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EFFECTS OF HEALTH CARE FINANCING ON HOUSEHOLD ECONOMIC WELFARE IN CAMEROON

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Abstract: This paper assessed the effect of health care financing on household economic welfare in Cameroon. Secondary data is gotten from the fifth round of the Cameroon Demographic Health Survey conducted in 2018. The dataset has information on healthcare financing and it is captured through out of pocket health payment reflected in the dataset as self-medical while household economic welfare is captured as wealth index. This study adopts a quantitative research design specifically survey research design. Control function approach was used to establish a link between healthcare financing and household economic welfare. The result reveals a positive and significant effect of healthcare financing through out-of-pocket on household economic welfare in Cameroon. Policy suggests that, decision makers should sensitize households to take advantage of preventive healthcare services to avoid costly medical treatments in the future. The government should continuously increase the percentage of budget allocated for health.

Keywords: Healthcare financing, Household economic welfare, Out-of-pocket health expenditure, Cameroon

1. INTRODUCTION

It is often said, "Health is wealth", but looking critically at some countries in Africa, one can reverse this statement with, "wealth is health". This is because the health systems have truly improved in the past decades, but those of

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African countries have done so sparsely due to poverty, poor infrastructure and mismanagement of funds. Looking at Africa today with its very high rate of population growth, it is very important to have a look at the health sector because an increase in population will automatically lead to an increase in the demand for healthcare services. This is the reason why it is very important to constantly analyze the sector of public health to see if the services are growing as the population is growing, is the population able to pay for these services? In Sub -Saharan African Countries, one can see that the improvement in the health system has not only led to an increase in political, social and economic welfare of the population, but has also improved the life expectancy and educational performance has as well noticed a positive change (Keltice *et al.,* 2021).

According to the Global Health Expenditure Report (GHER) , global spending on health more than doubled in real terms over the past two decades, reaching US$ 8.5 trillion in 2019, or 9.8% of global GDP. However, it was unequally distributed, with high income countries accounting for approximately 80%. Health spending in low income countries was financed primarily by out-of-pocket spending (OOPS) (44%) and external aid (29%), while government spending dominated in high income countries (70%) (GHER, 2019). Economists have long recognized a strong connection between health and economic outcomes. Measures of health, both self-reported and objectively measured, are positively associated with human capital, earnings, income, and wealth. The direction of causality in these relationships is unclear. Better health can lead to higher productivity, less working time lost to illness, and lower mortality, which further incentivizes human capital investment. Higher productivity and financial resources can facilitate access to care, avoidance of harmful environmental factors, and access to higher-quality food and drugs (Tchinda and Tambi, 2022).

The government health expenditure plays a critical role in shaping the health outcomes and well-being of the population in Cameroon. A country's low levels of investment in healthcare have significant implications for access to care, quality of services, availability of essential medicines, management of infectious and non-communicable diseases, and achievement of universal health coverage. The government spends very little on healthcare in Cameroon (Keltice *et al.,* 2021). According to the World Health Organization, Cameroon spent approximately 5.6% of its GDP on health in 2019, which is below the

recommended minimum of 15% by the Abuja Declaration. Despite efforts to improve healthcare services, the country still faces challenges in the allocation of funds to the health sector. This low level of expenditure has led to inadequate healthcare infrastructure and limited access to essential services for many citizens (WHO, 2019). The impact of insufficient government health expenditure in Cameroon is evident in the country's high mortality rates and poor health outcomes. With limited resources, healthcare facilities struggle to meet the needs of the population, leading to high rates of preventable diseases and deaths. Additionally, the inadequate investment in healthcare has contributed to a shortage of medical supplies, trained personnel, and infrastructure, further hindering the delivery of quality healthcare services to the population. This has resulted in disparities in health outcomes between urban and rural areas, with rural communities often experiencing poorer health conditions due to limited access to healthcare facilities.

The bulk of health care financing in Cameroon is derived from out-of-pocket payments. That is, healthcare financing in Cameroon remains a major challenge for the majority of the population, with out-of-pocket payments being the primary source of healthcare financing (World Bank, 2018). This means that individuals are required to pay for healthcare services at the point of care, whether it is for consultations, diagnostics, medications, or hospitalization. This form of financing places a significant financial burden on households, especially those living in poverty or with limited resources. Out-of-pocket healthcare financing in Cameroon contributes to high levels of financial hardship and impoverishment among the population. With limited access to health insurance or social protection schemes, individuals are left to bear the full cost of their healthcare needs, which can be prohibitively expensive. This often leads to individuals forgoing necessary medical care or seeking care from traditional healers or unregulated providers, which can have negative implications for their health outcomes. Additionally, the high cost of healthcare can push households further into poverty, perpetuating a cycle of illness and economic hardship.

The World Health Organization (2021) has emphasized the need to protect households from catastrophic healthcare expenditure and equally calls for health financing systems to ensure that healthcare costs do not prevent people from receiving the necessary health services. This can be achieved

by ensuring that there is universal health coverage (UHC) that monitors the availability of resources for health and the extent of their efficient and equitable use. OOP health expenditure poses adverse effects on households like hindering access to health services which is likely to result in death. It also pushes households into vicious cycles of poverty leaving them unable to enjoy the basic standards of living (WHO, 2000). Despite these consequences, OOP for health care is still the main source of health care financing in Cameroon (Republic of Cameroon, 2023). From the foregoing, this study has as targeted objectives: (1) to determine the factors influencing healthcare financing in Cameroon and (2) to evaluate the effect of healthcare financing on household economic welfare in Cameroon.

