## Impact of Macroeconomic Variables on Stock Market Performance in Nigeria

### BY

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### ABSTRACT

*Stock markets perform an essential role in the development of industries and trade, which has an impact on the whole economy. The study looked at macroeconomic variable's impact on Nigerian stock market performance spanning from 1986 to 2019. The analysis relied on secondary data from the World Bank databank and the Nigerian Central Bank. The study adopted the Error correction model. It found that inflation, oil price, exchange rate, and investment positively affect stock market performance in Nigeria. The paper concludes with the suggestion that almost all institutional investors and financial planners undertake systematic research on the macroeconomic environment and instruct their clients accordingly on the perfect sweepers to invest in because of so many influences of the macroeconomic environment on stock market performance.*

**KEYWORDS: Macroeconomic Variables, Stock Market, ECM Model**

### Introduction

Investing in the stock market can be profitable, but it can also be quite hazardous. As a result, to maximize their efficiency and minimize risk, prospective buyers strive to anticipate the trajectory of stock market prices (Emmanuel I.J., 2019). As a result, this same stock market allows the government and industries to secure long-term capital for new initiatives, as well as to develop or modernize existing industrial or commercial enterprises. If cash flows are not allocated to those economic regions, particularly firms with growing demands for finances and the ability to increase yield and profitability, the economy's rate of expansion declines (Imobighe, 2015).

Notwithstanding the efficient market hypothesis (EMH), which states that investors cannot make an extraordinary profit since all information available is wholly reflected in stock market prices, many scholars feel that macroeconomic drivers impact stock returns (Ross in 1976). Stock exchanges react to regional and global happenings as well, and they do so swiftly. The Nigerian stock exchange (NSE) showed remarkable growth in aggregate market capitalization and the quantity of shares traded between 2004 and the second quarter of 2008.

The Nigerian stock market began to experience serious decline activities as soon as the crisis in the United States was declared in July 2008. It was also noticed that investors were withdrawing their funds, causing the stock price to fall in general, right up until now

(2019). The financial crisis had negative consequences for developed and emerging economies, with detrimental effects on their economies through finance and trade. Since the start of the recession, net capital inflows have decreased dramatically. The crisis negatively impacts developed countries' FDI, portfolio investment, and exports (Igbal, 2010). The global financial crises' ripple effects have an adverse impact on the stock exchange in Nigeria. By October 2009, market capitalization had dropped, and the market index had fallen as well, resulting in a flight of foreign portfolio investment. Stocks and bonds were no longer convertible (Osaze, 2009).

Conversely, investors are keener to find sustainable ways of efficiently investing in Nigeria's stock market due to the country's uncertain macroeconomic outlook, which is why this study was done. This research adds to the current body of knowledge in two ways. The study examines the key macroeconomic factors that influence stock market performance in Nigeria, including investment and oil prices, which were not previously considered. Second, the analysis uses more recent data points from 1986 - 2019 to offer more current and credible investors. As a result of these results, investors will be better equipped to make more educated decisions on investing in Nigerian equities in light of the current macroeconomic situation.

The following research questions, however, necessitated practical answers in light of the above submission. What are the effects of interest rate, inflation and oil prices on the stock market in Nigeria?

The remaining part streamlines into three: part two focuses on the literature review, and section three is devoted to materials and methods. The results and outcomes are highlighted in part four, and the study is concluded in section five.

## Literature Review

The study of the links between economic indicators and financial markets has long been a goal of financial economics. One of the grounds for the interest in these links was that the volumetric efficiency of common stocks tended to change with the business cycle. The question is whether or not anticipated performance is affected by cyclic frequencies and macroeconomic variables. On the other hand, key macroeconomic indicators are expected to play a significant impact in explaining stock market outcomes. Thus;

Asma, Amara, Naseem, and Sultana (2013) investigated the effect of inflation, interest rates, gross domestic savings, and per capita GDP on the Karachi Stock Exchange stock index in Pakistan. According to the findings, GDP per capita and gross domestic savings have an essential and optimistic effect on the stock index of the Karachi Stock Exchange. Interest rates and inflation (as calculated by the Consumer Price Index) had a significant but negative impact on the Karachi Stock Exchange stock index. According to the report, the explanatory variables under consideration accounted for approximately 98 per cent of the Karachi Stock Exchange stock index variations.

Lekobane and Lekobane (2014) investigated the cointegration of macroeconomic variables and stock market prices in Botswana using the VECM system. The variables under investigation were found to be cointegrated, according to their results. Stock market prices were found to have positive cointegration with real GDP, inflation, the diamond index, and short-term interest rates, but no cointegration with money supply, foreign reserves, exchange rates, or long-term interest rates.

