DETERMINANTS OF TAX REVENUE IN ETHIOPIA

A Thesis Submitted to a School Graduate Study of Jimma University in Partial Fulfillment of the Requirement for the Award of the degree of Masters of Accounting and Finance

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DECLARATION

I hereby declare that this thesis entitled "Determinants of tax revenue in Ethiopia", has been carried out by me under the guidance and supervision of Kenenisa Lemmie (PhD) and W/Mikael Shibru (M.Sc).

The thesis is original and has not been submitted for the award of Degree, Diploma and any other title at any university or institutions.

Researcher's Name	Date	Signature
_____	_____	_____

CERTIFICATE

This is to certify that the thesis entitles “Determinants of tax revenue in Ethiopia”, Submitted to Jimma University for the award of the Degree of Master of Accounting and finance and is a record of valuable research work carried out by Mr. Neway Gobachew, under our guidance and supervision.

Therefore we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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Co-Advisor’s Name	Date	Signature

Abstract

Fiscal deficit is the core issue of most of the developing countries over the past several decades. The reason behind the large increase in fiscal imbalance is the rapid expansion in expenditure and low revenue collection. Hence, efficient tax system is crucial for these countries. Since Ethiopian is one among developing countries, pattern of tax revenues and economic growth across country has become a significant concern. Due to aforementioned deficiencies, Ethiopia struggles with budget deficits for a long time. The focus of this paper is to identify determinants of tax revenue in Ethiopia by using a secondary data and multiple variables regression model using OLS method. Literatures indicated that sectors of economy like agriculture, industry and service, FDI, inflation rate, public debt, per capita income and trade openness as main determinants of tax revenue. Hence this study is important to identify significant variables affecting tax revenue in case of Ethiopia. In this study quantitative research method using time series data set that consists of seventeen years has been used. The time period covered was 1999/00 to 2015/16; this is primarily due to unavailability of organized data before the indicated period. Both descriptive statistics and econometric tools were employed to analyze and present the data collected from concerned bodies. In this study, classical linear regression assumption test have done in order to assess fitness of the model. The findings from this study reveals that, industry sector share to GDP, per capita income and trade openness as measured by share of export and import to GDP have significant positive effect on tax revenue whereas agriculture sector share to GDP and annual rate of inflation have significant and negative effect on tax revenue as measured by share of tax revenue to GDP. The regression result also indicates as foreign direct investment has negative effect on tax revenue but it is not significant. Finally based on these findings the study forwarded recommendation and policy implication that will help Ethiopian government to enhance its tax collection performance.

Key words: *tax revenue, determinants of tax revenue, Ethiopia*

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Acronyms and Abbreviations

ERCA = Ethiopian Revenue and Customs Authority

GDP = Gross Domestic Product

IMF = International Monetary Fund

MOFED = Ministry of Finance and Economic Development

NBE = National Bank of Ethiopia

CLRM = Classical Linear Regression Model

ECC = Ethiopian Chamber of Commerce

OECD = Organization for Economic Cooperation and Development

OLS = Ordinary Least Square

MDGs = Millennium Development Goals

SAP = Structural Adjustment Plan

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Bird (2008) suggested that economic development is one macroeconomic goal of each country in the world. Especially, in most developing economies, the issue of economic development is still to be answered. While most developing countries are resource blessed, they face a problem of fiscal deficit, which make them to depend on foreign assistance to finance their development program. Therefore, better mobilization of internal resources could help to reduce the fiscal deficit, and to better control the process of economic development and reduce poverty. In least developed countries, efficient utilization of resources remains poor so far and governments in these economies play greater role in stabilization of the economy through various policy measures such as fiscal policy. Hence the role of taxation in many developing countries has been emphasized as an instrument of economic growth and development.

Chaudhry and Munir, (2010) posited the fact that economic resources to society is limited. So, an increase in government expenditure normally means a fall in private spending. Hence, implementation of fiscal policy, i.e. raising tax revenue is one means of transferring resources from the private to the public sector. Governments often use different methods of raising resources like, borrowing, receipt of aid, printing of money and taxation. But, taxation is undoubtedly the most important source of government revenue.

Organization for Economic Cooperation and Development study (2009) explained as taxation is central to the contemporary economic development program. It provides a stable flow of revenue to finance development priorities, such as strengthening physical infrastructure, and is interlink with many other policy areas, from good governance and formalizing the economy, to stimulate growth. Also tax policy shapes the environment in which international trade and investment take place. Thus, a core challenge for African countries is finding the optimal balance between a tax regime that is business and investment friendly, and one which can leverage enough revenue for public service

delivery to enhance the attractiveness of the economy. Pius and Raymond (2014) explained the main function of a tax system is to raise enough revenue to finance essential expenditures on the goods and services provided by government.

Tax policy has always been an important instrument to increase revenue. This is as true in developing countries as in developed countries, where tax revenue is the major source of domestic revenue. By understanding this tax revenue advantages for nations, various studies attempted to investigate the determinants of tax revenue performances.

Suri and Shome, (2013) suggested that as in many developing countries, tax revenue collected in Ethiopia is deemed too insufficient to finance government expenditure and this has resulted into a continuous grapple with persistent budgetary deficits. The plausible unfortunate consequence of the high levels of fiscal deficits is the stifling of economic growth and the subjection of the government budget to foreign policies and political pressures.

According to IMF report (2016) the current tax-revenue to GDP ratio of 23.47 percent in Ethiopia remains low by the required standards of the East African Community of 29 percent and still below the standards of many Sub-Saharan African countries, which on average collected about 26 percent of GDP in tax revenue. As a result, the increasing budget deficit has raised concerns regarding the sustainability of government debt, the control of inflation, exchange rate control and the fiscal program in general. For example according to world bank WDI (2014) report the general government budget deficit including grants increased to 2.6 percent of GDP in 2013/14, compared to 1.9 percent of GDP in the previous year whereas government revenues declined modestly from 14.3 percent to 14.0 percent of GDP in 2013/14. The general government revenue performance showed a relative decline as a result of lower collection of non-tax revenues. The non-tax revenue declined from 2.0 percent of GDP to 1.2 percent of GDP. As a result, it contributes for deficit problem in Ethiopia every year. In addition this World Bank report (2013), indicates that Ethiopia's tax revenue to GDP ratio was only around 23.5% out of expected 25%, while sub-Saharan country has 26% of tax revenue to GDP ratio.

Thus, the most important motivation for fiscal policy in the world is the need to raise revenue. However, generation of tax revenue requires strong economic decisions and good administration of tax system. In this paper we look at the main determinants of tax revenues of the central government of Ethiopia, and analyze the extent to which factors such as government policies, the structure of the economy (i.e. Agriculture share to GDP, Service sector share to GDP and Industry share to GDP) per capita income and openness affect tax revenue. Therefore, the present study focuses to identify which variables can determine Ethiopian tax revenue performance and solving literature conflict.

1.2 Statement of the Problem

In many developing countries, a low collection tax-revenue prevents these nations from undertaking ambitious expenditure programs. Thus Tax revenue is of vital importance for the sustainability of both developed and developing countries because of the following reasons. Firstly, taxation is the main source of central government revenue, even in aid-dependent low income countries. Secondly, taxation aims to meet the social and public needs by providing public goods and services. Thirdly, government need tax revenue to establish armed forces and judicial systems to ensure the secure environment and justice of the society.

Hence Bird (2008) forwarded that a rapid increase in domestic revenue and a corresponding increase in public services is a policy priority. However, one needs to be cautious about increased public spending and increased taxation, as distortionary taxes begin to reduce growth when pushed beyond certain levels.

According to Bhushan and Samy, (2012) global economic crisis coupled with uncertainty and instability of aid flows has given due attention for governments to look for stable and sustainable modes of development finance. In addition, excessive reliance on foreign financing may in the long run leads to problems of debt sustainability. As a result, developing countries will need to rely substantially on domestic revenue mobilization Gupta, (2007). One way of mobilizing domestic resource is achieved through raising of revenue from taxation.

According to the World Bank report of 2016 tax revenue (% of GDP) in Ethiopia was last measured as less than 23% which is even less than the average value of sub Saharan country that has 26% of GDP. As a result, Ethiopia has faced budget deficit every year since government expenditure exceed government revenue.

To tackle this problem, the government impose tax (direct and indirect), among others; as major and important sources of public revenue. However, Tadele, (2010) forwarded that this imposition of tax couldn't still brought the required result due to a number of reasons such as lack of clear understanding about the tax system by the tax payers, tax payers don't comply with their tax obligation, hostility between the tax payers and tax officials, negative attitude of tax payer towards the tax system, that is, understating their taxable income by significant amount and related. For these reasons, the actual amount of tax couldn't be collected properly. Therefore it is very important to study factors that affect tax revenue of the country in order to increase government revenue and assure economic stability.