2. LITERATURE REVIEW

A large number of studies have employed different methodologies to investigate the effect of healthcare financing (out of pocket) on household welfare in different settings. Maya *et al.,* (2022) investigated the effect of healthcare financing on household welfare in Uganda. Out of pocket was used as a proxy for healthcare financing. They made use of the Ugandan National Household Survey data (UNHS) 2016/17. Due to the presence of endogeneity, the study employs a robust sampling instrumental variable technique to control for simultaneous causality between household welfare and the OOP health expenditure variable in the model. The findings revealed that a unit increase in OOP health expenditure reduces household food consumption expenditure by 9% and the household asset base by 2%, respectively. Most reviewed literature indicates negative findings (Ssewanyana and Kasirye 2020; Kiros *et al* 2020; Aregbeshola and Khan, 2018). In Senegal, Séne and Cissé (2015) use a seemingly unrelated equation system of Tobit regressions to identify the relationship between catastrophic health expenditure and poverty. They found that catastrophic health expenditures jeopardize household welfare for some people that fall into poverty as a result of negative effects on disposable income and disruption of the material living standards of households. Aregbeshola & Khan (2018) explored OOP payments; catastrophic health expenditure and poverty in Nigeria examine the financial burden of OOP health payments among households in Nigeria. The study used the Harmonized Nigeria Living Standard Survey of 2009/2010 and found that a total of 16.4% of

households incurred catastrophic health payments at the 10% threshold of total consumption expenditure, whereas 13.7% of households incurred catastrophic health payments at the 40% threshold of non-food expenditure. Using the $1.25 day poverty, the poverty headcount was 97.9% gross of health payments. OOP health payments led to a 0.8% rise in poverty headcount, which implied that about 1.3 million Nigerians are being pushed below the poverty line. However, well-to-do households were found to be more likely to incur catastrophic health payments than poorer households.

The link between spending in healthcare and economic growth in Cameroon was examined by Ndedi et al (2017) and found that more health expenditure promotes economic growth while Séne and Cissé (2015 examined the effect of OOP health expenditure on rural households of Kwara state in Nigeria using a two stage sampling technique where 180 rural households were sampled. Their study shows that OOP health expenditure had a negative significant effect on both per capita calorie intake and income at 10% statistical significance. In the same way, Rashad & Sharaf (2015) studied the catastrophic economic consequences of healthcare payments and their effects on poverty estimates in Egypt, Jordan, and Palestine. By using nationally representative surveys from to assess the incidence, intensity and distribution of catastrophic health payments and poverty impact of OOP health payments. The results showed OOP to exacerbate households' living conditions, severely so in Egypt than in the other countries, pushing more than one-fifth of the population into a financial catastrophe and 3% into extreme poverty in 2011. However, in Jordan and Palestine, the disruptive impact of OOP was found to be modest. In the three countries, the catastrophic health payment was found to be problematic among better-off households.

The distribution of health care payments among households determines how their overall welfare is affected when they pay for health care. Therefore, equity concerns regarding the burden of health care payments are critical when deciding on health care financing options. Equity in health care financing is the extent to which the various health care payment options contribute to the redistribution of income (Ataguba et al, 2019). Health care payments can be progressive or regressive depending on whether the burden falls on richer or on low-income individuals. While progressive and regressive payments have opposite effects on the distribution of incomes, progressive payments reduce

post-payment income inequality, whereas regressive payments increase post-payment inequality (Ataguba & Akazili, 2010). In a study of the progressivity of health care financing mechanism, catastrophic spending on health and the distribution of healthcare benefits in Ghana, South Africa, and Tanzania, Mills et al (2012 found that the overall healthcare financing was progressive in all three countries. The findings also indicated that out-of-pocket payments, in particular, were regressive in all three countries. In addition, the overall distribution of health service benefits in all three countries benefited the rich more than the poor, although the burden of illness was greater for lower-income groups.

In a recent study, Munye and Briggs (2014) analyzed the progressivity of the main sources of health care financing in Kenya. The authors used data from the Kenyan National Accounts of 2005–2006 and the Kenyan household expenditure and utilization survey conducted in 2007 to show that the overall Kenyan health care financing system is regressive. The study also showed that out-of-pocket payments on health care were regressive. Ataguba et al (2019) used the Gini index to study the redistributive effects of health financing between and within groups in Nigeria. The results indicate that health care financing through out-of-pocket contributed to a significant increase in income inequality in Nigeria. The study also shows that, income inequality would be lesser within the six geopolitical zones in Nigeria without out-of-pocket payments. Thus, regardless of whether the health care financing system is progressive or not, out-of-pocket payments will lead to inequity in health care payments within the same income groups Mondaca and Chi (2017). McIntyre et al (2005) have reported that out-of-pocket payments are the single largest source of health care financing in many African countries and impose a very heavy burden on households, particularly the poorest. Ataguba and McIntyre (2012) used nationally representative datasets and standard methodology to examine equity in the delivery and financing of health care in both the public and the private sectors in South Africa. The study suggests an overall progressive financing system but a pro-rich distribution of health care benefits where more rich people than the poor benefit from the financing system. The study further suggests that the distribution of health care benefits is pro-rich but not according to health care needs. Richer groups receive a far greater share of service benefits within the public and private sectors, although with a relatively low burden of ill-health.

