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THE EFFECTS OF BUDGET DEFICITS ON SELECTED MACROECONOMIC VARIABLES IN NIGERIA AND GHANA (1970 – 2013)

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Abstract

This study investigates the effects of budget deficits on selected macroeconomic variables in Nigeria and Ghana using annual time-series data of both economies covering from 1970 to 2013; and taking previous empirical studies as its point of departure. The specific objectives of the study include: to examine the effects of budget deficits on interest rates, inflation, and economic growth in Nigeria and Ghana within the methodological framework of Seemingly Unrelated Regression (SUR) model and Two-Stage Least Squares (2SLS). The study employs Eagle-Granger Cointegration test, Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests in estimating the systems equations. Data sourced from World Bank, IMF - World Economic Outlook, Central Bank of Nigeria, Bank of Ghana and others, were analyzed using SUR model with several diagnostic and specification tests to examine the objectives of the study. From the perspective of this study, the empirical findings demonstrated that budget deficit has statistically negative effects on interest rate, inflation, and economic growth thereby supporting the neoclassical argument in the literature that budget deficit slows growth of the economy through resources crowding-out. Based on the empirical findings, appropriate recommendations were made for both Nigeria and Ghana economies.

Keywords: Budget deficit, interest rate, inflation, economic growth, seemingly unrelated regression (SUR), Nigeria and Ghana

1. INTRODUCTION AND RESEARCH PROBLEM

Budget deficits and its effects on macroeconomic policy variables is one of the most extensively debated topics in the theoretical and empirical literature amongst economists and policy makers in developed and developing world (Saleh, 2003; Aisen & Hauner, 2008; Georgantopoulos & Tsamis, 2011). Intuitively, it is commonly perceived by different authors and researchers that huge budget deficits have adverse macroeconomic consequences on growth and development such as high interest rates, current account deficits, inflation, and high exchange rates volatility (Bernheim, 1989).

The budget deficit effects could either be negative, positive or a no positive or negative relationship on macroeconomic variables. The differences on the nature of the effects can be as found in economic literature according to Anyanwu (1997) could be attributed to different methodologies countries employed and the nature of data used by different researchers. Most of the studies regress the macroeconomic variable(s) on the fiscal deficit or the deficit on the macroeconomic variable(s).

Budget deficit refers to government expenditure exceeding government revenue over a period of time (Anyanwu, 1997). However, when a deficit occurs in a country, it becomes important to find remedy for financing such deficits so as to eradicate its negative effects. In the developing countries

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like Nigeria and Ghana, fiscal deficits have been blamed for the economic crisis that beset the economies about two decades ago resulting in over indebtedness and the debt crisis, high inflation, poor investment performance, and growth (Ezeabasili *et al.,* 2012). In Nigeria, public expenditure has led to increase in the fiscal imbalances that siphon funds from the private sector investment, retarding growth and reducing standard of living (Mpia & Ogrike, 2014). Fiscal imbalances create potential large burden on future generations as workers may be forced to finance unfunded social programmes. Budget deficits, therefore, lead to incurring debts which is a stock of liabilities of the government (Udu & Agu, 2000). Budget deficit is generally associated with recession because of the effect on revenues and expenditures (Dernberg, 1985).

In Ghana, the second leg of its centenary of independence and democracy, presents bold objectives that include; accelerated gross domestic product (GDP) growth rate of 8% in 2009 and 10% before 2015 and achievement of middle-income status of 1000 USD per capita by 2015 (Ackah *et al.,* 2009). Ghanaian economy has experienced different swings in growth cycles since her independence from British rule in 1957 which is characterized by poor economic performance and military coup d'états through to the 1980s. National economic policies during this period were often devoid of market principles, and characterized by frequent price and income controls. At best, the economy muddled through, with low productivity, high and volatile prices, an overvalued currency and high interest rates (Ndulu & Connell, 2008).

The choice of this study which brought the economies of Nigeria and Ghana into focal point for empirical investigation is formed by a number of reasons. Besides the obvious reason that both economies share similarities in political and economic structures, the economies have experienced very large fluctuations in the government budget deficits and high accumulation of foreign debt, poor export performance, huge service account deficits, external debt amortization, low inflow of foreign direct investment, misappropriation of external funding support, excessive domestic monetary and credit expansion; price distortions and a deterioration in the terms of trade (Ogiogio, 1996; & Obioma,1998).

