordable, effective, of good quality, and responsive to clients. The second is to provide sustainable healthcare financing by mobilising adequate levels of resources, establishing broad-

based risk-pooling mechanisms, and maintaining effective control over public and private expenditure.

Out-of-pocket (OOP) health expenditure is a worry to households and a barrier to healthcare utilization especially in developing countries. For many of the poorest populations living in poor countries, the rise in OOP expenses as a result of health service reform has significantly increased the burden of ill health (McPake, 1993). The implications and the pathways through which this induces poverty have been outlined in Whitehead and others (2001): reduced access to care, untreated morbidities, and long-term impoverishment.

The dynamics of health expenditure and welfare change is important in understanding the effect of OOP on poverty reduction and avoidance of health shock vulnerability. Recent investigations into these dynamics are gradually moving towards a more nuanced understanding of the burden of health shocks in the context of vulnerability. Illness is identified as the most likely constraint on a household's ability to improve its socioeconomic status (Kabir et al. 2000). Chambers (1989) also hinted of it when he talked of a "ratchet effect" that prevents people below the poverty line who face costs of illness from moving out of poverty. Clearly OOP expenses act as a financial barrier to essential health care and a source of impoverishment among households (Xu et al., 2007, Wagstaff, and van Doorslaer, 2002, van Doorslaer, et al. 2006; O'Donnell et al. 2008).

Several studies in other parts of the world have examined the effect of OOP health expenditure on poverty (Wagstaff and Doorslaer, 2003; Garg and Karan, 2005a; Schneider and Hanson, 2006). Wagstaff and Doorslaer, (2003) actually pioneered minimum standard approach of analyzing OOP effect on consumption using the concept of horizontal equity. Other studies then followed and included other approaches such as concentration index to analyse distribution of financial burden due to OOP health expenditure and the impact of OOP health expenditure on poverty in cross-sectional and multi-country studies (Garg and Karan, 2005a; Schneider and Hanson, 2006). Suggestions from these studies call for policy measures to protect poor households' consumption expenditure in the event of health shock. Attempts to waive fees for poorer patients have largely been unsuccessful, not least because health workers in many programmes depend on user fees to top up their salaries, and therefore they are more likely to prioritize clients who pay (McPake, 1993).

Health insurance is widely believed to be one of the most viable instruments for alleviating this burden of health care and enhancing access and utilization of health services. Health insurance is associated with increased access and timely utilisation of regular and appropriate source of health care services by individuals and families (Nielsen and Garasky, 2008; Mitka, 2004). Health insurance reduces OOP expenditure and ultimately reduces vulnerability and poverty (Joglekar, 2008; Sepehri *et al.* 2006; and Jutting, 2002). In India, it is observed that the probability of households incurring catastrophic OOP health expenditure reduces by 10 percentage points due to medical insurance (Joglekar, 2008). In Senegal positive effects of health insurance is also observed (Jutting, 2002). Recent studies conducted in Ghana also suggest that enrolment in the national health insurance scheme protected households from paying high health

expenditures (Asante and Aitkins, 2008). Uninsured persons paid as high as 10-20 times more for inpatient care than insured persons (Sulzbach et al. 2005).

Essentially these studies bring out the importance of health insurance in reducing the probability of catastrophic OOP health payments. However, few other studies also find weak, if any, effect of health insurance on health expenditure and vulnerability. These studies provide evidence suggesting that membership of health insurance indeed actually increase ones likelihood of incurring catastrophic health expenditure. Studies from Zambia (Ekman, 2007), China (van Dalen, 2006) and other countries observe that insurance coverage does not radically change the health care decisions of households and may even enlarge the perverse effects of the health care system. Van Dalen (2006) for example, observed that health insurance does not offer real protection against unpredictable high health care expenditures and can lead people into a position of long-term poverty or serious liquidity problem. Similarly, Ekman (2007) observed that there is not enough evidence to support the claim that health insurance protects people from catastrophic health expenditure.

Ghana implemented a health insurance programme five years today and the discussion on its benefit is growing. The justifications are however axiomatic and non-empirical. While recognising that health insurance can reduce the chances of out-of-pocket payment for health care at the point of service, its role in insulating households from health shock vulnerability is not conclusive. This study provide relevant policy knowledge on the following research questions: Which households face catastrophic health expenditure? Which households are vulnerable to a health shock? Does a household's participation in the health insurance programme reduce exposure to vulnerability? Empirical evidence like this is badly needed to inform policy decision making process and also enrich political debates on health reforms.

3 Definition and some conceptual issues

Vulnerability

Vulnerability and health shocks are both dynamic concepts and their relationship is multidimensional. Vulnerability is a condition in which people face a high risk of experiencing forms of deprivations that threaten their well-being, or survival. The Human Development Group of the World Bank, in a report on social protection in Africa, defined vulnerability as the inability to manage risk, or the inability of households to prevent major declines in their living standards or major variability in their consumption (World Bank, 2000). Due to its multidimensionality measurement has always been difficult in the literature and varied. Two different methods often used to assess vulnerability of falling into poverty (Chaudhuri 2002; Christaensen and Subbarao 2004, Sarris and Karfakis 2006; Gunther and Karttgen, 2009), and a second that considers vulnerability as low expected utility (Ligon and Schechter 2003). The two approaches consider household consumption as the outcome, which is subject to covariate or idiosyncratic risk factors.

