



Do Community-based Health Insurance Schemes Improve Poor People's Access to Health Care? Evidence From Rural Senegal

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Summary. — Community-based health insurance is an emerging and promising concept, which addresses health care challenges faced in particular by the rural poor. The aim of this paper is to analyse whether rural Senegal members of a health insurance scheme are actually better-off than nonmembers. The results show that in poor environments, insurance programs can work: Members of *les mutuelles de santé* (mutual health organizations) have a higher probability of using hospitalization services than nonmembers and pay substantially less when they need care. Furthermore, the analysis revealed that while the schemes achieved to attract poor people, the poorest of the poor remained excluded.

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1. INTRODUCTION

Health security is increasingly being recognized as integral to any poverty reduction strategy. While the objective of poverty reduction remains of central concern, there has been a shift of focus away from poverty reduction *per se* to social risk management. Such is the case because of the growing appreciation of the role that risk plays in the lives of the poor (Holzmann & Jorgensen, 2000). Of all the risks facing poor households, health risks probably pose the greatest threat to their lives and livelihoods. A health shock leads to direct expenditures for medicine, transport and treatment but also to indirect costs related to a reduction in labor supply and productivity (Asfaw, 2003). Given the strong link between health and income at low income levels, a health shock usually affects the poor the most (CMH, 2001; Morrisson, 2002).

The states in most developing countries have not been able to fulfill health care needs of their poor population. Shrinking budgetary support for health care services, inefficiency in public health provision, an unacceptable low quality of public health services, and the resultant imposition of user charges are reflective of the state's inability to meet health care needs of the poor (World Bank, 1993).¹ In the last decade,

the "health care crisis" led to the emergence of many community-based health insurance schemes (CBHI) in different regions of developing countries, particularly in sub-Saharan Africa (Preker, 2004; Wiesmann & Jütting, 2001). The decentralization process unleashed in these countries to empower lower layers of government and the local community further fueled their emergence (Atim, 1998; Musau, 1999). The success of community-based micro-credit schemes may have also contributed to the emergence of community-based health initiatives designed to improve the access through risk and resource sharing (Dror & Jacquier, 1999). Elsewhere, particularly in regions of Asia and Latin America, community-based health initiatives have come about independently and

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as part of income protection measures or to fill the void created by missing institutions.²

Neither the state nor the market is effective in providing health insurance to low-income people in rural and informal sectors. The formal providers are often at an informational disadvantage and face high transaction costs. On both these counts health insurance schemes rooted in local organizations potentially score better than alternate health insurance arrangements.³ In rural and informal sectors where supply of health services is expected to be weak, both financing and provision aspects need to be tackled simultaneously.⁴ Indeed, most of the CBHI schemes have either been initiated by the health providers i.e., missionary hospitals, or tend to be set around the providers themselves (Atim, 1998; Musau, 1999). Thus, the potential benefit of these schemes is seen not just in terms of mobilization of resources but also in the improvement and organization of health care services.

Whereas the CBHI concept is theoretically appealing, its merits still have to be proven in practice. In the literature, this question is controversially debated: Proponents argue that CBHI schemes are a potential instrument of protection from the impoverishing effects of health expenditures for low-income populations. It is argued that CBHI schemes are effective in reaching a large number of poor people who would otherwise have no financial protection against the cost of illness (Dror & Jacquier, 1999). Other available studies however, are less optimistic. Community structures may not necessarily reflect the views of the wider population, critical decisions may not take into account the interest of the poorest, and they may be excluded from decision-making (Gilson *et al.*, 2000). It is furthermore argued that the risk pool is often too small, that adverse selection problems arise, that the schemes are heavily dependent on subsidies, that financial and managerial difficulties arise, and that the overall sustainability seems not to be assured (Atim, 1998; Bennett, Creese, & Monash, 1998; Criel, 1998).

The existing studies on CBHI schemes face the important limitation that most of them are not based on household data and/or rely solely on qualitative methods of investigation. In addition, they mainly look at the impact of the schemes on the provider or the insurance scheme, largely neglecting the effects on the members.

Against this background, the objective of this paper is to analyze the impact of community

financing on the access to health care using data from a household survey in rural Senegal. We chose the case of Thiès region in Senegal for the following reasons:

- a relatively long, 10-year experience with community-based health insurance schemes,
- the Thiès area is characterized by a high incidence of poverty, malnutrition and bad health conditions, while the health care supply is tailored only to a small percentage of the population,
- an innovative institutional setting. There exists a contract between a nonprofit health care provider, a Catholic-run hospital, and the mutuals, which allows them to receive health care at a lower rate.

To answer our question we use a logit/log-linear model to analyze the impact of membership on health care utilization and financial protection.

The outline of the paper is as follows: Section 2 elaborates the conceptual framework of the study and highlights the dynamic interactions between the supply and demand effects after the introduction of a health insurance scheme. Section 3 describes the case study, research design and methodology. The results of the estimations are discussed in Section 4. Section 5 concludes the paper.

2. SUPPLY AND DEMAND EFFECTS OF HEALTH INSURANCE

Health insurance schemes are supposed to reduce unforeseeable or unaffordable health care costs through calculable and regularly paid premiums. In contrast to the history of social health insurance in most developed countries, where health insurance schemes were first introduced for formal sector employees in urban areas, recently emerging health insurance schemes have taken the form of local initiatives of a rather small size that are often community-based with voluntary membership.⁵ They have either been initiated by health facilities, member-based organizations, local communities or cooperatives and can be owned and run by any of these organizations (Atim, 1998; Criel, 1998). There are several possible ways to classify these schemes, according to: Kind of benefits provided, degree of risk pooling, circumstances of their creation, fund ownership and management and the distinction whether the schemes focus on coverage for high-cost, lowfrequency events or on low-cost, high-fre-

quency events. Similar characteristics of these schemes are:

- voluntary membership,
- nonprofit character,
- pre-payment of contribution into a fund and entitlement to specified benefits,
- important role of the community in the design and running of the scheme,
- institutional relationship to one or several health care providers.

Figure 1 highlights in a stylized fashion the dynamic interactions between the supply and demand for health insurance and health care.