Muhammed (2012) looked into the impact of interest rates and industrial development on Dhaka Stock Exchange stock prices. The Autoregressive Integrated Moving Average (ARIMA) model has been used in the analysis. It was discovered that there were positive correlations between interest rates and industrial output with market stock prices, but the coefficients were statistically insignificant. In Ghana, Issahaku, Ustarz, and Domanban (2013) wanted to see whether there was any correlation between macroeconomic variables and stock prices. According to the report, stock prices, money supply, inflation, and foreign direct investment all had a significant long-run relationship. Stock prices and interest rates, inflation, and money supply have also been shown to have short-run relationships. Unidirectional causal relationships were found out among the variables.

**Theoretical Framework and Methodology**

This study's framework was based on the arbitrage pricing principle. He opined that the expected rate of return of a financial instrument could be described as a linear function of different factors or theoretical market indexes, with sensitivity to changes in each element indicated by a factor-specific beta coefficient.

In the light of the above theoretical framework underpinning this work, the model of this study is adapted from the work of Harcourt (2017) is adjusted as follows;

$$ASI = f(INF, FEX, GDP)................................................(3.1)$$

*ASI* denotes stock market performance, *INF* represents inflation rate, *FEX* represents the foreign exchange rate, and *GDP* represents gross domestic product, while *f* representing the functional relationship. However, the model is modified to *INTR*, *OILP*, and *INV* as in equation 3.2

$$ASI = f(EXCH, INTR, INFL, OILP, INV)...................................(3.2)$$

The inclusion of oil price as one of the explanatory variables is because. According to reports, the oil prices cause the naira to appreciate because more foreign currencies are produced due to increased oil revenue, as shown by the increase in the value of oil export as a percentage of total export. The rate at which banks borrow from and lend to one another is often said to influence and decide the stock market. Simultaneously, investment as a control variable is since the stock market and investment have a similar relationship. That is, stock market volatility can affect business investment. The "q theory of investment," founded by James Tobin, captures the relationship between stock market values and firms' physical capital investments (1969). Putting it another way, a rise in the anticipated return on capital or a decrease in the market's discount rate raises q, which raises investment. In a simplified process of adjustment cost for modifying the capital stock, the optimum quantity of present investment is only determined by the current value of q.

Equation 3.3 is the product of converting equation 3.2 into a linear form.

$$ASI = \beta_0 + \beta_1 EXCH_1 + \beta_2 INTR_2 + \beta_3 INFL_3 + \beta_4 OILP_4 + \beta_5 INV_5...............(3.3)$$

Where $\beta_0$ = constant

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$\beta_1$ to $\beta_5$ represents various slope coefficients while $EXCH, INTR, INFL, OILP$ and $INV$ remaining as defined above. Putting the variables in the same scale of measurement and adding the stochastic disturbance term yields equation 3.4

$$ASIL = \beta_0 + \beta_1 LEXCH_1 + \beta_2 LINTR_2 + \beta_3 LINFL_3 + \beta_4 LOILP_4 + \beta_5 LINV_5 + \varepsilon......(3.4)$$

Where $L$ represent the natural log of the variables. This is necessary to avoid significant fluctuation in the variables. All other variables remain as defined above. On a-priori

$$\beta_1, \beta_2, \beta_3, \beta_5 > 0 \text{ and } \beta_4 > \text{or} < 0$$

## Techniques of Data Analysis

The research employs a time series approach. The estimation process starts with a unit root test, then a cointegration test, over-parameterized model estimation, and finally, the parsimonious ECM Model. E-VIEWS 10, an econometrics software application, was used to conduct all estimates.

## Data Presentation, Analysis and Discussion of Findings

A descriptive analysis of the variables used in the study is presented in this section. Descriptive statistics aims to provide a historical context for the data's behaviour. From 1986 to 2019, the variables are inflation, interest rate, exchange rate, oil price, and all shares index. Table 1 summarizes the descriptive statistics.

