Distribution Impact of Public Spending in Cameroon: The Case of Health Care

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Abstract

The study assessed Cameroonians' participation in public health care services in order to grasp the distributional effects of those services. Three specific objectives are specified: determine the extent to which public spending on health care may constitute a targeted means for poverty reduction; identify the determinants of participation in health care services in general and in public services in particular; and propose alternative health care policies compatible with the government's concern for poverty alleviation. In a benefit incidence analysis, it is shown that the benefits acquired from using publicly funded health care services are globally progressive. Integrated health care centres are chosen because of their nearness. Households appreciate the quality of services provided at the peripheral health care centres. Private health care is chosen because of the quality of the service, and people go to traditional healers or resort to self-medication because of the low cost. The majority of the considered factors – cost, nearness, revenue, education, age, gender and illness – had the expected sign and significantly affect the choice of health care providers. But for educated individuals who are employed in the formal sector, nearness and cost are the key variables in the design of health care policies.

Key words:
Public spending, health care providers, distributional impact, benefit incidence analysis, nested multinomial logit model

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1. Introduction

Good health is fundamental to economic growth, as highlighted by the theory of endogenous growth. The link between health and growth has become stronger than ever in the context of the generalized poverty experienced by a number of African countries since the second half of the 1980s. Indeed, if an equitable labour-using growth is to be secured, necessary pillars of any poverty reduction strategy are broad-based investments in basic heath, education and infrastructure.

Cameroon's constitution recognizes health as a primary right for all Cameroonians. Moreover, the country shaped its development plans along the lines of the recommendations of the Alma-Ata Declaration upon its adoption of the United Nations Declaration on Health for All in the year 2000. For example, the Fourth Development Plan (1976–1980) led to the development of provincial and departmental hospitals, health centres and pharmacies. The implementation of the fifth (1981–1985) and sixth (1986–1990) development plans implied some degree of coordination in the health care systems, which reduced significantly the imbalances between rural and urban areas. In general, health care services in Cameroon are provided in a dual system that involves both the public and the private sectors.

In the early 1990s, the health care system comprised 170 hospitals, 216 developed health centres, 243 basic health centres, and 218 infant and maternity hospitals, of which about 10% were privately run. Globally, the ratio of medical doctors rose from 1 doctor for 48,000 inhabitants in the 1960s to 1 doctor for 12,500 inhabitants in the early 1990s. According to the Cameroonian Sanitary Map (1998), there was 1 doctor for 10,083 inhabitants, 1 hospital bed for 768 inhabitants and 1 pharmacy for 62,823 inhabitants in the late 1990s. Those figures highlight the improvement achieved in the health care system in Cameroon. Indeed, the life expectancy has risen to 52 years, while the infant mortality decreased to 94 per thousand, and the death rate was reduced to 14 per thousand live births. But efforts are still to be made, given that the incidence of infectious diseases such as malaria, sexually transmitted diseases (STDs), diarrhoea, poliomyelitis and cerebrospinal meningitis remains high, while that of poverty increases.

Unfortunately, however, since the early 1990s, the government has put in place a health cost recovery system that entails the participants' bearing some of the cost. This system chased some individuals away from public health care facilities to search for cheaper means such as self-medication, traditional medicine and drugs from the street vendors. For example, the Cameroon Demographic and Health Survey of 1998 indicated that the rate of utilization of public health centres, as far as delivery attendance is concerned, was barely 15% in the late 1990s. But, neither traditional medicine nor street vendors

stand for the cheapest means to assure health care needs, given that these sources can become more costly in the longer run.

Gertler and Hammer (1997) point out that the combination of user fees and general government budget financing of health care affects how public subsidies are allocated across programmes and who gets the subsidies. Moreover, the structure of fees provides financial incentives that affect utilization patterns and health outcomes, as well as affecting how well individuals are insured against the risk of large economic losses associated with unexpected illness. That is, the way government expenditures on health care are financed is critical to the success of health care policies. Indeed, in their analysis of the experience of Cameroon, Litvack and Bodart (1993) indicate that user fees and the implied quality policy led to increased utilization of health facilities, given that the travel and time costs involved in seeking alternative sources became too high. But, as poverty incidence increased during the 1990s, spreading from rural to urban areas, factors other than quality of service should better explain the utilization of health care services.

As part of its effort to combat poverty, the government has increased, although slightly, its spending on health care since the second half of the 1990s. The general question, then, is to know if those increases really benefited the poor in Cameroon. More specific questions are: What type of distributional impact of public spending on health care characterizes the late 1990s? What are the determinants of participation in publicly funded health care services? The answer to those questions constitutes the thrust of this study.

Globally, the objective of the study is to assess the welfare impact of publicly funded health care services and the uses of such services in Cameroon. The specific objectives are to:

- Determine the extent to which public spending on health care constitutes a targeted means for poverty reduction;
- Identify the determinants of participation in publicly funded health care services; and
- Propose alternative health care policies compatible with the government's concern for poverty alleviation.

The specified objectives are based on two main hypotheses. These are:

1) Government spending on health care over the late 1990s was not enough to induce a notable degree of targeting of the poor, especially those in rural areas, and
2) Factors other than revenue and quality of health care services explain households' utilization of publicly funded health care services in Cameroon.

Six additional sections make up the paper. Section 2 provides the evidence on the problem being analysed in terms of its socioeconomic setting and Section 3 reviews relevant literature. The method of analysis is presented in Section 4. Section 5 analyses the distributions of the benefits acquired from using publicly funded health care services. The determinants of the choice of health care providers in Cameroon are analysed in Section 6. Finally, Section 7 concludes the paper.

2. Socioeconomic setting: A binding budget constraint

Cameroon is highly endowed with economic structure, language, religion, education, geography and climate. But the country's enormous potential has not been synonymous with growth. Indeed, following a period of marked growth from 1975 to 1985, the country slipped into a profound economic crisis marked by economic collapse and political as well as social transition. Between 1986 and 1988, real GDP decreased by 11%, while gross domestic investment and consumption went down by 38% and 9%, respectively. The global outlook at the time is as depicted by columns 2 and 3 of Table 1. The rate of growth in the primary and tertiary sectors remained positive despite the severe economic crisis, but the secondary sector plunged, along with private investment, becoming even more negative up to the end of the first half of the 1990s.

In effect, as government spending levels remained substantial following the country's Dutch disease over the late 1970s and early 1980s, its share in GDP rose from 12.4% in 1985 to 20.4% in 1992. The budget deficit also increased. As well among other means for sustaining its economy, the country resorted to heavy indebtedness both internally and externally. In the late 1980s, arrears accrued internally in terms of not only unpaid services to the private sector, but also as unpaid salaries. Externally, the government was forced into successive debt rescheduling as it became unable to service its external debt.

Table 1: Evolution of key macroeconomic performance indicators in Cameroon from 1976 to 2001

% growth in	1976–1984	1985–1993	1994–1996	1997–2001
GDP	8.2	-0.6	3.4	4.6
Primary sector	3.0	1.4	0.8	2.2
Secondary sector	20.3	-3.2	-5.0	1.3
Tertiary sector	5.1	0.6	8.7	6.8
Consumption	6.5	0.7	2.6	2.4
Investment	14.5	-8.0	-0.8	7.5
Public investment	19.5	-10.3	5.1	5.1
Private investment	13.2	-6.7	-1.9	6.3

Source: The Cameroonian PRSP (Draft 2002).

Consequently, the government had to set out conditions for a more effective macroeconomic adjustment. Two specific measures were the substantial cut in the public salaries in November 1993, and the government's agreement with other members of the Franc Zone on the devaluation of the CFA franc in January 1994. Public sector salaries were cut successively by rates ranging from 36% to 70%. Yet, public servants were

already suffering from several months (two months in Yaoundé and many more in other parts of the country) of arrears in their salaries.

The private sector had to readjust itself in order to cope with the depressed economic condition and the ever-increasing delays in the government payments, and in doing so generated widespread layoffs. In sum, although spending cuts prescribed under the structural adjustment programmes concerned primarily the public sector, investment, both public and private, decreased in order to adjust itself to the decrease in domestic demand and to the reduced competitiveness of the industrial sector. Ultimately, the secondary sector incurred a negative growth till 1996. The informal sector grew to become a solution for the short term. Indeed, the activity in the informal sector decreased even further following the successive salary cuts in the public sectors. The unemployment rate was then estimated at 17% (DSCN/MINEFI, 1997).

The extent of impoverishment in Cameroon worsened. While some of the newly unemployed joined the traditional sector in rural areas, many more remained in the cities, joining the informal sector where the activities are rather precarious. Moreover, cuts in government salaries without their indexation after the devaluation of the CFA franc pushed a good number of households to the brink of poverty. Using the 1996 Household Budget Survey, Kamgnia and Timnou (2000) estimated a food poverty incidence of 52% for Cameroon as a whole, while Fambon et al. (2000) estimated a cost of basic needs poverty line between 44% and 68%. In either case, more than 50% of the households in Cameroon have been living below the poverty line ever since the late 1980s.[1]

Low incomes, salary cutbacks, low producer prices, unfavourable terms of trade, large family sizes and parental irresponsibility are all contributing causes in explaining poverty in Cameroon. An equally important cause is the lack of basic infrastructure, mainly roads, education, electrification, water supply and health; in short, an inadequate – even absence of – social policy. In sum, the causes of poverty are numerous, and so should be the means to reduce it. The broad strategies suggested by the World Bank (1995) for a sustainable reduction of poverty in Cameroon involved an equitable labour-using growth, accompanied by a broad-based investment in basic health, education and infrastructure. A major constraint is the availability of financial resources.

Despite the numerous adjustment programmes put in place since the late 1980s, effective recovery was observed only towards the end of the 1990s. Even then, the growth in real GDP was not substantial enough (ranging from 3.3% to 5.2% between 1994 and 2001[2]) to sustain a notable increase in public expenditures on essential sectors such as education, health, infrastructure, employment and the rural sector, as shown in Table 2.

Indeed under the structural adjustment programmes, public expenditures were squeezed. Such a budget contraction was more stringent as far as non-wage expenditures were concerned. As pointed out by the World Bank (1995), even in 1994/95, total recurrent expenditure allocations for agriculture, social services and other development sectors declined while those for national sovereignty and environment ministries have increased. Moreover, the already negligible share of non-salary expenditures precluded the effective provision of critical non-salary inputs such as medicines, books and equipment. In the late 1980s through the early 1990s, it was a rare exception to find public sector facilities such as hospital and clinic with adequate supplies to fulfil their tasks. In this scenario one

should expect health inequalities to increase, thus requiring the government to increase its investment in the sector.

