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EFFECTS OF FINANCIAL INCLUSION AND OUT OF POCKETS COST ON HUMAN HEALTH (1990 - 2020)

Temitope Sade AKINTUNDE
Osun State University, Nigeria

Ifeade Adetutu OLADIMEJI
Osun State University, Nigeria

Adekunle ARIBATISE*
Wesley University Ondo, Nigeria

Abstract: This study examined the dynamic relationship amongst financial inclusion, out of pocket expenditure and health outcome proxied by life expectancy. This was with the view to investigate the effects of financial inclusion and out-of-pocket medical expenses on health outcomes as well as the causal connections between various variables in Nigeria. Time series data from 1990 through 2020 were analysed using Autoregressive Distributed Lag (ARDL) and pairwise granger causality as the estimation technique. The study found a positive relationship between financial inclusion and health outcomes and there was a bidirectional causal relationship between financial inclusion and life expectancy and a unidirectional causal relationship running from out-of-pocket expenditure to life expectancy at 5% significance level and vice versa. The study also revealed that financial inclusion had a positive and significant effect on life expectancy in Nigeria. Also, out of pocket expenditure had revealed not to be statistically significant on life expectancy in the long-run.

JEL classification: G21, H51, I31

Keywords: Financial inclusion, Out-of-pocket expenditure, life expectancy, ARDL, pairwise granger causality

1. Introduction

A basic requirement of existence is health, and the capacity to enjoy excellent health and longer life is crucial for human development (United Nations, 2012). The advantages of excellent health and long life extend beyond the person to the entire society, as a longer life expectancy boosts economic growth (Mahyar,

* Corresponding author. Address: Department of Economics, Wesley University, P.M.B 507, Ondo-Ife Road, Ondo, Nigeria. E-mail: kundun95@gmail.com

2016). As one scenario of individuals having a longer lifespan is the foundation for enhanced economic resource productivity, and the choice of individuals and economic players to engage in long-term investment expenditure is greatly influenced by the anticipated average lifespan of such private investors (Adediyan, 2021).

Economies that value longer life expectancies tend to concentrate on programs that would promote lifelong health and in spite of modest improvements with increase in government health expenditure in the year 2019 with N1, 190.71bn (Statista, 2023), the health indicators for Nigeria are still too high with life expectancy very low as well as increase in infant mortality rate in relation to other African countries (Akintunde and Olaniran, 2022). In 2021 for instance, life expectancy rate (at birth) in Nigeria was 60.87 years which is quite below some African countries such as Ghana (64.42), Kenya (66.95), Togo (61.48) and Cape Verde (73.23) (World Bank, 2021). Also, Infant and child mortality rates are 70 and 104 per 1000 live births, respectively, while the rate for maternal mortality is 814 per 100,000 births.

Out-of-pocket health expenditure (OOPHE) primarily explains why households are forced into poverty, especially when faced with high medical costs (Bredenkamp, Mendola, and Gragnolati, 2010). In contrast to developed nations, government expenditure on health as a percentage of GDP is generally very low in developing nations. For instance, as of 2015, US and UK average health spending to GDP ratios were 17.07% and 9.76%, respectively, while it was 3.76% and 5.14%, respectively, for Nigeria and sub-Saharan Africa (World Bank, 2017). Another estimate places the number of people who experience financial ruin due to household spending on health care at 150 million. Consequently, reduced out-of-pocket medical costs are a significant prerequisite for enhancing better health outcome through financial inclusion or government health expenditure.

Access to financial services is made possible and equally available through financial inclusion. It refers to a procedure that ensures that all economic participants can easily access, utilize, and benefit from the products and services offered by the established financial system i.e., “financial inclusion aims to remove the barriers that prevent people from engaging with the financial system. (Akintunde and Aribatise, 2022)”. Improved financial inclusion is crucial, according to Duvendack and Mader (2019), and can be a key strategy for fostering improved health outcomes or a decent quality of life. It is expected that individuals who have access to some services, such as loans from banks, equity and insurance products may benefit from prompt medical care and be in better health than those without access to microcredits.

