INNOVATIONS

Financial deepening and health outcome in Nigeria

*Ugherughe, Joseph Ediri Ph.D., Akakabota, Eta Edward Ph.D. and Alagba, Ogheneochuko Samuel Ph.D.

Department of Banking and Finance,
Faculty of Management and Social Sciences,
Dennis Osadebay University,
Asaba

*Corresponding Author: Ugherughe, Joseph Ediri (ugherughejosephediri@yahoo.com)

Abstract

The study looked at the impact of financial deepening on Nigerian health outcomes. To achieve this research objective, relevant data was sourced from the Central Bank of Nigeria (CBN) statistical bulletin and the United Nation Development Programme (UNDP) Database for the period from 1986 to 2018. The study used life expectancy at birth (LE_{AB}) as a proxy for health outcomes as the dependent variable and the ratio of Broad Money Supply (M_2) to Gross Domestic Product (GDP), the ratio of Credit to the Private Sector (CPS) to Gross Domestic Product (GDP), the ratio of Total Deposit (TD) to Gross Domestic Product (GDP), and the ratio of Total Loan (TL) to Gross Domestic Product (GDP). Furthermore, specific characteristics of a country, such as the inflation rate and lending interest rates, were introduced as independent variables that cannot act alone. The results of the ordinary least square results show that the F-statistics and probability of the independent variables have a positive, significant impact on the dependent variable. The coefficient of determination, R^2, is 86%, indicating that the estimated model has predictive power, and the Durbin-Watson statistic is close to 2, indicating that serial autocorrelation does not exist in the estimated model. The study thus recommends, among other things, that the government continuously reform the financial sector, the private sector to improve employee health, increase money supply while keeping inflation in mind, and make the money market more investment oriented and friendly by limiting lending interest rates to one digit, as seen in the world's economies.

Keywords: 1.Financial Deepening 2. Health outcomes 3. Ordinary Least Square 4.Nigeria.

Introduction

The health sector of any nation cannot be over-emphasized in terms of the amount of funds channeled into it. Financial deepening is one of the mechanisms that broaden people's options by providing them with income-generating opportunities as well as competitive options for obtaining health insurance services.Finance matters for growth and human capital accumulation given its special role in bridging the gap between saving and deficit units. Financial intermediaries channel funds to those areas where resources can be allocated efficiently (Levine, 2004). He argues that a well-functioning financial system contributes to the economy by performing the following functions.The effect of financial development on healthy capital accumulation runs through income growth and poverty reduction. Financial intermediation becomes especially important for getting better health care when families are liquidity constrained, says Dr. John O'Mara Ogbono from the World Health Organization.For individuals, gross investments in health are produced by household production functions that relate the output of health to inputs such as medical care utilization, diet, exercise, cigarette smoking, and alcohol consumption. These might include cheaper health insurance, cheaper loans to finance education, and better housing.Financial intermediation can play an important role in promoting better health through income-generating opportunities. Income-generative opportunities for families are important from the very beginning of the child's health development process (Violato, Stavros, Ron & Maggie, 2011). Financial intermediation is a key part of the fight against child poverty in Canada.Financial development affects life expectancy via better health. Easier access to finance leads to income-generating opportunities easily for lower-middle-income class families. For those already their enterprises, finance provide an additional avenue to expand entrepreneurial skills. According to the World Health Organization, there is a need to invest in the development of the financial sector. The effect of financial development can be seen in better diets, medical care, awareness, and self-satisfaction. We can also present this in a logical framework whereby the effect is seen in a better diet and better medical care for health.

Figure 1: From Finance to Health

Financial System

i. Insurance
ii. Credit Access
iii. Savings Mobilisation

↓

i. Health Insurance
ii. Income
iii. Education
iv. Social Status

↓

i. Medicare
ii. Better Diet
iii. Awareness
iv. Self Satisfaction

Source: Claessens and Feijen (2006)

Income effect: The financial system offers income-generating opportunities and access to insurance, credit, and savings. There may be a higher prevalence of health care expenses for poor families because of the lack of past health care treatment and poor living conditions. Health insurance makes it possible to treat diseases and take precautionary measures.

Educational effect: Financial services may contribute to attaining the better future health of households through the education of their children. School returns could go up through better health care and reduced undernourishment, according to the World Health Organisation report on child malnutrition in Kenya.

Infrastructure Development: Financial development also contributes to developing infrastructures such as transportation, electricity, schools, trained health workers, and hospitals. These activities increase employment and income-generating opportunities for the country's economy. The government of Zambia aims to improve access to financial services in the country.

Risk Management: Finance can contribute to better health and a long life through access to credit in times of crisis, and the provision of insurance to mitigate future risks. The purpose of this research is to study the effect of financial deepening on health outcomes in Nigeria.

Based on the facts enumerated above and the 2007/2008 global financial crisis, policymakers have been forced to become more vigilant in managing the financial system. Thus, this study is aimed at analysing the effect of financial deepening on health outcomes in Nigeria from 1986 to 2018.

The main objective of this study was to examine the effect of financial deepening on health outcomes in the Nigerian economy. The specific objectives are to: assess the effect of the ratio of Credit to the Private Sector (CPS) to Gross Domestic Product (GDP) [CPS/GDP] on the health outcomes in the Nigerian economy; examine the effect of the ratio of Money Supply (M_2) to GDP (M_2/GDP) on the health outcomes in the Nigerian economy; assess the effect of the ratio of Total Deposit (TD) to Gross Domestic Product (GDP) [CPS/GDP] on the health outcomes in the Nigerian economy; and examine the effect of the ratio of Total Loan (TL) to GDP (TL/GDP) on the health outcomes in the Nigerian economy.

