

A Comparative Analysis of the Determinants of Seeking Prenatal Health Care in Urban and Rural Areas of Togo

By

Ablamba Johnson,
Alima Issifou

and

Etsri Homevoh
University of Lomé

AERC Research Paper 264
African Economic Research Consortium, Nairobi
July 2013

THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are those of the author, however, and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 – City Square
Nairobi 00200, Kenya

Printed by: Modern Lithographic (K) Ltd
P.O. Box 52810 – City Square
Nairobi 00200, Kenya

ISBN 978-9966-023-42-1

© 2013, African Economic Research Consortium.

Contents

List of tables

Abstract

1.	Introduction	1
2.	Aim, objectives and hypotheses of the study	4
3.	Methodology and measurement techniques	5
4.	Results	11
5.	Conclusions and policy implications	18
	Notes	19
	References	20
	Appendices	21

List of tables

1.	Proportion of women who were assisted by trained medical staff during delivery	2
2.	List and characteristics of the explanatory variables in the model	8
3.	Some descriptive statistics on the model's variables	10
4.	Distribution (in %) of pregnant women who sought prenatal care according to area of residence	11
5.	Distribution (in %) of women according to type of prenatal care and region	12
6.	Distribution (in %) of women according to type of prenatal care and age	13
7.	Distribution (in %) of women according to type of prenatal care and level of education	13
8.	Distribution (in %) of women according to type of prenatal care and their households' wealth index	14

Appendix 1

Table 9:	Results of econometric estimations (including the variables “size of the household” and “number of children below 5 years of age in the household”)	21
----------	---	----

Appendix 2

Table 10:	Results of econometric estimations (without the variable “size of the household”)	22
-----------	---	----

Appendix 3

Table 11:	Results of econometric estimations (without the variable “children below 5 years”)	23
-----------	--	----

Appendix 4: Methodology of how the wealth index was computed from the MICS data

Table 12:	Description of the variables related to the non-monetary dimensions of poverty	24
-----------	--	----

List of figures

1.	Choice options for prenatal consultations	7
----	---	---

Abstract

A country may have invested significantly in essential health facilities in order to supply goods and services related to reproductive health, but still see the demand for prenatal health care influenced by equally important economic and social factors. The aim of the present study was to identify the economic and social factors that would determine the probability of a pregnant woman choosing one type of prenatal health care over another and to specifically measure the effects of the variables of living standards on seeking this care. The study used a multinomial logit model to analyze data collected during the 2006 Multiple Indicators Cluster Survey (MICS-3) survey. From the main results, the following observations could be made: (i) pregnant women without formal education went for prenatal consultations less frequently than those with formal education; (ii) the higher the wealth index was for the household in which the pregnant woman lived, the more likely that she would seek prenatal care from trained medical staff; (iii) the pregnant woman's level of formal education, her age, the size of the household she lived in, the household's wealth index, the number of children below five years living in the household, the cost of prenatal consultations at public health facilities, and the quality of care these offered, were all found to have a statistically significant effect on the pregnant woman's choice to seek prenatal care from a modern health facility or not.

1. Introduction

Togo is classified as one of the least developed countries (LDCs) with a per capita income of US\$360 in 2005. The country has a total area of 56,000 km² and an estimated population of 5.2 million people, 43.7% of whom are aged below 15 years. The population growth rate was 2.5% in 2000, against 3.1% in 1975; the fertility rate (that is the number of children per woman) is reported to have fallen from 7.1 in 1970 to 5.4 in 2000. Life expectancy in Togo is 54 years, and the literacy rate is 53%. According to the United Nations Development Programme (UNDP) Human Development Report for 2007/2008 Togo's human development index (HDI) was 0.512 and ranked it 152nd in the world out of 177 countries. (According to the 2006 report, this HDI was 0.495, which ranked Togo 147th in the world out of 177 countries.) The 2007 report further indicates that Togo's human poverty index (HPI-1) was 39.2%, which ranked the country 72nd in the world, out of 102 developing countries (this HPI-1 was 38.5% in 2003).

Despite the implementation of various economic and social policies, Togo has yet to achieve satisfactory levels of development; instead, its macroeconomic performance is still worsening. Although the health sector has always been a priority sector in Togo's social policy, more than three decades after its independence, the country still had not put in place a mechanism to enable it formulate general and systematic health-related policies. It was not until November 1998 that a national health policy was set up (Koffi-Tessio et al., 2000). The goal of Togo's health policy is to ensure that the entire country's population attains a health status that allows people to lead socially and economically productive lives.

Togo has implemented various plans of action over three decades, in particular the National Health Development Plan (PNDS) for 2002–2006 and the new Plan (for 2009–2013). These have enabled the government to implement short-, medium- and long-term programmes aimed at strengthening the health system, improving maternal and infant health, and reducing poverty. However, Togo is still characterized by the persistence of huge health challenges and needs. The neonatal mortality rate stands at 42.4%, while that of infant mortality is about 80%. This mortality rate is higher in rural than in urban areas: 85 deaths per 1,000 live births against 65 deaths per 1,000 live births. In terms of budgetary allocation, the share allocated to the health sector in the 2008 budget was 66% of that allocated to investment expenditure and 96% of that of operating expenditure. This means that, on average, the allocation to the health sector was 78% of the whole budget.

In Togo, reproductive health is defined in Article 2 of Law No. 2007-005 as “a human being’s state of general well-being, be it physical, mental, psychological and social, regarding everything that concerns the genital organ and its functioning and not just the absence of illnesses or infirmities”. Prenatal care is defined as all the care a woman receives during pregnancy. This care comprises both the advice and all the other services she receives and which are vital for her health and that of the newborn child.

The findings of the Multiple Indicators Cluster Survey (MICS) -3 survey (conducted in 2007 by the “*Direction Nationale de la Statistique et de la Comptabilité Nationale (DGSCN)*” (General Directorate of Statistics and National Accounting) indicate that out of 100 women who gave birth, 84 had consulted trained medical staff at least once. The rate of women seeking prenatal care was found to be higher in urban areas (96%) than in rural areas (76%). The same disparities were observed between specific regions: for example, 97% in Lomé against only 64% in the Savanes Region. With regard to getting medical assistance during the delivery process, six women out of 10 delivered at a health facility; four gave birth at home. These proportions decrease as far as one moves away from Lomé (almost 10 women out of 10); towards the northern localities, Maritime (a little more than seven women out of 10); Plateaux (a little more than six women out of 10); Central (nearly 7 women out of 10); Kara (nearly 6 women out of 10) and Savannese (nearly five women out of 10). The disparities that were observed between regions and areas of residence are reported in Table 1.

Table 1: Proportion of women who were assisted by trained medical staff during delivery

Region and area of residence	Percentage
Lomé	100
Maritime	70
Plateaux	60
Central	70
Kara	60
Savanes	50
Rural area	50
Urban area	90
Overall	60

The rate of medical assistance during the delivery is, overall, largely inadequate and very unequal. For its entire population, Togo has a total 924 health facilities. These have 5,159 hospital beds, 2,253 maternity beds, and 787 delivery tables. However, in relation to reproductive health, the country has made enormous progress. As pointed out earlier, the rate of women seeking prenatal care from trained medical staff was found by the MICS-3 survey to be 96% and 76% in urban and rural areas, respectively.

Regarding prenatal consultations, the findings of the same survey revealed that out of 100 women who gave birth, 84 had consulted trained medical staff at least once. Moreover, just under one pregnancy in two (48%) had been monitored by a nurse or midwife; the prenatal care provided by midwives represented 12% and that provided by auxiliary midwives represented 19%. Prenatal consultations provided by a medical doctor represented only 5%.

Arguably, one of the fundamental causes of the severity of the health problems in Togo is the increase in poverty. Indeed, a study carried out by the *Ministère de l'économie et du Développement, 2007* (Economy Ministry in 2007) revealed that poverty affected 61.7% of individuals, corresponding to 47.3% households. This poverty incidence greatly varies with areas of residence and regions. In the rural area, where 79.9% of the Togolese population live, the poverty incidence rate is 74.3%; it is 36.8% in the urban area, where 20.1% of the people live. Lomé—the capital city—and its environs, account for only 7.9% of the poor populations. It is in the other five regions of the country that both the poverty incidence is particularly high and variable: the Maritime and Plateaux regions together house 44.6% of the country's poor population, with poverty incidence rates of 69.4% and 56.2% for the Maritime Region and the Plateaux Region respectively. The Central and Kara regions together represent 29.1% of the poverty in the country. However, the poverty incidence is very high within these regions, with a rate of 77.7% for Central and 75% for Kara. Finally, the Savanes Region, which has 18.4% of the poor population of Togo, has a poverty incidence rate of 90.5%.

