

# Analysis of the Impact of Rural Households Membership in the Micro Health Insurance on the Utilization of Health Services in Tanzania

Arnold Kihale  
Ardhi University  
Dar es Salaam, Tanzania

kihauleas@hotmail.com

**Abstract**—This paper analyses the utilization of health services among the members of micro health insurance schemes in rural areas in Tanzania. Most literature on health insurance in rural areas in developing countries, including Tanzania, had analyzed socio-economic determinants of the households' demand for health insurance plans. Little attention has been given to the outcomes of purchasing the health insurance plans as the determinants of membership in the schemes. This is the research knowledge gap that this study seeks to fill.

In order to examine the effect of households' membership in the micro health insurance schemes, on the utilization of health services, the matching estimator method has been adopted. In addition, the data from Tanzania Demographic and Health Survey of 2011 were used to analyse the outcome of households' membership in the health insurance schemes on the utilization of health services.

The findings revealed that the membership in the micro health insurance plans increased the utilization of the health services among the poor households, but not for the non-poor. Moreover, the insurance schemes did not provide protection against catastrophic health spending among the rural households in the episodes of illness. The reasons are that the households had to incur additional expenditures when visiting the health facilities in episodes of illness and that the plans provide limited range of benefits to households. Thus, it is recommended that poor households should be encouraged to enrol in the micro health insurance schemes. Moreover, the health facilities should provide adequate supplies so as to minimize out of pocket spending for households in the episode of illness.

**Keywords** — micro health insurance, rural households, Tanzania, utilization of health services

## I.INTRODUCTION

This paper analyses the effects of rural households' membership in the micro health insurance plans on the utilization of health service in the episodes of illness in Tanzania. Membership in the micro health insurance plans enables households to utilize health services, and get protection against catastrophic health spending in the episodes of illness.

On the contrast, non-membership in the health insurance schemes leads households to incur a large out of pocket spending for health care services in the episodes of illness, which potentially aggravates poverty especially for the low income and poor households [52] [64]. Specifically, in Tanzania, out of pocket spending is estimated to be 80 percent of the total private spending and 50 percent of total health care expenditure [38]. This is a large proportion of the incomes, especially for the rural households, given that 34 percent of the rural population are categorised as poor [36].

In Tanzania, the National Health Strategic Plan of 2002 aims at attaining 30 percent of its population having the health insurance cover by 2015. However, in the practical sense, only 15 percent of the households have health insurance cover. This is in sharp contrast with the situation in few successful countries such as Rwanda that have enrolled more than 90 percent of citizens in the insurance schemes [50].

Thus, in Tanzania, a large part of the populace have not complied with the WHO -World Assembly resolution of 2005 on the universal coverage aimed at promoting equity in accessing and utilizing health services [62]. The low enrolment in the private micro health insurance schemes, indicates limited success of the implementation of the health sector reforms, which among other things, led to establishment of the Community Health Funds to cater for those in the informal sector in 1997 [29] [58]. In 2003, the government also introduced the National Health Insurance Plan to accommodate the civil servants [35]. During same period, private health insurance firms were allowed.

Non-membership in health insurance schemes limits the households' utilization of health care services. In particular, the findings from the household budget survey of 2007 revealed that a third of Tanzanians who were sick did not seek health services. One of the reasons was unaffordable fees for health services. Most of households who had limited access to health services were those in the rural areas.

The micro health insurance schemes are organised along economic interest groups and religious denominations belonging in developing countries [3] [4] [6] [20]. They are also the means to spread health risk among the members and protect themselves against expenditure shocks in the episodes of illness. The same benefits are expected in the context of Tanzania.

A number of scholars have questioned the envisaged benefits of private micro health insurance schemes to the rural households, since most of the schemes have fixed or limited range of premiums and that the poor cannot afford them [18] [19] [31]. Furthermore, the members of micro health insurance schemes usually incur extra expenses such as transport costs to health facilities and the purchase of prescribed drugs, when sick [34] [50]. Notwithstanding the arguments provided by different scholars, micro health insurance schemes are useful in facilitating access and equity in utilizing the health services among the low income and poor households, particularly in the rural areas. However, only a few households have enrolled in the schemes.

In this regard, this paper sought to examine the outcomes of rural households' membership in micro health insurance plans on the utilization of health care services in the episodes of illness. In most literature on developing countries, including Tanzania, little attention has been given to examining the outcomes of membership in the private health insurance plans on households'

utilization of health services and financial protection against catastrophic health spending in the episode of illness. This is the knowledge gap this study sought to fill.

#### A. **Statement of the problem**

Micro health insurance schemes provide the opportunity to low income households to access and utilize health care services in episodes of illness. They also enable the households to get protection against catastrophic health spending in the episodes of illness. However, in Tanzania low enrolment in the micro health insurance schemes has been observed [36], [37]. This has resulted in a large out of pocket spending for health services among the households, amounting to 80 percent of the total private expenditure, as pointed out before.

Such a spending level is undesirable, especially for the majority of rural households, given that most of whom are poor [39]. Specifically, for the poor households, spending a large proportion of income for health services leads to the reduction of disposable income and capabilities of households to augment human and non-human capital [52]. It also results in the excluding of the poor households in utilizing modern health services when ill [22] [38] [63].

