Wondimagegne Assefa Reda, 2021, 7(1):1-14

Public Expenditure and Economic Growth in Ethiopia

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Abstract
Using data from 1975 to 2019, this research examines the association between government spending on four sectors of the economy - education, health, agriculture, and defense - and economic growth (GDP) in Ethiopia. The study utilized descriptive statistics and panel data regression to analyze the data. Granger causality test was also used to find out the direction of causality between spending and economic growth. Panel data regression was selected because panel data estimation is better to work with entities that are observed across time. Hausman test was applied in order to select the better model from Fixed Effect and Random Effect panel regression data models. Accordingly, the result of the descriptive analysis shows that, on average, the government of Ethiopia has been spending relatively more on the education sector followed by agriculture, health, and defense sectors sequentially. The panel data regression analysis indicates that government spending on education and health sectors has a statistically significant and positive relationship with the economic growth of Ethiopia; whereas, public expenditure on agriculture and defense has a positive but insignificant association with the GDP of the country. Applying the Granger causality test with lag 2, this study also found a bidirectional causality relationship between GDP and expenditure in an Ethiopian economy thus supporting both the Keynesian theory and Wagner's law. The study concludes that, since there is bidirectional causality between expenditure and economic growth in Ethiopia, expanding the public sector and using government expenditure as a policy instrument will promote the economic growth of the country. It also shows that the Ethiopian government should focus on expending more on the health and education sectors.

Key words: Public Sectorial Expenditure, GDP, Economic Growth, Ethiopia, Panel Regression, Keynesian theory, Wagner's law, Granger causality

1. Introduction

Ethiopia is the second most populous country in Sub-Saharan Africa (World Bank, 2014). Currently, the population number of the country is 115 million and has been growing at an average of 2.7 percent per annum (Deren and Motamed, 2020). The country's economy mainly concentrates in agriculture and services (World Bank Group, 2016). Though 80 percent of its population is engaged in agriculture, a sector that accounts more than 30 percent of the country's GDP, its productivity has remained very low. The country is also one of the poorest in the world with an annual per capita income of US $850 (Deren and Motamed, 2020).

The economic growth of Ethiopia has been rapid and stable with an average real GDP growth rate of 10.9 percent and real GDP growth per capita averaging 8 percent per year (World Bank Group, 2016). Figure 1 depicts the trend of GDP growth of Ethiopia from 1975 to 2019. As can be seen from the

Wondimagegne Assefa Reda, 2021, 7(1):1-14

graph, the GDP growth trend of the country shows three main phases. Phase one (1975-1992) demonstrates a steady GDP growth rate. The period from 1993 to 2005 shows a gradually increasing rate of growth. Since 2005, the GDP growth rate of Ethiopia has been rapid.

Figure 1: GDP of Ethiopia from 1975 to 2019
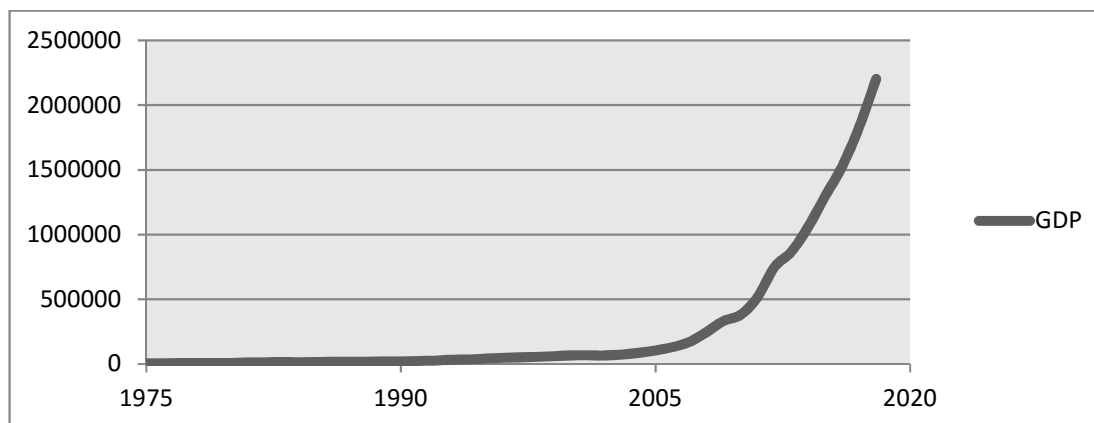
One of the reasons for the rapid GDP growth of Ethiopia could be the increasing amount of government expenditure. There are two main economic theories that explain the relationship between government spending and economic growth. These are: the Keynesian Theory and the Wagner's law of increasing state activities. According to Keynes, the link between public spending and national income runs in the direction from government expenditure to national income (Keynes, 1936). This puts Wagner's law in a completely opposite position as compared to Keynes's theory. For Wagner, the link between government spending and economic growth goes in the direction from national income to public expenditure (Afonso and Alves, 2016). Contrary to Keynesian theory, the dependent variable for Wagner's law is public expenditure while economic growth being the explanatory variable. This study, therefore, uses these theories as a perspective to examine the association and causal directionality between public expenditure and economic growth in Ethiopia.

