

Research Article

Impact of Government Expenditure on Economic Growth in Ethiopia

Teshale Degefa¹ , Abera Daba^{2,*}

¹Commercial Bank of Ethiopia, Jimma District, Jimma, Ethiopia

²Department of Horticulture and Plant Sciences, Jimma University, Jimma, Ethiopia

Abstract

This finding explores that the influence of various public expenditures on the economic growth of Ethiopia. The data was examined by utilising secondary sources of data from the National Bank of Ethiopia, and the World Bank. A modified version of the endogenous growth model using the Autoregressive Distribution lag model was applied to attain the effect of public expenditure, and their role in economic growth. Both descriptive and econometric analysis was applied for two separate models estimated by using the consecrated Vector autoregressive approach for the period 1970-2021. ADF-unit root test, Phillips person test, as well as pairwise Granger causality test was also used. All variables were found to be integrated at first different and stable long-run equilibrium relations occur between the dependent and independent variables. It showed that health; investment, consumption, and education expenses have a substantial effect on GDP growth in the eventually or short run. The results of the finding showed that education and expenditures have a negative and noteworthy impact on RGDP in the ultimately as well as short term. However, investment, consumption, and healthy expense were positive and significant influence eventually. An empirical finding exhibited that all variables were statistically significant, and they explained the effect of government expenditure on economic growth. In general, the results indicated that increasing government expenditure on health, investment, and consumption helps GDP, though education expenditure has a negative relation or decreases GDP growth. Thus, from the results of current finding, the government should focus on the sectors that foster economic growth, and the sectors that hinder economic growth should generate their income or transfer to other private sectors.

Keywords

Economic Growth, Government Expenditure, ARDI Ethiopia

1. Introduction

The association between public expenditure and economic growth is an essential subject of analysis and debate, especially for under developed countries. The main question is whether public expenditure increases the ultimately steady state growth rate of the economy. The overall view is that public expenditure, notably on physical infrastructure or

human capital, can be growth-enhancing although the financing of such expenditures can be growth-rating [1]. They utilize the indicators of the ratio of state expenditures to the gross domestic production (GDP) function of the states in the economy. The relation of the two has entered a great deal of attention in recent times as economists and politicians

*Corresponding author: aberadaba@gmail.com (Abera Daba)

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try to figure out how government spending influences economic growth as noticed by [2].

As a result of government spending effects on the economy's level of growth, it has initiated the interest of both academic and macroeconomic policymakers around the world [3]. Several questions have been raised about the role of the states in economic, social, and political events in today's mixed economic system. As a whole, the economic position of the government is an attempt to be decided by using public expenditure measures. As per the World Bank data, global public expenditure has increased by an average of 2.28% since the 1970s. On the other hand, they are commonly examined in terms of their impact on economic growth [4].

Today, the Ethiopian government is accelerating the country's growth and development by investing in various infrastructure such as Renaissance Dams, railroad, condominium construction, and roads. To achieve these goals, the government of the country applied the Growth and Transformation Plan (GTP). According to the GTP baseline scenarios, these total government expenditures increased from 20,520 million birr in 2003 to 480,143.19 million in 2019 compared with these GDP increased rates showed a decrease in 2003 GDP rate is 11.7% but declined from time to time and reached 6.1% in 2019 according to National Bank of Ethiopia third quarter report of 2020/21. There were several studies conducted on analyzing the role of government spending in the long-term growth of national economics. However, there is no consistent and concrete evidence for the existence of a significant association between them. Therefore, based on the above reality, there is a need to explore the effect of government expenditure on economic growth, particular, understanding its different components is crucial to economic policymakers. The main aim of this finding was to examine the effect of government expenditure on the economic growth of Ethiopian.

2. Literature Review

Results and evidence analytical method employed and categorical of public expenditure, some of the works of literature were discussed in this manuscript. Nurudeen and Usman [5] studied in an attempt to investigate the effects of government spending on economic growth for a sample of time series data (1979 to 2007) in Nigeria. The finding showed that total government expenditure and expenditure on education harm economic growth, however, increasing expenditure on transport, communication, and health raises economic growth. Musyoki [6], evaluated the impact of government expenditure on economic growth using annual time series data (1963 to 2008) in Kenya. The outcome of the paper showed that government expenditure on investment, physical infrastructure, education, health care, public debt serving, economic affairs, general administration, public order, national security, and government consumption

affected economic growth.