In Nigeria, available data from the CBN (2012) statistical bulletin, show that deficit of -8.62% of GDP was recorded in 1970 which rose to a surplus of 2.58% of GDP in 1971 and declined to -0.82% of GDP in 1972. In 1974, Nigeria experienced a remarkable improvement in the overall fiscal balances from 1970 to 2013 as surplus rose from 1.92% of GDP in 1973 to a surplus unit of about 9.54% of GDP as can be seen in figure 1 below.
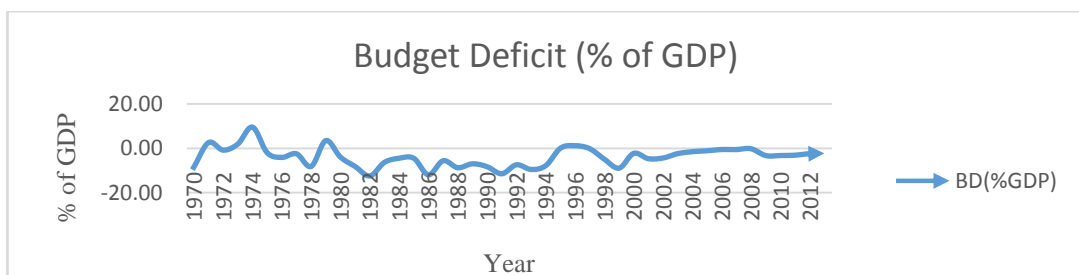

Figure 1: Trends in Budget Deficit (% of GDP) in Nigeria (1970 – 2013)

Source: Researcher's computation with data from CBN (2012) Bulletin

As seen in figure 1 above, the Nigerian overall fiscal balance deteriorated between 1980 and 1994 and recorded greater deficit of about -12.44% of GDP in 1982 on the average. However, between 1995 and 2013, the Nigerian economy recorded a surplus of about 1.19% of GDP on the average in 1996 with other years experiencing different deficit percentages to GDP.

In Ghana, there has been huge and continuous deterioration in government fiscal position. The economy has been in a persistent tendency towards budget deficit since independence as a result of

over expanding government expenditure, inadequate revenue generation capacity of government and increasing debt levels (Pomeyie, 2001). The available statistics from World Bank (2014) show that the Ghanaian economy has not recorded any surplus since their independence and between 1970 and 2013 as shown in figure 2 below.
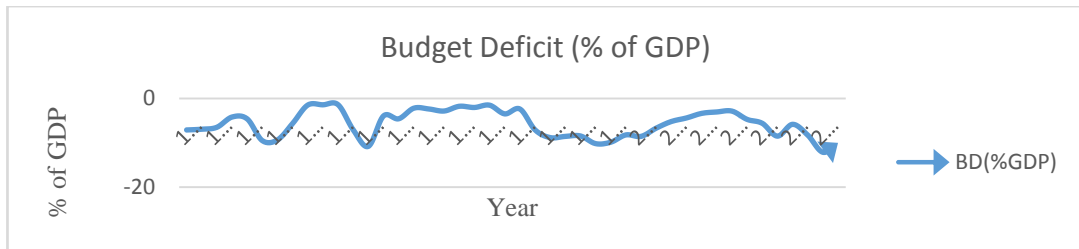

Figure 2: Trends of Budget Deficit (% of GDP) in Ghana (1970 – 2013)

Source: Researcher's computation with data from World Bank, 2014

In figure 2 above, it is evidenced that the trends of the overall fiscal balances of Ghanaian economy between 1970 and 2012 has been on the deficit side with a huge deficit records of about -10.79% of GDP and -12.12% of GDP in 1982 and 2012 respectively. Apart from the period between 1981 and 1990 when there was remarkable fiscal discipline, the government budget was consistently in deficit in the 1990s. On average, the deficits was more than 5% of GDP in 1993.

As the economy of Ghana grows, policy makers have been concerned with the extent to which the budget deficit is sustainable, and its effects on macroeconomic variables. However, a deficit policy plays a vital role in assisting countries to achieve macroeconomic stability, poverty reduction, income redistribution and sustainable growth. For this reason, most governments use the budget as effective tool in achieving their economic objectives. This means that large and accumulating budget deficit may not necessarily be a bad policy objective if such deficits are effectively utilized to enhance economic growth. It is in line with this that an appropriate operational definition and measure of budget deficit must be clearly stated. Otherwise, the occurrence of large nominal budget deficit may be misleading depending on the operational measure adopted by a particular country (Antwi & Mills 2013).

In Nigeria, the economy was caught in the deficit trap since early 1980s (*as shown in figure 1*) when the world oil market collapsed, and since then, there have been frantic efforts to exit the trap but all to no avail (Wosowei, 2013). Nevertheless, the fiscal policy adoption of Nigeria and Ghana in financing deficits are attributable to major factors causing rapid monetary growth, exchange rate depreciation and rising inflation. Thus the objectives and motivation for this study is to examine the effect of budget deficit on interest rate, inflation and economic growth in Nigeria and Ghana.

Generally, in the case of Nigeria and Ghana, it has been claimed that the main causes of these high rates of inflation were the widening fiscal imbalances, sources of deficit financing, economic growth and the depreciation of the exchange rate. Nonetheless, the transition to high inflation rates over the period resulted in substantial real cost and large losses in income, at the same time as the performance of the economy as a whole declined as a result of widening fiscal deficits and exacerbated by poor macroeconomic management and political uncertainty (Arestis & Sawyer, 2006).

Nevertheless, empirical studies on the effects of budget deficit on macroeconomic variables such as interest rate, inflation and growth seem not to lay credence on Keynesian proposition or Ricardian Equivalence Hypothesis (REH). The major trust of this study is to examine the budget deficits on interest rate, inflation and economic growth in Nigerian and Ghana.

