

FINANCIAL AND INVESTMENT PERFORMANCE MEASUREMENT OF INSURANCE FIRMS IN NIGERIA: X-RAYING THE KEY DETERMINISTIC VARIABLES

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ABSTRACT

A panel data set covering from 2017 to 2021 was utilized in this study to analyze key determinants of the financial and investment performance of insurance companies in Nigeria. Investment and financial performance are proxied using investment yield while the predictors are measures relating to numbers of economic and firm specific variables, which are the profit/interest rate levels, equity returns, size of company, solvency margin, liquidity, and contribution/premium growth, chosen based on relevant theory and literature. Three models of panel data estimation are employed for this study. Based on the empirical results, this study finds that company's size, insurance/ reinsurance dependence and solvency margin are statistically significant determinants of the financial and investment performance of the insurance companies in Nigeria. For Linkage Assurance Plc, all factors are statistically significant determinants of financial performance, except for equity returns. As these factors are important in determining the Nigeria's general insurance companies' financial performance, it was recommended that it should be capitalized on to further improve and sustain their financial and investment performance. As size plays an important factor in the financial performance of the insurance companies, it was further recommended that the industry should undertake the expansion of their businesses locally and offshore through branding and the offering of diverse and innovative products to meet the wider needs of the consumers.

Keywords: investment, financial, insurance, investment yield, liquidity, equity returns, premiums

JEL Classification Code: G31, L25, O16

1. INTRODUCTION

2. Insurance business is seen as the backbone of any country's risk management system, since it ensures financial security, serves as an important component in the financial intermediation chain, and offers a ready source of long term capital for infrastructural projects in Nigeria (Augustine & Nwanneka, 2011). In the same vein, insurance business plays a major role in the Nigerian economy through risk bearing, employment of labour, payment of tax, providing vehicle for investors and other financial investment services (Hamadu & Mojekwu, 2010). Besides, its role in financial inclusion and deepening of the economy is not in doubt. However, the growing number of insurance poor financial and investment performance in recent years leading to their liquidation has caused further concerns on the financial stability of the insurance industries to stakeholders hence the quest of these insurance companies seeking profitable and sustainable investment in financial instruments and other related financial assets to boost investment performance, preserve financial stability as well as to be flexible to innovations and remain competitive.

Insurance is a risk transfer mechanism whereby an individual or business enterprise known as the insured, transfers risks for a premium (price) to another party known as the insurer (Bickelhaupt 1974). The primary purpose of insurance is to reduce the burden of financial loss to individuals or companies and not necessarily to make the insured to profit from the insurance contract. Insurance business contributes significantly to the economic growth of any nation, be it developed or developing nations. It is therefore imperative to ensure that insurance firms in Nigeria are performing effectively and efficiently as well as significantly by investing in financial instruments and other related assets. The study becomes particularly relevant given that the insurance industry in Nigeria is still developing and has not made a significant impact when compared to its counterpart in other sector in terms of financial performance and financial deepening as it contributes around 12.2 percent of the combined Gross Domestic Product (GDP) of Nigeria as reported in 2016. In

addition, Nigerian insurance financial performance is very low when compared to insurance businesses in other developing economy

Globally, the performance of insurance firms is an important indicator of a thriving and boisterous economy that could lead to an increase in Gross Domestic Product (GDP) of a nation, more specifically the non-banking sector like insurance companies. Furthermore, the world economy has become more integrated; firms have been facing more and more pressure to disclose their business performance to interested parties and are struggling to remain competitive in a global competitive market. In this vein, insurance companies are seeking for ways to improve their financial performance by exploring various investment streams including financial instruments and other related financial assets that are profitable. On the other hand, regulators all over the world are negotiating and harmonizing global insurance regulations which could lead to greater standardization of insurance policies and promote globalization of the insurance value chain. Therefore, a better and clearer understanding of the impact of financial instruments on the financial performance of insurance companies in Nigeria through an empirical study is of the interest to parties like the investors, lenders, regulators and other market participants. Thus, the study is aimed at providing a comparative analysis on the key factors impacting the investment and financial performance of insurance firms in Nigeria using two listed insurance companies: Aiico Insurance Plc and Linkage Assurance Plc, which will be of interest to regulatory authorities, shareholders, creditors and other industry players.

