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Stock Market Reactions to Fiscal Policy Shocks: Empirical Evidence From Nigeria

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ABSTRACT

This study sets out to investigate the effect of fiscal policy on stock market performance in Nigeria. Specifically, the study examines if shocks in government expenditure and government debt affects stock market performance. The period of the study is from 1981-2012. Following the VAR estimates, the variance decomposition and impulse response analysis was employed to empirically show the effects of fiscal and policies on stock market performance. The result of this study reveals that market capitalization does not react immediately to fiscal policy but reacts with a significant time lag. This suggests that there is the need for effective fiscal policy coordination and increased efficiency of institutions that are expected to facilitate the fiscal policy execution. In addition, policy coordination between the central bank and the government is still relatively nascent. Consequently, the gains from policy coordination in the context of improving stock market performance could easily be eroded. Thus the study recommends that it will be useful to further strengthen the coordination arrangement by close monitoring of the impact of fiscal policies on the economy.

Key Words: Stock market, Fiscal policy, government expenditure, government debt and VAR.

INTRODUCTION

All over the world, the capital market has played significant roles in national economic growth and development. Essentially, the stock market provides liquidity, contributes to capital formation, and investment risk reduction by offering opportunities for portfolio diversification. However, equity

investments are generally very liquid and the time horizons of equity investors are often relatively short. As a result, changes in government policies can trigger a swift response by investors. Government policies that enhance investor confidence will be rewarded by higher stock prices and market valuations. On the other hand, investors can quickly withdraw their funds if governments choose market-unfriendly policies, thereby generating downward pressure on stock prices and valuations. Stock markets, in short, are a valuable indicator of financial actors' preferences over government policy outcomes. In recent years, there has been growing literature explaining the relationship between fiscal policy and stock market performance both in the developed and developing world (Agnello & Sousa 2012; Afonso & Sousa, 2011; Goodness, Rangan, Charl, Stephen & Zeynel 2012) and this studies are also characterized with no clear-cut predictions on the impact of fiscal policy on stock market. for example, while Agnello and Sousa (2012) found that there is an immediate temporary negative response of stock prices to fiscal policy shocks, Afonso and Sousa (2011) found that government revenue shocks has little but positive effects on stock prices. Laopodis (2010) showed that fiscal policy is important for stock prices. Another gap identified is that aside from the polarity in the research empirics in this area, theoretically also, the influence of fiscal policy on stock markets seems to lie within an unsettled theoretical domain depending on whether it is viewed from a Keynesian, classical or Ricardian equivalence approach. Fiscal policy used in a Keynesian manner can support aggregate demand, boosting the economy and potentially driving stock prices higher. In contrast, classical economic theory focuses on the crowding out effects of fiscal policy in the market for loanable funds and of the productive sectors of the economy. Hence, fiscal policy could potentially drive stock prices lower through the crowding out of private sector activity. Furthermore, from a Ricardian perspective (Emad 2006) fiscal policy is impotent and as such will have no effect on stock markets. Consequently, there is the need to show what the empirical findings are for Nigeria and on what side of the theoretical divide can the findings be situated.

Specifically, for Nigeria, the focus of most studies for example (Ogbole, Amadi & Essi, 2011; Abata, Kehinde & Bolarinwa 2012; Olopade & Olopade 2010; Medee & Nenbee 2011) from have been in the area of the effect of fiscal policy on economic growth and therefore not much is known about the reaction of stock market in Nigeria to fiscal policy. It is therefore of utmost importance to investigate the effects of fiscal policy on the Nigerian stock market performance especially as it has been difficult for the market to return to its pre-crisis level despite several reforms. The objective of this study is to examine the impact of fiscal policy on stock market performance in Nigeria. The study hypothesizes that fiscal policy has a significant impact on stock market performance in Nigeria.