2. BRIEF LITERATURE REVIEW

2.1. Theoretical literature
   a) The Neoclassical School proposes an adverse relationship between budget deficits and macroeconomic variables.
   b) The Keynesian School proposes a positive relationship between budget deficits and macroeconomic variables.
   c) The Ricardian School, also known as Ricardian equivalence, or the Barro-Ricardo equivalence suggests that government budget deficits do not affect the total level of demand in an economy.

2.2. Empirical literature
Vamvoukas (1998) empirically examines the short and long-run effects of budget deficits on interest rates for Greece using annual time series data from 1970 to 1990 within the methodological framework of cointegration, ECM strategy, and several diagnostic and specification tests. The estimation results support the Keynesian model of a significant and positive relationship between budget deficits and interest rates

Noula (2012) examines the determination of fiscal deficit and nominal interest rate in Cameroon using annual time series data from 1974 to 2009. The study employs a loanable funds model to test for fluctuations in the economy budget deficits and nominal lending rates.

Moreover, the empirical assessment carried out using ADF test and Error Correction Model reveals a significant positive association between budget deficits and domestic nominal lending interest rate. Also, the result from the Pairwise Granger Causality test conducted shows a bi-directional causality between budget deficits and nominal interest rate.

Similarly, Bonga-Bonga (2011) investigates the extent of the effects of the systematic and surprise changes in budget deficits on the long-term interest rate in South Africa between 1960 and 2000 using vector autoregressive (VAR) techniques. The study finds a positive relationship between the budget deficits and long-term interest rates. On the other hand, Akinboade (2004) uses the LSE approach and Granger-causality methods to investigate the nexus between budget deficit and interest rate in South Africa, the study finds no relationship between the budget deficit and interest rates.

Mukhtar and Zakaria (2008) uses Granger Causality test and Error Correction Model (ECM) to examine long run relationship between budget deficits and interest rates for Pakistan using quarterly time-series data for the period 1960 to 2005. The regression results show that budget deficits have no significant effect on nominal interest rates. The results equally reveal that budget deficit-GDP ratio has significant positive impact on nominal interest rates.

Obi and Nurudeen (2009) empirically investigate the effects of fiscal deficits and government debt on interest rate in Nigeria between 1970 and 2005 using Vector Autoregression approach (VAR). The empirical findings of the study reveal that the explanatory variables account for approximately 73.6 percent variation in interest rate in Nigeria. The estimation also shows that fiscal deficits and government debt are economically and statistically significant.

Larbi (2012) investigates the long-run impact of budget deficit on economic growth in Ghana covering the period of 1980 to 2010 using Johansen cointegration procedure and Granger Causality test. The empirical evidence from the Johansen cointegration test shows that budget deficit exerts no significant long-run impact on economic growth. Further evidence from the Granger Causality test conducted suggests significant positive long-run relationships between the capital stock, openness, total government expenditure and growth rate with budget deficit coefficient variable – positive and statistically significant.

Odionye and Uma (2013) employ augmented Granger causality test approach in examining the relationship between budget deficit and interest rate in Nigeria using Vector Error Correction model (VECM) for the period of 1970:1 – 2010:1. The results reveal that in the long run co-integrating equation, budget deficit exert a positive and significant impact on interest rate implying that a high budget deficit will increase interest rate in the country. The result supports the Keynesian proposition. Also, evidence from Johansen co-integration result indicates that there is a long run relationship between budget deficit and interest rate.

Sowa (1994) utilizes Error Correction Model (ECM) in estimating an inflation equation for Ghana over the period 1963 - 1990. The study shows that inflation in Ghana is influenced more by output volatility than by monetary factors, both in the long run and in the short run. In Nigeria, Onwioduokit (1995) employs Granger causality test in investigating the causal relationship between inflation and fiscal deficits using annual data from 1970 to 1994. The variables in the empirical model are ratio of fiscal deficit to gross domestic product (GDP), level of fiscal deficit and inflation rate. The study shows that fiscal deficit causes inflation without a feedback effect but however feedback exist between inflation and the ratio of fiscal deficit to gross domestic product.

Oladipo and Akinbobola (2011) employ Granger causality pair-wise test in determining the causal relationship between budget deficit and inflation in Nigeria. The study find that there is no causal relationship from inflation to budget deficit but from budget deficit to inflation in Nigeria. This indicates that budget deficit affects inflation through fluctuations in exchange rate in the Nigerian economy.

3. METHODOLOGY AND DATA

Following the extensive review of the related literature in section 2 above, the following models were adopted.

3.1. Empirical models
The overall empirical models of this study is linked to growth model anchored on Seemingly Unrelated Regression (SUR) Model as stated below.