The rest of the study is structured into four main sections, namely: Section 2: a literature review with subheadings of a conceptual framework, theoretical framework, and empirical reviews. Section 3: material and methods, in which the study delves into research design, methods of data collection, the technique of data analysis, model specification, and a priori expectations, while Section 4 deals with data analysis and discussion of findings. Finally, Section 5 concludes the study with a conclusion and recommendations.

Review of Literature

Concept of health outcome and financial deepening

Health outcome is a change in health that from measures or explicit social insurance ventures or mediations. Health outcomes incorporate: forestalling demise after a coronary episode through in-emergency clinic care (World Bank, 2019).

Put simply, in Sub-Saharan Africa, a number of patients pass on as a result of money to pay for surgeries and anesthesia care because of a lack of funds. Illnesses associated with surgery and anesthesia care for the poor in society are sometimes spiritual attacks and witchcraft-related. Patients in this category are either allowed to die or taken to a spiritual place of worship or an herbalist.

Although the majority of governments in the region have implemented health insurance schemes, these are primarily for civil servants and those working in government agencies. The services are limited to the operator, their spouse, and three children and, in some cases, parents and extended family are excluded. Financial deepening, paradoxically and happily, can be an escape route from this impoverishment in health expenditure.

Financial deepening, for the most part, implies an expansion in the proportion of cash supply to GDP or some value list. It alludes to liquid cash. The greater the availability of liquid cash in an economy, the more opportunities for development. The "adaptation proportion" and the "intermediation proportion" are two fundamental quantitative pointers used to estimate the size of the money-related area. The adaptation proportion incorporates cash-based pointers or liquid liabilities like the expansive cash supply to GDP proportion, the intermediation proportion comprises markets concerned with bank-based estimates like bank credit to the private area and capital market-based estimates, for example, the capitalization proportion of the securities exchange. Financial deepening is estimated by the proportion of gross residential capital development to GDP and the proportion of gross local savings to GDP.

Theoretical literature

Theories have established that a relationship exists between financial deepening as a financial development and health outcomes as economic development. In their studies, Schumpeter (1934), Goldsmith (1969), McKinnon (1973), and Shaw (1973) all emphasized the role of a financial institution as an intermediary in economic growth. In the same vein, Greenwoods and Jovanovich (1990) observed that financial institution development can lead to improved health outcomes. In a related study, Grossman’s model (2000), explains that the financial development of an economy contributes to health outcomes vis-a-vis economic growth by channeling savings to good health care facilities and reducing the death rate and/or mortality rate and a healthy workforce. They concluded that financial deepening leads to development as a result of a healthy workforce. Based

on this assertion, this study examines the extent to which financial deepening and listings affect health outcomes in Nigeria.

Theoretical framework

This research study is theoretically underpinned by the Grossman model (2000). Similarly, existing literature shows that the health model of Groossman has been applied to examine the impact of financial deepening on health outcomes in other countries, especially the Organisation for Economic Cooperation and Development (OECD) through the provision of funds (Arturo & Sandhya, 2018; Serdar, 2015; Alenoghena, Enakali-Osoba, & Mesagan, 2014; Gunakar, 2013).

Empirical review

Private Sector Credit (PSC)/GDP and Health Outcomes

Taofeek and Olumuyiwa (2016) conducted a threshold analysis of Nigeria's financial development and inclusive growth from 1980 to 2013. They used quartile regression and the Granger Causality Test with GDP as the dependent variable and Trade Openness (TOP), credit to the private sector, and broad money (M2) as ratios of GDP, (CPS GDP) and (M2 GDP) as financial development indicators, financial openness (FOP), government consumption (GCONS), FDI, gross fixed capital formation (GFCF), and inflation as the independent variables. Their findings demonstrate 90th percentile threshold and uni-directional causality through inclusive growth rather than financial development, as measured by the financial deepening measure, according to the Granger causality test.

From 1997 to 2016, Nwafor & Yomi (2016) evaluated the economic impact of financial deepening in Nigeria. He used the two-staged Least Squares Regression approach (OLS) with GDP as the dependent variable (percentage change in GDP/GDP growth rate) and M2/GDP and CPS/GDP as independent variables. Financial deepening has a major impact on economic growth, according to their findings.

Mumeen, Sheriffdeen, Ibrahim, and Olumuyiwa (2018) looked at the impact of financial deepening and foreign direct investment on Nigerian output performance from 1980 to 2015. Because domestic credit to the private sector by banks (CPS), money supply (MS), and market capitalization (MCP) are used to measure financial sector development, they used the statistical tool of the Autoregressive Distributed Lag (ARDL) Bound Test approach with GDP as the dependent variable and the independent variables of financial sector development (FSD), and foreign direct investment (FD).Foreign direct investment and market capitalization as a proportion of GDP had a considerable impact on output performance in both the short and long run, according to their findings.

Money Supply (M_2)/GDP and Health Outcomes

Serdar (2015) used a Federal–Ram approach to look at the government's health spending and economic development in Turkey from 2006:01 to M10. With GDP as the dependent variable and government health expenditure as the independent variable, he employed the Federal–Ram model. The findings of this study reveal that, in general, government health expenditures have a favorable and large direct influence on economic growth in Turkey, whereas their indirect impact is negative and significant.

