

The Effects of Monetary and Fiscal Policy on the Stock Market in Nigeria

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Abstract

The main objective of this paper is to empirically examine the impact of macroeconomic policy and stock market behavior in Nigeria. Broad Money, Interest Rate, Government Expenditure, Tax Revenue and Gross Domestic Product have been chosen as indicators of macroeconomic policy while stock prices are used to represent stock market behavior. The Methodology used is the ARDL bounds testing approach. The empirical findings show that money supply and interest rate have statistically significant effects on the stock market in the short and the long run. Similarly, government spending and taxation have statistically significant effects on the stock market in the short and the long run. This therefore, suggests that macroeconomic policy actions have significant effects on the stock market in Nigeria both in the short and the long run. Considering that the main channel of such influence is primarily through the monetary and fiscal operations it becomes necessary the authorities to employ fiscal and monetary policy in tandem rather than in isolation in order to realize the full potentials of the stock market activities in the countries.

Keywords: Fiscal Policy, Monetary Policy, Stock Market

JEL: C32, E44, E62, H50

1. Introduction

A significant number of studies have investigated the relationship between monetary policy and stock market performance (e.g., Gali and Gertler, 2007; Bjornland and Leitemo, 2009). However, only few investigated the effects of fiscal policy on stock markets (Jansen, Li, Wang and Yang, 2008; Afonso and Sousa, 2012). In addition, little is known on the effects of monetary and fiscal policy on stock market when the two policies interact (Jansen et al., 2008; Chatziantoniou, Duffy and Filis, 2013). According to Chatziantoniou et al (2013, p. 2): “It is widely believed that monetary policy should not be examined in isolation from fiscal policy, and vice versa, as both their individual stances, as well as their interaction, play an important role in the economy and thus, we argue, that they also influence stock market performance”.

For example, monetary policy authorities maintain low inflation by influencing the economy’s interest rates. However, monetary policy influences stock market returns through five possible channels, namely (i) the credit channel (ii) the interest rate channel, (iii) the exchange rate channel, (iv) the wealth effect, and (v) the monetary channel. Similarly, fiscal policy influences the stock market. According to Keynesian economics, fiscal policy supports aggregate demand, boosts the economy and drives stock prices higher. According to classical economics, the crowding out effects of fiscal policy in the market for loanable funds and of the productive sectors of the economy could drive stock prices lower (Chatziantoniou et al, 2013).

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Therefore, examining the effects of monetary policy and fiscal policy on stock market is necessary, considering that the literature has neglected the interaction of the two policies (Agnello and Sousa, 2010). By examining the role of both fiscal and monetary policy on stock market performance, this study captures the full dynamics of both fiscal and monetary impulse mechanisms to the Nigerian stock market.

The purpose of this paper is therefore to empirically investigate and provide insight into the effects of monetary and fiscal policy on the stock market in Nigeria. In this investigation, the paper applies the empirical analytical method of autoregressive distributed lag (ARDL) bounds testing approach in an attempt to establish a long run relationship between monetary and fiscal policy and the stock market using time series data.

Most of the earlier studies on the effects of monetary and fiscal policy on the stock market are multi-country with little attention devoted to individual countries, especially, African countries such as Nigeria. This paper contributes to the literature on the effects of monetary and fiscal policy on the stock market by establishing whether monetary and fiscal policy has any influence on the stock market in Nigeria.

The paper is divided into five sections including the introduction. Section 2 reviews the literature on monetary and fiscal policy and the stock market. This is followed in section three with the methodology section. Section four presents the empirical analysis while section 5 concludes.

2. Literature review

Stock markets play a multidimensional role in monetary policy decision making. The stock market is greatly affected by monetary policy innovations through several channels. As well, stock prices are considered by monetary authorities in the conduct of monetary policy decisions. Stock market thus not only responds to monetary policy but also provides feedback to central banks regarding the future course of macroeconomic variables (Mishkin, 2001).