One of the priorities of the Millennium Development Goals is to improve maternal health (Goal No. 5). To achieve this, action must be directed towards the main components of reproductive health, notably family planning, antenatal and postnatal care, antenatal and neonatal vaccinations, childbirth best practices, etc. According to Ajakaiye and Mwabu (2007), elements of the information one must have about reproductive health include: (i) knowledge of the current state of health through medical consultations; and (ii) knowledge of factors that improve health through advice on nutrition, family planning, HIV/AIDS and sexually transmitted diseases.

From the above, it is evident that the availability of goods and services related to reproductive health is a necessary condition for better health, even though on its own it is insufficient. In other words, the reproductive health products and services which countries, including Togo, strive for must be used to improve the health of their populations. Thus, if the supply is available, a better comprehension, on the demand side of the reproductive health market is essential for the setting-up and implementation of policies that would improve the health of mothers and the newborn babies. This better comprehension requires answers to the following research questions: (i) What factors determine the choice of specific types of prenatal care by area of residence? (ii) Is there a relationship between the household's state of poverty and the choice of type of prenatal care?

2. Aim, objectives and hypotheses of the study

Aim and objectives

The aim of this study was twofold: first, to identify the economic and social factors that would determine the probability of choosing one type of prenatal care; and two, to specifically measure the effects of the variables of living standards on the demand for prenatal health care. The specific objectives of the study were:

- to model and measure the relationship between the demand for prenatal care and specific socioeconomic and demographic factors on the part of the household;
- to measure the effect of living standards on the choice of prenatal care.

Hypotheses

The study tested the following hypotheses:

- H1: There is a positive relationship between the lack of formal education on the part of the pregnant woman and her seeking traditional prenatal care, both in the urban and rural areas.
- H2: There is a positive relationship between the household's level of wealth and the pregnant woman's seeking prenatal care from trained medical staff.

3. Methodology and measurement techniques

Two methodological approaches were used: descriptive and econometric. The descriptive approach was used to identify and analyse:

- the distribution of pregnant women according to type of prenatal care they received;
- The distribution of pregnant women according to the type of prenatal care, they receive and according to several socio-economic factors, such as the woman's age, the area of residence, the size of her household, her level of formal education, the distance between her house and the health centre and the household index.

The econometric approach was used for modelling. The conceptual and empirical frameworks on which this approach is based are described below.

The conceptual framework

As part of the research on investment in human capital, numerous models of household behaviour have been developed. The theoretical basis for these models rests on a utility function that depends on the health and nutritional status of each member of the household and on the goods acquired from the household's production. The models in question suggest that decisions about production and consumption of health are taken simultaneously, and with each being dependent upon the other. In this case, the implicit cost for health is determined within the family entity and the health of an individual is the result of individual and family decisions in a given environment (Charasse, 1999). A microeconomic analysis of the health of individuals can be done from two angles: that of health production (Schiff and Valdes, 1990a; b; Strauss and Thomas, 1995) and that of the demand for health.

With regard to the demand for health, following Mwabu (2008, 2009) and Strauss and Thomas (2008), this study used a modified version of the model developed by Rosenzweig, Mark R. and Schultz Rosenzweig and Schultz (1982) in which health is integrated into the behaviour of the maximization of an agent's utility. The form of the utility function in the Rosenzweig-Schultz model for a given period is:

$$U = U(X, Y, H) \quad (1)$$

where X is an item of goods that produces the utility U of an individual but has no effect on the reproductive health of a person; Y is an item of goods or a behaviour that produces an individual's utility and also affects his/her reproductive health (for example, the consumption of tobacco and alcohol, and preventive activities); and H is the state of an individual's reproductive health.

The production function of the reproductive health is given by the following equation:

$$H = F(Y, Z, \mu) \quad (2)$$

where Z represents the inputs bought, such as medicines that directly affect health, and μ is the health component that is due to environmental or genetic conditions that are not influenced by behaviour.

Given Equation 2, an individual maximizes Equation 1 under the budgetary constraint given by:

$$I = XP_x + YP_y + ZP_z \quad (3)$$

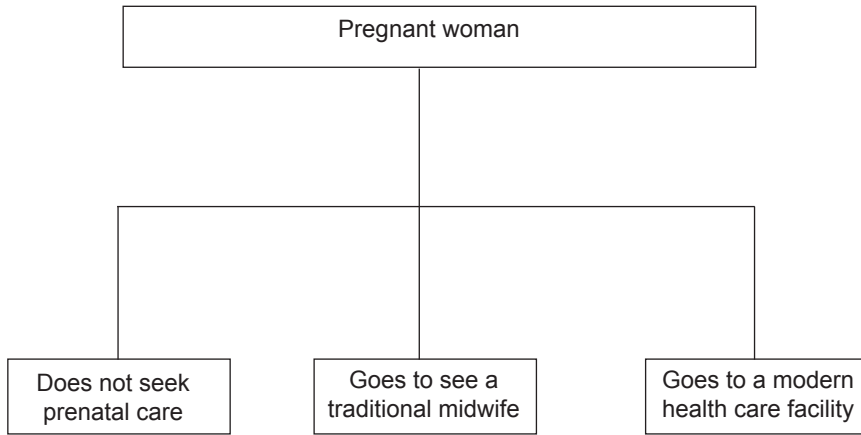
where I is the exogenous income; P_x represents prices of neutral goods items X (such as clothing); P_y represents consumer goods Y (such as quitting smoking); and P_z represents goods invested in health Z (such as immunization).

Equations (1) and (2) show that investment in health goods is only bought with the sole aim of improving reproductive health so that this investment becomes part of an individual's utility through only H . Equation (2) describes a health production function. The maximization of this production function under the constraint of Equation (3) makes it possible to obtain demand functions, among which is the health demand function.

The empirical framework

The analysis of the empirical framework used in this study was inspired by Ichoku and Leibbrandt (2003). In this regard, we considered the reproductive health component, which is the access to prenatal consultations. We used the model to explain the factors that made pregnant women seek prenatal care from either trained medical staff or traditional midwives.

Let us suppose that for a given pregnant woman, there are two possibilities: to seek prenatal health care or not. If she decides to seek it, then she has two choices: one, to go to trained medical staff (like a nurse, a midwife or a doctor); two, to go to a traditional midwife (Figure 1).

Figure 1: Options for prenatal consultations

According to the research literature, the decision of the individual pregnant woman to seek prenatal health care or not is influenced by various factors. Thus, the empirical issue for our study lay in determining the probability of pregnant woman i choosing one of the following options: (i) not to seek prenatal care; (ii) to seek prenatal care from a modern health facility; or (iii) seek prenatal care from a traditional midwife. Given these several options, we used a multinomial logit model, taking into account the identification of the factors that determined the pregnant women's choice to seek health care or not. Our use of the multinomial logit model can be justified by the fact that this is an extension of the binary logit model in the case of a dependent variable with several unordered categories. The decision to seek prenatal care from either a modern medical facility or from a traditional midwife is not sequential or ordered, but depends on the type of care available.

The specification of our multinomial logit model is that it has three options: not to seek prenatal care at all (Option 0), to seek prenatal care from trained medical staff (Option 1), and to seek prenatal care from a traditional midwife (Option 2). The probability that a pregnant woman i will choose the option j is defined by:

$$Pr ob (Y_i = j) = \frac{\exp(\beta'_j x_i)}{\sum_{k=0}^2 \exp(\beta'_k x_i)}, \quad j = 0, 1, 2 \quad (4)$$

where x_i designates the vector of explanatory variables for individual i independently of the choice of the j^{th} option. With the three options in mind,¹ one can write the following:

$Y_i = 0$ if the woman i did not seek prenatal care;

$Y_i = 1$ if the woman i sought prenatal care from trained medical staff;

$Y_i = 2$ if the woman i sought prenatal care from a traditional midwife.

It is clear here that the parameters differ according to the different options and that the explanatory variables vary only according to the pregnant women concerned. As in the case of the dichotomous logit model, the estimation of multinomial logit models can be done using the maximum likelihood method. The functional form of the model to be computed can be written as follows:

$$\Pr ob (Y_i = j) = \frac{\exp(\beta_{j1}x_1 + \beta_{j2}x_2 + \beta_{j3}x_3 + \beta_{j4}x_4 + \beta_{j5}x_5 + \beta_{j6}x_6 + \beta_{j7}x_7)}{\sum_{k=0}^2 (\beta_{k1}x_1 + \beta_{k2}x_2 + \beta_{k3}x_3 + \beta_{k4}x_4 + \beta_{k5}x_5 + \beta_{k6}x_6 + \beta_{k7}x_7)} \quad (5)$$

where Y_i represents the type of prenatal care the woman i sought and X the explanatory variables which are defined and measured in Table 2. Among the independent variables are the following: the size of the household, the pregnant woman's level of formal education, the woman's age, the number of children aged below six years, the distance between the home and the health facility, the composite well-being index,² etc.