Thus, in Tanzania membership in private micro health insurance schemes provides benefits to not only the households, but also the country as well. For the country, enrolment of a large number of rural households in the insurance schemes shall contribute to the efforts to overcome poverty as per Millennium Development Goals of 2000. It shall also contribute in increasing per capita health spending to US \$ 34, the necessary level of health spending to overcome poverty [38].

Evidences from some developing countries suggest that even the poor rural households are willing and able to purchase private micro health insurance plans, provided appropriate mechanisms are in place [1] [9] [19] [23] [41] [65] [44]. Such schemes have enabled a number of countries to record remarkable achievement as shown by demographic and health indicators. This is what is being expected in Tanzania. Nonetheless, in the country only a few households have purchased micro health insurance plans, leading to the minimal spreading of health risks and limited protection against expenditure shocks, in the episode of illness. Such a situation aggravates poverty in rural areas.

#### B. **Motivation for the study**

In the rural areas, voluntary micro health insurance schemes provide an opportunity to households to have access to health service system,

to insure against health risk and reduce out of pocket spending in the episode sickness. The reduction of poverty as envisaged by the Millennium Development Goals and National Strategy for Growth and Reduction of Poverty depends on among other things, households being able to protect themselves against expenditure shocks [51] [59]. However, despite the envisaged benefits of the micro health insurance schemes, few rural households have enrolled in the schemes.

Thus, the findings from the study will provide an insight into the outcome variables of the membership in the micro insurance schemes and an additional knowledge on the rural household demand for voluntary private health insurance. The findings will also enable policy makers to devise strategies to promote households enrolment in the health insurance schemes.

The specific objectives of the paper are (i) to analyse the utilization of health care services among the rural households who are members of micro health insurance plans, when ill; and (ii) to examine whether the membership in the micro health insurance schemes helps to protect rural households against catastrophic health spending, in the episodes of illness.

This paper is organised as follows: Section one is- introduction, followed by section two on literature review on the demand for health insurance, section three provides a framework of analysis and methodology. Section four focuses on sampling, sources of data and definition of variables. Estimation results and discussion are presented in section five and the last section is a conclusion.

## **II.LITERATURE REVIEW ON THE DEMAND FOR HEALTH INSURANCE AND EMPIRICAL STUDIES**

In literature, micro health insurance fund or micro health insurance schemes are also referred to as either community based health insurance funds or mutual health funds. Such funds are regarded as one of the types of private voluntary health insurance schemes [2][19] [43]. Notwithstanding various terms used, the general consensus among scholars is that community based or micro health insurance funds are specific group organized insurance schemes, characterized by the pooling of revenue, the sharing of health risk and voluntary membership. The voluntary micro health insurance scheme is one of types of private health insurance schemes. Thus, in this paper, micro health insurance is also considered as synonymous to community based health insurance and mutual health funds.

Demand for health insurance refers to the amount of insurance cover an individual is willing to purchase at different prices, that is, premiums [12] [30]. The appropriate amount of health insurance is purchased when the marginal benefit of health insurance is equal to the cost of insurance. The theories of large numbers and that of risk provide the foundation for the understanding of demand for health insurance as well.

Furthermore, as per the law of large numbers, if a segment of population falls sick and choose to pay premium for being sick, it will be possible to charge premium in advance to collect enough premiums that cover health expenditure with a profit margin to the insurance firms [42]. The underlying assumption is that individuals who are health risk averse can afford to pay health insurance premiums and access health care services in the episodes of illness.

The expected utility theory postulates that people purchase health insurance so as to hedge themselves against financial risks due to illness [39]. Individuals purchase health insurance because they are risk averse and that they prefer certain losses over the uncertain ones. Thus, accessibility to health services and protection against health risk, motivate individuals or households to purchase health insurance plans.

Furthermore, the theory of risk highlights that under the condition of rationality and risk aversiveness, the households' decision to purchase insurance plan is made on the basis of expected utility to be gained [7]. The utility gained depends on the expected medical needs of the individuals or households, when sick and the level of financial protections.

The prospect theory suggests that individuals demand health insurance so as to transfer income from the healthy state to the ill state [55]. During the healthy state, medical care is an irrelevant good, while during the episodes of illness; it becomes a substitute to other goods and services. The assumptions of the expected utility and prospects theories of demand for health insurance are that households are risk averse and compare the expected gains from the health insurance plans over the cost of premium before purchasing health insurance plans. Risk averse individuals purchase health insurance for events with the low probability of occurring and can lead to a large expenditure shocks. In such a situation, marginal benefit is higher than marginal costs.

As far as demand for health insurance is concerned, households have two choices. The first

one is to purchase health insurance plans and incur small loss in the form of premium and the other one is to decide to self-insure, that is facing a small possibility of large loss in event that illness or injury will occur, or large possibility that medical loss will not occur [12]. In that respect, the demand for private health insurance is the predictor of enrolment in the insurance plans. It is believed that rural households make assessment of health risks and associated expenses before purchasing health insurance plans. Thus, individuals or households or individuals purchase health insurance to overcome income and expenditure shocks, when sick among other things. They also purchase health insurance in order to overcome disutility of being sick.

Since micro health insurance is one of the types of voluntary private health insurance, the theory of demand for health insurance provides a framework for analysing households decisions to purchase micro health insurance plans as well [1] [2] [20]. The reason is that the theory considers health insurance not only as risk avoidance mechanisms but also the way of ensuring individuals or households' access health services, when ill.

