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## Effect of Interest Rate, Exchange Rate and Inflation Rate on Stock Returns: Evidence from Listed Firms in the Nigerian Stock Exchange

**Iyodo Baba Yaro**

Lecturer, Department of Banking and Finance, University of Jos, Nigeria

**Ukpabi Innocent Ogbu**

Ph.D. Research Student, Department of Banking and Finance,  
University of Nigeria Nsukka, Enugu Campus, Nigeria

**Odumu Victor Ato**

Lecturer, Department of Banking and Finance, University of Jos, Nigeria

### **Abstract:**

*Domestic economic fundamentals play a vital role in determining the performance of stock market and stock returns, and stock market being an important part of the financial system should have a systemic linkage with fundamentals of the economy. Scholars have used macroeconomic factors to explain stock returns and found that changes in some macroeconomic variables was associated with risk premium. But as major economic factors affecting the stock exchange operation, the impact on stock returns especially on financial institutions remains ambiguous. Therefore, the paper examined the effect of interest rate, exchange rate and inflation rate on stock returns of banks quoted on the Nigeria stock exchange, 2007 to 2017. Researchers applies ordinary least square regression, and results revealed that interest rate had negative and significant impact on stock returns, exchange rate had positive and insignificant impact on stock returns and inflation rate had negative and insignificant impact on stock returns within the time under review. Base on the findings, researchers' recommends that sectoral allocation of credits should be directly administered on the Nigeria stock exchange markets to curtail the high cost of capital arising from scarcity of funds, monetary authorities should design special exchange rate regime for investors in the Nigerian stock exchange markets to guarantee the value of returns on investment and mitigates the effect of exchange rate volatility on stock performance and plausible monetary policy tools should be utilized to control inflation and its negative effect on stock returns.*

**Keywords:** Interest rate, exchange rate, inflation rate and stock returns

### **1. Introduction**

Investors are concerned with returns on investment and wealth maximization which are subject to some externalities undiversifiable in nature. Basically, stock managers are saddled with the objectives of maneuvering these uncontrollable factors to satisfy and justify clients' objectives. The applicability was based on the observable economic trends and its impact on factor analysis. Obviously, the domestic economic fundamentals play a vital role in determining the performance of stock market, and stock market being an important part of the financial system should have a systemic linkage with fundamentals of the economy. Many scholars have used macroeconomic factors to explain stock returns and found that changes in some macroeconomic variables was associated with risk premium. Alam and Uddin (2009) conclude that as inflation rate affects the returns and value of any investment, stock returns are also sensitive to interest and exchange rate because changes in interest and exchange rates are inversely related to stock returns. However, the economic reasons behind the logic remains that the price of stock necessarily reflects all the future cash flows discounted appropriately and the future cash flows depend on many economic factors such as wholesale price index, interest rate, inflation rate, exchange rate fluctuations, global and domestic oil prices (Naka, Mukherjee and Tufle, 2001 in Muthukumaran and Somasundaram, 2014). As important economic factors affecting the stock exchange operation, the impact on stock returns especially on financial institutions remains ambiguous. Therefore, the paper examines the effect selected economic variables on stock returns of commercial banks quoted on the Nigerian stock exchange.

### **2. Literature Review**

Conceptually, stock returns are subject to some macro-economic variables. Kpanie, Esumanba and Sare (2014) assert that macroeconomic approach is a method of using factor analysis technique to determine the factors affecting asset returns. Invariably, the relationship between exchange rate, inflation and interest rates and stock returns postulate as either positive or negative, as currency depreciation makes local firms more competitive, leading to an increase in exports as a result of stocks price appreciations, or negative if the production was dependent on imported input, cost of

production would rise as a result of currency depreciation, thus reducing profitability and a resulting decline in stock returns, and a weak or no relationship, as an export oriented firm's price rises with currency depreciation. Since the input cost is also affected by this currency depreciation than the effect would be nullified to some extent because of increased cost of production. Theoretically, economic factors may lessen the performance or may increase the rate of stock returns and enhances the performance of stock exchange market by discouraging those factors which have diverse impact on stock returns.

