

Effects of Components of Fiscal Policy Shock on Private Consumption in Nigeria

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Abstract

The study examined the empirical relationship between the components of fiscal policy shock and private consumption in Nigeria for the periods 1981:1 to 2012:4 using Ordinary least square technique. The study also revealed that the coefficients of anticipated fiscal policy shocks ($\varepsilon_t^{ag} = 1.6313$, $p < 0.05$; $\varepsilon_t^{ab} = 0.1730$, $p < 0.1$ and $\varepsilon_t^{atr} = -0.4003$, $p > 0.05$) had significant impacts on private consumption while the coefficients of unanticipated fiscal policy shocks ($\varepsilon_t^{ug} = 9.81E-07$, $p < 0.05$; $\varepsilon_t^{ub} = -2.33E-07$, $p < 0.05$ and $\varepsilon_t^{utr} = -7.50E-08$, $p > 0.05$) had no significant effect on private consumption in Nigeria. The study concluded that consumers in Nigeria responded sharply to announcement effect (anticipated shock) than implementation effect (unanticipated shock).

Introduction

Although, several countries around the world have implemented large fiscal stimulus in order to cushion the blow from the financial crisis and jump start the economic recovery in response to the largest economic downturn since the 1930s, which Nigeria is not an exemption. To address this issue, studies have examined the behaviour of Nigeria's private consumer spending with emphasizes on the response of government spending shocks and tax revenue shocks on private consumption by addressing only unanticipated shock component (Onodje, 2009; Favero et al, 2007; Christiano, Eichenbaum & Vigfusson, 2005 and Orisadare, 2012). Meanwhile, these studies used SVAR technique of analysis and it only accounted for unanticipated shocks while neglecting anticipated shocks

(Ramey, 2011). For instance, study from developed country argued that anticipation effect was one of the major reasons for slow recovery from the 2001 recession in the U.S, (House & Shapiro, 2006; Yang & Susan, 2005). Thus, anticipated shock is a shock that has immediate effects on macroeconomic variables such as output, private consumption upon announcement by the fiscal authorities either via increase in expenditure or decrease in tax cuts, leaving current government spending unchanged until the moment of implementation while unanticipated shock is the shock that affect macroeconomic variables upon implementation. Few studies that have examined both anticipated and unanticipated fiscal policy shocks in developed countries used the lag length between announcement period and implementation period, and episodes to proxy anticipated shock and generated unanticipated shock through SVAR result (see House & Shapiro, 2006; Yang and Susan, 2005; and Den, Wouter & Georg, 2006). However, since these sources of data may not be available in Nigeria, this study would generate both anticipated and unanticipated time series data using ARMA model in line with the work of Yaqub (2011) so as to effectively fill this gap in Nigeria context. Therefore, this study examines the effect of both anticipated and unanticipated fiscal policy shocks on private consumption in Nigeria using simple ordinary least square technique since its results are best linear unbiased estimator as well as efficient and sufficient to predict the future.

Literature Review

The debate on the usefulness of fiscal policy as tools for promoting growth and development in less developed countries remains inconclusive, given the conflicting results of current research. With reference to studies in Nigeria such as Olomola &

Olagunju, 2004; Oseni & Onakoya, 2012 and Orisadare, 2012, none has examined the relationship among fiscal policy shock's components and private consumption. For instance, Aiyagari et al (1992) examined the effect of government spending shocks on various economic aggregates using neoclassical growth model with constant returns to scale and variable labour supply. They found that an increase in government spending significantly leads to a decline in private consumption. Heppke et al. (2006) investigated macroeconomic effects of exogenous fiscal policy shocks in Germany using SVAR Model and found that a positive shock in government spending increases output and private consumption, although the effect is relatively small.

Adeoye (2006) examined the impact of fiscal policy on growth in Nigeria between 1970 and 2002. The study covered two periods (before SAP, 1970 to 1985 and SAP and beyond, 1986 to 2002) to ascertain whether there exists any structural shift in economic growth before and after SAP. The study adopts growth model and used ordinary least square technique (OLS) to examine the impact of fiscal policy on economic growth using time series annual data. The study found that fiscal policy variables such fiscal deficit and customs and excise duties are growth retarded in Nigeria. Hence, he concluded that deficit financing crowd out private sector investment which could have promoted output growth. Furthermore, studies that examine fiscal policy shocks and macroeconomic variables (such as private consumption, private investment, output growth) in Nigeria found mixed result and inconclusive. For examples, Onodje (2009) investigated empirically the effects of fiscal policy shocks on private consumption in Nigeria between 1980 and 2004. The study examines whether government expenditure shocks and tax revenue shocks have Keynesian effects using annual time series data. The study employs Vector Error

Correction Model and found that both government consumption and tax revenue shocks have Keynesian effect.

