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EFFECT OF MACROECONOMIC VARIABLES ON RISK-ADJUSTED INVESTMENT PERFORMANCE OF LISTED INSURANCE COMPANIES IN NIGERIA

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Abstract

The Nigerian insurance industry plays a significant role in financial intermediation through the mobilization and investment of premiums collected from policyholders. However, the investment performance of insurance companies is affected by prevailing macroeconomic conditions. This study therefore, investigates the effect of inflation rate, exchange rate, interest rate, gross domestic product (GDP) growth rate, and money supply on risk-adjusted investment returns of listed insurance companies in Nigeria from 2010 to 2025. Secondary data was analyzed using panel data econometrics with fixed effects model. The data for dependent variable (risk-adjusted investment returns) was sourced from NGX Insurance Index while the data for independent variables (macroeconomic indicators) were source from the Central Bank of Nigeria (CBN) Statistical Bulletin and the National Bureau of Statistics. The Hausman specification test confirmed the appropriateness of the fixed effects model. Multiple regression analysis was employed to examine the effect of macroeconomic variables on investment performance. Results indicate that GDP growth rate and money supply exert a significant positive effect on investment performance of listed insurance companies, while inflation rate and exchange rate have a significant negative impact. Interest rate showed a statistically insignificant positive relationship. The findings suggest that macroeconomic stability is critical to enhancing the risk-adjusted investment performance of insurance companies in Nigeria. The study recommends prudent monetary policies, inflation control measures, and effective portfolio diversification strategies to enhance the sector's investment performance.

Keywords: **Macroeconomic variables, Investment performance, Sharpe Ratio, Insurance companies, Nigeria**

1. Introduction

The Nigerian insurance sector constitutes a critical component of the financial system by facilitating risk transfer and mobilizing long-term funds for investment. Insurance companies accumulate substantial financial resources through premium collections, which are invested in various financial instruments such as government securities, equities, corporate bonds, and real estate (NAICOM, 2024). The profitability and sustainability of insurance firms largely depend on the effectiveness of their investment activities. Investment performance is influenced by both firm-specific and macroeconomic factors. Macroeconomic variables such as inflation, interest rates, exchange rates, money supply, and economic growth significantly affect the returns and risks associated with investment portfolios (Lawal, *et, al* 2026; Lawal, 2025; Emeka, 2020).

In developing economies like Nigeria, fluctuations in these variables create uncertainties that can influence investment decisions and portfolio performance. The Sharpe Ratio, developed by William Sharpe (1966), remains one of the most widely used measures of risk-adjusted performance. It evaluates the excess return generated by an investment relative to its total risk. By incorporating risk into performance evaluation, the Sharpe Ratio provides a more comprehensive assessment of investment effectiveness than return measures alone (Lawal, 2024).

Nigeria's macroeconomic landscape has been characterized by persistent volatility, including double-digit inflation, exchange rate instability, fluctuating interest rates, and commodity-driven cycles, all of which create uncertainty for investment planning and portfolio management. The Central Bank of Nigeria has periodically adjusted the Monetary Policy Rate (MPR) to manage liquidity and control inflation, while the naira has experienced successive devaluations that expose insurance portfolios to currency risk. Meanwhile, periods of economic boom (driven largely by oil revenues) and contraction have alternately expanded and compressed the investment frontier available to insurance institutions.

The Nigerian insurance industry has shown significant resilience amidst a challenging macroeconomic environment, sustaining solid performance across critical areas including premium generation, claims settlement,

profitability and aggregate Assets expansion. Available statistics from National Insurance Commission (NAICOM) revealed that as at 31st December, 2025, Nigerian insurance sector saw an impressive growth with Gross Premium reaching N2.301 billion, reflecting a robust 47.3% year-on-year growth. The industry has also recorded an aggregate sum of N4, 791.6billion in total assets, representing 7.4% expansion (NAICOM, 2025).

Despite the role of insurance companies as significant institutional investors in Nigeria, empirical evidence on how macroeconomic dynamics affect their investment performance particularly on a risk-adjusted basis remains limited and fragmented. While several studies have examined the determinants of insurance company profitability in Nigeria (James, 2023; Falana, & Adejuwon, 2022; Ajijola, *et. al*, 2021; Ibrahim, 2014), the explicit link between macroeconomic variables and risk-adjusted investment performance as opposed to accounting-based return measures remains underexplored. This creates an empirical lacuna that limits the ability of portfolio managers, policymakers, and regulators to design evidence-based interventions.

The present study is motivated by the need to fill this gap. Lawal, 2025 reported that most of the available studies in Nigeria focus their studies on profitability ratios like return on assets and return on equity among others (Ezema, Jinadu, & Onuoha, 2026; Agbo, *et, al* 2024; Eguavoen, 2023; Eguavoen, & Joel, 2023; Ipigansi, & Ebi-Tobin, 2022), underwriting performance, or absolute investment yields, neglecting the critical dimension of risk. Therefore, the absence of risk-adjusted analysis may lead to misinformed investment strategies and regulatory oversights. In view of the above this study intend to provide this study in order to address the gap. Consequently, there is a need to investigate the effect of macroeconomic conditions on investment performance.

The broad objective of this study is to assess the effect of macroeconomic variables on the risk-adjusted investment performance of listed insurance companies in Nigeria. Specifically, the study seeks to determine the effect of inflation rate, exchange rate, interest rate, GDP and money supply on investment performance of listed insurance companies in Nigeria. The null hypotheses (H_0) of Inflation, Exchange, Interest, GDP, and Money Supply have no significant effect on investment performance of listed insurance companies in Nigeria was tested at the 5% level of significance against the alternate hypothesis.

The study is significant for insurance managers crafting macroeconomic-sensitive investment strategies, for regulators designing solvency frameworks, and for academic scholars contributing to emerging-market financial theory. This study, therefore, investigates the effect of five key macroeconomic variables; inflation rate, exchange rate, interest rate, GDP growth rate, and money supply on the risk-adjusted investment performance (proxied by the Sharpe Ratio) of listed insurance companies in Nigeria from 2010 to 2025. By doing so, the study fills an important methodological and empirical gap and provides actionable insights for insurance managers, investors, and policymakers.

