

# **Social Welfare and Demand for Health Care in the Urban Areas of Côte d'Ivoire**

By

Arsène Kouadio  
Vincent Monsan  
and  
Mamadou Gbongue  
*CIRES, University of Cocody  
Abidjan*

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## Abstract

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This paper analyses the relationship between the demand for health care and that for health insurance by the population of Côte d'Ivoire. A Poisson model is used to estimate the demand for health care and a multinomial logit model for estimating the demand for insurance. The data on which the research was based were taken from a sample of 2,040 households that were interviewed as part of a survey on *Recours aux soins et dépenses de santé* or *PSA 92* (Health care use and health expenses, or *PSA 92*), which was carried out in 1992 in Yopougon, a working class neighbourhood of Abidjan. The results show that the length of the illness appears to be the factor that triggers the use of modern health care. They also indicate that employment and age are important factors in making decisions about which insurance to take. Extending the data collection system to the rural population, or generalizing it to the whole population, and gaining a better definition of the variables "state of health", "consulting a health service", "behaviour of the insured person and of the insurance company vis-à-vis health services" should be envisaged to refine the research. All this will lead to a better grasp of the problems of moral hazard and adverse selection in Côte d'Ivoire's health system as a result of the minimizing costs of the implementation of the expected Universal Health Insurance (AMU).

JEL classification : I11, D81, D82.

*Key words:* Demand for health care, demand for insurance, Poisson law, multinomial logit

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# 1. Background and research problem

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Health care is an essential need, but at the same time, an expensive one. Because it is both essential and expensive public authorities, including the most liberal of them, are constantly engaged in actions designed to improve the health sector. This is the case in Côte d'Ivoire, where the health policy is characterized by two ideological viewpoints: one, neo-liberal and the other, socialist. The main lines of the evolution of the country's health policy highlight such a characterization.

The French colonial health policy aimed to ensure the health of the male population in order to maximize their productivity. The system rested on free health care and prevention. The same system worked differently, however, depending on whether it was dealing with foreigners and African elites living in urban areas, or with the rural population. For the former, the policy was to offer medical care through hospitals, while for the latter it was mainly preventive (Brunet-Jailly, 2002). After independence (1960), the health policy retained the guidelines set during the colonial period. For example, most of the investment in the health sector went to the big urban hospitals, while the disparities inherited from the colonial era between basic medicine and hospital medicine persisted. Until the economic crisis of the 1980s, the aim was to equip the country with public health establishments of international standards. This quasi-exclusive interest for tertiary-level health care, which can also be noticed in the majority of other West African countries, has raised the issue of the bias of such a system against the poor and rural populations.

At an international level, the emphasis has been on the need for restructuring the health systems in West Africa in order to give priority to the development of primary health care. The Alma-Ata Conference organized by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) in 1978 outlined new ambitious objectives by defining health as overall wellbeing – physical, mental and social – and by launching the slogan “Health for all in the year 2001”. The will to reduce injustices between rural and urban populations, the elites and the masses, was one of the objectives of such a grand project. The end of the 1970s was thus characterized by the will to strike a balance for the health system between the needs of the population and the resources of the country.

In Côte d'Ivoire, health care was in principle free in the 1960s and 1970s. In reality, though, the users of the health care system had to incur a significant share of their health care expenses. The economic crisis of the 1980s marked the beginning of a profound change in the organization of the health care system in Côte d'Ivoire. It suddenly, and starkly, exposed the limits and weaknesses of the existing system. In the meantime, from 1980 to 1990, the country undertook a series of structural adjustment programmes (SAPs)

proposed by the World Bank and the International Monetary Fund. Tight control of public expenditure was one of the constraints imposed in the framework of these programmes. As part of this structural adjustment, the World Bank advocated the liberalization of the health sector and recommended a reduction in costs. Liberalization including user-fees was a cornerstone of the neo-liberal macroeconomic policies embedded in stabilization and structural adjustment (Gilson et al., 1995). Thus payment for health care by its beneficiaries constituted an essential political response to the financial crises that stakeholders in many low-income countries were facing.

Paying for health care was not the only element of the new health policy proposed at the end of the 1980s. The Bamako Initiative, launched in 1987 by WHO, UNICEF and the governments of West African states, laid out the principles on which the reorientation of the health policy was to be based. The policy aimed at enabling the majority of the people to have access to a minimum level of health care through a restructuring of primary care services. It rested on three main pillars: the setting-up of a cost-saving system by having people pay for medical treatment, a policy of supplying generic medicines and a system of resource management through community monitoring. The aim of the reorganization of the health care system was twofold: to find a solution to the financial constraints that plagued the system and to offer solutions aimed at reducing problems encountered in its management – problems essentially due to wastage and mismanagement of existing resources.

Suffering the constraints of structural adjustment, today Côte d'Ivoire no longer has the resources for a generous health policy. That is why a less interventionist policy is being implemented, meaning that cost-saving is achieved by having people pay for medical treatment. To make the policy work, private community health centres have been set up in Abidjan, the economic capital of Côte d'Ivoire. In addition to the existing public and private health centres, eight urban community-based health units have been built since 1994 as part of a grand health scheme: *Projet Santé Abidjan* (the Abidjan health project). This policy reversal confirms the policy of a liberal health care model based on individual contribution. At the same time, though, households were not spared by the economic crisis, which basically impoverished entire sections of the population: In 1988, according to a World Bank report, 30% of the population of Côte d'Ivoire were poor, 10% of whom were extremely poor (Grootaert, 1993). That is why Côte d'Ivoire, once a welfare state, has in a few years and under external pressure, become the promoter of a system of cost-saving, supplying generic medicines and even setting up community health centres (Brunet-Jailly, 1999).

The deterioration of households' living conditions and the withdrawal of the public authorities from the health sector therefore raise the acute question of how to provide health care in Côte d'Ivoire. The new health policy orientations attempt to answer to this question. Since the late 1990s, the idea of promoting a health insurance system and expanding the network of health establishments has been a major concern for the government (Koné, 2001). The expansion of Côte d'Ivoire's health network was actually part of the African Development Bank (AfDB) education and health programme in the 1990s.

The new health policy aims at providing social security cover for health risks, as a direct consequence of the generalized cost-saving measures realized by charging fees

for medical treatment and promoting private health care. Two divergent approaches in the strategy to implement an insurance system stand out in this new health policy.