Although the Nigerian healthcare system has improved over time, it is still unreliable, unfair, and broken. Private hospitals operate in a free market, while public hospitals are run under government authority, making the health system a complex mixed system. About 60% of healthcare services are delivered by the private health sector, with 40% by the public health sector (NSHDP, 2010). For example, out-of-pocket cost was about 71.52 as of 2019. In the previous 19 years, the value peaked in 2017 at 77.27 and peaked at 60.16. in 2000. This further increased to a level of 74.7 % in 2020, up from 71.5 % previous year.

Consequently, World Health Statistics claims that out-of-pocket medical costs can put people putting them in a precarious financial position by forcing them to decide between paying for their personal care and other essentials. When out-of-pocket health costs reach a specific percentage of a household's income or consumption, studies have labeled them as catastrophic (Sirag and Mohamed,

2021). With all these it is pertinent to raise these questions; how has financial access influenced out of pocket expenditure in Nigeria? Do both inclusive financing and out of pocket cost contributed to the health outcomes in Nigeria? In light of this, this study aims to contribute to the existing knowledge by determining the association between financial inclusion and out-of-pocket cost in Nigeria and to look into the contributions of financial inclusion and out-of-pocket cost on health outcomes as well determining the causal relation amongst the variables in Nigeria from 1990 to 2020. This study is structured in sections; section one, two and three are introduction, literature review and methodology respectively, followed which analysis and discussion of results in section four and conclusions in the last session.

2. Literature review

In the literature, the health capital theory has been linked to works of Schultz (1961), Becker (1964) and Grossman (1972). Becker introduced health as a form of human capital that can be invested on. Grossman linked human capital with the demand for health. His model explained health demand and medical care as it relates with people's wealth constraints, preferences and consumption expenditure over people's lifetime. (Galama, 2011). It showed that individuals can spend on their health and stock up their health capital by adding up medical care, food, education, etc. to get better health outcomes. Furthermore, Neo-Materialist theory asserts that a society with a large percentage of people in poor health will also have significant income disparities. The high percentage of the impoverished in society accounts for the general lack of health among the populace. Therefore, income disparity is a result of a number of "neo-material" conditions can have an effect on people's health. (Lynch et al., 2000).

Some studies have tried to link financial inclusion, out-of-pocket cost and health outcomes. **For instance,** Ajefu et al. (2020) looked at how financial inclusion affected the mental health of Nigerian household heads. They used geo-referenced financial services data along with data from the Nigerian General Household Survey (GHS) conducted in 2015 and 2016 to create their analysis. To identify financial institutions, they used a household's proximity to the closest financial institution. Financial inclusion has been demonstrated to significantly improve mental health. Similarly, using bank account ownership to examine how financial inclusion affects health. Aguila et al. (2016) in their study concentrated on Hispanic residents of the US who were between the ages of fifty-one (51) and ninety (90). This more mature age group was more inclined to have problems obtaining essential financial services as a result of their cultural heritage or absence of acculturation. In older Hispanics, having a bank account was significantly correlated with better mental health, according to panel data studies. Furthermore, Finkelstein et al. (2012) and Gyasi et al. (2020) proven that a variety of additional measures of financial inclusion, such as having access to health insurance, are crucial for giving people and communities financial security. Additionally, these protective services have a higher likelihood of lowering cognitive stress, enhancing mental health, and enhancing general wellbeing same as Gyasi et al. (2019), Allmark & Machaczek, 2015; Manor, Matthews, & Power, 2000 have all linked financial inclusion to health and finding out that access to finance improves health both mentally and physically. However, Moffat et al. (2006) gave contrary evidence from their study and concluded that poor health was attributed to factors other than access to money.

