Impact of Government Spending on Economic Growth in Ethiopia: Time Series Analysis

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ABSTRACT

The objective of this study was to investigate the impact of government expenditure on economic growth using time series data from 1970 to 2019 in Ethiopia. To this end, unrestricted error correction model (UECM) and single equation autoregressive distributed lag model (ARDL) was used to identify short run and long run impact of government expenditure on economic growth respectively. The estimation result envisaged that capital expenditure has distorting effect in the short run, while it promotes growth in the long run. The study also revealed that government recurrent expenditure has positive effect in the short run, but has no positive effect and implication on growth in the long run. Similarly, debt financed capital expenditure crowd in economic growth in the short run even though it crowds out economic growth in the longrun. Therefore, government should pay due attention to development project management to enhance the effectiveness of capital expenditure in achieving sustainable economic growth and closely supervise the adverse effect of recurrent expenditure to maintain macroeconomic stability.

Key words: *capital expenditure, autoregressive distributed lag, unrestricted error correction model, recurrent expenditure, economic growth*

1. INTRODUCTION

1.1. Background

Ethiopia is a country endowed with abundant arable land and become home of second populous nations in Africa. Nevertheless, it remained as one of the poorest country characterized by low per capita income, high population growth, high unemployment and inflation rate. The country registered variable economic growth in different time. For instance, during the Derg regime, the country registered about 1.7% positive growth in 1976, and negative 13.2% growth rate in 1992 (UNICTAD,2017). Nevertheless, it registered growth during EPRDF regime with double digit in some years. For

instance, annual economic growth registered was 13.6% in 2004 and 10.28% in 2014 respectively (Ibid). Besides, per capita income increased from 95 USD 1971 (NBE, 2017) to 749 USD in 2015/16 (EEA, 2017). Besides, population of the country was growing on average at a rate of 2.5 during Derg regime and 2.9 for the period from 1991 to 2019 (WDI, 2019). Similarly, the unemployment rate is also quite significant and found to be 21.30% in 2017 (ILO, 2019). Even thought, per capita income has increased, the national poverty level is still high (23.5%) in head count (WDI, 2019).

To curve such trend, government has been designing different pubic policies and strategies with basic aim of improving income and social welfare. To this end, the government adopted aggregate demand management theory with basic argument that expansionary government expenditure stimulates economic growth directly through its multiplier and indirectly through marginal productivity of capital (Dornbusch et al. 2011; Agenor & Montier, 2015). Following these successive structural plans such as Plan for Accelerated Growth and Sustainable Development, Growth and Transformation Plan I and II were designed and implemented with due attentions given to social services. For instance, the country launched its second Growth and Transformation Plan (GTP II), underpinned sustainable, rapid, broad based and equitable economic growth strategies targeting 11% annual average growth rate of real GDP (FDRE, 2018).

To realize such the targeted goal, the government has focused on growth fostering social and economic development activities increasing public expenditure. Accordingly, the capital expenditure allotted to these activities has been increasing through time. For instance, the expenditure on these activities has increased from 24.4% in 1991/92 to 29.28% in 2019 (MoFED, 2019). Besides, fiscal policy implementation of 68% on pro-poor sectors and 59% on capital accumulation was proposed (NPC, 2016). However, the results of the interventions were not as expected and rate of unemployment is still high.

Even though, there are large body of literature related to impact of government expenditure on economic growth, there is no consensus among scholars. Hereby, literatures on the impacts of expansionary government

expenditure on economic growth categorized into three. First group support the fact that amplified government expenditure promotes economic growth (Trebicka, 2015; Macek & Janku, 2015; Chen et al. 2016; Babatunde et al. 2013; Tamai, 2006; Adefeso, 2016 and Mulay, 2016). Whereas, the second group of literature underlined that expansionary government expenditure causes the economy to contract in the direction of unintended growth path (Boniface et al 2017; Ali & Ahmad, 2010). The third group of literature emphasized on mixed effect of government expenditure on economic growth (Osebo, 2017; Mulugeta , 2017; Muhdin, 2016; Solomon, 2019; Bleaney, Gemmell, & Kneller, 2001; Ghosh & Gregoriou, 2006; Masca, Cuceu, & Valdean, 2015).

