

Effect of Macroeconomic Variables on Share Price Movement in the Banking Sector in Nigeria

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Abstract

This study was carried out to investigate empirically the effect of macroeconomic variables on share price movement in Nigerian Banking Industry within the periods from 2010 to 2019. Three macroeconomic variables were chosen as the independent indices; including the exchange rate, inflation rate, and foreign portfolio investment. For the movement of the share prices, the Nigerian banking sector index was used as proxy. Information from the annual time series covering the period between Q1 2010 and Q4 2019 was used. Analysis from the study showed that foreign exchange rate, and foreign portfolio investment are both significant in determining the movement of share prices of the deposit money banks in Nigeria during the period studied. On the other hand, inflation was insignificant which implies that it cannot be used to explain variations in share price movement in the banking sector of Nigeria. Based on these findings, the study recommended that there is need to formulate macroeconomic policies aimed at reducing the high dependence on imported products. This will curtail depreciation of the Naira, as well as high inflation rate. There is also need to promote local participation in the Nigerian equities market so as to cushion the adverse effect of foreign portfolio investors' incessant entrance and exit strategies.

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Background to the Study

Share price movement is a very significant part of every stock market, and is an indication of the extent to which the market is active. Stocks whose prices remain static over a period of time are regarded as dormant stocks and this reflects the perception of the issuer of the shares by the participating general public. Hence, share price movements are important in the market and they are a pointer regarding the potentials of the stock market in particular and the economy in general. Share prices can move either downwards or upwards depending on the forces driving the shift at any point in time. With an active market, investors can either gain or lose substantial proportions of their investment within a couple of minutes due to sudden price movements. Remarkable fluctuations have been observed in the Nigerian share prices especially in the banking sector and during the past decade.

The Nigerian banking sector is one major sector in the economy given the pivotal role it plays in financial intermediation, mobilization of funds, coupled with its visibility as a lucrative business in the financial sector. The movement of the average Nigerian banking industry share price can quickly be observed from the Nigerian Banking Sector Index. The Nigerian Exchange (formerly Nigerian Stock Exchange) computes and maintains an index for the listed banks in Nigeria. The index is price weighted; therefore, a decline in the general banking stocks prices will push the index downwards while increasing share prices will result in upward movement in the banking index figures.

The movement in share prices are determined by a number of factors ranging from market sentiments, fundamental factors, macroeconomic variables, market manipulations, unforeseen events to technical forces. These factors transmit into the share prices through the mechanism of price discovery which is based on the economic theory of demand and supply. 'Market sentiments' is the perception of investors about the future of the listed entities and their values. Fundamental factors include the stock's Earnings per share, price earnings ratio, dividend payment history, and dividend per share, expected growth rate of the dividend over years, discounted value of future earnings which is a function of the rate of inflation, the risk inherent in the stock or the nature of the business of the Company itself.

Macroeconomic variables are the indices and figures generated from the day-to-day business transactions at the micro business levels. These variables are collated, summarized and stored by the relevant authorities. The variables are veritable pictures of the volume and characteristic of the business transactions in the system and how they emanate. Macroeconomic variables range from indices that reflect the average interest rate, average exchange rates, inflation rates and includes figures for aggregate measures of production and output in the system.

Based on the Nigerian Exchange Limited factbook 2020, the Nigerian equities shares have witnessed significant variations in the recent years. These have created a need to find out what could be the force behind these fluctuations. Between 2010 and 2019, the Nigerian

Banking sector index witnessed both positive and negative variations, moving from 399.36 in Q1 2010 to 355.05 as at Q4 2019, representing 11.10% reduction. These figures represent the overall index for the eleven listed Nigerian Banks. The banks are Access Bank Plc, Ecobank Transnational Incorporated Plc, Fidelity Bank Plc, Guaranty Trust Bank Plc, Jaiz Bank Plc, Sterling Bank Plc, United Bank for Africa Plc, Union Bank Plc, Unity Bank Plc, Wema Bank Plc and Zenith Bank Plc.

