

Budget Deficit and Economic Growth in Sierra Leone: An Empirical Re-Examination

Dr. Emmanuel Onwio duokit and Dr. Christopher Nyong Ekong*

Department of Economics, University of Uyo, Uyo

*Corresponding Author: Dr. Christopher Nyong Ekong, Department of Economics, University of Uyo, Uyo; Tel: +2348181077078; E-mail: chrisnekong@gmail.com

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Abstract

The debate regarding the impact of fiscal deficits on economic growth in the literature is essentially inconclusive. The conventional knowledge is that budget deficit is a major cause of macroeconomic instability. Empirical findings, however, does not overwhelmingly support this assertion as results from various studies are mixed and contentious across countries [1-4]. These conflicting results have underscored the usefulness of time series data for country specific studies to investigate the assertion. This paper sought to investigate the relationship between Budget deficits and economic growth in Sierra Leone. The study employs time series data for over a 30 years period using OLS method to estimate the relationship between deficit and growth in Sierra Leone. The study found positive relationship between budget deficit and economic growth, in agreement with the Keynesians assertion and hence proposes prudent fiscal management so as to crowd-in private sector investment and thus amplified economic growth in Sierra Leone.

JEL Classification: C2, E1, E2, O4, O5

Keywords: Budget Deficit; Economic Growth; Threshold; Sierra Leone.

1. Introduction

In the face of limited own resources, governments usually incur deficits to finance economic and social infrastructure. In general, the relationship between economic growth and fiscal deficits revolves around three interrelated issues: excessive domestic borrowing by the government which crowds out private sector investment and push up interest rates; the accumulation of public debts; and the fear that the government may resort to money printing or seignior age, thus resulting in inflation tax. Hermes and

Lensink [5] identified three main channels through which the effect of deficit viciously impacts on the economy. Firstly, high budget deficit may lead to higher real interest rates in financial markets, which may reduce investment and growth. Secondly, high deficits may increase risk premiums on interest rates, particularly raising the inflation risk and default risk premium. High interest rates risk premiums may discourage private investment. Thirdly, high budget deficits may signal a high tax burden in future, which may discourage current aggregate expenditures and therefore private investment.

In the past three decades, fiscal operations of government in Sierra Leone showed consistent deficits position. In the last decade for instance, the country recorded budget deficit excluding grants of more than 5.0% consistently. The country recorded respective budget deficit rates of 16.5%, 11.7%, 10.0%, and 8.6% in 2001, 2002, 2003 and 2004, respectively. In 2005, the rate declined marginally to 9.6%. Subsequently, the deficit rate dropped to 8.6% (2006) and 5.0% (2007) and 7.9% in 2008. However in 2009 and 2010, the deficit nudged to 10.4 and 14.1%, respectively. On the other hand, the growth rate of the economy exceeded 5.0% in all the years (2001-2010) with the exception of 2009 when the economy grew by 4.0%. The observed trend in the growth rate was driven by buoyant service sector and increased agricultural production.

There are different schools of thought regarding the impact of budget deficits on economic growth. One strand of the argument, following Keynes, is that high Budget deficit accelerates capital accumulation and growth [6-8]. The underpinning reasoning here is that Budget deficits incurred as a result of public sector investment, particularly in infrastructure, promote growth in the private sector. Public investment within an appropriate policy framework provides the private sector adequate incentives to invest leading to overall economic growth. While the conventional view point of the classical and neo-classicalists claim that budget deficit is a major source of economic instability and therefore growth retarding. Empirical results on the impact of deficits on growth are mixed and controversial across countries, data and methodologies [1-4]. These conflicting results have raised the important question of heterogeneity and also underscore the need of country specific studies in order to address heterogeneity.