Assume that a health insurance scheme has been set up and that some people are willing to test the new financing option and demand health insurance, that is, they decide to pay the premium and become members for one year. A certain proportion of the insured will fall ill during that time and need care at the hospital or health post. Financial barriers to access are removed for them by the insurance. In spite of a possible lack of cash income at the time of illness, and despite user fees being relatively high with respect to their income, the insured can readily get treatment at the health facility. This stylized scenario could lead to three effects (Wiesmann & Jütting, 2001):

(a) *Effect on members*

First of all, insured members no longer have to search for credit or sell assets. They also

recover more quickly from their illness since there are no delays in seeking care. Considering the fact that people in rural areas rely mainly on their labor productivity and on assets such as livestock for income generation, a serious decline of income can be prevented as productive assets are protected and people can return to work sooner. Income is stabilized and may even—counting the sum throughout the year—be increased. Consumption will be more stable and probably even higher, thereby positively affecting the health of all household members. Both increased consumption and better health contribute to overall income. In the mid- to long-term, the positive experience of some households or community members with health insurance in terms of immediate access to care and benefits for their health may create trust in the new institution. It also encourages people to prolong their membership and convince others to join the scheme. Therefore, the demand for health insurance increases, as shown in Figure 1 by the dotted feedback line.⁶

(b) *Effect on provider(s)*

Given the fact that people may be willing to spend more money on securing access to health care than they can actually pay as user fees at the time of illness and that the healthy carry the financial burden of illness together with the sick via the insurance scheme, additional resources

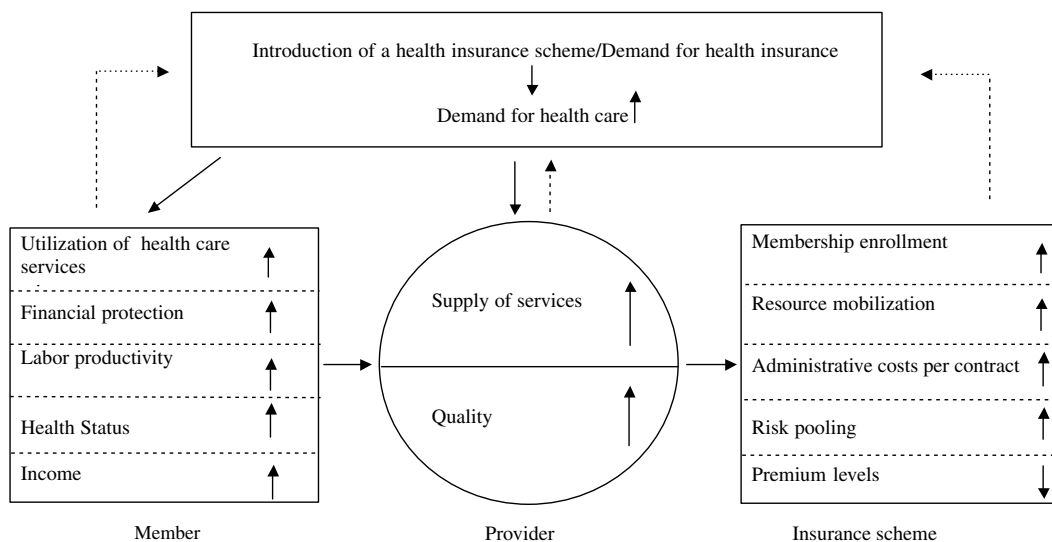


Figure 1. Demand and supply effects after the introduction of a health insurance scheme. Source: Based on Wiesmann and Jütting (2001).

may be mobilized for health care provision. Utilization of health facilities will probably increase, a desirable effect if one considers currently prevailing underutilization in developing countries (Müller, Cham, Jaffar, & Greenwood, 1996). A part of these resources could then be used up to expand access. Under the assumption that there is net revenue generation in spite of higher utilization rates, the hospitals or health facilities will utilize the financial means to improve the quality of care—for example, by increasing drug availability and purchasing extra necessary medical equipment. Better quality of care will increase people's expectations of getting value for money in the case of illness, and will again enhance demand for insurance (dotted feedback line).

(c) *Effect on the insurance scheme*

Assuming that effects 1 and 2 actually materialize, one can imagine that new members join the scheme and hence membership enrollment increases. This could drive down the administrative cost of insurance provision per member. Risk pooling is therefore enhanced as more people participate. Consequently, risks become more calculable. Though the idea of rising demand usually suggests rising prices, in this case it could result in reduced premiums due to "economies of scale" (McGuire, Fenn, & Mayhew, 1989). Lower premiums will probably once again increase demand for insurance and coverage rates. Besides acting as an agency that expresses the interests and needs of its members, the CBHI can try to promote the use of preventive care and healthy behavior (Garba & Cyr, 1998). Health education and awareness of health problems would improve public health outcomes and counteract cost escalation.

The scenario presented here seems very promising, but it may be far too optimistic about what can be achieved by introducing health insurance alone as a new institution in rural areas. The benefits described here—improved quality of care, increased access to health care, better health outcomes, higher and more stable incomes—cannot be realized if some serious pitfalls are not taken into account in the scheme design, if the CBHI is badly managed or if impeding factors at the health facility or household level cannot be overcome. Keeping the balance between mobilization of resources by means of insurance on the one hand, and increasing costs for health care

provision due to higher utilization rates on the other hand may turn out to be a considerable problem.

In the following, we concentrate our analysis on the effect 1 of the developed framework. We address the question whether community-based health insurance schemes actually lower the barriers for poor people to access health services. The hypothesis to be tested is that even in a poor institutional environment insurance can work: Members of a health insurance scheme use health care services more often and pay less at point of use than nonmembers controlling for other factors. In addition, we test whether poor people are actually reached by the schemes.

It would also have been of the utmost interest to address effects 2 and 3 of the framework. This would have, however, required a different research design than chosen for the Senegal case study. The same holds true for the effect on members regarding labor productivity, health status, consumption smoothing and welfare.

3. THE CASE STUDY, RESEARCH DESIGN AND METHODOLOGY

(a) *"Les mutuelles de santé" in the Thiès region of Senegal*

The idea of community-financing schemes in Senegal has its roots in the Thiès region, which is located in the western part of Senegal and is, with over one million inhabitants, the second most densely populated region in the country. Roughly one-third of the population lives in the town of Thiès, the large majority living in the rural areas. Agricultural activities are the main income source for the rural population. For a long time peanuts production dominated, but with sinking world market prices in the early 1990s, farmers have started to diversify by producing vegetables, fruits and food crops such as cassava. Poverty is widespread, notably among rural households. The average income of the richest quintile of the surveyed populations—approximately 18,500 F CFA/per month/per household member—still lies below the minimum monthly salary that amounts to 37,000 F CFA per person.⁷

The health care situation is equally unsatisfactory: People are exposed to a variety of illnesses and health risks such as malaria and diarrhea. Furthermore, access to health care is constrained by financial constraints and the

limited number of health facilities accessible to the population. The latter point poses a very important problem for the rural poor: When facing an illness, they have to rely on risk-coping strategies such as the selling of assets, or on transfers from their family and local networks to be able to pay the treatment fees. As a consequence the majority of the rural population still frequent the “*pharmacie de la rue*” which offers medicine at lower prices but with an insecure and often lower quality (Tine, 2000).

