THRESHOLD ANALYSIS OF BUDGET DEFICIT AND ECONOMIC GROWTH IN SIERRA LEONE

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ABSTRACT

The deteriorating budget deficit over time in Sierra Leone has prompted policy makers to look for measures to improve the budget balance by focusing on reducing government expenditures as a primary approach to tackle the issue of budget deficit. As governments normally run deficits to sustain economic growth or provide stimulus for economic recovery based on the Keynesian framework, the effectiveness of a budget deficit needs to be determined so that the appropriate government budget position can be maintained to best suit the economic circumstance of the country. Without definite empirical framework to guide policy maker on the level of budget deficit that is appropriate for economic growth in Sierra Leone, the danger of government running excessive deficits that might destabilize the economy cannot be ruled out. This paper estimates the threshold level of Budget deficit that is conducive for growth in Sierra Leone using the non-Linear Least Squares approach following Khan and Senhadji (2001) and Onwioduokit (2012). The empirical results indicate that the threshold level of Budget deficit conducive for economic growth for Sierra Leone was identified at 7.0 percent. The findings of this paper provide ample evidence in support of the proposition that Budget deficit beyond certain threshold is detrimental to growth. This suggests that the Sierra Leonean authorities should endeavour to implement policy measures aimed at reducing Budget deficits to levels below or equal to 7.0 per cent (levels consistent with economic growth).

1.0   Introduction

The world over, governments usually run deficits to sustain economic growth or provide stimulus for economic recovery. The effectiveness of such policy needs to be determined in order to be able to appropriately determine government budget position that is best suited for economic growth at any point in time. This is also to avoid the danger of government running excessive deficits that might destabilize the economy. In recent times the Sierra Leonean authorities have

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expressed concern over the widening budget deficits. This is because more debt might be required to finance the deficits should it continue at the current rate. Since there are currently no guidelines for policymakers regarding what level of budget deficit to be maintained, there is a possibility that deficit could increase to a level that is detrimental to growth and thus pose great risk of insolvency in the future.

Disproportionate deficits, regardless of the mode of financing, are assumed to be growth retarding. For instance, deficits financed through arrears tantamount to the imposition by the government of an illegal and unexpected tax on its local creditors. This will lead to abrupt reduction in the profitability of local investors, dimple relationship between the private and the public sectors, or perhaps create a crisis of confidence and thus dampened private initiative. Even when the accumulation is limited to domestic arrears, the damage done to the profitability of national ventures could be huge and the country's credibility could be dented.

With respect to deficit financed through monetary expansion which amounts to imposition of an inflation tax, the real value of private claims on the government could be eroded. Beaugrand (2004) notes that the negative effects on economic activity and social peace of continued attempts to impose the inflation tax will create uncertainty and, in particular, real interest rates and real exchange rates instability. The external financing option of deficits through the issue of foreign liabilities or accumulation of external arrears, could through the market perception of the risk of future debt-servicing difficulties, push up the country's risk premium, raising the country's cost of borrowing in the world financial markets.

The effect of budget deficit on economic growth is one of the vastly disputed issues in economics. There is no consensus among economists on this issue either theoretically or empirically. The conventional view is that budget deficit is the main source of macroeconomic instability. Empirical studies, however, do not conclusively support this assertion as results are mixed and controversial across countries, data and methodologies. A strand of the argument, following Keynes is that budget deficits accelerate capital accumulation and growth (Krishnamurthy, 1984; and Chandrasekhar, 2000). The accent here is that enlarged Budget deficit as a result of public sector investment, particularly in infrastructure, encourages growth in the private sector. Increasing public investment within an appropriate policy framework, gives the private sector adequate composure and incentives to invest leading to overall economic growth.

On the other hand, as articulated by Bernheim (1989), neoclassical school envisions farsighted individuals planning consumption over their own life cycles. Through budget deficits, individuals raise total lifetime consumption by shifting taxes to subsequent generation. If economic resources are fully employed, increased

consumption implies decreased saving and interest rates must then rise to bring capital markets into balance. Thus, persistent deficits crowd out private capital accumulation and can be highly detrimental to the economy.

Sierra Leone has never recorded a budget deficit excluding grants of less than 5.0 percent in the past one decade. The country recorded respective budget deficit rates of 16.5 percent, 11.7 percent, 10.0 percent, and 8.6 percent in 2001, 2002, 2003 and 2004. In 2005 the rate of 9.6 percent was recorded. Subsequently, the deficit rate dropped to 8.6 percent (2006) and 5.0 percent (2007).Since recording 7.9 percent in 2008, the deficit has trended upwards reaching 10.4 and 14.1 percent in 2009 and 2010, respectively.

Figure 1: Budget deficit/GDP, Output and Inflation (2001-2010)
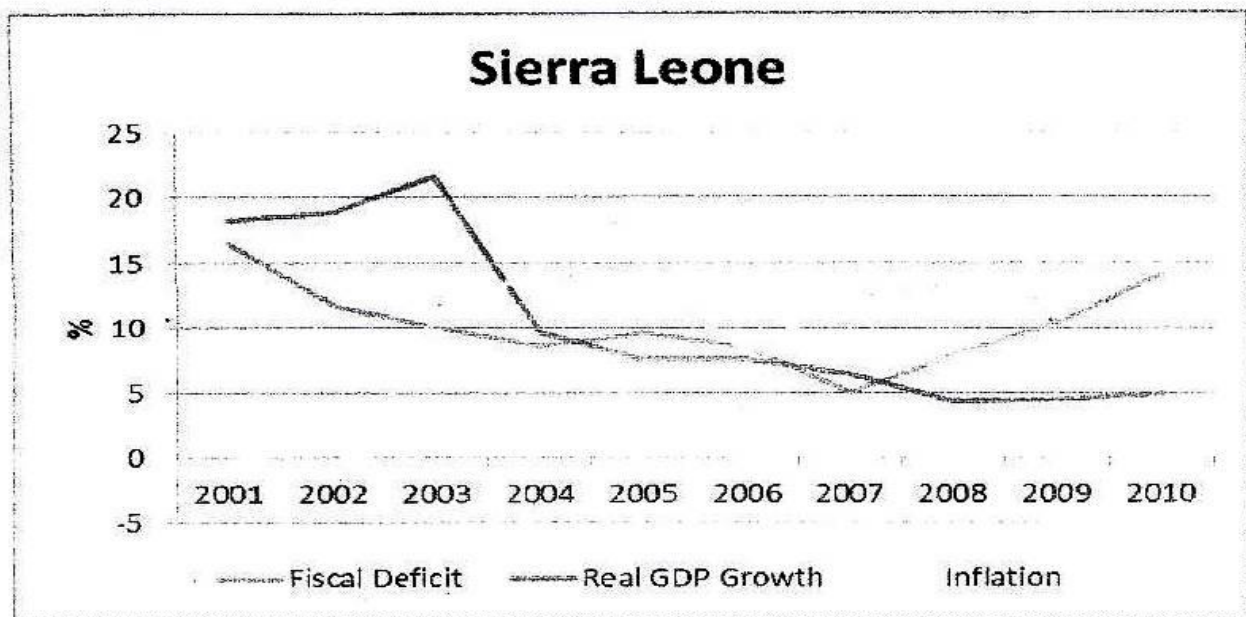
In the last decade inflation rate in Sierra Leone has been in double digits, except in 2002 and 2006 when single digits were recorded. Inflation decelerated from 13.2 percent in 2008 to 12.2 percent in 2009 but the trend was reversed in 2010 when 17.8 percent inflation rate was recorded. Persistent depreciation of the Leone and increases in the domestic fuel prices adversely impacted on the domestic prices via increased transport costs. Furthermore, the financing of government deficits from central bank was seen as the causes of inflation in 2009 and 2010. The growth rate of the economy has been very strong exceeding 5.0 percent in all the years (2001-2010) with the exception of 2009 when the economy grew by 4.0 percent. The observed trend in the growth rate was driven by buoyant service sector and increased agricultural production.

