THE IMPACT OF GOVERNMENT SPENDING ON ECONOMIC GROWTH IN ETHIOPIA

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The Impact of Government Spending on Economic Growth in Ethiopia

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APPROVAL SHEET

This is to certify that this thesis prepared by Gizachew Asefa Hurisa entitled : *"*The impact of government spending on economic growth in Ethiopia*"* and submitted in partial fulfillment of the requirement for the Degree of Master of Science Development Economics complies with the regulations of the university and meets the accepted standardswith respect to originality and quality.

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DECLARATIONS

This is to certify that the thesis entitled: The impact of government spending on economic growth in Ethiopia is submitted in partial fulfillment of the requirements for the Degree of Master of Science in Developmental Economics complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by:

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ACRONYMS AND ABBREVIATION

ADF-	Augmented Dickey-Fuller
ADBG-	African Development Bank Group
AIC-	Akaike information criterion
ARDL-	Autoregressive Distributed Lag
CSA-	Central statistical Agency
EFY-	Ethiopian Fiscal Year
FY-	Fiscal Year
GDP-	Gross Domestic Product
GNP-	Gross National Product
MDG-	Millennium Development Goals
NGOs-	non-governmental organizations
NSCE-	National Survey of Consumption Expenditure
OLS-	Ordinary Least Squares
PP-	Phillip-Perron
R&D-	Research and Development
SSA-	Sub-Saharan Africa
TYDP-	Ten-Year Development Plan
USD-	United State Dolla
VECM-	Vector Error Correction Model

ABSTRACT

This study aims to analyze the impact of government spending on economic growth in Ethiopia by using annual time series data from 1994-2023. The study uses public expenditure variables from recurrent and capital expenditure components Such as expenditure on education, defense, agriculture, Health, Industry, Transport, Road, Urban Development and Interest payment expenditure components, that expenditure of all selected components are on increasing trend. The result of the ADF test has shown that all variables are stationary at I (1). Johansen Co-integration validates co-integration among variables as a sign of long run relationship. VECM used to test to know long run and the short run impact of government spending on RGDP growth in Ethiopia analyzed using STATA. In long run expenditure of government on Industry development, Urban Development and interest payment is positive and has statistically significant, whereas expenditure on health, education, transport and communication and road construction sector has insignificant impact on RGDP growth in Ethiopia. But government expenditure on defense and agriculture sector is negative and significant effects in long run. In short run, expenditure on agriculture, education, industry development, transport and communication, urban development, health and expenditure on interest payment are the major beneficiary for RGDP growth. But only expenditure government on defense and Road construction sector has no significant impact on RGDP growth in Ethiopia. The author recommends that there is a need to manage and control Public expenditure, increasing budget utilization system and decreasing corruption. Disaggregated analysis is valuable from the policy perspective therefore author recommended future research is suggested why most of the public expenditure have insignificant relation with economic growth in Ethiopia. Finally author recommend that to know the determinants of RGDP growth of developing counties like Ethiopia not only public spending and also various shocks (i.e. rainfall, political and institutional factors, and etc) should have to be studied.

Keywords: Government spending, RGDP, Economic growth, VECM, Ethiopia.

1. INTRODUCTION

1.1 Background of the Study

Government spending refers to budgetary expenditures made by the federal government and regional states together for the entire nation (Dereje Mulugeta, 2014). It is the primary tool utilized, particularly in developing nations to encourage economic growth that is a necessary component of sustainable development. Every sector in emerging nations' national economies requests more budget allotments (World Bank, 2020). Economic growth is the increase in output of an economy's capacity to improve the wellbeing of residents within a country (Jibril Adamu & Babayo Hajara, 2015).

Ethiopia, with a population of over 120 million, is the second most populous country in Africa after Nigeria. Its economy is also one of the fastest-growing in the area, with an anticipated to grow by 6.1 in 2023 and 6.4 by 2024. With a per capita gross national income of $1,020, Ethiopia is still among the poorest countries, but by 2025, it hopes to move into the lower middle class (World Bank, 2023).Although real GDP growth decreased from 5.6% in 2021 to 5.3% in 2022, it was still higher than the average for East Africa. The economy was expected to expand by 5.8% in 2023 and 6.2% in 2024, mostly due to investment, private consumption, and industry (ADBG, 2023).

For a nation like Ethiopia that has endured poverty and violence for a variety of reasons, understanding the link between public spending and economic progress is vital. First, the financial resources available to emerging nations are scarce and often diminishing; thus, it is imperative to use these resources sensibly in order to promote economic progress and the reduction of poverty (Shenggen Fan and Neethen Rao, 2003).Ethiopia's national debt and deficit are rising, according to (Akshaya Kumar, 2017). Examining how different spending components affect economic development and classifying and treating different sectors according to the expenditure-output relationship is one strategy to reduce the degree of deficit and debt. Last but not least, Ethiopia's uneven government spending on the military has hampered the nation's economic development (Taressa Adugna , 1997) and contributed to the country's mounting foreign debt (MoFED, 2022).

Overall Ethiopia's government expenditures grew 20.97%, from 17 billion birr in 2002 to 599 billion birr in 2021, 387bn for the 2019/20FY (World Bank, 2023). Ethiopia's general government final consumption expenditure, on the procurement of goods and services as a percentage of GDP, was estimated to be 7.36 in 2022 (Trading Economics , 2023). With nation's growing demand, Ethiopian government spending grew from 562 bill Birr in 2021/22 to 786.6 billion Birr in 2022/23 (UNICEF, 2023). Ethiopia government approved budget of ETB 801.6 billion for the 2023/24 fiscal year with forecast of economic growth rate 7.9 per cent for 2023/24 (UNICEF, 2023). Ethiopia's 2023/24 budget expenditures include for debt service 27.8%, roads 11.9%, education 9.7%, defense 8.7%, health 3.9%, water & energy 3.4%, agriculture 3.4%, justice & security 3.1% and for urban development transport 1.7% (Cepheus research, 2023).

As Wondimagegne Assefa (2021) the reason for Ethiopia's GDP grown at a high rate might be the rising government spending. The Ethiopian government has been allocating greater funds for education, agriculture, health, and defense respectively (Wondimagegne Assefa, 2021).Even when budget utilization is not as proposed as we can see in Ethiopia, Ethiopia budget allocation Priority align with the country's 10-year development plan, past, present, and future macroeconomic projections and trajectories, as well as the national homegrown economic, job creation and the poverty reduction in general (MoFED, 2022).

Even it is crucial for those making policy decisions; there aren't many empirical studies in Ethiopia that examine how government expenditure affects economic growth. Given Ethiopia's improved economic development throughout this time (ADBG, 2023); it's intriguing to learn how government expenditure has influenced economic expansion. This study added the body of knowledge about how government spending affects Ethiopia's economic growth and to suggest policy recommendations based on the findings.

1.2 Statement of the problem

Ethiopia, as a developing nation, has seen a consistent growth in public spending (UNICEF, 2023), which has led to a rise in budget deficits and public debt. Meeting the MDGs will also require increase in the structure of public spending (MoFED, 2018). Increasing government spending might has a negative impact on economic development (Mitchell, 2005). Ethiopia

still has a lot of obstacles to overcome, and it is critical to comprehend how government expenditure may help to address these obstacles and advance sustainable economic growth.

Ethiopian government spending has been increasing quickly as a result of giving priority to the fields of agriculture, health, and education in reducing poverty. The government has allotted enormous funds to increase expenditure in the areas it designates as the "primary pro-poor sectors," which include roads, water and electricity, education, health and agriculture as well as food security (Solomon Tilahun, 2021). Nuredin Abu (2010) noted that increased government spending might impede the economy's overall growth. For policymakers, economists and stakeholder's evidence is necessary to look into and analyze the link between government expenditure and economic development in Ethiopia.

Several studies have attempted to investigate how government expenditure can affect economic growth in worldwide. But different research studied have been focused in Ethiopia also, those are Wondimagegne Assefa (2012), Kojo Menyah & Yemane Wolde-Rufael (2013), Addu Mohammed and Melesse Asefaw (2014), Bazezew Berihun (2014), Dereje (2014), Alemayehu and Adugna (2015), Abelone Dagne (2017), Tufa and Mekonnen (2018), Endaylalu Solomon (2019), Biniam Kefyalew (2021),Wondimagegne Asefa (2021), Girum (2023) and Girma (2023). Using VAR regression, (Berhanu Tolcha, 2014) discovered transport and communication have a negative impact on growth which is contradict the theory, inconsequential impact on growth, health, education; defense, tourism, culture and sport have both short- and long-term positive significant effects on growth.

Abelone Dagne (2017) studied the effects of government spending on infrastructure, health, education, defense and agriculture on the country's economic growth in the short and long terms. General services spending were shown by Tufa Garoma & Mekonnen Bersisa (2018) to have a negative and significant impact on Ethiopia's economic growth which is maybe due to unproductive. Endaylalu Solomon (2019) studied by using VECM analysis of time series data 1982-2016 economic infrastructures spending variables (agriculture, road and energy), social infrastructure (education) and recurrent and capital expenditure components impacts on Ethiopian economic growth.

