

How are healthcare demand determinants changing during the decentralization process in Cameroon?

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Abstract:

The objective of the paper is to analyze the evolution of the determinants of the demand for care during the decentralization process in Cameroon. For this purpose, an analysis of adjusted standardized residuals and phi statistics was conducted using data from the first three Cameroonian Household Surveys (ECAM).

The results show that in the process of decentralization individuals have moved furthest away from traditional health care for the benefit of informal drug vendors, whose attendance has steadily increased; the demand for modern public and private care first decreased between 1996 and 2001 and then increased from 2001 to 2007. Moreover, an increase and then a decrease in the number of significant determinants of the demand for care can be observed during the period.

Two main recommendations can thus be made with a view to improving the demand for care: i) improve the supply of care through a real organization of traditional medicine, a relentless fight against the informal sale of medicines, an improvement of the quality of services and human resources in the public sector, and collaboration and synergy of actions between the different providers of care; (ii) improve access to care for poor households and women through specific programs for these households.

Keywords: Decentralization, Healthcare demand, Adjusted standardized residuals, Phi Statistics.

1. Introduction

Cameroon's health system has undergone many reforms since the 1960s. Starting from a free of charges public healthcare system since political statehood in 1960, Cameroon will implement its first Primary Health Care Policy in 1982. Following the economic crisis of the 1980s, the country introduced cost recovery and user fees at the end of the same decade. This reform package will await one of its culminating points through the official implementation of the health sector decentralization in 1996[1], followed in 2001 by the first Health Sector Strategy (HSS), in accordance with the principles of the Bamako Initiative (BI).

Following the principles of BI[2–4], decentralization of the health sector in Cameroon has long been shaped by regionalization (transfer of powers from a central authority to regional peripheries[5]) which is more akin to a delegation of powers that does not necessarily imply a gain of financial autonomy for local actors. If foreign experiences show that results on healthcare demand

differ according to the approach of decentralization adopted, Cameroonian researches mainly approach the problem of healthcare demand under the prism of poverty[6–9] and health mutuals [10–13].

From some developing countries health sector decentralization experiences, it emerges that: (i) not differentiating between approaches in terms of strategic and commercial services and those in terms of social services has led to reforms oriented towards a market approach rather than a social approach to services (in Viet Nam) with negative effects on the universality of access to care, equity and efficiency[14] with the final consequence that poor health cost was higher than that of the rich; ii) the opening up to the private sector has increased the number of patients to this sector by 60% over a period of 10 years, still in the Vietnamese case, with a surge in demand for pharmacies, with a consequence on the increase of self-medication (mainly the poorer strata, less covered by health insurance) and drug resistance risk[15]; iii) decentralization has generated three types of

informal care markets in Africa: traditional medicine, street drug market and an informal health insurance market born from tontines[16]. In addition, there is a notable increase in private for-profit structures in urban areas, as rural areas are not able to ensure their profitability[17].

The aim of this paper is to analyze the evolution of the determinants of healthcare demand, that is the determinants of the choice of health services, during the first two crucial stages of the decentralization process in Cameroon, in order to identify a possible impact of the policies carried out.

2. Methodology

According to Grossman[18] and Gertler[19], a set of variables can be selected as determinants of the demand for health care. These variables concern, on the one hand, the determinants of demand related to individual and household characteristics, but also the determinants related to the supply of health care on the other hand.

A non-parametric approach is used to analyze and compare, through contingency tables, the changes in the behavior of the determinants of healthcare demand over three years (1996, 2001 and 2007). The adjusted standardized residual (ASR) is so used to analyze the relevance of the association (attraction or repulsion) between the modalities of two Qualitative variables, that is, in this particular case, between health services choice modalities and each of its determinants' modalities taken separately. The ASR is supplemented by the phi (Φ) statistic that makes it possible to attest to the significance of the general relationship between the dependent variable and each of its determinants taken separately.

The ASR is defined for each element (box) of the contingency table. A 5% bilateral test is performed, the critical threshold is the 0.975 order quantile of the standard normal law: $U_{0,975} = 1.96$. When $|ASR|$

> 1.96 the relationship between the modalities of the variables is significant, that is either attractive (for $ASR > 0$), or repulsive (for $ASR < 0$).

The value of Φ is between 0 and Φ_{max} . Φ_{max} is given by the square root of the smallest number of modalities owned by one of the two variables minus one. The intensity of the relationship between two variables is strong when Φ is close to Φ_{max} . However, for practical reasons, the interpretation of the statistical significance alone is sufficient to report for the possibility of associating the two variables.

