



**THE IMPACT OF TAX REVENUE ON ECONOMIC GROWTH  
IN ETHIOPIA.**

**BY: MEHAMMED NASSIR  
ADVISOR: PAULOS ASRAT (PHD)**

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**ST. MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
INSTITUTE OF AGRICULTURE AND DEVELOPMENT  
STUDIES**

**THE IMPACT OF TAX REVENUE ON ECONOMIC GROWTH  
IN ETHIOPIA.**

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## DECLARATION

I, investigator signing below confirms that the work presented in this document is original and has not been published or submitted elsewhere. Any external sources referenced in this thesis have been properly acknowledged and cited.

Name

Signature

Date

Mehammed Nassir

\_\_\_\_\_

## ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

**Paulos Asrat (PhD)**

Advisor

St. Mary's University, Addis Ababa

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Signature

June 2024

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**SCHOOL OF GRADUATE STUDIES**  
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MEHAMMED NASSIR

APPROVED BY BOARD OF EXAMINERS

Examiner \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

Examiner \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

Examiner \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_



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## LIST OF ACRONYMS AND ABBREVIATION

AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Difference Lag
OLS	Ordinary Least Squares
ECM	Error Correction Methods
GDP	Gross Domestic Products
LNGDPPCT	Natural Logarithm of GDP per Capita at time t
LNTRT	Natural Logarithm of Tax Revenue at time t
LNGET	Natural Logarithm of Government Expenditure at time t
LNGCFT	Natural Logarithm of gross capital formation at time t
LNLFT	Natural Logarithm of Labor Force at time t
MOR	Ministry of Ethiopia
ECC	Ethiopian Custom Commission
MOFEC	Ministry of Finance and Economic Cooperation
CUSUM	Cumulative Sum of Recursive Residuals
EC	Error Correction Term
MPRA	Munich Personal Repec Archive
ADF	Augmented dickey fuller
IJOE	International Journal of Economics
JOPE	Journal of political economy
JOBE	Journal of business and economics

## **Abstract**

The main objectives of the study is to examine the long run and short run impact of tax revenue on economic growth in Ethiopia using gross domestic product (GDP) per capita, as a proxy for economic growth over the period of 33 years 1990/91 to 2022/23. The trends of tax revenue and gross domestic product (GDP) per capita growth rate of Ethiopia is fluctuating during specified time of period. Autoregressive Distributed Difference Lag (ARDL) and Error Correction Methods (ECM) methods are used for the study. The results of the Bound test suggests that there is long term correlation with gross domestic product (GDP) per capita, tax revenue, government expenditure, Gross capital formation and real labor force.

The result of Autoregressive Distributed Difference Lag (ARDL) models indicates that estimated coefficients, tax revenue, is significant effect on economic growth and their signs are consistent to the existing theories.

The findings of the research have an important policy implication. The result of trends of tax revenue and gross domestic product (GDP) per capita growth of Ethiopia during the study periods are fluctuating so it recommended that Ethiopian government should take appropriate measures that makes tax revenue and gross domestic product (GDP) per capita growth lower fluctuating trends. In order to increase economic growth, it is important to strengthen the taxation system. Firstly, Tax authority should build strong and stable tax institution and encourage volunteer taxpayers. Secondly, Policy makers should build a secure business atmosphere for taxpayers to raise tax revenue. Finally, government revenue and government expenditure must go in parallel ways, so government establishes strategies that encourage distortionary taxation and productive government expenditure. There are several further research direction Firstly, the study did not consider some variables, like illegal trade, contraband trade, tax evasion and informal sectors activities. Secondly, macroeconomic variables such international trade, inflation rate, and remittance that directly affect economic growth but cannot included in the model so this can be an opportunity or further research directions.**Key Words: Ethiopia, Economic Growth, TaxRevenue,ARDLMethod,BoundTest,ECMMode**

# **CHAPTER ONE**

## **1. INTRODUCTION**

### **1.1. Background of the study**

Government needs revenues resource in order to run both public and administrative activities. For these activities, different sources of finances are used under different condition. Taxation is one sources of finance and it is a compulsory contribution imposed by the state (Belay, 2015).

Most factors that can boost the economic growth have attention of most economists and policy makers for a long time. It is a well-known fact that taxation affects the decisions of economic agents regarding to resource allocation such as working, saving and investing (Singapore economic review, 2018). Tax revenue is vital for the growth and sustainability of the economy of both developed and developing countries (Bird, 2008 and Aliye, 2016).

Olashore, L. and orjih, M. (2001) cited in African capacity building foundation (2015) states that taxation is useful in raising revenue, controlling the consumption of certain commodities, controlling monopoly, reducing income inequalities, Improving the balance of payments as well as securing sectors for infants.

Sanely, D., Ali, A. and Ali, Y. (2018) conducted study to evaluate the effect on economic growth and tax revenue on Kenya over the period 1991 to 2013 In addition to this, Babatundel, A., Ibukan, O. and oveyemi, G. (2017) carried out a study to look at the correlation between taxation and economic growth in Africa between 2004 and 2013. The researchers conclude that there is a positive effect on economic growth from tax revenue.

The tax revenue of Ethiopia in 2017 and 2018 fiscal year amount was 210.1359 billion birr and 235.23 billion birr respectively growing up by 10.67% (MOR, 2018). In other ways the gross domestic product (GDP) of Ethiopia by 2018 year was 7.13% that is higher relative to 2016 years (MOFEC, 2018).

In Ethiopia, the government collects a mix tax including both direct and indirect taxes. Direct taxes comprise of personal income tax, rental income tax and other incomes tax at federal and

regional levels. In addition to this indirect taxes are comprised of domestic taxes and foreign trade taxes, including customs duties, excise tax, value added tax, surtax, and withholding tax (Haile, 2015).

The goal of this research is to examine the effect of tax revenue on economic growth (GDP per Capita) in Ethiopia by considering GDP per capita measured as dependent variable and tax revenue, government expenditure, gross capital formation and labor force as independent variables by using the year 1990/91 to 2022/23.

## **1.2. Statement of the problem**

Theoretically, there are two arguments that tax impacts on economic growth. Firstly, Solow growth model show that fiscal policy, such as taxation, can have level effects but cannot affect the rate of economic growth in the long run (Solow, 1956). Secondly, endogenous growth models give that a role for policy, like taxation, to positively affect the growth rate of economy in the long-run, has been developed by (Barro, 1990; Barro and Sala-i Martin, 1992; King and Rebelo 1990; Lucas, 1990; Rebelo, 1991 and Romer, 1996).

Empirically, many different studies have showed the impact of taxation on economic growth in different ways. Among those Orcan, C. (2009) cited in MPRA (2018) investigated the impact of tax on economic growth in South Africa. The result indicated that tax revenue is positive relationship to economic growth. Babatundel, A., Ibukan, O. and oveyemi, G. (2017) makes investigation to assess the connection of taxation and economic growth in Africa from the period 2004 to 2013; the outcome of the study shows that tax revenue is positive relation to GDP and encourages economic growth in Africa. In addition to this; Ali, A. (2015) and Ali, Y. (2017) as cited in Saney, D. (2018) conducted study to examine the effect on economic growth of tax revenue in Kenya over the period 1991 to 2013. The result indicates that tax revenue collections have a major positive impact on Kenya's economic development (Saney, D. 2018).

Similarly Dladla, K. (2017) as cited in Hlalefang, D. (2018) conducted the study on impact of taxation on economic growth in South Africa for the period 1981-2016. The results suggest that, in the short and long run, it is negatively linked taxation and economic development. In other ways, some studies evidenced no relationship between taxation and economic growth for instance; Ojong, M., Anthony, O. and Arikop, F. (2016) investigate the effect of tax revenue on

Nigerian GDP growth from the period 1986 to 2010. The finding reveals that there are no effect and the insignificance relationship between tax revenue and Economic growth (GDP).

Workineh, A. (2014) cited in international journal of business and economics (2016) study on the tax revenue determinants in Ethiopia from the period 1974 to 2013 using Johnson co-integration method and the result indicated the GDP, foreign assistance, industrial value added share of GDP and per capita income in the long-term a positive effect on tax revenue. In other ways, Firehiyot, H. (2016) conducted study on the Nexuses between tax revenue, inflation, private final consumption and economic growth in Ethiopia for the period 1970 to 2015 using VECM methods. The result revealed that Real GDP has a negative and significant long term effect on real tax revenue where as in the long run the impact of the actual private final consumption is positive and negligible in the long term. Theoretical literature implicates an inverse relationship between taxation and economic growth, on the other side the finding of empirical studies shows positive, negative and no relationship between taxation and economic growth.

There are inconsistencies and conflicting result of study which require further research to identify the effect of tax revenue in Ethiopia. The main focus of this research is to evaluate the effect of tax revenue on economic growth. In addition to this, previous studied research in Ethiopia did not clearly identify the effect of tax revenue on economic growth therefore, this research elaborates the previous similar study in Ethiopia by including tax revenue and government expenditure in Solow and Swan growth models.

### **1.3. Objectives of the study**

This study has two objectives. Those are:

#### **1.3.1. General objectives of the study**

The main objective of this study's analysis is to evaluate the short and long-run effect of tax revenues on economic growth in Ethiopia over the period from 1990/91 to 2022/23.

#### **1.3.2. Specific objectives of the study**

Beside this,

- i. To identify impact of tax revenue on GDP per capita in Ethiopia.
- ii. To analyze the relationship between tax revenue and economic growth short and long-run analysis.

#### **1.4. Research question**

- i. What is the long-run and short-run impact of tax revenue on Economic growth in Ethiopia?
- ii. What looks like the trends of tax revenue and GDP per capita growth rate of Ethiopia?

#### **1.5. Research of hypothesis**

The following hypothesis confirmed by this study:

H0: Tax revenue has no significance impact on economic growth in Ethiopia

#### **1.6. Significance of the study**

Firstly, the findings of the study may be used by the Ethiopian ministry of revenue to serve as a reference in setting certain actions for improvement on tax revenue. Secondly, the policy makers can use the findings to come up with the policies that will be helpful in tax revenue. Finally, the study stands to benefit future researchers, scholars and academicians who may wish to study in tax revenue related issues.

#### **1.7. Scope and/or Limitation of research papers**

To analyze the effect of tax revenue on economic growth, the analysis is limited to four independent variables. The analysis uses tax revenue, government expenditures, gross capital formation and labor force as independent variables and GDP per capita in terms of economic growth as dependent variables. The time period selected in the study covers time series data from 1990/91 to 2022/223.

#### **1.8. Organization of the Study**

This research has organized into five chapters. The current Chapter deals background of the study; statements of the problems, objectives of the study, research questions, statements of hypothesis, significance of the study and scope **and/or** limitations of the study. The rest of the paper is organized as follows. The next Chapter two deals the theoretical literature, empirical literature and conceptual frame works that pertaining to the relationship between tax revenue and economic growth; Chapter three presents about the research methodology; Chapter four presents descriptive and econometric analysis of the models and the interpretation of the results; the last Chapter provides a summary of main findings, conclusions, policy implication, limitation and direction for future research.



