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Demand for Child Healthcare in Cote d'Ivoire: A Multinomial Probit Analysis

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In Côte d'Ivoire, despite priority given to child care by governments, child mortality remains high and malnutrition and anemia among children reached alarming proportions. Our study tests influences of variables that condition demand for child healthcare. The sample covered 1,023 children who used a medical consultation and data are from Living Standards Measurement Survey of 2008. We obtain that tariff of consultation has negative impact while distance positively influences decision to consult modern health services; households headed by men are less likely to utilize modern services and as well as wealthy and highly-educated, households have a preference for private care.

JEL Codes: C25, D13 and I14

1. Introduction

Health indicators in Côte d'Ivoire contrast with economic situation of this country previously prosperous. Yet, Côte d'Ivoire has made the development of modern health care a priority objective for governance. Funds have been mobilized with support of development partners for building health centers and implementation of programs intended for vulnerable people. However, health indicators are not better; supervision of pregnancy and birthing process is low and use of maternal health services by pregnant women decreases with progress of pregnancy. Consequently, child mortality (12.3 per 1000 births) and maternal mortality (470 deaths per 100,000 live births) remains high, malnutrition and anemia among children who are five years old or less, reached alarming proportions (MSP, 2008).

This paradox is the result of a prestigious health policy adopted by Côte d'Ivoire since its independence. Thus, in this country health system is characterized by an oversized tertiary sector, a secondary sector particularly reduced and a primary supply clearly insufficient: about 300 public functional health centers throughout the country. In parallel, private medical supply, particularly abundant in Abidjan, is highly deficient in provinces. Moreover, Ivorian health system remains dependent on a network of an unstructured traditional care but highly active. Therefore, for a given episode of illness, people use concomitantly or sequentially several forms of therapies and resources (Haddad, 1994), so that use of modern medicine has stiff competition from other subsystems of healthcare, such as self-medication and traditional care (tradithérapy).

In Côte d'Ivoire, despite establishment of programs for maternal and child health (e.g. national program of reproductive health and child health program) aiming reducing morbidity and mortality of mothers and children, health situation of children remains highly marked by eminence of neonatal disease, malaria, acute respiratory infections and malnutrition. According to Ivoirian Public Health Ministry, these four causes explain 94%

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of infant mortality and one-third of children five years old or less suffer from chronic malnutrition or stunted growth in Côte d'Ivoire. In consequence, child mortality (119 ‰ in 2009) remains fairly high, reflecting that health policies had no significant effect on infant mortality (Tiehi 2011).

Unfortunately, despite these alarming health statistics, few studies have focused on demand for child care in Côte d'Ivoire. Therefore, it seems important to understand determinants of children's survival process in Cote d'Ivoire. Such an investigation should drive to not only design in favor of children a suitable health policy, but also look for ways for implementation and resource mobilization in a timely manner.

The objective of our study is to capture influences of variables that condition demand for child healthcare and suggest policies to improve provision for health services to Ivorian households. For that, we ask following set of interrelated questions. What are the determinants of primary healthcare use? How important are income, tariff, access, gender, education level and others in choice of health care provider? How do the poor and rich households make decision about treatment of their ill child in response to the tariff?

To conduct this analysis, we first present major analysis that looked at demand of healthcare in developing countries (section 2); then we describe the data and the econometric model, basis of our research (section 3); we present and discuss in following session our results (section 4); and finally, in light of these results, we draw conclusions (section 5).

2. Literature Review

Since work of Arrow (1963) on the unstable, irregular, and unpredictable individual characters of demand on the market for health care, the utility of care and the opportunity cost of the disease, analysis of demand has declined in several ways. Among these approaches, we have those of Grossman (1972), who first proposed a model of health demand in the context of the theory of human capital and redefines the concepts of demand for health care and demand for health. Beyond theoretical construction, Grossman's approach is original in that it lays foundation for a conceptualization of demand for medical care as derived from demand for health.

Subsequently, theoretical analysis of the demand for health care extended Grossman model so that, concept of "health capital" is a tangible translation into measures developed to assess utility of health states. These measures extend from the 80's to the issue of choice of care provider and theoretical framework of these measures is presented by Acton (1975) and Christianson (1976). For these authors, demand for care is a complex process, covering different decisions, starting with the declaration of an episode of illness and continuing through choice of a mode of treatment. Then, analysis moves not only to the study of discrete choice and their determinants, but also to decision-making processes from which these choices are made (Cissé et al 2004).