In most developing countries and especially in Africa, where prepaid financing of health care is limited, low income households are likely to be disproportionately hurt by reforms that implement user charges for health services. Data from the Cameroon National Health accounts as well as from the Cameroon Household and Consumption survey published in 2014 suggest that over 70% of health care expenditure in Cameroon is financed from out-of-pocket household payments. Out-of-pocket payments are expected to be regressive, especially if lower income groups are paying a large share of their incomes for health care. Mandiefe and Tieguhong (2015) examined the contribution of public health investments to the economic growth of Cameroon. They employed the Vector Error Correction Model as the econometric model used in their estimations. Annual time series data from 1988 to 2013 was used. The results of the estimations showed that public health investments contribute to the economic growth of Cameroon only in the long-run. This implies that public health investments boost economic growth in the long-run through efficient allocation of resources. Hence, they recommended that: first, the government should increase its health investment to 10 or 15% of its GDP as recommended by the African Union and WHO respectively; second, to enhance the provision of health care services by the private sector and third, to ameliorate the quality of health care services rendered by granting competitive awards to health units that render quality health care services.

Kwesiga *et al* (2015) assessed catastrophic and impoverishing effects of health care payments in Uganda. The study used data from the Uganda National Household Survey 2009/10. The paper measured the catastrophic impact of OOP payments using thresholds that vary with household income. The impoverishing effect of OOP health care payments was assessed using the Ugandan national poverty line and the World Bank poverty line of ($1.25 per day). Results revealed that OOP payments led to a high level and intensity of financial catastrophe and impoverishment. When using an initial threshold of 10% of household income, the findings show that about 23% of Ugandan households face financial ruin. Based on both the $1.25 per day, about 4% of the population was indicated to be further impoverished by such payments. This represents a relative increase in poverty headcount of 17.1% and 18.1%, respectively.

Tomini, *et al* (2013) investigated the extent to which healthcare financing (OOP healthcare expenditure) impoverished households in Albania. The study used 2002, 2005 and 2008 data from Albania Standard Measurement Survey. It was found that OOP increased in real value throughout the years. Even though their catastrophic effect had decreased due to declining absolute poverty, the results showed that the effect for the poorest expenditure quintiles remained high. OOP was found to deepen the poverty headcount and enlarge the poverty gap, with the effect being larger for the poorest quintiles. On the other hand, Cima and Almeida (2018) analyzed the dynamics of GDP and health expenditure for 25 OECD countries from 1993–2015. They concluded that health status is caused by GDP growth rather than by health spending growth. These results showed that countries mostly financed by compulsory health insurance schemed had a worse health status, even though there was no decrease in the growth of health expenditure.

3. METHODOLOGY

The study area, Cameroon, is a developing country found at the extreme north eastern end of the Gulf of Guinea and lies within the Central African sub region. It lies between longitudes 8 degree and 13 degrees east of the Greenwich Meridian and latitudes 2 degrees and 13 degree North of the equator. The country is bordered to the south by Equatorial Guinea, Gabon and Congo; to the west by Nigeria; to the east by Central African Republic and Chad and to the north by a portion of Lake Tchad. The territory has the shape of a triangle with a base of about 700km and a height of about 1200km. Cameroon has a population estimated at more than 27,031,658 people that is spread over a total surface area of 475,000km square, making an average density of about 56 inhabitants per kilometer square of land unevenly distributed over the 10 regions of the country. The most populated towns in Cameroon are Douala (economic capital), Yaoundé (political capital) and Bamenda. Almost half of its populace (44%) lives in rural areas with both high birth and death rates. The demographic distribution resembles a classical expansive population pyramid with almost two-thirds of Cameroonians younger than 25 years of age; the average life expectancy at birth is 58.6 years (United Nations Development Programs [UNDP], 2018). Cameroon has two official languages which are English and French inherited from her former

colonial masters Britain and France respectively. The country has an estimate of about 250 ethnic groups.

Model Specification

Health care financing as manifested in out of pocket payment can affect household economic welfare positively or negatively depending on its direction of effects. Health care financing in the form of cash payment or electronic transfer (mobile money) for health facilities accepting such means of payment can lead to major economic consequences including economic welfare (Akachi et al., 2009) and vice versa. We adopt the health production model as applied by Mwabu (2009). Here, the causal link of Health care financing captured by out of pocket payment (HCF) and household economic welfare (HEW) captured as welfare index can be expressed in the following structural equation:

$$HEW_i = \alpha_1 \pi_i + \beta_1 HCF_i + \varepsilon_{1i} \quad (1)$$

From equation (1) α is a vector of exogenous covariates such as community characteristics (such as place of resident and asset ownership) and parental characteristics (education, age, gender), β is the parameter estimate of the potential endogenous variable. Normally, the estimation of the parameter β would show the effect of Health care financing on household economic welfare. π is the vector of parameters to be estimated and ε is the error term that captures both random effects and unobservable variables, while i = 1,2.....N.