In other words, Chibi et.al. (2010) analyzed the effects of macroeconomic shocks to fiscal policy in Algeria for the periods of 1965 to 2007. The study concluded that one positive structural shock in government spending by 1% (or a Algeria dinner) will have a significant positive effect on real GDP in the short term only, while there is positive impact of fiscal policy on inflation and interest rates, which means that expansion spending policies advocating Algeria exercise some sort of non-Keynesians effects through crowding effects. One positive structural shock in income will have positive a significant impact on the size of government expenditures, the same effect by these shock to real GDP but the multiplier is very small, while generate this shock, a kind of decline in the rate of inflation in the short term and long term. The impact of this shock on interest rates has made a positive and significant in the short term only, while this effect would fall to negative levels in the medium term and long term. For the response of the components of real GDP, there is a significant positive impact on both consumption and private investment.

Orisadare (2012) examined the impact of fiscal policy shocks on economic activities in Nigeria with reference to both private consumption and investment from 1970 to 2009 using annual time series data. The study used structural vector autoregressive technique (SVAR) and found that fiscal policy shocks has both Keynesian and non-Keynesian effect on economic activities in Nigeria while Oseni & Onakoya (2012) examined the effect of fiscal policy shock on current account dynamic in Nigeria and found a positive effect between expansionary fiscal policy shock and current account balance.

In summary, most of the studies in Nigeria centered on the effect of either fiscal policy or fiscal policy shocks on economic growth with emphasize on components of government spending and government revenue. Thus, this study therefore contributes to existing studies by examining the effects anticipated and unanticipated fiscal shock on private consumption in Nigeria for the periods 1981:1 to 2012:4.

Methodology

To estimate the effects of anticipated and unanticipated fiscal shock on private consumption as well as generating their series, this study follows the work of Meese & Rogoff (1983) and Yaqub (2011). To generate the series, two main methods are used in empirical studies to identify the unanticipated components namely time series and structural models. Meese and Rogoff (1983) among others observed that time series outperforms the structural model. Therefore, this study uses time-series method in line with Yaqub (2011) using ARMA process. This model contains the AR (p) and MA (q) models as follows:

$$X_t = c + \varepsilon_t + \sum_{i=1}^p \varphi_i X_{t-i} + \sum_{i=1}^q \theta_i \varepsilon_{t-1} \quad 1$$

Where $X_t = (g_t, tr_t, b_t)$ g_t represents government expenditure; tr_t stands for government revenue and b_t implies government debt. The error terms ε_t are generally assumed to be independent identically distributed random variable. Hence, the equation was used to generate anticipated and unanticipated fiscal shock series. To capture the relationship among anticipated fiscal shock, unanticipated fiscal shock and private consumption in Nigeria, we used this model:

$$PC_t = \beta_0 + \beta_i \varepsilon_t^a + \beta_j \varepsilon_t^u + \mu_i K_t + u_t \quad 2$$

Where PC represents private consumption; ε_t^a implies anticipated shocks; ε_t^u represents unanticipated shocks; K represents control variables; ε_t^{ag} stands for anticipated government spending shock; ε_t^{ug} represents unanticipated government spending shocks; ε_t^{atr} stands for anticipated government revenue shock; ε_t^{utr} represents unanticipated government revenue shock and u_t stands for disturbance term. The expected signs and size of magnitude depend on estimation.