Particularly, the stock market is greatly affected by monetary policy innovations through several channels. One of the main channels is the interest rate channel. The interest rate channel suggests that changes in interest rates will have effects on the cost of capital, which affects the present value of cash flows. Thus, high interest rates lead to low present values of future cash flows, which, leads to low stock prices. Another monetary policy transmission channel is the credit channel. The credit channel suggests that the central bank can affect investment by altering interest rates. In this sense, high corporate investment can lead to high future cash flows and increase the firm's market value. An additional transmission channel is through the wealth effect. The wealth effect suggests a rise in interest rates which reduce the value of stock prices. High interest rates can lead to appreciation of exchange rate and result in high imports and low exports, which may eventually lead to low asset prices (Chatziantoniou et al, 2013).

An increasing number of studies have examined the effects of monetary policy on financial markets in recent years. Authors such Ehrmann and Fratzscher (2004), and Sousa (2010) have provided evidence of a negative relationship between monetary policy and the stock market. Additionally, monetary policy affect stock prices not only via the trade-off between interest gains and stock returns, but also via investors' expectations. For example, Gali and Gertler (2007), Bjornland and Leitemo (2009), and Castelnuovo and Nistico (2010) found that stock market prices are forward-looking and encompass relevant information vis-à-vis future expectations. This way, monetary policy can significantly affect these expectations.

Laopodis (2010) found no consistent dynamic relationship between US monetary policy and the stock market, arguing that the volatile relationship is as a result of changes in monetary policy regimes. Other studies however suggest that a strong negative relationship exist between monetary policy and stock market in the US. Bomfim (2003) and Bernanke and Kuttner (2005), among others, suggest that monetary policy influence financial markets through their effects on real interest rates, expected future stock returns and expected future dividends. In Nigeria, Nwakoby and Alajekwe (2016) indicate that monetary policy has the potential (53%) to influence the stock market.

The literature has mostly de-emphasized the effects of fiscal policy on asset prices. Some exceptions are Jansen et al. (2008), Ardagna (2009) and Afonso and Sousa (2010). Agnello and Sousa (2010) noted that there is still an "important gap in the literature...regarding the empirical relationship between fiscal policy actions and developments in asset prices" (p. 2). Considering the recent recession and the growing emphasis on fiscal policy as a tool for economic stabilization, it is important to understand the effects of fiscal policy on the stock market in Nigeria in particular.

Van Aarle et al. (2003) and Laopodis (2010) showed that fiscal policy matters for stock prices. Agnello and Sousa (2010) showed that stock prices respond negatively and instantaneously to fiscal policy shocks. Afonso and Sousa (2011) found that government spending shocks have negative effects on stock prices; government revenue shocks have little positive effects. Ardagna (2009) found that fiscal adjustments correlated to stock market prices. Jansen et al. (2008) suggested that the monetary policy effects on the stock market varies, depending on fiscal policy stance.

There has also been growing interest in the interactions between monetary and fiscal policy (Nwaogwugwu and Evans, 2016). The interactions have implications for the stock market. In particular, Chatziantoniou et al (2013) investigated the effects of fiscal and monetary policy shocks on stock market performance in three advanced economies: the US, UK and Germany. Their findings show that fiscal and monetary policies affect the stock market, either through direct or indirect channels. They found evidence that the interaction of fiscal and monetary policies is very important in explaining developments in the stock market. Afonso and Sousa (2011), Van Aarle et al. (2003) and Chatziantoniou et al (2013) emphasised the importance of integrating fiscal and monetary policy interactions and the effects analysed on the stock market. This is the main objective of this paper. Considering this interaction between monetary and fiscal policy and the effects of both policies on the stock market, it is important to assess their impacts on the stock market in Nigeria

3. Methodology

The study uses annual from 1970 to 2016. The source of the data is World Bank's World Development Indicators. The variables under consideration are stock market capitalization, lending interest rate, broad money, tax revenue, general government final consumption expenditure, exchange rate and Gross Domestic Product (Table 1).

Table 1: Definition of Variables

Indicator Name	Definition
Lending interest rate	Lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing.
Broad money	Broad money is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveler's checks; and other securities such as certificates of deposit and commercial paper.
Tax revenue	Tax revenue refers to compulsory transfers to the central government for public purposes.
General government final consumption expenditure	General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security.
Exchange rate	Exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).
GDP	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.

