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Budget Deficits and Stock Market Returns: Evidence from Ghana

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Abstract Budget deficits and stock markets play vital role functions to a country's economic condition. Thus, this study aims to provide empirical evidence regarding the causality between real budget deficits and real stock market returns in Ghana. We investigate whether changes in budget deficits cause changes in stock prices using monthly data adjusted for inflation from January 2008 to December, 2015 applying VAR framework. Granger Causality test and Impulse Response Functions (IRFs) were also used to aid in the analyses of the results. The sample data was divided into two sub-samples for the period of 2008-2010 (sample 1) and 2011-2015 (sample 2) due to the shift from All Share Index to Composite Index in 2011. The results of this study suggest a significant positive relationship between real stock market returns and real budget deficit for both samples which is in contrast to prior studies. The results further suggest that, for sample 1, budget deficit Granger Cause stocks but stocks does not Granger Cause budget deficit while for sample 2,both budget deficit and stocks does not Granger Cause each other. For sample 1, a shock of deficit of 1% resulted in a decrease in stocks. For sample 2, a shock of deficit of 1% results in a simultaneous increase in stocks.

Keywords: *budget deficits, stock market returns, Ghana, VAR framework, granger causality*

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1. Introduction

The objective of this study is to investigate the impact of government budget deficit on stock market returns in Ghana as copious studies in literature have outlined the linkages between stock market and government budget deficit [9,11,16]. Budget deficits have many effects but all these effects follow from a single initial effect of a reduction of national saving which is the sum of private and public saving [5]. Public saving becomes negative reducing national saving anytime a country runs a budget deficit which leads to an increase in domestic real interest rates in the financial markets exerting an inverse effect on private investment. Budget deficit occurs as a result of either a reduction in tax revenue or an increase in government spending or a combination of the two but available data shows that most countries run huge budget deficit as a result of increases in government spending. Ghana over the years have recorded continuous increase in huge budget deficit as evidenced in Figure 1 below. Ghana's huge budget deficit is as a result of fiscal indiscipline resulting from excessive government spending. The continuous increase in Ghana's budget deficit have raised concerns over its impact on the growth of Ghana's stock exchange market since Roley and Schall [25] advanced changes government budget deficit influences stock markets prices in three ways, namely through changes in aggregate economic output, interest rate and inflation. It is against this background that this study conducts a country specific analysis on Ghana to ascertain the impact of budget deficit on the stock market from the period, 2008-2015. Also, this country specific study will tend to explain the dynamics that causes the linkage between budget deficit and the stock exchange market as the real effects on a country depends on country-specific factors such as institutions, political environment, macroeconomic stability, the level of financial deepening and the level of fiscal imbalances.

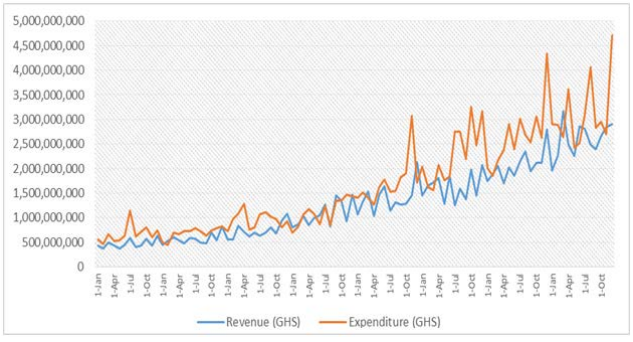

Figure 1. Plot of Government Revenue & Expenditure from 2008-2015

Source: Ministry of *Finance* and Economic Planning.

In the wake of the International Monetary Funds' (IMF) three year extended credit facility of $918 million for Ghana in 2015 to help repay its debt and stabilize the country's economy, a lot of attention has now been paid

towards the management of the country's high budget deficits and its effects of the economy as a whole. From an investor's point of view, knowledge on the possible linkage between a country's budget deficit and the stock exchange market may be critical in deciding whether to invest in a specific market especially in the equity market. Budget deficits tend to have an effect on the stock market via its effect on stock prices and stock market returns. Also, investors are usually concerned about the impact of budget deficits on stock market returns and not about whether budget deficits are inherently good or bad. Budget deficits affect stock prices through inflationary expectations, anticipated future taxes, economic speculations and competitiveness of domestic products as compared to foreign products [5,18]. Budget deficits affect stock prices by influencing both the overall economic climate and the evaluation of alternative assets [25]. A plethora of studies have concentrated on the impact budget deficits have on some key macroeconomic variables such as economic growth, inflation, exchange rate, interest rates and unemployment neglecting the possible effects on the stock exchange market [3,4,12]. Even though there is a general consensus in the literature that budget deficit have negative effects on economic growth, the level and volatility of inflation, exchange rate, debt-to-GDP ratio and other key macroeconomic variables, the effects on the stock exchange market are barely known as not so much work has been done in this area.