The interest in estimating the nature of the link between macroeconomic variables and stock prices have led to various studies. The pioneer works include those of Fama (1965), Chen, Roll and Ross (1986), Binswanga (2000), and Acikalin, Aktas and Unal (2008). Musa and Ibrahim (2014), Asekome and Agbonkhese (2015), and Lawal, Somoye, Babajide and Nwanji (2018), all concluded that the stock market volatility is sensitive to changes in the selected macroeconomic variables. On the opposite side Inyiama and Nwoha (2014), Okoro (2017) as well as Udoka, Nya and Bassey (2018) discovered that macroeconomic variables cannot be used to determine explain share price movement. The divergence in research findings call for further examination on this subject which was one of the recommendations made by Okoro (2017). Most of the works studied the effect of macroeconomic variables on the stock market generally. Inyiama and Nwoha (2014) did a similar study but their work was focused on the Nigerian Breweries Industry. This gap is significant in that this study showed what percentage of changes in the Nigerian banking sector share price that is jointly accounted for by exchange rate, inflation rate and foreign portfolio investment.

The objective of this study is to investigate if macroeconomic variables affect movement in the prices of banks listed on the Nigerian Exchange, during the years from 2010 to 2019. The rest of this paper is arranged as follows: section 2 contains the review of literature and the methodology is explained in section 3. Data analysis and results are presented in section 4 while section 5 discusses the conclusions and recommendations.

Literature Review

Every Stock Exchange computes and maintains indices for the whole market as well as sector specific indices. In Nigeria, aside the All-Share Index (ASI) which represents the performance of all listed stocks, there are other sectoral indices such as Banking index, insurance index, consumer goods, manufacturing, oil and gas, etc. The Nigerian Exchange banking Index comprises of the listed banks in Nigeria. When the prices of shares of the constituent companies increases, the index will grow while a fall in prices of the constituent stocks will lead to a fall in the index value. Hence the index mirrors the shares price movement. According to the NGX (2020), the Nigerian Banking Index was launched on 12 January 2009 with a value of 100 as the base year price and it has grown over time to close at 365.83 on 25 June 2021 as at the time of concluding this study. Udenwa and Uwaleke (2015), stated that the shares index is an indication of the volume of activity as measured by the changes in equity price. The share index is a measure of the the direction of the general price movement in the banking sector. It is measures in absolute numbers and not in percentages or monetary values. The index is value-relative and is computed for every trading day. It is designed to provide an investable benchmark to capture the performance of the banking sector.

Chen, Roll and Ross (1986), is among the early conceptualization and examination of the impact of macroeconomic indices on the stock market behavior. Their work tested the effect of movement in selected variables on expected dividends, discount rates and stock prices. Another work by Fama (1981), established the existence of a long-term association between macroeconomic variables and stock market in United States of America. The present study is tailored along the same concept that micro business activities cumulates to form the aggregate macroeconomic variables which can be used to predict the future movement in the general price movement in the equities market with particular reference to the Nigerian banking industry.

Exchange rate is known as the worth of one currency in terms of a unit of another currency. It can also be explained to mean the real purchasing power of one country's currency when compared with the currency of another nation. Adegbite (2007) defined exchange rates as a means of effecting trade and capital flows across international borders.

Inflation is an indicator of price stability in an economy and it influences the purchasing power of the currency. Olofin (2001), stated that inflation is usually measured by the Consumer Price Index. In general terms, it is said that inflation occurs when 'too much money is purchasing too few goods/service'. Two basic causes of inflation exist in economic literature viz: Demand-Pull inflation and Cost-Push Inflation. Chen et al (1986), listed inflation among the determinants of stock market transaction levels.

Foreign Portfolio Investment (FPI) involves the purchase of equities, bonds and other financial assets by an investor in a foreign country and this does not give the investor any direct ownership in the entity. In line with this, Gumus, Duru and Gungor (2013), identified Capital flow as an essential factor for developing nations to attain their desired levels of growth. Nwala, Nwagboso and Nwankwo (2019), stated that FPI comprise securities that are held inactively by alien investors.