#### **A. Empirical studies on households demand for micro health insurance**

In a number of studies on households demand for micro health insurance plans in developing countries, the focuses have been either on analysing the demand or supply side factors or both [28] [47]. The authors have also used different methods and variables to analyse demand for micro health insurance plans. In addition, a number of authors have examined factors determining low income or rural households enrolment in the micro health insurance schemes [1] [20] [25] [40] [45].

The findings from the above cited studies revealed that households and community characteristics that is, age of the head of household, gender and income were among the factors determining households' decision to purchase health insurance plans in rural areas. Other factors were education level of the household members, household size and religious denomination belonging. The same factors are expected to determine household demand for private micro health insurance plans in rural areas in Tanzania.

Furthermore, the reciprocal relationship in helping each other, among the family members including the extended families, was also found to deter households demand for micro health insurance plans [5][19][20]. A similar finding was

observed by [17] in Indonesia. The reciprocal relationship determines social values of individuals or households which influence the calculation of costs and benefits and the decisions of households to be members in the micro health insurance schemes. The larger the social capital or network, the lower the enrolment in the micro health insurance schemes is expected.

Risk attitude among the households also determine the households' enrolment in the micro health insurance schemes. In developing countries, individuals and households have low attitude towards health risk, which lead a few of them to enrol in the micro health insurance schemes [21]; [42]. In various parts of developing countries, appropriate mechanisms are available, but low income or rural households have joined micro health insurance schemes [23]. This suggests that even the low income households can purchase micro health insurance plans provided that appropriate arrangements are available.

Moreover, a number of scholars have examined the effect of the supply factors, that is, the quality of health services, the availability of health facilities and waiting time on the demand for micro health insurance plans in developing countries [7] [8] [17]. In particular, the benefit packages, the insurance plans provide, the degree of freedom to choose providers and the extent of compensation given, are the supply factors that also determine households' decisions to purchase micro health insurance plans or not to [48]. Such factors are also expected to determine the households' probability to enrol in the micro-health insurance schemes in Tanzania.

Reference [50] and [52] examined the outcome of households' enrolment in micro health insurance schemes in developing countries. Among the outcomes considered were the households' utilization of health services in the episodes of illness and protection against catastrophic health spending. [50] also examined the use of health services among the poor and non-poor households, who were members and non-members of the insurance schemes in order to ascertain whether they had different utilization pattern of health services, when ill. The author also examined the protection against catastrophic health spending between the two groups. In particular, the studies of [50] and [52] have focused on the issues of equity, access and inclusion of the poor in utilizing health care services, when sick. The issues are also worth exploring in the context of Tanzania since a small proportion has purchased health insurance plans.

In sum, the review of literature on empirical studies on demand for micro health insurance plans in developing countries reveals that studies have focused on either examining socio economic or supply factors or both as determinants of household membership in the schemes [1] [7] [20] [23]. Few studies had analysed the effects of rural households' membership in the micro health insurance plans on the utilization of health services and protection against catastrophic health spending, when ill.

### **B. Methodological issues**

Experimental, cross sectional studies and case study approaches have been used to examine the determinants of demand for micro health insurance plans in developing countries [7] [17] [23] [25] [40] [45] [50]. The approaches have a number of advantages and shortcomings as well.

Although, cross section methods together with econometrics tools are among the methods used to analyse the demand for micro health insurance plans in a number of studies in developing countries, one of their shortcomings is the selection bias in the process of collecting data [1] [25] [40]. The problem can be addressed by using instrumental variables and matching estimator method [15] [17] [54] [51].

In particular, econometric methods such as the probit or binary logit models have been used to estimate the demand for micro health insurance plan [1] [7] [14] [25] [40] [50]. Among the problems encountered in the estimations is the inability of the models to address the problem of endogeneity of the variables as well as selection bias [15]. In addition, in regression analysis, both dependent and independent variables are discrete. Thus, the estimation process tends to be complicated and leads to implausible results.

In order to overcome the problems highlighted above, matching estimator method has been used to analyse the outcomes of membership in the micro health insurance plans. The method enables the estimation of households' utilization of health care services and protection against catastrophic health spending, when ill [17] [50]. It has also been used to examine the differences in the utilization of health care services among the members of micro health insurance and non-members. Thus, this paper uses the same method since it is expected to provide plausible results.

### **C. Empirical studies on demand for micro insurance plans in Tanzania**

A number of scholars have analysed the government supported community based health

insurance schemes and those which are privately managed in Tanzania [10] [13] [21] [23] [31] [32]. Scholars have also examined the impact of the micro health insurance schemes on the accessibility to health care services and on households' consumption [27] [33].

Reference [23] examined whether group or individual premiums were better alternatives for making private micro health insurance plans affordable to households in the informal sector. The author found that premiums payment modes had an impact on households' decisions to purchase insurance plans and the continuity of the households' membership in the schemes. A similar finding was observed by [32].

Reference [33] also observed that rural households' decisions to join government supported community health funds was determined by whether they were going to save, when ill. This also suggests that financial protection against catastrophic health spending determines households' memberships in the micro health insurance schemes.