The conventional belief that fiscal deficit is detrimental to output growth, has compelled policy makers in Sierra Leone and elsewhere to attempt to operate balanced budget. However, a strand of the literature both theoretic and empirical also seems to suggest that fiscal deficit is growth enhancing. This therefore poses a dilemma for policy makers: In effect, how low should deficit be? Should the deficit target be 0.0 percent, 2.0 percent, 6.0 per cent, 10.0 per cent or what percent? Broadly, at what level of deficit does the relationship between deficit and output growth turn negative? These are some of the quandaries that several empirical studies have examined, centering explicitly on whether the relationship between deficit and output growth is a nonlinear one.

Put differently, at some (low) level of deficit, the relationship is assumed to be either positive or nonexistent, but at an elevated level it is assumed to be negative. If such a nonlinear relationship exists, then it should be possible, in principle, to estimate the inflexion point, or threshold, at which the sign of the relationship between the two variables would switch. The possibility of such a nonlinear relationship has been identified by Adams and Bevan (2002) and Onwioduokit (2012).

The lack of threshold levels to serve as guidelines in maintaining and ensuring that deficit level is on a sustainable path could cause the fiscal position of the country to go out of control as there are no empirically established formal guidelines for policymakers to adhere to when it comes to budget deficits. The key objective of this paper is to estimate the threshold level of budget deficit that is conducive to economic growth in Sierra Leone. Determining appropriate threshold for this significant indicator is critical in the overall economic management as it would inform policy in Sierra Leone. The remaining part of the paper is organized as follows: Part II reviews theoretical and empirical literature while part III contains analytical framework. The results are presented in Part IV. Part V contains summary and some concluding remarks.

2.0   THEORETICAL AND EMPIRICAL REVIEWS

Theoretical conclusions regarding the relationship between budget deficit and economic growth are contentious. While the Keynesians opine that there is a positive relationship between these two variables, the neo classicals argue the opposite. Meanwhile, the Ricardian equivalence hypothesis claims that there is a neutral relationship between budget deficit and economic growth. The differences in terms of opinions and analyses reflect the influence of various factors including time dimension, the level of economic development of the countries, forms of government administration and method of analysis as well as the level of budget deficit (Briotti, 2004).

Brender and Drazen (2008) opine that budget deficit can also reduce the economic growth of a country based on the perspective of politics and election process. They note that high budget deficits recorded by a country will give negative signals to the citizens on the ability of the government to perform well in managing the funds of a country. As a result, there is a probability of re-election process to be conducted in order to replace the authorities. Indirectly, the authorities who did not perform well may not be able to bring the country to the upper level. Hence, it will not contribute to high economic growth due to lack of confidence among citizens, investors and other neighbouring countries.

Also, Benos (2005), consistent with the Ricardian equivalence hypothesis, argue that the budget surplus that is currently recorded by the government will be used to finance future deficits. Therefore, an increase in the budget deficit will not impact the economic growth since it is financed through previous surplus. Bivens (2010) asserts that government borrows money internally or externally in order to finance budget deficit. An increase in the demand of the loanable funds by the government will distort the level of private investment due to an increase in the interest rate. The decline in the private investment will definitely reduce the level of economic growth.

2.1   EMPIRICAL REVIEW

Empirical findings on the relationship between Budget deficit and economic growth have been mixed. Barro (1979) reports a positive and significant impact of budget deficit on growth. Kormendi, and Meguire (1985) arrive at a similar conclusion that budget deficit enhances growth, based on the cross sectional analysis. Fischer (1993) finds that huge budget deficit helped Morocco and Italy to grow since the excessive spending helped to increase the level of private consumption in the short-run. From consumer perspectives, deficits were used to reduce the burden of taxation.

Aschauer (1989) applies annual data on the US over the period 1953-1986 to examine the effect of government deficit on private investment and the rate of return to private capital. He found that an increase in public investment arising from deficit reduced private investment nearly one-to-one as the private sector utilizes the public capital for its required purposes rather than expand private capacity. At a deeper level, a distinctive feature of public infrastructure capital is that it complements private capital in the production and distribution of private goods and services. Hence, public investment is expected to raise private investment as the former raises the profitability of private capital stock. The empirical results indicated that while both channels appear to be operating paripasau, the later dominates, so the net effect of a rise in deficit financed public investment had a positive effect on private investment. This implies that government deficit financed

investment had a positive effect on private investment and caused crowding-in rather than crowding-out.

Giannaros and Kolluri (1989) apply the OLS technique on the fisher equation and the IS-LM general equilibrium model by using data set of five industrial countries from (1965-1985). The analysis yielded three different results; first, there is a negative relation between interest rate and inflation, second, there is an indirect significant effect of budget deficit on interest rate, third, the study did not find any clear relation between variables with the help of other exogenous variables. Easterly et al (1993) reported a consistently negative relationship between growth and budget deficits. Fischer (1993) findings support Easterly et al (1993) results and conclude that large budget deficits and growth are negatively related. Among other variables including inflation and distorted foreign exchange markets, the author emphasized the importance of a stable and sustainable fiscal policy, to achieve a stable macroeconomic framework.

Anusic (1993) investigates the relationship between budget deficit and economic growth in the Republic of Croatia using data from (1991-1992). He finds that deficit is a priori harmful for the proper and smooth economic system. He refers to the Keynesian economic theory; the increase in budget deficit will cause an increase in real interest rate, this increase will cause decrease in real investment. The author concludes that the impact of budget deficit on overall economy is harmful. However, he points out that the outcome also depended on the internal condition and way of financing by the country. Ball et al (1995) note that in the long-run, huge budget deficits ruined the level of economic growth for countries since they have to struggle in paying back the national debts. However, Ghali (1998) reports a neutral relationship between budget deficit and economic growth in Saudi Arabia.

