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Datatric Research Consulting, Nigeria, Globafrique Consulting, U.K

2010

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Determinants of Stock Market Performance in Nigeria:

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Abstract

This study examines critically the long-run macroeconomic determinants of stock market performance in Nigeria between 1984 and 2007. The properties of the time series variables are examined using the Augmented Dickey-Fuller (ADF) unit root test and most of the incorporated variables in the study was found to have a unit root at level. The Augmented Engle-Granger Cointegration test result revealed that the stock market performance in Nigeria is mainly determined by macroeconomic forces in the long-run. However, the empirical analysis showed that the NSE all share index is more responsive to changes in exchange rate, inflation rate, money supply, and real output. While, the entire incorporated macroeconomic variables were found to have simultaneous and significant impact on the Nigerian capital market performance in the long-run. The study recommended that investors should pay close attention to exchange rate, inflation, money supply, and economic growth rather than treasury bill rate in the long-run in their investment decision.

Keywords: Macroeconomic Variables, Stock Market Performance, Long-run,

Unit root and Cointegration.

JEL Classification: G10, G12, G19, E2

INTRODUCTION

The Nigerian economy has over the years and under various administrations been subjected to series of social, political and economic policies and reforms. In the pre-1980 era, the economy was basically agrarian and the various regional governments then largely achieved food security. The need to encourage private capital for development was realized early enough with the establishment of the Nigerian Stock Exchange (NSE) in 1961 to develop the capital market.

It is a known fact that the investment that will promotes economic growth and development requires long term funding, far longer than the duration for which most savers are willing to commit their funds and sometimes beyond the capacity of the government. Capital markets generally, are believed to be the heart beat of the economy given their ability to respond almost instantaneously to fundamental changes in the economy. It encourages savings and real investment in any healthy economic environment. Aggregate savings are channeled into real investment that increases the capital stock and therefore economic growth of the country. Given this attributes the capital market makes it possible for the discerning minds to feel the impulse of the economy. The Nigerian Stock Exchange may not be an exemption as it is expected to be influenced by macroeconomic forces, which are outside the realm of capital market. These forces are the macroeconomic fundamentals or indicators that determine the stock prices movement in Nigeria. The changes in macroeconomic balances are often reflected by the magnitude and movement in stock prices, market index and liquidity of the market.

The prevailing financial crisis and the sensitiveness of the capital market to external shocks that are often reflected on macroeconomic variables. Thus, resulting from the global financial meltdown that have affected the fundamentals

in the economy as a result of the unfavourable performance of some major economic indicators in the economy. The Nigerian economy has experienced mixed macroeconomic performance over the years. Likewise, the Nigerian Stock Exchange has undergone series of reforms in comparison with other emerging markets and increase influx of foreign investors. This reform measures aim at promoting development in the key sectors of the economy, make the market accessible for raising capital and attractive to both foreign and local investors. Against the background that macroeconomic variables have taken different values over the years, alongside the stock market price index, a lot of policy questions then arise among which are: Is there any long-run relationship between the key macroeconomic variables and stock market index in Nigeria?; and What determines the stock market performance within the Nigerian macroeconomic environment?

This is the thrust of this study i.e. to investigate the long term relationship between the Nigerian Stock Exchange (NSE) all share index and the key macroeconomic variables in Nigeria between 1984 and 2007. This choice of the research timeframe is to cover the period when the NSE all share index computation started and also to exclude the global financial crisis effect that resulted to poor stock performance at the beginning of 2008.

The remaining part of this paper is divided into four sections. Section 2 discusses literature review and theoretical framework. Section 3 highlights the methodology employed in carrying out the research. Section 4 analyses the result while the last section concludes and proffers policy recommendations.

Section 2

2.0   LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1   THEORETICAL FRAMEWORK

2.1.1 FINANCIAL ECONOMIC THEORY

One way of linking macroeconomics variables and stock market returns is through arbitrage pricing (APT) (Ross, 1976), where multiple risk factors can explain asset returns. While early empirical studies on APT focused on individual security returns (for selection of relevant studies see Fama, 1981, 1990; Fama and French, 1989; Schwert, 1990; Ferson and Harvey, 1991; and Black, Fraser, MacDonald, 1997). It is also used in an aggregate stock market framework, where a change in a given macroeconomic variable could be seen as reflecting a change in an underlying systemic risk factor influencing future returns. Most of the empirical studies on APT theory, linking the state of the macro-economy to stock market returns, are characterized by modeling a short run relationship between macroeconomic variables and the stock price in terms of first difference, assuming trend stationarity (Andrew and Peter, 2007)