Table 2: Evolution of percentage shares of public spending on key social sectors

	1996	1997	1998	1999	2000	2001
Education	18.1	16.4	17.9	18.1	18.0	23.1
Health	4.7	4.7	5.6	5.6	5.3	6.6
Infrastructures	7.6	11.4	12.2	10.9	9.9	11.0
Social development and employment	1.1	1.0	0.7	0.9	0.9	1.0
Rural sector	4.3	4.2	4.5	4.5	3.9	4.3

Source: The Cameroonian PRSP (Draft 2002).

3. Literature review

Generally, health objectives are either established in terms of society-wide averages or based on a set of international development goals. While society-wide averages usually are specified as overall infant mortality, society's average life expectancy, international development goals are stated in connection with the 1995 global summit in Copenhagen. According to Gwatkin (2000), society-wide averages, although informative about conditions prevailing in a society as a whole, remain silent on the prevailing inequalities. This author recommends restating the objectives from the 1995 Summit to emphasize existing inequalities, thereby preparing the way for the development of effective interventions necessary for dealing with those issues (Gwatkin, 2000).

As pointed out by Wagstaff (2002), only recently have issues on socioeconomic inequalities in health started to receive attention in the developing world. But one needs to know the extent of such inequalities, as well as the factors that accounts for the observed inequalities. Wagstaff undertakes such a study, looking at the case of child health inequalities in 42 countries, with an emphasis on the effect of three factors that influence how much people pay out-of-pocket for their health care: differences in incomes, differences in income inequalities and differences in policies. His results point to a strong positive relationship between health inequality and average income; that is, richer countries tend to have higher health inequalities. He therefore recommends that health costs of rising incomes should be traded off against the health benefits. Such a trade-off could be quantified on the basis of, among others, country-based evaluation studies with either controls or decompositions, or benefit incidence analyses.

Gupta et al. (2001) estimated the impact of public spending on the health status of the poor in over 70 developing and transition countries. Basing their analysis on a comparison of disaggregated data for the poor and non-poor, they arrived at the same conclusion that the poor have significantly worse health status and are more strongly affected by public spending on health care than the non-poor. They point out, however, that increased public spending alone will not be sufficient to meet the commitments for improving health status. Indeed, as observed by Castro-Leal et al. (2000), understanding the behaviour of individuals vis-à-vis the use of publicly funded health facilities would help identify the most appropriate public interventions. In effect, based on a benefit incidence analysis of health subsidies in Côte d'Ivoire, Ghana, Guinea, Kenya, Madagascar and South Africa, these authors find that in Africa, even where health spending is reasonably progressive, curative health spending is not well targeted to the poorest. Of course, van de Walle (1998a), in benefit incidence analyses of public spending, points to the fact that spending on basic services – notably primary and secondary education and basic health care – is

found to reach the poor almost universally largely because most public spending programmes are to some degree targeted to the poor. The issue is to determine the degree of targeting is optimal.

In sum, while the benefits of public spending on social matters may be assessed through either behavioural or benefit incidence studies, the identification of the determinants of the participation in these programmes would best elucidate the distribution of the benefits. To date, existing studies on health care in Cameroon either looked at the financing of the health sector (Amin, 1995; Ntangsi, 1998) or assessed the effects of user fees on the utilization of public health facilities (Litvack and Bodart, 1993). Amin (1995) states that as overall public spending decreased in the early 1990s, the improvement in health care services required shifting the financing to the individuals through the institution of user fees. Ntangsi (1998) quantifies the contributions of both the public and the private sectors in the supply of health services for the 1995/96 fiscal year.

As far as Litvack and Bodart (1993) are concerned, user fees and the policy of quality led to increased utilization of health facilities, given that the travel and time costs involved in seeking alternative sources became too high. Indeed in the absence of user fee and quality policy, local health centres tend to be confronted by constant drug shortages, with people having to incur substantial travel and time costs. Then the questions are: Do publicly funded health facilities really benefit the poorest in Cameroon? What factors determine the demand for public health care facilities in Cameroon?

4. Method of analysis

As stated by van de Walle (1998b), benefits are valued using either monetary or non-monetary welfare metrics that are consistent with behavioural responses to the public spending. Monetary measures commonly used are compensating and equivalent variations, and willingness to pay. Non-monetary measures are social indicators such as infant mortality or nutritional status. The assessment of the impact of publicly funded health care in the current study is based on monetary welfare metrics. More specifically, the degree of targeting of public spending on health care is evaluated in terms of the analysis of the nature (progressive or regressive) of the benefits acquired from using the considered health care facility, basically curative health care, antenatal, postnatal, and care for wounds and accidents – hence the use of benefit incidence analysis (BIA). The determinants of participation in publicly funded health services are identified in evaluating an appropriate quantal response model. The required information is obtained mainly from the 2001 Cameroon household budget survey (ECAM II).

Analysis of the extent of targeting public health care spending to the poor

One solution to alter a binding budget constraint is targeting, as pointed out by van de Walle (1998b). Types of spending or types of persons could be targeted.[3] What matters under expenditure targeting is the type of the programme and its scope. Hence, spending would be tailored to those areas that matter relatively more to the poor, notably social and basic infrastructure services. Under individual targeting, the poor would be directly addressed. More specifically, groups are first identified and specific programmes are then designed. Frequently implemented programmes are cash transfers such as family allowances and means-tested social assistance, along with micro-credit schemes addressed to rural landless women.

Some public expenditures on health care may help to reduce inequality, while some others would increase it, even when the spending is targeted. Simply stated, public expenditure may be either progressive or regressive. In the current study, the distributional impact of public spending on curative diseases (malaria, respiratory diseases, diarrhoea and meningitis) is assessed through a benefit incidence analysis**.** The principle of benefit incidence, as well as its data requirement and use in the specific case of Cameroon, is presented in the following sections.

Principle of benefit incidence analysis

A benefit incidence analysis (BIA)[4] entails the assessment of how costs of health care consultations or visits are distributed among various population subgroups, combining data on costs of service provision with information on clients, hence proceeding in the following steps:

1) For individuals ranked according to a welfare measure (income or consumption expenditure, or total expenditure), determine appropriate groups, either quintiles or percentiles.
2) Determine the corresponding number of uses of specified public facilities.
3) Multiply the identified frequencies by the public cost of providing one day or one week or one year of the specific service. Of course, the number of visits could suffice to proceed into the benefit incidence analysis.
4) Plot concentration curves that show the cumulative distribution of benefits across households.

In a more formal way, Castro-Leal et al. (2000) define the benefit incidence of public spending on a given health care service to the

jth household group as:

$$X_j = \sum_{i=1}^{L} H_{ij} \frac{S_i}{H_i} \equiv \sum_{i=1}^{L} \frac{H_{ij}}{H_i} S_i \qquad (1)$$

where:

X_j is the value of the total health subsidy imputed to group *j*
L is the number of observed levels in the health system of the considered country
H_{ij} is the number of visits of group *j* to the ith facility
H_i defines the total visits to the ith facility across all the groups
S_i is the government net spending on health care at level *i*

Moreover, the share of net subsidy accruing to the *j*th group is determined by specifying *Xj* relative to total government subsidy to the health sector, which comes down to the following expression:

$$x_j = \sum_{i=1}^{L} \frac{H_{ij}}{H_i} \left(\frac{S_i}{S} \right) \equiv \sum_{i=1}^{L} h_{ij} s_i \qquad (2)$$

with h_{ij} defining the share of the group in total health consultation at each health care level and s_i is the share of the health care level in total government net subsidy.

In general, benefits so estimated are represented in various ways in order to allow one to determine whether the public spending component is progressive (inequality reducing) or regressive (inequality increasing) and whether it appears to be a better means of transferring benefits to the poor compared to other public spending components. Appropriate representations are concentration curves.

The distribution of health services is considered progressive if the concentration curve for its benefits lies anywhere above the Lorenz curve, as it is more equal than consumption expenditures (or wealth scores). A per capita progressivity is obtained if the concentration curve of the benefits lies above the 45-degree line, and the programme is such that benefits accrue more to the poor than the non-poor. A regressive programme has the concentration curve of its benefits lying below the Lorenz curve. When the curves cross each other, other welfare indexes such as the Gini coefficient and concentration indexes should be used to determine the distributional impact of the considered health service. Normally, the higher the index, the more concentrated is the benefit and the higher the inequality. Hence, of two benefit schemes, the most regressive one would be associated with the highest concentration index.

Although the benefit incidence approach is straightforward in principle, it has been criticized for being grounded on strong assumptions and for not explaining incidence outcomes, but leading rather to limited and general policy implications. Indeed, as pointed out by Lanjouw and Ravallion (1998), the estimated subsidy per unit of usage may be a poor indicator of benefits: unlike commodities obtained on (competitive) markets, the level of utilization of publicly supplied goods would not be able (as a general rule) to reveal the value that consumers attach to the goods. Moreover, the distributional impact of a reallocation of the budget between programmes will depend on how well positioned different socioeconomic groups are to benefit from marginal expansions, given the history of the programme. Further, the timing of programme capture by different income groups remains critical to policy conclusions about the incidence gains and losses from public spending. Hence, the results from the benefit incidence analysis should be taken with some caution, especially in the face of problem of individuals' responsiveness to incentives.

Data requirement and benefit incidence setting for Cameroon

It should be noted that a benefit incidence is undertaken when it is difficult either to identify individual users or to estimate the unit cost of providing the facility. The databases for such an analysis are household level data on participation and information on the unit cost (or benefit). Participation data are readily available from country survey data, while unit costs are collected separately from government budget data at various ministries. The implementation of the benefit incidence analysis in the current study necessitated the determination of L, H and S, as defined in equations 1 and 2.

Specification of L. As in a number of African countries, the health system of Cameroon is a three-tiered one, with clinics and dispensaries at the first level, provincial hospitals at the second level, and reference and speciality hospitals at the third level. In this study, L is set equal to 3 in accounting for the three publicly funded health services for which data are available. These are: integrated health centres (CSI), medical centres of wards (CMA), and district hospitals (HD).

Determination of H_{ij}. The database for the analysis of benefit incidence in Cameroon is ECAM II, which contains information on the various components (health, education, food, leisure) of household expenditures. The survey also documents the health status of members of the household over the two weeks preceding the survey, the health facilities

utilized by the individual, the cost of the consultation, the causes (illness, injury, maternal care, other matters) of the consultation, individual appreciation of the cost of the consultation and the duration of the illness. It does not, however, indicate the number of times the individuals used the health facilities. Rather, this variable is determined on the basis of the use of the health services by the considered individuals.