Three rounds of econometric regression were calculated: one for the entire sample, one for the rural area, and one for the urban area. The composite well-being index was calculated using a multiple components analysis, which we introduced into the model as a proxy for well-being.

Table 2: List and characteristics of the explanatory variables in the model

Variables	Definition	Measures	Expected effect ¹
X_i Age of the pregnant woman			
- 20–24 years		= 1 if Yes and 0 if No	(+)
- 25–29 years		= 1 if Yes and 0 if No	(+)
- 30–34 years		= 1 if Yes and 0 if No	(+)
- 35–39 years		= 1 if Yes and 0 if No	(-)
- 40–49 years		= 1 if Yes and 0 if No	(-)

continued next page

Table 2 Continued

Variables	Definition	Measures	Expected effect ¹
X_2	The woman's level of formal education	1 = if educated 0 = if not	(+)
X_3	Size of the household	Number of people living in the same home as the pregnant woman	(-)
X_4	Number of children aged below 5 years	The number of children below 5 years of age that the woman has	(-)
X_5	Distance from the health facility	Distance between the woman's home and the health facility	(-)
X_6	Quality	Number of people per trained member of the medical staff per region	(-)
X_7	Cost of a prenatal consultation at a public health facility	Consultation fee fixed by the government for Lomé and the other regions, depending on whether the health facility is located in an urban or rural area	(-)
X_8	Index of living standards	Composite wealth index ²	(+)

1 On the probability that the pregnant woman will seek prenatal care.

2 As calculated by the DGSCN Statistics Directorate using the Multiple Correspondence Analysis (MCA) based on the non-monetary variables of poverty, notably the ownership of durable goods, access to social amenities such as electricity, water, decent sanitation and housing.

Data: Source and nature

To achieve the objectives of the study, we used primary data. These were collected in Togo in 2006 as part of the MICS-3 survey (*Direction de la Statistique* [Directorate of Statistics], 2007). The questionnaire that was addressed to women had sections such as maternal health, contraception, HIV/AIDS awareness, prenatal care. A total of 6,492 households were surveyed and 6,213 women were interviewed. After analysing the data and by considering the observations made from the information gathered on the model's variables, we found that 1,751 women had given birth in the two years preceding the survey.

Supplementary data were also collected. These were essentially data on the distance between the pregnant woman's home and the health facility, the number of pregnant women attended to by trained medical staff (as a proxy for the quality of health care

received), and the fee for prenatal consultations at public health facilities. Such data are collected regularly by the General Directorate of Statistics and the Directorate of Health Statistics. For the case of the distance in particular, we used data from a survey called “Single Questionnaire on Basic Well-being Indicators” (*Questionnaire Unifié des Indicateurs de Bien-être de Base*, QUIBB) that was carried out in 2006. The data matching was done using the variable “census area” or “primary unit”. For the MICS-3 and QUIBB surveys, stratified area sampling was used; 300 census areas (104 from urban areas and 196 from rural areas) drawn in the sample were identical. A proxy variable was used for quality of prenatal care. This was the number of pregnant women attended to by one member of the medical staff. We assumed that the lower the ratio for this variable, the higher the quality. The cost of prenatal consultations at public health centres was measured by the fee charged depending on the area of residence and the particular case of Lomé. A summary of data on the variables used is given in Table 3.

Table 3: Some descriptive statistics on the model's variables

	Overall		Urban area		Rural area	
	Mean	SD	Mean	SD	Mean	SD
20 to 24 years	0.299	0.458	0.321	0.467	0.291	0.454
25 to 29 years	0.183	0.387	0.196	0.397	0.178	0.383
30 to 34 years	0.158	0.365	0.115	0.319	0.176	0.381
35 to 39 years	0.050	0.217	0.038	0.190	0.055	0.227
40 to 49 years	0.013	0.114	0.004	0.063	0.017	0.129
Formally educated (1 = Yes)	0.480	0.500	0.723	0.448	0.381	0.486
Size of the household	6.840	3.430	5.982	3.236	7.187	3.446
Number of children aged below 5 years	1.690	0.870	1.535	0.718	1.753	0.917
Distance from the health facility	3.134	2.312	1.726	0.879	3.704	2.464
Quality of prenatal care	1,322.97	570.22	838.654	376.837	1,519.262	515.602
Cost of consultations at public health centres	1,707.881	1,351.577	3,454.455	1,430.92	1,000.000	0.000
Area of residence (1 = urban)	0.288	0.453	1.000	0.000	0.000	0.000
Composite wealth index	-0.171	1.013	1.055	0.709	-0.667	0.618
Number of observations	1,751	505	1,246			

4. Results

Descriptive analysis

Prenatal consultations are occasions at which pregnant women and their families are informed about possible signs and symptoms of threat to the pregnancy, and about the risks that come with labour. These consultations, therefore, enable the pregnant women to access various types of health care vital for their own health and that of their new-born babies. The consultations also provide pregnant women with the opportunity to give birth with the assistance of a health care provider.

Analysis of pregnant women's characteristics according to type of prenatal care received and area of residence

An analysis of the results in Table 4 reveals that in relation to area of residence, the rate of prenatal care provided by trained medical staff was found to be higher in urban areas (94.5%) than in rural ones (73.5%). This indicates a large disparity in access to medical staff between areas of residence. We see from Table 4 that rural areas recorded the highest rate of women who did not seek prenatal care at all (17.9%), and that of those who did, about half (8.6%) sought it from traditional midwives. Moreover, the Chi-square test revealed that there was an association between a pregnant woman seeking prenatal care and area of residence.

Table 4: Distribution (in %) of pregnant women who sought prenatal care according to area of residence

Area of residence	Modern health care	Traditional health care	Did not seek any prenatal health care	Standard error
Urban	94.5	0.6	4.9	0.010
Rural	73.5	8.6	17.9	0.014
Other statistical characteristics				
Chi ²	98.8852 Pr = 0.000			

Source: MICS-3 and authors' computations.

Analysis of pregnant women's characteristics according to type of prenatal care received and region

The proportion of women who sought prenatal care from modern health facilities varied between 65% in the Savanes Region and 97% in Lomé. It is also in Savanes Region that the percentage of women who consulted traditional midwives was highest (19%). The number of women who did not seek prenatal care at all was particularly high in the northern regions of Togo, namely Kara (22%), Central (18%), and Savanes (16%), and in the Maritime Region (18.3%) in the south of the country. The Chi-square test showed that there was an association between the variables of demand for prenatal care and the regions of Togo (see Table 5).

Overall, the results in Table 5 point to a high availability of modern prenatal care services from state-owned health facilities. This is an indication of improvement in maternal health. Most non-governmental organizations (NGOs) in the country, especially those based in the Central and Plateaux regions, run specific programmes aimed at improving the health of mothers and their children. As part of these programmes, the NGOs pay more than half the prenatal consultation fees.

Table 5: Distribution (in %) of women according to type of prenatal care and region

Region	Modern health care	Traditional health care	Did not seek any prenatal health care at all	Standard error
Lomé	97.3	0	2.7	0.012
Maritime	79.8	1.9	18.3	0.013
Plateaux	84.1	6.4	9.5	0.025
Central	81.9	0	18.1	0.024
Kara	73.5	4.3	22.2	0.032
Savanes	64.8	18.8	16.4	0.029
Other statistical characteristics				
Chi ²	229.8517 Pr = 0.000			

Source: MICS-3 and authors' computations.

Analysis of pregnant women's characteristics according to type of prenatal care and socio-demographic factors

The woman's age

A woman's age was found to considerably influence her decision to seek prenatal health care: prenatal consultations were more frequent among younger women than older ones. Indeed, as Table 6 shows, about eight women in 10 aged between 15 and 35 years sought prenatal consultations from trained medical staff. Beyond that age, the number of those who did reduced. In addition, it is among these older women (especially those aged above 44 years) that the percentages of those who sought prenatal care from traditional midwives or who did not seek it at all were the highest, that is 17.4% and 21.7%, respectively. The value of the Chi-square statistic shows that there was no association between seeking prenatal care and pregnant woman's age.

This lower rate of seeking prenatal health care by older women could be explained by the fact that they grow less frightened of the signs and symptoms related to pregnancy. These women rely on the diagnosis and advice received during earlier consultation visits and, thus, no longer deem it necessary to visit a modern health facility for consultation.