In the light of the controversy that has arisen in recent times regarding the impact of budget deficits on economic growth, where some authors have found positive relationship between the two variables while others have reported negative relationship, it is germane to empirically ascertain the relationship between budget deficits and economic growth in Sierra Leone. The key objective of this paper is to ascertain the relationship between budget deficits and economic growth in the Sierra Leone. The findings will not only aid the Sierra Leonean authorities in their pursuit of appropriate policy direction regarding the role of deficit in economic management, but will also contribute to the literature on the subject for Sierra Leone, thus filling the gap in the literature. The remaining part of the paper is organized as follows: Part II contains conceptual issues, theoretical and empirical literature reviews while part III contains analytical framework. The results are presented in Part IV. Part V contains summary and some concluding remarks.

2. Conceptual Issues, Theoretical and Empirical Reviews

2.1 Conceptual Issues

The measurement of budget deficit raises an avalanche of conceptual and practical issues, which are complicated by the absent of homogeneity universally. For example, the conventional budget deficit can be measured on cash basis or on commitment basis. In the former case, the deficit is essentially the difference between total cash flow expenditure and fiscal revenue, while in the later, deficit reflects accrued income and spending flows regardless of whether they involve cash payment or not. Accumulation of arrears on payments or revenue is reflected by higher deficit when measured on commitment basis compared to a cash-based measure [9].

A couple of different ways to measure the conventional budget deficit exists. The most generally accepted measure used by government world-wide to define the budget deficit is the resources utilized by the government in a fiscal year that need to be financed after revenues were deducted from the expenditure. The conventional deficit can therefore, usually be defined as the difference between current revenues and current expenditures of government. It therefore reflects the financing gap that needs to be closed by way of net lending [10].

Alternative indicators to measure the different interpretations of fiscal policy have increasingly been used by a large group of countries and international organizations including the IMF, the World Bank, the OECD and the European Union (EU). Countries use different definitions of the budget deficit mainly because of convention, relationships with other levels of government and the structure of their budgets. Some countries go a step further and analyze the public sector borrowing requirement; while others essentially focus on central or federal government activities.

In summary, the conventional budget deficits are the resources needed during a fiscal year after government expenditure has been deducted from total income. The latter expenditure total includes interest payments but not amortization of public debt. Thus, the choice of a budget deficit is mainly focused on the interpretation and management of fiscal policy. There is no single superior measure of the budget deficit-rather a set of different budget deficits measurements, each applicable to specific condition.

In Sierra Leone various measures of fiscal deficit are provided by the authorities. However, since the country is part of the West African Monetary Zone, where the measure of fiscal deficit is the deficit excluding grants on commitment basis, this study adopted this measure of deficit in the analysis.

2.2 Theoretical Review

The theoretical underpinning of this study pivots around [11]proposition that the government intervention in economic activity can help spur long term growth by ensuring efficiency in resource allocation, regulation of markets, stabilization of the economy, and harmonization of social conflicts. However on a broader theoretical front, the impact of deficit on economic growth is encapsulated in three distinctive schools of thought. These are: Neoclassical, Keynesian, and Ricardian equivalence, with each adumbrating different perspective.

Bernheim[12] provides a brief summary of the three perspectives. The Neoclassical school considers individuals planning, their consumption over their whole life cycle. By shifting taxes to future generations, budget deficits increase current consumption. Based on their assumption of full employment of resources, the Neoclassical argues that increased consumption implies reduction in saving as interest rates rises to ensure equilibrium in the capital markets. Higher interest rates, sequentially, result in a decline in private investment.

The Keynesians provide argument centered on the expansionary effects of budget deficits. They argue that usually budget deficits results in an increase in domestic production, which makes private investors more positive about the expected future path of the economy resulting in them investing more. This is also regarded as the “crowd-in” effect. Most traditional Keynesians including Eisner [13]argue that deficits need not crowd-out private investment. They suggest that increased aggregate demand as a result of deficit enhances the profitability of private investments and leads to a higher level of investment at any given rate of interest. Thus, deficits may stimulate aggregate saving and investment, despite the fact that they raise interest rates. In their summation deficits crowd-in investment instead of crowding-out investment. However, as indicated by Aschauer [14], it is worth noting that public capital crowds-out or crowds-in private capital, depending on the relative strength of the two contrasting forces: as a substitute in production for private capital, public capital tends to crowd-out private capital; and on the other hand, by raising the return to private capital, public capital tends to crowd-in private capital. Consequently, on balance, public capital will crowd-out or crowd-in private capital, depending on whether public and private capitals are gross substitutes or gross complements.