Given that equation (1) is a simultaneous equation in which we can simultaneously determine household economic welfare function and *HCF* determinants. This simultaneous determination of the outcome and endogenous variable may result to causality effect that can cause an endogenous bias. Further, there is a possibility to omit important variables that can potentially influence the *HCF*-HEW relation; this also can cause bias in our result. However, this bias can be solved through the use of instrumental variable approach. Instrumental variables are those variables that can be used to treat the bias problem that is cause by either omission of variables in the outcome equation or problem of causality. The instruments can be related to the potential endogenous variable that is HCF and not the outcome variable. We used distant to health facility (DHF) as our instruments to treat the problem of the bias. However, distance to health facility The reduced form of HCF generating the HEW strategy can take the following form:

$$HCF_i = \alpha_1 \pi_i + \beta_1 DHF_i + \varepsilon_i \quad (2)$$

In equation (2), α is a vector of exogenous instrumental variable affecting π but have no direct influence on household economic welfare, π and *DHF* are vectors of parameters of exogenous explanatory variables in the reduced form of *HCF* to be estimated and ε is the error term that captures both the random effects and other relevant but unobservable characteristics or complementary inputs. The 2SLS model based on equations (1) and (2) will be estimated for the determinants of household economic welfare using the econometric software Stata 16.

Using the 2018 Cameroon Demographic and Health Survey (CDHS) as our data source, we observed that since Cameroon is pre-dominated by rural inhabitants, it is possible that some of the household were not interviewed and so there will be some missing values in our outcome variable and so biasing the result. There is therefore a need to deal with potential sample selection bias. The Heckman procedure is used to deal with the sample selection bias (Tchinda and Tambi, 2022). To control for potential sample selection bias, the whole sample, which includes recorded welfare information and none recorded by choice is used. To handle the selection problem, we introduce equation (3).

$$\Pi = 1(\alpha_1 \pi_\Pi + \alpha_3 DHF_\Pi + \varepsilon_3 \succ 0) \quad (3)$$

In equation (3), Π is an indicator function for the selectivity bias. It takes the value zero when household economic welfare is not recorded and the value 1 when household economic welfare is recorded. π_Π and DHF_Π are vectors of parameters of exogenous explanatory variables in the sample selection equation, while α_3 is a vector of exogenous variables instrumenting for the selection of household economic welfare into the estimation sample and ε_3 is the error term that captures both the random effects and unobservable characteristics of selection. Equation (3) is the probit for sample selection and it will help correct any sample selection bias in the estimated parameters. The correction factor derived from equation (3) is the inverse of the Mills ratio.

Given the heterogeneity of households due to non-linear interaction of healthcare financing with unobservable and omitted variables could also bias the estimated structural coefficients of our result. The control function approach is used to address this issue. Thus, to take care of potential endogeneity

bias, heterogeneity bias and non-linear interactions of unobservable variables with the observed regressors specified in the household well-being function regressors simultaneously, equation (1) above can be upgraded to equation (4) as follows:

$$HEW_{1} = \alpha_1 \pi + \beta HCF + \gamma_1 \hat{\varepsilon}_2 + \phi IMR + \chi_2 (\hat{\varepsilon}_2 * HCF) + \Theta \quad (4)$$

Following equation (4), $\hat{\varepsilon}_2$ is fitted residual of *HCF* derived from the reduced form linear probability model of healthcare financing; *IMR* is the inverse of the Mills ratio (Heckman, 1979) obtained after estimating the probit model for selection; $(\hat{\varepsilon}_2 * HCF)$ is interaction of the fitted healthcare financing residual with the actual value of healthcare financing conditions, Θ is a composite error term comprising ε_1 and the unpredicted part of ε_2, under the assumption that $E(\Theta) = 0$ and $\alpha, \beta, \phi, \gamma$ are parameters to be estimated.

As revealed in Mwabu (2009), exclusion restrictions are imposed on equation (4) since the set of instruments for healthcare financing is absent from equation (4). The terms *IMR*, $\hat{\varepsilon}_2$ and $(\hat{\varepsilon}_2 * HCF)$ in equation (4) are the control function variables because they control for the effects of unobserved factors that would otherwise contaminate the estimates of structural parameters. The reduced form healthcare financing residual, ε_2 serves as the control for unobservable variables that correlates with *HCF*. In particular, if an unobserved variable is linear in $\hat{\varepsilon}_2$, it is only the constant term that is affected by the unobservable and the instrumental variable estimates of equation (4) are consistent even without the inclusion of the interaction term. In conclusion, Tchinda and Tambi (2022) underscored that the instrumental variable estimates of equation (4) are unbiased and consistent only when: (a) the expected value of the interaction between healthcare and its residual is zero, or the interaction between healthcare financing and its fitted residual is linear and (b) there is no sample selection problem. But, if the correlation is non-linear, then the control function approach is required and the inclusion of the interaction term in equation (4) purges the estimated coefficients of the effects of unobservable variables.

Data Presentation

The study made use of data collected from secondary sources. In this study use was made of the 2018 CDHS by the National Institute of Statistics. This data set

is designed to provide data for monitoring the population and health situation in Cameroon. The 2018 CDHS is the 5th Demographic and Health Survey in Cameroon since 1991. The objective of the survey was to provide reliable estimates of fertility levels, marriage, sexual activity, fertility preferences, family planning methods, breastfeeding practices, nutrition, childhood and maternal mortality, maternal and child health, domestic violence, malaria, and HIV/AIDS and other sexually transmitted infections that can be used by program managers and policymakers to evaluate and improve existing programs. A nationally representative sample of 13,527 women age 15-49 in all selected households and 6,978 men age 15-64 in half of the selected households were interviewed. This represents a response rate of 98% of women and 98% of men. The sample design for the 2018 CDHS provides estimates at the national level, for urban and rural areas, and for 12 study domains. Due to security concerns, teams were not permitted to visit some zones in South-West.