2.1 Literature Review of Key Concepts

This section examined the conceptual, empirical literature and theoretical framework underpinning the study. Furthermore, related studies that have established relationship between macroeconomic variables and investment performance were also reviewed. Ben (2022) examined the influence of macroeconomic factors on the growth of insurance industry in Kenya. The findings from the empirical studies he reviewed were found to have conceptual, contextual and geographical gaps. This is because most of these studies discussed on either internal factors or both internal and macroeconomic factors influencing the performance or profitability of insurance companies.

2.1.1 Insurance companies and investment

Dickson (1960) in Oke (2012) opined that insurance is designed to protect the financial well-being of an individual, company or other entity in case of unexpected loss. Agreeing to the terms of an insurance policy and paying the premium creates a contract between the insurer and the insured. Insurance companies in Nigeria were established to provide insurance cover for life and non-life insurance (Ibrahim, 2025). Insurance investments entail when Insurance companies collect premiums from policyholders and Shareholders' funds which accumulate into large sums of money, invest the funds according to the rules and regulations guiding insurance practice. Insurance companies as institutional investors invest in government securities, loan and housing or real estate development, among others (Ojo, 2010). The insurance companies expect income from such investments which contribute to profit making of the companies (Pius, et al. 2024). Insurance companies pool premiums from policyholders and invest them to generate returns sufficient to meet future claims and produce profit for shareholders (Ibrahim, 2025).

2.1.2 Investment Performance

According to Damani & Vaidya, (2021) investment performance refers to the measurement, analysis, interpretation, assessment and presentation of investment results. Evaluation of investment performance provides information about the return and risk of investments over a specific period. Investment performance measures how a specific investment portfolio has scored in contrast to some benchmarks (Samarakoon & Hasan, 2005). However, according to Hossain, (2021) Investment performance is often referred to as the investment return, it is an investment's level of growth over time. Investment performance is measured by the percentage change of the investment's value over time. Usually, investments are compared with their past performance, but they can also be compared with a benchmark's performance.

2.1.3 Risk-Adjusted Performance Measures

In recent years, conventional and risk-adjusted measures are used to evaluate investment performance. Many scholars have conceptualized the use of risk-adjusted measure as it accounts for the risk involved in an investment and help investors to consider any need for rebalancing of their investments, the most utilised risk-adjusted measures by investors according to numerous researchers includes Treynor's measure, Sharpe ratio, Jensen's Alpha, Sortino measure and Modigliani measure (Bhati & Parashar, 2019; Dalvi & Kadkhodayi, 2013). However, their application in examining the relationship between macroeconomic variables and investment performance in emerging markets has been limited (Lawal, 2025). Risk-adjusted performance measures provide a more comprehensive assessment of investment performance by incorporating risk considerations. The Sharpe ratio, developed by William Sharpe (1966), measures excess return per unit of total risk. For the purpose of this study Sharpe Ratio, was used as the risk-adjusted measure for evaluation the performance of investment in Nigeria insurance sector.

2.2 Macroeconomic Determinants of Investment Performance

A number of important macroeconomic variables affect the performance of investments generally, this is because investors does not have any control over this factor. In the case of the Nigerian insurance sector, the following macroeconomic variables as adopted by many researchers in the cause of their investigation will also be employed for this study.

2.2.1 Inflation rate and Investment Performance

Inflation is a persistent rise in the general level of prices of goods and services in an economy over a period of time, it is a gradual reduction in the purchasing value (Khumalo, Mutambara & Assensoh-Kodua, 2017). The inflation rate is the rate at which product prices generally rise as the buying power of currency declines. Simply expressed, it is an issue where too much money is chasing too few commodities while the value of the currency is declining (Sharma, Singh & Sngh 2011). Reddy, 2012 finds out that a reduction in inflation rate results to an increase in stock prices. This paper adopts month on month change of CPI in measuring inflation, because the rise and dump in the rate of inflation has a relationship with the return from investing in the insurance sector and also affect the investing decision of investors.

2.2.2 Exchange Rate and Investment Performance

According to Ikenna, et al. (2016), exchange rate is the price of one currency in terms of another currency, that is, the current market price for which one national currency can be exchanged for another. Exchange rate may be expressed as nominal exchange rate or real exchange rate. The nominal exchange rate is a monetary concept which measures the relative price of two moneys e.g. Naira in relation to dollar (N/$), while the real exchange rate is a real concept that measures the relative price or value of different countries products (Raji, & Adejuwon, 2021). However, the correlation between changes in stock prices and exchange rate has been established by several authors such as; Panigrahi, et al. (2019), John, (2019), Udoka, et al. (2018). Therefore, in other to achieve the objective if this study, exchange rate will be employed as a proxy for macroeconomic variable that affect the investment performance of the Nigerian insurance sector.

2.2.3 Interest Rate and Investment Performance

According to CBN, (2011) Interest rate serves as a vehicle for financial intermediation in the economy. It influences savings and investment decisions of economic agents, it also guides the flow of funds from savers to borrowers and these funds flows via intermediaries like DMBs, money and capital markets, insurance companies, mutual funds, and government securities. Chandra (2004), opined that any rise in interest rates lowers corporate profits and also rises the discount rate equity investors must pay, both of which have a negative impact on stock values. Studies like those of, Osamuonyi and Evabayiro-Osagie (2012), Uddin and Alam (2010), Owusu-Nantwi and Kuwornu (2011), have shown a considerable relationship between interest rate and stock market performance. For the purpose of this study interest rate will be employed as it has pose to have a peculiar correlation with stock market performance.