Alemayehu and Abebe, (2005) posited that various efforts aimed at obtaining optimal fiscal policies with emphasis on the role of taxation as an instrument of economic development has been implemented in Ethiopia. According to World Bank (2015) report 24% of GDP to finance investment requirement is being solicited from loans and grants. Furthermore, for the period 2001 to 2010, the average share of tax revenue, and total revenue and grants in GDP were 11.2 and 19.6 percent, respectively Tadele, (2013). This implies that the tax revenue of the country is at low level.

According to Workineh, (2016) the role of tax revenue is imperative in bringing economic development, where its working or efficiency is determined by different socio economic and political factors. Furthermore, the ability to generate adequate fiscal revenue is determined by different socio economic and political factors, which may have different effects on tax revenue either negatively or positively. Therefore, examining the effects of tax revenue on economic performance depends on identifying the factors affecting tax revenue. Therefore, understanding the rational for low level of tax revenue pose remedial mechanisms to correct prevailing problems of tax revenue.

Eltony (2002) find foreign aid and foreign debt positively influence on tax revenue, but Gupta (2007) suggested as both are negatively influence over tax revenue which reveals contrary to the Eltony. When we see the tax revenue and inflation rate, Tanzi (1992), indicated that tax revenue is negatively affected by inflation, the called Olivera-Tanzi effect contrary to this, Mahdvi (2008) explained on as positive relationship between tax revenue and inflation rate. In Ethiopia Tesfaye (2015) forwarded that, foreign direct investment to GDP percentage regression result shows negative significant influence on tax revenue, but Belay (2015) in his study reveals that foreign direct investment have significant positive relationship with tax revenue. In addition to this Tesfaye (2015) included share of sectors of economy to GDP as independent variables in his study whereas, Belay (2015) do not. Furthermore, Belay (2015) used public debt as one of independent variable in his model but, Tesfaye (2015) did not include it. Generally the above review indicate that, there are conflicting results which needs further investigation to identify determinants of tax revenue performance in Ethiopia. In addition to this, there were also few researches conducted in this area and they did not incorporated variables that are most important determinants of tax revenue such as sectors of economy in developing countries like Ethiopia. Hence, the main focus of this study is to identify the variables which affect tax revenue performance in Ethiopian and speak out policy implication.

1.3 Objective of the Study

Research objectives have general and specific characteristics each of them are explained separately in the following paragraphs.

1.3.1 General objective

The major objective of this study is to identify the determinants of tax revenue in Ethiopia.

1.3.2 Specific objectives

Specifically, the study aims to:

- Examine the effect of macro-economic variables (inflation rate and public debt) on tax revenue %GDP.

- Investigate effect of structural variables (sectors of economy like share of agricultural sector to GDP, share of manufacturing sector to GDP per capita, trade openness and share of service sector to GDP) on tax revenue % GDP.
- Show trends and performances of tax revenue in Ethiopia.

1.4 Hypotheses of the Study

Per capita income is a proxy for the overall development of the economy and is expected to be positively correlated with tax share as it is expected to be a good indicator of the overall level of economic development and sophistication of the economic structure. Gupta (2007) investigated revenue performance of a large set of developing countries over the past 25 years. He found that several structural factors like per capita GDP, share of agriculture in GDP and trade openness are significant and strong determinants of revenue performance. His findings suggest a strong positive and significant relationship between per capita income and revenue performance.

Clausing (2007), regression analysis shows that the share of the value added of the corporate sector, profit level GDP per capita and GDP growth have a positive impact on tax revenue. Lotz and Morss (1967) find that per capita income and trade share are determinants of the tax share, and this finding has been replicated also by Piancastelli (2001). In addition to this several studies, including Chelliah (1979), Baas and Kelly (1975) and Tait, Grätz and Eichengreen (1979), obtained similar results.

H_1: There is no relationship between GDP per capita and tax revenue

Stotsky and WoldeMariam, (1997) suggested that certain sectors of the economy are not easier to tax than others; i.e., the agriculture sector may be hard to tax, especially in developing countries where the lion's share of the economy is dominated by this sector; it is not politically feasible to tax this sector. Many countries are unwilling to tax this sector since it is subsistent. Also, this sector is highly informal and costly to assess. In addition, the tax rate is lower on the sector and taxable items do not generate surplus production. As a result, he found negative relationship between agricultural share and tax revenue.

Gupta (2007) investigated revenue performance of a large set of developing countries over the past 25 years. He found that several structural factors like per capita GDP, share of agriculture in GDP and trade openness are significant and strong determinants of revenue performance. He also looked at the impact of foreign aid and foreign debt on revenue mobilization. His findings suggest a strong negative and significant relationship between agriculture share and revenue performance.

Chelliah et al. (1975), using a sample of 47 countries averaged over the 1969-71 period finds that mining is positively related to the tax share while agriculture is negatively related and the export ratio is insignificant.

Ghura (1998) also concludes that the tax ratio rises with income and degree of openness, and falls with the share of agriculture in GDP. Tanzi (1992), Workneh (2016) and Eltony (2002) also found significant and negative relationship between agriculture share to GDP and tax revenue.

H_2: There is no relationship between agriculture and tax revenue

In comparison to agricultural enterprises, manufacturing enterprises are easier to tax since business owners typically keep better books of accounts and records. According to Eltony (2002), if production is efficient, manufacturing can generate large taxable surpluses and so, there is expected to be a positive correlation between the share of manufacturing and tax revenue. Overall, in comparison to the agricultural sector, a large manufacturing sector is well-organized, highly monetized and therefore relatively easier to tax Bird et al., (2004)

Mahdavi (2008) used a modified model with a number of explanatory variables based on 43 developing countries over the time period 1973-2002. Total tax revenue was positively related to the degree of international trade, Industry share to GDP, relative size of the urban population, adult literacy rate, and the level of development approximated by per capita income.

Levin (2006) conducted study focuses on exploring the determinants of tax revenue by using a dataset which includes an unbalanced panel data of 39 SSA countries over a time period covering the years from 1980 to 2005. In this paper, the factors that influence the

tax revenue performance are divided into three aspects including the tax base, structural factors, and the political environment including conflict. He found that industry share to GDP has significant and positive relationship with tax revenue share to GDP.

H_3: There is no relationship between manufacturing sector and tax revenue

H_4: There is no relationship between service sector and tax revenue

Tanzi (1992) that incorporated a sample of 83 developing countries over the period 1978-88 finds that the relationship between tax share and inflation rate is significant and negative, where half of the variation in the tax ratio is explained by per capita income, import share, agriculture share inflation rate and foreign debt share. In his research he provided evidence that tax revenue is negatively affected by inflation, the so – called Olivera – Tanzi effect.

Madhavi (2008) used the advanced estimation techniques with an unbalanced panel data for 43 developing countries over the period 1973-2002 including Pakistan. His results showed that aid had a negative effect, non-tax revenue had also negative effect while agriculture sector share had positive but insignificant coefficient. Trade sector share had a positive effect and economically active female variable had a net adverse but insignificant effect while the old-age portion of population showed negative association for both income and sales tax. Extent of urbanization and literacy rate both showed positive effect. Population density, monetization and inflation rate remained negatively correlated. In another study by Crane and Nourzard (1986) that covered the United States data, inflation was found to significantly and positively impact tax evasion.

H_5: There is no relationship between inflation and tax revenue

Tanzi (1987) suggested that with a large debt, the government needs to raise the revenues necessary to service it. When the interest on the debt exceeds net borrowing plus the possible reduction in non - interest expenditure, the level of taxation must go up unless the rate of growth of the economy is high enough to neutralize the increase. He founds that tax revenue is positively related with tax revenue.

Eltony (2002) find public debt positively influences on tax revenue, but Gupta (2007) suggested as negatively influence over tax revenue.

H_6: There is no relationship between public debt and tax revenue

Diego (2006) examined the effect of foreign direct investment (FDI) on tax revenue performance for a group of Latin American countries and forwarded that FDI exerts a significant positive effect on central government tax revenues, which is channeled through its effect on the most important component of tax revenues, the taxes on goods and services. Belay (2013) examined determinants of tax revenue in Ethiopia using time series data also found as foreign direct investment has significant positive effect on tax revenue.

In addition Haider M & A.R Chaudhary (2013) also found that foreign direct investment and gross domestic product per person employed have positive and significant effect on tax revenue.

However Tesfaye (2014) examined the determinants of tax revenue in Ethiopia using time series data of fifteen years from year 2000 to 2014 and forwarded that foreign direct investment has significant negative effect on tax revenue due to incentives given by government like duty free import of raw materials and machineries, low price of lease land, tax holly day from minimum two years to maximum of six years as investment well explained on investment.

