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**Interest Rate, Inflation Rate and Exchange Rate Influence  
on the Nigerian Stock Market Index**

**Amadasu, David E.**, FIMC, FCNA  
Senior Lecturer, Dept of Banking & Finance  
University of Benin, Nigeria.  
E-mail: [davidamadasu@yahoo.com](mailto:davidamadasu@yahoo.com)  
GSM: 08055477864

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**Abstract**

*There is need to know what influence the Nigerian stock market. Index (SMI), proxy for stock prices. The index of all share prices (SMI), is a barometer for growth of the stock market and therefore that of the economy. Studies had been conducted on the subject but not specifically on these three isolated macro-economic variables which are quite intimidating or over-whelming and for reliability and effectiveness. Their dynamic effect on or relationship with the SMI is investigated, using co- integration on yearly data between 1975 and 2009. The finding is that some relationships exist among them, though not significant. It is therefore recommended that the authorities should manage these variables and enhance exports to improve growth because of the long- run negativity of the exchange rate.*

## Introduction

Stock prices or the proxy stock market index (SMI) serves as the barometer for knowing the changes in economic activities or macro-economic variables. Economic theory and empirical studies support this; hence, beginning a recession the average stock price declines while it rises when recession is ending. Also, future dividends and discount rates are affected. All is because of the fact that investment opportunities and consumption activities are priced on the stock market (Chen, Roll and Ross, 1986; Smith, 1990; Goswami and Jung, 1997).

Returns or interest rates have inverse relationship with stock prices or SMI in the long-run from the studies of Fama (1981, 1990). Even, there is a to and fro influence of SMI and macro-economic variables (Smith 1990; Amadi and Odubo, 2002; Amadasu and Iyoha, 2012)). However, the gap to be filled by the present study is the paucity of well documented findings on relationship between SMI and macro-economic variables in the developing world like Nigeria. The period covered is 1975 to 2009, utilizing co-integration method on yearly data for the Nigerian stock market 207 quoted firms as well as that for inflation, interest rates and exchange rates (few variables chosen for reliability and effectiveness). The rest of the study is divided into related literature review, methodology, data presentation and analysis and the concluding part.

## Related Literature Review

Chandra (2004) notes that economic factors explain about 35% of changes in stock prices using fundamental analysis. That is, what is intrinsic to the firm like earnings are in turn determined by economic factors (Global and Bishop, 1997) such as economic growth, capital stock quality, labour force and output. The economic growth being preceded by investment growth which could call for buying and selling stocks to source for funds (Amadasu, 1997a; 1997b; Oaikhena, 2002). Short-term and long-term interest rates, inflation rates, exchange rates, e.t.c, are identified as economic growth factors (Hondroyannis and Papapetrou, 2001; Bulmash and Trivoli 1991; Bilson et al, 1999; Panetta, 2002; Islam, 2003; Emeni and Asein 2003; Abeyratna et al, 2004; Maysami et al, 2005; and Aga and Kocaman, 2006). This is the enabling economic environment for monitoring and forecasting to get corporate earnings, dividends and interest rates, exchange rates, etc. These have relationships with stock prices or SMI as revealed by previous studies below.

### **Interest Rate and Stock Prices**

Money market and stock market instruments are substituted for one another and in addition to a spate of speculative activities because of interest rate changes. Also, such happens for as long as interest rates vary with time, inflation rate, monetary policy guidelines, demand and supply of funds, investors' investment consideration, etc (Kevin, 2000; Amadasu, 2001; Amadasu, 2004 Chandra, 2004). The same goes for a rise in interest rate leading to corporate profits reduction, increase in discount rate for equity investors; all having implication for stock prices. In support, is the evidence from the United States of stock prices jumping after and sometimes before Federal Reserve announcement of a cut in discount rate or interest rate and Chase Manhattan cut in its prime loan rate (Smith, 1990). That from Korea speaks of stock prices negative relationship with long-term interest rate and positive relation with the short- term interest rate (Goswami and Jung, 1997).

### **Inflation Rate and Stock Prices**

Inflation rate has both positive and negative effect on the corporate sector as some industries benefit while others suffer (Chandra 2004). It also has negative effect on consumer price index (CPI), (Fama and Schwert, 1977), and share prices as investors under- value equity (Feldstein, 1980; Summers, 1981; Amadi and Ddubo, 2002).

### **Exchange Rate and Stock Prices**

Amadasu(2011) and Osamwonyi (2003) note that since the exchange rate is the price of a unit of domestic currency in terms of a foreign currency, a rise in it negatively affect the performance and profitability of industries relying on imports .External trade, Balance of Payments and the level of external reserves influence the exchange rate. Also, theoretically, there is a positive relationship between the exchange rate and the stock prices (Akinnfesi, 1981).

### **Methodology**

The study population is the 207 firms quoted on the Nigerian stock exchange between 1975 and 2009. The researcher interest is in the SMI relation to interest rate, inflation rate and the exchange rates .The data is secondary data on stock prices and the macro-economic variables sourced from various issues of Central Bank of Nigeria (CBN) Annual Reports and accounts (Statistical Bulletin) and the Fact Book of the Nigerian stock Exchange. The

assumption of the model or equation is on extraneous factors or fundamentals explaining the stock prices and SMI. Thus:

$$\text{SMI} = F(\text{INTR}, \text{INFL}, \text{EXCR}) \dots \dots \dots (1)$$

Where, SMI = Stock Market Index

INTR = Interest Rates

INFL = Inflation Rates

EXCR = Exchange Rates

$$\text{The model is restated as } \text{SMI} = b_0 - b_1 \text{INTR}_t + b_2 \text{INFL}_t + b_3 \text{EXCR}_t + E_t \dots (2)$$

The a priori signs are:

$$b_1 < 0, b_2, b_3 > 0$$

To avoid the spurious results of ordinary least squares (OLS) and the non-stationarity of time-series data, the method of analysis utilized is co-integration with error correction model (ECM) to investigate the short- and long- run impact of the variables. Others that have used this method before include Maysami and Koh, 2001; Islam and Watanapalachaikul, 2003; Maysami and Sim, 2002, etc.

