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Determinants of Insurance Sector Development in Nigeria

Kolapo, Funso Tajudeen (PhD)[1], Oluwaleye, Taiwo Olarinre[2], Osasona, Adedeji Viscker[3]

[1] Department of Finance, Faculty of Management Sciences, Ekiti State University, Ado-Ekiti, Ekiti State, Nigeria
[2,3] Department of Finance (Insurance Unit), Faculty of Management Sciences, Ekiti State University, Ado-Ekiti, Ekiti State, Nigeria

ABSTRACT: Insurance market in Nigeria like other developing African countries have remained small, less pervasive, and underdeveloped with evidence from the abysmally low density and penetration rates. These casts doubt on insurance sector development in Nigeria to question whether the issues are related to dynamics in macroeconomics, demographic, and institutional factors affect the sector. The determinants of insurance sector development in Nigeria for the period 1987 to 2020 follows a multiple regression framework through ARDLbounds cointegrationtesting. The Error Correction Model (ECM) results show the speed-of-adjustment to equilibrium-level following a short-term distortion had negative coefficients of0.02725;p=0.000<0.01and 1.08206; p=0.014<0.05 for non-life insurance density and penetration, respectively.Non-life insurance demand is positive and significantly influenced by trade openness, real interest rates, population growth, and financial development in the long run, according to long-term estimates. Non-life insurance premiums are reduced by inflation and the age of the population. This study recommends that GDP per capita be grown further through quick investment and social spending, greater exports, and a decrease in unemployment, while interest rates and inflation levels should be checked (monitored) through monetary policy activities of the apex financial institution.

KEYWORDS: Insurance Sector, Life Assurance, Non-Life Assurance, Premium, Development

1. INTRODUCTION

Large investors in the insurance industry provide risk management services to various economic sectors, making it an important component of the financial sector (Gaganis, Hasan &Pasiouras, 2019). Insurance companies areimportant financial intermediaries that perform critical risk underwriting, financing, and management for individuals and companies. Besides, these institutions help to channel long-term resources and domestic savings through their financial intermediation process (Olayungbo, 2015; Guerineau& Sawadogo, 2015).

Life and non-life insurance activities that encourage long-term savings, investment, and growth could drive the insurance market. Despite the insurance sector's perceived rolein business survival and economic growth, several factors can improve or plague its development. Extant studies have identified several factors which may be classified into macroeconomic, demographic, sociocultural, and institutional factors(for instance, interest rate, dependency ratio, and economic freedom) as determinants of insurance sector development (for instance, Brokešová*et al.*, 2014; Mathew &Sivaraman, 2017; Satrovic&Muslija, 2018).The factors affecting insurance sector development could differ across geographical regions due to the dissimilarities in their economic, demographic, and institutional components. The development of the insurance sector depends on the convergence of the supply and demand of life and non-life insurance businesses. These factors can have an impact on how the insurance sector operates as a whole (Brokeová et al., 2014).

Nigeria and other developing African countries have extremely low levels of insurance penetration, despite the low costs of insurance products (Alhassan&Biekpe, 2016). The insurance market in Nigeria has remained underdeveloped. The market activities contribute minimally to the economy's growth due to the lack of adequate reforms andstrict 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).Non-life insurance penetration of 0.18% in Nigeria is one of the lowest in the world, according to insurance statistics. As a result, Nigeria's insurance sector is still in its infancy, and the country's growth in the sector should be given the utmost importance. The insurance industry in Nigeria is still developing. An investigation into possible impact of economic variables' on the insurance market is necessary. There are limited studies on growth of non-life insurance markets in African economies. This study's overarching goal is to investigate the factors that influence the growth of Nigeria's insurance market. The non-life insurance is more common in

developing countries like Nigeria, this study focuses on this area.

Empirical studies have examined the role of insurance sector for economic expansion in Nigeria, there is little empirical evidence on what drives the development of the sector. In light of the foregoing, a comprehensive market approach (considering both demand and supply) is needed to examine the factors influencing insurance sector development in Nigeria, as this topic has received little attention in the country's academic literature.