Senegal has a relatively long tradition of mutual health insurance schemes. The first experience started in 1990 the village of Fandène in the Thiès region. From its inception, a local health care provider, the nonprofit hospital St. Jean de Dieu, supported the movement in Senegal. In the year 2000 there are 16 mutual health insurance schemes operating in the area of Thiès. They cover in total approximately 30,000 persons and the average size of the mutual is around 500 covered persons.⁸ The main features of the schemes are:

- The scheme is community-based, membership is voluntary and the organization of the scheme is done by a mutual health organization. This organization selects a board, holds regular meetings with the member and negotiates with the hospital the benefit package and the sharing of costs,
- 90% of the schemes operate in rural areas,
- with the exception of one mutual—Ngaye Ngaye—they only cover hospitalization,
- the “*mutuelles*” have a contract with the hospital St. Jean de Dieu, where they get a reduction of up to 50% for treatment,
- membership is on an individual basis.

Table 1 presents the details of the different payment forms at the hospital. It shows that for a treatment, a member has to pay a minimum amount of 3,000 F CFA. If the member needs surgery, he will pay 50% of the total costs for the operation himself. The daily cost of hospitalization, including laboratory analysis, con-

sultation and in some cases radiography, is paid by the mutual, which benefits from a 50% reduction. A mutual pays 3,750 F CFA/day for each hospitalization of its members, compared to the 7,500 F CFA/day paid by a nonmember. In the eventuality of hospitalization, the member has to produce a letter of guarantee, which is given to him by the manager of the mutual, if the member has regularly paid the insurance premium. A 10–15 days hospitalization is paid integrally by the mutual. If hospitalization exceeds this limit, the mutual pays the hospital for the entire invoice as pre-arranged. The member then reimburses the mutual in various steps. To receive the described benefits, household heads have to buy a 1,000 F CFA membership card once, and all members have to pay a monthly premium of between 100 and 200 F CFA.

(b) *Research design*

A household survey was carried out by the Dakar-based Institute for Health and Development (ISED), in cooperation with the Center for Development Research (ZEF) in Bonn. A pre-test was carried out in March 2000 and the final survey took place in May 2000. The participation rate in the interviews was over 95%.

We chose a two-stage sampling procedure for the survey: First, we selected four out of the 16 villages in which mutuals operate. In each of the selected villages Fandène, Sanghé, Ngaye Ngaye and Mont Rolland only one mutual is in place, and bears the name of the village itself. The four schemes vary according to age, there services provided and the participation rate of village households in the mutuals (Table 2).

The second step consisted of randomly selecting households for the interviews. In all four villages, members and nonmembers were interviewed. In order to both get a random sample out of the four villages and to calculate the percentage distribution between members and nonmembers and their respective weight in

Table 1. *Hospitalization fees for members and nonmembers at St. Jean de Dieu Hospital*

	Hospitalization		
	Ticket for consultation	Daily cost	Operation (surgery)
Members payment by:	3,000 F CFA member	3,750 F CFA mutual	750 F CFA/unit member
Nonmembers payment by:	6,000 F CFA nonmember	7,500 F CFA nonmember	1,500 F CFA/unit nonmember

Source: Jütting and Tine (2000).

Table 2. *Selection criteria for mutual to be included in the survey*

Name of mutual/ village	Years of operation	Distance from hospital (km)	% of member household in villages	Services
Fandène	10	6	90.3	Hospitalization
Sanghé	3	8	37.4	Hospitalization
Ngaye Ngaye	6	30	81.5	Primary health care
Mont Rolland	4	15	62.6	Hospitalization

Source: Jütting and Tine (2000).

the sample, we used household lists of all inhabitants (members and nonmembers) of the four villages. We interviewed a total of 346 households, 70% of which were members and 30% of which were nonmembers. The data set contains information on roughly 2,860 persons, of which 60% were members and 40% nonmembers.

Using SPSS Windows, the data were entered immediately after completing the survey. In addition to the household survey, we interviewed key persons (mutual leaders) in order to get complementary information about the functioning, problems and success of the mutuals.

(c) *Methodology*

When modeling the impact of mutual health insurance schemes on health care use and expenditure, one encounters the important challenge of dealing with both the problems of “endogeneity” and “self-selection.” This problem currently receives considerable attention in different areas of development economics: While some publications focus on measuring the impact of microfinance institutions (e.g., Coleman, 1999; Nada, 1999), others estimate the returns of education (e.g., Bedi & Gaston, 1999), and some analyze the impact of health insurance on various outcomes such as health demand and financial protection (Waters, 1999; Yip & Berman, 2001). In each case, the evaluation of a policy intervention or institutional innovation raises the problem of the difficulty of randomly assigning some individuals to nonprogram control groups and others to program treatment groups. It flows from this that the identification of an adequate control group is the first and most important step when trying to control for self-selection.

With respect to the impact of health insurance on health care use, Waters (1999) identifies the potential endogeneity of the choice of

insurance for health care use as the main problem, leading to potential selection bias. Individuals who self-select the insurance program have unobservable characteristics—related to preference or health status (adverse selection)—that might make it more likely for them to join the program, and might also influence their decision to use health care services. An observed association between health insurance affiliation and health care use and expenditure may therefore be due not to insurance but to underlying unobservable characteristics. The insurance effect would then be overestimated.

To test whether “membership of a health insurance” is in fact an exogenous variable, we follow a procedure applied by Waters (1999). We first estimate a reduced form of participation in a mutual. The predicted and the actual observed membership variables are then included as regressors in the health care demand and health care expenditure equation. If the predicted coefficient for membership is not significant, one can assume that membership is exogenous.

To control specifically for self-selection in the program, proxies for health status and health risks have been included in the study. Finally, village dummies are included to control for characteristics of communities that take into account differences in the cost of seeking health care at the village level as well as the specific design of the schemes.

To control for a sample selection bias in the demand equation for health care, the total sample is included, i.e., the sick and nonsick and members and nonmembers. Finally, the models are checked for stability and robustness by adding and subtracting key variables and by applying the likelihood-ratio test for the logit model and the *F*-test for the log linear model.

To assess the impact of the mutual health organization on the financial protection of

members, two aspects have to be taken into account: The probability of visiting a hospital and the out-of-pocket expenditure borne by the individuals. The first part of the model assesses the determinants of utilization, thereby enabling us to analyze whether membership in a mutual reduces barriers to assess health care services. The second part of the model estimates the amount of money paid for hospital use. This includes costs for transport, medications, treatment and any other expenditure related to the hospital stay.