From VECM and ADF test of time series data of 1990-2020 the output of short run causality test by Biniam Kefyalew (2021) revealed that public expenditure on education and health have significant effect. Wondimagegne Assefa (2021) and Girma Mulugeta (2023) used panel data regression analysis to examine the relationship between government spending and Ethiopia's economic growth. Girma Mulugeta, (2023) only added to the previous research the effects of investment spending only on Ethiopia's economic growth beyond the first four sectors.

This study contributed new evidence on impact of growing government spending on economic growth in Ethiopia to the existing literature. This study added variable such as expenditure on Industry Development, Transport and communication, Road construction, Urban Development and Interest payment expenditure components in addition to the variable further studied (i.e agriculture, education, defense and health) to identify the impact of government spending on economic growth in Ethiopia. This study varies from earlier research studies that it used time series data from 1994-2023, which is quite a long time. Besides, this study fills methodological gap by adopting all step by step testing time series model as constructed by Pesaran Shin et al (2001) since time series analysis is better with data that are observed across time and used to estimate the long and short-run relationships among the variables.

1.3 Objective of the Study

Broadly speaking, the objective of this study is to analyze the impact of government spending on economic growth in case of Ethiopia for the period 1994-2023. More specifically, the study has the following objectives.

i. To know the trends and patterns of government spending and sectorial distribution overtime in Ethiopia

ii. To investigate the relationship between the components of selected government expenditure and economic growth in Ethiopia.

iii. To analyze the short-run and the long-run effects of government expenditure on economic growth.

1.4 Research questions

The research questions of the study are the followings:-

i. What are the trends and patterns of government spending and sectorial distribution overtime in Ethiopia?
ii. What is the relationship between the components of selected government expenditure and economic growth in Ethiopia?
iii. What are the short-run and the long-run effects of government expenditure on economic growth in Ethiopia?

1.5 Research Hypothesis

Based on the above research questions the following hypothesis is tested.

Ho1: On short-run government spending has positive effect on Ethiopian GDP growth

Ho2: On short-run government spending has negative effect on Ethiopian GDP growth

Ho3: On long-run government spending has positive effect on Ethiopian GDP growth

Ho34: On long-run government spending has negative effect on Ethiopian GDP growth

1.6 Significance of the study

The research enhance to the understanding of the role of government spending in promoting economic growth in Ethiopia. Policymakers, economists and other stakeholders engaged in creating and putting into practice efficient fiscal policies and resource allocation plans gate great value in the findings. This study updated information and the findings of this study can be used as a guide for researchers, policy developers and provide important information on the current performance of the public sectors for budget allocation. The study serve as a basis for further research projects and policy suggestions aimed at helping Ethiopia to achieve sustainable economic growth.

1.7 Scope and Limitations of the study

This study focused to know the impact of government spending and economic growth in Ethiopia. This paper is limited to study the impact of government spending on development enhancing sectors in Ethiopia and by using only available data that covers from the period 1994-2023. Many factors (monetary and fiscal policies) can influence economic growth; but, due to time and resource restrictions, this study primarily examined the effect of government expenditure on economic growth in Ethiopia.

1.8 Organization of the Thesis

This study organized in to six chapters. First chapter the background of the study, statement of the problem, objectives, research questions significance of the study scope and limitation of the study and organization of the study was discussed. The second chapter composed of the literature review and summary of research gap analysis. The third chapter explains that the details of the research methodology. The fourth chapter explains work plan and the fifth chapter contain budget break-down of the research; and chapter last chapter contain reference.

2. LITERATURE REVIEW

2.1 Definition of Basic Terms and Concepts

Expense brought about by the public central authorities, state and local self-governments are called public expenditure. It is a best tool for promoting economic growth and development. Expenditures are made for the support of the legislatures just as to assist the public as entirety. In this case, public expenditure has monetary and social targets. It is important to guarantee that the administrator's use is made exclusively in the open intrigue and doesn't serve any person's advantage or that of any ideological group or a gathering of people.

Government Spending: It refers to the total expenditure made by the government on goods, services, and investments. This includes expenditures on public infrastructure, social welfare programs, defense, education, healthcare, and other essential services. Lower level of government spending would upgrade economic growth and different conditions in which more significant levels of government spending would be attractive (Teshome Ketema, 2006).

Economic Growth: is the increase in the production and consumption of goods and services in an economy over a specific period (Jibril Adamu & Babayo Hajara, 2015). It is measured by changes in the GDP, which is the total value of all goods and services produced within a country's borders.

GDP: represents the monetary value of all final goods and services produced within a country's borders during a specific time period. It is indicator measures the size and growth of economy.

2.2 Theoretical literature review

The political theory of government spending determination which holds that governments like to spend more, that taxpayers dislike paying more taxes, and those governments must take their wishes into consideration was the basis for the analysis of the time path pattern of the public expenditure model. The model makes the assumption that there is a reasonable tax rate that serves as a restraint on the actions of the government. Tax income would increase at a

consistent pace as the economy grew, allowing government spending to increase in step with the GNP (Wiseman and Peacock, 1961).

Paul Romer and Robert Lucas are credited as the primary creators of endogenous growth theory (Paul Romer, 1990). This theory posits that government spending can have positive effects on economic growth by promoting investments in human capital, research and development, infrastructure, and innovation. According to this perspective, government spending can enhance productivity and technological advancements, leading to sustained economic growth. Growth is reduced when public spending discourages investment by raising taxes above what is required to finance the ventures, involving a sector better served by private institutions, or by removing the incentives to save and build capital (Foister S and Henrekson M, 1997). Higher rates of investment by the public or private sectors, a decrease in the GDP's percentage of government consumer spending, higher rates of school enrollment, and more political stability are all linked to faster economic growth. Technical change, in contrast to neo-classical growth theory, is no longer dependent on chance but may instead be encouraged and advanced by suitable policies.

John Maynard Keynes, an economist, is credited with developing the Keynesian hypothesis, which holds that government expenditure can boost economic growth in recessionary or low aggregate demand periods. The link between public spending and national income is oriented from government expenditure to national revenue, according to Keynes (1936). In general, this means that higher government expenditure can raise aggregate demand, which will raise output, create jobs, and spur economic expansion.

As to Keynesians, government spending is a useful tool for generating both higher long-run growth rates and short-term stability in fiscal policy Keynes (1936). As a result, they mandate fiscal policies that allow the government to intervene in the economy. They support expansionary measures in times of economic contraction and vice versa in order to stabilize short-term volatility and raise the pace of growth in the long run steady state; otherwise, the economy would grow on a slower trajectory. But classical economists believe fiscal measures are unproductive because they discourage private spending, especially investment spending.

Wagner's Law has the name of the German professor Adolf Wagner from the eighteenth century. According to this rule, the proportionate size of the public sector will increase together with the growth in per capita income. According to him, there is a direct link between government spending and national revenue Afonso & Jalles (2016). Wagner's law defies Keynesian theory using economic growth as the explanatory and governmental spending as the dependent variable. Henrekson identified three primary causes of the expansion of the government's role based on Wagner's law (1993). First, modernization and industrialization would cause public operations to be replaced by private ones, boosting government spending on contract enforcement and law and order. Second, the income elastic would expand in response to a rise in actual income. Thirdly, the government had to assume control of natural monopolies like railroads due to their exorbitant operating expenses.

Economists Vu Le & Terukazu Suruga (2005) explained how public spending is maintaining economic development in two scenarios. In the first instance, capital accumulation is aided by governmental spending. Public spending can be used to fill up the gaps left by a free-market economy, such as manufacturing national public goods.

According to Adamu Jibir & Chandana Aluthge (2019b), classical economists, especially Adam Smith, supported minimal government action in the provision of public goods, law and order, and those investments that the private sector is unable to adequately offer because of their high risk or unprofitable character. Up until the 1930s Great Depression, when the failure of the classical model became apparent, this theory ruled the global economy.

According neoclassical model, a consistent rise in capital investment only momentarily accelerates growth Robert Solow (1956). This theory depicts an economy where two types of inputs capital and labor produce a single homogenous output. In addition, they assume that the economy is competitive and always operates at full employment. But contrary to analysis of Malthusian, labor growth is determined by forces outside the economy and is not changed by economic variables. Michael Todaro, (1994) postulated that economies in countries with higher levels of government spending would grow more slowly. Proponents of Keynesianism may counter that greater economic development might undoubtedly result from the government providing essential public goods for which there is no private sector rivalry.

2.3 Empirical literature review across worldwide

It becomes crucial to consider which government spending can promote long-term trends in economic growth (Carsten Colombier, 2000). According to Mesghena Yasin (2003) trade openness, state spending and private investment expenditure all contribute favorably to the economic growth of Sub-Saharan Africans; population growth rate and foreign development aid have little effect. Wadad and Kamel (2009) used a multivariate co-integration analysis to look at the impact of four sectors (defense, education, health and agriculture) on GDP growth in to study the long- and short-term growth effects of government spending in Lebanon from 1962 to 2007.