The Ghana Stock Exchange (GSE) was established in July 1989 as a private company limited by guarantee under the Companies Code, 1963. Over the last 25 years, the GSE has created 3 markets namely: Equity market, Ghana Alternative Market and the Ghana Fixed income market. It currently has 42 companies listed on the major bourse. Since the year 1990, the GSE has raised over GH 2.1 billion capital and has witnessed an increase in market capitalization from GH3.05 million in 1990 to GH 62,183.49 million as at October 2015 GSE, 2015). It recorded its highest turnover of equities in volume in 1997, with 125.63 million shares, from a volume of 1.8 million shares by the end of 1991. Since then, the volume have been falling steadily from 125.63 million in 1997 to 91.45 million in 1998, 49.57 million in 1999 to 30.72 million in 2000. In 2001, the volume increased to 55.3 million, fell to 44.12 million in 2002, inched up to 96.33 million in 2003 and 104.35 million in 2004. The market share index has continued to fluctuate over the past few years with occasional rise or dip. The stock market plays a key role in fostering capital formulation and sustaining economic growth [1]. The purpose of the stock exchange market is to facilitate the exchange of securities between the lender and the borrower, at an agreed price at a physical location.

2. Literature Review

Keynesian hypothesis suggests that higher budget deficits results in higher interest rates. Keynesian hypothesis has it that, as the government runs a high budget deficit, there is an increase in the supply of bonds as government seeks to finance its high budget deficit. This results in the fall in the prices of bonds resulting in an increase in the interest rate. Higher interest rates tend to crowd out private investment as firms only borrow small amounts of money to finance their investment projects as a result of the high interest rate. This Keynesian hypothesis has led some studies to examine empirically and theoretically the impact of budget deficits on investment [6,17,19,22]. The Keynesian hypothesis has also led some studies to look beyond the effect of budget deficits on investment and to examine the impact of budget deficits on interest rates [10,13,28].

Even though researchers are yet to provide and formulate an economic theory that clearly shows the linkage between budget deficits and the stock market returns, some theoretical evidence have been undertaken to ascertain the channels through which the two are interrelated. Mention can be made of some theories that have attempted to bring out the relationship between budget deficit and the stock exchange market. One of such protuberant theories is the Ricardian Equivalence proposition attributed to Barro [6] which asserts that fiscal policy options have no effect on the stock market activity due to the efficiency of the stock markets. This view expressed by the Ricardian Equivalence proposition is also supported by Stock Market Efficiency (SME) hypothesis. The SME hypothesis asserts that fiscal policy options have no effect on the stock exchange market activities due to the observation that stock prices fully reflect all publicly available information. However, Tobin [27] and Blanchard [7] among others found a results different from that of Barro [6] and the SME hypothesis. In particular, Tobin [27] in his general equilibrium approach asserts that there is a linkage between stock returns and the real and financial sectors of the economy. Tobin [27] further depicted how budget deficits and the growth of money could have important impact on the stock market. Tobin [27] explains that increases in government spending with taxes constant tend to increase asset returns (prices) inducing investors to invest more in the capital market. Moreover, high capital gain taxes which may result from excessive government spending may discourage investors from actively trading their shares which may dampen the liquidity of the stock market.

