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RESEARCH ARTICLE

DOES INSURANCE MARKET ACTIVITY PROMOTE ECONOMIC GROWTH? EVIDENCE FROM NIGERIA

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ABSTRACT

This study examined the dynamic relationships between insurance market development, and economic growth in Nigeria using the Johansen approach to cointegration analysis, Vector Error Correction Model (VECM), and Granger Causality test on yearly data over the period 1985 to 2017. Two indicators of insurance sector development (total insurance premium and insurance density) were employed.The results show that total premium (life and non-life) to nominal GDP exerts positive and significant impact onreal GDP in the long run. Insurance Density exerts negative and significant impact on real GDP. The granger causality test indicates that there is a weak unidirectional causality running from, insurance density to real GDP. The study established weak relationship between insurance development and growth in Nigeria. The study recommends the need to establish financial institutions that would strengthen and resolve the institutional and structural problems in the economy and create structures that would sustain other causal factors that mediates growth and financial intermediation (insurance side) where appropriate

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INTRODUCTION

The level of growth which should be in line with Nigeria's huge potentials has not been attained and may never be attained for decades. Thus as opines by Oluoma (2010), several factors have been advocated for this lack of growth of the Nigerian economy and among such notable factors is inadequate funding for investment purposes which have limited insurance penetration in the economy. The major role of an economy's financial sector is helping to channel resources from surplus unit to the deficit units for investment. Therefore, the financial sector improves the screening of fund seekers and the monitoring of the recipients of funds, thus improving resource allocation, mobilizes savings, lowers cost of capital via economies of scale and specialization, provides risk management and liquidity. Insurance companies could play a major role in these functions if properly managed thus, supporting economic growth. However, in Nigeria, based on the nation's experience of stunted growth; the insurance sector has not actually contributed meaningfully in its role of effectively mobilizing funds for productive investment which could lead to growth. The major functionality of the insurance on the client side is risk transfer. Usually the insured pays a premium and is secured against a specific uncertainty. By reducing uncertainty and volatility, insurance companies smoothen the economic cycle and reduce the impact of crisis situations on the micro and aggregate macro level. However, the demand for protection against loss of life and property caused by natural disaster, crime, violence, accidents, are not so demanded in Nigeria thus the purchase, possession and sale of goods, assets and services which are often facilitated by the indemnification of the insurance thereby not enhancing growth. Therefore, the assured safety of life and property which enhances trade, transportation and capital lending and many sectors are not heavily reliant on insurance services. It is against the background of insufficient funding from major financial sectors of the economy that could drive Nigeria's economic wellbeing, alternative sources of funding becomes imperative that it behooves researchers and policymakers to attempt at examining the role of insurance in enhancing economic growth. However, there seems to be insufficient studies especially in developing economies that this study examined the impact of the Nigerian insurance market on economic growth. The main objective of this study is to examine the impact of insurance market development on economic growth in Nigeria. Understanding the key role of insurance will be significant because of the effect the findings will have on the Nigerian populace in general. By encouraging the development of good insurance culture, awareness and penetration of insurance in the rural and urban sectors, the study will help to increase the level of patronage of insurance products, understanding of the benefits of insurance as a financial solution to risks, and the deepening of the density of insurance, and as an efficient savings, credit and investment mechanism.The remainder of this study is structured as follows:

Section 2 presents the data and methodology of the study. Section 3 presents and discusses the empirical results. Finally, section 4 offers some concluding remarks on the findings.

Review related literature

Asymmetric Information, Moral Hazards and Finance: A major impediment to the efficient functioning of the financial system is asymmetric information, a situation in which one party to a financial contract has much less accurate information than the other party. For example, a borrower who takes a loan usually has much better information about the potential returns and risk associated with the investment projects the loan will finance than the lender does. Mishkin (1999) has identified two basic problems associated with asymmetric information. These are (a) adverse selection and (b) moral hazard. Adverse selection is an asymmetric information problem that occurs before the transaction. This exists when the parties who are most likely to produce the most undesirable (adverse) outcome are the most likely to be selected for a loan. Borrowers who want to engage on big risks are likely to be the most eager to take out a loan because they know that they are unlikely to pay it back. Since adverse selection makes it more likely that loans might be made to bad credit risks, lenders may decide not to make any loans, even though there are good credit risks in the market place.