Table 6: Distribution (in %) of women according to type of prenatal care and age

Age of the pregnant woman (years)	Modern health care	Traditional health care	Did not seek any prenatal health care at all	Standard error
15–19	79.3	7.4	13.3	0.039
20–24	81.3	6	12.7	0.022
25–29	80.2	5.9	13.9	0.019
30–34	82.6	5.6	11.8	0.023
35–39	75.8	7.2	17	0.029
40–44	74.7	4.6	20.7	0.051
45–49	60.9	17.4	21.7	0.133
Other statistical characteristics				
Chi ² = 15.1794 Pr = 0.232				

Source: MICS-3 and authors' computations.

The pregnant woman's level of education

The results in Table 7 below show that more educated women sought prenatal health care than those without formal education, with the respective rates being 89% and 71% respectively. This difference can be explained by two facts: (i) a better analysis and understanding of the risks of not going for prenatal health care or of seeking it from non-trained people; and (ii) a greater demand for satisfactory health care provided by health workers. The Chi-square test showed that there was an association between seeking prenatal health care and the pregnant woman's level of formal education.

Table 7: Distribution (in %) of women according to type of prenatal care and level of education

Level of education of the pregnant woman	Modern health care	Traditional health care	Did not seek any prenatal health care	Standard error
Without formal education	70.5	8.8	20.7	0.018
With formal education	89.4	3.5	7.1	0.011
Other statistical characteristics				
Chi ² = 15.1794 Pr = 0.232				

Source: MICS-3 and authors' computations.

The wealth index

An upward trend was observed between the wealth index and the choice of a specific type of prenatal health care. That is, the proportion of prenatal consultations by trained medical staff rose from one quintile to another. The percentages of pregnant women who went for prenatal consultations varied from 67% among the women from very poor households to almost 100% among the women from very rich households (see Table 8). The same results also show that about 11% of women from very poor households consulted non-trained staff and that about 22% did not seek any prenatal care at all. The corresponding percentages for women from very rich families are only 0.7% and 1%, respectively. This logical finding can be explained by the fact that some women are attracted by the lower fee charged by traditional midwives compared to health centres without appreciating the risks of infections and other complications. These risks frequent by result in the same pregnant women seeking care from trained medical staff. The Chi-square test showed that there was an association between seeking prenatal care and the household's wealth index.

Table 8: Distribution (in %) of women according to type of prenatal care and their households' wealth index

Wealth index	Modern health care	Traditional health care	Did not seek any prenatal health care	Standard error
Very poor household	66.5	11.1	22.4	0.026
Poor	73	9.4	17.6	0.026
Average	79.4	3.9	16.7	0.025
Rich	92.3	1.9	5.8	0.017
Very rich	98.3	0.7	1	0.007
Other statistical characteristics				
Chi ² = 158.8883 Pr = 0.000				

Source: MICS-3 and authors' computations.

Analysis of econometric estimations

The econometric estimation of the model was done first in a general way and then by area of residence. The coefficients of the model indicated the direction which the probability of pregnant women seeking prenatal health care would take as a result of variation in one factor. The results in Table 9 (in Appendix 1) indicate that several factors significantly influenced the probability of the women going to modern health care facilities or to traditional midwives.

The effect of characteristics that are specific to the pregnant woman

At the national level, whether or not the variables "number of children below five years" and "size of the household" were included, the variables that were found to significantly influence the pregnant woman's choice of which type of prenatal care to seek were the woman's level of education and age (see Tables 9, 10 and 11 in appendices 1-3).

The level of education was found to have a positive impact on the woman's choice to consult medically trained staff. As the coefficient for this variable shows, the probability of a woman with formal education choosing to go to modern health facilities for prenatal consultations was much higher than that of a woman without formal education. This is a logical finding because formal education increases awareness of the risks related to a pregnancy that is not monitored by trained medical staff. This finding is an indication that educated women have little confidence in traditional health practices. The results were similar, whether in a rural area or an urban one (see Table 9): that is, the positive influence of the level of education on the choice of the pregnant woman to seek prenatal health care from modern health facilities. The observed significant and negative effect of seeking traditional care in the rural area means that the higher the pregnant woman's level of education, the less likely she would be to choose traditional prenatal care.

In relation to the area of residence, the analysis of the results of the second scenario (i.e. without including the variables "number of children below five years" and "size of the household") showed that the variable "level of education" was significant in the rural area. The same variable was not statistically significant in the urban area. This can be explained by the fact that towns have more awareness campaigns. Furthermore, the surrounding environment (i.e. living near a health facility) means that the spillover effect is automatic, whether one is educated or not.

Regarding the pregnant woman's age, especially the 25–35 year bracket, its coefficient indicates that it had a positive and significant effect on the woman's choice of consulting trained medical staff (see Tables 9, 10 and 11). The results actually show that the probability of the pregnant woman choosing this type of prenatal care was highest for the age bracket 25–39 years in scenario 1 (see Table 9), and for the age bracket 25–29 years in scenarios 2 and 3 (see Tables 10 and 11). Moreover, the results indicated that any variation of one year in this age bracket led to a 6% increase in the probability of the pregnant woman going for modern health care.

In all three scenarios, "area of residence" was found to have a positive influence on the probability of pregnant women in urban areas seeking care from modern health facilities. However, the results in Table 9 show that in the rural area, the variable "pregnant woman's age" had a positive effect on the probability of pregnant women aged between 20 and 24 seeking prenatal care from modern health facilities. This finding can be explained by the fact that a young pregnant woman will be curious to learn more about the risks that accompany pregnancy and the signs and symptoms of any pregnancy-related health problem. However, the older the pregnant woman is, the more confident she feels about handling her pregnancy and, hence, the less concerned she is about going for prenatal consultations.

The effect of characteristics that are specific to the household

Three variables were considered when measuring the effect of the characteristics of the household on the pregnant mother's choice to seek prenatal health care: the number of children below five years of age, the state of poverty in the household, and the size of the household (see Tables 9 and 10). At the national level, the first of the three variables had a positive effect on the pregnant woman's probability to consult a traditional midwife. In

relation to this, an increase by one child in the number of children below five years of age led to a 10% increase in the probability of the pregnant woman consulting a traditional midwife. However, the same variable was found to have a negative effect on the pregnant woman's choice to consult trained medical staff (see Table 9). In other words, the higher the number of children aged below five in the household, the higher probability that a pregnant woman would choose to consult a traditional midwife. In terms of area of residence, similar results were found for both rural areas and urban areas (see Table 9).

This finding can be explained by the fact that the households with a high number of under five years children old have more family responsibility, and also because these children require a lot of care.

Regarding the variables that relate to the household's state of poverty, at the national level they were all found to have a statistically significant and positive effect on the pregnant woman's choice to seek prenatal care from trained medical staff (see Tables 9, 10 and 11). For example, the higher the wealth index was, the higher the probability that the pregnant woman would go to modern health facilities for prenatal care. This finding suggests that a wealthy household was predisposed to pay for prenatal consultation at a modern health facility. The results of the marginal effects showed that any increase in the composite wealth index by one led to an 8% increase in the probability of the pregnant woman seeking prenatal care from trained medical staff. This probability increased by 3% in the rural area and 2% in the urban area (see Tables 10 and 11). Still in relation to area of residence, in rural areas (see Table 9), even when the level of income was decent enough, pregnant women still chose to seek prenatal care from traditional midwives. For women in urban areas, the higher their wealth index was, the less likely they were to seek care from traditional midwives. This finding can be explained by the influence of tradition in rural areas, where residents believe that certain traditional medicines are indispensable for the survival of both the mother and the newborn child, and by the social environment characterized by awareness campaigns in urban areas.

Overall, and in relation to urban areas, the size of the household was found to have a significant impact on the choice of the woman to seek care from trained medical staff (see Table 9). The negative sign of the coefficient for this variable means that the bigger the size of the household, the lower the probability that the pregnant woman would seek prenatal care from trained medical staff. Moreover, the significant and positive result observed for the national level (see Table 9) and for rural areas (see Tables 9 and 11) mean that the pregnant woman's choice to seek traditional care increased as the number of the people in her household increased. This finding can be explained by the fact that the increase in the dependants in the household reduced the financial resources available to cover medical expenses for them.

The effect of community characteristics

To measure the effect of community facilities and the cost of services on the pregnant woman's choice of which type of prenatal care to go for, three variables were tested in the model. These were the quality of health care offered, the distance between the woman's home and the health facility, and the cost of prenatal consultations (see Tables 9, 10 and 11).