Hamzah [7] investigated the relationship between government expenditure and economic growth in Malaysia from 1970 to 2007. The researcher found that the whole government expenditure has a significant and negative impact on economic growth. Similar results were seen in the total government expenses in economic services. According to the research findings, there is no association between total government expenditure in social services and economic growth. Mudaki and Masaviru [8] examine the effect of public spending on education and health using a sample of time series data (1970 to 2008) in Kenya. According to the result of the study, public expenditure on education was a highly significant factor of economic growth. On the other hand, expenditure on agriculture was significant and negatively related to economic growth. However, health and defense were found to have insignificant factors of economic growth.

Patricia and Izuchukwu [9] studied the impacts of public expenditure in education on economic growth (1977 to 2012) in Nigeria. The result indicated that overall expenditures on education were highly significant in economic growth in the country. Njoku, Ugwu [10] investigate the impact of government expenditure on the economic growth of the Nigerian economy using time series data (1961-2013). The result showed that the government expenditure on capital administration, re-current social and communication services, and re-current economic services was positively associated with economic growth. However, economic expenditure, capital transfer, re-current administration expenditure, and re-current transfers harm the economic growth of the country.

In Ethiopia, there are few studies have been conducted to explore the impact of government spending on economic growth. For instance, the impact of various components of government spending on economic growth was done using annual time series data (1960/61 to 2003/04) by Ketema [11] in Ethiopia. From the output of the researcher's findings, expenditure on human capital has a long-term significant effect and positive relationship with the economic growth of the country. On the other hand, government investment expenditure exhibitions insignificant effect on economic growth. Tsadiku [12] measured the impact of different government sectoral spending on economic growth using annual time series data (1960/61-2010/11) in Ethiopia. The result showed that education expenditure has a short and long-run effect and is statically significant as well as positively associated on economic growth. Whereas, expenditure on health and agriculture was insignificant on the economic growth of the country during the study period. Siraj [13] in his study on official development assistance (ODA), public spending, and economic growth in Ethiopia using annual time series data (1975 to 2010). The research found that public spending on physical investment and human capital development has a positive contribution to economic growth while spending on consumption affects

economic growth negatively. The finding also illustrated that ODA plays a positive and significant role in Ethiopia's economic growth.

Muhammed and Asfaw [14] studied in an attempt to see the relationships that can be revealed between economic growth and various compositions of government expenditures in Ethiopia using annual time series data (1975 to 2011). The output of the finding revealed that expenditure on health and total capital expenditures have a positive relationship and statistically significant influences on the growth of the Ethiopian economy. While, expenditure on agriculture, education health, transport and communication, urban development and housing, and total recurrent expenditure have an insignificant effect on Ethiopian economic growth in the sample period. Gebru [15], in his research titled "the determinant of economic growth in Ethiopia", using annual times series data (1974 to 2013). The output of the researcher showed that both physical capital and human capital had a positive and significant impact on economic growth in Ethiopia during the sample period. On the other hand, the variable "debt" was illustrated to have an insignificant and negative impact on GDP growth. Besides, the study showed that the export of goods and services, foreign aid, and inflation have insignificant impacts on the economy in Ethiopia in the long run.

To sum up, much of the literature reviewed above was done in specific countries specifically those who are conducted in Ethiopia. This is an advantage for policy decision-makers since the studies came with concrete results for the specific countries' situation. Taking this into consideration this study also concentrates on Ethiopia's cause by employing the most recent time series data.

3. Methods

3.1. Data Type and Source

The present study aims to establish the impact of public expenditure components such as health, education, consumption, and investment on economic growth in Ethiopia using secondary data of a sample time series data (1970 to 2021). The sources of data were the Ministry of Finance and Economic Cooperation (MOFEC), the Central Statistics Authority (CSA), the National Bank of Ethiopia (NBE), and the World Bank.

3.2. Model Specification

As indicated by [16], in the neoclassical growth model, if the incentives to save or invest in new capital are affected by fiscal policy this changes the equilibrium capital-out ratio and therefore, the level of output path. However, it is not a slope with transitional impacts on growth as the economy moves on to its new path. The novel character of the public-policy endogenous growth model of Barro [17], Barro,

Mankiw [18], and Mendoza, Milesi-Ferretti [19] are that fiscal policy can decide both the level of output and the steady state growth.