Moral hazard is an asymmetric information problem that occurs after the transaction. The lender is subjected to the hazard that the borrower has incentives to engage in activities that are undesirable (immoral) from the lenders point of view because they make it less likely that the loan will be paid back. Moral hazard occurs because the borrower has incentives to invest in high-risk and sometimes in unprofitable projects in which the lender bear most of the loss if the project fails. The conflict of interest between the borrower and the lender stemming from moral hazard (the agency problem) implies that many lenders will decide that they would rather not make loans, so that lending and investment activity will be at low levels. Moral hazard can also occur if high enforcement costs make it too costly for the lender to prevent moral hazard even when the lender is fully informed about the borrower's activities. Information acquisition costs create the incentive for financial intermediaries to emerge (Diamond 1984). The existence of financial intermediaries, economics on information acquisition costs, hence, facilitating the acquisition of information about investment opportunities and thereby improves resource allocation. Individual savers may not have the time, capacity, or means to collect and process information on a wide array of enterprises, managers and economic conditions. Savers will be reluctant to invest in activities about which there is little reliable information. Consequently, high information costs may keep capital from flowing to its highest value (Levine, 2004).

Empirical Review: The application of the finance-growth nexus to insurance has received scant attention in empirical literature. Han et al. (2010) analyzed the effect of insurance consumption on economic growth on a dataset of 77 developing and developed countries from 2004 to 2005. By separating aggregate insurance penetration into life and non-life density, they estimated a system GMM with both developing and developed country samples. They found the coefficients of insurance density (life and non-life) to be significantly higher for developing countries compared to developed countries underlying the importance of insurance to growth in developing countries. However, by disaggregating insurance consumption into life and non-life insurance consumption, non-life penetration was found to have greater impact on growth compared to life insurance penetration. Using panel data on 51 developed and developing countries from 1981 to 2005, Azman-Saini and Smith (2011) examined the impact of insurance market development on economic growth. The authors found that a positive relationship between insurance development and economic growth which they explained is transmitted through improvements in productivity for developed countries whereas the channel for developing countries was through capital accumulation for investments. In Africa, Akinlo and Apanisile (2014) examined the relationship between insurance and economic growth in sub-Saharan Africa over the period 1986-2011. Pooled OLS, Fixed Effect Model and Generalized Method of Moment Panel Model were employed in the estimation. The estimations of the dynamic panel-data results show that insurance has positive and significance impact on economic growth in sub-Saharan Africa. There result showed that premium contributes to economic growth in sub-Saharan Africa which means that a well-developed insurance sector is necessary for the economic development.

Ilhan and Bahadir (2011) investigated the relationship between the insurance sector and economic growth for a group of 29 countries for the period 1999 to 2008. The study observed that the insurance sector positively affected economic growth in the sample countries. Nguyen, Avaram and Skully (2010) examined the impact of insurance development on economic growth for a group of 93 countries over the period 1980 to 2006. The study utilised the ordinary least square (OLS) technique on cross-sectional data and the generalized method of moments (GMM) estimation technique on panel data. Insurance growth was proxy by insurance density and insurance penetration. The study observed that insurance density had a positive and significant effect on economic growth, while insurance penetration had an insignificant effect on economic growth. Curak et al. (2009) examined the effect of insurance sector development on economic growth in 10 transition European Union member countries for the period spanning 1992 to 2007. Three insurance variables (total insurance, non-life and life insurance) were used. Utilising a fixed-effects panel model, the study observed that total insurance and non-life insurance had a significant and positive effect on economic growth, while life insurance had a positive but insignificant effect on economic growth. Zouhaier (2014) examined the relationship between the insurance business and the economic growth of 23 OECD countries over the period 1990–2011, using a static panel data model. The key findings emerged from the empirical analysis show a positive impact of non-life insurance, as measured by the penetration rate on economic growth and a negative effect exerted by the total insurance and non-life insurance, as measured by the density on economic growth.

RESEARCH METHODOLOGY

Sources of data: To carry out this empirical analysis, the study employed secondary data. The relevant data for this study were sourced from central bank statistical bulletin covering the period from 1986 to 2017. This study uses annual data to examine the impact of insurance market development on economic growth in Nigeria.

The choice of the sample period is based on data availability. To avoid perfect collinearity, these variables were transformed in its natural logarithm; excel and E-View10 (software) were used for data estimation and analysis.

Model formulation and specification: Koutyannis (2003) articulated that model specification is the formulation of a maintained hypothesis. This involves expressing the model to explore the economic phenomenon empirically. The relationship between economic growth and financial sector development can be modeled in different forms

Theoretical Framework: Our first objective is to identify finance-growth relationship in Nigeria. Therefore, thus adopts the endogenous growth model with a modified Cobb-Douglass production function. This is because Cobb Douglas function captures the amount of output in an economy taking note of labour and capital inputs. This consistent with the study by Haiss and Sümegi (2008), Akinlo and Apanisile (2014). Aggregate output is specified as:

$$Y = AK^{\alpha} L^{1-\alpha}$$

Where
$Y = aggregate\ GDP, L = labor, K = capital\ and\ A = TFP$

Also, Y measures economic growth (proxy with real GDP per capital), K denotes the amount of capital (measured by gross fixed capital formation), and L denotes the amount of labour (measured by labour rate), A is parameter that captures the effects of other factors of production which is also known as the efficiency parameter. Technically, A measures a Total Factor Productivity (TFP). Augmenting the neoclassical Cobb Douglas Production function by incorporating insurance development, by taking logarithm of both sides and differentiating Equation (1)

$$\Delta ln(y) = lnid + \alpha \Delta ln(k) + \beta \Delta(h) \quad (1)$$

A denote TFP as a function of financial sector development variables A=f(id).