The coefficient for the quality health care suggests that overall, the probability for a pregnant woman seeking prenatal care from traditional midwives was still high. As we see from Tables 9, 10 and 11, the higher the ratio of pregnant women per trained health worker was, the higher the probability for women to go to traditional midwives for prenatal care. This was observed for both rural (see Tables 10 and 11) and urban areas (see Table 9). It follows from this observation that the number of medically trained health workers was still low compared to the number of pregnant women they had to attend to. Moreover, the positive and statistically significant influence observed for this variable on the probability of pregnant women choosing to seek prenatal care from traditional midwives can be explained by the long queues encountered at the health centres. The queues meant that women had to spend a lot of time waiting for medical consultation, and sometimes there was the possibility that a woman would go back home without being seen by the relevant medical staff. This would make women seek an alternative source of prenatal care.

Regarding the cost of prenatal consultations, at the national level, this variable was found to have a positive effect on the probability of pregnant women seeking care from traditional midwives (see Tables 9, 10 and 11), and a negative effect on the probability that they would seek care from modern health facilities. In other words, the probability that pregnant women would seek prenatal care from traditional midwives was high when the cost of prenatal consultations at health facilities was high.

5. Conclusions and policy implications

The aim of this study was twofold: one, to identify the economic and social factors that would determine the pregnant women's probability of choosing a specific type of prenatal health care; two, to examine the effects of the variables related to living standards on the pregnant women's seeking prenatal care. To achieve this aim, the study modelled the probability that a pregnant woman would choose one of the following three options: not to seek prenatal health care at all, to seek it from trained medical staff, and to seek it from a traditional midwife. Based on data from the 2006 MICS-3 survey, the methodological approach used was both descriptive and econometric.

The descriptive analysis revealed that the percentage of pregnant women who did not seek prenatal care and that of those who sought it from traditional midwives, was higher in rural than in urban areas. The study also found that the older the pregnant women were, the less likely they were to seek prenatal consultations at modern health facilities. A similar result was found for women without formal education, as opposed to those who were educated with. Further, the study found that the higher the quintile of wealth of the household which the pregnant woman lived in, the more likely she was to seek prenatal consultations at a modern health facility.

The econometric analysis revealed that at the national level, the number of children under five years of age, the pregnant woman's level of formal education, her age, the size of the household she lived in, the cost of prenatal consultations at a modern health facility, the household's wealth index, and the quality of health care offered by modern health facilities, all had a positive and statistically significant effect on the her decision to seek prenatal care from trained medical staff or not.

Based on the results reported above, we propose the following maternal health policies: (i) to take specific measures to further promote young girls' access to formal education; (ii) to increase awareness campaigns to sensitize women on the necessity for birth control, thus to reducing the number of children below five years of age in the household; (iii) to promote access to maternal health care in rural areas by building more health facilities; (iv) to implement the policy of free prenatal health care, especially by removing delivery fees; (v) to improve household living conditions by increasing incomes; and (vi) to train women peer educators on the advantages of going for prenatal medical consultations, especially in rural areas, which would facilitate the dissemination of information to other women in their localities.

Notes

1. In our econometric estimations, the group of women who did not seek prenatal care was taken as the reference category.
2. Two other variables used as proxies for well-being were separately included in our regression calculations: one variable related to the possession of durable goods, and the other related to housing conditions. However, we did not obtain improved results.

References

- Ajakaiye, O. and G. Mwabu. 2007. "The demand for reproductive health services: frameworks of analysis". Paper presented at an AERC Seminar on Reproductive Health. Nairobi.
- Charasse, C. 1999. "La mesure et les déterminants de l'état de santé en Afrique du Sud". *Revue d'économie du développement*, 4: 9–37.
- Direction Générale de la Statistique et de la Comptabilité Nationale (2007), "Résultats de l'Enquête Nationale à Indicateurs multiples (MICS-3) - Togo 2006". Lomé.
- Ichoku H.E and M. Leibbrandt (2003), "Demand for healthcare services in Nigeria: A multivariate nested logit model". *African Development Review*, vol. 15 (2-3). pp. 396-425.
- Koffi-Tessio, E., Y. Tossou and K. Homevoh. 2000. "Situation de la santé et de la nutrition au Togo". Technical Report No. 2. HRD/SADAOC-Togo Project.
- Ministère de l'Économie et du Développement (2007), « Le profil de la pauvreté et de la vulnérabilité au Togo », Lomé.
- Mwabu, G. 2008. "Health economics for low- income countries". In: T.P. Schultz. and J. Strauss, eds., *Handbook of Development Economics*, Vol. 4. Amsterdam: Elsevier Science, North-Holland..
- Mwabu, G. 2009. "The production of child health in Kenya: a structural model of birth weight". *Journal of African Economies*,. 18: 212-60.
- Rosenzweig, Mark R. and Schultz. T. Paul (1982), "The behavior of mothers as inputs to child health: the determinants of birth weight, gestation, and the rate of fetal growth", in: Fuchs, Victor R. (ed.), *Economic Aspects of Health*. Chicago: The University of Chicago Press, pp. 53-92
- Schiff M. and A. Valdes. 1990. "Poverty, food intake and malnutrition: implications for food security in developing countries". *American Journal of Agricultural Economics*, 72(5): 1318-22.
- Strauss, J. and D. Thomas. 1995. "Human resources: empirical modeling of household and family decisions". In: J. Behrman and T.N. Srinivasan, eds., *Handbook of Development Economics*, Vol. 3A. Amsterdam: Elsevier Science, North-Holland.
- Strauss J. and D. Thomas. 2008., "Health over the life course". In: T.P. Schultz and J. Strauss, eds., *Handbook of Development Economics*, Vol. 4. Amsterdam: Elsevier Science, North-Holland.
- UNDP (2007) "Fighting Climate change: Human solidarity in a divided world", Human Development Report 2007/2008, New York.

Appendix 1

Table 9: Results of econometric estimations (including the variables “size of the household” and “number of children below 5 years of age in the household”)

	Model 1: Overall		Model 2: Urban area		Model 3: Rural area	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
<i>Sought prenatal care from trained medical staff</i>						
Age of the pregnant woman						
- 20 to 24 years	0.20	0.29	0.14	0.48	0.38	0.00***
- 25 to 29 years	0.41	0.07*	0.35	0.00***	0.81	0.22
- 30 to 34 years	0.03	0.09*	-0.03	0.88	0.37	0.62
- 35 to 39 years	-0.26	0.06*	-0.35	0.29	0.16	0.88
- 40 to 49 years	0.27	0.63	-0.10	0.87	-2.23	0.21
With formal education (1 = Yes)	0.83	0.00***	0.91	0.00***	0.43	0.06*
Size of the household	-0.05	0.07*	-0.05	0.09*	0.02	0.47
No. of children below 5 years	-0.29	0.00***	-0.33	0.00***	-0.23	0.06*
Distance from the health facility	-0.04	0.16	-0.05	0.15	-0.06	0.79
Quality of health care	0.01	0.20	0.01	0.29	0.01	0.32
Consultation fees at public health facilities	-0.01	0.05**			0.01	0.01***
Area of residence (1 = Urban)	0.29	0.00***			1.36	0.00***
Composite wealth index	0.63	0.00***	0.51	0.00***	0.25	0.86
Constant	1.26	0.00***	1.60	0.00		
<i>Sought prenatal care from traditional midwives</i>						
Age of the pregnant woman						
- 20 to 24 years	-0.24	0.44	-0.30	0.31	2.35	0.22
- 25 to 29 years	-0.10	0.80	-0.12	0.74	-31.6	0.32
- 30 to 34 years	-0.11	0.77	-0.15	0.68	29.5	0.03**
- 35 to 39 years	-0.70	0.24	-0.75	0.22	30.1	0.20
- 40 to 49 years	0.51	0.48	0.63	0.40	34.3	0.52
With formal education (1 = Yes)	0.35	0.21	0.47	0.10*	-2.13	0.02**
Size of the household	0.01	0.79	0.00	0.89	0.75	0.02**
No. of children below years	0.28	0.06*	0.24	0.09*	1.73	0.06
Distance from the health facility	0.27	0.60	0.02	0.12	-0.88	0.07*
Quality of health care	0.10	0.00***	0.01	0.00*	-0.01	0.34
Consultation fees at public health facilities	0.01	0.00***			0.01	0.78
Area of residence (1 = Urban)	2.30	0.00***				
Composite wealth index	0.14	0.52	-0.06	0.09*	2.67	0.07*
Constant	4.23	0.12	-2.3	0.00	8.00	0.03

* significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

Source: Authors' computations.

