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An Empirical Analysis of Macroeconomic Variables on the Stock Prices of Deposit Money Banks and Insurance Firms in Nigeria

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Abstract
This study examines the sensitivity of stock prices of insurance firms and commercial banks to macroeconomic variables in Nigeria. The study adopted longitudinal data analysis to capture both time series and cross-sectional effects. Panel unit root test was also conducted to establish the suitability of the series in estimating possible long-run relationship using the Johansen cointegration method. Data were tested at first difference 1(1) and second differencing 2(1) and the logarithmic transformation of some of the data series to ensure that none of the data have unit root problem. Our population covers the twenty-seven insurance companies and fourteen (14) commercial banks listed on the Nigerian stock exchange and covering the period 2006-2020. Annual time series macroeconomic data (interest rate spread, inflation rate, exchange rate, and oil price) were sourced from CBN statistical bulletin. While the average of annual monthly stock prices and returns data of the listed insurance firms and commercial banks were sourced from factbook of the Nigerian stock exchange. Using panel multiple regression analysis, the result revealed that stock price of insurance firms has negative relationship with interest rate spread, oil price, and inflation rate, while exchange rate showed a positive influence on insurance firms' stock prices. Furthermore, it was found that oil price, inflation rate and exchange rate have negative and significant influence on deposit money banks stock prices, while interest rate spread has a positive and significant effect on the stock prices of deposit money banks. Furthermore, the results clearly underscore that an increase in the level of interest rate spread, exchange rate, oil price change, and inflation rate in the Nigerian economy has the likelihood of influencing price movements of the stocks of listed insurance firms and commercial banks on the floor of the Nigerian stock exchange either positively or negatively. Implying that the sensitivity of these macroeconomic variables to stock prices of the financial institutions under study were not the same. Thus, we recommended that government through its agency should review interest rate spread, implement policies that will diversify the economy away from crude oil, manage exchange rate such that it will stimulate investment in the capital market and then channel effort towards checkmating inflation to reduce the adverse effect of incessant price fluctuations that will induce negative investment in the capital market.

Keywords: *Macroeconomics Variables, Stock Prices, Deposit Money Banks, Insurance Firms*

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I. Introduction

Insurance companies play vital role in a nation's economy. They provide rest of mind for business entities in the economy through the underwriting of risk thereby creating wealth for their shareholders as well as mobilizing funds through premiums for long term investments. Deposit money banks are also established for the purpose of creating money for shareholders. They trade solely in money, using money to make money thus, enhancing the ability of investors to exploit desired profitable ventures. They perform intermediation functions and credit creation as their main income generating activities. The loan portfolios of deposit money banks are the largest asset and the predominant source of revenue. For example, deposit money banks have deposits as their liabilities with tenure extending between 30 days and 365 days. Similarly, the tenure of their loans is also

short-term, not exceeding 24 months meaning that the tenure of the liability is longer than that of the asset. Hence positive gap is produced due to the imbalance in the tenure and whenever this happen, there will be some behavior of interest rate on the price of stocks of this firm due to the gap.

This also applies to insurance firms, even though insurance investments are long-termed, that is, longer term on the liability than the assets. Hence, negative gap will be produced due to the imbalance, and that again will signal some behavioural influences of interest rate. This shows that activities of insurance firms in relation to the interest rates prevalent in the economy may have some influence on how these firms' stocks perform in the capital market. While it has been agreed on the systemic nature and effect of interest rates in the economy, there is need to mention that insurance firms with their long-termed plans are not completely immune since their activities are also considered through the crafting of monetary policies in every economy. This perceived behaviour of interest rate in the economy creates and embeds interest rate risks for insurance firms and other financial institutions in the Nigerian economy.

The macroeconomic variables, just as it affects the banking sector, may also have serious impact on the insurance sector's stock prices. Given that both institutions are in the same financial industry and their activities are prominently driven by interest rate. The deposit money banks assets and liabilities rely on the movement of interest rate to determine the direction of its investment. And this applies to insurance assets, even though insurance firms' liabilities are influenced by the quality of risk covered; the consideration paid by the insured would be invested where interest rates are attractive implying that both stock prices may be affected by the same macroeconomic variable or differently based on the tenure of their statement of financial position. Though banks, pension funds, and insurance firms are part of the financial sector, the banks are more liquid and are more exposed to retail lending and diversification in terms of customers. Insurance firms on the other hand, though are liquid, predominantly lend to institutions at fixed rates. Hence it is assumed that the reactions to macroeconomic variables in the industry may not be the same given the fact that commercial bank's statement of financial position are relatively short term as compared to insurance firm's statement of financial position which are long termed (Berend, McMenamin, Plestis, and Rosen, 2013).