There is first a cautious and progressive approach. "Cautious" in that its proponents want a locally based, mutual insurance scheme that would gradually become federative. "Progressive" because the initiative first rests on an experimental phase, one that is necessary in order to put in place all the means of control over its future development. In line with this approach, the Ivorian government has encouraged the setting up of private insurance companies in the country and, more significantly, has put in place institutions to oversee the process: the National Social Provident Fund (CNPS) and the General Mutual Insurance Company for Civil Service Employees (MUGEFCI). So far, however, these efforts on the part of the government have borne little fruit. For example, the vouchers issued by the Mutual Insurance Company are rarely accepted by dispensing chemists because of accumulated unpaid arrears. Very often people find themselves obliged to pay the total amount of the cost of medication. For its part, the CNPS is unable to meet the needs of its members because of insufficient resources and inadequate organization (Ministère de la Santé et de la Protection Sociale [Ministry of Health and Social Welfare], 1991).

The other approach, which is currently a subject of debate, advocates a health insurance system called Universal Health Insurance (AMU) that guarantees to every person residing in Côte d'Ivoire health and maternity insurance cover. This system hinges on the principle of national solidarity, which compels every beneficiary to pay a financial contribution. Insurance companies, mutual insurance companies and provident fund societies will then offer a complementary insurance cover. This system has two schemes: the universal health insurance for the agricultural sector and the universal health insurance for all the other sectors. Despite the rhetoric, health risk insurance is still embryonic and uncertain, a situation that stems from the difficulties encountered in its implementation.

## Justification for the study

As a response to this situation, the government of Côte d'Ivoire has set itself the objective of establishing a reliable, free for everyone, social security system, one that is capable of meeting the population's needs more effectively. Until now, however, no definitive formula has been settled on. The experimentation in real-life conditions that was scheduled to take place in the centre-west and centre regions of the country has not been carried out yet. It was meant to be used as test case before the system was generalized to the entire country. It is clear, though, that such a project can only succeed if it is based on rigorous scientific studies. The present study was therefore designed to contribute quality information to help the country's decision makers arrive at appropriate choices in relation to social security.

The real difficulties in implementing such a system are essentially linked to the lack of real studies on the feasibility of such a project. The feasibility and experimental studies on health insurance that were planned for the administrative *départements* of Yamoussoukro and Daloa were not carried out to completion. In fact, only household surveys were conducted in these two localities, and for only 11 days instead of the two

months that would have been required. Those surveys covered 4,600 households spread fifty-fifty across the two localities (CEPRASS<sup>1</sup> et al., 2001). The survey phase was separated from the experimental one, which has not yet taken place but is still planned (CEPRASS et al., 2001). Thus, there is no study yet that could serve as a reference for the viability of the universal health insurance scheme.

The studies by Koné (2001) and Perrin (2001) have analysed the impact of the policy of cost-saving on medical treatment on equitable access to health care. They show that since 1992 this policy has greatly contributed to the increasingly inequitable access to health care for the residents of the suburbs of Abidjan. However, none of the recommendations made by the two studies seems to be related to the concern of our study, which is to establish the relationship between the demand for health care (or the use of health care) and social welfare in Côte d'Ivoire.

## Study Objectives

The intentions of this study are to, one, bring out the relationship between demand for health care and the status of the insured person and, two, to analyse the behaviour of individuals in their choice of type of insurance. In other words, the study seeks to answer the following question: *What types of therapeutic behaviour does the population adopt depending on whether it is a beneficiary of a health insurance or not?* As secondary concerns, the study looks at the difficulties that people encounter while seeking insurance cover, at the situation of non-insured people and at the strategies they use to receive modern health care.

## 2. Literature Review

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Studies on the issue of demand for health care (or the use of health care) can be reviewed through two approaches. One approach focuses on the demand for health care and the other on the provision of health care. The latter approach has been widely followed in research, but this is not the case with the former.

The demand for health care approach analyses the therapeutic behaviour of stakeholders in relation to the use of health care in the face of uncertainty (Arrow, 1963). This behaviour can be captured by an intertemporal utility function whose arguments are, among others, the health of the individual, the stakeholders' individual characteristics and the nature of the system of reimbursement of medical expenses (insurance policies). The relevance of such an approach lies in the description of the health demand function derived from the intertemporal utility function.

Very few of the studies carried out in this area in Côte d'Ivoire have used this approach; rather, most studies on health issues in this country have been more concerned with the provision of health care in relation to notions of fairness, equity and efficiency than with demand for health care. Studies by Perrin (2001) and Koné (2001), for example, highlight the inequitable aspects of a health policy based on saving costs on medical treatment. Using a comparative study based on living standards, Perrin assesses the differences in impact on demand, differences arising from a change in health care costs and some quality variables. Thus, improvement in the quality of health care influences the behaviour of the rich more than that of the poor; the latter are mostly affected by an increase in prices.

Using socio-anthropological data from a 1988 survey in three communes of Abidjan in 1998, Koné (2001) looks at the determinants of the use of health care by the poor in the urban health care units (FSU) in the communes of Sagbé, Yopougon-Attié and Attécoubé-Centre. The quality of health care, the cost of services and the lack of social safety nets in the FSUs are the essential parameters for the use of health care by the poor. While Koné's study is a good attempt at describing the use of health care, it says little about the nature of the expressed demand. Furthermore, it does not point out the importance of taking a social welfare system into account in the use of health care. The findings, especially regarding the description of the use of health care, corroborate those of the survey on living conditions, health care use and health expenses in the Yopougon commune carried out in 1992 (PSA, 1993), thus validating data collected five years earlier.

An analysis of questionnaires and findings of three successive Household Living Conditions Surveys (ECVM 1993, 1995 and 1998) conducted by the National Institute of

Statistics (INS) – even though they contain little information on health – shows that people’s behaviour in terms of making use of health care did not really change between 1992 and 2001, as economic conditions had not improved since the crisis of the 1980s.

An attempt to address the issue of the nature of the relationship between social welfare and health care use was made by CEPRASS (1995). The central theme of this study was focused on health matters, since access to health care is conditional upon the prior existence of mechanisms for reimbursing medical expenses. According to the CEPRASS study, it is advisable to have control over the non-state-controlled forms of solidarity by bringing into play only individual-to-individual or community-to-community relationships. The study found the mutual insurance system to be the collective mode that is most functional in the context of Côte d’Ivoire in terms of reimbursing medical expenses. In this connection, the study assesses the measures the population can depend on to have their health-related risks covered by a mutual insurance system. Furthermore, it brings to light the constraints that will face any policy aimed at generalizing health insurance and social welfare cover in Côte d’Ivoire – like the Universal Health Insurance (AMU) scheme. Two such constraints are the relatively low percentage of the salaried population compared with the entire working population, and the tightening of the budget, which limits the resource envelope. Although the CEPRASS study describes social security institutions, it does not explain the link between the demand for health care and having a social welfare system. This is what our study intends to do.