The first work (Heller 1982) analyzes behavior of care consumption, to a change in tariff of public health services. It concludes that there is an inelasticity of demand relative to the price of care and patient income. Accordingly, there would be no significant correlation between applied tariffs, income of households and demand for health services. On other hand, Gertler and Gaag (1990) showed a significant correlation

between demand and hospital tariffs and this correlation varies from child to adult and according to income and age of individual. For this purpose, they conclude that for adults, elasticity varies between – 0.38 (for individuals with high income) and -1.83 (for poor), whereas for children, this elasticity varies between -0.31 (for children from rich households) and -2.82 (for those from poor households). More recently, Yates et al. (2006) and Kermani (2008) in their works on Uganda and Iran, showed existence of a negative relation between price of consultation and utilization ratio of the health service (public or private).

Overall, research which studied the decisions of individuals regarding disease had to also analyze influence of factors other than price of medication and income. The choice of these factors which does not follow a particular rule of selection rather relies on the demand for healthcare as for any other good. Such an approach is likely to be affected by parameters other than price and income. Thus, in the beginning, Dor et al. (1987) and Gertler and Gaag (1990) assess discriminating effect of sex of the head of household (or decision maker), influence of number of persons in the household, age of the head of household, etc in decision of health service use.

Thus, age (of patient or decision maker) was analyzed as a quantitative variable. However, with regards to its nonlinear effects on probability to use health services, Sahn et al. (2003) considered a discrete measurement of age to assess its impact on choice of healthcare provider. On other hand, more recently, Sarma (2009) and N'Tembe (2009) capture this nonlinear effect on decision to use care services by introducing the square of variable « age ». Moreover, size of households and level of education (Mariko 2003) were often used as explanatory variables of decision of households. In the same way, area of residence influences decision of households and it is shown that rural households declare less morbid episodes (Chima et al. 2003).

In Côte d'Ivoire, Dor et al. (1987) estimated and analyzed determinants of health care demand and choice of provider in rural areas. They showed that health status, income, and price of consultation constitute the most determinant factors of the decision of an individual to resort to modern care. More specifically, Gertler and Gaag (1990) found that use of health services is inelastic to the price of health care in rural area in Côte d'Ivoire. Audibert et al. (1998), using a multinomial probit model, studied access to care by considering three possible choices (self medication, traditional system, modern system) and identified variables which determine probability of resorting to a given type of care provider. Furthermore, Perrin (2001) evaluated the impact on demand following a modification care tariffs and other factors, such as quality of care and income of the patients (or decision maker). She found that riches individuals are more sensitive to the quality of the care, whereas poor are significantly affected by the raising of prices of the care.

In sum, we deduce from last studies that effectiveness of cost recovery policies depends on socio-economic structure of the country. Therefore, necessity of introducing or increasing the cost of access to care (especially the tariff) as a means to mobilize resources for financing of health system should take into account situation of each countries and particularly situation of vulnerable individuals. To this end, our study aims to identify factors influencing decision of household in choosing child healthcare provider in Côte d'Ivoire.

3. The Methodology and Model

Data are from *Living Standards Measurement Survey* 2008 (LSMS 2008) of National Institute of Statistics of Cote d'Ivoire. This survey covered 16,200 households for a total of 59,700 people of all ages living at home. The survey covers a number of socio-demographic subjects (household structure, level of education, place of residence, income), a description of living conditions (home furnishings, access to technical infrastructures), as well as data on individual's health condition and access to the health care. From this data pool of surveyed individuals, we extracted children five years old or less, that is 9,954 individuals. The number (2,340) of ill children in this group is reduced to 1,196 children having been declared sick during the four last weeks preceding the survey. While excluding from this group (1,196), individuals imperfectly surveyed, sample is restricted to 1,023 children who used a medical consultation.

The medical recourses are gathered in categories of medical alternatives representative of principal options available to the head of household when one of the children of family is sick: *(i) self medication, (ii) private hospital, (iii) public dispensary, (iv) public hospital*. Specifically, "self medication" alternative categorizes care received outside of formal structures. Thus, it is care received by an individual without any preliminary doctor visit and about care offered by traditional caretakers. As for "private hospital" alternative, it includes private clinics and establishments of care whose capital is held by private actors. "Public dispensary" alternative represents health centers (urban and rural) of first contact. Lastly, "public hospital" alternative categorizes public sanitary institutions of second contact which are located in districts and exempts primary care. These medical alternatives represent dependant variable in estimated model, comprising four modalities not coordinated and mutually exclusive.