4. RESULTS

4.1. Descriptive Statistics

Table 1 shows the summary statistics describing the variables used in the empirical analysis**.** On average, Household economic welfare stands at about 26.4%. This can be explained by the fact that Cameroon is a developing country characterized by low income earners relatively and also coupled with the fact that the country was stricken by a political crises causing businesses and economic activities to face a downward turn. Out of pocket health expenditures by households stands at about 65%. Amongst the many other non-health expenses, this high OOP expenditure reduces the consumption of other goods by household since most of the income has been taken by healthcare. About 54% of household cover long distances to access healthcare. This could be as a result of the poor nature of the roads and many living in rural areas.

Maternal education in complete years of schooling stands at about 39%. On average, the mother's age is 28years with the lowest 15 and the highest 49. This is because most women attain menopause by the age of 50. Mother's age squared is about 0.1. Again about 81% of mothers spend more time (about five hours maximum) to fetch water. This can be caused by the fact that not all households have water sources (pipe borne or wells) in their premises, opposed to the few 19% who have supply in their premises. It is a probable phenomenon

in rural Cameroon where a majority of the women spend their time fetching water. Still in this statistical table about 59% of women are involved in the agricultural activities or own farmlands. This helps them generate income to support and or meet their family needs. About 68% of fathers are educated with about 36% of households with both parents educated. About 74% of fathers live with their family. This suggests that a majority of them are married households. The average age of the father is 39years with the lowest 15 and the highest 95.About 14% of households own an asset. As concerns gender of household, there are 74.6% male headed households.

Table 1: Descriptive Statistics of variables use to estimate HCF and HEW in Cameroon

Variable	*Mean*	*Std. Dev.*	*Min*	*Max*
Household economic welfare (wealth index)	.2640669	.1837071	0	1
Healthcare financing (1=OOP,0=otherwise)	.6503497	.4332367	0	1
Distance to health facility (1=difficulty)	1.546408	.4978672	0	1
Maternal education in complete years	5.394282	4.535953	0	17
Mother's age	28.79143	6.712642	15	49
Mother's age squared	874.0013	405.2075	225	2401
Time spent by mothers to fetching water (in minutes)	24.81745	22.592	0	300
Mother involved in agriculture (1=yes)	.5869942	.4923991	0	1
Father educated	4.676044	4.959756	0	17
Interaction of Father and mother education	36.36278	56.42492	0	289
Father present	.741938	.4375908	0	1
Father's age	39.73253	9.597813	15	95
Gender of the household head (1=male)	.0746365	.2628174	0	1
Ownership of asset (1=house, 0=otherwise)	.1414321	.3484847	0	1
Household size	10.74051	6.025526	1	40
Household size squared	151.6618	198.1532	1	1600
Area of residence (1=Urban, 0=otherwise)	.4014034	.4902075	0	1
interaction term	.2162675	.2021384	-.1985	.8220177
Residual	.1286419	.2549327	0	1.070742
Observation	9,733			

Source: author, computed from DHS 2018; Min=minimum, Max=maximum.

On average, household size stands at about 10 persons with the smallest household size having 1 person and the largest household size having around 40 persons. This could be explained by the Anglophone crisis that has led to many

internally displaced persons living in the houses of relatives or well-wishers. The size squared of the household on average stands at about 152 persons where the smallest household size squared has 1 person and the largest household size squared has about 1600 persons. More than 40% of the households in our sample are urban dwellers as opposed to about 60% who are rural dwellers.

4.2. Reduced Form Parameter Estimates

Table 2 submits the reduced-form estimates of the endogenous variable, health care financing. The traditional Ordinary Least Squares method was used to estimate the effect of Out-of-Pocket healthcare expenditure on household welfare. However, due to the presence of endogeneity that was confirmed by the Durbin-Wu-Hausman test, a more robust Two-stage sampling instrumental variable technique (2SLS) was used to control for the simultaneous causality between household welfare and out-of-pocket health expenditures. An instrumental variable distance to health facility was identified whose validity was confirmed using the over-identifying restrictions test - the Sargan Statistic. Distance to health facility affects health care financing positively by 32.83% and the result is significant at 1% level. This means that the further the distance to a healthcare facility, it increases the cost and as such increases the amount of money leaving the pocket of an individual. This provokes household to spend more to finance their health. Money meant to do other things may be deducted to finance healthcare.

Maternal education in complete years of schooling has a positive effect on healthcare financing by 0.32%. The result is significant but at a lower magnitude of 10% level of significance. This suggests that the more a woman is educated, the higher the probability to pick up a job to carter for some household expenses amongst which healthcare is one. Also the more educated a woman is, the more conscious she is everything being equal about the importance of investing in health care. The result is significant but of a lower magnitude because some mothers though educated, may be prevented from working and so they cannot finance. Again, educated mothers are likely to be cautious about health by doing exercise and eating nutritious food (Grossman, 1972). In Brazil equally, better-educated mothers are more likely to report higher out-of-pocket expenditures for medicines and private health insurance for their children (da Silva et al. 2015). Again in India, two studies found higher

household educational attainment was associated with increased spending on maternal health (Tchinda and Tambi, 2022).

