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STOCK MARKET RESPONSE TO FISCAL POLICY IN NIGERIA: EMPIRICAL EVIDENCE

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Abstract
This study investigates the stock market response to fiscal policy shocks in Nigeria using the structural VAR methods. The data used consist of 31 yearly observations on total government revenue, total expenditure and the Nigerian stock market price index from 1985 to 2015. Fiscal policy variables are expressed as a ratio of GDP. Contradicting most previous studies including Darrat (1988), Ardagna (2009), Agnello and Sousa (2010) and Laopodis (2010), the study finds evidence that although, stock prices respond positively to fiscal policy shocks, the effect of these shocks on the stock market is insignificant. The observed variation in stock prices is largely caused by own shock. Thus, fiscal policy has very little or no influence on the stock market in Nigeria. Based on these findings, the study recommends that Nigerian fiscal authorities should take cognizance of stock market activities while formulating fiscal policies in Nigeria.

Key words: Fiscal policy shocks, stock prices, government expenditure, government revenue

1.0 Introduction

Stock market is a critical cog in the wheel that smoothens the transfer of funds for economic growth. Broadly speaking, stock exchanges are expected to accelerate economic growth by increasing liquidity of financial assets thus, making global risk diversification easier for investors and promoting wiser investment decisions. In principle, a well-functioning stock market, all things being equal, helps the growth of the economy and facilitates the development process through the mobilization of savings, efficient allocation of investment resources and the inflow of foreign portfolio investment. The stock market encourages savings by providing households with investible funds, an additional financial instrument, which meets their risk preferences and liquidity needs better. It infact provides individuals with relatively liquid means for risk sharing in investment projects (Mohtadi & Agarwal, 2006).

Stock market activity is prone to vary with macroeconomic fluctuations and these fluctuations directly affect the investor's spirit. This sentiment is expressed when an investor considers preference of stock investment to other forms of investment. It is also manifested in

consideration of the opportunity cost of stock investment and its return. The investor weighs all the available options for their attractiveness to make his investment strategy.

The earlier works on the stock market activity however, focused mainly on the company specific variables as explanations of the stock price variation. In late 1970's, Stephen Ross developed arbitrage pricing theory of asset pricing, proposing that expected return on an asset or security could be determined by the macroeconomic factors. With the advent of this theory, the research on the asset pricing focused on the macroeconomic variables as well.

Moreover, efficient market hypothesis proposed by Eugene Fama in the 1960's also advocated that stock prices are related to the fundamental macroeconomic indicators. The hypothesis also suggested that the prices at the stock market reflect every piece of substantial information that could affect the stock price in any way including the company specific factors, market factors and economic factors. This theory however, could not withstand effectively, the criticism on the inadequacies found by empirical evidence (Shiller, 1981). Yet, the importance of the macroeconomic factors in the determination of the stock market activity has been proven by many studies such as Hussainey and Ngoc (2009), and Masudussama (2012).

The Nigerian economy has experienced significant changes in its macroeconomic aggregates in the recent past. The introduction of the Structural Adjustment Programme (SAP) in 1986 came with fundamental economic reforms [a major aspect was the far-reaching liberalization of various sectors of the economy]. Similarly, the transition from a military to civilian rule in 1999 witnessed various programmes of deregulation, privatization and commercialization, with implications for stock market index.

While economic literature has been devoted to studies on the relationship between stock market returns and macroeconomic activities, there are a few attempts at narrowing it down to fiscal policy effects in developing economies such as Nigeria. This therefore, forms the crux and focus of this study. Thus, the problems which the study intends to address include – what is the nature and direction of influence between Nigeria's fiscal policy and stock market response? Does the operation of the economy's fiscal policies determine the performance of the stock exchange or vice versa? What is the individual effect of selected fiscal policy variables on the stock market performance index?

The rest of this study is structured as follows: The next section contains both theoretical and empirical literature review. Sections 3 and 4 contain methodology and data analysis respectively, and section 5 concludes the study.