The explanatory variables are those which are most commonly used in analysis of the determinants of care demand resultant of seminal work of Getler and Gaag (1990) and Dor et al. (1987). These variables consist of a range of socio-demographic factors (distance to the care center, gender of the head of household, age of head of household, level of education of head of household, place of residence of household, and size of household) and economic factors (income of household, tariff of consultation). In following table, explanatory variables and assumptions on expected effects are briefly described.

Table 1: Specification of the variables

Variables	Description	Expected Impact
Tariff	Tariff of consultation	(ref) (-) (-) (-)
Income	Monthly income approximated to consumer expenditure	(ref) (+) (-) (-)
Distance	Distance between place of residence and provider	(ref) (-) (-) (-)
Gender (Man)	=1 if head of household is a man	(ref) (+) (+) (+)
Area (urban)	=1 if household lives in urban area	(ref) (+) (+) (+)
Education	Number of years of study to obtain the last diploma by head of household	(ref) (-) (-) (-)
Age Age^2	Age of head of household Square of the age of head of household	(ref) (-) (+) (+)
Household size	Number of individuals living in household	(ref) (-) (+) (-)

Our approach follows, work of Gertler and Gaag (1990) and the econometrics model is inspired by works of Akin et al. (1993) and Mwabu et al. (2003). On basis of assumption that individual (or decision maker) is rational, it will choose alternative which gives the highest level of utility U_i to him among whole of *p* possible choices. Formally, we note U_{ij} utility of an individual *i* when he receives care of a type of provider *j*. In absence of specific information on each alternative (such as tariff of consultation for example), this utility is defined as follows:

$$U_i = X_i \beta_j + \varepsilon_{ij} \qquad (1)$$

$$1 \leq j \leq p$$

In this equation X_i is the matrix of specific explanatory variables relative to each individual. Matrix X_i does not vary accross alternatives, and it represents observable component of the function of utility. Term ε_{ij} represents the stochastic component which captures the unobserved share of the utility. The matrix form of the equation arises as follows:

$$\begin{bmatrix} U_{i1} \\ U_{i2} \\ \dots \\ U_{ip} \end{bmatrix} = \begin{bmatrix} X_i & 0 & \dots & 0 \\ 0 & X_i & \dots & 0 \\ \dots & \dots & \dots & \dots \\ 0 & \dots & 0 & X_i \end{bmatrix} \times \begin{bmatrix} \beta_1 \\ \beta_2 \\ \dots \\ \beta_p \end{bmatrix} + \begin{bmatrix} \varepsilon_{i1} \\ \varepsilon_{i2} \\ \dots \\ \varepsilon_{ip} \end{bmatrix} \quad (2)$$

Given that utility cannot be observed, one is interested in probability that an alternative *j* is selected compared to other alternatives. An individual chooses alternative *j* if utility he withdraws is higher than that of all other alternatives.

$$y_{ij} = \begin{cases} 1 \quad if \quad U_{ij} > U_{ik} \ \forall \ k \neq j \\ 0 \quad if \ no \end{cases} \qquad (3)$$

For an individual *i*, the probability to choose alternative *j* is equal to:

$$P(y_{ij} = 1) = P(U_{ij} > U_{ik}, \forall \ k \neq j) \qquad (4)$$

This probability (equation 4) is conditioned by nature of the distribution followed by the disturbance ε_{ij}. Assuming that ε_{ij} is normally, identically, and independently distributed ($\varepsilon_{ij} \rightarrow \aleph(0, \Omega)$ with Ω a matrix of covariance *p* x *p* without restriction of independence of disturbance between alternatives), the defined model characterizes multinomial probit model (Hausman and Wise 1978).