Source: World Bank (2017)

Following Chatziantoniou et al (2013) and Nwakoby and Alajekwe (2016), the model to test the effects of monetary and fiscal policy on the stock market in Nigeria is specified as: $LogSmc = \omega_0 + \omega_1 LogM2 + \omega_2 LogIntr + \omega_3 LogGovt + \omega_4 LogTax + \omega_5 LogExcr + \omega_6 LogGdp + \varphi_t$ Where Smc is the stock market; $M2$ is broad money; $Intr$ is interest rate; $Govt$ is government spending; Tax is tax revenues; $Excr$ is exchange rate; and Gdp is Gross domestic product. Log is the log operator. ω_0 is a constant parameter and φ_t is the white noise error term.

Stock market (Smc) is proxied by stock market capitalization; monetary policy is proxied by broad money ($M2$) and interest rate; and fiscal policy is proxied by government spending ($Govt$) and tax revenues (Tax). The ARDL-bounds testing approach based on unrestricted error correction model technique involves two stages (Owusu and Odhiambo, 2014).

The first stage is to construct an unrestricted error correction models and then test whether the null hypothesis of no cointegration is rejected or accepted by conducting a Wald test for the joint significance of the lagged levels of the variables. The second stage involves the estimation of the long-run coefficients and then estimate the associated error correction model. The short run-effects are captured by the coefficients of the first differenced variables in the error correction model. There is also the need to perform series of tests diagnosis on the model(e.g., homoscedasticity, non-serial correlation, and stability tests).

4. Empirical Analysis

Firstly, in order to eliminate the possibility for spurious results, it is necessary to carry out unit root test to determine the order of integration of the variables. Table 2 shows the results of the unit root tests. The ADF test and the Phillips Perron test statistics shows that the variables are a mix of I(0) and I(1).

Table 2: Unit Root Test

	ADF		PP	
	I(0)	I(1)	I(0)	-1.00
<i>Log(M2)</i>	-1.42	-4.25*	-1.41	-4.07*
<i>Log(Smc)</i>	-2.25	-5.58*	-1.57	-6.71*
<i>Log(Intr)</i>	-1.02	-6.08*	-0.92	-7.27*
<i>Log(Govt)</i>	-1.94**	-4.23*	-1.93**	-4.12*
<i>Log(Tax)</i>	-1.39	-5.00*	-0.35	-2.97*
<i>Log(Excr)</i>	-1.96**	-4.36*	-0.37	-5.63*
<i>Log(Gdp)</i>	0.95	-4.91*	-0.39	-3.00*

Note: * and ** denote the significance level at the 1% and 5%. The lag length is determined by Akaike's Information Criterion (AIC).

Having established that the variables are a mix of I(0) and I(1), we can safely proceed to implement the ARDL bounds test. Table 3 exhibits the results of the ARDL bounds test. The ARDL bounds test shows that the variables are cointegrated at the 1% level of significance.

Having established that the variables are a cointegrated, the next step is to estimate the variables using ARDL. Table 4 suggests the validity of the long run relationship between the variables. In the table, the estimated coefficient of the error correction term, $Ect(-1)$ is negative and statistically significant as expected. It shows that the speed of adjustment to equilibrium requires 84% whenever the variables drift from equilibrium. This further provides evidence that the variables are cointegrated. The coefficients of money supply and interest rate are all statistically significant.

Table 3: ARDL Bounds Test

Test Statistic	Value	k
F-statistic	103.41	6
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Having established that the variables are a cointegrated, the next step is to estimate the variables using ARDL. Table 4 suggests the validity of the long run relationship between the variables. In the table, the estimated coefficient of the error correction term, $Ect(-1)$ is negative and statistically significant as expected. It shows that the speed of adjustment to equilibrium requires 84% whenever the variables drift from equilibrium. This further provides evidence that the variables are cointegrated. The coefficients of money supply and interest rate are all statistically significant. This implies that, in the short run, monetary policy has significant impacts on the stock market. Also the coefficients of government spending and taxation are all statistically significant.

Similarly, this implies that, in the short run, fiscal policy has significant impacts on the stock market. Further, GDP and exchange rate has significant impacts on the stock market in the short run.