2. REVIEW OF RELATED LITERATURE

2.1 Conceptual Review

2.1.1 Financial and Investment Performance

There are many measures that could be adopted in evaluating the financial and investment performance of firms. These include return on assets, return on investments, earning per share, return on equity, profit margin, cash flow, total equity holder return, residual income, economic value added, balanced score card, activity- based costing, cash value added, etc. In the past, the key focus of regulators and other stakeholders all over the globe has largely been on internal factors that influence financial performance of companies. But since the signing of World Trade Organization (WTO) Agreement in Marrakesh City of Morocco in 1994, competition and fast-changing of international policies has put great pressure on firms to give

more concern on external environmental factors as one of the critical factors in strategic business planning and also as a factor that determine their performance (Azizi & Sidin, 2008). Besides internal factors, business decision and financial performance of companies are also influenced by external factors which are macroeconomic factors like interest rates, foreign exchange rates, inflation, technology, environmental, social, political and others. These factors are not within the control of the management. This means that business entities must interact with both internal and external factors that influence their decisions, investment and financial performance.

Over the years, measurement of companies' investment and financial performance continues to be a critical area of research especially in the social and management sciences. Many scholars paid more attention on modifying the traditional financial measures in developing models for performance measurement, while others have suggested non-financial measures (Irala, 2007). Moreover, the performance of a company can also be measured in the form of qualitative features like market position, quality of product, and goodwill of the customers (Kruger 2004). Seelanatha (2011) concentrated on variables like turnover, total earnings, and profit before interest and taxes, earnings per share, total assets and share price in the measurement of companies' performance. However, the application of these variables varies from one industry to another. Therefore, this study utilizes profit or interest rate levels, equity returns, company size, insurance or reinsurance dependence, solvency margin, stability of underwriting operation and liquidity as independent variables, while firms investment yield was used as surrogate for investment performance. The choice of these variables has been motivated by numerous literatures reviewed in this study. Researchers use these internal environmental variables to measure the corporate performance as observed in the work of Irala (2007), Browne *et al.* (1999) and Booth *et al.* (1999).

Profit or interest rate levels: An increase in profit/interest rates produces greater returns on investment assets and this will increase the total company's returns, provided the returns are not counteracted by lower underwriting gains. According to D'Arcy (1979), high interest rates will give rise to high investment earnings and consequently this would enhance the investment performance of insurance companies. Bonds and fixed deposits are examples of investment portfolios which

depend mostly on the levels of interest rates for returns on investment. According to Browne and Hoyt (1995), as interest earnings are a significant source of revenue for insurers, companies are more likely to perform well and remain solvent when interest earnings are high. Therefore, it is expected that investment performance is positively related to profit/interest rate levels.

Equity returns: Investment in equity portfolio will provide the insurance companies with a stream of dividend income. According to Browne *et al.* (1999), as equity returns increase, returns on insurer's investment portfolio may also increase and this will improve the performance of the insurer. Booth *et al.* (1999) are of the view that equities have the benefit of providing inflation hedge and over the long term, the investment would be expected to give higher real returns than fixed interest investments. However, a higher proportion of investment in equities could lead to a higher risk of insolvency if the values of the assets dropped. Thus, we expect a positive relationship between performance and equity returns.

Company size: Industrial organizations, economists such as Bain (1968) and Scherer (1980) have argued that large firms possess monopoly power which allows them to set prices above the economic costs involved in the production of the products resulting in additional profit for the larger firms. Thus, large corporate size enables insurers to effectively diversify their assumed risks and respond more quickly to changes in market conditions. In terms of investment performance, Adams (1996) believes that large companies are able to diversify their investment portfolios and this could reduce their business risks. Grace and Timme (1992) suggest that large companies generally outperform smaller ones because they manage to utilize economies of scale and have the resources to attract and retain managerial talent. Therefore, it is expected that investment performance is positively related with size of company.

Insurance or reinsurance dependence: Insurance companies undertake insurance and reinsurance, respectively with the aims of improving their financial performance and security. Selection of the right reinsurance may therefore improve underwriting performance, especially as regards spreading insurable risks. In addition, Booth *et al.* (1999) assert that reinsurance is one of the financial dynamics of the insurance operation that can lead to substantial variability in the overall financial results. Based

on the above, there is no prior expectation on the direction of the relationship between performance and insurance/reinsurance dependence.