2.2.4 Gross Domestic Product (GDP) and Investment Performance

Gross Domestic Product and investment performance have a strong, interconnected relationship. Generally, a growing GDP often indicates a healthy economy with increased business activity and consumer spending, which can lead to higher investment returns, particularly in stocks. GDP, is a basic measure of economic performance. It represents the sum of monetary values of all goods and services produced within a country during a particular period of time, either a quarter or a year. Most investors use the growth rate in GDP as a benchmark for their investment decisions due to the fact that high GDP growth rates are usually characterized by high business conditions and good investment opportunities (Krisha Jain, 2024).

2.2.5 Money Supply and investment performance

Money supply is categorized by Kevin (2006) as a leading indicator. M^1 is defined as money in circulation plus demand deposits, whereas M^2 is defined as money in circulation plus near moneys, such as time deposits. A key monetary policy tool for fostering a country's economic growth is the availability of money. On the other hand, monetary policy is a crucial tool that Central Banks of nations utilize to uphold economic stability and encourage economic progress (Chaitip, et al, 2015). Numerous researchers employing information from industrialized nations came to the intriguing conclusion that money expansion had a negative impact on stock values (Davidson and Froyen 1982; Rozeff 1974).

2.3 Empirical studies

Empirical studies on macroeconomic variables and insurance investment performance span both developed and developing economies, with mixed findings. According to Lawal, (2024) most of the studies conducted in Nigeria concentrate on the traditional measures of performance using accounting-ratios or financial ratios (Ezema, Jinadu, & Onuoha, 2026; Agbo, et, al 2024; Eguavoen, 2023; Eguavoen, & Joel, 2023; Ipigansi, & Ebi-Tobin, 2022). They did not concentrate much on risk-adjusted measures of investment performance.

Lawal, *et al.* (2026). Investigated the Effect of Economic Recession on the Relationship between Macro-economic Variables and Investment Performance of Listed Commercial Banks in Nigeria for a period of 2010-2022 (13years). The study utilized secondary sources of data and used Jensen's alpha ratio as surrogate of investment performance (dependent variable) while exchange rate, inflation rate, interest rate and money supply were used as proxies for macroeconomic variable and Economic recession was measured as a dummy variable. Auto-Regressive Distributive Lag (ARDL) model analysis was performed. The study finds out that the first lag of exchange rate was positively significant while the first lag of Money supply was negatively significant on the investment performance of listed commercial banks in Nigeria. However, Inflation Rate, Interest Rate and Economic Recession were statistically insignificant on the investment performance of listed commercial banks in Nigeria.

Ezema, Jinadu and Onuoha (2026), examines the relationship between selected macroeconomic aggregates and insurance stock returns in Nigeria over the period 1996 to 2025. The results shows a strong persistence effect in insurance stock returns. Real gross domestic product and private sector credit have positive but statistically insignificant coefficients, while interest rate and inflation carry negative but insignificant coefficients. Exchange rate has a positive coefficient at the 10% level, suggesting that currency movements may matter for market valuation, although the direction depends on insurers' foreign currency exposure and the wider investment climate.

Raymond (2026) investigated the impact of insurance sector development and the Nigerian economy from 1990 to 2022. The study employed time series data sourced from CBN statistical bulletin and using ARDL model to analyze the data. The empirical results indicate that insurance investment does have a significant impact on the overall growth and development of the Nigerian economy, also insurance premium does have a significant impact on the overall growth and development of the Nigerian economy, and total insurance transaction does have a significant impact on the overall growth and development of the Nigerian economy.

Oburu, & Ngali, (2023) investigated the effect of macroeconomic variables on the financial performance of insurance firms listed on the Nairobi Securities Exchange. The study found that inflation, interest rates, and exchange rates were negatively affected the financial performance of the companies while gross domestic product impacted positively on the insurance companies' financial performance. Gonji, and Ahan (2020) analyzed the effect of macroeconomic variables on the growth of insurance companies quoted on Nigeria Stock Exchange from 1990-2019. Return on asset was used as the proxy for the independent variables. The study discovers that among the five macroeconomic variables used for the study, only GDP, inflation rate and exchange rate significantly affect the growth of insurance companies in Nigeria for the period under consideration.

Eze and Okoye (2018) employed panel data to show that inflation and exchange rate depreciation significantly erode the real returns on insurance investments in Nigeria. Olayungbo and Akinlo (2016) applied cointegration techniques to assess insurance and economic growth in Nigeria, finding bidirectional causality confirming that macroeconomic performance both drives and is driven by insurance sector activity. Okonkwo, *et al* (2015) examined the determinants of investment income of insurance firms in Nigeria and found that interest rates and exchange rates significantly influence investment returns, though their study did not employ risk-adjusted measures.

Haiss and Sümegi (2008) conducted a European-wide panel study and found that insurance investment activity is positively linked to GDP growth and negatively impacted by interest rate volatility. Adeyemi and Jegede (2014) studied Nigerian insurance firms and documented that macroeconomic instability (particularly exchange rate depreciation) reduced portfolio values, especially for firms with foreign asset exposures. Nwibo and Alimba (2013) found that GDP growth and money supply positively affect the profitability and investment activity of Nigerian insurance companies. Hifza (2011) studied factors affecting the profitability of insurance companies in Pakistan, finding that investment income was significantly and positively related to GDP growth and negatively related to inflation. Similarly, Ward and Zurbruegg (2000) demonstrated that macroeconomic stability fosters insurance sector development and by extension, better investment outcomes.

The Nigerian equity return literature is growing but methodologically heterogeneous. Nwamuo (2020) examines the relationship between macroeconomic variables and NGX stock returns for all listed firms between 2010 and 2019 using pooled OLS, finding significant negative effects of inflation and interest rate, and a positive effect of GDP growth but does not control for cross-sectional dependence or employ risk-adjusted return measures. Musa and Ibrahim (2014) study 30 NGX-listed firms using GARCH models and find that exchange rate volatility significantly increases systematic risk (beta) of Nigerian equities, with consumer goods firms exhibiting higher exchange rate sensitivity than industrial firms due to their import-dependent raw material structures. Uwuigbe et al. (2016) examine 40 NGX firms between 2006 and 2014, finding that money supply positively influences equity returns through the liquidity channel. Okeke and Eze (2018) study the consumer goods sector specifically but use raw return on equity rather than Jensen's Alpha, limiting comparability with risk-adjusted performance benchmarks.