To empirically investigate the relationship between government expenditure as well as economic growth in Ethiopia, an econometric regression method is established. To overcome the problem which is developed by Ram [20] is employed for this study. The advantage of using this model is that it captures most of the government variables: physical investment, consumption, and human capital, which are easy to disaggregate into many categories the other advantage is the model clearly shows how the public spending the private sector [21]. In the model, there exist two sectors in the economy, namely the private and the government sectors with two factors of production labour and capital distributed between both sectors and the relation of them explained as follow:

$$K = KP + KG, \text{ and } L = LP^* + LG$$

Where:

P = private sector

P* = public sector –

K = capital and L-Labour.

To include the externalities effect which comes from the public sector, G entered the production function of the private sector P: The production function is therefore:

$$P = p(KP: LP, G) \quad (1)$$

$$G = G(KG: LG) \quad (2)$$

Assuming a constant productivity differential between labour in both

$$\frac{GL}{PL} = \frac{GK}{PK} = (1+\alpha) \quad (3)$$

Where:

$\alpha < 0 \rightarrow$ implies higher productivity in private sector.

$\alpha > 0 \rightarrow$ thereverse and $\sigma \neq 0$. from equation (3) we obtain the following up on simplification.

$$GL = (1+\sigma) DL \quad (4)$$

Totally differentiating equations (1) and (2), given the national income $y = P + G$, gives:

$$dy = PKdKp + GkdKG + pLdLG + pGdC \quad (5)$$

Where pk, Gk, PL and GL are the marginal products of respective factors in respective sector.

By substituting equation (4) in to (5) and up on re arrangement we get

$$dy = pkdkp + Gkdkg + PL(dLp + dLc) + \sigma pLdLG + PGdG \quad (6)$$

Using equation (4) we can re write: $dg = GkdG + (1+\delta)pLdLG$

This can be rearranged as: $pLdLG = \frac{dG}{(1+\delta)} - \frac{dG}{(1+\delta)}dkG$ (7)

Substituting equation (7) in to (6) and collecting like terms,

$$dy = pkdkp + pLdLP + (1+PG)Dg \quad (8)$$

Assume there is linear relationship between the marginal products of labour in each sector the average output per unit of labour in the economy, that is $pL = (\frac{y}{L})$ letting dkp --- (gross investment and substituting in to equation (8), then dividing by Y gave:

$$dy/y = pk \frac{i}{y} + \frac{dLP}{L} + \frac{(1+PG)dG}{Y} \quad (9)$$

However, assuming that $pk = \alpha(1+PL) = \beta$ and including coefficient for $\frac{dLP}{Y}$ variables the equation (9) becomes:

$$\frac{dy}{y} = \alpha \frac{1}{Y} + \frac{\beta dLP}{Y} + \frac{ydG}{Y} \quad (10)$$

Equation (10) corresponding to Ram [20] equation. Thus this equation formed the basic model for regression equation for the sake of this study. The model predicts that, economic growth ($\frac{dy}{y}$) which will be represented by GDP exogenous variables, responds to the t ratio of gross investment ($\frac{i}{y}$) to GDP, growth of labour which can be gained by expenditure on education and health ($\frac{dLP}{Y}$) shall be called human capital (Hg) and finally, the ratio of government consumption (Cg) to GDP. Thus applying little modification to add some variables the final equation is given as:

$$y = \alpha 1(\frac{i}{y}) + \alpha 2(\frac{Hg}{y}) + \alpha 3(\frac{Cg}{y}) \quad (11)$$

By adding the constant term and the error term as well as by disaggregating human capital (Hg) in to expenditure on education (EDU) and health expenditure (HEL) model is rewritten equation as follows.

$$\frac{dy}{y} = \alpha o + \alpha 1(\frac{i}{y}) + \alpha(\frac{EDU}{Y}) + \alpha 3(\frac{HEL}{Y}) + \alpha 4(\frac{Cg}{y}) + \epsilon \quad (12)$$

For the estimation purpose, equation (12) above is converted in to linear form and the result is indicated as:

$$GDP = \alpha o + \alpha 1INVG + \alpha 2EDU + \alpha 3HEL + \alpha 4CONg + \epsilon \quad (13)$$

αo = is the constant $\alpha 1, \alpha 2, \alpha 3$ and $\alpha 4$ -coefficient of the explanatory variables.