Our literature review search suggests that empirical studies on the relationship between budget deficits and the stock exchange market are very few clearly giving reasons why this subject should be explored further. Results from empirical studies on the relationship between budget deficit and stock market prices have been inconclusive. Whereas some studies find a positive relationship between budget deficit and stock market prices [16,25,29,30], other studies find a negative relationship [9,11,14,20]. Grobys [16] investigated the nexus between stock prices and budget deficit from the US economy of which contrary to earlier study he found a positive significant relationship between stock market returns and federal budget deficit. Adrangi and Allender [2] examined the relationship between budget deficits and stock market prices in industrialized countries such as Japan, USA, France and Germany using the Granger causality and the Vector Auto Regression (VAR) tests. The study found an inverse relationship between budget deficit and the stock market prices in the US. However, a positive relationship was found in the other countries. Similarly, Quayes [24] also studied the relationship between budget deficits and stock market prices in the US by integrating the effects of inflation and demographic structure. The study results

showed a negative relationship between budget deficit and stock market prices. In the case of developing countries, Osamwoyi and Osagie [23] investigated the relationship between some macroeconomic variables such as interest rate, inflation rate, exchange rate, fiscal deficit, GDP, money supply and the Nigerian stock market. Using an annual data from 1975-2005, the study found a negative relationship between the stock market index and money supply, interest rate and GDP. However, the study found a positive relationship between stock market index and macroeconomic variables such as budget deficit, inflation rate and exchange rate. Similarly, Saleem et al. [26] investigated the long run causal relationship between budget deficit and stock market in India and Pakistan. The study results show a positive relationship between budget deficit and stock market in Pakistan due to high development expenditures. On the other hand, the study found a negative relationship between budget deficit and stock market in India due to increase in current expenditures. With regards to the causal relationship, a causal relationship running from budget deficit to stock market was found in Pakistan. However, no causal relationship was found in India.

3. Data and Methodology

This study conducts an empirical analysis on the impact of government budget deficits on stock market returns in Ghana. The study uses monthly data covering the period January 2008 to December 2015 representing a total of 96 monthly observations. The stock market data of Ghana stock exchange was obtained from Ghana stock exchange while data on government of Ghana monthly budget deficits was obtained from the Ministry of Finance. The data obtained was adjusted for inflation hence given in real terms for both variables understudy. The data for stock market was divided into two samples (2008-2010 and 2011-2015) due to the shift from All Share Index to Composite Index in 2011. This current study adopted the approach of Grobys [16] who examined the impact of federal budget deficits on stock market returns in the US by using a VAR model in contrast to Ewing [11] since the VAR model does not impose arbitrary exogeneity restrictions on the variables.

The model is given by:

$$Y_t = A_1 Y_{t-1} + ... + A_p Y_{t-p} + DX + E_t \qquad (3.1)$$

Y_t is a 2 × 1 vector containing the real budget deficit returns (hereafter, deficit) and the real stock market returns which will be referred to as stocks hereafter, X is a 2×1 vector that contains a constant and a time dependent deterministic term and E_t is a 2×1 vector of random variables which is assumed to be multivariate normally distributed with expectation of zero and covariance matrix $\sum$. Also $A_1,....,A_p$ and D are a 2×2 parameter matrices.

For the purposes of the study we choose a lag order of $\rho = 1$ since we using monthly data for the estimation. The study relied on sequential elimination of regressors as advanced by Bruggermann and Luthkephol [8] to ensure the models are parsimonious. Hence we considered the value of $c_T = 2$ for AIC criterion as suggested by Lutkepohn and Kratzig [21]. Granger causality test and estimation of impulse response functions was done using the reduced models.

The bivariate system in equation 1 was re-written by labelling the reduced models parameter estimates with *.

$$\begin{pmatrix} y_{1,t} \\ y_{2,t} \end{pmatrix} = \begin{pmatrix} a^*_{11,1} & a^*_{12,1} \\ a^*_{21,1} & a^*_{22,1} \end{pmatrix} \begin{pmatrix} y_{1,t-1} \\ y_{2,t-1} \end{pmatrix} + ... + \begin{pmatrix} a^*_{11,p} & a^*_{12,p} \\ a^*_{21,p} & a^*_{22,p} \end{pmatrix} \begin{pmatrix} y_{1,t-p} \\ y_{2,t-p} \end{pmatrix} + \begin{pmatrix} d^*_{11,1} & d^*_{12,1} \\ d^*_{21,1} & d^*_{22,1} \end{pmatrix} \begin{pmatrix} c \\ t \end{pmatrix} + \begin{pmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \end{pmatrix} \qquad (3.2)$$

