

Research Article

The Implications of Health Insurance on Demand for Healthcare in Cameroon

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Abstract

Health insurance is an important factor in enhancing demand for healthcare, especially in the context of developing countries like Cameroon, where a greater proportion of the population have financial barriers to health services. This study investigates the implications of the main health insurance models; community-based, government-based, and employer-based insurance coverage on healthcare demand in Cameroon. Based on the probit regression model and data drawn from the 2018 Cameroonian Demographic and Health Survey, with a total sample of variables derived from a sample of 10,303 observations, the study found that health insurance significantly increases the likelihood of individuals seeking healthcare, with community-based health insurance demonstrating a compelling impact, and elevating demand by approximately 67.7%. Conversely, government and employer-based insurances also positively influence healthcare demand, albeit with distinct variations across demographic segments. Hence, the study underscores and recommends the importance of employer-sponsored insurance in enhancing healthcare access and suggests expanding such programs will lead to improved health outcomes across the population. This can be done by incentivizing businesses to offer comprehensive coverage which includes tax breaks or subsidies. This will enhance health benefits thereby ensuring that employees and their families have better access to necessary healthcare services. Similarly, it is important to strengthen Government Health Insurance by Increasing funding and resources for Government Based Health Insurance (GBHI) programs that will expand service delivery by improving healthcare infrastructure, increase coverage options, and ensuring that government-sponsored plans effectively meet the needs of underserved populations.

Keywords

Health Insurance, Healthcare, Community-Based Health Insurance, Government-Based Health Insurance, Employee-Based Health Insurance

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1. Introduction

The emergence of health insurance schemes in the early 20th century marked a significant shift towards addressing the financial barriers to healthcare. Initiatives such as pre-paid hospital plans began to gain grounds, with the aim of protecting individuals from the high costs of medical care and the risk of inability to purchase health care in times of need. These early initiatives aimed to provide individuals with safety by ensuring access to necessary services without the burden of substantial out-of-pocket expenses. As healthcare costs continued to rise, these schemes remain important for preventive care and routine medical visits, shaping the landscape of modern health insurance [9].

Health insurance plays a crucial role in shaping access to healthcare services and healthcare demand, especially with the rising healthcare costs. The relationship between health insurance and the demand for healthcare services has attracted significant attention from researchers and policymakers. Some authors argue that health insurance enhances healthcare demand as it reduces out-of-pocket expenses, providing financial security and increasing access to a broader range of services. They suggest that individuals with insurance are more likely to seek timely and appropriate medical care, leading to improved health outcomes [16, 43].

The relationship between health insurance and healthcare demand is complex and multifaceted. Research on health insurance and healthcare demand indicates that individuals with health insurance are more likely to use healthcare services [10]. However, various socio-economic and demographic factors, such as education level, employment status, and geographic location, also affect this relationship [10]. Health insurance increases healthcare demand by reducing the financial burden which is associated with medical costs, making it more affordable. With a low out-of-pocket expense, insured patients are more likely to access both preventive and curative services. Additionally, health insurance usually provides access to a set of healthcare providers, facilitating timely appointments and treatments.

On the other hand, critics have raised concerns about the potential negative consequences of health insurance on healthcare demand [42, 45]. They argue that insurance coverage may lead to moral hazard, where individuals may use healthcare services due to reduced financial constraints. Individuals may therefore consume more healthcare services since they do not bear the full costs, leading to higher overall demand [10]. Additionally, the presence of insurance may incentivize the utilization of unnecessary or low-value services, potentially driving up healthcare costs without corresponding improvements in health outcomes. Though healthcare insurance often promotes preventive care, the high costs associated with extensive treatments may lead individuals to prioritize only essential services. More so, educational efforts by insurance programs encourage a cautious approach to healthcare usage, making patients to seek care only when necessary [35].

The situation is not different in developing countries though marked by unique challenges. Despite government efforts to enhance health insurance coverage in developing countries, insurance enrollment still remains low, especially among the poorer populations [16]. Socio-economic factors, such as income and level of education, also play a critical role in determining healthcare demand [16]. As countries strive to improve universal health coverage, it is important to understand the effects of health insurance on healthcare demand. While insurance mitigates the effect of financial burden associated with healthcare access, the disparity in health care demand still remains a crucial issue [16, 41].

The effect of health insurance on the consumption of healthcare in Cameroon is complex and depend on a number of factors. While health insurance is generally associated with an increased access to healthcare services, the relationship is not straightforward. An improvement in health insurance coverage does not necessarily lead to an increase in healthcare utilization across different populations. In Cameroon, healthcare insurance can be classified into several types, community-based health insurance, government-based health insurance, and employee-based health insurance. Research indicates that the effect of insurance on service usage varies significantly among these categories [3, 39]. For instance, it is argued that patients with the urban employee basic medical insurance plan had a 23.30% increased risk of esophageal cancer-specific death [42].

Cameroon faces numerous challenges in its healthcare system, including limited access, inadequate infrastructure, and high out-of-pocket expenses for healthcare services. In recent years, there has been increased attention on the role of health insurance in improving access to healthcare and reducing financial barriers for individuals and households [1]. The availability and accessibility of health insurance can influence the demand for healthcare services in Cameroon. The availability and accessibility of health insurance can influence individuals demand for healthcare services [33].