ϵ = the error term.

Equation (13) above is transformed in to log form given the following equation. (Expected sing in parenthesis)

$$\text{Log GDP } t = \alpha o + \alpha 1 \log INVG_t + \alpha 2 \log EDU_t + \alpha 3 \log HEL_t + \alpha 4 \log CONg_t + \epsilon \quad (14)$$

Where:-

GDP = Gross domestic production

INTG = Government investment expenditure

CON = Government consumption expenditure

EDU = Education expenditure

HEL = Health expenditure

α = coefficient of each variables.

4. Results and Discussion

4.1. Unit Root Test Result

Augment dickey fuller (ADF) and Philips-perron (PP) tests were used to test for the stationary data series. Because the ADF producer attempts to retain the validity of the test on white-noise, while, the PP procedure is used to correct for serial correction and a non-parametric correction to the standard statistics. Formal testing for stationary and the order of integration of each variable is primarily undertaken using ADF and PP. The test with these methods is performed with different trend assumptions including intercept, both linear trend, and intercept, and no intercept and no trend. Performing the test under all three alternatives would identify whether only the intercept or both the trend and intercept are significant. The table below shows the result of the unit root test based on the ADF and PP tests.

Table 1. Unit root test results.

Variables	At level		At first difference		Order of integration
	With constant	With constant & trend	With constant	With constant & trend	
	t.calc p-value	t.cal p-value	t.calc p-value	t.cal p-value	

Augmented Dikey Fuller (ADF)

Variables	At level				At first difference				Order of in- tegration
	With constant		With constant & trend		With constant		With constant & trend		
	t.calc	p-value	t.cal	p-value	t.calc	p-value	t.cal	p-value	
LOGGDP	2.34	1.00	-1.15	0.9	-6.09	0.000*	-7.5	0.000*	I(1)
LOGEDU	-1.7	0.39	-1.79	0.69	-5.99	0.000*	-5.93	0.000*	I(1)
LOGCOG	0.18	0.06	-2.03	0.57	-7.43	0.000*	-8.21	0.000*	I(1)
LOGHEL	1.47	0.99	-1.8	0.69	-5.71	0.000*	-6.15	0.000*	I(1)
LOGINVG	0.47	0.98	-2.39	0.37	-9.75	0.000*	-10.9	0.000*	I(1)
Philips-perron (pp)									
LOGGDP	2.34	1.00	-1.09	0.91	-6.17	0.000*	-7.53	0.000*	I(1)
LOGEDU	-1.83	0.36	-1.89	0.64	-5.99	0.000*	-5.93	0.000*	I(1)
LOGCOG	0.25	0.97	-1.93	0.62	-7.41	0.000*	-8.18	0.000*	I(1)
LOGHEL	1.47	0.99	-1.8	0.68	-5.71	0.000*	-6.11	0.000*	I(1)
LOGINVG	0.88	0.99	-2.25	0.45	-9.42	0.000*	-10.82	0.000*	I(1)

Note: * indicates the rejection of the null hypothesis which is the variable is unit root. By using both p-value (all p-values are less than 5%) and t calculated by both ADF and PP which is greater than the critical value at 5% level in absolute terms for all variables.

LOG: Logarithm, GDP: Gross domestic production, EDU: Education expenditure, COG: Government consumption expenditure, HEL: Health expenditure, INVG: Government investment expenditure

From the present finding, the unit root test results indicated in (Table 1) for variables in levels, the intercept test revealed that all the variables were not non-stationary. All different variables on intercept were stationary at 1% significance level. On trend and intercept, all variables were non-stationary in level but, all variables on trend and intercept were stationary at 5% significant level when first differenced, for the test under no trend and no intercept, all variables in levels were non-stationary. When first different, all the variables were at 5% significant level. Both systems used to test for stationary significantly illustrated that the data series were non-stationary in level and stationary when first differenced. Thus, the time series are integrated in the same order I(1). The stationary of data of the same order I(1). The stationary of data is the prerequisite for the next steps in time series analysis. Hence, after the stationary data is confirmed, the next step is the lag length section.