This model (multinomial probit model) is more adapted in cases where alternatives are similar (like choice of a medical alternative), and Independence of Irrelevant Alternatives hypothesis (IIA hypothesis) proves implausible, insofar as absence of an alternative is likely to favor a similar one (Hausman and Wise 1978). Under assumptions of normality of error terms and homoscedasticity (Alvarez and Nagler 1995; Rudolph 2003), the model is rewritten in terms of differential of utilities by taking “self-medication” alternative and is referenced as follows:

$$U_i^* = U_{ij} - U_{i1} = X_i(\beta_j - \beta_1) + (\varepsilon_{ij} - \varepsilon_{i1}) = X_i \beta_j^* + \varepsilon_{ij}^* \qquad (5)$$

Where

$$(\varepsilon_2^*, \varepsilon_3^*, \varepsilon_4^*) \rightarrow \aleph\left(\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, \Omega \right) \quad \text{and} \quad \Omega = \begin{bmatrix} 1 & \sigma_{23} & \sigma_{24} \\ \sigma_{23} & 1 & \sigma_{34} \\ \sigma_{24} & \sigma_{34} & 1 \end{bmatrix}$$

Coefficients in discrete choices models do not have direct economic interpretation, because of problem of standardization of residual variance. This is why we calculate marginal effects as follows:

$$\rho_j = \frac{\delta P_i}{\delta x_i} = P_j\left[\beta_j - \sum_{k=0}^{j} P_k \beta_k\right] = P_j\left[\beta_i - \beta\right] \qquad (6)$$

The marginal effects describe sensitivity of probability of event (y_i = 1) compared to variations of the explanatory variables to give a sense to the obtained results.

4. The Findings

Table 2: Distribution of households according to medical alternatives

	Observations	Frequency	Percentages
Self medication	1023	44	4.30%
Private hospital	1023	336	32.84%
Dispensary	1023	520	50.83%
Public hospital	1023	123	12.03%

In the sample of this study, 4.30 percent of households had recourse to self-medication and 32.84 percent of them profited from services of private hospitals. Public dispensaries are used with a rate of frequentation of 50.83 percent whereas public hospitals record 12.03 percent of recourse (Table 2).

Table 3: Socio-demographic and economic characteristics of the households

		Self medication		Private Hospital		Public Dispensary		Public Hospital	
Variables	Obs.	Average (std-dev)	Min (Max)	Average (std-dev)	Min (Max)	Average (std-dev)	Min (Max)	Average (std-dev)	Min (Max)
Tariff of consultation	1023	1396 (2701)	200 (30000)	5898 (3020)	100 (30000)	1728 (995)	100 (10000)	47 30 (1049)	200 (10000)
Income	1023	66942 (63573)	6033 (916666)	66942 (63573)	6033 (916666)	66942 (63573)	6033 (916666)	66942 (63573)	6033 (916666)
Distance	1023	0.55 (3.27)	0 (50)	12.13 (10.35)	1 (60)	10.89 (8.22)	1.50 (50)	13.25 (10.03)	1.50 (56.20)
Gender (man)	1023	1.47 (0.499)	1 (2)	1.47 (0.499)	1 (2)	1.47 (0.499)	1 (2)	1.47 (0.499)	1 (2)
Age of head of household	1023	40.51 (12.85)	21 (99)	40.51 (12.85)	21 (99)	40.51 (12.85)	21 (99)	40.51 (12.85)	21 (99)
Area (urban)	1023	1.49 (0.500)	1 (2)	1.49 (0.500)	1 (2)	1.49 (0.500)	1 (2)	1.49 (0.500)	1 (2)
Household size	1023	6.2 (3.641)	1 (37)	6.2 (3.641)	1 (37)	6.2 (3.641)	1 (37)	6.2 (3.641)	1 (37)
Education (diploma)	1023	3.95 (4.47)	1 (22)	3.95 (4.47)	1 (22)	3.95 (4.47)	1 (22)	3.95 (4.47)	0 (22)

Table 3 reveals that average tariff for consultations in case of self-medication is 1,395 francs CFA (3.1 USD), tariff is 5,897 francs CFA (13.1 USD) for private hospitals, of 1,727 francs CFA (3.83 dollars us) in public dispensaries and 4729 francs CFA (10.5 USD) when public hospital is chosen. Maximum tariffs in case of self-medication and

consultation in a private hospital are approximately 30,000 francs CFA (66.67 USD), whereas this one is of 10,000 francs CFA (22.22 USD) in public dispensary and public hospital. We also note that average distance is 0.55 km for self-medication, of 12.13 km for the private hospital, of 10.89 km for public dispensary, and of 13.25 km for public hospital. Maximum distance for all alternatives varies between 50 km and 60 km.