Table 2: Reduced Form estimate of HCF

Variable	*Coef*	*Std. Err*	*T*	*P>|t|*
	Health Care Financing			
Distance to health facility	.3283***	.00907	36.19	0.000
Maternal education in complete years of schooling	.0032*	001704	1.91	0.056
Mother's age	.0010	.006213	0.16	0.871
Mother's age squared	-.00005	.000098	-0.59	0.556
Time spent in fetching water	-.0004**	.00019	-2.05	0.040
Mother involved in agriculture (1=yes, 0=otherwise)	-.0662***	.00991	-6.68	0.000
Father educated	.002457	.00190	1.29	0.197
Interaction of Father and mother education	.00080***	.00022	3.64	0.000
Father present	.02209*	.012587	1.76	0.079
Father's age	.00047	.00057	0.83	0.409
Gender of the household head(1=male, 0=otherwise)	-.03492	.02293	-1.52	0.128
Ownership of asset (1=house, 0=otherwise)	.13754***	.012646	10.88	0.000
Household size	.00719***	.00243	2.95	0.003
Household size squared	-.000301***	.000073	-4.09	0.000
Area of residence (1=Urban, 0=otherwise)	.01013	.01088	0.93	0.352
Constant	-.33098***	.097362	-3.40	0.001
R-Squared	0.2410			
F-Statistics	143.84[15, 6794; 0.0000]			
Number of observations	6,810			

Source: author, computed from DHS 2018. Values in parentheses represent robust t-statistics while ***, **, * indicate 1%, 5% and 10% level of significance respectively.

Time spent by the mother to fetch water has a significant inverse relationship with health care financing at 5% level of significance. That is the fact a mother covers longer distance to fetch water will reduce her expenditure on health care. Household water and sanitation facilities are also predisposing factors and are associated with the prevalence of morbidity and mortality, especially diarrheal disease, and therefore influence the likelihood of needing health care services. This could mean that she covers that long distance just to ensure that there is enough water to maintain hygiene and sanitation such as washing of food stuffs, kitchen utensils, dresses, cleaning of the environment and flushing and washing of toilets, etc. Above all, she may spend more time to get very clean

water or pipe born water for direct consumption since such phenomenon is a characteristic of rural areas. All of these will go a long way to maintain good health for the household and reduce out of pocket health expenditure.

Mother involved in agriculture in agriculture has a very significant negative effect on health care financing at 1% level. Mothers who are involved in agriculture ensure that their children or household feed well through their produce or money acquired from the sale of their produce can enable them get balanced meals for their household, thereby reducing the probability of household members falling sick. As such expenditure on health care is curbed. Interaction of Father and mother education positively and significantly affects health care financing by 0.08%. This can be due to the fact that when both parents are educated, their level of consciousness about health care is high everything being equal. As such, in everything they will afford to spend. Mothers who are more educated are more likely to understand the benefits of preventative care or capable of identifying symptoms and seeking health care compared with individuals who are illiterate or less educated, and they are also more likely to be able to afford health care. A positive association between level of education and out-of-pocket expenditure was found in a study of the determinations of out-of-pocket health payments for malaria among child under age 5 in Uganda (Orem et al. 2013).

Again, father present positively and less significantly affect health care financing by 2.21% and at 10% level of significance. This could be because some fathers though present, may be negligent. Ownership of asset has a positive and very significant influence on healthcare financing by 13.75%. This means that the richer a person is, the easier it is for him to spend on healthcare everything being equal. Household size positively affects health care financing at a higher magnitude of 1% level of significance. The more there are many people living in a house the, the more the likelihood that they will fall sick and it will increase healthcare financing because when the family is large, they will always spend money.

4.3. Estimate of Health Care Financing and Household Economic Welfare in Cameroon

Table 3 shows the OLS, 2SLS and the CF with and without interaction estimates of the effects of Health Care Financing on Household Economic Welfare in

Cameroon. However, the OLS estimate of the regression coefficient is biased as can be seen in the results on the table. Variable HCF the main variable of interest is significant at 1%, but the sign is contrary to expectation, given the theory on Out of Pocket and welfare. Due to inconsistency of results using the Ordinary Least Squares method, a more robust method of estimation which is the two-stage least squares regression technique is used. Again, the sign is still contrary to the expectation with the 2SLS estimation technique and equally that of the control function estimate with and without interaction. Therefore according to the parsimonious result, healthcare financing through out of pocket payments strongly and positively affects household economic welfare. This can be associated with immediate medical intervention that saves the life of a patient as a result of direct payment by the household. Some patients die in hospitals and others at home because of their inability to pay for their medical bills. So out of pocket payments would help to preserve life especially during emergencies.