This topic is popular in among finance researchers and a lot of studies have been carried out in examining the relationship between macroeconomic variables and stock market behaviours. Among the various works is that of Khan and Ali (2015), which investigated the nexus between exchange rate and stock market prices in Karachi Stock Exchange in Pakistan from January 1992 to February 2013. The generalized autoregressive conditional heteroscedasticity (GARCH) and Granger Causality analysis confirmed that a bidirectional relationship exists between the Pakistan Rupee and the KSE-100 stock index.

Korsa and Fosu (2016), used error correction model to examine the relationship between exchange rates movements and stock market capitalization in Ghana between 1990 – 2013. The study was an ex-post facto research in design. Ghana stock exchange market capitalization was the dependent variable while Ghana Cedi exchange rate to the United States Dollar was the independent proxy. The results of the study discovered a significant negative effect of exchange rates on stock market.

In Nigeria, Udoka, Nya and Bassey (2018), examined the influence of gross domestic product, exchange rate, interest rate and inflation rate on average stock price using the augmented dickey fuller unit root test and autoregressive distributed lag models in testing secondary data covering between 1986 – 2014. The study model revealed no long run relationship between the explanatory and explained variables, and therefore suggested policies that will promote capital market investment in the country.

Okoro (2017), conducted an ex-post facto work in investigating the effect of selected macroeconomic proxies on Nigeria all-share index using the ordinary least squares and spanning the years 1986-2015. Non of the variables (gross domestic product, money supply, interest rate, inflation rate and exchange) proved to exert any effect on the dependent variable as they all returned as insignificant coefficients.

In India, Kedia and Vashisht (2017), studied to check the relationship between the Bombay Stock Exchange Index as the regress and while inflation rate, interest rate and exchange rate were used as the regressors between 2005 – 2014. The analysis was conducted through multiple ordinary least squares regression estimation. There was no proof of a strong relationship between the dependent and independent variables which was interpreted to mean that changes in interest rate, inflation rate and exchange rate does not affect movement in Bombay Stock Exchange Index.

John (2018), modelled the effect of money supply, interest rate, exchange rate and inflation rate on Nigerian stock market capitalization using annual time series data from 1981 to 2016. The ex-post facto research design was conducted by Augmented Dickey-Fuller (ADF) and Ordinary Least Squares (OLS) tests and found that money supply has a significant positive effect; interest rate has a significant negative effect; whereas, exchange rate and inflation rate have no statistically significant effect on stock market performance in Nigeria. The study suggested that further researches should capture other factors, which may be determining factor in this linkage.

Omodero and Mlanga (2019), investigated the macroeconomic determinants of Nigeria stock market performance using annual time series data in an ex-post facto study covering a period from 2009 to 2018. The results from the Ordinary Least Squares (OLS) regression analysis indicated that exchange rate and interest rate do not have significant effect on all share price index. On the other hand, inflation (negative) and gross domestic product (positive) were found to be the determining factors in this circumstance.

Assagaf, Murwaningsari, Gunawan and Mayangsari (2019), tested the effect of macroeconomic variables on the Indonesian stock market returns over the period November 2016 – June 2018. The study regressed inflation rates, interest rates, money supply, and foreign exchange rates on the Indonesian composite stock price index being the proxy for the stock market returns through the method of ordinary least squares(OLS). All the explanatory indices returned significant coefficients and this made the authors to recommend that similar research should be done with an extended period of time of up to 5 to 10 years timeframe to make the test more robust.

In an ex-post facto research, Ojikutu, Onolemhemhen and Isehunwa (2017), surveyed the linkages between oil price, exchange rate and stock market performance in Nigeria. All Share Index was conceptualized to be dependent on crude oil price and exchange rate during the years 1985 – 2014. The Ordinary Least Squares technique returned with the output that both explanatory variables could not significantly affect the performance of the all shares index.

In India, Sharma, Giri, Vardhan, Surange, Shetty and Shetty (2018), reviewed the linear nexus between crude oil price and the stock market indices. Weekly time series data from January 2010 to January 2017 was subjected to Augmented Dickey-Fuller (ADF) and Vector Autoregressive (VAR) model. Crude oil price, Nifty index and Bombay Stock Exchange (BSE) energy index were the endogenous, while their lagged values were the exogenous indices. The work concluded with 'no cointegration' showing no long-run relationship. The VAR concluded that energy index is significantly influenced by lagged values of the three variables in the short-term horizon.