Despite the government's efforts to expand health insurance schemes in Cameroon, health insurance coverage remains very low. According to the World Bank, only about 4% of the population of Cameroon had access to health insurance in 2018, with only about 6.46% of the population enrolled in any form of health insurance as of 2020. This situation has resulted in a heavy reliance on out-of-pocket expenditures for healthcare services, which account for approximately 71.8% of total health financing in the country [10]. These costs create barriers to accessing basic healthcare services, affecting low-income households and intensifying health disparities across different socio-economic groups [41]. Healthcare demand in Cameroon is affected by factors like population growth, disease burden, and socio-economic disparities. The country faces a high burden of infectious diseases such as malaria, Human Immunodeficiency Virus/Acquired Immune Deficiency

Syndrome (HIV/AIDS), and tuberculosis, which significantly affect healthcare demand. The growing population and urbanization in Cameroon have contributed to increased healthcare needs. These urban areas face unique challenges including overcrowding, inadequate healthcare infrastructure, and disparities in access to quality healthcare services. These factors place a strain on the healthcare system and contribute to increased demand for healthcare services. The healthcare demand in Cameroon is also affected by socio-economic disparities. The rural population, which constitutes a significant proportion of the country's inhabitants, often face barriers in accessing healthcare services due to geographical distances to access healthcare services, limited healthcare facilities, and financial constraints. This disparity in access to care contributes to higher demand in urban areas, where healthcare facilities are relatively more accessible [40].

Moreover, the Cameroonian healthcare system struggles with systemic issues, insufficient public health funding, which was only 3.9% of the GDP as of 2022 [10]. This limitation hampers the development of universal health coverage, which is aimed at ensuring that all individuals have access to quality healthcare without incurring financial hardship (World Health Organization, 2010). As Cameroon seeks to address these challenges, understanding the impact of health insurance on healthcare demand is essential for formulating effective policies that enhance access and equity in healthcare services. As a result of these overwhelming needs and evidence of low demand for healthcare, the objective of this study is to determine the effect of health insurance on the demand for health care in Cameroon, specifically to determine how community health insurance, government base health insurance, and employee health insurance affect the demand for health care in Cameroon. This will bridge the gap of little or no empirical evidence on health insurance and demand for health care in Cameroon, which is a new area of research in the Cameroonian health sector.

2. Literature Review

2.1. Theoretical Literature

Theoretically, the effect of health insurance on demand for healthcare in Cameroon is grounded on several theoretical lenses, notably the Health Belief Model, the Theory of Fundamental Causes and the Demand and Supply Framework. The Health Belief Model argues that individuals' health behaviors are influenced by personal beliefs about health threats and the effectiveness of health interventions [36]. In the context of health insurance in Cameroon, individuals are likely to seek healthcare services if they believe that they are at risk of illness and that the insurance can provide access to necessary treatments. This model emphasizes the role of perceived vulnerability, severity, benefits, and barriers to health-seeking be-

havior [14]. According to the Health Belief Model Cameroonians ought to seek for health insurance which provides healthcare services and hence reduces the risk of using out-of-pocket expenses.

The Theory of Fundamental Causes emphasizes that Socio-Economic Status (SES) is a core determinant of health because it shapes access to essential resources such as financial capital, knowledge, social networks, and power [19]. The theory assumes that these resources enable individuals to avoid health risks and access better healthcare regardless of changes in disease mechanisms. Within the scope of health insurance, this theory offers a powerful explanation for variations in healthcare demand: individuals with higher SES are more likely to afford insurance premiums, understand its benefits, and navigate administrative procedures, thus increasing their healthcare utilisation. For Cameroon, where socioeconomic inequalities are pronounced, this theory explains why low-income households often face barriers to health insurance enrolment and how these barriers perpetuate unequal access to healthcare services [6]. This understanding underscores the importance of addressing structural inequities in designing health insurance policies to expand coverage and improve healthcare access.

The Demand and Supply Framework posits that healthcare consumption results from the interplay of price, income, preferences, and availability of substitutes [20]. The theory assumes that individuals make rational choices aimed at maximising their wellbeing, balancing the costs of healthcare against the benefits. Applied to the health insurance context, the framework explains how insurance reduces the effective price of care, thus lowering financial barriers and increasing demand for services. For households in Cameroon, this means that access to affordable health insurance can directly stimulate healthcare utilisation by reducing out-of-pocket expenditures. This framework allows for a structured analysis of how variations in premiums, household income, and insurance coverage influence demand for healthcare, offering critical insights for policymakers aiming to strengthen healthcare systems through strategic insurance interventions.

According to the classical demand-supply framework, demand for healthcare services is determined by price, income, preferences, and the availability of substitutes [20]. Cameroonians characterized by low income out to seek for health insurance packages that will help to reduce their direct costs on healthcare services.