Determination of S_i. Health expenditures S is taken to comprise all expenditures and outlays for prevention, promotion, rehabilitation, care, population activities, nutrition and emergency programmes, exclusive of expenditures on medical education and training, as defined by Ntangsi (1998). Those expenditures are financed by the government, households, religious missions and NGOs, and through external aid. More specifically, government spending is done mainly through the Ministry of Public Health, and to a lesser extent through the Ministry of Armed Forces, the Ministry of National Education, the Ministry of Higher Education and the Ministry of Social Affairs. We collected information on recurrent budget of the Ministry of Public Health[5] for the year 2001 and imputed costs to each of the individuals in the sample. In this imputation, a per capita budget was determined as a sort of unit budget, accounting for regional and institutional (types of publicly funded health care services[6]) differences. It is assumed that consultation fees paid by individuals contribute to the budget with at least a year delay.

Concentration curves. In a first step, a Lorenz curve is constructed with total expenditure used as the main measure of welfare. In the second step, concentration curves are constructed for the benefits acquired from the use of publicly funded health care facilities. Finally, the progressivity (regressivity) of the benefits is determined by comparing the two groups of curves.

Identification of the determinants of choice of public health care facilities

If the distributional impact analysis reveals some inequalities, these can be reduced by health policies based on objectives established in distributional terms. Hence, it appears necessary to assess individuals' decisions to participate or not in the considered public health services. Of course, health inequalities would be reduced if health services were targeted, notably by disease, and specifically with respect to the diseases that are most important to the poor. But targeted health services are likely to have the greatest impact on the poor if their delivery mechanisms are structured specifically to reach the poor. We expect the determinants of the probability of participating in a given health care programme will contribute to the design of appropriate delivery mechanisms in Cameroon. We first present the structure of the health care system in Cameroon and then develop the logit model for the identification of the determinants of the choice of health care providers.

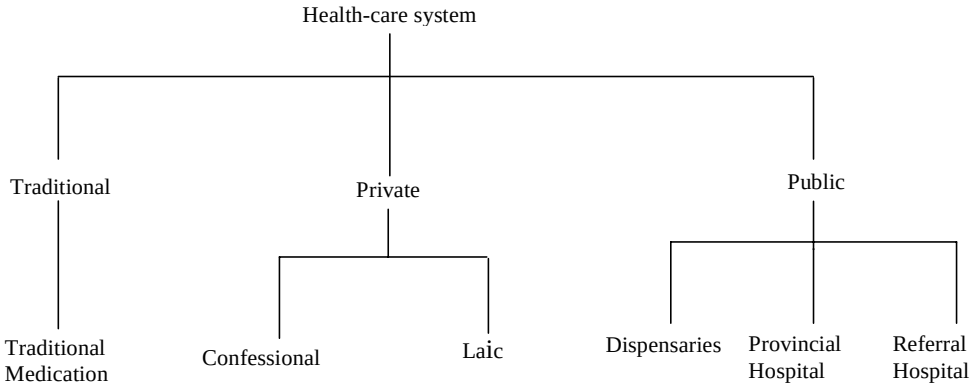
The structure of the health care system in Cameroon

Alternatives to the public health services are private services, either formal (private hospitals and clinics) or informal (traditional healers), and self-medication. Whether public

or private, formal sector services are provided by specialized institutions as well as non-specialized centres, the whole making up modern health care services (as opposed to self-medication or traditional healers). Overall, individuals' options for health care providers in Cameroon are government hospitals, public health centres, faith-based hospitals and health centres, private pharmacies, private doctors, and street or market vendors.

A survey conducted by OCEAC[7] in 1997 indicates that for any disease in Cameroon, individuals resort first to the structured health care system (47%), then to self-medication (44%), and accessorily to relatives (8%) and traditional healers (1%). A similar pattern is found by Kamgnia (2001) in the case of malaria treatment in Yaoundé, in a blend of modern health services (41%); self-medication (44%); traditional healers (10%); no-treatment (2%); and others (1%). As for antenatal care, 79% of the observed cases in the 1998 DHS were satisfied by modern health care services, while 20% resorted to self-medication and 1% to traditional services (Ministère des Investissements Publics et de l'Aménagement du Territoire, 1998). Hence, one could think of three main alternatives in health care delivery in Cameroon – the public sector, the private institutions, and self-medication – which bear a nested relationship among themselves. The set of decisions would be considered sequentially in a reduced decision tree as shown in Figure 1.

Figure 1: A decision tree for selecting health care providers



Source: Constructed by the author.

A primary concern in our analysis is to determine the extent to which costs or user fees in the modern sector (public and private) push the demand for health care towards services in the traditional sector, even as the reduced quality and lack of respect in public institutions (hospitals and dispensaries) would encourage people to seek care from private institutions.

Modelling the demand for public health care providers

Following Sahn et al. (2002), we analyse the participation in health care in terms of the selection of a health care provider by estimating the probability that a certain alternative will be selected, given a structure which requires the use of a nested multinomial logit

model**.** Our study develops these authors' model, as adapted from Gertler et al. (1987),[8] with some extension to the specification done by Gertler et al. (1988).

We let U_{ij} be the level of the utility a patient i associates with a visit to provider *j (j* = 0, 1, 2, 3, 4, 5 for traditional medication, religious health centres, non religious health institutions, public dispensaries, provincial hospitals, and referral hospitals, respectively). Such a utility is specified as the sum of two components: a deterministic effect V_{ij} and a random effect e_{ij}. V_{ij} is a function of the characteristics of both the patient/household *i* and the provider *j*, which are supposed to be observable by the researcher. The random component e_{ij} is a conception of the researcher that is known only to the patient. U_{ij} is maximized conditional on the choice of the provider and is a function of variables that are exogenous to the patient, thus defining a conditional indirect utility function.

More specifically, one specifies:

$$j = 0, 1, 2, 3, 4, 5 \text{ providers} \qquad (3)$$
$$i = 1, 2, 3, ..., n \text{ individuals}$$

where $y_i - p_{ij}$ is net income after paying for health care services, or to say, the level of consumption of all goods other than health. $Q(X, Z_j)$ indicates the quality of provider *j* and is defined as a linear function of *X* and Z_j. While *X* comprises variables such as age, education, household size, marital status, type of illness and other demographic variables of the households, *Z* specifies variables describing the providers. Sahn et al. (2002) define *Z* to express the quality of each one of the options (providers). In our study, information on the characteristics of the option is based mainly the cost of the consultation, and the motive for the choice of the service; the information on the distance to the health care facility was poorly reported by the households and questions pertaining to the quality of the health personnel were not asked in the surveys.

$$V_{ij} = f\left(y_i - p_{ij}\right) + Q\left(X, Z_j\right)$$

Duschesne (1998) introduces the quality of the service provider in terms of a semi-logarithm specification:

$$Log\left(Q_{ij}\right) = \beta_{0j} + \beta_{1j} x_i \qquad (4)$$

where x_i is the vector of the socio-demographic characteristics of the household, and the characteristics of the health service provider, hence a pool of *X* and *Z*.

As for the consumption of other goods, Sahn et al. (2002) specify:

$$f\left(y_i - p_{ij}\right) = \alpha_1 Log\left(y_i - p_{ij}\right) + \alpha_2 \left(Log\left(y_i - p_{ij}\right)\right)^2 \qquad (5)$$

Upon a development of the right-hand terms, these authors find the following equation:

$$f\left(y_i - p_{ij}\right) = \alpha_1 \left(Logy_i + Log\left(1 - \frac{p_{ij}}{y_i}\right)\right)$$

$$\alpha_2 \left(Log\left(y_i\right)^2 + 2Log\left(y_i\right) Log\left(1 - \frac{p_{ij}}{y_i}\right) + Log\left(1 - \frac{p_{ij}}{y_i}\right)^2 \right) \qquad (5a)$$

Given that p_{ij}/y_i is a small fraction, $Log(1-(p_{ij}/y_i))$ could be approximated by $-(p_{ij}/y_i)$. Further, $Log(y_i)$ and its square are constant for all providers, and given that a sick person starts by resorting to self-medication before considering other care facilities, a residual utility is defined and the following specification is obtained:

$$U_{ij} = \beta_{0j} + \beta_{1j} x_i + \alpha_1 \left(-\frac{p_{ij}}{y_i} \right) + \alpha_2 \left(2\frac{p_{ij}}{y_i} Logy_i \right) + \varepsilon_{ij} \tag{6}$$

In sum, it is assumed that sick persons will choose the health care provider that maximizes their utility. Specifically, provider *j* would be chosen over a provider *k*, if

$U_{ij} > U_{ik}$, for j ≠ *k*,
in that case, $hp_{ij} = 1$,
but $hp_{ij} = 0$ otherwise.

Those utilities are not observed, but the provider to be chosen is the one that yields U_{ij}.

On the basis of the random utility model (McFadden, 1973) and allowing for independently and identically distributed random terms, the probability that individual *i* chooses alternative *j* is obtained as:

$$\begin{aligned} Pij &= Prob\ (U_{ij} > U_{ik}, \text{ for } j \neq k) \\ &= Prob\ (V_{ij} + e_{ij} > V_{ik} + e_{ik}, j \neq k) \\ &= Prob\ (e_{ik} - e_{ij} < V_{ij} - V_{ik}, j \neq k) \end{aligned} \tag{7}$$

However, with respect to care/no-care (as defined in the current analysis), it would be unreasonable to assume independence between e_1, e_2, e_3, e_4 and e_5, though e_0 could be independent of the other five.