Healthcare demand and its determinants are (apart from the part of the household expenditure devoted to health) thus transformed into qualitative variables (with two or more modalities). The part of the household expenditure devoted to health is remaining quantitative, defined in percentage and observed over the three years and over healthcare demand modalities.

Healthcare demand (D_C) is analyzed through the choice of services. It is a matter of observing the evolution of the relation between the choice of services and its determinants during the process of decentralization. According to both theoretical and empirical literature healthcare demand (D_C) is determined by household, individual (that is the head of the household) and healthcare providers characteristics ($D_C = f(Res, In, Ex, A, G, Ed, Sact, Dist, Sat)$) such as the place of residence of the household (Res), per capita household income class (In), the part of the household expenditure devoted to health (Ex), age group (A), gender (G), level of education (Ed), activity and informality status ($Sact$), distance from the closest public provider to home ($Dist$) and satisfaction with the use of public services (Sat). These different variables are labeled as shown in Table 1 below.

Table 1: Variables label

Variables	Mesure
Healthcare demand (D_c)	Captured by the choice of healthcare provider. Six modalities variable: <i>none</i> (no healthcare provider structure chosen), <i>public*</i> (public hospital or health center), <i>private**</i> (formal private structure), <i>informal***</i> (informal drug vendor), <i>traditional****</i> (traditional therapist) and <i>other</i> (example of the practice of religion, etc.) *Pub. **Priv ***Inform ****Oth.
Residence (Res)	The place of residence. Three modalities variable: <i>Yaoundé / Douala</i> (the two main capitals, which benefit from the best public reference hospitals); <i>Urban</i> (all other urban centers), <i>Rural</i> (landlocked areas that have a low-quality technical platform).

Income (In)	Household income per capita. Variable constructed from the ratio of total household expenditure to the number of individuals in the household. Four modalities variable: <i>Below the poverty line; [threshold – 50,000 CFA francs]; [50,000 CFA Franc -100,000 CFA Franc]; More than 100,000 CFA francs.</i>
Health expenditure (Ex)	Evaluated as a percentage of total consumption expenditure
Age (A)	Four modalities variable: <i>15 to less than 21 years; 21 to 55 years old; 55 years to less than 60 years; 60 years and over.</i>
Gender (G)	Binary variable: <i>Male; Female.</i>
Education (Ed)	The level of education. Four modalities variable: <i>no education; primary; secondary; Higher.</i>
Activity (Sact)	Situation of activity and informality. Three modalities variable: <i>Formal, Informal; Unemployed.</i>
Distance (Dist)	Distance to the Closest Public provider to Home. Three modalities variable: <i>Near; far; Indifferent.</i>
Satisfaction (Sat)	Satisfaction with the use of public services. Three modalities variable: <i>Satisfied; Not satisfied; Indifferent.</i>
Source : Author	

Data analyzed are those from the Cameroonian Household Surveys (CHS) carried out by the National Institute of Statistics in 1996, 2001 and 2007. They covered respectively 1731, 10,992 and 11,534 households and as many heads of households. Only individuals reporting an illness in the two weeks preceding the survey were considered, that is 590, 4249 and 3504 individuals, respectively. The Cameroonian Household Surveys (CHS) seem to be the most suitable for the analysis, since their collection coincides with the three major punctuations of decentralization in the health sector: The results extracted from the analysis of the phi statistics are expressed in Table 2 bellow. Among individuals' characteristics, Gender is not a significant determinant of the choice of healthcare provider in any given year. The significance of age increased from 10% (in 1996) to 1% (in 2001), before falling back to 5% in 2007. The significance of education increased from 10% (in 1996) to 1% (in 2001 and 2007). The significance of the business sector remains relevant at 1% whatever the year.

i) official implementation of decentralization and the first Cameroonian Household Survey in 1996; ii) implementation of the first Health Sector Strategy as prescribe by Bamako Initiative and second Cameroonian Household Survey in 2001; iii) Third Cameroonian Household Survey in 2007, six years after the second ECAM, the ideal time to measure the impact of a health policy [20]

3. Results and Discussion

3.1 Results

With regard to the characteristics of the household, the place of residence as well as the per capita income of the household are significant determinants at 1% whatever the year (Table 2 bellow).

For the characteristics of the public health supply, the distance to the nearest public health service and the satisfaction with this structure are not significant in 1996 but become so in 2001 and 2007 at 1%.