2.2. Empirical Literature

Empirically the literature on health insurance on demand for healthcare has not been neglected. For example, the effect of China's New Cooperative Medical Scheme on healthcare utilization and mortality using nationwide panel data from 2004 to 2011 was investigated [18]. Based on a Two-Way Fixed Effect model, they found that New Cooperative Medical Scheme enrollment significantly increased healthcare use,

particularly inpatient admissions, and reduced infectious disease incidence across 15 provinces. Furthermore, based on longitudinal offline medical services and online healthcare datasets of a major city in China, it was discovered that two health insurance policies (the integration of health insurance systems between pairwise-cities and integration of health insurance systems in rural regions and urban) significantly increased the demand for online consultation [44]. In addition, from a fixed effects and instrumental variables regression model on a panel of 31 provinces in China from 2009 to 2019, it was noticed that public health education significantly increased demand for commercial health insurance through improved health literacy, risk perception, and attitudes [11]. The effect was stronger in regions with higher urbanization, male populations, education levels, economic development, and medical resource access. Furthermore, the impact of the 2002 Universal Health Care Coverage of Thailand on the demand for health care services [34]. Based on a hospital level data from 640 public hospitals across Thailand from 1998-2006, their findings revealed that, the universal health care coverage program increased outpatients demand for health care especially the demand by the poor and the elderly. However, after the implementation of universal health care coverage program in 2002, outpatient demand for health care increased dramatically in the first year of the universal health care coverage program and faded in the following years, on the other hand, the number of inpatient visits declined continued even after the universal health care coverage program was launched.

More so, the effect of healthcare services on health insurance coverage on the demand and supply of healthcare in Vietnam using a biyearly provincial panel data from 2006 to 2014 was investigated [21]. The findings revealed that the expansion of health insurance coverage enhances admissions and inpatient days. Also, the effect of health insurance on patient demand for physician services demand for physician services in the United States [8]. The study used a Medical Expenditure Panel Survey from the nationally representative data from 2015 to 2017 from the different states for individuals of the age group 26 to 64 years. Based on multinomial logistic regression revealed that insured respondents reported higher use of routine care compared to uninsured respondents. The causal effect of health insurance on health care expenditures were also investigated [4]. Based on a unique quasi-experimental setup in which the deductibles and copayments were zero in a managed care plan, and non-zero in a regular insurance. Using a difference-in-difference estimation technique on a panel data and a non-linear, they found the demand elasticity of about -0.14 compared to a full insurance with a cost-sharing model. [13] investigated the impact of intensified job demands on employee well-being and patient satisfaction in the healthcare setting in Finland using a multilevel approach. Based on data from 1,024 healthcare employees and 951 patients, the findings revealed that higher experiences of intensified job demand is correlated with increased employee exhaustion and lower patient satisfaction.

In African context, from a behavioral economic approach with 106 participants recruited via social media and convenience sampling technique that age, income, gender, and insurance status significantly shaped demand in Nigeria [38]. In addition, based on a household-level cross-sectional design and double-bounded contingent valuation method on sample of 400 rural households in South West Shoa Zone, Ethiopia, they found out that 65% of respondents were willing to pay an average annual premium of 255.55 Birr, above the current policy price [24]. Moreso, from a Heckman-type selection model and a simultaneous equation model on a survey data collected from 1607 individuals in the rural area of the Niakhar locality in Senegal from 2019 to 2020 that there is a reinforcement effect of an enrolment in a community-based health insurance on the willingness to pay for health insurance, with the presence of a substantial consumer surplus among enrolled individuals at the actual premium [17, 37]. Base on a multinomial logistic regression on data from 2018 to 2019 gotten from the Harmonized Survey on Living Conditions of Households (EHCVM) for 6,171 households, [7] found a high rate of non-utilization of healthcare professionals even among mandatory health insurance scheme holders. However, mandatory health insurance coverage significantly increased the likelihood of consulting specialists and formal healthcare providers were more likely to seek formal care, with Grand Lomé showing higher specialist consultations than the Maritime region.

In Cameroon, using the 2018 Demographic and Health Survey a nationwide cross-sectional design on 5,014 households selected through multistage randomized cluster sampling across all ten regions on the as the sampling frame Diaby *et al.* (2024) found that 72% of households were willing to contribute financially toward Universal Health Coverage. studies on a multinomial logistic regression model found that household income, education level, occupation, household size, knowledge of Universal Health Coverage, and existing insurance are significant determinants on the willingness to pay for a Universal Health Coverage. In addition, a cross-sectional data from 2,043 responses out of 2,500 administered questionnaires to member of Bamenda ecclesiastical province health assistance scheme to investigate the determinants of the uptake of community-based health insurance in Bamenda ecclesiastical province health assistance scheme [32]. Base on a logistic regression model it was found that age, income, religion, and marital status were positively associated with adherence to community-based health insurance, while education level, place of residence, and distance to health facilities negatively influenced the uptake of community-based health insurance. Moreso, based on a qualitative descriptive case study design with data from 20 adherents and 7 BEPHA staff members through semi-structured interviews, focus group discussions, and document reviews [2] examined the factors influencing the uptake and utilization of Mutual Health Insurance schemes in Cameroon, with a focus on BEPHA in Kumbo. The findings of a Content analysis revealed that individual, community, and

systemic factors shaped uptake and utilization. In addition, reliability, accessibility to the insurer and inclusive membership criteria were the key promoting factors, while high contribution fees, adverse selection, and the absence of a national Mutual Health Insurance policy were major barriers. Furthermore, based on data from Fourth Cameroon Household Survey of 2014, it was found from a Heckman selection model that, male gender, level of education and the age of the household head has a negative effect on micro insurance membership and subscription [22].

