

Willingness to Pay For Long-Term Health Care Financing in Côte d'Ivoire

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Abstract

Background: Based on Community-based health care financing schemes experience, this paper analyses people's willingness-to-pay for long-term health care in Côte d'Ivoire.

Materials and methods: A cross-sectional survey was conducted in the Autonomous District of Abidjan (Côte d'Ivoire) between March and June 2010, as part of our doctoral thesis in Economics. The study sample was constructed using a two-stage random sample, resulting in the choice of 464 households. We use econometric analysis to find factors affecting willingness to pay decision, using a selection model.

Findings: The results show that Ivoirians are in favor of disease risks pooling systems. The mean member is willing to pay 10 963.86 FCFA per month to receive health care in any community-based health care financing scheme. Potential member can be a household that has already been a member of any association, which belong to poor or middle class, and resides far from a health facility. Typical potential payer can be any household whose leader is young, has any level of education and is rich.

Conclusion: Information's on characteristics of potential adherents and their amount of willingness to pay can be helpful to improve feasibility and sustainability of the "*Couverture Maladie Universelle*" recently implemented by the government.

Keywords: Willingness-to-pay, Community-based health care financing, Couverture Maladie Universelle, Côte d'Ivoire.

Introduction

Millions of Africans suffer severe economic consequences due to the need to pay for out-of-pocket health care, which in turn aggravates inequities and impedes sustainable social and economic development, and millions more do not even seek the care they need due to the high costs of accessing and using it, thereby contributing to avoidable morbidity and premature mortality (AfDB, 2014). Ensuring the financial accessibility of the African populations against the risk of disease is now more than necessary. To this end, powerful interests must be called into question and the political and economic priorities of the states must also be reshaped. Offering low-cost health insurance to low-income households is one innovative method through which to finance health care provision and to avoid catastrophic out-of-pocket health expenditures (Gustafsson-Wright et al., 2009). Indeed, since 1992, the Ivorian government, with the support of the French Cooperation, institutionalized community financing of health care through the creation of community-based "Formation Sanitaire Urbaine" (FSU) (Ortiz et Dogaud, 1998). The Yearbook of Health Statistics 2008 (edited in 2010) of the Ministry of Health and Public Hygiene listed 86 community health care financing systems, 74 of which were based in Abidjan and the other 12 were dispersed in the deep country.

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These are mainly rural health mutuals, company health mutuals, community-based FSU, Community-based "Centre de Santé Urbain" (CSU), non-governmental organizations and intersectoral associations working in the sector of health. Generally, these health systems cover a workforce whose beneficiaries represent less than 3% of the population (Séry, 2006). Most these are linked to the professional activity (Séry, 2004), because in Abidjan, the members of the community and employers' financing systems represent almost 95% of the members, beneficiaries, Receipts and benefits paid from all community systems together, with the remaining 5% being made by neighborhood associations and NGOs. The contributions and benefits are, as for insurance, very variable per CBHCF schemes. The monthly contributions vary from 520 to 33 280 FCFA and benefits per beneficiary fluctuate between 1040 and 20 800 FCFA per year (Séry, 2006). Implementation in Côte d'Ivoire of the CBHCF has reduced direct health spending, contributed to better use of health resources, and improved equity in financing and access to health care. (Atim et al., 1998, Sery, 2006). However, it must be noted today that although they are in their embryonic stage, several of these structures have been erected as general hospitals. The CBHCF system is therefore currently vulnerable and endangered, leaving place to the "*Couverture Maladie Universelle*" (CMU). The CMU, a "finalized prepayment system", conceived since 2001 (under the name of "Assurance Maladie Universelle") and whose experimental phase of implementation was launched in April 2017, is a policy which aims to ensure the financial inclusion of the Ivorian populations in the health. This experimental phase will make it possible to "test" the entire system before the generalization of the Universal Health Coverage scheduled for January 2018. For six months, 150,000 students will benefit from cares and drugs of the CMU. The financial contribution estimated at 900 million FCFA will be provided by the State through the National Health Insurance Fund (in French *Caisse Nationale d'Assurance Maladie: CNAM*). To date, more than 1.4 million people have been pre-enrolled for CMU, while 725 603 people have completed their enrollment. The system proposes two contributory and non-contributory schemes. The first "contributory" scheme, which is the "basic" scheme, offers a minimum package of care offered to all the populations of Côte d'Ivoire with a monthly contribution of 1000 FCFA per insured. The non-contributory scheme concerns people in situations of indigence for whom the State will inject nearly 49 billion FCFA francs into the CMU's coffers. The CMU, like the CBHCF system, is likely to play an important role in mainstreaming and streamlining national health financing system. However, if the current premiums charged by the CMU do not meet the consent and the capacity of the populations to pay, its sustainability risks being undermined. Indeed, the sustainability of a health financing system depends largely, among several other determinants, on the mechanisms for setting the premium and for community participation. Hence the interest in our study to focus on the question of the demand and the contribution of the populations to the financing of long-term health care.

