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Digitalization of Insurance Sector for Nigeria's Sustainable Development: A Panel Auto-regressive Distributed Lag (ARDL) modeling

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ABSTRACT
Insurance is a risk transfer mechanism, whereby the insured is put in the pecuniary position that he was before the occurrence of the insured event. The compensation is drawn from the portfolio of those in the same pool facing similar fortunes. The Insurance industry continues to play an important role in the financial and economic development of the country. The study analyses the long–run and short-run impacts of Insurance penetration into the Nigeria Economy. The Panel Auto-Regressive Distributed Lag Model (ARDL) was used on the 19 Insurance Companies that are quoted in the Nigeria Stock Exchange, between the periods 2006-2015 with the corresponding Gross Domestic Products. A co-integrating and Autoregressive relationship was discovered between insurance variables,(profitability, liquidity and tangibility, and equity) with the Gross Domestic Products. The Error Correction Term's significance and negative sign demonstrate that all variables are heading towards long run equilibrium at a moderate rate of 56.4%. This further affirms that profitability, liquidity and tangibility determine insurance profits and hence penetration into Nigeria economy in the long run. The findings of this study recommend that a digitalized Insurance driven economic-wide policies by the government and regulators of insurance market informed by these significant factors would boast Sustainable National Development.
Keywords: Panel data, Auto-regressive Distributed Lag, Liquidity, Tangibility, Co-integration.

INTRODUCTION
An Insurance contract normally covers an Insurer's liability to indemnify losses caused by specific events like fire, accident, death etc. An Insurance contract can in addition, include more than these pure risk elements, in particular, life and pension. Insurance schemes may also provide savings for future years. Insurance is a risk transfer mechanism, whereby the insured is put in the pecuniary state he was before the occurrence of the insured event. The consideration to the insurer is the premium paid at the start of the contract; adequate to commensurate the level of the risk. The growing share of the insurance sector in almost every developing and developed countries, has shifted attention to insurance growth nexus.

In absence of a financial system that can provide the means of transforming technical innovations into broad implementations, technological progress will not have significant and substantial impact on the economic development and growth. The importance of insurance growth is due to the increasing share of the insurance sector in the aggregate financial sector in almost every developing and developed country. Insurance companies are one of the biggest institutional investors into stock, bond and real estate markets and their possible impact on the economic development will rather grow than decline due to issues such as aging societies, widening income disparity and globalization. The growing links between the insurance and other financial sectors also emphasize the possible role of insurance companies in economic growth (Rule, 2001).Insurances are similar to banks and capital markets as they serve the needs of business units and private households in financial intermediaries. The availability of insurance services is essential for the stability of the economy and can make the business participants accept aggravated risks.

By accepting claims, insurance companies also have to pool premiums and form reserve funds. So insurance companies are playing an important role by enhancing internal cash flow at the assured and by creating large amount of assets placed on the capital market and hence may contribute to economic growth.

The major functionality of the insurance on the client side is risk transfer. Usually the insured pays a premium and is secured against a specific uncertainty. Measured in terms of insurance premium paid relative to Gross Domestic Product (GDP), the importance of insurance based risk transfer grew by about 40% between 2006 - 2015 in Nigeria. This measure could be used to depict the insurance sector impact on the economy. By reducing uncertainty and volatility, insurance companies smoothen the economic cycle and reduce the impact of crises situations on the micro and aggregate macro levels.

1.2 Problem Statement.

This work was motivated by the dwindling economic situation of Nigeria and the liquidation of many firms that had hitherto contributed to the growth of the economy. High inflation rate and rapid decline in the value of the Nigerian Currency against other currencies, increase in poverty level, insecurity and other vices are contributory factors to the decline in the economic growth of the nation.

1.3 Aim and Objectives of the study

The aim of this research on application of digitalization and scientific research on the insurance sector by the application of Panel Auto- regressive model on insurance sector variables to the economic growth of Nigeria. The objectives of the research include:

(1) To determine how digitalization of the insurance industry will affect the growth of the sector, and develop important estimators of the parameters of the panel data model,and investigate some asymptotic properties of the estimators developed therein.

(2) To determine appropriate econometric modeling that best suits the digitalization of the sector. And compare the performance of new estimators with existing estimators.

