

ARTICLE

Relationship between Budget Deficit and Economic Growth: Evidence from Ethiopia

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Abstract

Background: This study examined the relationship between budget deficit and economic growth in Ethiopia. **Methodology:** The study employed time series data for the period 1991 to 2019 by applying the ARDL bounds testing approach. **Findings:** The empirical results indicate that budget deficit and economic growth in Ethiopia have a negative relationship in the long run, and have a weak positive association in the short run. In line with this, in the long run, a one percent increase in the budget deficit causes a 1.43 percent decline in the economic growth of the country. This result is consistent with the neoclassical view which says budget deficits are bad for economic growth during stimulating periods. Moreover, in the long run, the variables trade openness and inflation have a positive impact on Ethiopian economic growth, and on the other hand, the economic growth of Ethiopia is negatively affected by the nominal exchange rate in the long run. Similarly, in the long run, gross capital formation and lending interest rates have no significant impact on the economic growth of the country. Therefore, the study recommends the government should manage its expenditure and mobilize the resources to generate more revenue to address the negative impact of the budget deficit on economic growth.

Key words: Budget deficit, Economic growth, ARDL bounds

1. Introduction

Budget is a financial planning tool which consists of the details of estimation of receipts and expenditure for the financial year and could be reevaluated subject to annual revisions and depending on the country's conditions. The budget plan could be in deficit, surplus, or balanced depending on the conditions of the country starting from planning up to collecting the tax and disbursement of the expenditure. A budget deficit occurs when the total revenue collected from taxation, social contributions, grants, recurrent appropriations in-aid, or other revenue sources are less than the expenditures projected in the budget. The idea of the relationship between budget deficits and economic growth is inconclusive and is the subject of debate in developing and developed countries (Aisen and Hauner; 2008).

Theoretically, there are three views on the relationship between budget deficit and economic growth. The Keynesian theory asserts that budget deficit and economic growth have

a positive relationship. The Neoclassical on the contrary states that both variables have a negative relationship; and Ricardian equivalence argues the relationship between the two variables is neutral (Akamobi and Unachukwu; 2021; Peters et al.; 2020). The causes of budget deficits are of varying levels. The causes may be from an incomplete understanding of the government's fiscal position (forecasting error) or/and exogenous shocks to the general public finances or/and endogenous changes in economic policy settings (Aliona; 2008). Ethiopia had registered the fastest economic growth for the past decades by running a budget deficit and financing the deficit from both external and internal sources (Ministry of Finance and Economic Cooperation, (MoFEC; 2017)). Both have impacts on the macroeconomic stability and economic growth of the country.

Nevertheless, domestic borrowing may have both positive and negative impacts on economic growth. When the government sells bonds to the private sector to finance the budget deficit, it decreases the bond prices and raises the interest

rate. And where the interest rates are controlled, domestic borrowing leads to credit restrictions and reduction of private investments. However, a positive effect of domestic borrowing is that the money used for debt servicing remains within the country which automatically restrains the possible loss of liquidity towards the foreign land (Gaber; 2010).

The government can finance its deficit externally through the mobilization of resources from international financial institutions, bilateral relations, and multilateral institutions. Foreign borrowing increases foreign debt stocks which lead to a currency crisis, the balance of payment crisis, and capital flight and devaluation of the currency, and debt reschedules. In extreme cases, government increases the money supply to pay back debt by monetizing, hence in short-term securities, the government offered the bank, and this caused the rise of money supply because banks may consider bonds more attractive for investing (William and Klaus; 1993). Thus, the way the government finances budget deficit may have an impact on the economic growth of one's country.

A few studies were carried out to identify the effect of budget deficit financing on macroeconomic variables in Africa. The study carried out by Haile (2014) assessed the relationship between government budget deficit, inflation, and money supply. The result indicates budget deficit affects both inflation and money supply in Ethiopia in the long run. But, there is no indication of the relationship between budget deficit and economic growth in this study. Wolde-Rufael (2008) analyzed the relationship between budget deficit, money, and inflation in Ethiopia from the period of 1964 – 2003. The results designate that there is a long-run relationship among the series with a unidirectional Granger causality running from money supply to inflation and from budget deficits to inflation. But, fiscal policy does not seem to have any impact on the growth of the money supply.