2. LITERATURE REVIEW

Conceptual Issues

The expansion of the insurance industry necessitates an increase in the market's density and penetration. Increased per capita insurance premium spending leads to an increase in the sector's density (Brokeová&Vachálková, 2016). Another factor that influences how quickly the industry grows is the numbers of insurance companies. Direct premiums written in relation to productivity increase each year, resulting in insurance penetration. Life, non-life, and total insurance companies can contribute to the expansion of the insurance market. Non-life insurance companies are essential to any financial system because they promote long-term savings and large-scale reinvestment in public-private projects (Satrovic&Muslija, 2018). Premiums adjusted for population, insurance penetration, insurance density, and net-written premiums are four measures of the insurance sector's development (Din, Regupathi, Abu-Bakar, Lim, & Ahmed, 2020). Using insurance premium penetration and density (the amount of money people spend on insurance per person) as indicators of the development of the insurance sector is appropriate. This study examines the growth of the insurance industry in terms of GDP and non-life insurance premiums paid per person using both non-life insurance penetration and density.

The Life Cycle Theory

According to the life-cycle hypothesis proposed by Ando and Modigliani (1963), households aim to maximize the expected utility of their consumption over the course of their lifetime. The life-cycle hypothesis of Ando and Modigliani (1963) was espoused by Yaari (1965) to explain the need for insurance because of an individual's uncertain lifespan. According to this theory, a person's savings habits show that he or she is trying to spread out his or her consumption over the course of a lifetime, from work life through to retirement. A person's utility function is increased by purchasing insurance to provide for his or her dependents in the event of his or her death (Beck & Webb, 2003). The life cycle model considers an individual's wealth, estimated lifetime income, interest rate level, insurance policy fees (administrative costs), and the assumed subjective discount for current and future consumption (Satrovic&Muslija, 2018). According to the life cycle model's underlying principles, the insurance sector's growth could increase as life expectancy rises. Based on this hypothesis, insurance demand is inversely related to age dependency. As the number of people who are dependent on others grows older, fewer people are able to save for the future because they are too busy taking care of their immediate needs (Zerriaa&Noubbigh, 2016).

Empirical Review

A well-developed financial sector has also been shown to boost people's confidence in taking out insurance policies (Alhassan&Biepke 2016a; Mishra, 2014; Sen &Madheswaran, 2013; Zerriaa&Noubbigh, 2016). These studies agree that development in the insurance industry is influenced by changes in the financial, social, and macroeconomic environments. Many studies have shown that a combination of favorable economic conditions, a well-educated populace, high national income and financial development, and the strict enforcement of property rights have the potential to help the insurance sector thrive. The factors identified above can influence the insurance industry, but how much depends on environmental, population, and other societal factors. Thus, empirical studies focused on cultural (Chui & Kwok, 2009); religious (Feyen, Lester & Rocha, 2013); globalisation (Lee & Chiu, 2016); interest rate (Lee & Chang, 2015); the perception of health status (Al-Wang, Lee, Lin, & Tsai, 2018); and health expenditure (Alhassan&Biekpe, 2016a) differences as factors that affect insurance sector development.

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. Factors such as the elderly-to-dependents ratio, inflation, social security, urbanization, and criminality have an effect on the growth of the insurance sector in Central European economies. Zyka and Myftaraj (2014) looked at how the Albanian insurance industry have grown from the period 1999 to 2009. Economic growth, population growth, urbanization, and paid insurance claims have a positive effect on the overall insurance premium. A rise in insurance premiums results from an increase in demand, which has an effect on the culture of insurance use. Non-life insurance consumption in 16 CSEE countries was studied by Petkovski and Kjosevski (2014) for the period from 1992 to 2011. The long-term results of the cointegration test and Dynamic Ordinary Least Squares (DOLS) estimator showed that non-life insurance consumption is positively influenced by the number of passenger cars per 1,000 people, as well as GDP per capita. An error correction model was used by Kjosevski and Petkova (2015) in a study of non-life insurance consumption in 14 countries in Central and Southeast Europe, which spans from 1995 to 2010. Findings reveal the long-term impact of household size and car ownership on nonlife

insurance consumption, while the rule of law and EU membership have short-term impacts.