**Table 1: Descriptive Statistic**

| Statistics | Macroeconomic Indicators | | | | | |
|---|---|---|---|---|---|---|
| | INFL (%) | INV (In Trillion) | INTR | OILP (In Billion) | EXCH | ASI (In Trillion) |
| Mean | 19.46 | 28.94 | 18.82 | 38.72 | 1.68 | 2.76 |
| Median | 12.54 | 28.61 | 17.98 | 23.19 | 2.04 | 2.94 |
| Maximum | 72.73 | 29.98 | 29.80 | 91.48 | 2.40 | 4.06 |
| Minimum | 5.40 | 28.21 | 10.50 | 11.91 | 0.30 | 0.97 |
| Std. Dev. | 17.60 | 0.6 | 3.83 | 27.06 | 0.59 | 0.82 |
| Skewness | 1.67 | 0.63 | 0.90 | 0.90 | -0.73 | -0.69 |
| Kurtosis | 4.71 | 1.71 | 4.45 | 2.30 | 2.22 | 2.45 |
| Jarque-Bera | 18.34 | 3.9853 | 6.96 | 4.82 | 3.54 | 2.85 |
| Probability | 0.000104 | 0.136328 | 0.03 | 0.08 | 0.16 | 0.24 |
| Sum | 603.4600 | 897.4254 | 583.67 | 1200.48 | 52.18 | 85.59 |
| Sum Sq. Dev. | 9294.323 | 11.34428 | 440.81 | 21968.04 | 10.73 | 20.23 |
| Observations | 34 | 34 | 34 | 34 | 34 | 34 |

*Source: Author's Computation, 2021*

Table 1 summarises these variables, including means and medians and maximum and minimum values for the time. The substantial variance between the minimum and maximum values for these variables indicates significant variations. A high standard deviation indicates that the variables were highly volatile during the period under review. The descriptive result shows that inflation rates were highly unpredictable, with the highest rate of 72.73 per cent and the lowest rate of (5.4 %) recorded in 2007. However, the highest recorded exchange rate was 360 naira to a dollar in 2019. The descriptive statistics also revealed that the highest interest rate offered was 29.98 per cent, while the lowest was 10.5 per cent.

A test is run to see if the distribution adheres to the normality condition, and Jarque-Bera statistical test was used. It was found that the null hypothesis of a normal distribution, skewness is positively skewed, and excess kurtosis is 4.71, indicates a leptokurtic distribution, which is non-normal. The null hypothesis of the normal distribution is accepted if the probability value in table 1 exceeds 5%; otherwise, the null hypothesis of the normal distribution is rejected. All distributions are positively skewed except for the exchange rate and the all-shares index, which were negatively skewed during the study period. INV, OILP, EXCH, and ASI variables qualified for platykurtic (fat or short-tailed) kurtosis are less than three. On the other hand, Leptokurtic (slim or long-tailed) variables have a kurtosis value greater than three, and INF, INTR variables qualified for this during the study period.

**Table 2: Unit Root Test (ADF)**

| Variable | ADF calculated value at Level | ADF calculated value at 1$^{st}$ Difference | Order of Integration | Remark |
|---|---|---|---|---|
| LOGASIV | -2.0090 | -6.319186 | I(1) | Reject H$_o$ |
| LOGEXCH | -2.3089 | -5.620482 | I(1) | Reject H$_o$ |
| INTR | -5.5121 | -5.510817 | I(1) | Reject H$_o$ |
| LOGINV | -2.2875 | -6.026209 | I(1) | Reject H$_o$ |
| INFL | -3.8007 | -5.045715 | I(1) | Reject H$_o$ |
| OILP | -1.7661 | -5.708482 | I(1) | Reject H$_o$ |

*Source; Researcher's Computation*
**Note: 5% Critical value at level and 1$^{st}$ Difference = -3.5683 and -3.5806**

Accept the hypothesis that the series contains a unit root in the process at level, as shown in Table 2. The ADF value is less than the ADF critical value in absolute terms for all variables at level, as shown in Table 2. However, after taking the first difference, each series appears stationary because the ADF value is less than the ADF critical value. No more experiments are carried out because the data seems to be stationary in first differences. As a result, the series can be concluded to be all integrated of order one I (1) process.

**Table 3: Co-integration Test Result**

| H0 | H1 | Trace Statistics | 5% critical value | Maximum Eigen Value Test | | | |
|---|---|---|---|---|---|---|---|
| | | | | H0 | H1 | Max-Eigen Statistics | 5% critical value |
| n ≤ 0 | n > 0 | 129.21 | 96.75 | n ≤ 0 | n > 0 | 59.66 | 40.07 |
| n ≤ 1 | n > 1 | 69.54** | 69.81 | n ≤ 1 | n > 1 | 31.14** | 33.87 |
| n ≤ 2 | n > 2 | 38.40** | 47.85 | n ≤ 2 | n > 2 | 21.63** | 27.84 |
| n ≤ 3 | n > 3 | 16.76** | 29.79 | n ≤ 3 | n > 3 | 7.99** | 21.13 |
| n ≤ 4 | n > 4 | 8.77** | 15.49 | n ≤ 4 | n > 4 | 6.89** | 14.26 |
| n ≤ 5 | n > 5 | 1.88** | 3.84 | n ≤ 5 | n > 5 | 1.88** | 3.84 |