1.4 Scope of the Study

This study did an in-depth research of the Panel-ARDL analysis proposed by Pesaran and Smith (2001). The research investigates the activities of some insurance companies that are quoted in the Nigerian Stock Exchange. The data was obtained from National Bureau of Statistics, and the Nigerian Stock Exchange from 2006 – 2015 when the companies recapitalized.

2.0 LITERATURE REVIEW

2.1 Literature Review

The relevant literature on the relationship between Insurance and economic growth is reviewed. Akinlo and Apenisile. (2014) examined the effects of insurance on economic growth in Nigeria from 1986 to 2010. The structure, growth of insurance sub-sectors, and the direction between insurance causality and economic growth in Nigeria were addressed in the study. An error correction model analysis and cointegration technique was adopted .Alhassan and Fiador (2014) examined long –run causal relationship between insurance penetration and economic growth for Ghana during the period 1990 to 2010, using autoregressive distributed lag (ARDL) bounds approach to cointegration by Pesaran *et al* (1996, 2001).The study found a long run positive relationship between insurance penetration and economic growth.

Olayungbo. (2015) investigated the asymmetric non-linear relationship between from insurance and economic growth in Nigeria from 1976-2010.The conclusion is that asymmetric effect is present in Nigeria’s insurance market. Haiss and Sumegi (2008) applied cross country panel data analysis from 29 European countries in the period from 1992-2005.

Liyan et al (2016) investigated the relationship between insurance development and economic growth on a dynamic panel data-set of 77 economies for the period1994-2005.Omoke and Ethe. (2012) makes use of insurance density (premium per capita) as a measure for insurance market activity and real GDP for economic growth in Nigeria between 1970 -2008.

Essi and Ogonda (2018) evaluated the effect of health expenditure per capita and the percentage of Gross Domestic Product (GDP) on infant mortality rate (IMR) on five countries using three model methods namely; Pooled Ordinary Least Squares (POLS), Fixed Effect Model (FEM) and Random Effect Model (REM). Im, *et al* (2003) developed a more flexible and computationally simple unit root for panel using the likelihood method. Bai and Ng 2004 proposed an approach based on separating the data into a common factor component that is highly correlated across the series and a specific part that is idiosyncratic; a further approach is to proceed with OLS but to employ modified standard errors- so-called panel correct standard errors (Breitung and Das (2005).

Acemogle *et al* (2008) challenge the literature that finds income per capita is strongly correlated with the level of democracy across countries. Using an unbalanced panel of 150 countries over the period 1960 – 2000 at five year interval and after controlling for country and time –specific effects. Acemoglu, *et al* (2008) find that this positive association vanishes. Acemoghu *et al* (2008) also find an insignificant effect of income on democracy, by estimating a dynamic democracy equation using the two step robust Arellano and Bond (1991) estimator. However, Heid and Henderson (2012) over -turn this result by finding a significant positive relationship between income and democracy using system GMM.

Baltagi,*et al* (2009) use panel data of 42 developing countries over the period 1980 – 2003 to address the empirical question of whether trade and financial openness can help explain the pace in financial development, as well as its variation across countries

3.0 METHODOLOGY

Panel data set of 19 insurance companies quoted in the Nigerian Stock Exchange are selected for this study. The 19 companies contribute to Nigeria Gross Domestic Product (GDP).The Panel data matrix set includes time series for each cross sectional member in the sample data . We suppose y_{it} represents the dependent variable (economic growth) for the insurance companies i at time t (i = 1, . . . ,N and t = 1,2,. . . ,T) and x_{ij} is the value of the j^{th} explanatory variable,(ie liquidity, tangibility, risk, equity, growth, debt etc) for cross section unit i at time t (j = 1,2 . . k) ,