Poposki et al. (2015) examined the elements that influenced the penetration of non-life insurance for eight SEE countries from 1995 to 2011. An error correction model was used by Kjosevski and Petkova (2015) in their study of non-life insurance consumption for 14 countries in Central and Southeast Europe, which ran from 1995 to 2010. People, houses, and cars have long-term effects on nonlife insurance consumption, while rule of law and EU membership have short-term effects, according to the findings. For four Central European countries, Brokeová and Vachálková (2016) studied the macroeconomic environment's influence on the development of the insurance industry from 1995 to 2013. Macroeconomic conditions have an enormous impact on the insurance industry development for the transition countries through the results of the pooled OLS model. It was discovered that GDP per capita has a negative impact on insurance premiums in Tanzania, according to Abbas and Ning (2016), the study used the OLS estimator for the period 1991 to 2010.Inflation and interest ratesnegatively impact on Tanzania's insurance industry. There was evidence to suggest that GDP growth has a positive impact on the industry's development.

Over a period from 2000 to 2011, Trinh, Sgro and Nguyen (2016) examined the factors that determinenonlife insurance expenditures for 36 developed- and 31 developing-countries. Using several estimators, the results showed that across countries, income, bank development, economic freedom, urbanization, law systems, and culture drive non-life insurance expenditures, and their impact varies across countries. Akhter and Khan (2017) focused on the macroeconomic factors that influence Takaful (Islamic insurance) and conventional insurance in the 14 ASEAN and Middle East regions from 2005 to 2014. Urbanization, financial development, as well as income levels affect insurance demand positively, according to Fixed and Random Effects regression models. All regions' Takaful demand was found to be positively affected by inflation; dependency and education ratios had a negative impact. An analysis of the influence of economic factors on insurance development in Western Balkan countries was carried out by Buric et al. (2017) over a five-year period from 2005 to 2015. Insurance demand in the Western Balkans is positively affected by GDP and wage growth, but negatively affected by unemployment and interest rates.

Using data from 2002 to 2012 obtained for 31 European countries, Dragos, Mare, and Dragos (2019) identified the main institutional drivers of insurance consumption. Interest rates and fiscal freedom have a positive impact on insurance consumption, governance effectiveness has a impacts it when using the difference and system Generalised Method of Moments (GMM) estimators. From 1980 to 2017, Zewge (2019) examined Ethiopia's insurance industry's growth from an economic and demographic perspective and analysed the data with the Autoregressive Distributed Lag (ARDL) regression. Trade openness, urbanization, income, financial development, and economic growth were found to have positive and significant effects on the development of the insurance industry, according to the findings. As a result, insurance demand is negatively correlated with inflation.Gaganis*et al.* (2019) examined the relationship between insurance sector regulation and development in 44 developed and developing countries from 2000 to 2008. Feasible Generalized Least Square estimator results showed that inflation, dependency ratio and life expectancy have a negative impact on the development of the insurance sector while GDP per capita and the growth of banks have a positive impact. Government expenditure has no effect on the insurance industry.

An investigation the drivers of insurance demand in Ethiopia from 2001 to 2016 was carried out by Meko, Lemie, and Worku (2019). Age dependency, urbanization, real interest rate, inflation, and life expectancy have positively significant effect on insurance demand in Ethiopia, while GDP per capita and the price of insurance have no effect. Insurance consumption in South-Asia insurance markets was examined by Sanjeewa, Hongbing, and Hashmi (2019) from 1996 to 2017. The results showed that demographic factors are important in explaining insurance consumption than financial factors. Furthermore, it reported that urbanisation, private health expenditure, income, dependency, and life expectancy reduce insurance demand whereas financial development and education affectinsurance consumptionpositively.

Research Gap

Most studies have identified the factors influencing insurance sector development in developed countries. However, there are limited studies from other 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.As a result of the wide range of factors influencing insurance demand that exist from country to country, insurance consumption differs among countries. Probably as a result of the insurance industry's small size in comparison to the banking industry, there have not been many studies in Nigeria looking at its development. Thus, this study focuses on Nigeria's insurance industry's development drivers.

Besides, this study employs two alternative measures of insurance sector development, namely insurance sector density and penetration, to better understand the subject of discussion. In empirical studies on the development of Nigeria's insurance sector, the role of institutional factors, such as banking sector development and economic freedom, has been overlooked.