Table 2:Healthcare demand determinants and health services (Phi statistic)

Healthcare provider determinants	Healthcare provider		
	1996	2001	2007
Individual characteristics			
Age	0,179*	0,126***	0,085**
Gender	0,040	0,022	0,041
Education	0,203*	0,173***	0,156***
Activity	0,223***	0,190***	0,164***
Household characteristics			
residence	0,192***	0,220***	0,132***
Income per capita	0,265***	0,165***	0,173***

Public provider Characteristics			
Distance	0,105	0,129***	0,100***
Satisfaction	0,151	0,118***	0,123***
Significance at: 1% (***) , 5% (**) and 10% (*).			
Source: Author			

Depending on the relevance of the phi statistic, healthcare demand (D_C) is defined by the following determinants: i) for 1996 $D_C = f(Res, In, Ex, Sact)$, ii) for 2001 and 2007 $D_C = f(Res, In, Ex, A, Ed, Sact, Dist, Sat)$. Such a specification tends to show that during the decentralization process some variables that were not significant before its implementation become so after 1996.

The adjusted standardized residual analysis corroborates the results of the phi's general

Table 3: Adjusted standardized residuals for individual characteristics and health services

Variables	Healthcare providers														
	1996					2001					2007				
	None	Pub	Priv	Inf	Tra.	None	Pub	Priv	Inf	Tra.	None	Pub	Priv	Inf.	Tra.
Age															
[15-21[	2,0	-1,0	-1,2	-0,7	0,2	1,4	-1,3	-1,1	1,2	-0,8	2,3	-1,9	-0,7	-0,4	0,1
[21-55[	-0,3	1,6	0,5	0,4	-3,1	-6,1	3,2	4,9	1,5	-0,8	-2,6	0,1	1,6	3,1	-1,1
[55-60[	0,2	0,6	-1,1	-0,4	0,8	0,1	0,4	-1,3	-0,2	1,7	-1,1	1,5	-0,2	-0,7	1,3
60and over	-0,6	-1,9	0,6	0,1	3,0	6,5	-3,5	-4,3	-2,0	0,0	2,6	0,0	-1,4	-2,9	0,4
Education															
No edu	0,3	-1,2	-0,2	-1,1	2,4	3,7	-2,1	-6,5	3,4	0,6	1,8	-2,3	-4,4	4,3	2,7
Prim.	1,3	-1,0	-2,1	1,1	1,6	0,4	-2,5	-0,2	0,7	3,3	0,8	0,0	-1,9	1,1	-0,1
Secon.	-1,0	1,5	1,1	0,4	-2,3	-2,6	3,1	4,3	-2,6	-2,7	-2,0	1,2	4,5	-3,2	-1,3
Higher	-0,8	0,8	1,7	-0,7	-2,0	-2,6	2,8	4,2	-2,6	-2,3	-0,8	1,8	3,2	-3,8	-2,2
Activity															
Formal	-2,4	1,6	2,7	0,4	-2,7	-6,9	6,3	7,0	-2,2	-3,2	-4,9	4,3	5,6	-3,6	-2,3
Inform.	3,1	-2,5	-3,2	0,1	3,0	4,5	-5,6	-6,5	4,6	3,7	3,1	-4,8	-4,3	5,7	2,1
Unemployed	-1,1	1,2	0,8	-0,4	-0,6	1,9	0,2	0,6	3,5	-1,2	1,1	1,8	-0,3	-3,8	-0,4

Values in **bold** represent the interpretable significant values of the residual

Source: Author, from CHS I, II and III data, using SPSS 20 software

The 21-55 age group has an aversion to traditional care in 1996. This effect is less noticeable in 2001 and 2007. In 2001 the 21-55-year-old seek public or private care and turn away from self-medication (no). Unfortunately, in 2007 this age group no longer seeks formal care (public or private), but rather informal care (informal drugs sellers).

In addition, people over 60, who were more attracted to traditional care in 1996, have since 2001

associations. The nature of the relationship between the modalities of the choice of health services and the modalities of its determinants is expressed in the following three tables.

Table 3 shows that the effect of age is noticeable in any year. However, there is an attractive (and significant) relationship between the 15-21 age group and *none* in 1996 and 2007. Thus, individuals from this age group tend not to seek care.

Whatever the year, the level of education influences the choice of structure. In general, the higher the level of education is, the more public or private care will be sought. In 1996, people with *no education* seek mainly traditional care. In 2001 they clearly show aversion to public and private care and turn to informal care or self-medication (none). In 2007, individuals with no school education (again, in addition to informal care) turn to traditional healers, turning away from public and private structures. The policies implemented have thus had no positive effect on improving the demand for care of this category of individuals. Lastly, it is observed that working in the formal sector has a positive effect on attendance at public

and private structures and negative for none, the use of traditional healers and informal drug sellers. These effects were greater from 1996 to 2001, and then decreased from 2001 to 2007, demonstrating a positive impact of decentralization between 1996 and 2001 and diminishing after 2001.