The effects of community, government, and employer-based health insurance on healthcare demand reveals several critical research gaps, particularly in the context of Cameroon. While numerous studies have investigated the impact of these insurance models in various countries, there is a notable lack of empirical evidence specific to Cameroon that addresses how these different types of health insurance influence healthcare utilization patterns among diverse populations. Most existing literature primarily focuses on developed nations or specific regions, leaving a significant gap in understanding the unique socio-economic, cultural, and infrastructural dynamics within Cameroon. For instance, while community-based health insurance schemes have shown promise in enhancing access to healthcare in other low- and middle-income countries, their effectiveness in the Cameroonian context remains underexplored.

3. Methodology

3.1. Source of Data

This research made use of secondary data from the 2018 Cameroonian Demographic and Health Survey (CDHS), which was collected in 2018. The Cameroonian Demographic and Health Survey [5] is a nationally representative survey that provides comprehensive data on various health indicators. Among other modules, this study is based on the household modules which was conducted on a sample of 10,303 household, comprising 4,839 households in rural areas and 5,464 households in urban areas. The CDHS is part of the worldwide Demographic and Health Survey project conducted every 5 years to obtain data for monitoring and evaluating population, health and nutrition programs.

The Cameroonian DHS 2018 was conducted by the National Institute of Statistics (NIS) of Cameroon in collaboration with ICF International. The survey authors ensure rigorous sampling procedures to obtain nationally representative data that can be used for policy-making and research purposes. The data collection methodology involved a multistage sampling design, where clusters were selected systematically from all regions of Cameroon. Within each cluster, households were randomly selected to participate in the survey, and eligible women of reproductive age were identified for interviews.

Information was collected through face-to-face interviews using structured questionnaires administered by trained surveyors. The survey questionnaire covered a wide range of topics related to maternal and child health, healthcare utilization, family planning, nutrition, and socio-economic factors. Data on different health insurance types and visits to the hospital were also captured to analyze the relationship between health insurance and healthcare demand.

3.2. Model Specification and Estimation Technique

In investigating the impact of community-based, government-based, and employer-based health insurance on healthcare demand in Cameroon, a causal research design is employed [25, 29]. This approach investigates the effect of the independent variable on the dependent variable [26, 30, 28] *et al.* (2025). A Probit model was employed to analyze the data, taking into account control variables such as area of residence and age of the household head. The Probit model is particularly suitable for this type of analysis because it effectively handles binary dependent variables, such as whether an individual seeks healthcare or not. This model estimates the probability that a given outcome occurs based on the independent variables, allowing for a nuanced understanding of how different types of health insurance influence healthcare demand. By incorporating control variables like area of residence, which can affect access to healthcare facilities and resources, and the age of the household head, which may correlate with health needs and insurance utilization patterns, the Probit model provides a comprehensive framework for examining these relationships. The model accounts for the non-linearities in the relationship between the predictors and the likelihood of seeking healthcare, making it a robust choice for this research. Furthermore, the use of the Probit model allows for the interpretation of marginal effects, offering insights into how changes in insurance coverage or demographic factors might influence healthcare-seeking behavior. This analytical approach is crucial for policymakers aiming to enhance healthcare access and improve health outcomes in Cameroon, bamenda

healthcare demand in the context of varying insurance schemes [27]. Ultimately, the probit model facilitates a deeper understanding of the interplay between health insurance types and healthcare utilization, guiding effective health policy decisions.

$$\text{Healthcare Demand} = f(\text{Health Insurance}) \quad (1)$$

$$\text{HCD} = f(\text{CBHI, GBHI, EBHI, ED, ES, MS, AHH,}) \quad (2)$$

Considering the importance of the intercept coefficients to be estimated and the error term, the econometrics equation for the model becomes:

$$HCD_i = \beta_0 + \beta_1 CBHI_i + \beta_2 GBHI_i + \beta_3 EBHI_i + \beta_4 ED_i + \beta_5 ES_i + \beta_6 MS_i + \beta_7 AHH_i + \epsilon_i \quad (3)$$

Where; HCD=Healthcare Demand (1=if visited, 0=Otherwise), CBHI = Community-Based Health Insurance (1=has a community health insurance, 0=Otherwise), GBHI = Government-Based Health Insurance (has a government health insurance, 0=Otherwise), EBHI = Employee-Based Health Insurance (has an employee-based health insurance, 0=Otherwise), ED= educational level of the household head (No Education, Primary, Secondary, and higher education), ES= Employment status of the household head (Fully Employed, Seasonally Employed, Occasionally Employed and otherwise not employed), MS= marital status of the house hold (Married, Not Married) R= Region (basically the study considers the cultural repartition of the country into three regions; northern, the southern region, and the western high lands of Cameroon), β_0 = Intercept or constant, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and β_7 are the coefficients to be estimated and ϵ_i = Error term. Cameroon can be

divided into three cultural regions: the Northern Region, characterized by a predominantly Muslim population engaged in cattle herding and traditional customs; the Southern Region, known for their rich musical traditions and crafts; and the Western Highlands, which feature mountainous terrain and vibrant cultural practices, including significant festivals and craftsmanship. Each region showcases distinct cultural identities and lifestyles shaped by their geography and ethnic diversity.