Where; y= real GDP

TIP= total insurance premium (life + non-life insurance), (2)

Insurance density: the average value of the insurance premium paid by an inhabitant across one year (insurance density)

Model Specification on the Impact of Insurance Development on Economic Growth: Following our research objectives which are in line with Haiss and Sümegi (2008), Akinlo and Apanisile (2014).The following model represents the relationship between insurance sector development and economic growth by

$$lnrgdp = f(lnINPgdp, lnIPENE, lnHABr, lnKAP) \quad (3)$$

Econometrics specification of the model

$$lnrgdp = \alpha_0 + \alpha_1 lnINPgdp + \alpha_2 IPENE + \alpha_3 LGFCF + \alpha_4 LABR + \varepsilon_t \quad (4)$$

Table 1 below has detailed explanation of the variables.

Model on Causality between Insurance Development and Economic Growth: This study uses the Granger causality test augmented by the error correction term for detecting the direction of causality between the variables. The advantage of using vector error correction (VECM) modelling framework in testing for causality is that it allows for the testing of short-run causality through the lagged differenced explanatory variables and for long-run causality through the lagged ECM term. A statistically significant ECM_{t-1} term represents the long-run causality running from the explanatory variables to the dependent variable. If two variables are non-stationary, but become stationary after first differencing and are cointegrated, the pth-order vector error correction model for the Granger causality test assumes the following equation:

$$\Delta lnX_t = \alpha_{10} + \sum_{i=1}^{p_{11}} \theta_{11i} \Delta ln\, X_{t-1} + \sum_{i=1}^{p_{12}} \partial_{12j} \Delta ln\, Y_{t-j} + \delta_{13} ECM_{t-1} + u_{1t}$$

$$\Delta lnY_t = \alpha_{20} + \sum_{i=1}^{p_{21}} \theta_{21i} \Delta ln\, X_{t-1} + \sum_{i=1}^{p_{22}} \partial_{22j} \Delta ln\, Y_{t-j} + \delta_{23} ECM_{t-1} + u_{2t}$$

Where θ and $\boldsymbol{\partial}$ are the regression coefficients, u_t is error term and p is lag order of x and y. The presence of short-run and long-run causality can be tested. If the estimated coefficients of y in Eq. 2 is statistically significant, then that indicates that the past information of y has a statistically significant power to influence x suggesting that y Granger causes in the short-run. The long-run causality can be found by testing the significance of the estimated coefficient of ECM_{t-1} (δ_{23}).

Justification for the control variables

Gross fixed capital formation: Is the net increase in physical assets within the measurement period. It does not account for the consumption (depreciation) of fixed capital, and also does not include land purchases. This indicator is included because it captures absorptive capacity to produce, which in turn affects economic growth. It is expected that a positive relationship exists between gross fixed capital formation and economic growth.

Labour force participation rate: Is the proportion of the population aged 15 and older that is economically active. That is, all able-bodied individuals who supply labour for the production of goods and services during a specified period. This variable is used because labour is a key production factor in developing countries due to the high cost of acquiring capital. It is therefore important that necessary technical skills and education are acquired to enhance labour productivity in the course of attaining a high level of growth. Thus, the significance of the variable in this model is to capture the existence to which labour input affects economic growth and a positive coefficient is expected.

Technique of Analysis: The study estimated time series unit root test for stationarity state of the variables using different unit roots tests such as The ADF (Augmented Dickey Fuller) test and PP (Phillips Perron) test. Based on the unit root test, we conducted cointegration test using ARDL approach to cointegration (in EViews) to ascertain the long run relationships among the variables and subsequently vector error correction model (VECM) and granger causality test were estimated based on the cointegration test outcome to find out the short run and long run relationships.