## CHAPTER TWO

### 2. REVIEWS OF THEORITICAL AND EMPRICAL LITRATURE

This chapter shows to review literature on taxation, tax revenues, economic growth and the conceptual framework for dependent and independent variables. The review has three main parts. Part 2.1 presents a review of the conceptual frameworks. This is followed by the theoretical aspects related to the study 2.2 and finally 2.3 empirical literature review in part .

#### 2.1. CONCEPTUAL FRAMEWORK OF THE STUDY

The study uses Solow and Swan growth models of Cobb-Douglas production function as their conceptual framework by specifying economic growth a proxy of GDP per capita as dependent variable, while tax revenue, government expenditure, labor force and capital as independent variables. Takumah, W. (2014) is used Cobb-Douglas production function to investigate tax revenue and economic growth in Ghana.

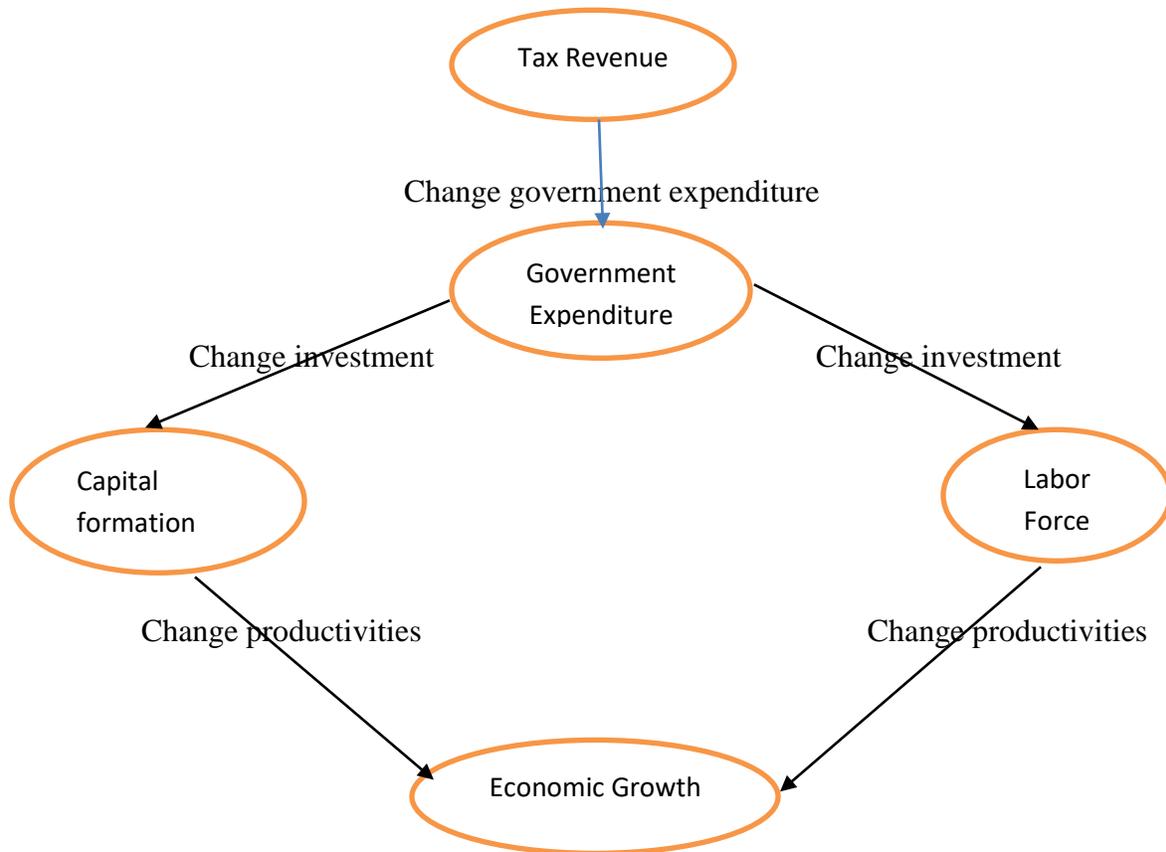


Figure 2.1 conceptual Framework

Source: Solow and Swan growth models of Cobb-Douglas production function relationship.

## **2.2. THEORITICAL LITRATURE ON TAXATION**

There are several researches that have been carried out to evaluate the relationship of economic growth with taxes. The outcomes of these studies, however, appear to yield contradictory results. Some studies have shown that taxes have improved the economy's efficiency, while other studies have shown that taxation decreases development and economic growth, while others have little evidence. The theoretical portions of the literature explain subjects such as the concept of taxation, Tax revenue and economic growth, and Exogenous and Endogenous growth model.

### **2.2.1. Taxation and Economic Growth**

Tax revenue is the revenue received by government through taxation. Ola, F. (2001); Jhingan, D. (2004); Bhartia, K. (2009) cited by Bernard, J. (2015) states that Taxation is important to cover government expenditure and to redistribute wealth which transfers to development of a country.

Tax revenues are used to fund public services and products, such as infrastructure, education, health care, etc., on which innovators and companies benefit and rely on. Endogenous growth theories like, Romer, R.(1996) argues that taxation firstly, maintains economic growth and enhances global competitiveness, secondly, provides secure and predictable economic stability, thirdly eliminates long-term reliance on assistance, and finally, ensures good governance by enhancing government accountability.

Another view argues that taxation is an important determinant to investment and economic development, because taxation inhibits and deprives individuals or enterprises of ingenuity and rewards. Proponents of this view, such as Judd, Chamley, Barro, and King and Rebelo (1996), suggest that lower taxes inspire people to be innovative. Engen and Skinner (1996) argue that taxation can have a negative effect on economic growth in to five ways. Firstly, discourage the expenditure. Secondly affect the labor supply. Thirdly decrease the growth productivity, fourthly diminishing the marginal productivity of resources. Finally reduce the efficient utilization of human capital.

Economic growth defined as changes in material production and increase in country's GDP during a relative short period of time, usually one year. Majority of literature proofs that gross domestic product per capita can be used as an efficient measure of economic growth. Gross

domestic product per capita is defined as a total production of a country's output divided by its population.

### **2.2.2. Exogenous and Endogenous Growth model**

Solow neoclassical growth theory (1956) shows that population growth and technological progress results in improve long run growth rate. Distortionary taxation and productive government expenditure encourage investing on human or physical capital but in the long run affect transitional growth effect rather than growth effect. In other ways, Endogenous growth theories like Barros (1990) and king and Rebel (1990) cited by Canadian journals of economics indicate that Distortionary taxation and productive government expenditure will effect on the long run growth rate of economy.

### **2.2.3. Benefit theory and Taxations**

The benefit theory of taxation fundamentally deals the connection between the taxpayers and the state in conceptual terms. Taxation is the price paid by taxpayers for benefit or service provided by the states. Therefore, taxation should be small or insignificance for those receives no benefit from the state and high taxation receives high benefit from the state (Graeme, S. 1994).

Samuelson, P. (2012) cited by Magus, F. (2013) states as taxation of benefit theory treats that tax level are determined because taxpayer pays taxation proportionately for the government benefit they receive. In other ways, the individuals or organization that benefits the most from public service pay the most taxes.

## **2.3. EMPIRICAL LITRATURE**

The empirical study shows on prior research conducted on impact of tax revenue on economic growth. Accordingly, some studied research from Ethiopia and other countries is selected as follows bellow to illustrate the results that are relevant to these studies.

### **2.3.1. Empirical studies on tax revenue in case of global Studies**

The empirical studies conducted on impact of tax revenue on economic growth showed that positive, negative and no relationship among tax revenue and economic growth. The empirical study and the finding of the result are described as follow bellows:

Lulia, R. (2015) cited in MPRA paper (2018) studied on the effect on Romania's economic growth of government revenues and expenditures over the period 1998q1 to 2014q1 using auto regression methods and Wajahat, R., Raza, A. and Shazia, K. (2020) also make investigation on

government revenue and economic growth of Pakistan a variables GDP growth, tax revenue, non-tax revenue and additional receipt by using ARDL method over a period 1979 to 2017. The result of both researchers study shows that tax revenue is positive relationship with economic growth. In addition to this, Dladla, K. (2018) conducted the study on impact of taxation on economic growth in South Africa for the period 1981-2016 using Auto regressive difference Lad methods. The result shows an inverse correlation relationship between taxation and economic growth.

Gashi, B., Asllani, G. and Boqolli, L. (2015) cited IJOE and Business Administration Volume VI on the impact of tax system and economic growth (GDP) on Kosovo by OLS methods using variables such as personal tax, vat, withholding tax and GDP. Tony, A. and Jorgen, L. (2006) asses the Determinants of Tax Revenue in Sub-Saharan Africa over the period 1980 to 2005 using OLS methods. Badreldin, M. and Ahmed, A. (2013) studied on Fiscal Policy and Economic Growth in Sudan using a variable GDP, government tax revenue and government expenditures over a period by OLS methods. Sanely, D., Ali, A. and Ali, Y. (2018) conducted study to evaluate the effect on economic growth and tax revenue on Kenya over the period 1991 to 2013 In addition to this, Babatundel, A., Ijukan, O. and oveyemi, G. (2017) carried out a study to look at the correlation between taxation and economic growth in Africa between 2004 and 2013. The researchers conclude that there is a positive effect on economic growth from tax revenue. On the other ways, Ojong, M., Anthony, O. and Arikop, F. (2016) investigated the effect of tax revenues on Nigerian economic growth using OLS methods over the period 1986 to 2010. The finding reveals that there are no effect and the insignificance relationship between tax revenue and Economic growth (GDP).

Seida, B. (2015) analyzed the effect of tax and government expenditure on the Ethiopia's economic growth for the period from 1980 to 2014. The result shows that the direct taxes and current expenditure has a significant negative long-term effect on GDP growth and indirect tax and capital expenditures has positive significant impact on GDP growth in long run. In other ways, both government expenditures and direct taxes are not any significant effect on economic growth, whereas indirect taxes are positive significant impact on economic growth of Ethiopia in the short run. Orcan, C. (2009) cited in MPRA papers (2018) investigated the effect of tax on economic growth in South Africa using VAR method. The result indicated that tax revenue is positive relationship to economic growth.

### 2.3.2. Empirical studies on tax revenue in case of our countries

There are some researches that investigated on tax revenue issues in Ethiopia with various topic names, some of which are described below:

Teshome, A. (2018) makes study on government revenue and economic growth in Ethiopia using yearly time series data from 1985-2016. The researcher follow VECM to analysis the finding of the study by using the variables such as Real GDP, total labor force, tax revenue, investment and grant and the result indicate that tax revenues are positively affect economic growth in Ethiopia. In other side, Firehiywot, H. (2016) conducted study on the Nexuses between tax revenue, inflation, private final consumption and economic growth in Ethiopia for the period 1970 to 2015 using VECM methods. The result revealed that Real GDP has a negative and significant long term effect on real tax revenue where as in the long run the impact of the actual private final consumption is positive and negligible in the long term.