Individuals working in the informal sector do not consume public or private care. They attend the traditional healer and the informal seller of medicine or practice self-medication. Unemployed individuals, however, experience a repulsion for informal care.

The relationship between health services and the patterns of variables related to household characteristics are described in the table below.

Table 4: Adjusted standardized residuals and descriptive statistics for household characteristics and health services

Variables	Healthcare providers														
	1996					2001					2007				
	<i>None</i>	<i>Pu b</i>	<i>Pri v</i>	<i>Inf</i>	<i>Tra .</i>	<i>Non e</i>	<i>Pu b</i>	<i>Priv</i>	<i>Inf</i>	<i>Tra .</i>	<i>No n</i>	<i>Pu b</i>	<i>Pri v</i>	<i>Inf</i>	<i>Tra.</i>
Residence															
<i>Ydé / Dla*</i>	-1,5	-0,1	1,2	2,6	-0,8	-8,0	3,8	9,3	0,0	-2,6	0,2	-2,3	5,5	-3,7	-0,7
<i>Urban</i>	-2,1	1,6	1,0	-0,1	0,0	-2,5	1,8	3,8	-1,4	-1,5	-1,2	2,5	0,1	-1,0	-0,9
<i>Rural</i>	3,4	-1,2	-	-2,7	0,9	8,5	-4,6	-	1,2	3,4	1,1	-0,8	-4,3	3,9	1,5
			2,2					10,7							
Income															
<i>Und. pov. Li**</i>	3,0	-1,6	-	1,9	2,3	5,0	-4,1	-7,0	3,2	2,2	2,1	-3,0	-5,8	5,9	3,5
<i>[Pov. line – 50,000CFA [</i>	-1,2	1,2	1,9	-0,9	-1,9	-1,8	1,1	3,2	-0,9	-1,5	-0,3	1,2	0,9	-1,8	-1,1
<i>[50,000-100,000 CFA]</i>	-2,8	0,7	3,7	-1,3	-0,6	-3,0	3,2	3,2	-2,4	-4	-1,6	1,0	4,2	-3,1	-1,9
<i>More than 100,000 CFA</i>	-1,1	0,0	1,9	-0,9	-0,4	-3,4	2,4	5,0	-1,8	-1,8	-1,2	1,9	3,3	-3,5	-2,0
Health exp.															
<i>Minimum</i>	0,0	0,0	0,0	0,0	0,0	0,00	0,0	0,00	0,0	0,0	0,0	0,0	0,0	0,0	0,39
<i>Maximum</i>	59,3	78,4	52,1	20,0	64,6	79,5	77,1	65,8	43,5	45,7	38,4	52,7	44,8	14,7	30,9
<i>Mean</i>	6,16	10,8	11,6	5,58	10,6	7,80	9,68	8,89	5,60	7,06	3,74	6,99	6,62	2,86	6,16
<i>St. Dev.***</i>	7,98	11,2	11,3	5,24	12,5	8,66	10,2	8,35	6,67	7,78	4,67	6,96	6,35	2,76	5,58
(*) Yaoundé / Douala; (**) Under poverty Line; (***) Standard deviation															
Source: Author, from CHS I, II and III data, using SPSS 20 software															

Living in Yaoundé or Douala would promote the demand for informal care in 1996. In 2001, the inhabitants of these two cities frequented public and private services, with a repulsion for none (self-medication) and the attendance of traditional healers. In 2007, living in Yaoundé or Douala favored the demand for private care and disadvantaged the demand for modern public and informal care. Living in other urban areas would have a negative effect on self-medication in 1996

and 2001. This effect would be positive on attendance of private care in 2001 and public services in 2007. Living in rural areas has a positive effect on none in 1996 and 2001. This effect is negative on private. However, this negative effect in 1996 on the attendance of informal drug sellers, becomes positive but not significant in 2001 and significant (and positive) in 2007.

Concerning income per capita, living below the poverty line has a negative effect on attendance of

public and private facilities and positive on the demand for modern informal care and traditional medicine. This effect would also be positive on self-medication. This trend is completely reversed for other income groups.

The share of health expenditure is higher for individuals seeking public and private care, followed by individuals seeking traditional care. Individuals

who do not require any form of care and those who seek modern informal care have the lowest health expenditure.