Table 3: Estimate of Health Care Financing and Household Economic Welfare

Variable	*OLS*	*2SLS*	*CF without interaction*	*CF with interaction*
	Household Economic Welfare			
Healthcare financing (1=OOP,0=otherwise)	.02725*** (9.18)	.0689*** (9.21)	.0192*** (5.94)	.0325*** (2.64)
Maternal education in complete years of schooling	.01293*** (28.41)	.0126*** (27.26)	.0126*** (27.70)	.0126*** (27.72)
Mother's age	.0024 (1.45)	.0025* (1.50)	.0025* (1.53)	.0024 (1.47)
Mother's age squared	-.00004* (1.73)	-.00004* (1.72)	-.00004* (-1.75)	-.00004* (-1.68)
Time spent in fetching water	-.0001** (-2.16)	-.0001* (-1.93)	-.0001** (-1.96)	-.0001* (-1.94)
Mother involved in agriculture (1=yes, 0=otherwise)	-.0296*** (-11.16)	-.0271441*** (-9.98)	-.0271*** (-10.14)	-.0269*** (-10.07)
Father educated	.0018*** (3.60)	.0017*** (3.34)	.0017*** (3.39)	.0017*** (3.47)
Father and mother educated (feducmeduc	.0004*** (7.23)	.0003*** (6.51)	.0003*** (6.62)	.00037*** (6.30)
Father present	-.0023 (-0.68)	-.0032 (-0.96)	-.0032 (-0.98)	-.0033 (-1.01)
Father's age	.0009*** (6.24)	.0009*** (5.84)	.0009*** (5.93)	.0008*** (5.89)
Gender of the household head(1=male, 0=otherwise)	.0048 (0.79)	.0066 (1.06)	.0066 (1.08)	.0064 (1.06)

Variable	*OLS*	*2SLS*	*CF without interaction*	*CF with interaction*
	Household Economic Welfare			
Ownership of asset(1=house, 0=otherwise)	-.0019 (0.56)	-.0088** (2.44)	-.0088** (-2.48)	-.0095*** (-2.63)
Household size	.0050*** (7.69)	.0049*** (7.48)	.0049*** (7.60)	.0049*** (7.58)
Household size squared	-.0001*** (-6.43)	-.0001*** (6.04)	-.0001*** (6.14)	-.0001*** (6.14)
Area of residence (1=Urban, 0=otherwise)	.1272*** (44.32)	.1237*** (41.74)	.1237*** (42.41)	.1236*** (42.37)
Constant	.0134 (0.52)	.0067 (0.26)	.0067 (0.26)	.0088 (0.34)
Interaction term			.0496*** (6.17)	.0474*** (5.73)
Residual term				-.0209*** (11.12)
R-Squared/(log-likelihood)/ Uncentered R2	0.5889	0.8593	0.5912	0.5913
F-Statistics [df;p-val]	648.95[15, 6794; 0.0000]	630.86[15, 6794; 0.0000]	614.09[16, 6793; 0.0000]	578.07[17, 6792; 0.0000]
F test of excluded instruments		1309.51 [1, 6794; 0.0000]		
Weak identification test:Cragg-Donald F-Stat[10% maximal IV relative bias]		1309.505 [16.38]		
Sargan statistics(over identification test of all instruments)		0.000		
Durbin Wu-Hausman χ^2 test for exogeneity of variables (p-value)		38.010 [0.0000]		
Uncensored Observation	6,810			

Source: author, Note: Values in parentheses represent robust t-statistics while ***, **, * indicate 1%, 5% and 10% level of significance respectively.

When individuals pay out of pocket for their medical expenses, they are more likely to make informed choices about their healthcare. This can lead to better health outcomes and lower overall healthcare costs in the long run. Studies have shown that when patients have a financial stake in their healthcare decisions, they are more likely to seek out cost-effective treatment options and adhere to their prescribed treatment plans. Additionally, out of pocket health expenditure can encourage individuals to take better care of their health in order to avoid costly medical bills in the future. For example, individuals may be more likely to exercise regularly, eat a healthy diet, and avoid risky behaviors

if they know they will have to pay for any health problems out of pocket. By incentivizing preventive care and healthy lifestyle choices, out of pocket health expenditure can lead to a healthier households and population overall. This can result in reduced healthcare costs and improved productivity in the workforce, ultimately boosting household economic well-being.

Furthermore, out of pocket health expenditure can spur innovation and competition in the healthcare industry. When consumers have the freedom to choose their healthcare providers and treatment options, providers are encouraged to offer higher quality care at competitive prices. This can lead to improved efficiency and effectiveness in the healthcare system, ultimately benefiting both individuals and the economy as a whole. In other words, out-of-pocket health expenditure can improve household economic well-being by promoting cost-consciousness among consumers. When individuals are responsible for a larger share of their healthcare costs, they are more likely to shop around for the best prices and to seek out lower-cost alternatives. This can lead to increased competition among healthcare providers, which in turn can help to drive down healthcare costs for everyone.

Also, when individuals are responsible for a larger share of their healthcare costs, they may be more likely to question the necessity of certain medical procedures or treatments. This can help to reduce unnecessary healthcare spending and to ensure that individuals are receiving the most effective and appropriate care for their specific needs. Moreover, high out-of-pocket health expenditure can also encourage individuals to save more for future healthcare needs. By requiring individuals to set aside money for healthcare expenses, out-of-pocket spending can help to promote financial responsibility and preparedness. This can reduce the likelihood of individuals going into debt or facing financial hardship in the event of a medical emergency. Additionally, out-of-pocket health expenditure can help to reduce moral hazard in the healthcare system. Moral hazard occurs when individuals are insulated from the full cost of their healthcare decisions, leading to overutilization of healthcare services and increased costs for everyone. When individuals are responsible for a larger share of their healthcare costs, they are more likely to consider the costs and benefits of different treatment options and to make more informed decisions about their healthcare.