The general matrix model is:

$$y_i = \begin{bmatrix} y_{i1} \\ y_{i2} \\ \vdots \\ y_{iT} \end{bmatrix}_{NT\times 1} ,X_i = \begin{bmatrix} X_{i1}^1 & X_{i1}^2 & \dots\dots & X_{i1}^k \\ X_{i2}^1 & X_{i2}^2 & \dots\dots & X_{i2}^k \\ \vdots & \vdots & & \vdots \\ X_{iT}^1 & X_{iT}^2 & \dots\dots & X_{iT}^k \end{bmatrix}_{NT\times K} \qquad \varepsilon_i = \begin{bmatrix} \varepsilon_{i1} \\ \varepsilon_{i2} \\ \vdots \\ \varepsilon_{IT} \end{bmatrix}_{NT\times 1}$$

where ε_I is the disturbance term for the ith cross – section unit at time t. Generally the data are stacked to the following form;

$$Y = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_N \end{bmatrix}, X = \begin{bmatrix} X_I \\ X_2 \\ \vdots \\ X_N \end{bmatrix}, \varepsilon = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_N \end{bmatrix} \quad , \quad \text{Where} \quad \beta = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_K \end{bmatrix}$$

The standard linear model can be written as follows; Baltagi and Levin (1986) general linear model applied to a dynamic model estimate:

GDP = α_i + Xβ + ε_I, and the required pool equation is given as;

$$GDP = \alpha_I + \beta_1 P_{it} + \beta_2 R_{it} + \beta_3 L_{it} + \beta_4 T_{it} + \beta_5 E_{it} + \beta_6 G_{it} + \beta_7 D_{it} + u_{it} \quad (3.1)$$

On the first differenced the equation (3.1) becomes;

$$\ln GDP = \alpha_I + \beta 1\ln Pit + \beta 2\ln Rit + \beta 3\ln Lit + \beta 4\ln Tit + \beta 5\ln Eit + \beta 6\ln Git + \beta 7\ln D_{it} + u_{it}. \quad (3.2)$$

Where: GDP is the Gross Domestic Product, P_{it} is the Profitability of the insurance company, R_{it} is the Risk level , L_{it} is the Liquidity of the company, T_{it} is the Tangibility of the company, E_{it} is the company's equity, and D_{it} Is the company's debt .

The y variables are a set of the Gross Domestic Products.

Our data estimation with balanced panels (i e N = T) that is we have the same number of observations on each cross – section unit so that the total number of observations is N.T.

ARDL are standard least squares regressions that include lags of both the dependent variables and explanatory variables as regressors (Green,2008).ARDL is a method of examining co-integrating relationships between variables through the work of Pesaran and Shin (1998,ps(1998) and Pesaran,*et al* (2001,ps(2001).

ARDL Specifications are linear time series model in which both the dependent and independent variables are related not only contemporously but across historical (lagged) values as well. In particular, if y_t is the dependent variable and $x_{1, \ldots}$,x_k explanatory variables, a general ARDL $(p,q_1 \ldots,q_k)$ model is given by;

$$Y_t = \alpha_0 + \alpha_1 t + \sum_{t=1}^{p} \psi_i y_{t-1} + \sum\sum \beta_{j,\iota_j,} \chi_{j,t-1} + \varepsilon_t, \tag{3.3}$$

where $,\varepsilon_t$ are the error terms, α_0 is a slope constant term, α_1 ,β_j ι_j are respectively the coefficients associated with a linear trend ,lags of Y_t and lags of k regressors x_{jt} for all j = 1,- - - ,k. The Linear panel include lag dependent variables as covariant along with the dependent variables allows for the modeling of a partial adjustment mechanism, i.e

$$Y_{it} = \emptyset_o + \sum_{j=1}^{p} \emptyset_j \, y_{i,t-j} + \chi'_{i,t}\beta + \varepsilon_{I,t.}. \tag{3.4}$$

We decompose the error $\varepsilon_{i,t.}$, in unobserved time – invariant heterogeneity, μi, and the idiosyncratic error component $\varepsilon_{i,t..}$ $\mu_{I,t}$ = $\mu_i + \varepsilon_{i,t.}$.