### *2.1. The Concept of Interest Rate and Stock Returns*

According to Muthukumaran and Somasundaram (2014), a rise in the interest rates affects the valuation of the stocks. The rise in the interest rate raises the expectations of the market participants, which demand better return that commensurate with the increased returns on financial market instruments. Thang (2009) asserts that when the interest rate is low, investors normally shift to high-risk assets in order to gain high returns. However, in a low interest rate regime, firms are able to increase profitability by reducing their interest expenses. But during rising interest rate regime, as interest expenses rise, profitability is affected. When interest rate rises, investors move from equities to bonds. Whereas when it falls, returns on bond fall while the returns on equity tend to look relatively more attractive and the migration of fund from bonds to equities. Kpanie, Esumanba and Sare (2014) assert that interest rate is the most significant variable affecting the stock market, and that almost all individual stocks are sensitive to variations in interest rates. However, relationship between interest rate and stock returns has been widely examined by researchers. French, Schwert, and Stambaugh, (1987) documented theoretically, that stock returns responded negatively to interest rates both in the short and long term. But Choi and Jen (1991) emphasis that the expected returns on common stocks are systematically related to the market risk and the interest rate risk. The empirical results of Muradoglu and Metin (2001) postulate that growth rate of interest negatively affect stock returns with a significant lag in short run dynamic model. Ogiogio (1988), Alile (1992) collaborates that interest rate in Nigeria would significantly influence the holding of financial assets by investors. Thus, an increase in interest rate would be accompanied by a decrease in stock prices.

#### 2.1.1. The Concept of Inflation Rate and Stock Returns

Richid (1981) states that predicted inflation rate is unenthusiastically interrelated with expected authentic activity, which is at the same time positively correlated to stock market returns. Price stability is essential in determining whether an economy is stable or not. Inflation as the constant increase in price creates uncertainty in the economy which influences investors' willingness. In Nigeria inflation has led to increase in nominal interest rates which affect the value of interest payment of banks and other financial institutions. However, determination of the problem caused by inflation depends upon the degree in which inflation was projected, if inflation was projected correctly and the monetary authority seems credible, the fluctuation in price would be managed effectively but if inflation was wrongly projected, some economic agents will gain while others will lose. Unanticipated inflation impact negatively on saving ability of the citizens and as a result, low saving leads to a fall in the demand for stocks and equities as financial wealth. This decrease in demand causes the price of equities to fall thereby reducing returns on stocks. Furthermore, the prices of stock determine how effective and efficient the stock market allocates shares and equities based on preference and availability of market information. Increase or decrease in price of stock create uncertainty for the investors and in turn affect the demand and supply of stocks. Therefore, general increase in price level may affect potential investors decision as a result of returns on stocks.

#### 2.1.2. The Concept of Exchange Rate and Stock Returns

According to Abdulrasheed (2013), over the years the monetary authority has put in place various exchange rate regimes to achieve a sound financial system, including return on stocks. The exchange rate policy applied at any time depends on the prevailing condition in the economy. Bala and Hassan (2018) posit that in flow-oriented model, it is the changes in exchange rate that lead to stock price changes. Exchange rate fluctuations affect both multinational and domestic firm operations. In the case of multinational firms, a change in the rate of exchange will influence the value of firms' foreign operations via balance sheet as either profits or losses. Long as profits or losses declared, the firm's stock price will change. On the other hand, exchange rate affects the stock price of domestic firms, if fluctuations in exchange rate affect their input-output prices and demand for their products.