Chaudhuri (2002) constructed a probability distribution of consumption that takes into account the cumulative probability distribution and the density functions of consumption that relates to the Foster, Greer and Thorbecke indices, with a threshold differentiating the vulnerable from the non-vulnerable. Gunther and Karttgen, (2009) provided an extended version of Chaudhuri's methodology by allowing the error term in the consumption regression or the unexplained variance in the consumption of otherwise equal households to capture both the impact of household-specific and community-specific shocks on a household's consumption. The utilitarian approach to vulnerability analysis espoused by Ligon and Schechter (2003) defined vulnerability as low expected utility. In the utilitarian model vulnerability is the difference between the utility derived from a certain level of consumption and the expected utility from household consumption.

In all these formulations, vulnerability measures need a probability threshold, the choice of which is often intuitive and arbitrary (Chaudhuri et al., 2002; Luers et al. 2003). However, the use of a poverty threshold is important to establish those who are vulnerable and those who are non-vulnerable; thus, a household can be said to be vulnerable if its vulnerability coefficient is greater than or equal to the chosen threshold. Several studies in the literature have used a 0.5 threshold in the analysis (Chaudhuri, 2000; Dercon and Krishnann, 2000; Chaudhuri et al., 2002). This, Chaudhuri (2000) argues, makes intuitive sense to assume that a household is vulnerable if it faces a 50% or higher probability of falling into poverty in future if it suffers a risk now.

Disease burden

Three approaches commonly used in estimating the economic burden of illness are the cost of illness (COI) method; economic growth (growth accounting) models; and the full-income method. The cost-of-illness framework which focuses on actual health damages or costs following the onset of illness is seen to be more attractive because it uses actual data of financial costs directly measured in a market setting, such as lost earnings and medical services from illness (Dwight et al. 2005). This approach is also much suited for household and cross-sectional surveys because it describes the resources used and potential resources lost as a result of a disease.

Cost-of-illness method estimates burden of illness in three parts: direct out-of-pocket (OOP) expenditure on health care, indirect cost of illness, and the intangible cost of illness. However the intangible component which includes such things as suffering, grief, and social exclusion arising from illness is often excluded in the cost of illness computations due to practical difficulties in quantifying these outcomes. Direct cost include costs on medical service such as drugs, consultation, laboratory services, and other services that are consumed by an illness victim (Dror et al., 2008). Others include direct non-medical cost such as cost of transportation (Segel, 2006). Indirect cost measures the opportunity cost of time lost in seeking health care, time lost due to morbidity, reduced labour capability, and other informal care cost (Segel, 2006).

Cost-of-illness studies in the international literature have largely used two methodological approaches. The first is the prevalence-based approach in which the costs of illness are estimated for a specific period of time (usually 1 year) for a specified cohort of disease patients. This approach estimates the burden of disease for a determined period of time and is normally cross-sectional. The second is the incidence-based approach to determine the costs of illness for a cohort of patients, usually from diagnosis until death. This approach provides longitudinal information of the costs over a lifetime. With the benefit of a large cross-sectional dataset at our disposal we employ the prevalence-based approach to analyse the burden of health shocks on households in 23 selected districts in Ghana.

Catastrophic health expenditure

A health expenditure (OOP) that is so huge that it is likely to send the household's consumption expenditure below the poverty line is often referred to as catastrophic health expenditure (CHE). There are two perspectives in looking at the concept of CHE. The first if the perspective of a household's capacity to pay for health care which considers the effective income remaining after basic subsistence needs have been met (Kawabata, Xu, Carrin, 2002; and Xu et al., 2003). The second perspective is defined in terms of the proportion of household income consumed by medical expenses (Prescott, 1999; Pradhan, 2002; Skordis-Worrall et al. 2007). Whichever perspective is used there is a need for a threshold beyond which to define health expenditure as catastrophic. In the literature the choice of this threshold is rather controversial leading to arbitrariness and left to institutional, cultural and environmental factors to determine what is chosen.

We believe that, if not for analytical convenience the choice of a threshold should not matter. As Russell (2004) argues, whilst health budget share of 10% may not be catastrophic for highincome households that can cut back on luxuries, or for resilient households that can mobilise assets and social networks to pay for treatment, a health budget share of 5% may be catastrophic for poorer households and may force them to cut spending on other basic necessities such as food. More importantly, any amount of health expenditure required of the poor is catastrophic since they are already vulnerable. The poor for example struggle to meet daily consumption needs. So another expenditure demand of even 1% is vicious enough to constitute catastrophic health expenditure. For analytical convenience as indicated earlier, we espouse that a health budget share of 1% for a poor household is enough to cause a fall in consumption. We also applied other higher thresholds to allow for sensitivity analysis (5%, and 10%).