Empirical Results

Time Series Properties of the Variables Employed

Testing for non-stationarity in the form of unit roots has become a clip of time series econometrics, (Engle and Granger, 1987). The reason for this stalks from the challenges that non-stationary data front for inference using standard statistical techniques such as Ordinary Least Square Method (OLS). It is well established, for instance, that OLS produces spurious results when applied to data with unit roots. What OLS is really estimating in such situations are common trends and not the underlying relationships between two or more variables. Inadequately accounting for unit roots can lead to estimates that appear to be significant and meaningful but in reality are meaningless and insignificant (Hamilton, 1994). If data are non-stationary, transformations such as differencing are often employed to induce stationarity. While differencing a data series is common in ARIMA modelling, it is less common in VARs and is usually discouraged because such transformations discard long-run information. On the other hand, if testing

reveals the likely presence of unit roots and the absence of error correction, then the standard statistical tests used for conducting Granger tests will still be valid when applied to differenced data (Brandt and Williams, 2007). Therefore, this study employed both Augmented Dickey Fuller (ADF) and Phillips-Perron Methods of unit roots test with Constant, without trend and Constant, Linear Trend. The results of the unit roots are presented below in tables 1 and 2

Table 1: Unit Root Test using Augmented Dickey Fuller (ADF) Technique

Variables	Level		First Difference		Order of Integration
	Constant	Constant, Linear Trend	Constant	Constant, Linear Trend	
<i>PC</i>	-0.7821	-1.1029	-4.5665*	-4.5995*	<i>I(1)</i>
<i>Debt (B)</i>	-1.9877	-1.7138	-4.1899*	-4.4055*	<i>I(1)</i>
<i>DIS</i>	-4.1493*	-1.1411	-	-3.6232**	<i>I(0)</i>
<i>GEXP</i>	-1.3317	-0.7381	-7.2304*	-4.3478*	<i>I(1)</i>
<i>IR</i>	-2.9006	-2.8509	-6.0496*	-6.1677*	<i>I(1)</i>
<i>TR</i>	-0.4402	-2.6686	-6.2488*	-4.7880*	<i>I(1)</i>
<i>TW</i>	-1.9945	-1.3067	-4.1005*	-4.3133*	<i>I(1)</i>
<i>Y</i>	-0.5649	-1.1990	-4.3371*	-4.3236*	<i>I(1)</i>
<i>Critical Values:</i>					
<i>1%</i>	-3.6793	-4.2967	-3.6793	-4.3098	
<i>5%</i>	-2.9678	-3.5684	-2.9678	-3.5742	
<i>10%</i>	-2.6230	-3.2184	-2.6230	-3.2217	

Note: *(**) *** implies 1% (5%) 10% significance level.

Source: Authors' Computation, 2013

Table 1 presents the results of the unit root test using Augmented Dickey-Fuller (ADF) test with and without a trend term. The results indicated that all the variables were non-stationary at level without a trend term except the distortionary taxes which was stationary at 5% level. However, the results of the unit root test with a trend term indicated that all the variables were stationary at first difference and non-stationary at level at 5% level, even the distortionary taxes that was stationary at level when a trend is not included

was equally stationary at first difference. Thus, the study concluded that all the variables were integral order of one, I (1) series by considering a unit root test with a constant, linear trend.

Also, table 2 presents the results of the unit root test using Phillips-Perron (PP) technique with and without a trend. Without a trend term, three variables were stationary at level using 5% level of significance. The variables were debt, distortionary taxes and total wealth while others like private consumption, government spending, interest rates, total revenue and disposable income were stationary at first difference for both with and without a trend term at 5% significant level. Hence, the variables are both I(0) and I(1) series.

Table 2: Unit Root Test using Phillips-Perron Technique

Variables	Level		First Difference		Order of Integration
	Constant	Constant, Linear Trend	Constant	Constant, Linear Trend	
<i>PC</i>	-0.7679	-1.4743	-4.5714*	-4.5644*	<i>I(1)</i>
<i>Debt (B)</i>	- 3.0271**	-1.7650	-	-4.3563*	<i>I(0)</i>
<i>DIS</i>	-3.6692*	-1.2174	-	-4.7852*	<i>I(0)</i>
<i>GEXP</i>	-0.4036	-2.0774	-7.0846*	-7.0017*	<i>I(1)</i>
<i>IR</i>	-2.8105	-2.7779	-7.0970*	-6.9445*	<i>I(1)</i>
<i>TR</i>	-0.2777	-2.7052	-6.8850*	-7.0700*	<i>I(1)</i>
<i>TW</i>	- 3.4041**	-1.2213	-	-4.9040*	<i>I(0)</i>
<i>Y</i>	-0.5524	-1.5565	-4.3244*	-4.3236*	<i>I(1)</i>
<i>Critical Values:</i>					
<i>1%</i>	-3.6702	-4.2967	-3.6793	-4.3098	
<i>5%</i>	-2.9640	-3.5684	-2.9678	-3.5742	
<i>10%</i>	-2.6210	-3.2184	-2.6230	-3.2217	

Note: *(**) *** implies 1% (5%) 10% significance level.