H_7: There is no relationship between foreign direct investment and tax revenue

Mahdavi (2008) used a modified model with a number of explanatory variables based on 43 developing countries over the time period 1973-2002. Total tax revenue was positively related to the degree trade openness, relative size of the urban population, adult literacy rate, and the level of development approximated by per capita income.

Levin (2008) exploring the determinants of tax revenue by using a dataset which includes an unbalanced panel data of 39 SSA countries over a time period covering the years from 1980 to 2005 divided the factors that influence the tax revenue performance into three aspects including the tax base, structural factors, and the political environment including

conflict and found as trade openness have significant and positive effect on tax revenue share to GDP.

Ghura (1998) concluded that the tax ratio rises with income and degree of openness, and falls with the share of agriculture in GDP.

$H_{8:}$ There is no relationship between trade openness and tax revenue

1.5 Significance of the Study

The study provide feedback to the Ethiopian government in making policy measures to be under taken regarding those determinants, and also serves Ethiopian revenue and customs authority in improving its performance in tax collection and in making future policy recommendations. In addition, it is expected to help serve as an input for the upcoming researchers to further investigate the points under considerations.

1.6 Scope and Limitation of the Study

The Study focuses on determinants of tax revenue in Ethiopia and all required time series data were collected by taking into account past seventeen years data from 1999/2000-2015/16 based on the closing year annual reports. The reason of using an indicated years is unavailability of organized data before that that period which is also the limitation for this paper. GDP per capita, inflation rate, public debt, foreign direct investment, agriculture share of GDP, service share of GDP, industry share of GDP, and openness, were selected as independent variables and tax revenue as dependent variable in this study. The variables are selected by reviewing different literatures (i.e. articles, researches and working papers) and variables which were most commonly used in those studies (especially on developing countries) were selected based on their significance to influence the level of tax revenue.

1.7 Organization of the Paper

The paper is organized into five chapters. The first chapter is the introductory part of paper followed by second chapter in which the relevant literatures is reviewed. Methodology is presented in the third chapter of this paper. Data is analyzed in fourth chapter. Finally, Conclusion and recommendations is presented in the fifth chapter of the paper

CHAPTER TWO

LITERATURE REVIEW

In this chapter the theoretical part and empirical parts of past literature will be discussed in detail to assist as a base for this study. The review basically designed into theoretical and empirical literature review which explains about theory regarding to tax and work done by others on this area of study.

2.1 Theoretical review

2.1.1 Meaning and concepts of Tax

Tax has been defined by various authorities and professionals in various ways. According to Uremadu (2000), tax can be conceptually defined or seen as a compulsory transfer of resources from the private to the public sector. According to Adesola (1998), tax is a compulsory levy which a government imposes on its citizens to enable it to obtain the required revenue to finance its activities. And the other scholars Lymer and Oats (2009) tax is defined as a compulsory levy, imposed by government or other tax raising body, on income, expenditure, or capital assets, for which the taxpayer receives expenditure, or capital assets, for which the taxpayer receives nothing specific in return. A traditional function of the tax system is to bring in sufficient revenue to meet the growing public sector requirements. State or the functional equivalent of a state such that failure to pay is punishable, because Tax incomes are used to run government planned expenditure. Taxes are also imposed by many sub-national entities as well it consists of direct tax or indirect tax.

2.1.2 Types of Taxes

As it was cited in Aggrey.(2011), types of taxes are, Personal Income Tax, Profit Tax, Capital Gains Tax, Tax on Interest Income on Deposits, Dividend Income Tax, Tax on Income from Royalties, Tax on Income from Games of Chance, Tax on Gain of Transfer of certain Investment Property, Tax on Income from Rental of Property, Tax on Income from Rendering of Technical Services, Agricultural Income Tax, Land Use Tax, Turnover Tax, Excise Tax Stamp Duty, Customs Duty, Value Added Tax, and like. Governments

use different kinds of taxes and vary the tax rates so as to carry out developmental goals. This is done to distribute the tax burden among individuals or classes of the population involved in taxable activities, such as business, or to redistribute resources between individuals or classes in the population.

A nation's tax system is often a reflection of its communal values or/and the values of those in power. According to Omoruyi (2003) explanation, to create a system of taxation, a nation must make choices regarding the distribution of the tax burden that will pay taxes and how much they will pay and how the taxes collected will be spent. In democratic nations where the public elects those in charge of establishing the tax system, these choices reflect the type of community that the public and/or government wish to create. In countries where the public does not have a significant amount of influence over the system of taxation, that system may be more of a reflection on the values of those in power. The resource collected from the public through taxation is always greater than the amount which can be used by the government. The difference is called compliance cost, which includes salary of staff who hired for undertaking tax collection in order to spend it on a specified purpose.

Castles and Dowrick (1990), Agell, Lindhand Ohlsson (1997) all argue that the different uses of total government expenditure affect growth differently and a similar argument applies to the way tax revenue is raised. During the past decades, some countries have increased taxation quite dramatically, while in other countries tax rates have remained roughly the same.In theory there are three main hypotheses on the causal relationship between government expenditure and government revenues. The first of these is the fiscal synchronization hypothesis where government expenditure and government revenues are said to be determined simultaneously.

Vamvoukas (1997) suggests that there is a feedback causal relationship between expenditure and revenue. In this hypothesis the public is said to determine the levels of government tspending and taxation by weighing the benefits of government services to their costs. Meltzer and Richard (1991) have advanced arguments in favor of this theory for the United States of America. The second hypothesis is mainly known as the tax-and-spend hypothesis. This approach stresses that any expenditure budget must be expanded in line with taxation and therefore that expenditure must follow revenue. Thus the amount of tax revenues available will determine the level of government spending. The view here is

that if taxes are raised they will propel (push or force) a growth in government spending. Friedman (1982) suggests a cut in tax leads to higher deficits, which should influence government to reduce its level of spending.

2.1.3 Direct and Indirect Taxation

As cited in Aggrey (2011) direct taxes are paid by taxation on the income of the wage earner. This form of taxation is unavoidable, and for simplicity usually collected before the worker collect his/her wages. Indirect taxation is often avoidable and is not taken from wages. An example of indirect taxation is VAT (Value Added Tax) or sales tax placed on goods and services. This is tax, but not all people have to pay it, and can choose not to. The benefits and costs of both forms of taxation are many. Direct taxation reduces the incentive to work, as 'take home' pay is reduced as a result of an increase in income tax compared to unemployment benefits. On the other hand, indirect taxation may result in people with similar incomes and wealth paying different amounts, simply as a result of slightly different circumstance.

2.1.4 Principles of a Good Tax System

As suggested by misrak (2008) the following are the most common principles of good tax system:

Efficient - A tax system should raise enough revenue such that government projects can be adequately sponsored, without burdening the economy too much (not particularly the tax payer), as not to become a disincentive for performance (internal and external investment, work returns and savings).

Understandable - The system should not be incomprehensible to the layperson, nor should it appear unjust or unnecessary complex. This is to minimize discontent and costs.

Equitable - Taxation should be governed by people's *ability to pay*, that is, wealthier individuals or firms with greater incomes should pay more in tax while those with lower incomes should pay comparatively less.

Benefit Principle - Those that use a publicly provided service (which is funding primarily through taxation) should pay for it! However, conflicts in principle may and often do arise between this and principle.

2.1.5 History of taxation in Ethiopia

Wogene (1992) posited that resources were allocated among the various sectors of the economy differently in the imperial and revolutionary periods. Under the emperor, the government dedicated about 36 percent of the annual budget to national defense and maintenance of internal order. Toward the end of the imperial period, the budgets of the various ministries increased steadily while tax yields stagnated. With a majority of the population living at a subsistence level, there was limited opportunity to increase taxes on personal or agricultural income. Consequently, the imperial government relied on indirect taxes (customs, excise, and sales) to generate revenues .For instance, in the early l970s taxes on foreign trade accounted for close to two fifths of the tax revenues and about one-third of all government revenues, excluding foreign grants. At the same time, direct taxes accounted for less than one-third of tax revenues.

Ethiopian Chamber of Commerce and Ethiopian Business Development Services Network ECC, EBDSN (2005) suggested that the revolutionary government changed the tax structure in 1976, replacing taxes on agricultural income and rural land with a rural land-use fee and a new tax on income from agricultural activities. The government partially alleviated the tax collection problem that existed during the imperial period by delegating the responsibility for collecting the fee and tax on agriculture to peasant associations, which received a small percentage of revenues as payment. Whereas total revenue increased significantly, to about 24 percent of GDP in l988/89, tax revenues remained stagnant at around l5 percent of GDP. In l974/75, total revenue and tax revenue had been l3 and 11 percent of GDP, respectively. Despite the 1976 changes in the tax structure, the government believed that the agricultural income tax was being under paid, largely because of under assessments by peasant associations.