From McFadden (1973), an appropriate distribution for the error term is the Gumbel's type B multivariate extreme-value distribution, such that,

$$F(\varepsilon_1, \varepsilon_2, .., \varepsilon_5) = e^{-\left(\sum_{j=1}^{5} e^{-\frac{\varepsilon_j}{1-\sigma}} \right)^{1-\sigma}} \tag{8}$$

where $0 \leq \sigma \leq 1$ measures the degree of dependency. If $s = 0$, one falls under the case of independence and $F(e_1,\ldots,e_5)$ reduces to the product of five type I extreme-value distributions, hence specifies the case of independent logit (Amemiya, 1981).[9] e_0, being different from the other two, its density is

(9)

The choice between the similar alternatives would be made according to a polytonic logit model, such that

$$P[hp = 1/hp \neq 0] = \frac{e^{\frac{U_1}{1-\sigma}}}{e^{\frac{U_1}{1-\sigma}} + ... + e^{\frac{U_5}{1-\sigma}}} \tag{10}$$

The choice between care and no-care is like a logit model, but with the use of some weighted average of $e^{U_1}, ..., e^{U_5}$. That is,

$$P[h = 0] = \frac{e^{U_0}}{e^{U_0} + \left[e^{\frac{U_1}{1-\sigma}} + ... + e^{\frac{U_5}{1-\sigma}} \right]^{1-\sigma}} \tag{11}$$

On practical grounds, for a two-level nested logit model, letting the index *l* define the first level alternative and *q* the bottom-level alternative, we determine

$$P_{lq} = Pq_{/l} * P_l = \frac{e^{\beta' x_{2q/l} + \gamma' x_{1l}}}{\sum_{l}^{J_1} \sum_{q}^{J_2} e^{\beta' x_{2q/l} + \gamma' x_{1l}}} \tag{12}$$

$$= \left(\frac{e^{\beta' x_{2q/l}}}{\sum_{q}^{J_2} e^{\beta' x_{2q/l}}} \right) \left(\frac{e^{\gamma' x_{1l}}}{\sum_{q}^{J_1} e^{\gamma' x_{1l}}} \right) \left(\frac{\left(\sum_{q}^{J_2} e^{\beta' x_{2q/l}} \right) \left(\sum_{l}^{J_1} e^{\gamma' x_{1l}} \right)}{\sum_{l}^{J_1} \sum_{q}^{J_2} e^{\beta' x_{2q/l} + \gamma' x_{1l}}} \right) \tag{13}$$

Defining the inclusive values for alternative l as

$$I_l = \ln \sum_{q}^{J_2} e^{\beta' x_{2q/l}} \tag{14}$$

and upon cancelling terms in the expression of P_{ql}, one gets:

$$Pq_{/l} = \frac{e^{\beta' x_{2q/l}}}{\sum_{q=1}^{J_2} e^{\beta' x_{2q/l}}} \tag{15}$$

$$P_l = \frac{e^{\gamma' x_{1l} + \tau_l I_l}}{\sum_{l}^{J_1} e^{\gamma' x_{1l} + \tau_l I_l}} \quad (16)$$

where x_1 specifies the vector of explanatory variables determining the choice of the sector of health services. More specifically, x_1 comprises: education; household size; revenue; type of illness, age of the household head; and gender. $x_{2,}$ which defines the vector of explanatory variables in the choice of the service providers, comprises: consultation cost and the motive (proxied by nearness) for the choice of the service.

Indeed, following Grossman (1972) in his extension of the neo-classical analysis of consumer theory, we would think of an individual maximizing an inter-temporal utility function, given a time constraint. Such a utility is defined as an initial stock of health, which depreciates over time at a rate that depends on the age of the individual but accelerating in the later period of the individual's life time. When perceived as a pure investment, health care is modelled as a derived demand from the demand for good health, given that it is consumed in order to produce good health. But health care can be conceived as a consumption good, in which case health condition increases the utility derived from the consumption of other goods. Good health and health care are interrelated in the consumption approach of health care analysis, and the older individuals get the more means they devote to alter the depreciation of their health condition.

Hence, the major factors explaining the demand for health care are age, gender, consultation cost, and the socioeconomic variables of the households. In the specific case of age, a J-type of relationship was found between expenditures on health care and age: the expenditures tend to be high at birth, decrease at adolescence, then increase rapidly over the fifties. The partial effect of revenue was found to be minor in developed countries, given that hospital care is sought only in acute illness (d'Intignano, 2001). The cost effect is decomposed into a revenue effect and a substitution effect, with the revenue effect bring highest among the poorest. The substitution effect depends on the acuteness of the illness and the socioeconomic condition of the household, so that the overall cost effect is negative if the revenue effect dominates, and positive otherwise.

Once the parameters of the model have been estimated, the measure for the degree of dependency is determined as the inverse of the estimated coefficient of the inclusive variable; that is $s = t/t$.

On accounting for poverty in the analysis of the demand for health care services

The analysis of the demand for health care services along with poverty issues is based on the $P_{\pm}$ indexes. Indeed in the expression,

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - y_i}{z} \right)^\alpha \quad (17)$$

the quantity $\sum_{n}(z - y_i)$ defines the total amount to be transferred to the poorest to bring them above the poverty line *z*, with each individual being granted the positive value of $(z - y_i)$. Hence in the utility function, the income variable would be defined so that it reveals the poverty status of the considered household. Morey, Sharma and Mills (2002) specified a piece-wise linear Spline function (Greene, 2003) of $(y_i - p_{ij})$, considering two cases:

Net income ≡ $(y_i - p_{ij})$ if $(y_i - p_{ij}) < z$;
Net income ≡ $(y_i - p_{ij} - z)$ if $(y_i - p_{ij}) > z$.

In our study, we accounted for the concern for the poorest in two ways: first by fitting a Spline function and second by scaling the income for all households by the poverty line, hence specifying the effect of income relative to the poverty line, which is y_i/z, in the modified expression of the P_α:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(1 - \frac{y_i}{z}\right)^\alpha \qquad (18)$$

The databases

The main database is the ECAM II (Deuxième Enquête Camerounaise auprès des Ménages) a survey of 12,000 households comprising 56,927 individuals in the second semester of the year 2001. The general objective of the survey was to produce a poverty profile for Cameroon that would characterize living conditions in the late 1990s and early 2000s. For this purpose, the country was divided into 22 strata, of which 10 are rural and 12 urban. The administered questionnaire was about 40 pages long; it consisted of questions organized into 15 sections: (01) composition and characteristics of the household; (02) health of the household members; (03) education of the household members; (04) activity status of household members; (05) fertility of women aged 15–49 years; (06) anthropometry and vaccination coverage; (07) lodging and equipments; (08) migration of household members; (09) access to basic infrastructure; (10) living conditions assessment; (11) non-agricultural family enterprises; (12) material and financial wealth, savings and social capital; (13) agriculture and rural activities; (14) non-consumption expenditures; and (15) daily expenditure of the households. While sections 01, 02 and 03 involved every member of the household, sections 04–06 concerned specific members. The remaining sections were meant to collect information on the household as a single unit. Finally, data were obtained for a total of 10,992 households upon editing the completed questionnaires.

The inequality analysis in assessing the degree of targeting the poor is done on DAD version 3, and the multinomial nested logit model is estimated using STATA version 8.

5. The incidence of public spending on health care

Following its assessment of poverty in Cameroon in the early 1990s, the World Bank (1995) recommended, among others, a health policy that would emphasize basic preventive care and family planning programmes that would be strengthened by the government and other development agencies in their projects. Since then, affirmative actions have been taken to implement those recommendations. Therefore, it appeared important to determine the degree of targeting of the poor in those types of public spending.

Characteristics of the 2000 poverty profile

In the second half of the 1990s, the DSCN determined a poverty incidence of 53.3% for Cameroon, based on a CBN poverty line of 148,000 CFA francs. From the 2001 household survey (ECAM II), the DSCN characterized a new poverty line in terms of a minimum value of CFAF 232,547 and a maximum of CFAF 345,535, hence distinguishing the households into three categories: poorest with a expenditure per adult equivalent that is below the lower poverty line; an intermediate group with an expenditure between the two poverty line values; and the richest group with expenditure set at the maximum poverty line value or above. Table 3 pools the poverty indexes (incidence P_0 and extent P_1) and profile corresponding to the two data points: 1996 (ECAM I) and 2001 (ECAM II).

Table 3: Cameroon's poverty indexes and profiles for 1996 and 2001

Area of residence	P_0		P_1	
	1996	2001	1996	2001
Rural	59.6	49.6	21.5	18.3
Urban	41.4	22.1	14.7	6.3
Cameroon	53.3	40.2	19.1	14.1

Source: PRSP April 2003 version (referring to the DSCN ECAM I and ECAM II reports).

Overall, both the incidence (P_0) and the extent (P_1) of poverty felt down by 24.58% and 26.18%, respectively, with the greatest reduction in the urban areas (46.62%). That could be the result of the various strategies put in place by the government, first to improve the overall economic condition and second to curb poverty nationwide. The rate of growth of GDP in that period not only became positive but also reached a level of 5%. Since the required rate for a significant reduction of poverty incidence in Africa is estimated at 7%, however, more effort needs to be made to further reduce those figures in Cameroon.

In the 1990s, the identified causes of poverty were the level of education, the area of residence and the socioeconomic activities of the household (DSCN/MINEFI, 1997; Kamgnia and Timnou, 2000; Fambon et al., 2000). Following the DSCN/MINEFI, those factors remain at play in explaining the poverty profile in 2001, although the participatory poverty assessment points to factors such as the need for liberalization in the agricultural sector; poor institutions and governance; ecological conditions; and unequal access to basic infrastructure. The last point is to be cross-checked in the specific case of public health care services in assessing the distribution of their benefits to the households.

Targeting the poor in public health care spending

As indicated in the description above of the methodology, a benefit incidence analysis was undertaken. In that respect, the net subsidy implied by public spending on health care was determined as the per capita recurrent budget of the Ministry of Public Health for the year 2001, accounting for regional and institutional differences.

Individuals normally pay some fees when they use health care services irrespective of the source. Table 4 indicates that the maximum costs are incurred at either referral public hospitals or non religious private institutions. Restricting ourselves to public institutions, it appears that the mean cost and the standard deviation are the largest for referral hospitals and lowest for peripheral health centres. More interestingly, the consultation fees at the provincial hospitals (public) have a maximum that is lower than that of faith-based institutions but a comparable mean value. Hence, on a cost basis, we would expect the peripheral health centres to attract the maximum number of individuals, followed by the provincial hospitals. Traditional healing is the cheapest on average, but individuals pay as much as CFAF 30,000 in resorting to it.

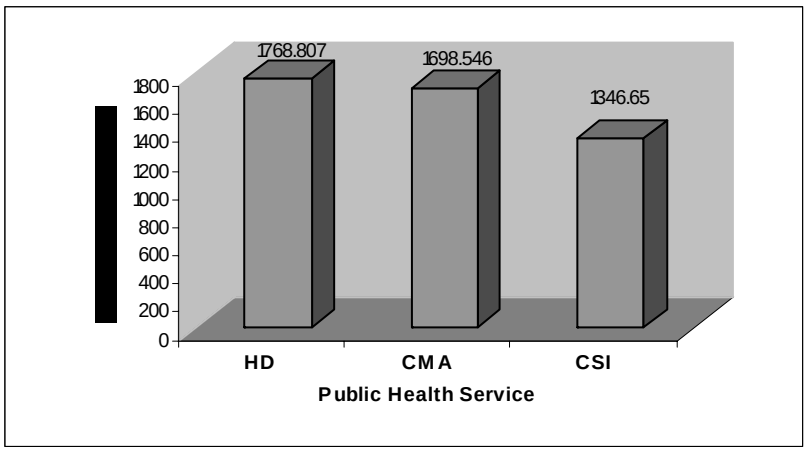
Table 4: Consultation costs (CFAF) by service providers

Service providers	Minimum	Maximum	Mean	Std deviation
Referral hospitals	0	60,000	2,758	4,370
Provincial hospitals	0	15,000	969	1,257
Peripheral health centres	0	20,000	600	771
Private non religious	0	60,000	1,597	3,236
Private religious	0	20,000	938	1,419
Traditional	0	30,000	260	1,158

Note: Peripheral heath centres include integrated health centres (CSI) and medical centres of wards (CMAs).
Source: Author's construction based on ECAM II.