Mahmah and Kandil (2019), explored the impact of oil price variations on fiscal consolidation in the United Arab Emirates (UAE) between 1980 – 2015 adopting Ordinary Least Squares technique. The dependent variables comprised bank's liquidity, domestic credit, foreign direct investment and non-oil GDP growth. The work proved that oil price movements significantly affects bank's liquidity, domestic credit and foreign direct investment. However, its effect on non-oil GDP growth was insignificant.

Akinmulegun (2018), measured the impact of capital market development (indexed by market capitalization, all share index, gross domestic product, exchange rate and interest rate) on foreign portfolio investment (FPI) in Nigeria between and including the years 1985 and 2016. The study methodology was ex-post-facto while the estimation method was the Vector Error Correction Mechanism (VECM) and Granger Causality tests. Though the Granger causality test revealed the absence of causality between the variables, the study concluded that capital market significantly determines FPI inflow in Nigeria because the VECM produced significant coefficients for market capitalization and all share index.

Agu, Ogu and Ezeanyej (2019), modelled an Ordinary Least Squares (OLS) and Autoregressive Distributed Lag (ARDL) to measure implications of movement in Foreign Portfolio Investment (FPI), exchange rate and interest rates on Stock Market Returns (proxied by market capitalization) in Nigeria between 1986 and 2017. Based on the test output, exchange rate and FPI were significantly positive while the coefficient of interest rate was insignificant and negative.

Nwala, Nwagboso and Nwankwo (2019), modelled an Exponential Generalized Conditional Heteroscedasticity (EGARCH) and Autoregressive distributed lag (ARDL) with the objective of investigating the impact of foreign portfolio investment (FPI) on market capitalization in Nigeria from January 2007 to December 2018. The work tested the

three hypotheses that: Volatility in Equity Investment, bond investment and money market investment of Foreign portfolio have no significant impact on total market capitalization in Nigeria. Based on the findings, only volatility in Equities foreign portfolio investment had significant impact on market capitalization in Nigeria, while bond portfolio investment and money market portfolio investments were insignificant.

The Arbitrage Pricing Theory (APT) has been proved empirically as an effective way of linking macroeconomic variables and stock market behavior. Under the APT, multiple risk factors can be used to describe the features of stock values (Ross, 1976). The emergence of APT in finance literature was necessitated as result of the fact that the Capital Asset Pricing Model (CAPM) which preceded it assumes the existence of only one risk factor which is not realistic.

Nkechukwu, Onyeagba and Oko (2015), used APT model and explained that the model is premised on a multi-factor assumption where investors are likely to leverage on arbitrage opportunities in the stock market. Therefore, the return on an asset is measured as the opportunity cost of return on other assets while giving due consideration to several other risk elements.

The Arbitrage Price Theory (APT), have been adopted for this study. The justification of the choice is because the APT can conveniently be used to examine the study conceptual framework. In this study, the several risk factors of the APT are indexed by the five macroeconomic variables (exchange rate, interest rate, inflation rate, crude oil price and foreign portfolio investment) which are theorized to impact the stock market movement in Nigeria. Many studies have been based on the APT, including those of Kuwornu and Owusu-Nantwi (2011), Adu (2012), Carino et al (2013), Tripathy and Kumar (2015), Islam and Habib (2016), Worlu and Omodero (2017), Kolapo et al (2018), Ditimi et al (2018), Adesanmi (2018), John (2019) and recently Olaolu and Nwankpa (2021).

Methodology

This study adopted ex-post facto research design, which fits well to address the study objective, The population comprised all the eleven commercial banks listed on the floor of Nigerian Exchange Limited. Sampling was not needed because the required data was extracted with ease on aggregate basis from the reliable database, covering the 10 years period from Q1 2010 – Q4 2019 which gives 40 observations.

The two major sources of secondary data used for this work came from the Central Bank of Nigeria (CBN) 2019 Statistical Bulletin which is available on the bank's website, and information sourced from the Nigerian Exchange (NGX) database and Factbooks. The third source of data was the website of Securities and Exchange Commission (SEC) as well as its statistical bulletin, The data was extracted and arranged in Microsoft excel format before being uploaded into the analysis software.