Understanding the relationship between public spending and economic growth is very important for a country that has been suffering from poverty and conflicts like Ethiopia for various causes. First, developing countries have a restricted and frequently declining amount of financial resources; as a result, there is a need to allocate this limited resource wisely by evaluating the relative sectorial expenditure contribution to poverty alleviation and economic growth (Fan and Rao, 2003). Second, Ethiopia's level of deficit and public debt is increasing (Wolde-Rufael, 2008). One of the mechanisms to bring down the rising level of deficit and debt is to analyze the impact of various components of spending on economic growth to identify and treat sectors differently based upon the expenditure-output link. Finally, Ethiopia's unbalanced government spending that favors the defense sector has been damaging the country's economic growth (Adugna, 1997) and has resulted in the buildup of the country's external debt (Wolde-Rufael, 2009). Various studies indicate that there is association between public sectorial expenditures and economic growth although the relationship varies among countries and continents. For example, government expenditure on agriculture and health had a significant positive relationship with economic growth in Africa while it is agriculture, education, and defense spending for Asian countries. Contrary to Africa and Asia, it is only health expenditure that has a strong impact on the growth of Latin American countries (Fan and Rao, 2003).

In case of Ethiopia, there are very few studies that try to examine the impact of public sectorial expenditure on the economic growth of the country, and at the same time investigate the spending-output causal directionality by testing Keynesian theory and Wagner's law. This paper is also different from the previous studies as it covers a 45 years period, which is from 1975-2019. Moreover, there are disagreements on the results of the studies conducted in Ethiopia. For instance, the published works of Menyah and Wolde-Rufael (2013) and Abdu and Melesse (2014); and the unpublished studies of Wendwesen (2012) and Bazezew (2014). Therefore, the findings of this paper will contribute by clarifying the inconclusive and controversial findings of the earlier studies.

This paper argues that public sectorial expenditures especially in education and health are significantly associated with economic growth in Ethiopia. It also states that there is bidirectional causality between government spending and economic growth in the country.

The paper is organized as follows. In section 2, a brief summary of theoretical and empirical literature on the association between public expenditure and economic growth are reviewed. The data and empirical framework used to determine the relationship between expenditure and growth in Ethiopia are discussed in section 3. This is followed by the result of the descriptive statistical analysis (section 4), panel regression analysis (section 5), and causality test (section 6). Concluding remarks are presented in section 7.

2. Literature review on the impact of government spending on economic growth

2.1 Theoretical literature review

The Keynesian theory and the Wagner's law of increasing state activities are the two main economic theories that debate on the directional causality nexus between expenditure and economic growth. The Keynesian theory was first noticed due to the 1930's depression. The then existing economic theories were not capable of neither explaining the cause nor providing the solutions to the Great Depression of the 1930's (Jahan *et al* , 2014). It was then that John Maynard Keynes brought his revolutionary economic thinking that disproved the classical economists idea which touts free markets as having self-balancing mechanisms to provide full employment if workers are flexible in their wage demands *(Ibid)*. The main objective of Keynes in writing his book *The General Theory of Employment, Interest and Money* in 1936 was to explain the reason for the widespread unemployment situation that had a huge impact in all major economies in the 1930's. Keynes's work also recommended policy measures to alleviate the problem (De Vroey & Malgrange, 2011). According to Keynesian economics, government intervention to manage the business cycle is seen positively (Jahan *et al* , 2014). It assumes that public spending increases aggregate demand and aggregate supply that ultimately results in economic growth.