Tulakemelwa (2015) examined the effect of budget deficit on economic development in the case of East African countries (excluding Ethiopia) and the finding indicates, there was a positive relationship in all countries and the effect of budget deficit on economic performance varies on how financing the deficit. If the government used it for investment, then it would have a positive relationship, but for the recurrent expenditures, there would be a negative relationship between the two variables. The few studies carried out in this area only assess the relationship between the other macroeconomic variables and budget deficit rather than real economic growth and do not determine the relationship between budget deficit and economic growth. Therefore, this paper aims to re-validate the relationship between budget deficit and economic growth in Ethiopia from 1991 to 2019 using the ARDL approach.

The rest of the paper is organized as follow: the literature review, which provides a holistic review of literature on the budget deficit and economic growth, the methodology, discusses the data and estimation technique. The finding section present and discuss the result and the conclusion section provide a summary and implication for the study.

2. Literature Review

2.1 Theoretical Review

Generally, there are three theoretical views on the relationship between budget deficit financing and economic growth. The Keynesian theory asserts that budget deficit and economic growth have a positive relationship, the Neoclassical, on the

contrary, states both variables have a negative relationship and Ricardian equivalence argues the relationship between the two variables is neutral (Bernheim; 1989). In particular, the Neo-classical schools state that the present generation has no consumption shortcut in case of a budget deficit. Budget deficit leads to lower national savings. When the government finances the deficit by debt, it leads to an increment in the debt stock and causes rise in the interest payment. This indicates that capital market is affected by the deterioration of national savings and interest rates rises. The Neo-classical school suggests that budget deficit affects economic growth by discouraging investors and low activity of investment, which is actually a case of crowding out private investment (Bernheim; 1989).

On the other hand, the Keynesian school of thought argued that budget deficit comes from the increment in government expenditure, and its need to finance does not crowd out private investment. This is because increased government spending stimulates private investment and national output. Hence, budget deficit accelerates national output and economic growth through increasing stimulant aggregate demand. Thus, the Keynesians conclude that budget deficits have crowding-in investment rather than crowding-out (Barro; 1989; Al-Tamimi; 2020). Lastly, the Ricardian equivalence perspective, argued that the budget deficit increased due to rising costs of government may be paid now or at a later time. Tax cuts or lower taxation in the present will be balanced by higher taxation in the future; which means that the budget deficit will have no impact on saving and consumption or macroeconomic variables. The government may finance the deficit by taxing or through borrowing and this borrowing is repaid in the future generation. So Ricardo argues that budget deficit financing through borrowing does not affect the current account and exchange rates (Tulakemelwa; 2015; Haile; 2014; Barro; 1989).

2.2 Empirical Literature

Few studies have been dedicated to validating either of the theories. For instance, Akoto (2019) assesses the relationship between budget deficit and economic growth using Ghana survey data from 2007 to 2016. The finding designates that Ghana's budget deficit financing and economic growth are negatively correlated and this implies that deficit financing has harmed Ghana's economic growth over the research period. A similar view was shared by Amwaama (2018) who conducted a study to determine the relationship between budget deficit and economic growth in Namibia using ARDL approach. The results confirm that budget deficit and economic growth have a negative relationship both in the long run and short run. The two studies Akoto (2019) and Amwaama (2018) affirm the assertion of the neoclassical economist who views budget deficit as inimical to economic growth.

However, several empirical studies have been consistent with the view of Keynesian school of thought. For instance, Biplob (2019) investigated the impacts of the budget deficit on economic growth using a time series data of Bangladesh from 1981–2017 by applying ARDL approach. The results indicate that both in short-run and long run budget deficit has a positive impact on the economic growth of the country. Similarly, Emmanuel and Uduakobong (2018) examine the relationship between budget deficit and economic growth in Liberia employing OLS to estimate the parameters and a parsimonious Error Correction Model. The study showed that in the long run, there is a positive relationship between budget deficit and economic growth in Liberia consistent

with Biplab (2019) findings. Two studies in Pakistan by Nayab (2015) and Ahmed et al. (2015) revealed a positive significant relationship exists between budget deficit and economic growth further validating the assertion made by Keynes.