We use a two-part model developed as part of the Rand Health Insurance Experiment in the United States (Manning *et al.*, 1987).⁹

—a logit model, which assesses the probability of visiting a hospital: $\text{Prob}(\text{visit} > 0) = X\beta + M_x + u$, where X stands as a vector for individual, household and community characteristics (including membership)

—a log-linear model that estimates the incurred level of out-of-pocket expenditures, conditioning on positive use of health care services:

Log (out-of pocket expenditure/visit > 0)

$$= X_y + M_z + e,$$

where X again represents a set of independent variables that are hypothesized to affect individual patterns of utilization, M represents a dummy variable for membership in a mutual health organization and u and e as terms of interference. The independent variables determining both the demands for health care and expenditure in the case of illness are—among others—age, sex, education, health status and income.

A binary probit model is estimated to analyze the determinants of participation in the mutuals. It is assumed that participation of a household (p) in a mutual depend on the current income of the household (y), characteristics of the household head (H), who decides if the household joins or not, household characteristics (Z), community characteristics (C) and on the error term u , who is uncorrelated with the other regressors.

The following equation describes our model:

$$p_i = f(y_i, Z_i, H_i, C, u). \quad (1)$$

In order to estimate the probability of participation we use a binary probit model:

Binary probit model:

$$p_i^* = \beta y_i + \phi Z_i + \alpha H_i + \delta C + u_i. \quad (2)$$

$p_i = 1$ if $p^* > 0$, meaning the household_{*i*} is member of the insurance scheme

$p_i = 0$ otherwise.

4. ESTIMATING THE IMPACT OF HEALTH INSURANCE

(a) *Variable used and descriptive statistics*

Our primary variable of interest is membership in a mutual. We hypothesize that, after controlling for individual, household and community characteristics, members of a mutual have better access and lower financial burden of health care than to nonmembers. This would entail that membership has a positive coefficient for the demand for health care and a negative one for the effect on expenditure. Besides membership, the other variable of key interest is income, as we want to determine the extent to which demand for health care utilization and out of pocket expenditure is due to income level and paying ability.¹⁰ Former studies have shown that the demand for health care is influenced by the ability to pay (e.g., Gertler & Van der Gaag, 1990).

As control variables, we include individual characteristics such as age, sex, education, illness frequency and type of illness.¹¹ These first three variables capture the differences in the need for health care and the latter serves as a proxy for an individual's health status.

Household characteristics are included and aim to control for health preferences due to factors such as income, religion and ethnic group belonging. Finally, village effects are taken into account in terms of both the differences in the cost of seeking health care at the village level and of the specific design of the mutuals. One assumption is that for two reasons, Fandène inhabitants have better access to health care: the relatively short distance to hospital and a well-functioning scheme.

The descriptive statistics suggest that members use hospitalization services more often than nonmembers do (Table 3). Other factors having an influence on the use of hospitalization services seem to be illness frequency, education, age, income, religion, the belonging to an ethnic group and the village community.

Table 3. *Descriptive statistics (hospitalization)*

Variable	People hospitalized mean (SD)	People not hospitalized mean (SD)	Differences (<i>t</i> -test for significance)	Total mean (SD)
<i>Individual and household characteristics</i>				
Sex (1 = male)	0.41 (0.49)	0.51 (0.50)	0.1**	0.50 (0.50)
Age group 1 (<26)	11.08 (7.22)	10.85 (6.85)	0.23	10.86 (6.85)
Age group 2 (26–50)	37.95 (6.73)	37.12 (6.95)	0.83	37.17 (6.94)
Age group 3 (>50)	69.49 (9.52)	65.26 (9.19)	4.23***	65.74 (9.32)
Literacy (1 = yes)	0.35 (0.48)	0.44 (0.50)	0.09**	0.44 (0.50)
Member (1 = yes)	0.72 (0.45)	0.45 (0.50)	0.27***	0.46 (0.50)
Frequency of illness	0.46 (0.64)	0.36 (0.51)	0.10**	0.36 (0.52)
Wolof (1 = yes)	0.066 (0.25)	0.17 (0.37)	0.104***	0.16 (0.37)
Religion (1 = yes)	0.75 (0.44)	0.55 (0.50)	0.2***	0.56 (0.50)
Income	93,533 (69,261)	81,387 (69,491)	12,146**	82,021 (69,519)
Lower tertile	39,099 (10,297)	37,641 (9,733)	1,458	37,698 (97,755)
Middle tertile	68,028 (10,885)	69,053 (10,821)	1,025	68,999 (10,821)
Upper tertile	158,559 (74,714)	158,523 (92,448)	36	158,526 (91,281)
<i>Community characteristics</i>				
Fandène	0.54 (0.50)	0.30 (0.46)	0.24***	0.31 (0.46)
Ngaye Ngaye	0.073 (0.26)	0.20 (0.40)	0.127***	0.20 (0.40)
Sanghé	0.17 (0.37)	0.27 (0.44)	0.1***	0.26 (0.44)
Mont Rolland	0.22 (0.41)	0.23 (0.42)	0.01	0.23 (0.42)

Source: Own estimation based on ZEF-ISED survey data.

*Significant at the 0.1 level.

**Significant at the 0.05 level.

***Significant at the 0.01 level.

(b) *Marginal coefficients for access to health care and financial protection*

Two models have been estimated for each dependent variable: The first one includes income as a continuous variable and the second uses dummies for income tertils. The results presented are marginal coefficients. In the case of the log linear model for the expenditure effect, we had to transform the estimates of the dummy variables into marginal coefficients by subtracting one from the anti-log of the estimate (Gujarati, 1995).

All the models are highly significant and the results between the two variations in the modeling approach with respect to the income variable are quite similar (Table 4). The applied test for the potential endogeneity of the membership variable *vis-à-vis* health care use and expenditure indicated in both cases, that membership is in fact exogenous and no corrections for endogeneity are needed (see Appendices A and B).¹² Overall, 151 people

out of 2,856 have been in hospital within the last two years.¹³ The most important result is that membership has a strong positive effect on the probability of going to a hospital, even though the magnitude, with a higher probability of 2% points, is quite moderate. More important from the perspective of the functioning of the mutual is the expected strong negative effect on expenditure in the case of hospitalization. The findings in Table 4 show that in such a situation, members pay on average less than half of the amount non-members pay. This is an impressive finding and is an indication that the mutuals seem to reach the objective of better financial protection against hospitalization risk.