On the other hand, it has been more than a century since Adolph Wagner highlighted the relationship between the increase of government spending and economic growth. Contrary to Keynesian theory, Wagner hypothesizes that a nation's economic development is the cause of its public sector and government spending growth (Afonso and Alves, 2016). The Wagner proposition, according to Diamond, states that government expenditure is increasing due to three reasons. Firstly, the government's traditional functions have expanded. Secondly, even if his justifications were not apparent, Wagner anticipated that there is a need for the government to provide cultural and welfare expenditures. Thirdly, due the demand for technologically efficient production in some sectors, the private sector would not be willing to participate in such projects because of the associated high risk

Wondimagegne Assefa Reda, 2021, 7(1):1-14

and heavy investment; as a result, the government would be forced to provide such kind of public goods and services to the society *(Ibid)*.

2.2 Empirical literature review on the impact of public spending on economic growth

The empirical findings on the impact of public expenditure on economic growth are mixed. Fan & Rao (2003) investigated the impact of government spending on the economic growth of 43 developing countries in Africa, Asia, and Latin America. Accordingly, public spending on health and agriculture are positively contributing to the economic growth of African nations. On the other hand, the Asian economy is benefiting more from government spending on education, agriculture, and defense. Conversely, health care is the only government expenditure component that is causing economic growth in a statistically significant way for Latin American countries.

Kimaro (2017) also examined the impact of public spending and efficiency on the economic condition of 25 Sub-Saharan African countries, and found out that government expenditure has a positive effect on the economic growth of the countries. Nevertheless, government spending has no contribution for the economy of Sub-Saharan countries when it is interacted with government efficiency *(Ibid)*. In addition, Yassin (2003) analyzed the influence of government expenditure on the economic growth of Sub-Saharan African countries. The result of his study shows that, though public expenditure, private investment expenditure, and trade-openness have a positive impact on the economic growth of the countries, the contribution of foreign development assistance and population growth rate are insignificant.

Desmond *et al* (2012) identified that recurrent and capital spending on economic services had a negative but insignificant impact on the economic growth of Nigeria; however, similar type of expenditures on social and community services impacted the country's growth positively. Similarly, Onifade *et al* (2020) studied the impact of recurrent and capital government spending on economic growth in Nigeria. Accordingly, recurrent spending has been identified to impact the economic growth of the country negatively; the contribution of capital expenditure was also statistically insignificant. Onuoha & Okoye (2020) also evaluated the effect of total government expenditure, capital expenditure, and recurrent expenditure on the performance of Nigerian economy between 1981 and 2018. The result of the study indicates that aggregate government spending significantly influences economic growth in a positive way. However, similar to the findings of Desmond *et al* (2012) and Onifade *et al* (2020), the economic contribution of capital and recurrent expenditures are irrelevant. The authors also found support for the applicability of Wagner's law in Nigeria by discovering a causality direction that runs from economic growth to public expenditure. Nevertheless, the expenditure-output causal directionality finding of Onifade *et al* (2020) contradicts previous studies of Danladi *et al* (2015) and Ewa & Okoi (2018). According to Danladi *et al* (2015), the causality direction is from public expenditure to economic growth. Similarly, Ewa & Okoi (2018) found prove for Keynesian theory that indicates the positive impact of public spending on national income, unemployment rate, and private investment in Nigeria.