Furthermore, there is no comprehensive study, which include effect of increased government expenditure through variables such as fiscal deficit, productive and unproductive expenditure …etc in short run and /or long run. Besides, variables includes, relationship investigated and findings differ among scholars. There are literatures which revealed that fiscal deficit, lagged growth and productive government expenditure positively and significantly affect economic growth (Villanueva, 1994; Ali & Ahmad, 2010). Some literature indicated that productive public spending and budget surplus have positive (deficit has negative) and significant impact on economic growth in short but it has no effect in the long run, while unproductive expenditure reduce economic growth (Bleaney et al. 2001; Park , 2009. Masca et al. 2015). However, Adefeso (2016) found that productive government expenditure has dampening effect on economic growth but the study ignored the role of unproductive (recurrent) expenditure and debt financing. There are studies which found that government expenditure has counter cyclical (Ghosh & Gregoriou, 2006; Boniface et al., 2017) or procyclical effects. On the other hand, extensive studies found existence of procyclical relationship between capital expenditure and growth, but they overlooked the impact of recurrent expenditure (Solomon, 2019; Babatunde et al. 2013; Mulugeta, 2017).

From the aforementioned empirical findings, one can observe controversies regarding the impact of expansionary government expenditure on economic

growth as aggregate demand theory per se. Except few studies others overlooked the impact of deficit financed on productive expenditure and unproductive (recurrent) expenditure (Ghosh & Gregoriou, 2006; Masca, Cuceu, & Valdean, 2015). There are also measurement error as in some studies government expenditure measured as ratio of GDP which does not reveal the distribution and separate impact of government expenditure. Therefore, this study is motivated to investigate the impact of expansionary government expenditure on economic growth in Ethiopia taking in to account above issues. To this end, the study also attempts to fill the mentioned gaps by incorporating the overlooked variables, correct measurement error to capture the intended impacts using disaggregated measurement approach, uncovers the short and long run consequence of deficit financing though borrowing. In doing so, this study tries to test the theoretical underpinnings related to impact of government expenditure and disparities in recent empirical studies.

2. MATERIAL AND METHODOLOGY

To achieve the objectives of the study, quantitative approach using time series data from 1971 to 2019 was employed. In order to estimate the impact of government expenditure on economic growth we applied Autoregressive Distributed Lag (ARDL) model with single equation using STATA 14 version.

2.1. Data Collection, Nature and Measurement

For study, secondary data from different institutions such as UNCTAD online database 2019, National Bank of Ethiopia, and World Bank online database 2019 were used. The variables are real economic growth, gross capital formation measured as ratio of GDP; capital expenditure, recurrent expenditure, gross secondary school enrolment (used as proxy for human capital accumulation, measured by the years of education), working age population(measured as percentage of total population used as proxy for labor force), and. budget deficit interacted with capital expenditure(serves as proxy for government deficit financing by selling bonds or borrowing to finance capital expenditure) were identified and used.

2.2. Model and its Specification

Theoretical growth literatures point out different theories that explain factors stimulating economic growth. Keynesian macroeconomics treats government expenditure as one of demand management policy (fiscal policy) in IS-LM model improve resource use when a given country is below full employment. According to the IS-LM model, increased government expenditure increases output through its effect on aggregate demand. However, the extent of output and employment expansion depends on interest elasticity of investment (Snowdon & Vane, 2005). On the other hand, Solow (1956), drawn a sharp distinction between physical capital and labor. He emphasized physical capital accumulation as engine of economic growth. Assuming, production function of the form: $Y = AF(KL)$ and the capital accumulation process stated as $K_{t+1} = sf(k) - \delta K_t$, one can see how an economy converges to its steady state via expanding physical capital. However, diminishing return to capital gradually reveals, and it would be difficult to achieve sustainable economic growth beyond the steady state (Mankiw, 2010). Despite this, the model overlooked the role of human capital in enhancing productivity and ability to adopt new technology. Such role of Human capital later on emphasized by Nelson and Phelps (1966) stating, more educated workers are more likely to adopt new technologies. They forwarded augmented production function given by:$Y_t = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \quad 0 < \alpha + \beta < 1$ and the human capital accumulation process is $H_{t+1} = s_h Y_t - \delta_h K_t$ (Acemoglu, 2009). This implies that adding human capital into the neoclassical growth model provides another way of generating large differences in income per worker.