In a related study, Al-Khedar (1996), applies VAR model on data of G-7 countries for the period 1964-1993 and reports that budget deficit had a positive and significant impact on the economic growth of these countries. He also avers that the deficit negatively affects the trade balance. Hakkio's (1996) studies of the USA, Finland, Sweden and Germany for the period of 1979-1995 could not establish any empirical association between deficit and economic growth in the economies of United States of America (USA) and Germany. However, by applying simple regression technique and considering data from Sweden and Finland he was successful in establishing a negative relationship between budget deficit and the exchange rate.

Jenkins (1997) motivated by the persistent deficits in Zimbabwe, examines public sector deficits and macroeconomic stability in Zimbabwe. The author identified an intense debt problem, drought and terms of trade shocks coupled with the

government's unwillingness to engage in fiscal adjustment as fundamental macroeconomic setbacks in Zimbabwe. Findings of the study show that uncertainty caused by the growing public-sector debt reduced private investment and further resulted in a decline in growth. The macroeconomic model explored by the researcher shows that the variable with greatest influence on overall growth was agricultural output. However, the budget deficit exercises an unambiguously negative impact on exports. It also reduces private welfare, worsens income distribution and reduces employment. The author concludes that the growth of government resulted in a drain on the economy, rather than facilitate economic growth and development.

Cebula (1988) avers that, the crowding-out effect surfaces as the budget deficit burden increases. The author reports a strong, significant and positive relationship between the budget deficit and the long-term nominal rate of interest in a study conducted for the period 1971 to 1984 on United States of America. Anyanwu (1998) deviated manifestly from past studies that focused more on the effects of deficits and concentrated on the impact of deficits financing. He applies regression analysis to pooled cross-section and time series data for Nigeria, Ghana and the Sierra Leone. The results did not reveal a significant positive association between overall budget deficits (and its foreign financing) and domestic nominal deposit interest rates. However, the author reports a significant positive relation between domestic financing of the budget deficits and domestic nominal deposit rates. He concludes that the concern of economists in the Sub-region should shift from the deficits itself to the manner of financing the deficit.

Mugume and Obwona (1998), concerned about the role of fiscal deficit in the reform programme in Uganda, investigate public sector deficits and macroeconomic performance in Uganda. The study set out to provide a more systematic modelling framework to explain the interrelationships between budget deficits, current account deficits and real exchange rate depreciation. Another focus of the research was to analyze the behaviour of important aggregate variables such as price level, current account balance, external sector and money stock as influenced directly and indirectly by changes in Budget deficits. A miniature macroeconomic model that captured the interactions between exports, import, real exchange rate, government expenditure, price, and money supply was specified. The empirical strategy attempted to build an integrated model linking the public sector with the financial market and then generate implications for the conduct of fiscal policy. A distinct finding of the estimations was the observed interaction of the public sector and monetary sector. He concludes that deficit positively relate with economic growth.

Bahmani (1999) applied the Johansen Juselius co-integration technique to

investigate the relationship between the budget deficit and investment, using quarterly data for the period of 1947-1992 for the U.S.A. The author reported a 'crowding in' impact of the budget deficit on real investment, which is a validation of the Keynesian arguments regarding the expansionary effect of the budget deficit on investment. Olaniyan (2000) measures the effects of economic instability on aggregate investment in Nigeria. Using a classic reduced form of investment equation with measures of instability among which includes, budget deficits; he finds that fiscal deficit depressed investment in Nigeria.

Ahmed and Miller (2000) in a cross-sectional study of thirty nine states utilizing data for the period 1975-1984, using Ordinary Least Squares model (OLS), fixed effect and random effect methods maintain that government spending can be segregated into two parts: First, the spending on social security and welfare of its people; this reduces investment; Second, the spending on communication sector, including transport, increases investment by the private sector in less developed countries (LDCs). He reports that reduction in investment led to less revenue generation, hence causing deficit, and vice-versa when spending in transport and communication was analysed.

Adams and Bevan (2002) assess the relation between budget deficits and growth in a panel of forty five (45) developing countries. An overlapping generation's model in the tradition of Diamond (1965) that incorporates high-powered money in addition to debt and taxes was specified. The estimation strategy involves a standard fixed effect panel data estimation and bi-variate linear regression of growth on the budget deficits using pooled data. An important contribution of the empirical analysis is the existence of a statistically significant non-linearity in the impact of budget deficit on growth. However, this non-linearity, the authors argue, reflected the underlying composition of deficit financing.

In effect, the authors posit that for a given level of government spending, a shift from a balanced budget to a (small) deficit may temporarily reduce distortions especially if the distortions impact growth rather than output. Based on a consistent treatment of the government budget, the authors found evidence of a threshold effect at a level of the deficit around 1.5 percent of GDP. While there appeared to be a growth payoff to reducing deficits to level, this effect disappeared or reversed itself for further fiscal contraction. The magnitude of this payoff, but not its general character, necessarily depended on how changes in the deficit were financed (through changes in borrowing or seigniorage) and on how the change in the deficit was accommodated elsewhere in the budget. The authors also found evidence of the effects of interaction between deficits and debt stock, with high debt stocks exacerbating the adverse consequences of high deficits.

Nyong and Odubekan (2002) apply ordinary least squares estimation procedure to the effect that monetary financing of deficits leads to an increase in the money supply which affects inflation. The increase in inflation generates instability in the macro economy and hence poor economic growth due to the negative signal it sends to investors and savers. Saleh (2003) building on earlier studies on the impact of budget deficit on different economic variables, concludes that budget deficit has diverse impact on different economic variables. The range of the impact varies from country to country but could not ascertain the true impact on the economic growth. He applies the IS-LM model to explore the impact of budget deficit on different variables, including, interest rate, using simultaneous equations model for trade deficit and simple equation model to assess the impact on the GDP. He reports a positive and significant relationship between budget deficits and economic growth. Vit (2004) applies quarterly data on Czech Republic's economy over the period 1995 to 2002 to study the impact of deficit on the economy. He reports that budget deficits cause inflation and current account deficits, which subsequently impede economic growth.

Loizides and Vamvoukas (2005) apply the trivariate causality test to examine the relationship between government spending and economic growth, using data set on Greece, United Kingdom and Ireland. The study finds that government expenditure granger cause economic growth in all the countries. The finding was true for Ireland and the United Kingdom both in the long and short-run. The results also indicate that economic growth granger causes public expenditure for Greece and United Kingdom, when inflation is included.