Al-Tamimi (2020) studied the impact of budget deficit on the Jordanian economy for the period of 2010–2019 by employing ARDL. The results indicate that budget deficit calculated as a percentage of GDP and inflation rate have insignificant effects on the Jordanian economy in the study period. Rahman (2012) researched the relationship between budget deficit and economy in Malaysia with quarterly data in 2000–2011 and designated that there is no long-term relationship between fiscal deficit and economic growth in Malaysia during the study period.

The finding is consistent with the work of Ricardian school of thought. There are other studies which found mixed support for the three theories. For instance, Odhiambo (2013) researched the relationship between fiscal deficits and economic growth using the OLS approach in Kenya from 1970 to 2007. The multivariable linear regression model used in this paper suggested that there is a positive relationship between the two variables. Particularly, it shows that a 1% change in budget deficits contributes 6.6% a positive change in the growth of the economy. The previous level of budget deficits was also found to have a positive impact on economic growth at a 5% level and that 1% change in the previous level of budget deficits increases growth by 0.09%. On the other hand, budget deficit crowds out private investment by increasing the interest rate on investment because the government borrows more from domestic financial institutions.

Kneller (1999) indicated that budget deficit may have different effects on economic growth depending on how budget deficit happened. If the budget deficit is a result of reducing the distortion taxes, the effect on economic growth would be positive because tax reduction stimulates the investors and increases the aggregate demand. If the budget deficit is a result of reduced not distortionary taxes, there is no economic growth in this case. If the budget deficit is a consequence of increment the government investment expenditures, the effect on economic growth would be positive, because the productive government expenditures lead the macro development. If the budget deficit is a result of increasing the unproductive government expenditures, there is no economic growth, and the growth rate can be reduced with the budget deficit and it is hard for the government to recover the economy.

3. Methodology

To examine the relationship between budget deficit and economic growth, the study uses the following variables by identifying variables that determine real economic growth. The model derived and modified from the work of (Mohanty; 2019). The functional form of the model is as specified in equation (1)

$$Y_t = f(BD, X_i) \quad (1)$$

Where BD is budget deficit and Xi is the control variables which includes Gross Fixed Capital Formation (Investment) (GCF), Trade Openness (TRO), Inflation (INF), Nominal Exchange Rate (NER), and Lending Interest Rate (LIR). The econometric form

of the model is as given in equation (2):

$$Y_t = \beta_0 + \beta_1 BD + \beta_2 GCF + \beta_3 TRO + \beta_4 INF + \beta_5 NER + \beta_6 LIR + \varepsilon_t \quad (2)$$

It is important to point out that all variables under study are transformed into natural logarithms to avoid heteroskedasticity (Gujarati, 2004). Therefore, in the long run, it is expressed by percentage change and equation (2) can be rewritten as;

$$\ln Y_t = \beta_0 + \beta_1 \ln BD + \beta_2 \ln GCF + \beta_3 \ln TRO + \beta_4 \ln INF + \beta_5 \ln NER + \beta_6 \ln LIR + \varepsilon_t \quad (3)$$

Times series data are often not stationary at level although economic model is built on the assumption that the time series is stationary at level. Equation 3 can be differenced to achieve stationarity and avoid spurious results and given as in Equation (4):

$$\Delta \ln Y_t = \beta_0 + \beta_1 \Delta \ln BD + \beta_2 \Delta \ln GCF + \beta_3 \Delta \ln TRO + \beta_4 \Delta \ln INF + \beta_5 \Delta \ln NER + \beta_6 \Delta \ln LIR + \varepsilon_t \quad (4)$$

The ARDL approach to cointegration (Osuji; 2001) entails to estimate the error correction model (ECM) version of ARDL model for the determinants of economic growth:

$$\begin{aligned} \Delta \ln Y_t = & \beta_0 + \sum_{i=1}^p \beta_1 \Delta \ln Y_{t-i} + \sum_{i=1}^p \beta_2 \Delta \ln BD_{t-i} + \\ & \sum_{i=1}^p \beta_3 \Delta \ln GCF_{t-i} + \sum_{i=1}^p \beta_4 \Delta \ln TRO_{t-i} + \sum_{i=1}^p \beta_5 \Delta \ln INF_{t-i} + \\ & \sum_{i=1}^p \beta_6 \Delta \ln NER_{t-i} + \sum_{i=1}^p \beta_7 \Delta \ln LIR_{t-i} + \alpha_1 \ln Y_{t-1} + \\ & \alpha_2 \ln BD_{t-1} + \alpha_3 \ln GCF_{t-1} + \alpha_4 \ln TRO_{t-1} + \alpha_5 \ln INF_{t-1} + \\ & \alpha_6 \ln NER_{t-1} + \alpha_7 \ln LIR_{t-1} + \mu_t \end{aligned} \quad (5)$$