Based on the experience of CBHCF systems, this paper analyzes people's willingness-to-pay (WTP) for long-term health care in Côte d'Ivoire. In addition, factors that influence WTP are identified, to readapt people's adherence mechanisms for the CMU.

In the absence of real world experience, the willingness to pay (WTP) for health insurance in low-income countries is gauged by means of contingent valuation (CV) methods which elicit directly what individuals would be willing to pay for a hypothetical health insurance package (Gustafsson-Wright et al., 2009). This study aims to analyse the willingness of people to pay for long-term health care using CV. Studies on the subject remain rather limited in Côte d'Ivoire. Like the studies carried out on "The contribution of health mutuals to the financing, provision and access to health care in West and Central Africa: the case of Côte d'Ivoire" (5) feasibility studies have been carried out by the Coordination (Atim et al., 1998; Sery, 2004), and of our doctoral thesis work on community financing of health care in Côte d'Ivoire. The fundamental objective of these studies was to define operationally an insurance system capable of attracting a large proportion of the population to allow a real sharing of risks and to avoid that only the high-risk population adheres to it. In addition to these studies, we can note the contribution made by Bouaffon and N'Guessan in the study relative to "the contribution of rural households to the financing of Universal Health Insurance in Côte d'Ivoire: an analysis based on the Tobit model censored" (Bouaffon et N'Guessan, 2006) and also the study of N'Guessan (2008) relative to the willingness-to-pay of rural households for a health insurance premium in Côte d'Ivoire. The willingness-to-pay study conducted here is useful in that it provides additional information on the pay-offs of urban households in Côte d'Ivoire. In addition, it is not logic to set up new Community-based health care financing schemes, but with a view to ascertaining how much the care-giver is willing to pay for long-term health care term.

Given the constraints of public and private resources in the management of sickness risk, an understanding of the impact of the contributions of the populations on their membership in the CMU and the success of this project remains a question to be explored. This study is therefore aimed at providing knowledge to inform the policies of the Ministry of Health and Public Hygiene on the management of sickness risk in Côte d'Ivoire.

Materials and methods

A cross-sectional survey was conducted in the Autonomous District of Abidjan (Côte d'Ivoire) between March and June 2010, as part of our doctoral thesis in economics. This survey, called the "Survey of Community-Based Health Financing in Côte d'Ivoire 2010" (SCBHF 2010), comprises two components: a household survey and a survey of community-based health financing systems. The "Household" component of SCBHF 2010 aimed at collecting information to assess the knowledge of populations on the concept of Community-based health care financing (CBHCF) and the degree of acceptance of this alternative by them, the recovery of data allowing to apprehend the Factors Determining people's adherence to community-based health care financing systems.

The study sample was constructed using a two-stage random sample. In the first stage, Census Districts (CD) were chosen in an unequal probability draw. The CD drawdown was proportional to the size of the CDs in terms of households. Thirty-one (31) CDs were selected in total. The sampling frame used comes from the 1998 General Population and Housing Census (GPHC 98), which is the most comprehensive national-scale operation. In each CR drawn, a household count operation was conducted to provide an updated sampling frame for the equi-probable selection of households. At the end of the enumeration, a total of 15 households were selected by CD in an equal probability draw, with a total of 465 households selected.