Dornbusch and Fischer (1980) suggest that fluctuations in exchange rate can significantly have an effect on firm's value, as they influence the terms of competition, the input and output price, the value of firm's assets and liabilities denominated in foreign currencies. Therefore, the fluctuations affect the competitiveness of firms earning and cost of its funds and thereby impacting on the value of its shares. Although firms with foreign operations, from exporting to international production, are more affected compared to domestic firms, virtually no company can be considered as fully insulated from the effects of exchange rates changes. Consequently, all firm prices may react sooner or later to changes in the exchange rates. Depending on the moment in time when exchange rates change, a company might face: (1) transaction exposure, that arises whenever the firm commits or is contractually bounded to make or receive a payment at a future date denominated in a foreign currency; (2) translation exposure, arising from the need to globally consolidate the financial reports of a multinational company from affiliate reports denominated in various currencies; and (3) economic exposure, seen as the change in the firm's present value as a result of changes in the value of the firm's expected future cash flows and cost of capital, induced by unexpected exchange rate change.

## 2.2. Theoretical Review

Literature unveiled major hypotheses that explored the relationship between inflation, interest and exchange rates on stock returns. These theories include fisherian hypothesis, proxy hypothesis, tax-effect hypothesis and inflation hypothesis. Considering the level of price instability in Nigeria, this study adopts fisherian hypothesis which suggest that stock hedges inflation. This was based on the fact that the literature suggests that the price of a stock is a major determinant of stock returns which is affected positively by expected or unexpected inflation (consumer price index) and other macro-economic performance indicators. Economic theory also suggests a causal relationship between exchange rate and stock prices. But the nature of the relationship remains contentious among scholars. However, theoretical underpinning of the relationship between exchange rate and stock prices could be traced to two main theories that relate these segments of financial market. Firstly, the traditional approach, which assumes that exchange rates lead stock prices. Under this approach the transmission channel spans from exchange rate fluctuations which affect firms' value via changes in competitiveness and changes in the value of firms' assets and liabilities dominated in foreign currency, there by affecting firms' profits and the value of equity and returns (Gavin, 1989). Portfolio approach also postulates that changes in stock price influence movements in exchange rate through portfolio adjustments (inflows/outflows of foreign capital). The approach believes that an inflow in foreign capital rises as upward trend in stock price was recorded, and a decrease in stock price would induce a reduction in domestic investors' wealth, leading to a fall in the demand for money and lower rates, causing capital outflows and consequently currency depreciation. This hypothesis also points that a depreciation of the local currency makes exporting of goods attractive, increases foreign demand and hence revenue for the firm and its value appreciates thus stock returns increases. Conversely, appreciation of local currency reduces the profit for an exporting firm and negatively affects value of stock price (Jorion, 1991).

## 2.3. Empirical Review

Jawaid and Ulhaq (2012) researched on effects of interest rate, exchange rate and their volatilities on stock prices: evidence from banking industry of Pakistan. Results revealed significant negative long run relationship between exchange rate and short-term interest rate with stock prices, positive and significant relationship between volatilities of exchange rate and interest rate with stock prices. Musawa and Mwaanga (2017) researched on the impact of commodity prices, interest rate and exchange rate on stock market performance: Evidence from Zambia. Findings indicated that interest rate, exchange rate, copper and oil price jointly have long and short run impact on the Lusaka stock market. When disaggregated, only interest rates and copper price had a significant long-term impact on the stock market, and in the short run only copper and exchange rates had an immediate impact on the stock market. Abdurashed (2013) studied oncausal relationship between stock market index and exchange rate: Evidence from Nigeria before and during the global financial crisis, Results depicts absence of long run relationship before and during the crisis.

Muthukumaran and Somasundaram (2014)reveals short term relationship between the interest rate and stock returns. In the short run results show that there is no causality between interest rate and stock returns in India. Taofik and Agbaje (2013) found a long run relationship between stock returns and inflation in Nigeria. Ifionu and Ibe (2015) post SAP impact analysis ofinflation, interest rate, real gross domestic product and stock prices on the Nigerian stock exchange indicates long run equilibrium relationship among the variables and inflation as the most influential variable. Furthermore, Samuel and Iyodo (2011) conducted a research on the effects of interest rates volatility on developmental stocks, using regression analysis and descriptive statistics and their study revealed that interest rates had a negative effect on stocks. Schrey, Hafdisarson and Wendt (2017) shows that anticipated interest rate changes do not affect stock prices on the announcement day; unanticipated interest rate changes had a statistically significant effect on stock returns on the announcement day, and that the Icelandic stock market was efficient when incorporating interest rate changes. Thang (2009) found that interest and the exchange rate had short and long run negative impact on the Malaysia stock market index. Bala and Hassan (2018) shows that exchange rate and economic growth had positive and statistically significant impact on stock market in Nigeria, while money supply had negative and statistically significant influenceon stock market.