Focusing on the impact of government sectorial spending on economic growth, Nwaolisa & Chinelo's (2017) investigated the effect of public sectoral expenditure on economic growth in Nigeria from 1983-2016. The findings demonstrate that public expenditure on education and general administration has a significant and positive impact on growth. Government expenditure on health has an insignificant positive relationship with economic growth; in contrast, public spending on defense has a significant but negative correlation with economic growth. Maingi (2017) also looked

at the impact of public expenditure on economic growth in Kenya between 1963 and 2008. The results of the study revealed that public expenditure on investment, physical infrastructure, education, health care, public debt servicing, economic affairs, general administration and services, defense, public order and national security and government consumption have a positive impact on economic growth.

The relationship between government expenditure and economic growth is also inconclusive and contradictory in Asia. Al Gifari (2015) investigated the role of government expenditure on the economic growth of Malaysia during the period 1970-2014. The author disaggregated the expenditure as operational and developmental and on the bases of the sector for which the spending was allocated. Consequently, the result shows that there is negative relationship between public expenditure and economic growth in Malaysia. Moreover, Gupta (2018) examined the influence of various government expenditure components on economic growth in Nepal. The findings indicate that expenditure components like agricultural, non-agricultural, industry and service sector have positive relationship with economic growth. In contrast, the impact of total current and recurrent expenditures and inflation on growth is negative. In a comparative Study on the connection between public expenditures and economic growth between China and Korea, Lee *et al* (2019) found out that both nations experienced economic growth and confirmed the role of public spending on economic growth in an Asian context.

A study by Alexiou (2009) on the effect of government expenditure on the economic performance of seven transition economies in South Eastern Europe (SEE) helps to see the situation in a European context. The results of the study demonstrate the existence of positive relationship between government spending and economic growth in the SSE countries. Particularly, public expenditure on capital formation, development assistance, private investment and trade-openness has a significant positive impact on growth. However, the effect of population growth rate on the economic growth of the seven South Eastern European countries is statistically insignificant. In another study, Yilgör (2012) examined the causal directionality between public spending and economic growth in Turkey for the period of 1980-2010. The findings of the study provided support for Keynesian theory; the result also shows a one-way causality only where current, transfer, and total expenditure Granger causes economic growth in Turkey.

Various studies on government expenditure have also been conducted in industrialized nations. Among others, the comparative study by David Caputo *New Perspectives on the Public Policy Implications of Defense and Welfare Expenditures in Four Modern Democracies: 1950-1970* explores the relationships among various components of public expenditure in four industrial nations from three continents (Caputo, 1975; and Cyr & de Leon, 1975). It compares expenditure decisions on defense, health, education, and all government expenditures from 1950 to 1970 among Australia, Sweden, the United Kingdom, and the United States). Contrary to the findings of studies that had been conducted before, Caputo's work calls for a reconsideration on the assumption of trade-off between defense and welfare expenditures. Starr *et al* (1984) also conducted a comparative study on the relationship between defense spending and inflation among United States, United Kingdom, France, and the Federal Republic of Germany by examining data covering the period from 1956-1979. The cases of United States and United Kingdom indicate no significant association between defense spending and inflation. However, relationship between defense spending and inflation was discovered for France and the Federal Republic of Germany.

In another comparative study, Butkiewicz & Yanikkaya (2011) compared the effect of public spending on economic growth between developed and developing countries. Accordingly, the study found that total government expenditure has negative impact on some developed countries. On the other hand, consumption expenditures in developing countries that have ineffective governments have been found out to have a negative effect on economic growth. Nevertheless, capital expenditures have a positive impact on the economic growth of developing countries with ineffective governments.

2.3 Empirical literature on the impact of public spending on economic growth in Ethiopia

Studies that show the nexus between government spending and economic growth are very scarce in Ethiopia. There are only two published and two unpublished works on the area of public expenditure and economic growth on Ethiopia. Similar to other countries, the findings on the impact of public expenditure on the economic growth of Ethiopia have also been varied. In order to test Wagner's law that proposes national income to be a cause for the increase in public expenditure in Ethiopia, Menyah and Wolde-Rufael (2013) examined time series data for the period 1950-2007. Accordingly, they found out a unidirectional causality that runs from national income to public expenditure. The authors concluded by stating that the Keynesian theory that advocates government spending being the cause for economic growth has not been supported for the case of Ethiopia.