Literature review

Goodness, Mehmet, Rangan, Charl, Stephen and Zeynel (2012), did a study on fiscal policy shocks and the dynamics of asset prices using South Africa as a case study. The sign restriction was used to identify government revenue and spending shocks. They identified 3 types of fiscal policy scenarios; a deficit financed spending increase, a deficit financed revenue cut and a balanced budget spending increase. The quarterly data was used ranging from 1966 to 2011 using real household consumption, real non-residential investment, real GDP, total government expenditure and revenue, real wage, treasury bill and the CPI using the Bayesian Vector Auto Regressive [BVAR] estimation technique. The study found that deficit spending shock does not affect house prices but temporarily exerts positive effects on stock prices. Also, fiscal policy shock affects stock prices in the short run; monetary policy exerts a more direct effect on asset; markets and contractionary monetary policy shocks lower the real stock price index.

Laopodis (2008), examined the dynamic linkages among the federal budget deficit, monetary policy and the stock market for the 1960 to 2004. The findings from the study indicated that deficits matter for the stock market, contrary to the Ricardian equivalence proposition. Further analyses using taxes and government spending confirmed a higher sensitivity of the stock market to taxes relative to spending. When market returns is replaced with before- and after-tax corporate profits and excess market returns, several economically significant results were reported. The study lend credence to the fact that unexpected increases in the fed funds rate lower expected stock returns leading to lower corporate profits and, thus, ultimately lower corporate tax revenues.

Udegbunam and Oaikhenan (2012), in their empirical study of the effects of persistent rising fiscal deficits on the stock market in Nigeria find out that money- financed deficits have an ambiguously positive effect on stock prices in the short-run. On their part, Asaolu and Ogunmuyiwa (2011) in their study of the impact of macroeconomic variables on stock market movement in Nigeria, observe an inverse relationship between budget deficits and the average share prices for the period 1986-2007.

Vafa and Matin (2011) examined the relationship between Japan's financial structure and the country's fiscal and monetary policies using annual time series for the period span of 1960 to 2008 using variables such as real GDP, real narrow money, real fiscal spending to GDP ratio, total equity value traded ratio to GDP. The Vector Error Correction model and the unrestricted Vector Auto Regressive approach (VAR) were used in the study. They found that there exists long run relationship between policy variables and financial structure, and that stock markets also benefit from increasing fiscal consumption.

Ioannis, David and George. (2011) examined the stock market response to fiscal policy shocks using quarterly data from the period 1991 to 2010

using Government expenditure (which was used as a proxy for fiscal stance) using the structural vector autoregressive approach (SVAR). They found that both fiscal policies influence stock market returns via direct and indirect channels.

METHODOLOGY

The nature of this study necessitates the use of a time–series research design and an extensive reliance on secondary data. The data which include selected macroeconomic variables were sourced from the Central Bank of Nigeria (CBN) statistical bulletins and National Bureau of Statistics (NBS) for the period 1980-2012. The method of data analysis utilized in the study involves several econometric applications often used in most contemporary economic time-series studies. First, the data description, Pearson correlation analysis and the Variance inflation test are conducted. Next, the unit root test is applied to examine the stationarity condition of the variables in a time–series analysis. In this study we adopt the Augmented Dickey-Fuller (ADF) statistics to test for stationarity of the data. Thereafter, we conduct the VAR estimation and then the impulse response and variance decomposition follows. The model for the study is presented as follows;

$$MKTCAP = \gamma_0 + \gamma_1 \frac{GEXP}{GDP} + \gamma_2 \frac{GDEB}{GDP} + e \quad \text{---------- (1)}$$

Where MKTCAP= Stock Market Capitalization,
GEXP/GDP= Government Expenditure-GDP ratio,
GDEBT/GDP= Government debt-GDP ratio and
e = the stochastic disturbance or error term.