Moreover, 52.98 percent of households are headed by men, while 47.02 percent are by women. In total, 50.24 percent of households are located in urban areas. In addition, majority of surveyed heads of household have a level of education which does not exceed primary school (4 years of study on average). The average number of individuals in a household is rather high (6.2 individuals). The average age of heads of household is 40.51 years and average monthly income of households is 66,941 francs CFA. (148.75 USD)

Table 4: Coefficients and marginal effects of the demand for infant care

	Private Hospital Prob.= 0.310		Public Dispensary Prob.= 0.5912		Public hospital Prob.= 0.0759	
Variables	coefficient	elasticity	coefficient	elasticity	coefficient	elasticity
Tariff of consultation	- 0.2593***	- 0.0755***	- 0.2593***	- 0.1087***	- 0.2593***	- 0.052***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income (Log consumption)	0.1010	0.1335***	- 0.3509***	- 0.1044***	- 0.4622***	- 0.0455***
	(0.516)	(0.000)	(0.008)	(0.000)	(0.002)	(0.002)
Distance	0.5259***	0.1533***	0.5259***	0.2206***	0.5259***	0.1040***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gender (man)	- 0.5269***	- 0.1139***	- 0.1419	- 0.0846**	- 0.1357	- 0.0177
	(0.006)	(0.001)	(0.367)	(0.018)	(0.432)	(0.326)
Age of head of household	0.0637	0.0114	0.0260	- 0.0073	0.0226	- 0.0021
	(0.106)	(0.135)	(0.416)	(0.333)	(0.520)	(0.561)
Age^2 of head of household	- 0.0006	- 0.0001	- 0.0002	- 0.0000	- 0.0002	- 0.0000
	(0.117)	(0.124)	(0.483)	(0.294)	(0.575)	(0.563)
Area (urban)	0.4267**	0.2281***	- 0.3826**	- 0.2048***	- 0.3694*	- 0.0368*
	(0.040)	(0.000)	(0.033)	(0.000)	(0.059)	(0.051)
Household size	- 0.0136	- 0.0082	0.0119	0.0028	0.0356	0.0060**
	(0.648)	(0.133)	(0.646)	(0.614)	(0.180)	(0.022)
Education (diplôma)	0.0365*	0.0154***	- 0.0119	- 0.0073*	- 0.0432**	- 0.0085***
	(0.091)	(0.000)	(0.513)	(0.091)	(0.057)	(0.001)
Constant	-0.8617	……	4.576***	……	5.8367***	……
	(0.642)	……	(0.003)	……	(0.001)	……
Integration points:	= 200		Wald chi2(23)	= 94.65		
Log simulated-likelihood	= -756.3201		Prob > chi2	= 0.0000		

The numbers in bracket are the probabilities;
Reference alternative: self-medication
(***) significance at 1%,
(**) significance at 5%,
(*) significance at 10%.

Self-medication (Prob=0.022) is medical alternative least preferred as a first recourse when a child falls ill in Ivorian households; probability of resorting to public hospitals (Prob=0.076) is slightly higher. Private hospitals (Prob=0.311) and public dispensaries (Prob=0.591) are medical alternatives most desired for infant care. These results reflect importance of public sector in offering primary care and noteworthy place of private health centers in Ivorian medical system. Our results contradict with those of Juillet (1999) and Mariko (2003) which, based on samples of a heterogeneous population, reveal preeminence of self-medication over formal alternatives in choice of health provider. Indeed, although it is possible to extend their conclusions to Cote d'Ivoire in

terms of demographic, economic, and cultural similarities, our results nevertheless demonstrate that when health of their children is concerned, Ivorian households prefer to address modern physicians.

Considering self-medication as reference alternative, estimation emphasizes that probability of using formal care (private hospital, public dispensary and public hospital) drops significantly with tariff of consultation. So, an increase of 1 percent of tariff of consultation reduces probability of using private hospital by 7.55 percent. As well, an increase of tariff of consultation of 1 percent reduces probability of using public dispensary by 10.87 percent and probability to use public hospital by 5.02 percent. This result is consistent with work of Fournier and Haddad (1997) and of Creese (1997), which showed a negative correlation between demand for modern care and price of consultation. Also, our results reflect that of Nyonator and Kutzin (1999), Chawla and Ellis (2000), Buor (2004), and Kermani (2008) which reveals that increase of tariffs has a negative effect on use of modern health services, with a prejudice against the most vulnerable groups.