All consenting participants were asked to complete a researcher-administrated questionnaire that considered their socio-demographic and economic profile, their household characteristics, their preferences concerning CBHCF and their willingness to join and pay for long-term health care. The interview was performed using contingent valuation method in an open-ended style. We have thus led the people themselves to suggest the amounts they are willing to pay to join CBHCF schemes. But before that, they were asked whether they would like to join a CBHCF scheme, to improve their access to health care (for the insured) or in the eventual implementation of a Community-based health care financing system (For the uninsured).

Data analysis

We use econometric analysis to find factors affecting willingness to pay decision, based on Bath and Jain's method (Bath and Jain, 2006). The decision of willingness to pay has been formulated in two interrelated choices. First, the choice is related to the decision to buy or not the insurance. Second, if the decision to buy insurance is positive then the second choice is what amount of insurance is willing to be paid. Therefore, the second decision will come only if first decision is positive. The sample of people who will offer their willingness to pay will therefore exclude those who will not eventually want to join a CBHCF scheme. Estimating relationships between interrelated choices pose methodological problems. One problem is selection bias in the first stage. Very often people that respond to a survey related to insurance buying decision are self-selected. The seminal work of Heckman (1979) addresses the problem of self-selection. This method makes it possible to assess presence of selection bias, identify the factors contributing to the selection bias and to control for this bias in estimating the relationships. Heckman (1979) discusses the bias that results from using non-randomly selected samples when estimating behavioural relationships as « omitted variables » bias. He proposes a simple consistent method to estimate these models using a bivariate normal model for the selection equation, and ordinary least squares to estimate the behavioural equation with the selected sample. The key insight of Heckman's work is that if we can estimate the probability that an observation is selected into the sample, we can use this probability estimate to correct the model.

In our analysis first we segregate households who have willing to join CBHCF schemes and who have not willing to and then we see the amount of willingness to pay by analysing households who are willing to pay. In the framework of sample selection, we could specify one equation for whether (or not) a household is willing to join and pay insurance scheme and another equation for determining the amount of willingness to pay. The basic idea of a sample selection model is that the outcome variable, Y , is only observed if some criterion, defined with respect to a variable D , is met. The common form of the model has two stages. In the first stage, a dichotomous variable D determines whether (or not) Y is observed, Y being observed only if $D = 1$.

(And estimate a model with some matrix of independent variables w and get alpha coefficients; the model is estimated, of course, with an error term, e). In the second stage, we model the expected value of Y conditional on its being observed. So, we observed D , a dummy variable, which is a realization of a latent continuous variable D^* , having a normally distributed independent error, e , with a mean zero and a constant variance sigma squared e . For values of $D = 1$, we observe Y , which is the observed realization of a second latent variable (and model that with some variable X and get a vector of coefficients beta), Y^* , having a normally distributed independent error, u , with a mean zero and a constant variance sigma squared u . The two errors are assumed to have a correlation rho. The joint distribution of e and u , is a bivariate normal distribution (Appendice 1).

The model to be estimated is therefore:

$$\left. \begin{array}{l} D_i^* = w_i' \alpha + e_i \\ D_i = 0 \text{ if } D_i^* \leq 0; \\ D_i = 1 \text{ if } D_i^* > 0 \end{array} \right\} \text{Selection equation}$$

$$\left. \begin{array}{l} Y_i^* = x_i' \beta + u_i \\ Y_i = Y_i^* \text{ if } D_i = 1; \\ Y_i \text{ not observed if } D_i = 0 \end{array} \right\} \text{Outcome equation}$$

In our model, the first equation dependent variable is a binary variable, which takes the value of one if household is willing to join and pay for CBHCF scheme and zero if not. The discrete nature of the dependent variable leads us to use the probit or logit maximum likelihood estimator. So, we used a probit model in this study to analyse first equation related to health insurance purchase decision. In the second equation, where only the observations where households willing to pay have been used, the dependent variable is measuring the amount of willingness to pay and is a continuous variable. Therefore, we used OLS in this case. But, in addition for this second equation we used Inverse Mills Ratio (IMR) (calculated in the first equation) as one of the independent variables. The IMR is a "correction term" for the bias that arises from the selectivity bias problem. Heckman characterized the sample selection problem as a special case of omitted variable problem with IMR being the omitted variable if directly OLS were used on the subsample without using the selection equation, then this estimator is consistent. The other biases (strategic, evaluation, starting point) were taken into account in the design of the survey questionnaire. All data was analyzed using the Stata 11™ software and the MS Excel 2010 spreadsheet.