ECC EBDSN (2005) also forwarded that the government levied taxes on exports and imports. In 1987 Addis Ababa taxed all exports at 2% and levied an additional export duty

and a sur-tax on coffee. Import taxes included customs duties and a 19% general import transaction tax. Because of a policy of encouraging new capital investment, the government exempted capital goods from all import taxes. Among imports, intermediate goods were taxed on a scale ranging from 0 to 35 percent, consumer goods on a scale of 0 to l00 percent, and luxuries at a flat rate of 200 percent. High taxes on certain consumer goods and luxury items contributed to a flourishing underground economy in which the smuggling of some imports, particularly liquor and electronic goods, played an important part. Although tax collection procedures proved somewhat in effective, the government maintained close control of current and capital expenditures. The Ministry of Finance over saw procurements and audited ministries to ensure that expenditures conformed to budget authorizations.

Gebrie (2008) proposed that the first major change in Ethiopia's tax system was initiated in the post-Second World War period (between1942-1944) the years 1947-52 covering its second stage. These changes were generally discretionary, including amendments to property taxes (land and cattle). Broad-based taxes on goods and services were also introduced in the mid-1950s. Current expenditures as a proportion of GDP grew from l3.2 percent in l974/75 to 26.1 percent in l987/88. This growth was largely the result of the increase in expenditures for defense and general services following the 1974 revolution. During the l977-78 Ogaden War, for example, when the Somali counter offensive was underway, defense took close to 60% of the budget.

Workneh (2002) suggested that economic and social services received less than 30 percent of government funds until l972/73, when a rise in educational outlays pushed them to around 40%.Under the Dergue regime, economic and social service expenditures remained at pre-revolutionary levels: agriculture's share was 2%, while education and health received an average of l4% and 4%, respectively. Since 1992/93, the Government of Ethiopia has made a major economic policy shift from Central Planning to market oriented economic system. In line with this change, a series of tariff and tax reform measures have been taken. The reasons to these were: outdated tariff and tax laws; weak customs and tax administration; failure of the tariff and tax regime to attract investment, to facilitate trade and to generate adequate revenue to cover current and capital expenditure, and hence finance development and poverty reducing projects.

Wogene (1994) posited that the series of tariff and tax reform programs have helped to increase both Federal Government and national revenue. As per the reports of the Ministry of Revenue, the Federal Revenue has increased to Birr 6.7 billion in 2002/2003 from Birr 2.54 billion in 1993/94 as the result of which federal revenue as percentage of the GDP increased from 8.97% in 1993/94 to 11.87% in 2002/03. The increase in revenue mainly attributes to the modest increase in both direct and indirect taxes, mainly the foreign trade taxes. As well, National tax revenue as percentage of GDP has increased to 15.1% in 2002/03 from 10.9 in 1993/94. Despite, the series of reforms and increase in revenue, the overall budget deficit with and without grant has been increasing. For example, the overall budget deficit without grants as percent of GDP has increased from -5.2% in 1996/97 to-14.5% in 2002/03. This shows that performance of revenue collection in Ethiopia has been low compared to the rest of Sub-Saharan African countries which is over 23% of the GDP.

Gebeyehu (2001) added that coupled by a series of reduction in the import tariff, excise tax and income tax and widening of the budgetary deficit, introducing a neutral and efficient tax, i.e. the VAT with broad tax base was considered. Value Added Tax (VAT) has become a major tax instrument Worldwide. VAT has also become an indispensable component of tax reforms in developing countries. Ethiopia's tax reform program has introduced VAT since January, 2003.VAT revenue performance and its neutrality and efficiency are also the reasons for superiority of this tax in contrast to other common tax instruments such as the turnover tax. The emerging conventional wisdom, based largely on practice and numerous country case studies, suggests that a single rate VAT (with the rate between 10 and 20%), with very few exemptions and, therefore, abroad base is superior to a VAT with multiple rates and many exemptions which reduce its base and complicate administrations.

Musgrave (1967) suggested later in the decade and in the early 1960s, changes were also made in the rate and structure of taxes, especially on income. In the post-revolution period (1974-91), particularly during 1976- 79, significant major changes on the rate and structure of all types of taxes were made. These involved widening the land tax base, introducing capital and surplus transfers from nationalized firms, as well as certain minor arrangements on other taxes.

Tesfaye (2014) also posited that leaving aside this brief description of the evolution of the tax system before the 1991/2 reform, the subsequent taxing system in Ethiopia can be divided into three broad categories: (i) taxes on income and profits, (ii) taxes on goods and services and (iii) taxes on international trade. Most of these taxes have been reformed and amended in the last decade following the general 1992 liberalization (or reform) policy. Some institutional reforms aimed at enhancing the government's capacity to raise tax revenue have also been made.

2.1.6 Determinants of Tax Revenue

Workneh (2016) suggested in his study as many literatures suggest there are various determinants of tax revenue which includes the level of economic development, Fiscal Deficits and Debt, Trade Openness, inflation rate, foreign direct investment, Share of Aid in GNP, Population Density, Share of Agriculture in GDP, and Share of Manufacturing in GDP, Tax Evasion, and other.

2.1.6.1 Level of Economic Development

Tanzi (1987) posited that economic development is assumed to bring about both an increased demand for public expenditure and there is also the consideration that, as income grows countries generally become more urbanized. Urbanization brings about a greater demand for public services while at the same time facilitating tax collection a larger supply of taxing capacity to meet such demands. Musgrave (1969). Chelliah (1971) suggested in his study that higher per capita income reflecting a higher level of development is held to indicate a higher capacity to pay taxes as well as a greater capacity to levy and collect them.

2.1.6.2 Fiscal Deficits and Debt

Tanzi & Blejer (1988) proposed that the growth of public spending has generated large fiscal deficits in many countries, leading to increases in the share of public debt relative to GDP. With a large debt, the government needs to raise the revenues necessary to service it. When the interest on the debt exceeds net borrowing plus the possible reduction in non - interest expenditure, the level of taxation must go up unless the rate of growth of the economy is high enough to neutralize the increase. Therefore public debt plays a role in

determining the extent to which countries may take advantage of their taxable capacity. According to Tanzi (1989) however, a high debt burden can also create macroeconomic imbalances that may tend to reduce the tax level Servicing of the foreign debt requires a trade account surplus, which in turn may require a reduction in imports. This affects revenue given the high dependence of the tax system on the external sector. In general, Tanzi (1992) concluded that a high debt burden would tend to raise the tax level, ceteris Paribus.

2.1.6.3 Share of Agriculture in GDP

As Tanzi (1992) asserts, agriculture is considered to be a salient feature regarding the structure of the economy and a country's economic structure is one of the factors that could be expected to influence the level of taxation. For developing countries, the share of agriculture may be an important influence on the tax share. Stotsky & WoldeMariam (1997) on the other hand, forwarded that small farmers are notoriously difficult to tax and a large share of agriculture is normally subsistence, which does not generate large taxable surpluses, as many countries are unwilling to tax the main foods that are used for subsistence.

2.1.6.4 Share of Manufacturing in GDP

In his study Tesfaye (2015) suggested that manufacturing enterprises are easier to tax than agricultural enterprises since business owners typically keep better books of accounts and records. Manufacturing can generate larger surpluses if production is efficient. Therefore the variable is positively related to the tax ratio.

2.1.6.5 Share of Aid in GDP

Aid and grants have been a major source of development finance for the majority of developing countries over the past few decades. Empirical literature has tended to evaluate the impact of aid by including it as a variable in a regression for the determinants of some economic performance indicator, emanating from the general concern that it might have a negative impact on some of such indicators. For instance, there is a general concern that aid may decrease taxation revenue in recipient countries. In fact, the results in Franco-

Rodriguez, Morrissey, and McGillivray (1998) study on Pakistan were in agreement with this concern.

From a policy perspective there is an important distinction between countries with a substantial share of resource-related tax revenues and those without. Resource revenue provides an opportunity for reducing distortionary taxation that may have a negative impact on economic activity, but it also provides the opportunity for maintaining highly inefficient subsidy programme Collier et. al., (2009). Bornhorst et al. (2009) found that countries that receive large revenues from the exploitation of natural resource endowments are likely to reduce their domestic tax effort considerably. This is not necessarily worrying as reduced domestic tax burden could foster private sector activities consistent with an improvement in development prospects.

Accelerated development is in itself an important determinant of tax revenue. Structural factors exert the strongest influence on the tax revenue/GDP in low-income countries. Growing levels of per capita income, a shift from agricultural to industrial production, a change in consumer demand from basic necessities to manufactured goods and services, falling age-dependency ratios, and increasing urbanization all lead to rising shares of tax revenue in national income. This implies that policies which emphasize structural changes will aid countries in the development process.