For the period 1981 to 2012, Alenoghena, Enakali-Osoba, and Mesagan (2014) empirically evaluated the financial deepening and performance of the Nigerian capital market. They used VECM to analyze stock market performance, with the GDP growth rate, financial development, limited money diversification, and savings growth rate as independent factors. NMD and SAVR had a considerable impact on the performance of the Nigerian stock market during the research period, according to their findings.

Osuka, Ihejirika, and Chinweze (2018) used VECM to investigate human capital development in Nigeria and whether financial deepening matters. They used the Human Development Index (HDI) as the dependent variable and the independent variables of the Credit to Private Sector to GDP ratio (CPS/GDP), Broad Money Supply to GDP ratio (M2/GDP), and Market Capitalization to GDP ratio (MC/GDP). Their research revealed that unidirectional causality exists between FD and HCD, and as a result, they argued that FD is vital and beneficial in improving Nigeria's human capital.

From 1981 through 2013, Luka, Akila, Samson and Lugu objectively researched Nigeria's financial deepening and economic progress. They used OLS and VECM using GDP as the dependent variable. The ratio of money supply to gross domestic product (M2/GDP), the ratio of credit to the private sector to gross domestic product (CPS/GDP), trade openness (TROP), and the rate of inflation are the independent variables (INFLA). Their research demonstrates that the financial system has failed to maintain effective financial intermediation, particularly credit allocation and a high level of monetization.

Dabwor and Abimiku (2016) investigated the prevalence of poverty in Nigeria by asking, "Does financial deepening matter?" The study covered the years 1990 through 2013. They used OLS to calculate the ratio of broad money supply to GDP (RM2/GDP), the ratio of credit to the private sector to GDP (RCP/GDP), the ratio of stock market capitalization to GDP (RMC/GDP), the ratio of total stock traded to GDP (RST/GDP), and the ratio of foreign direct investment in equities (RFE/GDP) as dependent variables. The study concludes that the coefficient of the broad money supply to GDP reduces the poverty rate in Nigeria, based on the estimated parameters.

Total Deposit (TD)/GDP and Health Outcomes

Gunakar (2013) used the OLS-Fixed effect methodology to examine financial development and health capital accumulation in 27 OECD countries from 1990 to 2010, utilizing data on life expectancy as the dependent variable and credit, LIQLAIB, MKTCAP, and unemployment as the independent variables. His findings suggest that financial development has a greater impact on health outcomes in underdeveloped countries. This shows that in these nations, financial development has a better rate of return on health outcomes.

Iorember (2016) used the statistical method of VECM in the framework of VAR to investigate Nigeria's financial depth and economic growth from 1981 to 2011. He utilizes real GDP as a dependent variable and the ratio of broad money to GDP, the index of openness, the deposit rate, and market capitalization as independent variables. In the short run, there is a considerable causal association between financial deepening and economic growth in Nigeria, according to his findings, which indicate a bi-directional relationship between the ratio of broad money to GDP and real gross domestic product.

From 1981 through 2016, Igwebuike, Udeh, and Okonkwo (2019) investigated the effects of financial deepening on Nigerian economic growth. They used OLS with GDP as the dependent variable and the ratios of insurance industry premiums to GDP (INSP/GDP), savings accumulated to GDP (SA/GDP), credit to the private sector by commercial banks to GDP (CTPS/GDP) as independent variables. According to their findings, commercial bank credit to the private sector has a considerable effect on GDP, whereas insurance industry premiums have no significant effect on GDP in Nigeria.

From 2006 to 2011, Lameck (2012) investigated financial deepening and its effects on savings and investments in Kenya. He used OLS with the dependent variable of Financial Deepening (FD) and the independent variables of X1; Savings (gross national savings) as a percentage of GDP; and X2; Investments (direct and capital investments and other investments) as dependent variables. The two independent factors and financial deepening have a definite inverse relationship, according to his research.

Total Loan (TL)/GDP and Health Outcomes

Arturo and Sandhya (2018) used a geographical scope of 27 middle-income economies and 24 high-income economies from the Organisation for Economic Cooperation and Development in their study "Comparing the income elasticity of health spending in middle-income and high-income countries: The role of financial protection" (OECD). They used OLS, with health spending as the dependent variable and per capita income, life expectancy, and infant mortality as the independent variables. The relationship between per capita health expenditure and GDP growth is positive and statistically significant across sampled middle-income (51 per unit-growth in GDP) and high-income nations, according to their findings (50 per unit-growth in GDP).

Using a multivariate methodology, Anuli and Ewubare (2019) investigated the implications of financial deepening for macroeconomic volatility and economic development in Nigeria from 1986 to 2012. They used an ex-post facto study design that included a VECM multivariate model (MVA). The dependent variable is the percentage of Real Gross Domestic Product (RGDP) — a proxy for economic growth – while the independent variables are Exchange Rate Volatility (EXRV), Growth Volatility (GDPV), and the Consumer Price Index (CPI) as a control variable. Their VECM results reveal that financial deepening has both a long-run and short-run impact on economic growth. There is no causation between the financial deepening variable, economic growth, and growth volatility, according to the causal results.

Maduka (2012) looked at the influence of financial deepening on Nigerian domestic investment from 1970 to 2008. He uses the dependent variable of domestic investment (DI) as well as the independent variables of per capita GDP (PCG), human development index (HDI), foreign direct investment (FDI), financial deepening (FD), inflation rate (INFLR), real exchange rate (RER), and population growth rate in the VECM statistical tool (POPR). Financial deepening has no major influence on domestic investment in Nigeria, according to the findings of the study.