Results

A total of 464 households were approached, and all accepted to participate in the research, resulting in a response rate of 100%. Out of 464 respondents, 101 (21.77%) were female and 363 (78.23%) were male, with a mean age of 39 years (SD=12.83). Households were mainly Ivorian 372 (80.17%). One hundred and nineteen (25.65%) households were affiliated to a community-based health care financing (CBHCF) scheme. The average household size was 5.82 (SD=3.3); with 2 children on average and at most one old people. Most household had an average monthly income less of 200 000 FCFA and they average direct household health expenditure was about 20 358.94 FCFA (SD=21 058.22)(Table 1).

Table 1. Characteristics of the sample

Variables	N (%) / M±SD	Willingness to join and pay		P-value
		No	Yes	
Overall	464 (100)	132 (28.45)	332 (71.55)	
Age of the respondent	38.64 ± 12.83	37.73 ± 13.46	39.00 ± 12.57	0.336
Household size	5.82 ± 3.30	5.95 ± 3.37	5.78 ± 5.36	0.617
Sex				
Male	363 (78.23)	108 (81.82)	255 (76.81)	0.238
Female	101 (21.77)	24 (18.18)	77 (23.19)	
Nationality				
Ivoirian	372 (80.17)	95 (71.97)	277 (83.43)	0.005***
Non ivoirian	92 (19.83)	37 (28.03)	55 (16.57)	
Education level				
None	105 (22.63)	38 (28.79)	67 (20.18)	0.005***
Koranic	13 (2.80)	8 (6.06)	5 (1.51)	
Primary	82 (17.67)	22 (16.67)	60 (18.07)	
Secondary	158 (34.05)	44 (33.33)	114 (34.34)	
Superior	106 (22.84)	20 (15.15)	86 (25.90)	
Occupation				
Worker	341 (73.49)	100 (75.76)	241 (72.59)	0.562
Retired	50 (10.78)	11 (8.33)	39 (11.75)	
Non-worker (student, other)	73 (15.73)	21 (15.91)	52 (15.66)	
Marital status				
Married	324 (69.83)	99 (75.00)	225 (67.77)	0.126
Single	140 (30.17)	33 (25.00)	107 (32.23)	
Member of a CBHCF scheme				
Member	119 (25.65)	23 (17.42)	96 (28.92)	0.011**
Non-member	345 (74.35)	109 (82.58)	236 (71.08)	
Former or current membership of an association				
Never been a member	212 (45.69)	83 (62.88)	129 (38.86)	0.000***
Former or current member	252 (54.31)	49 (37.12)	203 (61.14)	
Monthly income				
<100 000	195 (42.03)	51 (38.64)	144 (43.37)	0.001***
100 000-200 000	120 (25.86)	33 (25.00)	87 (26.20)	
200 000-400 000	46 (9.91)	6 (4.55)	40 (12.05)	
400 000-600 000	11 (2.37)	3 (2.27)	8 (2.41)	
>600 000	10 (2.16)	1 (0.76)	9 (2.71)	
Undeclared	82 (17.67)	38 (28.79)	44 (13.25)	
Monthly Health Expenditures	20 358.94 ± 21 058.22	22 884.09 ± 16 182.45	21 542.01 ± 21 540.1	0.073*
Use of care by a member of the household in the last 3 months				
Yes	318 (68.53)	83 (62.88)	235 (70.78)	0.098*
No	146 (31.47)	49 (37.12)	97 (29.22)	
Perception of geographical accessibility				
Near	308 (66.38)	78 (59.09)	230 (69.28)	0.074*
Far and away	140 (30.17)	50 (37.88)	90 (27.11)	
Far-off	16 (3.45)	4 (3.03)	12 (3.61)	
Perception of community-based health care financing				
Good	158 (55.63)	42 (66.67)	116 (52.49)	0.000***
Very good	122 (42.96)	17 (26.98)	105 (47.51)	
No idea	4 (1.41)	4 (6.35)	0 (0.00)	
<i>Analysis were performed using the Student and Chi Square tests of differences of mean and proportions ;</i>				
<i>***p < 0.01, **p < 0.05, *p < 0.1</i>				