Therefore, one way error component model in dynamic framework can be specified as:

$$y_{it} = \emptyset_o + \phi_i \, y_{it-1} + \beta' \chi_{i,t-1} + \mu_i + \varepsilon_{i,t.}. \tag{3.5}$$

To analyze the problems, we consider first a univariate AR (1) Model for cross section unit *i* = 1,2,- - - ,N. Then,

$$y_{it} = \emptyset_o + \phi_1 \, y_{it-1} + \mu_{i,t.} \text{ Or } y_{it} = \emptyset_o + \mu_i + \phi \, y_{it-1} + \varepsilon_{i,t.}. \tag{3.6}$$

Panel-ARDL data describes the case where a lag of the dependent variable is used as regressor. The presence of the lagged dependent variable violets strict exogeneity, that is endogeneity may occur .Consider the ARDL $(q_1, q_2 , q_3 \ldots ,q_k)$ model :

$$y_{it} = \alpha_I + \sum_{j-1}^{p} \lambda_{ij} y_{i,t-1} + \sum_{j=o}^{q} \delta'_{ij} x_{i,t-j} + \varepsilon_{i,t.}. \tag{3.7}$$

for i = 1,2 . . . ,N Where x_{ij} is a k – dimentional vector of explanatory variables for group i, α_I represent the fixed – effects, the coefficients of the lagged dependent variables, λ_{ij} are scalars and δ_{ij} are k dimentional coefficient vector. In the following, we assume that the disturbances $\varepsilon_{i,t}$ i = 1,2,. . . ,N and t = 1,2, . . . , T are independently distributed across i and t ,with zero means, variances σ_i^2 and are distributed independently of the regressors x_{it} The error correction representation of the above ARDL model is: $\Delta y_{it} = \alpha_i + \phi y_{i,t-1} + \beta_i' x_{it} + \sum_{j=1}^{p-1} \lambda_{i,j}^{*'} \Delta x_{i,t-j} + u_{it}$,where $\emptyset_i = -(1 - + \sum_{j-1}^{p} \lambda_{ij})$, $\beta_i = \sum_{j=o}^{q} \delta_{ij}$, $\lambda_{ij}^{*} = -\sum_{m=j+1}^{p} \lambda_{Im}$,j =1,2 . . . ,p -1, $\delta_{ij}^{*} = -\sum_{m=j+1}^{q} \delta_{i,m},$ (3.8)

,j=1,2,. . . , q-1.If we stack the time series observations for each group, equation 3.12 can be written as :

$$\Delta y_i \ \alpha_i \tau_T + \phi i y_{i,-1} + x_i \ \beta_i + \sum_{j=1}^{p-1} \lambda_{i,j}{}^{*} \Delta y_{i,-j} + \sum_{j=0}^{q-1} \Delta x_{i,-j} \ \delta_{ij}{}^{*} + \varepsilon_{i,t}. \quad (3.9)$$

for i = 1,2 . . . ,N, where τ_T is a T x 1 vector of ones, $y_{i,-j}$ and $x_{i.-j}$ are j-period lagged values of y_i and x_i., $\Delta y_i = y_i - y_{i,-1}$, $\Delta x_i = x_i - x_{i,-1}$, Δy_{i-j} and $\Delta x_{i,-j}$., are j period lagged values of Δy_i and Δx_i .

5.0 RESULTS

The E-View (10) Results of the analysis are given the Tables below.

Table 1 Linear Regression Matrix of the Insurance Variables with corresponding Gross Domestic Period

Pooled OLS Results
Dependent Variable: GDP
Method: Panel Least Squares
Date: 06/03/2024
Sample: 1 190
Periods included: 10
Cross-sections included: 20
Total panel (balanced) observations: 190
GDP = C(1) + C(2)*PAT + C(3)*LIQ + C(4)*TANG + C(5)*RISK + C(6)
*LOGTA + C(7)*EQUITY + C(8)*GROWTH + C(9)*DEBT

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	420.5426	156.0577	2.694790	0.0077
C(2)	8.15E-06	5.57E-05	0.146267	0.8839
C(3)	-1.675742	0.581431	-2.882100	0.0044
C(4)	1.189947	0.925301	1.286011	0.2001
C(5)	-0.954719	0.742186	-1.286361	0.2000
C(6)	-6.743553	4.132153	-1.631971	0.1044
C(7)	-0.005917	1.509346	-0.003920	0.9969
C(8)	4.567602	2.482009	1.840284	0.0674
C(9)	0.349444	1.475397	0.236847	0.8130

R-squared	0.062590	Mean dependent var	392.7814
Adjusted R-squared	0.021157	S.D. dependent var	98.35063
S.E. of regression	97.30466	Akaike info criterion	12.03978
Sum squared resid	1713743.	Schwarz criterion	12.19359
Log likelihood	-1134.779	Hannan-Quinn criter.	12.10209
F-statistic	1.510643	Durbin-Watson stat	0.340788
Prob(F-statistic)	0.156144		

Author's computation, using E-View s 10 statistical package.