Material and Methods

This section discusses the research approach used in this study. This comprises the research design, sample size and data collection method, model specification, and data analysis procedures.

Research design:

The research design for this study is an ex-post-facto study. This research design reveals how the independent variables have a major impact on the dependent variable. It also depicts the causal relationship that exists between the dependent and independent variables. Because it does not allow for alterations, this design is ideal for this type of investigation.

Method of data collection:

The World Bank Database was used to compile the data for this study, which spans the years 2000 to 2019.

Method of data analysis:

The study uses descriptive statistics to examine the statistical properties of the variables, as well as the Augmented Dickey-Fuller (ADF) unit root test for stationarity, the Johansen Co-integration test for long-run equilibrium relationships among the variables, the Granger Causality test for directions of the dependent and independent variables, and OLS-Ordinary Least Squares (i.e. NLS-Nonlinear Least Sq) test for directions of the dependent and independent variables.

Econometric-views are used for all statistical approaches. These statistical techniques were chosen because they were applicable to this investigation.

Model specification:

The dependent and explanatory variables are determined based on the theoretical sign and size of the parameters stated in the model specification. The study used the Igwebuike, Udeh, and Okonkwo (2019) model to examine the impact of financial deepening on Nigeria's economic growth. Their model was as follows:

GDP = f (INSPT/GDP, SAT/GDP, CTPST/GDP)..... Model 1

Where:

GDP = Gross Domestic Product (Dependent variable).
INSPT/GDP = the ratio of insurance industry premiums to GDP (independent variable).
SAT/GDP = the ratio of savings accumulation to GDP (independent variable).
CTPST/GDP = the ratio of credit to the private sector by commercial banks to GDP (independent variable).

For this study, the above model has been modified to suit the variables of this study. Therefore, the re-modified model for this study is stated as:

$LE_{AB} = f$ (CPS/GDP, M_2/GDP, TD/GDP, TL/GDP, INFR, LINR)..... Model 2

The linear or mathematical equation for the modified model of Igwebuike, Udeh and Okonkwo (2019) is stated thus:

$LE_{AB} = ß_0 + ß_1$CPS/GDP $+ ß_2M_2$/GDP $+ ß_3$TD/GDP $+ ß_4$TL/GDP $+ ß_5$INFR $+ ß_6$LINR $+ \mu$..... Equation 1

Where:

LE_{AB} = Life expectancy at birth, total (year)
CPS/GDP = Ratio of credit to the private sector to the gross domestic product.
M2/GDP = Ratio of money supply to gross domestic product.
TD/GDP = Ratio of total deposits to gross domestic product.
TL/GDP = Ratio of total loans to gross domestic product.
INF = Inflation rate, as a control variable.
LINR = Lending interest rate, as a control variable.
μ = Stochastic or error term.

The study model used health outcomes (LEAB) as a dependent variable, whereas Igwebuike, Udeh, and Okonkwo (2019) used Gross Domestic Product (GDP) as a dependent variable. The inclusion of M2/GDP, TD/GDP, TL/GDP, INFR, and LINR, which were not included in the Igwebuike, Udeh, and Okonkwo (2019) model, is another unique feature of this study.

A priori expectation:

Except for inflation and loan interest rates, we expect all independent variables to have a direct and positive connection with the dependent variable. Except for inflation and loan interest rates, a 1% increase or decrease in any independent variable will result in a comparable increase or reduction in the dependent variable. This can be represented mathematically as follows: $ß_1$, $ß_2$, $ß_3$, and $ß_4 > 0$; $ß_5$ and $ß_6 < 0$.

Result of the Findings

Descriptive statistics

Table 1 shows the characteristics of the variables in this investigation. The descriptive statistics include the mean, median, maximum, minimum, kurtosis, Jarque-Beran probability, and observations. When the values are ordered in ascending or descending order, the mean is the average value of the series; when the values are arranged in ascending or descending order, the median is the midpoint value of the series. The highest and lowest values of each series are represented by the maximum and minimum values. The kurtosis is a graphical representation of the peak of the series. The Jarque-Beran probability is used to confirm the series' normalcy, while the observations reveal how many series there are.

Table 1: Descriptive statistics

Statistical Tools	LE_{AB}	CPS/GDP	M2/GDP	TD/GDP	TL/GDP	INFR	LINR
Mean	48.43515	11.69485	14.70515	1.484592	1.910540	19.91939	18.99000
Median	46.84000	8.260000	13.13000	0.112420	0.141112	12.22000	17.95000
Maximum	54.33000	20.77000	21.31000	12.94362	18.51433	72.84000	31.65000
Minimum	45.84000	6.220000	9.150000	0.034459	0.059468	5.380000	9.960000
Kurtosis	1.984130	1.628903	1.630448	9.578144	11.29233	4.215287	5.286788
Jarque-Bera Probability	0.116502	0.079953	0.181783	0.000000	0.000000	0.000287	0.002553
Observations	33	33	33	33	33	33	33

Source: Researcher's Computation from E-Views.

LE_{AB}: This is shown in the second column of table 1 with a mean of 48.44 and a median of 46.84 for the year 2004. The highest value was 54.33 in 2018, while the lowest was 45.84 in 1994. The slope is mesokurtic, as indicated by the kurtosis of 1.98.The Jarque-Bera probability is 0.12, indicating a normalcy level of 10%. The consistent rise in the LE_{AB} index can be ascribed to increased health as a result of democracy's dividend and the World Health Organization's (WHO),

2011 advocacy of the need for enhanced health facilities in rising markets around the world, particularly in Africa.