Hence, will the changes in the deposit money banks and insurance firm's share price be the same due to the influences of these macroeconomic variable? In other words, the researchers want to find out whether changes in interest rate will produce greater changes in insurance stock price as compared to that of deposit money banks' stock prices. By this, the goal of this study is to comparatively examine the effect of macroeconomic variables (interest rate spread, inflation rate, oil price and exchange rate) on the stock price of deposit money banks and insurance firms in Nigeria. To achieve this objective, we postulate that interest rate spread, inflation rate, oil price and exchange rate all have the same effect on the stock price of deposit money banks and insurance firms in Nigeria. On the whole, the study is divided into five sections. Section one deals with the introduction of the study; the second section contains the review of relevant literature; section three focused on variables and models specification, and estimation techniques; section four provides the findings and major results and section five concludes the study with useful recommendations

II. Review of Related Literature

2.1 The Relationship between Interest Rate and Stock Price

The influence of economic variables on the insurance industry has been broadly investigated in the literature. Several empirical studies have been conducted in order to examine the relationship between insurance premiums, insurance stock prices and economic factors like interest rate and the consumer price index (or the inflation rate) in different countries (Perera, 2015). Understanding the relationship between insurance stock prices and the macroeconomic variables is essential for setting the proper pricing levels especially in competitive markets, for monitoring the reliance and the market risk from a competitive point of view and for forecasting the profitability. According to the recommendations in Solvency II framework, the importance of incorporating all the risks, including the inflation risk and the interest rate risk, when striking the solvency capital rules was emphasized. Some studies found that fluctuations in insurance premiums (or measures of underwriting profits) and insurance stock prices are related to the changes in the interest rate (Choi, Hardigree, and Thistle, 2002; Fenn and Vencappa 2005; and Adams, Diacon, Fenn, and Vencappa, 2006).

Few studies have recognized the impact of the inflation rate on the insurance industry performance indicators. Meier and Outreville (2006, 2010) established that underwriting profits and stock prices are interrelated with the inflation rate. Eling and Luhnen (2008) also establish that fluctuations in insurance premiums and stock prices are linked to the inflation rate. According to Krivo (2009) the relationship between insurance stock prices, underwriting profits and the inflation rate varies with time: between the periods of 1951-1976, the relationship was negative, while in 1977-2006, the relationship was positive.

The fact that the authors apply linear regression models and linear error correction models shows lack of consensus which assume that the relationship between the variables are stable over the period. Due to the presence of structural breaks and the existence of regime change, that assumption seems to be restrictive. An

alternative approach based on the smooth conversion regression model will allow the structural breaks and regime change which supposes that the transition from one regime to another is linked to an exogenous variable, has been useful. More specifically, Higgins and Thistle (2000) engaged a smooth transition regression model to look at the influence of the interest rate on stock prices and underwriting profits but they establish no significant relationship between the variables. Also, to examine the influence of the economic variable on the combined ratio, Bruneau and Sghaier (2009) considered a smooth transition regression model. Their study revealed that combined ratio is not affected by the interest rate. These studies were constrained with the used of stationary variables therefore, they discovered only the short-run dynamics.

Furthermore, nonlinear cointegression approach was considered by Jawadi, Bruneau and Sghaier (2009) to consider nonstationary variables. More specifically, evidence of a nonlinear cointegration relationship between the stock market index and the interest rate for three countries was established by Jawadi, Bruneau and Sghaier (2009), United States, Japan and France, while evidence of a nonlinear cointegration relationship between insurance stock prices, and the consumer price index for the same countries were found by Bruneau and Sghaier (2009b). Even though these authors offer a comparative analysis of the relationship between the variables in an international framework, they adopted individual time series models and made the evaluation country by country. The weakness of the individual time series models is that they do not report for the homogeneity and the heterogeneity that may exist. They adopted a panel data approach to overcome this problem. The benefit of this method was to increase the power of the econometric tests (the unit root tests, the cointegration tests and the linearity tests, etc). Even though, several studies have applied panel data approach (Lamm-Tennant and Weiss 1997), Fenn and Vencappa (2005), and Eling and Luhnen (2008)), they have measured stationary series, thus studied only the short-run dynamics. Besides, they measured panel linear models which presume that the parameters are stable over time. These assumptions are limiting because the parameters of the panel models vary with time.

2.2 The Relationship between Inflation rate and Stock Prices

Extensive researches have been carried out on the relationship between stock prices and inflation in Nigeria as revealed in the literature. Precisely in 2007, inflationary rate was 6.5 per cent, this rose from a single digit to 15.1 per cent as at December 2008. According to the central banks of Nigeria the inflationary pressure continued into 2009 and this was attributed to the depreciation of the naira, rising food prices, port congestion, inefficient and poor transport services, and the rush to expend the budgeting allocation by the government agencies before the fiscal year ends and a host of many factors. The Nigerian capital market within the same period experienced a bullish trend with market capitalization of ₦10.284 trillion and the highest value of 66,371 was achieved ever in the same year 2008 with a market capitalization of ₦12.640 trillion. Again, in October 2009 the capital market lost about ₦3.38 trillion, over 26.7 per cent as market capitalization stood at ₦9.11trillion. However, the apparent anomaly of the negative relationship between inflation and stock market returns as revealed in several studies has been the issue even though majority of these studies concluded that stock market returns may provide an effective hedge against inflation in Nigeria. This argument may also imply that since stock market serves as a hedge against inflation, the investors are fully compensated for the increase in the general price level through corresponding increase in nominal stock market returns and hence the real returns remain unaltered. As hypothesized by Fisher (1930) that equity stock represents claims against real assets of a business and as such may serve as a hedge against inflation.