More recent studies have found that not only do supply factors matter but that demand factors such as institutional quality has a significant impact in determination of tax effort Bird et al., (2008). As they conclude, a legitimate and responsive state is one that secures the rule of law and keeps corruption under control appears to be an essential pre-condition for a more adequate tax collection effort. Chand and Moene (1997) argue that fiscal corruption is a key factor behind the poor revenue performance in a number of developing countries. There is also strong evidence to suggest that measures taken to reduce corruption could be expected to enhance tax revenue

2.1.6.6 Tax Evasion

As forwarded by Tesfaye (2015) tax evasion is considered to be of serious concern to those dealing with taxation issues of a country because of the detrimental effects it is assumed to

have on tax revenue and the tax system as a whole. One obvious consequence of tax evasion is the loss of tax revenue for government. The fact that some income goes untaxed and also certain indirect taxes such as VAT and excise duties are evaded, leads to the conclusion that tax revenues are lower than if everyone had paid their taxes.

2.2 Empirical Literature review

Several empirical studies have looked into determinants of resource mobilization at regional level. For sub-Saharan African countries, Tanzi (1981) finds that mining and non-mineral export share positively affect the tax ratio. Focusing on the same region, Leuthold (1991) uses panel data to find a positive impact from trade share, but a negative one from the share of agriculture. Using a panel of 43 sub-Saharan African countries during 1990-95, Stotsky and Wolde Mariam (1997) measured the determinants of the tax share in GDP and constructed a measure of tax effort. The analysis suggests that the shares of agriculture in GDP and mining in GDP are both negative and significantly related to the tax share, and that the export and import shares in GDP are both positive and significantly related to the tax share whereas per capita income is not significant. Trade liberalization also may have some effects on the domestic exchange rates as well as fiscal structure.

Agbeyegbe etal. (2004) investigated the relationship between the tax revenue, trade liberalization and changes in the exchange rate using a panel data set of 22 sub-Saharan countries. Their results suggest that trade liberalization, agricultural share, industrial share, government consumption, and terms of trade exert a positive effect on total tax revenue, and inflation exerts a negative effect. They explain the unexpected positive effect of agricultural share by the influence of exports in providing a tax handle. On the other side, the sign of agricultural sector share turns to negative when the independent variable is income tax revenue, while the industrial sector's share remains same.

Ahmed and Mohammed (2010) attempted to search the determinants of tax buoyancy of 25 developing countries. Their study revealed that growth in import and manufacturing sector has positive impact on growth of tax collection. The effects of the agriculture is insignificant but unlike of the previous studies which found insignificant impact of service sector on tax buoyancy this study found positive and significant impact on tax buoyancy

due to the development of service sector in 1990s. Monetary growth also influence positively on tax collection. Finally increase in budget deficit has positive influence on tax collection by demanding more resource mobilization from the governments, however, at the same time the growth in grants inversely influences on tax collection because government in developing countries avoids unpopular steps of imposing taxes for domestic resource mobilization

Anware M. (2014) on the title Determinants of tax revenue performances in Ethiopia as mini research for Partial Fulfillment of the Requirements for the course Professional Training Program for Economists (a Case Study in Ethiopian Revenues and Customs Authority) the researcher used time series data set that consists of 21 years. For the time period covered 1990/91 to 2010/11 with identifying six variable industry , agriculture, inflation, GDP per capital income, export and import he concluded that structural factors such as exports of goods and services (% of GDP) and import of goods and service (% of GDP) significantly affect tax revenue performance of Ethiopia

Bird et al. (2008) found that Latin American countries show consistently lower tax effort compared to other developing or transition countries. Performance in African countries shows a mixed trend. Some countries collect as little as half while others collect up to 2 to 3 times what they would be expected to (OECD, 2010). The latter group include to a large degree of those countries having a high share of resource-related tax revenue. Thus, estimates of tax effort for some resource-rich countries turn out to be quite sensitive to whether resource-related tax revenues are considered or not. Using a tax effort measure that excludes resource-related tax revenues is revealing: more than half of the African countries (22 out of 42) collect more or what is expected. This suggests that in quite a number of countries domestic revenue mobilization is not constrained by the tax system but more by GDP growth and broader development.

Chaudhry and Munir (2010) attempted to analyze empirically the determinants of low tax revenue in Pakistan by employing time series econometric techniques over the period 1973-2009. They investigated whether economic policies, external variables and social indicators along with elements of tax base can account for part of the variation in the tax

revenue performance. Their empirical results suggest that openness, broad money, external debt, foreign aid and political stability are the significant determinants of tax efforts in Pakistan with expected signs. The results also indicates that the determinants of low tax revenue in Pakistan are narrow tax base, more dependence on agriculture sector, foreign aid and low level of literacy rate.

Eltony (2002) examined the determinants of tax revenue shares and constructed an index of tax effort for the sixteen Arab countries. The results suggest that the main determinants of the tax share in the GDP for the Arab countries are the percapita income, the share of agriculture in GDP and the share of mining in GDP. These variables are statistically significant and possessed the expected signs. Other variables that are also important determinants are the share of exports and imports and in only the non-oil Arab countries, the outstanding foreign debt was found significant and positively related to the tax share. In connection with the title under investigation, studies have been done in different counties as a panel studies.

Gupta (2007) investigated revenue performance of a large set of developing countries over the past 25 years. He found that several structural factors like percapita GDP, share of agriculture in GDP and trade openness are significant and strong determinants of revenue performance. He also looked at the impact of foreign aid and foreign debt on revenue mobilization. His findings suggest a strong negative and significant relationship between agriculture share and revenue performance. It is estimated that a 1% increase in the share of agriculture sector could reduce revenue performance by as much as 40% percent. The results indicate that although foreign aid improves revenue performance significantly, debt doesn't. Among the institutional factors, he found corruption has a significantly negative effect on revenue performance. Political and economic stability are other effective factors, but only across certain specifications. On the other hand, countries that put greater emphasis on taxing income, profits and capital gains, perform better. Structural factors are found to be significant across all income groups, when the analysis is conducted over the sub-samples based on income level.

Leuhold (1991) examined the tax share for African countries by taking the share of agriculture in income, mining share, per capita income and export ratio as its determinants. Their results showed that agricultural share has negative; mining share has positive while the share of foreign trade and the share of foreign grants and loans have also positive and statistically significant relation.

Leuz (1993) used panel data and find a positive impact from trade share, but a negative one from the share of agriculture and Stotsky and WoldeMariam (1997) find that both agriculture and mining share are negatively related to the tax ratio, while export share and percapita income have a positive effect. Ghura (1998) concluded that the tax ratio rises with income and degree of openness, and falls with the share of agriculture in GDP. He also finds that other factors like corruption, structural reforms and human capital development affect the tax ratio. While a rise in corruption is linked with a decline in tax ratio, structural reforms and an increase in the level of human capital is associated with an increase in tax ratio.

Madhavi (2008) used the advanced estimation techniques with an unbalanced panel data for 43 DCs over the period 1973-2002 including Pakistan. His results showed that aid had a negative effect, non-tax revenue had also negative effect while agriculture sector share had positive but insignificant coefficient. Trade sector share had a positive effect and economically active female variable had a net adverse but insignificant effect while the old-age portion of population showed negative association for both income and sales tax. Extent of urbanization and literacy rate both showed positive effect. Population density, monetization and inflation rate remained negatively correlated. Inverse of GDP per capita was strongly and negatively correlated with the level of taxation. Net effect of political rights and civil liberties was significant.

Rajan (1996) tried to investigate the stability of the determinants of personal income tax which is influenced by drastic changes in the political scenario during the study period. To this end a multivariable linear time series regression equation has been estimated and stability of the relationship along the political blight periods has been probed via Chow test. The results of the analysis reveal that the variables such as per capita GDP, literacy

rate, per capita public expenditure are positively associated and variables such as urban population, Scheduled Caste and Scheduled Tribe population are negatively associated with per capita income tax. Further, it is found that the determinants of per capita personal income tax equation are not stable during the politically "stable" and "non-stable" periods. This finding is explained by the leap of the successive governments from growth oriented to populist programs and from egalitarian to liberalized policies during the study period.

Rodrik (1998) also points out that there is a strong positive correlation between trade openness and the size of the government, as societies seem to demand (and receive) an expanded role for the government in providing social insurance in more open economies subject to external risks. The degree of external indebtedness of a country may affect revenue performance as well. To generate the necessary foreign exchange to service the debt, a country may choose to reduce imports. In such a scenario, import taxes will be lower. Alternatively, the country may choose to increase import tariffs or other taxes with a view to generate a primary budget surplus to service the debt. Foreign aid has also been identified as a factor that may affect revenue performance. A key distinction appears to be whether the aid is used productively or simply to finance current consumption expenditures. Moreover, the composition of aid has an important effect on revenue performance. Gupta etal. (2004) find that concessional loans are associated with higher domestic revenue mobilization, while grants have the opposite effect.

