DETERMINANTS OF NON-LIFE INSURANCE SECTOR DEVELOPMENT IN NIGERIA

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Abstract

The low rates of the insurance market's density and penetration in Nigeria put to question the level of development and the determinants of the sector. This study, therefore, investigates whether the issues are related to dynamics in demographic, macroeconomics, and institutional factors for the period 1987 to 2018. The autoregressive distributed lags estimation technique is used to examine the factors that determine non-life insurance sector development in Nigeria. Findings from the study showed that trade openness, real interest rate, population growth, and financial development are positive and significant factors affecting the demand and supply of non-life insurance services while the level of education is a negative (positive) and significant factor that affects the demand (supply) for non-life insurance services. Based on the findings, the study recommends, among others that, the Nigerian government put in place measures to increase exports and enhance financial development to promote non-life insurance sector development. Furthermore, the real interest rates should be checked and monitored through monetary policy actions of the apex banking institution. Policies and strategies such as cross-selling may be introduced to intensify and consolidate the cooperation between the insurance and banking sectors to ensure that the insurance market is made more competitive and efficient in service delivery.

Keywords*: Non-life Insurance, Penetration, Density, Autoregressive Distributed Lags, Financial Development.*

1. INTRODUCTION

The insurance industry plays a major role in the financial sector by having large investors that provide risk management services to various sectors in the economy (Gaganis, Hasan & Pasiouras, 2019). Insurance companies are important financial intermediaries that perform critical risk underwriting, financing, and management for individuals and companies. Besides, these institutions also channel domestic savings through their financial intermediation process (Olayungbo, 2015). In addition, the sector provides an avenue for the mobilisation of long-term finance for enterprises and has increasingly gained attention in the financial landscape (Guerineau & Sawadogo, 2015).

Insurance market development represents both life and non-life insurance activities that encourage savings, investment, and growth in the long-term making the sector an important financial intermediary. However, in spite of the growing importance of the insurance industry, it remains the most undeveloped segment of the financial sector due to problems such as the ethical distribution of products, disappearing cash values in the policy and declining premium collection. These according to Mathew and Siyaraman (2017), present challenges to the growth of the sector. Nonetheless, extant studies have identified macroeconomic, demographic, sociocultural and institutional factors that may either enhance or regress the sector's development (Mathew & Sivaraman, 2017; Satrovic & Muslija, 2018). Furthermore, these factors could vary across geographical regions due to the dissimilarities in their economic, demographic, and institutional components. Insurance sector development depends on the fusion between the supply and demand of the policies of life and the non-life insurance industry implying that any factor affecting any of the sub-markets would affect the whole insurance industry (Brokešová, Pastoráková & Ondruška, 2014). Insurance penetration in Nigeria, like other developing African countries, has remained abysmally low notwithstanding availability of low-priced insurance products (Alhassan & Biekpe, 2016a). The market activities contribute minimally to the economy's growth due to the lack of adequate reforms and strict regulations (Sawadogo, Guerineau & Ouedraogo, 2018). The non-life insurance market activities mostly dominate Africa's insurance markets, and Nigeria has the largest market players (Alhassan & Biekpe, 2016a). Nevertheless, Nigeria's insurance companies' non-life premiums as a ratio of Gross Domestic Product (GDP) also known as penetration given as 0.18% is low relatively compared with other African countries like South Africa with 1.82%, Egypt with 0.34% and Algeria with 0.64% (World Bank Global Financial Development Report, 2018).This implies that insurance sector penetration level in Nigeria can be said to be in its embryonic stage and calls for an investigation into factors influencing the sector's development. Moreover, studies that focused on the non-life insurance markets of Africa's emerging economies such as Nigeria are scarce. A few existing studies in Nigeria mainly focused exclusively on insurance sector development and economic growth (Iyodo, Samuel & Inyada, 2018; Madukwe & Anyanwaokoro, 2014)and a closer attempt explored the determinants of insurance companies' performance in Nigeria (Ibrahim, 2016). Accordingly, this paper examined the determinants of non-life insurance sector development using the total market approach (demand and the supply sides) because such discussion remains mostly open in the Nigerian literature thus far. Empirical studies have explored life insurance, but this study focuses on non-life insurance because it is more common than life insurance in developing countries like Nigeria. This is in addition to the emerging risks that threaten the increasing volume of assets owned by individuals or households (Masárová & Ivanová, 2016).