An alternative, but not inconsistent approach is the discounted cash flow or present value model (PVM). This model relates the stock price to future expected cash flows and the discount rate of these cash flows. Again, all macroeconomic factors that influence future expected cash flow or the discount rate by which these cash flows are discounted should have an influence on the stock price. The advantage of the PVM model is that it can be used to focus on the long run relationship between the stock market and macroeconomic variables. Campbell and Shiller (1988) explore the relationship between stock prices, earnings and expected dividends. They find that a long term moving average of earnings estimate predict dividends and the ratio of this earning variables to current stock

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price is powerful in predicting stock returns over several years. They conclude that these facts make stock prices and returns much too volatile to accord with a simple present value model.

2.2   MACROECONOMIC PERFORMANCE AND STOCK MARKET RETURNS: EMPIRICAL REVIEW

The issue of causality between macroeconomic variables and share returns over the years has stem up controversies among researchers based on varying findings. Theoretically, macroeconomic variables are expected to affect returns on equities. But over the years the observed pattern of the influence of macroeconomic variables (in signs and magnitude) on share returns varies from one study to another in different capital markets. A brief overview of studies using macroeconomic factor models is presented in this section. The findings of the literatures suggest that there is a significant linkage between macroeconomic indicators and stock return in the countries reviewed.

Ibrahim and Aziz (2003) investigate the relationship between stock prices and industrial production, money supply, consumer price index, and exchange rate in Malayasia. Stock prices are found to share positive long-term relationships with industrial production and CPI. One the contrary, he found that stock prices have a negative association with money supply and (Ringgist) exchange rate.

Serkan (2008) investigates the role of macroeconomic factors in explaining Turkish stock returns. He employed macroeconomic factor model from the period of July 1997 to June 2005. The macroeconomic variables consider are growth rate of industrial production index, change in consumer price index, growth rate of narrowly defined money supply, change in exchange rate, interest rate, growth rate of international crude oil prices and return on the MSCI World Equity Index. He found that exchange rate, interest rate and world market return seem to affect all of the portfolio returns, while inflation rate is significant for only three of the

twelve portfolios. Also, industrial production, money supply and oil prices do not appear to have significant effect on stock returns in Turkey.

Adam and Tweneboah (2008) examined the impact of macroeconomic variables on stock prices in Ghana using quarterly data from 1991 to 2007. They examined both the long-run and short-run dynamic relationships between the stock market index and the economic variables-inward foreign direct investment, treasury bill rate, consumer price index, average oil prices and exchange rates using cointegration test, Vector Error Correction Model (VECM). They found that there is cointegration between macroeconomic variable and stock prices in Ghana indicating long-run relationship. The VECM analysis shows that the lagged values of interest rate and inflation have a significant influence on the stock market. Also, the inward foreign direct investments, oil prices, and the exchange rate demonstrate weak influence on price changes.

Attempt has been made by Nigerian researchers to investigate the relationship between macroeconomic variables and stock prices. Akinnifesi (1987) used a disaggregated analysis to investigate the relationship between exchange rate and stock prices fluctuation. He found that a depreciating Naira exchange rate increases stock prices. Soyode (1993) made an attempt to test the association between stock prices and macroeconomic variables as exchange rate, inflation and interest rate. He found that the macro economic variables are cointegrated with stock prices are consequently related to stock returns.

Amadi, Oneyema and Odubo (2000) employed multiple regression to estimate the functional relationship between money supply, inflation, interest rate, exchange rate and stock prices. There study revealed that the relationship between stock prices and the macroeconomic variables are consistent with theoretical postulation and empirical findings in some countries. Though, they found that the

relationship between stock prices and inflation does not agree with some other works done outside Nigeria.

Nwokoma (2002), attempts to establish a long-run relationship between the stock market and some of macroeconomic indicators. His result shows that only industrial production and level of interest rates, as represented by the 3-month commercial bank deposit rate have a long-run relationship with the stock market. He also found that the Nigeria market responds more to its past prices than changes in the macroeconomic variables in the short run.

Ologunde, Elumilade and Asaolu (2006), examines the relationships between stock market capitalization rate and interest rate. They found that prevailing interest rate exerts positive influence on stock market capitalization rate. They also found that government development stock rate exerts negative influence on stock market capitalization rate and prevailing interest rate exerts negative influence on government development stock rate.