### Data Presentation and Analysis

The unit root test for stationarity shows that only inflation rate pass the stationarity test at their level form while exchange rate and interest rate and the stock market index pass at their first difference form (Appendix A). The co-integratio test of the error term in the relationship, testing for the residuals stationarity in the regression, shows stationarity at order (0) and the variables do not tend to deviate from their linear relation. The VECM or the vector error correction model generated shows the long-term and short-term relationship between SMI and the variables (Appendix B). The interest rate has negative impact on SMI and is not significant. But exchange rate and inflation rate have positive impact on SMI. The variables conform to a priori expectations. The 81% adjusted  $R^2$  means that the variables explain that extent of the systematic variations in SMI. Only the exchange rate in the short-term has a significant influence on SMI. The model is a good fit as the F-Statistic at 1% level is significant. The Durbin- Watsin statistic shows no auto-correlation and therefore the estimates are unbiased. The long-term

equilibrium relation between the variables and SMI using VECM is shown by the over-parameterized model in Appendix C. This shows that some relationships exist between exchange rate, inflation dependency syndrome and the capital intensive oil and gas imports. The stock market activities or participation will be low. Interest rate and lagged SMI but only the lagged SMI is significant (1% level). The F- statistic is significant at 5%. The parsimonious model (Appendix D) for fewer variables (or definite outcome) derived from the over-parameterized model shows that the lagged SMI is significant too. The D-W statistics of Appendices C and D reflect no auto-correlation.

**FINDINGS:** though discrepancy exists between the short-run and long-run analysis they also confirm each other in some aspects. The interest rate negativity is understandable or good for more participants in share transactions. The exchange rate negativity in the long-run though positive in the short-run from import trade returns, is also understandable because of Nigeria's import dependency syndrome plus the capital intensive oil and gas imports. The stock market activities or participation will be low. This is apart from the fact that there are growth impairment as well as adverse Balance of Payments.

**The policy implication:** is that the Nigerian Government should manage these variables to improve exports and the Stock Exchange.

### **Conclusion**

The study was designed to know the relationship between interest rate, inflation rate, exchange rate and stock market index. The finding is that there is a relationship using VECM on Nigerian data for the short and long term equilibrium.

It is therefore recommended that the Nigerian Government should manage exchange rate, interest rate and inflation rate and even efficient supervision of the Stock Market because the lagged SMI also significantly influence the SMI.

**APPENDIX A**

**Unit Root Test for Stationarity**

variables	Order of integration	ADF Test statistics with intercept and a linear trend	Critical ADF Test
SMI	I(1)	-3.8687	-3.5796 at 5%
EXCR	I(1)	-3.2055	-2.9705 at 5%
INTR	I(1)	-3.3325	-2.9705 at 5%
INFL	I(0)	-3.3892	2.9665 at 5%
$E_t$	I(0)	-3.3004	-2.9665 at 5%

Source: Computer generation.

**APPENDIX B**

**SHORT-RUN STATIC MODEL OF STOCK MARKET INDEX AND THE VARIABLES**

Dependent variable	Independent variable	Coefficient	't' Statistics	Probability
SMI	EXCR	125.1005	10.4322	0.0000
	INTR	-34.5239	-0.2404	0.8121
	INFL	22.8369	0.6189	0.5418
	C	1850.243	1.2255	0.2323
	R2	0.85		
	Adjusted R <sup>2</sup>	0.81		
	F-Statistics	23.1173 (0.00)		
	Durbin- Wats.	2.01		
	S.E. of Regression	2834.389		

Source: computer Generation

**APPENDIX C**

**OVER-PARAMETERIZED MODEL OF VARIABLES AND SMI**

Dependent variable	Independent variables	Coefficient	't' statistics	Probability
DLSMI	DLSMI(-1)	0.5934	.4859	0.0262
	DER	-0.0002	-0.0772	0.9394
	DER(-1)	0.0008	0.2229	0.8268
	DIR	-0.0046	-0.2119	0.8353
	DIR (-1)	0.0118	0.5598	0.5845
	Residual (-1)	-0.7182	-2.7768	0.0148
	C	-0.0283	-0.2536	0.8035
	R <sup>2</sup>	0.67		
	Adjusted R <sup>2</sup>	0.55		
	F- Statistic	2.0633(0.09)		
	Durbin- Watbin	2.2001		
S.E.of Regression	0.1766			

Source: computer Generation.

**APPENDIX D**

**PARSIMONIOUS MODEL OF VARIABLES AND SMI**

Dependent variable	Independent variables	Coefficient	't' statistics	Probability
SMI	DLSMI (-1)	0.5384	4.5086	0.0002
	DIR (-5)	-0.0205	1.6976	0.1051
	Residual (-1)	-0.7919	-5.8340	0.0000
	R <sup>2</sup>	0.70		
	Adjusted R <sup>2</sup>	0.64		
	D-W Statistic	2.00		
	S.E. of Regression	0.2		

Source: Computer Generation.

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