There are evidences of the link between health outcomes and out- of- pocket expenditure. According to a study conducted in Agincourt, South Africa, households with sick members spend roughly 5% of their total family income on direct medical expenses (Goudge et al., 2009). In Pelotas, Brazil, cohort research indicated that many families spent more than 15% of their disposable income on health services for their children (de Silva et al., 2015). In a separate study, Mohammad and Rasheda (2015) looked at the correlation between healthcare spending and the region's three primary health status indicators (life expectancy at birth, and infant mortality rate). An analysis of panel data using the 20-year (1995-2014) World Bank data collection in 15 nations in the region showed that total spending on health, public and private health spending all have a significant impact on lowering infant mortality rates, with the impact of private health expenditure being more noticeable than that of government expenditure. The reduction in the overall death rate is significantly aided by private health spending. However, the research found no evidence of a substantial relationship between health spending and birth weight. Some studies examined expenditure on healthcare and health outcomes. For instance, in the case of Sri Lanka, Russia, and Nigeria, research by Anand and Ravallion (1993), Patricio (2008), and Imoughele et al. (2013) all found a correlation between public healthcare expenditure and performance in the health system. However, no correlation was discovered between these variables by Filmer and Pritchett (1997), Musgrove (1996), or Kim and Moody (1992). According to Filmer and Pritchett (1997), the key determinants of child mortality are not public health spending but rather the degree of poverty, income disparity, female education, and other socioeconomic factors. Additionally, a study on Indian states by World Bank from 1980 to 1999 employed panel data and found identical results to those of Burnside and Dollar (1998) found no connection between healthcare costs and newborn death rates. Additionally, Mckec (2004) and Young (2001) found no conclusive evidence of a connection between health expenditure and health outcomes.

In another study, Anyanwu and Erhijakpor (2007) found that overall healthcare spending affects health outcomes as expected in a study of 47 African countries between 1999 and 2004. A 1% increase in total expenditure on health per person results in reductions of 2.1% in the rates of infant and 2.2% under-five mortality. Similar to this, Akinkugbe and Mohanoe (2009) discovered that healthcare spending, together with other variables, had a significant impact on health outcomes. Gupta et al. (2001) identified stronger impacts for the underprivileged from the national data on the association between public health spending and health status. Gupta et al. (1999) found that health spending decreased child death rates in 1994 in a study they conducted on 50 developing and transitional nations. In a panel study of 160 nations where they divided health expenditure into public and private spending, Issa and Ouattara (2005) discovered a negative association between health expenditure and newborn death rates.

Furthermore, using quantitative and qualitative analyses, Onah and Govender (2014) investigated the gendered effects of out-of-pocket payments (OOPs) on healthcare consumption in south-eastern part of Nigeria. Six conversations in single-sex focus groups and a survey of 411 households were undertaken. Their findings confirmed that female-headed households (FHHs) are socioeconomically and demographically vulnerable, which influenced gender-based variations in healthcare access, financial burden, provider preferences, and coping mechanisms between

households. Also, Appleton (1995); Dercon (1996); Lavy and Germain (1994) also discover that in Kenya, Ethiopia, and Ghana, that the selection of medical facilities and the uptake of the sick are affected by the distance to health services. Better access to medical facilities was discovered by Turner (1991) to be the main factor influencing household health care consumption in Nicaragua. Families that must travel farther to access medical care are prone to developing evasion techniques, such as using self-medication, quack pharmacies, and traditional native healers. However, Collier and Mackinnon (1997) discovered that quality is far more sensitive to household use of health facilities than distance. Similar to this, Nakovics et al. (2020) looked into the factors that influence out-of-pocket spending (OOPE) on curative healthcare services in rural Malawi. It was discovered that there is a substantial positive correlation between age 15–39 years, household head, having a chronic disease, how long the illness lasts, being hospitalized, the number of accompanying people, wealth quartiles, and being a city resident and the size of OOPE.

According to the aforementioned, the study reviewed so far has either examined at the relationship between financial inclusion and health outcomes or the relationship between out-of-pocket medical expenses and health outcomes. The trio's complex association has not received enough attention in the literature as there is still a glaring void in the literature about the effects of financial inclusion and out-of-pocket expenses on human health. This gap this study intends to fill.

3. Methodology

The Grossman (1972) model of health production function's findings serve as the foundation for this study's theoretical framework. To examine the effect of financial inclusion and out of pocket expenditure on health outcomes in Nigeria, this paper is guided by the model specified by Ofeh, Tii and Ofeh, (2021), Brown et al., (2015) and Koomson, Abdul-Mumuni and Abbam, (2021). The model's functional form is specified as:

$$HO = f(FI, OOPHE, GDP, GEH, DCPS, EDU) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

In a simple linear equation and log form, model (2) becomes

$$HO = \alpha_0 + \alpha_1 FI + \alpha_2 OOPHE + \alpha_3 GDP + \alpha_4 GEH + \alpha_5 DCPS + \alpha_6 EDU + \mu \quad \ldots\ldots 2$$

Where:

HO is life expectancy at birth; FI is Financial Inclusion; OOPHE is Out-of-Pocket Health Expenditure; GDP is Gross Domestic Product per capita; GEH is Government Expenditure on Health; DCPS is Domestic Credit to the Private Sector which is a proxy of financial development; EDU is Education; μ is the error term, α_0 is the intercept, and α_1, α_2 … α_6 represent the parameter estimates. The apriori expectation is expressed mathematically as $\alpha_1 > 0$, $\alpha_2 > 0$, $\alpha_3 > 0$, $\alpha_4, > 0$, $\alpha_5 > 0$ and, $\alpha_6 > 0$.