Furthermore, in studies on Tanzania, different research methodologies have been used to examine government supported community health funds or micro health insurance schemes [23] [24] [26] [27] [33]. The authors either used case or cross sectional studies approaches or experimental methods.

In addition, the studies on Tanzania have used primary data to examine various issues concerning micro health insurance schemes. Among other things, the studies have analysed the socio economic determinant of rural households' membership in the micro health insurance schemes.

In contrast to previous studies on private micro health insurance schemes in Tanzania, this paper uses data from Tanzania Demographic and Health Survey conducted in 2010 and published in 2011 [37]. In addition, the matching estimator method is adopted to examine whether membership in the private micro health insurance scheme has impact on the households demand on the utilization of health care services and protection of members against health related expenditure shocks, in the episodes of illness.

### **III. FRAMEWORK OF ANALYSIS AND METHODOLOGY**

The theory of demand for health insurance provides the framework for analysing households' membership in the health insurance scheme. It is assumed that individuals or households seeking

health services behave in economic and rational manner. In that respect, membership in the health insurance scheme, facilitate individuals or households to access health services and get protection against catastrophic health spending, when sick.

In particular, the households' membership in the health insurance schemes increase effective demand on health services. One of the outcomes is an increase in the utilization of health services in episodes illness. In this regard households who are members of health insurance are expected to visit health services facilities, whenever they are ill.

In order to ascertain the outcomes of membership in micro health insurance scheme, two groups are identified, that is, members and non-members. The groups are also categorised as "treated" and "control" conditional on observable covariates, that is, common characteristics of households [17] [50] [54]. The households' characteristics are also used to match the treated and control group households.

The dichotomy allows the estimation of the statistics for the purpose of evaluating the impact of membership of micro health insurance scheme on the utilization of health care services and protection against catastrophic expenditure shocks, when sick. It also allows the comparison of the utilization of health services among the members and non-members.

In particular, in this paper, the average treatment effects of the treated (ATT) are estimated. This is done to measures the impact of the micro health insurance schemes on the utilization of health services among the randomly selected individuals or households within the treated group. This refers to the member of health insurance schemes.

As pointed out before, the use of matching estimator method to evaluate the impact of the micro health insurance plans requires the information on whether individuals or households are treated or not. The differentiation between the treated and control groups is done by using dummy ("d") variable on the realised outcome (yi), due to the treatment, Thus, (xi) is used to represent the set of exogenous covariates used as control variables [50]. The formal matching estimator is expressed as equation (1) below:

$$y_i = y_i(d_i) = y_iC \quad y_i; \text{if } d_i=0; y_iC \text{ if } d_i=1 \quad (1)$$

where

-yi is the potential outcome for unit "I" with treatment if di= 1 or no treatment if di = 0

- xi = k x 1; coefficients of covariates for the members and non-members of the private micro insurance schemes.

#### A. Matching estimator

Before performing estimations, the assumptions guiding the use of matching estimator method need to be tested. It is necessary to ascertain the matching of members and non-members by using close similarity of characteristics of the households [16]. The matching is done using proxies for the utilization of health service facilities, including households and community characteristics.

The matching estimator method is used after confirming that two assumptions hold [50] [16]. They are as follows:

- (i) Adequate information on the subject under the study is available, and thus there are no unobserved factors that are simultaneously correlated with the outcome and the decisions to participate in the treatment
- (ii) There is a positive probability of participation in the programme at all values of the covariate (xi).

The testing of the validity of the assumption was done before proceeding with the estimations of the average treatment effects of the treated.

#### B. Propensity score estimator

As pointed out before, it is necessary to ascertain the matching of member of micro health insurance schemes and non-members using close similarity of households. The matching is done using proxies for the utilization of health service facilities, as well as households and community characteristics. Given the high dimension covariates, an attempt was made to remove biasness [16] [46]. This was done by adjusting the covariates into a scalar function. Thereafter matching estimation was done.

#### C. Matching

In determining the matching, between the two groups for each treated (yi) the corresponding members in the untreated groups (y0) respectively were determined, in order to find out the effects of membership in the insurance schemes on the utilization of health services and protection against catastrophic health spending (Heckman, 1979). In that regard, for each treated individual or household a corresponding respective untreated unit is found. In that process, the equation (1) is

specified as follows:

$$\hat{Y}(1) = \begin{cases} y_i & \text{if } w_i = 1 \\ y_j & \text{if } w_i = 0 \end{cases} \dots(2)$$

$$\hat{Y}(0) = \begin{cases} y_i & \text{if } w_i = 0 \\ y_j & \text{if } w_i = 1 \end{cases} \dots\dots\dots$$

(3)

Where

-  $\hat{Y}$  is the estimated outcome of being a member or not

- " $w_i$ " is the binary treatment with

$w_i = 0$  if no treatment,  $w_i = 1$  if there is treatment

Then, the simple matching estimator is estimated using equation (1):

In particular, after getting the units with the nearest matches, estimation was done for the modified matching estimators as shown in equation (4).

Matching is efficient only when the nearest matches are infinite. In this respect, there was a need to correct for unbiasedness. Thus, the matching that is corrected for biasness was estimate by using equation (4).