Household's income has a positive effect on use of private care. However, the use of public services is negatively affected by income of households. When household income increases by 1 percent, decision to use private establishments raises 13.45 percent, whereas in governmental establishments, it decreases to 10.62 percent in dispensaries and 4.47 percent in public hospitals. Richest households have a preference for care provided by private institutions, unlike poor households that prefer public health facilities. In other words, increase of resources of households is an important determinant of access to health care provided by modern private services. This result confirms one of conclusions of Shaw and Griffin (1995), according to which, wealthy individuals are more willing to pay for more expensive services.

Apart from financial parameters of access to health care, our study was interested in socio-demographic characteristics of households. Contrary to our expectations and work of those such as Carrin et al (1993) and Ensor and Cooper (2004), our results show that distance of access to healthcare positively influences the demand for care. As paradoxical as it may seem, the positive impact of distance on probability of choosing formal care by households in Côte d'Ivoire can be explained by proximity of health facilities.

Hence, distance is not decisive in the decision of care demand. In this respect, although significant (with a 1 percent threshold), increase of the probability to choose modern care following an increase of 1% of distance is very weak (0.015 percent; 0.02 percent and 0.01 percent respectively for private hospitals, public dispensaries and public hospitals). This result is in line with that of Sauerborn et al. (1994) which show that in case of grave or serious diseases, distance does not constitute an obstacle in utilization of modern health services. Mariko (2003) also obtains similar results in his study on use of health services in Bamako (Mali). So, we can conclude that in Cote d'Ivoire, distance is not a limiting factor in the decision of parents to use modern care services for their children.

With respect to gender, our results show that, in comparison to female heads of households, male are less likely to require care for the ill children. This inclination is stronger in case of private providers, so that decision to choose a private hospital drops by 11.3 percent, whereas probability of resorting to public dispensary decreases by 8.46 percent, when one passes from a household headed by a woman to a household headed

by a man. These results are contradict with those of Nonvignon et al. (2009), who show that in a study on demand for care for infants with malaria in Ghana, probability of using modern care increases when payment of cost of care is covered by men. However, our findings remain in conformity with previous works (such as those of Sahn et al. 2003) which concluded to the existence of a negative effect of gender on demand of care in a household headed by a man.

Also, we note that compared to rural areas, probability of using private care establishments in urban areas increases significantly by 22.8 percent, whereas probability drops by 20.5 percent for public dispensaries and 3.67 percent for public hospitals. These results reflect possibility of a larger substitution between private providers and public providers in urban areas. So urban households are less constrained in their choice of health provider, and, as Bitran (1995) specified, in the absence of information on quality, private establishments are regarded as being much better in quality than public care services.

Education level of household head affects positively and significantly the demand for child healthcare in private clinics. In contrast, frequentation of public care service decreases when education level of household head is high. This negative impact is significant only for public hospitals. The preference for private health centers increases with level of education of head of household so that probability of resorting to private care increases significantly by 1.53 percent for every additional year of education. As level of education rises, households tend to deviate from care offered by governmental services so that probability of choosing a public dispensary drops by 0.7 percent, whereas probability of choosing a public hospital falls by 0.88 percent. These results are partly in conformity with those of Strauss and Thomas (1998), for whom parent's education level has a positive and significant impact on child health status as it increases their level of efficiency in evaluating health of their children and use of available health services. Heads of households which have high levels of education give more credit to efficiency of modern private care.

5. Summary and Conclusions

Concept of health care demand is closely related to search for healthcare of the individuals. In their step, endogenous and exogenous parameters influence household decision to be seen at one provider rather than another. The investigation of these parameters is important, particularly when it is question of looking after children, i.e. those who are most vulnerable due to higher rate of morbidity. The objective of this study is to measure and understand influence of factors on the demand of infant care in Cote d'Ivoire.

Our study uses a model of discrete choice inspired by the estimation approach of Akin et al. (1993) and Mwabu et al. (2003), and is useful in examination of situations where individuals have to choose between several medical alternatives. Our regression point out that tariff of consultation negatively affects decision of using modern health services (public or private) so that an increase in tariff significantly reduces probability of demanding care for ill children. Also, as expected, income affects recourse to healthcare services when a child is sick. Thus, as shown, by Gertler et al. (1990), and more recently by Sarma (2009), we find that tariff of consultation is the principal limiting factor of access to modern health services and increase in income positively increases demand for health care for ill children.