In determining the benefit to individuals of public health spending, we assumed that user fees collected each year are reflected in the following year's budget allocation for public services. Hence, the transfer to individuals from using publicly funded health care services was determined as the per capita recurrent budget of public health care centres. The mean subsidy provided to the users of three of the publicly funded health care services is shown in Figure 2. District hospitals (HDs) yield the highest subsidy, followed by CMAs. Integrated health centres (CSI) or dispensaries provide the smallest subsidy, but not the least given that the three mean values are comparable in magnitude.

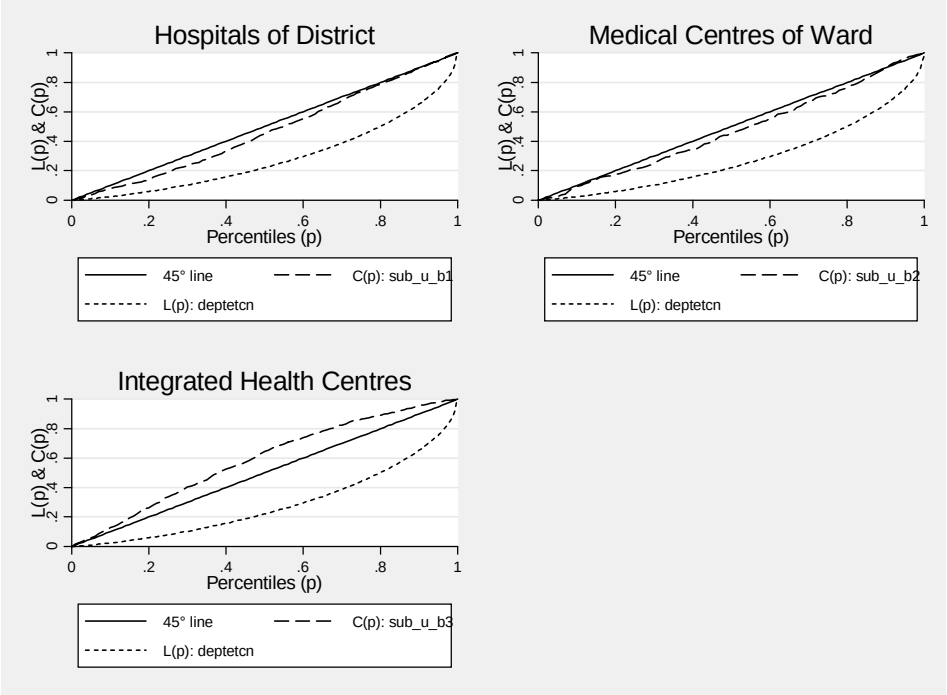
Figure 2: Distribution of the recurrent budget over the health services



Source: Author's construction based on the 2001 recurrent budget of the Ministry of Health.

The analysis of the concentration curves of the benefit (subsidy) acquired from using the various public health care services reveals that the richer the individual, the less the transfer in all three cases. More interestingly, expenditures on the CSI are pro-poor, as indicated in part c of Figure 3.

Figure 3: Concentration curves of benefits on using public health care services



Source: Author's construction based on ECAM II.

The results therefore tend to confirm those found in the cases of Côte d'Ivoire, Ghana, Guinea, Kenya, Madagascar and South Africa by Castro-Leal et al. (2000), in Mozambique (Heltberg et al., 2001), and in developing countries as a whole as determined by van de Walle (1998a).

Subsidies on the utilization of district hospitals (HD) and CMAs are rather progressive. Moreover, a comparison of the three subsidy measures based on their progressivity indexes on Table 5 indicates that the benefits acquired by individuals in the utilization of CMAs are pro-poor as well. Of course, the estimate of the concentration index of CMAs is less precise than those of the two other benefit measures, as revealed by the corresponding t-statistics.

Table 5: Gini coefficient and concentration indexes in the utilization of public health care services

	Estimate	t- statistics	Lower bound	Upper bound	Progressivity index
Consumption expenditure	0.4148	117.02	0.4079	0.4218	na
Subsidy on HD uses	0.1975	9.96	0.1587	0.2364	0.2173
Subsidy on CMA uses	-0.0801	-2.64	-0.1394	-0.0207	0.4949
Subsidy on CSI uses	-0.0746	-5.88	-0.0994	-0.0497	0.4894

Source: Author's construction based on ECAM II.

The same pattern of concentration curves is observed for the area of residence: the progressivity indexes are all significantly positive in rural and urban areas, as indicated in Table 6. Expenditures on CSIs are consistently pro-poor in both urban and rural areas, but the benefits of the utilization of CMAs are pro-poor only in urban areas. Although the benefits on the utilization of district hospitals are progressive over the two categories, they are more progressive in urban than in rural areas.

Table 6: Gini coefficient and concentration indexes in the utilization of public health care services by milieu of residence

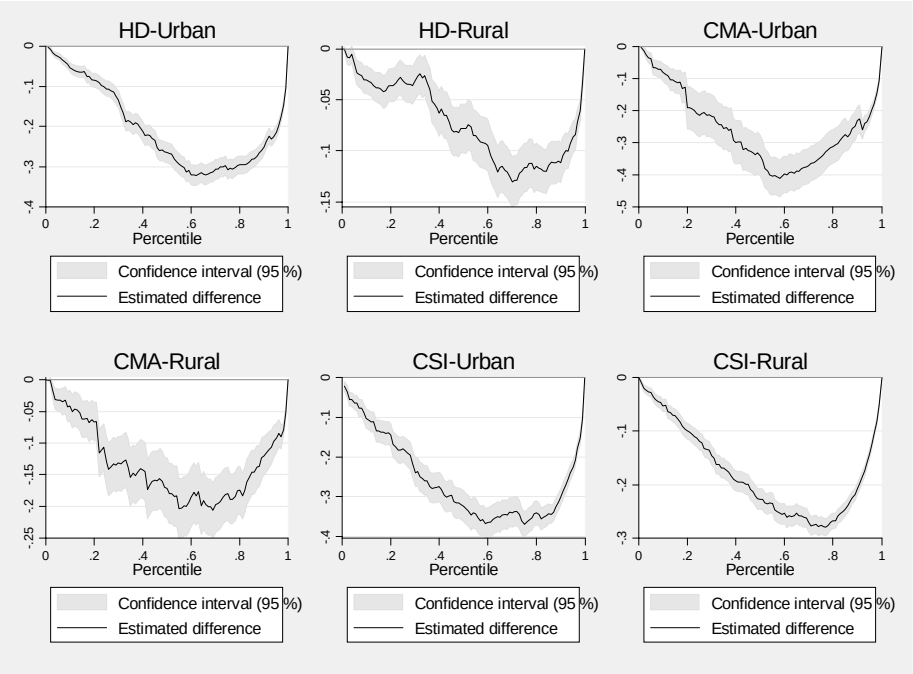
	Consumption expenditure		HD		CMA		CSI	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Gini coefficient	0.436996	0.370487	na	na	na	na	na	na
Concentration indexes	na	na	0.0329	0.1822	-0.0552	0.1950	-0.0899	-0.0616
Progressivity indexes	na	na	0.4041 (28.06)	0.1883 (10.88)	0.4922 (13.18)	0.1755 (6.35)	0.5269 (23.58)	0.4321 (39.66)

Source: Author's construction based on ECAM II.

Overall, individuals are relatively worse off in rural areas in their utilization of publicly funded heath care services. The confidence intervals of the progressivity curves (Figure 4) further support such a fact.

The government had made a good deal of effort to equip urban and rural areas with health care centres, notably the CSIs. Unfortunately, the delivery of the services in rural areas tends to be constrained by the quality of the roads. In some cases, health personnel as well as medicines are not available in rural areas for a number of reasons.

Figure 4: Confidence intervals of progressivity curves of the benefits from using public health care services in the areas of residence



Source: Author's construction based on ECAM II.

The structure of distribution of the benefits from the utilization of the publicly funded health care services is kept over the regions of the country, as indicated by the progressivity indexes presented in Table 7. Expenditures on CSIs are consistently pro-poor in all the regions, but the benefits of the utilization of CMAs are pro-poor only in the large cities, Douala and Yaoundé. The highest concentration of the benefits of CMAs is determined for their utilization the Centre/South/East region. The observed difference could be due to the means of communication in that region, which happens to be the poorest of the country. Although the region is equally equipped with CMAs, the quality of the roads tends to delay the delivery of medicines and lower the accessibility of these health services. The benefits of the utilization of district hospitals are progressive over all the regions and their concentration is highest in the Littoral/West region. The confidence intervals of the progressivity curves are presented in Appendix A.

Overall, the structure of the net subsidy from public spending on health care to individuals in Cameroon seems to take us back to the debate on the introduction of user fees in developing countries. Such fees are usually perceived as components of structural adjustment programme (SAP) measures; IMF and World Bank lending conditionality; and a response of countries to their adherence to the Alma-Ata Declaration and to the Bamako Initiative adopted by African governments in 1988. Larbi (2003) refers to a number of authors which support the assertion that user charges are justified in order to manage the demand side by encouraging more responsible use of the health system and to achieve equity by reallocating and targeting revenue to poorer communities at the

primary health care level. It is true that public spending on health care services targets the poor in Cameroon, but could such a structure be explained by the introduction of user fees? A willingness to pay type of study needs to be conducted to confirm the benefit incidence results obtained in the current work.