Taking into account the modified matching, the unbiased estimator was estimated using equation (4).

$$rbcm = \frac{1}{N} \sum_{i=1}^n y_i(1) - y_i(0) \dots\dots(4)$$

This was done in order to estimate for "average treatment effect for the treated (ATT)". The estimations of equation (4) and the corresponding results are presented in Section 5.

**IV. SAMPLE SIZE AND DATA**

In order to estimate the equation as provided in section III and realize the objectives of the paper, it was necessary to determine the optimal sample size of data for households, who are members of the micro health insurance schemes and non-members. Equally, it was important to determine

and define the variables used in this paper. The details are provided in this Section.

**A. Determination of the sample size**

The data used in this study were obtained from Tanzania Demographic and Health Survey conducted by National Bureau of Statistics in Tanzania, from December, 2009 to May 2010 [36]. The survey covered 475 clusters and 10,300 households [37]. The study included the men and women aged between and 15-49 only. While all women in the selected sample were interviewed, only one third of the men were included in the survey exercise. In addition, women had more questions to answer than men in the questionnaires administered.

The objective of the survey was to collect data of households in the country, including their status on membership in micro insurance schemes. During the survey, data on the households' utilization of health care services, in the episodes of illness, were also collected. Other data collected were those on households' demographics and community characteristics. [37]. In order to get data for this study, the households were divided into two groups, that is, one group for members of the micro health insurance schemes and the other one for non-members.

In addition, the households were categorised into different income groups, that is, those who are poor and non-poor. Thus, given the total population of 6,266 rural households, the optimal sample size for the research was 362 households. This included 127 who were members of the micro health insurance schemes and 235 non-members. Both members and non-members were obtained through random sampling. However, one of the limitations for using household budget survey data is the presence of indefinite factors that may limit the findings of the study [15] [19] [50]. This study is of no exception.

**A. Sources of data and definitions of variables**

As previously pointed out, this study used data from Tanzania Demographic and Health Survey conducted by the National Bureau of Statistics [37]. The report also provided data for various variables used in this study. The dependant variables of interests were the membership in the micro health insurance schemes and the non-membership. It is deemed that membership in the micro health insurance scheme is influenced by the demand for health services, in the episode of illness. Thus, the dummy variable was used to capture the respective households who sought health service in the episode of illness and those who did not. Additional dummy variable was

provided to capture the utilization of the health services for poor and non-poor and members and non-members respectively. Similar approach was used by [50].

Another factor that is associated with the membership in the micro health insurance schemes is the protection of households against catastrophic health spending, in the episodes of illness. In this study, the dummy variables were used to capture the households that experienced catastrophic health spending and those whose health spending was not a burden. The variable was expected to be positively related to the membership in the schemes.

In addition to the above mentioned variables, other variables on the households and community characteristics were introduced and were used in the estimation of equation (4). The variables included age and gender of the head of the household, occupation dummies, household size, the highest education level attained by the head of household, and consumption for different income groups. Additional variables included those for illness and disability conditions.

**V. ESTIMATION RESULTS**

This Section provides results for testing the assumptions on the un-confoundedness, overlap and propensity score, which must hold before further estimations and analysis are done. It also provides details on the estimation of the average treatment effects of the treated

**A. Testing of the assumptions of unconfoundedness and propensity score results**

The testing of the assumption on unconfoundedness was done for the average treatment effect for the treated ATT. Table I presents results for testing assumption of unconfoundedness. The results revealed that the assumption was holding for ATT.

**TABLE I. RESULTS FOR THE TEST OF UNCONFOUNDEDNESS**

statistic	coefficient	p-value
ATT	0.0074505 (0.0242342)	0.003

The results for propensity score revealed that the dimension of conditioning was reduced to one. This suggests that biasness was removed by conditioning on a scalar function of covariates.

**B. Matching estimator**

In order to realize the two objectives of the study, the average treated effect for the treated (ATT) was used in the matching estimator estimations for various sub-groups of households. Table II provides the results on the estimations.

**C. Average treated effect for the treated (ATT)**

Table II provides the results from the matching estimator estimations on the effects of membership on the micro health insurance plans among the insured, in respect to the utilization of the health service facilities and protection against catastrophic health spending, in the episode of illness. The estimation results revealed that the coefficient for utilization of health services in the episodes of illness among the poor was significant and positive. The results imply that the utilization of the health service facilities among the poor households who were members of health insurance plans increased by 9 percentage points.

It also implies that the micro health insurance schemes reduced financial barrier to modern health service utilization among the poor households, in the episodes of illness. The finding is similar to that of [11] [20] [49] [52] who observed that the utilization of health care facilities among the poor households in the rural areas increased, once they enrol in the micro health insurance plans. In addition, the authors observed that poor members of health insurance schemes utilized modern health facilities more frequently in the episodes of illness compared to non-members.

Table II further reveals that the utilization of health services among the non-poor households, in the episodes of illness, decreased by 6 percentage points for members of micro health insurance schemes. The probable reasons for the finding could be the narrow range of services the micro health insurance schemes provide to members. In that respect, households had to pay for the services that are not included in the insurance plans. This may have prompted some of the households either not to enrol in the micro health insurance schemes or if they are members, not to use their health insurance cover for treatment, in the episodes of illness.

Table II also shows that the estimated coefficients in regard to the protection for catastrophic health spending for all sub groups were negative and insignificant. This suggests that all sub groups of the households did not realise protection against catastrophic health spending,



when ill. The reasons are that the members of health insurance need to pay for health services or bribe health workers to get services. They also incur other expenses such as travelling to health facilities or paying for meal when sick and admitted.