Additionally, Aschauer [14]argues that higher public investment raises the national rate of capital accumulation beyond the level anticipated by private sector agents; therefore, public capital spending may crowd-out private expenditures on capital goods on an *ex ante* basis as individuals seek to re-establish an optimal inter-temporal

allocation of resources. On the other hand, public capital, particularly infrastructure capital including high ways, power, and water, is expected to permit a complementary relationship with private capital. Thus, higher public investment may raise the marginal productivity of private capital and, thereby, “crowd-in” private investment. The traditional Keynesian view swerves from the standard neoclassical model in two fundamental ways. First, it assumes that some economic resources are unemployed. Second, it presupposes the existence of a large number of liquidity constrained individuals. The second assumption guarantees that aggregate consumption is very sensitive to changes in disposable income.

The Ricardian equivalence paradigm states that far-seeing tax-payers will increase their savings in response to the increased government borrowing, and that would keep the interest rates stable. This view has been amplified by Barro[15], who argues that an increase in budget deficits, owing to an increase in government spending, must be paid for either now or afterward, with the total present value of receipts fixed by the total present value of spending. Thus, a reduction in today’s taxes has to be matched by an increase in future taxes, leaving interest rates, and thus private investment, unchanged.

Other major contributors to the theoretical debate on the subject include Premchand [16], Ball and Mankiw [17]; Heng [18], Kelly [19]Brender and Drazen [20]and Bivens and Irons (2010). Premchand [16]asserts that financing budget deficit by borrowing from the public implies an increase in the supply of government bonds. In order to improve the attractiveness of these bonds, the government offers them at a lower price, which leads to higher interest rates. The increase in interest rates discourages the issue of private bonds, private investment, and private spending. In turn, this contributes to the financial crowding-out of the private sector.

Ball and Mankiw [17] argue that in the long-run, an economy’s output is determined by its productive capacity, which in turn is partly determined by its stock of capital. When deficits reduce investment the capital stock grows more slowly than it otherwise would. Over a period of one to two years, this crowding-out of investment has a negligible effect on the capital stock. But if deficits continue for a decade or more, they can substantially reduce the economy’s capacity to produce goods and services.

Heng [18]utilize an Overlapping-Generation (OLG) model to provide a theoretical framework to analyze the “crowding-in” of private capital by public capital. The author shows that public capital crowds-in private capital through two channels, namely, via its impact on the marginal productivity of labor and savings, and via (gross) complementarity/substitutability between public and private capital.

Kelly [19] contends that public investment and social expenditures may promote economic expansion by reducing social conflict and creating an environment conducive for investment in human and physical capital. He also asserts that social expenditures enhance growth by fostering welfare and productivity improvements. The complementarity of public and private action is likely to be important in developing countries where factors including income disparity, asset concentration and fragmented financial markets may warrant substantial public investment programs. In such instances, public investment is likely to be a central determinant of successful private sector activity and economic growth. The complementary proposition is a critical because it implies that public investment has direct and indirect influences on economic growth. These indirect effects may be channeled through private investment and national output. Public investment may directly raise growth by adding to the stock of total social capital. Public investment may indirectly enhance growth by improving the climate for private investment through public good provision.

Furthermore, public investment may increase current national output, which in turn stimulates higher private investment and higher growth. The author also departs from conventional approaches by emphasizing that public investment programs may assist nations channel saving (and borrowing) to productive use. While even the crowding-out literature has recognized that a limited amount of public investment may contribute to growth, that literature has tended to view social program, with the exception of education as unproductive. Hence, the literature recently has largely ignored the effects of social expenditures other than education on economic growth Kelly [19].

Brender and Drazen [20] opine that budget deficits can also reduce the economic growth 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 inability of the government to perform well in managing the resources 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 [21], consistent with the Ricardian equivalence hypothesis, argues 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 and Irons (2010), assert that by and large, the government has to borrow 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.