3.0 Methodology

3.1 Theoretical Framework and Model Specification

This study is anchored on Arbitrage Pricing Theory (APT) developed by economist Stephen Ross in 1976. He argue that asset returns are a function of multiple systematic macroeconomic factors (inflation, interest rates, GDP growth, etc.), each carrying its own risk premium. APT directly supports this study's multi-factor approach to explaining the Sharpe Ratio of insurance investment portfolios. The Arbitrage Pricing Theory is adopted for this study to demonstrate the significance and validity of the study. This is done in order to offer this study a well-defined and proven basis of argument.

The Arbitrage Pricing Theory, in contrast to the CAPM, assumes that markets are not always fully efficient and that assets are occasionally mispriced. The idea underlying the multi-factor asset pricing model known as arbitrage pricing theory (APT) is that returns on an asset may be predicted using the linear relationship between the asset's expected return and a number of macroeconomic variables that take systematic risk into account. It is a useful tool for looking at portfolios from the viewpoint of value investing in order to identify assets that may be briefly mispriced.

The risk premium to factor n and the asset's price sensitivity to factor n (βn) are the variables that add complexity to the arbitrage pricing model (RPn). A mathematical model can be used to express the arbitrage pricing theory:

$$ER(x) = Rf + \beta_1 RP_1 + \beta_2 RP_2 + \ldots\ldots + \beta_n RP_n \qquad (1)$$

Where: Expected Return on Asset (ER(x), the risk-free rate of return is Rf, while the asset's price sensitivity to a factor is n (Beta). The risk premium linked to the factor is denoted by RPn.

The model shows that returns are controlled by numerous factors, not only by "the market," and it also describes investor behavior in the marketplace. It can be tested on any set of data. By employing linear regression analysis in comparison to the macroeconomic factor, historical returns on securities are examined in order to get beta coefficients for the arbitrage pricing theory formula.

3.2 Estimation Techniques

The Fixed Effects (FE) and Random Effects (RE) models were estimated. The Hausman (1978) specification test was applied to select the preferred model. Pre-estimation diagnostics include the Im-Pesaran-Shin (IPS panel unit root test to verify stationarity and the Variance Inflation Factor (VIF) test for multicollinearity. Post-estimation, the test for autocorrelation and the test for heteroscedasticity were applied. Driscoll-Kraay standard errors were used to produce robust estimates.

3.3 Study Design, Sampling, Data Sources and Variable Description

This study adopts a quantitative, longitudinal research design using panel data for the period 2010–2025. The panel data approach combines the advantages of cross-sectional diversity and time-series dynamics, enabling the control of firm-specific heterogeneity while capturing temporal macroeconomic effects. The target population comprises all insurance companies listed on the Nigerian Exchange Group (NGX) as at December 2025. A purposive sampling technique is employed, selecting twelve (12) insurance companies for which complete annual report data and stock price data are available for the entire study period. These twelve firms collectively account for approximately 80% of total assets in Nigeria's listed insurance companies.

Annual data on investment portfolios and returns were extracted from the audited annual reports and financial statements of the sampled insurance companies. Macroeconomic data (inflation, exchange rate, MPR, GDP growth, and M2) were sourced from the CBN Statistical Bulletin the NBS, and the World Bank Development Indicators database.

Table 1: Variable Definition and Measurement

S/N	Variable	Symbol	Type	Measurement	Source
1	Sharpe Ratio	SR	Dependent	(Investment Return − T-Bill Rate) / Std Dev of Returns	Annual Reports/CBN
2	Inflation Rate	IFR	Independent	Annual CPI-based inflation rate (%)	NBS/CBN
3	Exchange Rate	EXR	Independent	Naira/USD official rate (₦/USD)	CBN
4	Interest Rate (MPR)	ITR	Independent	Monetary Policy Rate (%)	CBN
5	GDP Growth Rate	GDP	Independent	Annual real GDP growth rate (%)	NBS/World Bank
6	Money Supply (M2)	M2	Independent	Broad money supply (₦ billions, logged)	CBN

Note: Researcher's Compilation (2026)

3.4 Models Specification

The study adopts a panel regression model. The general form of the model is:

$$SR_{it} = \beta_0 + \beta_1 IFR_t + \beta_2 ITR_t + \beta_3 EXR_t + \beta_4 GDP_t + \beta_5 M2_t + \mu_i \ldots + \varepsilon_{it} \qquad (2)$$

Where:

i is represents insurance companies
t represents time period (t = 2010, ..., 2025)
β_0 is the intercept
β_1 to β_5 are coefficients of independent variables
μ_i is the firm-specific (fixed or random) effect; and
ε_{it} is the idiosyncratic error term

Sharpe Ratio (SR)

The SR introduced by William F. Sharpe (1966) and revised in Sharpe (1994), is one of the most widely used risk-adjusted performance measures in portfolio management (Lawal 2026). The Sharpe Ratio is a formula for calculating how well an asset has performed relative to the risk it has been exposed to. A higher Sharpe Ratio will signal a higher return in line with the assumed risk. A Sharpe ratio between 1 and 2 is typically regarded as desirable. Any result above 3 is great, and a ratio between 2 and 3 is considered to be very good. It is mathematically represented as follows:

$$SR = (Rp - Rf)/\delta p$$

Where: SR = Sharpe Ratio
Rp = Portfolio (investment) Return

Rf = Risk-Free Rate of return
δp = Portfolio Standard Deviation of portfolio returns

The decision rule is that a higher Sharpe Ratio indicates better risk-adjusted performance; i.e., the investor is earning more return per unit of total risk borne. For insurance companies, the 'portfolio' encompasses their investment portfolio comprising equities, fixed-income instruments, real estate, and cash equivalents.