Solvency margin: The solvency of an insurance company corresponds to its ability to pay claims as they fall due. Thus, solvency margin is the amount of capital which acts as a cushion to absorb the risk of conducting insurance and meeting long term obligations. The capital or surplus is measured as the excess of assets over obligations. Consequently, insurance companies with higher solvency margin are considered to be more financially sound as it has more surpluses to cater for any unexpected losses. In theory, prospective policyholders would prefer to buy policies from financially sound insurance companies. Generally, insurance financial and investment metrics may improve through a higher solvency margin as better risks are attracted to the more stable insurers and this will contribute towards higher premium incomes. Therefore, we expect that the relationship between investment or financial performance and insurance/reinsurance dependence would be positive.

Stability of underwriting operation: An increase in premium growth could improve the financial performance of insurance companies as it provides inflows of income to the company. However, the National Association of Insurance Commission (NAICOM) (2001) in Nigeria denote that a remarkable increase in premium volume could indicate favourable business expansion and thus improve earnings, provided it is accompanied by adequate reserves, profitable operation and stable product mix. It has been debated that a dramatic variation in underwriting performance could signal that the insurance company is having financial issues. But worthy of note is the fact that an underwriting cycle can have impact on the stability of the underwriting operation of insurance firms. Accordingly, there is no prior expectation on the direction of the relationship between performance and stability of the underwriting operation.

Liquidity: According to Adams and Buckle (2003), liquidity measures the ability of managers in insurance and reinsurance companies to meet their immediate commitments to policyholders and other creditors without having to increase profit from underwriting and investment activities and/or liquidate financial assets. Therefore, having high liquidity shows the need for the management of the insurance companies to improve their financial performance. Companies with more liquid assets are likely to perform better as they are able to realize cash at any point of time

to meet its obligation and are less exposed to liquidity risks (Browne & Hoyt, 1995). By not having sufficient cash or liquid assets, insurance companies may be forced to sell investment securities at a substantial loss in order to settle claims promptly. However, there are contrasting views with regard to performance and liquidity in relation to the agency theory. Generally, high liquidity could increase agency costs for owners by providing managers with incentives to misuse excess cash-flow by investing in projects with negative net present values and engaging in excessive perquisite consumption and of course in misappropriations. Consequently, there is no prior expectation on the direction of the relationship between performance and liquidity. The above determinants have been empirically studied in the insurance sector.

2.2 Theoretical Review

This paper is anchored on agency-based causative theories. This is because there are many theoretical reasons to assume that liquidity directly affects the financial performance of firms including insurance firms. Thus, a strong positive relationship between liquidity and financial or investment performance would not be far-fetched (Fang *et al.*, 2009) due to the fact that stock/shares are the currency which commands both cash flow and control rights and the tradability of this currency plays a central role in the governance, valuation, and performance of firms (Fang *et al.*, 2009). The distinguishing characteristic of the causative agency theories is that it predicts that the effect of liquidity on financial performance will be related to the extent of the agency conflict within the firm. In contrast to the agency-based causative theory, Subrahmanyam and Sheridan (2001) and Khanna and Ramana (2004) show liquidity can positively affect firm performance even when agency conflicts are absent. In this setting liquidity stimulates the entry of informed investors who make prices more informative to stakeholders.

2.3 Empirical Review

Empirical researches on companies' financial and investment performance use either market-based measures or accounting-based measures to assess firm performance. Klein (1998) used return on assets (ROA) and Alshehadeh *et al.* (2022) used return on equity (ROE) as operating performance indicators. Brown and Caylor (2005) use ROE and ROA as their two operating performance measures. Generally, we can measure

the operating performance of a firm through the ROA ratio which shows the amount of earnings that have been generated from invested capital assets (Epps & Cereola 2008). Dogan (2014) analyzes the relation between dividend policies and financial performances of the companies operating in Istanbul Stock Exchange (BIST). The study uses data of 172 companies outside of financial sector for the period of 2008-2011. An empirical analysis was conducted using multiple regression, t test methods as well as descriptive statistics. The results of analysis showed that dividend payments had influence on companies 'performances. Furthermore, there was a positive and statistically meaningful relation between the dividend per share rate (DPS) within groups and market-based performance indicator Tobin 's q while there was a statistically meaningless relation between accounting-based performance indicators ROA and ROE and dividend per share rate.