Table 1. List of Variables

Variable	Definition/ A priori Expectation
Rrgdp	*Per capita economic growth*: percentage change in per capita gross domestic product
GFCF	capital stock is measured by gross capital formation % gdp (+)
lABR	Labour force is measured by the population of those in the working age group (+)
INPENE	Total Insurance density: Direct domestic premiums (both life and non-life) per capita in local currency unit LCU
INPgdp	Total insurance penetration: Direct domestic premiums (both life and non-life) as a percentage of gross domestic product.(+)

Source: Central Bank of Nigeria (CBN) Statistical Bulletin
Sector contributions are calculated as % of total GDP (constant 1990local currency)

Table 1. ADF Unit Root Test Results for Annual Series (1986-2017)

1St diff	Augmented Dickey-Fuller test					
Variables	Lag	t-statistic	Critical values			remark
			0.01	0.05	0.1	
LRGDPPC	0	-5.28872	-3.67017	-2.96397	-2.62101	I(1)
LLINPGDP	4	-3.25685	-3.71146	-2.98104	-2.62991	I(1)
LIPENE	0	-4.68712	-3.67017	-2.96397	-2.62101	I(1)
LHABOUR	1	-3.81203	-3.67932	-2.96777	-2.62299	I(1)
LGFCF	1	-5.70622	-3.67932	-2.96777	-2.62299	I(1)

Source: Author's estimation using E-view 10

Table 2. VAR Lag Order Selection Criteria

Endogenous variables: LRGDPPC LIPENE LINPGDP LHABP LGFCF						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-34.8694	NA*	9.82e-06*	2.657959	2.891492*	2.732668*
1	-23.7921	17.7237	2.55E-05	3.586138	4.987335	4.034393
2	2.645079	33.48705	2.70E-05	2.515242*	6.05919	4.312129
3	42.27137	36.98454	1.57E-05	3.490328	6.251769	3.710589

Table 3. Johansen Cointegration Test Results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.702478	114.27	79.34145	0
At most 1 *	0.66193	73.05289	55.24578	0.0006
At most 2 *	0.411878	36.17982	35.0109	0.0373
At most 3	0.339829	18.13193	18.39771	0.0544
At most 4 *	0.111335	4.013201	3.841466	0.0451
Trace test indicates 3 cointegratingeqn (s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.702478	41.21707	37.16359	0.0162
At most 1 *	0.66193	36.87308	30.81507	0.0081
At most 2	0.411878	18.04788	24.25202	0.2668
At most 3	0.339829	14.11873	17.14769	0.1309
At most 4 *	0.111335	4.013201	3.841466	0.0451
Max-eigenvalue test indicates 2 cointegratingeqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Extraction from estimation output using E-views 10 Note: * shows the rejection of null hypothesis at 5%

Table 4. Long run Estimates

LRGDPPC(-1)	LLINPGDP(-1)	LIPENE(-1)	LHABOUR(-1)	LGFCF(-1)	C
1.000000	0.943824	-0.119145	1.922327	0.603712	29.28983
	(0.15197)	(0.03484)	(0.25561)	(0.13399)	
	[6.21070]	[-3.42010]	[7.52048]	[4.50551]	

Source: Extraction from estimation output using E-views 10

The pre condition for cointegration is that variables are non stationary at levels but when they are differenced of order 1, they become stationary.

Stationarity test (Unit Root Test): The first step is to investigate the order of integration of the variables used in the empirical study. The ADF (Augmented Dickey Fuller) test will be used, in which the null hypothesis is $H_0: \beta = 0$ i.e. β has a unit root, and the alternative hypothesis is $H_1: \beta < 0$.

If the unit root tests confirm that at least some of the variables are I(1), then the next step would be to test if they are cointegrated, i.e. if they are bound by a long-run relationship. Cointegration exists between a set of non-stationary variables when a certain linear relationship of the series is stationary.

Testing for lag Structure: In the assertion of Walter (2008) the section of an appropriate lag length is as significant as determining the variables to be included in any system of

Table 5. Estimates of Error Correction Model (short run estimates)