Butkiewicz J.L and Yanikkaya H (2011) examined how public spending in industrialized and emerging nations affected economic development. According to the study, consumer expenditures have a detrimental impact on economic growth in emerging nations with incompetent governments. However, capital investments boost the economic expansion with incompetent leadership.

According to Edmund Kimaro et al, (2017) research, government spending has a favorable impact on the economic growth of the 25 Sub-Saharan African nations that were examined, as did efficiency in public spending. However, when compared to government efficiency, government expenditure has little effect on the economies of Sub-Saharan nations. James Maingi (2017) found spending on investments, physical infrastructure, public debt servicing, economic affairs, education, health care, public order and national security, defense and government consumption all have an impact on economic growth. The study revealed spending reforms including budget rationalization, expenditure reduction, and privatization and governance impact economic development. Nwaolisa and Chinelo (2017) and James Maingi (2017) findings for Nigeria and Kenya support the influence of education spending in Ethiopia.

Gupta Rajesh (2018) determined how different elements of government spending affect Nepal's economic expansion. The results show that while overall current and recurrent expenditures and inflation have a negative effect on growth, spending in the agricultural, non-agricultural, industrial, and service sectors has a positive association with economic growth. In

a study that compared the relationship between public spending and economic development in China and Korea, (Jong Leet al, 2019) found that both countries had economic growth and that public spending plays a significant influence in economic growth in the Asian region.

Keynesian theory shows that public expenditure has a beneficial effect on national income, the unemployment rate, and private investment in Nigeria, is supported by (Ewa and Okoi (2018) findings. Lee et al (2019) study examining the nexus between public spending and economic growth in China and Korea revealed that both countries had economic growth, confirming the impact of public spending on economic growth in an Asian setting. According to Nnachi Onuoha & Gregory Okoye (2020), capital and government expenditures have a negative effect on Nigeria's GDP and capital spending's contribution was also shown to be statistically negligible.

The impact of overall government spending, capital spending, and recurrent spending on the Nigerian economy's performance from 1981 to 2018 was examined by (Nnachi Onuoha & Gregory Okoye (2020). The study's conclusion shows that overall government expenditure has a major beneficial impact on economic growth. Consistent with the conclusions of (Ifeanyi Desmond et al, 2012) and (Nnachi Onuoha & Gregory Okoye, 2020), there is no discernible economic benefit from capital and ongoing expenses. The authors also discovered a causation direction that links public spending to economic development, providing more evidence for the application of Wagner's law in Nigeria. By using the ARDL model to analysis data from 2004 to 2019, Ahmad Walid (2020) found that although spending on infrastructure and education is favorably connected with economic growth, spending on security is adversely correlated with Afghanistan's growth rate.

2.4 Empirical literature on Ethiopia

Mulugeta Dereje (2012) investigated the effects of trade openness, private investment, and government spending as shares of nominal GDP 1970/71 - 2010/111 in Ethiopia. Long-term estimation result showed that real government consumption is growth-retarding, real government physical investment becomes unimportant in explaining growth in real per capita income and real government expenditure on human capital development is growth-promoting. The study found that real openness and real private investment had a favorable and

considerable impact on the rise of real per capita income. As short-run dynamics finding, none of the government expenditure's significantly affects anything. That is because of lagged affect public expenditure.

Menyah and Wolde-Rufael (2013) looked at time series data of 1950–2007 in order to assess Wagner's rule, which postulates that national wealth is a factor in Ethiopia's rising public spending. They discovered a unidirectional causal link between national income and public spending. They conclude that Ethiopian economic development does not support the Keynesian view, which holds that government expenditure is the root source of economic expansion. Abdu and Melesse (2014) investigated the connection between Ethiopia's economic expansion and state spending 1975 and 2011. Their findings demonstrate health investment and overall capital expenditure have major and favorable impact on Ethiopia's RGDP growth.

The growth impact of government sectorial expenditure in Ethiopia from 1975 to 2013 was examined by (Bazezew Berihun, 2014). According to the study, spending on defense has a large and detrimental influence on economic growth both in the short and long term, whereas spending on education has a favorable long-term impact but a negligible short-term impact. Also the study found that government expenditure on agriculture had a short-term negligible correlation with growth but a long-term negative correlation.

According to Abelone Dagne (2017) from 1975-2016 data and VAR estimation approach, public spending has a substantial impact on all of its constituent parts. Public spending on defense and infrastructure both contribute to economic growth. The study concluded that public expenditure reform and the makeup of government spending are important for GDP growth. Because of bureaucracy of the institution General services spending have a negative and considerable impact on economic development, according to Tufa Garoma & Mekonnen Bersisa (2018) time series study of short- and long-term data from 1975 to 2015. It focuses on sector-specific spending on the general services, social, economic, and other service sectors. Endaylalu Solomon (2019) from time series data 1982-2016 with the help of VECM and co-integration, found all public expenditure components in Ethiopia at all have a significant positive effect in the long-run but they have insignificant impact in short-run except education and road mean that it is not effective in the short-run since economic growth takes time.

Wondimagegne Asefa (2021) found that public spending on health and education sectors has a statistically significant and positive relationship with Ethiopia's economic growth, while public spending on defense and agriculture has a positive but insignificant association with the nation's GDP this is because of institutional quality. The study also concluded that there was bidirectional causality. Government spending on agriculture has a detrimental influence on long-term economic growth, but it also has significant short-term consequences, according to Girma Mulugeta (2023) spending on investments has a negative and significant short-run, but a positive & small long-run run impact on economic growth. In the short and long run, defense spending has favorable but insignificant impact on economic growth b/c of bureaucracy.

Girum Mulugeta (2023) found that spending on roads, health care and agriculture has a positive and statistically significant impact in the near term; it also has a positive and long-term impact in the long run. He discovered a unidirectional causal link of government spending on roads, health, transportation, and communication and growth at a one duration using the Granger causality test.

2.5 Summary of Research Gap Analysis

Since there is lack of sector-specific analysis there is a need for more in-depth analysis of the impact of government expenditure on specific sectors such as health, education, agriculture, defense, investment, public debt servicing, physical infrastructure, and government consumption and servicing in relation to Ethiopian economic growth. There is gap as we can see from literature above through comparative analysis between different but this can help policymakers in resource allocation and setting priorities for government spending. Also there is a research gap in understanding the long-term impact of government spending on Ethiopian economic growth. There is a need for more research that evaluates government expenditure policies in promoting economic growth. There is also limited research within regional disparities: Within the available data this study closes this gap by adding by considering the long-term effects of government expenditure on Ethiopian economic growth by adding new variables which is never under studied until now in a case of Ethiopia. This study also be significant from a methodology that the study applied step by step time series analysis of recently data from 1994 to 2022/23

3. RESEARCH METHODOLOGY

3.1 Research Design

The purpose of this research is to present a convincing case for how government expenditure affects Ethiopia's economic expansion. The researcher applied quantitative data analytics for the collected data, taking a time frame from FY 1994-2023, in order to analyze government expenditure on collected variables and come to a logical conclusion with some degree of evidence. For the data analysis, the researcher used all step-by-step time series analysis models to analyze the short- and long-run dynamics that the spending could impact on economic development outcomes in Ethiopia context on the specified period.

3.2 Data types, sources & method of data collection

The research used secondary data types in this study. These data are anticipated to be time series covering a sample of observations between 1994 and 2023 because the study involves time series. Potential sources for these data are included both government and non-government organizations. Those are National Bank of Ethiopia (NBE), the World Development Indicator (WDI) and Central Statistics Agency (CSA) provided as secondary source for this research.

3.3 Methods of data analysis

This study used two types of data analysis tools to examine the data collected from various sources that is explanatory data analysis (tables and graphs were utilized to elucidate the links and interactions of various variables) and the second one is inferential statistics. To of understand the short run and long-run relationship between public expenditure variables and economic growth in Ethiopia step by step time-series analysis was used, within statistical analysis program software like Stata and Microsoft Excel.