Abdu and Melesse (2014) also studied the relationship between public expenditure and economic growth in Ethiopia for the period between 1975 and 2011. The findings of their research show that public spending on health and total capital expenditure contribute for the economic growth of Ethiopia in a significant and positive way. Nevertheless, no significant impact was found on the economic growth of Ethiopia from government spending on agriculture, education, transport and communication, urban development and housing, and total recurrent expenditure.

In unpublished work, Wendwesen (2012) analyzed the influence of sectoral government expenditure on human capital and agriculture on the economic growth of Ethiopia for the period 1960/61-2010/11. The results revealed that government spending on the education sector has a significant positive impact on economic growth both in the short and long-run. However, public expenditure on health and agriculture has negative relationship with growth. In a similar unpublished study, Bazezew (2014) evaluated the impact of public sectoral spending on economic growth in Ethiopia from 1975 to 2013. The findings show that education expenditure has a positive impact on economic growth in the long-run; however, contrary to Wendwesen's (2012) finding, the contribution of education to the economic growth of Ethiopia is insignificant in the short-run. In addition, government expenditure on defense has a significant but negative impact on the growth of Ethiopian economy both in the short and long-run. Moreover, public expenditure on agriculture has a negative relationship with economic growth in the long-run. Furthermore, the contribution of health expenditure has also been found out to be insignificant both in the short and long-run.

To sum up, this section discussed the theoretical and empirical works conducted on the area of government expenditure and economic growth. Because of their importance for this research, Wagner's law of increasing state activities and the Keynesian Theory are discussed. Keynesian economics proposes that public expenditure is the cause for the growth of a nation's economy. On the contrary, Wagner's law postulates that economic growth is the factor that affects public expenditure. The two theories have been used in this study as a framework to identify and understand the nexus and causal directionality of public expenditure and economic growth in Ethiopia. In

addition to theoretical works, empirical literatures on the impact of public spending on economic growth are reviewed. The results show that the impact of public spending on the economic growth of nations, including Ethiopia, has been mixed.

3. The Data and Empirical Framework

To determine the relationship between public expenditure and economic growth in Ethiopia, this study used a 45 year time series data that was collected from the Ministry of Finance of Ethiopia covering the period from 1975 to 2019 for both the independent (education, health, agriculture, and defense spending) and dependent (GDP) variables.

The study used descriptive statistics, panel data regression analysis, and Granger causality to examine the association between public expenditure and economic growth in Ethiopia by using Eviews 10 statistical software. In order to facilitate the analysis, the four independent variables of the study are labeled as EDUC (Education), HEAL (Health), AGRI (Agriculture), and DEFE (Defense). The dependent variable is labeled as GDP (Gross Domestic Product).

The study used panel regression model (also known as longitudinal or cross-sectional time-series data). This is because panel data estimation is better to work with entities such as countries, states, etc that are observed across time. It also helps to control variables that can neither be observed nor measured such as culture, differences in practices, or variables that change over time (Torres-Reyna, 2007). Therefore, the Fixed Effect and Random Effect panel regression data models are used to calculate the regression estimate. In order to select the better model that explains the relationship between public spending and economic performance, the Hausman Test was applied. The Fixed Effect and Random Effect panel regression models are depicted as follows:

a) Fixed Effect Model

$$GDPt = ß0i + ß1EDUCt + ß2HEALt + ß3AGRIt + ß4DEFEt + ut$$

b) Random Effect Model

$$GDPt = ß0i + ß1EDUCt + ß2HEALt + ß3AGRIt + ß4DEFEt + i + ut$$

Where:

GDPt: the gross domestic product for Ethiopia during the period t;
EDUCt: the education sector spending for Ethiopia during the period t;
HEALt: the health sector spending for Ethiopia during the period t;
AGRIt: the agriculture sector spending for Ethiopia during the period t;
DEFEt: the defense sector spending for Ethiopia during the period t;
i: the random error for each regime;
ut: the random error from the regression model

4. The Result of the Descriptive Statistical Analysis

This part provides the result of the descriptive statistical analysis that describes the mean, median, maximum value, minimum value, and the standard deviation of the data on the dependent variable

(GDP) and independent variables (education, health, agriculture, and defense). A 45 year time series data that runs from 1975 to 2019 has been used for both the explanatory and dependent variables. The amounts are in millions of Birr (Ethiopian currency).