Slightly more than half of the households (n=332; 71%) responded favorably to the request to join a community-based health care financing scheme for long-term health services. All respondents who were willing to join were also willing to pay for adhesion. The average maximum amount of the willingness to pay for CBHCF was 10963.86 FCFA per households of five members (SD=16728.65) and per month; and this was shown to be different by occupation, the status of member of a CBHCF scheme, monthly income groups, use of care, and perception of CBHCF (Table 2). Retirees and non-workers seem to want to pay a lot more than workers. This is also the case for current or former members of a CBHCF scheme, unlike those who have never integrated a CBHCF scheme. Heads of household with a monthly income above 200 000 FCFA agree to pay beyond the average willingness to pay. Similarly, those who used the care in the three months before the survey as well as those who have a good perception of the CBHCF are willing to pay more than those who do not usually seek care and who do not know the CBHCF.

Tableau 2. Univariate analysis of maximum amount of willingness to pay

Variables	Willingness to pay, FCFA		P
	Mean	SD	
Overall	10963.86	16728.65	
Sex			
Male	10888.24	16953.45	0.881
Female	11214.29	16066.77	
Occupation			
Worker	9645.228	13570.71	0.0026**
Retired	19525.64	31215.92	
Non-worker (student, other)	10653.85	12617.11	
Member of a CBHCF scheme			
Member	16567.71	23881.57	0.0001***
Non-member	8684.322	12064.94	
Monthly income			
<100 000	6427.083	6730.312	0.0000***
100 000-200 000	7942.529	6438.63	
200 000-400 000	17637.5	18560.36	
400 000-600 000	14000	7329.003	
>600 000	63333.33	41306.78	
Undeclared	14454.55	23768.95	
Use of care by a member of the household in the last 3 months			
Yes	12278.72	18824.82	0.0256**
No	7778.351	9306.967	
Perception of community-based health care financing			
Good	12844.83	21787.25	0.0016**
Very good	13747.62	16566.75	
No idea	6364.865	7339.478	
<i>Analysis were performed using the Bartlett's test for equal variances ; ***p < 0.01, **p < 0.05, *p < 0.1</i>			

A probit model was estimated to examine the impact of various factors that affect the willingness of respondent to join community-based health care financing (CBHCF) schemes (Table 3).

Tableau 3. Factors influencing household's willingness to join and pay for CBHCF

Variables	Coefficients	Robust standard errors	P
Age of respondent	.0367561	.0333611	0.271
Age of respondent square	-.0004059	.0003897	0.298
Household size	-.0381564	.0589143	0.517
Household size square	.0002229	.0033183	0.946
Sex (1 male, 0 female)	-.1206077	.1832501	0.510
Nationality (1 ivoirien, 0 not)	.2593379	.1735701	0.135
Education level			
None (ref.)			
Koranic *	-.6289247	.3749708	0.093
Primary	.1755318	.2106423	0.405
Secondary	.0324866	.1974231	0.869
Superior	.1762936	.2437813	0.470
Occupation			
Non-worker (ref.)			
Worker	-.0058844	.1938766	0.976
Retired	.1754793	.3161982	0.579
Marital status** (1 married, 0 unmarried)	-.4386361	.1539602	0.004
Member of a CBHCF scheme	.1026169	.1981111	0.604
Former or current membership of an association***	.498675	.1422239	0.000
Income			
Non-declared (ref.)			
<100 000***	.7173231	.1961473	0.000
100 000-200 000***	.5424543	.1937126	0.005
200 000-400 000***	1.130015	.3006025	0.000
400 000-600 000	.4494387	.4657291	0.335
>600 000*	1.023753	.612059	0.094
Perception of the social class			
Very poor (ref.)			
Poor*	.5337945	.3055701	0.081
Average**	.7024887	.3129167	0.025
Rich	-.0354553	.4733605	0.940
Use of care by a member of the household in the last 3 months	.1892597	.1476322	0.200
Perception of geographical accessibility			
Far and away (ref.)			
Near**	.3223446	.1499692	0.032
Far-off	.3456702	.3483329	0.321
Perception of community-based health care financing	-.0233265	.0906021	0.797
Constant*	-1.627164	.8337943	0.051
Observations	464		
Pseudo R2	0.1497		
Wald chi2 (27) (prob > chi2)	73.83 (0.000)		
***p < 0.01, **p < 0.05, *p < 0.1			