Table 4: Short-run EstimatesDependent Variable: $\text{Log}(Smc)$ Selected Model: ARDL(2, 3, 3, 2, 3,
3, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta \text{Log}(Smc(-1))$	0.64	0.07	8.52	0.00
$\Delta \text{Log}(M2)$	-0.02	0.18	-0.10	0.92
$\Delta \text{Log}(M2(-1))$	-0.95	0.19	-5.11	0.01
$\Delta \text{Log}(M2(-2))$	2.44	0.19	13.03	0.00
$\Delta \text{Log}(Intr)$	-1.19	0.09	-12.78	0.00
$\Delta \text{Log}(Intr(-1))$	0.79	0.07	10.61	0.00
$\Delta \text{Log}(Intr(-2))$	0.78	0.16	4.92	0.01
$\Delta \text{Log}(Govt)$	-0.06	0.05	-1.32	0.26
$\Delta \text{Log}(Govt(-1))$	0.54	0.10	5.43	0.01
$\Delta \text{Log}(Tax)$	1.68	0.10	16.42	0.00
$\Delta \text{Log}(Tax(-1))$	0.28	0.07	4.15	0.01
$\Delta \text{Log}(Tax(-2))$	-0.29	0.04	-8.19	0.00
$\Delta \text{Log}(Excr)$	-0.99	0.08	-12.95	0.00
$\Delta \text{Log}(Excr(-1))$	-0.28	0.05	-6.08	0.00
$\Delta \text{Log}(Excr(-2))$	-0.56	0.07	-8.12	0.00
$\Delta \text{Log}(Gdp)$	1.56	0.29	5.39	0.01
$\Delta \text{Log}(Gdp(-1))$	-0.58	0.42	-1.39	0.24
$\Delta \text{Log}(Gdp(-2))$	4.40	0.25	17.84	0.00
$Ect(-1)$	-0.85	0.05	-17.66	0.00
R-squared	1.00	Breusch-Godfrey Serial Correlation LM Test:		10.63
Adjusted R-squared	0.99	Heteroskedasticity Test: Breusch-Pagan-Godfrey		0.46

The long-run result in Table 5 indicates that the coefficients of money supply and interest rate are all statistically significant. This implies that, in the long run, monetary policy has significant impacts on the stock market. The table also shows that the coefficients of government spending and taxation are all statistically significant. Similarly, this implies that, in the long run, fiscal policy has significant impacts on the stock market. Further, GDP and exchange rate has significant impacts on the stock market in the long run. These are consistent with the short-run results.

Table 5: Long-run EstimatesDependent Variable: $\text{Log}(Smc)$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\text{Log}(M2)$	-1.09	0.14	-7.97	0.00
$\text{Log}(Intr)$	-2.20	0.12	-18.55	0.00
$\text{Log}(Govt)$	-1.25	0.09	-13.63	0.00
$\text{Log}(Tax)$	2.56	0.15	17.57	0.00
$\text{Log}(Excr)$	-1.06	0.10	-10.50	0.00
$\text{Log}(Gdp)$	5.22	0.30	17.43	0.00
C	-131.87	6.48	-20.36	0.00
R-squared	0.99	Breusch-Godfrey Serial Correlation LM Test:		3.77
Adjusted R-squared	0.99	Heteroskedasticity Test: Breusch-Pagan-Godfrey		1.34

Finally, the regression for the short and long run models fit very well at R square = 99%. Also, the models pass the diagnostic tests against serial correlation and heteroscedasticity.

Further, an inspection of the cumulative sum (CUSUM) graphs (Figures 1 and 2) from the recursive estimation of the model shows stability at 5% significant level over the sample period.