Stotsky and WoldeMariam (1997) using a panel of 43 sub-Saharan African countries during 1990-95, measured the determinants of the tax share in GDP and constructed a measure of tax effort. The analysis suggests that the shares of agriculture in GDP and mining in GDP are both negative and significantly related to the tax share, and that the export and import shares in GDP are both positive and significantly related to the tax share whereas per capita income is not significant. No strong link between IMF programs and tax shares is found, on average

Studies focusing on the sectorial factors have likewise produced varying results. For example, Chelliah et al. (1975), using a sample of 47 countries averaged over the 1969-71 period finds that mining is positively related to the tax share while agriculture is negatively

related and the export ratio is insignificant. Sixteen years later, Leuthold (1991) uses panel data from Sub-Saharan countries to document a positive impact of trade on tax revenue on the one hand and a negative relationship between agriculture share and tax revenue on the other. Stotsky and WoldeMariam (1997) find that both agriculture and mining share are negatively related to the tax ratio. In Alm et a. (2004), however, while the mining-to-GNP ratio is significant and positively related to the tax effort, the agriculture-to-GDP ratio is negative but not significant though a later study by Ahsan and Wu (2005) the negative impact on revenue mobilization is strongly significant. In a study of Arab countries, Eltony (2002) observes that mining share has a negative impact on the tax ratio for oil exporting countries, but a positive impact for non-oil exporting countries.

Wahid (2008) analyzed the causal relationship between total expenditure and tax revenue. In general, his results support the hypothesis that government expenditure causes revenues. Teera (2002), used time series data on Uganda to examine the determinants of tax revenue share in that country. He used the Augmented Dickey Fuller (ADF) and the Error Correction Model (ECM) and found that, there is a positive relationship between per capita income and total tax revenue as well as income taxes. This finding lends support to the hypothesis that, as countries develop tax bases develop more than proportionately to the growth in income.

To sum up, in this empirical literature, several variables have been considered as determining factors of tax revenues. For example per capita GDP, the sectorial composition of output, the degree of trade and financial openness, and the ratio of foreign aid to GDP, the ratio of overall debt to GDP, foreign direct investment, public debt to GDP a measure for informal economy, and degree of political stability as well as corruption as potential determinants of revenue performance. Several empirical studies have looked into determinants of resource mobilization at regional level too.

Research Gap

Various empirical studies have been performed to investigate the determinants of tax revenues. Most of these studies examine the issue, relying largely on cross-sectional and (more recently) panel data whereas country-specific studies are rather scarce. As it is well

known, cross-sectional analysis ignores the possible changes over time, while panel data set encompasses both cross-sectional and time-related information. In panel data setting, however, it is not possible to distinguish the country-specific behavior of the explanatory variables, whilst a country may has distinct feature among a group of others. Therefore, any single-country-level time series analysis has its own merit in order to identify country specific effect of the explanatory variables.

2.3 Conceptual framework

This conceptual framework describes the relationship of tax revenue with GDP, Inflation rate, openness, foreign direct investment, agriculture, service and industrial sectors share to GDP and public debt .Based on different literature, the following conceptual framework has been developed to guide this particular paper.

As per literature, the effects of those variables were stated as per capita income, openness, service share, industrial share, public debt and foreign direct investment have positive effect on tax revenue while agriculture share to GDP and inflation have negative effect on tax revenue.

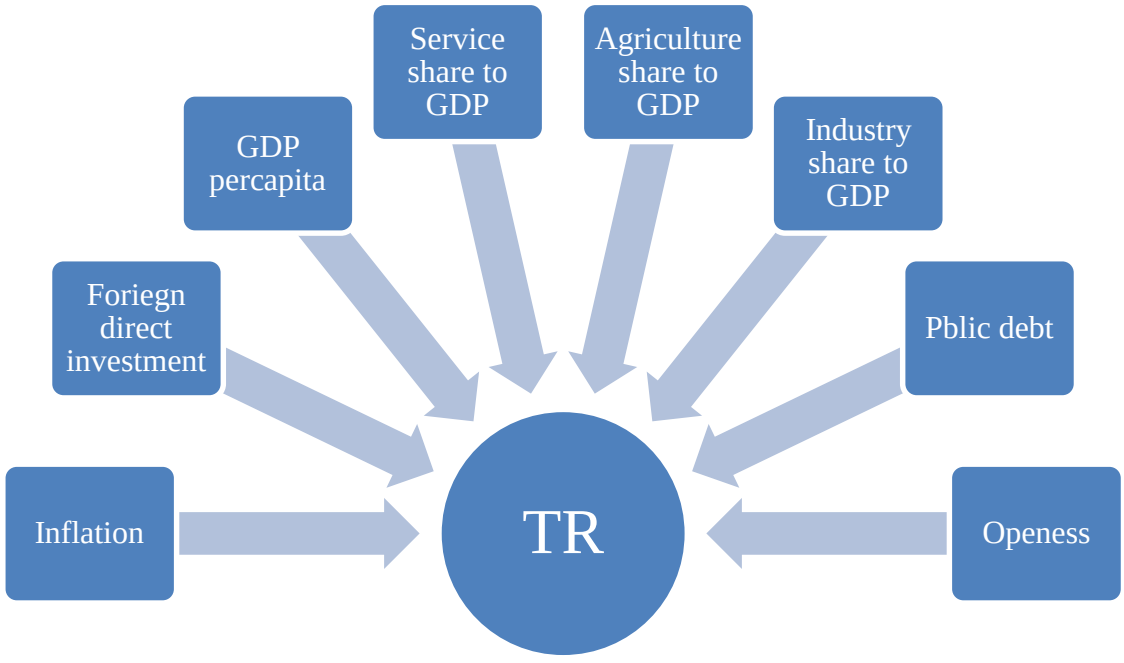


Figure 2.1 Conceptual Framework

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

In this chapter the detail methodology, showing the logical frame work that discusses research approaches, Research strategy, data collection and data analysis method is presented. To achieve the stated objective of this research the appropriate method should be adopted. The objective of this research is to explore the determinants of tax revenue in Ethiopia. The main variables stated for this study includes Per Capita income, share of agricultural sector in GDP, share of manufacturing sector in GDP, share of service sector in GDP, inflation rate, foreign direct investment, public debt and trade openness in the country that were collected from secondary data in the country. To find out valid and reliable results different methods and sources are used, making sure they are also relevant to the research objective. In addition it is critically important that the materials and data collected are analyzed and examined to be able to make objective conclusions.

3.1 Research approach

The research approach in this study has chosen based on the purpose and the research questions set out to be addressed. According to Creswell (2003) there are three basic types of research approaches, quantitative, qualitative, and mixed approach**.** Kothari (2004) in the quantitative method data is collected through a systematic empirical study and the results can be quantified with the help of statistics and mathematics. In quantitative research it is possible to compare and study several determinants and analyzing and testing them empirically will prove if there are relationships to be found in order to draw conclusions on the research.

This paper was interested in examining the associations between the dependent variable (that is tax revenue) and the independent variables Per Capita income, share of agricultural sector in GDP, share of manufacturing sector in GDP, share of service sector in GDP, inflation rate, foreign direct investment, public debt and trade openness. So, quantitative approach is more appropriate to meet the purpose of this research, since this paper was searching for what factors were affecting tax revenue, because of the fact that those

variables can be easily quantified. On the other hand the quantitative method is used to measure how the tax revenue can grow if there is a change in those independent variables. With the quantitative method it is possible to compare different numerical measures.

3.2 Study Area

The study was conducted at country level i.e. Federal democratic Republic of Ethiopia. The country is located in Eastern Africa particularly sub-Saharan Africa and a country with a total population of over 99 million in 2015 which makes it populous among African countries. It is a Federal Democratic Republic, including nine regional states: Afar, Benishangul-Gumuz, Amhara, Oromia, Tigray, Somali, Southern Nations-Nationalities and Peoples Region (SNNPR), Gambella and Harari, and two administrative states: Addis Ababa city administration and Dire Dawa City Council. Since 1991, Ethiopia has adopted a market economy after the fall of the Dergue regime, which practiced a state controlled economy. The country's current economic situation is rated at developing stage in high speed. So, to make it really, government needs high revenue which he can raise more from tax.

3.3 Type of Data, Source of Data and Collection Techniques

According to Koul (2006) using appropriate data collection techniques help researchers to combine the strengths and amend some of the inadequacies of any source of data to minimize risk of irrelevant conclusion. He further argues that consistent and reliable research indicates that research conducted by using appropriate data collection techniques increase the credibility and value of the research findings.

To enhance the quality of data, the researcher employed secondary data. According to Kothari (2004) depending on the sources and techniques ones uses for gathering data it can be divided into primary and secondary data. He go by saying that primary data is data collected by using techniques like interviews, questionnaires and tests. On the other hand secondary data refers to documents that have been organized before.