2.0 Literature Review

2.1 Theoretical Framework

There appears to be dearth of specific theory that focuses on the influence of government's fiscal policy on stock market performance in an economy. Theoretically, the economic influence of fiscal policy depends on whether one takes a Keynesian, Classical or Ricardian view of the economy (Chatziantoniou, Duffy and Filis, 2013). Keynesian theory sets out the prescription as to the appropriate role of fiscal policy in stabilizing economic fluctuations. In particular, similar to automatic stabilizers, discretionary fiscal policy should also act in a countercyclical manner. The mix of discretionary and automatic stabilizers will depend on the extent and composition of the role of government in the economy. Contrary to the Keynesian view of fiscal policy, the Ricardian approach stipulates that policy can have no impact on aggregate demand as any public borrowing will be offset by the private savings of rational households. On the other hand, classical economists emphasize that fiscal policy crowds out private sector activity in markets and thus, its effects will be less important in an economy which operates close to its potential output.

Other theories and hypotheses have been propounded by several scholars to explore the nature of relationships that may exist between stock prices and macroeconomic variables. However, these macroeconomic variables are mostly from the monetary side and not strictly focused on the fiscal aspect of the macro economy. However, they still exert significant importance and bearing on our current study and they need to be highlighted.

The studies of Ross (1976), Roll (1977), Roll (1979), Roll and Ross (1980) culminating in the Arbitrage Pricing Model is somewhat similar to CAPM stated earlier. While CAPM is a single-factor model, the APT is a multi-factor model with many beta values as necessary. In APT, there are a number of industry-specific and macro-economic factors that affect the security returns. Thus, a number of factors may measure the systematic (non-diversifiable) risk of an asset under APT. The fundamental logic of APT is that investors always indulge in arbitrage whenever they find differences in the returns of assets with similar risk characteristics.

Francis (1980) and Okafor (1983) assert that two major theories dominate thinking on investor behavior. These are the bandwagon theory and contrary opinion hypothesis. While the former asserts that errors of judgment in stock market transactions will be minimized by an investor who follows the lead market-makers, and therefore more likely to avert mistakes and losses, the later argues that if the market is efficient the best strategy is to do exactly the opposite of what the lead market makers do thereby, investing in the stocks they shy away from.

The relationship between stock prices and macroeconomic variables is further espoused by the works of Modigliani and Miller (1961) herein referred to as the Dividend Discount Model (DDM). Accordingly, the current price of stock equals the present value of all future cash flows. Consequently, the determinants of stock prices constitute the required rate of return and expected cash inflows.

2.2 Review of Empirical Studies

As observed by Chatziantoniou, Duffy, and Filis, (2013), the major focus in the literature on the effects of macroeconomic policy choices on asset prices has been on the role of monetary policy. Little attention has been paid to the role of fiscal policy in influencing asset prices; however, some studies are exceptions and they include those by Darrat (1988), Jansen et al. (2008), Ardagna (2009) and Afonso and Sousa (2011, 2012). Darrat (1988) observes that fiscal policy has been virtually ignored in representing policy actions which influence stock market returns. Agnello and Sousa (2010) in line with Darrat (1988) argue that there still exists an important gap in the literature regarding the empirical relationship between fiscal policy actions and developments in asset prices. In light of the intermittent economic crisis and the increasing emphasis on the role of fiscal policy both as a tool of economic stabilization and a potential source of destabilization it is increasingly important to gain a better understanding of the effects of fiscal policy on the economy, in general, and the stock market, in particular.

Still on the empirical evidence on the relationship between fiscal policy and stock market performance, we have already noted that this is rather limited. In his findings, Darrat (1988) finds that fiscal deficit exerts a highly significant negative effect on current stock prices. The study by Agnello and Sousa (2010) also demonstrates that there is an immediate temporary negative response of stock prices to fiscal policy shocks. Afonso and Sousa (2011) approach their study by considering separately the revenue and expenditure components of the fiscal

deficit and found that government expenditure shocks have a negative effect on stock prices, while government revenue shocks have a small and positive effect. Ardagna (2009) opines that fiscal adjustments based on expenditure reductions are related to an increase in stock market prices. Van Aarle et al. (2003) and Laopodis (2010) also provided evidence that fiscal policy matters for stock prices.