2. LITERATURE REVIEW

The development of the insurance sector encompasses pervasiveness of the insurance market in terms of density and penetration. Density of the sector becomes higher when per capita spending of individuals on insurance premiums in a country increases and determines the state of the sector's development (Brokešová & Vachálková, 2016). Insurance penetration occurs when the proportion of direct premiums underwritten in a year to output productivity expands. This also represents the portion of gross written premiums in a country's GDP. Studies have shown that activities of non-life, life, and total insurance businesses could promote insurance sector development required to enhance output growth. Particularly, the non-life insurance companies play a key role in any financial system since they encourage savings on long-term basis and the investment of funds in public and private projects in addition to risk mitigation and provision of liquidity (Lee & Chiu, 2016; Olayungbo, 2015; Satrovic & Muslija, 2018). Nigeria's insurance market is still an emerging market because the number of operating companies and the nation's portion of gross written premium in total gross written premium among the developed markets are relatively small. Some of the proxies used to represent insurance sector development include; net written premiums, insurance density, GDP insurance penetration and premiums adjusted for population. However, the acceptable measures of insurance sector development are insurance penetration and density which measures insurance activity in proportion to the size of the economy and insurance premium paid per citizen, respectively (Din, Regupathi, Abu-Bakar, Lim, & Ahmed, 2020). Thus, this study makes use of the acceptable measures in the investigation.

Theoretically, a vast majority of empirical studies that assessed the determinants of insurance sector development used the life cycle hypothesis which emphasised that the expected utility of a household is maximized over its lifetime consumption. It explains the problem of an individual's uncertain lifetime and states that an individual's savings behaviour is an attempt at smoothing consumption during the different phases of a lifetime. This theory explains the readiness of the active population to work and save until retirement age when their income is expected to decline and hypothesise that an individual's expenditure on specific insurance products at any point is a function of the degree of return on capital, availability of resources, and their age (Dwivedi, 2010).Furthermore, Satrovic and Muslija (2018) notes that insurance demand is a function of factors such as an individual's wealth, expected lifetime income, interest rates, price of insurance policies, and the expected discount rate for consumption (current and future). The theory supports the existence of an inverse relationship between age dependency and insurance demand because as age dependency increases, the young population

may find it difficult to start saving. So also, the working population endeavours to meet up with demands of dependents and considers insurance as an endless expenditure (Zerriaa & Noubbigh, 2016).

Empirical studies have also shown that a developed financial sector encourage economic units to undertake insurance activities. These studies agree that financial development, socio-economic, and macroeconomic factors affect insurance sector's development. Some of these factors include age dependency ratios, a highly educated populace, high per capita income and financial development. However, the impact of these variables on insurance sector development could differ across geographical regions due to the dissimilarities in their economic, demographic, and institutional components. Extant literature shows that dissimilarities may appear in the form of socio-cultural factors such as culture, religion, globalization, perceived health status and expenditure on health.

Dragos (2014) investigated the different factors that influence the development of life and the non-life insurance sector in 17 emerging countries from Asia and Europe. Adopting the generlaised least squares estimator, the results showed that income, urbanization, and education are positive and significant determinants of non-life insurance sector development in Central and East European (CEE) countries and Asian countries. Similarly, Brokešová *et al.* (2014) studied the factors that influenced insurance sector development in four Central European transition economies over the period 1995 and 2010. Adopting a panel regression approach, the results showed that insurance market development in transition economies differs from the experience in advanced economies. age dependency ratio, inflation rate, the social security system, the degree of urbanisation, and criminality rate have varying influence on insurance sector development in the Central European economies. In Albania, Zyka and Myftaraj (2014) investigated factors that affect insurance sector development over the period 1999 to 2009. The co-integration regression results showed that economic growth, population size, urbanisation, and paid claims have positive effects on the aggregate insurance premium. Other studies that found similar results for the region include Petkovski and Kjosevski (2014; 2015); Poposki*et al.* (2015); Brokešová and Vachálková (2016). Abbas and Ning (2016) investigated variables that influence insurance sector development for the period 1991 to 2010 in Tanzania using the ordinary least squares regression estimator.The results showed that GDP per capita impacts insurance premium negatively in Tanzania. It also showed that inflation and real interest rates influence Tanzania's insurance industry negatively. However, it revealed that GDP growth rate positively influences the growth of the insurance industry. Trinh, Sgro, and Nguyen (2016) studied variables that determine non-life insurance spending in 36 developed countries and 31 developing countries from 2000 -

2011. The results showed that determinants of the non-life insurance spending varied across the countries and include income, bank development, economic freedom, urbanisation, law systems, and culture.

Dragos, Mare, and Dragos (2019) explained the main institutional drivers of insurance consumption across 31 European nations for the period 2002 - 2012. The study applied a technique that takes care of endogeneity and results showed that that governance effectiveness, interest rate and fiscal freedom have significant effects on insurance consumption. Other studies with similar results include Meko, Lemie, and Worku (2019); Sanjeewa, Hongbing, and Hashmi (2019).

The preceding literature review reveals a research gap in the area of studies from developing and/or emerging countries while the subject of discussion is relatively underexplored in Nigeria where the economic freedom seemed to be less solid. Therefore, the importance of identifying the country-specific determinants of insurance sector development that could help policymakers in taking responsive actions cannot be overemphasised. Based on the complex differences in factors that shape the demand for insurance from one country to another, there are cross-national variations in insurance consumption among countries. The present study addresses this gap by specifically focusing on the determinants of non-life insurance sector development in Nigeria. In addition, the use of insurance sector density and penetration, and institutional factors contributes to the gap fulfilled because it creates an avenue to deeply explore the literature on non-life insurance in Nigeria.