In the neoclassical setting, scholar like Barro(1990) and others, explained physical capital accumulation as proximate as well as fundamental determinants of economic growth. His model treated government purchase as endogenous variable. Accordingly, the production function is given by: $Y_i = AL_i^{1-\alpha}.K_i^{\alpha}.G_i^{1-\alpha 1}$ (Barro & Sala-i-Martin, 2004). He sorted government expenditure a sum of productive (g) and unproductive (h)

[1] G = government expenditure and 0<α<1, AL includes labor and labor productivity. Thus A = H human capital

expenditure measured as ratio of GDP. Though these theories explain growth factors, none of them is exhaustive to explain deriving forces of growth. Endogenous growth theory is one of the recent and most frequently used theoretical approach as a lens of analysis. Because, it treats all variables endogenously to analyze impacts on the target variable (Barro, 1990; Shaw, 1992; Ghosh & Gregoriou, 2006; Futagami, Morita, & Shibata, 1993).

As theories discussed above could not capture both proximate and fundamental determinants of economic growth comprehensively, this study relies on eclectic approach. Therefore, we construct our conceptual framework based on capital expenditure and recurrent expenditure as independent variables and gross capital formation, education and working age population are considered as intermediate variables in analyzing relationship between government expenditure and economic growth. Accordingly, the functional relationship among the variables and expected signs are presented as follow

$$Ygt = f\left(\underset{\pm}{GCF_t}, \underset{\pm}{CE_t}, \underset{\pm}{RE_t}, \underset{\pm}{SE_t}, \underset{\pm}{WP_t}, \underset{\pm}{CB_t}, \ldots\right) \qquad 2.1$$

where, economic growth (Y_{gt}); Gross capital formation **(GCF)**; capital expenditure (CE); recurrent expenditure (RE); Secondary school enrollment (SE); Working age population (WP; Deficit financed capital expenditure (interaction variable) (CB) and t refers to time.

To avoid problem of normality, testing for normality for each variables has been conducted. Based on the normality test for each variable, the variable/s that revealed outlier and/ or any other indicators of non-normality property are/is transformed to logarithm form. Then the model further specified as follows;

$$\boldsymbol{Y_{gt} = \alpha_1 \pm \alpha_2 lnGCF_t \pm \alpha_3 lnCE_t \pm \alpha_3 lnRE_t \pm \alpha_4 lnSE_t \pm \alpha_5 lnWP_t \pm \alpha_6 CB_t + \varepsilon_t} \qquad \textbf{2.2}$$

The variables such as, $\boldsymbol{Ygt}$ and CBt are normally distributed thus not transformed to logarithm. $\boldsymbol{\varepsilon_t}$ refers disturbance term, assumed to satisfy all classical linear regression model assumptions (i.e. (IID~N ($0, \delta^2$).). We anticipated that except recurrent expenditure and the debt financed variables

the remaining variables included in the model positively and significantly affect economic growth both in the short run and long run.

2.3. Estimation Methods

The existence of interaction among variables are treated as endogenous is captured by Vector Autoregressive (VAR) model, in which we do not have any priori distinction between endogenous and exogenous variables (Gujarati, 2004). To estimate short run and long run relationships among variables we used ARDL model instead of Engle & Granger (1987) and Johanen methods (1988). Because ARDL (p, q) model has the following advantages over the two methods. Firstly, ARDL (p, q) model does not require variables to be integrated of the same order.