The VAR Specification

The shocks from fiscal variables considered on stock market performance was analyzed using the Vector Autoregressive Model (VAR) which showed the response of the shocks from fiscal policies variables on stock market performance and vice versa. Since the early eighties, VAR models have become the standard tool to analyse macroeconomic policy and are found to be more successful in predicting than the complex structural macro econometric models (Bahovec & Erjavec, 2009). The Vector Autoregressive Model can be expressed as,

$$A_0 y_t = a_o \Sigma_{i=1}^{p} A_i y_{t-1} + e_t \quad \text{---------- (2)}$$

Accordingly the baseline VAR model with p lags VAR(p) is specified in its reduced form as:

$$Y_t = a_0 + a_1(t) + A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_p Y_{t-p} + e_t$$

---------- (3)

where a_0 is the is a ($k \times 1$) vector of constants; $a_1(t)$ is a ($k \times 1$) vector of linear time trend;
t=1,…T; A_i are (k X k) coefficient matrices, K being the number of endogenous variables in the system and $Y_t = \left(\frac{GEXP}{GDP}, \frac{GDEB}{GDP}, e\right)$ is the vector of endogenous variables. The K x 1 vector $e_t = (e_t^{gexp}, e_t^{gdebt},)$ consists of reduced form residuals ordered with their corresponding observed endogenous variables in vector Y_t. Furthermore, each residual is a mean zero white noise process that is serially uncorrelated, i.e. $e_t \sim N(0, \varepsilon_\mu)$.

In order to get the reduced form of our structural model, we multiply both sides with A_0^{-1} such as that:

$$y_t = a_o \sum_{i=1}^{p} B_i y_{t-1} + e_t \text{ ---------- (4)}$$

where, $\mathbf{a}_0 = \mathbf{A}_0^{-1}\mathbf{c}_0$, $\mathbf{B}_i = \mathbf{A}_0^{-1}\mathbf{A}_i$, and $\mathbf{e}_t = \mathbf{A}_0^{-1}\boldsymbol{\varepsilon}_t$, i.e. $\boldsymbol{\varepsilon}_t = \mathbf{A}_0\mathbf{e}_t$. The reduced form errors $\mathbf{e}_t$ are linear combinations of the structural errors $\boldsymbol{\varepsilon}_t$, with a covariance matrix of the form $E[\mathbf{e}_t\mathbf{e}_t'] = \mathbf{A}_0^{-1}\mathbf{D}\mathbf{A}_0^{-1'}$.

The structural disturbances can be derived by imposing suitable restrictions on $\mathbf{A}_0$. The short-run restrictions that are applied in this model as the following:

$$\begin{bmatrix} \varepsilon_t^{gexp} \\ \varepsilon_t^{gdebt} \\ \varepsilon_t^{Mktcap} \end{bmatrix} = \begin{bmatrix} \alpha_{11} & 0 & 0 & 0 & 0 \\ \alpha_{21} & \alpha_{22} & 0 & 0 & 0 \\ \alpha_{31} & \alpha_{32} & \alpha_{33} & 0 & 0 \end{bmatrix} \text{X} \begin{bmatrix} e_t^{gexp} \\ e_t^{gdebt} \\ e_t^{Mktcap} \end{bmatrix}$$

Where: ε_t^{Mktcap}, ε_t^{gexp}, ε_t^{gdebt}, denote the shock in market capitalization, government debt-GDP ratio, government expenditure-GDP ratio respectively. Furthermore, $(e_t^{gexp}, e_t^{gdebt},)$ consists of reduced form residuals ordered with their corresponding observed endogenous variables in vector Y_t. Our restrictions and indentication of the VAR model is based on the recursive approach using Cholesky decomposition. To investigate the relative impact of fiscal policy on stock market performance, variance decompositions (VDCs) and impulse response functions (IRFs) derived from vector autoregression (VARs) is utilized.

RESULTS

Table 1 shows the correlation coefficients of the variables. A positive correlation is observed between Market capitalization and Government expenditure-GDP ratio (r=0.012). In addition, we find the existence of negative correlation between market capitalization and government debt-GDP ratio (r=-0.618).

Table 1: Correlation Result.

	MKTCAP	GEXP	GDEBT
MKTCAP	1		
GEXP	0.295218	1	
GDEBT	-0.61867	-0.03955	1

Table 2: Unit root test Results.