3. METHODS

Model specification: This study adapts the model from the study of Brokešová *et al.* (2014) by incorporating real interest rate, and an additional institutional variable(index of economic freedom) as plausible determinants of insurance sector development. This study differs from Brokešová*et al.*(2014) in two ways. One, it focuses on both the demand and supply sides of insurance sector development, i.e., density and penetration and two, the exclusion of variables whose data are not available for Nigeria. .The functional model is thus specified as:

$$ISD = f\ (GY, OPEN, RIR, INF, EDU, AD, POP, LEX, URB, FD, FRE) \quad (1)$$

The econometric form of the functional model is restated as:

$$ISD_t = \beta_0 + \beta_1 GY_t + \beta_2 OPEN_t + \beta_3 RIR_t + \beta_4 INF_t + \beta_5 EDU_t + \beta_6 AD_t + \beta_7 POP_t + \beta_8 LEX_t + \beta_9 URB_t + \beta_{10} FD_t + \beta_{11} FRE_t + \mu_t \quad (2)$$

where ISD proxies non-life insurance sector development (penetration and density, which are estimated separately); GY is the growth rate of income; OPEN is trade openness; RIR is the real rate of interest; INF refers to inflation; EDU represents education; AD refers to age dependency ratio; POP is population growth; LEX represents life expectancy; URB is urbanisation; FD represents financial development; and FRE is economic freedom index. β_0 is the intercept in the model; $\beta_1 - \beta_{11}$ are coefficient estimates; μ is error term; and t represents time-series element.

Following Pesaran, Shin, and Smith (2001) Autoregressive Distributed Lag (ARDL)model, the study uses Equation 3 as the error correction version of ARDL relating to the variables in Equation 2:

$$\triangle ISD_t = \beta_0 + \sum_{j=0}^{n} \beta_1 \triangle GY_{t-j} + \sum_{j=0}^{n} \beta_2 OPEN_{t-j} + \sum_{j=0}^{n} \beta_3 \triangle RIR_{t-j} + \sum_{j=0}^{n} \beta_4 \overset{\triangle}{INF}_{t-j} + \sum_{j=0}^{n} \beta_5 \triangle EDU_{t-j} + \sum_{j=0}^{n} \beta_6 \triangle AD_{t-j} + \sum_{j=0}^{n} \beta_7 \triangle POP_{t-j} + \sum_{j=0}^{n} \beta_8 \triangle LEX_{t-j} + \sum_{j=0}^{n} \beta_9 \overset{\triangle}{URB}_{t-j} + \sum_{j=0}^{n} \beta_{10} \triangle FD_{t-j} + \sum_{j=0}^{n} \beta_{11} \triangle FRE_{t-j} + \lambda ECM_{t-1} + \varepsilon_t \quad (3)$$

where Δ is the first difference operator, t is the time trend, β's are the long-run coefficients, ε_t is the independent and identically distributed error term and λ is coefficient of the error correction mechanism (ECM).

Data, Variables Definition, Measurement, and Sources: This study uses data which covers the period from 1987 to 2018. The start period of this study represents the year after the adoption of the structural adjustment programme in July 1986 and the liberalisation of Nigeria's financial sector. The emergence of the programme led to significant improvement in the insurance industry's activities and created a wave of macroeconomic, demographic, and institutional dynamics that may negatively affect insurance businesses.

The data for the variables are sourced from the World Bank's World Development Indicators (WDI) databases and Fraser Institute. Table1 presents the variables description and data sources, their measurement, and the supporting studies that employed these variables in investigating the determinants of insurance sector development.

Table 1. Description of Variables, Measurement, Supporting Studies, and A-priori Expectation

Variable	Description	Measurement	Supporting Studies	A-priori Expectation	Data Sources
Dependent variables					
Non-life Insurance density(DEN)	DEN refers to the per capita spending of individuals on the demand fornon-life insurance services and is the primary measure of insurance sector development.	Ratio of gross written premiums for the non-life insurance to the total population (non-life insurance per capita)	Dragoş*et al.* (2019); Gaganis*et al.* (2019)	NA	Author's calculation
Non-life insurance penetration(PEN)	PEN is the contribution of the non-life insurance market (supply) to the entire economy. It is used as an alternative (supply-side) measure of insurance sector development.	Ratio of non-life gross written premiums to GDP	Alhassan and Biekpe (2016b); Chui and Kwok (2009); Gaganis*et al.* (2019)	NA	World Bank schedule of the Sigma Reports
Independent variables:					
	Macroeconomic variables				
GDP per capita (GY)	It is the gross domestic product divided by midyear population	GDP per capita expressed in US dollars	Meko *et al.* (2019); Lee *et al.* (2017); Gaganis*et al.* (2019)	Positive	WDI
Trade openness (OPEN)	It shows a country's degree of openness to trade with the rest of the world.	It is the ratio of a country's total trade to GDP	PetkovskiandKjosevski(2014)	Positive	WDI
Interest rate (RIR)	It reflects insurance companies' investment returns and the opportunity cost for alternative assets.	Difference between the nominal interest rate (lending rate) and inflation.	Meko *et al.* (2019); Zerriaa*et al.* (2017); Lee *et al.* (2017)	Positive	WDI
Inflation rate (INF)	It is the rate of increase in prices over a given period.	It is measured as Inflation, GDP deflator (annual %)	Meko *et al.* (2019); Zerriaa*et al.* (2017); Akhter and Khan (2017); Lee *et al.* (2017)	Negative	WDI
	Socio-demographic variables				
Age dependency ratio (AD)	Proportion of dependents in a population to the number of working-age people.	Age dependency ratio is used as a measure for the population group between above 15 and below 65 as a percentage of population below 15 and above 64	Akhter and Khan (2017); Gaganis*et al.* (2019)	Positive	WDI