Furthermore, it is normal to assume that equities would provide a striking hedge against inflation for the reason that the dividend streams that return to shareholders which are obtained from the corporate profits are based on the operation of real assets. Therefore, it could be assumed that corporate organizations would more often than not be able to pass on inflationary price increases to their customers. However, studies have revealed that although equities are good hedges in the long run, they are poor hedge in the medium or short run. Equities experience even larger negative effects than bonds and long-term real asset returns are provided by equities. Clearly, the relationship between inflation and equity returns in the short term is negative hence the conclusion that using common stock to hedge against inflation must be in the short run (Bruneau and Sghaier 2009b).

2.3 The Relationship between Exchange Rates and Stock Prices

The relationship between exchange rate and stock prices can be explained using the flow-oriented model and this elucidate the effect of changes in exchange rate on stock price that are seen as the present values of a company's cash flow in the future. Given that a firm's cash flows depend to a large extent on the impart of exchange rates through the transaction, economic and accounting outcomes, change in exchange rates will also be apparent in stock prices (Homaifar, 2004, Madura, 2008; Bekaert and Hodrick, 2012).

Since the rapid expansion of international capital flows, theoretical linkage has been very strong and this has brought about the exchange rate risk to the trading partners. On the other hand, exchange rates determination is influenced by the effect of stock price which was formulized in stock-oriented models of

exchange rate determination. As stated in the portfolio balance model, foreign direct investment is driven by an increase in stock prices in a country and thus, foreign exchange would be converted into domestic currency that will boost the appreciation of the domestic currency. Given that capital controls were removed and capital flows between countries were relaxed, the relationship between stock price and exchange rate became robustly relevant.

2.4 The Relationship between Oil Prices, and Stock Prices

In the literature, the methods through which oil price shocks affects the macro economy have been confirm through the side effects of supply and demand. Since production is known to depend on oil, an increase in oil price will increase the cost of production which will ultimately cause a decline in productivity. The purchasing power of consumers is reduced by an increase in oil price and this will cause the producers to substitute less intensive energy capital for more intensive energy capital. The extent of this effect, according to the literature depends on whether the nature of the shock is temporary or permanent. Aggarwal (2010) and Basher, Alfred, Haug and Padorsky (2012), because of the outcome have chosen weight to the supply and demand channels. As revealed in the literature, the real balance effect and the transfer of income effect are the other channels. A decrease in the global demand in oil-importing nations is a direct effect of the wealth transfer from the oil-importing nations to oil-exporting nations. This of course will outweigh the increase in the exporting nations due to the assumption of low propensity to consume later. As revealed in the literature, three oil price measures have been recognized: The net oil price increase, asymmetric oil price and the linear measure of oil price. The assumption that oil price activities, whether increase or decrease are equal is derived from the linear or symmetric measure of oil which holds that a rise in oil price may have negative impact on the economy and a decline will have positive impact. Possibly, cost of production in a modern economy whose oil share of total imports increase together with the industrial objectives of that economy is influenced by the impact of higher price. Hence, the quantity by which oil prices exceed its maximum value over the previous periods is the definition of net oil price increase. Therefore, the percentage change between the current prices of oil when it is higher than the maximum oil price of previous periods can be computed. The assumption of the measure of oil price is that when oil price is simply increasing to attain its maximum level in the previous period, it would contain no impact. However, it will be expected to have an impact when the current price of oil is increase to a level above its maximum value in the previous periods. When an oil price measure differentiates between the positive and negative oil price movement, it is referred as Asymmetric oil price shocks (Liang, Lin and Hsu, 2013).

By way of increasing globalization of markets, economies are interwoven worldwide. Thus, it is essential to establish the relationship between exchange rate, oil price, and stock market. For the investor, it enhances and evaluate their investment portfolio. Also, for the multinationals, they can appraise their exposure to foreign contracts. While, for oil importers, variation in oil price influence their trade balance and net foreign assets position. It could also decrease their disposable income and corporate profitability for the citizenry. The reason is that economic crisis can be avoided by such knowledge. Literature is complete with how the activities of macroeconomic variable is explain by oil price since the oil crisis of the 1970s, irrespective of whether they are oil resource economies or not.

III. Methodology

Cross sectional or panel research design was adopted in this study. This was based on the combination of the data on the research variables for 27 insurance firms and 14 deposit money banks in Nigeria. The variables are defined as presented in Table 3.1:

Table 3.1: Variables of the study

Variables	Code	Description
Insurance firm Stock Price	ISP	This is measured as Average of annual monthly Share Price of each insurance firms
Deposit money banks stock price	BSP	This is measured as Average of annual Monthly Share Prices and Returns of each Deposit money banks
Foreign exchange	EXR	Annual Naira to US Dollar Foreign exchange rates (Average rate)
Oil price change	OP	Annual Oil price (%)
Inflation rate	*IFR*	Annual Actual Inflation rate (%)
Interest rate spread	SPD	Annual Interest rate spread (for banks, it is the difference between the lending and deposit rates)
Error term	$\mu it/\varepsilon_{it}$	Error term over cross section and time

Source: Compiled by the researchers, 2022

3.1 Model Specification

A panel data multiple regression model is specified. A panel data multiple regression model is one that seeks to explain changes in the value of one variable (share price) on the other independent variables using pooled data (combination of cross-sectional and time series data). The assumption of panel data regression is that the dependent variable is a linear function of the explanatory variables with consideration to the heterogeneity in the pooled firms. That is the differences in the characteristic of the firm example, firm size, age, and liquidity level and management style.