The 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. However, from the reviewed literature it could be deduced that the differences in terms of opinions and analyses are mainly due to a variety of 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 deficits [22].

2.3 Empirical Review

Empirical findings on the relationship between Budget deficits and economic growth have been inconclusive. Landau [23] used a sample of 96 developing countries to investigate the relationship between fiscal deficits and economic growth. He reported that fiscal deficit reduced growth of per capita income. Kormendi and Meguire [24] arrived at a converse conclusion that budget deficit enhances growth based on the cross sectional analysis. Similarly, Fischer [1] found that huge budget deficits help Morocco and Italy to grow since the excessive spending increased the level of private consumption in the short-run as deficits reduced the burden of taxation from the consumers' perspective.

Aschauer [14] used annual data for 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 may be expected to reduce private investment nearly one-to-one as the private sector utilizes the public capital for its required purposes rather than expanding 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 *paripassu*, the later comes to dominate, thus, the net effect of a rise in deficit financed public investment had a positive effect on private investment. This means that budget deficit had a positive effect on private investment and caused *crowding-in* rather than *crowding-out*.

Glannaros and Kolluri [25] applied the OLS technique on different models, i.e. Fisher equations and the IS-LM general equilibrium model by using data set of five industrial countries from (1965-1985). The analysis yielded three different results; firstly there is a negative relation between interest rate and inflation, secondly there is an indirect but significant effect of budget deficit on interest rate, thirdly the study did not find any clear relation between deficit and output growth.

Fischer [26] applied econometric technique to examine the relationship between macroeconomic performance (fiscal deficits, inflation rate and external debt outstanding) and long run economic growth. The author executed cross-section regression on 73 developing countries. The result of his study evidently indicated that economic growth had a negative relationship with the fiscal deficit, inflation rate and external debt outstanding. Easterly et al. [27] reported a consistently negative relationship between growth and budget deficits. Fischer [1] findings supported Easterly et al. (1992) results; the author concluded that Budget deficits and economic 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 [28] investigated the relationship between budget deficit and economic growth in the Republic of Croatia using data from (1991-1992). He found that deficit is a priori harmful for growth. He averred that increase in budget deficit causes an increase in real interest rate and a reduction in real investment. The impact of budget deficit on the studied economy according to the author depended on the initial conditions, including the way of financing by the country.

Aizenman and Marion [29] presented empirical evidence that implied that, there is a significant and negative correlation between growth and uncertainty in a number of fiscal variables, such as levels of revenue, public expenditure, and fiscal deficits. The uncertainty in a variable is measured in the model adopted by the standard deviation of the residuals from a first order autoregressive process.

Nelson and Sing [2] applied data on a cross section of 70 developing countries over two time periods (1970-1979) and (1980-1989), to investigate the effects of fiscal deficit on output growth. The authors estimated the relationship between economic growth and fiscal deficits using ordinary least square (OLS) method. Their study concluded that the budget deficit had no significant effect on the economic growth of those nations in the 1970s and 1980s. On the other hand, Ghali [31] found no relationship between budget deficit and economic growth in Saudi Arabia.

In a related study, Al-Kheddar [31], applied VAR model on data of G-7 countries for the period 1964-1993

and established that interest rates increase in the short run due to budget deficit, but in long run the impact of deficits on the interest rate peters out. The author reported positive and significant impact of budget deficit on the economic growth in the studied countries.

Bahmani [32] applied the Johansen Juselius cointegration 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 the real investment, which is a validation of the arguments of Keynesian regarding the expansionary effect of the budget deficit on the investment.

Adams and Bevan [33] studied the relation between budget deficits and growth in a panel of forty five (45) developing countries, using an overlapping generation's model in the tradition of Diamond [34] that incorporates, high-powered money, debt, and taxes. The estimation strategy involved 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 argued reflected the underlying composition of deficit financing. In effect, Adams and Bevan [33] posited 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% of GDP. While there appeared to be a growth payoff to reducing deficits to this level, the 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 interaction effects between deficits and debt stock, with high debt stocks exacerbating the adverse consequences of high deficits.