Using Vector Autoregression (VAR) approach, Cochrane (1994) examines the cause of variation between GDP growth and stock returns. The results show that substantial amount of variation is due to short run distortions. However, Gonzalo, Lee and Maysami (2007) criticize the earlier study of Cochrane (1994). Following the earlier work of King, (1991) the study demonstrates that Cochrane's results depended on the assumption of weak exogeneity of one of the variables with respect to the cointegration vector. Tripathi (2008) examines the relationship between four company fundamentals (market capitalization, book equity to market equity ratio, price earnings ratio and debt equity ratio) and equity returns in the Indian stock market using monthly price data of a sample of 455 companies. The results indicate that market capitalization and price earnings ratio have statistically significant negative relationships with equity returns, while book equity to market equity ratio and debt equity ratio have statistically significant positive relationships with equity returns in India.

Errunza and Hogan (1998) examined whether the variability of a set of monetary and real macroeconomic factors do explain the volatility in stock prices in Europe. Employing a Vector- Auto Regression (VAR), they found evidence to support that monetary instability is a significant factor for France and Germany, while for Italy and the Netherlands industrial production is significant. Brooks, Tsolacos and Lee (2000) examine the cyclical regularities of financial, macroeconomic and property market aggregates in relation to the property stock price cycle in the UK. The results indicate that cycles of consumer expenditure, per capita total consumption, dividend yield and the long term bond yield are correlated.

Morelli (2002), attempts to determine the relationship between conditional macroeconomic volatility and conditional stock price volatility. This study considers several economic variables namely, industrial production, money supply, exchange rate, inflation and real retail sales. The results tend to suggest that volatility of chosen economic indicators does not explain the volatility of stock price in the UK market.

Rangvid et al. (2005) evaluate the predictability of stock returns in twelve developed economies using macroeconomic variables. The study employs macroeconomic indicators

such as industrial production, money supply, consumer price index, purchasing power parity, exchange rates and interest rates. The results show that interest rates tend to be the most reliable and consistent forecaster of equity returns in developed economies.

Hussainey and Ngoc (2009) examine whether macroeconomic indicators of industrial production and interest rates affect Vietnamese stock prices as well as how Vietnamese stock prices are influenced by the US macroeconomic indicators using time series data during the period of January 2001 to April 2008. The results show that there exist notable relationships among stock prices, money market and domestic industrial productions in Vietnam. They further indicate that United State's real production activity has significant effects on stock prices in Vietnam. Hamzah et al. (2004) evaluate the nature of long run relationship among several macroeconomic indicators, stock price indices and property indices in Singapore. The results show that stock market indices and property indices create co-integrating relationships among industrial production, money supply, exchange rate and interest rates.

Filis (2010) examines the relationship between oil prices, stock market and macroeconomic indicators. The study finds that there is no causal relationship between Greek Stock Market and industrial production during the period, spanning January 1996 to June 2008 using multivariate Vector Auto Regression (VAR) model. Daly and Fayyad (2011) examine the relationship between Gulf Cooperation Council (GCC) countries of Kuwait, Oman, United Arab Emirate (UAE), Bahrain and Qatar; the United Kingdom, and the United States of America stock market returns and oil price by employing Vector Auto Regression (VAR), Variance Decomposition and Impulse Response techniques during the period September 2005 to February 2010. The study finds among others that when oil prices increase sharply, it predicts the economies of USA, UAE and Kuwait but not the UK, Oman, Bahrain and Qatar.

Abugri (2008) finds that Chile, Argentina, Brazil and Mexico stock markets returns have been influenced by macroeconomic factors like industrial production, exchange rate, money supply etc. as well as the US three month Treasury bills yields. On the other hand, identical results are found by Bilson et al (2001), who claim that global factors are less important than local factors for the stock return variation in the emerging stock markets.

Yartey and Adjasi (2007) study the effect of stock markets on economic growth using three stock market indicators – market capitalization relative to GDP, value of shares traded relative to GDP, and the turnover ratio (value traded/market capitalization). The results

indicate that the ratio of value of shares to GDP remains a significant predictor of economic activity.