### 3. Conceptual framework and methodology

Persons who are likely to seek health care generally behave in an economic and rational way. And being covered by health insurance is one factor in the use of health care. In fact, one can logically expect that when people consider membership in a scheme to cover their health care costs, they take into account the services to which they are entitled through the social security system in use and do not simply aspire to all the health care services available. Such behaviour raises the issue of the basic functions of a social security scheme – that is its capacity to cater for a population’s expected and expressed demand for health care.

This study is the first step of a major research programme developed by Centre Ivoirien de Recherches Economiques et Sociales de l’Université d’Abidjan-Cocody (CIRES). The programme will lead to an estimation of the functions of demand for insurance by the Ivorian population, urban as well as rural and belonging to different socioeconomic groups. These must be taken into account if a social security system designed to serve the entire national community is to succeed.

Non-ordered polytomous logit models constitute a family of models of which the basic model is the multinomial logit one used in this study to estimate the demand for insurance. The unified framework for analysis in this context is based on “count data” regression models. The basic model for analysis is based on the Poisson distribution. A wide literature exists that used these models in studies on the use of health services and insurance products (Cauley, 1987; Cameron et al., 1988; Grossman, 1982; Gendtham, 1997; Pohlmeier and Ulrich, 1995).

#### Estimation method

In order to highlight the demand for health care in relation to individual characteristics, we will estimate the number of consultations (by medical doctors and healers), the number of hospitalization days, etc., according to individual characteristics. The demand is measured as the number of times an individual seeks health care during the period before an interview. This means that the dependent variable is a function of discrete probability – it follows a “count data” process. The specification of the estimation of the demand for health care using the Poisson model is linked to the advantages that this model offers. First, it captures the discrete and non-negative nature of data; second, it allows one to make an inference on the probability that the event will happen. These features correspond to the types of data we have and thus justify our choice of the Poisson model.

Let us designate the number of consultations for individual  $i$  as  $y_i$ . We then assume that  $y_i$  follows the Poisson law of parameter  $x_i$ ,  $i > 0$ ; this means that

$$P(Y_i = r) = e^{-\xi_i} \frac{(\xi_i)^r}{r!} \quad (1)$$

where

- $r = 1, \dots, n$  indicates the number of effective consultations with  $\xi_i = \exp [Z_i' B]$
- $Z_i =$  the vector of individual characteristics, including the state of being insured or not
- $B =$  the vector of unknown parameters

We also assume that the numbers of events occurring during two unconnected times are independent. This has not been empirically proved. Wooldridge (2002) offers the following innovation through the Poisson variance hypothesis. In this case, the variance of the Poisson law becomes:  $\sigma^2 = \xi_i$ , where  $\sigma^2$  is the “variance mean ratio”. We have adopted this approach in this study.

Regarding the demand for insurance, we assume that an individual makes a choice from three options of modern insurance: “not insured” = 0, “has membership in a mutual insurance scheme” = 1 and “is covered by a private insurance” = 2. We then have to estimate the probability that the individuals concerned will choose one of the three options according to their individual characteristics,  $x$ . To do this, we have to use an econometric model that respects the particular nature of the variable to be explained (the insurance system). It is, indeed, a qualitative variable, not a numerical one. Correlatively, it is a discrete variable: unlike continuous variables, it takes a limited number of modalities. Moreover, it is not an ordered variable; that is, one cannot, beforehand, classify one insurance system in relation to others and assert, for example, that the modern private insurance is “superior” to the mutual insurance, and that the latter is itself “superior” to the not-insured option, etc.

Discrete choice models are best suited to the present case. They are so called because they precisely model behaviours where an individual must make a choice from a discrete set of possible choices. The most used of these models are the non-ordered polytomous logit models because of their flexibility and – for at least some of them – the relative ease in using them, compared for example with alternative models like the multinomial probit ones.

We thus use a multinomial logit model (Maddala, 1983; Gourieroux, 1989) to explain the individual behaviour of insurance seekers using the following equation:

$$P(j/x_i) = \frac{e^{x_i \beta_j}}{\sum_{h=1}^J e^{x_i \beta_h}} \quad (2)$$

with  $J$  referring to the number of choice options  $j=1, \dots, J$ ;  $X_i$  to characteristics of the individual  $i$ ; and  $P$  to the probability that the individual  $i$  will choose option  $j$ .

For the estimation, we use the maximum likelihood method, whose likelihood function is given by:

$$L(Y/X, B) = \prod_J \prod_N \left[ \frac{e^{\beta_j X_i}}{\sum_{i=1}^J e^{\beta_h X_i}} \right]^{N_{ji}} \tag{3}$$

From this equation, we draw the linear form given by:

$$\ln[P(j|x_i)/P(J|x_i)] = x_i \beta_j \text{ pour } j = 1, 2, \dots, J-1, \tag{4}$$

with  $J$  being the number of choice options and  $N$  the number of observations, while  $X$  and  $x$ , respectively, are vectors and variables of individual characteristics.

Equation 4 allows us to interpret the estimated parameters by using the odds ratio principle, whose formula is given as follows:

$$\frac{P(j|x, x_k = 1)/P(J|x, x_k = 1)}{P(j|x, x_k = 0)/P(J|x, x_k = 0)} = \exp[\beta_{kj}] \tag{5}$$

Here the binary variable  $x_k$  is coded 0/1. The ratio on the left-hand side of (5) is the odds ratio. The ratio on the right-hand side is nothing more than the mathematical hope of the estimated parameter.

### Source of data

The main source of the data used in the present study is the survey, Recours aux soins et dépenses de santé ou PSA92 (Health care use and health expenses, or PSA92), which was carried out in April and May 1992 in Yopougon, a working class neighbourhood of Abidjan. It was conducted by ENSEA<sup>2</sup> (under the supervision of ORSTOM<sup>3</sup> with funding from the French Cooperation). We decided to use these data for two reasons: first, because of the insufficiency of the data collected on health care use by the INS in 1993, 1995 and 1998, and of those collected as part of the other studies mentioned previously; second, because of the multifaceted nature of the variable at the centre of our model, namely the insurance system. The objective of our study is to understand the nature of the relationship between the insurance system chosen and the use of health care. A comparison of the databases set up between 1992 and 2001 on health issues in Côte d'Ivoire shows that only the 1992 data perfectly describe all the existing options of the insurance system (whether associative or not, whether formal or informal).