Table 2 ; Linear Regression Matrix Equation of Insurance Components with GDP

Dependent Variable: GDP
Method: Panel Least Squares
Date: 06/03/2024
Sample: 1 190
Periods included: 10
Cross-sections included: 19
Total panel (balanced) observations: 190
GDP = C(1) + C(2)*PAT + C(3)*LIQ + C(4)*TANG + C(5)*RISK + C(6)
*LOGTA + C(7)*EQUITY + C(8)*GROWTH + C(9)*DEBT

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	478.8004	224.2000	2.135595	0.0342
C(2)	2.930005	6.190000	0.473023	0.6368
C(3)	-2.544171	0.833833	-3.051175	0.0027
C(4)	1.987586	1.808411	1.099079	0.2734
C(5)	-3.324770	1.712952	-1.940959	0.0540
C(6)	-5.727938	5.867146	-0.976273	0.3304
C(7)	-0.232247	2.280350	-0.101847	0.9190
C(8)	8.344098	4.392680	1.899546	0.0593
C(9)	0.382708	1.550089	0.246894	0.8053

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.107215	Mean dependent var	392.7814
Adjusted R-squared	-0.041582	S.D. dependent var	98.35063
S.E. of regression	100.3746	Akaike info criterion	12.19100
Sum squared resid	1632160.	Schwarz criterion	12.66951
Log likelihood	-1130.145	Hannan-Quinn criter.	12.38484
F-statistic	0.720547	Durbin-Watson stat	0.423123
Prob(F-statistic)	0.840798		

Author's computation using E-View 10 Statistical package

RANDOM EFFECT MODEL(REM)

GDP = c(1) + c(2)*YEAR + c(3)*PAT + c(4)*LIQ + c(5)*TANG + c(6)*RISK + c(7)*LOGTA + c(8)*EQUITY + c(9)*GROWTH + c(10)*DEBT + u_i

Table 3:Panel Generalized Least Square

Dependent Variable: GDP
Method: Panel EGLS (Cross-section random effects)
Date: 06/01/23 Time: 13:05
Sample: 1 190
Periods included: 10
Cross-sections included: 19
Total panel (balanced) observations: 190
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	322.3977	71.34318	4.518970	0.0000
GROWTH	2.917830	2.451883	1.190036	0.2355
DEBT	0.100178	0.806131	0.124271	0.9012

Effects Specification

			S.D.	Rho

Cross-section random	0.000000	0.0000
Idiosyncratic random	102.9945	1.0000

Weighted Statistics

R-squared	0.008233	Mean dependent var	392.7814
Adjusted R-squared	-0.002374	S.D. dependent var	98.35063
S.E. of regression	98.46731	Sum squared resid	1813117.
F-statistic	0.776175	Durbin-Watson stat	0.319270
Prob(F-statistic)	0.461639		

Unweighted Statistics

R-squared	0.008233	Mean dependent var	392.7814
Sum squared resid	1813117.	Durbin-Watson stat	0.319270

Author's computation using E-View 10 statistical package

Table 4: Hausman Test for Random or Fixed Effect Model

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.002930	2	0.3673

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
GROWTH	8.163941	2.917830	13.797338	0.1578
DEBT	-0.118558	0.100178	0.727329	0.7976

Cross-section random effects test equation:
Dependent Variable: GDP
Method: Panel Least Squares
Date: 06/01/23 Time: 13:13
Sample: 1 190
Periods included: 10
Cross-sections included: 19
Total panel (balanced) observations: 190

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	214.1927	113.4264	1.888384	0.0607
GROWTH	8.163941	4.450738	1.834289	0.0684
DEBT	-0.118558	1.173531	-0.101027	0.9196

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.025187	Mean dependent var	392.7814