In Nigeria's economic environment, Nyong (1997) attempts an aggregate capital market development index and applies it in predicting Nigeria's economic growth. Using principal component analysis, the results of the study indicate that capital market development is negatively and significantly correlated with long-run growth in Nigeria and that there exists bi-directional causality between capital market development and Nigeria's economic growth. Osinubi and Amaghionyeodiwe (2003) equally assessed the relationship between stock market development and long-run economic growth in Nigeria for the period 1980 to 2000. The study employs secondary data for analysis deriving from four specified regression models. The results show that measures of stock market development statistically had no significant effect on economic growth in Nigeria during the period 1980 to 2000.

A major fall out of the studies reviewed above is that there exists a dearth of empirical literature and where they exist, there are still variations in the nature of empirical relationships between the stock market and macroeconomic fundamentals especially the fiscal policy. The dearth of literature and the prevalence of variations in the empirical results given various economic settings therefore, necessitate such a vital study in Nigeria using current data. This constitutes the key gap that this study aims to fill.

3.0 Methodology

3.1 Data

To examine the stock market response to fiscal policy shocks in Nigeria. This study uses 32 yearly observations on government capital expenditure and NSE All share index for the period from 1985 to 2016.All data are sourced from 2015 CBN annual statistical Bulletin. Government revenue and government expenditure data are expressed as a ratio of nominal GDP. Stock prices are converted into logarithms to minimize the effects of data extreme. Figure 1 shows the graphical plots of all the data.

From figure 1, stock price data exhibit a positive trend, suggesting that the data follow a random walk movement. On the contrary, both government revenue and government expenditure appear to be stationary as there is no observable trend in their plots.