Secondly, it applies to single equation, where dependent and independent variables are clearly known (Pesaran et al.2001). Thirdly, each variable in ARDL (p, q) technique stands as single equation. Moreover, endogeneity is less problematic in ARDL modeling because it is free of residual correlation (Nkoro & Uko, 2016). Finally, ARDL (p, q) model does not impose any restriction on coefficients (Green, 2012). Due to these advantages, we employed ARDL (p, q) model as our estimation method. The reparametrized UECM model is:

$$\Delta Y_{gt} = \alpha_0 \pm \alpha_1 Yg_{t-i} \pm \alpha_2 lnGCF_{t-i} \pm \alpha_3 lnCE_{t-i} \pm \alpha_4 lnRE_{t-i} \pm \alpha_5 lnSE_{t-i} \pm \alpha_6 lnWP_{t-i} \pm \alpha_7 CB_{t-i} \pm \delta_1 \sum_{i=1}^{p} \Delta Yg_{t-i} \pm \delta_2 \sum_{i=1}^{q} \Delta lnGCF_{t-i} + \delta_3 \sum_{i=1}^{q} \Delta lnCE_{t-i} \pm \delta_4 \sum_{i=0}^{q} \Delta lnRE_{t-i} \pm \delta_5 \sum_{i=1}^{q} \Delta lnSE_{t-i} \pm \delta_6 \sum_{i=1}^{q} \Delta lnWP_{t-i} \pm \delta_7 \sum_{i=1}^{q} \Delta CB_{t-i} - \gamma EC_{t-i} \quad 2.3$$

Where **Δ** refers to change in the respective variable; α_i is a 1 x K vector of long run coefficients; δ_i is a 1 x K vector of short run coefficients and ϒ is the speed of adjustment coefficient, ∑ = summation and p the optimal lag length of the dependent variable, while q the optimal lag length for the independent variables. We undertake all the necessary pre and post estimation tests to achieve the maximum level best to find robust estimates that is free of any bias and spurious outcomes see section 2.1-2.3.

3. RESULTS AND DISCUSSION

3.1. Results and Tests

3.1.1. Test for Stationarity

To check for stationarity tationary of each variable augmented Dicky Fuller (ADF) in level and first difference have performed. The test result indicted in table 3.1. The ADF tests for economic growth and capital expenditure with first differences have ignored to avoid over differencing. While, the remaining variables become stationary after fist differencing. The test results indicate the existence of long run relationship between economic growth and independent variables included in the model. Therefore, the test results give green light to use Autoregressive distributed lag (ARDL) model with unrestricted error correction model (UECM) to capture both the long run and short run information contained in the variables.

Table 3.1: ADF Test for Stationarity

	ADF test at level				ADF test at first difference				
	Test statistics	**1% critical value**	**5% critical value**	**10% critical value**	**Test statistics**	**1% critical value**	**5% critical value**	**10% critical value**	**Order of integration**
Yg	3.624***	3.614	2.944	2.606	8.271***	3.621	2.947	2.607	I(0)
lnCE	2.933*	3.614	2.944	2.606	3.125**	3.634	2.952	2.610	I(0)
lnRE	0.764	3.614	2.944	2.606	6.591***	3.621	2.947	2.607	I(1)
lnGCF	1.407	3.614	2.944	2.606	2.968**	3.621	2.947	2.607	I(1)
lnWP	1.764	3.614	2.944	2.606	7.519***	3.621	2.947	2.607	I(1)
lnSE	1.583	3.614	2.944	2.606	8.239***	3.621	2.947	2.607	I(1)
CB	2.111	3.614	2.944	2.606	5.620***	3.621	2.947	2.607	I(1)

***, **, * indicates significance level at 1%, 5% and 10% critical values respectively

3.1.2. Lag Length Selection

Optimal lag length selection was conducted based on AIC and SBIC selection criteria after running Vector autoregressive model on each variable. The AIC and SBIC differ in their trade-off between fit and parsimony (Verbeek, 2004). The SBIC criterion is preferred to AIC criterio because it almost select the true model. Bur the AIC criterion tends to result asymptotically in over parametrized models. However, in our test for optimal lag length both information criteria produced the same order of ARDL model. We portrayed the maximum lag length determined by these information criteria in table 3.2.

3.1.3. Bound Test For Cointegration

To confirm the existence of cointegration among the variables, we performed the bound test for cointegration using Wald test (F_ statistics). Therefore, the bound test asserts the existence of cointegration among the variables (Table 3.2).