This study employed the ARDL (Autoregressive Distributed Lag) model to determine how out-of-pocket expenses and financial inclusion affect health outcomes. This model is fundamentally important because it allows us to examine

long-run and short-run relationships simultaneously inside the same framework, irrespective of "whether all variables are I(1), I(0), or a combination of I(1) and I(0) variables," i.e., in the same sequence. The ARDL model is derived as follows from equation 2:

$$\Delta HO_t = \beta_0 + \sum_{j=1}^{n} \partial_j \Delta FI_{t-1} + \sum_{J=1}^{P} \alpha_j \Delta OOPHE_{t-1} + \sum_{J=1}^{p} \varphi_j \Delta GDP_{t-1} + \sum_{J=1}^{p} \Phi_j \Delta GEH_{t-1} + \sum_{j=1}^{P} \theta_j \Delta DCPS_{t-1} + \sum_{j=1}^{P} \Upsilon_j \Delta EDU_{t-1} + \beta_1 HI_{t-1} + \beta_2 \mathrm{OOPHE}_{t-1} + \beta_3 GDP_{t-1} + \beta_4 GEH_{t-1} + \beta_5 DPCS_{t-1} + \beta_6 EDU_{t-1} + \mu_t \quad \ldots\ldots\ldots\ldots 3$$

To examine the influence of financial inclusion and out of pocket expenditure on health outcomes both in the short and long run, and to explain how quickly poverty adjusts to changes in health outcomes in the long run, the ECM form is specified by reparametrizing eqtn 3.

$$\Delta HO_t = \beta_0 + \sum_{j=1}^{n} \partial_j \Delta FI_{t-1} + \sum_{J=1}^{P} \alpha_j \Delta OOPHE_{t-1} + \sum_{J=1}^{p} \varphi_j \Delta GDP_{t-1} + \sum_{J=1}^{p} \Phi_j \Delta GEH_{t-1} + \sum_{j=1}^{P} \theta_j \Delta DCPS_{t-1} + \sum_{j=1}^{P} \Upsilon_j \Delta EDU_{t-1} + \beta_1 HI_{t-1} + \beta_2 \mathrm{OOPHE}_{t-1} + \beta_3 GDP_{t-1} + \beta_4 GEH_{t-1} + \beta_5 DPCS_{t-1} + \beta_6 EDU_{t-1} + \tau ECM_{t-1} + \mu_t \quad \ldots\ldots\ldots 4$$

In Equation (4) β_{1-6} represent the convergence of short-run dynamic coefficients to long-run equilibrium while τ is the error correction model and speed of adjustment parameter derived from the predicted equilibrium relationship. The aforementioned ECM could be considered as including both short-term transient effects and long-term consequences.

To establish the direction of causation among the variables, the pairwise Granger causality test created by Granger (1988) was also used. The Granger equations for the model, however, are laid down as follows:

$$HO_t = \sum_{i=1}^{n} \beta_i HO_{t-1} + \sum_{j=1}^{n} \delta_i FI_{t-j} + \mu_t \quad \ldots\ldots\ldots 5$$
$$FI_t = \sum_{i=1}^{n} \beta_i FI_{t-1} + \sum_{j=1}^{n} \delta_i HO_{t-j} + \mu_t \quad \ldots\ldots\ldots 6$$
$$HO_t = \sum_{i=1}^{n} \beta_i HO_{t-1} + \sum_{j=1}^{n} \delta_i OOPEH_{t-j} + \mu_t \quad \ldots\ldots\ldots 7$$
$$OOPEH_t = \sum_{i=1}^{n} \beta_i OOPEH_{t-1} + \sum_{j=1}^{n} \delta_i HO_{t-j} + \mu_t \quad \ldots\ldots\ldots 8$$

The decisions on the acceptance or rejection of the hypothesis depends highly on the value of the *F*-statistics and the probability.