Model I (for objective 1)
The specification of the interest rate model mirrors the works of Ariyo and Raheem (1991), cited in Tchokote (2004). The specification of the model considers the following variables: Interest rate (INT) is the independent variable; while Government expenditure (GEX), budget deficit (BD), money supply (MS), and inflation rate (INF) are the dependent variable; μ_t is error term. The model is represented as:

$$RIR = f(GEX, BD, MS, INF)$$

The above relationship can be presented through a system of related equations by considering a set of t linear equations for each t time points, and thus becomes:

$$RIR_{t1}^{Ng} = \beta_{01} + \beta_1 GEX_{t1}^{Ng} + \beta_2 BD_{t1}^{Ng} + \beta_3 InMS_{t1}^{Ng} + \beta_4 INF_{t1}^{Ng} + \mu_{t1}^{Ng}$$
$$RIR_{t2}^{Gh} = \beta_{02} + \beta_1 GEX_{t2}^{Gh} + \beta_2 BD_{t2}^{Gh} + \beta_3 InMS_{t2}^{Gh} + \beta_4 INF_{t2}^{Gh} + \mu_{t2}^{Gh} \qquad \text{…………..... (1)}$$

Where: β_0 = the intercept and, $\beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients of the regression equation.
$_{Ng, Gh}$ = $^{Ng:}$ for Nigeria, $^{Gh:}$ for Ghana respectively

A priori, it is expected that the following relationship will occur; $\beta_1, \beta_2, \beta_4 > 0$; $\beta_3 < 0$;

Model II (for objective II)

The second objective of the study is to examine the short and long run effects of budget deficit on inflation in Nigeria and Ghana. Following the literature, we present an econometric model similar to the work of Dockery and Ezeabasili (2012) which essentially is informed by standard economic theory as evince in both Classical and Keynesian approaches. Accordingly, a log linear inflation-fiscal deficit econometric model is specified as follows:

$$INF_{t1}^{Ng} = \Phi_{01} + \Phi_1 BD_{t1}^{Ng} + \Phi_2 InRGDP_{t1}^{Ng} + \Phi_3 InMS_{t1}^{Ng} + \Phi_4 EXDEP_{t1}^{Ng} + \gamma_{t1}^{Ng}$$
$$INF_{t2}^{Gh} = \Phi_{02} + \Phi_1 BD_{t2}^{Gh} + \Phi_2 InRGDP_{t2}^{Gh} + \Phi_3 InMS_{t2}^{Gh} + \Phi_4 EXDEP_{t2}^{Gh} + \gamma_{t2}^{Gh} \quad \ldots\ldots\ldots\ldots (2)$$

Where: INF $\quad$ = Inflation rate
$\qquad$ BD $\quad$ = Budget deficits
$\qquad$ MS $\quad$ = Money supply (M2)
$\qquad$ RGDP = Real gross domestic product
$\qquad$ EXDEP = Depreciation of the exchange rate
$\qquad$ $^{Ng, Gh}$ $\quad$ = $^{Ng:}$ for Nigeria, $^{Gh:}$ for Ghana respectively
$\qquad$ γt is a stochastic term.

(A priori, we expect $\Phi_1, \Phi_3, \Phi_4 > 0$; $\Phi_4 > 0$ or $\Phi_4 < 0$).

Model III (for objective III)

The third objective of the study which states – short and long run effects of budget deficit on economic growth in Nigeria and Ghana can be captured following the adoption of the work of Awe and Funlayo (2014). The model is specified below:

GDP = f(investment, savings, interest rate, budget deficit).

$$InRGDP_{t1}^{Ng} = \alpha_{01} + \alpha_1 INF_{t1}^{Ng} + \alpha_2 InSAV_{t1}^{Ng} + \alpha_3 RIR_{t1}^{Ng} + \alpha_4 BD_{t1}^{Ng} + \varepsilon_{t1}^{Ng}$$
$$InRGDP_{t2}^{Gh} = \alpha_{02} + \alpha_1 INF_{t1}^{Gh} + \alpha_2 InSAV_{t2}^{Gh} + \alpha_3 RIR_{t2}^{Gh} + \alpha_4 BD_{t2}^{Gh} + \varepsilon_{t2}^{Gh} \quad \ldots\ldots\ldots\ldots (3)$$

Where:
$\qquad$ RGDP = Real Gross Domestic Product, a proxy for economic growth
$\qquad$ INF $\quad$ = Inflation
$\qquad$ SAV $\quad$ = Savings
$\qquad$ INT $\quad$ = Interest rate
$\qquad$ BD $\quad$ = Budget Deficit
$\qquad$ α_0 $\quad$ = the constant or the intercept
$\qquad$ $\alpha_1 - \alpha_4$ = the coefficients of the explanatory variables
$\qquad$ ε_t $\quad$ = Stochastic error term

3.2. Data and sources

Most of the data needed for this study will be sourced from the World Bank, World Economic Outlook 2014, World Development Indicators (WDI) 2014, International Monetary Fund (IMF), Ghanaian Central Bank Database 2013 and the Ghanaian Statistical Services (GSS) Data. For the Nigerian based data; the study shall explore the Central Bank of Nigeria (CBN) Statistical Bulletin of various years, CBN Annual Report and Statement of Account of various years as well as National Bureau of Statistics (NBS).