If the deficit is not Granger Casual for the stocks, the parameters $a^*_{21,1},\ldots a^*_{21,p}$ will not be significantly different from zero. Hence the following pair of hypothesis is tested.

a. $H_0 : a^*_{21,1} = ... = a^*_{21,p} = 0$ against H_1 : at least one of $\left\{a^*_{21,1},...a^*_{21,p}\right\}$ is $\neq 0$

Also if the stocks are not Granger Casual for the deficit, the parameters $a^*_{12,1},\ldots a^*_{12,p}$ will not be significantly different from zero. Hence the following pair of hypothesis is tested.

b. $H_0 : a^*_{12,1} = ... = a^*_{12,p} = 0$ against H_1 : at least one of $\left\{a^*_{12,1},...a^*_{12,p}\right\}$ is $\neq 0$

In addition to examine the relevance of the stochastic interrelations coupled with the adequacy of the selected VAR model framework we tested for instantaneous causality by considering the following pair of hypothesis:

c. $H_0 : E(\varepsilon_{1,t}\varepsilon'_{2,t}) = 0$ against $H_1 : E(\varepsilon_{1,t}\varepsilon'_{2,t}) \neq 0$

We as well investigated the response of stocks to shocks of one percent point in the deficit process after performing causality tests by making use of Wold Moving Average (MA) that depicts the process in equation 1:

$$Y_t = E_t + \Phi_1 E_{t-1} + \Phi_2 E_{t-2} + ... \qquad (3.3)$$

Where $\Phi_S = \sum_{j=1}^{S} \Phi_{S-j} A_j$ and Φ_0 is the identity matrix.

In order to set the variables such that the deficit will impact on the stock, we used orthogonal innovations by applying the Cholesky decomposition of the covariance matrix advanced by Lutkepohl and Kratzig [21].

4. Empirical Analysis

Table 1 summarizes the descriptive statistics of the variables understudy for the entire period. Both real returns of stock market and budget deficit recorded negative skewness. Also both series show low dispersion which signifies that the deviations of the actual data from their mean values are small. In addition, the Jarque-Bera test of normality is rejected for both series as probability <0.05. Further analysis reveals that, the mean and median lies with the minimum and maximum values which depicts the series possesses high level of consistency.

Table 1. Descriptive Statistics and Jacque Bera Test of Normality

	Stock Market	Budget Deficit
Mean	-0.134307	-23.69524
Median	-0.117643	-0.535414
Maximum	0.112373	8.844602
Minimum	-0.947461	-1984.614
Std. Dev.	0.120420	203.9457
Skewness	-3.457584	-9.506485
Kurtosis	23.77173	91.88684
Jarque-Bera	1897.167*	32705.18*
Probability	0.000000	0.000000
Observations	95	95

Source: Authors Estimations. *Denotes statistical significance at 1% level.

For the sake of comparison, the study incorporated the ADF and PP test into the study. Table 2 presents the unit root rest of these two conventional unit root test. The result shows that both variables understudy attained stationarity at levels.

Table 2. Unit Root Test Results

	Levels	
	ADF	PP
Stock Market Returns	-7.351*(0.000)	-7.347*(0.000)
Budget Deficit Returns	-9.713**(0.000)	-9.712**(0.000)

Source: Author's Estimations. Note: * and ** indicates significance at the 1% and 5%level of testing respectively.
Values in parenthesis indicate p-values.

To test for the impact of budget deficit on stock returns, the sample data was divided into two sections to account for the shift from All Share Index to Composite Index in the stock market data. Table 3 shows the results for testing the hypothesis (a) – (c). For sample 1, we found out that deficit is Granger Causal to stocks. However, the results concerning stocks shows that, stocks does not Granger cause deficit at 5% level of significance. Sample 2 further indicates that, deficit does not Granger Cause stocks and stocks does not Granger Cause deficit.

Table 3. Testing for Causality

Causality Hypothesis	Test Value	Distribution	P-Value
Sample 1 (2008-2010)			
(a)	1.194**	$\chi(1)$	0.001
(b)	0.146	$\chi(1)$	0.865
(c)	2.69*	$\chi(2)$	0.045
Sample 2 (2011-2015)			
(a)	0.124	$\chi(2)$	0.884
(b)	0.428*	$\chi(1)$	0.023
(c)	1.68*	$\chi(3)$	0.014

Source: Authors Estimations. Note: * and ** depicts significant on a 5% and 1% significance level.