The panel multiple regressions with an error term are expressed in equations (1) and (2) below.

$ISP_{it} = \beta_{it} + \beta_1 SPD_{it} + \beta_2 IFR_{it} + \beta_3 EXR_{it} + \beta_4 OPit + \varepsilon_{it}$……Equation (1)

$BSPit = \alpha_{it} + \alpha_1 SPD_{it} + \alpha_2 IFR_{it} + \alpha_3 EXR_{it} + \alpha_4 OP_{it} + \mu_{it}$……Equation (2)

Where:

β1-β4 = Beta coefficients of the explanatory variables

$\alpha_1 - \alpha_4$ = Alpha coefficients of the explanatory variables

β_{it} is the intercept for insurance firms' stock prices

α_{it} is the intercept for deposit money banks stock prices

3.2 Estimation Techniques

The panel fixed and Random effects regression techniques are the econometric techniques adopted in this study. Fixed effects and random effects model work to removed omitted variables bias by measuring change within a group. A number of potential omitted variables unique to the group are controlled by measuring within a group, (a cross time). Hence, the justification for its usage is based on the following good reasons: the data that have been collected have time and cross-sectional features that gives room for studying stock price over time (time series) as well as across the sampled firms (cross-section); panel data regression provides better results since it increases sample size and reduces the problem of degree of freedom (Muhammed, 2012); it avoids the problem of multicollinearity and help to capture the individual cross-sectional (or firm-specific) effects that the various pools may demonstrate with respect to the dependent variable in the model The Hausman specification test was used to evaluate the panel regression results between fixed effect and random effect. The individual statistical significance test (T-test) and overall statistical significance test (F-test) was also used. Importantly, the goodness of fit of the model was ascertained using the coefficient of determination (R^2). All analyses were conducted at 5% level of significance. Our panel regression analysis was done after descriptive statistics, panel unit root and Johansen cointegration method to test for unit root problems and a possible long-run relationship respectively.

IV. Data Analysis and Discussion

4.1 Descriptive Analysis

Data utilized in the analysis of this study comprised of insurance stock prices (ISP), deposit money banks stock prices (BSP), macroeconomic indicators – interest rate spread (SPD), and three control variables - inflation rate (IFR), exchange rate (EXR) and oil price (OP). Interest rate spread was given as the difference between lending rate and deposit rate given in the period covered in this study. The data formed a panel of eleven-year period (2006 – 2016) across fourteen (14) deposit money banks and twenty-seven (27) insurance firms yielding a total of 154 and 297 observations respectively.

The table below indicates the descriptive analysis results for insurance companies' and deposit money banks cross-section showing all the six (6) variables which include insurance stock prices, deposit money banks stock prices, interest rate spread, inflation rate, exchange rate and oil price of the quoted twenty-seven (27) insurance companies and fourteen (14) deposit money banks in the Nigeria Stock Exchange (NSE) as at December 31st 2016.

Table 4.1: Descriptive Statistics for Stock Prices of Deposit Money Banks, Insurance Firms and other Macroeconomic Variables.

	ISP (₦)	BSP(₦)	SPD (%)	IFR (%)	OPC (%)	EXR(₦)
Mean	1.312346	12.27043	21.58267	11.79333	2.267333	200.9293
Median	0.890000	10.49000	22.36000	11.83000	8.560000	155.4500
Maximum	7.380000	42.92000	26.62000	18.55000	31.50000	358.8100
Minimum	0.000000	0.000000	14.81000	6.620000	-34.74000	117.7800
Std. Dev.	1.024818	9.100976	3.635370	3.310569	18.74566	79.18312
Skewness	1.922537	0.928396	-0.548328	0.300952	-0.483194	0.747124
Kurtosis	7.815667	3.453973	2.299387	2.191620	2.304852	1.951851
Jarque-Bera	640.8322	31.97047	28.57806	17.14108	23.91420	56.21731

Probability	0.000000	0.000000	0.000001	0.000190	0.000006	0.000000
Sum	531.5000	2576.790	8740.980	4776.300	918.2700	81376.38
Sum Sq. Dev.	424.3021	17311.00	5339.231	4427.788	141965.5	2533067.
Observations	405	210	405	405	405	405

Source: Researchers' Computations (2022)