4. ESTIMATED RESULTS

4.1. Presentation of results

As stated in the methodology, three models were adopted in line with the objectives of the study. The results of the various models estimated for both countries are presented sequentially in this chapter in order to reinforce the robustness of the impact analysis which is the main focus of this study. First, the results of the descriptive statistics of all variables, including the correlation matrix

and unit root tests are presented. This informs the levels at which the variables should be specified in the models. Second, the results of the Engle-Granger cointegration test are presented in order to determine whether the model should be specified in dynamic or long run forms. Third, the estimation results of the Seemingly Unrelated Regression (SUR) models on budget deficits and selected macroeconomic variables in both economies. Finally, the results and discussions of the models and several diagnostic tests are presented.

4.1.1.   The Nigeria

4.1.1.1. Descriptive statistics for all variables

The distribution properties of the variables for the model indication that most of the variables are well behaved (see Table 1). Budget deficit for example has mean value of -3.885 USD, a median of -3.623 USD and respectively small standard deviation (4.430 USD). Also, budget deficit has a minimum of -12.439 USD and a maximum of 9.543 USD.

Table 1: Nigeria descriptive statistics

	RGDP	BD	EXDEP	GEX	INF	MS	RIR	SAV
Mean	307225.700	-3.885	52.584	882534.100	19.078	23.082	-1.674	11.817
Median	269457.800	-3.623	19.147	79690.900	13.100	21.835	-1.864	10.339
Maximum	888893.000	9.544	293.100	4605320.000	72.800	37.957	24.262	23.245
Minimum	4219.000	-12.440	0.000	903.900	3.500	9.317	-41.984	4.977
Std. Dev.	252893.100	4.431	65.688	1395947.000	16.059	7.042	14.047	4.770
Skewness	0.732	0.334	1.428	1.593	1.705	0.227	-0.518	0.610
Kurtosis	2.612	3.535	5.210	4.169	5.207	2.132	3.474	2.171
Jarque-Bera	4.211	1.343	23.915	21.110	30.247	1.761	2.377	3.990
Probability	0.122	0.511	0.000	0.000	0.000	0.415	0.305	0.136
Sum	13517933.000	-170.961	2313.702	38831500.000	839.424	1015.629	-73.672	519.954
Sum Sq. Dev.	27500.000	844.084	185540.500	83800.000	11089.240	2132.416	8484.983	978.182
Observations	44.000	44.000	44.000	44.000	44.000	44.000	44.000	44.000

Source: Computed by the Author with EViews 8

The probability of 0.510 for the deficit indicates that it is fairly normally distributed. Real GDP was normally distributed with a mean of 307225.7 USD, a median of 269457.8 USD and standard deviation of 252893.1 USD. Real interest rate was negatively skewed with value of -0.517 USD, while inflation was positively skewed with value of 1.705 USD.

4.1.1.2. Analysis of the correlation matrix

The results of the correlation are shown in Table 2. Budget deficit for example is negatively correlated to inflation, money supply, real interest rate, and total savings of the economy. The relationship as indicated in the results is consistent with economic theory in the case of inflation, money supply real interest rate, but inconsistent in the case of total saving, particularly in a Keynesian sense. Also shown in table 2 is the positively correlation between budget deficit and real economic growth rate which is also consistent with the theory. Nevertheless, it should be noted that descriptive statistics merely show the direction of relationship and not a causation. The strongest level of correlation (0.926623) is between economic growth (RGDP) and government expenditure (GEX), followed by the money supply (MS) and total savings (SAV) (0.910811) while the weakest level of correlation (-0.015014) is between the exchange rate depreciation (EXDEP) and total savings (SAV). In general, the results of the correlation matrix would be of information value when we embark on empirical analysis.

Table 2: Nigeria correlation matrix

	RGDP	BD	EXDEP	GEX	INF	MS	RIR	SAV
RGDP	1.000	0.058	0.626	0.927	-0.147	0.447	0.375	0.453
BD	0.058	1.000	0.149	0.204	-0.155	-0.459	-0.109	-0.357
EXDEP	0.626	0.149	1.000	0.498	0.366	0.048	-0.078	-0.015
GEX	0.927	0.204	0.498	1.000	-0.263	0.399	0.365	0.465
INF	-0.147	-0.155	0.366	-0.263	1.000	-0.075	-0.496	-0.116
MS	0.447	-0.459	0.048	0.399	-0.075	1.000	0.373	0.911
RIR	0.375	-0.109	-0.078	0.365	-0.496	0.373	1.000	0.317
SAV	0.453	-0.357	-0.015	0.465	-0.116	0.911	0.317	1.000

Source: Computed by the Author with EViews 8

4.1.2. The Ghana

4.1.2.1. Descriptive statistics for all variables
The descriptive statistics of the variables used in the Ghana study is presented in Table 3.