CPS/GDP: The ratio of credit to the private sector to GDP (CPS/GDP) is shown in the third column of table 1. In 2005, the mean was 11.69485, while the median was 8.26. These metrics of tendency to the center are quite outstanding. On average, 1169 percent of the CPS contributed to GDP across the study period, and when the statistics are organized in ascending or descending order, the middle range of 826 percent is reached. The highest value of 20.77 was recorded in 2016 and the lowest value of 6.22 was recorded in 1995. This demonstrates a consistent upward trend across the years under consideration. The kurtosis is measured as a mesokurtic slope with a value of 1.628903, and the Jarque-Bera probability is 0.079953, indicating 10% normalcy. This encouraging forecast could be due to financial sector reforms that have stimulated lending to the economy's small and medium-sized businesses.

M_2/GDP: The M2/GDP is found in column four of table 1. In 1993, the mean score was 14.70515 and the median value was 13.13. In 2016, the maximum value was 21.31, with a minimum of 9.15 in 1996. The slope is mesokurtic, as indicated by the kurtosis of 1.630448.The Jarque-Bera probability is 0.181783, indicating a 10% normalcy. The effect of various banking reforms on the financial reform process can be linked to the variation in the M2/GDP numbers for the time under investigation.

Table 1's fifth column contains the TD/GDP ratio. In 2012, the mean was 1.484502, and the median was 0.112420. In 1996, the highest value was 12.94362, and the lowest was 0.034459 in 1997. This demonstrates a consistent upward trend across the years under consideration. Kurtosis is calculated as a leptokurtic slope of 9.578144, and the Jarque-Bera probability is 0.0000, indicating a normality of 5%. This positive outlook may be due to large deposits from aggressive financial services marketing as a result of the country's financial deepening throughout the study period.

TL/GDP: This can be found in table 1's sixth column. In 2010, the mean value was 1.910540, while the median value was 0.141112. In 1996, the highest value was 18.51433, and the lowest was 0.059433 in 1998. This demonstrates a consistent upward trend across the years under consideration. Kurtosis is calculated as a leptokurtic slope of 11.29233, and the Jarque-Bera probability is 0.0000, indicating a normality of 5%.This bleak forecast could be due to bottleneck policies in the financial sector's loan administration.

INF: This can be found in table 1's seventh column. In 2012, the mean rate was 19.91939, with a median of 12.22. The maximum rate of 72.84 was recorded in 1995, and the lowest rate of 5.38 was recorded in 2007. This demonstrates a consistent upward trend across the years under consideration. Kurtosis is calculated as a leptokurtic slope of 4.215287, and the Jarque-Bera probability is 0.000287, indicating a normality of 5%.This rate of inflation can be attributed to the depreciation of the naira and a decrease in manufacturing sector output, i.e. inflation caused by government actions.

LINR: This is presented in the eighth column of table 1 with a mean of 18.99 and a median of 17.95 for the year 2005. The highest rate was 31.65 in 1993, and the lowest was 9.96 in 1986. This demonstrates a consistent upward trend across the years under consideration. The kurtosis is measured as a leptokurtic slope with a value of 5.286788, and the Jarque-Bera probability is 0.002553, indicating 10% normalcy. The lack of loan-able funds on the part of banks as a result of the central bank's reserve ratio regulations can be attributed to this lending interest rate.

Augmented Dickey-Fuller (ADF) unit root test

The stability of the variables was tested using an Augmented Dickey-Fuller (ADF) unit root test. Except for the country's particular, the ADF tests were conducted at levels. The decision rule is to reject stationary if ADF statistics are more than the value of critical values at 1%, 5%, and 10% in absolute terms, and to accept stationary if ADF statistics are less than the critical value at 1%, 5%, and 10% in absolute terms. According to Kozhan (2010), one can proceed to estimate the variables if the results of the variables are stationary at 1 (0). The results of the ADF test are shown in table 2 below.

Table 2: Augmented Dickey-Fuller (ADF) unit root test

Variables	ADF Statistics	1% Critical Values	5% Critical Values	10% Critical Values	Order of Integration	Level of Significance
LE_{AB}	-1.809848	-3.689194	-2.971853	-2.625121	1(0)	0.3682
CPS/GDP	-0.525789	-3.670170	-2.963972	-2.621007	1(0)	0.8725
M_2/GDP	-0.991512	-3.653730	-2.957110	-2.617434	1(0)	0.7443
TD/GDP	-2.507749	-3.653730	-2.957110	-2.617434	1(0)	0.1231
TL/GDP	-2.648500	-3.653730	-2.957110	-2.617434	1(0)	0.0942
INFR	-2.660803	-3.737853	-2.991878	-2.635542	1(1)	0.0954
LINR	-3.340240	-3.653730	-2.957110	-2.617434	1(1)	0.0212

Source: Researcher's Computation from E-Views.

The Augmented Dickey-Fuller unit root test for stationarity of the variables is shown in Table 2. The results demonstrate that the ADF statistics values for LEAB, CPS/GDP, M2/GDP, and TD/GDP are -1.809848, -0.525789, -0.991512, and -2.507749, respectively, which are less than 1%, 5%, and 10% critical level values in absolute terms. The ADF statistical values for TL/GDP and INFR are -2.6485 and -2.660803, respectively, which are less than 1% and 5% critical values in absolute terms but larger than 10% critical values in absolute terms. The ADF statistic value for LINR is -3.340240, which is less than 1% critical in absolute terms but more than 5% and 10% critical values in absolute terms. The results show that the variables associated with financial deepening are stationary at 1. 0 (0).As a result, ordinary least square data estimates can be used in data analysis.