Table 3.2: Cointegration Bound Test

Variables	F_ statistic	Cointegration	Optimal lag length
$y_{gt} = f(lnGCF, lnCE, lnRE, lnSE, lnWP\ CB)$	14.29937***	There is co integration	2, 2 ,1 ,3 , 1 ,0 , 3
	Critical value	Lower bound{I (0)}	Upper bound {I (1)}
	1%	3.15	4.43
	5%	2.45	3.61
	10%	2.12	3.23

Source: Authors' computation **** Significant at 1% level

3.1.4. Econometric Model Estimation Result

After confirming the existence of cointegration, we estimated the model using unrestricted error correction model (UECM). The estimated results show that the independent variables have mixed impact on economic growth (Table 3.3)

Table 3.3: ECM Estimation Result

Variables		Variables	
Long-run dynamics	**Long run coefficients**	**Short-run dynamics**	**Short run coefficients**
LNGCF	3.13**(1.466)	Δy_{gt-1}	0.273*(0.1395)
LNCE	7.908***(2.766)	$\Delta lnGCF_{t-1}$	5.870**(2.758)
LNRE	-9.027(5.384)	$\Delta lnGCF_{t-2}$	5.2099*(2.893)
LNSE	-1.397(1.064)	$\Delta lnCE_{t-1}$	-11.808*(5.843)
LNWP	-10.973(113.401)	$\Delta lnRE_{t-1}$	9.921(8.938)
CB	-3.718***(0.911)	$\Delta lnRE_{t-2}$	17.012***(5.838)
		$\Delta lnRE_{t-3}$	18.704***(5.505)
		$\Delta lnSE_{t-1}$	2.790*(1.518)
		ΔCB_{t-1}	5.114***(1.079)
		ΔCB_{t-2}	4.947***(1.059)
		ΔCB_{t-3}	4.318***(0.852)
		Adjustment coefficient (y_{t-1})	-1.4856***(0.1899641)
AIC = 5.418140 SBIC = 6.196344 DW =1.837169			
R-squared = 0.857359			
Adj. R-square = 0.750378			
St. Error = 3.126281 LR=-97.49001			
F-statistic =8.014136(0.00003)			

***, **, * significant at 1%; 5% and 10% respectively. The values in parenthesis refers to standard error

Source: Authors' computation

The estimation result indicated statistically significant relationship between economic growth and government expenditure, even if, the result revealed mixed signs. That is, capital expenditure positively related to economic growth in the long run, while, recurrent expenditure is negatively and insignificantly related to economic growth in the long run. It implies that a percentage increase in capital expenditure leads to 0.079 units increase in economic growth, recurrent expenditure has no effect on economic growth in the long run ceteris paribus. Likewise, the short run effect of government expenditure also revealed mixed effects. Other thing equal, a percentage change in capital expenditure reduces economic growth by 0.118 units. But,

the same percentage change in recurrent expenditure stimulates economic growth by 0.17 and 0.18 units with time lags respectively.

Besides, deficit financed capital expenditure (interaction variable), like the other expenditure variables, revealed mixed effect on economic growth. A unit increase in current borrowing to finance capital expenditure reduces economic growth by about more than three folds in the long run. Contrary to this, a unit increase in current borrowing to finance capital expenditure augments economic growth by more than four folds in the short run ceteris paribus. Moreover, our estimation result also revealed the importance of lagged economic growth in serving as a millstone to the leading economic growth. That is, a unit increase in lagging year economic growth contributes to the leading growth by 0.27 units, ceteris paribus.

Finally, the error correction term is negative and its magnitude is 1.4856, which is greater than unity. The negativity of the error correction term indicates the existence of convergence to the steady state growth rate. That is, the short run shock in economic growth due to shock in government expenditure "overshoots" the long run dynamics in economic growth. This higher magnitude indicates very rapid response of economic growth to shock in government expenditure. Therefore, to eliminate the disequilibrium, output adjusts by approximately 1.5 unit each year. That is, the long run output should grow as fast as the short-term shock response to eliminate the disequilibrium.