The result is not as obvious as it might appear in the first instance. First, it cannot be taken for granted that an insurance scheme works in the usual poor institutional environment of rural areas in low-income countries often characterized by weak health care systems and under-the-table payments. Second, the

Table 4. *Determinants of using hospitalization care and of out-of-pocket expenditures at point of use (marginal coefficients; standard errors in brackets; for logit model: $p = 1$, individual has used hospitalization care in the last two years)*

Variable	Model 1a ^a (hospital)	Model 1b ^a (hospital)	Model 2a ^a (expenditure)	Model 2b ^a (expenditure)
Constant	-0.301*** (0.065)	-0.137*** (0.021)	4.611*** (2.016)	9.445*** (0.642)
<i>Individual and household characteristics</i>				
Sex (1 = male)	-0.014** (0.007)	-0.014*** (0.006)	0.370 (0.214)	0.401 (0.21)
Age group 1 (age < 26)	-0.016** (0.008)	-0.016** (0.008)	-0.495*** (0.258)	-0.520*** (0.210)
Age group 3 (age > 50)	0.022** (0.009)	0.022** (0.009)	-0.008 (0.323)	-0.141 (0.327)
Literacy (can read/read and write, 1 = yes)	-0.107 (0.007)	-0.010 (0.007)	0.07 (0.243)	0.035 (0.239)
Membership (in health insurance without Ngaye Ngaye, 1 = yes) ^b	0.020** (0.009)	0.020** (0.009)	-0.452** (0.287)	-0.514** (0.291)
Frequency of illness	0.009 (0.006)	0.008 (0.006)	-0.02 (0.16)	-0.03 (0.157)
Type of illness (complications during pregnancy/childbirth, 1 = yes)			1.273** (0.303)	1.125** (0.299)
Severity of illness (number of days hospitalized)				0.015*** (0.005)
Wolof (household belonging to ethnic group of Wolof, 1 = yes)	-0.007 (0.020)	-0.005 (0.019)	-0.002 (0.576)	-0.033 (0.582)
Religion (1 = Christian household)	-0.005 (0.012)	-0.004 (0.012)	0.089 (0.324)	0.142 (0.323)
Income (expenditures per household member log)	0.015*** (0.005)		0.441** (0.174)	
Income tertile: Lower		-0.008 (0.008)		-0.120 (0.273)
Income tertile: Upper		0.016** (0.008)		0.67*** (0.238)
<i>Community characteristics</i>				
Fandène (household belonging to Fandène community, 1 = yes)	0.046** (0.022)	0.046** (0.022)	0.550 (0.67)	0.568 (0.676)
Sanghé (1 = household belonging to Sanghé community, 1 = yes)	0.017 (0.020)	0.018 (0.020)	1.573 (0.643)	1.588 (0.643)
Mont Rolland (household belonging to Mont Rolland community, 1 = yes)	0.027 (0.022)	0.027 (0.021)	1.986* (0.636)	1.779 (0.629)
Number of observations	2,855	2,855	118	118
Chi ² /F value	103.00	103.96	3.990	4.176
Corrected <i>r</i> squared			0.264	0.289
Prob > Chi ² /F value	0.000	0.000	0.000	0.000
Frequencies of actual/predicted outcomes	94.7%	94.7%		

Source: Own estimation based on ZEF-ISED survey data.

^a Models 1a/2a use “income” as an explanatory variable; models 1b/2b use “income tertiles.”

^b Members of the mutual Ngaye Ngaye are counted as “nonmembers” as this mutual only covers primary health care (see Table 2).

*Significant at the 0.1 level.

**Significant at the 0.05 level.

***Significant at the 0.01 level.

“insurance effect” of the mutual is reduced by the fact that members have to pay substantial co-payments, by the fact that the mutuals generally only cover hospitalization costs up to 10–15 days, and by the fact that very poor nonmembers also might get health care at a reduced rate. There have been single reported cases, where some of the doctors have given simple treatment and medicaments for free after work to very poor people. Given the described circumstances it is very unlikely that this practice has a major impact on the insurance value, however, it is an additional explanation for the smaller differences in out-of-pocket payments between members and nonmembers than one might expect.

While the reduction in out-of-pocket payments for members is impressive, the cost side of joining the health insurance scheme is also important.¹⁴ Households have to take into account both the payment of the premiums and the probability of a family member being hospitalized. For an average household, the annual premium of covering the family totals roughly to 2% of the household’s annual average income, while the household can expect that a member has to be hospitalized every two years. A single stay of one member can lead to an expenditure that represents more than 25% of the household’s annual budget. Furthermore, this is without calculating the indirect cost of illness, i.e., loss of working hours, reduction in labor supply, and potential reduction in labor productivity. This underlines the fact that hospitalization is a low-frequency, but high-cost risk that can push people deep into poverty.

With respect to other characteristics affecting the demand for hospitalization and money spend, age has an influence on both frequentation and expenditure. In all the models, the younger population (below the age of 21) frequents hospitals less often than older people do. If young people are hospitalized do so, they also tend to pay less. It is quite logical that the probability of being hospitalized and the necessity to pay more for the treatment increase with age. In addition to age, sex also matters. Women tend to frequent the hospital more often than do men. Most hospitalized women have health problems related to maternity. Complications during pregnancy and birth have a large impact on the amount of money spent, with expenditure increasing by more than 120% points. Finally, the frequency of illness and education as further individual characteristics are nonsignificant.

Turning to the influence of household characteristics on health care use and expenditure, we find that income has the expected strong positive influence on both the frequencies of hospitalization and expenditure. This is in line with common economic understanding that with rising income, the demand for health care increases due to higher opportunity costs. It also shows that despite membership in a scheme and insurance, the level of income still matters to a great extent for the demand for health care. In terms of village effects, it seems that people living in Fandène have a higher effective hospitalization demand than the people in the other three communities.¹⁵ A possible explanation is the fact that Fandène is the oldest mutual, and is, according to our interview partners, well organized and well functioning. A further explanation might be the fact that it is the closest mutual to the St. Jean de Dieu hospital.

To summarize, the analysis of the impact of the mutuals on access to health care has shown that members frequent the hospital more often than nonmembers and pay less for a visit. The results seem to confirm our hypothesis that community-financing through pre-payment and risk-sharing reduce financial barriers to health care, as is demonstrated by higher utilization but lower out-of-pocket expenditure. In addition, it shows that risk pooling and pre-payment, no matter how small-scaled, can improve financial protection for the poor.

Turning to the important question, what determines the participation in a mutual, Table 5 presents the marginal coefficients from the probit-analysis. While the table offers a set of interesting results, we concentrate here on the influence of income on membership as the general results are discussed in greater detail in Jütting (2003).