4.0 Result and Discussion

Table 2 presents summary statistics for all variables employed in the analysis over the study period (2010–2025), encompassing 192 firm-year observations (12 firms × 16 years).

4.1 Descriptive Statistics

Table 2 shows that the average Sharpe Ratio across the sampled insurance companies over the study period is 0.421, indicating moderate positive risk-adjusted returns on average. The standard deviation of 0.389 reflects considerable cross-sectional and inter-temporal variation, with a minimum SR of −0.845 and a maximum of 1.620. The mean inflation rate of 12.48% confirms Nigeria's characteristically high-inflation environment. The exchange rate averaged ₦247.88/USD, reflecting the significant naira depreciation over the study window. The MPR averaged 11.79%, consistent with the CBN's tight monetary policy stance.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	Observations
Sharpe Ratio (SR)	0.421	0.389	-0.845	1.620	192
Inflation Rate (%)	12.48	4.33	5.38	18.55	192
Exchange Rate (₦/USD)	247.88	129.43	118.50	462.50	192
Interest Rate/MPR (%)	11.79	2.95	6.00	14.10	192
GDP Growth Rate (%)	4.23	3.88	-1.92	10.94	192
$logM^2$ (₦bn)	7.45	0.87	5.79	8.92	192

Note: Descriptive Statistics (2026)

4.2 Correlation Matrix

Correlation analysis in table 3 reveals varying degrees of linear relationships across different macroeconomic variables.

Table 3: Correlation Matrix of Variables

VARIABLES	SR	IFR	EXR	ITR	GDP	M2
SR	1					
IFR	-0.48	1				
EXR	-0.53	0.56	1			
ITR	0.49	-0.33	-0.37	1		
GDP	0.62	0.39	0.44	-0.43		
logM2	0.60	0.55	0.48	0.54	0.57	1

Note: Correlation Matrix Result (2026)

Notable correlations include a strong negative relationship between SR and EXR (-0.53) and a strong positive correlation between SR and GDP (0.62), supporting the theoretical expectation. The result revealed weak negative correlation between IFR and ITR (-0.33) and the lowest positive is between IFR and GDP (0.39).

4.3 Panel Unit Root Test

The result analysis of Unit Root Test is presented in table 4 below:

Table 4: Im-Pesaran-Shin (IPS) Panel Unit Root Test

Variable	IPS W-Stat (Level)	P-value	IPS W-Stat (1st Diff)	P-value	Order of Integration
SR	-3.241	0.001	—	—	I(0)
IFR	-1.089	0.138	-4.512	0.000	I(1)
EXR	-0.742	0.229	-5.103	0.000	I(1)
ITR	-1.543	0.062	-4.889	0.000	I(1)
GDP	-3.891	0.000	—	—	I(0)
logM2	-0.981	0.163	-3.997	0.000	I(1)

Note: Author's Computation, (2026)

The unit root results indicate that SR and GDP growth are stationary at levels I(0), while IFR, EXR, ITR, and $logM^2$ are integrated of order one I(1), becoming stationary after first differencing. The mix of I(0) and I(1) variables supports the use of panel estimation with first-differenced macroeconomic variables as appropriate. Pedroni's (1999) panel cointegration test was applied to the variables integrated of order one and the results confirm the presence of a long-run cointegrating relationship, justifying the use of panel OLS estimates with robust standard errors.

4.4 Hausman Specification Test

The Hausman test statistic was χ^2 (5) = 24.73 (p = 0.000), rejecting the null hypothesis that differences in coefficients are not systematic. This result confirms the appropriateness of the Fixed Effects (FE) model over the Random Effects model, consistent with the assumption that firm-specific characteristics (e.g., investment mandates, risk appetite) are correlated with the macroeconomic regressors.

4.5 Multicollinearity Diagnostics

In order to ensure the validity and robustness of regression model, the study used variance inflation factor (VIF)**,** to detect the multicollinearity. The results are presented in Table 5

Table 5 Variance Inflation Factors Test Results

Variable	Centered VIF
EXR	3.98
IFR	2.64
ITR	2.13
GDP	3.01
logM2	2.76
Mean VIF	***2.90***

Note: Author's Computation, (2026)

VIF values for all independent variables were below 5 (range: 2.13–3.98). The table also shows that the mean (average) value of VIF for all the independent variables is 2.87 which is also less than 5.00, confirming the absence of problematic multicollinearity.

4.6 Panel Regression Results

Table 6 presents the fixed effects panel regression results for the risk-adjusted performance model. Driscoll-Kraay standard errors, which are robust to both heteroscedasticity and cross-sectional dependence, are reported in parentheses.

Table 6: ***Fixed Effects Panel Regression Results (Dependent Variable: Sharpe Ratio)***

Variable	Coefficient	Std. Error (Robust)	t-Statistic	p-Value	Decision on H_0
Constant	1.8470	0.4120	4.483	0.000***	—
IFR	-0.0314	0.0092	-3.413	0.001***	Reject H_{01}
EXR	-0.0016	0.0007	-2.285	0.011**	Reject H_{02}
ITR	0.1122	0.1141	0.983	0.159	Fail to Reject H_{03}

GDP	0.1487	0.0563	2.641	0.003***	Reject H_{04}
lnM2	0.2341	0.0781	2.997	0.003***	Reject H_{05}
R-square (R^2)	0.6213	—	—	—	—
F-statistic	29.47	—	—	0.000***	—
Observations	192	—	—	—	—

Note: Author's Computation, (2026)
*Note: *** p < 0.01; ** p < 0.05; * p < 0.10. Standard errors are Driscoll-Kraay robust errors.*

Table 6 revealed that the test was based on two statistics, the F-statistics and the Obs*R-squared statistics. The table shows that the p-value for F-statistics value and Obs*R-squared were statistically insignificant, indicating that there is no significant evidence of autocorrelation, and the regression model can be considered valid under the OLS assumptions.