Vulnerability to health shock

A household will be said to be vulnerable to health shock if the net value of its consumption budget expenditure falls below the national poverty line due to the occurrence of a health shock and the payment of health care out-of-pocket. It is not just the occurrence of a health shock the payment of OOP health expenditure, but the probability that when that occurs the household's total consumption expenditure (net of health expenditure) will fall below a predetermined poverty line. It is a circumstance that the household is said to be exposed to a "medical poverty trap"; when medical costs lead a household into poverty or increase the poverty of those who are already poor (Whitehead et al. 2001).

4 Data and methods

We use data from a survey conducted in 2008 on behalf of the Millennium Development Authority (MiDA) in Ghana. MiDA is the authority that executes the Millennium Challenge Corporation compact signed with the government of Ghana in 2006 to implement a set of development programmes in Ghana. As part of a process of assessing the impact of the programme on the target population as well as the economy as a whole, the Institute of Statistical Social and Economic Research (ISSER) in conjunction with Ghana Statistical Service (GSS) implementing two main living standards surveys modelled on the framework of the existing Ghana Living Standards Survey (to be known as GLSS5+). The GLSS5+ survey covered six (6) out of the ten (10) administrative regions, twenty-three (23) administrative districts from these regions, and interviewed 9310 households. The selection of enumeration areas (EAs) and the households from these EAs was representative at each level. The survey collected detailed information on so many things including ethnic and religious background, membership of health insurance scheme, and general socioeconomic and demographic background of households.

The household is the unit of analysis in the paper. A household is classified as insured if at least there is one member of the household who is registered on the health insurance scheme. A simple summary statistic analysis shows that the average number of persons a household registers is 1.90 with a variance of 2.98. The distribution further shows that the variable is over dispersed implying that the use of Poisson model (a natural starting point for count data models) will not be appropriate.

Estimation of empirical models

We investigate the determinants of vulnerability to health shocks using an instrumental variable estimation. Univariate probit model is used to estimate the probability that a household will fall into poverty after it has experienced catastrophic health expenditure. We did this for all the three threshold levels.

In order to investigate the effects of preventive health and insurance on the vulnerability to health shocks, we specify the following instrumental probit model:

$$VUL_{i} = \beta Z_{i} + \theta NHIS_{i} + \varepsilon_{i}$$

$$NHIS_{u} = \lambda Z_{u} + \eta_{u} + \varepsilon_{u}$$
(1)
(2)

where *VUL* and *NHIS* represent vulnerability to health shocks and the number of households insured, respectively. Z_i and Z_u are vectors of exogenous covariates comprising individual level characteristics, household characteristics, and other policy variables. β and θ are vectors of parameters to be estimated. θ captures the effects of insurance on vulnerability. η_u capture unobservable characteristics of a household and include household composition and other socio-

economic characteristics. εi and ε_u denote any other unobserved characteristics that are likely to affect vulnerability to health shocks and NHIS membership respectively.

We considered the health insurance model as an endogenous variable in this non-linear health expenditure outcome model because unobserved factors which affect the likelihood of a household to buy health insurance for an individual may also affect the likelihood of falling into poverty when the household experiences catastrophic health expenditure. Characteristics of households that affect household insurance status may result in non-zero correlation between the unobserved heterogeneity term in the insurance equation and error term in the vulnerability regression. Ignoring this correlation will lead to biased estimates. One approach to cope with the potential endogeneity issue is to choose instruments (X_u from Z_u), which are highly correlated with insurance status but not correlated with the error term in the vulnerability equation. The degree of penetration of a district health insurance scheme in a district and other policy target variables - such as the number of children under 18 years, the number of adults in formal employment, whether the household has a pregnant woman and whether the household has someone who is 70 years or over - were considered.

A Wald test provides evidence of the correlation between the unobserved explanatory variables from both equations to test the null hypothesis that there is no endogeneity bias (insurance status is not influenced by unobserved heterogeneity) i.e. $\rho = 0$. If the test shows that ρ is insignificant, then insurance status is not endogenous in both regressions and the models can be estimated separately. However, if ρ is significant (i.e. $\rho \neq 0$), then endogeneity of the insurance is confirmed. We also controlled for selectivity bias by estimating probability of reporting positive health expenditure conditioned on a number of variables and extracting the residuals to use as an explanatory variable in the main model.

Measurement of key variables

Cost of illness: Cost of illness as measured in our model is the direct OOP payment for health care calculated mathematically as:

$$OOP_h = \sum_{i=1}^n \sum_{j=1}^m \sum_{k=1}^r S_{ijk}$$

where OOP is health expenditure measured at the household level; i.e. for each cost (S) associated with a health shock (j) on individual (i), needing a specific health care service (k), the total OOP for each household is measured for all individual members who paid for health care in the two weeks preceding the survey.

Catastrophic health expenditure (CHE): CHE is determined if the ratio of its OOP to consumption expenditure is greater than a selected threshold. As discussed earlier, we used three different thresholds (1%, 5%, and 10%) for the purpose of sensitivity analysis.

$$CHE_{j} = 1$$
 if $\frac{OOP_{h}}{\exp d_{HH}} > j$ j = 0.01,0.05,0.10

where OOP_h is as before and $expd_{HH}$ is total household expenditure within the period.