All three models are highly significant and their explanatory power is quite good. Model 1 shows that income has the expected positive and highly significant effect on the probability of participation. If we look at how the different stratas of the population participate, we find that the poorer segment of the population is represented to a lesser extent than people with an average or high income. The results of model 2 suggest that the probability of participation for people belonging to the poorest tertile is 11% points less, while in model 3 the equivalent figure for the self-classified poor people is 26% points. We also have indications that the “upper income” strata tend to partici-

Table 5. *Determinants of participation in a mutual health insurance (marginal probabilities; standard errors in brackets; p = 1, household member of a scheme)*

Variable	Model 1	Model 2	Model 3
Constant	-2.048*** (0.541)	-0.223 (0.155)	0.064 (0.147)
<i>Individual characteristics of household head and household characteristics</i>			
Sex (1 = male)	0.054 (0.083)	0.071 (0.083)	-0.001 (0.083)
Age group 1 (age 21–40)	0.088 (0.092)	0.085 (0.092)	0.079 (0.091)
Age group 3 (age > 60)	0.087 (0.061)	0.079 (0.061)	0.101 (0.062)
Literacy (can read/read and write, 1 = yes)	0.059 (0.063)	0.062 (0.063)	0.043 (0.063)
Other organization (membership in other group, 1 = yes)	0.180*** (0.066)	0.183*** (0.066)	0.120* (0.065)
<i>Household characteristics</i>			
Wolof (household belonging to ethnic group of Wolof, 1 = yes)	0.249* (0.135)	0.284** (0.137)	0.229* (0.133)
Religion (1 = Christian)	0.370*** (0.085)	0.369*** (0.085)	0.347*** (0.083)
Income (expenditures per household member log)	0.167*** (0.046)		
Income tertile: Lower		-0.110* (0.063)	
Income tertile: Upper		0.165** (0.073)	
Self-wealth (self-classification of household): Poor			-0.254*** (0.058)
Self-wealth: Rich			0.018 (0.113)
Illness-ratio (number of cases of illness per household in the last 6 month divided by number of household members)	0.002 (0.088)	0.007 (0.088)	0.037 (0.086)
Fandène (household belonging to Fandène community, 1 = yes)	-0.029 (0.151)	-0.011 (0.152)	-0.119 (0.150)
Sanghé (household belonging to Sanghé community, 1 = yes)	-0.277** (0.132)	-0.261* (0.134)	-0.383*** (0.130)
Mont Rolland (household belonging to Mont Rolland community, 1 = yes)	-0.225 (0.139)	-0.202 (0.141)	-0.308** (0.137)
Solidarity (perceived solidarity in the village, 1 = yes)	0.103 (0.066)	0.100 (0.067)	0.104* (0.065)
Number of observations	338	338	341
Pseudo-R ²	0.567	0.569	0.568
Chi ²	120.32	121.39	127.96
Prob > Chi ²	0.000	0.000	0.000
Frequencies of actual/predicted outcomes	80%	80%	80%

Source: Own estimation based on ZEF-ISED survey data.

*Significant at the 0.1 level.

**Significant at the 0.05 level.

***Significant at the 0.01 level.

pate more than the average group with a 16% points higher probability (model 2). A major reason given in personal interviews from poor nonmember was that there are interested in

joining the scheme but have no financial means to pay the required insurance premium.

These results, however, do not mean that the poor are not reached. As pointed out earlier, even the average income of the richest quintile of the surveyed population lies below the minimum monthly salary. Among members are also households that belong to the poorest quintile, although, the poorest of the poor are hardly reached by the mutuals. Hence, one has to think carefully about appropriate solutions to target also this part of the population.

The case study in rural Senegal shows that the successful introduction and development of CBHI insurance schemes depends on a set of factors. One crucial aspect to be looked at is, if there is a viable health care provider who can and is willing to support the schemes. Without the logistical, administrative and financial support of the hospital St. Jean de Dieu one can hardly imagine that the same results could have been achieved. This hints at the necessity to analyze in depth the quality of the institutions providing health care services before promoting the introduction of health insurance schemes for the poor.

Another important question is the ability of the CBHI insurance schemes to attract members and also to reach the chronic poor within the region of coverage. Debated options to increase membership are the introduction of well-targeted subsidies, flexibility in the payment procedure of the premium, and the strengthening of the management capacity of the organizations running the health insurance schemes (Jütting, 2003).

5. CONCLUSIONS

Formal health insurance schemes cover only a marginal proportion of the population in low-income countries. Due to economic constraints, lack of good governance and institutional weaknesses, formal social protection for the vulnerable segments of the population is widely absent. This study has analyzed the impact of community-based health insurance on the access to health care of the rural poor taking *les mutuelles de santés* in the Thiès region of Senegal as an example. It was shown that in an area where most people are deprived of access to health care of good quality, the introduction of CBHI schemes can make a

substantial difference. While low-cost, high-frequency events are covered within the extended family, the risk of hospitalization is shared by the larger community. This has a potential positive effect on the ability of households to smooth their consumption, on labor supply and labor productivity and on the health status of the people insured. Further research should analyze and evaluate these effects, if possible within a panel data set framework. This would give policy makers a clearer idea on the social costs and benefits of introducing health insurance for the poor.

Participation in insurance schemes and local organizations is not cost-free and requires a minimum of income which the most disadvantaged often do not have at their disposal. Therefore, donors and policy makers should be aware that it may be very difficult, even impossible, to reach the poorest part of the population when promoting participation in local institutions. In order to reach the poorest members of the community, the cost of participation would have to be reduced by the institutions themselves or the public sector would have to subsidize their premiums. This could be achieved by linking community-financing schemes to social funds, for instance. As one major objective of social funding is to finance investments benefiting the poor and as in most places it is the public sector which administers social funds, such a support scheme would also strengthen linkage to the more formalized health care system. But, public financial support for such schemes should only be considered if the schemes fulfill certain conditions, such as assuring broad-scale access, transparent operational and financial accountability, management experience, etc.

An important policy implication of this study is that it is critical to move away from resource mobilization instruments that are based on point-of-service payments. If pre-payment and risk-sharing can be encouraged, they are likely to have an immediate direct and indirect impact on poverty. The direct impact would be, by preventing impoverishment due to catastrophic health expenditures. The indirect impact would be by ensuring access to health and thereby improving health, thus allowing the individual to take advantage of economic and social opportunities.