Table 3: Ghana descriptive statistics

	RGDP	BD	EXDEP	GEX	INF	MS	RIR	SAV
Mean	1090.470	-5.746	0.394	108.731	31.450	22.778	-13.595	7.817
Median	988.950	-5.615	0.040	108.205	20.900	22.761	-5.307	6.821
Maximum	3250.700	-1.390	2.024	125.273	122.970	34.108	28.430	24.048
Minimum	-1186.000	-12.120	0.000	94.516	3.030	11.305	-107.550	1.258
Std. Dev.	884.885	3.027	0.577	7.893	29.023	6.289	29.634	4.602
Skewness	0.233	-0.171	1.369	0.172	1.957	-0.049	-2.032	1.481
Kurtosis	3.577	1.865	3.725	1.966	6.299	1.967	6.885	5.656
Jarque-Bera	1.007	2.577	14.699	2.177	48.032	1.975	57.934	29.006
Probability	0.604	0.276	0.001	0.337	0.000	0.373	0.000	0.000
Sum	47980.700	-252.843	17.335	4784.141	1383.780	1002.229	-598.176	343.929
Sum Sq. Dev.	33669902.00	394.076	14.300	2678.617	36221.30	1700.964	37762.16	910.690
Observations	44.000	44.000	44.000	44.000	44.000	44.000	44.000	44.000

Source: Computed by the Author with EViews 8

The distribution properties of the variables for the model indicate that most of the variables are well behaved. Budget deficit for example has a mean value of -5.746 USD, a median of -5.615 USD and relatively small standard deviation (3.027 USD). The probability of 0.275 for the deficit indicates that it is fairly normally distributed. Real GDP was normally distributed with a mean 1090.470 USD, a median of 988.950 USD and standard deviation of 884.884 USD. Real interest rate negatively skewed at -2.031 USD while inflation was positively skewed with value 1.956 USD.

4.1.2.2. Analysis of the correlation matrix
Table 4 present the correlation matrix of the variables applied in this study. The highest correlation (-0.935) is between inflation (INF) and real interest rate (RIR). This is consistent with economic theory. The correlation coefficient of (-0.210) was registered between our variable on interest budget deficit (BD) and real GDP. This not really a problem as the static correlation is most times not a true reflection of the relationship between the variables when dynamic models are specified. The weakest correlation (0.113) is between budget deficit (BD) and inflation (INF).

Table 4: Ghana correlation matrix

	RGDP	BD	EXDEP	GEX	INF	MS	RIR	SAV
RGDP	1.000	-0.210	0.881	0.700	-0.364	0.466	0.344	0.132
BD	-0.210	1.000	-0.314	-0.143	0.113	-0.375	-0.189	-0.465
EXDEP	0.881	-0.314	1.000	0.593	-0.377	0.686	0.271	0.299
GEX	0.700	-0.143	0.593	1.000	-0.378	0.511	0.460	-0.250
INF	-0.364	0.113	-0.377	-0.378	1.000	-0.255	-0.935	-0.211
MS	0.466	-0.375	0.686	0.511	-0.255	1.000	0.171	0.322
RIR	0.344	-0.189	0.271	0.460	-0.935	0.171	1.000	0.143
SAV	0.132	-0.465	0.299	-0.250	-0.211	0.322	0.143	1.000

Source: Computed by the Author with EViews 8

4.2. Stationary (unit root) tests results

To examine the time series characteristics of the variables in the models, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) stationarity (unit root) tests were conducted. Essentially, both the ADF and PP tests are presented in table 5 below:

Table 5: Summary of ADF and PP stationary (unit root) tests for the variables in the models, 1970 – 2013

| | NIGERIA | | | | | |
| | Augmented Dick-Fuller (ADF) Test | | | Phillip-Perron (PP) Test | | |
Variables	At Level	At First Difference	Order of Cointegration	At Level	At First Difference	Order of Cointegration
RIR	-7.046** (-3.518)	-	I(0)	-3.518**	-	I(0)
GEX	-	-4.561* (-3.557)	I(1)	-	-3.520**	I(1)
MS	-	-6.331** (-3.520)	I(1)	-	-3.520**	I(1)
INF	-	-6.587** (-3.523)	I(1)	-	-3.520**	I(1)
BD	-	-4.099** (-3.520)	I(1)	-3.518**	-	I(0)
RGDP	-	-5.238** (-3.520)	I(1)	-	-3.520**	I(1)
EXDEP	-3.843** (-3.518)	-	I(0)	-3.518**	-	I(0)
SAV	-	-6.001** (-3.520)	I(1)	-	-3.520**	I(1)

***Significant at 1%, **Significant at 5%, *Significant at 10%

| | GHANA | | | | | |
| | Augmented Dick-Fuller (ADF) Test | | | Phillip-Perron (PP) Test | | |
Variables	At Level	At First Difference	Order of Cointegration	At Level	At First Difference	Order of Cointegration
RIR	-	-11.300** (-3.520)	I(1)	-	-4.682** (-3.518)	I(1)
GEX	-4.307** (-3.518)	-	I(0)	-4.261** (-3.518)	-	I(0)
MS	-	-6.053** (-3.520)	I(1)	-	-6.057** (-3.520)	I(1)
INF	-5.084** (-3.518)	-	I(0)	-5.029** (-3.518)	-	I(0)
BD	-	-6.249**	I(1)	-	-7.440**	I(1)