3. METHODOLOGY

Model Specification

This study adopts the model from the study of Brokešová*et al.*(2014) by incorporating foreign direct investment, real interest rate, and an additional institutional variable(index of economic freedom) as plausible determinants of insurance sector development.There are two ways in which this study differs from Brokeová et al. (2014). Firstly, it focuses on both demand and supply, i.e. density and penetration, in the insurance sector development. Second, the variables incorporated are important because increasing inflows of foreign direct investment without macroeconomic disturbances, market-entry restrictions, and trade barriers could help to accumulate more insurance assets, thus enhancing insurance sector development. This study examines the determinants of insurance sector development using variables such as income, trade openness, interest rate, inflation, education, dependency ratio, population growth, life expectancy, urbanization, financial development, and economic freedom. The functional model is 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 stands for insurance sector development: non-life insurance penetration and density, 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; FDrepresents financial development;and FRE is economicfreedom index. Besides, β_0, the intercept; $\beta_1 - \beta_{11}$ are the regressors' coefficients; μ is error term; while t representstime-series element. The explanatory variables may have a varying relationship with insurance sector development depending on the measure used.

The ARDL model, which is used to estimate short- and long-term relationships, is elaborated upon using the basic equation 2. Based on this, the generalised ARDL modelfrom Pesaran, Shin, and Smith (2001) is specified as follows;

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{a} \delta_h \Delta Y_{t-i} + \sum_{j=0}^{b} \delta_j \Delta X_{t-j} + \beta_1 Y_{t-1} + \beta_2 X_{t-1} + \varepsilon_t \quad (3)$$

where Δ refers to the first-difference operator, α_0 is the equation's drift component, while T refers to time-trend. Y_t is the dependent variable and X_t is the vector for Y_t determinants, δ's are the short-run coefficients to be calculated, β's are the long-run multipliers, and e_t represents the error- term that are assumed to be identically distributed and independent.

Following the establishment of the ARDL model and the co-integration of the variables using the bounds testing approach, it is necessary to estimate the short-run relationships of the variables using an error-correction model in the generalised form specified by Pesaran and Shin (1999) and Pesaran et al. (2001).

To incorporate variables of study into the ARDL framework, the model is specified as:

$$\Delta ISD_t = \beta_0 + \sum_{j=0}^{n} \beta_1 \Delta GY_{t-j} + \sum_{j=0}^{n} \beta_2 \Delta OPEN_{t-j} + \sum_{j=0}^{n} \beta_3 \Delta RIR_{t-j} + \sum_{j=0}^{n} \beta_4 \Delta INF_{t-j}$$
$$\sum_{j=0}^{n} \beta_5 \Delta EDU_{t-j} + \sum_{j=0}^{n} \beta_6 \Delta AD_{t-j} + \sum_{j=0}^{n} \beta_7 \Delta POP_{t-j} + \sum_{j=0}^{n} \beta_8 \Delta LEX_{t-j}$$
$$\sum_{j=0}^{n} \beta_9 \Delta URB_{t-j} + \sum_{j=0}^{n} \beta_{10} \Delta FD_{t-j} + \sum_{j=0}^{n} \beta_{11} \Delta FRE_{t-j} + \sum_{j=0}^{n} \beta_7 \Delta LEX_{t-j} + \lambda ECM_{t-1} + \varepsilon_t \quad (4)$$

where λ is the error-correction coefficient, ECM_{t-1}. δcould be negatively signed, implying variables in the model can be restored backtoequilibrium levels at the instance of any short-run deviations.

Research Design and Data Information

The ex-post facto research design is used to unravelthe factors that determineNigeria's insurance sector development. Based on existing facts and data, this design is appropriate. The data used in this study spans the years 1987 to 2020. The start period 1987, a year after Nigeria's financial sector had just been liberalized and the Structural Adjustment Program (SAP) had been implemented. The emergence of SAP 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.

Definition of Variables, Measurements, and Data Information

The data-series are gleaned from the Fraser Institute and World Bank's database. Table1 presents the variables

description and data sources, their measurements, and the supporting literature.

Table 1. Variables' Description, Measurement, Supporting Literature, and Expected Sign