During the 1992 survey, 7,217 people from 2,040 households were interviewed. We took into account individuals who had a source of income. Their total number was 4,166. For the estimation of the demand for health care, the sample consisted of individuals who suffered from at least one spell of illness and who had a source of income. These were

about 1,627. As for the demand for insurance, the estimation covered people with an income, whose number was 3,887. The survey had two objectives: to describe the use of health care and health expenses by the population of the Yopougon commune; and to relate health expenses to indicators of households' living standards. The 1988 census was used as a basis for sampling.

This is the only study at the beginning of this research (year 2003) that enabled researchers to describe health care use by pointing out, for every spell of illness that occurred during the time of the survey, the details of the stages followed by the patients in seeking and using health care.

For each stage, information was collected on the expenses that patients may have incurred while being diagnosed or when buying the prescribed medication or both.

## Description of the entry variables of the model

The analysis of the relationship between demand for health care and demand for a health insurance policy rests on a number of variables that indicate the frequency of choice of insurance or of use of health care.

### *Indicators of the use of health care*

Indicators of the use of health care indicate the demand for health care. From Cameron et al. (1988), Piaser and Raynaud (2002), and the PNDS (1996),<sup>4</sup> on the one hand, and from specific information contained in our PSA92 data base, on the other hand, we have extracted indicators of the use of health care; these are given in Table 1.

**Table 1: Variables of health care use as defined in the PSA92 data**

Variable	Definition of the variable
CONMED	Number of consultations received from a medical doctor
CONTRADI	Number of consultations received from a traditional healer
CONMODERN	Number of consultations received from a modern health official
CONNONMED	Number of consultations received from a health official who is not a doctor
DURHOSP	Number of hospitalization days

Source: Authors' formulation.

Table 2 shows the distribution of the frequency of the variables of health care use.

**Table 2: Distribution in percentages of the frequency of health care use variables**

Number of uses (X=n)	Health care use variables				
	CONMED (N= 1,731) <sup>a</sup>	CONTRADI (N= 1,731)	CONMODERN (N= 1,731)	DURHOSP (N= 1,731)	CONNONMED (N= 1,731)
0	60.14	87.00	33.56	94.17	69.61
1	33.33b	12.13c	53.67d	1.04e	26.29f
2	5.37	0.75	9.65	0.64	3.29
3	0.96	0.12	2.31	0.75	0.69
4	0.92		0.64	0.23	0.06

*Continued*

Table 2, continued

Number of uses (X=n)	Health care use variables				
	CONMED (N= 1,731) <sup>a</sup>	CONTRADI (N= 1,731)	CONMODERN (N= 1,731)	DURHOSP (N= 1,731)	CONNONMED (N= 1,731)
5	0.17		0.12	0.23	0.06
6	0.06		0.06	0.23	
7				0.81	
8				0.12	
10				0.35	
13				0.06	
14				0.17	
15				0.12	
20				0.06	
21				0.17	
22				0.06	
25				0.12	
30				0.06	
40				0.06	
41				0.06	
45				0.06	
48				0.06	
60				0.23	
90				0.06	
120				0.06	
130				0.06	
Mean	0.520	0.1399	0.834	0.1826	0.3517
SD	0.580	0.0222	0.450	0.934	0.1296

Notes:

- a. N indicates the number of people who suffered from a spell of illness.
- b. Proportion of individuals who went for a medical doctor's consultation once.
- c. Proportion of individuals who went for a traditional healer's consultation once.
- d. Proportion of individuals who were admitted at a health centre once.
- e. Proportion of individuals who were hospitalized for a day.
- f. Proportion of individuals who went for a consultation by a health official who was not a medical doctor once.

Source: Authors' calculations.

### ***Types of insurance as variables***

The insurance variables that reflect the health risk cover from the PSA92 data are defined as dummy indicators according to Table 3.

It transpires from the analysis of the database that there are two insurance systems: a modern system and one referred to as organized mutual aid. The modern system is made up of the supplementary private health insurance (offered by mutual benefit insurance companies), which is compulsory for civil servants, and the insurance offered by the formal private sector. The organized mutual aid system is a form of informal organization where members come together on the basis of community solidarity in order to support each other in circumstances such as hospitalization, illness, death or birth. The system is usually organized around community, ethnic, socioeconomic, occupational or religious groups. In the present case, the mutual aid concerns hospitalization and illness.

**Table 3: Definitions of “types of insurance” variables**

Types of insurance		
Variables	Modes	Definitions of the variables
INSUR	NONINSUR	Takes the value 0 if the person surveyed is not insured
	MUTUALINSUR	Mutual benefit medical insurance, which is compulsory for civil servants and state employees; it takes the value 1 if the person surveyed is insured under this mode
	PRIVATEINSUR	Private medical insurance; it takes the value 2 if the person surveyed is insured under this mode
	MUTUALAID	Hospitalization and illness: organized mutual help system; it takes the value 1 if the person surveyed belongs to the system; it takes 0 if not

Source: Authors' formulation.

From the foregoing, the “insurance system” variable can be categorized into two distinct types:

- The *INSUR* variable, with three modes: to be non-insured, to be insured through a mutual insurance scheme, or to have a private insurance.
- The *MUTUALAID* variable, when the household belongs to a mutual aid system or does not.

Table 4 summarizes the distribution in the study sample of the modes of insurance systems defined above.

**Table 4: Distribution of the modes of insurance in the two insurance systems**

Variables	Modes	Absolute frequencies	Relative frequencies
Modern Insurance	NONINSUR	3,398	81.57
	MUTUALINSUR	450	10.80
	PRIVATEINSUR	318	7.63
Mutualaid System	Death – Birth	4,100	98.42
	Hospitalization – Illness	66	1.58

Source: Authors' calculations.

Table 4 shows that the people surveyed are little covered by the two modes of modern insurance (*MUTUALINSUR* and *PRIVATEINSUR*). As for the *MUTUALAID* system, the solidarity principle that forms its basis works more in the case of deaths and births – where 98.42% of the people surveyed benefited from the system – than in the case of hospitalization and illness, in which only 1.58% benefited.