Olowononi (2006) investigates the impact of budget deficit on selected macroeconomic variables in Nigeria. The results indicate that budget deficits had increasingly caused inflation in Nigeria. Budget deficit was also found to be negatively correlated with unemployment. The author concludes that the results corroborate the prescription of economic theory that rising budget deficit reduced unemployment. The author however, reports a negative relationship between budget deficits and gross capital formation and private investment in Nigeria. Bose, Haque and Osborn (2007) investigate the relationship between budget deficit and economic growth for 30 developing countries from 1970 to 1990 using panel data. The authors find that budget deficit impacts positively on output growth provided such deficit are applied in the productive expenditures such as education and health.

Olawumi and Tajudeen (2007) examine the contribution of fiscal policy in the achievement of sustainable economic growth in Nigeria using the Solow growth model and report that fiscal policy had not been effective in the area of promoting sustainable economic growth in Nigeria. They attribute the poor performance of

fiscal policy to the problems of policy inconsistencies, high level of corruption, wasteful spending, poor policy implementation and lack of feedback mechanism for implemented policies.

Aghion and Marinescu (2007), in analyzing cyclical budgetary policy and economic growth, apply yearly panel data on OECD countries to analyze the relationship between growth and the cyclicality of the budget deficit. Their result indicate that a more countercyclical budget deficit is positively correlated with growth. A coefficient of 0.11 of the lagged counter cyclicality of budget deficit means that if private credit to GDP is 0, then increasing the counter cyclicality of the budget deficit by one percentage point increases growth by 0.11 percentage point. For each percentage point increase in private credit to GDP, this positive effect of counter cyclicality diminishes by 0.0004. The effect of the interaction is thus small: private credit over GDP would need to be larger than 2.75 for a countercyclical budgetary policy to become growth-reducing. Thus, it is only at fairly high levels of financial development that countercyclical budgetary policy becomes noticeably less growth enhancing. Thus when the economy is on a decline, an increase in the budget deficit through public investment expenditure has a much greater effect on economic growth. In periods of economic boom, reductions in such expenditures have similar effect. At high level of financial development however, private sector credit is high and as such the effect of government expenditure is not as prominent as otherwise.

Obi and Nurudeen (2009) examine the effects of budget deficits and government debt on interest rates in Nigeria, by applying the Vector Auto-regression approach. The results of the estimation show that the explanatory variables account for approximately 73.6 percent variation in interest rate in Nigeria. The estimation also shows that budget deficits and government debt are statistically significant. For instance, a 1 percentage increase in government debt-GDP ratio raises interest rate by approximately 2.47 percent. The results indicate that budget deficits and government debt have positive impact on interest rates, while inflation and exchange rate were found to have negative effect on interest rates. The authors conclude that deficits financing leads to huge debt stock and tends to crowd-out private sector investment, by reducing the access of investors to adequate funds, thereby raising interest (and/or lending) rates. The rise in interest rate reduces investment demand and output of goods and services. These in turn reduce national income as well as employment rate, and the overall welfare of the people would decline.

Korsu (2009) investigates the effects of budget deficit on the external sector of Sierra Leone. The study utilized aggregate annual data from 1971 to 2005. Equations for

money supply, price level, real exchange rate and the overall balance of payments were estimated simultaneously, using Three Stage Least Squares (3SLS). Counterfactual policy simulation was then performed. The result shows that fiscal restraint improves the external sector of Sierra Leone by reducing money supply and the price level. The result also points to the need for a sustained reduction in the budget deficit of Sierra Leone as this helps in achieving monetary restraint and low price level, which has real exchange rate depreciation and improvement in the balance of payments as ultimate external sector benefits.

Korsu (2009) finding support the arguments of Jenkins (1997) and Mugume and Obwona (1998) who worked on data on Zimbabwe and Uganda, respectively. They argue that budget deficits are inimical to macroeconomic performance as a whole and advocated for fiscal restraint as a pathway to improving other sectors of the economy and welfare. Korsu (2009)'s work recognises economic growth, low and stable prices and healthy external balance as the macroeconomic policy objectives of the economy of Sierra Leone. These, he argues have been hampered by the persistence of budget deficits following some background analysis and historical records. To provide empirical support to the background information, aggregate annual data for the period 1971 to 2005 are used in an econometric estimation. Predicated on an open economy model, equations for money supply, price level, real exchange rate and the overall balance of payments were specified. The empirical models are estimated using a 3-stage least square estimation technique. The estimated results show that fiscal restraint improved the external sector of Sierra Leone by reducing money supply and the price level. The important contribution of Korsu's paper rests on the simulation experiments which differ from previous studies reviewed. The results point to the need for fiscal restraint and improved revenue generation to meet the expenditure requirements of the government.

Kumar and Soumya (2010) study the relationship between GDP growth and budget deficits taken as percentage of GDP to estimate a simple regression equation. The result yields a negative correlation, though a weak one, between GDP growth and budget deficit as a percentage of GDP. However, the long run relationship between budget deficit and GDP, using the logarithm of both variables to avoid non-stationary problem, is surprisingly positive.

Onwioduokit (2012) investigates the relationship between budget deficits and economic growth, as well as the threshold level of budget deficit in the West African Monetary Zone countries (The Gambia, Ghana, Guinea, Nigeria and Sierra Leone). The study explores the Ordinary Least Squares Technique (OLS) and the non—Linear Least Square (NLLS) methods for panel data estimations for the period 1980 to 2009. Two striking results are obtained: There exist a positive relationship between budget

deficit and economic growth in the WAMZ with a two year lag; and the threshold level of budget deficit conducive to economic growth for the WAMZ group was 5.0 per cent. The author concludes that the findings support the proposition that budget deficit beyond certain threshold was detrimental to growth in the Zone. The major recommendation from the study was that the Zone should raise the budget deficit/GDP criterion stipulated in the convergence criteria for eligibility to accede to the monetary union from 4.0 per cent to 5.0 per cent.

Most of the empirical studies on the relationship between budget deficit and economic growth are from the perspective of cross country analysis. The panel data methodology was widely adopted to investigate the relationship between series, by integrating time dimensions and various countries at a time. The results vary between various researchers. Some researchers including Barro (1991) Easterly et al (1992); Easterly et al (1993); Fischer (1993); Anusic (1993); Al-Khedar (1996), Hakkio's (1996); Jenkins (1997); Ghali (1998); Nyong and Odubekan (2002); Vit (2004); and Obi and Nurudeen (2009), found that the budget deficits do harm economic growth, while others including Barro (1979); Kormendi and Meguire (1985); Fischer (1993); Aschauer (1989); Mugume and Obwona (1998); Bahmani (1999); Saleh (2003); Bose, Haque and Osborn (2007); Aghion and Marinescu (2007); Kumar and Soumya (2010) find that budget deficit is positively related to output growth. Yet some researchers including Glannaros and Kolluri (1989) also report that there is no relationship between budget deficit and economic growth.