**TABLE II: ATT OF MICRO HEALTH INSURANCE AMONG THE TREATED: SIMPLE MATCHING ESTIMATOR**

outcome variables	coefficient	p-value
utilization of health services by households that reported to be sick	-0.00833427 (-0.0230086)	0.717
utilization of health services by poor households that reported to be sick	0.0944882 (0.0136382)	0.000
utilization of health services by non-poor households that to be reported sick	-0.0661417 (-0.0265809)	0.013
out of pocket catastrophic health expenditure by all households	-0.072028 (-0.1134192)	0.525
out of pocket catastrophic health expenditure by poor households	-0.0246344 (-0.0998661)	0.805
out of pocket catastrophic health expenditure by non-poor households	-0.072028 (-0.1134192)	0.64

## VI. CONCLUSION AND RECOMMENDATIONS

This paper has analysed the outcomes of rural households' membership in the micro health insurance plans on the utilization of health services in Tanzania. Data from Tanzania Demographic and Health Survey of 2011 were used to examine the outcomes of memberships in the micro health insurance plans. The matching estimator methods were adopted to analyse households' utilization of health services and protection against catastrophic health spending in the episodes of illness.

Specifically, in this study, the matching estimator' estimates for ATT were used to examine the utilization of health services among the insured. The estimations of coefficients among the insured group, that is ATT, showed that households who are members of micro health

insurance reduced utilization of health services when ill. On the contrary, the poor households who were sick increased the utilization of health care services.

ATT estimations were also used to ascertain whether membership in the micro health insurance provided rural households with protection against catastrophic health spending in the episodes of illness. The results revealed that all estimated coefficients were insignificant. This suggests that for all groups of households, membership in the micro health insurance schemes did not provide them with the protection against catastrophic health spending in the episodes of illness. The reason is that, in a number of occasions, the households were required to buy drugs and other medical supplies and incur transport and meal expenses when visiting health services, in the episodes of illness.

Following from the above findings, it is recommended that: firstly, the policy makers and the government in particular should promote the enrolment of the poor households in the micro health insurance schemes. Their enrolment in the schemes results in the increased utilization of health services with an ultimate outcome of reducing poverty and augment human capital. It will also contribute towards poverty reduction as per the Millennium Development Goals in poverty reduction.

Secondly, the government and other owners of the modern health facilities should provide adequate medical supplies in order to minimize out of pocket spending for rural households in the episode of illness. This will also motivate non-members households to enrol in the micro health insurance schemes.

One thing worth noting is the limitation of this study. The major limitation of the study was a constraint which was experienced in getting the quality data. The data used were for the households aged 15-49 and that the women provided more information on health status compared to men. Thus, groups of people who are expected to widely use health services were excluded.

Given the limitation of the data used in this study, further research on the utilization of the health services and protection against catastrophic health spending need to be done using a set of comprehensive primary data. Another area of research could be analysing urban households' willingness to purchase health insurance plan and utilization of health services in Tanzania.