3.4 Econometric Model Specification

This section offers an econometric model for the link between government expenditure and economic growth in Ethiopia, with a particular emphasis on spending by the government. Revised theoretical model resembled the growth model is specified as GDP as a function of various components of government expenditure (Nuredin Abu, 2010).i.e

$GDP\ GROWTH = f(\text{public Expenditure Components})$……..... (1)

Unlike the Vector Auto Regressive (VAR) model, which is only used to integrated of order one series, the ARDL model can be applied to variables that are integrated of order zero I(0), order one I(1), or mutually con-integrated. The ARDL (p, q) model for testing co-integration can be specified in the following Unrestricted Error Correction Model (UECM)

$\Delta Y_t = \alpha_{0i} + \sum^{p}_{i=1} \beta 1\, \Delta Y_{t-i} + \sum^{q} \beta 2\, \Delta X_{t-i} + \delta 1 Y_{t-i} + \delta 2 X_{t-i} + \varepsilon_{1t}$ ……..…. (2)

$\Delta X_t = \alpha_{0i} + \sum^{p}_{i=0} \beta 1\, \Delta X_{t-i} + \sum^{q} \beta 2\, \Delta Y_{t-i} + \delta 1 X_{t-i} + \delta 2 Y_{t-i} + \varepsilon_{1t}$ ……..…. (3)

Where, p and q are the optimal lag length for the dependent and independent variables in order. The short run dynamic coefficients are βs, the long run relationship coefficients are δs, Δ is the first difference operator, the constant parameter is $\alpha 0i$, and the error term is assumed to be independently and identically distributed. The F-statistic (Wald statistic) is used to compare the coefficient of joint null hypothesis equaling zero (no co-integration) to the alternative (there is co-integration). Ho: $1 = \delta 2 = 0$ ($no\ long\ run\ relationship\ exists$),
H1:$\delta 1 \neq \delta 2 \neq 0$ ($long\ run\ relationship\ exists$)

The empirical framework of this study evaluated the link between Ethiopia's economic development and government spending in the domains of certain independent variables using the VAR technique. The vector error correction model methodology (VECM) need the paper to test the data employed for stationary or order of integration. The stationary or order of integration test of the data avoids producing spurious results. The linearity relationship between variables will be assumed. The following linear specification form was used.

$\text{GDP}_t = \beta_0 + \beta_1 \text{ED}_t + \beta_2 \text{HE}_t + \beta_3 \text{AE}_t + \beta_4 \text{DE}_t + \beta_5 \text{IE}_t + \beta_6 \text{TCE}_t + \beta_7 \text{RE}_t + \beta_8 \text{IPE}_t\, \varepsilon_t$… (4)

$\ln\text{GDP}_t = \beta_0 + \beta_1 \ln\text{ED}_t + \beta_2 \ln\text{HE}_t + \beta_3 \ln\text{AE}_t + \beta_4 \ln\text{DE}_t + \beta_5 \ln\text{IE}_t + \beta_6 \ln\text{TCE}_t + \beta_7 \ln\text{RE}_t + \beta_8 \ln\text{IPE}_t\, \varepsilon_t$… (4) I using log of GDP

Where, ED- Education expenditure

HE- Health expenditure

AE- Agricultural expenditure

DE- Defense Expenditure

IE- Industry Expenditure

TCE- Transport and communication expenditure

RE- Road expenditure

UDE- Urban Development expenditure

IPE-Interest payment expenditure

t=Time Index, εt= Error Term

3.4.1 Stationary testing procedure

According to Tsay (2001) this is the first stage of a conventional approach to make that the series have a consistent mean and variance and that the regression findings make sense. The Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests are the techniques used to evaluate stationary or the existence of unit roots that were employed (Pierre Perron, 1987). By verifying that the mistakes in the regression model are, in fact, white-noise, the ADF process seeks to maintain the validity of the tests based on these errors. The underlying series is non-stationary when the ADF value is less than its critical value; the series is stationary when the ADF value is more than its critical value. Conversely, PP approach applies a non-parametric adjustment to standard statistic in order to account for serial correlation (James Stock, 1994).

3.4.2 Co-integration test

This is the second stage in determining if the underlying variables in the models are co-integrated, following the stationary test. The co-integration process described by Johansen and Juselius (1990) cannot be used if a co-integrating vector is present. However, the bound processes for a long-run connection or the Autoregressive Distributed Lag (ARDL) approach to co-integration yield effective and realistic estimates. The maximum eigenvalue test and the trace test are the two tests used in the technique to ascertain the number of co-integrating vectors. Testing r co-integrating against the alternative of r + 1 co-integrating relations, where r = 0, 1, 2. . . n – 1 and n is the number of variables in the system, is null hypothesis (H_0) for the greatest eigenvalue. Maximum eigenvalue test statistic is calculated:-

$$LRmax\left(\frac{r}{n}+1\right) = -T * log(1 - \omega i \quad) \text{ ..... (5)}$$

Where ω is the maximum eigenvalue and T is the sample size. The trace statistics tests null hypothesis (H_0) of r cointargeting relations against the alternative of n co-integrating

relations, where n is the number of variables in the system and test r = 0, 1, 2. . . n − 1. Computed as

$$LRmax(r/) = -T * \sum_{i=r+1}^{n} log(1 - \omega i \quad) \text{ ....} \quad (6)$$

3.5 Vector Error Correction Model (VECM)

Fitting the proper time series model comes next, after the Johansen co-integration test. A long-term link between the variables is implied by the presence of co-integration between them. Therefore, to ascertain the short-term correlations between co-integrated variables, the VECM is utilized.). Conversely, in the event when co-integration is absent, the vector autoregressive (VAR) model is derived from the VECM and the causal relationships between the variables are ascertained by the use of Granger causality tests (Engle and Granger, 1987). The last stage is to estimate the short run dynamic parameter coefficients based on the long run estimations using the error corrections model (ECM).The VECM regression equation as follows;

$$\Delta \mathrm{GDP}_{\mathrm{growth\ t}} = \alpha_1 + \alpha_1\, \mathrm{e}_{\mathrm{t-1}} \sum_{\mathrm{i=r+1}}^{\mathrm{n}} \beta \mathrm{i} \Delta \mathrm{GDP}_{\mathrm{growth\ t-i}} + \sum_{\mathrm{i=r+1}}^{\mathrm{n}} \delta \mathrm{i} \Delta \mathrm{ExpShareX}_{\mathrm{t-i}} \ldots\ldots\ldots \quad (7)$$

$$\Delta ExpShare_t = \alpha_1 + \alpha_1\, e_{t-1} + \sum_{i=r+1}^{n} \beta i \Delta ExpShare_{t-i} + \sum_{i=r+1}^{n} \beta i \Delta GDPgrowth\, X_{t-i} \ldots \quad (8)$$

3.6 Ethical Consideration

To obtain approval, a formal letter is sent from Addis Ababa University College of Post Graduate Studies to the entire office data source. No data was altered or changed; thus, the data obtained was provided as gathered, and all the material gathered for this study's purpose will be acknowledged in the reference list. All information was kept private and utilized exclusively for research purposes only. Confidentiality and the researcher avoid bias and incorrect reporting.

3.7 Definition of variables, measurement and hypothesis

The study has eight variables, one dependent and eight independent variables. Expenditure in each of the given independent variable can be defined as the total amount of government expenditure in each sector measured in terms of monetary value in Ethiopian Birr (ETB).

GDP growth rate (GDP): Real GDP is defined as the amount of physical goods and service produced in a given country for a specific fiscal year (Endaylalu Solomon, 2019)..

Education expenditure (ED): Consists of all capital and current expenditure made on education. It was measured as the total expenditure on education (current and capital) as a ratio of GDP. Educated labor is essential for development. This indicator is approaches to have a positive relationship with GDP growth (Ademuyiwa Adeniyi & Temitope Adetunji, 2019).

Health expenditure (HE): It is the share of all expenditure made by government for health to total government expenditure. It was calculated as the ratio of GDP to the total amount spent on health care (both capital and current. Keeping the nation's resident health is the leading to the growth of one country. Therefore, government expenditure on health sector is projected to GDP growth, will be hypothesis positively correlated to GDP growth (Kidanemariam Gidey & Gebrehiwot, 2014).

Agricultural expenditure (AE): Share of total government expenditure on agriculture. It includes expenses such as buying modern agricultural equipment, inputs, trained and hiring agricultural development agents and so. Agriculture is the backbone of Ethiopian economic growth; therefore government expenditure on agricultural sector is hopefully projected to GDP growth on (Osuji Emmanuel et al, 2017).

Defense Expenditure (DE): is Expenditure of all operation of military defense affairs and forces. It was calculated as the ratio of GDP to the total amount spent on defense (current and capital) Protecting the peace of one country is the leading things to economic growth. This indicator is likely to have a positive relationship with GDP growth. (James Maingi, 2017).

Industry Expenditure (IE): It is provided by government total capital expenditure to improve the country's infrastructures through investment. Without investment nothing growth is there, therefore the government has expenditure on it. Government expenditure on this sector is likely to have a positive relationship with (James Maingi, 2017).

Transport and communication expenditure (TCE): It is the government expenses both as recurrent as well as capital expenditure on all transport and communication services. Government of Ethiopia has expense on transport and communication services for growth, so likely to have positively correlated to GDP growth (James Maingi, 2017).

Road construction expenditure (RE): It is the government expenses both as recurrent as well as capital expenditure on all road construction and maintenance and also any expenditure has joint expense on this area. Government of Ethiopia expense on **road construction** services for growth, so likely to have positively correlated to GDP growth (Endaylalu Solomon, 2019)

Urban Development expenditure (UDE): This expenditure in Ethiopia refers to the financial resources allocated to initiatives aimed at improving and enhancing urban areas. It cover a range of activities related to urban planning, infrastructure development, housing, and services this expenditure enhance growth for the country, so it likely have positively correlated to GDP growth (James Maingi, 2017).