Johansen Co-integration test

For each of the models in the study, the Johansen co-integration test is used to determine whether there is a long-run relationship between the variables. There are two sorts of co-integration tests in the Johansen co-integration test. Unrestricted co-integration, rank test (Trace) and unrestricted co-integration, rank test (Trace) are the two methods (Maximum Eigenvalue). The decision rule, according to Johansen (1991), is to accept the null hypothesis if the critical value's probability is larger than the 5% level of significance. Otherwise, the null hypothesis is rejected.

Table 3: Johansen Co-integration Test

Hypothesized No of CE(s)	Eigenvalue	Unrestricted Cointegration Rank Test (Trace)			Unrestricted Cointegration Rank Test (Maximum Eigenvalue)		
		Trace Statistics	5% Critical Value	Prob.**	Maximum Eigenvalue Statistics	5% Critical Value	Prob.**
None *	0.979324	328.5345	125.6154	0.0000	120.2416	46.23142	0.0000
At most 1 *	0.940555	208.2929	95.75366	0.0000	87.50376	40.07757	0.0000
At most 2 *	0.896652	120.7891	69.81889	0.0000	70.35918	33.87687	0.0000
At most 3 *	0.502311	50.42993	47.85613	0.0281	21.63118	27.58434	0.2399
At most 4	0.411219	28.79875	29.79707	0.0648	16.42074	21.13162	0.2012
At most 5	0.310479	12.37801	15.49471	0.1397	11.52451	14.26460	0.1298
At most 6	0.027157	0.853497	3.841466	0.3556	0.853497	3.841466	0.3556

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level
Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
*** denotes rejection of the hypothesis at the 0.05 level**
****MacKinnon-Haug-Michelis (1999) p-values**

Source: Researcher's Computation from E-Views.

The model evaluated the null hypothesis of no co-integration on the premise of a linear deterministic trend for the long-run association between financial deepening variables CPS/GDP, M_2/GDP, TD/GDP, and TL/GDP and LE_{AB}, a proxy for health results. LE_{AB}, M_2/GDP, TD/GDP, TL/GDP, INR, and LINR (INR and LINR are country-specific) are all included in the model. Table 3 displays the results of the co-integration. The Trace probability yielded four (4) co-integration equations, while the Maximum-Eigen probability yielded three (3) co-integration equations. The results are based on the probability of critical values with a degree of significance of less than 5%. The study then concludes that the variables in the model are co-integrated. This implies that in Nigeria, there is a long-term link between financial deepening and health outcomes.

Correlations

The link between dependent and independent variables is investigated using correlation analysis. It assesses the relationship between two variables on a linear scale. Its values range from -1 to +1. +1 implies that two variables have a positive linear relationship and are perfectly related, whereas -1 shows that two variables have a negative linear relationship and are not completely related. There is no linear relationship if the value is zero.

Table 4: Correlations

	LE_{AB}	**CPS/GDP**	**M_2/GDP**	**TD/GDP**	**TL/GDP**	**INFR**	**LINR**
LE_{AB}	1						
CPS/GDP	0.9264	1					
M_2/GDP	0.8932	0.9517	1				
TD/GDP	-0.4149	-0.3968	-0.4619	1			
TL/GDP	-0.3841	-0.3751	-0.4448	0.9945	1		
INFR	-0.3959	-0.3356	-0.3407	0.6542	0.6169	1	
LINR	-0.4104	-0.3553	-0.3031	0.2948	0.2411	0.4202	1

Source: Researcher's Computation from E-Views.

The coefficient of the type of relationship that exists between the independent factors and the dependent variable is shown in Table 4. The coefficients for CPS/GDP and M_2/GDP are 0.9264 and 0.8932, respectively, indicating that they have a strong positive correlation with LE_{AB}. This means that a unit rise in CPS/GDP and M_2/GDP in Nigeria would have the same proportionate effect on LE_{AB}. The coefficients for TD/GDP, TL/GDP, INFR, and LINR were -0.4149, -0.3841, -0.3959, and -0.4104, respectively, indicating that they had a weak negative correlation with LE_{AB}, implying that an increase in TD/GDP, TL/GDP, INFR, and LINR would have a negative impact on LE_{AB} in Nigeria.

Pair-wise Granger causality tests

The direction of the variables in the specified model is determined using a pair-wise Granger causality test. Bidirectional, unidirectional, or no-direction directions are all possibilities. When the F-probability is greater than the 5% level of significance, the decision rule is to accept the null hypothesis. Otherwise, the null hypothesis should be rejected.

Table 5: Pair-wise Granger causality tests

Null Hypothesis:	Obs.	F-Statistic	Prob.	Remark
CPS/GDP does not Granger Cause LE_{AB}	31	1.47729	0.2468	No Causality
LE_{AB} does not Granger Cause CPS/GDP		5.38279	0.0111	Unidirectional Causality
M_2/GDP does not Granger Cause LE_{AB}	31	0.28225	0.7564	No Causality
LE_{AB} does not Granger Cause M_2/GDP		5.54639	0.0099	Unidirectional Causality
TD/GDP does not Granger Cause LE_{AB}	31	1.09518	0.3494	No Causality
LE_{AB} does not Granger Cause TD/GDP		1.73774	0.1957	No Causality
TL/GDP does not Granger Cause LE_{AB}	31	0.81748	0.4526	No Causality
LE_{AB} does not Granger Cause TL/GDP		1.72954	0.1972	No Causality

Source: Researcher's Computation from E-Views.