## 3. Methodology

Based on the nature and optimal characteristics, ordinary least square regression (OLS) was considered as the most plausible approach for data analysis in this study. Stock returns proxied by return on equity (ROE) of quoted banks in Nigeria represents the dependent variable while the explanatory variables include inflation, interest and exchange rates.

Models specified thus:

$$ROE = f(INTR, EXCR \text{ and } INFR) \dots\dots\dots (I)$$

$$ROE = b_0 + b_1LR_1 + b_2MPR_2 + b_3MLR_3 + u_t \dots\dots\dots (II)$$

$$ROE = b_0 + b_1EER_1 + b_2SDR_2 + b_3UDR_3 + u_t \dots\dots\dots (III)$$

$$ROE = b_0 + b_1AFR_1 + b_2TFR_2 + b_3AAF_3 + u_t \dots\dots\dots (IV)$$

Where: ROE = average Returns on equity of quoted banks in Nigerian, f = function, INTR = interest rate, EXCR = exchange rate, INFR = inflation rate,  $b_0$  = Constant,  $b_1 - b_2$  = Regression coefficients, LR = lending rate, MPR = monetary policy rate, MLR = maximum lending rate, EER = real effective exchange rate base on consumers price index, SDR = domestic currency per special drawing right (period average), USD = domestic currency per US dollar (period average), AFR = actual inflation rate, TFR = target inflation rate, AAF = annual average of inflation rate and  $u_t$  = error term.

<b>Dependent Variable: ROE</b>				
<b>Method: Least Squares</b>				
<b>Date: 3/25/2021 Time: 06:55</b>				
<b>Sample: 2007 2017</b>				
<b>Included observations: 11</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	4.262432	1.626744	2.620223	0.0344
LR	-0.260281	0.105218	-2.473731	0.0426
MLR	0.090103	0.031772	2.835935	0.0252
MPR	-0.143657	0.044502	-3.228108	0.0145
R-squared	0.600220	Mean dependent var		0.458182
Adjusted R-squared	0.598885	S.D. dependent var		0.245023
S.E. of regression	0.185169	Akaike info criterion		-0.259805
Sum squared resid	0.240014	Schwarz criterion		-0.115116
Log likelihood	5.428930	Hannan-Quinn criter.		-0.351012
F-statistic	3.503206	Durbin-Watson stat		2.426859
Prob(F-statistic)	0.077978			

*Table 1: Regression Result*  
*Source: Researchers' E-VIEWS Result*

ROE = -0.260281+ 0.090103MLR -0.143657MPR, P- Value = 0.0426 < 0.05 critical value, LR had negative and significant impact on ROE. This was explained by the negative coefficient value of our explanatory variable (LR) and the corresponding probability value of the t-statistic 0.0426, which is less than 0.05 critical values. This implies that high interest rate negatively affects stock returns in Nigeria, and that interest rate is veritable tool in stock market operations. The R<sup>2</sup> as the summary measure that shows how well the sample regression line fits the data equals 0.60 meaning that 60% variation in ROE was explained by a change in LR, and the remaining 40% was explained by variable not included in the model. The adjusted R<sup>2</sup> takes account of a greater number of regressors if included and it explains 59% variation in the dependent variable.