Variable	Description	Measurement	Supporting Studies	Expected Sign	Data Sources
Dependent variables					
Non-life insurance density(DEN)	Individuals' spending on non-life insurance services is reflected in this figure. The insurance sector's development is a primary indicator.	Non-life insurance premiums are calculated as a percentage of the total population's gross written premiums (non-life insurance per capita)	Dragoş*et al.* (2019); Gaganis*et al.* (2019)	NA	Author's calculation
Non-life insurance penetration(PEN)	It is a measure of how much the non-life insurance market (supply) contributes to overall economic activity. As an alternative measure of insurance sector development, it is employed in this study.	It is measured as the 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 (Swiss Re)
Independent variables:					
Macroeconomic variables					
GDP per capita (GY)	It is the gross domestic product divided by mid-year population	GDP per capita expressed in US dollars	Meko*et al.* (2019); Lee *et al.* (2017); Gaganis*et al.* (2019)	Positive	World Bank Database
Trade openness (OPEN)	A country's willingness to trade with the rest of the world can be seen by looking at its GDP per capita.	It is the ratio of a country's total trade to GDP	PetkovskiandKjosevski(2014)	Positive	World Bank Database
Interest rate (RIR)	It reflects insurance companies' investment returns and the opportunity cost for alternative assets.	The difference between lending rate and inflation is used to calculate the real interest rate (percent).	Meko*et al.* (2019); Zerriaa*et al.* (2017); Lee *et al.* (2017)	Positive	World Bank Database
Inflation rate (INF)	It is a measure of how quickly prices have risen over a specific time period. Price increases or the cost of living in a particular country are two examples of broad measures of inflation.	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	World Bank Database

	Socio-demographic variables				
Age dependency ratio (AD)	In a population, it is the number of people in the labor force divided by the total number of people in the population.	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	World Bank Database
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 %)	Kaur(2015); Feyen*et al.* (2013)	Positive	World Bank Database
Level of education (EDU)	It shows the qualification of individuals in a country, ranging from primary to tertiary levels.	It is measured as primary education enrolment rate (% gross)	Akhter and Khan (2017); Lee *et al.* (2017)	Positive	World Bank Database
Life expectancy (LEX)	A life insurance policy's actuarially fair price is often unavailable to the general public.	It is measured as life expectancy at birth (in years)	Lee *et al.* (2017); Gaganis*et al.* (2019)	Positive	World Bank Database
Urbanisation (URB)	It refers to people living in urban areas	It is measured as percentage change in annual urban growth	Akhter and Khan (2017); Lee *et al.* (2017)	Positive	World Bank Database
Institutional variables					
Financial development (FD)	It describes the developments in financial size, efficiency, stability, and access	It is measured as the credit to private sector by banks as a ratio of GDP	Gaganis*et al.* (2019)	Positive	World Bank Database
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.	Park andLemaire (2012); Kjosevski (2012); Feyen*et al.* (2013); Trinh *et al.* (2016)	Positive	Fraser Institute

Source: *Author's compilation (2021) 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 World Bank. and Central Bank of Nigeriadatabases.*

Estimation Techniques

The factors that influence the development of Nigeria's insurance industry are examined in this study using both descriptive and inferential statistical methods. There were both shortterm as well as longtermeffects of the independent variables on insurance sector development, which was conducted using the ARDL bounds framework. When compared to the Johansen cointegration method, the technique put forward by Pesaran et al. (2001) has some

distinct advantages. A co-integration test can be performed regardless of whether the series is I(0), I(1), or fractionally co-integrated [I(0)/I(10)] because it does not impose the restrictive assumption of series integration in the same order. A study with a small sample size can use the ARDL model rather than the Johansen's cointegration model (Pesaran et al., 2001). Results' reliability 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 & DISCUSSION

Summary Statistics

Table 2 summarizes the descriptive statistics for the variables used in the study. The sample mean, standard deviations, minimum and maximum values are all included in these statistics.

Table 2. The Summary Statistics

VARIABLE	MEAN	STD. DEV	MIN.	MAX.
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, (2021) with underlying data fromthe World Bank Database, Swiss Re Reports, and Fraser Institute.*

Results for the Stationarity of Variables

Unit Root Test

It is critical to guarantee that all time-series data are stationary, with constant mean and variance throughout time, before estimating a regression model. The test determines whether or not the model's variables have a unit root (stationarity properties). When using non-stationary data in a regression, the existence ofspurious result becomes imminent (Wang &Hafner, 2018). The test is also used to examine the order of integration-I(d) for each variable, since this will indicate the correct regression model to estimate. As a result, the augmented Dickey-Fuller Test of Unit Root (ADF-URT) confirms the variables' stationarity. Table 3 shows the findings from the unit root test.

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

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, (2021).*

Note: *** and *** denote the null hypothesis being rejected at the 5% and 1% significance levels, respectively.*

The results of the ADF unit-root test reveal that the stationarity of variables at I(0) or I(1). Except for PEN, GY, and FRE, all of the variables are level stationary. This shows that the null hypothesis of variable non-stationarity at their respective significance levels is rejected. This finding meets the requirement for estimating the ARDL framework, which ensures the establishment of long-term linkages between variables. The bound testing technique to cointegration assumes that all variables must be I(0) and I(1), implying that the variables are mutually integrated.