Concerning public services characteristics, in table 5 below, the modalities of distance from home to public hospital have no significant effect on the demand for care in 1996.

Table 5: Adjusted standardized residuals for public services characteristics and health services

Variables	Healthcare providers														
	1996					2001					2007				
	<i>None</i>	<i>Pu</i>	<i>Pri</i>	<i>In</i>	<i>Tra</i>	<i>None</i>	<i>Pu</i>	<i>Pri</i>	<i>Inf</i>	<i>Tra.</i>	<i>None</i>	<i>Pu</i>	<i>Pri</i>	<i>Inf</i>	<i>Tra.</i>
	<i>b</i>	<i>v</i>	<i>f</i>	<i>.</i>		<i>b</i>	<i>v</i>				<i>b</i>	<i>v</i>			
Distance															
<i>Near</i>	-1,0	-1,1	1,3	-0,1	1,7	-5,5	4,1	5,8	-0,9	-2,6	-1,2	3,0	2,3	-4,7	-0,7
<i>far</i>	1,0	0,8	-1,4	0,0	-0,9	5,5	-4,1	-5,8	0,9	2,6	1,0	-3,1	-2,1	4,7	0,8
<i>Indifferent</i>	0,1	0,6	0,1	0,2	-1,4	-	-	-	-	-	1,1	0,0	-1,3	0,1	-0,5
Satisfactio															
<i>n</i>															
<i>Satisfied</i>	0,3	2,0	-2,2	0,0	0,0	-0,8	1,4	-0,9	1,5	-1,5	0,7	1,9	0,8	-4,2	-1,1
<i>Not satisfied</i>	-0,8	-0,5	1,0	-1,0	1,2	3,3	-2,0	-4,2	-0,3	3,1	-1,6	0,7	-3,4	5,0	1,7
<i>Indifferent</i>	0,8	-1,3	0,9	1,3	-1,7	-2,4	0,3	5,3	-1,5	-1,3	1,0	-3,6	3,3	-0,4	-0,7
Values in bold represent the interpretable significant values of the residual															
Source: Author, from CHS I, II and III data, using SPSS 20 software															

In 2001 and 2007, living close to a public health center has a negative effect on none, informal and traditional drug vendors. This effect is positive on attendance at public and private structures. To be satisfied with the services offered by the public sector has no effect in 1996 on the attendance of public structures (positive effect) and private (negative effect).

3.2 Discussion

Although decentralization has not generally favored traditional medicine in Cameroon, it has contributed to the emergence of the same types of health care reflexes as elsewhere in Africa: self-medication, informal vendors of modern medicines, traditional medicine, the modern private sector and the modern public sector. These different types of care facilities are functions of the characteristics of individuals, of those of their household but especially of the characteristics of the public sector supply. For example, living in rural areas fosters demand for modern, informal medicines to the detriment of public and private services. The same is true of the

level of income: the poor practice self-medication and care at the informal seller of drugs, to the detriment of public and private services.

In the process of decentralization, individuals have moved furthest away from traditional health care for the benefit of informal drug vendors, whose attendance has steadily increased; the demand for modern public and private care first declined between 1996 and 2001 and then increased from 2001 to 2007.

Moreover, an increase then a small decrease in the number of significant determinants of the demand for care is observable during the period. Since the increase is comparable to the implementation of decentralization without the implementation of a sectoral health strategy, the relative stability that followed was due to the implementation of the sectoral health strategy from 2001.

4. Conclusion

The ultimate goal of any health policy is to improve the health status of the population[21,22]. Despite

the overall positive impact of decentralization in the health sector after 2001, the weaknesses observed during the process allow us to draw conclusions in the direction of improving access to care and thus improving the quality of life. health status of the populations.

Two main recommendations can thus be made to improve the healthcare demand: i) improve the supply of care through a real organization of traditional medicine, a relentless fight against the informal sale of medicines, an improvement of the quality of services and human resources in the public sector, and collaboration and synergy of actions between the different providers of care; (ii) improve access to care for poor households and women through specific programs for these

households.

Improving access to care means improving access to care for poor households. Such an enterprise is not easy in Cameroon because it poses stealthy passenger problems. Since the Cameroonian health system is unable to distinguish the poor from the non-poor, there will always be individuals who, although they are not eligible to benefit from pro-poor policy measures, will still be able to benefit from it. lack of barriers to entry. Two simpler solutions could be apply: (i) increase the subsidies for diseases related to poverty and insalubrity, in particular diseases linked to water, malaria and respiratory diseases; ii) intensify prevention through the information and education of the poorest strata.

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