<b>Dependent Variable: ROE</b>				
<b>Method: Least Squares</b>				
<b>Date: 3/25/2021 Time: 06:51</b>				
<b>Sample: 2007 2017</b>				
<b>Included observations: 11</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
C	0.958348	1.173156	0.816897	0.4409
EER	0.001630	0.008082	0.201633	0.8459
SDR	-0.015038	0.015461	-0.972614	0.3631
USD	0.018428	0.019160	0.961806	0.3682
R-squared	0.6563795	Mean dependent var		0.458182
Adjusted R-squared	-0.577435	S.D. dependent var		0.245023
S.E. of regression	0.272564	Akaike info criterion		0.513401
Sum squared resid	0.520038	Schwarz criterion		0.658090
Log likelihood	1.176295	Hannan-Quinn criter.		0.422195
F-statistic	0.360410	Durbin-Watson stat		2.223171
Prob(F-statistic)	0.783736			

*Table 2: Regression Result*  
*Source: Researchers' E-VIEWS Result*

ROE = 0.001630 - 0.015038SDR + 0.018428USD, P- Value = 0.8459 > 0.05 critical value. EER had positive and insignificant impact on ROE. This was explained by the positive coefficient value of our explanatory variable EER and the corresponding probability value of the t-statistic 0.8459, which is greater than 0.05 critical values. This implies that exchange rate affects the stock returns, and the value of domestic currency influences the stock market activities. R<sup>2</sup> as the summary measure that shows how well the sample regression line fits the data equals 0.65 implies that 65% variation in ROE was explained by a change in LR, and the remaining 35% was explained by variable not included in the model. The adjusted R<sup>2</sup> takes account of a greater number of regressors if included and it explains 57% variation in the dependent variable.

Method: Least Squares				
Date: 3/25/2021 Time: 06:57				
Sample: 2007 2017				
Included Observations: 11				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.413588	0.551240	0.750288	0.4775
AFR	-0.058057	0.052945	-1.096544	0.3091
TFR	-0.000740	0.067815	-0.010906	0.9916
AAF	0.065095	0.064066	1.016070	0.3434
R-squared	0.624407	Mean dependent var		0.458182
Adjusted R-squared	-0.596562	S.D. dependent var		0.245023
S.E. of regression	0.268025	Akaike info criterion		0.479812
Sum squared resid	0.502861	Schwarz criterion		0.624501
Log likelihood	1.361034	Hannan-Quinn criter.		0.388606
F-statistic	0.452426	Durbin-Watson stat		2.483475
Prob(F-statistic)	0.723688			

Table 3: Regression Result  
Dependent Variable: ROE  
Source: Researchers' E-VIEWS Result

ROE = -0.058057 - 0.000740TFR + 0.065095AAF, P- Value = 0.3091 > 0.05 critical value. AFR had negative and insignificant impact on ROE. This was explained by the negative coefficient value of our explanatory variable (AFR) and the corresponding probability value of the t-statistic 0.3091, which is greater than 0.05 critical values. This implies that high inflation rate negatively affects the stock returns, and that inflation as a macroeconomic variable impact on the stock market operations. R<sup>2</sup> as the summary measure that shows how well the sample regression line fits the data equals 0.62 depicting that 62% variation in ROE was explained by a change in LR, and the remaining 38% was explained by variable not included in the model. The adjusted R<sup>2</sup> takes account of a greater number of regressors if included and it explains 59% variation in the dependent variable.

### 3. Conclusion/Recommendations

This study empirically proved the relationship between selected macroeconomic variables and stock markets performance, basically the stock returns and quoted banks in Nigeria. Invariably, the domestic economic fundamentals play a vital role in determining the performance of stock market and stock returns. Thus, it was observed that the stock market, being an important part of the financial system had a systemic linkage with fundamentals of macroeconomic variables. The impact of these economic variables on stock returns was strong and coordinated to some extent. Therefore, investors and portfolio managers' cognition of external environmental factors in their bid to maximizing shareholders wealth were subject to some externalities, which were manageable through monetary policy framework. Base on the finding, researchers' recommends that sectoral allocate of credits should be administered on the stock markets to curtail the cost of capital arising from scarcity of funds, monetary authorities should design special exchange rate regime for investors in the stock exchange markets to guarantee the value of returns on investment and mitigates the effect of exchange rate volatility on stock performance, and desirable monetary policy tools should be utilized to control inflation and its negative effect on the returns on investment.

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