					WDI
Population growth (POP)	This represents the change in the size of a country's human population over two periods, the change can either be positive or negative.	Population growth (annual %)	Feyen*et al.* (2013)	Positive	
Level of education (EDU)	It shows the qualification of individuals in a country, ranging from primary to tertiary levels.	Primary education enrolment rate (% gross)	Akhter and Khan (2017); Lee *et al.* (2017)	Positive	WDI
Life expectancy (LEX)	It reflects the actuarially fair price of life insurance because the commercial price is not usually available	It is measured as life expectancy at birth (in years)	Lee *et al.* (2017); Gaganis*et al.* (2019)	Positive	WDI
Urbanisation (URB)	Urban area population	It is measured as percentage change in annual urban growth	Akhter and Khan (2017); Lee *et al.* (2017)	Positive	WDI
Institutional variables					
Financial development (FD)	It describes the developments in size, efficiency, stability, and access to the financial system.	Credit to private sector by banks expressed as a ratio of GDP	Gaganis*et al.* (2019)	Positive	WDI
Economic Freedom (FRE)	It represents five major areas of economic institutions, such as the size of government, legal system and property rights, sound money, freedom to trade internationally and regulation.	It is measured as the index of economic freedom.	Kjosevski (2012)	Positive	Fraser Institute

Source: Author's compilation (2020) from the literature review.

Note: Non-life insurance density is arrived by scaling gross written premium over Nigeria's population and this was computed using the data from the Central Bank of Nigeria and the World Bank.

Estimation Techniques: This study employs both the descriptive and inferential statistical dimensions to investigate the determinants of insurance industry development in Nigeria. The time-series data used for this study could produce spurious regression results because they are hardly stationary in their level forms, hence it is important to subject the implied series of the study to stationarity with the use of the augmented Dickey-Fuller unit root test (Gujarati, 2003; Wang & Hafner, 2018). Thereafter, the ARDL technique which allows the short and longrun properties of the explanatory variables on insurance sector development to be revealed is applied to Equation 3. The reliability of the results was tested by applying a model diagnostic procedure which includes the tests for normality of series and model misspecification error, serial correlation and heteroscedasticity, model instability and structural changes.

4. RESULTS AND DISCUSSION

Summary Statistics: Table 2presents the summary statistics of the variables in the study and shows that they all have positive mean values. Nevertheless, the average values for per capita income and non-life insurance density (non-insurance premium per capita) are $1766.34 and $0.1246, respectively. This implies that the consumption of non-life insurance represents a non-significant proportion of the income received by households. Non-life insurance density and penetration have the lowest minimum values (0.0734 and 0.1799), hence, this study verified that there is a low density and penetration rate in the non-life insurance market in Nigeria as rightly noted in extant studies. Real interest rate has a minimum and maximum values of -65.857 in 1981 and 18.18 in 2009, respectively. These figures imply that at some point, the level of inflation rate is extremely larger than the nominal interest rate while the latter appears higher at the other, respectively. When the level of inflation rate is above the nominal interest rate, the borrowing cost for financial related transactions such as insurance becomes higher and thus reducing investment. Inflation level, measured as GDP deflator showed a maximum value of 219 in 1981, implying that the current-year price of goods and services is higher than the base-year price more than twice. The standard deviation of all the variables except RIR and INF is lower than the mean and suggests that the figures are not subject to a high frequency of changes over time. The variance of non-life insurance density is the lowest at 0.00362, implying that the volume of households' income that goes to financing non-life insurance consumption remains less volatile. The growth rate of income has the highest standard deviation, suggesting that the income level of individuals' risen and fallen consistently over the period under review.