Table 7: Concentration and progressivity indexes of the benefits of selected health care services

a.) Gini coefficients of consumption expenditures over the regions

	Douala/ Yaoundé	Great North	Centre/ South/East	Littoral/ West	North-West/ South-West
Gini coefficient	0.4702	0.3797	0.3742	0.3607	0.4207

b.) Concentration and progressivity indexes of the benefits from using HDs

	Douala/ Yaoundé	Great North	Centre/ South/East	Littoral/ West	North-West/ South-West
Concentration indexes	0.0766	0.1616	0.1276	0.1743	0.0945
Progressivity indexes	0.3936	0.2181	0.2466	0.1864	0.3261
	(15.92)	(7.66)	(10.47)	(8.91)	(11.28)

c.) Concentration and progressivity indexes of the benefits from using CMAs

	Douala/ Yaoundé	Great North	Centre/ South/East	Littoral/ West	North-West/ South-West
Concentration indexes	-0.0997	0.0520	0.1347	0.0852	0.0717
Progressivity indexes	0.5699	0.3277	0.2395	0.2755	0.3490
	(16.81)	(6.57)	(5.52)	(5.60)	(6.54)

d.) Concentration and progressivity indexes of the benefits from using CSIs

	Douala/ Yaoundé	Great North	Centre/ South/East	Littoral/ West	North-West/ South-West
Concentration indexes	-0.0953	-0.0286	-0.1763	-0.0198	-0.2325
Progressivity indexes	0.5655	0.4083	0.5505	0.3806	0.6532
	(15.62)	(27.24)	(26.72)	(17.46)	(24.19)

Note: values in parentheses indicate t- statistics values.
Source: Author's construction based on ECAM II.

Indeed, in practice user fees have had unintended consequences for the poor and that efficiency and quality objectives have been difficult to realize. Another interesting point is the cascading user charges in health services, a scheme regarded as a means for providing a correct price signal to encourage better use of the reference system and reduce the perceived excessive use of the basic[10] health care system, especially by higher income groups (Larbi, 2003).

In sum, although Ntangsi (1998) reports that about 40% of the population in Cameroon may not have had the necessary means to cover their basic health needs in the late 1990s, the penalty then incurred could have been lessened by the transfer obtained from using public health services, provided the poor demand those services.

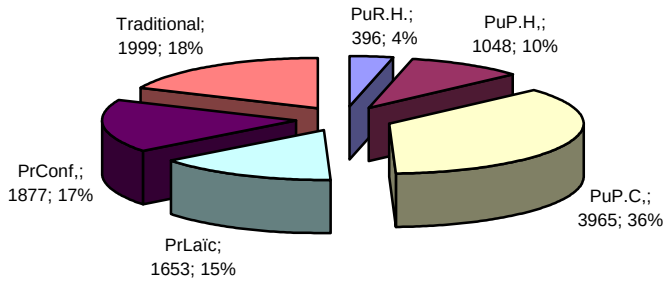
6. Choice of health care providers

The descriptive pattern of the choice of health care providers is first presented, followed by the discussion of the results of the nested logit model. In this discussion, confessional refers to health care provicers with a religious affiliation and laic refers to non-religious providers.

Descriptive patterns of the choice of health care providers

The database defines ten health care providers, which we grouped into six categories: public referral hospitals, public provincial hospitals, public dispensaries, private religious, private non religious laic, and traditional. Public health services are the primary source (49.6%) of health care for households, followed by the private sector (32.4%) and the traditional sector (18.0%), as shown in Figure 5.

Figure 5: The distribution of households by health care providers



Notes: Confessional (PrConf) refers to faith-based facilities and laic indicates non religious private health care providers.
Source: Author's construction based on ECAM II.

In the public sector, households resort the most to the peripheral medical centres (*PuPC*), which mainly comprise dispensaries; these are used by 36% of the households. Indeed, those services are the most accessible to households in terms of the cost (as evidenced by Table 4) and their reach. More interestingly, 18% of households resorted to traditional healers, who happen to charge the lowest fees on average (Table 4), although

their maximum consultation cost is significantly higher than those of provincial hospitals and private faith-based health care centres. We would recall that "traditional" comprises traditional healers, self-medication and others, as originally specified in the ECAM database.

Another important determinant of the demand for health care provider is gender. The differences in the percentages of males and females per health care provider appear minor, and the Chi-square test indicates the rejection of the null hypothesis of independence between health care provider and gender, as shown in Table 8.

Table 8: Distribution of households by health care provider and gender

Health care provider	Male		Female		Total	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Referral hospitals	285	3.4	111	4.2	396	3.8
Provincial hospitals	793	9.6	255	9.5	1,048	9.6
Peripheral health centres	3,046	36.8	919	34.4	3,965	35.6
Private non religious laic	1,261	15.3	392	14.7	1,653	15.0
Private religious	1,340	16.2	537	20.1	1,877	17.1
Traditional	1,542	18.7	457	17.1	1,999	18.2
Total	8,276	100.0	2,675	100.0	10,951	

Notes: The test of independence provides a Pearson Chi-Square= 27.04 with 5 d.f. and a ± probability of 0.000.
Source: Compiled by the author from ECAM II.

In addition, the area of residence has a strong effect on the distribution of households by health care providers, as shown in Table 9. The null hypothesis of independence is rejected at the 1% significance level.

Table 9: Distribution of households by health care providers and area of residence

Health care provider	Urban		Rural		Total	
	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Referral hospitals	357	7.2	39	0.7	396	3.8
Provincial hospitals	818	16.5	230	3.8	1,048	9.6
Peripheral health centres	1,209	24.4	2756	46.0	3,965	35.6
Private non religious laic	1,150	23.2	503	8.4	1,653	15.0
Private religious	766	15.5	1,111	18.5	1,877	17.1
Traditional	648	13.1	1,351	22.6	1,999	18.2
Total	4,948	100.0	5,990	100.0	10,951	

Notes: the test of independence provides a Pearson Chi-square = 1668.62 with 5 d.f. and an ± probability of 0.000.
Source: Compiled by the author from ECAM II.

Finally, the distribution of households per health care provider and motive for the choice of providers (Table 10) reveals a strong relationship between the two. Overall, the most important reason for choosing health service providers is the quality of services, followed by the bearable cost and the nearness of the centre; family's choice is the least important factor. In the case of public health services, the peripheral health centres were

chosen mainly because of their nearness, which appears to confirm the government's effort to provide all areas of residence with those centres. Nevertheless, while households do appreciate the quality of services provided at the peripheral health centres, the most important reason for their choice is the distance to the service, followed by the quality of the service, then the cost. Private health care is chosen primarily because of the quality of the service. People go to traditional healers or resort to self-medication because of the cost, which is acceptable.

Table 10: Distribution of households by health care providers and motives of the choice

Health care provider	Bearable cost	Nearness	Family choice	Quality of services	Other	Total
Referral hospitals	56	28	1	224	87	396
Provincial hospitals	205	136	14	494	199	1,048
Peripheral health centres	918	1,549	27	976	495	3,965
Private non religious laic	241	325	20	518	549	1,653
Private religious	344	421	40	791	281	1,877
Traditional	1,022	279	188	135	375	1,999
Total	2,786	2,738	290	3,138	1,986	10,951

Notes: values are absolute frequencies; the test of independence provides a Pearson Chi-square = 2655.35 with 20 d.f. and a probability of 0.000.
Source: Compiled by the author from ECAM II.

Determinants of the probabilities of choosing health care providers

The database reflects households' choices from among six health care providers. In assessing the choices, we estimated a nested logit model to account for choice-specific attributes and to relax the homoscedasticity (independence from irrelevant alternatives) assumption of a potential conditional logit model. The tree structure is such that the household first chooses the health sector (public, private, traditional) and then chooses the service provider: public referral hospital, public provincial hospital, public peripheral centres, private laic, private faith-based, and traditional healer.

Of the estimations made on STATA 8, three versions reveal interesting features of the choice of health care providers in Cameroon (refer to Appendix B). In the first version (Appendix B, Table B1), consumption (a proxy for income) is specified without any specific consideration for poverty. While consumption is scaled by the poverty line in Table B2, Table B3 presents the results of the estimation accounting for a linear spline function on the poverty line. The considered knots were the lower poverty line of CFAF 232,547 and the upper line of CFAF 345,535. Hence, three income variables were specified in the last version of the logit model: *Ln Revenue1* (values < 232,547), *Ln Revenue2* (232,547 ≥ values < 345,535) and *Ln Revenue3* (values ≤ 345,535).

In each version of the model, the variables that were considered in explaining the choice of health service provider (final decision) are mainly consultation cost *(Ln cost)* and the nearness of the service. The log of age of the household head *(Ln Age)* and its square, the gender, the milieu of residence *(Milieu Resid)*, the sectors of activity as

specified by *Activity FS (Formal Sector)* and *Activity IFS (Informal Sector)*, the reasons for choosing the service *(Curative disease, Wound/accident, Antenatal)*, and the level of education *(Illiteracy)* are defined as potential determinants of the choice of the health sector.

Each one of the tables in Appendix B (Tables B1, B2 and B3) shows that the independence of irrelevant assumption (IIA) between public services (taken as the reference) and the alternatives of other services is weak, thus supporting the evaluation of a nested (heteroscedastic) logit model. The inclusive value parameters for public, private and traditional are given in the last block of each one of the three tables, followed by the sigma values. It should be noted that the sigma values are obtained as the inverse of the inclusive value parameters. Overall, the majority of the coefficients are not only significant but also have the expected sign.

Effects of the characteristics of service providers

The effects of two service provider characteristics are tested in our study. These are cost of the consultation and nearness of the service. Interestingly, while consultation cost significantly and negatively affects the predictions of the utilization of service providers, nearness of the service has a significant and positive effect. Indeed, consultation cost blends together income and substitution effects which are not only negative, but also are expected to be the strongest, the lower the revenues are. Hence, the significantly negative effect further reinforces the soundness of the model in assessing individuals' behaviour with respect to health care. We therefore conclude that in Cameroon consultation costs strongly drive households' choice of health care provider. Proximity of the provider was the third most important determinant. The details of health care providers are shown in Table 10. Households would first go to the public peripheral health centres then to the private faith-based centres, and last to public referral hospitals. Indeed, it has always been a policy option to get public health centres close to the households, even in rural areas; such a policy was thought to afford Cameroonians with a reasonable degree of access to publicly funded health care services.

Effects of household characteristics

Regarding income per se, its effect remains marginal as expected. While income exhibits a positive effect in the private sector equation, its effect is negative in the traditional sector equation (Tables B1). Hence as expected, when revenue increases, households would choose the private sector over the public institutions, but prefer the public to the traditional healers or self medication. Households' preference for private services over the public services could be explained by the difference in quality and in cost of the services. Of course, as shown in Table 10, households would first go to the public peripheral health centres, then to the private faith-based ones, if quality of services is the motive for the use of the services. But in terms of service provision, faith-based health care centres are rather comparable to public provincial hospitals, and it seems clear that households prefer private centres on both cost and quality bases. Even though traditional healing and self-medication appear to be the cheapest health care services available to the households, only a few of them think that the quality of such services is adequate. The effects of income on the choice of health care providers are not modified if the households' incomes

are deflated by the poverty lines: the households still choose the private sector over the public institutions, but prefer the public to the traditional healers or self medication, as deflated income increases (Table B2).