Table 4 shows test of correlation and serial correlation for both samples. For both samples, the null hypothesis of serial correlation was accepted since the p-values of both multivariate LM Test and Multivariate ARCH-LM test exceeds the alpha value of 5%. The results of the test of serial correlation gives evidence for no potential misspecification The estimated correlation of 0.5 between stock and deficits for sample 1 was found to be positive and significant at 5% level of significance. For sample 2, the null hypothesis of no correlation was rejected hence the estimated correlation of 0.02 between stocks and deficit for sample was as well found to be significant. The positive linkage found in this study is in consonance with earlier studies by Grboys [16].

Table 4. Correlation and Serial Correlation Test

	Multivariate LM Test	Multivariate ARCH-LM Test	Correlation Estimate
Sample 1 (2008-2010)	5.499 (0.239)	9.542(0.568)	0.50*
Sample 2 (2011-2015)	2.550(0.636)	5.874(0.354)	0.02*

Source: Authors Estimations. Note: * depicts significant on a 5% significance level.

Table 5. Orthogonal Impulse Responses

Time (in months)	Sample 1	Sample 2
1	-0.902019	0.000000
2	-0.076922	7.092262
3	-0.068801	1.049246
4	-0.044780	0.179825
5	-0.029576	0.030243
6	-0.019519	0.005098
7	-0.012882	0.000859
8	-0.008502	0.000145
9	0.005611	2.44E-05
10	0.009703	4.11E-06
11	0.021444	6.93E-07
12	0.065613	1.17E-07

Source: Authors Estimations.

The Table 5 shows the estimated responses for an increase in the deficit by 1% in both samples. For sample 1, a shock of the deficit of 1% results in a decrease in stocks till the ninth month where the impulse to shock becomes positive. For sample 2, the shock of the deficit of 1% results in a simultaneous increase of 7.09% in stocks in the second month. After the third month, the cumulative increase in stock declines up to the twelfth month.

5. Conclusion

In this study, an effort has been made to investigate whether budget deficits affect stock prices in Ghana. To achieve this objective, we employed monthly data from January 2008 to December, 2015 for all variables used in the estimation. The present paper used VAR framework, Granger Causality and Impulse Response Functions for the analysis. The study made use of ADF and PP unit root tests to check the non-stationarity property of the series. The test statistics of the unit root suggest that both variables included in the study attained stationarity at levels. We found out that, for sample 1 budget deficit Granger Cause stocks but for sample 2 the study found budget deficit does not Granger Cause stocks and stocks

does not Granger Cause budget deficit. The study also found a significant positive correlation between stocks and budget deficit for both samples. For sample 1, a shock of the deficit of 1% results in a decrease in stocks till the ninth month where the impulse to shock becomes positive. For sample 2, the shock of the deficit of 1% results in a simultaneous increase of 7.09% in stocks in the second month. After the third month, the cumulative increase in stock declines up to the twelfth month.

Evidence reveals that there is positive relationship between budgets deficit and stock market. The economy of Ghana is not fully employed and in order to sustain the economic conditions government spent money on different sectors of economy by running deficits and this increase in development expenditures by government causes increase in stock prices. Ghana is still trying to achieve the industrial stability even though it is still considered a secure place for investment opportunities. Moreover, currently Ghana is under IMF bailout and inefficient capital market, unemployment and economic conditions are few other reasons due to which positive correlation among deficits and stock market has occurred.

The rising budget deficit should serve as the reminder for policy makers to monitor and control its effects on economic conditions. There are some recommendations for the stakeholders, which are formulated on basis of this study. Firstly, the authorities that deal with fiscal policymaking should take correct measures to curb budget and trade deficit up to that level which is acceptable for current economic conditions. Also, Government should take some bold steps to cut down its running expenditure leading to lesser borrowings from state bank. Moreover, central bank should follow strict rules and regulations in advancing loans to the government and repayment schedule. Whereas concern authorities should promote bilateral trade and tax free zones to reduce the current account deficit, monetary authorities on the other hand should concentrate on resource utilization and concrete strategies to drive the economic conditions smoothly. The capital market for Ghana which is at the developmental stages hence authorities should formulate laws and regulations to protect investor's funds, enhance transparency and improve member listings.

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