Table 2.Summary Statistics

VARIABLE	MEAN	STANDARD DEVIATION	MINIMUM	MAXIMUM
DEN (US$)	0.1246	0.0362	0.0734	0.1941
PEN (%)	0.4875	0.2084	0.1799	0.8378
GY (US$)	1766.34	436.73	1324.3	2563.9
OPEN (%)	32.676	12.670	9.1358	53.278
RIR (%)	0.1006	14.602	-65.857	18.18
INF (Annual %)	22.08	35.482	0.6861	219
EDU(% gross)	93.547	8.5867	78.664	113.08
AD (% of working pop.)	89.056	1.9962	86.615	92.763
POP (Annual %)	2.5890	0.0794	2.4888	2.8493
LEX (in years)	47.872	2.7134	45.33	53.95
URB (% change)	4.7685	0.5728	4.0543	5.8507
FD (%)	9.6414	4.2597	4.948	22.267
FRE (annual index)	4.8637	1.2885	3.48	6.86

Source: *Author's computation, (2020) with underlying data fromthe World Bank Database, Swiss Re Reports, and Fraser Institute.*

4.2 Unit Roots Test Result

Unit Root Test

The unit root test has a null hypothesis that a variable contains a unit root while the alternative is that it does not. The AIC, HQC and SIC information was used in selecting the optimum lag length for the stationarity test. Table 3 presents results of the Augmented Dickey-Fuller Unit Root Test (ADF-URT) and show the variables in combination of I(0) and I(1).

Table 3. Augmented Dickey-Fuller Unit Root Test (ADF-URT)

Variables	Lags	Drift, trend	ADF statistic value	Conclusion
DEN	1	Drift	-4.138**	I(0)
PEN	1	Drift, trend	-4.208**	I(1)
GY	2	Drift, trend	-3.213***	I(1)
OPEN	1	Drift	-2.051**	I(0)
RIR	1	Drift	-5.179***	I(0)
INF	1	Drift	-8.584***	I(0)
EDU	1	Drift	-3.202***	I(0)
AD	1	Drift	-1.820**	I(0)
POP	1	Drift	-3.081***	I(0)
LEX	1	Drift	-9.094***	I(0)
URB	1	Drift	-1.938**	I(0)
FD	1	Drift	-2.367**	I(0)
FRE	2	Drift, trend	-3.983***	I(1)

Source: *Author's Computation, (2020).***Note:** **and *** indicates a rejection of the null hypothesis at 5% and 1% level of significance respectively.

Specifically, all the variables except PEN, GY, and FRE are I(0) i.e. stationary at level suggesting the rejection of the null hypothesis i.e. non-stationarity of variables at their respective significance levels. This result satisfies the condition to estimate the ARDL bound testing approach to cointegration which ensures that long-term relationships amongst variables are established. One of the conditions of using the ARDL technique for cointegration is that variables must be a combination of I(0) and I(1). Results in Table 3 therefore suggests that the ARDL method is suitable for the estimation and indicates the possibility of a long-run (co-integrating) relationship.

4.3 Co-integration Integration Test

This study adopts the ARDL bounds testing procedure of Pesaran*et al.* (2001) to establish if there is a long-run equilibrium relationship among the variables. The lower and upper bound critical values from the ARDL bounds test is used to check the null hypothesis of no long-term relationship between the underlying variables. The critical values in Table 4 show that the calculated F-test is for the two dependent variables (density =6.084 and penetration = 4.355) exceed the upper bound I(1) critical values at all levels of significance. This implies the rejection of the null hypothesis of no cointegration and establishes the existence of a long-run relationship based on Pesaran*et al.* (2001).

Table 4. Results of the ARDL Bounds Testing for Cointegration

	F-statistics	**Asymptotic critical values**							
		10%		**5%**		**2.5%**		**1%**	
Model 1	*F*-stat. value =6.084***	**I(0)**	**I(1)**	**I(0)**	**I(0)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
Model 2	*F*-stat. value = 4.355***	1.83	2.94	2.06	3.24	2.28	3.50	2.54	3.86

Source: *Author's Computation, (2020).* ***Note:*** **** implies the rejection of null hypothesis at a 1% significance level.I(0) is lower bound and I(1) is upper bound.*

4.4 Results of the ARDL Estimates

Table 5 presents results of the long-run and short-run ARDL estimates to investigate factors that determines non-life insurance sector development in Nigeria.

Table 5: Long-Run and Short-Run ARDL Estimation Determinants of Insurance Sector Development (ISD) in Nigeria