Moreover, high out-of-pocket health expenditure can also lead to greater transparency and accountability in the healthcare system. When individuals

are paying for healthcare services out of pocket, they have a greater incentive to demand price transparency and to hold healthcare providers accountable for the quality and cost of their services. This can help to promote competition and efficiency in the healthcare market, leading to better outcomes for patients and lower costs for everyone. Furthermore, out-of-pocket health expenditure can also promote innovation in the healthcare industry. When individuals are responsible for a larger share of their healthcare costs, they may be more willing to try new and alternative treatments that could be more cost-effective or more effective than traditional options. This can encourage healthcare providers to innovate and develop new technologies and treatments that can improve health outcomes and reduce healthcare costs in the long run.

Maternal education correlates positively and significantly with household economic welfare at 1%level of significance. This is explained by the fact that everything being equal, an educated mother will be more health cautious and can easily pick up a well-paid job to enable her meet the needs of the family. It is obvious that accessing better education implies the possibility of knowledge enhancement regarding choices made in terms of employment opportunities, sound practices and even on how income is spent in the household, with a view to ensuring household welfare. This finding corroborates the result obtained by Sackey (2005) for Ghana and Awoyemi and Adekanye (2003) for Nigeria. At the level of the 2SLS estimates and the control function without interaction, mother's age has a positive but very low significant effect on household economic welfare at 10% level of significance. This can because of the fact that as the mother gets old it does not necessarily mean that she educated or have acquired skills or has a job to enable her fend her family incidentally age comes with experience which can serves as reference point to the mother when comes to the upbringing of her kids in way that will influence their welfare positively. This finding is similar to the results obtained by Babatunde et al. (2008) in studying determinants of poverty in south-western Nigeria. Mothers age squared negatively and affect household economic welfare and the relationship is statistically significant at 10%. This can be explained by the fact that very old mothers may not have the strength to ensure proper upbringing of their children or to even work and generate income to carter for their family needs. Some mothers may have the strength but may have attained the retirement age. As such, they would rather need to be catered for at that age and not the other way round.

Time spent in fetching water correlates negatively and significantly with household economic welfare though at a lower magnitude of 10% level. The more time is spent by the mother to get water, the less time she has available to carter for the family (cooking, washing, nurturing, etc.), and also fewer hours to put in at her work place. This may reduce income and negatively affect the wellbeing of the household. Mother involved in agriculture impacts negatively and significantly on household economic welfare at 1% level. This is associated to mothers operating their farm holdings unprofitably. Since formal safety-nets like insurance, unemployment benefits and old age pension facilities are not accessible to informal sector operators in Cameroon, they might sensibly continue to operate production units even if such units are economically unprofitable. Looking at father's education, it is directly and significantly proportional to household economic wellbeing at 1% level of significance. This can be associated with better knowledge and experience on family welfare and also participation in the labour market.

Interaction of mother and father education positively and significantly affects household economic welfare in Cameroon at 1% level of significance. This is because both educated parent higher possibility of getting a well part paid job to carter for the needs of the family and also are endowed with knowledge on healthcare, again most educated parents may prefers birth to a fewer number of children who they can be well carter for eating quality or nutritive meals attaining higher educational level and foot all medical all medical expenses effortlessly. Through education skills of entrepreneurship can be acquired such that even without a job the parent can create one will which intends employ many job seekers. Father present has a negative and insignificant effect on household economic welfare. Father's age is associated with positive and significant household economic welfare effects at 1% level of significance; the older the father becomes the more conscious he is about the welfare of the family everything being equal. For instance acquiring an asset for the family and ensuring good health for the household.

Household size on the contrary to our expectation the sign shows a positive effect on household economic welfare at 1% level of significance. This could by the fact that every member of the household is employ and contribute to the provision of the family needs, since income per capital is high. The relationship between household size squared and household economic welfare

is strong and negative. This indicates that a higher number of 'dependents' or individuals residing in a particular household will tend to exert a lot of pressure on the meagre income generated by the household head and consequently an overall dip in well-being. Area of residence has positive significant effects on household economic welfare at 1% level of significance. This may be as results of the fact that leaving in town exposes the household to better opportunity education, employment, medical facilities which improve the well-being of the household. Generally, households living in urban areas are exposed to more opportunities which is income generating than rural dwellers and that may explain why poverty levels appear low in urban regions.

In sum, regressed variables were generally consistent with economic literature and significant in explaining the determinants of household economic welfare for the ordinary least square, two stage least square and control function approach. Diagnostic results indicate that the model was globally significant. The R-square ranged from 0.58 to 0.85. In like manner, the Fisher values also corroborate this result.

5. CONCLUSION

The focus of this study was to determine the effect of health care financing on household economic welfare in Cameroon. The principal econometric model used to estimate this objective is the *Control function model*. With respect to the relationship between healthcare financing and household economic welfare, the results show that health care financing through out-of-pocket (OOP) payment has a strong positive influence on household economic welfare in Cameroon at a 1% statistical level of significance.

Therefore we reject the null hypothesis and accept the alternative. Other control variables that affect household economic wellbeing positively includes maternal education, father's education, interaction of mother and father's education, father's age, household size and are of residence, while variables with negative effects include mother's age squared, time spent in fetching water, mother involved in agriculture and household size squared. The study recommends that the government and policymakers in Cameroon sensitize households and emphasize that they take advantage of preventive healthcare services to avoid costly medical treatments in the future, as well as creating more jobs to ease out-of-pocket health spending. The government and policy

makers should continuously increase the percentage of budget allocated for health every year.

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