The descriptive statistics shows that there is a considerable level of spread in the panel data for insurance firms' stock prices (ISP) had a mean of ₦1.31 and a median of ₦0.89. The closeness of the mean and the median as given by these values also suggests normality in the data series. Though it could be said that considering the range of ₦7.38 (maximum value was ₦7.38 and minimum value was ₦0.00), that the spread in insurance stock prices (ISP) was marginal. The reason for this could be related to inconsistent and reduced level of stock trading activities both in volumes and values on insurance stock prices in the Nigerian Stock Exchange compared to that of deposit money banks. This means that there are less activities on insurance stock prices in the stock market as investors may explore or diversify to other sectors of the economy rather than invest more in the insurance industry. The level of variability also suggests low variability with the standard deviation given as 1.025% which indicates minimal dispersion in the data series on insurance stock prices. However, the data series is normal judging by the Jarque-Bera probability value which is less than 0.05. The normality of the data on insurance stock prices was also supported by the positive skewness value of 1.922 and the kurtosis value of 7.816 (leptokurtic). Data on insurance stock prices (ISP) for the period of the study is thus normal and acceptable for further analysis judging by the descriptive statistics in Table 4.1.

Deposit money banks stock prices (BSP) also exhibited a good level of spread given the range of the values. The maximum and minimum stock prices recorded by the selected banks were ₦42.92 and ₦0.00respectively. This produced a range of ₦42.92, which indicated a good level of spread in deposit money banks stock prices. The mean and median of the bank stock prices (BSP) for the cross-section of quoted deposit money banks were given as ₦12.27 and ₦10.49 respectively. The closeness of the mean and the median values suggests normality in the data series and this is confirmed by the Jarque-Bera probability value of 0.000 which is less than 0.05. The variability of banks stock prices was indicated by the standard deviation value of 9.10 suggests the prevalence of stock market activities gains and losses in the stock prices within the covered period for this study. The level of variability in bank stock prices was accentuated further by other measures of dispersion such as skewness and kurtosis. Skewness was obtained as 0.928. This indicates that the data on banks stock prices is positively skewed around the mean and median of the series. The kurtosis value of 3.45 suggests that the data series for banks stock prices (BSP) was mesokurtic and affirms the normality in the series. In all, the data on deposit money banks stock prices for the covered period exhibited normality and a considerable level of spread and variability as given by the results of its descriptive statistic.

Four macroeconomic variables were considered in this study. These variables included interest rate spread (SPD), inflation rate (IFR), oil price change (OP) and exchange rate (EXR). From Table 4.1, interest rate spread (SPD) had a mean value of 21.58% and median value of 22.36%. The two values exhibit proximity which suggests equality. This indicated normality of the data on interest rate spread (SPD) and this level of normality were affirmed by the Jarque-Bera probability which is within the 5% region. There was also a considerable level of spread with the maximum value of interest rate spread during the period covered given as 26.62%, while the minimum value was 14.81%. This gave a range of 11.81% which suggested a wide disparity between lending and deposit rates. This implies that while lending rates were increasing during the period covered in this study, deposit rates were lagging behind in terms of positive changes. Though with a skewness value of -0.55% suggest negative skewness and a kurtosis value of 2.299 indicating a platykurtic distribution, the normality of the distribution of this variable ws confirmed by the Jarque-Bera probability value of 0.000001. This also applies to oil price change (OP), exchange rate (EXR), and inflation rate, with Jarque-Bera probabilities less than 0.05.

4.2 Unit Root Test

The panel unit root tests were carried out with the assumption of individual unit root processes adopting Augmented Dickey Fuller-Fisher method. The ADF-Fisher unit root tests for all the variables in this study were conducted at level, first difference and at second difference. The summary of the results are given in Table 4.2.

Table 4.2: Summary of Panel ADF-Fisher Unit Root Test Result for all the Variables

Variables	ADF-Fisher Test Statistic	Prob. Value	Order of Integration
ISP	151.995	0.0000	*I(1)*
BSP	50.196	0.0061	*I(1)*
SPD	141.642	0.0000	*I(1)*
IFR	186.445	0.0000	*I(0)*
OP	159.446	0.0000	*I(0)*
EXR	134.846	*0.0000*	*I(1)*

Source: Researcher's Computation using E-views 8.0

With the assumption of individual unit root processes which adopts the null hypothesis that there is the existence of unit root problem in each of the variables and a maximum lag of 1, Table 4.2 shows that insurance firms' stock prices (ISP) and deposit money banks' stock prices (BSP) were stationary at order of integration one (that is at first difference). This indicates the rejection of the null hypothesis and the acceptance of the alternative hypothesis which suggests that there is no unit root problem in the data series of insurance firms stock prices (ISP) and deposit money banks stock prices (BSP) since the probability values of the probability of ADF-Fisher statistic is less than 0.05. At first difference (order of integration = 1), the macroeconomic variables which includes interest rate spread (SPD) and exchange rate exhibited stationarity hence they were adjudged to be free from unit root problem at that order of integration. Finally, inflation rate (IFR) and oil price (OP) were found to be stationary with their probability values of the ADF-Fischer statistics falling within the 5% region. This led to the rejection of the null hypothesis of the existence of unit root problem for all the variables.