Dasalegn, M. (2014) studied on Taxation Contributions on Ethiopia's economic growth using yearly data from 1993 to 2012 using multiple ordinary least square methods .It uses a variables tax revenue, non-tax revenue and foreign revenue as dependent variables and Gross domestic product (GDP) as dependent variables and the result shows that positive and significant correlation between taxation and economic growth. In addition to this, Workineh A. (2016) study on the tax revenue determinants in Ethiopia from the period 1974 to 2013 using Johnson co-integration method and the result indicated the GDP, foreign assistance, industrial value added share of GDP and per capita income in the long-term a positive effect on tax revenue.

**Table 2.1: Summary of theoretical and empirical literature reviews**

Author, and year of study	Titles of the thesis/study	Statistical method	Included variables in the models	Result of the findings
Exogenous growth model like (Solow, 1956)	Taxation and economic growth	Theoretical	Taxation and economic growth	Taxation has no effect on economic growth in the long run rather it has short run effect

Endogenous growth model like Lucas, 1990 and Romer,1996	Taxation and economic growth	Theoretical	Taxation and economic growth	Taxation can have long run or permanent effect on economic growth
Lulia Rosoiu (2015)	the effect on Romania's economic growth of government revenues and expenditures	ARDL methods	Economic growth(GDP), government revenue and expenditure	Government expenditure and revenue positively affect economic growth of Romanian economy.
Wajahat, R, Raza, A. and Shazia, K. (2020)	government revenue and economic growth of Pakistan	ARDL methods	GDP growth, tax revenue, non-tax revenue and additional receipt	Tax revenue is positive relationship with economic growth of Pakistan economy.
Dladla, K. (2018)	Impact of taxation on economic growth in South Africa	ARDL	GDP, Tax on income, profits, capital gains, investment and trade openness	An inverse correlation relationship between taxation and economic growth
Tony, A. and Jorgen, L. (2006)	The Determinants of Tax Revenue in Sub-Saharan Africa	OLS methods	Economic growth(GDP), tax revenue	open and less agricultural based economies, in less populated and peaceful countries, the tax to GDP ratio is higher

Sanely, D., Ali, A., and Ali, Y. (2018)	Impact of tax revenue on economic growth in Kenya	OLS multiple regression	GDP, tax revenue and grant	Taxation has a direct positive impact on economic growth <b>and/or</b> development in Kenya.
Babatundel, A. and oveyem, G. (2017) and MPRA papers, (2018)	The correlation between taxes and GDP (economic growth) in Africa	OLS multiple regression	GDP, Direct Foreign Investment (DFI) and Inflation	Taxation is linked to GDP in a constructive way and stimulates economic development in Africa.
Ojong, M., Anthony, O. and Arikop, F. (2016)	Impact of tax revenue on economic growth in Nigeria	OLS multiple regression	GDP, VAT, Non-oil Revenue, and Tax revenue	No effect and the insignificance impact on tax revenue and Economic growth.
Dasalegn, M. (2014)	tax revenue for economic growth of Ethiopia	OLS Methods	GDP, revenues from taxation, non-tax revenue and international income	Positive and significant correlation between tax revenue and economic growth.
Orcan (2009)	Effect of tax on economic growth in South Africa	VAR method	GDP, tax revenue, real interest rate, CPI Gov.t expenditure.	Tax revenue is positively related to economic growth in south Africa.
Workineh, A. (2016)	tax revenue determinants in Ethiopia	Johnson co-integration Method/maximum likelihood/V	Actual GDP per capita, assistance, and the share of GDP in industrial value added	Economic growth positively and significantly affect tax revenue

		ECM		
Teshome, A. (2018)	government revenue and economic growth in Ethiopia	Johnson test and VECM methods	Real GDP, total labor force, tax revenue, investment and grant	Positive relationship b/n tax revenue and economic growth.
Firehiywot, H. (2016)	The Nexus between Tax Revenue, Inflation, Consumption and Economic Growth in Ethiopia	VECM Methods	GDP, Tax Revenue, Inflation, Private Final Consumption	Negative relationship between taxes revenue and economic growth in the long run

Source: organized by the researcher, 2020

### 2.3.3. Evaluation and gaps of existing literature

The literatures that incorporated in studies are scholarly journal articles, books and theses. The existing literatures are evaluated based on basic criteria such as accuracy, authority, objectivity, and coverage. Identified variables in reviews of literature on impact of tax revenue on economic growth are capital stock, total labor force, government expenditure, tax revenue, and GDP per capita. Previously discussed under review of empirical literature parts; there are researches in some developing nations on effect of taxation on economic growth; in Ethiopia also there are some researches, for instance, Workeneh A. (2014) tax revenue determinants in Ethiopia which involving variables such as GDP growth, tax revenue, Foreign assistance, GDP per capita and the share of GDP in industrial value added. They exclude some policy variables such as government revenue (tax revenue), government expenditure, gross capital formation, labor force and GDP per capita. This research attempts to fill this gap in existing literature.

## CHAPTER THREE

### 3. RESEARCH METHODOLOGY

Topics that are discussed in this chapter are types and sources of data, description of variables, research design, and data analysis and model specification.

#### 3.1. Types and Data Source of the study

The secondary data sources of the study are found from domestic source and World Bank. Domestic data sources are available from the Ministry of Revenue of Ethiopia, the Ethiopian Customs Commission, and the Ministry of Finance and Economic Cooperation. Data's that are not getting from domestic sources are taken from World Bank. After 1990/91 yearly data of labor force and GDP per capita is not easily obtained from domestic source and I get from Ethiopia's national bank after 2000 years, due to shift in base year fresh data is done by institution, this is not sufficient for needed yearly data, so I ought to use World Bank data source that is closest to domestic source of data.

**Table 3.1 Types and Sources of Data**

Variables	Proxy	Units	Expected Sign	Source of data
Real GDP per capita	RGDPPCt	US Dollar	+	World bank
Tax revenue	TRt	million birr	+	MOR
Government Expenditure	GEXt	million birr	+	MOF
Gross Capital Formation	GCFt	million birr	+	MOF
Labor Force	LFt	In number	+	World bank

Source: organized by the researcher

#### 3.2. Research Design

In order to see the impact of tax revenue on economic growth in Ethiopia, the researcher adopts quantitative research approach because of the quantifiable and the numerical data that is used in the process. This research deals with the analysis of the empirical variables from time series data for the period 1990/91 to 2022/23.

### 3.3. Data Analysis Method

In order to achieve the study goals and assessing the data, both descriptive and inferential statistics are applied. In the descriptive analysis, the simple graph, mean, minimum, maximum and so on will be employed to analyze the data. In addition to this, inferential statistics has been used and the study utilizes time series data analysis method involving autoregressive difference lags (ARDL) model for analyzing the impacts of tax revenue on economic growth in Ethiopia. Hence, the final data analyzed by using eview software version 12.

### 3.4. Model Specification

#### 3.4.1. Theoretical Model Specification

Econometric model is used for the study, which runs a multiple regression analysis between GDP per capita (dependent variable) and the variables that affect economic growth such as Tax Revenue, government expenditure, Gross capital formation and labor force (independent variables).

Solow and Swan (1956) neoclassical growth model identifies the relationship between tax revenue and economic growth. Solow-Swan model explains the total output in an economy as a product of capital and labor.

$$Y_t = f(K_t, L_t) \dots\dots\dots 3.1$$

Where total output is  $Y_t$ ,  $K_t$  is capital and  $L_t$  is labor, and  $t$  is time

$$Y_t = f(K_t, L_t, A_t) \dots\dots\dots 3.2$$

Where, total factor productivity (TFP) is  $A_t$

We assume that the functional Cobb-Douglas form production function, then we get

$$Y_t = A_t K_t^\alpha L_t^\beta \dots\dots\dots 3.3$$

Where  $\alpha$  and  $\beta$  are shares of capital and labor

$A_t$  is not constant but varies over time

#### 3.4.2. Empirical Model Specification

The study uses the neoclassical Solow growth model by including technology  $A_t$  to over time.

Following studies such as Mansouri (2005), Fosu and Magnus (2006), we derived

Let  $A_t = f(TR_t, GE_t) = TR_t^{B1} GE_t^{B2}$ , then substitute

$$Y_t = \partial K_t^\alpha L_t^{\beta1} TR_t^{B2} GE_t^{B3} \dots\dots\dots 3.4$$

$TR_t$  is Tax Revenue,  $GE_t$  is Government expenditure

$B_i$  are share of inputs in the total output

By taking the natural logarithm, we arrive at the following specification

$$Y_t = \ln \delta + \alpha \ln K_t + B_1 \ln L_t + B_2 TR_t + B_3 GE_t + U_t \dots \dots \dots 3.5$$

Let  $\ln \delta = B_0$

$$Y_t = B_0 + \alpha \ln K_t + B_1 \ln L_t + B_2 TR_t + B_3 GE_t + U_t \dots \dots \dots 3.6$$

The following ARDL model is specified to determine the long-run co-integration relationship between dependent and independent variables.

$$\begin{aligned} \Delta \ln GDP_{PC_t} = & \beta_0 + B_1 \ln GDP_{PC_{t-1}} + B_2 \ln TR_{t-1} + B_3 \ln GE_{t-1} + B_4 \ln GCF_{t-1} + \\ & B_5 \ln LF_{t-1} + \sum_{i=1}^n B_6 \Delta \ln GDP_{PC_{t-i}} + \sum_{i=0}^n B_7 \Delta \ln TR_{t-i} + \sum_{i=0}^n B_8 \Delta \ln GE_{t-i} + \sum_{i=0}^n B_9 \Delta \ln GCF_{t-i} + \\ & \sum_{i=0}^n \Delta \ln LF_{t-i} + U_t \dots \dots \dots 3.7 \end{aligned}$$

WHERE,

Logarithm of GDP per Capita at T,  $\ln GDP_{PC}$

Logarithm of Tax Revenue at T,  $\ln TR$

Logarithm of Government expenditure at T,  $\ln GE$

Logarithm of Gross capital formation at T,  $\ln GCF$

Logarithm of Labor force at T,  $\ln LF$

It is intercept i.e.  $\beta_0$

$B_6, B_7, B_8, B_9$  and  $B_{10}$ ; are coefficient that measures short-run relationships

$U_t$  is an error term and  $n$  denotes lag length of autoregressive process

$T$  is the time trend of the models

If the variables have a long-run equilibrium relationship; co-integration boundary tests are carried out. The hypotheses are described as shown below:

No long-run co-relationship between the variables exist  $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$

The following long-run model is calculated after assessing the presence of long-run relationships between the variables:

$$\begin{aligned} \ln GDP_{PC_t} = & \beta_0 + B_1 \ln GDP_{PC_{t-1}} + B_2 \ln TR_{t-1} + B_3 \ln GE_{t-1} + B_4 \ln GCF_{t-1} + \\ & B_5 \ln LF_{t-1} + U_t \dots \dots \dots 3.8 \end{aligned}$$

The next step is to estimate the model of VET that displays the dynamic short run parameter.