Definitions and Measurement of variables

Based on the literature, the measurements of the different variables of the model for the study are described briefly and stated as follows.

Variable	Descriptions	Symbol	Data source
Life Expectancy Rate	This is total life expectancy for both male and female. It is used as the proxy for health status. It serves as a gauge of how long a person's life expectancy is at birth.	HO	WDI
Financial inclusion	Financial inclusion is the provision of transactions, payments, savings, credit, insurance, and other financial goods and services in a responsible and sustainable manner, to both individuals and enterprises.	FI	CBN
Out-of-Pocket Expenditure	Proportion of out-of-pocket expenses to total current medical costs. Households directly pay for their own health care through out-of-pocket expenses.	OOPHE	WDI/CBN
GDP Per Capita	GDP per capita is gross domestic product divided by population. a proxy for economic growth	GDP	WDI
Gross primary school enrolment	Gross enrollment ratio (GER) is the ratio of total enrollment, regardless of age, to the population in the age range deemed to formally correspond to the stated education level.	EDU	WDI
Government Expenditure on health	All costs associated with providing healthcare, family planning, nutrition, and emergency medical assistance fall under the category of health expenditure.	GEH	CBN
Domestic credit to private sector	Domestic credit refers to financial resources given by financial institutions to the private sector. lending, purchasing non-equity securities, etc.	DCPS	WDI

Source: Author's Compilation, 2023

4. Results and Discussion

4.1. Descriptive Statistics

In order to observe the distribution and variability of variables, descriptive statistics is usually employed, prior to analyzing time series data. It establishes information about sample statistics. The result of the descriptive statistics employed in the study is presented in Table 4.1. The outcome of the descriptive statistics demonstrates a high degree of consistency across all study variables. This is seen in the mean and median values, which lies between the maximum and minimum values of the series. Almost all series have standard deviations that are reasonably small which shows small deviations of actual data from their respective mean values.

Table 4.1. Descriptive Statistics

	HO	FI	OOPEH	GEH	GDP	EDU
Mean	49.16	10.11	71.59	104.44	3.40	88.53
Median	48.25	8.91	72.76	55.70	3.33	89.70
Maximum	55.04	19.63	77.22	388.37	12.46	102.11
Ste. Dev.	3.27	3.53	4.67	117.46	2.58	9.68
Skewness	0.45	0.97	-0.94	0.99	1.53	-1.153
Kurtosis	1.68	3.66	3.06	2.81	6.44	4.97
Jarque-Bera	3.29	5.39	4.56	5.11	27.51	11.87
Probability	0.19	0.07	0.10	0.08	0.00	0.00
Sum	1524.01	313.44	2219.37	3237.76	105.52	2744.47

Source: Authors computation 2023

The result from Table 4.1, HO has a mean value of 49.16, which is higher than the median value of 48.25 for the study period. This denotes that HO is somewhat skewed to the right, with the consequence that some of the data series' variables have medians that are smaller than their means. Also, Kurtosis, a measure of the variables' degree of peakness revealed that HO and GEH are platykurtic while FI, OOPHE, GDP, CCPS, and EDU are leptokurtic. The Jarque-Bera (JB) statistics significantly reject the normal distribution for FI, GDP, GEH, DCPS, and EDU indicating non-normality and except for HO and OOPHE also indicating normality of their conditional distributions.

Before proceeding with the analysis, the stationary status of all variables (health outcomes, financial inclusion, out of pocket expenditure on health, government expenditure on health, GDP per capita, and gross primary school enrolment) were tested to determine their stationarity. This is to ensure that the variables are not integrated of order two i.e. I(2) in order to avoid spurious results for the ARDL results.

4.2. Preliminary test

4.2.1. Unit Root Tests

To better understand the nature of variables used in this study, and as well determine the stationarity status of each variable, the unit root test is employed. The stationarity property of a variable helps to explain the consistency of data estimates. The ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron) unit root tests were used in the study to determine whether all variables were stationary. It was differenced when a variable was discovered not to be stationary at level. The unit root test's conclusion is reported in table 4.2 and 4.3 below.