Figure 1: Short Run CUSUM

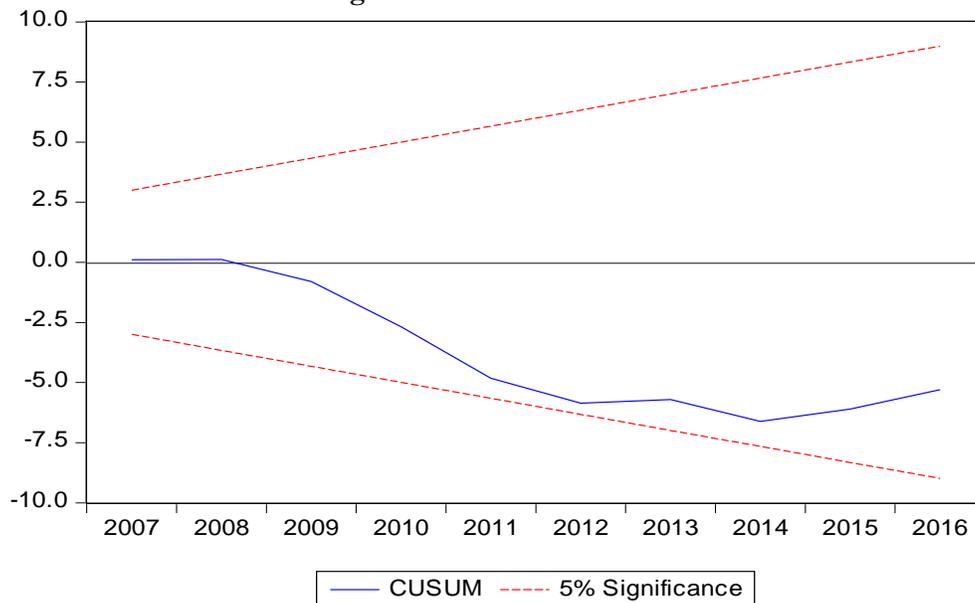
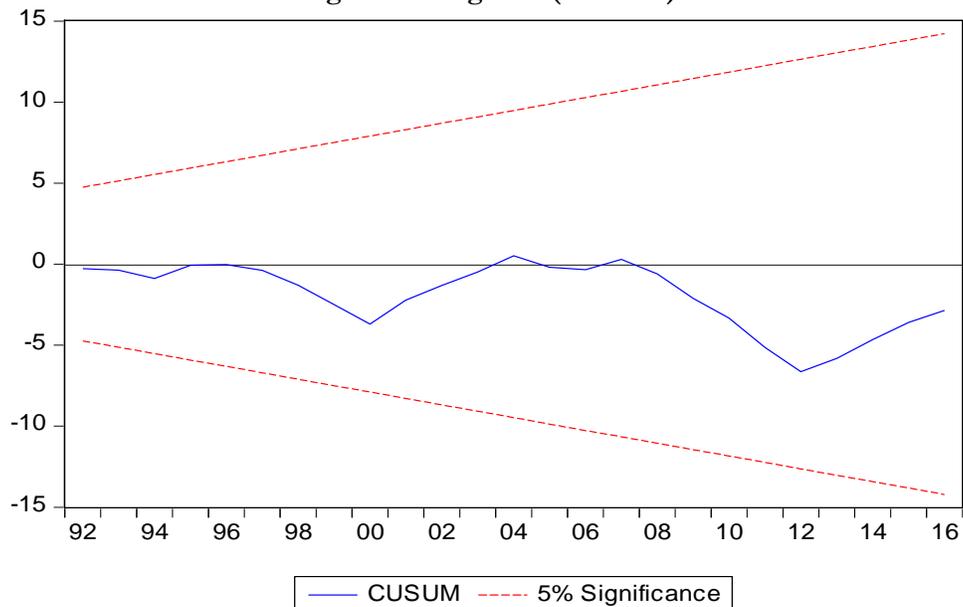


Figure 2: Long Run (CUSUM)



5. Conclusion

The main objective of this paper is to empirically examine and investigate the impact of monetary and fiscal policy on the stock market in Nigeria using the ARDL bounds testing approach popularised by Pesaran et al (2001) to establish the long run relationship between the variables. The unit root tests show that the variables are a mix of I(0) and I(1). Also, the variables are cointegrated, meaning that there are long run relationships between the variables. The empirical findings show that money supply and interest rate have statistically significant effects on the stock market in the short and long run. Similarly, government spending and taxation have statistically significant effects on the stock market in the short and long run. This suggests that monetary and fiscal policy have significant effects on the stock market in Nigeria.

The policy implication arising out of the empirical findings is that monetary and fiscal policy has been supportive but more needs to be done by the authorities in Nigeria to realize its full potential effects on stock market. These can be done by increasing government expenditure, reducing taxation and interest rates. These results also have important implications for both investors and analysts in their effort to discern the relationship between monetary and fiscal policy and the stock market performance. This study show that they should consider fiscal and monetary policy in tandem rather than in isolation.

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