Base on the binary nature of the dependent variable, we opt for a probit regression. A probit regression is used when the dependent variable is binary, meaning it takes only two possible outcomes (healthcare demand, Visited Health Facility last 12 months (1=Yes, 0=Otherwise). In this case, the relationship between the independent variables and the probability of the dependent variable (Healthcare demand) is modeled using the cumulative distribution function of the standard normal distribution as follows.

$$P(HCD_i=1|X) = \Phi(\beta_0 + \beta_1 CBHI_i + \beta_2 GBHI_i + \beta_3 EBHI_i + \beta_4 ED_i + \beta_5 ES_i + \beta_6 MS_i + \beta_7 AHH_i) + \epsilon_i$$

$P(HCD_i=1|X)$ is the probability that a respondent visited the hospital given the independent variables

X. Where X is a metrics of all the independent variables taken into consideration. Φ is the cumulative distribution function of the standard normal distribution.

Theoretical discussions often highlight a simultaneous relationship between healthcare demand and the choice of health insurance coverage. Individuals who anticipate needing more healthcare services may be motivated to seek comprehensive health insurance, whereas those in better health might opt for minimal or no insurance at all. This reciprocal relationship can result in biased estimates concerning the impact of health insurance on healthcare demand. The presence of endogeneity

has been documented in the literature, with various studies employing methods like instrumental variable regression and the control function approach to mitigate its effects. This study utilizes the control function approach, a robust method designed to address endogeneity issues in regression models. The control function approach involves incorporating an additional equation that accounts for unobserved factors influencing both the endogenous explanatory variable (in this case, health insurance type) and the dependent variable (healthcare demand). This is achieved by adding an interaction term, which combines the residuals obtained from the first-stage regression with the endogenous variable [12].

$$P(HCD_i=1|X) = \Phi(\beta_0 + \beta_1 CBHI_i + \beta_2 GBHI_i + \beta_3 EBHI_i + \beta_4 ED_i + \beta_5 ES_i + \beta_6 MS_i + \beta_7 AHH_i + \beta_8 \mu_i) + \epsilon_i$$

Where μ is the interaction term of the residuals obtained from the first-stage regression with the endogenous variable. While previous studies have typically relied on common instrumental variables to address endogeneity, this method offers a dynamic alternative by explicitly modeling the relationship and controlling for unobserved heterogeneity. By employing this approach, the study aims to provide more accurate estimates of how different types of health insurance influence healthcare demand, enabling a clearer understanding of the effects at play in the Cameroonian context.

4. Results and Discussion

This section presents finding of the effect of insurance coverage on healthcare demand in Cameroon. The findings are based on a descriptive and inferential statistics. The descriptive statistics focuses on providing a summary statistic of the variables used. Table 1 provides a summary of the descriptive statistics from the study, detailing various variables related to healthcare demand in Cameroon.

Table 1. Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Demand	33983	.555	.497	0	1
Community insurance	33983	.003	.058	0	1
Employer insurance	33983	.013	.113	0	1
Government insurance	33983	.005	.068	0	1
No Education	33988	.277	.447	0	1
Primary	33988	.366	.482	0	1
Secondary	33988	.324	.468	0	1
Higher	33988	.033	.179	0	1
Fully employed	33988	.447	.497	0	1
Seasonally employed	33988	.248	.432	0	1
occasionally employed	33988	.089	.285	0	1
Married	33988	.809	.393	0	1
Not Married	33988	.191	.393	0	1
Northern	33988	.349	.477	0	1
Western	33988	.155	.362	0	1
Southern	33988	.496	.5	0	1

The descriptive statistics for the analytic sample is drawn from the 2018 Cameroon Demographic and Health Survey (CDHS). Demand (demand for health care services) equals 1 if the respondent visited a health facility in the last 12 months (0 otherwise). Community insurance, Employer insurance, and Government insurance are indicator variables equal to 1 if covered by the respective scheme (0 otherwise). Education (No Education, Primary, Secondary, Higher), employment (Fully employed, Seasonally employed, occasionally employed), marital status (Married and Not Married, and region (Northern, Western and Southern) variables are coded as indicator categories as labeled in the table. For indicator variables, the mean equals the sample proportion.