## REFERENCES

- [1]. Ahuja, R. and Jütting, J. (2001), "Are Poor, too Poor to Demand Health Insurance, Journa", 1 Vol.6 No.1, pp 1-20.
- [2]. Al-Khatib, H. (2007), "Can private Health Insurance Improve Health Care in Syria", MPH programme Department of Public Health, Indian University School of Medicine.
- [3]. Amergien Wilms (2006), "The Financial Impact of the Formal Health Insurance Schemes", Evidence from Uganda, Virje Universitiet, unpublished paper.
- [4]. A  
mpsonah E. N. (2009), "Demand for Health Insurance among Women in Ghana: Cross Section: Evidence", International Journal of Finance and Economics Issues Vol. 33, pp171-191.
- [5]. Basaza, R. Criel, B. van der Stuyt, P. (2007), "Low Involvement in Ugandan Community Health Insurance Schemes. Underlying Causes and Policy Implications"; BMC Health Services Research, July Vol. 7, pp 7-105.
- [6]. Bennett, S. (2004), "The role of Community Based Health Insurance within the Health Care Financing System: A Framework of Analysis", Health Policy and Planning, Vol. 19; Issue 3, pp 147-158.
- [7]. Bhat, R. and Jain, N. (2006), "Factors Affecting the Demand for Insurance in a Micro Health Insurance Scheme" W.P. No.2006 – 07 Indian Institute of Management Ahmedabad 38015 India, pp 1-29.
- [8]. Bitran, R. and Yip, W. (1998), "Review of Health Care Providers Payment Reforms in Selected Countries in Asia and Latin America", Partners in Health Reforms, Abt. Associates Inc, Montgomery.
- [9]. Cook B & Dzator J.A (2007), "Lessons and Options for Universal Health Insurance Coverage with Special Reference to Priority Policies on Health Care", The Case of Australia, Ghana and Social Policy in Globalization World, Developing a North – South Dilemma, Florence, Italy.
- [10]. Culter, D.M. and Zuckerhaus, R.J. (2000), "The Anatomy of Health Insurance in Handbook of Health Economics", Vol. 1 Edited by A.J. and Newhouse, Elsevier.
- [11]. Ekmon, B. (2004), "Community Based Health Insurance in low Income Countries: A systematic review of evidence", Health Policy and Planning, Vol. 19, Issue 5 pp 249-270.
- [12]. Feldstein, P.J. (1988), "Health Care Economics 3rd Edition; John Wiley & Sons. New York
- [13]. Frech III, H. E. and Hopkins, S. (2002)", "Why Subsidise Private Health Insurance", A Paper Presented at the Private Health Insurance Workshop, ANU July.
- [14]. Gujarati, D. N. (2002), "Basic Econometrics" , McGraw Hill College,
- [15]. Heckmann, J.K (1979), "Sample Selection Bias as a Specification Error;" *Econometrica*, Vol. 47 No.1, pp 153-161.
- [16]. Imbens, G. (2007), "Implementing Matching Estimator for Average Treatment Effects in STATA", Havard University, West Coast Stata Users group meeting, Los Angeles, 26th October, 2007.
- [17]. Johar, M. (2007), "The Impact of the Indonesian Health Card Program: A Matching Estimator Approach", School of Economics Discussion Paper, School of Economics University of New South Wales.
- [18]. Jowett, M. and Ensor, T. (2000), "Financing Health Services, in Witter, S., Ensor, T. Jowett, M. Thomson, R. (ed), Health Economics for Developing Countries: A Practical Guide Macmillan, The University of York, Oxford.
- [19]. Jütting, J. (2001), "The Impact of Health Insurance on Access to Health Care and Financial Protection in Rural Developing Countries: Example of Senegal", HNP Discussion Paper.
- [20]. Jütting, J. (2003), "Health Insurance for the Poor? Determinants of Participants in the Community Based Health Insurance Schemes in Rural Senegal" Dev/DIC 2003 (0.2).
- [21]. Kamuzora, P. and Gilson, L. (2007), "Factors Influencing the Implementation of the Community Based Health Insurance", Health Policy and Planning Vol. 22, pp 130 – 150.
- [22]. Kida, T (2012), "Provision and Access to Health Care Services in  
Urban Health Care Market in Tanzania, ESRF, Discussion paper, No. 42.
- [23]. Kiwara, A. D. (2007), "Group Premium in Micro Health Insurance Experience from Tanzania", East Africa Journal of Public Health" vol. 4, No. 1; pp 28-32
- [24]. Kiwara, A. D. and Heijis, F. (2001), "Health Insurance for Informal Sector Workers" Feasibility Study on Arusha and Mbeya Tanzania, Unpublished paper.
- [25]. Kouadio, A. Monsan, V. and Gbongue, M. (2008), "Social Welfare and Demand for Health Care in Urban Areas of Cote d'Ivoire", AERC Research Paper 181, Nairobi, Kenya.
- [26]. Kumar, R. (1999), "Research Methodology", Sage Publications, London.
- [27]. Makoka, D. Kaluma, B. and Kambebwa P. (2007), "Demand for Private Health Insurance in Malawi, University of Malawi", Chancellors College, Economic Department ; Working Paper NO. 2007/02.
- [28]. McIntyre, D. Garrishong, B. Mtei, G. Maheus, F. Thiede, M. Akazali, J. Ally, M. Akusi M. Goudge J. 2008, "Beyond Fragmentation and Towards Universal Coverage": Insight from Ghana, South Africa and Tanzania, (Unpublished paper).
- [29]. Minja, G., Mramba, A.B. Tiba, M. Stomer, M. (2008), "Strengthening the Claiming,