Akande (2013) employed Ordinary Least Square (OLS) regression analysis and used panel data to analyze the data collected from the financial statements of ten (10) Nigeria firms 34 over 20 years (1991 - 2010). ROA, ROE, EPS and dividend per share (DPS) on the one hand and total debt to capital employed (DC) on the other hand, were surrogated for firms 'performance and debt financing respectively. From the regression analysis, he found that there is a positive relationship between DC and ROE, EPS, DPS; while a negative relationship exists between DC and ROA. An empirical investigation was conducted on factors associated with firm performance: evidence from kingdom of Saudi Arabia by Abdullah *et al.* (2011). The study investigates the relations between firm size, leverage and auditor type and the firm performance of 392 listed companies in the Saudi Stock Exchange (SSE) during 2007-2010. This study identifies two measurements of the firm performance: ROA and ROE. Using the multiple regressions, the results of this study show that the likelihood a firm performance (ROA) is significantly affected by the firm size. On the other hand, leverage and auditor type have no influence on the firm performance. Interestingly, the explanatory power of firm performance (ROA) model is high. Somewhat surprisingly, model (2)'s explanatory power is insignificant indicating the inability of the proposed variables (firm size, leverage and auditor type) in explaining the expected effect on firm performance (ROE).

Mashayekhi and Mohammad (2008) conducted an empirical study and used data from companies listed in the Tehran Stock Exchange (TSE) for the years 2005-2006 to

investigate the role of corporate governance indices on firm performance. They use board size, board independence, board leadership and institutional investors on the board as corporate governance indices and EPS, ROA and ROE as firm performance surrogates. Their regression results show that board size is negatively associated with firm performance. Moreover, the presence of outside directors strengthens the firms' performance. They however, found that there is no relationship between leadership structure and firm performance. Likewise, the presence of institutional investors on the board of directors is not positively associated with firm Performance. Daniel and Titman (2006), in their study of relationship between past fundamental performance and future returns found that firms with high past fundamental returns such as earnings and earnings per share (EPS) actually outperform weaker firms. The study substantiates the importance of EPS in predicting future performance. Similarly, earnings play a vital role in evaluating the prospects and predicting future performance of the firms as EPS are the portion of the company's profit that is attributed to each individual share of common stock. Literatures so far reviewed, emphasize that the best measure of a company's performance is its profitability, without it, it cannot grow, and if it doesn't grow, then its stock will trend downward. Furthermore, increasing profit is the best indication that a company can pay dividends and that the share price will trend upward. Creditors will loan money at a cheaper rate to a profitable company than to an unprofitable one; consequently, profitable companies can use leverage to increase stockholders' equity even more.

The common profitability measures compare profits with sales, assets, or equity: net profit margin, return on assets, and return on equity. But two indicators that are the most commonly used to judge the profitability of a company are ROA and ROE. Furthermore, ROE and ROA are two indicators of the financial performance of a company. There are many indicators to help find a company's financial health as well as its profitability. How profitable a company is, is always relative to its assets. The financial statement of a company is a picture of its financial position and operating performance. Return on equity and returns on asset are both measures of return. At first glance, these two metrics seem pretty similar. This is because both gauge a company's ability to generate earnings from its investments but do not exactly represent the same thing. Together, however, they provide a clearer representation of a company's performance and clear picture of management's effectiveness. If ROA is sound and debt levels are reasonable, a strong ROE is a solid signal that managers are

doing a good job of generating returns from shareholders' investments. ROE is certainly a "hint" that management is giving shareholders more for their money. On the other hand, if ROA is low or the company is carrying a lot of debt, a high ROE can give investors a false impression about the company's fortunes.