Most of the education level indicator variables are insignificant in explaining the decision of respondents to join the schemes, excepting "koranic" which affect it negatively and significantly. The marital status is statistically significant but has a negative influence on the decision of respondent to join a CBHCF scheme. In addition, former or current membership of an association, income and perception of social class appear statistically significant in explaining the decision to join CBHCF schemes. Geographical accessibility plays also a statistically significant role in determining the decision of respondents to join the scheme. However, variables such as nationality, use of care by a member of the household and perception of CBHCF did not appear statistically significant in explaining the decision to join CBHCF schemes.

We also examined the impact of various covariates on the amount that households are willing to pay for the proposed health insurance scheme using an OLS model. Before running the model, we examine if there is any selection bias problem. Estimating WTP values from respondents who are only willing to join the scheme can lead to biased and inconsistent results. In fact, the response can be biased if respondents who are willing to join the scheme have different observable characteristics compared to those who are willing to pay (Mattsson and Li, 1994; Whitehead, Blomquist, Hoban, & Clifford, 1995).

Otherwise, even if there is no significant difference in observed characteristics; the WTP can differ due to unobservable characteristics of respondents (Heckman, 1979; Eklof and Karlsson, 1997). To address this problem, we estimate a Heckman two-steps model in the way suggested by Heckman (1979). The Inverse Mills Ratio (IMR) variable in the OLS model was not statistically significant ($p=0.277$) indicating the absence of sample selection problem. Therefore, the OLS model was estimated without the IMR variable and the results are presented in Table 4. Age variables are statistically significant, positive, and then negative. Education level variables are statistically significant and positive in explaining the amount of willingness to pay. Worker variable is also statistically significant but negative. Income has a negative, then positive and statistically significant impact on the amount of willingness of households to pay for CBHCF schemes. Finally, one variable "Near" which was significant in the first equation was also significant in the second one, but negative.

Tableau 4. Factors affecting the maximum amount of willingness to pay for CBHCF

Variables	Coefficients	Robust Standard errors	P
Age of respondent**	757.6504	339.8918	0.027
Age of respondent square**	-8.340882	4.093234	0.042
Household size	-277.7679	519.032	0.593
Household size square	.8647909	32.11734	0.979
Sex	-766.2787	1782.62	0.668
Nationality	-3061.889	2490.226	0.220
Education level			
None (ref.)			
Koranic*	5569.659	3190.568	0.082
Primary*	3443.202	1756.993	0.051
Secondary*	3341.795	1919.711	0.083
Superior***	10737.87	2774.765	0.000
Occupation			
Non-worker (ref.)			
Worker*	-3534.738	2116.881	0.096
Retired	1545.504	3536.162	0.662
Marital status	1368.611	1615.694	0.398
Member of a CBHCF scheme	1432.203	1987.681	0.472
Former or current membership of an association	791.7185	1403.66	0.573
Income			
Non-declared (ref.)			
<100 000***	-7639.933	2875.126	0.008
100 000-200 000**	-7278.599	3227.41	0.025
200 000-400 000	-794.6284	4940.144	0.872
400 000-600 000*	-10359.87	5894.161	0.080
>600 000***	35250.45	13399.34	0.009
Perception of the social class			
Very poor (ref.)			
Poor	-2188.367	1657.742	0.188
Average	-798.9523	1553.807	0.607
Rich	-4524.9	2839.097	0.112
Use of care by a member of the household in the last 3 months	1669.88	1147.512	0.147
Perception of geographical accessibility to health facilities			
Far and away (ref.)			
Near**	-5278.747	2161.184	0.015
Far-off	-4912.582	4143.727	0.237
Perception of community-based health care financing	-852.3584	830.3961	0.305
Constant	6524.112	7526.393	0.387
Observations	332		
R2	0.4302		
F (27, 304) (prob > chi2)	3.93 (0.000)		
***p < 0.01, **p < 0.05, *p < 0.1			

Discussion

The “*Couverture Maladie Universelle*” (CMU) system, like the Community-based health care financing (CBHCF) system, is likely to play an important role in mainstreaming and streamlining national health financing system. However, if the current premiums charged by the CMU do not meet the consent and the capacity of the populations to pay, its sustainability risks being undermined. Indeed, the sustainability of a health financing system depends largely, among several other determinants, on the mechanisms for setting the premium and for community participation. Hence the interest in our study to consider the question of the demand and the contribution of the populations to the financing of long-term health care.