4.2. Determination of Optimal Lag Length

After identifying the number of co-integrating equations, it was estimated the long-run relation between GDP growth and government expenditure by using Johansen [22] maximum likelihood methods. Since all variables were used in the logarithmic form, the estimated coefficient can directly be interpreted as long-term elasticity. All the variables are significant at 5%, except which is observed to be statistically significant because its t-statistics value is less than 0.05% or

5%.

Table 2. Long run co-integration coefficient (standard errors in parenthesis).

Variables	Coefficient	Std error	T-statistics	Prob.
C	1.596013	0.109196	14.614604	0.0000*
HEL	0.208219	0.021716	9.588157	0.0000*
INVG	0.173764	0.068918	2.520539	0.0152*
EDU	-0.086168	0.014583	-5.908755	0.0000*
COG	0.356817	0.062566	5.703061	0.0000*

C: Constant, HEL: Health expenditure, INVG: Government investment expenditure EDU: Education expenditure, COG: Government consumption expenditure.

The result (Table 2) showed that all variables are statistically significant at 1% level in explaining total government expenditure in the long-run. It has specified that the total government expenditure growth model in a long-linear form coefficient can be interpreted as elasticity concerning total government expenditure. The interpretation of the above model proceeds as follows: for a unit increase in HEL, INVG, and COG, was increased by 0.2, 0.17 & 0.35%

in the long run. This result implied that HEL, INVG, & COG have a positive and significant effect on public expenditure. These results are consistent with the findings, particularly with Okoh [23], Okafor and Eiya [24]. The long-run association between variable consumption expenditure and economic growth is positive and statistically significant.

When 1% increase in consumption expenditure GDP also increased by 35%. The rationale may be, because of the effectiveness of the government's expenditure on its recurrent or consumption expenditure. This result is also supported by different previous research by Agostino, Scarlato [25]. On the other hand, education expenditure in the country during this sample period showed a negative and significant association with economic growth. As can be seen in the long run equation above, it is only education expenditure that has a negative coefficient which is 8% this may be because of the huge government investment in education especially during the study period, and as a result of governments stand to expand the accessibility of primary education without tuition fee to all its citizen and the aggressive expansion and opening of new higher educations. The same result in this study was seen in Tsadiku [12].

Finally, a 1% rise in health expenditure results in a 20% increase in economic growth in Ethiopia. This may be because the improved health of the citizen has a positive impact on their productivity. The results of previous research by Babu, Kiprop [26] and Alshahrani and Alsadiq [27] comply with this result. According to Ram [20], one of the components of government expenditure was stated as government human capital expenditure which is classified into education expenditure and expenditure in this paper. This helps us to separately examine their impact on economic growth.

5. Conclusion

The present finding examined the effects of different public expenditures on the economic growth of Ethiopia from 1970 to 2021. The Johnson test for co-integration was also used to gain the long-run relationship between the dependent variables GDP and independent variables. The empirical results of the study showed that various government expenditures matter for the economic growth of the country. According to the findings, both consumption and health expenditure have a positive and significant impact on economic growth in the long run. On the other hand, education expenditure has a negative and significant impact on the economic growth of the country, while investment expenditure has an insignificant relationship in the long run. From this finding, in the long run, all variables except expenditure on education have positive coefficients and are statically significant. in the short run, on the other hand, expenditure on health, and investment indicates that they have no major impact on economic growth for the study period in the country. In general, from the results of the present finding, the government should give attention to the sectors that raise economic growth, and the sectors that hamper economic

growth should generate their income or transfer to other private sectors. In general, it can be concluded that the resulting study can be a baseline and offer an understanding for policy policymakers to research important factors that decide the economic growth of Ethiopia.

Abbreviations

ADF	Augmented Dickey Fuller
COG	Government Consumption Expenditure
CSA	Central Statistics Authority
EDU	Education Expenditure
GDP	Gross Domestic Production
GTP	Growth and Transformation Plan
HEL	Health Expenditure
INVG	Government Investment Expenditure
LOG	Logarithm
MOFEC	Ministry of Finance and Economic Cooperation
NBE	National Bank of Ethiopia
ODA	Official Development Assistance
PP	Philips Perron

Conflicts of Interest

The authors declare no conflicts of interest.

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