	Variables	ISD measured as Non-Life Insurance Density Model 1 Coefficients	ISD measured as Non-Life Insurance Penetration Model 2 Coefficients
ADJ	DEN_{t-1}	-0.02725*** (0.00057)	-
	PEN_{t-1}	-	-1.08206** (0.29483)
Panel A Long-Run			
	GY	1.35e-06 (1.01e-06)	0.00033 (0.00059)
	OPEN	0.00003*** (7.06e-06)	0.00221** (0.00034)
	RIR	0.00002* (0.00001)	0.00576** (0.00054)
	INF	-0.00002** (7.90e-06)	-0.01009 (0.00572)
	EDU	-0.00006*** (0.00001)	0.00237** (0.00035)
	AD	-0.00027*** (0.00007)	0.06478 (0.06126)
	POP	0.04429*** (0.00272)	1.50887 (2.23353)
	URB	0.00012 (0.00039)	-0.15436 (0.29985)
	FD	0.00006*** (0.00002)	0.02643* (0.01110)
	FRE	0.00105*** (0.00033)	0.07943 (0.22399)
Panel B Short-Run			
	GY_{t-1}	2.09e-08 (2.82e-08)	0.00050 (0.00073)
	INT_{t-1}	4.92e-08 (4.92e-08)	-0.00382 (0.00204)
	EDU_{t-1}	-1.48e-06*** (4.15e-07)	0.0088** (0.00072)
	AD_{t-1}	-1.61e-06 (5.66e-06)	0.00857 (0.14966)
	POP_{t-1}	-0.00107** (0.00010)	5.05317 (6.3086)
	URB_{t-1}	3.79e-06 (6.86e-06)	0.04696 (0.12988)
	FD_{t-1}	-8.65e-07 (7.91e-07)	-0.00567 (0.01323)
	FRE_{t-1}	8.46e-06 (7.13e-06)	-0.14627 (0.24372)
	Constant	-0.00399*** (0.00029)	-1.16962 (4.47697)
F-statistics		*7.44***26.24****	
R-squared *0.8748 0.9946*			
Breusch Godfrey LM Serial Correlation test *Chi^2 = 0.261[0.6097]Chi^2 = 0.608 [0.3007]*			
Ramsey Reset test for Misspecification Error *F(3, 2) =0.84 [0.3923] F(3, 2) =0.97 [0.5451]*			
White Heteroscedasticity test *Chi^2 =36.00 [0.4215]Chi^2 =25.00 [0.4058]*			
CUSUM* and *CUMSUMSQModel Stability test		*Lies within the 5% significance level (see Appendix)*	

Source: *Author's Computation, (2020).* ***Notes:******, **, and * signify rejection of null hypothesis of non-significance at 1%, 5%, and 10% levels of significance, respectively. The standard errors are in parenthesis (), while the *p*-values are in brackets[]. A number of variables from Model 1contains exponential values.

4.4.1 ARDL Long-Run Regression Estimates

4.4.1.1 Long-Run Regression Estimates for Non-Life Insurance Density (Panel A: Model 1)

Panel A in Table 5 reports the ARDL long-run regression results of the macroeconomic, demographic, and institutional factors that affect insurance sector development in Nigeria. The study used two measures to capture insurance sector development namely non-life insurance density (demand-side) and penetration (supply-side).

The results of Model 1in Table 5indicate a positive (0.00006) and significant(p<0.01) relationship between financial development and insurance sector density, implying that a unit change in financial development leads to 0.00006-unit positive changes in non-life insurance density. Likewise, economic freedom is positively related to non-life insurance density with coefficient value of 0.00105 at p<0.01. This result implies that a unit change in economic freedom leads to positive changes in non-life insurance density by 0.00105 unit.

Population growth (β = 0.04429, p<0.01) has a positive and statistically significant effect on non-life insurance density as seen in Model 1. The level of education (β=-0.00006, p<0.01) has a negative and significant effect on non-life insurance density. Similarly, age dependency ratio shows a negative coefficient value of 0.00027with p<0.01.Real interest rate shows an expected positive coefficient of 0.00002 at p<0.1. Conversely, inflation has a negative effect on non-life insurance density at p<0.05. Table 5 also reports that trade openness shows a positive coefficient value of 0.00003 at p<0.01. Income growth rate and urbanization have positive coefficients but are statistically insignificant.

4.4.1.2 Long-Run Regression Estimates for Non-Life Insurance Penetration (Panel A: Model 2)

Table 5, Panel A, Model 2 presents the long-run regression estimates for non-life insurance penetration. Trade openness has a positive coefficient value of 0.00221 at p<0.05 implying that a unit change in trade openness results in 0.00033 unit positive change in non-life insurance penetration. Real interest rate reveals an expected positive coefficient of 0.00576 at p<0.05 and implies that a unit change in the real interest rate creates 0.00576 unit positive change in non-life insurance penetration. Educational level (β=0.00237, p<0.05)is positively related to non-life insurance penetration and suggests that non-life insurance penetration increases by 0.00237 unit when the level of education changes by a unit. Financial development shows positive coefficient of 0.02643 with p<0.1 implying that a unit change financial development leads to 0.02643 unit positive change in non-life insurance penetration. Table 5 also reveals that income growth rate, inflation, age dependency ratio, population,

urbanization, and economic freedom are not significant determinants of non-life insurance penetration in Nigeria.