An additional important point that has emerged from the review is that the exact impact of deficit on economic growth is difficult to measure and that for any meaningful inference of policy relevance, a country specific study is required. Again, most of the existing empirical studies on the subject assume a linear relationship between deficits and growth, and even the two studies [Adams and Bevan (2002); and Onwioduokit (2012)] that assumed non linearity, and proceeded to estimate threshold are not country specific. From this point of view, this study will be the first to apply the threshold model in investigating the relationship between budget deficit and economic growth in Sierra Leone. Thus, the finding of this study will not just fill the identified gap in the literature for the studied Sierra Leone but will be of policy relevance.

3.0 • ANALYTICAL FRAMEWORK AND EMPIRICAL METHODOLOGY
The analytical framework adopted for this study follows essentially the Keynesian framework as applied in Onwioduokit (2012), while the threshold methodology adopted follows Khan and Senhadji (2001). Recall that in a simple Keynesian framework, desired aggregate demand relationship is specified in the goods

market as: $Y = C + I + G + (X - M)$ (1)

With the following behavioural equations:

$$C = a + bY^d, \quad b > 0$$

$$Y^d = Y - T$$

$$I = \delta + \gamma i, \quad \gamma < 0$$

$$G\overline{G}$$

$$X = s + \sigma e, \quad \sigma > 0$$

$$M = m + \phi Y^d, \quad \phi > 0$$

Where Y is output; C, consumption; I, investment; G, government spending which is assumed to be exogenous; X, exports; M, imports; Y^d, disposable income; T, tax revenue; i, interest rate; e, exchange rate.

In equilibrium (after substituting behavioural equations into the desired aggregate demand equation (1)), output will be given by

$$\overline{Y} = \frac{A}{\theta} + \frac{1}{\theta}(\gamma i + \sigma e + G - (b - \phi\, T)) \quad\quad (2)$$

Where $\theta = 1 - b + \phi$, $A = a + \delta + s - m$

From equation (2), increasing taxes will reduce output, while increasing government spending will increase output.

But Budget deficit (FD) is given by

$$FD = G - T \approx G - (b - \phi)T \quad\quad\quad (3)$$

Budget deficit is the excess of government expenditure over its revenue. Assuming that the government derives its total revenue from tax sources (which is quite realistic), G-T gives the deficit position of the government. Since individuals do not spend all their income, the total revenue that could be generated from consumption expenditure is $(b - \phi)T$. Thus, subtracting this from government expenditure will give approximate position of the fiscal balance.

Putting (3) into (2) gives

$$\overline{Y} = \frac{A}{\theta} + \frac{1}{\theta}(\gamma i + \sigma e + FD) \quad\quad\quad (4)$$

Given that Sierra Leone is essentially a small-open economies (without ability to influence international price developments) and for holistic treatment of the economy, the model is extended to incorporate the money sector as well as the

external sector. The money market in an open economy can be represented by the following equations:

Money Demand Function: $\dfrac{M^D}{P} = kY + \lambda i,$ $\qquad\qquad k > 0,\ \lambda < 0$ (5)

Money Supply Function: $\dfrac{M^S}{P} = m_1 \dfrac{B}{P} + m_2 i,$ $\qquad\qquad m_1, m_2 > 0$ (6)

Equilibrium Condition: $\quad M^D = M^S$ $\qquad\qquad\qquad\qquad\qquad$ (7)

where $P\equiv$ is the general price level,

$\quad\ B\equiv$ international reserves held by the central bank and m_1 and m_2 are coefficients.

From the above money market model, the LM schedule[6] can be specified as

LM Schedule: $\qquad\qquad i = \psi \dfrac{B}{P} + \varphi Y,$ $\qquad\qquad \psi < 0,\ \varphi > 0$ (8)

Given the importance of the external sector in Sierra Leone, the influence of the sector is incorporated through the balance of payments schedule. The balance of payments schedule is given as

BP Schedule: $B = A_2 - \theta_0 Y + \theta_1 e + \theta_2 i,$ $\qquad\qquad \theta_0, \theta_1, \theta_2 > 0$ (9)

where A_2 is the aggregate of exogenous components in the net export function and $\theta_0, \theta_1, \theta_2$ are coefficients.

Putting equation (8) into (3) gives

$$Y = A_1 + \beta_1 \dfrac{B}{P} + \beta_2 Y + \sigma e + FD \qquad\qquad (10)$$

Where $\beta_1 = \dfrac{\psi \gamma}{\theta}$ and $\beta_2 = \dfrac{\varphi \gamma}{\theta}$

Putting equation (9) into (10) produces

$$Y = A_1 + \dfrac{\beta_1}{P}(A_2 - \theta_0 Y + \theta_1 e + \theta_2 i) + \beta_2 Y + \sigma e + FD \qquad\qquad (11)$$

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[6] The LM curve is used to determined equilibrium in the money market. The L stands for liquidity and M for Money

isolating like terms and re-arranging equation (11) gives

$$Y = C + \frac{1}{P}\left(\alpha_1 e + \alpha_2 i\right) + \alpha_3 e + \alpha_4 FD \tag{12}$$

Where $1 + \beta_1 \theta_0 - \beta_2 = \varphi$, $C = \dfrac{A_1 + \beta_1 A_2}{\varphi}$, $\alpha_1 = \dfrac{\beta_1 \theta_1}{\varphi}$, $\alpha_2 = \dfrac{\beta_1 \theta_1}{\varphi}$, $\alpha_3 = \dfrac{\sigma}{\varphi}$, $\alpha_4 = \dfrac{1}{\varphi}$

Recasting the second term on the right-hand side of equation (12) in logarithmic generic term gives:

$$Y = C + \lambda e + \alpha_2 i - \pi + \alpha_4 FD \tag{12B}$$

where $\pi \equiv$ the rate of inflation and $\lambda = \alpha_1 + \alpha_3$.

In equation (12B), equilibrium output is positively related to Budget deficit.

In a time series context, output is influenced by its own past level (output dynamics) which is consistent with accelerator principle. Equation (12B) can be restated as

$$Y_t = c + \varpi Y_{t-1} + \alpha_2 i_t + \lambda e_t + \alpha_4 FD_t - \pi \tag{13}$$

Recasting (13) gives

$$y_t = c + \delta_1 i_t + \delta_2 e_t + \delta_3 FD_t + \delta_4 \pi \tag{14}$$

where $y_t = Y_t - Y_{t-1}$ which captures the change in GDP (growth rate of GDP) and $\delta_1, \delta_4 < 0$. Equation (14) is essentially an output (GDP) growth model which gives the long-run relationship between output growth (change in output) and Budget deficit. This relationship is positive; implying that widening of Budget deficit will improve growth. However, some empirical studies document the negative relationship between growth and Budget deficit, while some others establish a positive relationship as given by the simple Keynesian framework. This ambiguity of the relationship between growth and Budget deficit suggests a threshold effect of Budget deficit on growth. This will inform the empirical modelling of growth-deficit relationship in this study.