The data was subjected to tests for normality and stationarity. After the preliminary tests followed the cointegration and Autoregressive Distributed Lag (ARDL) tests to determine the relationships between the variables. E-views 10 software was used to run the analysis.

Model Specification

The model for this study is stated as follows:

$$NBI = F (EXR, INF, FPI) \dots\dots\dots(2)$$

The model is stated econometrically as;

$$NBI_t = \beta_0 + \beta_1 EXR_t + \beta_2 INF_t + \beta_3 FPI_t + \varepsilon_t \dots\dots\dots(3)$$

Where;

NBI_t = Nigerian Banking Index at the Nigerian Exchange at time t

EXR_t = Exchange Rate at time t

INF_t = Inflation Rate at time t

FPI_t = Foreign Portfolio Investment at time t

ε = error term

β_0 = Intercept of the regression line

β_1 - β_3 = Coefficient of the independent variables

Table 1: Variable Measurement

Variable	Notation	Nature of Data	Measurement	Source
Nigerian Banking Index	NBI	Dependent Variable	The Banking Sector Index as computed and published by the Nigerian Exchange for listed Nigerian Banks.	Nigerian Exchange Website
Exchange Rate	EXR	Independent Variable	Exchange rate of Nigerian Naira to the United States Dollars (Monthly Average Official Rate).	CBN Statistical Bulletin 2019
Inflation Rate	INF	Independent Variable	Consumer Price Index Inflation represented by the 12-month average inflation rate.	CBN Statistical Bulletin 2019
Foreign Portfolio Investment	FPI	Independent Variable	Net Foreign Portfolio equity investment inflow to Nigeria for every quarter.	CBN Statistical Bulletin 2019

Source: Field Survey, June 2021.

Data Analysis and Results

Table 2: ARDL Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
NBI(-1)	0.464344	0.142689	3.254228	0.0028
EXR	0.208438	0.137331	1.517776	0.0495
INF	-10.88506	11.26069	-0.966643	0.3415
INF(-1)	19.22832	10.68181	1.800099	0.0819
FPI	0.019538	0.008359	2.337284	0.0263
FPI(-1)	-0.017839	0.010933	-1.631645	0.1132
FPI(-2)	0.021855	0.008748	2.498444	0.0182
C	13.93433	59.63189	0.233672	0.8168
R-squared	0.743945	Mean dependent var		365.4511
Adjusted R-squared	0.684199	S.D. dependent var		68.32717
S.E. of regression	38.39728	Akaike info criterion		10.31851
Sum squared resid	44230.53	Schwarz criterion		10.66327
Log likelihood	-188.0518	Hannan-Quinn criter		10.44118
F-statistic	12.45175	Durbin-Watson stat		1.877681
Prob(F-statistic)	0.00000			

Source: Authors Computation, 2021 (Eview-10)

The analysis shows that the R-squared measured as the coefficient of determination is 74.4% which implies that 74.4% of the total variations in Nigeria Banking Index (NBI) is represented by the explanatory variables which are EXR, INF, and FPI, while the remaining 25.6% accounts for the changes in the dependent variables, which were not included in the equation. After the R-squared have been adjusted, the total explanatory power of the model came down to 68.4%. Also, the Durbin Watson test shows that there is no serial correlation. This is because $R\text{-squared} < DW = 1.88$. The bounds test analysis to check for levels relationship (See appendix) shows that there is a levels relationship among the variables. The F-statistics (5.088) is greater than the upper limit (I(1)) value of 3.2 which necessitated our rejecting the null hypothesis of no levels relation.

Statistical Test of Hypothesis

The test of the three hypotheses of this study were approached as stated below.

Hypothesis One (H_{01}): There is no significant relationship between exchange rate and Nigerian Banking Sector Index. The empirical result shows that there is a significant positive effect of exchange rate on banking sector share price movement in Nigeria. From the result output in table 2, a percentage change in exchange rate will increase the Nigerian banking sector index by 0.21 percent ceteris paribus. The result clearly showed that a positive relationship exist between exchange rate and banking sector share index, and the p-value is within the acceptable 5% level of significance. Hence the null hypothesis of “no significant relationship” is rejected.