Health insurance: Health insurance is considered at the household level. A household is classified as insured if at least there is a member of the household who is covered by the health insurance scheme (District Mutual Health Insurance Scheme).

Vulnerability to health shock: A household is said to be vulnerable to health shock when its consumption level falls below a predetermined poverty threshold due to medical expenditure.

$$VUL_{i} = 1$$
 if $CHE_{i} = 1 \& (\exp d_{HH} - OOP_{h}) < \delta, j = 0.01, 0.05, 0.10$

where δ is the pre-determined poverty level. In this case $\delta = GH \epsilon 478.55$, the April 2008 value of national poverty line as defined by Ghana Statistical Service (ISSER, 2009). The estimate is measured in adult equivalent terms and represents roughly \$1.25 a day per person. For households whose consumption is already below the poverty line, they are assumed to be vulnerable to health shock if expenditure on health care leads to a deepening of their current consumption expenditure gap.

5 Descriptive results and results of empirical model

Participation in the national health insurance scheme

Health insurance is considered a key national risk mitigation strategy that is expected to reduce the magnitude of medical cost as a financial barrier to health service utilisation in Ghana. But the scheme protects individuals who take up the policy. We first analysed participation in the scheme at the individual level and we found that only about 45% of individuals belong to or are covered under the health insurance scheme in these districts (District mutual health insurance scheme). At the household level, a little over 40% of households have at least a member insured (Figure 1). Uptake is higher in the Northern Zone and Afram Basin where in nearly five out of ten households, there is at least a member insured as compared to the Southern Zone where the proportion is four out of ten households. In all the zones, the percentage of uninsured households is higher than the insured.



Figure 1: Households' insurance status in the MiDA zone (%)

Source: Authors, computed from GLSS5+, 2008

The percentage of uninsured is particularly higher in the Southern Zone as compared to the other zones. The general low uptake is attributable to a general concern about the premium associated with the DMHIS. About 71% of respondents in the surveyed population found themselves excluded because high premium. More than half of these households are in the Afram Basin. About three and a half percent of others did not purchase the scheme because of lack of adequate knowledge about it. This has to do with inadequate and unclear communication about the principles and individual cum social benefits associated with participation in the scheme. This is particularly present in the Northern Zone and the Afram Basin as well. Lack of confidence in the management of the scheme is also a reason that about three percent others have not bought into the scheme.

Consequences of medical expenditure on household consumption expenditure

To appreciate the consequences of an illness episode on the consumption expenditure of households in the study areas, we calculated the proportion of a household's OOP health expenditure as a share of total consumption expenditure. Since the health expenditure is collected for the past two weeks, we also calculated two weeks expenditure for each household. The mean proportion of OOP medical expenditure and total household consumption expenditure in all three zones is about 18%. This means that households that suffered a health shock had to seek medical care in the past two weeks spent on average an amount that is approximately 18% of the household total budget for two weeks. Considering all the thresholds that we have chosen as benchmarks, this is much higher than expected, thus pointing to an indication that medical expenditure in the three MiDA zones is highly catastrophic (i.e. high propensity of leading households into poverty).

The proportion is particularly higher in the Southern Zone as compared to the other zones (Figure 2). The mean OOP as a share of household budget for the Southern Zone is 22% which is

over 40% higher than the share in the Northern Zone (13%) and about 36% higher for the Afram Basin (14%). Medical expenditure also constitutes a higher proportion of the core poor's household consumption expenditure. In fact OOP medical expenditure as a proportion of the core poor's consumption expenditure (30%) is almost double that of the non-poor (15.2%) and the less poor (15.5%). This is not surprising since the core poor already have low resources, hence a low consumption budget.

The consumption consequence of OOP expenditure in insured households is less than in uninsured households. The difference however is not statistically significant. This result may raise preliminary doubts about the effect of health insurance on the probability of reporting higher OOP and also the probability of facing vulnerability. The difference between the benefit of insured and uninsured in terms of how much of the household's consumption budget is displaced due to OOP payment for health care is more noticeable in the urban areas than in the rural areas. OOP payment for health care constituted only about 14.8 percent of insured households in the urban area as against 22.7 percent for uninsured households. In the rural areas there is virtually no difference between insured and uninsured in terms of how much of the household's budget is displaced by health expenditure. There is also a significantly clear difference in favour of urban households against rural households in terms of OOP payment as a proportion of household budget vis-à-vis their insurance status. Whilst in the urban areas insured household spent 14.8 percent of total budgetary expenditure on health care, rural households spent as 18.4 percent on health care. This has serious implications for medical poverty as poverty is also believed to be more severe in rural Ghana.



Figure 2: OOP as a proportion of household consumption expenditure

Source: Authors, computed from GLSS5+, 2008

Households facing catastrophic health expenditure

In order to understand more closely households that are vulnerable as a result of medical expenditure we analyse OOP as a share of the household's budget using three threshold points. For the purposes of sensitivity analysis and for policy simulation we have chosen three

thresholds (1%, 5% and 10%). Any household whose OOP expenditure on health care calculated as a proportion of the total consumption expenditure for two weeks is greater than any of these thresholds will be said to have suffered catastrophic health expenditure.