Interest payments (InE): It is the interest payments made for the use of all borrowed money both domestic and external. It was measured as yearly total interest payment for external and domestic debts. High public debt levels, particularly in low-income countries tend to undermine the government to look out on GDP growth expenditure even the government concentrated on paying the debt decreasing. Therefore, interest payments made to decrease public debt hypothesized positively correlated to GDP growth (James Maingi, 2017).

4. RESULT AND DISCUSSIONS

4.1 Structure of Government Expenditure

Ethiopia Government spending is categorized in to two, those are capital and recurring. Ram (1986) created different categorization scheme for expenditures on consumption, tangible assets, and human capital. Capital expenditures contribute to growth while recurring expenditure don't to growth but support growth. Capital expenditure enhances the capacity of the economy for the production of goods and provision of economic and social services. Recurrent expenditure is an expense on consumables that facilitate productive activities, for example, salaries, raw materials purchase, fuels and other factors of production.

Capital expenditure divided into three groups: economic development, social development, and general development. Economic development has productive activities and infrastructural facilities (industry, mining and energy, transport and communication etc.); Social development (education, public health and social welfare), while general development includes compensation payments as its component. While recurrent spending contains expense recurring in the process of delivering government economic and social services. Wages and salaries, operation and maintenance, pension and price subsidies, and debt servicing are among the major components of recurrent expenditure.

4.2 The Result of the Descriptive Statistical Analysis

This part provides the result of the descriptive statistical analysis that describes the dependent variable and independent variables. A 30 year time series data that runs from 1994 to 2023 has been used for both the explanatory and dependent variables. Expenditure in each of the given independent variable can be defined as the total amount of government expenditure in each sector measured in terms of monetary values expressed in million birr. The amounts are in millions of Birr (Ethiopian currency). They are all expressed in logarithm form for the sake of econometric analysis.

Table 1 Summary of both capital and recurrent expenditure expressed in Million ETB

Variable		Mean	Std. Dev.	Min	Max
RGDP		101,1507	71,8714.4	196,583.8	24,83,725
Recurrent expenditure	General Service	42,381.46	59,759.76	3,188.96	215,850.3
	Economic Service	13,691.01	16,973.76	648.93	55,862.95
	Social Service	49,206.99	65,336.44	1,700.82	217,279.4
Total Recurrent expenditure		**117,503.8**	**159,964.2**	**7,190.52**	**582,854.6**
Total Capital expenditure	General Development	10,175.83	15,254.93	363.11	65,011.82
	Economic Development	55,884.62	59,073.66	2,362.51	216,131.9
	Social Development	22,140.54	231,82.37	603.5774	74,773.24
Total Capital expenditure		**176,402**	**193,040.2**	**6,856.728**	**711,834**
Total expenditure		**293,905.8**	**349,904.6**	**14,236.98**	**12,94,689**

Source: Authors' computation by using STATA from NBE data source

As we can see from table above from recurrent expenditure those are general service, economic service and social service expenditure more expense as Ethiopia from 1994 up to 2023 NBE and WDI data is happened on social service sector within mean of 49,381,46 ETB, std.dev of 65,336.44, minimum of 1,700.82 ETB and maximum of 217,279.4 ETB. Whereas general service expenditure as Ethiopia from 1994 up to 2023 NBE and WDI data is ranked the second one within mean of 42,381.46 ETB, std.dev of 59,759.76 ETB, minimum value of 3,188.96 and maximum value of 215,850.3 ETB and expenditure happened on economic service was the last one as data obtained from NBE and WDI year of 1994 to 2023. But when we see capital expenditure more expense is on economic development by leading the expense of social development whereas the expense on General Development is the little one as NBE and WDI data1994 up to 2023. From capital expenditure more expense as Ethiopia is on economic development within mean of 55,884.62 ETB, std.dev of 59,073.66ETB, minimum value of 2,362.51 ETB and maximum value of 216,131.9. From capital expenditure the second ranked expense as Ethiopia from 1994 up to 2023 NBE and WDI data is on Social Development within mean of 22,140.54 ETB, std.dev of 231, 82.37 ETB, minimum value of 603.5774 and maximum value of 74,773.24 ETB

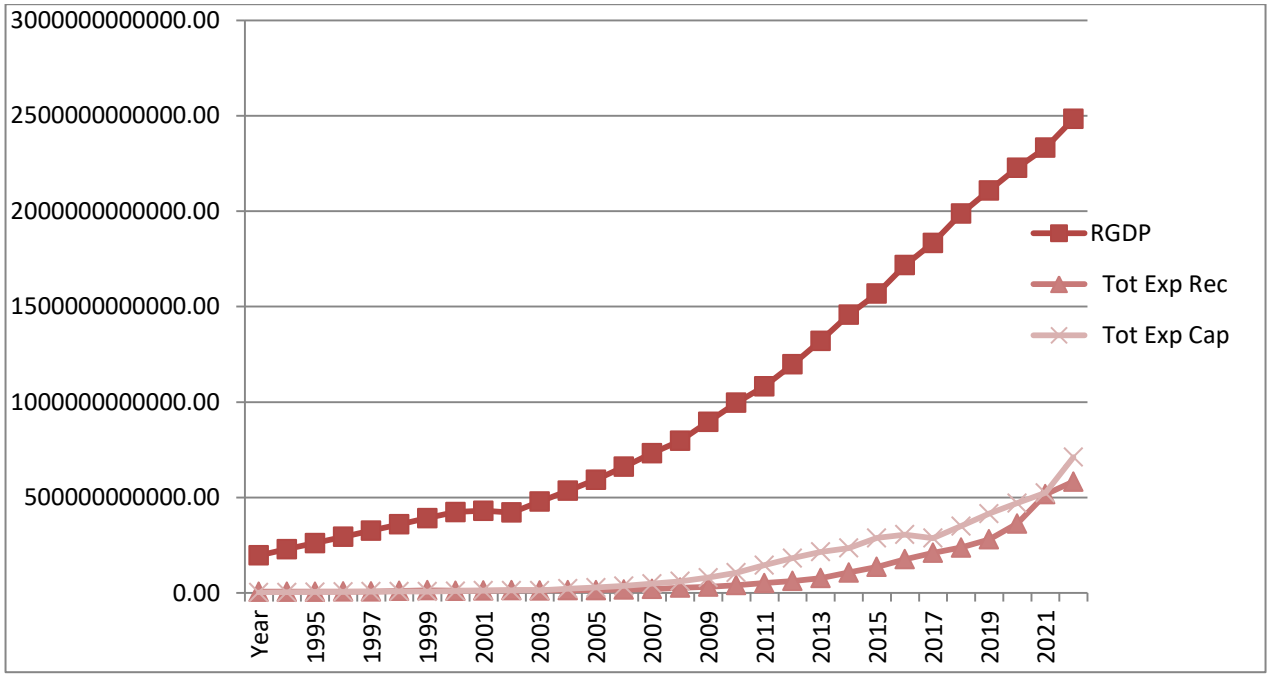
Table 2 Descriptive analysis summary of all selected components from 1994 to 2023

Variable	Mean	Std. Dev.	Min	Max
RGDP	101,1507	71,8714.4	196,583.8	24,83,725
Agriculture	23,435.21	2,9482.21	700.41	92,994.54
Defense	12,487.71	2,3072.47	1455.5	102,616.7
Education	41,310.65	55,296.08	766.83	193,666.3
Health	15,120.28	21,966.72	541.8	72,238.6
Industry	4,175.501	5,759.174	69.017	21,341.42
Transport & commutation	2,256.668	2,980.447	34.76	10,863.04
Road	20,928.66	23,019.21	558.24	78,597.6
Urban Development	7,034.157	12,203.67	56.82	49,720.42
Interest payment	6,807.406	12,235.48	337.72	54,544.01

Source; Computed by author using Stata based on data obtained from NBE and WDI

Above table summarizes 30 years of time series dataset using mean, std.dev, maximum and minimum value, expenditure on education, defense, agriculture, Health, Industry, Transport, Road, Urban Development and Interest payment expenditure components for expressed in Ethiopian Birr(ETB). RGDP of Ethiopia has Minimum value of 196,583.8 maximum value of 24, 83,725 ETB, Std.Dev 71, 8714.4 and the mean value of 101, 1507. Ethiopia has more expense on education sector within minimum value of 766.83 maximum value of 193,666.3 ETB, Std.Dev 55,296.08 and the mean value of 41,310.65. Whereas the most second expense of Ethiopia government is on Defense sector within minimum 1,455.5 and maximum value of 102,616.7 ETB, Std.Dev 2,3072.47 and the mean value of1 2,487.7. The third ranked expense of Ethiopian government is on Agriculture sector within minimum value of 23,435.21, maximum value of 92,994.54 ETB, Std.Dev 2, 9482.21 and mean value 26,930.57. Here the higher maximum expenditure is the main sectors that contribution to growth. The descriptive analysis does not examine the impact and causality of spending on economic growth of the