Error Correction:	D(LRGDPPC)	D(LIPENE)	D(LINPGDP)	D(LHABP)	D(LGFCF)
CointEq1	-0.128025	1.059453	1.236863	0.001954	-0.145897
	-0.05962	-0.1883	-0.22346	-0.08886	-0.19708
	[-2.14729]	[5.62634]	[5.53515]	[0.02199]	[-0.74029]
D(LRGDPPC(-1))	0.246615	0.323714	0.472897	-0.065212	0.126042
	(0.19638)	-0.62022	-0.73601	-0.29268	-0.64914
	[1.25581]	[0.52193]	[0.64251]	[-0.22281]	[0.19417]
D(LRGDPPC(-2))	-0.079714	0.723546	0.730808	-0.146624	1.046744
	(0.19379)	-0.61206	-0.72632	-0.28883	-0.64059
	[-0.41133]	[1.18215]	[1.00618]	[-0.50765]	[1.63403]
D(LIPENE(-1))	0.059991	0.336832	0.283258	-0.107215	0.153841
	(0.07562)	-0.23882	-0.2834	-0.1127	-0.24995
	[0.79336]	[1.41041]	[0.99949]	[-0.95136]	[0.61548]
D(LIPENE(-2))	-0.056003	0.496136	0.367666	-0.014701	-0.209748
	(0.07907)	-0.24973	-0.29635	-0.11785	-0.26137
	[-0.70826]	[1.98669]	[1.24064]	[-0.12474]	[-0.80249]
D(LINPGDP(-1))	-0.088287	0.0144	-0.059668	0.083693	-0.199368
	(0.06647)	-0.20994	-0.24914	-0.09907	-0.21973
	[-1.32813]	[0.06859]	[-0.23950]	[0.84476]	[-0.90732]
D(LINPGDP(-2))	0.036055	-0.062216	-0.194618	0.032613	0.116479
	(0.06532)	-0.2063	-0.24481	-0.09735	-0.21591
	[0.55199]	[-0.30159]	[-0.79498]	[0.33500]	[0.53947]
D(LHABP(-1))	-0.168995	2.892206	3.14587	-0.065013	-0.233362
	(0.21278)	-0.67203	-0.79749	-0.31713	-0.70336
	[-0.79421]	[4.30367]	[3.94470]	[-0.20500]	[-0.33178]
D(LHABP(-2))	-0.247822	1.571214	2.380908	-0.012256	-0.250497
	(0.20648)	-0.65211	-0.77385	-0.30773	-0.68251
	[-1.20024]	[2.40942]	[3.07669]	[-0.03983]	[-0.36702]
D(LGFCF(-1))	0.011843	0.548431	0.580556	-0.00365	0.089126
	(0.05745)	-0.18143	-0.2153	-0.08562	-0.18989
	[0.20617]	[3.02283]	[2.69650]	[-0.04263]	[0.46936]
D(LGFCF(-2))	-0.044742	0.316826	0.392022	0.0461	-0.447668
	(0.06111)	-0.19299	-0.22902	-0.09107	-0.20199
	[-0.73220]	[1.64166]	[1.71174]	[0.50619]	[-2.21631]
C	0.005037	0.107113	-0.020689	0.010068	-0.030403
	(0.02012)	-0.06353	-0.0754	-0.02998	-0.0665
	[0.25037]	[1.68589]	[-0.27440]	[0.33581]	[-0.45721]
R-squared	0.520304	0.650289	0.625263	0.073254	0.303813
Adj. R-squared	0.419545	0.475434	0.437895	-0.390119	-0.044281
Sum sq. resids	0.094048	0.938103	1.321059	0.208903	1.027605
S.E. equation	0.065383	0.206497	0.245047	0.097445	0.216123
F-statistic	0.94249	3.719015	3.337079	0.158089	0.87279
Log likelihood	51.89144	12.79045	6.970849	38.32427	11.2413
Akaike AIC	-2.346555	-0.046497	0.295832	-1.548487	0.044629
Schwarz SC	-1.80784	0.492218	0.834548	-1.009771	0.583345
Mean dependent	0.014436	0.188185	0.009833	-0.014324	-0.00971
S.D. dependent	0.064753	0.285111	0.326844	0.082648	0.211492

Source: Extraction from estimation output using E-views 10

Table 6. Result of Granger Causality tests

Pairwise Granger Causality Tests				
Null Hypothesis:	Obs	F-Statistic	Prob.	Remark
LIPENE does not Granger Cause LRGDPPC	35	3.42546	0.0457	uni-directional
LRGDPPC does not Granger Cause LIPENE		0.45455	0.639	
LINPGDP does not Granger Cause LRGDPPC	35	1.96595	0.1577	no-directional
LRGDPPC does not Granger Cause LINPGDP		0.92254	0.4085	
LHABP does not Granger Cause LRGDPPC	35	1.38655	0.2655	no-directional
LRGDPPC does not Granger Cause LHABP		0.96524	0.3924	
LGFCF does not Granger Cause LRGDPPC	35	1.98861	0.1545	no-directional
LRGDPPC does not Granger Cause LGFCF		3.3102	0.0502	
LINPGDP does not Granger Cause LIPENE	35	0.98045	0.3868	no-directional
LIPENE does not Granger Cause LINPGDP		1.19019	0.3181	
LHABP does not Granger Cause LIPENE	35	3.07078	0.0612	no-directional
LIPENE does not Granger Cause LHABP		0.56949	0.5718	
LGFCF does not Granger Cause LIPENE	35	1.61637	0.2154	no-directional
LIPENE does not Granger Cause LGFCF		0.43063	0.6541	
LHABP does not Granger Cause LINPGDP	35	3.72404	0.0359	no-directional
LINPGDP does not Granger Cause LHABP		0.03414	0.9665	
LGFCF does not Granger Cause LINPGDP	35	2.74781	0.0802	no-directional
LINPGDP does not Granger Cause LGFCF		0.98799	0.3841	
LGFCF does not Granger Cause LHABP	35	0.80855	0.455	no-directional
LHABP does not Granger Cause LGFCF		0.0715	0.9312	

Source: Extraction from estimation output using E-views 10

Diagnostic Test	df	Rao F-stat	Chi-sq	Prob	Remark
Serial correlation	25	1.093132		0.4281	Do not reject Ho
VEC Residual Heteroskedasticity Tests	330		307.4442	0.8086	Do not reject Ho

equations. Based on that, the study employs that Akaike Information Criterion (AIC) to choose the appropriate optimal lag length of the variables for this study.