Source: Authors' Computation, 2013

Cointegration Test and Vector Error Correction Model

Having established the order of integration of our series, we determine the number of long-run equilibrium relationships or Cointegrating vectors between the variables. Since the variables are found to be integrated of the same order, such as $I(1)$ as shown above using Augmented Dickey-Fuller test results, it implies that an equilibrium relationship exists among the variables. Therefore, since the main focus of the study is to examine the effect of fiscal policy on private consumption in Nigeria, we conduct a Cointegration test in line with Johansen test. Thus, the result of the cointegration test reveals that there are five cointegrating vectors based on Trace statistic and Eigen values since the hypotheses of no cointegration were rejected at 5% level for both test using Mackinnon-Haug Michelis (1999) p-values as shown in table 3 below:

Table 3: Johansen Maximum likelihood test for Cointegration

Hypotheses	Trace Test	5% Critical values	Max-Eigen Statistic	5% Critical values
$R = 0$	477.75	159.53	192.42	52.36
$R \leq 1$	285.33	125.62	107.16	46.23
$R \leq 2$	178.17	95.75	60.11	40.08
$R \leq 3$	118.07	69.82	45.86	33.88
$R \leq 4$	72.21	47.86	43.81	27.58
$R \leq 5$	28.40	29.80	17.71	21.13
$R \leq 6$	10.69	15.49	10.67	14.26
$R \leq 7$	0.02	3.48	0.02	3.84

Source: Authors' Computation, 2013

After establishing the long-run relationship among the variables, the study investigated the short-run dynamics of the model using Error Correction Mechanism (ECM). This shows the speed of convergence towards equilibrium among the variables. The coefficient of the ECM is negatively sign and statistically significant has expected. Thus, this indicates that the speed of convergence among the variables towards equilibrium exists. This is shown in table 4.4 below.

The above empirical result was analyzed with the use of the two-step Engle and Granger (1987) model which suggests that any set of Cointegrated time series

has an error-correction representation, which reflects the short-run adjustment mechanism. The motive of the analysis is to discover whether the short-run dynamics are influenced by the estimated long-run equilibrium condition that is, the Cointegrating vectors.

Table 4: Parsimonious Dynamic Regression Result

Variables	Coefficients	Standard Error	t-Statistic
$\Delta ECM(-1)$	-0.67	0.31	-2.17**
ΔDIS	-0.17	0.09	-2.02***
$\Delta PC(-1)$	0.40	0.15	2.63**
ΔIR	0.47	0.70	0.67
$\Delta GEXP$	-0.07	0.03	-2.47**
ΔY	0.95	0.16	5.86*
ΔB	0.57	0.20	2.93*
ΔTW	-0.56	0.17	-3.35*
ΔIR	0.01	0.01	1.16
R-squared:	0.73		
Adjusted R-square:	0.66		
Durbin-Watson stat:	1.95		
F-statistic:	10.09		

Note: *(**) *** implies 1% (5%) 10% significance level. ΔPC is the dependent variable
Source: Authors' Computation, 2013

A crucial parameter in the estimation of the short-run dynamic model is the coefficient of the error-correction term which measures the speed of adjustment between fiscal policy variables and private consumption in Nigeria to equilibrium level. The results show that the parameter of the error-correction terms in the model is statistically significant and correctly signed. This confirms that the relationship between fiscal policy variables and private consumption in Nigeria has automatic adjustment mechanism and the economy responds to deviations from equilibrium in a balancing manner. The value of -0.67 for the coefficient of error correction term suggests that the fiscal policy variables and private consumption will converge towards its long-run equilibrium level in a moderate speed after the fluctuation in fiscal policy variables and private consumption.

Eliminating, for instance, 95% of a fluctuation in fiscal policy variables and private consumption would take a little more than 8 years or precisely 32.16 quarters.