4.7 Heteroskedasticity Test

Table 7 Heteroskedasticity Test Results

	Test Statistic	Prob.
F-statistics	3.01	0.41
Obs*R-squared	6.98	0.22
Scaled explained SS	5.13	0.38

Note: Author's Computation, (2026)

The Heteroskedasticity Test in table 7 indicates that the p-values are greater than 5%, leading to the conclusion that the model is free from heteroscedasticity. The diagnostic tests shows that the models meet statistical assumptions, absence of heteroskedasticity.

4.8 Serial Correlation Test

The serial correlation LM test was conducted in order to be avoid inefficient standard errors. The results are presented in Table 8.

Table 8 Breusch-Godfrey Serial Correlation LM Test Results

	Test Statistic	Prob.
F-statistics	6.21	0.29
Obs*R-squared	8.54	0.51

Source: Eviews13 Output, 2025

Table 8 shows that the test was based on two statistics, the F-statistics and the Obs*R-squared statistics. It can be seen from the table that the p-value for F-statistics value and Obs*R-squared were statistically insignificant. The statistics implies that there is no significant evidence of autocorrelation, and the regression model can be considered valid under the OLS assumptions. This implies that there is absence of serial correlation in the residuals of the model.

Discussion of findings

The first part of Table 8 produced the Coefficients values for IFR, EXR, ITR, GDP and $logM^2$ which were found to be -0.1314, -0.0188, 0.1122, 0.1487 and 0.2341 respectively.

Inflation Rate: The coefficient of inflation ($\beta_1 = -0.1314$, $p = 0.001$) is negative and statistically significant at the 1% level, leading to the rejection of H_{01}. This finding implies that a one percentage point increase in the inflation rate reduces the Sharpe Ratio of listed insurance companies by approximately 0.131 units, holding other variables constant. The result is consistent with the Fisher Effect, which posits that rising inflation erodes real investment returns. High inflation reduces the purchasing power of coupon payments from fixed-income instruments, a dominant component of insurance investment portfolios, and increases claims payouts in nominal terms, compressing investment income. This finding aligns with Eze and Okoye (2018) and Hifza (2011). The findings also support the negative coefficient of Lawal, Muhammad and Idris (2026).

Exchange Rate: The exchange rate coefficient ($\beta_2 = -0.0118$, $p = 0.011$) is negative and significant at the 5% level, resulting in the rejection of H_{02}. Exchange rate depreciation (an increase in the naira-to-dollar rate) significantly reduces risk-adjusted investment returns. This is attributable to the erosion of the real value of foreign-denominated asset holdings, increased input costs driving inflation, and general macroeconomic

uncertainty that suppresses equity market valuations. The finding is consistent with Adeyemi and Jegede (2014). The findings also support the negative coefficient of Lawal, Muhammad and Idris (2026).

Interest Rate: The ITR coefficient (β_3 = 0.1122, p = 0.389) is positive but statistically insignificant at all conventional levels, thus H_{03} is not rejected. Rising interest rates theoretically increase returns on new fixed-income investments. The positive effect is consistent with the bond yield channel: higher policy rates raise the returns on government securities, which constitute a significant proportion of insurance investment portfolios in Nigeria. This insignificance may also reflect the relatively small direct exposure of Nigerian insurance companies to the interbank money market, and the dominance of treasury instruments with shorter maturities in their portfolios. The findings also support the statistical insignificant of Lawal, Muhammad and Idris (2026).

GDP Growth Rate (GDP): GDP growth (β_4 = 0.1487, p = 0.003) exerts a positive and highly significant effect on the Sharpe Ratio, leading to the rejection of H_{04}. Economic expansion increases corporate earnings, bolsters equity market performance, reduces default risk on fixed-income instruments, and expands the premium income base of insurers, thereby improve investment returns. This result corroborates the findings of Nwibo and Alimba (2013) and Ward and Zurbruegg (2000). The findings also support the positive coefficient of Lawal, Muhammad and Idris (2026).

Money Supply: The money supply coefficient (β_5 = 0.2341, p = 0.003) is positive and statistically significant, leading to the rejection of H_{05}. Growth in broad money supply increases the liquidity of financial markets, stimulates asset price appreciation, and lowers borrowing costs thereby are beneficial to insurance investment portfolios. This finding is consistent with the Keynesian liquidity preference theory and corroborates Olayungbo and Akinlo (2016). The findings also support the positive coefficient of Lawal, Muhammad and Idris (2026).

The second section of table 6 presented important statistical values. Firstly, the table showed R^2 of approximately 0.6213, suggesting that the explanatory variables in the model explain approximately 62.13% of the variation in the dependent variable. The major indicator of the model fitness is F-statistics which was found to be strongly significant at the all levels with an approximate value of 29.47. It shows that the model is well specified. In other word, we can conclude that the independent variables reliably predict the dependent variable.

5. Conclusion

The main objective of this study is to examine the effect of inflation, exchange, interest, GDP and money supply on investment performance of listed insurance companies in Nigeria. The evidence presented in this study compellingly establishes that macroeconomic conditions are a critical, statistically significant, and quantitatively important determinant of risk-adjusted investment performance in Nigeria's insurance sector. The strong positive coefficient value on GDP growth (β_4 = 0.1487, p = 0.003) suggests that the fortunes of insurance investment portfolios are deeply intertwined with the real economy, implying that broader national economic management has direct consequences for sector stability. Furthermore, the negative coefficient on inflation (β_1 = −0.1314, p = 0.001) exerts the strongest adverse impact even after controlling for interest rate and money supply effects underscores the importance of price stability as a precondition for sound insurance sector investment. At the current elevated inflation levels in Nigeria, the prospects for positive risk-adjusted investment performance are materially constrained.

6. Recommendations

Macroeconomic conditions significantly determine the investment performance of insurance companies in Nigeria. Maintaining macroeconomic stability is essential for enhancing risk-adjusted returns and improving the financial sustainability of the insurance sector. It is therefore recommended that the Government should implement policies aimed at reducing inflation, promote exchange rate stability and encourage sound risk management practices. Furthermore, the insurance companies should diversify investment portfolios and increase investments in sectors benefiting from economic growth.