Appendix 2

Table 10: Results of econometric estimations (without the variable “size of the household”)

	Model 1: Overall			Model 2: Urban			Model 3: Rural		
	Coeff.	Prob.	E.M.	Coeff.	Prob.	E.M.	Coeff	Prob	E.M.
<i>Sought prenatal care from trained medical staff</i>									
Age of the pregnant woman									
- 20 to 24 years	0.15	0.43	0.00	0.46	0.41	0.00	0.09	0.67	0.01
- 25 to 29 years	0.40	0.08*	0.06	0.81	0.02**	0.12	0.34	0.17	0.00
- 30 to 34 years	0.13	0.57	0.10	0.48	0.52	0.05	0.07	0.77	0.05
- 35 to 39 years	-0.14	0.65	-0.03	0.28	0.81	0.04	-0.22	0.51	-0.02
- 40 to 49 years	-0.14	0.80	-0.01	-2.08	0.26	-0.15	0.06	0.92	0.03
With formal education (1 = Yes)	0.84	0.00***	0.06	0.41	0.23	0.03	0.94	0.00***	0.006
Number of children below 5 years	-0.15	0.25	0.16	-0.17	0.13	-0.00	-0.16	0.19	-0.00
Distance from the health facility	-0.05	0.12	-0.62	-0.04	0.69	-0.01	-0.05	0.11	-0.04
Quality of health care	0.00	0.23	0.88	0.00	0.27	0.06	0.00	0.34	0.01
Consultation fees at public health facilities	-0.01	0.08*	0.04				0.00	0.24	0.03
Area of residence (1 = Urban)	-0.26	0.47	-0.62	-	-	-	-	-	-
Composite wealth index	0.63	0.00***	0.08	1.27	0.00***	0.03	0.51	0.00***	0.02
Constant	1.15	0.00		0.09	0.95		1.40	0.00	
<i>Sought prenatal care from traditional midwives</i>									
Age of the pregnant woman									
- 20 to 24 years	-0.16	0.60	-0.00	1.19	0.39	0.00	-0.26	0.42	-0.00
- 25 to 29 years	-0.03	0.93	-0.18	-36.45	1.00	-0.01	-0.05	0.89	-0.10
- 30 to 34 years	-0.14	0.70	-0.22	-36.43	1.00	-0.00	-0.17	0.64	-0.03
- 35 to 39 years	-0.74	0.22	-0.00	-36.84	1.00	-0.04	-0.77	0.20	-0.02
- 40 to 49 years	0.47	0.51	0.48	-38.74	1.00	-0.02	0.62	0.41	0.00
With formal education (1 = Yes)	0.33	0.24	0.01	-1.58	0.25	-0.00	0.47	0.11	0.01
Number of children below 5 years	0.22	0.10*	0.10	0.26	0.56	0.00	0.23	0.16	0.01
Distance from the health facility	0.03	0.53	0.00	0.22	0.76	0.14	0.02	0.66	0.01
Quality of health care	0.00	0.01***	0.00	0.00	0.83		0.00	0.01***	0.00
Consultation fees at public health facilities	0.01	0.00***	0.02				0.34	0.22	0.00
Area of residence (1 = Urban)	2.35	0.00***	0.34	-	-	-	-	-	-
Composite wealth index	0.10	0.67	0.02	-2.27	0.30	0.05	-0.12	0.63	-0.02
Constant	4.62	0.00		8.31	1.00	0.20	-1.95	0.00	

NB: EM = marginal effects.

*significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

Source: Authors' computations.

Appendix 3

Table 11: Results of econometric estimations (without the variable “children below 5 years”)

	Model 1: Overall			Model 2: Urban			Model 3: Rural		
	Coeff.	Prob.	E.M.	Coeff.	Prob.	E.M.	Coeff.	Prob.	E.M.
Sought prenatal care from trained medical staff									
Age of the pregnant woman									
- 20 to 24 years	0.15	0.33	0.00	0.40	0.22	0.00	0.09	0.67	0.01
- 25 to 29 years	0.40	0.06*	0.06	0.81	0.02**	0.12	0.34	0.17	0.00
- 30 to 34 years	0.13	0.55	0.10	0.48	0.52	0.05	0.07	0.77	0.05
- 35 to 39 years	-0.14	0.65	-0.03	0.28	0.81	0.04	-0.22	0.51	-0.02
- 40 to 49 years	-0.14	0.80	-0.01	-2.08	0.26	-0.15	0.06	0.92	0.03
With formal education (1 = Yes)	0.84	0.00***	0.06	0.41	0.40	0.03	0.94	0.00***	0.06
Size of the household	-0.17	0.15	0.02	-0.17	0.26	-0.00	-0.16	0.14	-0.02
Distance from the health facility	-0.05	0.11	-0.62	-0.04	0.89	-0.01	-0.05	0.11	-0.04
Quality of health care	0.00	0.23	0.88	0.00	0.27	0.06	0.00	0.34	0.01
Consultation fees at public health facilities	-0.01	0.06***	0.04				0.00	0.24	0.03
Area of residence (1 = Urban)	-0.26	0.47	-0.62	-	-	-	-	-	-
Composite wealth index	0.63	0.00***	0.08	1.27	0.00*	0.03	0.51	0.00***	0.02
Constant	1.15	0.00***		0.09	0.95		1.40	0.00***	
Sought prenatal care from traditional midwives									
Age of the pregnant woman									
- 20 to 24 years	-0.16	0.62	-0.00	1.19	0.39	0.00	-0.26	0.42	-0.00
- 25 to 29 years	-0.03	0.90	-0.18	-36.45	1.00	-0.01	-0.05	0.89	-0.10
- 30 to 34 years	-0.14	0.70	-0.22	-36.43	1.00	-0.00	-0.17	0.64	-0.03
- 35 to 39 years	-0.74	0.22	-0.00	-36.84	1.00	-0.04	-0.77	0.20	-0.02
- 40 to 49 years	0.47	0.50	0.48	-38.74	1.00	-0.02	0.62	0.41	0.00
With formal education (1 = Yes)	0.33	0.24	0.01	-1.58	0.25	-0.00	0.47	0.11	0.01
Size of the household	0.16	0.09*	0.02	0.19	0.21	0.00	0.03	0.08*	0.01
Distance from the health facility	0.03	0.55	0.00	0.22	0.76	0.14	0.02	0.66	0.01
Quality of health care	0.00	0.01***	0.00	0.00	0.83		0.00	0.01***	0.00
Consultation fees at public health facilities	0.01	0.02***	0.02	0.01	0.0***	0.00	0.34	0.22	0.00
Area of residence (1 = Urban)	2.35	0.00***	0.34	-	-	-	-	-	-
Composite wealth index	0.10	0.58	0.02	-2.36	0.30	0.01	-0.12	0.63	-0.02
Constant	4.62	0.00***		8.31	0.78	0.20	-1.95	0.00***	

NB: EM = marginal effects.

*significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

Source: Authors' computations.

Appendix 4: Methodology of how the wealth index was computed from the MICS data

The methodology adopted consisted of using a technique that enables the aggregation of different dimensions of non-monetary poverty with a view to constructing a composite poverty indicator. In this connection, the main areas considered were: education, access to water and electricity, ownership of durable goods, housing, sanitation, etc. (see Table 12).

Table 12: Description of the variables related to the non-monetary dimensions of poverty

Dimensions
Elements of comfort, equipment and other assets
Refrigerator
Communications and transports
Radio
Television
Car
Motorcycle
Bicycle
Energy
Electricity
Housing and sanitation
Type of roof (modern vs. traditional)
Type of walls (modern vs. traditional)
Type of terrace (modern vs. traditional)
Type of toilet (modern vs. traditional vs. no toilet at all)
Source of water
Clean drinking water
Protected water source
Unprotected water source
Education
Level of education of the head of the household

The multiple correspondence analysis (MCA) is the factor analysis technique that we used as the aggregation approach. We used MCA because the initial data on poverty indicators as collected from households were qualitative and could be codified in a binary way. The functional form of the composite indicator is simply the mean of the weights of categories, which in turn is the mean of standard scores. Suppose that m designates a

given household indicator, and C_m is its value for the composite wealth indicator. Then, the functional form of C_m will be:

$$C_m = \frac{\sum_{k=1}^K \sum_{jk=1}^{J_k} W_{jk}^k I_{jk}^k}{K} \quad (1)$$

where

K = number of category indicators;

J_k = number of the category of the indicator K ;

W_{jk}^k = weight (score of the first standardized axis) of the category J_k ;

I_{jk}^k = binary variable 0/1 which takes the value 1 when the unit has the category J_k .

The weightings obtained using MCA correspond to the standardized scores on the first factor axis. The value of the composite wealth indicator for every household m simply corresponds to the mean of weights of the binary categorical variables. With N households, the weight of a category is simply the mean of the standardized scores of the size of the population belonging to the category in question.