Otherwise, our study assesses effects of socio-demographic characteristics of households. In this respect, our estimates show, firstly, that distance from a service provider increases probability of resorting to modern care and that households headed by men are less likely to require infant care. Secondly, we find that compared to rural areas, urban households have a very significant preference for private hospitals, whereas probability of using public services in town drops. Lastly, our study reveals that probability of using private care increases with level of education.

There are a number of limitations with this study and its results. Among other we have the bad quality of data. Thereby, generalizing study results to all countries of West Africa on basis of homogeneity of household behavior should be done with extreme caution. Also, our study doesn't take into account the characteristics of medical alternatives. However, it is clear that quality of care, patient intake and other characteristics of health services are important in the household's decision. Nevertheless, this study is a preliminary attempt in the direction of modeling demand for child healthcare in Côte d'Ivoire and can motivate future research.

References

Acton, JP 1975, 'Non-monetary factors in the demand for medical services: some empirical evidences', *Journal of Political Economy,* vol. 83, n°3, pp. 595-614

Akin, JS Guilkey, DK and Denton, HE 1995, 'Quality of services and demand for health care in Nigeria: a multinomial probit estimation', *Social Science and Medicine*, vol.40, n° 11, pp. 1527-37.

Alvarez, RM and Nagler, J 1995, 'Economics, issues and the Perot candidacy: voter choice in the 1992 presidential election', *American Journal of Political Science,* vol.39, n° 3, pp. 714-44.

Arrow, KJ 1963, 'Uncertainty and the Welfare Economics of Medical Care', *American Economic Review,* vol.53, n° 5, pp. 941-73.

Audibert, M, Mathonnat, J, Nzeyimana, I and Henry, MC 1998, 'The determinants of health care demand amongst the senufo of Côte d'Ivoire', *Health and System Science,* vol.2, n° 1-2, pp. 111-26.

Bitran, R 1995, 'Efficiency and quality in the public and private sectors in Senegal', *Health Policy and Planning,* vol.10, n° 3, pp. 271-83.

Buor, D 2004, 'Gender and the utilization of health services in the Ashanti Region, Ghana', *Health Policy,* vol.69, pp. 375-88

Carrin,G, Perrot, J and Sergent, F 1993, 'The Influence of Financial Participation on Health Care Demand: An Analytical Tool for Countries in Greatest Need', WHO, Geneva.

Chawla, M and Ellis, RP 2000, 'The impact of financing and quality changes on health care demand in Niger', *Health Policy and Planning,* vol.15, n° 1, pp. 76-84.

Chima, RI, Goodman, CA and Mills, A 2003, 'The economic impact of malaria in Africa: a critical review of the evidence', *Health Policy,* vol. 63, pp. 17-36.

Christianson, JB 1976, 'Evaluating locations for outpatients medical care facilities', *Land Economics,* vol.52, n° 3, pp. 299-313.

Cissé, B, Luchini, S and Moatti, JP 2004, Recouvrement des coûts et demande de soins dans les PED' *Revue Française d'Economie,* vol.18 n° 4, pp. 111-49.

Creese, A 1997, 'They don't reduce costs, and they increase inequity', *British Medical Journal,* vol.315, pp. 202-03.

Dor, A, Gertler, P and Van Der Gaag, J 1987, 'Non-price rationing and the choice of medical care providers in rural Cote d'Ivoire', *Journal of Health Economics,* vol.6, n° 3, pp. 291-304.

Ensor, T and Cooper, S 2004, 'Overcoming barriers to health service access: influencing the demand side', *Health Policy and Planning,* vol.92, n° 2, pp. 69-79.

Fournier, P and Haddad, S 1997, 'Dimensions de la qualité des services de santé en Afrique au Sud du Sahara', In BRUNET-Jailly, (ed.), *Innover dans les systèmes de santé : Expériences d'Afrique de l'Ouest,* Karthala, Paris, pp. 275-90.

Gertler, P, Van Der Gaag, J 1990, *The willingness to pay for medical care: Evidence from two developing countries,* Baltimore: Johns Hopkins University Press.