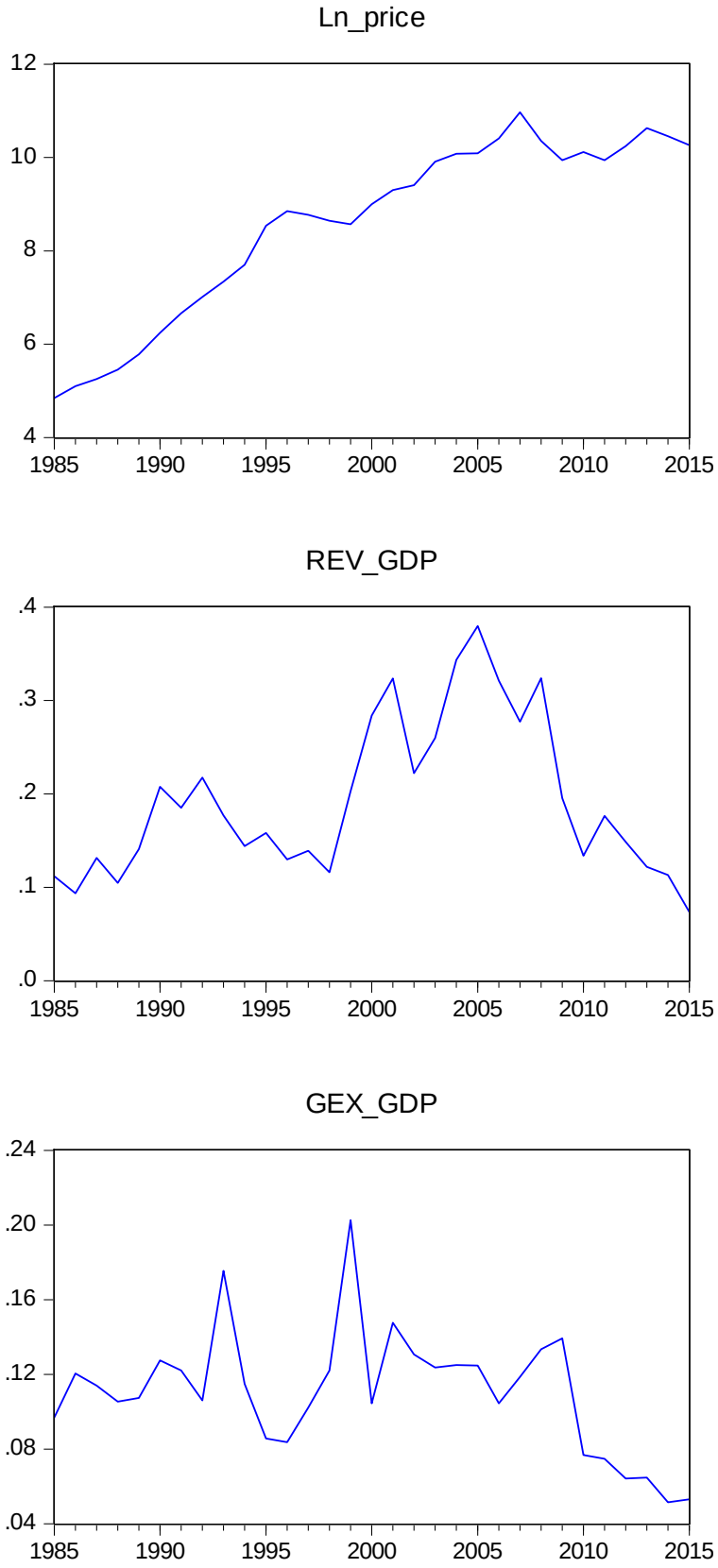

Figure 1: Data plot for the variables

3.2 Methods

In this study, the SVAR methodology is employed to examine the stock market response of fiscal policy shocks in Nigeria. To this end, impulse response function, Granger causality test and variance decomposition will be used to examine the dynamic relationships of interest. The success of structural VAR models in capturing the joint dynamics of macroeconomic and financial series is well documented.

4.0 Analysis and Discussion

4.1 Stationarity Test

To determine the order of integration for each of the study variables, we perform the popular Augmented Dickey Fuller (ADF) unit root/stationartiy test. We follow the usual procedure by performing the test on all the data at both level and first difference. To determine the appropriate lag length for the ADF test, we use the Schwarz information criterion (SIC), with a maximum of 7 lags allowed. Table 1 shows the results. Panel A contains the results based on the level data while panel B contains the results based on first difference data.

As the results in panel A indicate, the ADF test is significant at 5% level for GEX-GDP data but not significant for both LN-PRICE and REV-GDP. This implies that while LN-PRICE and REV-GDP data are nonstationary at level series, GEX-GDP data are stationary. From panel B, the test is highly significant for all data, implying that they are all stationary at first difference. Therefore, while REV-GDP and LN-PRICE are both I(1) series, GEX-GDP are I(0) series.

Variable	ADF statistic	*p*-value	Decision
Panel A			
LN-PRICE@ Level	-2.435159	0.1411	Nonstationary
REV-GDP @ Level	-0.730396	0.3971	Nonstationary
GEX-GDP @ Level	-3.034938	0.0430	Stationary
Panel B			
LN-PRICE @ First difference	-3.821661	0.0071	Stationary
REV-GDP @ First difference	-5.209949	0.0000	Stationary

Table 1: ADF test of stationarity for the study variables

4.2 VAR Analysis and Interpretation

4.2.1 Lag Length Selection

The first practical step in the estimation of a VAR model is the determination of the optimum lag length required for its specification. To do this, we employ three information criteria (AIC, SIC and HQC) to automatically select the appropriate lag order for our VAR estimation. Information criterion selects the lag length that corresponds to the lowest value. The results are shown in Table 2. As we can see, the three criteria all have a minimum value at lag 1 as indicated by the asterisks. Thus, a VAR (1) model is plausible for estimating the dynamic relationships being investigated.

Lag	AIC	SIC	HQC
0	-2.710443	-2.568998	-2.666144
.1	-6.735664*	-6.169886*	-6.558469*
2	-6.682164	-5.692053	-6.372073

Table 2: Lag selection criteria * indicates minimum value

4.2.2 VAR (1) Estimation

Table 3 presents the results of the fitted VAR (1) model. As this Table shows, there is no specification problem with the fitted model as both LM and Q diagnostic statistics cannot reject the null hypothesis of no serial correlation at 5% level of significant. Thus, the fitted VAR (1) model can be trusted. However, since the interpretation of VAR coefficients is done through structural analysis, we proceed to examine the stability our model which is required for evaluating and interpreting the estimated coefficients.