Saleh [35] building on earlier studies on the impact of budget deficit on different economic variables, concluded that budget deficit has diverse impact on different economic variables. The range of impact varied from country to country but could not ascertain the true impact on the economic growth. He applied 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 reported a positive and significant relationship between budget deficits and economic growth.

According to a study conducted by Vit [36], budget deficits cause inflation and current account deficits, which subsequently impede economic growth. The results were based on the quarterly data collected from Czech Republic's economy over the period 1995 to 2002.

Gulcan and Bilman [37] applied co-integration methodology and causality test to investigate the stationarity of the individual time series. The authors used Turkey data over the period 1960 to 2003 and showed that there is a strong impact of budget deficit on the real exchange rate. The study also found that the budget balance play a critical role in maintaining equilibrium real exchange rate. The authors suggested that government must focus in order to stable the budget because the trade balance is significantly affected by the real exchange rates. Sill [38] also adopted the methodology of Saleh [35] but took sample of 94 countries and reported a positive relationship between the budget deficit and inflation.

Bose and Osborn [39] investigated the relationship between budget deficit and economic growth for 30 developing countries from 1970 to 1990 using panel data. The authors found that budget deficit helps the economy to grow provided that the deficits were applied in the productive expenditures such as education and health. Huynh [40] utilizing data from the developing Asian countries over the period, 1990 – 2006, using OLS methodology, reported a negative impact of the budget deficit on the GDP growth of the country while simply analysing the trends in Vietnam.

Aghion and Marinescu [41] using yearly panel data on OECD countries analysed the relationship between growth and the cyclicity of the budget deficit. The authors reported that a more countercyclical budget deficit is positively correlated with growth. A coefficient of 0.11 of the lagged counter cyclicity of budget deficit means that if private credit over GDP is 0.001 then increasing the countercyclicity of the budget deficit by one percentage point increases growth by 0.11 percentage points. For each percentage point increase in private credit over GDP, this positive effect of counter cyclicity 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. 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 decline, an increase in the budget deficit through public investment expenditure has 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 much felt as otherwise.

Obi and Nurudeen [42] investigated the impacts 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 indicated 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 concluded 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 [43] studied 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's [43] finding supported the arguments of Jenkins [44] and Hugume and Obwona (1998) who worked on Zimbabwe and Uganda, respectively. They argued that Budget deficits were 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's [43] work recognised economic growth, low and stable prices and healthy external balance as the macroeconomic policy objectives of the economy of Sierra Leone. These he argued 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 were 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 were estimated using a 3-stage least square estimation technique.

The estimated results showed 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 pointed to the need for fiscal restraint and improved revenue generation to meet the expenditure requirements of the government.

Keho[46] estimated the causality between budget deficits and economic growth for West African Economic and Monetary Union (WAEMU) countries. The test results failed to reject the null hypothesis of Granger non-causality for Côte d'Ivoire, Senegal and Togo. There was no evidence of causality between deficit and growth for these three countries, confirming the "neutrality hypothesis". They found unidirectional causality running from deficit to growth in the case of Niger. The implication of this result is that in the case of Niger, long run variations in the fiscal deficit cause variations in the growth rate but a variation in economic growth does not cause long run variations in fiscal deficits. Thus the direction of causation is one way. In the cases of Benin, Burkina Faso and Mali there was a two-way causality between deficit and growth. In all cases where causality existed, the sum of the coefficients on lagged budget variable in the growth equation is positive, implying that deficits retard economic growth rates.

Kumar and Soumya[46] studied the relationship between GDP growth and Budget deficits taken as percentage of GDP by estimating a simple regression equation. The result yielded 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 to avoid non-stationary problem, was positive.

Most of the studies reviewed investigated the relationship between budget deficit and economic growth from a cross countries perspective. Panel data was the common methodology applied to investigate the relationship between series by integrating both the time dimensions and various countries simultaneously. The findings vary between various researchers. While some researchers found that budget deficits do harm economic growth, others reported the contrary. Apart from that, some researchers also found that there is no relationship between budget deficit and economic growth.