The spline function (Table B3) allows differentiating the choice of the poor from those of the intermediate and rich households. From Table B3, it appears that the poor would choose private health services, as well as traditional healing and self-medication, over the public health care services, which corroborates our expectation. The intermediate households prefer the public to the private services, while the rich households would go for the private sector. The intermediate group and the rich would choose the public over the traditional services. Hence, we would expect the poor to move away from traditional health practices to the public sector if they are compensated according to either one of the two poverty lines. Regarding attitudes towards the private sector, only compensation at an intermediate level induces a preference of the public sector over the private one, as indicated by the negative coefficient *Ln Revenue2* in the private equation.

Households systematically prefer public services over traditional ones, as revealed by the negative coefficients for curative disease, wounds/accidents, and antenatal, in the traditional healing equation in all three tables of Appendix B (B1, B2 and B3). If they should have to choose between the public and the private sectors, they prefer the public sector over private services in the cases of curative diseases and wound/accidents, which is rather reasonable. Indeed, it is widely admitted that the public sector is the last resort in all acute illnesses, given that public institutions are generally better equipped than a number of private dispensaries. Even illiterate household heads significantly use the public sector instead of the private sector, but would choose traditional healing over the public sector. While such an attitude could be largely due to some degree of ignorance, an underlying factor is the cost of consultation, which is more bearable in the use of traditional healing or resorting to self-medication than either private or public service.

7. Conclusion and recommendations

In order to cope with the combined revenue squeezes and the increased budget deficits in the late 1980s and early 1990s, the Cameroonian government not only reduced its expenditure on social services, but also introduced user fees in the health system. A policy of increased service quality intended to temper the burden of the fee system. It was found that user fees and the increased quality led to an increase in the utilization of health facilities in Cameroon, given that the travel and time costs involved in seeking alternative sources became too high. As the poverty incidence increased, however, spreading from the rural to the urban areas, means rather than quality of services became more relevant in explaining the demand for health care services.

As part of its poverty alleviation efforts, the government has increased its spending on health care since the second half of the 1990s. This study therefore sought to know if those increases really benefited the poor in Cameroon. More specifically, we proposed to evaluate the distributional impact of public spending on health care and to identify the determinants of participation in publicly funded services.

The analysis of the concentration curves of the estimated benefit from using publicly funded health care services revealed a high degree of progressivity not only globally, but also over the area of residence (urban/rural) and the region, although it was less progressive in rural areas and in the uses of the services in the Centre/South/East region.

But the public sector competes with the private sector and traditional practitioners. In the case of public health services, the peripheral health centres were chosen mainly because of their nearness. Additionally, households appreciate the quality of services provided at the peripheral health centres; the low cost motive comes third. Private health care services are chosen primarily because of their quality, and people go to traditional healers or resort to self-medication because the cost is acceptable. In the nested logit model, although the majority of the considered factors – cost, nearness, income, education, age, gender and illness – had the expected sign and significantly affected the choice of service provider, nearness and cost are key variables in designing health policies for people who have some education and are employed in the formal sector.

On the basis of the findings, the following recommendations are made.

- Government should reinforce the implementation of its strategies of health for all, with a special care for the Centre/South/East region, and for rural areas in general.
- Indeed, 50% of households do not access public health care services. A policy of compensating for poverty could be a sound means for increasing the number of users of publicly funded health services.
- Equally, government could consider reducing user fees so as to increase households' access to health care.
- While public health centres have been developed almost everywhere throughout the country, these should be properly equipped to assure their effectiveness.
- Health care for all strategies should be implemented along with those of basic education.

Notes

1. In the early 1980s, the incidence of poverty in Cameroon was highest in the rural areas, around 40%, and as low as 2% in the large cities, as documented by the World Bank (1995b).

2. As indicated in the Cameroonian PRSP (the Draft of 1998) and computed from the World Bank's 2002 World Table CD-ROM.

3. Van de Walle refers to the first type of targeting as "broad targeting" and terms the second approach "narrow targeting".

4. Details of the methodology of the BIA are provided by Demery (2000).

5. State Budget for the transitory period, Chapter 40: Ministry of Public Health, Cameroon 2001.

6. The three levels in the structure of the health system guided the allocation of the budget. That is, within each one of the ten provinces, the budget was allocated according to level 1 (clinics and dispensaries), level 2 (provincial hospitals) and level 3 (reference and speciality hospitals).

7. OCEAC stands for Organisation de Coordination pour la Lutte contre les Endémies en Afrique Centrale, that is the Coordination Organization for the Fight against Endemics in Central Africa (COECA).

8. Referenced by Sahn et al. (2002).

9. Amemiya (1981) used the case of a bivariate distribution, considering a three-response non independent model.

10. In his statement, Larbi (2003) opposes the reference health system to the tertiary one, but we use the term in conformance with the description of the health system presented in our methodology.

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Appendix A: Progressivity curves of the benefits from the utilization of publicly funded health care services over the regions

Figure A1: Utilization of district hospitals (HD)

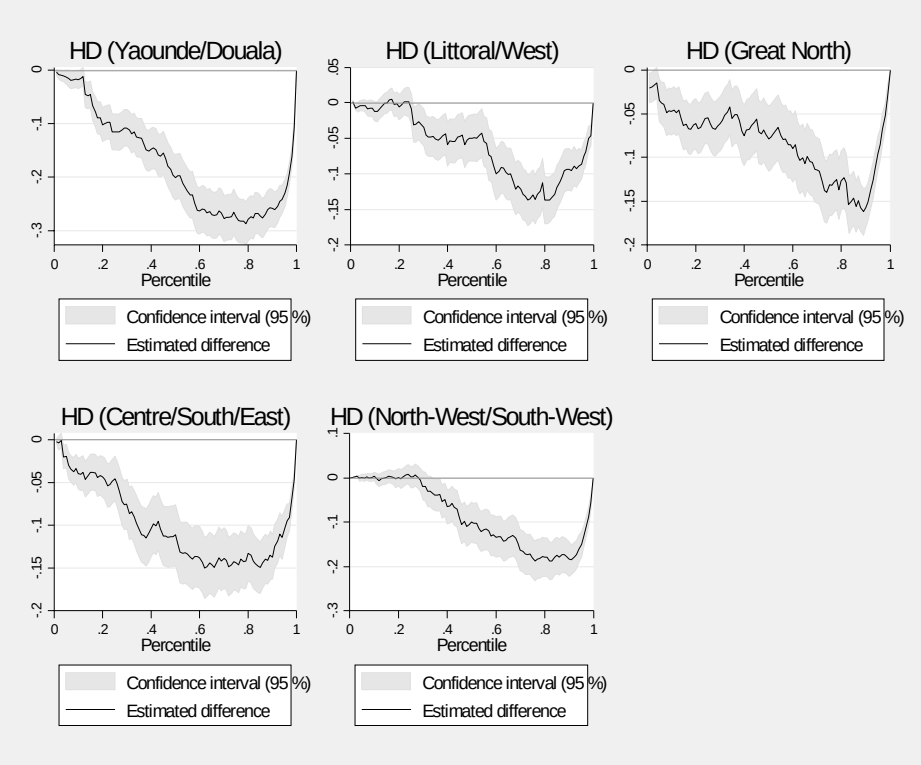
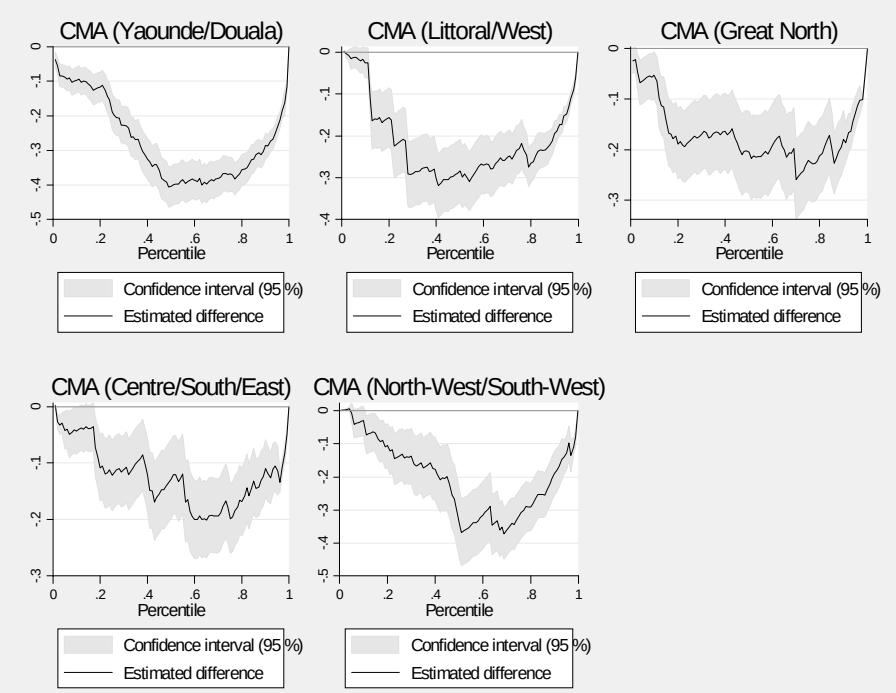
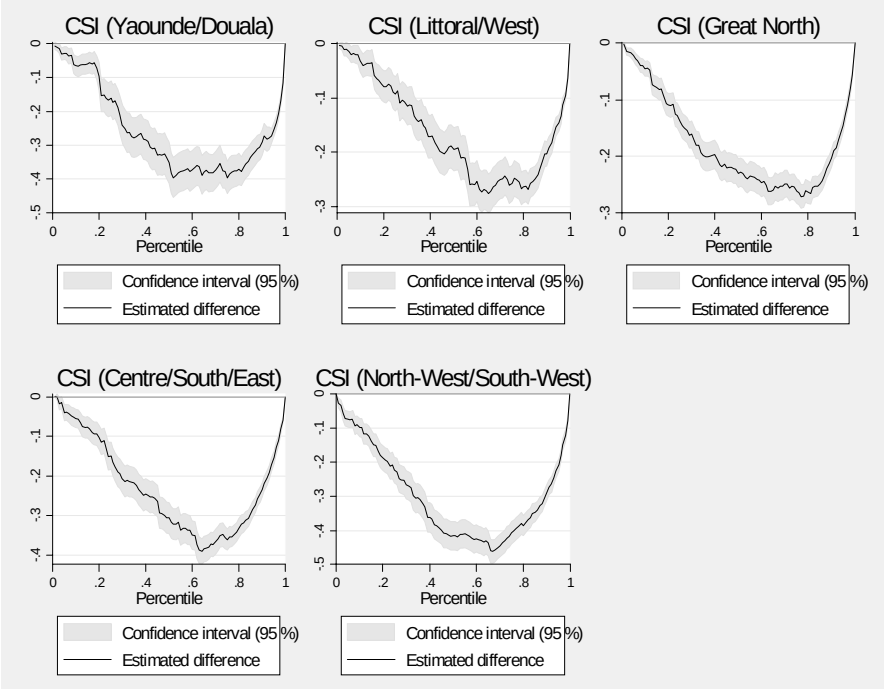


Figure A2: Utilization of medical centres of wards (CMA)



Source: Author's construction.