To enlarge poor and rural population access to health care, community-based health insur-

ance schemes can be an important element and a valuable first step. In order to overcome the existing limitations of the schemes, broader risk pools are required. In particular, the role of external financial support—such as government subsidies, donor funding, and reinsurance—in encouraging social inclusion needs to be further explored. An interesting option to be further tested would be to inte-

grate health insurance into microfinance schemes. In this respect, the cases of Self-Employed Women Association (SEWA) in India and the Grameen Bank in Bangladesh are promising examples. Further research is needed on how to scale-up and replicate these schemes, and on how to link them to other social risk management instruments such as social funds.

NOTES

1. Informal insurance mechanisms against health shocks give at best a partial protection. A recent study by Gertler and Gruber (2002) in Indonesia shows that severe and rare health shocks lead to substantial reduction in consumption despite the existence of informal insurance mechanisms. See also Jütting (2000) for a review on social security systems in low-income countries.
2. Health insurance by Self-Employed Women Association (SEWA), India, and insurance provided by Grameen Bank, Bangladesh are just two of the many such examples.
3. Local community-based or member-based institutions are better placed to harness information, monitor behavior and enforce contracts which are either too difficult or too costly for the government or for any private agency that is not a part of the community (Zeller & Sharma, 1998). Since a community-based scheme is more likely to enjoy the support and trust of the local people, it is also more likely to be successful in attracting greater membership.
4. After all, people demand health insurance not for its own sake but to be able to buy health services. If these services are not available or if the public does not find these existing health facilities trustworthy, there may be no demand for insurance at all.
5. Ahuja and Jütting (2003) describe the differences between alternate insurance arrangements, i.e., informal insurance, community-based insurance or microinsurance and market insurance.
6. In some settings, membership rates nearly doubled in the second and third year after the foundation of a CBHI, when people became aware that the scheme was working and have gained confidence in its benefits (Garba & Cyr, 1998).
7. 37,000 F CFA = 56US-\$ (August 2000).
8. This is still only a small percentage of the total population in the area. But, due to external support in the last two years mutual health organizations are now developing all over Senegal that has boost membership and coverage rates considerably.
9. For a recent application see Yip and Berman (2001).
10. Income is measured as the average expenditure of a household per year and member.
11. “Type of illness” is a dummy variable and controls for low-cost *versus* high-cost illnesses. The example used for a high cost illness is complications during pregnancy and birth.
12. The instruments used to predict membership, their significance as well as the R² of the prediction equation can be found in Table 5. A detailed discussion of the instruments in itself can be found in Jütting (2003).
13. Thirty-three of the hospitalized persons had to be excluded from the “expenditure” analysis as they were not aware of the costs which they had to pay since other family members were paying for them. Of the remaining 118 persons, 35 are nonmembers.
14. The poorest of the poor face important difficulties to finance the premium on a regular basis and are therefore underrepresented in the mutuals (Jütting, 2003).
15. This effect clearly pops up when leaving the Fandène mutual outside: The remaining mutuals get a significant negative coefficient.

REFERENCES

- Ahuja, R., & Jütting, J. (2003). Design of incentives in community-based health insurance schemes. *ZEF-Discussion Papers on Development Policy No. 63*. Bonn: Center for Development Research.
- Asfaw, A. (2003). *Cost of illness, demand for medical care, and the prospect of community health insurance schemes in the rural areas of Ethiopia*. Frankfurt: Peter Lang Eds.
- Atim, C. (1998). *Contribution of mutual health organisations to financing delivery and access to health care: synthesis of research in nine West and Central African countries*. Bethesda: Abt Associates Inc.
- Bedi, A., & Gaston, N. (1999). Using variation in schooling availability to estimate educational returns for Honduras. *Economics of Education Review, 18*, 107–116.
- Bennett, S., Creese, A., & Monash, R. (1998). *Health insurance schemes for people outside formal sector employment*. Geneva: WHO.
- CMH (2001). Macroeconomics and health: investing in health for economic development. *Report of the Commission on Macroeconomics and Health*. Geneva: WHO.
- Coleman, B. (1999). The impact of group lending in northeast Thailand. *Journal of Development Economics, 60*, 105–141.
- Criel, B. (1998). District-based health insurance in sub-Saharan Africa. Part II: case-studies. Antwerp: Studies in Health Services Organisation and Policy.
- Dror, D., & Jacquier, C. (1999). Micro-insurance: extending health insurance to the excluded. *International Social Security Review, 52*(1), 71–98.
- Garba, M., & Cyr, V. (1998). Présentation de mutuelles du Sud Borgou et Zou Nord au Bénin. Paper presented at the Séminaire—Atelier de CIDEF—Les Mutuelles de Santé en Afrique: Concept Importé ou Réalité Émergente? Experiences et Perspectives, Paris.
- Gertler, P., & Gruber, J. (2002). Insuring consumption against illness. *American Economic Review, 92*(1), 51–70.
- Gertler, P., & Van der Gaag, J. (1990). *The willingness to pay for medical care*. Baltimore/Washington, DC: Johns Hopkins University Press/World Bank.
- Gilson, L., Kalyalya, D., Kuchler, F., Lake, S., Oranga, H., & Ouendo, M. (2000). The equity impacts of community-financing activities in three African countries. *International Journal of Health Planning and Management, 15*, 291–317.
- Gujarati, D. N. (1995). *Basic econometrics*. Singapore: McGraw-Hill International Editions.
- Holzmann, R., & Jorgensen, S. (2000). Social risk management: a new conceptual framework for social protection, and beyond. *Social Protection Discussion Paper No. 0006*. Washington, DC: The World Bank.
- Jütting, J. (2000). Social security systems in low income countries: concepts, constraints, and the need for cooperation. *International Social Security Review, 53*(4), 3–25.
- Jütting, J. (2003). Health insurance for the poor? Determinants of participation in community-based health insurance schemes in rural Senegal. *Technical Paper No. 204*. Paris: OECD Development Centre.
- Jütting, J., & Tine, J. (2000). *Micro insurance schemes and health care provisions in developing countries: an empirical analysis of the impact of mutual health insurance schemes in rural Senegal*. Bonn: Center for Development Research (ZEF).
- Manning, W., Newhouse, J., Duan, N., Keeler, E., Leibowitz, A., & Marquis, M. (1987). Health insurance and the demand for medical care: evidence from a randomised experiment. *American Economic Review, 77*, 251–277.
- McGuire, A., Fenn, P., & Mayhew, K. (1989). The assessment: the economics of health care. *Oxford Review of Economic Policy, 5*, 1–19.
- Morrisson, C. (2002). Health, education and poverty reduction. *OECD Development Centre Policy Brief No. 19*. Paris: OECD Development Centre.
- Müller, O., Cham, K., Jaffar, S., & Greenwood, B. (1996). The Gambian National Impregnated Bednet Programme: evaluation of the 1994 cost recovery trial. *Social Science and Medicine, 43*, 1–7.
- Musau, S. (1999). Community-based health insurance: experience and lessons learned from East Africa. *Technical Report No. 34*. Partnerships for Health Reform Project. Bethesda, MD: Abt Associates Inc.
- Nada, P. (1999). Women's participation in rural credit programmes in Bangladesh and their demand for formal health care: is there a positive impact? *Health Economics and Econometrics, 8*, 415–428.
- Preker, A. (2004). *Health financing for poor people: resource mobilization and risk sharing*. Washington DC: The World Bank (in print).
- Tine, J. (2000). Les mutuelles de santé rurales de la région de Thiès au Sénégal: des initiatives communautaires pour améliorer l'accès aux soins de santé. Bonn: Center for Development Research.
- Waters, H. (1999). Measuring the impact of health insurance with a correction for selection bias: a case study of Ecuador. *Health Economics and Econometrics, 8*, 473–483.
- Wiesmann, D., & Jütting, J. (2001). Determinants of viable health insurance schemes in rural sub-Saharan Africa. *Quarterly Journal of International Agriculture, 50*(4), 361–378.
- World Bank (1993). *World development report*. New York: Oxford University Press.
- Yip, W., & Berman, P. (2001). Targeted health insurance in a low income country and its impact on access and equity in access: Egypt's school health insurance. *Health Economics, 10*, 207–220.
- Zeller, M., & Sharma, M. (1998). *Rural finance and poverty alleviation. Food Policy Report*. Washington DC: International Food Policy Research Institute.