Studies including Barro [47], and Ghali[48] found support for a negative relationship between Budget deficits and economic growth. Others, including Aghion and Marinescu [41], Kumar and Soumya[46] and Onwioduokit [49] reported positive relationship. Thus, the overall results from the empirical literature with respect to the impact of Budget deficit and growth are ambiguous. Another important point that emerges from the review is that the exact impact of deficits on economic growth is difficult to

measure and that for any meaningful inference of policy relevance, the analysis must be essentially a country specific. Currently there is no known study that has investigated the relationship between budget deficit and economic growth in Sierra Leone. From this perspective, this study will be the first empirical study that specifically investigates the relationship between these variables. The findings will contribute to the existing literature on the subject while also serving as a guide for the Sierra Leonean authorities in their quest to promote economic growth and development in the country, since the direction of relationship is expected to be ascertained.

3. Analytical Framework and Empirical Methodology

The analytical framework adopted for this study follows essentially the Keynesian paradigm as used by Onwioduokit [49]. Recall that in a simple Keynesian framework, desired aggregate demand relationship is specified in the goods market as:

$$Y = C + I + G + (X - M) \quad (1)$$

With the following behavioural equations:

$$\begin{aligned} C &= a + bY^d, \quad b > 0 \\ Y^d &= Y - T \\ I &= \delta + \gamma i, \quad \gamma < 0 \\ G &= \bar{G} \\ X &= s + \sigma e, \quad \sigma > 0 \\ M &= m + \phi Y^d, \quad \phi > 0 \end{aligned}$$

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

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

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

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

But Budget deficit (FD) is given by

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

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

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

Given that Sierra Leone is essentially a small-open economy (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:

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

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

$$\text{Equilibrium Condition: } M^D = M^S \quad (7)$$

Where $P \equiv$ is the general price level, $B \equiv$ international reserves held by the central bank and m_1, m_2 are coefficients. From the above money market model, the LM schedule¹ can be specified as

$$\text{LM Schedule: } i = \psi \frac{B}{P} + \phi Y, \quad \psi < 0, \phi > 0 \quad (8)$$

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

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

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

$$Y = A_1 + \beta_1 \frac{B}{P} + \beta_2 Y + \sigma e + FD \quad (10) \quad \text{Where } \beta_1 = \frac{\psi \gamma}{\theta} \text{ and } \beta_2 = \frac{\phi \gamma}{\theta}$$

Putting equation (9) into (10) produces

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

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

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

¹The LM curve is used to determined equilibrium in the money market. The L stands for liquidity and M for Money.

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

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

$$Y = C + \lambda e + \alpha_2 i - \pi + \alpha_4 FD \quad (12B)$$

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

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

Recasting (13) gives

$$y_t = c + \delta_1 i_t + \delta_2 e_t + \delta_3 FD_t + \delta_4 \pi \quad (14)$$

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

$$y = \omega_0 + \omega_1 \Delta \ln K + \omega_2 \Delta \ln L \quad (15)$$

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 the Empirical 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 (M2/GDP) and trade openness variable (Import + Export/GDP) in the empirical model. The key variables in the empirical model are defined as follows:

Dependent variable

Y_{it} = $GDPG_t$ = Growth rate of real GDP

Independent variables

INV_t = 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.

$Def_t = FD/GDP$ = Budget deficit/GDP, excluding grants

Inf_t = Inflation rate

Int_t = $InterestRate = LendingRate$

M_2GDP_t = M_2/GDP ratio – measuring financial depth

Dep_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 M_2/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 high interest rate creates more incentive to save rather than spend, makes borrowing more expensive, therefore less spending on credit and less investment. Consequently, an inverse relationship is expected between interest rate and economic growth. Exchange rate development impacts on the economic growth process. On balance we expect 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 M_2 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 proxy by the ratio of the sum of imports plus export over 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 noted by some studies to be 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 on Keynesian cross, higher Budget deficit, that is increased government expenditures, should stimulate growth. Consequently we expect to get positive relationship with output growth.