Adjusted R-squared	-0.096665	S.D. dependent var	98.35063
S.E. of regression	102.9945	Akaike info criterion	12.21575
Sum squared resid	1782122.	Schwarz criterion	12.59172
Log likelihood	-1138.496	Hannan-Quinn criter.	12.36805
F-statistic	0.206701	Durbin-Watson stat	0.329058
Prob(F-statistic)	0.999943		

Author's computation using E-View 10 statistical package

THE HAUSMAN TEST RESULT:

1. Null Hypothesis: Random effect is appropriate
2. Alternative Hypothesis: fixed effects model is appropriate.
3. According to figure the chi- sq statistics= 2.002930
4. p – value = 0.3673

Probability = 0.3673 > 0.05, we accept the null hypothesis the test is not significant.

6. Random-effect model is appropriate.

FIXED EFFECT VS POOLED OLS MODEL

Table 5: Descriptive Statistics on Panel Least Squares

Dependent Variable: GDP
Method: Panel Least Squares
Date: 06/01/23 Time: 14:10
Sample: 1 190
Periods included: 10
Cross-sections included: 19
Total panel (balanced) observations: 190
GDP=C(1)+C(2)*DEBT

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	394.6842	35.82561	11.01682	0.0000
C(2)	-0.041380	0.763373	-0.054207	0.9568

R-squared	0.000016	Mean dependent var	392.7814
Adjusted R-squared	-0.005303	S.D. dependent var	98.35063
S.E. of regression	98.61108	Akaike info criterion	12.03071
Sum squared resid	1828139.	Schwarz criterion	12.06489
Log likelihood	-1140.918	Hannan-Quinn criter.	12.04456
F-statistic	0.002938	Durbin-Watson stat	0.327055
Prob(F-statistic)	0.956828		

Author's computation using E-View 10 statistical package

WALD TEST

Table 6: Wald Test for F ,t and chi2 Tests (p > 0.05)

Wald Test:
Equation: Untitled

Test Statistic	Value	Df	Probability
t-statistic	10.79254	188	0.0000
F-statistic	116.4790	(1, 188)	0.0000
Chi-square	116.4790	1	0.0000

Null Hypothesis: C(1)=C(2)
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(1) - C(2)	394.7256	36.57393

Restrictions are linear in coefficients.

The random effect was better than fixed effect model and finally fixed effect model better than pooled effect model. So in conclusion random effect model is more appropriate than fixed effect model.