Unit root test at levels			
Variable	ADF-Test Statistic	95% Critical ADF Value	Remark
MKTCAP	-0.6238	-2.96	Non-stationary
GEXPGDP	-1.728	-2.96	‘’
GDEBT/GDP	-1.846	-2.96	‘’
Unit root test at 1st difference			
Variable	ADF-Test Statistic	95% Critcal ADF Value	Remark
MKTCAP	-4.419	-2.96	Stationary
GEXP/GDP	-6.664	-2.96	‘’
GDEBT/GDP	-3.771	-2.96	‘’

The result indicates that all of the variables at levels, have ADF values that are less than the 95% critical ADF value of 2.96 (Table 2). The implication of this is that the time series for these variables are non-stationary in their levels. Moving forward, we take the first differences of the respective variables and perform the unit root test on each of the resultant time series. The rationale behind this procedure is based on the assertion of Box and Jenkins (1976) that differencing non-stationary time series will make it attain stationarity. The result of the unit root test on these variables in first differencing shows that the ADF values in absolute terms is greater than the 95% critical ADF values. With these result, these variables are adjudged to be stationary. Thus we accept the hypothesis that the variables possess unit roots. Indeed the variables are integrated of order one i.e. I(1).

Lag length Selection

To obtain a reasonable conclusion, the selection of lag length is a key determinant factor to establish the appropriate VAR model.

Table 3: Lag length selection.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-904.835	NA	1.15E+22	64.98824	65.22613	65.06097
1	-776.31	201.968	7.33E+18	57.59359	59.02095	58.02995
2	-760.112	19.66982	1.66E+19	58.22226	60.83909	59.02225
3	-714.543	39.05914	6.68E+18	56.75304	60.55934	57.91667
4	-602.941	5.80060*	.85e+16*	0.56724*	5.56301*	2.09450*

* indicates lag order selected by the criterion

The optimal lag length criteria selection is based on the highest value of likelihood ratio (LR) LR and lowest information criteria (IC). From the criteria selection output in Table 3, lag length of four (Figure 1) appears to be the optimal lag length and hence it is used in the VAR procedure.

Impulse Response Functions

To investigate the relative impact of fiscal policy on stock market performance, the impulse response functions (IRFs) derived from vector autoregression (VARs) is utilized. Figure 1 displays the responses of all variables in the VAR to innovations in government expenditure. As observed, Market Capitalization used as a proxy for stock market performance appears to maintain its stability beginning from the first quarter and even up to the six quarter. Afterwards, it fluctuates slightly though non-negatively until the 11^{th} quarter where it begins to slide towards disequilibrium. We observe a delayed response of market capitalization to shocks in Government expenditure and the tendency for asymptotic disequilibrium. We also consider the responses of government debt to government expenditure shocks. The response is quite unsteady as the path seems to fluctuate continuously over the period. Specifically, we observe that government debt drops slightly at the first quarter and then rises immediately till about the sixth quarter and then begins to fall up to the eleventh quarter where it again begins to rise. This suggests that any sensible attempt at ensuring debt sustainability must take government expenditure patterns into serious consideration. Finally, the persistence of government expenditure which shows the pattern of development the variable within a protracted period caused by a shock to itself is fairly stable.