The distribution of types of insurance according to sex, age, annual per capita income and per adult equivalent is given in tables 5–7. Table 5 reveals that the male population is more covered by health insurance, whatever type it is, than the female population. The most used insurance type is the mutual insurance, which is compulsory for civil servants. These findings are identical with those reported in the studies by Koné (2001), Perrin

(2001), CEPRASS (1995), and CEPRASS et al. (2001). The Koné and CEPRASS studies looked at the patients' behaviour vis-à-vis the use of health care at the urban health units of Abobo and Yopougon, and at solidarity in health-related issues using survey data collected from Daloa and Yamoussoukro. These studies found that the mutual insurance, which primarily concerns civil servants, represented 22% of the health insurance cover in the localities concerned. This distribution by sex of the different insurance systems, which was also revealed by the PSA92 survey, reflects the distribution at the national level, according to Koné (2001) and CEPRASS et al. (2001).

**Table 5: Distribution of individuals by type of modern insurance and according to sex**

SEX	Type of modern insurance		
	MUTUALINSUR	PRIVATEINSUR	NONINSUR
Male	338 <sup>a</sup> (75.28) <sup>b</sup>	264 (83.02)	2,016 (59.52)
Female	111 (24.72)	54 (16.98)	1,371 (40.48)
Total	449	318	3,387

Notes: (a) Absolute frequencies of individuals; (b) Percentages in parentheses.  
Source: Authors' calculations.

The results in tables 6 and 7 show that the proportion of non-insured people (modern insurance) is high irrespective of their category of revenue per capita or per adult equivalent. For the brackets of annual per capita income between CFAF 10,000–20,000, and CFAF 20,000–40,000 (Table 6), and those between CFAF 10,000–25,000 and CFAF 25,000–50,000 per adult equivalent (Table 7), the proportions of individuals with a mutual insurance of a private modern insurance are high. This means that the higher the income, the higher the demand for insurance.

**Table 6: Distribution of individuals by brackets of annual per capita revenue (in thousands of CFAF) according to types of insurance**

Revenue bracket	Type of insurance			Total
	NONINSUR	MUTUALINSUR	PRIVATEINSUR	
R<10	1,017 <sup>a</sup> (29.93) <sup>b</sup>	90 (20.00)	39 (12.26)	1,146
10<R<20	1161 (34.17)	144 (32.00)	83 (26.10)	1,388
20<R<40	844 (24.84)	139 (30.89)	113 (35.53)	1,096
40<R	376 (11.07)	77 (17.11)	83 (26.10)	536
Total of individuals	3,398	450	318	4,166

Notes: (a) Absolute frequencies of individuals; (b) Percentages in parentheses.  
Source: Authors' calculations.

Table 8 shows that there is a relatively low insurance cover among people aged between 16 and 30 years. It can also be noticed that there is a higher proportion of insured people among senior citizens than among those aged below 30. Finally, it is within the 31–60 age bracket that the proportion of those with a health insurance is the highest, irrespective of type of insurance.

**Table 7: Distribution of individuals by annual income by adult equivalent (in thousands of CFAF) according to types of insurance**

Income bracket	Type of insurance			Total
	NONINSUR	MUTUALINSUR	PRIVATEINSUR	
R<10	614 <sup>a</sup> (18.07) <sup>b</sup>	56 (12.44)	28 (8.81)	698
10<R<25	1,286 (37.85)	130 (28.89)	70 (22.01)	1,486
25<R<50	1,010 (29.72)	165 (36.67)	110 (34.59)	1,285
50<R	488 (14.36)	99 (22.00)	110 (34.59)	697
Total of individuals	3,398	450	318	4,166

Notes: (a) Absolute frequencies of individuals; (b) Percentages in parentheses.  
Source: Authors' calculations.

**Table 8: Distribution of individuals by age according to types of insurance**

Age bracket	Type of modern insurance		
	NONINSUR	MUTUALINSUR	PRIVATEINSUR
0 – 15	101 <sup>a</sup> (2.97) <sup>b</sup>	1 (0.22)	0 (0.00)
16 – 30	1,636 (48.15)	51 (11.33)	34 (10.69)
31 – 60	1,340 (39.43)	328 (72.89)	243 (76.42)
61 and more	321 (9.45)	70 (15.56)	41 (12.89)
Total of individuals	3,398	450	318

Notes: (a) Absolute frequencies of individuals; (b) Percentages in parentheses.  
Source: Authors' calculations

Tables 9–11 illustrate the intensity of the relationship between insurance variables and those of health care use. Table 9 shows that the number of people seeking a medical doctor's services more than twice is very low. It further shows that the number of individuals who have an insurance cover and who seek a doctor's services once is relatively high for those whose insurance policy is of the mutual insurance type.

**Table 9: Frequency of seeking a medical doctor's services according to type of modern insurance**

Frequency	Type of modern insurance			Total
	NONINSUR	MUTUALINSUR	PRIVATEINSUR	
0	915 <sup>a</sup> (66.45) <sup>b</sup>	67 (33.84)	59 (37.82)	1,041
1	387 (28.10)	109 (55.05)	81 (51.92)	577
2	64 (4.65)	17 (8.59)	12 (7.69)	93
3	7 (0.51)	5 (2.53)	4 (2.56)	16
4	3 (0.22)	0 (0.00)	0 (0.00)	3
6	1 (0.07)	0 (0.00)	0 (0.00)	1
Total	1,377	198	156	1,731

Notes: (a) Absolute frequencies of individuals; (b) Percentages in parentheses.  
Source: Authors' calculations.

**Table 10: Frequency of seeking a traditional healer's services according to type of modern insurance**

Frequency	Type of modern insurance			Total
	NONINSUR	MUTUALINSUR	PRIVATEINSUR	
0	1,192 <sup>a</sup> (86.56) <sup>b</sup>	175 (88.38)	139 (89.10)	1,506
1	170 (12.35)	23 (11.62)	17 (10.90)	210
2	13 (0.94)	0 (0.00)	0 (0.00)	13
3	2 (0.15)	0 (0.00)	0 (0.00)	2
Total	1,377	198	156	1,731

Notes: (a) Absolute frequencies of individuals; (b) Percentages in parentheses.  
Source: Authors' calculations.

The higher the rate of insurance, according to Table 10, the lower the frequency of seeking a traditional healer's services. The table also shows that it is those who do not have a modern insurance cover that seek, at least once, a healer's services more. It can further be noticed that whatever the status of the insured person, about 80% of the people surveyed do not resort at all to a traditional healer's services.