From the supply-side of the economy, output is a function of capital stock and labour. A simple Cob-Douglas production function generates a growth model of the form

$$y = \omega_0 + \omega_1 \Delta \ln K + \omega_2 \Delta \ln L \tag{15}$$

where K refers to capital stock, L refers to labour force growth, Δ is a change notation and $\omega_0, \omega_1, \omega_2$ are coefficients.

3.1   SPECIFICATION OF THRESHOLD MODEL

In specifying the empirical model, the study relies on the theoretical framework. From both the demand and supply sides of the economy, variables such as interest rate, exchange rate, inflation, Budget deficit, investment (change in capital stock) and labour are identified as the key variables explaining growth. However, it is appropriate to include in the empirical model those reform variables that also influence economic growth. In Sierra Leone, financial sector reforms have been undertaken, while trade liberalization policies have also been implemented. Hence, it is appropriate to include financial reforms variable and trade openness variable in the empirical model.

Based on the general framework provided, the key variables in the empirical model are defined as follows:

Dependent variable

Yit = $GDPGt$ = Growth rate of real GDP

INV_1 = Gross fixed capital formation as a ratio of GDP as a proxy for growth in capital stock

Lab = Secondary school enrolment as a proxy for labour force

Def_t = Secondary school enrolment as a proxy for labour force.

Inf_t = Inflation rate

Inf_t = Interest Rate = Lending Rate

M_2GDP_t = M2/GDP ratio – measuring financial depth

Def_t = Exchange Rate expressed as a given amount of local currency per US dollar (Depreciation/ appreciation)

OPN_t = Degree of openness of the economy, measured as [(Imports + Exports/GDP]

Besides investment, labour force and Budget deficit; other control variables included in the model are, namely, interest rate (Int), exchange rate depreciation/ appreciation (dep), inflation (inf), financial deepening M2/GDP and openness index (OPN). Interest rate has an important role in economic growth. Higher interest rates reduce the growth of consumer spending and economic growth. This is because more incentive to save in a bank rather than spend, more expensive to borrow, therefore less spending on credit and less investment; increase cost of mortgage repayments, therefore, reduce disposable income and therefore consumer spending. Consequently, an inverse relationship is expected between interest rate and economic growth.

Exchange rate development impacts on the economic growth process. On balance, it is expected a positive relationship between depreciation and economic growth. Inflation is another significant variable influencing output growth rate. This variable is especially significant in Sierra Leone, where food price and other exogenous factors including high imports of food and intermediate products play very important role. In general, very high levels of inflation may undermine economic growth. However, if the inflation rate is low, stable and sustainable, it may be interpreted as an indicator of macroeconomic stability that would enhance growth. And if the economy is at equilibrium, higher inflation should impact adversely on growth. Hence, we expect to get inverse relationship with output growth.

Financial deepening measured by the ratio of M2 to GDP essentially seek to capture the role of the financial sector development in economic growth. The conventional theory predicts a positive correlation between the level of financial deepening and economic growth. In modern economic theory, the role of the financial sector is seen to be catalytic to the growth of the economy. Also, the index of openness proxied by the ratio of the sum of imports and export to GDP is expected to positively influence growth. All things being equal, the more open the economy, the more access to foreign capital that is expected to increase investment and economic growth. Thus, the level of openness of the economy is expected to positively impact on economic growth.

Budget deficit is another significant variable influencing output growth rate. This variable is especially significant for most developing countries including the Sierra Leone, where fiscal discipline plays very important role. In general, very high levels of Budget deficit may undermine economic growth. However, if the budget deficit is low, stable and sustainable, it may be interpreted as an increased demand for goods and services. And if the economy is below its equilibrium level of output, higher budget deficit, that is, increased government expenditures in virtue of Keynes, should stimulate growth. Consequently a positive relationship with output growth is expected.

The threshold model specifies that individual observations can fall into discrete classes based on the value of an observed threshold variable. Following the framework of Khan and Senhadji (2001); and Onwioduokit (2012), the threshold model is specified for the Sierra Leone as follows:

$$GDPG_t = \alpha_0 + \alpha_1 GDP_{t-1} + \alpha_2 Def_t[DM_t(Def_t < K^*)] + \alpha_3 Def_t[DM_t(Def_t > K^*)] + \alpha_4 INV_t +$$
$$\alpha_5 Inf_t + \alpha_6 Int_t + \alpha_7 M2GDP_t + \alpha_8 Dep_t + \alpha_9 OPN_t + \alpha_{10} Labr + U_t$$

Where DM_t = Dummy variable with values 1 if Def_i > K^* or 0 otherwise.

Def$_i$ = Annual Budget deficit - GDP ratio

K^* = The threshold level of Budget deficit/GDP which is to be calculated.

α_2 = The effect of Budget deficit below the threshold level.

α_3 = The effect of Budget deficit above the threshold level.

Other variables are as previously defined.

All the variables are defined above. From the above equation, a priori expectations of a threshold effect of deficit on growth are that α_2 > 0, α_3 < 0. If threshold effect holds, then the turning point can be calculated using the relation[7] $\ln Def_i = \dfrac{\alpha_2}{\alpha_3}$ Taking the antilog of this will give optimal level of Budget deficit that will maximize real GDP growth.

3.2   DATA SOURCES AND ESTIMATION METHODOLOGY

GDP growth data, gross capital formation as well as secondary school enrolment data were obtained from the World Bank's World Development Indicators; Budget deficit data were obtained from the Ministries of Finance of Sierra Leone. Imports, Exports, Interest rates, exchange rate, and broad money growth data were sourced from the Bank of Sierra Leone, while inflation rates were obtained from the National Bureau of Statics of Sierra Leone. All variables are measured either in growth rate terms or as ratios. The study uses the non-Linear Least Square (NLLS) method as suggested by Khan et al. (2001).

The method involves the following procedures: for any K*, the model is estimated by OLS, yielding the Residual Sum of Squares (RSS) as a function of K*. The least square estimate is found by selecting the value of K* that minimizes the sum of squared residuals. An extensive and systematic analysis of the data was carried out. In particular, the stationarity test using Augmented Dickey Fuller (ADF) and the co-integration test, using Engle-Granger Two-Step procedure (EGTS) were applied. The use of EGTS is informed by the large number of the explanatory variables and the fact that not all the series are integrated at order one to warrant the use of the Johansson Technique.