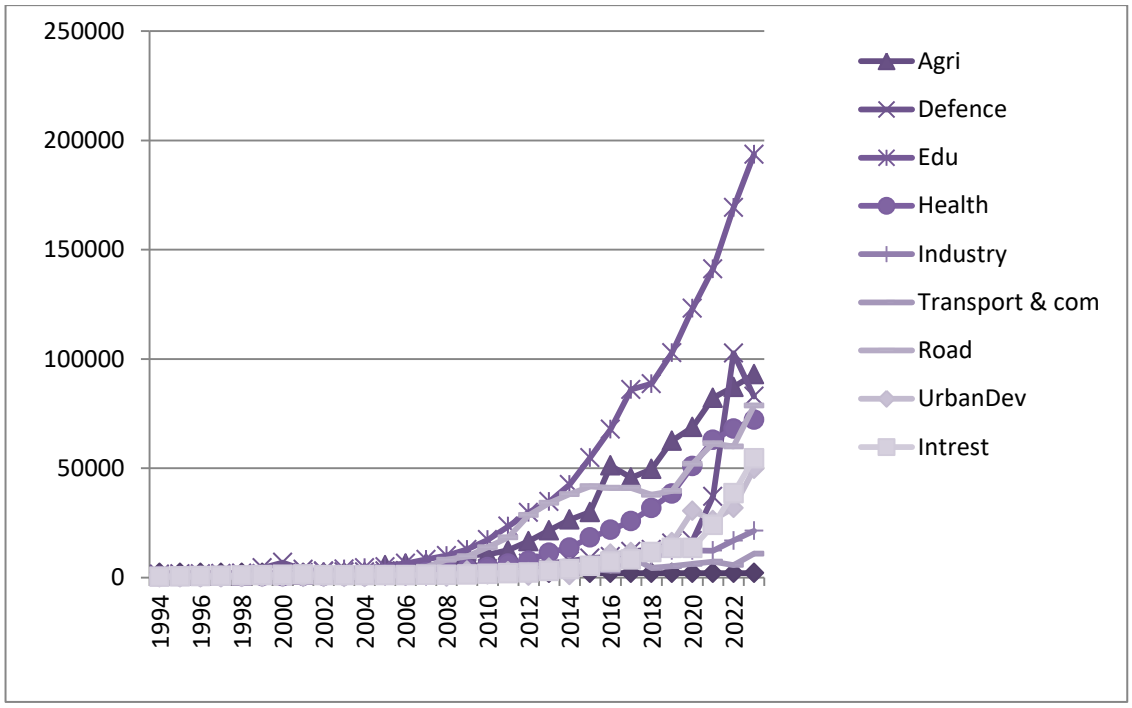
country. Then, time series analysis was used to determine the level of significance and causal directionality between government spending and GDP in Ethiopia.



Source: Authors' computation using Microsoft Excel from NBE and WDI source

Figure 1Trends of RGDP growth, total capital and recurrent expenditure in Million

As we can see from above over the past 30 years both recurrent and capital expenditure have raised dramatically structural fluctuations. The share of capital expenditure from total spending was higher than recurrent spending from 1994 until 2023.Also RGDP become sharply increasing especially from 2001.Afterr half year of 2019 capital expenditure become above recurrent expenditure which shows this expenditure is very important for economic development as productive activities and as a result RGDP become on increasing rate. Ethiopia aimed to balanced approach between recurrent (Which accounts 60-70%) and capital (30-40%) spending has helped support Ethiopia's impressive real GDP (RGDP) growth, which has averaged around 8-10% in recent years. The government's strategic investments in sectors like education, healthcare, transportation, and industrial development, combined with prudent management of day-to-day expenses, has contributed to Ethiopia's sustained economic expansion and progress towards its goal of becoming a middle-income country. This multi-faceted expenditure strategy has been a key driver in Ethiopia's overall development trajectory.



Source: Authors' computation using Microsoft Excel from NBE and WDI source

Figure 2 Graphical description all selected expenditure in Million

When we see from above graph the trends and patterns of government spending and sectorial distribution overtime in Ethiopia all selected sector are on increasing trend using 1994 up to 2023 NBE and WDI data source. Ethiopia's government has made significant investments in key sectors such as education (20-25% of the budget), defense (5-10%), agriculture (10-15%), health (5-10%), industry (5-10%), transport and road infrastructure (10-15%), and urban development (5-10%), while also allocating around 5-10% of the budget towards interest payments on domestic and external debt. These expenditures aim to improve access to essential services, modernize the military, support the agricultural sector, enhance healthcare, promote industrial diversification, develop transportation networks, address urbanization challenges, and maintain a sustainable debt profile, all of which are crucial for the country's economic and social development. Educational expenditure is highly above all selected sectors in Ethiopia especially from 2021. Continually the expenditure on defense sector is increasing within second rank whereas the trends of expenditure on agriculture sector is on increasing trend within third rank in case of Ethiopia as a data from NBE and WDI, this describe the directive of Ethiopian government on this sector is high.

4.3 Econometric Analytics

4.3.1 The unit root test analysis

Before conducting time series model, stationary status of time series data has to be tested in order to determine their order of integration. Unit root test is a tool that supports us in deciding which model should be applied. This indicates that unit root test is the first step in dealing with variables in the estimation of models. This study used the ADF Unit Root Test as follow:-

Table 3 Unit root test Augmented Deffuler (ADF) result

Variables	**Test Satistic**	**1%**	**5%**	**10%**	**p-value**
dlogRGDP	3.417	-3.730	-2.992	-2.626	0.014
dlogAgri	6.994	-3.730	-2.992	-2.626	0.0000
dlogDefence	-4.033	-3.730	-2.992	-2.626	0.0012
dlogEdu	4.355	-3.730	-2.992	-2.626	0.004
dlogHealth	-4.053	-3.730	-2.992	-2.626	0.0012
dlogIndustry	-6.914	-3.730	-2.992	-2.626	0.0000
dlogTransportcom	-6.089	-3.730	-2.992	-2.626	0.000
dlogRoad	3.290	-3.730	-2.992	-2.626	0.0153
dlogUrbanDev	-10.670	-3.730	-2.992	-2.626	0.000
dlogInterest	-3.101	-3.730	-2.992	-2.626	0.0265

Source: Authors' computation using stata from NBE and WDI data source

As we can see above all the variables are stationary at their first difference using ADF test as we copied stata output, which integrates order 1 I(1). As all p-value is less than critical by rejecting Ho: the variable has a unit root, the test result confirmed that the ARDL model can be used if variables are stationers at I(0)and I(1), or a combination of I(0) and I(1). Thus, the test confirms the use of the ARDL model. This mean that the long run co integration equations will only consist of variables which are I(1) (Abebe Ambachew et al, 2013).

4.3.2 Optimal lag length

In order to estimate time series model appropriate lag length selection is a vital and we chose Akaike information criterion (AIC) for this purpose as described below.

Table 4 Maximum Lag-order criteria Selection

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	59.1509	.001203*	-3.9320	-3.79684	-3.44452*	0	59.1509	.001203*
1	60.3229	2.3442	1	0.126	.001207	-3.94583*	-3.79709*	-3.40953
2	60.3574	.06895	1	0.793	.001333	-3.86859	-3.70632	-3.28353
3	60.6627	.61049	1	0.435	.001447	-3.81301	-3.63722	-3.1792
4	61.5366	1.7479	1	0.186	.001511	-3.80293	-3.61361	-3.12036

Source: Authors' computation using stata from NBE and WDI data source

From maximum lag-order criteria Selection above table output the maximum lag we have to use for our model is 1 as we can see under AIC. Whereas using stata (1 1 1 1 1 1 1 1 1 1) was found to the appropriate lag for each variable specification.

4.3.3 Co-integration test

As we have seen from above table since the order of integration of each variable in the model is equal to one and it mean that the variables involved in the model are co-integrated (Engle and Granger, 1987). The Johansen co-integration test was employed to check co-movement between dependent variable and independent variables.

Table 5 Johansen Co-integration test results

Maximum Rank	Parms	LL	eigenvalue	Trace Statistics	5% critical
0	10	-2.9281483	.	349.7962	233.13
1	29	40.978207	0.95655	261.9835	192.89
2	46	75.798965	0.91686	192.3419	156.00
3	61	105.07932	0.87649	133.7812	124.24
4	74	129.57875	0.82622	84.7824*	94.15
5	85	143.44275	0.62853	57.0544	68.52
6	94	152.79934	0.48744	38.3412	47.21
7	101	160.44527	0.42082	23.0493	29.68
8	106	165.62423	0.30921	12.6914	15.41
9	109	169.21427	0.22619	5.5113	3.76
10	110	171.96993	0.17867		

Source: Authors' computation using stata from NBE and WDI data source

The unit root test revealed that all variable are stationary at their first difference. As we can see from above table since all trace statistics is greater than 5% critical value except the fourth we conclude that there is co-integration problem in our model by rejecting Ho: no co-integration.