Figure A3: Utilization of integrated health centres (CSI)



Source: Author's construction.

Appendix B: Estimations of nested logit models

Table B1: Choice of health service provider free of poverty consideration

Nested logit estimates

Levels	**=**	**2**	**Number of obs**	**= 65628**
Dependent variable	**=**	**choice**	**LR chi2(27)**	**= 6066.631**
Log likelihood	**=**	**-16564.95**	**Prob > chi2**	**= 0.0000**

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Service providers						
Ln cost	**-0.1234**	**0.0112**	**-10.98**	**0.000**	**-0.1454**	**-0.1014**
Nearness	**1.1999**	**0.0234**	**51.25**	**0.000**	**1.1540**	**1.2458**
Health sector						
Private						
Gender	-0.1311	0.0556	-2.36	0.018	-0.2400	-0.0222
Ln age	-1.6834	0.5327	-3.16	0.002	-2.7274	-0.6394
Ln age_sq	0.2760	0.0751	3.68	0.000	0.1289	0.4232
Illiteracy	-0.3978	0.0639	-6.22	0.000	-0.5231	-0.2724
Milieuresid	-0.3440	0.0509	-6.75	0.000	-0.4438	-0.2442
Ln Revenue	0.0975	0.0329	2.96	0.003	0.0330	0.1621
Activity FS	0.0210	0.0766	0.27	0.784	-0.1292	0.1712
Activit IFS	0.0064	0.0707	0.09	0.928	-0.1322	0.1450
Curative dis	-0.1594	0.1281	-1.24	0.213	-0.4104	0.0916
Wound/accidt	-0.6301	0.1740	-3.62	0.000	-0.9712	-0.2890
Antenatal	0.0781	0.2696	0.29	0.772	-0.4504	0.6065
Traditional						
Gender	0.0890	0.0678	1.31	0.189	-0.04382	0.2218
Ln age	5.5244	0.6008	9.20	0.000	4.34696	6.7019
Ln age_sq	-0.7725	0.0844	-9.15	0.000	-0.93804	-0.6070
Illiteracy	0.4367	0.0663	6.59	0.000	0.30682	0.5666
Milieu resid	-0.1086	0.0637	-1.70	0.088	-0.23348	0.0163
Ln Revenue	-0.1955	0.0417	-4.69	0.000	-0.27724	-0.1134
Activity FS	-0.2412	0.1120	-2.15	0.031	-0.46072	-0.0218
ActivityIFS	0.4449	0.0956	4.65	0.000	0.25745	0.6323
Curativedis	-0.3806	0.1494	-2.55	0.011	-0.67343	-0.0878
Woundaccidt	-1.3126	0.2259	-5.81	0.000	-1.75535	-0.8698
Antenatal	-3.0483	1.0244	-2.98	0.003	-5.05621	-1.0404
Reference sector: Public						
Inclusive values parameters						
Public	7.6462	0.6887	11.10	0.000	6.2963	8.9959
Private	13.0857	1.0748	12.17	0.000	10.9791	15.1923
Traditional	2.8052	0.1861	15.07	0.000	2.4405	3.1699
Sigma						
Public	0.13					
Private	0.08					
Traditional	0.36					

LR test of homoscedasticity (iv = 1): chi2(3)= 914.49Prob > chi2 = 0.0000

Key: Ln (Logarithm); sq (square); FS (Formal sector); IFS (Informal sector); resid (residence); accidt (Accident).
Source: Author's construction.

Table B2: Choice of health service provider accounting for poverty concerns

Nested logit estimates

Levels	**=**	**2**	**Number of obs**	**= 65628**
Dependent variable	**=**	**choice**	**LR chi2(25)**	**= 5985.794**
Log likelihood	**=**	**-16605.368**	**Prob > chi2**	**= 0.0000**

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Service providers						
Ln cost	-0.2341	0.0083	-28.28	0.000	-0.2503	-0.2178
nearness	1.1293	0.0214	52.73	0.000	1.0873	1.1713
Health sector						
Private						
Gender	-0.0843	0.0553	-1.53	0.127	-0.1926	0.0240
Ln age	0.5439	0.0522	10.43	0.000	0.4416	0.6461
Illiteracy	-0.4192	0.0619	-6.77	0.000	-0.5406	-0.2978
Milieu resid	-0.3167	0.0504	-6.29	0.000	-0.4155	-0.2180
Revenue def	0.0478	0.0085	5.64	0.000	0.0312	0.0644
Activity FS	0.0251	0.0747	0.34	0.737	-0.1214	0.1716
Activity IFS	0.0342	0.0687	0.50	0.619	-0.1005	0.1689
Curative dis	0.0343	0.1226	0.28	0.780	-0.2060	0.2746
Wound/accidt	-0.4353	0.1694	-2.57	0.010	-0.7673	-0.1032
Antenatal	0.3242	0.2661	1.22	0.223	-0.1973	0.8457
Traditional						
Gender	0.1851	0.0667	2.78	0.005	0.0544	0.3158
Ln age	0.2891	0.0666	4.34	0.000	0.1585	0.4196
Illiteracy	0.3318	0.0646	5.14	0.000	0.2052	0.4584
Milieu resid	-0.1018	0.0628	-1.62	0.105	-0.2250	0.0213
Revenue def	-0.0903	0.0193	-4.67	0.000		-0.1282
-0.0524						
Activity FS	0.0587	0.1101	0.53	0.594	-0.1571	0.2744
Activity IFS	0.7253	0.0930	7.80	0.000	0.5430	0.9076
Curative dis	-0.0390	0.1515	-0.26	0.797	-0.3359	0.2579
Wound/accidt	-0.9246	0.2227	-4.15	0.000	-1.3611	-0.4881
Antenatal	-2.5770	1.0252	-2.51	0.012	-4.5864	-0.5677
Reference sector: Public						
Inclusive values parameters						
Public	4.8028	0.3145	15.27	0.000	4.1863	5.4192
Private	8.3534	0.4478	18.66	0.000	7.4758	9.2310
Traditional	1.7867	0.1131	15.80	0.000	1.565	2.0083
Sigma						
Public	0.21					
Private	0.12					
Traditional	0.56					

LR test of homoscedasticity (iv = 1): chi2(3)= 814.77 Prob > chi2 = 0.0000

Notes: Ln (Logarithm); sq (square); FS (Formal sector); IFS (Informal sector); resid (Residence); accidt (Accident).
Source: Author's construction.

Table B3: Choice of health service provider accounting for poverty in a Spline function

Nested logit
mkspline rev1 232547 rev2 345535 rev3=revenu

Levels	**=**	**2**	**Number of obs = 65628**
Dependent variable	**=**	**choice**	**LR chi2(31) = 6068.403**
Log likelihood	**=**	**-16564.063**	**Prob > chi2 = 0.0000**

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Service providers						
Ln cost	-0.1130	0.0118	-9.61	0.000	-0.1360	-0.0900
Nearness	1.2043	0.0234	51.05	0.000	1.1580	1.2505
Health sector						
Private						
Gender	-0.1416	0.0554	-2.55	0.011	-0.2502	-0.0330
Ln age	-0.2530	0.7932	-0.32	0.750	-1.8078	1.3017
Ln age sq	0.0787	0.1095	0.72	0.472	-0.1359	0.2933
Illiteracy	-0.3868	0.063	-6.06	0.000	-0.5119	-0.2618
Milieu resid	-0.3464	0.0509	-6.81	0.000	-0.4461	-0.2467
Ln Revenue1	0.0397	0.1129	0.35	0.725	-0.1816	0.2611
Ln Revenue2	-0.0157	0.0079	-1.98	0.048	-0.0312	-0.0001
Ln Revenue3	0.0144	0.0053	2.71	0.007	0.0040	0.0249
Activity FS	0.0119	0.0779	0.15	0.878	-0.1407	0.1646
Activity IFS	-0.0160	0.0712	-0.22	0.822	-0.1555	0.1235
Curative dis	-0.1529	0.1282	-1.19	0.233	-0.4043	0.0984
Wound/accidt	-0.6249	0.1740	-3.59	0.000	-0.9660	-0.2839
Antenatal	0.0581	0.2696	0.22	0.829	-0.4704	0.5866
Traditional						
Gender	0.0839	0.06792	1.24	0.217	-0.0492	0.2170
Ln age	2.8070	1.01278	2.77	0.006	0.8220	4.7920
Ln age sq	-0.4067	0.13890	-2.93	0.003	-0.6789	-0.1345
Illiteracy	0.4326	0.06692	6.46	0.000	0.3014	0.5638
Milieu resid	-0.1131	0.06369	-1.78	0.076	-0.2379	0.0117
Ln Revenue1	0.4034	0.13235	3.05	0.002	0.1440	0.6628
Ln Revenue2	-0.0227	0.00870	-2.61	0.009	-0.0398	-0.0057
Ln Revenue3	-0.0218	0.00636	-3.42	0.001	-0.0342	-0.0093
Activity FS	-0.1866	0.11365	-1.64	0.101	-0.4094	0.0361
Activity IFS	0.4849	0.09616	5.04	0.000	0.2965	0.6734
Curative dis	-0.3941	0.14907	-2.64	0.008	-0.6862	-0.1019
Wound/accidt	-1.3261	0.22610	-5.86	0.000	-1.7692	-0.8829
Antenatal	-3.0692	1.02781	-2.99	0.003	-5.0837	-1.0547
Reference sector: Public						
Inclusive values parameters						
Public	9.4965	1.0296	9.22	0.000	7.4785	11.514
Private	12.3839	1.0304	12.02	0.000	10.3645	14.4034
Traditional	2.8896	0.1947	14.84	0.000	2.5080	3.2711
Sigma						
Public	0.11					
Private	0.08					
Traditional	0.35					

LR test of homoscedasticity (iv = 1): chi2(3)= 913.38 Prob > chi2 = 0.0000

Notes: Ln (Logarithm); sq (square); FS (Formal sector); IFS (Informal sector); resid (residence); accidt (Accident).
Source: Author's construction.

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