Where α_0 Is the intercept; $\alpha_1 - \alpha_7$ and $\beta_1 - \beta_7$ are long-run and short-run elasticity, respectively, μ_t is the residuals; Δ is the difference operator, and p is the optimal lag length of the variables. If there is evidence of cointegration of the variables, the following long-run ARDL model is estimated.

$$\ln Y_t = \alpha_0 + \alpha_1 \ln Y_{t-1} + \alpha_2 \ln BD_{t-1} + \alpha_3 \ln GCF_{t-1} + \alpha_4 \ln TRO_{t-1} + \alpha_5 \ln INF_{t-1} + \alpha_6 \ln NER_{t-1} + \alpha_7 \ln LIR_{t-1} + \mu_t \quad (6)$$

While the short-run ARDL model can be estimated as given in Equation (7) below:

$$\begin{aligned} \Delta \ln Y_t = & \beta_0 + \sum_{i=1}^p \beta_1 \Delta \ln Y_{t-i} + \sum_{i=0}^p \beta_2 \Delta \ln BD_{t-i} + \\ & \sum_{i=0}^p \beta_3 \Delta \ln GCF_{t-i} + \sum_{i=0}^p \beta_4 \Delta \ln TRO_{t-i} + \sum_{i=0}^p \beta_5 \Delta \ln INF_{t-i} + \\ & \sum_{i=0}^p \beta_6 \Delta \ln NER_{t-i} + \sum_{i=0}^p \beta_7 \Delta \ln LIR_{t-i} + \theta ECT_{t-1} + \mu_t \end{aligned} \quad (7)$$

Where ECT_{t-1} is Error Correction Term; θ is the coefficient of the Error Correction Term (ECT).

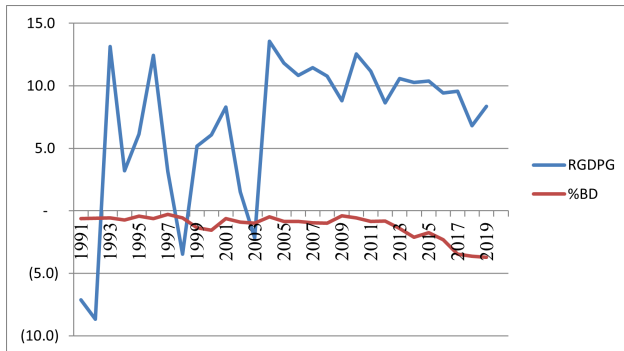


Figure 1. Trends of RGDPG and % of budget deficit to RGDP

3.2 Data and Source

All secondary data were sourced from World Bank Development Indicator. The time series secondary data was supported by primary data, where the researcher made effort to interview experts in the Ministry of Finance; Fiscal Policy, Debt Management, and Budget directorates at Ethiopia, Addis Ababa. The secondary data for a period running from 1991 to 2019 is collected from World Bank Data Index.

4. Result and Discussion

The study started by conducting a trend analysis to see the relationship between budget deficit and economic growth as presented in Figure 1.

As seen in Figure 1 there is no feasible relationship between percentage growth of budget deficit to RGDP and real economic growth in Ethiopia. In the meantime, we cannot say they have a positive or negative relationship by simply looking at the trend. Rather it may be possible to say there is a weak relationship between the budget deficit and economic growth which encourages us to look at the analysis of the model than relying on looking at the graph of the trend.

The researcher also made further effort to subject the time series to unit root test to ensure the model is fit for estimation. The Augmented Dickey-Fuller (ADF) unit root test was used to check for the presence or absence of stationarity in the series. This is based on the assumption that to apply the ARDL bounds test procedure, all variables should be stationary either at level, or first-order difference.