**Table 11: Frequency of seeking a modern health official's services according to type of insurance**

Frequency	Type of modern insurance			Total
	NONINSUR	MUTUALINSUR	PRIVATEINSUR	
0	519 <sup>a</sup> (37.69) <sup>b</sup>	29 (14.65)	33 (21.15)	581
1	693 (50.33)	135 (68.18)	101 (64.74)	929
2	127 (9.22)	25 (12.63)	15 (9.62)	167
3	25 (1.82)	8 (4.04)	7 (4.49)	40
4	10 (0.73)	1 (0.51)	0 (0.00)	11
5	2 (0.15)	0 (0.00)	0 (0.00)	2
6	1 (0.07)	0 (0.00)	0 (0.00)	1
Total	1,377	198	156	1,731

Notes: (a) Absolute frequencies of individuals; (b) Percentages parentheses  
Source: Authors' calculations.

The frequency of seeking the services of a modern health official seems high when people are covered by a mutual insurance or a private insurance (Table 11). Nonetheless, the number of people who do not have an insurance cover and who seek the services of a modern health official at least once is even higher.

### ***The explanatory variables of our model***

The explanatory variables of our model can be grouped into two categories:

- Those describing the socioeconomic characteristics of the households surveyed, and
- Those describing the state of health.

These variables are listed in Table 12 in accordance with the PSA92 data.

**Table 12: Definitions of the explanatory variables**

Socio-economic variable	Definition
<b>SEX</b>	<b>1 if male and 2 if female</b>
AGE (A)	0 if A<15 years; 1 if 15<A<30; 2 if 30<A<45; 3 if 45<A<60 and 4 if 60<A
MARITALSTATUS	Marital status: 0 if single; 1 if married
ETHNIC GROUP	0 if Akan; 1 if Mandé; 2 if Krou; 3 if Gur; 4 if foreign nationality
RELIGION	0 if no religion; 1 if Muslim; 2 if Christian
EDUCATION	Level of instruction: 1 if no instruction; 2 if primary; 3 if secondary; 4 if higher
INCOME (per capita)	Revenue bracket in thousands of CFA francs: 1 if R<10000; 2 if 10000<R<20000; 3 if 20000<R<40000; 4 if 40000<R
INCOME (per adult equivalent)	Revenue bracket per adult equivalent in thousands of CFA francs: 1 if R<10000; 2 if 10000<R<25000; 3 if 25000<R<50000; 4 if 50000<R
<i>State of health variable</i>	<i>Definition</i>
DURILL	Duration of illness

Source: Authors' formulation.

Table 13 gives some descriptive statistics on the explanatory variables used in estimating the demand for health care and insurance.

**Table 13: Some descriptive statistics of the explanatory variables used in the analysis model**

Qualitative variables		Descriptive statistics	
Variables	Attributes	Absolute frequencies	Relative frequencies
SEX	Male	2,618	63.02
	Female	1,536	36.98
MARITALSTATUS <sup>a</sup>	Single	2,200	52.96
	Married	1,954	47.04
ETHNIC GROUP	Akan	1,632	39.17
	Krou	912	21.89
	Mandé	899	21.58
	Gur	230	5.52
RELIGION	Foreigner	493	11.83
	Christian	2,149	51.73
	Muslim	1,065	25.64
ACTIVITY	No religion	940	22.63
	Employed	3,375	81.25
	Looking for 1st job	456	10.98
	Unemployed	310	7.46
	Pupil/Student	6	0.14
	Retired	6	0.14
EDUCATION	Housewife	1	0.02
	Has not gone to school	1,069	25.71
	Primary	985	23.71

*Continued next page*

**Table 13, continued**

Qualitative variables		Descriptive statistics	
Variables	Attributes	Absolute frequencies	Relative frequencies
	Secondary	1,757	42.30
	Higher	344	8.28
Quantitative variables	Mean ( SD)	Minimum	Maximum
AGE	32.87 (10.018)	8.00	88.00
Per capita INCOME	23,191 (23.277)	0.250	450,000
INCOME per adult equivalent	33,462 (33.462)	0.384	900000

Note: (a) For this variable the initial attributes considered were: 1 if single; 2 if married to one wife; 3 if married to two wives; 4 if married to at least three wives; 5 if divorced; 6 if widowed; 7 if in a cohabitation relationship.

Source: Authors' calculations.

## 4. Results of the estimation

The equation of the demand for health care has been estimated using the Poisson model. The variables are: *DURHOSP* (number of hospitalization days), *CONMED* (number of consultations with a medical doctor), *CONMODERN* (number of consultations with a modern health official), *CONTRADI* (number of consultations with a traditional healer) and *CONNONMED* (number of consultations with a health official who is not a doctor). The results are compiled in Table 14.

**Table 14: Results of the estimation of health care use equations (N = 1,339)**

	DURHOSP	CONMED	CONMODERN	CONTRADI	CONNONMED
Constant	-3.397 (0.151) <sup>a</sup>	-0.769 (0.021)	0.001 (0.995)	-3.275 (0.0001)	-0.819 (0.078)
SEX:					
- Male	-0.202 (0.530)	-0.129 (0.076)	-0.110 (0.025)	-0.0003 (0.998)	-0.091 (0.313)
- Female	--	--	--	--	--
AGE <sup>c</sup>	0.003 (0.819)	0.013 (0.0008)	0.003 (0.178)	-0.003 (0.709)	-0.007 (0.147)
INCOME	0.003 (0.399)	0.001 (0.227)	0.0003 (0.714)	0.003 (0.078)	-0.001 (0.431)
MARITAL STATUS:	0.086 (0.793)	-0.099 (0.182)	-0.089 (0.080)	-0.259 (0.089)	-0.081 (0.401)
- Single					
- Married	--	--	--	--	--
ETHNIC GROUP:					
- Akan	2.174 (0.231)	0.062 (0.719)	-0.005 (0.963)	1.025 (0.020)	-0.104 (0.607)
- Foreigner	2.291 (0.212)	-0.405 (0.043)	-0.030 (0.800)	1.108 (0.010)	0.217 (0.274)
- Krou	2.028 (0.267)	0.103 (0.566)	-0.007 (0.948)	0.982 (0.031)	-0.184 (0.387)
- Mandé	2.201 (0.224)	-0.038 (0.819)	-0.077 (0.475)	0.583 (0.173)	-0.130 (0.496)
- Gur	--	--	--	--	--
ACTIVITY:					
- Unemployed	0.372 (0.390)	-0.246 (0.033)	-0.145 (0.047)	-0.042 (0.836)	-0.021 (0.869)
- Employed	--	--	--	--	--
RELIGION:					
- Christian	0.904 (0.057)	-0.007 (0.930)	-0.062 (0.292)	0.211 (0.271)	-0.156 (0.158)
- Muslim	0.223 (0.626)	-0.111 (0.364)	-0.080 (0.305)	0.544 (0.024)	-0.113 (0.408)
- No religion	--	--	--	--	--
INSURANCE:					
- Non-insured	0.335 (0.624)	-0.332 (0.001)	-0.140 (0.080)	0.304 (0.267)	0.336 (0.075)
- Mutual Insur	0.774 (0.306)	0.011 (0.921)	0.049 (0.586)	0.079 (0.808)	0.157 (0.483)
- PrivateInsur	--	--	--	--	--
MUTUAL AID INSUR:					
- No mutual aid insur	-2.234 (0.0001)	-0.094 (0.617)	-0.131 (0.312)	-0.291 (0.415)	-0.204 (0.411)
- Mutual aid insur	--	--	--	--	--