*Source; Author's Computation*
**Note: n represents the number of cointegrating vectors. And ** denotes rejection of the null hypothesis at the 5% level.**

The cointegration result in table 3 shows that the hypothesis of no cointegration among the variables, H0, can be rejected. The trace statistic indicates one cointegrating equation, and the Maximum-Eigen statistics indicate one. As a result, the variables in the model have a long-term relationship. It also proves that the approximate relationship is not spurious. We continue to estimate an Error Correction Model since the model's variables have a long-term relationship.

**Table 4: Parsimonious ECM Model**

| Regressors | Co-efficient | Standard error | T-stat | P- Value |
|---|---|---|---|---|
| C | 0.0824 | 0.0456 | 1.8078 | 0.0874 |
| ΔLOGASIV(-2) | 0.4305 | 0.1876 | 2.2943 | 0.0340 |
| ΔLOGASIV(-1) | 1.0152 | 0.2936 | 3.4571 | 0.0028 |
| ΔOILP(-2) | -0.0183 | 0.0051 | -3.5613 | 0.0022 |
| ΔOILP(-3) | -0.0116 | 0.0051 | -2.2585 | 0.0366 |
| ΔINF(-3) | 0.0077 | 0.0030 | 2.5264 | 0.0211 |
| ΔINTR(-2) | -0.0566 | 0.0148 | -3.8119 | 0.0013 |
| ΔINTR(-3) | - 0.0283 | 0.0132 | -2.1481 | 0.0456 |
| ECM(-1) | -0.8364 | 0.1724 | -4.8488 | 0.0001 |
| R-squared | 0.6888 | | | |
| R-Bar-Squared | 0.5505 | | | |
| F-stat | 4.98 Prob (F-statistic = 0.0022) | | | |
| DW-statistic | 1.37 | | | |
| S.E of regression | **0.210** | | | |

**Source: Result generated from E-views now version of the software**

As seen in the table above, the outcome of the parsimonious error correction model suggests that all variables at lag 1 and lag 2 do not correspond to our apriori symbol, except for the exchange rate and investment. In particular, the findings show that the stock market in Nigeria does have an inverse and significant relationship with the exchange rate and investment. As a result, we infer that Nigeria suffers from a "resource curse." The results also show that oil prices positively correlate with stock market performance and that inflation and interest rates in Nigeria ultimately connect with stock market performance. Furthermore, the F-statistic and modified $R^2$ indicate that the parsimonious error correction model variables

significantly explain changes in oil prices at $p < 0.05$, accounting for 68% of the series' short-run variance. The coefficient of the ECM expression captures the adjustment towards the long-run equilibrium. The ECM coefficient also indicates the proportion of the difference dependent variable's disequilibrium in one cycle corrected in the next. The result shows that the correction speed is high, as 0.5505 (55%) of the error is corrected in a single cycle.

## Conclusion and Policy Implication

The stock market has been described as one of the primary drivers of economic growth and development and one of the safest ways for investors to invest their money to work and earn returns. It also helps to improve the economy by generating liquidity. However, many authors have identified some of the challenges that many countries, including Nigeria, face in operating a competitive stock market. The result has sparked a flurry of research into this fascinating topic. The empirical result of the regression analysis also suggests that government fiscal policy does not play the expected or desired role in stimulating stock market growth.

## Recommendations

1. To accelerate economic growth, policy changes that will speed up stock market development and encourage equity investment by domestic and foreign investors should be considered. Countries do not need to go further and implement interventionist measures, including tax breaks to stimulate stock investment. Countries will let market forces function naturally to improve their economic development and prosperity by eliminating barriers to the free flow of capital.

2. The Nigerian government must review its macroeconomic policies regularly to ensure that the country is still protected from external shocks such as the credit crunch and the oil crisis. To do so, national policies and regulatory mechanisms regulating key sectoral reforms with significant external dependencies, such as oil and machinery imports, and international debts and loans, must be implemented.

3. Central Bank of Nigeria must implement robust measures to control Nigeria's monetary policy to ensure a stable macroeconomic variable suitable for steering the country's economic growth, which directly affects the stock market's results.

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