In this study a time series data ranging from 2000 - 2016 was used to analyze the determinants of tax revenue in Ethiopia. The choice of time was dictated by data availability. All data's were secondary and gathered from different local and international organizations like; Ministry of Finance and Economic Development (MoFED), Ethiopian

Revenue And Custom Authority (ERCA) National Bank of Ethiopia (NBE), Ethiopian Investment Agency (EIA) and the Ethiopian Economic Association (EEA) database, and World Bank (World Development indicators (WDI))

3.4 Model Specification

Various studies included different variables while analyzing the determinants of tax revenue across the world. For instance, Levin (2008) included sectors share to GDP, population, aid share to GDP introduction of VAT dummy conflict dummy, openness and urbanization in his model as determinants of tax revenue. Teera (2003) tried to estimate the tax share of Uganda, by incorporating import share of GDP, gross domestic product per capita, foreign aid (%GDP), Manufacturing value added (%GDP), agriculture value added (%GDP) and population density as tax correlates. Whereas, Chaudhry and Munir (2010) included the following variables in estimating tax revenue in Pakistan: Tax base (agriculture value added (%GDP), manufacturing value added (%GDP), service value added (%GDP), per capita income, and openness), economic policy variables (exchange rate, inflation and monetization or M2), foreign aid, political stability, remittance and social variables (urbanization, literacy rate). Karagöz (2013) extends the model, including total stock of debt, agriculture value added (%GDP), industry value added (%GDP), money supply (M2 %GDP), urbanization rate and openness. Sinbo and Muibi (2013) studied the macroeconomic determinants of tax revenue in Nigeria by incorporating; real GDP, openness, exchange rate, inflation and external debt.

However, in developing the tax model including all variables is impossible due to unavailability of data. Therefore, following empirical literatures, this study attempts to empirically investigate the effect of policy variable (inflation), tax base (agriculture value added share of GDP, industrial value added share of GDP, service value added (%GDP) and real GDP per capita income), foreign direct investment, trade openness in the country and Public debt on tax revenue percentage of GDP. Natural logarithm of per capita income is used in this model because of its large size as compared to other variables. Hence as suggested by Worku (2010), log model is preferred due to the reason that log linear model helps to control the size of data and results in consistent and reliable estimates. Therefore, in this study the model will be specified as:

$$TR = F(GDP, OPNS, INFLN, FDI, PD, AGRI, INDU, SERV)$$

$\text{TR} = \alpha + \beta_1\text{PERC} + \beta_2\text{OPPS} + \beta_3\text{INFLN} + \beta_4\text{FDI} + \beta_5\text{AGRI} + \beta_6\text{INDU} + \beta_7\text{SERV} + \beta_8\text{PD} + \varepsilon_t$, Where, TR is tax revenue as percentage of GDP.

Where, α is intercept term and $\beta_1, \beta_2, \beta_3, \ldots\ldots\ldots\ldots\ldots\ldots\ldots\beta_8$, are coefficients,

$L\text{PERC} =$ Per capita income

$\text{OPPS} =$ Trade openess as measured by share of export and import to GDP

$\text{INFLN} =$ Annual inflation rate

$\text{FDI} =$ Foreign direct investment as percentage of GDP

$\text{AGRI} =$ Agriculture sector share to total GDP

$\text{INDU} =$ Industrial sector share to GDP

$\text{SERV} =$ Service sector share to GDP

$\text{PD} =$ Public debt as percentages of GDP

$\varepsilon =$ Error variable

3.5 Data analysis and interpretation

In order to analyze the research data, ordinary least squire (OLS) with multiple variables was used to assess the relation between dependent and independent variables by using software. In the section of data analysis and interpretation, each variable is presented and discussed by using descriptive statistics results related with the variables under study followed by inferential statistics using regression analysis, correlation analysis, ANOVA were made to check for the significance of the explanatory variable and relationship between the dependent variable and explanatory variables selected for the study.

3.6 Variable definition and measurement

Gross domestic product (GDP)

Gross domestic product (GDP) is total market value measured in current price, of all goods and services produced within the political boundaries of an economy during given period of time, usually one year. The nominal gross domestic product is measured in terms of current price or actual price, the price that a buyer actually pays for goods and services

purchased. There are three approaches of measuring GDP (i.e. expenditure approach, income approach and value added approach).

GDP Per capita income is expected to be positively correlated with tax share as it is expected to be a good indicator of the overall level of economic development and sophistication of the economic structure. This is because as a country develops, tax bases will be wider and grow more than the growth in income. According to Chelliah (1971) a higher per capita income reflects a higher level of development which implies a higher capacity to pay taxes as well as a greater capacity to levy and collect taxes. It is measured as the ratio of GDP to total population.

Agriculture share to GDP

Certain sectors of the economy are easier to tax than others; i.e., the agriculture sector may be hard to tax, especially in developing countries where the lion's share of the economy is dominated by this sector; it is not politically feasible to tax this sector. According to Stotsky and WoldeMariam, (1997) many countries are unwilling to tax this sector since it is subsistent. Also, this sector is highly informal and costly to assess. In addition, the tax rate is lower on the sector and taxable items do not generate surplus production. As a result, negative relationship is anticipated between agricultural share and tax revenue.

Industrial share to GDP

This variable helps to show the effects of industrialization on revenue generation, particularly it is intended to capture the effect of industrial growth on the tax revenue generation of Ethiopia. Increase in the growth of industrial sector will increase direct tax through corporate income tax, indirect taxes through sales tax, and excise duty on domestic products. Moreover, this sector is largely owned by businessmen that use better recording activities, which give the taxing authority better taxing capacity. As a result, the researcher expected positive sign of this variable. It is measured as the ratio of industrial value added to GDP.

Service sector ratio to GDP

Service enterprises are easier to tax than agricultural enterprises since business owners typically keep better books of accounts and records. Hence, service sector is expected to contribute high percentage to total tax revenue collected.

Foreign Direct investment (FDI)

It is a category of cross-border investment made by a resident in one economy (the direct investor) with the objective of establishing a lasting interest in an enterprise (the direct investment enterprise) that is resident in an economy other than that of the direct investor. The motivation of the direct investor is a strategic long-term relationship with the direct investment enterprise to ensure a significant degree of influence by the direct investor in the management of the direct investment enterprise. It is measured by net capital invested that has been invested in one country.

Public debt

Public debt refers to current outstanding obligations for which the central government and its branches are responsible. It is measured by ratio of public debt to GDP and shows country's ability to payback its debt.

Trade openness

Reviewing the existing literature on trade and growth shows that there is not a clear definition of trade openness. For many authors trade openness implicitly refers to trade policy orientation and what they are interested in is to assess the impact of trade policy or trade liberalization on economic growth. For other authors however, trade openness is a more complex notion, covering not only the trade policy orientation of countries but also a set of other domestic policies (such as macroeconomic policies or institutional ones) which altogether make the country more or less outward oriented.

The most basic measure of openness is the simple trade shares, which is exports plus imports divided by GDP. A large number of studies used trade shares in GDP and found, as reviewed in Harrison (1996), a positive and strong relationship with growth.

Inflation

Inflation is a sustained rise in the general price level of goods and services in an economy. It is the proxy for macroeconomic stability of a country. The most commonly used measure of inflation is consumer price index, which tracks the prices of a basket of core goods and services over time. It reduces the purchasing power of a society and erodes the taxpaying capacity of tax payers. Crane and Nourzad (1986) stated inflation as non-legislated tax increase which enhance government revenue. Unlikely; taxpayers on average, respond to the inflation-induced tax increase by instituting their own non legislated tax cut through evasion (i.e. The increased level and proportion of income underreported). Taxpayers will engage in an informal or underground economic activity. As a result, inflation is expected to affect tax revenue negatively.

Coefficient of Determination (R^2)

The coefficient of determination is a statistic that will give information the goodness of fit of model. It is a statistical measure of how well the regression line approximates the real data points. Is a descriptive measure between zero and one, a value of R^2 close to 1 indicates that the model explains nearly all of the variability of the dependent variable about its mean value, while a value close to zero indicates that the model fits the data poorly. Problems withR^2 as a goodness of fit measure: if a model is re parameterized (rearranged) and the dependent variable changes, R^2 will change, it never falls if more regresses are added to the regression and R^2 can take values of 0.9 or higher for time series regressions. So it's better to see at adjusted R^2 to minimize the second problem of R^2.

T-Statistic

T-statistic is used to determine whether the significance between the dependent variable and the independent variables exists or not. If the computed T-stat is greater than critical T-value, the independent variable is statistically significant and vice-versa. In order to determine critical T-value, the degree of freedom should be known at certain confidence interval.

F-test

F-test is an overall test of the null hypothesis that group means on the dependent variable do not differ. It is used when comparing statistical models that have been fit to a data set, in order to identify the model that best fit the population from which the data were sampled. F-test mainly arises when the models have been fit to the data using least square. In order to get book F-value, it should be calculated at certain significant level.