*Continued*

Table 14, continued

	DURHOSP	CONMED	CONMODERN	CONTRADI	CONNONMED
EDUCATION					
- Has not gone to school	1.711 (0.142)	-0.298 (0.048)	-0.012 (0.905)	0.246 (0.436)	0.353 (0.109)
- Primary	2.142 (0.059)	-0.155 (0.275)	-0.012 (0.916)	0.187 (0.549)	0.251 (0.246)
- Secondary	1.153 (0.298)	0.068 (0.565)	0.010 (0.133)	0.231 (0.415)	0.274 (0.171)
- Higher	- -	- -	- -	- -	- -
DURILL	0.007 (0.0001)	0.003 (0.0001)	0.002 (0.0001)	0.004 (0.0001)	-0.0009 (0.332)
-log (l)	31.11	1490.88	2316.04	684.22	1154.72
c(3) <sup>2b</sup>	0.0007***	0.003***	8.57 10 <sup>-6</sup> ***	0.293	0.047**
Scale <sup>c</sup>	4.989 (0.0000)	0.919 (0.0000 <sup>d</sup> )	0.823 (0.0000)	0.984 (0.0000)	1.004 (0.000)

Notes:

(a) p-value in parentheses; (b) Joint significance test for dummy variables of insurance; (c) Scale parameter was estimated by the square root of Pearson's Chi-square/DOF; (d) Standard error.

\* Significant at the 10% level.

\*\* Significant at the 5% level.

\*\*\* Significant at the 1% level.

Source: Authors' calculations.

## Results of the estimation of the demand for health care using the Poisson model

An analysis of the results of the estimation of health care use equations using the Poisson model applied to the data in Table 14 reveals a number of observations: the use of health care is highly linked to the state of health, especially the duration of illness (*DURILL*). Indeed, with regard to consultation by a medical doctor, use of modern health care, consultation by a traditional healer and hospitalization, the relationship with the *DURILL* variable is positive and statistically significant at 1%. This result seems to agree with those of Koné (2001) and Perrin (2001), who found that households go for modern health care only after self-medication and traditional treatment.

The use of health care is equally influenced by whether the person is insured or not. The results in Table 14 show that people who are not covered by either of the two types of modern insurance (mutual or private) consult a medical doctor less (with a coefficient of -0.332 significant at 1%) and seek modern health care less as well (with a coefficient of -0.140 significant at 10%). On the other hand, they consult health officials (who are not medical doctors) even when they are not insured (with a coefficient of 0.336 that is significant at 10%).

The data collected by the INS as part of the survey on the living standards of households (Enquête Niveau de Vie des Ménages 2002 – ENV) show that modern systems of insurance (mutual or private) influence the use of health care and consultations only at 3.8% (INS, 2003).

With regard to socioeconomic characteristics, *INCOME* does not influence the use of modern health care, except for the *CONTRADI* variable, where the relationship is positive and statistically significant at the 10% threshold. Sex has also an influence on the use of health care and, in particular, in relation to consultation by a medical doctor and use of modern health services. Indeed, the results show that men seek a doctor's consultation and modern health care less often than women: for men the coefficient is

-0.129, significant at 10%, while for women it is 0.110, significant at 5%. This can be explained by the fact that more occasions arise for women to seek modern health care than men (antenatal consultations, paediatric care, ante- and postnatal vaccinations, etc.). Age is positively and significantly (at 1%) related to consultation by a medical doctor: the older a person grows, the more often they go to see a doctor (with a 0.013 coefficient). Being single and being unemployed are negatively related to the *CONMODERN*, *CONMED* and *CONTRADI* indicators of use of health care.

Finally, certain socioeconomic variables such as religion and ethnic group influence health care use. In relation to religion, the results show that Christians seek modern health care services more often than Muslims; the latter tend to seek a traditional healer's services more. Regarding ethnic group, foreigners seek modern health care less, especially when it comes to seeking a doctor's consultation (with a coefficient of -0.405, significant at 5%).

The result of the  $\chi(3)^2$  test in the last line of the table for the dummy insurance variables is significant (at the 1% threshold) for all the equations that express the use of modern health care. This means that the combined effects of the different systems of insurance are more important for a medical doctor consultation than when they are taken separately.

The estimation of the health care use equations using the Poisson model enables us to understand the demand, from individuals, for health care. It shows that the duration-of-illness variable, which characterizes the individuals' state of health, appears to be more of a factor that triggers the demand for health care services than being insured and having an income.

## Results of the estimation of the demand for insurance using the multinomial logit model

The maximum likelihood method is used to estimate a multinomial logit expressing demand for insurance. This model suggests that an individual has three options in terms of demand for insurance. Thus, the dependant variable *INSUR* takes on the value 0 if the person is not insured, 1 if they are covered by a mutual type of insurance and 2 if they are covered by a private insurance. Furthermore, a condition that is likely to help identify the model has to be imposed on parameters. As a general rule, the condition in question imposes the nullity of all the parameters related to a given category, called a *reference category*. In our case we have decided that the reference category corresponds to that where  $j = 0$ , that is the "non-insured" category. This has indeed the lowest value. The results of the estimation using the multinomial logit have been compiled in Table 15.