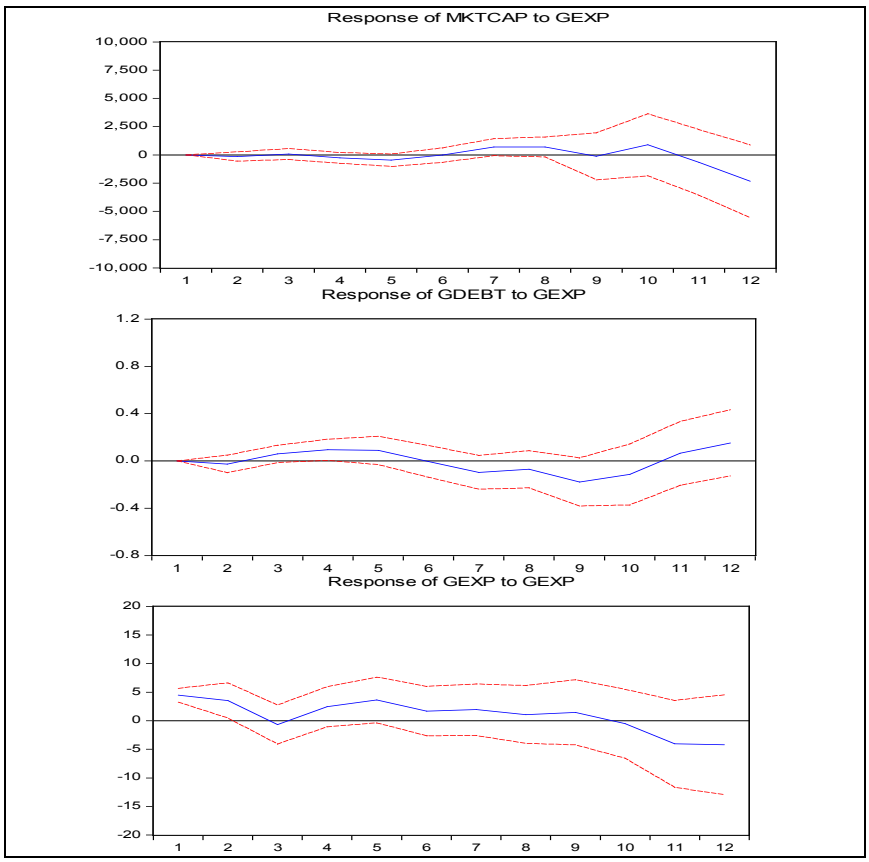

Figure 1: Responses of one standard deviation shocks to Government expenditure.

Figure 2 displays the responses of all variables in the VAR to innovations in government debt. We observe that market capitalization remains largely stable and unperturbed with relatively benign fluctuations which do not take the path away from stability. We also consider the responses of government expenditure to shocks in government debt. The response is quite steady with minor fluctuations which do not seem to pose significant threats to the stability of the time path and this holds over all quarters. Finally, the persistence of government debt which shows the pattern of development the variable within a protracted period caused by a shock to itself is fairly stable.