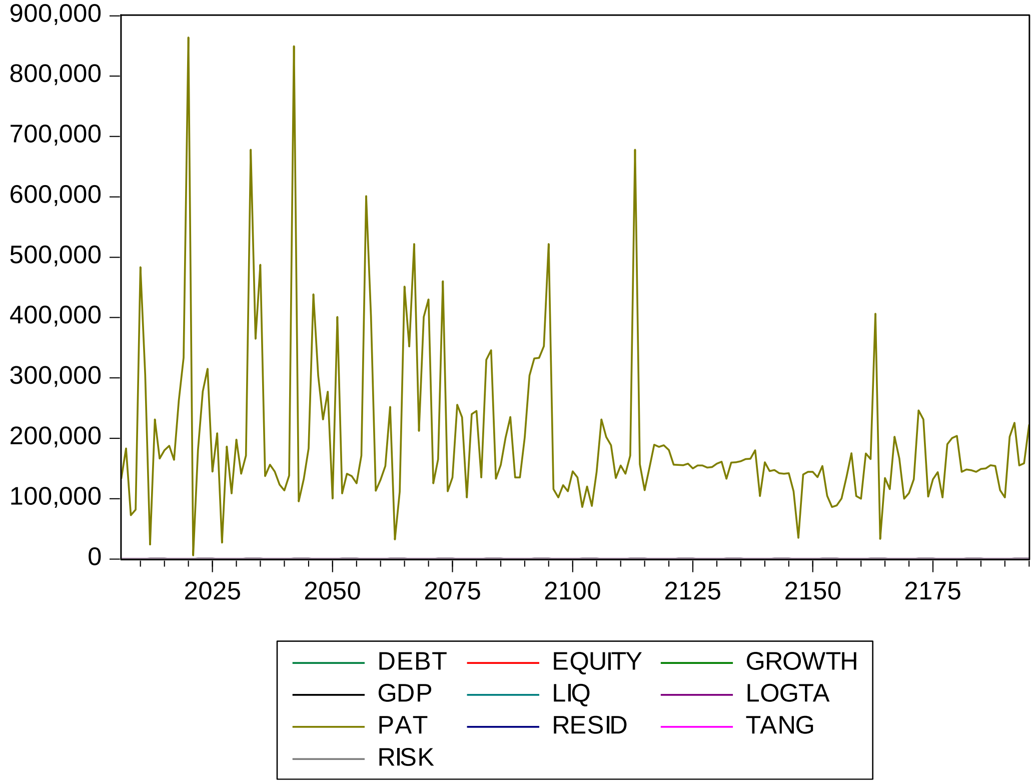

Figure 1.Graphical representation of the individual independent variables contribution to the GDP. Author's computation using E-View 10 statistical package

6.0 DISCUSSIONS

There are 190 individual year pair observations in Table 1. The variable labels describe the variable fairly clearly, though, we note that L/1 is the lag (1) of GDP, which is the dependent variable; Pat is the profitability, Liq. is the liquidity, Tan. is the tangibility, Risk is the risk elements, Logta is the tangibility, Equity is the equity share if the company, while Growth is the company growth, and Debt is the company indebtedness.

For consistency estimation, the estimators require that the error εit be serially uncorrelated. Specifically, if εit are serially uncorrelated, then $(\Delta\ \varepsilon_{it})$ are correlated with $(\Delta\varepsilon_{i,t-1}$because Cov($\Delta\varepsilon_i$, $\Delta\varepsilon_{i,t-1}$) = cov($\Delta\ \varepsilon_{it} - \Delta\varepsilon_{i,t-1}$ - $\Delta\varepsilon_{i,t-2}$) = - cov.($\varepsilon_{i,t-1}$, $\varepsilon_{i,t-2}$) $\neq$ 0. But $\Delta\varepsilon_{it}$ will not be correlated with $\Delta\varepsilon_{i,t-k}$ for k$\geq$2.

A test of whether $\Delta\varepsilon_{it}$ are correlated with $\Delta\varepsilon_{i,t-k}$ for k $\geq$2 can be calculated based on the correlation of the fitted residuals $\Delta\varepsilon_{i,t-1}$.The default in the test at lag2, we obtained test on whether the error is serially correlated. The null hypothesis that $(\ \Delta\varepsilon_{it}\ ,\Delta\varepsilon_{i,t-k}) = 0$ at 0.05 significance for k =1,2 is rejected at level of 0.05, that is if p < 0.05.But if ε_{it} are serially uncorrelated, we expect to reject H_o at order 1. Since p = 0.0406 at order 2 $\Delta\varepsilon_{it}$ and $\Delta\varepsilon_{i,t-2}$ are serially uncorrelated because P = 0.5437 $>$ 0.05.

This means that the restricted model-pooled is better model. The alternative hypothesis; the unrestricted model-the fixed effects model is appropriate. The chi-square statistic = 116.4790 and p-value = 0.0000, less than 0.05.So we reject the null hypothesis, the test is significant and the model is adequate ($p = 0.0000 < 0.05$).

Profitability is statistically not significant since its probability 0.6368 is greater than 0.05,p>0.05

However, Liquidity is statistically significant with probability 0.0027 which is smaller than 0.05 (P > 0.05); and hence has effect on the growth of the company. Under the random effect model the variable are significant with the Gross Domestic Product (GDP), showing that the insurance sector has greater contribution to the economic growth of the country.

Based on the result of the research; Liquidity, Tangibility and Equity of a firm have a significant effect on economic values of the firm vis –a –vis the nation's economic growth, and also contributed to the profitability of the insurance companies

CONCLUSIONS

This research contributes to the science of statistics and the development of the monetary and fiscal policies of government, and also expected to provide benefits to insurance companies in determining funding decisions that affect the profitability and risks borne by shareholders and the magnitude of the expected rate of returns to be able to achieve optimal profit. The performance of Panel Auto-Regressive Distributive Lag Model (ARDL), on the Fixed and Random Effect Models in the presence of Serial Correlation was evaluated, and recommended for future evaluation.

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