APPENDIX A. TEST OF ENDOGENEITY OF “MEMBERSHIP” VIS-À-VIS “HEALTH CARE DEMAND”

Logit model	
Maximum likelihood estimates	
Dependent variable	Hospital
Weighting variable	One
Number of observations	2855
Iterations completed ^a	8
Log likelihood function	-536.2763
Restricted log likelihood	-587.9174
Chi-squared	103.2822
Degrees of freedom	13
Significance level	0.000000

Partial derivatives of probabilities with respect to the vector of characteristics. They are computed at the means of the X s. Observations used for means are all Obs.

Variable	Coefficient	Standard error	$b/\text{standard error}$	$P[Z > z]$	Mean of X
<i>Marginal effects on Prob[Y = 1]</i>					
Constant	-0.3030965367	0.64972636E-01	-4.665	0.0000	
Sex	-0.1326886599E-01	0.65331929E-02	-2.031	0.0423	0.50542907
Age_GRI	-0.1615482854E-01	0.78847125E-02	-2.049	0.0405	0.61646235
Age_GR3	0.2084006627E-01	0.92773827E-02	2.246	0.0247	0.15376532
Literacy	-0.1133798379E-01	0.74847057E-02	-1.515	0.1298	0.43957968
Member	0.1996490103E-01	0.90434645E-02	2.208	0.0273	0.46094571
Fandène	0.5286374306E-01	0.25769618E-01	2.051	0.0402	0.31593695
Sanghé	0.2511066204E-01	0.26157686E-01	0.960	0.3371	0.25779335
Mrolland	0.3497194495E-01	0.26831450E-01	1.303	0.1924	0.23082312
Wolof	-0.7477753511E-02	0.19615615E-01	-0.381	0.7030	0.16252189
Religion	-0.1262740484E-01	0.18490040E-01	-0.683	0.4947	0.55796848
Income	0.1445207441E-01	0.54343134E-02	2.659	0.0078	11.095841
Illness	0.8401602592E-02	0.57460609E-02	1.462	0.1437	0.36252189
Est_Memb	0.9717258572E-02	0.18579926E-01	0.523	0.6010	0.68371278

Source: Own estimation based on ZEF-ISED survey data.

APPENDIX B. TEST OF ENDOGENEITY OF “MEMBERSHIP” VIS-À-VIS
“EXPENDITURE”

Ordinary least squares regression	Weighting variable = none	
Dep. var. = EX_HOS_L Mean = 9.972093721	SD = 1.198036130	
Model size: Observations = 118	Parameters = 16	Deg. Fr. = 102
Residuals: Sum of squares = 108.6469803	Std. Dev. = 1.03207	
Fit: <i>R</i> -squared = 0.353018	Adjusted	
	<i>R</i> -squared = 0.25787	
Model test: $F[15, 102] = 3.71$	Prob value = 0.00004	
Diagnostic: $\text{Log} - L = -162.5625$	Restricted(b = 0)	
	Log-L = -188.2533	
	ILogAmemiyaPrCrt. = 0.190	Akaike Info. Crt. = 3.026
I Autocorrel: Durbin-Watson Statistic = 1.83831	Rho = 0.08085	

Variable	Coefficient	Standard error	<i>t</i> -ratio	$P[T > t]$	Mean of <i>X</i>
Constant	4.496144024	2.0377790	2.206	0.0296	
<i>Sex</i>	0.3149716454	0.21489186	1.466	0.1458	0.40677966
<i>Age_GRI</i>	-0.6834172053	0.26115699	-2.617	0.0102	0.44067797
<i>Age_GR3</i>	-0.1612660003E-01	0.32489283	-0.050	0.9605	0.28813559
<i>Literacy</i>	0.6400049414E-01	0.24576701	0.260	0.7951	0.36440678
<i>Member</i>	-0.6088482787	0.28871600	-2.109	0.0374	0.73728814
<i>Fandène</i>	0.4628580075	0.72102999	0.642	0.5224	0.58474576
<i>Sanghé</i>	0.9748390838	0.73098337	1.334	0.1853	0.12711864
<i>Mrolland</i>	1.122150587	0.73243034	1.532	0.1286	0.21186441
<i>Wolof</i>	-0.9924966126E-02	0.58520448	-0.017	0.9865	0.76271186E-01
<i>Religion</i>	0.6093183978E-01	0.50035408	0.122	0.9033	0.77118644
<i>Days T_Hosp</i>	0.1472880607E-01	0.54947161E-02	2.681	0.0086	11.932203
<i>Pregnan</i>	0.8246609943	0.31058636	2.655	0.0092	0.17796610
<i>Illness</i>	-0.2221933699E-01	0.16046369	-0.138	0.8901	0.44915254
<i>Income</i>	0.4489115082	0.17740097	2.530	0.0129	11.271357
<i>Est_Memb</i>	0.3406547147E-01	0.50435985	0.068	0.9463	0.83050847

Source: Own estimation based on ZEF-ISED survey data.