Based on the general framework provided and the foregoing variables identified, the linear growth equation is explicitly specified as follows:

$$GDPG_t = \alpha_0 + \alpha_1 INV_t + \alpha_2 Def_t + \alpha_3 inf_t + \alpha_4 int_t + \alpha_5 M_2GDP_t + \alpha_6 Dept + \alpha_7 OPN_t + \alpha_8 Lab_t + U_t \dots 16$$

Where $\alpha_1, \alpha_2, \alpha_3, \alpha_5, \alpha_6, \alpha_7, \alpha_8 > 0$ and $\alpha_4 < 0$.

The equation represents formulation of the hypothesis that the growth in real output in Sierra Leone depends on the growth rate of Budget deficit as a ratio of GDP, real investment (INV_t), money stock (M_2) to GDP ratio (measure of financial depth), the lending rate ($LENDR_t$), the rate of depreciation of the domestic currency vis-ad-vis the US dollar, rate of inflation (INF_t) and the degree of openness of the economy ($OPEN_t$).

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 central banks 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 data cover the period 1980 to 2009.

The study employs the Classical Ordinary Least Squares Technique (OLS) as suggested by Li (2005). An extensive and systematic analysis of the data was carried out to ensure conformity with basic properties of the OLS estimate. In particular, the stationary 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.

Table 1: Sierra Leone ADF Unit Root Test Results

Variable	ADF -Statistic At Level	ADF -Statistic At 1 st 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%

4. Analysis of Results

The estimation of the model was done in stages. In the first stage of the estimation exercise, we tested for unit root properties of the data, having regard to Engle Granger's view that estimation of models using data that are not stationery 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 co-integrating relationship among the variables in the specification by testing the residuals obtained from the second stage of the estimation exercise for stationary. We also adopted a general - to - specific approach to estimate a parsimonious model of the relationship between Budget deficit and economic growth. This process imposes lag structures of all the variables in the co-integrated equation. Moreover, this technique makes it possible to deal with irrelevant variables rather than omitting relevant ones (Thomas 1993), using the Akaike information criterion², the significance of the individual variable, and the adjusted R² as a guide.

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.

² The AIC often is used in model selection for non-nested alternatives - smaller values of the AIC are preferred.

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% 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 1 st 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 Perron (PP) to test for the existence of unit roots in the variables (see Table 2)

4.2 Co-integration Tests Analysis

Table 3: Sierra Leone Co-integration 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% 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.

3.3 Analysis of Estimation Results for Linear Growth Equation

The estimation of the Sierra Leone model for this study adopted a general-to-specific modelling approach in the estimation process. The results of the parsimonious deficit-growth model are presented in table 4.

Table 4: Sierra Leone Parsimonious Deficit -Growth Model Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-62.46934	6.862757	-9.102659	0.0000
RGDPG(-1)	0.550824	0.071384	7.716319	0.0000
RGDPG(-2)	-0.543803	0.080788	-6.731273	0.0000
DEF	0.422944	0.174054	2.429958	0.0317
M2GDP	0.643761	0.370656	1.736816	0.1080
OPEN	0.567258	0.088859	6.383796	0.0000
DEF(-1)	-1.410862	0.167858	-8.405097	0.0000
DEP(-1)	0.368336	0.060995	6.038776	0.0001
INF(-1)	-0.249240	0.037757	-6.601189	0.0000
INV(-1)	0.725454	0.294261	2.465346	0.0297
LENDR(-1)	-0.444053	0.119092	-3.728662	0.0029
M2GDP(-1)	1.172393	0.324739	3.610256	0.0036
DEP(-2)	0.313234	0.048691	6.433134	0.0000
INV(-2)	1.129017	0.305218	3.699045	0.0030
LENDR(-2)	0.467140	0.101230	4.614634	0.0006
OPEN(-2)	-0.311500	0.083891	-3.713161	0.0030

R-squared	0.976307	Mean dependent var	1.380000
Adjusted R-squared	0.946690	S.D. dependent var	9.352732
S.E. of regression	2.159450	Akaike info criterion	4.673143
Sum squared resid	55.95869	Schwarz criterion	5.434403
Log likelihood	-49.42401	Hannan-Quinn criter.	4.905868
F-statistic	32.96472	Durbin-Watson stat	2.835661
Prob(F-statistic)	0.000000		