We noticed that generally a higher proportion of households in the Southern Zone face catastrophic health expenditure as compared to households in the other two zones. As the threshold is lowered towards one, the proportion narrows especially between the Southern Zone and the Afram Basin. At the various threshold levels, the Northern Zone continues to stay relatively parallel and below the other two zones. Generally, it is observed that for a third of households (35.5%), OOP medical expenditure constitutes more than 10% of total consumption expenditure. But as noted earlier, the proportion of households in the Southern Zone who face this catastrophic threshold lies above the other zones by about 15 percentage and 10 percentage points for the Afram Basin and the Northern zone respectively (Figure 3). Even as the threshold is lowered, the difference across zones is still considerable as many more households face catastrophic health expenditures. But the burden of one percent or five percent catastrophic health expenditures is relatively lower in the Northern Zone than in the other zones.



Figure 3: Proportion of households facing catastrophic health expenditure given various thresholds

Source: Authors, computed from GLSS5+, 2008

In terms of the poverty status of a household, the consequence of ten percent catastrophic health expenditure is higher for the core poor than the rich. Nearly half of households who are in the core poor group face more than 10 percent catastrophic health expenditure. Among the non-poor it is only in three out of ten households whose medical expenditure is greater than ten percent of total household consumption expenditure. This is not very surprising considering that household expenditure for the poor is generally lower. Membership of health insurance is expected to reduce the likelihood of having to pay medical expenditure directly out of pocket. This in effect should absolve insured households from facing catastrophic health expenditure. The proportion

of households who have at least a member insured but faced a 10% catastrophic health expenditure (30.8%) is considerably different from those with no member insured (39.2%).

Households whose total expenditure dropped below the poverty line

A high OOP health expenditure share of a household's budget has serious implications in terms of accentuating poverty in developing countries. We present in Figure 4 the poverty headcount ratio based on household consumption expenditure in 2008, net of OOP payments for health care. We find that as a result of OOP payments for health care about 4.3% new entrants into the poverty net. These households are often not noticed because their consumption expenditure is more often swelled up by health expenditures. The proportion is higher among uninsured households as compared to insured households. More than 5% of households with no member insured are exposed to catastrophic health expenditure and, for that matter, vulnerable. This is about 2% points higher than households with at least a member insured. This suggests that participation in the health insurance scheme provides protection for households from becoming vulnerable due to healthcare payments.





Source: Authors, computed from GLSS5+, 2008

As expected the poor are more vulnerable than the non-poor. The situation of the poor can only deepen with increasing need for OOP health care payments. Persons already below the poverty line are pushed further down into acute poverty. And for households just above the poverty line, a small fraction of OOP can "bring them to their knees". For non-poor households, 2.8% slipped below the poverty line due to expenditure on health care. As mentioned before, these are the people who are often not discussed in policy discourse. The vulnerable are not limited to only the

already poor, but include those who are marginally above the poverty line and can easily roll into poverty with the slightest extra stress on their non-discretionary budget expenditure. The poverty status of about 355 households (8% of 4,437 households who faced OOP) deepened further.

The vulnerability impact of OOP is higher in rural areas than in urban centres. About 4.5% of households in rural areas who were not in the poverty bracket suffered reduced consumption budget due to expenses on health care as compared to 3.7% in urban areas. In Ghana, the greater number and proportion of the poor live in rural areas with a greater number and proportion of persons concentrated just above the poverty line. Any small fraction in the form unexpected need for expenditure outside the budgeted household consumption expenditure has the implication of bringing down a large number of persons below poverty line. Households in urban areas generally have their monthly per capita expenditure well above the poverty line and only a higher fraction of OOP makes person poor. The challenge with urban households has to do with their tendency to seek more expensive medical care from private health care providers which tends to inflate their health expenditures which then imposes a critical burden on the budget.

The poverty headcount ratio in the three horticulture zones was approximately 43.1%. The impact is seen to be higher in the Southern Zone as compared to the other zones. This can be explained by the high cost of health care in the Southern Zone due to utilisation of expensive private healthcare service providers and also the unimpressive participation in the NHIS. The proportion of households who entered the poverty trap in the Northern Zone is not different from the proportion that slipped into the trap in the Afram Basin.

What influences a household's probability of being exposed to health shock vulnerability?

In this section we estimated the probability of a household being vulnerable to health shock. We start with the postulation that health insurance has a significant and negative effect on a household's probability of being vulnerable to health shocks. Because of the variation in the magnitude of the impact we analyse the occurrence of vulnerability impact using three different health expenditure share thresholds. The following set of variables are used in the model: 1) number of persons *insured* in a household, 2) *preventive health variables* (access to quality drinking water, sanitation and waste disposal, use of bed net, ever smoke, still smoking, and drinking), 3) *socioeconomic and community-level variables* (ethnic diversity, religious diversity, social network, and value of remittance into the household), 4) *household demographics* and other variables (age of household head, number of literate adults, number of educated adults, number of adult members in formal work, poverty status of household, household type by gender employment classification: female earner only, male earner only, dual earner, and no adult employed), and 5) some *locality dummies* (rural or urban, MiDA classified project zones).