3.2. DISCUSSION

The study result indicated that capital expenditure and recurrent expenditure revealed contradicting impacts on economic growth, which is partly unexpected outcome. Specifically, capital expenditure itself revealed surprisingly contradicting outcomes. That is, negative and positive effect in the short run and long run respectively. Even though, its impact is higher in the short run than in the long run, expansionary capital expenditure is contractionary in the short run unlike its effect in the long run. The expansionary-contractionary effect in the short run compared to long run is plausibly due to considerable dependence on various imported inputs for development projects. As expenditure on import generates no multiplier

effect on domestic sector, hence recent investment takes time to bring positive contribution to economic growth. This effect of expansionary capital expenditure is consistent with Ali & Ahmad (2010). The other possible explanation could be inefficient implementation of capital budget and prevalence of grand corruption in development projects. However, short run impact sustains only for very short time period. This finding is also consistent with Ghosh & Gregoriou (2006), and Solomon, (2019). On the other hand, the marginal productivity of government capital expenditure is found to be very small both in the long run and short run compared to the government expenditure multiplier indicated in the IS-LM model even if this one was measured at disaggregated level.

Likewise, recurrent expenditure has positive and significant impact on economic growth in the short run, though it remains silent in the long run. This positive effect of recurrent expenditure is owning to its direct effect on aggregate demand, which triggers current consumption, and promotes investment activities. That is, expansionary recurrent expenditure is stimulating effect in the short run. Such finding is consistent with the finding of Ghosh & Gregoriou (2006) which "predicted positive effect of recurrent expenditure on economic growth." However, it is inconsistent with the findings of Bleaney, Gemmell, & Kneller, (2001), Chen, Yao, Hu, & Lin (2016), and Masca, Cuceu, & Valdean (2015) which "explain the negative and significant effect of recurrent expenditure on economic growth" regardless of measurement scale. Our finding also disproved the finding of Solomon (2019), which claim the neutral impact of unproductive (recurrent) expenditure remains neutral to economic growth.

On the other hand, recurrent expenditure revealed negative and statistically insignificant effect on economic growth in the long run. Assuming size does not matter; this negative outcome is possibly because the stimulated demand would persist for a longer period, resulting in excess demand. Such effect discourages consumption and investment because of high price bide up and increased demand for money. This indicates that recurrent expenditure in the form of salaries, transfer payments, etc. stimulate aggregate demand leading to undesirable macroeconomic implications, unless complimented by the supply side progress.Therefore, this finding confirms that expansionary

capital expenditure promotes economic growth in the long run than it does in the short run compared to expansionary recurrent expenditure.

The relationship between economic growth and deficit-financed capital expenditure revealed expected outcomes. It promotes economic growth in the short run while it reduce growth in the long run. The possible explanation is this government borrowing makes financing development projects easier, which in turn creates new jobs, and perhaps bolster capital formation and improved factor productivity. This implies that deficit financed capital expenditure has two consequences. On one hand, it promotes economic growth in the short run via expansion of aggregate demand by stronger multiplier. That is, there is crowding in effect of deficit-financed capital expenditure in the short run. On the other hand, it reduces economic growth in the long run due the repayment of principal plus interest to the lender on the due date. Thus, deficit-financed capital expenditure crowds out economic growth in the long run. Similarly, if government finances its deficit internally, it would fight for the limited private saving, which might escalate shortage of fund for investment ending up in discouraged private investment. This finding is consistent with Teles & Mussolini (2013). Therefore, crowding out effect remains in effect though the economy is operating with excess capacity, which is against the Keynesian perfectly elastic supply per se.

The lagged economic growth carries the expected sign. That is, the lagged economic performance positively and significantly contributes to the leading economic performance. This finding supports the prior study conducted by Villanueva (1994). Therefore, it strengthens the prior empirical evidence that lagged economic growth triggers the leading growth.