$\frac{\partial RSS}{\partial Def_i} = \alpha_2 + 2\alpha_3 Def = 0: Def = \frac{\alpha_2}{2\alpha_3} = \frac{\alpha_2}{2\alpha_3}$, when α_2 > 0, α_3 < 0

3.3   DIAGNOSTIC TESTS FOR OPTIMAL LEVEL OF DEFICIT

After identifying the threshold level for deficit, it is important to determine whether the threshold effect is statistically significant. In this regard, this study conducted Normality Test (J-Qtest); Serial Correlation (LM test); Heteroscedasticity (ARCH) and Stability (Cusum square).

4.0   ANALYSIS OF RESULTS

The estimation of the model was done in various stages. We tested the data on the variables in the specification for unit root properties, having regard to Engle Granger's view that estimation of models using data that are not stationary has the potentials of yielding spurious regression results. Next, we estimated the model using the variables in the specification in the order in which they passed the unit root test. In the third stage of the estimation exercise, we tested for the existence of a cointegrating relationship among the variables in the specification by testing the residuals obtained from the third stage of the estimation exercise for stationarity. In the last stage of the exercise, we estimated the threshold model of the relationship between Budget deficit and output growth applying the range of between -1.0 percent and -10.0 percent.

4.1   UNIT ROOT TEST RESULTS

Essentially, we implemented both the Augmented Dickey-Fuller (ADF) and the Phillip-Perron (PP) tests for stationarity of the variables used in this study. The results are presented below.

Table 1: Sierra Leone ADF Unit Root Test Results

VARIABLE	ADF-STATISTIC AT LEVEL	ADF-STATISTIC AT 1ST DIFFERENCE	CONCLUSION
DEF	-2.967767**	-	I(0)
DEP	-3.580623**	-	I(0)
INF	-3.574244**	-	I(0)
INV	-4.309824*	-	I(0)
LENDR	-3.679322	-3.689194***	I(1)
M2GDP	-4.309824	-4.323979***	I(1)
OPEN	-3.612199**	-	I(0)
RGDPG	-1.952910**	-	I(0)

Source: Author's Computation   *** Significant at 1%, ** Significant at 5%, Significant at 10%

The results of the unit root tests (ADF) show that all the variables with the exception of (lending rate and broad money) passed the unit root test at conventional 10.0 percent level of significance in their levels. The two variables, however, passed the test for stationarity at 1st difference. The results obtained when the test for unit root

was conducted using variables in their first difference form are also reported in Table 1.

Table 2: Sierra Leone Phillip Perron Unit Root Test Results

VARIABLE	PP STATISTIC AT LEVEL	PP-STATISTIC AT 1ST DIFFERENCE	CONCLUSION
DEF	-2.967767**	-	I(0)
DEP	-3.574244**	-	I(0)
INF	-3.574244**	-	I(0)
INV	-4.309824*	-	I(0)
LENDR	-3.679322	-3.689194***	I(1)
M2GDP	-4.309824	-4.323979***	I(1)
OPEN	-3.574244**	-	I(0)
RGDPG	-3.679322	-3.689194***	I(1)

Source: Author's Computation   *** Significant at 1%, ** Significant at 5%,* Significant at 10%

Investment, deficit, depreciation, inflation, real GDP growth rate and openness variables were stationary at levels, while lending rate and broad money as a ratio of GDP were stationary at first difference. Similar results were recorded when we applied the Phillip Person (PP) to test for the existence of unit roots in the variables (see Table 2)

IV.2   Co-Integration Tests Analysis

Table 3: Sierra Leone Cointegration Test - Engel Granger First & Second Steps Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2GDP	-1.505390	0.441110	-3.412730	0.0020
C	47.63236	6.351386	7.499522	0.0000

Engle-Granger Second Step Results Null Hypothesis: RESID01 has a unit root

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.745226	0.0078
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

Source: Computed by the author

The ADF tests on the residuals at level (Table 3) confirm that the calculated ADF statistic (-2.745226) is greater (in absolute sense) than the tabulated critical value (-2.647120) at 1.0 percent level of significance.   Thus, the null hypothesis of non-stationarity of the residuals is rejected. The apparent conclusion from these results is that the variables used in this study are co-integrated. That is, there is a stable long run relationship between them although there might be some deviations in the short run.

4.3   ANALYSIS OF ESTIMATION RESULTS FOR THE THRESHOLD MODEL

The estimation results, based on repeated estimation of the threshold model for the different values of expected threshold (K), are reported in Table 4. The first column labelled K, gives the range over which the search for the threshold is conducted. The dummy variable D1t represents the effect of deficit below the chosen threshold (K) value while G2t represents the effect of deficit above the threshold. Only the explanatory variables that are statistically significant are reported along with the deficit dummies to conserve space.

Table 4: Sierra Leone Threshold Model Results[8]

K	Variable	Coefficient	Std. Error	t-Statistic	Prob.	RSS	R^2
3%	D3*DEF	-0.602047	0.428548	1.404854	0.1854	344.43	0.672
	G3*DEF	5.292883	3.274741	-1.616275	0.1320		
	RGDPG(-1)	0.708356	0.169988	4.167100	0.0013		
	DEF(-1)	-1.203191	0.411766	-2.922025	0.0128		
	INF(-1)	-0.322624	0.094549	-3.412230	0.0052		
	DEP(-2)	0.415429	0.140323	2.960518	0.0119		
4%	D4*DEF	-0.751969	0.582630	1.290646	0.2211	441.58	0.58
	G4*DEF	1.097843	2.762660	0.397386	0.6981		
	RGDPG(-1)	0.760777	0.189887	4.006468	0.0017		
	DEF(-1)	-1.109921	0.482898	-2.298459	0.0403		
	INF(-1)	-0.296972	0.113235	-2.622618	0.0223		
	DEP(-2)	0.280969	0.136948	2.051640	0.0627		
5%	D5*DEF	-0.792895	0.543775	1.458131	0.1705	435.41	0.59
	G5*DEF	0.802732	1.397114	0.574565	0.5762		
	RGDPG(-1)	0.764401	0.188750	4.049803	0.0016		
	DEF(-1)	-1.095727	0.454929	-2.408564	0.0330		
	INF(-1)	-0.299040	0.107284	-2.787373	0.0164		
	DEP(-2)	0.300060	0.140444	2.136508	0.0539		
6%	D6*DEF	-0.767288	0.554049	1.384873	0.1913	440.44	0.58
	G6*DEF	1.011968	1.432758	0.706308	0.4935		
	DEF(-1)	-1.084967	0.460726	-2.354909	0.0364		
	INF(-1)	-0.298864	0.110744	-2.698685	0.0194		
	DEP(-2)	0.288530	0.138696	2.080310	0.0596		