Table 45: Empirical Analysis of the Relationship among Anticipated, Unanticipated Fiscal Shocks and Private Consumption

Variables	Coefficients	Standard Error	t-Statistic
Constant	-4.7408	1.2557	-3.7755
ε_t^{ag}	1.6313	0.2251	7.2461*
ε_t^{ug}	9.81E-07	3.42E-07	2.8721*
ε_t^{atr}	-0.4003	0.2605	-1.5369
ε_t^{utr}	-7.50E-08	6.26E-08	-1.1969
ε_t^{ab}	0.1730	0.0947	1.8266***
ε_t^{ub}	-2.33E-07	1.14E-07	-2.0428**
IR	0.0391	0.0129	3.0416*
R-Squared	: 0.8831		
Adjusted R-Squared	: 0.8777		
F-statistic	: 182.9805*		
Durbin-Watson stat	: 1.87		

Note: *(**) *** implies 1% (5%) 10% significance level. PC is the Dependent Variable
Source: Authors' Computation, 2013

The coefficient of anticipated government spending is positively signed and statistically significant at 1 percent level. The elastic relationship exhibited by the coefficient of the announcement of government spending in Nigeria shows that if government announcing a million increased in her spending, private consumption would increase by 1.63 immediately after the announcement without awaiting for the government to execute the increase in her spending. This result shows that consumers response sharply to government announcement in Nigeria. This result is similar to that of Perotti, 2007; Ramey, 2007; and Eichenbaum & Fisher (2004). On the other hand, the coefficient of unanticipated government spending (implementation effect) is approximately zero and statistically significant at 1 percent. The perfectly inelastic relationship between unanticipated government spending and private consumption revealed that after implementation of government policy either by increasing or decreasing government spending by one million naira in Nigeria, private consumption remains unchanged. Thus,

consumers' consumption remains unchanged after implementation of government policy. The coefficient of anticipated tax changes in Nigeria has a negative and insignificant impact on private consumption. The inelastic relationship between anticipated tax changes and private consumption indicated that a unit percent tax cut announced by government would result in 40 percent increase in private consumption. This show that pre-implementation of government policy in terms of tax cut would have immediate effect on private consumption. However, the coefficient of unanticipated tax changes is perfectly inelastic and statistically non-significant. This reveals that the implementation of tax changes has no effect on private consumption in Nigeria. The coefficient of announcement of government borrowing is positively signed and statistically significant at 10 percent level. The elastic relationship between anticipated government borrowing and private consumption indicates that a unit percent increase in government borrowing would result in 17 percent increase in private consumption in Nigeria. This finding reveals that consumer presumes that increase in government revenue through borrowing would lead to increase in consumers' income and the multiplier effect will be increased in private consumption upon announcement. Conversely, the government borrowing has no effect on private consumption upon implementation has shown by the coefficient of unanticipated government borrowing which is perfectly inelastic in nature and statistically significant at 5 percent level. These results are similar to that of Heim (2007), and Romer & Romer (2007). Hence, the explanatory power of the model explained approximately 88 percent total variations in private consumption in Nigeria. This reveals that the model has high goodness of fit. The value of F-statistic is statistically significance at 1 percent level, indicating the overall significance of the model. The value of Durbin-Watson statistic is close to 2 or approximately 2 and this shows that the model has no serial autocorrelation problem.

Conclusion

The study concluded that consumers in Nigeria response sharply to announcement effect than implementation effect has shown in the result of the anticipated and unanticipated fiscal shocks effect on private consumption. It is observed from the study

that increased in government spending and debt did not response to increase in private consumption since both variables negatively influenced private consumption based on the analysis. Increases in government spending do not tend to crowd out private consumption but, if anything, they tend to crowd in private consumption, thus leaving more room for fiscal policy via changes in government spending. Since a substantial part of private consumption is found to exhibit near Keynesian responses to changes in disposable income, changes in taxes and government transfer policies are likely to have a marked impact on private consumption.

The study therefore recommended that government should exercise fiscal discipline; this can be achieved through reduction of wasteful spending. With this step, it will be relatively easy to determine the expenditure growth path. Also, countries should intensify her efforts towards reduction of external debt stock which has imposed huge debt service payments on their economy as this is a major source of government deficits.

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