As Table 1 above shows, all variables excluding inflation are non-stationary at a level and become stationary at the first-order difference. Meaning, all variables are integrated into order one. So it fulfills the ARDL bound procedure criteria, and it detects a spurious regression. The existence of long-run relationship between the variables is checked by comparing the F-statistics of the unrestricted error correction model with the critical value bounds of the F-statistics. Since F-calculated (81.9) is higher than (4.43) of the critical value at 1 percent level of significance of the upper bound, there is evidence to reject the null hypothesis of no long-run relationship between the variables.

Long-run and Short-run ARDL Model

As seen in Table 2, the data indicates that the coefficient of error correction term of the given equation has a negative sign as expected and is statistically significant. The result indicates that in the presence of shock, economic growth at the current

period adjusts to its equilibrium by 20.8 percent per annum in every period.

The results indicate that in the long run, the budget deficit has a statistically significant negative effect on economic growth, although it has a weak positive effect on economic growth in the short run. In line with this, a one-percent increment of the budget deficit causes a 1.4 percent fall in real economic growth in the long run, *ceteris paribus*. This result confirms the empirical results in the literature Akoto (2019) in Ghana, Amwaama (2018) in Namibia, Awe and Funlayo (2014) in Nigeria. The result supports the idea of neo-classical views that budget deficit has a negative relationship with economic growth. In the short run, budget deficit has a weak positive effect on the economic growth of the country.

Trade openness is positively related to economic growth in the long run at a 5 percent level of significance, but it is contrary in the short run. In line with this, a one percent increment in trade openness causes 0.78 percentage rises in the real economic growth of the country in the long run. This result is consistent Barro and Bekele (2017) and Asnake and Liu (2019) papers results that indicate the trade openness in Ethiopia stimulates the economic growth of the country. One percent increment in the nominal exchange rate causes a statistically significant 0.64 percent turn down of economic growth in the long run, other variables remain constant. The result supports Maru (2018) paper that indicates the nominal exchange rate significantly and negatively affects the real economic growth of Ethiopia.

The other variable, the lending interest rate has no significant effect on Ethiopian real economic growth in the long run based on the analysis. With the line in the expectation, the lending interest rate has a negative association with real economic growth. But in the short run lending interest rate has weak negative association with the economic growth of Ethiopia and confirms the economic theory. On the other hand, gross capital formation has a weak positive association with the economic growth in the long run and it has no immediate impact on economic growth in the short run. In the case of the long run, the result is consistent with economic theory which states that capital formation is the major determinants of economic growth (Keynesian and Solow's theory of growth) and Al-Tamimi (2020).

One percent rise in the inflation rate causes a statistically significant 0.16 percent increment in the economic growth in the long run while a one percent increment in the inflation rate causes a 0.29 percent slowdown in the economic growth in the short run. In the short run, not only the current coefficient but also a one lag in the inflation rate significantly affects the economic growth of the country.

4.2 Model Diagnostic

The study carried out a number of diagnostic checking which includes Serial Brush and Godfrey LM test to check serial correlation, Ramsey's RESET test to check the functional form of the overall model, Jarque-Bera test to check the normality of the error terms and Heteroscedasticity test to check whether the error terms are constant over a time taken. Generally, as Table 3 indicates that the model satisfies the assumptions.

Interview Finding

Regarding the systematic government budget management in the country, there is a program-based budget system applied

Table 1. Unit root test (Augmented Dickey–Fuller test)

Variables	Integrated of Zero, I(0)		Integrated of one, I(1)	
	with trend	without trend	with trend	without trend
LRGDPG	-3.189*	-2.709*	-3.897**	-4.011***
LBD	-0.753	0.588	-5.377***	-4.914***
LGCF	-1.733	0.791	-5.374***	-5.261***
LTRO	-0.476	-1.701	-7.506***	-6.029***
LNEX	-2.274	-2.249	-3.014*	-3.083**
LLINR	-2.169	-1.922	-3.656**	-3.767***
LINF	-4.84***	-4.313***	-7.563***	-7.684***

Significance is indicated as follows: ***, ** and * for 1%, 5% and 10% respectively.