- Reimbursement and Use of National Health Insurance Funds”, (Unpublished Report).
- [30].Mladovsky, P. and Mossialos E. (2006), “A Framework for Community Based Health Insurance in Low Income Countries, Social Capital and Economic Development”, London School of Economics, Health Working Paper.
- [31].Mushi, D. (2004a), “Is Community Health Fund better than User Fee in Public Health Financing? Brief Formative Research on Local Government in Tanzania”, CMI NRBI and REPOA, Publication Series.
- [32].Mushi, D. (2004b), “Are Fees the major Barriers to Assessing Public Health Care?”, Brief Formative Research on Local Government in Tanzania, CMI NRBI and REPOA, Publication Series.
- [33].Mushi, D. (2007), “Financing Public Health Care: Insurance, User Fees or Taxes? Welfare comparison in Tanzania”, Research on Poverty Alleviation, Research Paper 07.2.
- [34].Mwananchi Communication Limited (2012), “Wananchi wagoma kujiunga na CHF, Mwananchi”, 19.1.2012.
- [35].National Health Insurance Fund (2003), “Health Care Financing in Tanzania”, FACT Sheet No.2.
- [36].NBS (2009), Tanzania Household Budget Survey Report.
- [37].NBS (2011), Tanzania Demographic and Health Survey.
- [38].NBS and Macro International Inc. (2007), “Service Provision Assessment Survey 2006”, Calverton, Maryland, USA.
- [39].Neuman, J and Morgenstedn, O. (1994), “Theory of Game and Economic Behaviour”, Princeton University Press
- [40].Osei-Akoto, I. (2001), “Demand for Voluntary Health Insurance by the Poor in Developing Countries”, Evidence for rural Ghana: Centre for Development Research University of Bonn Germany.
- [41].Pariyo, G. W, Ekirapa-Kiracho, E, Okui, O, Rahman, M, H, Peterson, S, Bishai, D. M, Lucas, H, and Peters, D. H. (2009), “Changes in the Utilization of Health Services among the poor and rural residents in Uganda”, are the reforms benefiting the poor? International Journal for Equity in Health, 8:39.
- [42].Pauly, M. V., P. Zweifel, R. M. Scheffler, A. S. Preker, and M. Basset (2004), “Private health insurance in developing countries,” Health Affairs, 25, No. 2, pp. 369-79.
- [43].Preker, A.S. (2004), “Voluntary Health Insurance in developing countries”, Review of Role in Africa and other Selected Developing Countries Experience.
- [44].Priyanka, S. Xu, K. Elovainio, R. and Perrot, J. (2010), “Health Service Utilization and Out of Pocket Expenditure at Public and Private Facilities in low Income Countries”, World Health Report, Background paper, 20.
- [45].Ranson, M. K. Sinha, T. Chartejee, M. Gadhi, F. Jayswal, R. Patel, F. Morris, S. Mills (2007), “Equitable Utilization of the Indian Community Based Health Insurance among its Rural Membership”, <http://www.bmj.com/cgi/contact/full> 25.5.2008.
- [46].Rosenbaum, R.P. and D.B Robin (1983), “The Central Role of the Propensity Score in Observational Studies for Causal Effects”, *Biometrika* Vol. 70 No. 1 pp 41-55.
- [47].Rosner, J. (2012), “Micro Health Insurance in Different Setting in Handbook of Micro Health Insurance in Africa” (eds) Rosner, J., Lippert, G. Digen, P. and Ouedraogo, L. (2012), Lit Verlag GmbH.
- [48].Sanhueza, R. and Ruiz-Tagle J. (2002), “Choosing Health Insurance in a Dual Health Care System: The Chilean Case”, Unpublished paper.
- [49].Schneider, P. and Hansen, K. (2007), “The Impact of Micro Health Insurance on Rwandan Health Centre Costs”. *Health Policy and Planning* Vol. 22 No.1, pp 40-45.
- [50].Shimeles, A. (2010), “Community Based Health Insurance Schemes in Africa”, The Case of Rwanda, Working Papers in Economics, No. 463.
- [51].Smith, R. J. and Blundel R.W (1986), “An Exogeneity test for a simultaneous equation tobit model with application to labour supply”, *Econometrica* Vol. 45 No.3 pp 679-685.
- [52].Spaan, E. Mathijssen, J. Tromp. N, McBain, F., Ten Have, A. & Baltussen, R. (2012), *Bulletin of the World Health Organization* Vol. 90 pp 685-692.
- [53].The Guardian (2013), “Huduma za bima ya Afya zalalamikiwa Muhimbili”, Nipashe 20.1.2013.
- [54].Todd, P. E (2006), “Matching Estimators”, unpublished paper
- [55].Tresrsky, A. and Kahneman, D. (1986), “Rationale Choice and the Framing Decision; *Journal of Business*”, Vol. 59; pp 252-78.
- [56].United Republic of Tanzania (URT), 1990, “National Health Policy”, Government Printers
- [57].URT (2000), Millenium Development Goals
- [58].URT (2001a), “The Community Health Insurance Act 2001”, Act Supplement; Government Printer, Dar Es Salaam.
- [59].URT (2001b), “The Community Health Fund Act 2001”, Act Supplement
- [60].URT (2009), Tanzania Health Strategic Plan 2009-2015.

- [61].URT (2010), "National Strategy for Growth and Reduction of Poverty", Ministry of Finance and Economic Affairs.
- [62].WHO (2005) Sustainable health financing, universal coverage and social health insurance; Resolution and Decision 139 WHA58.33;The Fifty-eighth World Health Assembly,
- [63].WHO (2006), "Human Development Report of Tanzania 2007/2008", Country Facts Sheet, <http://hdrstat.undp.org/countries/countryfactsheet/fsTZ> 12.05.2008.
- [64].Xu, K., Evans, D. Kawabata, B. (2003), "Household Catastrophic Health Expenditure", Multi country Analysis, Lancet 362 pp 111-117.
- [65].Zweifel. P. and Breyer, F. H. (1997), "Health Economics", Oxford University Press, First Edition

Arnold Kihale, is a lecturer of economics at the Ardhi University, Dar es Salaam, Tanzania. He holds BA (economics) and MA (economics) from University of Dar es Salaam, Tanzania, Lic.rer. reg. (regional planning) Technical University of Karlsruhe, Germany; PhD (economics and finance) Curtin University of Technology, Perth, Australia. His areas of research interest are health economics and financial economics. The other papers of the author are "The Impact of Economic Policy Shocks on the Outcome of Fiscal Adjustment Policies in Tanzania" a paper published in the Journal of Building and Lands Development – Special Issue, September, 2013, pp 131- 152, ISSN: 0856-0501

"The Outcomes of Rural Households Purchase of Micro-Health Insurance Plans in Tanzania" - a paper published in the proceeding of the 2<sup>nd</sup> Global Health Care Conference held in Singapore from 7<sup>th</sup> to 9<sup>th</sup> July 2013, ISSN: 2251-3833.

Dr Kihale is member of Australian Health Economics Association and International Health Economics Association.