Source: Computed by authors

The variable Demand (demand for health care services) indicates that approximately 55.5% of respondents accessed healthcare services within the past year, with a standard deviation of 0.497, reflecting variability in utilization among the population. This means that majority of Cameroonians are aware of the advantages of having a health insurance coverage. The results are also in line with those of Agyepong & Adjei (2017) who found that individuals with health insurance were more likely to access preventive as well as curative healthcare services in Ghana's. These results educational attainment shows a significant gap, with 27.7% of respondents having no formal education, while 36.6% completed primary education, and 32.4% reached secondary education. Notably, only 3.3% achieved higher education, highlighting the challenges in educational access that may impact health-seeking behavior. Employment status is also a crucial factor, with 44.7% of respondents fully employed and 24.8% seasonally employed. However, only 8.9% reported occasional employment. Marital status reveals that a substantial majority, 80.9%, are married, which may influence healthcare demand due to the larger

family units typically associated with marriage. Geographically, 34.9% of respondents reside in the northern region, 15.5% in the western region, and the largest portion, 49.6%, in the southern region. This distribution suggests that regional variations may affect healthcare access and demand. Health insurance coverage remains alarmingly low, with 0.3% of individuals enrolled in community-based insurance, 1.3% covered by employer-sponsored insurance, and only 0.5% benefiting from government health insurance. These figures underline the financial barriers many face in accessing healthcare, particularly among low-income households.

The probit regression analysis presented in Table 2 examines the effect of health insurance on the likelihood of individuals visiting a health facility in Cameroon. The table presents the average marginal effects from a probit regression. The effects provided to explain the effect of insurance types on healthcare-seeking behaviors in Cameroon. There are four different models (Model 1 to 4), firstly Model 1 a regression in which the key independent variable is community-based health insurance, in model 2 the key independent variable is

employer-based health insurance, in model 3 the key independent variable is government-based health insurance and lastly all the three insurance types are included in model 4. The objective of mining these three key variables is to avoid issues of multicollinearity which may bias the results and for checking the stability of the results and to see if the results are stable after mining the results.

The impact of educational attainment on healthcare demand is substantial. Individuals with primary education show an average marginal effect of 0.128 ($p < 0.01$), indicating that having primary education significantly increases the probability

of seeking healthcare services compared to those without any educational attainments. This effect is even stronger for those with secondary education, with a marginal effect of 0.239 ($p < 0.01$), and even more pronounced for those with higher education, with a marginal effect of 0.333 ($p < 0.01$). These findings suggest that as educational levels increase, so does the likelihood of individuals using healthcare services, highlighting the importance of education in creating awareness for health-seeking behavior.

Table 2. Probit regression of the Effect on insurance on Health care demand (marginal effects).

	Model 1	Model 2	Model 3	Model 4
VARIABLES	Demand	Demand	Demand	Demand
Primary	0.128*** (0.00776)	0.127*** (0.00776)	0.128*** (0.00776)	0.128*** (0.00776)
Secondary	0.239*** (0.00846)	0.238*** (0.00847)	0.239*** (0.00846)	0.238*** (0.00847)
Higher	0.333*** (0.0169)	0.330*** (0.0170)	0.332*** (0.0169)	0.324*** (0.0171)
Fully Employed	0.0852*** (0.00701)	0.0851*** (0.00701)	0.0852*** (0.00701)	0.0846*** (0.00701)
Seasonally Employed	0.0684*** (0.00775)	0.0685*** (0.00775)	0.0683*** (0.00775)	0.0683*** (0.00775)
Occasionally Employed	0.112*** (0.0105)	0.112*** (0.0105)	0.112*** (0.0105)	0.112*** (0.0105)
Married	0.0656*** (0.00669)	0.0652*** (0.00669)	0.0657*** (0.00669)	0.0652*** (0.00669)
Northern	-0.0516*** (0.00772)	-0.0517*** (0.00772)	-0.0513*** (0.00772)	-0.0511*** (0.00772)
Western	-0.0441*** (0.00767)	-0.0428*** (0.00767)	-0.0428*** (0.00767)	-0.0426*** (0.00767)
Community insurance	0.152*** (0.0503)			0.130** (0.0510)
Employer insurance		0.0732*** (0.0252)		0.0613** (0.0256)
Government insurance			0.154*** (0.0444)	0.124*** (0.0453)
Constant	-0.468*** (0.0290)	-0.467*** (0.0290)	-0.469*** (0.0290)	-0.468*** (0.0290)

	Model 1	Model 2	Model 3	Model 4
VARIABLES	Demand	Demand	Demand	Demand
LR chi2	2269.93	2268.91	2273.09	2285.78
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.486	0.486	0.487	0.489
Log pseudolikelihood	-22216.348	-22216.86	-22214.769	-22208.426
Observations	33,983	33,983	33,983	33,983

Demand (demand for health care services) equals 1 if the respondent visited a health facility in the last 12 months (0 otherwise). Community insurance, Employer insurance, and Government insurance are indicator variables equal to 1 if covered by the respective scheme (0 otherwise). No Education is used as the reference category for educational level, not employed was used as a reference category as those who were not fully employed or seasonally employed or occasionally employed were considered not employed, marital status, Not Married is also considered as reference category for marital status, and the Southern region is considered as the reference category for region. The reference are automatically selected by the Stata software to avoid multicollinearity issues among the other categories of the same variables.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed by authors

Similarly, employment status significantly influences healthcare demand. Fully employed individuals exhibit an average marginal effect of 0.0852 ($p < 0.01$), suggesting a notable increase in healthcare-seeking likelihood compared to those not employed. Seasonally employed individuals show a marginal effect of 0.0684 ($p < 0.01$), while those occasionally employed have a stronger effect at 0.112 ($p < 0.01$). These results indicate that stable employment conditions are associated with a greater propensity to seek healthcare services, which may be linked to better access to health benefits and awareness of available services.