The Pair-wise Granger causality test for the model is shown in Table 5. A unidirectional causality flows from LE_{AB} to CPS/GDP and M_2/GDP, according to the decision rule. As a result, the findings revealed that:

i. The relationships between TD/GDP, TL/GDP, and LE_{AB} are not causative.

ii. From LE_{AB} to CPS/GDP and LE_{AB} to M_2/GDP, there is a unidirectional causality.

As a result, the analysis concludes that in Nigeria, there is only a causal association between LE_{AB}, CPS/GDP, and M_2/GDP.

Ordinary Least Square (OLS)

The study employed a panel of multiple regression analysis with the Ordinary Least Squares (OLS) estimation method to assess the impact of financial depth on LEAB as well as to test the hypotheses presented. The OLS result for the formulated model is presented below. We accept the null hypothesis if the E-View Prob. Value is larger than (>) the chosen level f-significance (0.05), but we accept the alternative hypothesis if it is not.

Table 6: Ordinary Least Square (OLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	43.03725	1.760590	24.44480	0.0000
CPS/GDP	0.393687	0.127589	3.085595	0.0048
M_2/GDP	0.111893	0.178954	0.625257	0.5373
TD/GDP	-0.748669	0.847944	-0.882923	0.3854
TL/GDP	0.533380	0.583012	0.914870	0.3687
INFR	-0.007977	0.016459	-0.484631	0.6320
LINR	-0.031611	0.066584	-0.474758	0.6389
R-squared	0.875791	Mean dependent var		48.43515
Adjusted R-squared	0.847127	S.D. dependent var		2.950641
S.E. of regression	1.153671	Akaike info criterion		3.309606
Sum squared resid	34.60486	Schwarz criterion		3.627047
Log likelihood	-47.60850	Hannan-Quinn criter.		3.416415
F-statistic	30.55399	Durbin-Watson stat		1.622569
Prob(F-statistic)	0.000000			

Source: Researcher's Computation from E-Views.

The results of the estimated model using the ordinary least square (OLS) technique were evaluated in table 6 to indicate the impact of each of the financial deepening variables on Nigeria's health outcomes. With a probability of 0.0048 and a coefficient of 0.393687, the results reveal that CPS/GDP has a considerable beneficial impact on health outcomes in Nigeria. M2/GDP and TL/GDP have an insignificant positive impact on health outcomes in Nigeria, with probabilities of 0.5373 and 0.3687, and coefficients of 0.111893 and 0.533380, respectively, but TD/GDP has an insignificant negative impact with a probability of 0.3854 and a coefficient of -0.748669. With a likelihood of 0.6320 and 0.6389 and a coefficient of -0.007977 and -0.031611, respectively, the country's characteristics of INFR and LINR have a minor negative impact on health outcomes in Nigeria.

The R-squared (R2) coefficient of determination is 0.875791, indicating that variation in the financial deepening indicators and country specifics of CPS/GDP, M2/GDP, TD/GDP, TL/GDP, INFR, and LINR account for nearly 88 percent of the changes in health outcomes in Nigeria. The F-statistic explains the overall impact of financial deepening variables and country-specific factors on health outcomes. The F-statistic is 30.55399, with a probability value of 0.0000 and a level of significance of less than 5%. The study shows that financial deepening variables have a significant impact on health outcomes in Nigeria based on the F-probability. Although the Durbin-Watson coefficient is 1.622569 and is around 2, the model is autocorrelation-free.

Conclusion and Recommendations

Conclusion

According to our findings, some financial deepening indicators had a significant impact on life expectancy at birth in Nigeria, while others had a negligible impact. There is also no autocorrelation between the variables. This demonstrates that the results' reliability has been established.

The Johansen co-integration test revealed that the variables have at least three co-integration equations. In Nigeria, the ratio of credit to the private sector to gross domestic product (CPS/GDP) and life expectancy at birth (LEAB), the money supply to gross domestic product (M2/GDP) and LEAB, and the total deposit to gross domestic product (TD/GDP) and LEAB are the figures to look out for. This implies that there is a long-run association between the variables of CPS/GDP, M2/GDP, and TD/GDP and life expectancy at birth as a proxy for health outcomes.

The financial deepening indicators CPS/GDP and M2/GDP have a causal link with the health results (Life expectancy at birth) in Nigeria, according to the pair-wise Granger causality test. The financial deepening metrics TD/GDP and TL/GDP do not have a causal link, according to the Granger causality test. The study concludes that improvements in health outcomes led to an increase in the ratio of CPS to GDP, as well as an increase in the ratio of M2/GDP in Nigeria. The financial deepening indicators, which are part of the model for Nigeria, have a considerable positive impact on health outcomes, according to the ordinary least square results.