		(-3.520)			(-3.520)	
RGDP	-	-9.619** (-3.520)	I(1)	-	-5.169** (-3.518)	I(1)
EXDEP	-	-5.463** (-3.520)	I(1)	-	-5.454** (-3.520)	I(1)
SAV	-3.704** (-3.518)	-	I(0)	-3.682** (-3.518)	-	I(0)

***Significant at 1%, **Significant at 5%, *Significant at 10%

Source: Stationarity test results computed using EViews 8
Note: For both ADF and PP, the 5% critical values are given below the statistics in parentheses. Asterisk (**) shows no unit root at 5% critical value

In Nigeria, the result of the unit root tests (ADF) shows that all the variables with the exception of real interest rate and exchange rate depreciation failed the unit root test at 5% level of significance in their level form. All variables, however, passed the test for stationarity in their first difference. Similar results using Phillip-Perron (PP) test were carried out, and the result also shows that all the variables with the exception of real interest rate, budget deficit and exchange rate depreciation failed the unit root test at 5% level of significance in their level form. All variables, however, passed the test for stationarity in their first difference. In Ghana, both the ADF and PP test present identical results as all the variables with the exception of government expenditure, inflation and savings failed the unit root test at 5% level of significance in their level form. All variables passed the test for stationarity in their first difference.

4.2.1. Lag length/bandwidth selections
Appropriate lag length/Bandwidth was automatically chosen for the variables in the models as informed by both Schwarz Information Criterion and Bartlett Kernel.

4.3. Cointegration tests
Haven established the fact that some variables in the models are stationary at level I(0) and others in first difference I(1), it is necessary to further examine if there exist a likelihood of a long-run relationship amongst the variables. That is to ascertain if the variables are co-integrated. Once this is done, it implies that although some of the variables exhibit random walks, there is a stable long-run relationship amongst them and that the randomness will not make them to diverge from their equilibrium relationship. However, this was carried out with Engle-Granger two-step (EGTS), and presented in table 6 below:

Table 6: Cointegration (augmented Engle-granger) test results

NIGERIA			
Variable	**ADF Test Statistic**	**Test Critical Value at 5%**	**Conclusion**
RESID01	-5.936	-2.931	Stationary at level
GHANA			
Variable	**ADF Test Statistic**	**Test Critical Value at 5%**	**Conclusion**
RESID01	-3.825	-3.518	Stationary at level

Source: Author's computation using EViews 8

4.4. Analysis of the SUR models and two-stage least squares estimation results
To capture the three objectives of the study, a Seemingly Unrelated Regression (SUR) was applied using both the Nigerian and Ghanaian data. The estimation of results for the SUR model (equation 10, 11 and 12) are presented in Table 7 below. The equations represent formulation of the hypotheses on the effects of budget deficits on (1.) interest rate, (2.), inflation and (3) economic growth in both economy. However, the SUR estimation results are presented in tables below:

Table 7: SUR estimation results

Variable	NIGERIA			GHANA		
	RIR	INF	InRGDP	RIR	INF	InRGDP
GEX	1.91E-06 -1.25	-	-	0.711** -3.71	-	
BD	-0.214** (-3.42)	-1.457** (-2.61)	-0.016** (-2.47)	-1.233** (-2.71)	-1.111** (-3.08)	-0.037 (-3.57)
InRGDP	-	-2.236 (-1.09)	-	-	-0.006 (-1.63)	-
InMS	12.402 -1.66	-11.905 (-1.32)	-	-19.102** (-3.60)	-5.406 (-0.28)	-
RIR	-	-	0.026** -2.36			-0.007** (-2.21)
INF	-0.422** (-3.98)	-	0.014** (-3.38)	-0.913** (-19.35)	-	-0.014** (-2.11)
EXDEP	-	0.137** -3.37	-	-	-5.146** (-2.28)	-
InSAV	-	-	0.5 -1.31	-	-	0.033 -0.29
Constant	-34.472 (-1.62)	69.777** -2.9	10.673** -11.79	-10.427 (-0.51)	57.800** -2.99	7.013** -26.68
R^2	0.78	0.85	0.82	0.92	0.74	0.7
Adjusted R^2	0.76	0.83	0.81	0.9	0.73	0.69
Observation (Obs)	44	44	40	44	44	40
F-stat. (chi2)	34.31	16.85	12.9	496.03	5.6	15.54
P-Value	0	0.002	0.011	0	0.23	0.003
DW	1.376	1.431	1.576	1.423	1.631	1.391

Source: Author's estimation using STATA 13

Note: Asterisk (**) shows statistically significant at 5% level of significance. The t-Statistic is given below the statistics in parentheses

4.4.1. Analysis and discussion of the SUR estimation based on economic criteria

The estimation results for the Seemingly Unrelated Regression (SUR) equations are presented in Table 7 above. The equations represent formulation of the hypotheses that budget deficits exert effects on interest rate (first study objective), inflation (second objective), and economic growth (third objective) in Nigeria and Ghana.