The result shows that the impact of deficit, the variable of interest, on real growth rate is positive and significant at the 5.0% level. The coefficient of deficit suggests a positive effect on growth contemporaneously. This means that a 1.0% increase in deficits will result in an increase of approximately 0.42% in economic growth in the current year. This result is consistent with [50] who found a positive and significant relationship between deficit and growth in Nigeria, but inconsistent with the findings reported by Karras[51]who concluded that deficits are negatively correlated, with the rate of growth of real output, and that increased deficits do appear to retard investment.

Depreciation in Sierra Leone over the study period had a positive impact on growth with a lagged period of one to two year. The variable is significant at the 5.0% level. In order words, 1.0% change in the level of depreciation accounted 0.37% increase in the growth with one year lag and 0.31% with two year lag. The result implies that depreciation in a current year does not have any effect on growth, while it impact growth positively with one to two years lag. The results confirm Karras, [51] findings on the relationship between the variables.

Inflation impacts growth negatively with a one year lag and at 1.05% level of significance. Thus a 1.0% increase in inflation will results in 0.25%reductions in growth rate. This is consistent with a priori expectation. The result is in line with the findings of Darrat[52], who suggested that both monetary growth and government deficits significantly influence inflation. In addition, he concluded that government deficits bear a stronger and more reliable relationship to inflation than monetary growth. Also, Ahking and Miller (1985) concluded that government deficits appear to be inflationary.

The result suggests that money stock M2GDP is positively related with output growth and that a 1.0% change in the level of money stock will lead to a 0.64% increase in output growth contemporaneously and 1.17% with one year lags. This result is significant at 10% (current year) and 1.0% (with one year lag). The outturn of the variable coefficient and significance is consistent with Onwioduokit and Apo [53] on their studies on Nigeria.

The variable *OPEN* used to proxy the impact of level of openness of the economy indicated a positive and significant relationship with growth over the period. The variable was statistically significant at 1.0% level. The result is consistent with theoretical expectations and Onwioduokit[49] empirical study on the WAMZ countries.

The results show that investment impact positively on growth with a lag of two years in line with theoretical expectations. A 1.0% increase in investment will increase output growth by 1.13% with a two year lag. The result is statistically significant at the 1.0% level.

The other variable in the model that was found to also be consistent with a priori expectations was the lending rate. The results also show that lending rate does have negative effect on growth in conformity to theoretical expectations and Onwioduokit and Apo [53]. In Sierra Leone this variable was significant at 1.0%.

Overall, the model illustrates that the coefficients of most of the explanatory variables have the expected signs. The value of adjusted R^2 (0.946690) shows that most variations in output growth can be explained by the explanatory variables. In other words, about 94.67% of the changes in output growth can be explained by the parameter.

5. Conclusions and Recommendations

This paper sought to ascertain the nature of relationship between Budget deficits and economic growth in Sierra Leone. It is evident from the analysis that there exists a positive relationship between budget deficit and economic growth in Sierra Leone. The paper has provided ample evidence in support of the proposition that budget deficit is growth enhancing in the study country. However, given the estimated impact of fiscal deficit impact on Growth, the authorities should direct the deficit spending at the provision of critical economic and social infrastructure including power and transportation to optimize the growth augmenting impacts of deficit.

Furthermore, the Sierra Leonean authorities would need to adopt an admixture of policy to ensure that inflation is not excessively high so that growth will not be retarded. There is also need to pursue a competitive external sector policy that will attract foreign direct investment to augment the domestic savings so that growth could further be amplified. The case for the availability and affordability of credit to the private sector should also be re-examined with a view to reducing the cost of credit to the economy in order to foster investment and output growth. In addition, investment in skill upgrade should be pursued. The quality of education should be improved by improving access and maintaining a qualitative learning environment and culture in schools. Also robustlink between universities and industry should be pursued in order to create the needed synergy between the labour market requirement and the school curriculum.

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