Studies have tested this relationship between firm performance and size of insurance companies and demonstrated different results in developed countries. There are also few that focus on developing countries (Daniel & Tilahun, 2013). In addition, companies' choices with respect to their liability and ownership structure, their capital structure and their payout policy, appear to be the most important ones. Harhoff *et al.* (1998) showed that firms with limited liability display stronger growth than comparable companies under full liability. They argue that limited liability induces firms to pursue risky projects that offer higher returns and, hence, feed growth. Similarly, Downie (1958) claims that growth rates rise with profits as firms retain their earnings. Charumathi, 2012 in his empirical study on the Determinants of Profitability of Indian Life Insurers used 23 Indian life insurers (including 1 public and 22 private) and it used the data pertaining to 3 financial years, viz., 2008-09, 2009-10 and 2010-11. For this purpose, firm specific characteristics such as leverage, size, premium growth, liquidity, underwriting risk and equity capital are regressed against Return on Assets. He used log of equity capital as independent variable and ROE as dependent variable. From the result of his study, negative relationship between the return on assets and equity capital was established. The coefficient for the natural logarithm of equity capital is negative and significant at 10% level.

Many empirical results showed that the rapid increase of premium volume is one of the causal factors of insurers 'insolvency (Kim & Grace, 1995). Daniel and Tilahun (2013) investigated the firm specific factors that determine insurance companies 'performance in Ethiopia and found that the positive coefficient of growth in writing premium indicates a positive relationship between growth in writing premium and performance. However, this positive relationship is found to be statistically insignificant with the p-value of 0.105. The result of the study supports the findings of Chen and Wong (2004). This means that, an increase in premiums improves the profitability of the core operations of insurers and their overall profitability. This result lends support to the findings of Hrechaniuk *et al.* (2007) about the insurance markets of Spain, Lithuania and Ukraine.

3. METHODOLOGY

3.1 Research Design and Description of Variables

The ex post facto research design was adopted in this paper and in determining the factors that affect the financial and investment performance of the insurance companies, a combination of cross-sectional observations and time series data was employed. The performance model for this study is constructed based on the financial data from the statutory returns filed by Nigeria insurance sector to the regulator, (NAICOM). The population of the study is all the 27 insurance companies listed on the Nigerian Stock Exchange 2021. A sample of two listed insurance firms were drawn from the population using purposive sampling techniques as these firms possess specific characteristics coupled with the interest of the researchers. Linkage Assurance and AIICO Insurance companies were purposively selected because of their leading role in the insurance market and their special peculiarities. While Linkage Assurance represents a new generation insurance company in Nigeria established on 26th March 1991. AIICO Insurance is of the old breed established in 1963. The observations from these two firms were taken from the period of January 2017 to October 2021, which is about 5 years utilizing monthly financial data. This paper is thus an improvement on prior studies in terms of providing empirical evidence on the determinants of financial and investment performance of insurance two listed insurance firms: Linkage Assurance Plc and AIICO Insurance Plc.

Criterion variable and its measurement: Investment yield (IY) was used as the criterion variable as it reflects one of the principal activities of the insurance businesses. Investment is an integral function of insurance companies as their key role is to mobilize the contribution/premium received from the insured in prudent investment activities. Investment yield is measured as the net investment income divided by the average invested assets.

Predictor variables and their measurements: This paper considers both economic and firm specific variables affecting the investment performance of insurance companies in Nigeria. The economic variables reflect the market structure in which the industries compete whilst the firm-specific variables refer to the operating or corporate characteristics of the insurance companies; and the choice of these predictor variables is based on their theoretical relationship with the criterion variable. These predictor variables and their measurements are as follows:

- a) Profit / Interest rate levels: For insurance, the variable for interest rate level (IRL) is measured by the 5-year Nigerian Government Securities yields.
- b) Equity returns: For insurance, the variable for equity returns (ER) is measured by Composite Index.
- c) Company size: For insurance, the variable for reinsurance dependence is measured by the amount of reinsurance ceded to total assets
- d) Insurance or reinsurance dependence: amount of reinsurance ceded to total assets (LOG of total assets
- e) Solvency margin: For insurance, the variable for solvency margin is measured by net assets to net premiums written
- f) Stability of underwriting operation: For insurance, the variable for stability of underwriting operation is measured by the change in the gross premiums written of current year as compared to previous year
- g) Liquidity: For insurance the variable for liquidity is measured by total liability to liquid assets.