Table 1: Descriptive statistics of the economic variables in nominal terms

	GDP	EDUC	HEAL	AGRI	DEFE
Mean	334415.0	13762.31	4944.422	6258.311	3204.822
Median	51441.00	1453.000	578.0000	685.0000	1841.000
Maximum	2696223.	103139.0	41532.00	38341.00	13536.00
Minimum	5551.000	149.0000	46.00000	92.00000	185.0000
Std. Dev.	632160.3	26555.13	9676.229	10360.11	3417.346

Table 1 depicts the descriptive statistics summary for the independent and dependent variables used in the study. Accordingly, Ethiopia's 45 year GDP averages 334415 million birr and has a minimum and maximum value of 5551 and 2696223 respectively. In addition, public expenditure on education has a mean value of 13762.31 million birr and has a lowest amount of birr149 million and an upper limit of birr 103139 million. Moreover, government health sector spending of Ethiopia ranges from birr 46 to 41532 million with an average of birr 4944.422 million. Furthermore, Ethiopia's government expenditure on agriculture for the past 45 years has a mean amount of birr 6258.311 million with birr 92 and 38341 million minimum and maximum values respectively. Finally, public spending on defense sector in Ethiopia averages at birr 3204.822 million and varies from a lowest value of birr 185 million to a largest amount of birr 13536 million. On average, the government of Ethiopia has been spending relatively more on the education sector followed by agriculture, health, and defense sectors sequentially.

The descriptive analysis shows the mean, median, maximum, and minimum values of public expenditures in Ethiopia. However, it does not examine the impact and causality of spending on the economic growth of the country. As a result, panel regression model and Granger causality were used to determine the level of significance and causal directionality of the relationship between government spending and GDP in Ethiopia.

5. Result of the Panel Regression Analysis

The impact of public sectorial expenditure on the economic growth of Ethiopia for the period covering 1975 to 2019 has also been examined by using panel data regression analysis, and the results are presented in this section. First, the result of the Unit Root Test is portrayed. Second, the Fixed Effect and Random Effect models are displayed. Finally, the Hausman Test that was used to select the better model is summarized.

5.1 The Unit Root Test

The first step in panel regression is checking if the panel data are stationary or not. In order to ensure that the data are stationary, the panel unit root test was conducted. The study used the Augmented Dickey Fuller Unit Root Test.

Wondimagegne Assefa Reda, 2021, 7(1):1-14

Table 2: Augmented Dickey Fuller Unit root test results at level and first difference

Variable	At level		First difference	
	t-Statistic	Probability	t-Statistic	Probability
GDP	2.243042	0.9999	-4.436968	0.0009
EDUC	2.849280	1.0000	-5.012758	0.0002
HEAL	1.849102	0.9997	-6.020019	0.0000
AGRI	0.049712	0.9580	-8.187749	0.0000
DEFE	-1.108448	0.7040	-5.018713	0.0002

The null hypothesis for the test is that there is a unit root while the alternative is there is no unit root. Table 2 depicts the result of the test. Accordingly, at a significance level of 5 percent, all the variables are stationary at their first difference level. Therefore, based up on the result of the test, it is possible to reject the null hypothesis and proceed to apply the panel regression analysis to determine the association between public expenditure and GDP in Ethiopia.

5.2 Results of the Fixed Effect and Random Effect Models

The panel regression analysis on the impact of public spending on the economic growth of Ethiopia was carried out by using Fixed and Random effect models. Eviews 10 statistical software was used to examine the relationship between expenditure and GDP.

Table 3 below depicts the panel regression analysis result of the fixed and random effect models as well as the summary of the Hausman test. The Hausman test is carried out to choose between the fixed effect and random effect models. The null hypothesis for the Hausman test is that the preferred model is random effects vs. the alternative the fixed effects. The test result with a p-value of 0.2700 illustrates that the random effect model is preferred to determine the impact of public sectorial expenditure on the economic growth of Ethiopia.