The result obtained from the estimation exercise are fairly robust and satisfactory, such that the variables in the estimation models conformed largely to *a priori* expectations in terms of statistical significance. However, as indicated in the SUR equations results above, some estimated coefficients are consistent with *a priori* expectations, while others are not. Focusing our major interest on our core variable which is budget deficit, it is of great interest to note that the coefficients of the variables in three equations (as shown in Table 7) maintain negative signs in line with our *a priori* expectations. This suggests that the relationship between budget deficit; and interest rate, inflation and economic growth in Nigeria and Ghana are negative. The t-statistics, that is, the variables in parentheses in the Table (7) confirm that the coefficient of budget deficit is statistically significant at 5.0 percent. Thus, we can safely reject the null hypotheses that budget deficits do not have effects on interest rate, inflation and economic growth in Nigeria and Ghana.

Furthermore, the coefficients of budget deficit is negatively related to interest rate (RIR), inflation (INF), and economic growth (RGDP) but are all statistically significant. This further suggests that, if budget deficit increases by one percent, the interest rate, inflation and economic growth will decrease by about 0.21%, 2.61%, and 2.47% in Nigeria respectively. Similarly, in Ghana, if budget

deficit increases by one percent, the interest rate, inflation and economic growth will decrease by about 1.23%, 1.11%, and 0.04% respectively. These results support the neoclassical argument in the literature that budget deficit slows the growth rate of the economy through resources crowding-out. These findings suggest that the model variables are robust determinants of real interest rate, inflation, and economic growth in Nigeria and Ghana due to the fact that all their test statistics are relatively significant.

Table 8: Other diagnostic tests

NIGERIA				
Test Type	**Statistic**	**Value**	**Probability**	**Remarks**
Normality	Jarqua Bera	1.684	0.430	Normally distributed residuals
Serial Correlation (LM)	F-statistic	6.913	0.002	No serial correlation
Heteroscedasticity (Harvey)	F-statistic	0.821468	0.6475	No heteroscedasticity
GHANA				
Test Type	**Statistic**	**Value**	**Probability**	**Remarks**
Normality	Jarqua Bera	2.886	0.236	Normally distributed residuals
Serial Correlation (LM)	F-statistic	1.136	0.331	No serial correlation
Heteroscedasticity (Harvey)	F-statistic	1.339	0.246	No heteroscedasticity

Source: Author's estimation using EViews 8

The result of residuals generated the estimated equation was found to be normally distributed for both Nigeria and Ghana. No serial correlation and heteroscedasticity was observed in the equation, implying that the estimates are reliable and result can be relied on the for policy formulation.

5. SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

The study was carried out to empirically address three research questions on the fiscal deficits in Nigeria and Ghana for the period from 1970 to 2013 inclusive. The motivation and justification behind the study and selection of the economies of Nigeria and Ghana were as a result of: first, the centrality of role of fiscal imbalances in determining the economic growth and stability in both economies. Second, the similarities in socio-economic and political structures in both economies. Hence, the study broadly aims to test for the effects of budget deficits on interest rates, inflation and economic growth in Nigeria and Ghana. After testing for these effects of budget deficits on the selected macroeconomic variables in both economies, the empirical results have shown that there exists negative and statistically significant effects on budget deficits on interest rate, inflation and economic growth in Nigeria and Ghana.

The review of the study has shown that while vast growing volumes of research were being carried out in the developed economies, little attention has been paid to the issue of how the fiscal deficits affect interest rate, inflation, and economic growth in both economies. Based on this empirical analysis, appropriate policies can then be drawn given insight to how budget deficit can perform its roles without necessarily leading to inflation.

In order to achieve high and sustained long-run economic growth when budget deficit is used as fiscal policy instrument, then, monetary policy, industrial policy and commercial policy must be strengthened to act as checks and balances in Nigeria and Ghana. Relevant measures to enhance policy coordination among various arms of government should be put in place. Most especially, monetary policy should be made to complement fiscal policy measures. Also, fiscal discipline should

be strongly adhered to at every level of governments. Furthermore, since inflation has been established as monetary phenomenon in both Nigerian and Ghanaian economies; for budget deficit to be effective, some fundamental changes in the productive base of the economy need be made.

Based on the study findings, government of these economies should pursue policies capable of reducing in the size of informal sector which has imposed greater constraint to revenue collection and generation. Also, interest rate should be further reduced to enable availability and accessibility of funds for private sector investment which will contribute significantly to economic growth of the Nigeria and Ghana. Furthermore, exchange rate depreciation should be discouraged in both economies as it has negative implication to the economic growth. Moreover, the regional blocks which these economies belong should be mindful of adoption of one-way-fit-all policy as it may have different consequences on individual economy rather than all member countries. Finally, fiscal discipline is highly recommended for the both economies to combat unsustainable fiscal deficits.

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