Table 2. ARDL Model Estimation and Error Correction Model Result

Variables	Adjustment	Long-run Model	Short-run Model
LBDI		-1.436** (0.584)	
ITRO		0.783** (0.274)	
INEX		-0.637** (0.248)	
IIIR		0.208 (0.223)	
IINFL		0.161** (0.063)	
LGCF		0.216* (0.108)	
L.IRGDPG		-1.208*** (0.068)	
D.LBDI			1.081* (0.611)
D.ITRO			-0.728*** (0.238)
D.IIIR			-0.461* (0.255)
D.IINFL			-0.295*** (0.055)
LD.IINFL			-0.240*** (0.027)
Constant			4.088*** (0.923)
Observations	27	27	27
R-squared	0.987	0.987	0.987

All variables are logged and Significance is indicated as follows: ***, ** and * for 1%, 5% and 10% respectively. Standard errors of the Betas signify in parentheses; D. indicates the first difference operator; L. indicates the lag operator. LD. Lag of the first difference

Testing Method	Result	P-Value
Breusch–Godfrey Test	0.4993	0.05
Jarqua–Bera test	0.0968	0.05
Heteroskedasticity	0.4093	0.05
Ramsey Test	0.0659	0.05

Table 3. Diagnostic tests for ARDL models

in the federal institutions to manage and control government expenditure. But, this budgeting system has not been implemented as much in the government institutions and levels. And, there are also Integrated Financial Management Information Systems (IFMIS) and Integrated Budget and Expenditure System (IBEX) to assist public sector budgetary institutions to promote better public financial management with a centralized registry of public sector revenues and expenditures. The policies to manage the budget deficit of the country are categorized into two ways; increase revenue or decrease expenditure. In administering the budget deficit, delay of megaprojects, Natural disasters, Climate change, Endogenous changes in the fiscal policy and monitoring policy settings, world price rise, and political situations are among the major challenges in administering budget deficit in Ethiopia.

5. Conclusion and Policy Recommendations.

The objective of this study is to examine the relationship between budget deficit and economic growth of Ethiopian economy covering time-series data from 1991 to 2019. The study concludes that there were major challenges in administering the budget deficit. The major challenges found

were a delay of mega projects, natural disasters, climate change, world prices rising, and political situations. The government of Ethiopia takes policy actions to manage the budget deficit of the country in two directions. The first one is to reduce expenditure through controlling aggregate expenditure to ensure affordability and effective use of public expenditures. The second is increasing revenue by broadening the tax base and improving tax administration. In this regard, there is a systematic government budget management in the country like a program-based budget system to manage and control government expenditure. But, the system is not well functionalized in all budgetary institutions.

The empirical results revealed that budget deficit is found to have a negative association with the economic growth of Ethiopia in the long run affirming the neoclassical view. It was revealed that a 1 percent increment of budget deficit causes a 1.43 percent decline in real GDP, keeping other variables constant. This result tends to follow the Neo-classical economists' arguments. One possible reason might be due to the assertion of [Tonuchi et al. \(2020\)](#) that there is huge disparity between informal and formal sector and that high informality increases the time lag between government deficit financing and its impact on the formal economy.

However, the short run budget deficit has a weak positive association with economic growth. Trade openness, in the long run, has a positive effect on economic growth, while it has a negative association with economic growth in the short run. The nominal exchange rate has a negative association with economic growth in the long run and it has no immediate association in the short run. Apart from this, both gross

capital formation and lending interest rate have no significant effect on the real GDP of Ethiopia. Lastly, the inflation rate has a positive effect on economic growth in the long run and is negatively associated with economic growth in the short run.

The study recommends the government should strengthen the monitoring and evaluation of the projects, and strengthen the management of State-owned enterprises to improve the failure of mega-projects that causes the budget deficit. The government/ policymakers should be worried about the existence of a budget deficit, because it hurts economic growth in the long run, and should have to take into consideration both short-run and long-run effects. Stakeholders should have also to consider the effect of devaluation seriously and set a remedial policy that encourages output growth and contain the effects on other macro variables interlinked with the devaluation before making a devaluation of the local currency. The government should have to sketch more trade open policies to make a profit by integrating the country's economy with the regional/world economy as it exerts a visible positive impact on the economic growth of the country.

Competing Interests

Author declare no competing interests.

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