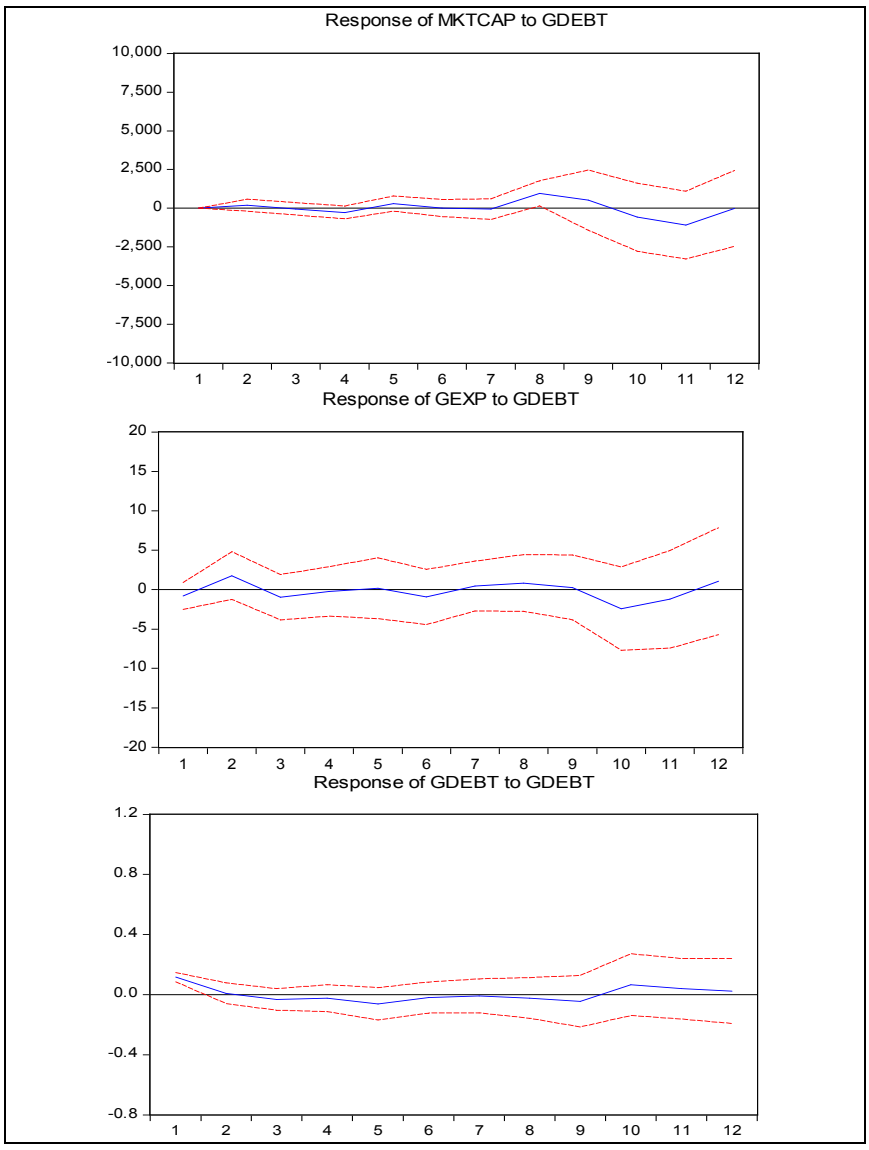

Figure 2: Responses of one standard deviation shocks to Government Debt.

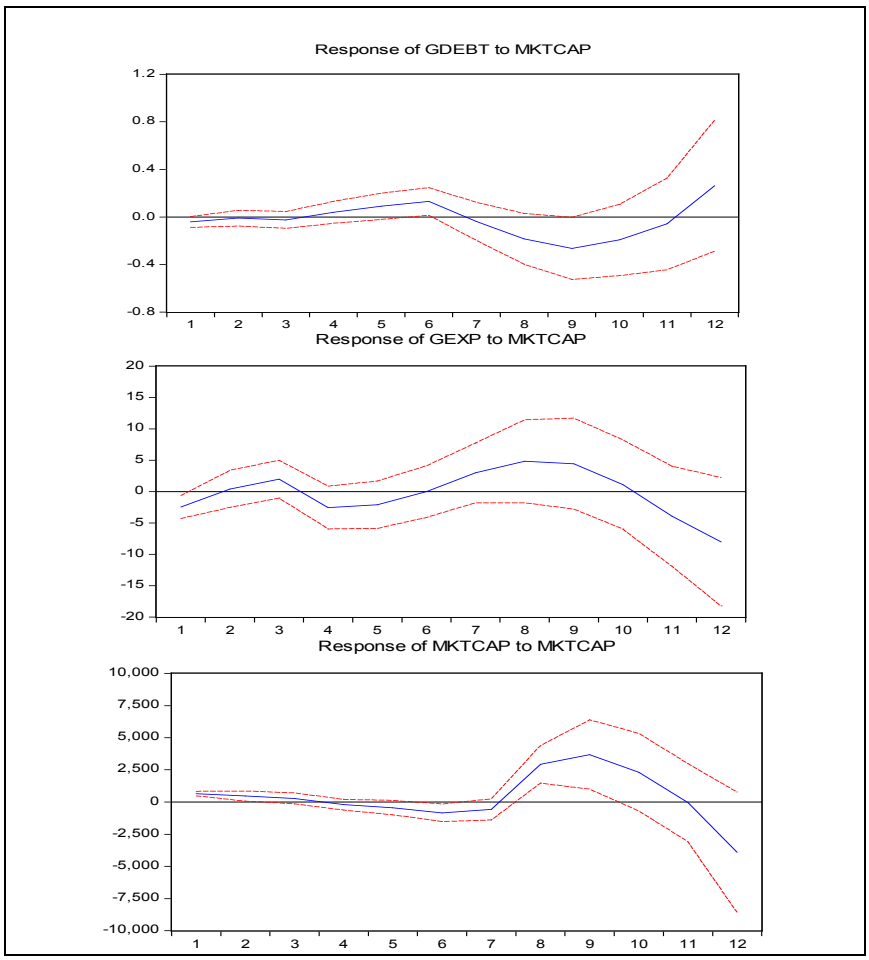

Figure 3: Responses of one standard deviation shocks to Market Capitalization.