ARDL Bounds Testing Approach for Co-integrating Relationship

To determine the existence of long-run equilibrium relationships among the variables, this study employs the ARDL framework, which was developed by Pesaran and Shin (1999) and endorsed by Pesaran et al. (2001). The ARDL limits test's lower and upper bound critical values are used to test the null hypothesis that the underlying variables have no long-term association. When the estimated F-statistic exceeds the upper bound critical values, the null hypothesis of no cointegration is rejected; otherwise, it is accepted.

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, (2021).*

Notes: **** denotes null hypothesis is rejected at a 1% significance level. I(0) and I(1) signify lower bound and upperbound, respectively.*

Table 4 displays the results of the ARDL bounds test, which reveal that when non-life insurance density and penetration are used to quantify insurance sector development, the derived F-test value is 6.084 and 4.355, respectively. At all significance levels, these figures far exceed the upper bound I(1) asymptotic critical values. As a result, the null hypothesis (H0) of no cointegration is ruled out. This shows that the variables have cointegrating relationships, allowing the long-run and short-run dynamic models to be established.

Results of the ARDL Estimates

This study generates long-run and short-run coefficients for the two separate models for comparison analysis using Stata 13 software. The results of the estimation will provide answers to the study's hypotheses. It will identify the demographic, macroeconomic, and institutional elements that impact on the insurance sector. Table 5 summarizes the findings. Stata could not generate a matrix with too many rows or columns, or fit a model with too many variables for the lag length technique, the study dropped life expectancy, which is directly linked to the demand for life insurance.

Table 5. Results of 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**	-0.01009

	(7.90e-06)	(0.00572)
EDU	-0.00006***	0.00237**
	(0.00001)	(0.00035)
AD	-0.00027***	0.06478
	(0.00007)	(0.06126)
POP	0.04429***	1.50887
	(0.00272)	(2.23353)
URB	0.00012	-0.15436
	(0.00039)	(0.29985)
FD	0.00006***	0.02643*
	(0.00002)	(0.01110)
FRE	0.00105***	0.07943
	(0.00033)	(0.22399)
Panel B		
Short-Run		
GY_{t-1}	2.09e-08	0.00050
	(2.82e-08)	(0.00073)
INT_{t-1}	4.92e-08	-0.00382
	(4.92e-08)	(0.00204)
EDU_{t-1}	-1.48e-06***	0.0088**
	(4.15e-07)	(0.00072)
AD_{t-1}	-1.61e-06	0.00857
	(5.66e-06)	(0.14966)
POP_{t-1}	-0.00107**	5.05317
	(0.00010)	(6.3086)
URB_{t-1}	3.79e-06	0.04696
	(6.86e-06)	(0.12988)
FD_{t-1}	-8.65e-07	-0.00567
	(7.91e-07)	(0.01323)
FRE_{t-1}	8.46e-06	-0.14627
	(7.13e-06)	(0.24372)
Constant	-0.00399***	-1.16962
	(0.00029)	(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]*
CUSUMandCUMSUMSQ Model Stability test	*Lies within the 5% significance level (see Appendix)*	

Source: *Author's Computation, (2021).* ***Notes:******, **, and * imply the null hypothesis is rejected at 1%, 5%, and 10% levels of significance, respectively. The standard errors are denoted by (), while the p-values are denoted by []. Exponential values appear in a variety of variables in model one.

ARDL Long-Run Regression Estimates

Estimates for Non-Life Insurance Density

On Panel A of Table 5, this study presents the ARDL long-run regression estimates. The findings highlight the impact of macroeconomic, institutional, and demographic factors on insurance sector development using two separate measures: non-life insurance density and penetration, which represent demand and supply, respectively.