From the result obtained using ADF unit root test in table 4.2; HO and GDP found to be stationary at levels I(0), indicating that on the incidence of shock, this variable does not drift away from its mean value, while other variables; FI, OOPEH,GEH and EDU became stationary at first difference I(1).

Thus, the study reported I(0) and I(1) series, which is also confirmed by the Phillips-Perron unit root test in table 4.3. In order to determine whether there is a chance of a long-term link between the variables, a co-integration test must be conducted because most of the series have unit roots.

Table 4.2. Unit Root Tests Results using Augmented Dickey Fuller (ADF) Technique

	Statistics at level		Statistics at first difference		
Variables	Intercept	Trend & Intercept	Intercept	Trend & Intercept	Order of Integration
HO	-3.69*	-6.92	-3.34	-4.22	I(0)
FI	-2.65	-3.50	-4.10*	-4.05	I(1)
OOPEH	-2.51	-2.65	-4.52*	-4.44	I(1)
GEH	1.29	-1.90	-6.31*	-6.08	I(1)
GDP	-4.67*	-4.51	-8.18	-6.02	I(0)
EDU	-2.93	-2.88	-4.83*	-4.78	I(1)
Critical Values					
1%	-3.68	-4.31	-3.68	-4.31	
5%	-2.97	-3.57	-2.97	-3.57	
10%	-2.62	-3.22	-2.62	-3.22	

Table 4.3. Unit Root Tests Results using Phillips-Perron (PP) Technique

	Statistics at level		Statistics at first difference		
Variables	Intercept	Trend & Intercept	Intercept	Trend & Intercept	Order of Integration
HO	-3.31*	-3.47	-3.25	-3.81	I(0)
FI	-I.93	-1.92	-5.14*	-5.93	I(1)
OOPHE	-2.29	-2.37	-5.02*	-4.94	I(1)
GEH	-2.28	-1.52*	-6.47	-10.55	I(1)
GDP	-4.70*	-4.56	-10.52	-10.21	I(0)
EDU	-2.39	-2.35	-5.81*	-6.25	I(1)
Critical Values					
1%	-3.68	-4.31	-3.68	-4.31	
5%	-2.97	-3.57	-2.97	-3.57	
10%	-2.62	-3.22	-2.62	-3.22	

Note: * implies 5% level of significance
Source: Author's computation 2023

4.2.2. Lag Order Selection

Table 4.4 present the lag length of the model. It is evident that the various lag selection criteria produced different results. FPE, AIC and SIC revealed two (2) lag length, HQ and LR chooses one (1) lag length. The lag length for the independent variables in this study is two, as suggested by the AIC, and is utilized to estimate the VAR, drawing on the rationale for AIC.

Table 4.4. VAR Lag Order Selection Criteria: Endogenous variables: LEX FI OOPEH GEH GDP EDU

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-526.4354	NA	22380485	36.78865	37.11868	36.89201
1	-315.6835	305.2269*	354.5685	25.63334	28.27364	26.46025*
2	26.46025	131.7164	1.671534*	19.60433*	24.55489*	21.15479

*** Indicates lag order selected by the criterion**

4.2.3. Correlation Analysis

Correlation matrix is needed to watch how strongly the explanatory variables in a model are associated with the dependent variable(s). Table 4.5 presents the correlation matrix between the dependent and explanatory variables of the model used in the study.

Table 4.5. Correlation matrix

Correlation Probability	HO	FI	OOPEH
HO	1.000000		
FI	0.632280	1.000000	
OOPEH	0.453374	0.282459	1.000000

Source: Author's Computation 2023

Table 4.5 specifically showed that the degree of association between dependent variable (HO) and independent variable (FI) is high. The result shows that HO has a moderate and positive correlation with FI, while a week and positive correlation between OH and OOPEH. This implies that financial inclusion (FI) and out of pocket expenditure (OOPEH) has a positive impact on health outcomes (HO). However, the likely multicollinearity problem that could have occurred as a result of high association is taken care off.

4.2.4. Co-integration Test: Bound Testing Approach

The study therefore chooses a maximum lag length of two for both the dependent variable(s) and regressors in the conditional ARDL model. The result of the bound test as provided by Pesaran et al. (2001) is presented in table 4.6, where the F-statistics is compared with the critical bounds at 5% level of significance.