4.3 Panel Cointegration Analysis

The existence of a long-run relationship implies that the variables in the model are cointegrated. From the preceding section, the data series were found to exhibit stationarity, thereby implying that a shift in time is not likely to cause a change in the shape of the distribution which is the case in the instances of data with unit root problems. Hence, it is believed that the linear combination of the variables in the models may result to a long-run relationship This was conducted using Kao Residual Cointegration test. Excerpts from the results are presented in Table 4.3 for the two statistical models developed in this study.

Table 4.3: Panel Kao Residual Cointegration Test Result

Kao Residual Cointegration Test
Series: ISP SPD IFR OPC EXR
Date: 03/26/22 Time: 08:06
Sample: 2006 2020
Included observations: 405
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	**3.792738**	**0.0001**
Residual variance	**0.053764**	
HAC variance	**0.051571**	

Kao Residual Cointegration Test
Series: BSP SPD IFR OPC EXR
Date: 03/26/22 Time: 08:07
Sample: 2006 2020
Included observations: 405
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	**2.763778**	**0.0225**
Residual variance	**8.072285**	

HAC variance	**0.608532**

Source: Researchers' Computation (2022)

The Kao Residual test result as presented in Table 4.3 shows that the macroeconomic variables of interest rate spread (SPD), inflation rate (IFR), oil price (OP), exchange rate (EXR) may relate with both insurance firms stock prices (ISP) and deposit money banks stock prices (BSP) in the long-run. The null hypothesis of no cointegration among the variables was rejected owing to the fact that probability of the ADF t-statistic is less than 5% in both cases. The implication of this result is that interest rate spread (SPD), inflation rate (IFR), oil price (OP), exchange rate (EXR), insurance firms stock prices (ISP) and deposit money banks stock prices (BSP) exhibit a tendency to consistently relate in the long-run.

Consequently, the above result has established that the combination of the selected macroeconomic variables and the stock prices of insurance firms and deposit money banks in Nigerian stock market exhibit a long-run statistically significant relationship. It can thus be surmised that quoted deposit money banks and insurance firms' stocks price changes as given in the Nigerian Stock Exchange (NSE) may possibly relate with the macroeconomic characteristics prevalent in the Nigerian economy in the long-run.

4.4 Relationship/Comparative Analysis

In the multiple linear regression analysis, all the macroeconomic variables selected for analysis in this study were regressed on insurance stock price (ISP) and deposit money banks stock price (BSP). The multiple linear regression results for insurance companies and deposit money banks are summarized below as follows:

ISP = 1.51 -0.02SPD - 0.006IFR - 0.001OP + 0.002EXR
S.E. = (0.1521) (0.0088) (0.0064) (0.0010) (0.0004)
t-stat = (9.827) (-2.662) (-0.924) (-0.996) (4.459)
P-values = (0.0000) (0.0081) (0.3561) (0.3199) (0.0000)
R^2 = 0.8871 (88.71%)
Adj. R^2 = 0.8781 (88.81%)
F-stat = 97.996
Prob. (F-stat) = 0.000
BSP = 474.594 +3.328SPD – 1.551IFR – 1.662OP - 100.627EXR
S.E. = (81.5718) (0.8043) (0.2066) (0.5423) (19.2813)
t-stat = (5.8181) (4.1376) (-7.5078) (-3.0651) (-5.2189)
P.values = (0.0000) (0.0001) (0.0000) (0.0028) (0.0000)
R^2 = 0.75.12 (75.12%)
Adj. R^2 = 0.7291(72.91%)
F-stat = 34.094
Prob. (F-stat) = 0.000

As revealed by the multiple regression equations given above for both insurance stock prices (ISP) and deposit money banks stock prices (BSP), the regression constant for insurance firms' stock prices is less than that of deposit money banks stock prices. That is to say, insurance firms' stock prices will be positive by an average of ₦1.51 if the independent variables of interest rate spread (SPD), inflation rate (IFR), oil price (OP) and exchange rate (EXR) are held constant while deposit money banks stock price will increase by an average of ₦474.594 if the independent variables are also held constant. This means that without the influences of the macroeconomic variables as indicated in this study deposit money banks stock prices will be higher than insurance firms' stock prices as 474.594 > 1.197 ($ß_0 \neq \lambda_0$).

For the effect of interest rate spread (SPD) on insurance firms and deposit money banks stock prices, the coefficients for insurance companies ($ß_1$) and deposit money banks (λ_1) are given as -0.02 and 3.328 respectively. This coefficient shows that interest rate spread has positive association with deposit money banks stock prices, negative effect on insurance firms' stock prices. A 1% increase in interest rate spread will lead to a decrease of ₦0.02 in insurance firms' stock prices (ISP). The same level of change in interest rate spread will also lead to an increase of ₦3.328 in deposit money banks' stock prices (BSP). Since this coefficient for deposit money banks stock prices is higher than that of insurance firms' stock prices (ISP), then it could be stated that interest rate spread exerts more positive influence on the changes in deposit money bank's stock prices and a negative influence on insurance firms' stock prices ($ß_1 \neq \lambda_1$). This could be attributed to the fact that deposit money banks are usually associated with short-term investments hence with increased spread will earn more from their lending activities while insurance companies' investments are usually medium to long-term hence the minimal effect of interest rate spread on their stock prices.