First, financial development and insurance sector density are positively linked, according to the results of model 1. Similarly, economic freedom shows a positive correlation with non-life insurance density, as expected, and this relationship is significant at the 1% level. Having a larger population has a positive influence on the density of non-life insurance. Model 1 has a 1% significance level for the relationship described. Similarly, urbanization is related with a higher density of non-life insurance. Non-life insurance is more prevalent in areas with a higher level of education. In model 1, the relationship is statistically significant at the 1% significance level. With a negative coefficient, the age dependence ratio shows an adverse effect on non-life insurance density. At the 1% significance level, age

dependency is significant in model 1. Expected positive and significant correlation between non-life insurance density and real interest rate. Non-life insurance density is positively correlated with the real interest rate at a 10% level of significance in model 1. Non-life insurance density and inflation go hand in hand. At the 5% significance level, the association issignificant in model 1. Although it is not statistically significant, the income growth coefficient was shown to be positive. Expected, but inconsequential at whatever significance level, is this positive association Non-life insurance density was positively associated with trade openness. Model 1 shows a substantial 1 percent correlation between trade openness and non-life insurance sector density. Insurance density for non-life businesses is positively associated with urbanization, but the correlation is not significant at any level.

Estimates for Non-Life Insurance Penetration

The results from model 2 reveal a relationship between insurance sector penetration and its determinants, as shown in Table 5. In model 2, the growth rate of income has a positive but non-significantly related with penetration of non-life insurance. As expected, trade openness was positively correlated with non-life insurance penetration. At a 5% level of significance, the direct relationship between insurance sector relationship and trade openness is significant for model 2.

The relationship between the real interest rate and insurance sector penetration becomes substantial at 5%. Inflation has a negative impact.

The percentage of people who have non-life insurance is inversely proportional to their level of education. At a 5% level of significance, the relationship is significant. Although there is a positive relationship between age dependency and non-life insurance penetration, age dependency is a non-significant factor of insurance sector penetration. Non-life insurance penetration shows an increasing effect as the population increase. Non-life insurance penetration is adversely related with urbanisation. The relationship between urbanisation and non-life insurance demand is non-significant.

Financial development has a favorable link with insurance sector penetration, which is statistically significant at 10% level of significance. Economic freedom is positively connected to non-life insurance penetration, as one would assume, although it is insignificant in explaining non-life insurance penetration.

ARDL Short-Run Regression Estimates

Estimates for Non-Life Insurance Density

The adjustment (ADJ) coefficient indicates how quickly the model 1 returns to equilibrium following a short-term distortion. The coefficients are negative, as expected, with a value of -0.02725. As demonstrated in model 1, this figure is significant at the 1% level of significance. Model 1's adjustment speed is quite slow, as shown in the diagram. The cointegration relationship between the insurance sector density and its determinants is confirmed by the negatively signed ADJ coefficient.

On Panel B of Table 4.4, the study also reports the ARDL short-run regression estimates non-life insurance density. The short-term behavior of the variables is depicted by the regression parameters from the one-period lagged variables in model 1. In the short run, the one-period lagged values of growth rate of income, real interest rate, urbanisation, and economic freedom are positively but non-significantly related to non-life insurance density, while other variables like level of education and population growth are significantly related to nonlife insurance density with a negative outcome. Non-life insurance density shows a negative, but not statistically significant, link with financial progress in the short term.

Estimates for Non-Life Insurance Penetration

The adjustment (ADJ) coefficient for model 2 is also indicated by the ARDL short-run results in Panel B of Table 4.4. It displays the speed with which the model 2 returns to equilibrium after a short-term shock. With a value of -1.08206, the coefficient is negative as expected and significant at the 5% level of significance. The ADJ coefficient is negatively signed, a long-run relationship between non-life insurance penetration and the plausible determinants may now be proven.

The ARDL short-run regression estimates for non-life insurance penetration, as shown in Panel B of Table 5, show the regression parameters from the one-period lagged explanatory factors as well as the non-life insurance penetration's short-term behavior. 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 to non-life insurance penetration, whereas level of education is positive and significantly linked to non-life insurance penetration. Non-life insurance prevalence is negatively but insignificantly connected to real interest rates, financial development, and economic freedom.