Table 3: Summary of the Fixed and Random Effect models, and the Hausman Test

	Fixed Effect Model				Random Effect Model			
	Cofnt	Std.err	t-test	p-value	Cofnt	Std.err	t-test	p-value
Constant	9218.221	6840.674	1.35	0.186	4443.477	5839.149	0.76	0.447
EDUC	4.924829	1.378076	3.57	0.001	6.694742	1.146177	5.84	0.000
HEAL	45.72047	2.702196	16.92	0.000	44.51396	2.740046	16.25	0.000
AGRI	3.834323	2.063851	1.86	0.071	1.68375	1.817939	0.93	0.354
DEFE	2.29903	3.22039	0.71	0.480	2.249474	3.038689	0.74	0.459
	Model Summary Fixed Effect				Model Summary Random Effect			
R^2	0.9988				0.9989			
Adjusted R^2	0.9958				0.9962			
Std. Error	21499.518				21499.518			
F	2637.31				35302.08			
P-value	0.0000				0.0000			
Summary of the Hausman Test								
Chi-Sq. Statistic			Chi-Sq. d.f.			Probability		
5.17			4			0.2700		

Wondimagegne Assefa Reda, 2021, 7(1):1-14

The random effect model shows that government spending on education, health, agriculture, and defense in Ethiopia has a positive relationship with GDP. The four sectorial expenditures collectively explain 99.62 percent of the variability in the economic growth of the country. The insignificant difference between the R^2 (0.9989) and the adjusted R^2 (0.9962) demonstrates that the explanatory power of the model is due to the significance of each variable in the study, not because of the number of explanatory variables.

The random effect model on table 3 above also depicts that government expenditure on education, health, agriculture, and defense sectors in Ethiopia has a positive association with the economic growth of the country though there is a difference on the significance level of the sectors. Public expenditure on education and health sectors has a statistically significant and positive relationship with the economic growth of Ethiopia. The results from the random effect model also demonstrate that government spending on agriculture and defense has a positive but insignificant association with the GDP of the country.

Health expenditure has a statistically significant relationship with the economic growth of Ethiopia with the highest positive coefficient. This finding is consistent with the study of Fan and Rao (2003) that analyzes the impact of various components of public spending on the economic growth of developing countries. Consequently, health expenditure has a positive and statistically significant relationship with the economic growth of Africa in general. The result of previous published and unpublished works conducted on Ethiopia are mixed. According to Abdu and Melesse (2014) government expenditure on health has a positive and significant relationship with economic growth in Ethiopia. In addition, Maingi (2017) found out that government spending on health care has a positive impact on the economic growth of Kenya. However, in unpublished work, Wendwesen (2012) found out that public expenditure on the health sector has a negative association with economic growth in Ethiopia. Another unpublished study by Bazezew (2014) also discovered that, government spending on health has an insignificant contribution for the economic growth of Ethiopia both in the short-run and long-run. Moreover, public spending on health has an insignificant positive relationship with economic growth in Nigeria (Nwaolisa & Chinelo's, 2017).

The second variable that has a statistically significant and positive association with economic growth in Ethiopia is education expenditure. The unpublished works of Wendwesen (2012) and Bazezew (2014) also corroborate that education expenditure has a significant positive effect on the economic growth of Ethiopia. In addition, the findings for Nigeria and Kenya by Nwaolisa & Chinelo's (2017) and Maingi (2017) respectively substantiate the impact of education expenditure in Ethiopia. However, according to Abdu and Melesse (2014), government spending on education has no significant impact on the economic growth of Ethiopia. Government expenditure on education has also been found out to have a negative coefficient for African countries as a whole (Fan and Rao, 2003).