This paper analyzed people's willingness-to-join and pay (WTJP) for long-term health care in Côte d'Ivoire. In addition, factors that influence household's contributions for community-based health care financing (CBHCF) were identified, to re-adapt people's adherence mechanisms for the CMU established by the Ivorian government. An open-ended method was used to elicit the willingness of households to pay for community-based health care financing system.

Most households (n=332; 71%) accepted to join a community-based health care financing (CBHCF) scheme for long-term health services. In low-income countries, peoples are very familiar with associations, especially with structures of risks pooling (death, health, etc.) such as mutual or tontine. Furthermore, implementing a CBHCF scheme in their area or expand health coverage in their community is expected to improve health care delivery services and hence, household health status (Fonta et al., 2010). So, in most willingness-to-pay studies for CBHCF, more than half of respondents agree to join (Dong et al. 2003; Gustafson-Wright et al., 2009; Fonta et al., 2010). This proportion of future members includes 80.67% (96/119) of current members of CBHCF schemes. But, the CBHCF scheme membership variable was not significant. Otherwise, it would have had a positive effect on membership. Thus, it was hoped that the former members of CBHCF schemes adhere to the Universal Health Coverage. Nevertheless, the 80.55% (203/252) former or current members of any other associations show more interest to join the community-based health care financing (CBHCF) schemes and can therefore represent a potential demand.

Others findings show that income plays a significant and positive role in the membership (Bath and Jain, 2006). In fact, respondents with income below 400 000 FCFA and more than 600 000 FCFA, or claiming to be in poor and middle social classes increase the probability to join schemes. However, rich ones are less likely to join the schemes. These results demonstrate that the CBHCF is of interest only to low- and middle-income populations or to those who identify with this status. The distance between the populations and a health facility also affects the willingness to join. The variable “near” is positive, implying that the further away a household is near a health facility the greater the probability to participate. This could be explained by the fact that the further away a household is from the nearest health center, the higher the cost of transportation and the opportunity cost of time is lower. One implication of this result is that health authorities should ensure that health care and services in the school and university health centers are covered by the CMU system to expect an increased interest of pupils and students for this system. Further on, we note that having done Koranic school or being married decreases the probability of joining CBHCF schemes. The refusal of the Koranic respondents to join CBHCF is perhaps due to the fact that they are less familiar with these structures than those who have attended modern schools. Most Islamic schools in West Africa essentially teaches that reading the Koran, and deals with little or almost no social issues. The non-significance of the other variables level of education and occupational status does not allow us also to sustain this reflection.

Similarly, the present study does not predict the probability and the level of membership of the students and different categories of occupation. Moreover, our result on the negative relationship between married status and CBHCF membership contradicts that of Cameron and McCullum (1995) cited by Bath and Jain (2006). The maximum amount of the willingness to pay for CBHCF was 10 963.86² FCFA (SD=16 728.65) per five members' household and per month. This amount is slightly higher than that obtained by Dong et al. (2003) by the bidding game method, and that of Bouaffon and Nguessan (2006) as part of the WTP evaluation for the AMU in rural Ivory Coast.

² Around of 18.755 US Dollars (1 USD = 584.58 FCFA)

This amount also represents 10 times the premium set for populations under the CMU. Richer useholds are willing to pay higher amounts than poorer household heads as also reported by Dong et al. (2003), Binam et al., (2004), Fonta et al. (2010) and Shafie and Hassali (2013). Young respondents are more likely to increase the amount of willingness to pay than elderly, as shown by the positive and negative coefficients of the age and the age square variables. The all education levels increase this amount; but with different impact levels. Moreover, workers are less likely to increase the amount of WTP. In Côte d'Ivoire, most workers in the formal sector have health insurance coverage, the amount of which is deducted at source. Perhaps this fringe of the population would not be very motivated to contribute again for an eventual health coverage. Although the amount of the average willingness to pay for this study is high, the government's contribution of 1 000 FCFA to the CMU remains a reasonable premium level; which also reduces the risk of non-recovery experienced by most CBHCF systems. Another result indicated that higher the perception of a health facility is near more will be lower the amount of willingness to pay.