4.4.2 Results of ARDL Short-Run Regression Estimates

4.4.2.1 ARDL Short-Run Regression Estimates for Non-Life Insurance Density (Panel B: Model 1)

Speed of adjustment (ADJ) coefficient (β =-0.02725, p<0.01in Model 1 shows that the variables slowly adjust to equilibrium position when deviations from equilibrium occurs. The negatively signed ADJ coefficient implies the existence of a cointegration relationship between insurance sector density and the independent variables. The study also reports the ARDL short-run regression estimates of non-life insurance density in Panel B of Table 5. The regression parameters from the one-period lagged variables in Model1 show the behaviour of the variables in the short-term. A holistic view of panel B in Table 5 reveals that the one-period lagged values of growth rate of income, real interest rate, urbanisation, and economic freedom are positively but non-significantly related with non-life insurance density in the short-run, while other variables such as level of education and population growth are significantly related with non-life insurance density though with negative outcome. Financial development is negative but has no significant relationship with non-life insurance density in the short-run.

4.4.2.2 ARDL Short-Run Regression Estimates for Non-Life Insurance Penetration (Panel B: Model 2)

The ARDL short-run results in Panel B of Table 5 also indicate the adjustment (ADJ) coefficient for Model 2 and reveals that the speed of adjustment is -0.08206 with p<0.05 implying a shift back to equilibrium level after a short-term shock. A long-run relationship is thus established between non-life insurance penetration and its determinants are now verified since the ADJ coefficient is negatively signed. For non-life insurance penetration, the ARDL short-run regression estimates as reported in Panel B of Table 5indicatesregression parameters from the one-period lagged explanatory variables and the short-term behaviour of the non-life insurance penetration. A cursory look at panel B in Table 5 shows that, in the short-run, the one-period lagged values of growth rate of income, age dependency, population growth, and urbanisation are positively but non-significantly related with non-life insurance penetration while level of education is positively and significantly related with non-life insurance penetration. Real interest rate, economic freedom, and financial development are negatively but non-significantly related to non-life insurance penetration.

4.4.3 Results of Model Diagnostics Tests

To validate results obtained in Table 5, the assumptions of the presence of serial correlation and heteroscedasticity are tested. The Breusch Godfrey LM

Serial Correlation test could not find evidence indicating the presence of higher-order autocorrelation in the disturbance/error term. The White Heteroscedasticity test revealed (*p*-value= 0.42>0.1) and (*p*-value= 0.41>0.1) for Models 1 and 2, respectively, it implies that the errors in the models are homoscedastic. The models are correctly specified as revealed by the Ramsey Reset test shows *p*-significance values of 0.3923 and 0.5451 for Models 1 and 2, which are not significant at10% significance level. In addition, cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests of Brown, Durbin, and Evans (1975) are employed to check the structural stability of the long-run coefficients. The results as presented in the appendix showed that neither the plots of CUSUM nor CUSUMSQ statistics are outside of the critical values at 5% significance level. This suggests that the null hypothesis of the stability of regression coefficients cannot be rejected. The diagnostics and stability tests thus validate the regression results.

4.5 Discussion

The ARDL estimation suggests the existence of a long-run relationship between insurance sector development (measured with non-life insurance density and penetration) and determinants while the model diagnostics also upheld the results. Therefore, the findings of this study are discussed from the purview of the long-run estimates.

4.5.1 Macroeconomic Factors and Insurance Sector Development

The positive and significant effect of trade openness on non-life insurance density and penetration, implies that further opening of trade to global markets helps insurers to accumulate more insurance assets. Moreover, trade openness requires that domestic companies involved in imports and exports businesses should protect their goods and/or services against the possibility of future losses or damage that may arise due to uncertainty, foreign competition, higher exposure to external shocks, and income volatility, thus increasing the request for non-life insurance products. This is consistent with the life cycle hypothesis and the studies of Petkovski and Kjosevski (2014), and Zewge (2019). Similarly, real interest rates positive and significant relationship with non-life insurance density and penetration implies that households' consumption of insurance products rises with increased real interest rate and suggests that a higher real interest rate have a tendency to increase the returns of insurers as well as their profitability which may enhance insurance sector development. This corroborates the findings of Meko *et al.* (2019) but negates the findings of Abbas and Ning (2016) and the life cycle hypothesis. The negative and significant effect of inflation on non-life insurance density implies that the demand and supply of insurance products together with expected returns are affected during periods of high inflation. Furthermore, a high level of anticipated inflation tends to discourage insurance consumers who cannot afford the high price of insurance products, thus causing a decline

in sales. The finding of this study agrees with the life cycle hypothesis and some extant studies (Beck & Webb, 2003). It deviates from the positive results reported by Abbas and Ning (2016) and Akhter and Khan(2017).