The effect of inflation rate (IFR) on insurance firms and deposit money banks' stock prices showed mixed results. Their coefficients for insurance companies ($ß_2$) and deposit money banks (λ_2) are given as -0.006

and -1.551 respectively. Thus a 1% increase in inflation rate will lead to a decrease of ₦0.006 in insurance firms' stock prices (ISP). Also, a 1% increase in inflation rate will lead to a decrease of ₦1.551 in deposit money bank's stock prices (BSP) respectively. Since the absolute value of magnitude of coefficient for deposit money bank's stock prices is greater than that of insurance firms' stock prices (ISP), then it indicates that inflation rate exerts more influence on the changes in deposit money bank's stock prices than on insurance firms' stock prices ($\lambda_2 > ß_2$). The effect of inflation on long-term performance of stock prices of listed insurance companies and deposit money banks stock prices it is negative. The effect of inflation rate on the stock prices of insurance companies though not equal to that on deposit money banks, it spells negative consequences for both ($ß_2 \neq \lambda_2$).

Furthermore, oil price (OP) has a negative effect on stock prices of insurance firms n deposit money bank's stock prices. The magnitude of this effect is given by their coefficients for insurance companies ($ß_3$) and deposit money banks (λ_3) which are given as -0.001 and -1.662 respectively. The absolute values of the magnitude of the effect of this macroeconomic variable shows that oil price changes associate negatively with deposit money banks stock prices (BSP) and insurance companies' stock prices (ISP), such that a unit percent change in the price of a barrel of crude oil in the world oil market will lead to a decrease in the stock prices of insurance companies to the magnitude of ₦0.001 and ₦1.662 in the stock prices of deposit money banks in Nigeria. This shows that deposit money banks stock prices are more susceptible albeit negatively to the influences of the changes in crude oil prices than insurance companies' stock prices in Nigeria ($\lambda_3 > ß_3$) that is $ß_3 \neq \lambda_3$.

Finally, the effects of exchange rate (EXR) on insurance firms were positive and negative on deposit money banks stock prices. are both inverses since their coefficients shows negative direction. The coefficients for insurance companies ($ß_4$) and deposit money banks (λ_4) are 0.002 and -100.627 respectively. Thus, a ₦1 increase in exchange rate will lead to an increase of ₦0.002 in insurance firms' stock prices (ISP) and a decrease of ₦100.627 deposit money bank's stock prices (BSP) respectively. Since the absolute value of the magnitude of the coefficient for deposit money banks stock prices is higher than that of insurance firms' stock prices (ISP), then it indicates that exchange rate exerts a more negative impact on deposit money bank's stock prices than on insurance firms' stock prices ($ß_4 \neq \lambda_4$).

Summarily, the result of the multiple regression analysis is further strengthened by the outcome of the residual statistics for both insurance companies and deposit money banks stock prices. The coefficient of determination- R-square (R^2) value of 0.8871 for insurance companies' cross-section indicates a high level of correlation amongst the series of data utilized in the estimation of the multiple regression equation and connotes the possibility of influence from the selected explanatory variables which are the macroeconomic indicators on the insurance stock prices of the listed insurance companies in Nigeria. It also indicates a high predictive power of interest rate spread (SPD), inflation rate (IFR), exchange rate (EXR) and oil price (OP) to explaining 88.71% of variations in insurance stock prices (ISP). The remaining 11.29% of the variations in the study can be said to be due to other variables outside the objectives and scope of this study, and is captured as the error term of the regression.

The computed F-statistics value shows the fitness of the regression model and from the result obtained, the F-statistics of 97.997 is statistically significant at 5% since the computed F-statistics value is greater than the table F-statistic value of 3.3567 ($F_{4,11}$) thereby lending credence to the ability of the studied independent or explanatory variables which are macroeconomic indicators to statistically explain the variations that occur in insurance stock prices of the insurance firms studied. Another residual statistic of interest is the Durbin-Watson (DW) statistic. This indicates the presence or absence of serial correlation or autocorrelation in the data series when it is far from or away from 2 respectively, using the rule of thumb. So, in this case, we conclude that the data series used in the multiple regressions have serial correlation since the Durbin-Watson statistics for weighted statistics and un-weighted statistics is 0.468 respectively. This indicates the presence of serial correlation in the data series used for this study with respect to insurance stock prices. This affirmed the need for the conducting of the unit root tests. However, the results of the regression results are considered appropriate and acceptable in this study given that the data on stock prices were as a result of market activities in the Nigerian Stock Exchange (NSE) and are reliable.

For multiple regression results for the deposit money banks stock prices (BSP) model, the coefficient of determination-R-square (R^2) value of 0.7512 indicates a high level of correlation amongst the series of data utilized in the estimation of the multiple regression model and connotes the possibility of the influence from the selected independent or explanatory variables which are the macroeconomic indicators on the stock prices of the studied deposit money banks in Nigeria. It also indicates a high predictive power of interest rate spread (SPD), inflation rate (IFR), exchange rate (EXR) and oil price (OP) to explaining 75.12% of the variations in deposit money banks stock prices (BSP) of the studied deposit money banks in Nigeria. The remaining 24.88% of the variations in the study can be attributed to other variables outside the scope of this study.