The calculation of the basic EC is as follows:

$$\Delta \ln GDPPC_t = \beta_0 + \sum_{i=1}^n B6 \Delta \ln GDPPC_{t-i} + \sum_{i=0}^n B7 \Delta \ln TR_{t-i} + \sum_{i=0}^n B8 \Delta \ln GE_{t-i} + \sum_{i=0}^n B9 \Delta GCF_{t-i} + \sum_{i=0}^n B10 \ln LF_{t-i} + \alpha ECT_{t-1} + \mu t \dots\dots\dots 3.9$$

Where:

B6, B7, B8, B9 and B10 are the short run model's coefficients

ECT<sub>t-1</sub> is error term lags by one period.

$\mu t$  is vector error terms

$\alpha$  is error correction parameter

ECT is calculated from the long-run model, the coefficients of which are obtained by normalization of equations. In order to verify the robustness of the model in the long-term and short-term, normality test; serial correlation test, heteroscedasticity test and recursive coefficient test for model stability are estimated.

### 3.5. Description of Variables

#### 3.5.1. Dependent variable

- i. Real GDP per Capita (*RGDPPC<sub>t</sub>*)

GDP per capita is the total amount of the market values of all domestically produced final goods and service divided by total population during each fiscal year is taken as a proxy for economic growth.

#### 3.5.2. Independent variables

- i. Tax Revenue (*TR<sub>t</sub>*)

Tax revenue is the amount of money that has been collected by the Ethiopia government from people and organizations during each fiscal year. It is money collected by the government from domestic tax and foreign trade taxes. It excludes other source of finance such as grant and so on. Tax revenue is direct source of finance for government expenditure and indirect positive effect on economic growth so it is expected to positive sign (Romero, 1992).

- ii. Government expenditure (*GE<sub>t</sub>*)

Government expenditures are total expense of goods and service by government during each fiscal years. Economic growth can be rise when an increase in government expenditure, particularly on productive activities such as infrastructure, water facilities, road Construction,

and provision of electricity (Bergh and Karlsson, 2010). Keynesian models propose government expenditure is expected to increase economic growth.

iii. Gross capital formation (*GCFt*)

Gross capital formation is used a proxy for capital in Solow swan growth models. It is total investment on capital (human and physical). The expected sign of GCF coefficient is positive because investment in capital accumulation is support economic growth by increasing production of goods and services Barro (1995) and Sala-I-Martin (2004).

iv. Labor Force (*Lft*)

Labor force is selected instead growth of population because it include the total population aged between 15 to 65 years which is active productive people. In developing country like Ethiopia labor force is a power for labor intensive economic growth but less productive. According to Domar, (1946) and Solow-Swan, (1956) models labor force is good indicators of economic growth.

## CHAPTER FOUR

### 4. RESULT AND DISCUSSIONS

In this chapter data are analyzed through descriptive statistics and estimation of multiple regression method of econometric models.

#### 4.1. Descriptive Statics

The first process analysis in this part is descriptive analysis. It is used to define relevant aspects of variables' phenomena and provide comprehensive information on each relevant variable. This displays the mean, standard deviation, minimum and maximum values of the various variables that help to provide an image about the variables. The mean, standard deviation, minimum and maximum values of these variables are used as a descriptive description of these variables. The study is 33 observations from 1990/91 to 2022/23, as shown in table 4.1 below. There is one GDP per capita growth dependent variable (*LNGDPPCT*) and three independent variables (*LNTRT*, *LNGET*, *LNGCFT* and *LNLFT*).

Table 4.1: Results of descriptive statistics

	LNGDPPCT	LNTRT	LNGEXT	LNGCFT	LNLFT
Mean	5.637826	3.084908	3.384370	4.733384	3.575923
Median	5.537334	2.650421	2.842581	4.420646	3.572065
Maximum	6.753438	6.091310	6.668228	6.506830	4.121635
Minimum	4.718499	0.104360	1.172482	2.818398	3.030617
Std. Dev.	0.735353	1.827250	1.626981	1.155764	0.325347
Skewness	0.248978	0.144055	0.479196	0.265489	0.002856
Kurtosis	1.525013	1.704985	2.049121	1.766086	1.845947
Jarque-Bera	3.332379	2.420099	2.506190	2.481164	1.831322
Probability	0.188966	0.298183	0.285619	0.289216	0.400252
Sum	186.0483	101.8020	111.6842	156.2017	118.0055
Sum Sq. Dev.	17.30383	106.8429	84.70620	42.74526	3.387211
Observations	33	33	33	33	33

**Source:** Own estimation using EVIEWS, version 12

Annual GDP per capita varies from 4.72 to 6.75 respectively that indicating minimum and maximum value in 2002/03 and 2022/23. The average percentage is 5.63 and the amount of 0.73 for each observation deviates from this average. Similarly, annual tax revenues vary from 0.10 to 6.09, reflecting minimum and maximum inflows for the years 1990/91 and 2022/223,

respectively. The average TR is 3.08 and each observation deviates from this average by a value of 1.82. The Government expenditure varies from a minimum of 1.17 in 1991/92 to a maximum of 6.66 in 2022/23. The average government expenditure is 3.08 and the deviation for each observation is 1.62.

The gross capital formation for the study period ranges from 2.81 (in 1991/92) to 6.50 (in 2022/23), representing the minimum and maximum exchange respectively. The mean value of the GCF is 4.73, with each observation deviating by 1.15 from the average value. In addition to this, Annual labor force varies from 3.03 to 4.12 respectively that indicating minimum and maximum value in 1993/94 and 2022/23. The average percentage is 3.52 and the amount of 0.29 for each observation deviates from this average

## 4.2. Trend of tax revenue and GDP per capita in Ethiopia

### 4.2.1. Trend of tax revenue in Ethiopia

Annual tax revenue collection of a country has been increasing from year to year but the amount of tax revenue is more than higher after 2008/2019 years (Figure 4.1). The amount of tax revenue collections in 1990/91 are 2.05 billion birr and 35.71 billion birr in 2009/10 between this year's 94.26 percent increases the tax revenue collection income. As shown in below tax revenue has been continuously increased after 2009/10 due to the establishments of institutional reforms (UNDP, 2015).

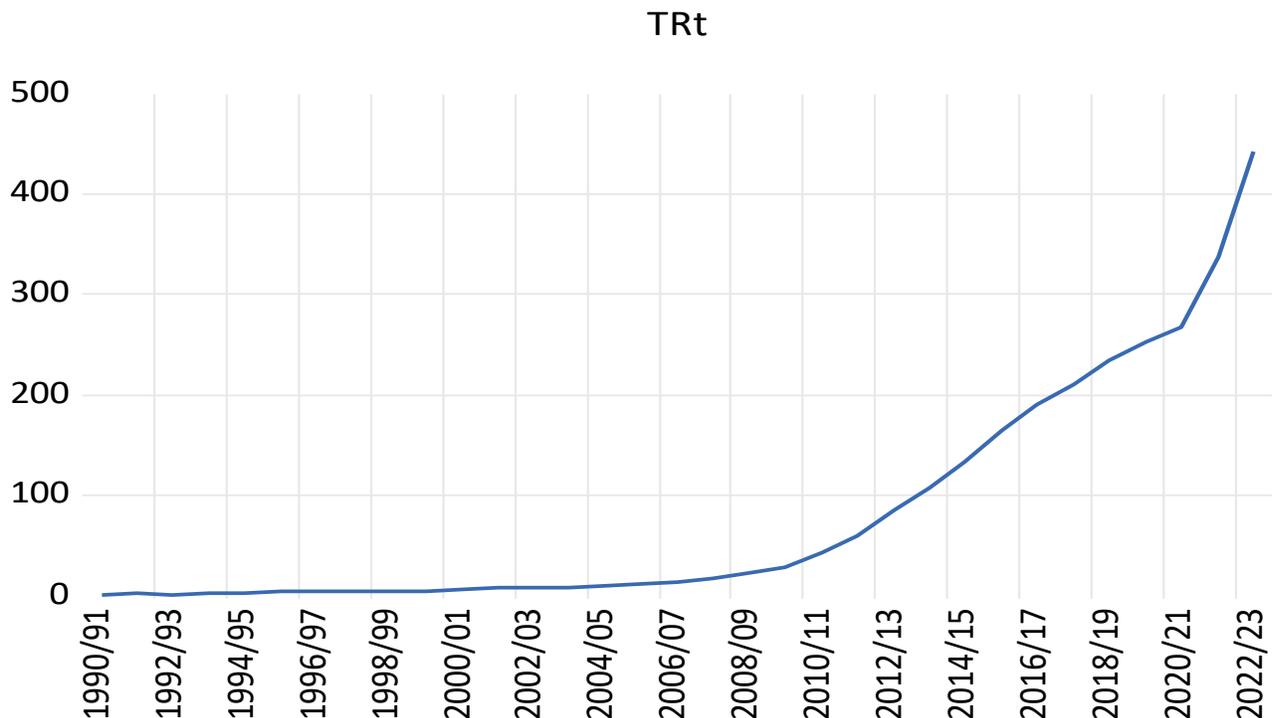


Figure 4.1: Trend of tax revenue (in billion birr)

Source: MOR statistical data own estimation using EVIEWS, version 12

### 4.2.2. Trends of GDP per capita in Ethiopia

As it indicated below figures the trends of Gross Domestic Product (GDP) per capita of Ethiopia is shows up and down. Teshome (2018) pointed out that the main reason for up and down direction of gross domestic product per capita is due to fluctuation of gross domestic product and increase in population of a country.

GDP per capita are sharply decrease up to 1995/96, and then starts to increase and decrease up to 2004/05, after 2005/06 up and down to 2022/23.