The remaining two variables that have a positive but insignificant contribution for the economic growth of Ethiopia are agriculture and defense spending. In a study conducted by Abdu and Melesse (2014), no significant impact has also been found on the economic growth of Ethiopia from public spending on agriculture. In addition, the unpublished studies of Wendwesen (2012) and Bazezew (2014) report that public expenditure on agriculture has a negative association with economic growth in Ethiopia. However, the findings of Fan and Rao (2003) show that public spending on agriculture promotes economic growth in Africa. On the other hand, public expenditure on defense has a significant but negative impact on the economic growth of Ethiopia (Bazezew, 2014). Government

Wondimagegne Assefa Reda, 2021, 7(1):1-14

spending on defense also has a significant but negative association with the economic growth of Nigeria (Nwaolisa & Chinelo's, 2017). Similarly, government spending on defense has a very strong negative impact on economic growth in Africa (Fan and Rao, 2003). Nevertheless, defense expenditure has been found out to have a positive impact on the economic growth of Kenya (Maingi, 2017).

6. Causality Test

Granger causality test is highly sensitive to the selection of lag length. Selecting less or more lag length than the true lag length results in biased and inefficient estimates. In order to select the optimum lag length, this study used AIC (Akaike information criterion), SC (Schwarz information criterion), and HQ (Hannan-Quinn information criterion). Consequently, as depicted in table 4 below, all tests select lag 2 as the appropriate lag length to run the Granger causality test.

Table 4: VAR Lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1064.806	NA	3.96e+19	50.80027	50.88302	50.83060
1	-907.5558	292.0357	2.68e+16	43.50266	43.75089	43.59364
2	**-892.8400**	**25.92773***	**1.61e+16***	**42.99238***	**43.40611***	**43.14403***

*indicates lag order selected by the criterion: each test at 5% level.

Table 5: Granger causality test with lag length 2

Null Hypothesis:	F-Statistic	Prob.
Government Expenditure does not Granger Cause GDP	4.03633	0.0260
GDP does not Granger Cause Government Expenditure	4.72083	0.0149

Table 5 above shows the result of the Granger causality test with lag 2. The null hypotheses for the Granger causality test are government expenditure does not cause GDP, and GDP does not cause government expenditure; both of the null hypotheses are rejected with p-value<0.0260 and p-value<0.0149 respectively. Accordingly, there is a bidirectional mutual causality relationship between GDP and expenditure in an Ethiopian economy. That is, an increase or decrease in expenditure results in an increase or decrease in GDP. Similarly, an increase or decrease in GDP causes in an increase or decrease in public expenditure. This finding supports both the Keynesian theory and Wagner's law. Therefore, both expanding the public sector and using government expenditure as a policy instrument will promote the economic growth of Ethiopia. However, it is contradictory with Menyah and Wolde-Rufael's (2013) finding; according to the authors, there is only a unidirectional causality relationship that runs from GDP to expenditure in an Ethiopian economy thus supporting the Wagnerian proposition.

7. Conclusion

Government expenditure is one of the main fiscal instruments that are primarily used in the developing world to impact their economy positively. Nevertheless, varies sectorial expenditure components have differential effect on the economic growth of the countries. As a result, the main objective of this study is to examine the nexus and causality direction between public expenditure and economic growth in Ethiopia by using a longitudinal data covering the period from 1975 to 2019. The study used descriptive statistics, panel data regression, and Granger causality test to analyze the data. The descriptive analysis shows the mean, median, maximum, and minimum values of public

expenditure and economic growth in Ethiopia. Consequently, the result of the descriptive analysis demonstrates that, the government of Ethiopia has been spending relatively more on the education sector.

The result of the panel data regression analysis shows that government expenditure on education and health sectors has a significant and positive relationship with the economic growth of Ethiopia; nevertheless, government spending on agriculture and defense has a positive but insignificant relationship with the economic growth of the country. By applying the Granger causality test with lag 2, this study also found a bidirectional causality relationship between economic growth and government expenditure in an Ethiopian economy thus supporting both the Keynesian theory and Wagner's law. Since there is bidirectional causality between expenditure and economic growth in Ethiopia, expanding the public sector and using government expenditure as a policy instrument could promote the economic growth of the country. This paper also recommends that Ethiopian policy makers should give more attention to the health and education sectors in order to significantly impact the economic growth of the country.

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