This outputs depicted confirms integrated long run relationship between GDP and government spending. This result is in line with Muhammed and Asfaw (2014). Then Johansen Co-integration Test determines that the variables co-move towards a long-run equilibrium. Even from stationary test ADF result appropriate model is ARDL, but presence of Co-integration from The Johansen Co-integration test these findings indicate that the appropriate model to fit in the data is VECM.

4.3.4 Long Run Analysis Vector Error Correction Model

From the co-integration test results displayed above, the next co-integrating relationships were obtained using the Johansen test of co-integration. That is solved through the Johansen test, which was used to confirm the selected equation. To know long-run effects in this model, we have presented estimated normalized co-integration coefficient vectors from stata next table.

Table 6 Johansen normalization restriction imposed for Long run relationship

Beta	Coef.	Std.Err.	z	P>z	P>z [95% Conf.	
dlogRGDP	1	.	.	.	.	.
dlogAgri	-2.191863	.3626131	-6.04	0.000	-2.902571	-1.481154
dlogDefence	-.7103523	.2490315	-2.85	0.004	-1.198445	-.2222595
dlogEdu	-1.857153	1.2251	-1.52	0.130	-4.258304	.5439983
dlogIndustry	.6405845	.246823	2.60	0.009	.1568203	1.124349
dlogTransportcom	.0778529	.1011499	0.77	0.441	-.1203972	.276103
dlogRoad	4717787	.54003	0.87	0.382	-.5866607	1.530218
dlogUrbanDev	.3059109	.150516	2.03	0.042	.0109051	.6009168
dlogHealth	.1084205	.3523704	0.31	0.758	-.5822128	.7990538
dlogInterest	1.826725	.4156186	4.40	0.000	1.012127	2.641322
cons	.2279898	.	.	.	.	.

Source: Authors' computation using stata from NBE and WDI data source

From above table, the co-integrating equation between RGDP growth and selected Ethiopia government spending sectors on education, defense, agriculture, Health, Industry, Transport and communication, Road, Urban Development and Interest payment as for the period of 1994–2023 is given as

log(RGDP)= 0.22 -2.19 dlogAgri – 0.71 dlogDefence + 0.640dlogIndustry +0.306 dlogUrbanDev + 1.826 dlogInterest

From co-integration test, we understood that RGDP growth in Ethiopia significantly depends on public expenditure. But the relationship between economic growth and public spending on agriculture and defense sector is negative significant impact, and also its relationship with educational spending is positive and insignificant in long run.

The sectorial expenditure on agriculture and defense sector is negative significant impact on RGDP growth in long run. That is a 1.0 percent increase in real government expenditure agriculture sector leading to a decline in economic growth on average by 2.19 percent in the long run. This finding is support the result of (T. Liu and K. W. Li, 2015) as the spending on agriculture has a negative impact on Ethiopia's economic growth. It may be necessary to review the allocation of resources to these areas. The reason is that this sector in Ethiopia has faced a lot of problems like lack of good finance, lack of transportation, inadequate farm inputs, and a lack of land tenure securities over the past few years. Those problems led to a decrease in productivity and the standard of living of rural farmers.

The relationship between economic growth and expenditure on defense was found significant and negative. That is a 1.0 percent increase in real government expenditure on defense sector leading to a decline in RGDP growth on average by 0.71% in the long run holding other variables constant. Defense expenditure did not provide internal and external security and safety for a country's citizens, and creates a worldwide environment for trade and investment in Ethiopia, this is because the lack of complementary policies, instability, unexpected shock and natural hazard, corruption, rent seeking problem by officials, having unmotivated civil servants, and lack neat administration result in the unproductive and poor performance of the sector's contribution to growth. The finding is complementary within the finding of (Bazezew Berihun, 2014), (Wadad Saad & Kamel Kalakech , 2009), but this finding against the findings of as (Teshome Ketema, 2006), (Abelone Dagne, 2017), (Tufa Garoma & Mekonnen Bersisa, 2018), (Twedros Ayalew, 2016). (Abelone Dagne, 2017) & (Endaylalu Solomon, 2019).

The results show that in the long-run, expenditure on education sector has insignificant impact on GDP growth in long-run in a case of Ethiopia. This may be due to lack of crucial focus on improving the efficiency and effectiveness of spending on education sector areas. This may be due to the fact that those educated are not productive as much as in need for RGDP growth of

Ethiopia. This finding against the finding of (Girma Mulugeta, 2023), (Wadad Saad & Kamel Kalakech , 2009), (Endaylalu Solomon, 2019) and (Bazezew Berihun, 2014) but this finding inline within the findings of (Sunday, Ol. And Elizabeth, F, 2012) and (Eden Wendemagegne, 2021). This did not support on the one hand Keynesian view that government investments on social sectors are causes of growth.

The results show that in the long-run, health spending is statistically insignificant impact on GDP growth in long-run in a case of Ethiopia. Even though the coefficient of health spending is statistically insignificant, but it is known that the contribution of this sector directly improves the real economic growth of the country promote growth by increasing RGDP growth. This is because of lack of focus on improving the efficiency and effectiveness of spending in health sector. Prioritize investments in healthcare infrastructure, access to quality education, teacher training, and curriculum development. This is also due to the fact health sector is not appropriately financed as needed level since without healthy notion RGDP growth not promoted. This finding did not support the findings of (Bazezew Berihun, 2014), (Eden Wendemagegne, 2021), (Endaylalu Solomon, 2019) and (Girma Mulugeta, 2023).

In long-run show that expenditure on Transport and communication and expenditure on road construction sector has insignificant impact on GDP growth in a case of Ethiopia. Thus, road construction, transport and communication infrastructure investment did not positively affect the economic growth by reducing the effect of distance and increasing business efficiency supporting of the economic activity as needed. This is due to lack of investing as in need to improve transportation networks, including roads, railways, ports, and airports. Enhancing connectivity and reducing logistical constraints can boost trade, investment, and economic activity across various sectors. This finding also did not support the finding of (James Maingi, 2017), (Endaylalu Solomon, 2019) and (Twedros Ayalew, 2016).

In long run expenditure of government on Industry development, Urban Development and interest payment is positive and has statistically significant impact on RGDP growth. One present increase in government spending on Industry development, Urban Development and Interest payment would lead to RGDP growth by 0.6405%, 0.3059%% and 1.8267 respectively holding another variable constant. This is a good justification that Industry development, Urban Development and interest payment the directly contribute the real economic growth of the country. Construction different industry for multiple insinuations,

organizations and factories, and become a leading and an emerging institution in registering remediable growth in the area of manufacturing production, hence the contribution of these institution directly improve growth RGDP of the country or directly it promote growth by increasing RGDP in a case of Ethiopia. This finding also did not support the findings of (Teshome Ketema, 2006) and (Gebre Yntiso, 2008) as they concluded that Investment government spending displays a negative but insignificant impact on growth of real GDP.

As expenditure on urban development has a positive impact on RGDP growth, it shows that allocation of good budget in this sector on the projects that enhance urban infrastructure, housing, and public services enhance RGDP growth in Ethiopia. As expenditure on interest payment has a positive impact on RGDP growth, it ensure sustainable debt management practices, including prudent borrowing, debt servicing, and fiscal discipline are the main beneficiary for GDP growth of Ethiopia. This can help maintain macroeconomic stability and prevent adverse effects on long-term economic growth.

4.3.5 Short Run Analysis Vector Error Correction Model

The model estimates the short run dynamics which is mainly driven by lagged real GDP, real total government expenditure on selected sectors. After identifying the long run relationship among the variables, estimated by VECM model explains the short run relationship.

Table 7 Vector error-correction model short run relationship

Equation	**RMSE**	**R-sq**	**chi2**	**P>chi2**
D_dlogRGDP	.031368	0.5642	19.41606	0.0790
D_dlogAgri	.299848	0.7900	56.43413	0.0000
D_dlogDef	.363557	0.5504	18.3595	0.1052
D_dlogEdu	.070799	0.7674	49.49875	0.0000
D_dlogInd	.420244	0.7599	47.464	0.0000
D_dlogTr	.84017	0.6950	34.18839	0.0006
D_dlogRo	.147554	0.5431	17.8278	0.1210
D_dlogUrbD	1.00923	0.8103	64.05356	0.0000
D_dlogHealth	.100277	0.8394	78.3738	0.0000
D_dlogInt	.146732	0.6169	24.1542	0.0194

Source: Authors' computation using stata from NBE and EDI data source

To know the short-run effects in this model, we have presented the effect of selected government spending sectors on RGDP growth as above from stata output in above table. As shown in Table above the coefficient of the first lagged value of RGDP was positive and

significant, this indicates, in the short run, that RGDP in the current period is sensitive to what it was in the previous period. From Selected government spending sectors the expenditure on agriculture, education, industry development, transport and communication, urban development, health and expenditure on interest payment are positive and significant impact on RGDP growth.