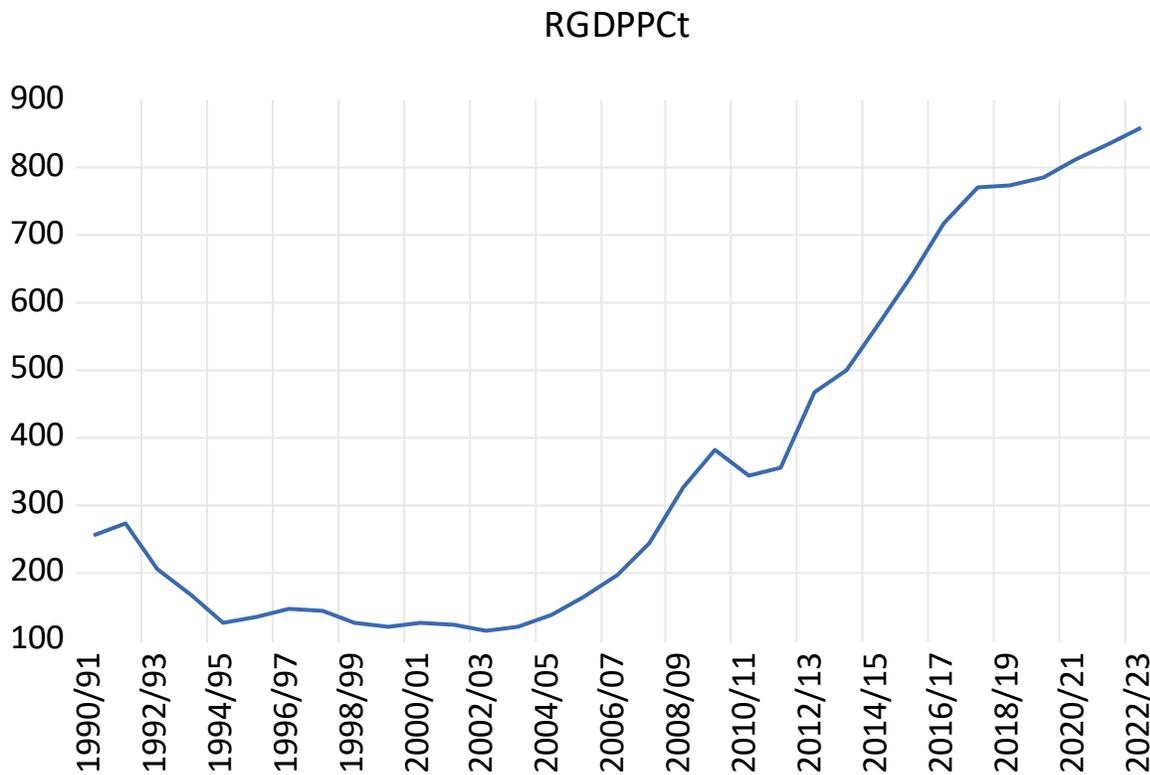


Figure 4.2: Trend of GDP per capita (in US dollar)

Source: World Bank statistical data Own estimation using EVIEWS, version 12

### 4.2.3. Trend of GDP per Capita and tax revenue growth in Ethiopia

Both tax revenue and GDP per capita growth rate are up and down trend. This shows that unstable trend of tax revenue and GDP per capita growth rate through specified time of periods. The trend is indicated as below figure 4.3.

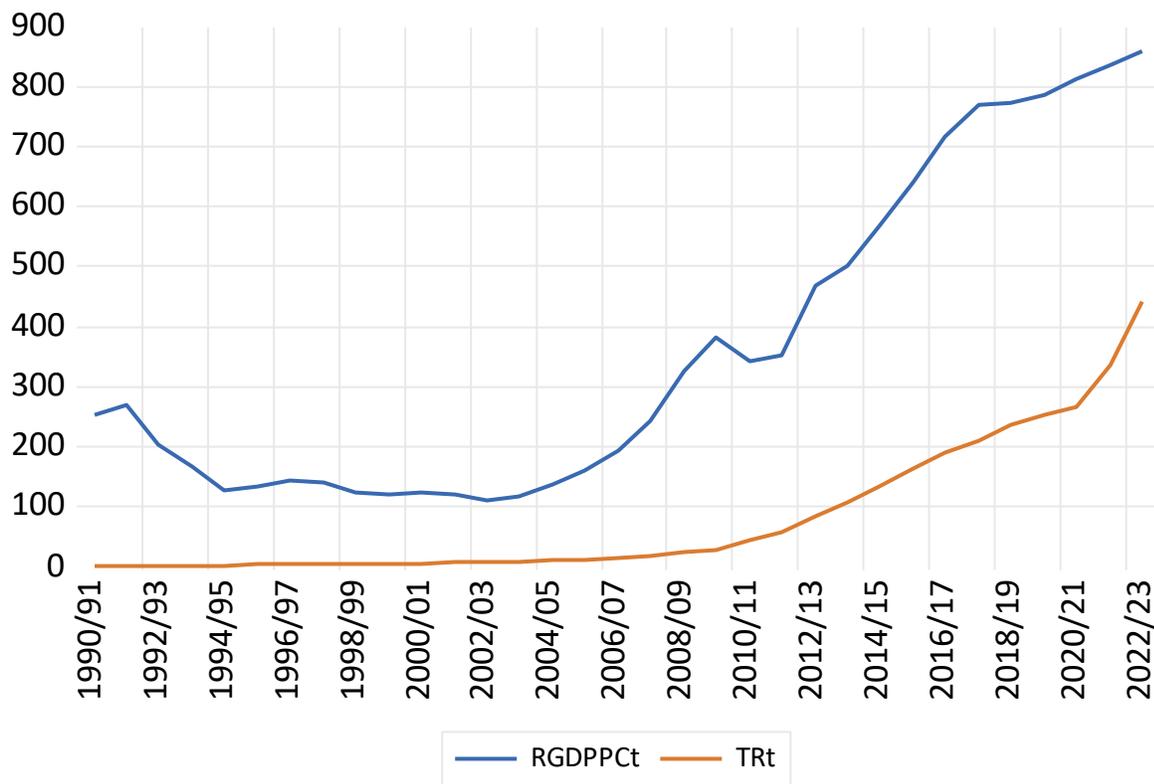


Figure 4.3: Trend of GDP per Capita and tax revenue growth (in %) in Ethiopia

**Source:** MOR and World Bank statistical data own estimation using EViews, version 12

The average rates of growth in GDP per Capita for the period for 1990-1993 are 7 percent. In other ways, tax revenue growth rate has decreased by 7.5 percent. The reason for this is due to war and transition period for emerging government and military rule regimes. The growth rate of GDP per capita and Tax revenue of Ethiopia for the period 1994-2019 is unstable (Figure 4.3). It is up and down in different direction, so the reason for these phenomena is due to new policy, institutional structure change and increase in the population of the country.

### 4.3. Multiple regression estimation method

#### 4.3.1. Augmented Dickey-Fuller Unit Root Test

A unit root test is performed using Augmented Dickey-Fuller unit root (ADF) test to evaluate the stationary variables. This test is performed to verify the order of integration of the variables.

Variables	Test Statistics	T-Statistic With C and T			Stationaries Level	Integration
		1%	5%	10%		
LNGDPPCT	-2.1662 (0.4901)	-4.2967***	-3.3683	-3.2183	Stationary	I(0)
D(LNGDPPCT)	-2.3096 (0.4159)	-4.43096	-3.5742**	-3.2217*	Stationary	I(1)
LNTRT	-0.9983 (0.9288)	-4.2967***	-3.3683	-3.2183	Stationary	I(0)
D(LNTRT)	-0.1225 (0.0000)	-4.3239***	-3.5806**	-3.2253*	Stationary	I(1)
LNGET	4.3887 (1.0000)	-4.2967***	-3.3683	-3.2183	Not Stationary	I(0)
D(LNGET)	1.6938 (1.0000)	-4.3098***	-3.5742	-3.2217*	Stationary	I(1)
LNGCFT	-1.8989 (0.6302)	-4.2967***	-3.3683	-3.2183	Stationary	I(0)
D(LNGCFT)	-2.3299 (0.4059)	-4.3098***	-3.5742	-3.2217*	Stationary	I(1)
LNLFT	2.6491 (1.0000)	-4.2967***	-3.3683	-3.2183	Not Stationary	I(0)
D(LNLFT)	-1.4445 (0.8253)	-4.3098***	-3.5742	-3.2217*	Stationary	I(1)

**Source:** Own estimation using EVIEWS, version 12

**NOTE.** \*\*\* (1% critical), \*\* (5% critical) and \* (10% critical) significance level.

The finding of this test shows that LNGDPPCT LNTRT, LNGEXT, LNGCFT and LNLFT are stationary both at levels and first difference, LNGET have not stationary at levels and stationary at first difference with intercept and trend. Such types of test result are not allowing us to apply the Johansson co-integration methods rather allow to use bound test. This is one of the key

explanations for the use of Pesaran, shin, and smith (2001) ARDL approach (bound test method of co-integration).

### 4.3.2. Long run ARDL Bound Test to Co-integration

#### 4.3.2.1. Optimal lag length

The first tasks in the co-integration of bound test method are to estimate lag length of the model. AIC\* is taken as the main reference for this study and ARDL model, maximum lag order two is selected.

Table 5.2: Lag order selection criteria

Lag No	Log. L	L.R Error	F.P Criteria	A.I. Criteria	S.C Criteria	H.Q Criteria
0	-770.6180	NA	3.71e+15	50.03987	50.27116	50.11527
1	-511.3826	418.1217	1.04e+09	34.92791	36.31564*	35.38027
2	<b>-433.2308</b>	<b>100.8411*</b>	<b>38673839*</b>	<b>31.49876*</b>	<b>34.04293</b>	<b>32.32810*</b>

Source: Own analysis using EVIEWS, version 12

#### 4.3.2.2. Bound test for Co-integration analysis

The results for the ARDL bound test are revealed from Table 5.3 at all significant levels; F-statistics i.e. 5.59 is larger than the critical bound values. This indicates that the variables are co-integrated at levels of significance Therefore; this suggests that the overall results show there is co-integration among the variables. There is a long run relationship between tax Revenue, government expenditure, gross capital formation, labor forces and real GDP per capita in Ethiopia.

Table 5.3: Bound test for lower and upper bound critical value

TS	Value	Significance levels	Lower Bound I(0)	Upper Bound I(1)
FS	5.619131	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Eview 12 results

As it is showed in table 5.3 below, with an intercept and no trend, the F-statistics i.e. 5.6191 estimated is larger than I (1) at all levels of significance. This implies that the null hypothesis (H0)  $B_1=B_2=B_3=B_4=0$  (there is no long run relationship) against its alternative (H1)

$B1 \neq B2 \neq B3 \neq B4 = 0$  (there is long run relationship) is rejected based on the critical values at 5% level of significance.

Table 5.4: Bound test for Co-integration analysis

Description	Value
number of observation	33
optimal lag length of the model	2

**Source:** owns analysis based on Eview 12 softwares

### 4.3.3. Long-run model Estimation Method

The result indicates that the existence of long-run relationship among variables such as GDP per capita, tax revenue, government expenditure, gross capital formation and labor force. Once the existence of a long-run co-integration relationship between variables has been approved, estimated coefficients after normalizing (long-run level equation) on GDP per capita are revealed as showed in table 5.4

Table 5.5: Long-run estimated coefficients using ARDL Methods: LNGDPPCT

Models Variables	Parameters	Standard Error	Test Statistics	Probability
LNTRT	24.44067	26062768	0.917867	0.3855*
LNGEXT	28.10799	1648367	0.705193	0.1266*
LNGCFT	1.8650	3.811421	0.489345	0.6377*
LNLFT	36.9233	18.07037	2.043307	0.0753*

$EC = LNGDPPCT - (24.4406 * LNTRT - 28.1079 * LNGET + 1.8650 * LNGCFT + 36.9233 * LNLFT)$
---

**Source:** Researchers calculation based on Eview 12 softwares

**Note:** \* (10% critical) significance level.

The result of the above table and long-run level equation indicates that the estimated coefficient of tax revenue is statistically significant and their signs are match to the existing theories. If one percent increases tax revenue, then 24.44 percent changes (increases) in GDP per capita in the long run. The finding of this study concerning indirect long run positive impact of tax revenue on economic growth is fit with the endogenous growth models mainly developed by (Barro, 1990; Barro and Sala-i Martin, 1992; King and Rebelo 1990; Lucas, 1990; Rebelo, 1991 and Romer, 1996). The developers of the model show that taxation has positive impact on economic growth

in the long run. When we see Empirical study made in Ethiopia and other area, many study are done, the result of this research are similar to Teshome A. (2018), Orcan(2009, and Babtundel, Ibukan and Oveyems (2017) using VECM, VAR and OLS methods respectively.