Johansen co integration test: The test of the presence of long run equilibrium relationship among the variables using Johansen Co integration test involves the identification of the rank of the n by n matrix Π in the specification given by.

$$\Delta Y_t = \beta + \sum_{i=1}^{k-1} \Gamma_i \Delta Y_{t-1} + \prod Y_{t-k} + \varepsilon_t \quad (7)$$

Where Y_t is a column vector of the n variables Δ is the difference operator, Γ and Π are the coefficient matrices, k denotes the lag length and β is a constant. In the absence of cointegrating vector, Π is a singular matrix, indicating that the cointegrating vector rank is equal to zero. Johansen co integration test will involve two different likelihood ratio tests: the trace test (λtrace) and maximum eigen value test (λmax) shown in equations below:

$$J_{trace} = -T \sum_{i=r+1}^{n} \ln(1 - \hat{\lambda}_i) \quad (8)$$

$$J_{max} = -T ln(1 - \hat{\lambda}_{r+1}) \quad (9)$$

Where r the number of individual series, T is the number of sample observations and and λ is the estimated eigen values. The trace test tests thenull hypothesis of *r* cointegrating vectors against the alternative hypothesis of *n* cointegrating vectors. The maximum eigen value test (λmax), on the other hand, tests the null hypothesis of *r* cointegrating vectors against the alternative hypothesis of *r* +1 cointegrating vectors. If the two series are found to be co-integrated, then vector error correction model (VECM) is appropriate to investigate causality relationship.

Vector Error-Correction Modelling (VECM): The Short run equilibrium relationship is tested using Vector Error-Correction Model (VECM). VECM is a restricted VAR that has cointegration restriction built into the specification. The VECM analysis in this study is based on the function: $\mathbf{y_t}$ = f(INPENE, INPgdp, GFCF, LABR). The VECM involving three co-integrated time series is set as:

$$\Delta lnRGDP_t = \alpha_1 + \sum_{k=1}^{p} \mu_{1k} \Delta lnRGDP_{t-k} + \sum_{k=1}^{p} \delta_{1k} \Delta lnINPENE_{t-k} + \sum_{k=1}^{p} \partial_{1k} \Delta lnINPgdp_{t-k} + \sum_{k=1}^{p} \partial_{1k} \Delta lnGFCF_{t-k} + \sum_{k=1}^{p} \partial_{1k} \Delta lnLABR_{t-k} + \lambda_1 Z_{t-1} + \varepsilon_t (10) \quad (11)$$

$$\Delta lnINPENE_t = \alpha_2 + \sum_{k=1}^{p} \mu_{2k} \Delta lnINPENE_{t-k} + \sum_{k=1}^{p} \delta_{2k} \Delta lnRGDP_{t-k} + \sum_{k=1}^{p} \partial_{2k} \Delta lnINPgdp_{t-k} + \sum_{k=1}^{p} \delta_{2k} \Delta lnGFCF_{t-k} + \sum_{k=1}^{p} \delta_{2k} \Delta lnLABR_{t-k} + \lambda_2 Z_{t-1} + \varepsilon_t \quad (11)$$

$$\Delta lnINPgdp_t = \alpha_3 + \sum_{k=1}^{p} \mu_{3k} \Delta lnINPgdp_{t-k} + \sum_{k=1}^{p} \delta_{3k} \Delta lnRGDP_{t-k} + \sum_{k=1}^{p} \partial_{3k} \Delta lnINPENE_{t-k} + \sum_{k=1}^{p} \delta_{3k} \Delta lnGFCF_{t-k} + \sum_{k=1}^{p} \delta_{3k} \Delta lnLABR_{t-k} + \lambda_3 Z_{t-1} + \varepsilon_t \quad (12)$$

Where Z_{t-1} is the error correction term obtained from the cointegrationmodel. The error correction coefficientsλ_1, $\lambda_2$and λ_3 indicate the rate at which it corrects its previous period disequilibrium or speed of adjustment to restore the long-run equilibrium relationship. Hence, they are expected to capture the adjustment in $\Delta lnRGDP_t$, $\Delta lnINPENE_t$ *and* $\Delta lnINPgdp_t$ towards the long-run equilibrium whereas coefficients of $\Delta lnRGDP_t, \Delta lnINPENE_t$ *and*$\Delta lnINPgdp_t$are expected to capture the short-run dynamics of the model. This method of analysis permits us to test for the direction of causality, if it exists, as discussed next. Moreover, it captures the dynamics of the interrelationships between the variables through variance decomposition. It is essential to appropriately specify the lag length k for the VECM model; if k is too small the model is misspecified and the missing variables create an omitted variables bias, while overparameterizing involves a loss of degrees of freedom and introduces the possibility of multicollinearity (Gujarati and Porter, 2009). The study uses Akaike information criterion (AIC) to determine the optimum lag length.