*log(RGDP)= 0.031*D_dlogRGDP + .299D_dlogAgri + .0707D_dlogEdu + .420D_dlogInd + *0* .84D_dlogTr + 1.009*D_dlogUrbanDev* +.100277D_dlogHealth + .146732 D_ *dlogInterest*

As shown in table above the coefficient on agricultural, education, industry development, transport and communication, urban development, health and expenditure on interest payment is positive and significant, implying that holding another variables constant, a 1% increase in agricultural, education, industry development, transport and communication, urban development, health and expenditure on interest payment Spending would lead to an increase in economic growth by 0.03136, 0.299%, 0.070%, 0.42%, 0.84%, 1.009%, 0.0012% and 0.1467% respectively, in the short run. This due to the fact that when the nation becomes agriculturally developed, literate, good industrial developed, has good transport and communication system, best urban developed country, healthier and able yearly paying her interest economic growth of the country fulfilled.

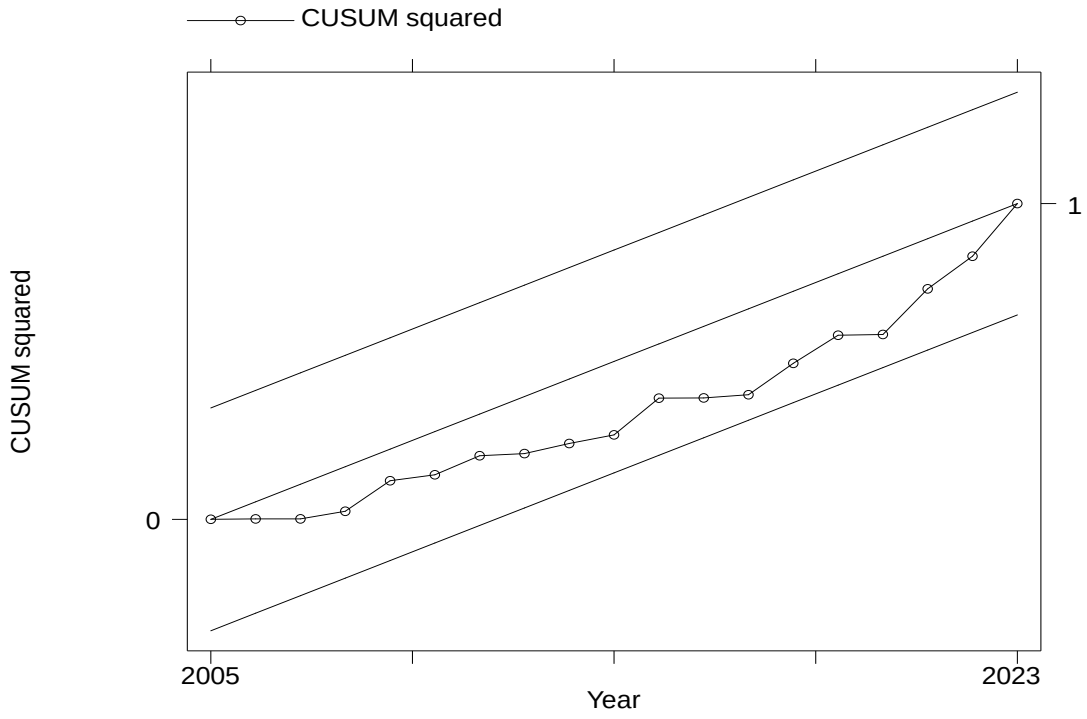
This finding supports the findings of (Bazezew Berihun, 2014), (Tufa Garoma & Mekonnen Bersisa, 2018), (Eden Wendemagegne, 2021), (Endaylalu Solomon, 2019) and the findings (Girma Mulugeta, 2023). This finding did not support the findings of (Teshome Ketema, 2006) and (Wadad Saad & Kamel Kalakech , 2009) as they concluded that expenditure on defense; education and health sector has insignificant on short-run RGDP growth.

But only the expenditure on defense and Road construction sector has no significant impact on RGDP growth in Ethiopia. This is because of the expenditure on defense and Road construction sector are not as in need level to have impact on RGDP growth in Ethiopia. In a case of this finding did not support the finding of (Yishak Merga, 2021) and (Endaylalu Solomon, 2019) as Road construction is the gate for economic growth of one country.

4.3.6 Model Diagnostic test

From Durbin-Watson statistics test at 2.21196 by rejecting H0: no serial correlation, therefore we concluded that there is no evidence of serial correlation which is supported by Breusch-Godfrey LM test for autocorrelation at p-value is 0.5010 as we reject H0: no serial correlation.

However the model is severing from hetro-secendacity as we did not reject from White's test of Ho: homoscedasticity. From correlation matrix since all of correlation coefficients is less than 0.8 and we can concluded there is no maximum correlation among the variables. Also we understood that there is no drop variables so we can't find any another proxy variables therefore there is no multi-colinerity. As we can see from below Cusum graph since the graph is displayed between 5% level of significance we can conclude that the model is stable.



Source: Authors' computation using stata from NBE data source

Figure 3 Cusum graph of model stability

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The relationship between public expenditure and economic growth is an important subject of analysis. This study has tried to empirically investigate the impacts of public spending on economic growth of Ethiopia by using 30 years' time series annual data from 1994 to 2023. As Ethiopia Government spending is categorized in to two, those are capital and recurring. Capital expenditure enhances the capacity of the economy for the production of goods and provision of economic and social services, whereas recurrent expenditure is an expense on consumables that facilitate productive activities. The analysis is done using descriptive statistics and VECM.

The natural logarithm taken for both dependent and explanatory variables, prior to the estimation of the specified model, test for stationary was carried out using ADF tests. Unit root test revealed that all the variables used in the estimation are all integrated of order one series, so that estimation is not spurious. Presence of Co-integration from Johansen Co-integration test reveals that there is long-run relationship among the variables. Then the author did both short run and long run impact of government spending on RGDP growth. From correlation matrix the author understood no correlation. The model diagnostic test to validity of the model by using Durbin-Watson statistics and there is non-serial correlation, there is no hetro-scendacity, from Breusch-Godfrey LM test for autocorrelation test the author verified that no autocorrelation and from cusum figure the author understood the model is stable

5.2 Conclusion

From short run and long run analysis using VECM the results found that in long run expenditure of government on Industry development, Urban Development and interest payment is positive and has statistically significant impact on RGDP growth, whereas expenditure on health, education, transport and communication and road construction sector has insignificant impact on GDP growth in Ethiopia. But government expenditure on defense and agriculture sector is negative and significant effects in long run.

The author concluded from analysis suggests that in the long run, smaller government expenditure, particularly in sectors such as health, education, transport and communication, and road construction, does not significantly contribute to Ethiopia's GDP growth. However, expenditure on industry development, urban development, and interest payment has a positive and significant impact on GDP growth. These findings imply that reducing government spending in certain sectors and focusing on areas that have a more substantial impact on economic growth could enhance Ethiopia's overall growth rate. These findings indicate that the Keynesian hypothesis is not applicable in Ethiopia economy. In other words, the evidence indicates that the growth rate of real GDP is enhanced by smaller government expenditure.

Additionally in short run the VECM result showed expenditure on agriculture, education, industry development, transport and communication, urban development, health and expenditure on interest payment are the major beneficiary for RGDP growth. But only expenditure government on defense and Road construction sector has no significant impact on RGDP growth in Ethiopia. These findings imply that reducing government spending in certain sectors and focusing on areas that have a more substantial impact on economic growth could enhance Ethiopia's overall growth rate. This result is in contradiction with previous finding of negative and significant effects of expenditure on agriculture, education and defense sector; as expenditure on health sector has no significant effects RGDP growth for Ethiopia. Model diagnostic test reveals no serial correlation, there is homoscedasticity and the model is stable.

5.3 Recommendation

Based on the authors' investigation we recommend that the government of Ethiopia should spend more on industry development, urban development and expenditure on interest payment are the major beneficiary for RGDP growth both in short and long run because expenditure in these sectors improves decreasing unemployment rate that encourage all labor force should have to ply his role economic growth in the country. The author recommends enough resources have to be allocated to urban development projects as it has quick impact on economic growth. The authors also recommend government should give attention redirecting expenditure to productive activities to foster economic growth in our country Ethiopia. As government spending is important for economic growth but it needs adjustment to switch these

expenditures form nonproductive and lower significant areas to productive and more significant areas.

The author suggested that it is necessary to efficiently review the allocation of enough expenditure to those we selected components that has no economic impact. There is a need to manage and efficiency of spending, increasing budget utilization system and decreasing corruption. The author recommended that further investigation has to be done to know the major determinants of growth for developing countries like Ethiopia as growth patterns not only depends on public spending that also it depends on various factors such as, quality of infrastructure, political cause, institutional factors, natural conditions, overall economic conditions and etc.

Finally, disaggregated analysis is valuable from the policy perspective therefore future research is suggested why most of the public expenditure have insignificant relation with economic growth in Ethiopia.

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