	LN-PRICE	REV-GDP	GEX-GDP
LN-PRICE (-1)	0.920506	0.002236	-0.007270
REV-GDP (-1)	0.655502	0.715988	0.175271
GEX-GDP (-1)	0.566701	0.455648	0.205689
Constant	0.665608	-0.015808	0.115331
R-squared	0.976952	0.648098	0.314265
LM-Stat (3)	9.375125 (0.4034)	Q-stat (3)	16.40982 (0.0588)

Table 3: VAR (1) estimation results; p-values are in bracket

4.2.3 The Stability Check

To determine whether the estimated VAR (1) is stable, we plot the roots in relation to unit circle. The stability of VAR is required for the results of any structural analysis to be valid. For VAR to be stable, all its roots must lie inside the unit circle. If any root lies outside the unit circle, the estimated VAR is not stable. Figure 2 shows the plotted VAR roots in relation to unit circle. As we can see, all the three roots lie inside the unit circle, indicating that the fitted VAR model is stable. Thus, we reliably use the impulse response function, forecast error variance decomposition and Granger Causality test to examine the economic significance of our VAR (1) model.

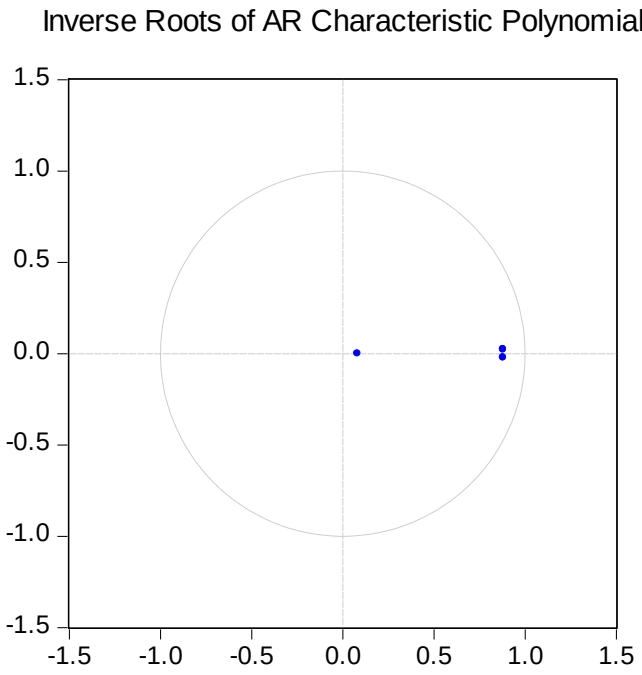

Figure 2

4.3 Structural VAR Analysis

4.3.1 The Impulse Response Function

To examine the effect of fiscal policy shocks on stock market, we plot the response of LN-PRICE to a one-time shock to REV-GDP and GEX-GDP for four periods. The graphical plot is shown in figure 3. As we can see from this figure, LN-PRICE responds positively to own shock and shocks to both REV-GDP and GEX-GDP. However, while the effect of own shock decreases as the response period increases, the effect of shocks to both REV-GDP and GEX-GDP increases as the period increases. However, a closer look at the figure reveals that REV-GDP shows more impact on LN-PRICE than GEX-GDP and the difference is quite large. For example, at

period 2, the impact of REV-GDP is approximately 0.04, while the impact of GEX-EXP is approximately 0.01. This implies that although, government revenue and expenditure both have a positive effect on stock prices, government revenue however, shows higher impact than government expenditure.