Health insurance and exposure to health shock vulnerability

The effect of health insurance on households' probability of falling into vulnerability is very strong and the sign, as expected is negative. It reinforces the earlier discussions and supports earlier studies that also noted that health insurance protects households against medical poverty (Joglekar, 2008; Sepehri *et al.* 2006). Insured households generally make less OOP payments at

the point of service delivery as compared to non-insured households. We are however unable to confirm whether the net benefit of health insurance is positive or negative. At the various threshold levels membership of health insurance is negatively associated with the probability of being vulnerable. A household that is prone to spending more than 10% worth of her budget on health care will reduce her chances of slipping into poverty by 5.5% if an additional member of the household is covered by the NHIS (Table 3). For households whose OOP health expenditure as a share of their consumption expenditure lies between one and less than ten percent, their chances of falling into poverty reduces by nearly 3.6% with an additional household member covered by the NHIS.

Effect of other socioeconomic and community-level factors

The poverty status of a household significantly determines the probability of being exposed to vulnerability. As noted by Joglekar (2008) poorer households are already in danger of being vulnerable (unable to finance consumption of basic necessities). As a result any proportion of their meagre consumption budget spent on health care is catastrophic. The results show that the core poor are about 13.6% to 19.5% more vulnerable to health shocks as compared to the relative poor households and about 13.0% to 21.6% more vulnerable than the non-poor households. Households in the Northern Zone are about 18% to 22.8% less vulnerable than households in the Afram Basin and about 26.1% to 28.6% less vulnerable than households in the Southern Zone.

Households that receive remittance are less likely to face vulnerability. An increase in remittance by GH¢100 per year into a household reduces her chance of being vulnerable to health shock by 11.4% to 22.4%. Unexpected costs such as medical cost put a lot of strain on households with 'tight budgets' and reduces household resources available for dealing with other unexpected shocks, such as decline in earnings due to illness morbidities. Households are more able to cope with these unanticipated health expenses if they have external financing such as remittances that can be used to cushion tightened budgets. Remittance serves to supplement the strained budget of many and is a major source of survival for poorer and vulnerable households.

We also employed two community level variables: ethnic and religious diversity, to examine the effect of diversity (heterogeneous society) in leveraging society against health shocks. An ethnically or religiously diverse community is one in which there are many different ethnic groups or religious denominations co-existing together. We found that the level of heterogeneity of a society significantly reduces a household's probability of facing health shock that will lead the household into poverty. If a community becomes religiously diverse, say a rise in the index by 10% the probability of being exposed to vulnerability reduces by between 5.7% and 4.9%. That for ethnic diversity is between 1.6% and 5.4%. This means that in communities that have many more variety of religious affiliations households are associated with a decrease likelihood of being exposed to health shock vulnerability. In communities that are also ethnically diverse households face a reduced probability of being exposed to vulnerability. The size of the effect of ethnic diversity is however larger than religious diversity as the impact of OOP payment for healthcare increases. This finding is curious and requires further and qualitative investigation.

In terms of the gender classification of the breadwinner of the household and the implication for vulnerability to health shock, we find no difference between male-earner only and female-earner only households. We however find that households with no adult member employed are more likely to suffer severe impact of catastrophic health expenditure of any magnitude. Such households are more vulnerable to health shocks than female earner households by 8.4 to 11.5%. The reason is quite obvious as these households are more associated with poverty than households where at least one adult is employed.

6 Discussions and policy options

It is clear from our paper that earlier findings that give credit to health insurance as a mechanism that limits a household's probability of incurring huge OOP health expenditure usually described as catastrophic are plausible. First of all, we find that cost of medical care is high, and particularly so high in the southern horticulture zone of Ghana. The implication of this is that it reduces the amount of resources available for current consumption in the household. This is seen in the fact that the household budget of about 4.3% dropped below the poverty line due to OOP payment for cost of medical care. The impact of paying such high health care out-of-pocket is usually more severe for core poor households as they are more likely to spend more in relation to their total budget as compared to non-poor households. The need for specific policies to protect the core poor is a health imperative.

More importantly for this paper is the evidence we find that insured households pay slightly lesser medical bills at the point of service delivery as compared to uninsured households. This evidence is in harmony with other empirical findings in the literature from developed and developing countries alike. The good thing about this result is that it strengthens the existing belief that participation in health insurance to a large extent insulates a household from directly suffering the perverse consequences of health shocks. It actually serves as a bulwark and offers households financial succour when they are hit with a health shock and have to seek health care. Our policy simulation estimates further shows that the probability of a household suffering a health expenditure catastrophe reduces by about 5.7% if the household is insured (taking that catastrophic health expenditure is 10%, the highest threshold in our model). We also find that the probability of a household being exposed to vulnerability reduces by about 5.6% if even they suffer a 10 percent displacement of their household budget due to health shock. Based on this the next thing to do is to identify groups of households such that expanding insurance coverage for them can have significant impact.