3.2 Model Specification

The equation models of non-effects are as follows:

$$i) \text{ Model for Insurance } IY_{it} = \alpha_0 + \beta_1 IRL_{it} + \beta_2 CI_{it} + \beta_3 LOGTA_{it} + \beta_4 RICTA_{it} + \beta_5 NANPW_{it} + \beta_6 CGPW_{it} + \beta_7 TLLA_{it} + \varepsilon_{it}$$

The equations of fixed effects model are as follows:

$$\text{Model for Insurance } IY_{it} = \alpha_0 + \alpha_1 D_{1i} + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \dots + \alpha_n D_{ni} + \beta_1 IRL_{it} + \beta_2 CI_{it} + \beta_3 LOGTA_{it} + \beta_4 RICTA_{it} + \beta_5 NANPW_{it} + \beta_6 CGPW_{it} + \beta_7 TLLA_{it} + \varepsilon_{it}$$

The equations of random effects model are as follows:

$$\text{Model for Insurance } IY_{it} = \alpha_{0i} + \beta_1 IRL_{it} + \beta_2 CI_{it} + \beta_3 LOGTA_{it} + \beta_4 RICTA_{it} + \beta_5 NANPW_{it} + \beta_6 CGPW_{it} + \beta_7 TLLA_{it} + \varepsilon_{it} + \mu_{it}$$

where, $D_{1i}, D_{2i}, \dots, D_{ni}$ are values for each unit of the cross-section; ε = error term; $i = i^{\text{th}}$ firm; $t = t^{\text{th}}$ period.

IRL - Profit / Interest rate levels; CI = Composite index; LOGTA - amount of reinsurance ceded to total assets (LOG of total assets; RICTA – Reinsurance ceded to assets (Size); NANPW - net assets to net premiums written (solvency margin); CGPW - change in the gross premiums written of current year as compared to previous year (stability of underwriting operation); TLLA- total liability to liquid assets (liquidity)

4. RESULTS

Table 1: DESCRIPTIVE STATISTICS – AIICO INSURANCE PLC

Variables	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	
IY	.0113	0.00985	0.0079	0.7615	2.8649	17.9249*	
PRL	3.8334	3.7400	0.3121	0.8083	2.6185	21.1524*	
SI	145.8	133.47	26.98722	1	38667	3.38720	60.1173*
LOGTA	18.4977	971	1.4395	0.49571	880	17.1521*	
RTCTA	0.0767	0.0568	0.0716	1.5039	4.9772	99.3295*	
NANCW	6.23032	9950	9.5738	4.3849	25.4314	4447.251*	
CGCW	0.2779	0.1823	0.2763	2.8960	14.9568	1353.253*	
TLLA	1.0637	.0804	0.1642	-1.4989	7.8483	249.1055*	

Table 2: DESCRIPTIVE STATISTICS – LINKAGE INSURANCE PLC

Variables	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
IY	0.0178	0.0169	0.0108	0.4568	2.5907	42.2577*
IRL	3.8124	3.7225	0.3347	0.5940	2.2641	82.358*
CI	993.835	916.730	176.277	1.1906	2.9483	239.209
LOGTA	19.8619	19.8856	0.4947	0.9736	4.5955	267.226*
RICTA	0.1057	0.0814	0.0834	1.0317	3.3576	184.928*
NANPW	3.7029	2.1523	4.4050	3.0401	15.5622	8213.1*
CGPW	0.2634	0.1535	0.3380	6.3721	69.0178	190625.5*
TLLA	0.8375	0.8171	0.1845	0.7645	3.4474	107.023*

Tables 1 and 2 present the descriptive statistics of the variables for the determinants of financial and investment performance of insurance companies, respectively. The tables illustrate the results of the mean, standard deviation, skewness, kurtosis and Jarque-Bera. Based on Tables 1 and 2, the assessment of the sample data for insurance companies indicates that the values of the mean and median for each variable are dissimilar. Furthermore, the values of skewness and kurtosis for all variables are unequal to zero and three, respectively. In terms of Jarque-Bera, the values for all variables are significant at the one percent level and hence it rejects the hypothesis that the data is normally distributed. Based on this analysis, it can be concluded that

the sample data for insurance companies is not normally distributed. Thus, the preliminary statistical analyses show that the estimation on the determinants of financial performance for insurance companies could not produce better results using the simple regression analysis estimation method. Hence, generalized least squares estimation method is more appropriate and expected to yield better results.