After computing the composite wealth indicator for each household, we classified the households into five categories, namely: very rich, rich, modest, poor and very poor.

Other recent publications in the AERC Research Papers Series:

- The Integration of Nigeria's Rural and Urban Foodstuffs Market*, by Rosemary Okoh and P.C. Egbon, Research Paper 151.
- Determinants of Technical Efficiency Differentials amongst Small- and Medium-Scale Farmers in Uganda: A Case of Tobacco Growers*, by Marios Obwona, Research Paper 152.
- Land Conservation in Kenya: The Role of Property Rights*, by Jane Kabubo-Mariara, Research Paper 153.
- Technical Efficiency Differentials in Rice Production Technologies in Nigeria*, by Olorunfemi Ogundele, and Victor Okoruwa, Research Paper 154.
- The Determinants of Health Care Demand in Uganda: The Case Study of Lira District, Northern Uganda*, by Jonathan Odwee, Francis Okurut and Asaf Adebua, Research Paper 155.
- Incidence and Determinants of Child Labour in Nigeria: Implications for Poverty Alleviation*, by Benjamin C. Okpukpara and Ngozi Odurukwe, Research Paper 156.
- Female Participation in the Labour Market: The Case of the Informal Sector in Kenya*, by Rosemary Atieno, Research Paper 157.
- The Impact of Migrant Remittances on Household Welfare in Ghana*, by Peter Quartey, Research Paper 158.
- Food Production in Zambia: The Impact of Selected Structural Adjustments Policies*, by Muacinga C.H. Simatele, Research Paper 159.
- Poverty, Inequality and Welfare Effects of Trade Liberalization in Côte d'Ivoire: A Computable General Equilibrium Model Analysis*, by Bédia F. Aka, Research Paper 160.
- The Distribution of Expenditure Tax Burden before and after Tax Reform: The Case of Cameroon*, by Tabi Atemnkeng Johennes, Atabongawung Joseph Nju and Afeani Azia Theresia, Research Paper 161.
- Macroeconomic and Distributional Consequences of Energy Supply Shocks in Nigeria*, by Adeola F. Adenikinju and Niyi Falobi, Research Paper 162.
- Analysis of Factors Affecting the Technical Efficiency of Arabica Coffee Producers in Cameroon*, by Amadou Nchare, Research Paper 163.
- Fiscal Policy and Poverty Alleviation: Some Policy Options for Nigeria*, by Benneth O. Obi, Research Paper 164.
- FDI and Economic Growth: Evidence from Nigeria*, by Adeolu B. Ayanwale, Research Paper 165.
- An Econometric Analysis of Capital Flight from Nigeria: A Portfolio Approach*, by Akanni Lawanson, Research Paper 166.
- Extent and Determinants of Child Labour in Uganda*, by Tom Mwebaze, Research Paper 167.
- Oil Wealth and Economic Growth in Oil Exporting African Countries*, by Olomola Philip Akanni, Research Paper 168.
- Implications of Rainfall Shocks for Household Income and Consumption in Uganda*, by John Bosco Asiimwe, Research Paper 169.
- Relative Price Variability and Inflation: Evidence from the Agricultural Sector in Nigeria*, by Obasi O. Ukoha, Research Paper 170.
- A Modelling of Ghana's Inflation: 1960–2003¹*, by Mathew Kofi Ocran, Research Paper 171.
- The Determinants of School and Attainment in Ghana: A Gender Perspective*, by Harry A. Sackey, Research Paper 172.
- Private Returns to Education in Ghana: Implications for Investments in Schooling and Migration*, by Harry A. Sackey, Research Paper 173.
- Oil Wealth and Economic Growth in Oil Exporting African Countries*, by Olomola Philip Akanni, Research Paper 174.
- Private Investment Behaviour and Trade Policy Practice in Nigeria*, by Dipo T. Busari and Phillip C. Omoke, Research Paper 175.
- Determinants of the Capital Structure of Ghanaian Firms*, by Jochua Abor, Research Paper 176.
- Privatization and Enterprise Performance in Nigeria: Case Study of some Privatized Enterprises*, by Afeikhena Jerome, Research Paper 177.
- Sources of Technical Efficiency among Smallholder Maize Farmers in Southern Malawi*, by Ephraim W. Chirwa, Research Paper 178.
- Technical Efficiency of Farmers Growing Rice in Northern Ghana*, by Seidu Al-hassan, Research Paper 179.
- Empirical Analysis of Tariff Line-Level Trade, Tariff Revenue and Welfare Effects of Reciprocity under*

- an Economic Partnership Agreement with the EU: Evidence from Malawi and Tanzania*, by Eviofus K. Zgovu and Josaphat P. Kweka, Research Paper 180.
- Effect of Import Liberalization on Tariff Revenue in Ghana*, by William Gabriel Brafu-Insaidoo and Camara Kwasi Obeng, Research Paper 181.
- Distribution Impact of Public Spending in Cameroon: The Case of Health Care*, by Bernadette Dia Kamgnia, Research Paper 182.
- Social Welfare and Demand for Health Care in the Urban Areas of Côte d'Ivoire*, by Arsène Kouadio, Vincent Monsan and Mamadou Gbongue, Research Paper 183.
- Modelling the Inflation Process in Nigeria*, by Olusanya E. Olubusoye and Rasheed Oyaromade, Research Paper 184.
- Determinants of Expected Poverty Among Rural Households in Nigeria*, by O.A. Oni and S.A. Yusuf, Research Paper 185.
- Exchange Rate Volatility and Non-Traditional Exports Performance: Zambia, 1965–1999*, by Anthony Musonda, Research Paper 186.
- Macroeconomic Fluctuations in the West African Monetary Union: A Dynamic Structural Factor Model Approach*, by Romain Houssa, Research Paper 187.
- Price Reactions to Dividend Announcements on the Nigerian Stock Market*, by Olatundun Janet Adelegan, Research Paper 188.
- Does Corporate Leadership Matter? Evidence from Nigeria*, by Olatundun Janet Adelegan, Research Paper 189.
- Determinants of Child Labour and Schooling in the Native Cocoa Households of Côte d'Ivoire*, by Guy Blaise Nkamleu, Research Paper 190.
- Analysis of Health Care Utilization in Côte d'Ivoire*, by Alimatou Cisse, Research Paper 191.
- Poverty and the Anthropometric Status of Children: A Comparative Analysis of Rural and Urban Household in Togo*, by Kodjo Abalo, Research Paper 192.
- African Economic and Monetary Union (WAEMU)¹*, by Sandrine Kablan, Research Paper 193.
- Economic Liberalization, Monetary and Money Demand in Rwanda: 1980–2005*, by Musoni J. Rutayisire, Research Paper 194.
- An Empirical Analysis of the Determinants of Food Imports in Congo*, by Léonard Nkouka Safoulanitou and Mathias Marie Adrien Ndinga, Research Paper 195.
- Determinants of a Firm's Level of Exports: Evidence from Manufacturing Firms in Uganda*, by Aggrey Niringiye and Richard Tuyiragize, Research Paper 196.
- Supply Response, Risk and Institutional Change in Nigerian Agriculture*, by Joshua Olusegun Ajetomobi, Research Paper 197.
- Multidimensional Spatial Poverty Comparisons in Cameroon*, by Aloysius Mom Njong, Research Paper 198.
- Earnings and Employment Sector Choice in Kenya*, by Robert Kivuti Nyaga, Research Paper 199.
- Covergence and Economic Integration in Africa: the Case of the Franc Zone Countries*, by Latif A.G. Dramani, Research Paper 200.
- Determinants of Employment in the Formal and Informal Sectors of the Urban Areas of Kenya*, by Wambui R. Wamuthenya, Research Paper 201.
- Financial Sector Liberalization and Productivity Change in Uganda's Commercial Banking Sector*, by Kenneth Alpha Egesa, Research Paper 202.
- Fiscal Reforms and Income Inequality in Senegal and Burkina Faso: A Comparative Study*, by Mbaya Diene, Research Paper 203.
- Factors Influencing Technical Efficiencies among Selected Wheat Farmers in Uasin Gishu District, Kenya*, by James Njeru, Research Paper 204.
- Exact Configuration of Poverty, Inequality and Polarization Trends in the Distribution of well-being in Cameroon*, by Francis Menjo Baye, Research Paper 205.
- Child Labour and Poverty Linkages: A Micro Analysis from Rural Malawian Data*, by Leviston S. Chiwaula, Research Paper 206.
- The Determinants of Private Investment in Benin: A Panel Data Analysis*, by Sosthène Ulrich Gnansounou, Research Paper 207.
- Contingent Valuation in Community-Based Project Planning: The Case of Lake Bamendjim Fishery Restocking in Cameroon*, by William M. Fonta, Hyacinth E. Ichoku and Emmanuel Nwosu, Research Paper 208.