Econometric diagnosis tests: Econometrics diagnosis test will be done to detect whether the research model consists of econometric problems. Such test include as follows: multicollinearity, autocorrelation and heteroscedasticity.

Autocorrelation: The assumption of no autocorrelation between the error terms is one of the classical linear regression model assumptions. The problem of autocorrelation normally occurs in a pure time series data but less likely to be occurred in a pure cross-sectional data. If the errors are not uncorrelated with one another, it would be stated that they are "auto correlated" or that they are "serially correlated". A test of this assumption is therefore required.

To test the presence of autocorrelation, the popular Breush-Godfrey serial correlation LM test and Durbin-Watson Test will be employed.

Ho: The model does not have autocorrelation problem.

Hi: The model has autocorrelation problem.

Decision rule: Reject Ho if the p-value of the test is less than significance level of 0.05. Otherwise, do not reject Ho.

Heteroscedasticity: Heteroscedasticity refers to the circumstance in which the variability of a variable is unequal across the range of values of a second variable that predicts it which means that the variances of error terms are not constant. The assumption of homoscedasticity is one of the classical linear regression model assumptions. The presence of heteroscedasticity will cause the variance or standard errors to be underestimated, eventually leading to higher T-statistic or F-statistic value and causes the null hypothesis to be rejected too often (Gujarati & Porter, 2009). Therefore, it is important for the model to achieve homoscedasticity so that OLS estimators will achieve best, linear, unbiased and efficient (BLUE) properties, as a result all hypothesis testing will become valid and reliable. The Arch test which is statistical test that establishes whether the residual variance of a variable in a regression model is constant will be adopted.

Ho: The model does not have heteroscedasticity problem.

Ho: The model has heteroscedasticity problem.

Decision rule: Reject Ho if the p-value of the test is less than significance level of 0.05. Otherwise, do not reject Ho.

Presentation and interpretation of empirical results: Here we present results of empirical analyses of the study. Unit root was first conducted, followed by regression, Johansen co integration, Vector Error Correction Model, Granger causality test and stability test. In this section, we present the empirical results on the long and short run and causality effects of financial deepening on the contribution of non-oil sectors to economic growth in Nigeria. Test for the stationarity of the variables are presented in tables 4.3.1 below.

Unit Root Test (ADF Tests): The results presented in Table 4.3.1 below clearly indicate that all series exhibit unit root property using both ADF test statistics. Thus, according to the ADF test, all the five variables of LRGDP, LLINPGDP, LIPENE, LHABOUR, and LGFCF were non-stationary at their levels but became stationary after the first differencing. Hence the series are all integrated series of order I (1) and therefore showed that all the variables are stationary (no unit root) at first difference using 5 per cent level of significance ($\alpha = 0.05$). This is because their respective ADF test statistics value is greater than Mckinnon critical value at 5% and at absolute term. The results implied that all series has to be differenced once in our models in order to avoid spurious results. Table 4.3 above reports the result of ADF unit root test. The test indicates that, all the variables are found to be stationary in their first difference at 1% level of significance. Thus, the variables are not stationary at level but are all stationary (do not have unit root) in their first difference. As such the variables are integrated of the same order i.eI (1) integrated of orders one.

VAR Lag Order Selection Criteria

Result of Johansen Cointegration Result: Given that the unit root test established the variables as I(1), we proceed to apply the Johansen‟ approach to determine whether there is at least one combination of these variables that is I(0). The result of Johansen cointegration test is presented in the table below: Table 3 above, reports the result of Cointegration based on Johansen‟s procedure. The test indicates the existence of one (1) cointegrating equation based on Trace Statistic and Max-Eigen Statistics at 5% level of significance. Thus, the null hypothesis that there is no cointegration can therefore be rejected at 5% level as both trace test and maximum eigenvalue statistics are greater than their critical values. The result therefore indicates the existence of long run relationship among the included variables.

Long Run Estimates: The long run relationship of the variables from the normalized cointegration result with respect to real GDP provides the evidence regarding the long-run dynamic adjustment among real GDP output as a proxy of economic growth, total premium (life and non-life) to nominal GDP (INPGDP), total insurance premium to population (IPGDP), Labor (HABOUR), Gross fixed capital formation to nominal GDP (GFCF) as presented below: The normalized cointegration equation as presented in the table above shows the long run coefficients of our independent variables as they affect the dependent variable. The sign of the variables are reversed due to the normalization. It specifically shows the effect of each individual variable on the dependent variable. The result of each individual variable is explained below:

Total premium (life and non-life) to nominal GDP (INPGDP): The estimate for the long run coefficient of total premium indicates a positive relationship between total premium and real GDP in the long run.The result specifically implies that a one unit increase in the total premium (life and non-life) to nominal GDP holding the effect of other variables constant, will lead to a corresponding decrease in real GDP by 0.9438% and vice versa. This comfort with theoretical postulations, (see: discussion of findings).