4.1 Multicollinearity

Checking for the presence of multicollinearity among the independent variables, the Pearson's correlation coefficients test was adopted. Tables 3 and 4 show the results of the Pearson's correlation coefficients for AIICO Insurance Plc and Linkage Assurance Plc, respectively. The results show that the correlation coefficients between pairs of independent variables are less than 0.8, indicating that there are no serious correlations among the variables.

Table 3 CORRELATION MATRIX OF INDEPENDENT VARIABLES - AIICO INSURANCE PLC

PRL	SI	LOGTA	RTCTA	NANCW	CGCW	TLLA	
PRL	1						
SI	-0.389	1					
LOGTA	-0.210	0.271	1				
RTCTA	0.008	-0.053	0.448	1			
NANCW	0.071	-0.217	-0.520	-0.381	1		
CGCW	0.087	-0.117	-0.180	-0.454	0.304	1	
TLLA	-0.282	0.172	0.372	0.201	-0.477	-0.218	1

Table 4: CORRELATION MATRIX OF INDEPENDENT VARIABLES - LINKAGE ASSURANCE PLC

IRL	CI	LOGTA	RICTA	NANPW	CGPW	TLLA	
IRL	1						
CI	-0.482	1					
LOGTA	-0.070	0.140	1				
RICTA	-0.024	-0.038	-0.310	1			
NANPW	0.018	-0.107	-0.300	-0.333	1		
CGPW	0.055	-0.048	-0.003	-0.241	0.157	1	
TLLA	0.040	-0.049	0.414	-0.159	-0.250	0.079	1

4.2 Heteroscedasticity

In this study, the effect of heteroscedasticity is assessed using Breusch Pagan Cook Weisberg test. Table 5 shows the outcomes of the Breusch Pagan Cook Weisberg test for AIICO Insurance Plc and Linkage Assurance Plc. The results of the χ^2 -test did not accept the null hypothesis which states that there is no heteroscedasticity. To overcome this problem, the study adopts standard errors which are robust to heteroscedasticity, and the t-statistics of the coefficient estimates are computed using White's heteroskedasticity-consistent standard error.

Table 5 BREUSCH-PAGAN / COOK-WEISBERG TEST OF HETEROSCEDASTICITY

	χ^2 statistic	Probability
AIICO Insurance Plc	7.71	0.0066
Linkage Assurance Plc	2.90	0.0944

4.3 Autocorrelation

In this study, the presence of autocorrelation is detected using the Durbin-Watson test. The Durbin-Watson test indicates the presence of autocorrelation for Linkage Assurance Plc and AIICO Insurance Plc. Autocorrelation in the residuals are handled with a first-order autoregressive or AR (1) model.

4.4 Model Selection Tests

The results for the regressions using generalized least squares with non-effects, generalized least squares regression with fixed effects and with random effects are shown in Appendix. The most appropriate estimation model of the three alternative regression specifications is chosen based on the results of the Lagrange Multiplier, Likelihood Ratio and Hausman tests as shown in Table 6 below.

In analyzing the results, the Lagrange Multiplier and Likelihood Ratio tests show that the χ^2 values for AIICO Insurance Plc and Linkage Assurance Plc are significant at the 1 percent significance level, indicating that fixed effects model is better than pooled model. The Hausman test for random effects versus fixed effects for the two insurance firms also shows that the χ^2 values are significant at the 1 percent level. This implies that the fixed effects model is the most appropriate model. Based on the results of the Lagrange Multiplier, Likelihood Ratio and Hausman tests, it can be concluded that of the three alternative regression specifications, the fixed effects

model is the most appropriate model to be adopted. The findings support the argument by Baltagi (1995) who affirms that random effects model would not be appropriate when the sample is not randomly taken from a large population. In addition, the fixed effects model gives the highest R² value among the three regression models for the two insurance companies.