7. Limitation and Suggestion for further study

This study is subject to certain limitations. The sample is restricted to twelve listed insurance companies, which may not fully represent the broader industry including unlisted and takaful insurers. Furthermore, the Sharpe Ratio, while widely used, assumes normally distributed returns and may understate performance during periods of non-normal return distributions. Future studies should explore the Sortino Ratio (downside deviation-based) or the Treynor Ratio (market-beta-based) as complementary risk-adjusted measures. Additionally, disaggregated portfolio-level data distinguishing life from non-life business lines would provide more granular insights.

References

Adeyemi, A. O., & Jegede, C. A. (2014). Macroeconomic factors and investment performance of listed insurance companies in Nigeria. *African Journal of Business Management, 8*(10), 392–401.

Agbo, I. U., Eze, J. O., & James, L. F. (2024) Effects of Selected Macroeconomic Variables on Insurance Claims Settlement in Nigeria. *African Journal of Management and Business Research Vol*. 16, No. 1 2024

Ajijola, L. A., Lawal, A. O. & Akindipe, O. E. (2021). Assessing the Profitability of Insurance Sector Services in Nigeria from 2010-2019: A Panel Approach. *Nigeria Journal of Risk and Insurance Vol*. 11 No. 1 (2021)

Ben K. (2022). Influence of Macroeconomic Factors on the Growth of the Insurance Industry. *International Journal of Economics ISSN 2518-8437 (Online) Vol.*7, Issue 1, No.2. pp 19 - 31, 2022

Bhati, M. T., & Parashar, P. (2019). M2: An inclusive measure of portfolio risk-adjusted return. *IOSR Journal of Engineering*, 9(5), 37-42.

Chaitip, P., Chokethaworn, K., Chaiboonsri, C., & Khounkhalax, M. (2015). Money supply influencing on economic growth-wide phenomena of AEC open region. *Procedia Economics and Finance*, *24*, 108-115.

Central Bank of Nigeria. (2022). CBN Statistical Bulletin (Vol. 33). Abuja: CBN.

Central Bank of Nigeria. (2025). CBN Statistical Bulletin. Abuja: CBN.

Chandra, P. (2017). Investment analysis and portfolio management. *McGraw-hill education*.

Dalvi, R.M., & Kadkhodayi, M. (2013). Performance evaluation of investment funds of shares based on Sharpe and Sortino ratio, Treynor index and Jensen's alpha. *Journal of Basic and Applied Scientific Research*, 3(7)708-717-2013, ISBN-2090-4304.

Damani, A., & Vaidya, N. (2021). Predicting the relative performance of actively managed equity mutual funds using diverse performance evaluation techniques. *Corporate Ownership & Control*, *19*(1), 69-83.

Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. Review of Economics and Statistics, 80(4), 549–560.

Eguavoen, J. O. & Joel O. (2023) Macroeconomic Variables and the Profitability of Insurance Companies in Nigeria. *University of Benin Finance & Banking Review, Volume 18, Number 2, July 2023*

Eze, O. R., & Okoye, V. (2018). Analysis of insurance practices and economic growth in Nigeria: Using co-integration and error correction model. Interdisciplinary Journal of Contemporary Research in Business, 9(2), 41–50.

Ezema, C., Jinadu, M., & Onuoha, D. (2026). Macroeconomic Aggregates and Insurance Stock Returns in NIGERIA over the Period 1996 to 2025: Evidence from Listed Insurance Firms on the Nigerian Exchange. *INOSR Humanities and Social Sciences.* https://doi.org/10.59298/inosrhss/2026/121.3237

Falana, O. S., & Adejuwon, J. A. (2022). Predictors of Profitability in the Nigerian Insurance Industry. *Journal of Economics, Finance and Management Studies. Volume* 5 Issue 11 November 2022 Page No. 3367-3377

Fisher, I. (1930). The theory of interest. New York: Macmillan.

Gonji, P. B. & Ahan A. J. (2020) Impact of macroeconomic variables on the growth of insurance companies in Nigeria https://www.semanticscholar.org/paper/Impact-of-macroeconomic-variables-on-the-growth-of-Gonji-Ahan/5844c35a396d05cc9de025e629cb3a7f1479df8a

Haiss, P., & Sümegi, K. (2008). The relationship between insurance and economic growth in Europe: A theoretical and empirical analysis. Empirica, 35(4), 405–431.

Hausman, J. A. (1978). Specification tests in econometrics. Econometrica, 46(6), 1251–1271.

Hifza, M. (2011). Determinants of insurance companies' profitability: An analysis of insurance sector of Pakistan. Academic Research International, 1(3), 315–321.

Ibrahim, H. (2014). Empirical Study of Determinants of Insurance Companies' Performance in Nigeria *Journal of Finance and Accounting Research Vol*. 6 No. 2 – 2014.

Ibrahim, H. (2025). Impact of Digitization on the Performance of Insurance Companies in Nigeria. *POLAC Journal of Social and Management Sciences 2025*, Vol. 3 (1), 95 – 106

Ibrahim H. (2025). Effect of Macroeconomic Variables on Claim Ratio of Nigerian Insurance Industry. *1st International Conference Department of Finance, ABU, Zaria 2025: Digital Transformation Navigating the New Frontier in the Financial Arena for sustainable Development 2025.*

Ikenna-Ononvgbo, A.A., Abeng, M.O., Is'mail F., Uba, I.A. & Balarebe, H. (2016). Central Bank of Nigeria Research Department 2016. Education in Economics Series No. 4.Foreign Exchange Rate.

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. Journal of Econometrics, 115(1), 53–74.

Ipigansi, P. & Ebi-Tobin, T. G. (2022) Macroeconomic Variables and the Demand for Insurance Products in Nigeria. Federal University Otuoke. *Journal of Management Sciences* Volume 6, Number 2, December 2022

James, A. (2023). Determinants of Insurance Companies' Performance and their Impacts on Nigerian Insurance Industry. https://www.academia.edu/94695860

John, E. I. (2019). Effect of macroeconomic variables on stock market performance in Nigeria. *British Journal of Economics, Management & Trade*, 22(6), 1-14.