Next to tax revenue, government expenditure has insignificant long run positive impact on GDP per capita. If one percent increases in government expenditure, then 28.12 percent increase in GDP per capita at 10% significant levels. Similarly, gross capital formation and labor force have a significant positive impact to the Ethiopian economy (GDP per capita). When one percent increase in gross capital formation, then 1.86 percent increases in GDP per capita. Whereas one percent increases labor force, GDP per capita increase by 36.92 percent.

### LONG RUN EQUATION

$$EC=LNGDPPCT-(24.4406*LNTRT+28.1079*LNGET+1.8650*LNGCFT+36.9233*LNFT)$$

This long-run equation shows that the relationship between GDP per capita as dependent variables and independent variables like, tax revenue (LNTRT), Government expenditure (LNGET), Gross capital formation (LNGCFT) and Labor force (LNLFT).

#### 4.3.3.1. Test of Hypothesis

**H0:** Tax revenue has no significance impact on economic growth in Ethiopia

Table 5.4.1 Walid test

Test Statistics	Value	Df	Probability
F-statistic	2.744975	(4, 14)	0.00408**
Chi-square	10.97990	4	0.0268*

**Source:** Researchers calculation based on Eview 12 softwares, 2021

**Note:** \*\*\* (1% critical) \*\* (5% critical) and \* (10% critical) significance level.

If the probabilities of F-statistics of walid tests are less than 5 percent, it implies that the variables (tax revenue) jointly statistically significant at 5 percent level. Therefore, the null hypothesis is rejected rather the alternative hypothesis is accepted.

In the long run, the test result in table 5.4 shows that tax revenues have a positive and meaningful effect on the actual per capita domestic product. The LNGDPPCT (GDP per capita) means that a 1 percent rise in tax revenue results in a 24.44 percent increase in actual GDP per capita and the relationship is statistically significant at 10 percent significance level, keeping other things constant. Therefore, higher the tax revenue leads to a higher level of infrastructure and social activities improvement, which ultimately increase a GDP per capita of a country (endogenous growth models). This study therefore concludes that the null hypothesis that tax revenue has no significance impact

on economic growth in Ethiopia from 1990/91 to 2022/23 is rejected and the alternative that there is a strong and relevant relationship for the study period between real GDP per capita and tax revenue can be fail to rejected rather can be accepted. The result is match with theoretical study of endogenous growth models and empirically the findings of Teshome A. (2018), Orcan (2009, and Babtundel, Ibukan and Oveyems (2017).

#### 4.3.4. Short run Error Correction Estimation Method

The short-run ECM model is estimated after the acceptance of long-run coefficients of the model. Table 5.6 indicates the error correction representation of the ARDL model. The estimated lagged error correction term (ECT-1) is negative and statistically significant at one percent levels. This result shows the co-integration among the variables included in the model. The coefficients of error correction term (-0.7257) implies that 72.57 percent of the disequilibrium is adjusted toward equilibrium annually.

Table 5.6: Error Correction representation of ARDL model: ARDL (1, 4, 3, 4, 4)  
Dependent Variables: D (LNGDPPCT)

Models Variables	Parameters	Standard Error	Test Statistics	Probability
C	-73.1145	67.4882	-10833	0.2938*
DLNGDPPCT(-1))	0.6543	0.2850	2.2260	0.0347**
DLNGDPPCT(-2))	-0.3496	0.2001	-1.7464	0.0988*
D(LNTRT(-1))	-1.2281	1.7760	-0.6915	0.04988**
D(LNTRT(-2))	0.7697	1.72188	0.9051	0.6605*
D(LNGEXT(-1))	0.6294	0.6954	0.9051	0.3780*
D(LNGEXT(-2))	-1.4917	0.8952	-1.6700	0.1132*
D(LNGCFT(-1))	0.2433	0.1467	1.6518	0.1169*
D(LNGCFT(-2))	-0.1617	0.1676	-0.9647	0.3482*
D(LNLFT(-1))	-41.3320	70.5094	-0.5856	0.558*
D(LNLFT(-2))	127.0277	87.1951	1.4568	0.1654*
ECT(-1)*	-0.7257	0.4338	-1.6727	0.011**
R-squared	0.5735	Mean dependent var	23.82759	
Adjusted R-squared	0.2976	S.D. dependent var	35.7991	
S.E. of regression	30.0019	Akaike info criterion	9.9339	
Sum squared resid	15302.01	Schwarz criterion	10.4996	
Log likelihood	-132.0417	Hannan-Quinn criter.	10.1110	
F-statistic	2.0787	Durbin-Watson stat	2.1408	
Prob(F-statistic)	0.0849			

**Source:** Researchers calculation based on Eview 12

**Note:** \*\* (5% critical) and \* (10% critical) significance level.

### Short-run Equation:

$$D(\text{LNGDPPCT}) = -73.1145 + 0.6543D(\text{LNGDPPCT}(-1)) - 0.3496 D(\text{LNGDPPCT}(-2)) - 0.2281D(\text{LNTRT}(-1)) - 0.7697 D(\text{LNTRT}(-2)) + 0.6294 D(\text{LNGEXT}(-1)) - 1.4917 D(\text{LNGEXT}(-2)) - 0.2433 D(\text{LNGCFT}(-1)) - 0.1617D(\text{LNGCFT}(-2)) - 41.3320D(\text{LNLFT}(-1)) + 127.0277 D(\text{LNLFT}(-2)) - 0.7257 \text{ECT}(-1) + \text{et}$$

According to the above results, tax revenue  $D(\text{LNTRT}(-2))$  GDP per Capita not only in the long run but also in short-run positively and significantly affect GDP per Capita at 10% level. If one percent increases in tax revenue result in 0.7697 percent increase GDP per Capita. The finding of this study concerning short run positive impact of tax revenue on GDP per capita are match with exogenous growth model mainly developed by Robert Slow, 1956 and empirically the result is not similar with the work of Orcan (2009). On the other hand, if one percent increases in government expenditures  $D(\text{LNGET}(-1))$ , then 0.6294 percent increases GDP per Capita in the short run.

### 4.3.5. Diagnostic tests

To assess the degree of fit of the approximate model, a diagnostic test is performed. The diagnostic test indicates that the serial correlation, heteroskedasticity and the model's non-normality have been passed by the model.

#### 4.3.5.1. Test for serial correlation

The Durbin-Watson Test and Breusch-Godfrey Serial Correlation LM Test are used to carry out serial correlation tests. The Breusch-Godfrey Serial Correlation LM Test has been used for this analysis and the result shows that there is no serial correlation. .Therefore, we do not dismiss the null residual hypothesis, but rather accept it because the F-statistic P-values surpass the 5% critical value.

F-statistic	1.802943	Prob. F(2,15)	0.1987
Obs*R-squared	5.620302	Prob. Chi-Square(2)	0.0602

Source: researcher calculations

#### 4.3.5.2. Heteroskedasticity Test

The existence of heteroskedasticity in the model has been tested to ensure that the regular errors are correct. The error variance is said to be heteroskedastic if the variance of the residuals is non-constant. This research contains both the Breusch-Pagan test and the heteroskedasticity ARCH

test. The rule of the decision states that if the p-value of the test is lower than any of the significance levels selected, i.e. 5 percent, it indicates a possible heteroskedasticity problem; while if the p-value of the test is higher than any of the significance levels selected, i.e. 5 percent does not indicate a possible heteroskedasticity problem. The Breusch-Pagan-Godfrey Test in table below shows that the F- statistic and chi-square p-value are more than 5 percent, meaning that, we do not reject the null-hypothesis that the residuals are homoskedastic at 5% significance level. Therefore, the residuals of the model have no problem of heteroskedasticity.

#### Breusch-Pagan-Godfrey Heteroskedasticity Test

F-statistic	1.422339	Prob. F(11,17)	0.2489
Obs*R-squared	13.89848	Prob. Chi-Square(11)	0.2387
Scaled explained SS	8.772928	Prob. Chi-Square(11)	0.6428

Source: Researcher Calculations

Furthermore, in the table below, the ARCH heteroskedastic test shows that both the F- statistic and chi-square p-value are more than 5 percent, which means that we do not reject the null hypothesis of no ARCH effect. In other words, the null hypothesis that the residuals are not heteroskedastic, it is accepted, but rather heteroskedastic at the 5 percent significance stage. Hence, the model's residuals are considered to be homoscedastic.

#### Heteroskedasticity Test : ARCH

F-statistic	2.436597	Prob. F(1,25)	0.1311
Obs*R-squared	2.397824	Prob. Chi-Square(1)	0.1215

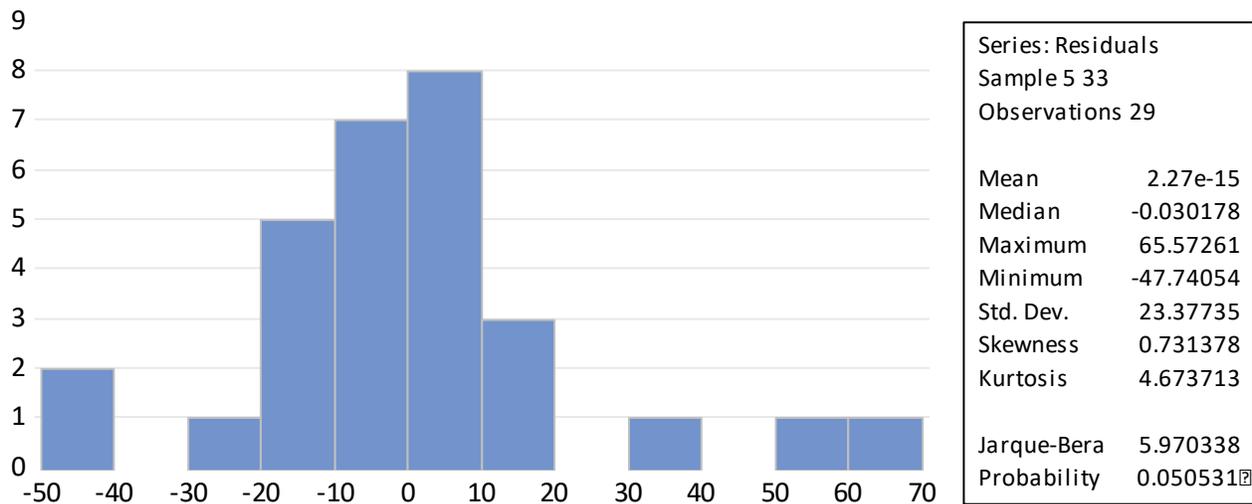
Source: Researcher Calculations

### 4.3.5.3. Normality Test

The study checked whether the residuals are usually distributed or not, by using the Jarque-Bera normality test. If there are no problems with normality in the model, the residuals are usually distributed. This means that, in order not to reject the null hypothesis of normality at the 5 percent level, the p-value given at the bottom of the normality test screen should be greater than 5 percent. As shown in the figure below, since the histogram is bell-shaped and the Bera-Jarque statistic is not significant, this means that the p-value given in the normality histogram figure is greater than 0.05, at the 5 percent level, we do not reject the null normality hypothesis. As a

result, in this study, we conclude that the error terms of the model specified are found to be normally distributed.