Insurance Density (ID): The coefficient of the insurance density shows that there exist a negative relationship between insurance density and real GDP. The result specifically implies that a one unit increase in the insurance density holding the effect of other variables constant, will lead to a corresponding decrease in real GDP by 0.1191% and vice versa. This is does not conformity with theoretical postulations.

Labor Force (LABR): The long run coefficient of the labor force shows a positive relationship between labor force and real GDP. The result specifically implies that a one unit increase in the labor force holding the effect of other variables constant, will lead to a corresponding increase in real GDP by 1.922% and vice versa.

Gross fixed capital formation (GFCF): The long run coefficient of the gross fixed capital formation to GDP shows a positive relationship between GFCF and real GDP. The result specifically implies that a one unit increase in the GFCF holding the effect of other variables constant, will lead to a corresponding increase in real GDP by 0.6037% and vice versa.

Result of Vector Error Correction Model (VECM): The estimates of the VECM provides the short run elasticities of the variables and how output in the real GDPresponds to changes in its own lagged value and the lagged value of the other variables in the short run. It therefore indicates the short run causality between ratio of total insurance premium, insurance density and real GDPrespectively. The table below presents the detail result regarding the short run causalities: Table 5 above, shows the result of Error-Correction Model using two lags.

From the result, the Error Correction Term which shows the speed of adjustment, is statistically significant and has a negative sign (-0.128025), this confirms the long-run equilibrium relationship between these variables. The result denotes a satisfactory convergence rate to equilibrium point per period that is about 12.80% of the deviation from long run equilibrium is corrected in the next period. The two economic implications are as follows; (a) the change in the level of economic growthrapidly responds to any deviation in the long-run equilibrium (or short-run disequilibrium)for the t-1 period. (b) The effect of an instantaneous shock toinsurance market activities, on economic growth will be completely adjusted in the long run. From the table also, the estimated coefficient (LIPENE at lag 1 and LINPGDP at lag 2) have the expected sign while other coefficients do not have expected signs. We noticed that all the variables are not statistically significant and this shows that there is no short run causality running from these variables to real GDP. In other words, we can infer that in the short run, the value which the real GDP takes do not influenced by these (explanatory) variables. The goodness of fit of the estimated relationship and the significance of the model as indicated by the value of the coefficient of determination (R2 and the adjusted R2) and F-Statistics respectively are good. These all together implies that, the output of the real GDP in Nigeria largely depends on the ratio of total insurance premium and insurance density for the period under study.

Results of Granger Causality Test: Error-Correction Model using two lags. From the result, the Error Correction Term which shows the speed of adjustment, is statistically significant and has a negative sign (-0.128025), this confirms the long-run equilibrium relationship between these variables. The result denotes a satisfactory convergence rate to equilibrium point per period that is about 12.80% of the deviation from long run equilibrium are corrected in the next period.

Diagnostic Test

Summary and Conclusion

Inspired by the traditional role of insurance in managing risk both as intermediary and as provider of risk transfer and indemnification. Insurance promotes growth by allowing different risks to be managed more efficiently through promoting long term savings, encouraging the accumulation of capital, serving as a conduit pipe to channeling funds from policy holders to investment opportunities as well as mobilizing domestic savings into productive investment. This study empirically examines the impact of insurance sector development and economic growth, over the period 1986 – 2017 using the Johansen approach to co-integration analysis and Vector Error Correction Model. Being an empirical study, an econometric model was derived using Cobb Douglas production functions. The study also examined the direction of causality and long-run relation between insurance sector development and economic growth. It employs two measures of insurance sector development while controlling for the possible effects of labour and capital.

The result emanating from the hypotheses tested indicates that insurance market penetration had positive impact on economic growth in Nigeria, implying that the insurance sector of Nigeria has assisted in influencing savings and investment decisions and hence long-run growth rates through lowering the costs of researching potential investments, exerting corporate governance, trading, diversification, and management of risk, mobilization and pooling of savings, conducting exchanges of goods and services, and mitigating the negative consequences that random shocks can have on capital investment thereby enhancing the growth of the Nigerian economy. Insurance density exerts negative and significant relationship on real GDP. The result of granger causality as indicates that, there is a weak unidirectional causality running from, insurance density to real GDP. This implies that lagged values of insurance density are to an extent important variable in explaining the future values of the output in the economic growth. We can therefore conclude that both insurance sector development in Nigeria were not successful in achieving the growth of the especially in the short run period as documented by period scholars.

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