7%	D7*DEF	-0.659884	0.147213	4.482513	0.0020	19.34	0.98
	G7*DEF	1.297777	0.368463	3.522136	0.0078		
	RGDPG(-1)	0.488093	0.062911	7.758452	0.0001		
	RGDPG(-2)	-0.498793	0.045134	-11.05142	0.0000		
	M2GDP	0.626480	0.302256	2.072681	0.0719		
	OPEN	0.529421	0.077886	6.797400	0.0001		
	DEF(-1)	-1.403013	0.092920	-15.09911	0.0000		
	DEP(-1)	0.325677	0.038391	8.483156	0.0000		
	LENDR(-1)	-0.555736	0.101483	-5.476157	0.0006		
	M2GDP(-1)	1.026591	0.343141	2.991743	0.0173		
	DEP(-2)	0.366352	0.024897	14.71447	0.0000		
	INV(-2)	1.524335	0.298344	5.109313	0.0009		
	LENDR(-2)	0.620096	0.078804	7.868791	0.0000		
	OPEN(-2)	-0.397831	0.060889	-6.533745	0.0002		
8%	D8*DEF	-1.035420	0.431111	2.401746	0.0334	312.57	0.70
	G8*DEF	-2.350726	0.841315	2.794109	0.0162		
	RGDPG(-1)	0.651814	0.166927	3.904793	0.0021		
	RGDPG(-2)	-0.378206	0.183597	-2.059983	0.0618		
	DEF(-1)	-0.846547	0.402757	-2.101882	0.0574		
	INF(-1)	-0.214100	0.095030	-2.252973	0.0438		
	DEP(-2)	0.286232	0.114812	2.493037	0.0283		
9%	D9*DEF	-0.955809	0.526315	1.816040	0.0944	408.22	0.61
	G9*DEF	-1.464029	0.888367	1.648000	0.1253		
	RGDPG(-1)	0.680385	0.199144	3.416552	0.0051		
	DEF(-1)	-1.127354	0.444850	-2.534235	0.0262		
	INF(-1)	-0.283542	0.101495	-2.793652	0.0162		
	DEP(-2)	0.313785	0.134829	2.327279	0.0383		
10%	D10*DEF	0.550323	0.396097	1.389364	0.1900	448.99	0.57
	G10*DEF	0.682364	0.649899	1.049954	0.3144		
	RGDPG(-1)	0.765364	0.197301	3.879178	0.0022		
	DEF(-1)	-1.014176	0.450761	-2.249922	0.0440		
	INF(-1)	-0.264260	0.101757	-2.596980	0.0234		
	DEP(-2)	0.242626	0.124311	1.951772	0.0747		

Source: Computed by the Researcher

As shown in Table 4 the minimization of RSS occurs at the threshold point of 7.0 percent, where the RSS records the lowest value of 19.34. To further confirm the threshold effect, the adjusted R^2 from the estimation at 7.0 percent yields the highest value of 98.0 percent. A passing perusal of the Table 7 shows that the coefficient of deficit dummy at the threshold (G2t), carries positive sign indicating that above 7.0 percent, the effect of deficit on growth may be positive. Conversely, the coefficient

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[3]Due to the data generating process for Sierra Leone, the threshold dummy for the Budget deficit at 1.0 and 2.0 percent yielded Identical matrix thus Git were zero. Hence 1.0 and 2.0 percentages level were excluded

of deficit dummy D1t, representing effect of deficit below the threshold level possess negative sign, suggesting that, deficit level below 7.0 percent is detrimental to growth. Thus the threshold level of deficit for the Sierra Leone is identified at 7.0 percent. It should be noted that the two parameters are statistically significant at 1.0 percent.

Table 5 presents another fascinating finding of this study. The effects of deficit, précised by the signs of the coefficients of the deficit dummies are generally positive. The coefficients of the deficit dummy G21t, maintain positive values between 3 and 7.0 percent, indicating that deficit impacts positively on growth within the deficit range of 3 to 7.0 percent. The policy implication is that running a deficit beyond 7.0 percent will be detrimental to growth. Thus the range 3.0 and 7.0 percent provides the arena for a menu of policy preferences on deficit levels that would be consistent with economic growth in Sierra Leone.

Table 5: Sierra Leone Range of Budget deficit Conducive for Growth

| K | D₁₁ = Effect of deficit below K | | G₂₁ = Effect of deficit above K | |
	Coefficient	Effect	Coefficient	Effect
3%	-0.602047	Negative	5.292883	Positive
4%	-0.751969	Negative	1.097843	Positive
5%	-0.792895	Negative	0.802732	Positive
6%	-0.767288	Negative	1.011968	Positive
7%	-0.659884	Negative	1.297777	Positive
8%	-1.035420	Negative	-2.35	Negative
9%	-0.955809	Negative	-1.464029	Negative
10%	-0.550323	Negative	-0.682364	Negative

Source: Computed by the Researcher

4.4   DIAGNOSTIC TESTS RESULTS

Diagnostic tests were carried out for the 7 percent threshold model. Diagnostic results for the optimal level of deficit are depicted in table 6.

Table 6: Sierra Leone Diagnostic Test Results at 7 Percent Threshold

TEST TYPE	STATISTIC	VALUE	PROBABILITY	REMARKS
Normality	Jarque Bera	3.722841	0.155452	Normally distributed residuals
Serial Correlation (LM)	F-statistic	3.163727	0.1235	No serial correlation
Heterescedasticity (ARCH)	F-statistic	0.675159	0.4190	No heteroscedasticity
Stability	Cusum squares	Within bands		Stable

Source: Computed by the Researcher

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The residuals for all the estimated equation was found to be normally distributed and stable. No serial correlation and heteroscedasticity were observed in the equation, implying that the estimates are reliable and accordingly, can be relied on for policy indication.

5.0   CONCLUSIONS AND RECOMMENDATIONS

This paper has sought to identify the budget deficit threshold that is consistent with economic growth in Sierra Leone. The threshold level of budget deficit conducive to economic growth for Sierra Leone was identified at 7.0 percent. Consequently, the level of Budget deficit beyond 7.0 percent is inhibitive of economic growth in Sierra Leone.

On the policy front, this paper has provided ample evidence in support of the proposition that Budget deficit beyond certain threshold is detrimental to growth. This suggests that the Sierra Leonean authorities should endeavour to reduce Budget deficits to 7.0 per cent (levels consistent with economic growth). Even so, these results are tentative having regard to weaknesses in data and limitations to econometric framework adopted. In any event, the study presents a useful prognosis of sustainable path of future budget deficits in Sierra Leone.

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