3.3. Sensitivity Analysis

Although, we have given model specification in section 2.3, yet for the purpose of estimation, we perform sensitivity analysis and choose the most robust variables. The robustness of the variables is apparent from residual diagnosis test. To test for existence of residual serial correlation and heteroscedasticity, we utilized the Lagrangian Multiplier (LM) test statistics and white test statistics respectively. The residual diagnosis test indicate that

there is no problems of autocorrelation and heteroscedasticity (see table 3.4). The absence of autocorrelation between the error terms approves the goodness of model specification. Thus, it is possible to conclude that there is no problem of model specification in the model specified.

Table 3.4. Test for Autocorrelation, Hetero scedasticity and Normality of Residuals

Null hypotheses	Test statistic	Coefficient	Prob. >chi2	Decision
No Serial correlation	Durbin-Watson	1.83717		
	Breush-Godfrey LM test	Chi^2 (4.4465)	0.2155	Fail to reject
Homoscedasticity	White test	Chi2(42)=43.00	0.4282	Fail to reject
Normality	Jarque-Bera	0.2261		
	Skewness	-0.170452	0.8931	Fail to reject
	Kurtosis	2.9000		

Source: Authors' Computation

Moreover, based on Jarque-Bera test statistics the residual of the estimated model is normally distributed. It confirmed that the data used in the regression is normally distributed. On the other hand, to test for model stability we employed CUSUM square test. As indicated in figure 3.1., the CUSUM square test showed that all variables are co-integrated. Furthermore, the CUSUM square test statistics indicated that neither of the CUSUM square test statistics exceeds the critical values, which ensures that the model is correctly specified and stable.

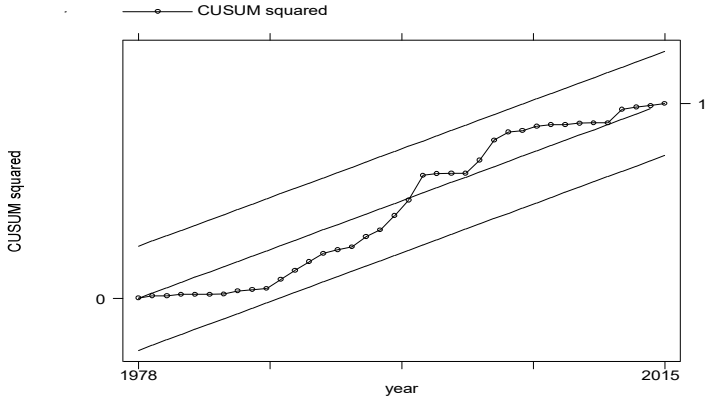

Figure 3.1: Test for Model Stability Source: Authors' Computation

4.7. Test for Granger Causality

To ascertain the direction of causation between the dependent variable and the independent variables in a co-integrated equation, we tested for granger causality. In accord, the granger causality test confirms the existence of causation from independent variables to the dependent variable but not vice versa except for the interaction variable. Therefore, granger causality test asserts the existence of relationship between the dependent and the independent variables.

Table 3.5: Test for Granger Causality

Null Hypotheses	Observation	F-statistic	Probability	Decision
LNGCF does not Granger Cause YG	45	6.67208	0.0032	Reject
YG does not Granger Cause LNGCF	45	0.62164	0.5422	Accept
LNPE does not granger Cause YG	45	2.59945	0.0868	Reject
YG does not Granger Cause LNPE	45	0.06456	0.9376	Accept
LNUPE does not Granger Cause YG	45	7.24254	0.0021	Reject
YG does not Granger Cause LNUPE	45	1.56935	0.2207	Accept
LNHC does not Granger Cause YG	45	3.53563	0.0388	Reject
YG does not Granger Cause LNHC	45	0.00335	0.9967	Accept
LNLABOR does not Granger Cause YG	45	0.26193	0.7709	Accept
YG does not Granger Cause LNLABOR	45	0.36105	0.6992	Accept
CB does not Granger Cause YG	45	01.06941	0.3528	Accept
YG does not Granger Cause CB	45	5.55089	0.0075	Reject

4. CONCLUSION AND POLICY IMPLICATION

4.1. Summary

This study investigated the impact of expansionary government expenditure on economic growth in Ethiopia using time series data from 19971 to 2019. The study used ARDL model to estimate long run relationship and UECM to estimate short run relationships. Appropriate test procedures were applied to identify existence cointegration among the variables.