Section 3

3.0   DATA AND METHODOLOGY

3.1   EMPIRICAL METHODOLOGY.

To capture the precise effect of macroeconomic variables on NSE index as a system of equation, the model is specified as:

$$LNSEDX_t = \eta_0 + \eta_1 LEXC_t + \eta_2 LCPI_t + \eta_3 LTBR_t + \eta_4 LM2_t + \eta_5 LRGDP_t + u_t \qquad (1)$$

Where: η_0 is the constant; η_i are the parameters to be estimated and U_t is the stochastic error terms.

The stationarity properties of the time series variables are examined using the Augmented Dickey-fuller (ADF) approach and the Augmented Engle-Granger

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(AEG) co-integration is employed to determine whether the selected macroeconomic variables are co-integrated with stocks prices in the Nigerian Stock Exchange.

3.1.1 AUGMENTED DICKEY-FULLER TEST

The time series variables characteristics and order of integration are determined using ADF unit root test developed by Dickey and fuller (1979). This is based on the following model:

For Intercept:

$$\Delta X_t = \delta_0 + \delta_1 \Delta X_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta X_{t-i} + \varepsilon_{t1} \tag{2}$$

For Trend:

$$\Delta X_t = \delta_0 + \delta_1 \Delta X_{t-1} + \delta_2 t + \sum_{i=1}^{n} \gamma_i \Delta X_{t-i} + \varepsilon_{t2} \tag{3}$$

The tau-statistic test the null hypothesis of $\delta_1 = 0$ (i.e. no stationary) against the alternative that $\delta_1 < 0$ (i.e. stationary). If the series is not stationary at level i.e. $I(0)$ it will be differenced d times to be stationary to determine its order of integration.

3.1.2 ENGLE-GRANGER COINITEGRATION TEST

The Engle-Granger (1987) cointegration test is employed to determine if the variables in equation (1) are cointegrated or linearly stationary. This is to investigate the long-run relationship between macroeconomic indicators and stock prices in Nigeria. The test requires the estimation of the residual term (U_t) in equation (1) based on the model below:

$$\Delta \ell_t = \phi \ell_{t-1} + \sum_{i=1}^{k} \lambda_i \Delta \ell_{t-i} + \omega_t \tag{4}$$

in which the presence of unit root is examined. If the estimated residual term is stationary i.e. $I(0)$, then the macroeconomic variables and stock prices are said to be cointegrated.

3.2   DATA DESCRIPTION AND SOURCES

In this paper, we draw upon theory and existing empirical work as a motivation for the selection of a number of macroeconomic variables that we expect to determines the performance of the Nigerian stock market in Nigeria**.** Five macroeconomic indicators that are hypothesized to determine changes in share returns are consumer price index (CPI) as a measure of inflation, broad money supply (M2), treasury bill rate (TBR) as a proxy for money market interest rate, real output growth (RGDP) and exchange rate (EXC). The Nigerian stock exchange (NSE) All-share index is used to measure the stock market trends and performance. This index is used in this paper as a barometer for monitoring upswings & downswings in the capital market. Since, the study focuses on determine the long-run causes of stock prices variability using the market index approach unlike other earlier empirical studies. The study span between 1984 and 2007 because the computation of the NSE index started in 1984 and the 2007 is chosen in order to exclude the global financial crisis effect that resulted to poor stock performance at the beginning of 2008. The time series data sets employed are sourced from various issues of the Central Bank of Nigeria Statistical Bulletin, Annul Abstract of Statistic of National Bureau of Statistic (NBS) and the NSE Annual Report. All the variables are transformed into natural logs to reduce multicollinerity and assume linearity.

Section 4

4.0   EMPIRICAL RESULTS

4.1   UNIT ROOT TEST RESULTS

The result of the ADF unit root test is shown in table 1. The result indicates that only the CPI and RGDP in level reject the null hypothesis of non stationary at the 1% Mackinnon (1988) critical value. This implies that they are integrated of order zero i.e. $I(0)$. The NSE index and other macroeconomic indicators-M2, TBR, and EXC-are found to be stationary at first difference. There results are consistent with previous literature that found most macroeconomic indicators and stock indexes non-stationary and non-mean reverting. Therefore, all the macroeconomic variables and NSE index are regarded to be integrated of order one i.e. $I(1)$ in the subsequent tests.