Table 4.6. Bounds Approach to Co-integration Test (ARDL)

F-Statistics	**Value**	
	116.20	
DF	6	
Critical Values for F-statistics	**Lower Bound I(0)**	**Upper Bound I(1)**
10%	1.99	2.94
5%	2.27	3.28
1%	2.88	3.99

Source: Author's Computation, 2023.

The result reveals the lower and upper bounds to be 2.27 and 3.28 respectively at 5%, and 1.99 and 2.94 respectively at 10%, which are obviously below the F-statistic value of all the model. Accordingly, Table 4.6 demonstrates that at the 5% and 10% level of significance, the computed F-statistic (116.20) exceeds the upper bound critical value. This implies the existence of a long-run relationship between financial inclusions, out of pocket expenditure and health outcomes in Nigeria. Thus, the null hypothesis of no co-integration is rejected.

4.3. The relationship between Financial Inclusion and Out of Pocket Expenditure on Health Outcomes in Nigeria.

Based on short-run analysis in Table 4.7, FI, OOPEH, OOPEH (-2), GEH, GEH (-1), GDP (-1), EDU (-1) and EDU (-2) have positive significant impact in determining HO, while FI (-1), OOPEH and (-1), GDP, GDP (-2), EDU are not significant at 0.05% level. Thus, these are in consonance with the a-priori expectation among the variables. This implies that in Nigeria as financial inclusion, out of pocket expenditure on health, and government expenditure increases, health outcome also increases in short run, this result can further be explained that as GDP per capita and gross primary school enrolment increases, life expectancy increases too, this is line with Finkelstein et al. (2012), Ajefu et al. (2020) and Gyasi et al. (2020)

Table 4.7. ARDL Short Run Dynamic

Variables	Coefficient	Std. Error	t-Statistic	Prob.*
HO(-1)	1.935385	0.026490	73.06077	0.0000**
HO(-2)	-0.930806	0.028982	-32.11658	0.0000**
FI	0.003393	0.000871	3.893789	0.0025**
FI(-1)	-0.001252	0.000971	-1.289538	0.2237
OOPEH	0.005165	0.000700	7.378968	0.0000**
OOPEH(-1)	0.000379	0.000728	0.520858	0.6128
OOPEH(-2)	0.001446	0.000607	2.382858	0.0363**
GEH	0.000201	5.07E-05	3.964306	0.0022**
GEH(-1)	0.000158	6.44E-05	2.450080	0.0322**
GDP	0.000858	0.000902	0.951014	0.3620
GDP(-1)	0.005320	0.000799	6.653860	0.0000**
GDP(-2)	-0.000754	0.000792	-0.952584	0.3613
EDU	-0.000323	0.000247	-1.306884	0.2179
EDU(-1)	0.000745	0.000215	3.462600	0.0053**
EDU(-2)	0.000880	0.000257	3.420214	0.0057**
CointEq(-1)*	-0.045795	0.000117	39.00204	0.0030

Source: Author's Computation, 2023.

Also from Table 4.7, the short run dynamic amongst the variables is significant at 1% level and negatively signed ECM has a significant estimated value of -0.0457 and a probability value of 0.0030; it is also appropriately signed. This indicates that the current year has corrected for about 4% of the disparity from the prior year. The economy will recover 4% after a year following disequilibrium because the adjustment process is poor.

From Table 4.8, it is evident that financial inclusion (FI), government expenditure on health (GEH), and GDP per capita (GDP), whose coefficients are 1.014545, 0.00940 and -1.18433 respectively are significant at 5% level thus have a long-run relationship with health outcome (HO) this is in line with Houeninvo *et al*., (2023). While out of pocket expenditure (OOPEH), gross primary school enrolment (EDU) do not exhibit long-run relationship. With the coefficients of 1.360914, 0.041172 and -5.402243 respectively and insignificant at 5% level.

Table 4.8. ARDL long-run Dynamic

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FI	1.014545	0.810193	1.252227	0.0365**
OOPEH	1.360914	1.204724	1.129648	0.0827
GEH	0.009433	0.011233	0.839707	0.0189**
GDP	-1.184352	0.886205	-1.336431	0.0084**
EDU	0.041172	0.089987	0.457530	0.6562
C	219.2580	129.1435	1.697786	0.0076**

Source: Author's Computation, 2023.