### 4.3.5.3. Normality Test



**Source:** Researchers plot based on Eview 12 softwares

The results reported in table 5.7 shows that there is no autocorrelations and hetroskedasticity, and the errors are normally distributed.

Table 5.7: Summary of Diagnostic tests

Test statistics	F statistics	Probability
Breusch-Godfrey correlation LM test	1.802943	0.1987*
Breusch-Pagan-Godfrey Hetroskedasticity test	1.422339	0.2489*
ARCH Heteroskedasticity Test	2.436597	0.1311*
Jarque-Bera Normality test	5.970338	0.050531*

**Source:** Researchers calculation based on Eview 12 software's

**Note:** The \* sign indicate the significance of the coefficients at 10% significance level.

### 4.3.5.4. Model Stability Test

In addition to the above-mentioned diagnostic tests, the stability of long-term estimates is assessed by applying the recursive coefficient test (RCT). For such tests, Pesaran (1999) and shin (2001) are suggested.

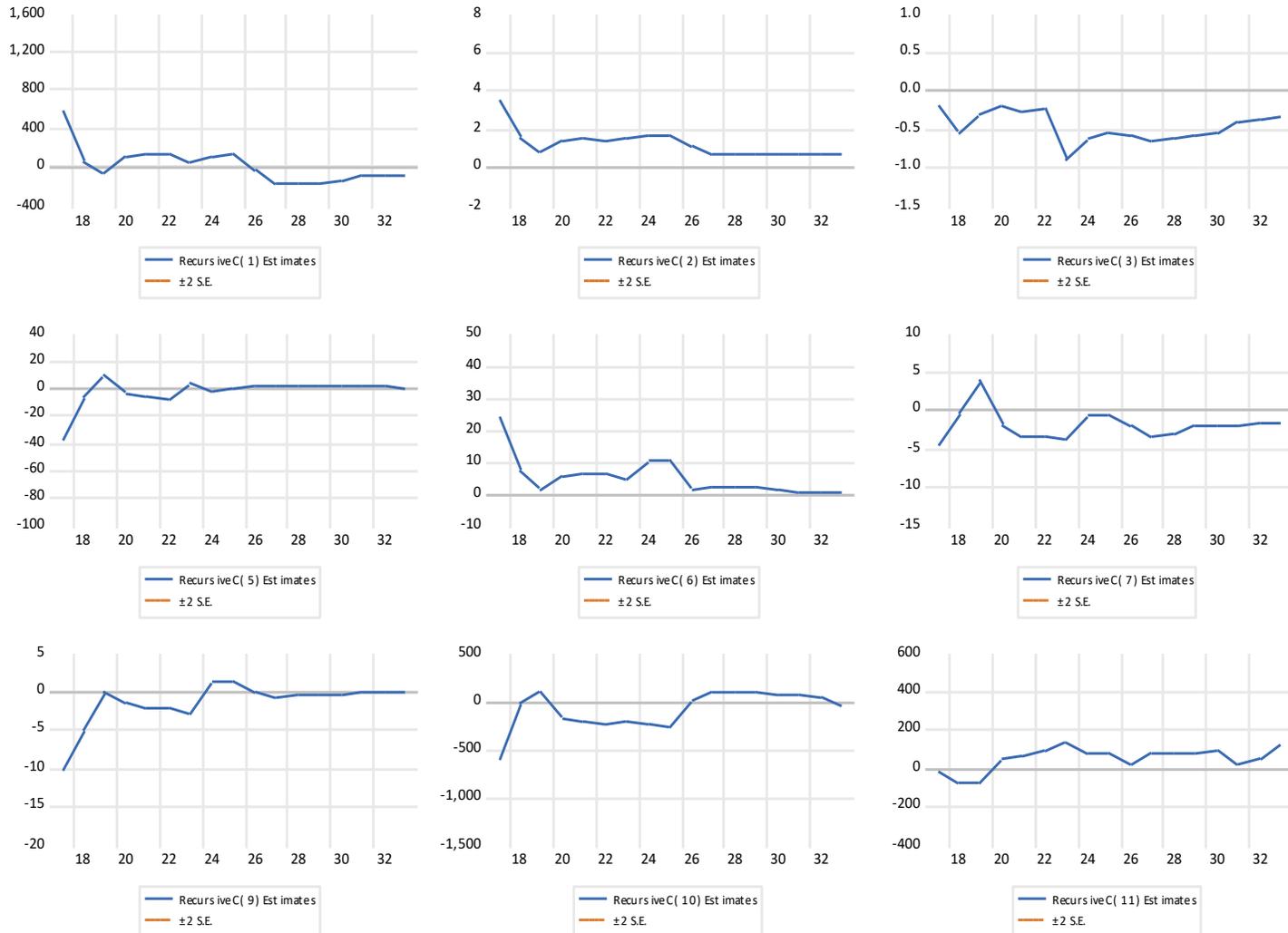


Figure 4.4 Plot of recursive coefficient stability test

**Source:** Researchers plot based on Eview 12 softwares

As can be seen from the above figure, the plot of recursive coefficient test did not cross the lower and the upper critical limits and there is no more high variation of coefficients of the variables. So we can conclude that long run and short run estimates are stable and the models are stable and efficient.

### 4.3.6. Granger-Causality test

If two variables are co-integrated in the long-run, one of the test, which is applied to determine the direction of causality, is Granger-Causality test. This is because the presence of co-integration leads to the existence of at least unidirectional causality between the variables.

Table 5.8: Granger Causality Checking Tests at lag two

Granger Causality Tests

Lag two

Null hypothesis	Observations	F- Statistics	Prob.
LNTRT does not Granger Cause LNGDPPCT LNGDPPCT does not Granger Cause LNTRT	31	8.99966 0.17478	0.0011** 0.8406
LNGEXT does not Granger Cause LNGDPPCT LNGDPPCT does not Granger Cause LNGEXT	31	6.90658 1.67886	0.0039 0.2062
LNGCF does not Granger Cause LNGDPPCT LNGDPPCT does not Granger Cause LNGCFT	31	8.90912 3.90294	0.0011 0.0329
LNLFT does not Granger Cause LNGDPPCT LNGDPPCT does not Granger Cause LNLFT	31	9.17193 2.74044	0.0010 0.0832
LNGEX does not Granger Cause LNTRT LNTRT does not Granger Cause LNGEX	31	0.42935 1.62406	0.6555 0.2165
LNGCFT does not Granger Cause LNTRT LNTRT does not Granger Cause LNGCFT	31	3.06345 6.12049	0.0639 0.0066
LNLFT does not Granger Cause LNTRT LNTRT does not Granger Cause LNLFT	31	1.47463 0.88635	0.2474 0.4242
LNGCFT does not Granger Cause LNGEXT LNGEXT does not Granger Cause LNGCFT	31	1.63437 1.60086	0.2145 0.2210
LNLFT does not Granger Cause LNGEXT LNGEXT does not Granger Cause LNLFT	31	0.51123 0.91448	0.6057 0.4132
LNLFT does not Granger Cause LNGCFT	31	1.47283	0.2478

LNGCFT does not Granger Cause LNLFT		1.71987	0.1988
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**Source:** Researchers calculation based on Eview 12 software's

**Note:** \*\*\* (1% critical), \*\* (5% critical) and \* (10% critical) significance level.

The Granger-Causality test are made to separate the direction of causality between the dependent variable GDP per capita and independent variable i.e. tax revenue. The outcome of Granger-Causality test indicates that, there is significant causality between GDP per capita and tax revenues. The results reported in table 5.8 show that, there is unidirectional causal relationship from tax revenue to GDP per capita so, we can reject the null hypothesis LNRGDPCT does not granger cause of LNTRT rather we accept LNTRT does not Granger Cause LNGDPPCT that means tax revenue causes GDP per Capita. Therefore, it is important to determine the direction of causality between tax revenue and economic growth in Ethiopia for policy purpose.

Table 5.9: Granger Causality Checking Tests at lag Three  
Granger Causality Tests  
Lag Three

Null hypothesis	Observations	F- Statistics	Prob.
LNTRT does not Granger Cause LGDPPCT LNGDPPCT does not Granger Cause LNTRT	30	4.83836 4.50242	0.0094** 0.0126**
LNGEXT does not Granger Cause LNGDPPCT LNGDPPCT does not Granger Cause LNGEXT	30	1.46189 2.86215	0.2510 0.0589**
LNGCF does not Granger Cause LNGDPPCT LNGDPPCT does not Granger Cause LNGCFT	30	1.75335 1.16553	0.1842 0.3444
LNLFT does not Granger Cause LNGDPPCT LNGDPPCT does not Granger Cause LNLFT	30	2.30425 2.84343	0.1036 0.0600**
LNGEX does not Granger Cause LNTRT LNTRT does not Granger Cause LNGET	30	0.42976 0.72940	0.7336 0.5450
LNGCFT does not Granger Cause LNTRT LNTRT does not Granger Cause LNGCFT	30	1.62779 4.35736	0.2104 0.0143**
LNLFT does not Granger Cause LNTRT LNTRT does not Granger Cause LNLFT	30	1.10564 0.75487	0.3670 0.5308
LNGCFT does not Granger Cause LNGEXT	30	1.97747	0.1455

LNGEXT does not Granger Cause LNGCFT		2.42067	0.0919*
LNLFT does not Granger Cause LNGEXT LNGEXT does not Granger Cause LNLFT	30	0.74906 0.86197	0.5340 0.4748
LNLFT does not Granger Cause LNGCFT LNGCFT does not Granger Cause LNLFT	30	2.31713 1.04991	0.1022 0.3894

**Source:** Researchers calculation based on Eview 12 software's

**Note:** \*\*\* (1% critical), \*\* (5% critical) and \* (10% critical) significance level.

The result reported in table 5.8 and table 5.9 shows that at lag two, there is unidirectional significant causality between GDP per capita and tax revenue. At lag three there is bidirectional relationship between GDP per capita and tax revenue.

## CHAPTER FIVE

### 5. CONCLUSION AND POLICY IMPLICATIONS

This chapter summarizes the key findings and result of the analysis. Furthermore, this chapter revealed the conclusion, policy recommendation, limitation and direction for future research.

#### 5.1. Conclusion

The descriptive statistics data reveals that the impact of tax revenue on economic growth of Ethiopia is increase from 1990/91 up to 2022/23 but it is unstable incremental rate both tax revenue and Economic Growth (Real GDP per Capita). In other way, the result of economic model that shows the relationship between tax revenue and economic growth described as follows.

This study aims to assess the long run and short run impact of tax revenue on economic growth in Ethiopia (using GDP per capita, as a proxy for economic growth) over the period 1990/91 to 2022/23. Due to fluctuations tax revenue collection amount, GDP and increase of population of the countries, the trends of tax revenue and GDP per capita growth rate of Ethiopia is unstable (goes up and downs) during specified time of period. The ARDL Approach to Co-integration and Error Correction Model are applied in order to analysis the long-run and short run impact of tax revenue on Economic growth. The findings of the Bounds test shows that there is a stable long run relationship between GDP per capita, tax revenue, government expenditure, gross capital formation and labor force.