Table 1:   ADF UNIT ROOT TEST RESULT

Variables	Level		First Difference		Order of Integration
			Intercept	Trend	
LNSEDX	-1.091	(4)	-3.390** (1)	-3.833* (9)	**I(1)**
LNCPI	-4.328*	(7)	-2.793 (1)	-5.533* (9)	**I(0)**
LM2	-2.810*	(6)	-3.971* (5)	-5.477* (5)	**I(1)**
LTBR	-1.798	(1)	-3.691** (1)	-4.534* (1)	**I(1)**
LRGDP	-6.439*	(1)	-4.852* (2)	-4.573* (3)	**I(0)**
LEXC	-2.613	(1)	-3.135** (1)	-3.546 (1)	**I(1)**

Note: Model 2 (with intercept only). The value in brackets show the no of lags which selection is based on minimum AIC and SIC.
*significant at 1%   ** significant at 5%

4.2   COINTEGRATION TEST RESULTS.

The Augmented Engle-Granger (AEG) cointegration test is carried out based on the estimated model 1, which result is shown in table 3. The residual term (U_t) series generated from it was found to be stationary at level. The result presented in table 2 shows that the null hypothesis of no cointegration is rejected at the 1%, 5% and 10% Asymptotic critical level for all the consider models. Therefore, there exist long-run relationship between macroeconomic variables and stock market performance in Nigeria. Also, all the macroeconomic indicators except CPI are found to have long-term significant effect on share returns in Nigeria, and the positive effect of CPI and TBR are not in tandem with a-priori expectation.

Table 2:   ENGLE-GRANGER COINTEGRATION TEST RESULT

Model	No of Lag	Tau Statistic
Series: $U_t = LNSEDX_t - \eta_0 - \eta_1 LEXC_t - \eta_2 LCPI_t - \eta_3 LTBR_t - \eta_4 LM2_t - \eta_5 LRGDP_t$		
None: $\Delta U_t = \phi U_{t-1} + \sum_{i=1}^{n} \lambda_i \Delta U_{t-i} + \omega_{t1}$	2	-3.875
Intercept: $\Delta U_t = \phi_0 + \phi_1 U_{t-1} + \sum_{i=1}^{n} \lambda_i \Delta U_{t-i} + \omega_{t2}$	1	-4.416
Trend: $\Delta U_t = \phi_0 + \phi_1 U_{t-1} + \phi_2 t + \sum_{i=1}^{n} \lambda_i \Delta U_{t-i} + \omega_{t2}$	2	-3.700

Note: the selection of lag is based on minimum AIC and SIC.

Table 3:   COINTEGRATING REGRESSION RESULT[1]

Dependent Variable: LNSEDX

Method: Least Square

Sample: 1984-2007

	C	LEXC	LCPI	LTBR	LM2	LRGDP
	-11.837	-0.3646	0.5848	0.0912	0.7419	0.5607
Std.Er:	2.7779	0.1463	0.1430	0.1702	0.1703	0.1534
Prob:	0.0005	0.0227	0.0007	0.5984	0.0004	0.0018

R^2= 0.9929   **Adjusted R^2**= 0.9910   **F-Statistic**= 505.672

Prob(F-Statistic)= 0.0000   **Durbin-Watson Stat**= 1.8034

1. Extracted from the E-View 5.1 output

Section 5

5.   CONCLUSION

The Augmented Dickey-Fuller (ADF) test is used to examine the presence of unitroot in the time series variables and the findings showed that only CPI and RGDP are stationary at level. While, other time series variables are found to be stationary at first difference. Likewise, the Augmented Engle-Granger (AEG) co-integration test results indicates that the variables are cointegrated i.e. there exist long-run relationship between macroeconomic indicators and stock prices in Nigeria. Also, the macroeconomic variables have long-run simultaneous significant effect on the stock market performance in Nigeria and this is consistent with other empirical results.

In general, the NSE all share index is consistently determined by exchange rate, consumer price index (inflation), broad money supply and real output during 1984-2007. Our results suggest that investment perception of Nigeria is a mixture of other mature stock markets, as was found in New-Zealand, Korea, the US and Japan. Considering the gradual recovery of economies from the global financial meltdown, prospective or existing investors either Nigeria or foreigners should pay more attention to the significant above mentioned macroeconomic variables in their investment decision rather than treasury bill rate (TBR) in the long-run.

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