Recommendations

Financial deepening, according to the findings, is a bright-spark for health outcomes in Nigeria, and as a result, the importance of the government implementing various contribution schemes for health delivery would have become feasible and successful with the implementation of the following recommendations.

i. In terms of the CPS/GDP, the study proposes that continual reforms be implemented to provide more robust credit lines for the private sector in Nigeria, in order to supplement and alleviate the government's health system at all levels. The government should encourage the private sector to expand its existing health-care plans for its workers. This, in turn, will result in a healthy working population that will produce output in terms of GDP.

ii. In terms of M2/GDP, the report suggests that Nigeria has adopted a more liquid economy (i.e. an increase in M2). This would have a huge impact on the current health system and the health of Nigerians in relation to their contribution to the country's GDP growth.

iii. Regarding the TD/GDP ratio, which has a negligible negative impact, the study proposes that the Nigerian government implement financial reforms that would not only encourage deposit habits among the populace, but will also help the economy grow (i.e. financial reform of financial inclusion). Increase the money market's investing focus (i.e. investment in money market instruments). This type of investment will quickly contribute to the development of a robust and enviable health-care system in Nigeria, which will improve health outcomes.

iv. In terms of TL/GDP, the study suggests that the government should support the issuing of more low-cost loans to the public and private health-care sectors. As a result, both public and private health-care plans will benefit, and the overall prosperity of the country will benefit greatly.

5.4 Reference

1. *Alenoghena, R., Enakali-Osoba, C, & Mesagan, P. E. (2014). Financial deepening and performance of the Nigerian capital market: Empirical evidence: A Global Perspective. Journal of Commerce & Management, 3 (4), 142-151.*
2. *Anuli, R. O. & Ewubare, D. B. (2019). Financial deepening implications for macro-economics volatility and economic growth in Nigeria, A Multivariate Approach. International Journal of Economics, Finance and Management Sciences, 5 (1), 66-80, www.sciencepublishinggroup.com.*
3. *Arturo, V. B. & Sandhya, V. S. (2018). Comparing the income elasticity of health spending in Middle-income and high-income countries: The Role of Financial Protection. International Journal of Health Policy and Management, 7 (3), 255-263.*
4. *Claessens, S. & Feijen, E. (2006). Financial sector development and the millennium development goals. World Bank, 55-56.*
5. *Dabwor & Abimiku (2016). Poverty incidence in Nigeria: Does financial deepening matter? Journal of Economics and International Finance, 8(6), 56-65,*
6. *Goldsmith, R.W. (1969). Financial structure and development. New Haven, Conn: Yale University Press.*
7. *Greenwood, J., & Jovanovich, B.D. (1990). Financial market development and financial market developmentJournal of Economic Dynamics and Control, 21 (1), 145-181.*
8. *Grossman, M. (2000). The human capital model. The Handbook of Health Economics, edited by Anthony J. Culyer and Joseph P. Newhouse, (1A), 348-408.*
9. *Igwebuike, E. C., Udeh, S. N. & Okonkwo, O. M. (2019). Effects of financial deepening on the economic growth of Nigeria (1981-2016). International Academy Journal of Business Administration Annals, 7 (1), 54-67.*
10. *Kozhan, R. (2010). Financial econometrics with E-views. London: Ventus Publishing. Available from: bookboon.com. Accessed: 5th August, 2020.*
11. *Lameck, A. N. (2012). Financial deepening and its implications for savings and investments in Kenya. Being an Unpublished Research Project Submitted in Partial*

Fulfillment of the Requirements for the Degree of Master of Business Administration (MBA), University of Nairobi.

12. *Levine, R. (2004). Finance and growth: Theory and evidence. NBER Working Paper, 10766.*
13. *Luka, Y. D., Akila, A., Samson, R. & Lugu, C. T. (2015). Financial deepening and economic development of Nigeria: An Empirical Investigation (1981-2013). European Journal of Business and Management 7 (33), 105-124, www.iiste.org. Accessed: 23/11/2019.*
14. *Maduka, A. C. (2012). The impact of financial deepening on domestic investment in Nigeria. ANSU Journal of Arts and Social Sciences 1 (1), 46-57.*
15. *Mckinnon, R.T. (1973). Money and capital for economic development. Washington, D.C.: Brookings Institution.*
16. *Mumeen, O. A. Sheriffdeen, A. T. Ibrahim, A. O. & Olumuyiwa, G. Y. (2018). Financial deepening, foreign direct investment and output performance in Nigeria. Scientific Annals of Economics and Business, vol. 65, no. 2, pp. 193-204.*
17. *Nwafor, M. C. & Yomi, A. I. (2016). Nigeria's economic impact of financial deepening economy. International Journal of Science and Research (IJSR), 6 (11), 1156-1161.*
18. *Osuka, B. O., Ihejirika, P. O. & Chinweze, R. M. (2018). Nigerian human capital development: Does the financial system work? Deepening matters? Journal of Resources Development and Management, 43, 48-56, www.iiste.org. Accessed: 23/11/2019.*
19. *Schumpeter, J.A. (1934). The Theory of Economic Development: An inquiry into Profit, Capital, Credit, Interest and the Business Cycle. Harvard University Press, Cambridge, MA.*
20. *Serdar, K. (2015). Government Health Expenditures and Economic Growth: A Feder–Ram Approach to the Case of Turkey. International Journal of Economics and Financials, 5, 441-447. Available at: www.econjournals.com. Accessed: 23/11/2019.*
21. *Shaw, E. (1973). Financial deepening of economic development, New York: Oxford University Press.*
22. *Taofeek, O. & Olumuyiwa, G. Y. (2016). Financial development and inclusive growth in Nigeria: A Threshold Analysis. Acta Universitatis Danubius. Economica, 12 (5).*
23. *Violato, M., Stavros, P., Ron, G. & Maggie, R. (2011). Family income and child cognition and Behavioural development in the United Kingdom: Does money matter? Health Economics, 20 (10), 1201-25.*
24. *World Health Organisation Report (2011). The World health report 2011. Health systems financing: The path to universal* coverage, Chapter 2, page 21.