Table 15 shows, for every type of insurance compared with the reference category (i.e., the "non-insured" mode), the values of the parameters attached to each explanatory variable, their standard deviations (in parentheses) and an indication of their levels of significance. In general, the parameters of the variables *age* and *activity* are significant at the 1% threshold, whether it is for the demand for private insurance or for the mutual. It can further be observed that for the mutual type of insurance, the parameters attached to the attributes "Has not gone to school", "Primary" and "secondary" of the variable *Level of instruction* are all significant at the 1% level. This is not the case for private

insurance. The parameter linked to *income* is significant at the 1% level for private insurance and not significant for mutual insurance. With regard to *religion*, the parameters of the attributes “Christian” and “Muslim” are significant at the 1% level for modern private insurance, but not for mutual insurance. The attributes “Akan” and “Foreigner” of the variable *ethnic group* have significant parameters at the 5% and 1% levels, respectively. Finally, the variable *marital status* seems to influence the choice of system of insurance, except in the case of mutual insurance, where the parameter linked to the attribute “single” is significant at the 10% threshold.

**Table 15: Results of the estimation using the multinomial logit for the choice of type of insurance (N= 3,887)**

Explanatory variables	Private insurance <sup>a</sup>	Mutual insurance <sup>a</sup>
Constant	-12.364 (31.441) <sup>b</sup>	-10.922*** (1.067)
AGE	0.093*** (0.00962)	0.100*** (0.008)
SEX:		
- Male	1.993 (31.423)	0.273** (0.111)
- Female	Ref	Ref
ETHNIC GROUP (geth)		
- Akan	0.273** (0.137)	0.520*** (0.139)
- Foreigner	-0.994*** (0.271)	-1.916*** (0.350)
- Krou	-0.011 (0.164)	0.331** (0.157)
- Mandé	0.241 (0.163)	0.053 (0.756)
- Gur	Ref	Ref
RELIGION (relig)		
- Christian	0.341*** (0.115)	0.116 (0.250)
- Muslim	-0.555*** (0.165)	-0.219 (0.127)
- No religion	Ref	Ref
MARITAL STATUS (etamat)		
- Single	0.141 (0.125)	-0.183* (0.104)
- Married	Ref	Ref
EDUCATION (NIVINST)		
- Has not gone to school	-6.354 (94.267)	-2.248*** (0.271)
- Primary	0.776 (31.423)	-0.612*** (0.176)
- Secondary	2.587 (31.422)	1.064*** (0.130)
- University	Ref	Ref
INCOME	0.008*** (0.0023)	-0.0009 (0.0028)
ACTIVITY (Act)	4.429*** (1.006)	4.871*** (1.006)
Number of observations	3,887	
-2Log L	4704.288	
Likelihood ratio	1416.300***	
Score	1155.744***	
Wald	564.574***	

Notes: (a) The “non-insured” mode is considered as the reference category; (b) Standard deviation in parentheses.

\*\*\* Significant at the 1% threshold.

\*\* Significant at the 5% threshold.

\* Significant at the 10% threshold.

Source: Authors' calculations.

The parameters of the variable *constant* take into account the fact that the systems are not equally represented. For example, the parameter *private insurance* (-12.36) is inferior to the parameter *mutual insurance*; this is in line with the fact that the number

of people with a private insurance cover is comparatively smaller than that of people with a mutual insurance cover.

The interpretation of the values of the parameters of variables is done according the odds ratio principle, which allows for enough flexibility in its application (ESSAFI, 2005). This interpretation relies on equations 4 and 5. In relation to age, the ratio of relative probabilities that is associated with the demand for private insurance is equal to  $\exp[0.093]=1.097$ . An additional year increases by  $\exp[0.093]=1.097$ , that is 9.7%, the probability that an individual will take out private insurance rather than being non-insured. Similarly, there is a probability of  $\exp[0.1]-1=0.105$ , that is 10.5%, that an individual will take a mutual insurance cover rather than being non-insured. With regard to gender, a man has about 31.4% ( $\exp[0.273]-1=0.314$ ) more chance than a woman of taking out a mutual insurance at the 5% threshold rather than being non-insured. At 83% ( $\exp[4.429]-1=0.8284$ ) there is probability that people who are employed will seek a modern private insurance rather than being non-insured. In addition, the probability is more than 100% ( $\exp[4.871]-1=0.130450$ ), that is 130.45% that people who are employed will take out a mutual insurance (which seems normal since this system is compulsory for each civil servant).

The results show that when an individual's income increases by one unit, this increases by 0.8% the probability that they will take out a modern private insurance rather than be non-insured. The level of education equally influences the probability of seeking private or mutual insurance. This probability is significant for the mutual type of insurance. The results do indeed show that an individual who has not gone to school, compared with one with university education, has about 89.5% chances of not taking out a mutual insurance and would prefer not to be insured. It is more or less the same case for someone with primary level education. An individual with secondary school education is 65% more likely to seek an insurance cover. Finally, marital status has very little influence over the decision to choose an insurance system. However, this parameter is significant at the 10% level for the mutual type of insurance with regard to the attribute "single". Thus, someone who is single is less likely to take out a mutual insurance than someone who is married.

## 5. Conclusion

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Our study considered the demand for health care and the demand for insurance in the outer suburb of Abidjan-Yopougon. The analysis of data from the PSA92 survey shows that few of the people surveyed were covered by a modern type of insurance, be it the mutual type (*MUTUALINSUR*) or the private insurance (*PRIVATEINSUR*) one. The former type is predominant, thanks to its compulsory nature for civil servants. The study found that when people are insured, they seek the services of a traditional healer less. Naturally, this means that the frequency of those who seek a traditional healer's services at least once is higher in the case of those who are not covered by modern insurance.

The estimation, using the Poisson law, of the demand for health care brings out the importance of the duration of the illness and the state of being insured or not as explanatory variables.

The analysis of the demand for insurance using a multinomial logit model brought out age and type of activity as significant explanatory variables for the two types of insurance. While income was found to be an explanatory variable for the demand for private insurance, the demand for mutual insurance was found to be influenced by the level of education.

Extending the data collection system to the rural population, or generalizing it to the entire population, and reaching a better definition of some of the variables ("state of health", "consulting a health service", "behaviour of the insured person and of the insurance company vis-à-vis health services") must be envisaged in order to refine the research so that it is even more useful to policy makers. All this will lead to a better grasp of the problems of moral hazard and adverse selection in Côte d'Ivoire's health system and, as a result, a clearer understanding of the costs of the implementation of the expected universal health insurance programme.

## Notes

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1. CEPRASS: Centre d'Etude Prospective et Appliquée sur les Politiques Sociales
2. ENSEA: Ecole Nationale Supérieure de la Statistique et de l'Economie Appliquée (National Higher Institute of Statistics and Applied Economics)
3. ORSTO : Office de Recherche Scientifique d'Outre-mer (Overseas Bureau for Scientific Research)
4. PNDS: Plan National de Développement Sanitaire (National Plan for Health Development)

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