Grossman, M 1972, 'On the concept of health capital and the demand for health', *Journal of Political Economy,* vol.80, n° 2, pp. 223-35.

Haddad, S 1994, 'Utilisation des services de santé en pays en développement. Une étude longitudinale dans la zone de santé rurale de Nioki au Zaire', In G DURU (ed.), *Analyses et évaluations en économie de la santé*, Hermes, Paris, pp. 227-52.

Hausman, JA and Wise, DA 1978, 'A conditional probit model for qualitative choice: discrete decisions recognizing interdependence and heterogeneous preferences', *Econometrica*, vol.46, n° 2, pp. 403-26.

Heller, P 1982, 'A model of demand for medical and health service in peninsular Malaysia', *Social Science and Medicine,* vol.16, pp. 267-84

Juillet, A 1999, 'L'impact des tarifs des services de santé et des revenus sur les décisions de recours aux soins des malades à Bamako. Estimation d'un modèle logit emboîté', *Revue d'Economie du Développement,* vol.4, pp. 69-89.

Kermami, M, Ghaderi, H and Yousoufi, A 2008, 'Demand for medical care in the urban areas of Iran: An empirical investigation', *Health Economics,* vol.17, pp. 849-62.

Mariko, M 2003, 'Accès aux soins et qualité: résultats d'une étude empirique menée à Bamako Mali', In M Audibert, J Mathonnat and De Roodenbeke E (ed.), *Le financement de la santé dans les pays d'Afrique et d'Asie à faible revenu,* Karthala, Paris, pp. 5-37.

Ministère de la Santé Publique 2008, Annuaire des statistiques sanitaires 2007-2008. Direction de l'Information, de la Planification et de l'Evaluation, Abidjan, Côte d'Ivoire.

Mwabu, G, Wang'ombe, J and Nganda, B 2003, 'The demand for health care in Kenya', *African Development Review*, vol.15, n° 2-3, pp. 439-53.

N'Ttembe, AN 2009, 'User Charges and Health Care Provider Choice in Cameroon', *International Review of Business Research Papers,* vol.5, n° 6, pp. 33-49.

Nonvignon, J Aikins, MKS Chinbuah, MA., and others. 2010, 'Treatment choices for fevers in children under-five years in rural Ghanaian district' *Journal of malaria,* vol.9, pp. 1-8.

Nyonator, F and Kutzin, J 1999, 'Health for some? The effects of user fees in the Volta Region of Ghana', *Health Policy and Planning,* vol.14, pp.329-41.

Perrin, H 2001, Justice sociale et santé: l'accès aux soins à Abidjan, Thèse de Doctorat es Sciences Economiques, université de Toulouse IRD. Unpublished

Rudolph, TJ 2003, 'Who's responsible for the economy? The formation and consequences of responsibility attributions', *American Journal of Political Science,* vol.47, n° 4, pp.698-713.

Sahn, DE Younger, SD and Genicot, G 2003, 'The Demand for Health Care Services in Rural Tanzania', *Oxford Bulletin of Economics and Statistics,* vol.65, n° 2, pp.241-60.

Sarma, SK 2009, 'Demand for outpatient health care: Empirical findings from rural India', *Applied Health Economics and Health Policy,* vol.7, n° 4, pp.265-77.

Sauerborn, R Nougtara, A and Latimer, E 1994, 'The elasticity of demand for health care in Burkina Faso: differences across age and income groups', *Health Policy and Planning,* vol.9, n° 2, pp.185-92.

Shaw, RP and Griffin, CC 1995, Financing health care in Sub-Saharan Africa through user fees and insurance, Washington, D.C: World Bank.

Strauss,J and Thomas, D 1998, 'Health, Nutrition, and economic development', *Journal of Economic Literature,* vol.36 n° 2, pp.766-57.

Tiehi, TN 2011, 'Population's health status in WAEMU countries : an analysis according to the theory of convergence', In K KONDLO, and C EJIOGU (ed.), Africa in Focus: Governance in the 21st century, HSRC Press, Cape Town, pp. 299-308,

WHO 1988, Economic support for national health for all strategies, WHO, Geneva,

Yates, J Cooper, R and Holland, J 2006, 'Social protection and health: experiences in Uganda', *Development Policy Review,* vol.24, pp.339-56.