- Multidimensional Poverty in Cameroon: Determinants and Spatial Distribution*, by Paul Ningaye, Laurent Ndjanyou and Guy Marcel Saakou, Research Paper 209.
- What Drives Private Saving in Nigeria*, by Tochukwu E. Nwachukwu and Peter Odigie, Research Paper 210.
- Board Independence and Firm Financial Performance: Evidence from Nigeria*, by Ahmadu U. Sanda, Tukur Garba and Aminu S. Mikailu, Research Paper 211.
- Quality and Demand for Health Care in Rural Uganda: Evidence from 2002/03 Household Survey*, by Darlison Kaija and Paul Okiira Okwi, Research Paper 212.
- Capital Flight and its Determinants in the Franc Zone*, by Ameth Saloum Ndiaya, Research Paper 213.
- The Efficacy of Foreign Exchange Market Intervention in Malawi*, by Kisukyabo Simwaka and Leslie Mkandawire, Research Paper 214.
- The Determinants of Child Schooling in Nigeria*, by Olanrewaju Olaniyan, Research Paper 215.
- Influence of the Fiscal System on Income Distribution in Regions and Small Areas: Microsimulated CGE Model for Côte d'Ivoire*, by Bédia F. Aka and Souleymane S. Diallo, Research Paper 216.
- An Econometric Analysis of the Monetary Policy Reaction Function in Nigeria*, by Chukwuma Agu, Research Paper 217.
- Analysis of Technical Efficiency Differentials among Maize Farmers in Nigeria*, by Luke Oyesola Olarinde, Research Paper 218.
- Import Demand in Ghana: Structure, Behaviour and Stability*, by Simon Lwadzpgah Harvey and Kordzo Sedegah, Research Paper 219.
- Monetary Policy Rules: Lessons Learned from ECOWAS Countries*, by Alain Siri, Research Paper 220.
- Volatility of resources inflows and Domestic Investment in Cameroon* by Sunday A. Khan, Research Paper 221.
- Efficiency Wage, Rent-Sharing Theories and Wage Determination in Manufacturing Sector in Nigeria* by Ben E. Aigbokhan, Research Paper 222.
- Government Wage Review Policy and Public-Private Sector Wage Differential in Nigeria* by Alarudeen Aminu, Research Paper 223.
- Rural Non-Farm Incomes and Poverty Reduction In Nigeria* by Awoyemi Taiwo Timothy, Research Paper 224.
- After Fifteen Year Use of the Human Development Index (HDI) of the United Nations Development Program (UNDP): What Shall We Know?* by Jean Claude Saha, Research Paper 225.
- Uncertainty and Investment Behavior in the Democratic Republic of Congo* by Xavier Bitemo Ndiwulu and Jean-Papy Manika Manzongani, Research Paper 226.
- An Analysis of Stock Market Anomalies and Momentum Strategies on the Stock Exchange of Mauritius* by Sunil K. Bundoo, Research Paper 227.
- The Effect of Price Stability On Real Sector Performance in Ghana* by Peter Quartey, Research Paper 228.
- The Impact of Property Land Rights on the Production of Paddy Rice in the Tillabéry, Niamey and Dosso Regions in Niger* by Maman Nafiou Malam Maman and Boubacar Soumana, Research Paper 229.
- An Econometric Analysis of the Monetary Policy Reaction Function in Nigeria* by Chukwuma Agu, Research Paper 230.
- Investment in Technology and Export Potential of Firms in Southwest Nigeria* by John Olatunji Adeoti, Research Paper 231.
- Analysis of Technical Efficiency Differentials among Maize Farmers in Nigeria* by Luke Oyesola Olarinde, Research Paper 232.
- Import Demand in Ghana: Structure, Behaviour and Stability* by Simon Kwadzogah Harvey and Kordzo Sedegah, Research Paper 233.
- Trade Liberalization Financing and Its Impact on Poverty and Income Distribution in Ghana* by Vijay K. Bhasin, Research Paper 234.
- An Empirical Evaluation of Trade Potential in Southern African Development Community* by Kisukyabo Simwaka, Research Paper 235.
- Government Capital Spending and Financing and Its Impact on Private Investment in Kenya: 1964-2006* by Samuel O. Oyeike, Research Paper 236.
- Determinants of Venture Capital in Africa: Cross Section Evidence* by Jonathan Adongo, Research Paper 237.
- Social Capital and Household Welfare in Cameroon: A Multidimensional Analysis* by Tabi Atemnkeng Johannes, Research Paper 238.
- Analysis of the determinants of foreign direct investment flows to the West African and Economic Union countries* by Yélé Maweki Batana, Research Paper 239.

- Urban Youth Labour Supply and the Employment Policy in Côte d'Ivoire* by Clément Kouadio Kouakou, Research Paper 240.
- Managerial Characteristics, Corporate Governance and Corporate Performance: The Case of Nigerian Quoted Companies* by Adenikinju Olayinka, Research Paper 241.
- Effects of Deforestation on Household Time Allocation among Rural Agricultural Activities: Evidence from Western Uganda* by Paul Okiira Okwi and Tony Muhumuza, Research Paper 242.
- The Determinants of Inflation in Sudan* by Kabbashi M. Suliman, Research Paper 243.
- Monetary Policy Rules: Lessons Learned From ECOWAS Countries* by Alain Siri, Research Paper 244.
- Zimbabwe's Experience with Trade Liberalization* by Makoche Kanwa Albert, Hurungo T. James and Kambarami Prosper, Research Paper 245.
- Determinants in the Composition of Investment in Equipment and Structures in Uganda* by Charles Augustine Abuka, Research Paper 246.
- Corruption at household level in Cameroon: Assessing Major Determinants* by Joseph-Pierre Timnou and Dorine K. Feunou, Research Paper 247.
- Growth, Income Distribution and Poverty: The Experience Of Côte d'Ivoire From 1985 To 2002* by Kouadio Koffi Eric, Mamadou Gbongue and Ouattara Yaya, Research Paper 248.
- Does Bank Lending Channel Exist In Kenya? Bank Level Panel Data Analysis* by Moses Muse Sichei and Githinji Njenga, Research Paper 249.
- Governance and Economic Growth in Cameroon* by Fondo Sikod and John Nde Teke, Research Paper 250.
- Analyzing Multidimensional Poverty in Guinea: A Fuzzy Set Approach* by Fatoumata Lamarana Diallo, Research Paper 251.
- The Effects of Monetary Policy on Prices in Malawi* by Ronald Mangani, Research Paper 252.
- Managerial Characteristics, Corporate Governance and Corporate Performance: The Case of Nigerian Quoted Companies* by Olayinka Adenikinju, Research Paper 253.
- Public Spending and Poverty Reduction in Nigeria: A Benefit Incidence Analysis in Education and Health* by Uzochukwu Amakom, Research Paper 254.
- Supply Response of Rice Producers in Cameroon: Some Implications of Agricultural Trade on Rice Sub-sector Dynamics* by Ernest L. Molua and Regina L. Ekonde, Research Paper 255.
- Effects of Trade Liberalization and Exchange Rate Changes on Prices of Carbohydrate Staples in Nigeria* by A. I. Achike, M. Mkpado and C. J. Arene, Research Paper 256.
- Underpricing of Initial Public Offerings on African Stock Markets: Ghana and Nigeria* by Kofi A. Osei, Charles K.D. Adjasi and Eme U. Fiawoyife, Research Paper 257.
- Trade Policies and Poverty in Uganda: A Computable General Equilibrium Micro Simulation Analysis* by Milton Ayoki, Research Paper 258.
- Interest Rate Pass-through and Monetary Policy Regimes in South Africa* by Meshach Jesse Aziakpono and Magdalene Kasyoka Wilson, Research Paper 259.
- Vertical Integration and Farm Gate Prices in the Coffee Industry in Côte d'Ivoire* by Malan B. Benoit, Research Paper 260.
- Patterns and Trends of Spatial Income Inequality and Income Polarization in Cameroon* by Aloysius Mom Njong and Rosy Pascale Meyet Tchouapi, Research Paper 261.
- Private Sector Participation in The Provision of Quality Drinking Water in Urban Areas in Ghana: Are the people willing to pay?* By Francis Mensah Asenso-Boadi and Godwin K. Vondolia, Research Paper 262.
- Private Sector Incentives and Bank Risk Taking: A Test of Market Discipline Hypothesis in Deposit Money Banks in Nigeria* by Ezema Charles Chibundu, Research Paper 263.