In Table 1 we show where insurance coverage will make the best impact. In terms of the three horticulture zones, we find that increased insurance coverage in the southern zone will bring significantly higher benefits to households as compared to the other zones. The simulation shows that an additional member insured in a household in the southern zone reduces the probability of being exposed to health shock vulnerability by as much as 5.6% if even that household has to spend 10 percent or more of total consumption budget expenditure on medical care. The effect, surprisingly, is particularly weak in the northern zone where poverty is known to be excruciatingly severe. According to the latest round of the Ghana Living Standards Survey

(GLSS 5, 2005/06) more than half every ten households have a consumption budget below the national poverty line (GSS, 2007).

As we argue elsewhere the benefits of health insurance are known when there is a health facility available to receive health care. Incidentally, the northern zone appears to be the most deprived in terms of distribution of health service resources (hospitals and medical doctors). Even though nearly five out of ten households are insured, utilisation is hampered by low quality service and distance. An alternative explanation is that due to large population in southern Ghana there is enormous pressure on the public and private health facilities that deliver health care on behalf of the health insurance scheme. As a result people (including insured) generally rely on private non-accredited facilities for medical care with catastrophic medical charges. If we are desirous of avoiding health shock vulnerability then intensive efforts must be made in southern Ghana to expand participation in the insurance scheme. The other thing to do is to increase the accreditation of private health care providers on the scheme to deliver service to clients on its behalf.

	OOP constitutes more	OOP constitutes more	OOP constitutes more	
Policy recipient	than 1% of household	than 5% of household	than 10% of household	
• 1	consumption budget	consumption budget	consumption budget	
MiDA zone				
Northern zone	-0.9	-0.9	-2.1	
Afram basin	-3.6	-3.4	-5.2	
Southern zone	-4.3	-4.2	-5.6	
Locality of household				
Urban	-3.4	-3.2	-5.1	
Rural	-3.7	-3.6	-5.5	
Poveerty status				
Core poor	-5.1	-4.9	-6.6	
Relative poor	-2.9	-2.7	-5.1	
Non-poor	-3.0	-2.9	-4.8	
Household type				
Male earner	-3.4	-3.2	-5.4	
Female earner	-3.8	-3.7	-5.4	
Dual earner	-3.7	-3.7	-5.4	
None-employed	-4.7	-4.6	-6.3	

Table 1: Average marginal effects of at least one more person in a household benefiting from the NHIS (%)

Source: Authors, computed from GLSS5+, 2008

The effect of insurance coverage will also be higher for the core poor as compared to the relative poor and the non-poor. The findings show that a unit increase in the number of persons covered under the health insurance scheme in core poor households that spend more than one percent or as high as 10 percent of its consumption budget expenditure on health care can reduce the household's probability of being vulnerable to health shocks by 5.1% and nearly 7% respectively. The effect health insurance coverage is also higher for households with no member employed, especially in households that spend about one percent of their household consumption budget expenditure on health care. The effect on the other type of households is not very different.

7 Conclusion

This paper investigates an important health policy, health insurance, and its effect on a household's probability of being exposed to vulnerability after suffering a health shock. The study further identifies areas that policy intervention will most likely make a difference. Presently and especially in developing countries, the thrust of health services is on cost-containment, attempting to improve the financing, delivery, and administration of the medical system. This paper shows that health shocks indeed hurt the welfare of the household. And households with low-incomes are more exposed to these shocks than any. The study further provides strong evidence that health insurance is a durable option for containing medical cost at the household level. But we also add that in between the health and vulnerability linkage is the benefit of preventive health practices which serve to rearrange the association. A greater attention should be paid to these preventive health practices as well to lessen the need to seek medical care and put pressure on the health insurance scheme.

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Appendix Tables

Table 1: Summary statistics of	of the variables	used in the models
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Description of variables	Mean	Std. Dev.	Min	Max
At least one household member reported illness	0.516	0.500	0	1
Household is vulnerable to health shocks	0.037	0.189	0	1
Household faces CHE (10%)	0.173	0.378	0	1
Household faces CHE (5%)	0.285	0.451	0	1
Household faces CHE (1%)	0.455	0.498	0	1
Number of household members insured under NHIS	1.898	2.984	0	20
Number of household members sleeping with bednet	0.837	1.926	0	21
Household has access to safe water source	0.301	0.459	0	1
Age of household head (years)	47.385	14.855	16	99
Female earner household	0.357	0.479	0	1
Male earner household	0.232	0.422	0	1
Dual earner household	0.365	0.482	0	1
No employed adult member	0.045	0.208	0	1
Number of adults employed in the household	0.509	0.850	0	7
Religious diversity index	0.555	0.245	0.025	0.747
Ethnic diversity index	0.226	0.165	0.007	0.637
At least one adult is a member of a social network	0.669	0.471	0	1
Value of remittance (100 Ghana cedis)	0.061	0.312	0	50
Household is core poor	0.289	0.453	0	1
Household is relative poor	0.148	0.355	0	1
Household is non-poor	0.561	0.496	0	1
Northern Zone	0.249	0.432	0	1
Afram Basin	0.292	0.455	0	1
Southern Zone	0.459	0.498	0	1
Locality of residence (rural==1)	0.729	0.445	0	1
Sample size	9310			