Married individuals have a marginal effect of 0.0656 ($p < 0.01$), reinforcing the idea that marital status correlates with higher healthcare demands. This is because marital households seek for health care services frequently as they are usually many and therefore higher possibilities of least one person to be sick at a point in time. Conversely, individuals residing in the northern and western regions of Cameroon show negative marginal effects of -0.0516 ($p < 0.01$) and -0.0441 ($p < 0.01$), respectively compared to those in the southern regions of the country. This suggests that geographical disparities exist in healthcare access, with those in these regions being less likely to seek medical care compared to those in the southern region.

The analysis identifies health insurance as a critical factor influencing healthcare demand. Community-based insurance demonstrates a marginal effect of 0.152 ($p < 0.01$), signifying that those with such coverage are significantly more likely to seek healthcare. Employer-based insurance also shows a positive effect of 0.0732 ($p < 0.01$), while government insurance has a substantial marginal effect of 0.154 ($p < 0.01$), indicating

that individuals covered by government plans are more inclined to utilize healthcare services. These findings underscore the importance of insurance coverage in reducing financial burden of individuals. These results highlight the importance of the effectiveness of government-base insurance in enhancing healthcare demand. The findings align well with those who found out that government-provided insurance significantly improved healthcare usage among insured individuals in Ghana [1]. The findings are also similar to the study on the impact of government-based health insurance on healthcare usage in Cameroon, that government insurance positively influenced healthcare demand [31].

Table 3 presents the results of a control function probit regression analysis examining the effect of various types of health insurance on healthcare demand in Cameroon. This approach aims to correct for any endogeneity issues present in the relationship between health insurance and healthcare utilization by incorporating interaction terms of the residuals obtained from the first stage of the analysis in Table 2. This analysis is critical for understanding how different insurance models influence individuals' likelihood to seek healthcare services, especially within the context of endogeneity issues that may affect the validity of direct estimations. In the same light, there are four different models (Model 1 to 4), firstly Model 1 a regression in which the key independent variable is community-based health insurance, in model 2 the key independent variable is employer-based health insurance, in model 3 the key independent variable is government-based health insurance and lastly all the three insurance types are included in model 4.

Table 3. The control function probit regression the Effect on insurance on Health care demand (marginal effects).

	(Model 1)	(Model 2)	(Model 3)	(Model 4)
VARIABLES	Demand	Demand	Demand	Demand
Primary	0.341*** (0.0210)	0.341*** (0.0210)	0.342*** (0.0210)	0.341*** (0.0210)
Secondary	0.640*** (0.0234)	0.637*** (0.0234)	0.639*** (0.0234)	0.635*** (0.0234)
Higher	0.890*** (0.0459)	0.879*** (0.0463)	0.888*** (0.0459)	0.865*** (0.0465)
Fully Employed	0.228*** (0.0188)	0.227*** (0.0189)	0.227*** (0.0188)	0.226*** (0.0189)
Seasonally Employed	0.183*** (0.0208)	0.183*** (0.0208)	0.183*** (0.0208)	0.182*** (0.0208)
Occasionally Employed	0.299*** (0.0281)	0.300*** (0.0281)	0.300*** (0.0281)	0.299*** (0.0281)
Married	0.175*** (0.0179)	0.174*** (0.0179)	0.175*** (0.0179)	0.174*** (0.0180)
Northern	-0.138*** (0.0207)	-0.138*** (0.0207)	-0.137*** (0.0207)	-0.137*** (0.0207)
Western	-0.117*** (0.0205)	-0.114*** (0.0205)	-0.114*** (0.0205)	-0.114*** (0.0205)
Community insurance	2.439** (1.906)			12.36** (276.0)
Community insurance X Residual	3.639** (2.447)			16.83** (366.4)
Employer insurance		2.447** (1.150)		11.20** (229.2)
Employer insurance X Residual		3.537** (1.542)		15.50** (313.2)
Government insurance			1.498** (1.461)	13.99 (282.5)
Government insurance X Residual			2.372** (1.816)	18.07** (373.6)
Constant	-0.468*** (0.0290)	-0.467*** (0.0290)	-0.469*** (0.0290)	-0.468*** (0.0290)
LR chi2	2272.44	2274.91	2274.86	2288.61
Prob > chi2	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.0487	0.0487	0.0487	0.0490
Log pseudolikelihood	-22215.092	-22213.858	-22213.885	-22207.011

	(Model 1)	(Model 2)	(Model 3)	(Model 4)
VARIABLES	Demand	Demand	Demand	Demand
Observations	33,983	33,983	33,983	33,983

Community insurance X Residual is the cross term between Community insurance and Residual obtained from the first stage regression, Employer insurance X Residual is the cross term between Employer insurance and Residual obtained from the first stage regression and Government Insurance X Residual is the cross term between Government insurance and Residual obtained from the first stage regression. The first stage regression is a regression without the interactive terms with the residual which is presented in Table 2.

Standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The analysis of health insurance types highlights their critical role in influencing healthcare demand. Community-based insurance shows a direct effect with a coefficient of 2.439 ($p < 0.05$), indicating a significant influence, though complex. The interaction term with the residual for community insurance yields a positive coefficient of 3.639 ($p < 0.05$), suggesting that after correcting for unobserved factors, the impact of community insurance may be more favorable. Employer-sponsored insurance exhibits a similar pattern with a direct effect of 2.447 ($p < 0.05$) and a positive interaction term of 3.537 ($p < 0.05$), indicating that such plans are effective in boosting healthcare demand. Government insurance demonstrates a significant direct effect of 1.498 ($p < 0.05$) and an interaction term of 2.372 ($p < 0.05$), reinforcing the positive influence of government-backed insurance on healthcare utilization. The control function probit regression results highlight the effect of health insurance types on healthcare demand, emphasizing the necessity of accounting for endogeneity using interaction terms with residuals.

The findings implies that health insurance generally enhances the likelihood of using healthcare services by alleviating out-of-pocket costs [23, 16]. For instance, the findings are in line with those who found from a Heckman selection model on the Fourth Cameroon Household Survey (ECAM4) that financial the security provided by insurance companies which is important in increasing healthcare demand [22]. The results are also in line with those of [1], who found that individuals with health insurance were more likely to access preventive as well as curative healthcare services in Ghana's. While the most findings are in view of seeking health insurance coverage to enhance healthcare, some studies argue this relationship need critical attention. For example, authors like [45], [42, 46] argued that moral hazards associated with health insurance, in which individuals may over use health services because of the reduced financial barrier.

This finding highlights the importance of employer-base insurance in improving healthcare access due to better coverage and financial protection. The findings are consistent with those of other authors. For instance, [8] found from a study on the effect effects of health insurance on patient demand for physician services in the United States. Base on a Medical Ex-

penditure Panel Survey, the study found that insured individuals have higher routine care compared to the uninsured. On the other hand, [15] in his studies on health-seeking behavior among younger and older South Africans found that individuals with employer-based insurance does not eliminate all barriers to access to healthcare access but this disparity remained due to socio-economic status. While employer base health insurance has a positive effect of healthcare demand, some systemic issues need to be addressed to optimize its effectiveness.

These results highlight the importance of the effectiveness of government-base insurance in enhancing healthcare demand. The findings align well with those of [1] found that government-provided insurance significantly improved healthcare usage among insured individuals in Ghana. The findings are also similar to those of [31] who found from a study on the impact of government-based health insurance on healthcare usage in Cameroon, that government insurance positively influenced healthcare demand.

The findings support the Health Belief Model, which posits that individuals are more likely to seek healthcare if they perceive insurance as a means of mitigating financial risk associated with illness. In the context of Cameroon, where finances is a significant barrier in accessing healthcare services by many individuals and households, an improvement in access to community-based health insurance will encourage individuals to seek for healthcare services. The findings also support the Demand and Supply Framework as it confirms that the demand for healthcare services is influenced by price and therefore concludes that community base health insurance coverage lowers the financial barriers (price) associated with healthcare services thereby increasing demand.

5. Conclusion and Policy Implication

The findings from the probit regression analysis provide valuable insights into the effect of health insurance on healthcare utilization in Cameroon, highlighting critical areas for policy intervention. The analysis reveals that Employer-Based Health Insurance has the most significant positive impact on the likelihood of individuals visiting health facilities therefore those covered by employer-sponsored insurance

plans are more likely to seek medical care. This explains the importance of employer-sponsored insurance in enhancing healthcare access. Also, Community-Based Health Insurance demonstrates a direct effect with a coefficient of 2.439 ($p < 0.05$), indicating a significant influence, though complex. The interaction term with the residual for community insurance yields a positive coefficient of 3.639 ($p < 0.05$), suggesting that after correcting for unobserved factors, the impact of community insurance may be more favorable and tend to have potential benefits on healthcare demand. Its current implementation may effectively encourage health-seeking behavior. Government-based health Insurance also have a significant positive effect on healthcare demand. Therefore, the study recommends the following:

- 1) Strengthen employer-sponsored health insurance programs by incentivizing businesses to offer comprehensive coverage. This could include tax breaks or subsidies for companies that provide health benefits, ensuring that employees and their families have better access to necessary healthcare services.
- 2) Implement targeted awareness campaigns to educate communities about the benefits of Community Based Health Insurance. This should include workshops, informational sessions, and partnerships with local leaders to increase enrollment and utilization of Community Based Health Insurance schemes.
- 3) Increase funding and resources for Government Based Health Insurance programs to enhance service delivery. This could involve improving healthcare infrastructure, expanding coverage options, and ensuring that government-sponsored plans effectively meet the needs of underserved populations.

Abbreviations

CDHS	Cameroon Demographic Health Survey
DHS	Demographic Health Survey
ECAM4	Cameroon Household Survey
EHCVM	Harmonized Survey on Living Conditions of Households
GBHI	Government Based Health Insurance
NIS	National Institute of Statistics

Conflicts of Interest

The authors declare no conflicts of interest.

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