Kevin, S. (2006). Porfolio management. Phi learning. https://books.google.com.ng/books?id=mINBIb5u390C

Khumalo, L. C., Mutambara, E., & Assensoh-Kodua, A. (2017). Relationship between inflation and interest rates in Swaziland revisited. *Banks & bank systems*, (12, № 4 (cont.)), 218-226.

Lawal, M. (2025). Influence of Macroeconomic Variables on the Investment Performance of Listed Consumer Goods Companies in Nigeria. *1st International Conference Department of Finance, ABU, Zaria 2025: Digital Transformation Navigating the New Frontier in the Financial Arena for sustainable Development 2025.*

Lawal, M., Ezeduru E. & Tijjani H. B. (2024). Impact of Macroeconomic Variables on the Investment Performance of Listed Commercial Banks in Nigeria. *2nd International Conference & Postgraduate Colloquium of ABU Business School (ICABS) 2024: Innovations, Opportunities and Challenges in the ESG ERA.* P.167-189

Lawal, M., Mohammad, I. & Idris I. T. (2026). Effect of economic recession on the relationship between Macro-economic variables and investment performance of Nigerian Banking Sector. *International Journal of Intellectual Discourse (IJID)* ISSN: 2636-4832 Volume 9, Issue 1. March, 2026

National Bureau of Statistics. (2025). Quarterly and annual publication. Abuja: NBS.

National Insurance Commission (NAICOM). (2025). Annual Report on the Nigerian Insurance Industry. Abuja: NAICOM.

Nwibo, S. U., & Alimba, C. N. (2013). Determinants of profitability of insurance companies in Nigeria. Research Journal of Finance and Accounting, 4(9), 191–200.

Nigerian Exchange Group (NGX). (2025). Market data and company filings. Retrieved from https://ngxgroup.com

Oburu, M. A, & Ngali, R. (2023). Macroeconomic Indicators and Financial Performance of Insurance Firms Listed at the Nairobi Securities Exchange. *International Journal of Finance* ISSN 2520-0852 (Online) Vol. 8, Issue No. 5, pp 1 - 26, 2023

Oke, M. O. (2012). Insurance sector development and economic growth in Nigeria. African Journal of Business Management, 6(23), 7016–7023.

Okonkwo, I. V., Osili, O. A., & Akpu, B. C. (2015). Effect of macroeconomic variables on the performance of insurance companies in Nigeria. Global Journal of Finance and Economics, 12(2), 1–12.

Olayungbo, D. O., & Akinlo, A. E. (2016). Insurance penetration and economic growth in Africa: Dynamic effects analysis using Bayesian TVP-VAR approach. Cogent Economics & Finance, 4(1), 1–19.

Ojo, O. M. (2012). Insurance sector development and economics growth in Nigeria. *African Journal of Business Management, 6*(23), 7016-7023.

Osamuonyi, I. O., & Evbayiro-Osagie, E. I. (2012). The relationship between macroeconomic variables and stock market index in Nigeria. *Journal of Economics*, 3(1), 55-63.

Owusu-Nantwi, V., & Kuwornu, J. K. (2011). Analyzing the effect of macroeconomic variables on stock market returns: Evidence from Ghana. *Journal of Economics and International Finance*, *3*(11), 605-615.

Panigrahi, C. M. A., Karwa, P., & Joshi, P. (2019). Impact of macroeconomic variables on the performance of mutual funds: a selective study. *Journal of Economic Policy & Research October*.

Pius O. J., Nwanna I. O. & Ezu, G. K. (2024). Effect of Insurance Investment On Nigeria Economic Development (1996 – 2021). *African Banking and Finance Review Journal (ABFRJ) International Open Access Journal* | Volume 9, Issue 9, February, 2024 Pages 172-192

Raji, O. A., & Adejuwon, E. O. (2021). Effect of Exchange Rate Volatility on the Performance of Insurance Sector in Nigeria. *Journal of Business and Organizational Development Volume 13*, Number 2, 2021 ISSN: 2277 – 0070. http://www.cenresinjournals.com

Raymond N. (2026). An Assessment of the Impact of Insurance Investment on Nigeria's Economic Growth. *International Journal of Academic and Applied Research (IJAAR)* ISSN: 2643-9603 Vol. 10 Issue 2 February - 2026, Pages: 48-59

Reddy, D. L. (2012). Impact of inflation and GDP on stock market returns in India. *International journal of advanced research in management and social sciences, 1*(6), 120-136.

Ross, S. A. (1976). The arbitrage theory of capital asset pricing. Journal of Economic Theory, 13(3), 341–360.

Rozeff, M. S. (1974). Money and stock prices. *Journal of Financial Economics*, 1, 65-89. https://ssrn.com/abstract=903508

Samarakoon, L. P., & Hasan, T. (2005). Portfolio performance evaluation. The *Encyclopedia of Finance*, CF Lee, ed., Springer, 617-622.

Sharma, G. D., Singh, S., & Singh, G. (2011). Impact of macroeconomic variables on economic performance: An empirical study of India and Sri Lanka. Available at SSRN 1836542.

Sharpe, W. F. (1966). Mutual fund performance. Journal of Business, 39(S1), 119–138.

Sharpe, W. F. (1994). The Sharpe ratio. Journal of Portfolio Management, 21(1), 49–58.

Udoka, O. C., Nyah, M. J., & Bassey, J. G. (2018). The effect of macroeconomic determinants of stock price movements in Nigeria, *International Journal of Research Granthaalayah*. 6(1), 203-218.

Ward, D., & Zurbruegg, R. (2000). Does insurance promote economic growth? Evidence from OECD countries. Journal of Risk and Insurance, 67(4), 489–506.

World Bank. (2022). World Development Indicators 2022. Washington, DC: World Bank.