Source: Authors, computed from GLSS5+, 2008

		000	0.010	
	OOP constitutes more	OOP constitutes	OOP constitutes	
Vulnerable to health shock	than 1% of nousehold	more than 5% of	more than 5% of	
Number of nousehold members insured under NHIS	-0.264***	-0.225***	-0.282***	
Bednet	-0.126***	-0.120***	-0.140***	
Bednet#Nhis	0.024***	0.019*	0.024**	
Access to improved drinking water	-0.394***	-0.245*	-0.318**	
Improved Water#Nhis	0.181***	0.155**	0.217**	
Remit_value	-0.625***	-0.625**	-0.820***	
Religious diversity (rel_div)	-3.136***	-2.425**	-1.778*	
Ethnic diversity (ethnic_div)	-0.881*	-1.215**	-1.986***	
At least one adult is a member of social network (soc)	-0.432*	-0.361	-0.759**	
Rel_div#soc	0.404	0.112	0.265	
Ethnic_div#soc	0.984*	1.581**	2.558***	
Age of head of household (agehead)	-0.034*	-0.047**	-0.039*	
Agehead#Agehead	0.033**	0.048***	0.043**	
Male earner only household				
Female earner only household	0.134	0.179	0.006	
Dual earner	0.102	0.174	-0.001	
No employed adult member	0.415***	0.487***	0.39*	
Number of adults with additional jobs	-0.112	-0.108	-0.1	
Extreme poor				
Relative-Poor	-0.675***	-0.739***	-0.658***	
Non-poor	-0.635***	-0.669***	-0.743***	
Northern Zone				
Afram Basin	1.864***	1.454**	1.248*	
Southern Horticulture Zone	2.179***	1.805***	1.459**	
Urban				
Rural	0.101	0.172	0.159	
Rural#Rel_div	-0.622	-0.713	-0.753	
Residuals_oop	-0.168	0.147	-0.346	
Constant	1.034	1.116	1.698	
athrho; _cons	0.655***	0.528**	0.638*	
lnsigma; _cons	0.721***	0.684***	0.651***	
N	3906	2397	1543	
chi2	325	246	225	
chi2 exog	13.5***	7.77***	6.57*	

Table 2: Estimated instrumental probit models of household vulnerability to health shocks

legend: * p<0.1; ** p<0.05; *** p<0.01 Source: Authors, computed from GLSS5+, 2008

Predictors of vulnerability	OOP constitutes more than 1% of household consumption budget		OOP constitutes more than 5% of household consumption budget		OOP constitutes more than 10% of household consumption budget	
	Marginal effects	Z-score	Marginal effects	Z-score	Marginal effects	Z-score
Number of household members insured under NHIS	-0.036***	-2.620	-0.036**	-2.240	-0.055***	-2.630
Household use dednet	-0.019***	-3.550	-0.021***	-3.460	-0.031***	-3.960
Access to improved drinking water	-0.041**	-1.990	-0.02	-0.850	-0.025	-0.850
Value of remittance to the household	-0.114**	-2.590	-0.131***	-2.480	-0.224***	-2.860
Age of head of household (agehead)	-0.006*	-1.860	-0.010**	-2.230	-0.011*	-1.810
Agehead squared	0.006**	2.060	0.010**	2.560	0.012**	2.190
At least one adult is a member of social network	-0.079	-1.580	-0.076	-1.140	-0.207	-2.220
Number of adults with additional jobs	-0.02	-1.610	-0.023	-1.340	-0.027	-1.170
Male earner only household						
Female earner only household	0.024	0.910	0.036	1.040	0.002	0.040
Dual earner	0.018	0.840	0.035	1.300	0	-0.010
No employed adult member	0.084**	2.500	0.111**	2.540	0.115*	1.880
Social diversity						
Religious diversity	-0.572***	-3.070	-0.509**	-2.200	-0.485	-1.600
Ethnic diversity	-0.161*	-1.710	-0.255**	-1.990	-0.542***	-2.920
Religious diversity with social networking	0.074	0.980	0.024	0.240	0.072	0.540
Ethnic diversity with social networking	0.179*	1.780	0.332**	2.310	0.698***	3.500
Poverty status (ref.: Extreme poor)						
Relative-Poor	-0.136***	-5.460	-0.167***	-5.140	-0.195***	-4.700
Non-poor	-0.130***	-6.530	-0.155***	-6.010	-0.216***	-6.690
MiDA Zone (ref.: Northern Zone)						
Afram Basin	0.201***	3.860	0.180***	3.000	0.228***	2.780
Southern Horticulture Zone	0.267***	6.660	0.261***	5.200	0.286***	4.360
Locality of residence (ref.: urban)						
Rural	0.018	0.410	0.035	0.590	0.042	0.490
Religiously diverse rural locality	-0.114	-1.490	-0.15	-1.450	-0.205	-1.450
Residuals oop	-0.031	-0.260	0.031	0.210	-0.094	-0.370

Table 3: Estimated average marginal effects of the probability of being vulnerable by CHE threshold

Notes: Marginal effect for a dummy variable is a marginal change in the probability of being vulnerable for a discrete change from the base level.

* *p*-value < 0.05 ** *p*-value <0.01 *** *p*-value <0.001 Source: Authors, computed from GLSS5+, 2008