Stock Market Price Index and Fiscal Policy in Nigeria: *Empirical Evidence*

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Abstract

This study investigated the effect of the fiscal policies on the stock market in Nigeria using the structural VAR methods. The study was to determine to what extent stock market price index respond to fiscal policies of the Nigerian government over the period. The study covered the period of 1985 – 2015. Data used were sourced from the Central Bank of Nigeria Statistical Bulletin, 2017. 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. The technique of analysis included unit root tests, granger causality test and structural Vector Autoregressive analysis (SVAR). The analysis found that although fiscal policies have positive effects on the stock prices, they are not significant over the period. The study, therefore, recommended that the financial market authorities such as the SEC and NSE should be given the power to make by-laws that govern the activities of the market since the activities of the government do not have significant effect on the prices of stocks.

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

Introduction

Stock market is a critical cog in the wheel that smoothen the transfer of funds for economic growth. Broadly speaking, stock exchanges are expected to accelerate economic growth by increasing liquidity of financial assets and making global risk diversification easier for investors and promoting wiser investment decisions. In principle, a well-functioning stock market may help the economic growth and development process in an economy through growth of savings, efficient allocation of investment resources and alluring of foreign portfolio investment. The stock market encourages saving by providing households having investable funds, an additional financial instrument, which meets their risk preferences and liquidity needs better, it in fact provides individuals with relatively liquid means for risk sharing in investment projects (Mohtadi & Agarwal, 2006). Stock market activity is prone to vary with the macroeconomic fluctuations as these fluctuations directly affect the investor's sentiment. 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 work 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 of 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 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 inefficiencies found by empirical evidence (Shiller, 1981). Yet, the importance of the macroeconomic factors in determination of the stock market activity has been proven by many studies such as Hussainey and Ngoc (2009), Masudussama (2012). The Nigerian economy has experienced significant changes in its macroeconomic aggregates in the recent past (Abugri, 2008). The inception 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 very few attempts at narrowing it down to fiscal policy effects in developing economies such as Nigeria. Thus, the problems which the study intends to answer include – what is the nature and direction of influence between Nigeria's fiscal policy and stock market performance? Does the performance 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 contains methodology and data analysis respectively, and section 5 concludes the study.

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. Thus, a theoretical perspective, 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, a 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 prevail 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 there 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 above. 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) here in 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 in-flows.

Review of Empirical Studies

As observed by Chatziantoniou, I., Duffy, D., and Filis, G. (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 study 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.

In their findings, Darrat (1988) finds that the 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 find 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 provide 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, et al. (2007) criticize the earlier study of Cochrane (1994). Following the earlier work of King, et al. (1991) the study demonstrates that Cochrane's results depend 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) examine 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 find 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 et al. (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 macroeconomic variables namely, industrial production, money supply, exchange rate, inflation and real retail sales. The results tend to suggest that volatility of chosen macroeconomic 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 assess 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 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.

Methodology

To examine the stock market response of fiscal policy shocks in Nigeria, this study used 31 yearly observations on government capital expenditure and NSE All share index for the period from 1985 to 2015. All data are sourced from 2017 CBN annual statistical Bulletin. Government revenue and government expenditure data are expressed as a ratio of nominal GDP. The researcher used the log form of the variables in the analysis. Figure 1 shows the graphical plots of all the data. From the plots in 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.
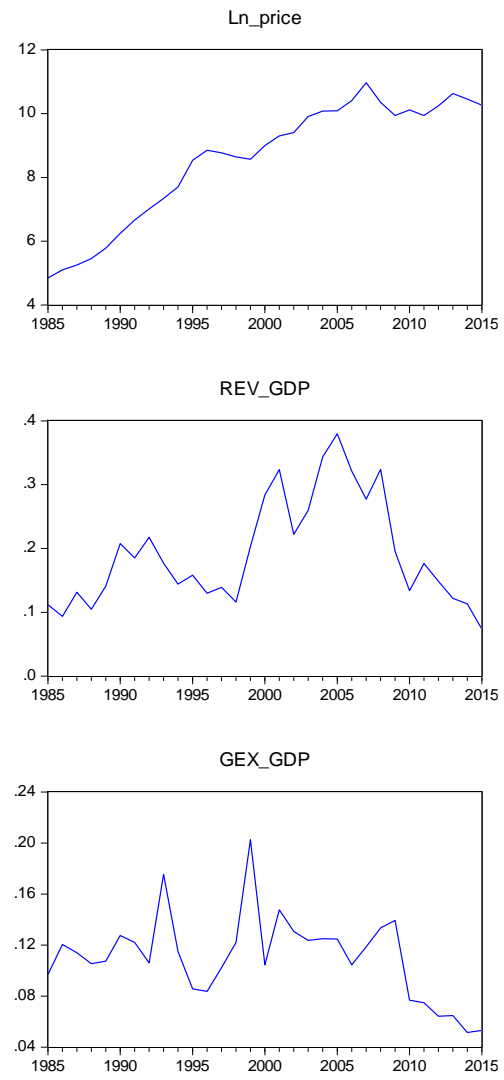
Figure 1: Data plot for the variables

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The graphs above show the changes that occurred over the period in each of the variables used. Lin_Price (Ln_Price) shows the changes that occurred over the period of time in the price. The graph shows that price was low in 1985, but started increasing until it peaked in 2005. Thereafter, it started on a downward trend as revealed in the graph. Again, the REV_GDP showed the same trend line as the Ln_Price over the same period. In 1985, it was low. It started increasing gradually till it peaked at 2005. Unfortunately, it started declining till it got to a point it was lower than what it was in the year 1985. Finally, the GEX_GDP graph shows a stationary time series with its zigzag trend line. It was low in 1985 but increased to slightly the following few years. It dropped again thereafter before increasing later. This, as shown in the trend, means that the variable was stationary over the period.

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.

Analysis and Discussion

Stationarity Test

To determine the order of integration for each of the study variables, we employed the Augmented Dickey Fuller (ADF) unit root/stationarity test. We followed 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 government expenditure as a ratio of GDP (GEX_GDP) data but not significant for both log of stock prices (LN_PRICE) and government revenue as a ratio of GDP (REV_GDP). This implies that while LN_PRICE and REV_GDP data are not-stationary 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	Not-stationary
REV_GDP @ Level	-0.730396	0.3971	Not-stationary
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

VAR Analysis and Interpretation

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 used 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. Thus, a VAR (1) model is plausible for estimating the dynamic relationships being investigated.

Lag	AIC	SC	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

VAR (1) Estimation

Table 3 presents the results of the fitted VAR(1) model. As this table shows, there is no specification problems 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

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. The analysis shows that 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.

Structural VAR Analysis

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 analysis shows that LN_PRICE reacts 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.

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 (EViews, 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 insignificance 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

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. 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

Conclusions

In this study, we investigated the stock market response of fiscal policy shocks in Nigeria using the structural VAR methods. The data used consists 32 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 results show 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. 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. The study recommends that although, the fiscal policy has positive relationship with stock prices, they are not significantly related. The authorities are advised to focus less on the impact of fiscal policy on the stock prices since they have no significant relationship with them. Again, the government must give the Nigerian Stock Exchange and related bodies such as Securities and Exchange Commission the autonomy to make by-laws to suit the workings of the stock market. This will help to regulate the stock prices and the activities therein.

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