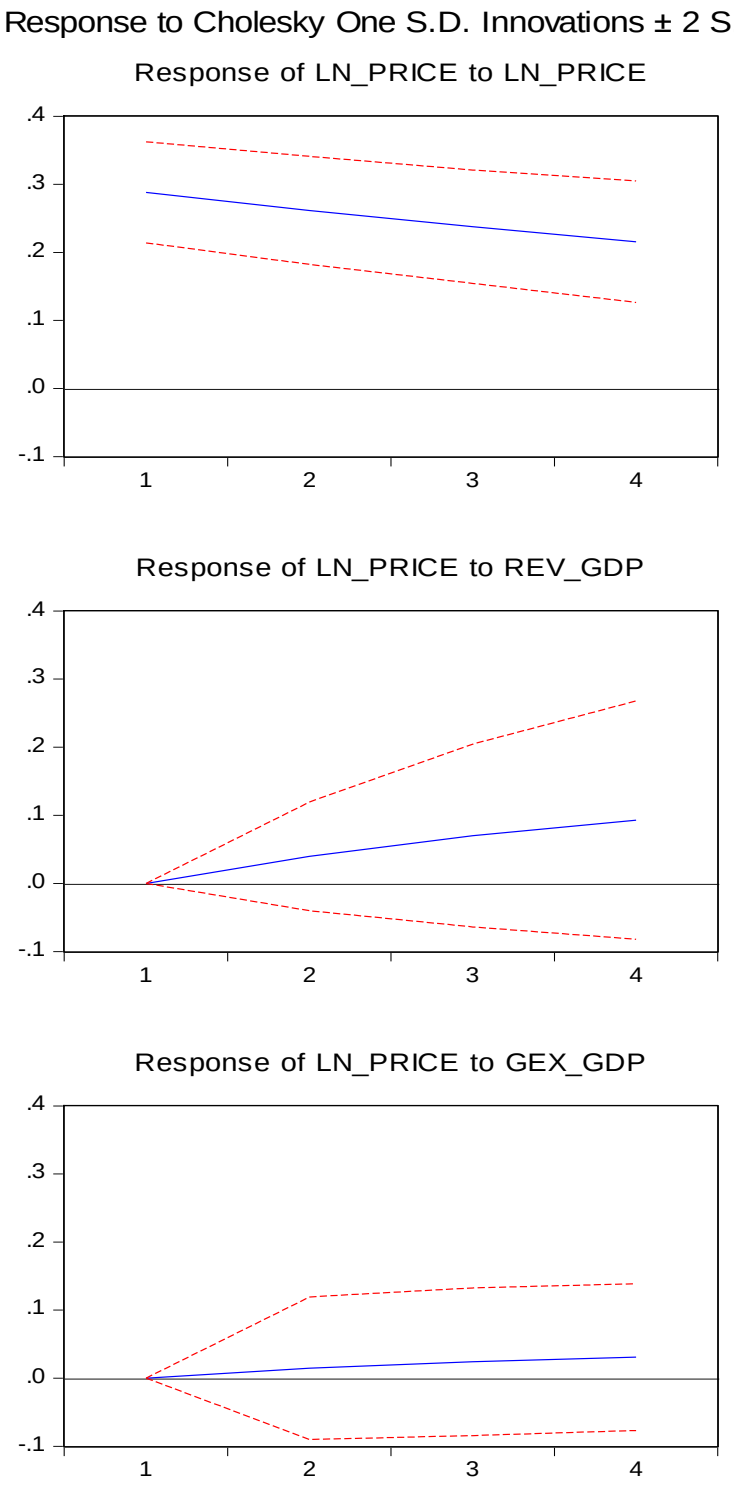

Figure 3: Impulse Response Function

4.3.2 Granger Causality/Block Exogeneity Wald test

To examine whether fiscal policy shocks are exogeneous to the stock market, we conduct the Granger Causality/Block Exogeneity Wald test. An endogenous variable in a VAR equation is seen exogenous if it is found to be significant in that equation (E-Views, 2015). Table 4 shows the results of causality/exogeneity test. As we can see from this table, none of the fiscal policy variables can be treated as exogenous in the LN-PRICE model, with the Chi-Square statistic showing 'no significance' for all cases. Thus, both government revenue and expenditure are endogenously related to stock prices.

Excluded	**Chi-sq.**	**DoF.**	**Prob.**
REV-GDP	0.544158	1	0.4607
GEX-GDP	0.076926	1	0.7815
All	1.186301	2	0.5526

Table 4: Granger Causality/Blocked Exogeneity Wald Test

4.3.3 Forecast Error Variance Decomposition

To determine the contribution of each fiscal policy variable to stock market shocks, we decompose the variance of LN-PRICE into its component sources. Table 5 shows the results. As we see from this table, there is very little contribution of fiscal policy variables to the changes in the stock market, with own shock explaining all the forecast error variance of LN-PRICE in the first period, and approximately 98%, 96% and 93% in the second, third and fourth periods respectively. This is consistent with the results in table 4.