4.4. Causality between Financial Inclusion, Out of Pocket Expenditure and Health outcomes

Table 4.9. Pairwise Granger Causality Tests

Null Hypothesis:	Obs.	F-Statistic	Prob.
FI does not Granger Cause HO	29	3.23133	0.0542
HO does not Granger Cause FI		5.37586	0.0118
OOPEH does not Granger Cause HO	29	10.0826	0.0007
HO does not Granger Cause OOPEH		1.29361	0.2927

Source: Author's Computation, 2023.

Considering the result in Table 4.9, the hypothesis that FI does not Granger cause HO, the null hypothesis of no causal relationship running from FI to HO is rejected with the p-value of 0.05 at 5% significance level. Also, in the hypothesis of HO does not Granger Cause FI, null hypothesis is rejected at 5% significance level with p-value of 0.0118. Thus, we found a bi-directional causality that runs from FI to HO vice-versa. This result obtained suggests that financial inclusion is influenced by health outcomes; this implies that a rise in the level of financial inclusion in Nigeria also results to a rise in health outcomes. Thus, creation of more commercial banks, ATM machines, means to borrow money from the banks and access to assets and countrywide income played a significant role in the health outcomes in Nigeria.

Table 4.9 also shows p-value of 0.0007 which is significant at 5%, revealed a causality running from OOPHE to HO. Therefore, the null hypothesis that OOPEH does not Granger cause HO is rejected and the alternative hypothesis accepted. Also with the p-value of 0.2927 at 5% significance level, revealed a no causal relationship running from HO to OOPHE i.e. no causality exists from HO to OOPEH. According to this finding, the level of out-of-pocket health spending is affected by the rise in health outcomes, but the level of health outcomes in Nigeria is unaffected by out-of-pocket health spending. This suggests that out-of-pocket medical expenses in Nigeria have little long-term influence on health outcomes this also is in tandem with Nakovics et al. (2020).

4.5. Discussion of findings

The estimated result showed that there was a correlation between financial inclusion and out of pocket in Nigeria which is in accordance with the a priori expectation. This implies a positive relationship between the variables. The estimated result on the influence of financial inclusion and out of expenditure on life expectancy in Nigeria also demonstrated that in Nigeria, there was a positive correlation between financial inclusion and out-of-pocket spending on health outcomes across all factors. These outcomes validate Grossman (1972) health investment framework. The study revealed existence of a long-run relationship among financial inclusions, out of pocket

expenditure and health outcomes. Financial inclusion, out-of-pocket expenditure, government expenditure on health, gross domestic product per capita all have positive short run significant impact on health outcomes, meaning that all the variables have a bigger association and influences good health in the short run, while financial inclusion, government expenditure on health, and GDP per capita had a long run significant impact on health outcomes and out-of-pocket expenditure and education do not significantly impacted on health outcomes in the long run this may be that in the long run, an increase in out-of-pocket expenditure may raise the financial risk and thus act as obstacles to healthcare services..

Also, the result indicated that there is a bidirectional causality relationship running from financial inclusion to life expectancy at 5% level of significance and vice-versa. This result revealed that life expectancy is affected by the increase in financial inclusion indicating synergy and complementarity, meaning that life expectancy is influenced by the level of financial inclusion in Nigeria. In the case of out-of-pocket expenditure, the result indicates a unidirectional causality running from out-of-pocket expenditure to life expectancy. This result revealed that life expectancy is influenced by the rate of change in out-of-pocket expenditure on health in Nigeria.

Conclusion

This bound test results revealed the existence of long-run relationship among financial inclusions, out of pocket expenditure and health outcomes in Nigeria. ARDL long run dynamics showed that FI, GEH, and GDP had a long run relationship and OOPEH and EDU do not exhibit long-run relationship. The short-run analysis also revealed a positive significant impact of the variables on HO. The study further revealed a unidirectional causality from out-of-pocket expenditure to life expectancy and a bidirectional causality from financial inclusion to life expectancy and vice-versa. To this end, the study recommends that financial structure be integrated into Nigeria's health policies and strategies and that financial institutions be held accountable for their actions. This will help people better understand the complex relationships between financial structure and health outcomes, thus leading to an enhancement of the financial structure's quality.

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