Table 7: Determinants of Financial Performance

Predictor Variables	AIICO Insurance Plc Fixed Effects Model	Linkage Assurance Plc Fixed Effects Model
Constant	-0.066062	-0.177139 -1.40958 -5.256252
PRL/IRL	-0.001426	-0.002058** (-1.014384) (-2.022766)
SI/CI	2.05E-05	8.91E-07 (0.494422) (0.19804)
LOGTA	0.004153*	0.010514*** (1.711899) (5.994412)
RTCTA/RICTA	0.08884***	0.100683*** (10.34855) (13.22767)
NANCW/NANPW	-0.000143**	-0.000738*** (-2.207177) (-6.713657)
CGCW/CGPW -	0.000598	0.002918*** (-0.756754) (-4.562737)
TLLA	-0.00252	-0.016891*** (-1.28731) (-3.834408)
AR (1)	0.775565***	0.685123*** (7.940057) (6.289772)
R Squared	0.799197	0.927118
Adjusted R squared	0.788681	0.914570
F-test	100.7714***	343.7387***
DW-test	1.896277	1.812512

1. White cross-section heteroskedasticity-consistent covariance matrix estimators are reported.
2. Figures in parentheses are t-statistics.
3. ***, **, * denote significant at 1%, 5% and 10% significant level, respectively.
4. LOGTA is the log of total assets.

4.4 Discussion of Findings, Policy implications and Recommendations

A panel data set covering from 2017 to 2021 was utilized in this study to analyze key determinants of the financial and investment performance of Insurance companies in Nigeria, specifically, AIICO Insurance Plc and Linkage Nigeria Insurance Plc). The findings indicate that company's size, insurance/reinsurance dependence and solvency margin are statistically significant determinants of the financial performance of the general insurance companies in Nigeria. For Linkage Assurance Plc, all factors are statistically significant determinants of financial performance, except for equity

returns. As these factors are important in determining the Nigeria's general insurance companies' financial performance, it should be capitalized to further improve and sustain their financial performance.

These findings which align to a large extent agrees with the conclusion of Ibrahim (2013) have a number of implications to the general insurance industries. First, as size plays an important factor in the financial performance of the insurance companies, the industry should undertake the expansion of their businesses locally and offshore through branding and the offering of diversity and innovative products to meet the wider needs of the consumers. Large size insurance companies will be in a better position to build a strong supporting infrastructure such as enhancing information management systems, upgrading risk management practices and improving their level of technical and management expertise. These are key factors that could further sustain the development and competitive positions of the general insurance companies in Nigeria.

The second implication is that insurance companies need to consider various factors in designing their insurance or reinsurance programmes such as the types of protection required and the way it matches the exposures and resulting claims, the expected business volume, availability of covers and the cost of insurance or reinsurance. These factors vary with companies depending on their size, corporate structure, financial strength, type of business written, and even regulatory space. Insurance firms can further improve their operations by developing dynamic financial models to examine the behaviour of the portfolios of business and to analyze the possible future experience of the businesses. There is also a need to put in place effective and robust data management system to facilitate the monitoring of the retained and ceded risk exposures as the industry has to identify the potential accumulation of exposure from a particular source.

Insurance companies must also take appropriate steps to adequately assess the soundness of its activities in terms of its capacity and financial strength as there are credit risks involved. The selection of the insurance companies or reinsurers should be based on information relevant in ascertaining their reliability and security. As a best practice, insurance or reinsurance protection should be well spread among a

number of insurance companies or reinsurers to avoid exposure to excessive credit risks concentration.

Third, as solvency margin plays an important role in the financial performance of insurance companies in Nigeria, it is imperative for the industry to ensure that there is a balance between the risks of deficiency of the fund and the benefits of higher returns from investments. Maintaining solvency of the fund is more important for reinsurance than for the insurance companies as any deficiency in the insurance fund is borne by the participants. Insurance companies will only be liable for the losses if the participants are able to prove negligence on the part of the insurance companies. In case of the deficiencies of the fund, insurance companies have a few options to exercise such as limiting the claim amounts payable to the participants or increasing the amount of contributions of existing and future participants. To safeguard the participants' interest, the Nigeria insurance regulator requires shareholders to provide interest-free loans as a measure to rectify the deficits in the insurance fund. Another prudent measure that can be implemented by the insurance company is to build up reserves from the underwriting surplus to absorb the deficits that may arise in future. The industry can also capitalize on the solvency models developed by the actuary to further improve the assessment of the solvency position of the companies. This includes deterministic models such as the dynamic solvency testing and stochastic models.

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