Hypothesis Two (H_{02}): There is no significant relationship between inflation rate and Nigerian Banking sector index. The empirical result shows that there is an insignificant negative effect of inflation rate on banking sector share price movement in Nigeria.

Considering the result output in table 2, a percentage change in inflation rate will decrease the Nigerian banking sector index by 10.89 percent holding other factors constant. The result clearly showed that a negative relationship exists between inflation rate and banking sector share index, but the p-value is far beyond the acceptable 5% level of significance and shows the level of insignificance of the effect of inflation rate on banking sector index in Nigeria. Hence, this study could not reject the null hypothesis.

Hypothesis Three (Ho₃): There is no significant relationship between foreign portfolio equity investment and Nigerian Banking sector index. The empirical result shows that there is a significant positive effect of foreign portfolio equity on banking sector share price movement in Nigeria. The result output in table 2 indicates that a percentage change in foreign portfolio equity will increase the Nigerian banking sector index by 0.02 percent *ceteris paribus*. The result clearly showed that a positive and significant relationship exist between foreign portfolio equity and banking sector share index, because the p-value is within the acceptable 5% level of significance. Hence, this study rejects the null hypothesis.

Discussion of Findings

Findings from the study showed that there is a significant relationship between exchange rate and Nigerian banking sector index. A possible explanation to this is that a weaker domestic currency that is falling in value does not attract foreign portfolio investors. A weak currency transmits to higher volume of naira per unit of the foreign currency, resulting to higher prices of most goods including share prices because the country is presently heavily import dependent. This study agrees with the findings of Massomah and Chien (2019), who found that exchange rate has a significant negative effect on banking development. Also, Lambe. (2015), found that exchange rate has a significant positive relationship with banking sector performance in Nigeria.

More so, the study showed that there is an insignificant relationship between inflation rate and Nigerian banking sector index. The implication of this result is that the effect of inflation on Nigerian banking sector share price movement is not material; hence, inflation cannot be used to predict the share price movement over the period 2010 to 2019. Similar to this result is the work of Miguel, Fransico and Vicktor (2018), found a consistently negative and nonlinear effect of inflation and banking sector performance.

Lastly, result showed that foreign portfolio equity investment inflows has a significant effect on Nigerian banking sector index. The interpretation for this is that as the more capital flows into the country for equity purchases, increase in demand for available few stocks leads to increase in price due to higher demand. This buttresses the point that the country is exposed to the activities of foreign participants due to a weak domestic participation in the stock market. This study agrees with Vihang (2001), who found that foreign portfolio investment has a significant positive effect on banking development.

Conclusion and Recommendations

Many studies have been conducted to explore the effect of macroeconomic variables on the stock market. However, few of the studies have been focused on specific sectors as most studies examined the entire stock market. The results of these studies vary greatly regarding the effect of changes in macroeconomic variables on stock market behaviour. For this study, the findings showed that exchange rate and foreign portfolio equity investment inflows have significant effect on the Nigerian banking sector price movement, while inflation rate returned an insignificant coefficient, which implies that its impact is not material. In particular, the present study showed that 74.4% of the total variations in Nigeria Banking Index (NBI) is represented by the explanatory variables which are EXR, INF, and FPI, while the remaining 25.6% accounts for the changes in the dependent variables, which were not included in the equation. Investors should therefore pay particular attention to these macro-economic variables in their investment decisions as regards to equity market investments. Market regulators should also bear these in mind while formulating policies.

On the basis of the findings above, the study made the following recommendations:

- i. There is the need to formulate policies, which will reduce the high dependence on imported goods as this will curtail the depreciation of the Naira. This will promote the stability of the Nigerian Naira and enhance the performance of shares in Nigeria.
- ii. Policies to promote local production and export should be vigorously pursued in a bid to curtail the negative influences of high exchange rates on the share market prices.
- iii. Regulatory authorities are also encouraged to create more awareness and enlightenment that will improve local participation in the equities market so as to cushion the adverse effects of foreign portfolio investors who buy and exist resulting to unjustifiable share price fluctuations.

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