Figure 3 displays the responses of all variables in the VAR to innovations in market capitalization. As observed, government debt is stable up to the third period. Afterwards, it responds by moving slightly upwards for 3 periods and then declines and then stabilizes at the eleventh period. In relation to government expenditure, the variable reacts cyclically following market capitalization shock. Finally, the response of market capitalization to its own shocks shows no threatening response up to the seventh quarter where it immediately rises and then begins to decline though still positive until the eleventh quarter where it turns negative.

Variance Decomposition Analysis

Variance decomposition is estimated for 12 quarters. The main focus of this analysis is investigating the relative importance of shocks from the fiscal variables in explaining the forecast error variance of the endogenous variable in the model. Shocks in the table such as (ε_t^{Mktcap}, ε_t^{gexp}, ε_t^{gdebt}) denote the shock in market capitalization, government debt-GDP ratio and government expenditure-GDP ratio respectively.

Table 4: Variance Decomposition

	Period	S.E.	ε_t^{Mktcap}	ε_t^{gexp}	ε_t^{gdebt}
VD OF MKTCAP	1	655.8994	23.25968	11.36562	22.70122
	3	1055.065	20.78622	6.229071	21.5597
	6	1646.891	24.6888	13.76935	16.71478
	9	5552.718	14.83323	3.145434	19.22028
	12	8068.812	27.60305	8.572107	9.454726
VD OF GDEBT	1	0.123769	0	99.96576	0.03424
	3	0.170118	13.52122	55.28201	17.2626
	6	0.32339	7.160618	27.95519	14.525
	9	0.535014	9.1706	11.72889	7.223831
	12	0.683007	15.47588	12.46683	5.771198
VD OF GEXP	1	5.172475	0	0	100
	3	7.682558	0.130554	7.787968	59.7901
	6	10.36046	3.506215	5.999737	61.57459
	9	13.81448	8.212804	4.786093	36.24037
	12	18.44922	18.3956	8.936052	21.04197

In evaluating the variance decomposition result in Table 4, we are particularly interested in the forecast error variance in market capitalization. The variance decomposition for market capitalization shows that in the first quarter 23.259 % of the forecast error variance in market capitalization is explained by the shock in itself declining by 2.473% to explain 20.786% in the third quarter and rising by 3.90% to explain 24.688% of forecast error variance in the sixth quarter. It declines further in the ninth quarter and then

eventually pushing up to 27.60% in the twelfth quarter. This confirms that market capitalization shocks are highly dependent on other shocks in the economy. As shown in Table 4 above, government debt shocks explains 11.365% in the first quarter and then declines by 5.137% to explain 6.229 % of the error variance in market capitalization in the third quarter. In the sixth quarter it rises by 7.540% to explain 13.769% and declines in the ninth quarter to 3.145% and then rises again to 8.57% in the twelfth quarter. Government Expenditure shocks explain about 22.70% of the forecast errors of Market Capitalization in one quarter and then declines by 1.142% to explain 21.559 % of the error variance in Market Capitalization in the third quarter. From third quarter, it declines by 4.844% to explain 16.714% in the sixth quarter and 19.22% in ninth quarter and 9.455% in the twelfth quarter respectively. From the variance decomposition evaluation, we find that shocks in fiscal policy variables; (government expenditure and government debt) exert some influence on forecast errors of market capitalization and this suggest that fiscal policy may not be neutral in its effect on Stock market performance as proxied by market capitalization.

CONCLUSION

The objective of this study was to provide empirical evidence on the reactions of the Nigerian stock market to fiscal policy. The result of this study reveals that market capitalization does not react immediately to fiscal policy but reacts with a significant time lag. This suggests that there is the need for effective fiscal policy coordination and increased efficiency of institutions that are expected to facilitate the fiscal policy execution. The study recommends that close attention be given to how the stock market reacts to fiscal policy moves. Furthermore, policy coordination between the central bank and the government is still relatively nascent and therefore very much less perfect. The gains from policy coordination in the context of improving stock market performance could easily be eroded. Thus it will be useful to further strengthen the coordination arrangement by close monitoring of the impact of the interaction of fiscal policies on the economy.

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