Accordingly, our finding reveals that capital expenditure negatively and significantly influence economic growth in the short run even though short

lived. This is so, due to the inefficient utilization of capital expenditure, existence of grand corruption on development projects, delay to implement and finalize development projects. Therefore, expansionary capital expenditure is contractionary in the short run. But, capital expenditure has significant stimulating effect on economic growth in the long run. Similarly, recurrent expenditure produces expansionary effect in the short run, while it is negative and insignificant in the long run. This is so, perhaps because recurrent expenditure affects economic growth through the demand side. That is, once it triggers demand it will evaporate within limited period leaving the economy with excess demand and inflationary situation. Hence, has no sustainable impact on economic growth.

It can be concluded that while recurrent expenditure is more relevant to promote economic growth in the short run compared to capital expenditure which is more important in the long run. Even though, the capital expenditure fails to follow the IS-LM model in the short run, recurrent expenditure does follow IS-LM model in the short run. It is difficult to judge the net effect of capital over the recurrent expenditure due to the mixed impacts revealed from the regression result. Unlike the IS-LM model with general expansionary government expenditure, disaggregated impact of expansionary government expenditures on economic growth is ambiguous. Thus, this study clearly underlines the choice of expenditure for short term demand management should be different from the one that aimed at stimulating long term sustainable growth. Deficit-financed capital expenditure, which as expected promotes economic growth in the short run, but crowds out output in the long run. This crowding out in the long run is due to the repayment of interest on the deficit and or loan.

4.2. Policy Implications

Theoretically, expansionary government expenditure expands output through the multiplier effect. But this study identified that capital expenditure is expansionary contractionary in the short run. While recurrent expenditure has no long run impact on economic growth. Similarly, deficit-financed capital expenditure also shown mixed effects. Thus, we propose the following policy implication based on the findings of this study.

To channel the capital expenditure to the productive economic activities, government should devise to enforce big project monitoring and act appropriately to increase the expansionary effect of capital expenditure. The government should implement the import substitution strategy to reduce the leakage due to increased imports by government, which takes huge amount of the capital expenditure due to import of inputs for almost all development projects. Because, expenditure on import does not have multiplier effect in domestic sector, besides, the imported inputs fight with the domestic producers, which further discourage existing capital productivity. Therefore, Government should work to its level best to reduce the size of capital expenditure on imports and increase the efficient utilization of it. The other concern is, the deficit financed capital expenditure, this variable actually supported expansion in infrastructure, thence, economic growth. However, to reduce its crowding out effect in the long run and enhance crowding in effect in the short run, it is better to focus on projects that generate sufficient income to repay expenditure made on them to combat the crowding out effect of the debt repayment in the long run.

Finally, this study investigated the impact of expansionary government expenditure by discomposing into capital expenditure and recurrent expenditure. However, this study relied only on the expenditure side to explain the impact of government expenditure disregarding the revenue side. Besides, some other institutional factors, geographical factors and foreign trade variables were not treated. Therefore, this is a partial analysis. The next task will be examining the impact of these variables on economic growth. Furthermore, this study focused on country level only due lack of access to cross country expenditure data. In addition to this, we did not analyzed the impact of government expenditure on employment owing to data problem. These would be our future area of research.

Abbreviations/Acronyms

ADF	Augmented Dicky Fuller
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
CSA	Central Statistics Authority

CUSUM	Cumulative Sum
ECM	Error Correction Model
EEA	Ethiopian Economics Association
GDP	Gross Domestic Product
GMM	Generalized Methods of Moment
GTP	Growth and Transformation Plan
I (0)	Integrated of order zero
I (1)	Integrated of order one
IS-LM	Investment and saving – liquidity and Money
NBE	National Bank of Ethiopia
NPC	National Plan Commission
SBIC	Schwarz Bayesian Information Criterion
UECM	Unrestricted Error Correction Model
UNCTAD	United Nations Conference for Trade and Development
USD	United Sates Dollars
VECM	Vector Error Correction Model
WB	World Bank

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