The computed F-statistics value shows the fitness of the deposit money banks stock prices regression model and from the result obtained, the F-statistic of 34.09 is statistically significant at 5% since the computed F-statistics value is greater than the table F-statistic value of 3.3567 ($F_{4,11}$) thereby implying the ability of the studied independent or predictor variables which are macroeconomic indicators to explain changes or variations that occur in the studied deposit money banks' stock prices. Durbin-Watson (DW) statistic value for weighted statistics and un-weighted statistics of 0.39 indicates the presence of serial autocorrelation since it is greater than 2 (using the rule of thumb). However, the effect of this on the regression result was minimized through the unit root tests analysis. The residuals are considered robust enough to be acceptable since the data series is from a reliable source.

Finally, based on the foregoing, we can accept that the various macroeconomic indicators of the Nigerian economy which includes interest rate spread (SPD), inflation rate (IFR), exchange rate (EXR) and oil price (OP) have significant influence on the performance or movement of stock prices of insurance companies and deposit money banks since their residual statistics indicate that the regression models are properly fitted. These regression models can be subjected to long-run estimation since the variables and data series studied are cointegrated and stationary.

As revealed by the results of the study, we therefore concluded that macroeconomic variables tend to influence stock prices of deposit money banks more significantly than that of insurance firms. We therefore recommend that insurance firms should diversify their investments to include real estate, loans, and bills of exchange to increase income and returns to further boost their stock prices positively. They also should develop and enhance their capacity to be major players in writing more policies in areas like oil and gas and marine ventures which can improve stock price outlook of insurance firms in Nigeria.

Reference:

[1]. Adams, M., Diacon, S., Fenn, P. and Vencappa, D. (2006).Underwriting Cycles and the Role of Internal and External Capital.Working Paper, University of Nottingham.

[2]. Aggarwal, R. (2010). Exchange Rates and Stock Prices: A Study of U.S. Capital Market under Floating Exchange Rates. Akron Business and Economic Review, 12:7-12.

[3]. Basher, S. A., Alfred A. Haug, A.A., Padorsky, S. (2012). Oil Prices, Exchange Rates and Emerging Stock Markets, Energy Economics, 34(1):227-240.

[4]. Bekaert, G., Hodrick, R. (2012). International Financial Management. Pearson Education Inc, USA.

[5]. Berends, K., McMenamin, R., Plestis, T. and Rosen, R. J. (2013).The Sensitivity of Life Insurance Firms to Interest Rate Changes. Economic Perspective; Federal Reserve Bank of Chicago,12 (2):29-39.

[6]. Bruneau, C. and Sghaier, N. (2009b). Effet de l'Inflationsur la Croissance des Cotisationsd'Assurance, Risques, No. 80.

[7]. Choi, S., Hardigree, D. & Thistle, P. D. (2002). The Property/Liability Insurance Cycle: A Comparison of Alternative Models. Southern Economic Journal,68(3):30-548.

[8]. Eling, M. and Luhnen, M. (2008). Underwriting Cycles in German Property Liability Insurance, Working Paper, Institute of Insurance Economics, University of St. Gallen.

[9]. Fenn, P. and Vencappa, D. (2005). Cycles in Insurance Underwriting Profits: Dynamic Panel Data Results. Working Paper, Nottingham University Business School.

[10]. Higgins, M. L. and Thistle, P.D. (2000). Capacity Constraints and the Dynamics of Underwriting Profits. Economic Inquiry, vol 38(3):442-457.

[11]. Homaifar, G. A. (2004). Managing Global Financial and Foreign Exchange Rate Risk. New Jersey: John Wiley & Sons Inc.

[12]. Krivo, R. (2009). An Update to D'Arcy's.A Strategy for Property-Liability Insurers in Inflationary Times, Casualty Actuarial Society E-Forum.

[13]. Lamm-Tennant, J. and Weiss, M.A. (1997). International Insurance Cycles: Rational Expectations/Institutional Intervention. Journal of Risk and Insurance,64(3): 415-439.

[14]. Liang, C. C., Lin, J. B. and Hsu, H. C. (2013). Reexamining the Relationships between Stock Prices and Exchange Rates in ASEAN-5 Using the Panel Granger Causality Approach, Economic Modelling,32: 560-563.

[15]. Meier, U. B. andOutreville, J. F. (2006). Business Cycles in Insurance and Reinsurance: the case of France, Germany and Switzerland. Journal of Risk Finance,7(2):160-176.

[16]. Meier, U. B. and Outreville, J. F. (2010). Business cycles in Insurance and Reinsurance: International Diversification Effects. Applied Financial Economics,20(8):659-668.

[17]. Muhammed, A. H. (2012). Determinants of cost of Financial Intermediation in Nigeria's Preconsolidated Banking Sector. International Journal of Advance Research in Management and Social Sciences 1(1):180-194.

[18]. Perera, M. (2015).The Impoetance of Interest rate in Determining Stock Returns of Banks Finance and Insurance Companies in Sri Lanka. International Journal of Management and Commerce Innovations,3(2):451-454.

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