4.5.2 Demographic Factors and Insurance Sector Development

The results for level of education are ambiguous, with the negative result suggesting that a high level of education could make an individual more family-dependent for a long period, and this can affect the demand for insurance products. Moreso, highly educated persons with an increasing desire for higher returns on investment may hold more risky assets rather than insurance products. The study of Alhassan and Biekpe (2016a) showed a negative relationship for the variables. Meanwhile, the positive result is ashred of evidence that highly educated individuals are aware of the benefits associated with insurance products, their risk-averse attitude will make them consider insurance products as risk mitigating tools. The finding is similar to the outcome in the studies of Zerriaa*et al.* (2017) and as predicted by the life cycle hypothesis. The negative result of age dependency on non-life insurance density implies that households with a high proportion of young people possibly have to save more to meet the emerging daily consumption and future needs of the family, thus reducing the possibility of insurance consumption. This finding supports the outcome in the studies of Chui and Kwok (2009) and Guerineau and Sawadogo (2015) but deviates the evidence provided by Meko *et al.* (2019). Contrarily, a higher proportion of older dependents to the employed population is likely to make insurance consumption rise. Relating to population, a growing population tends to increase the possibility of demanding insurance products due to an increase in damage to properties. The study of Feyen*et al.* (2013) also provided evidence on the importance of a larger population in increasing the demand for non-life insurance but Brokešová et al. (2014) and Feyen*et al.*(2013) showed contrary results.

4.5.3 Institutional Factors and Insurance Sector Development

For institutional determinants, financial development positively and significantly affects non-life insurance density and penetration. This implies that the presence of well-developed and functioning banks in a bank-based financial system like Nigeria may enhance consumers' confidence in insurance companies and other non-bank financial institutions. Besides, many insurers consider the banking sector as an effective selling and distribution channel for their non-life products. This finding is supported by the study of Zerriaa and Noubbigh (2016). Economic freedom positively affects non-life insurance density and penetration but its effect on non-life insurance penetration is non-significant. The early discussion shows that economic freedom captures the institutional factors that include government size, rule of law, property rights and free access to international trade. The results thus

suggests that reduction or possible elimination of entry restrictions into the insurance market may increase market competitiveness. Additionally, the insurance market would also flourish if a good regulatory framework is in place consistent with the assertions of Feyen*et al, (*2013), Kjosevski (2012) and Trinh *et al.* (2016).

5. CONCLUSION AND RECOMMENDATIONS

This study investigated the determinants of insurance sector development in Nigeria for the period 1987 to 2018 using the demand (density) and supply (penetration) aspects of the insurance industry. This study concludes that non-life insurance services demand in Nigeria is positively and significantly affected by trade openness, real interest rate, population growth, financial development, and economic freedom whereas inflation rate, level of education, and age dependency have negative and significant effects. For the supply side of non-life insurance services, trade openness, real interest rate, level of education, and financial development are important variables that determine the supply of non-life insurance services in Nigeria. The study also shows that determinants of insurance sector development in Nigeria is responsive to the measures used to proxy insurance sector development. Based on these findings, it is recommended that the Nigerian government further increases GDP per capita through rapid investment and social expenditure, increased exports, and by decreasing the unemployment rate. Inflation should be checked and monitored through the monetary policy actions of the apex banking institution, it tends to discourage potential and returning customers who cannot pay for the highly-priced insurance products. The regulators of the insurance sector should take effective measures that are useful to attract consumers of non-life insurance products instead of allowing them to seek higher returns from alternative assets class.

It is important to further open up the economy to trading activities with the rest of the world, such that more companies involved in import and export businesses can increase the demand for non-life insurance to get protection for their goods, services, and human capital against unexpected future losses or damage. There is the need for the government to increase the provision of social welfare packages such as improved health care facilities so that the working-class population can save more for their young dependents. Furthermore, policies and strategies such as cross-selling will help to intensify and consolidate the cooperation between the insurance and banking industries (referred to as bancassurance). It is equally important to formulate policies that will ensure strict compliance to the removal of restrictions to market entry as well as heavy regulatory requirements to make the insurance market more competitive to enhance efficient service delivery.

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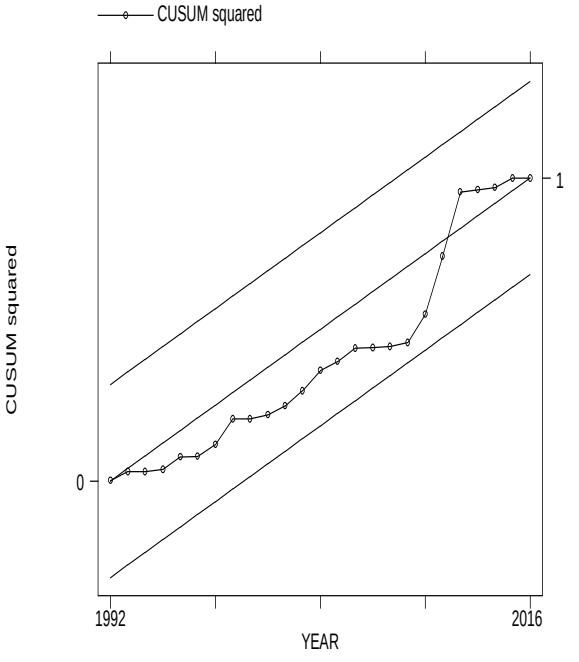
APPENDIX

Model 1



Model 2