Results of Model Diagnostics Tests

The model diagnostic and stability tests used in the study are to validate the regression results. The presence of serial correlation and heteroscedasticity assumptions are tested. Table 5 shows that the Breusch Godfrey LM Serial Correlation test found no evidence of higher-order serial correlation in the error term. For models 1 and 2, the White Heteroscedasticity test revealed (p-value= 0.42>0.1) and (p-value= 0.41>0.1), respectively, indicating homoskedastic errors. The Ramsey Reset test shows that the models are specified in a correct style, with p-values of 0.3923 and 0.5451 for models 1 and 2, respectively, that are non-significant at the 10% level of significance. The test statistic value and the p-value at a 10% level of significance are used

to determine whether the null hypothesis is rejected in these diagnostic tests. Brown, Durbin, and Evans (1975) proposed the cumulative sum of squares (CUSUMSQ) and cumulative sum (CUSUM) tests to determine the structural stability of the long-run estimates. According to the results presented in the appendix, neither the plots of CUSUM nor CUSUMSQ statistics remain within the limit of critical values at a 5% significance level. As a result, the null hypothesis of non-stability of regression coefficients cannot be rejected. According to the diagnostics and stability tests, the regression results are effective.

Discussion of Findings

Non-life insurance penetration and density were positively linked with income growth with a non-significant relationship. Kjosevski (2012) and Nkotsoe (2018) found that the development of insurance in developing countries is positively affected by an increase in income.Non-life insurance penetration and density increase with greater trade openness.An increasing opportunity to global trade increases insurer profits through increase in insurance assets.Petkovski and Kjosevski (2014), Chitayo (2017), and Zewge (2018) support this conclusion. Real interest rates had a positive impact on the density and penetration of non-life insurance. When real interest rates rise, households are more likely to purchase non-life insurance products.An increase in the real interest rate helps to increase insurers' investment returns and profitability. Meko*et al.* (2019) showed a similar finding. Inflationnegatively impacts on non-life insurance density and penetration, however, its density is significantly affected by inflation.Demand and supply of insurance products, as well as their expected returns, are impacted by inflationary pressures. This study's findings agree withBeck and Webb (2003).

The demographics, starting with the level of education is negatively and significantly related with non-life insurance density but has positively significant relations with non-life insurance penetration. This result is ambiguous, 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 positive result is a shred 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 the assertations from the life-cycle hypothesis. The age dependency ratio has a negatively significant effect on insurance density, but a non-significant positive effect on penetration. 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 (2008) and Guerineau and Sawadogo (2015). Increased insurance consumption is expected to increase with higher working population and a higher proportion of elderly dependents. A considerable and favorable impact of population on non-life insurance density has emerged, but there is no significant impact of population expansion on the penetration of non-life insurance. As population increases, there is a greater need insurance to offset the escalating costs of property damage. Non-life insurance density has a positive relationship with urbanization, whereas non-life insurance penetration has a negative relationship with urbanization. Insurance goods could be more widely available to the population if there is a high level of urbanization. This would reduce households' reliance on informal insurance agreements.

Non-life insurance density and penetration tend to improve with higher financial development. In a bank-based financial system like Nigeria, the presence of well-developed and functioning banks may increase consumer confidence in insurance companies and other non-bank financial institutions. The findings of Alhassan and Biekpe (2016b), Zerriaa and Noubbigh (2016) and Zerriaa et al. (2017), support this conclusion. Economic freedom has a positive impact on non-life insurance density and penetration, but it has no effect on insurance penetration. Consequently, the removal of entry restrictions into the insurance market tends to increase the market's competitiveness. Park and Lemaire (2012) and Trinh et al. (2016) found similar results. According to Park *et al.* (2002), regulations imposed on the insurance industry by the host government has an impact on the insurance sector's pervasiveness. The insurance market thrives when there is a well-functioning regulatory framework (Feyen et al., 2013; Kjosevski, 2012). Economic freedom has a positively significant influence on the development of the insurance sector, according to Trinh et al. (2016).

5. CONCLUSION & RECOMMENDATIONS

This study looked at the elements that influence the development of Nigeria's insurance sector from 1987 to 2020. Factors such as trade openness, real interest rates, population growth, and financial development influence Nigeria's demand for non-life insurance services positively and significantly, whereas inflation rate, level of education, and age dependency have negatively significant effect on demand for Nigeria's non-life insurance services. Real interest rates, trade openness, education levels, and the country's financial development determine the availability of non-life insurance services in Nigeria. Besides, the measures adopted in capturing insurance sector development in Nigeria matters, the determinants are responsive to such measures.

Based on policy measures, Nigeria should increase GDP per capita by increasing investment and social spending,

exporting more, and decreasing unemployment, as suggested by findings of this study. 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. It is critical to continue to open up the economy to global trading activities so that more enterprises engaged in import and export operations can benefit from non-life insurance to cover their goods, services, and human capital from unforeseen future losses or damage. 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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