Period	**LN_PRICE**	**REV_GDP**	**GEX_GDP**
1	100.0000	0.000000	0.000000
2	98.83748	1.025165	0.137360
3	96.61902	3.015845	0.365132
4	93.79144	5.567782	0.640782

LM = Lagrange Multiplier

AIC = Akarke Information Criterion

SIC = Schwarz Information Criterion

HQC = Hannan Quarrin Information Criterion

5.0 Conclusions

In this paper, we investigated the stock market response of fiscal policy shocks in Nigeria using the structural VAR methods. The data used consist of 31 yearly time series observations on total government revenue, total revenue, total expenditure and the Nigerian stock market price index from 1985 to 2015. The two fiscal policy variables are expressed as a ratio of GDP. The conclusions are as follows:

The results show that although, stock prices respond positively to fiscal policy shocks, the effect of these shocks on the stock market is not significant. The observed variation in stock prices is largely caused by own shock. Thus, fiscal policy has very little or no influence on the stock market in Nigeria. These results are not in agreement with most of previous studies as reported in the literature review. For example, Darrat (1988),Ardagna (2009), Agnello and Sousa (2010) and Laopodis (2010) all find that fiscal policy has significant effects on stock market. We therefore, recommend that Nigerian fiscal authorities should take cognizance of stock market activities while formulating fiscal policies in Nigeria.

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DATA

TGE = Total government expenditure, TGR = Total government revenue, NGDP = Nominal GDP, GEX_GDP = Government expenditure as a ratio of GDP, REV_GDP = Government revenue as a ratio of GDP, Ln_Price = Log of stock prices

Year	TGE	TGR	NGDP	GEX_GDP	REV_GDP	Ln_price
1985	13.0411	15.0504	134.5856	0.096898	0.111828	2.807522
1986	16.2237	12.5958	134.6033	0.12053	0.093577	2.872793
1987	22.0187	25.3806	193.1262	0.114012	0.13142	2.658684
1988	27.7495	27.5967	263.2945	0.105393	0.104813	2.678829
1989	41.0283	53.8704	382.2615	0.10733	0.140926	2.485593
1990	60.2682	98.1024	472.6487	0.127512	0.207559	2.414408
1991	66.5844	100.9916	545.6724	0.122023	0.185077	2.625974
1992	92.7974	190.4532	875.3425	0.106013	0.217576	2.541096
1993	191.2289	192.7694	1089.68	0.175491	0.176905	2.719527
1994	160.8932	201.9108	1399.703	0.114948	0.144253	2.800505
1995	248.7681	459.9873	2907.358	0.085565	0.158215	2.296912
1996	337.2176	523.597	4032.3	0.083629	0.129851	2.149095
1997	428.2152	582.8111	4189.25	0.102218	0.139121	2.289019
1998	487.1134	463.6088	3989.45	0.1221	0.116209	2.504376
1999	947.69	949.1879	4679.212	0.202532	0.202852	2.59834
2000	701.0594	1906.16	6713.575	0.104424	0.283926	2.571451
2001	1018.026	2231.6	6895.198	0.147643	0.323646	2.912828
2002	1018.156	1731.838	7795.758	0.130604	0.222151	2.961023
2003	1225.966	2575.096	9913.518	0.123666	0.259756	2.980597
2004	1426.2	3920.5	11411.07	0.124984	0.34357	2.927562
2005	1822.1	5547.5	14610.88	0.124708	0.379683	2.893392
2006	1938.003	5965.102	18564.59	0.104392	0.321316	3.018365
2007	2450.897	5727.5	20657.32	0.118645	0.277263	3.211699
2008	3240.82	7866.59	24296.33	0.133387	0.323777	3.495311
2009	3452.991	4844.592	24794.24	0.139266	0.195392	3.63645
2010	4194.577	7303.672	54612.26	0.076806	0.133737	3.005978
2011	4712.062	11116.9	62980.4	0.074818	0.176514	2.961525
2012	4605.391	10654.75	71713.94	0.064219	0.148573	2.964042
2013	5185.318	9759.794	80092.56	0.064742	0.121856	2.940667
2014	4587.385	10068.85	89043.62	0.051518	0.113078	2.988438
2015	4988.864	6912.502	94144.96	0.052991	0.073424	2.999565

Source: CBN statistic database