This study on the CBHCF is one of the few ever carried out in Côte d'Ivoire. It is therefore important in that it provides information on the potential demand for community health insurance and the financial contributions of the populations in terms of extending universal health coverage to the Ivorian populations. The results of the study show that the Ivorian populations are in favor of setting up community health financing systems. Overall, they are willing to contribute financially, given the high level of their average willingness to pay (10 963.86 FCFA per household per month). The study also points out that rich people are willing to join CBHCF structures and increase the overall financial contribution. On the other hand, poor or middle-income people are interested in this type of insurance but are very unfavorable to its financing. This is also the case for households with geographical access to health facilities. In addition, other factors such as youth, CBHCF former member status, or community life can contribute to the success of CBHCF systems. It is important to note, however, that the success and sustainability of a health financing system also depends on other factors (depth of coverage, breadth of coverage, cost of illness, premium, etc.) as outlined by Carrin et al., (2005). Although this study was carried out on the CBHCF and only in Abidjan, the information gathered can enable the Ivorian government to take important decisions concerning the implementation of the CMU and its sustainability.

Conclusion

The present study emphasizes that Ivoirians are in favor of systems for pooling the risks of disease. The typical member can be represented by a household that has already been a member of any association, which is poor or middle class, and who resides far from a health facility. The typical payer is the household whose leader is young, who has any level of education and who is rich. Community health financing structures are an uncontested means of addressing the health risk of people excluded from the formal social protection system. However, today they are virtually endangered in Côte d'Ivoire. Several exogenous factors (lack of ex ante actuarial studies to determine its feasibility) and endogenous (moral hazard, non-collection of contributions, inadequate care packages, etc.) surely helped their failure. The present study will therefore provide additional information on the profile of the potential members of the current CMU and the level of financial contribution that the populations are willing to make without incurring catastrophic expenditure. Additional information on the cost of the disease, the optimal insurance premium and the coverage package offered by the coverage may also be required to improve the sustainability of the "*Couverture Maladie Universelle*".

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Appendice 1: Bivariate normal distribution

Definition. Two r.v.'s (X, Y) have a bivariate normal distribution $N(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$ if their joint p.d.f. is

$$f_{X,Y}(x, y) = \frac{1}{2\pi\sigma_1\sigma_2\sqrt{(1-\rho^2)}} e^{-\frac{1}{2(1-\rho^2)}\left[\left(\frac{x-\sigma_1}{\sigma_1}\right)^2 - 2\rho\left(\frac{x-\sigma_1}{\sigma_1}\right)\left(\frac{y-\sigma_2}{\sigma_2}\right) + \left(\frac{y-\sigma_2}{\sigma_2}\right)^2\right]} \quad (1)$$

for all x, y . The parameters μ_1, μ_2 may be any real numbers, $\sigma_1 > 0, \sigma_2 > 0$, and $-1 \leq \rho \leq 1$.

It is convenient to rewrite (1) in the form

$$f_{X,Y}(x, y) = ce^{-\frac{1}{2}Q(x,y)}, \text{ where } c = \frac{1}{2\pi\sigma_1\sigma_2\sqrt{(1-\rho^2)}} \text{ and } Q(x, y) = \frac{1}{(1-\rho^2)} \left[\left(\frac{x-\sigma_1}{\sigma_1}\right)^2 - 2\rho\left(\frac{x-\sigma_1}{\sigma_1}\right)\left(\frac{y-\sigma_2}{\sigma_2}\right) + \left(\frac{y-\sigma_2}{\sigma_2}\right)^2 \right] \quad (2)$$

Statement. The marginal distributions of $N(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$ are normal with r.v.'s X and Y having density functions.

$$f_X(x) = \frac{1}{\sqrt{2\pi}\sigma_1} e^{-\frac{(x-\mu_1)^2}{2\sigma_1^2}}, \quad f_Y(y) = \frac{1}{\sqrt{2\pi}\sigma_2} e^{-\frac{(y-\mu_2)^2}{2\sigma_2^2}}$$