The result of ARDL models indicates that an estimated coefficient such as tax revenue is significant and their signs are consistent to the existing theories. If one percent increases in tax revenue, then 24.44 percent increases in GDP per capita. The finding of this study concerning indirect long run positive impact of tax revenue on economic growth is fit with the endogenous growth models mainly developed by (Barro, 1990; Barro and Sala-i Martin, 1992; King and Rebelo 1990; Lucas, 1990; Rebelo, 1991 and Romer, 1996) and empirically similar to the study of Teshome A. (2018), Orcan (2009), and Babtundel, Ibukan and Oveyems (2017) that are done using VECM, VAR and OLS methods respectively

Next to tax revenue, government expenditure has long run positive impact on GDP per capita but it is not significant at 5% level. If one percent increases in government expenditures, then

28.1079 percent increase in GDP per capita but insignificant at levels this is fit the theories of Keynesian that is government expenditures affect GDP calculation positively. On the other hand, gross capital formations and labor force rate have a significant positive impact to the Ethiopian economy (GDP per capita). If one percent increases in gross capital formation, then 1.8650 percent increases in GDP per capita in the long-run, while one percent increase in labor force, GDP per capita increase by 36.9233 percent this consistence to existing theories of exogenous and endogenous growth model.

In short-run, the coefficients of error correction term are -0.7257 suggesting about 72.57 percent annual adjustment toward long run equilibrium. The estimated short-run model indicates that tax revenue is significantly positive impact on GDP per capita. When tax revenue increases by one percent, then GDP per capita increased by 0.7697 percent at lag 2. The results of short-run analysis revealed that positive effect of tax revenue on per capita GDP are fit with exogenous growth model developed primarily by Robert Solow in 1956. Similarly, when one percent increases government expenditures, GDP per capita increase by 0.6294 percent at lag one and decreases by 1.4917 at lag two.

The models are checked the diagnostic test of serial correlation, test of heteroskedasticity, normality test and granger causality test. The test of result shows that the model is no problems of serial correlation, heteroskedasticity and the model is normality distributed. On the other hand, the test of granger causality test shows that there is unidirectional significant relationship between tax revenue and GDP per capita at lag two while bidirectional significant relationship between tax revenue and GDP per capita at lag three. This result indicated that there is strong relationship between tax revenue and economic growth in the long run.

## 5.2. Policy Implications

Both in the short-run and long-run, the study shows that tax revenue significantly affect economic growth. Therefore, Ethiopian ministry of revenue (MOR), Ethiopian custom commission (ECC), ministry of finance (MOF) and policy makers may try to improve tax revenue in the following manner to affect economic growth.

- i) The finding of trends of tax revenue and GDP per capita growth rate of Ethiopia during the study periods are fluctuating so it recommended that Ethiopian government should takes appropriate measures that makes tax revenue and GDP per capita growth rate stable and that make lower the gaps.
- ii) Tax authorities (MOR and ECC) should be build strong and stable tax institution and transparent to tax payers. Such measure should increase uncollected tax revenue due to bureaucratic work process of tax authorities.
- iii) Policy makers **and/or** the Government (MOFEC, MOR and ECC) should try to create comfortable trade environment for tax payers that increase tax revenue. Such measure should focus not only improve tax revenue but also increase tax revenue collection capacity of the country.
- iv) Government (MOR, ECC) should also try to educate and build capacity of tax payers and stakeholders at all levels. Such measures may important to aware the society about taxation and increase volunteers tax payer
- v) Government revenue and government expenditure must goes in parallel ways, so government and other responsible bodies establish strategies that encourage distortionary taxation and productive government expenditure. These measures should be important to increase GDP per capita of the countries.

## 5.3. Limitation

This study are faced a number of limitations. There are several limitations that can constrain my findings of the study as described below:

**Firstly**, illegal trade, contraband trade, tax evasion and informal sectors activities which may have some influence on economic growth and due to lack of data are not considered for the regression models for this study.

**Secondly**, another limitation that may constrain the findings of this study is easily unavailability of data particularly annual tax revenue data and GDP per capita beyond 1990/91. Therefore, this study considered time series annual data over the period 1990/91-2022/23 which limit only thirty three years.

**Lastly**, another limitation that may constrain my finding is that well-structured domestic data cannot easily available in Ethiopia. This created to restrict my variables to only four.

#### **5.4. Direction for future research**

This study uses several variables to investigate the impact of tax revenue and economic growth; there are several opportunities or further research. In spite of this, this part shows some of these directions.

**Firstly**, impact of tax revenue on economic growth to be analyzed in the context of Ethiopia. Since this study did not consider some independent variables, like illegal trade (street trader), contraband trade, tax evasion and informal sectors activities, this can be an opportunity or further researchers to analyze the impact of such variables on tax revenue and economic growth which may give more robust results.

**Secondly**, this study considered four macroeconomic independent variables. However, there are several other macroeconomic indicators that affect economic growth (GDP per capita). Some of such variables are international trade (sum of import and export trade), inflation rate, and remittance and so on. The addition of these variables to the model may be an opportunity or further researchers to achieve more robust result.

**Thirdly**, this study covers the period 1990/91-2022/23. If possible, further research maybe analyzed on a period that is earlier than 1990/91 to achieve more generalized result on the impact of tax revenue and economic growth. As such, this can be an opportunity or further research in this regard.

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## APPENDIX 1: Original data used for analysis

Year	Real GDP per capita (US dollar)	Tax revenue (Billion birr)	Government Expenditure (Billion birr)	Gross capital formation (Billion birr)	Labor Force (In million)	
	RGDPPCT		TRT	GEXT	GCFT	LFT
1990/91	254		1.11	3.64	19.68	20.71
1991/92	271		2.05	3.23	16.75	21.44
1992/93	204		1.18	3.43	29.02	22.19
1993/94	166		2.21	4.39	31.46	22.97
1994/95	126		3.07	5.21	35.95	23.9
1995/96	134		3.87	5.58	40.85	24.76
1996/97	145		4.72	5.75	43.06	25.64
1997/98	142		5.35	7.19	42.82	26.54
1998/99	125		5.29	10.53	44.83	27.48
1999/00	120	5.23000000...		13.67	44.19	28.47
2000/01	124		6.13	10.44	50.81	29.39
2001/02	121		7.45	10.55	57.78	30.37
2002/03	112		7.92	13.52	52.04	31.4
2003/04	119		8.24	11.96	70.59	32.46
2004/05	136		10.91	13.03	70.7099999...	33.55
2005/06	162		12.27	15.23	83.15	34.58
2006/07	195		14.16	17.16	81.34	35.5900000...
2007/08	244		17.35	22.79	91.08	36.71
2008/09	326		23.8	27.17	100.69	37.91
2009/10	381		28.99	32.01	123.11	39.2
2010/11	342		43.32	40.53	165.37	40.61
2011/12	354		58.98	51.44	207.6	42.1
2012/13	467		85.74	62.72	210.9	43.65
2013/14	500		107.01	78.08	259.17	45.17
2014/15	567		133.12	113.4	296.9	46.71
2015/16	641		165.31	131.9	585.66	48.24
2016/17	717		189.72	176.7	659.73	49.8
2017/18	769		210.14	210.5	625.31	51.41
2018/19	772		235.23	250	650.5	53.19
2019/20	785		253.5	290	669.7	54.99
2020/21	811		268	476	403.64	57.98
2021/22	835		336.71	561.67	527.89	59.73
2022/23	857		442	787	585.66	61.66

## APPENDIX 2: Original data Changed to natural logarithmic form

	LNRGDPCT	LNTRT	LNGGEXT	LNGCFT	LNLFT
1990/91	5.53733426...	0.10436001...	1.29198368...	2.97960289...	3.03061667...
1991/92	5.60211882...	0.71783979...	1.17248213...	2.81839825...	3.06525833...
1992/93	5.31811999...	0.16551443...	1.23256026...	3.36798524...	3.09964173...
1993/94	5.11198778...	0.79299251...	1.47932922...	3.44871689...	3.13418901...
1994/95	4.83628190...	1.12167756...	1.65057985...	3.58212908...	3.17387845...
1995/96	4.89783979...	1.35325450...	1.71918877...	3.70990682...	3.20922944...
1996/97	4.97673374...	1.55180879...	1.74919985...	3.76259449...	3.24415363...
1997/98	4.95582705...	1.67709656...	1.97269117...	3.75700528...	3.27865302...
1998/99	4.82831373...	1.66581824...	2.35422832...	3.80287755...	3.31345846...
1999/00	4.78749174...	1.65441127...	2.61520365...	3.78849851...	3.34885090...
2000/01	4.82028156...	1.81319474...	2.34564458...	3.92809318...	3.38065448...
2001/02	4.79579054...	2.00821403...	2.35612585...	4.05664269...	3.41345527...
2002/03	4.71849887...	2.06939120...	2.60417007...	3.95201265...	3.44680789...
2003/04	4.77912349...	2.10900034...	2.48156774...	4.25688849...	3.48000856...
2004/05	4.91265488...	2.38967979...	2.56725439...	4.25858700...	3.51303686...
2005/06	5.08759633...	2.50715725...	2.72326716...	4.42064620...	3.54327548...
2006/07	5.27299955...	2.65042108...	2.84258109...	4.39863790...	3.57206469...
2007/08	5.49716822...	2.85359250...	3.12632184...	4.51173824...	3.60304919...
2008/09	5.78689738...	3.16968558...	3.30211342...	4.61204648...	3.63521492...
2009/10	5.94279937...	3.36695094...	3.46604835...	4.81307826...	3.66867674...
2010/11	5.83481073...	3.76861442...	3.70204244...	5.10818538...	3.70401434...
2011/12	5.86929691...	4.07719840...	3.94041607...	5.33561315...	3.74004774...
2012/13	6.14632925...	4.45131946...	4.13868037...	5.35138408...	3.77620328...
2013/14	6.21460809...	4.67292228...	4.35773394...	5.55748421...	3.81043314...
2014/15	6.34035930...	4.89125097...	4.73092139...	5.69339538...	3.84395827...
2015/16	6.46302945...	5.10782249...	4.88204405...	6.37273941...	3.87618855...
2016/17	6.57507584...	5.24554930...	5.17445337...	6.49183066...	3.90801498...
2017/18	6.64509096...	5.34777397...	5.34948565...	6.43824752...	3.93983270...
2018/19	6.64898455...	5.46056375...	5.52146091...	6.47774129...	3.97387040...
2019/20	6.66568371...	5.53536382...	5.66988092...	6.50682985...	4.00715135...
2020/21	6.69826805...	5.59098698...	6.16541785...	6.00052339...	4.06009812...
2021/22	6.72743172...	5.81922202...	6.33091448...	6.26888792...	4.08983440...
2022/23	6.75343791...	6.09130988...	6.66822824...	6.37273941...	4.12163542...

### APPENDIX 3: Order of Lag Selection