Standard error

It is a measure of the dispersion of the data points from the regression line. Its objective is to identify whether a particular variable is significant at a certain level of confidence. Standard error can be measured in two ways: Using T-stat and Degree of freedom. It is also useful in determining the range in which the dependent variable will point to a specified probability.

3.7 Assumptions Underlying Multiple Regression

Regression, like most statistical techniques, has a set of underlying assumptions that are expected to be in place if we are to have confidence in estimating a model. Some of the assumptions are required to make an estimate, even if the only goal is to describe a set of data.

Multicollinearity

The correlation coefficient represents the linear relationship between two variables. A correlation matrix used to ensure the correlation between explanatory variables. Dancey and Reidy's (2004) categorize value of the correlation coefficient and strength of correlation like 1 value of correlation coefficient means perfect, 0.7-0.9 value of correlation coefficient means strong, 0.4-0.6 value of correlation coefficient means moderate and 0.1-0.3 value of correlation coefficient means weak. Cooper and Schindler, Mashotra, and Hair and *et al.* (as cited in Habtamu 2012) suggested that the correlation coefficient can be 0.75 but a correlation coefficient above 0.8 between independent variables should be corrected for because it is a sign for multicolinearity problem. They also argued that correlation coefficient below 0.9 may not cause serious multicolinary problem.

Gujarati (2002) stated that the problem with this criterion is that, although high zero-order correlations may suggest collinearity, it is not necessary that they be high to have collinearity in any specific case. The high zero-order correlations are a sufficient but not a necessary condition for the existence of multicollinearity because it can exist even though the zero-order or simple correlations are comparatively low say, less than 0.50.

Homoskedasticicity

This one of assumptions about the error term in regression which states that the probability distribution of error has constant variance. This implies that we assume a constant variance for dependent variable across all the levels of the independent variables. This is called homoscedasticity and it enables us to pool information from all the data to make a single estimate of the variance. Data that does not show constant error variance is called heteroscedasticity and must be corrected by a data transformation or other methods.

Autocorrelation

This assumption states that the errors terms are independent of each other and with the independent variables in the model. This means the error terms are uncorrelated with each other or with any of the independent variables in the model. Correlated error terms sometimes occur in time series data and is known as auto-correlation. If there is correlation among the error terms of with error terms and the independent variables it usually implies that our model is mis-specified. Another way to view this problem is that there is still pattern left to explain in the data by including a lagged variable in time series, or a nonlinear form in the case of correlation with an independent variable.

Gujarati (2004) suggested that this assumption can be tested with the Durbin-Watson test which test for serial correlation between errors. However, unlike the t, F, or $\chi 2$ tests, there is no unique critical value that will lead to the rejection or the acceptance of the null hypothesis that there is no first-order serial correlation in the disturbances ui. However, Durbin and Watson were successful in deriving a lower bound dL and an upper bound dU such that if the computed d from table lies outside these critical values, a decision can be made regarding the presence of positive or negative serial correlation. Moreover, these limits depend only on the number of observations n and the number of explanatory

variables and do not depend on the values taken by these explanatory variables. These limits, for n going from 6 to 200 and up to 20 explanatory variables, have been tabulated by Durbin and Watson.

As a rule of thumb, if d is found to be 2 in an application, one may assume that there is no first-order autocorrelation, either positive or negative.

Normality

Descriptive analysis was conducted to establish the normality of the variables. According to Maddala (1989), normality of the variables allows the use of parametric measures during estimation and hypothesis testing. If variables are not normally distributed, then variable transformation (or increase in sample size) is necessary to make the variables normally distributed.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the results of the study which include descriptive statistics of variables, correlation results for dependent and explanatory variables, CLRM assumption test for the regression models, and regression analysis for the variables.

4.1 Descriptive statistics

In this section descriptive statistics for the dependent variable; tax revenue and explanatory variables; per capita income, agriculture share to GDP, industry share to GDP, foreign direct investment share to GDP, annual rate of inflation, foreign aid share to GDP, and trade openness involved in the regression model are presented. Mean, maximum, minimum and standard deviation values are included in the table 4.1 below. These figures gives overall description about data used in the regression models**.** Generally the following table indicates the descriptive view about the data set that consists of 17 observations of each variable.

Table 4.1 Descriptive statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
AGRI	17	34.3410	46.7221	41.429546	3.4601924
FDI	17	11.3000	21.0000	14.390000	2.4674379
PERC	17	11.2743	19.6000	14.540780	2.6003727
INDU	17	8.2190	19.6547	12.656908	2.6572812
INFLN	17	-10.7734	55.2413	12.037441	15.2563531
OPPS	17	7.7384	51.0508	23.388970	15.4215207
TR	17	8.7326	23.4657	13.391545	4.4960757

Source: Data collected from NBE, ERCA and MOFED; SPSS output

From the above statistics result the average performance of tax revenue collection in percentage of GDP at constant market price, of 1999/00-2015/16 period found to be 13.39% which relatively indicate the poor performance as compared to average of sub-

Saharan countries for the same period which is 17.46% IMF (2016). The maximum and minimum values of TR percentage were 23.466 and 8.733 respectively. The value of standard deviation is 4.496 which implies high deviation from average tax revenue percentage.

With regard to of agricultural share to GDP at constant market price, the average share of this sector was 41.43 percent which indicate the overall high share of this sector in the economy; the minimum share is 34.34 percent of 2015/2016 whereas the maximum share of this sector is 46.72 percent in 1999/2000. However its share to GDP has decreased. This shows that the countries plan to transform to industry is promising and on the good truck. The standard deviation for the sample period for this sector was 3.6 which is high enough.

The mean value and standard deviation of industry share to GDP is 12.66 and 2.66 percent respectively. This implies that industrial sector contributes lowest percentage to GDP. This is attributed to the fact that Ethiopia's economy is largely dominated by agriculture share followed by service sector.

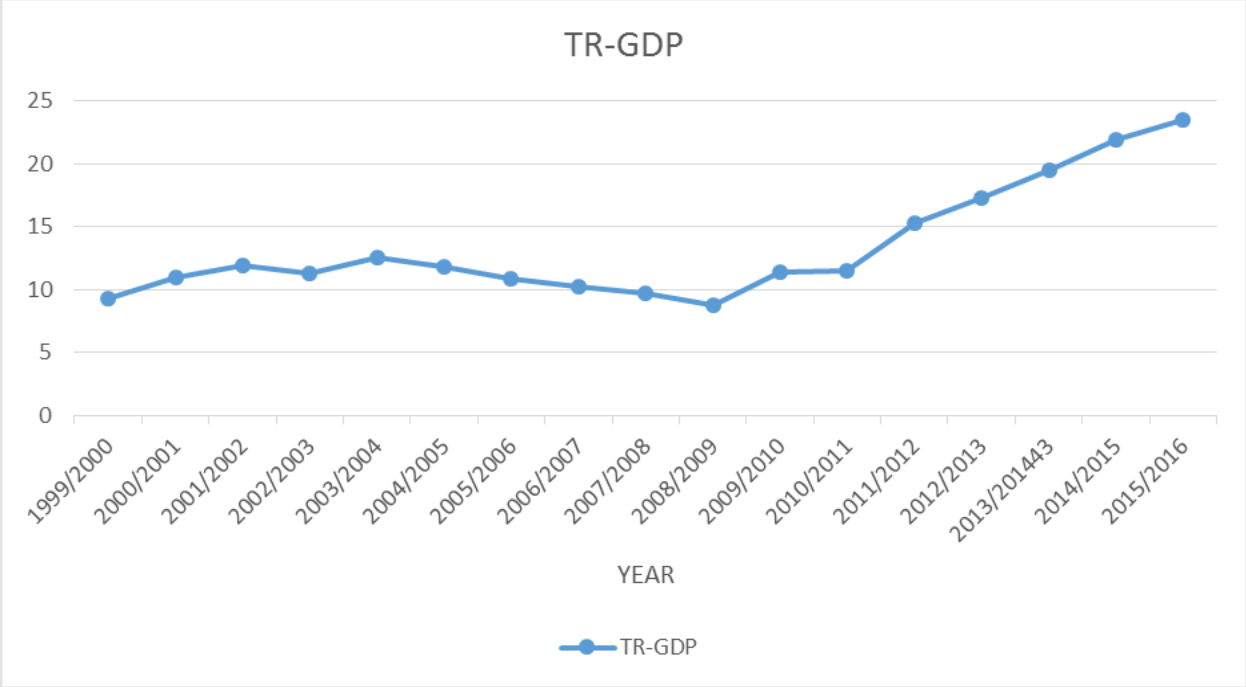
Foreign direct investment (FDI) is a category of cross-border investment in which an investor resident in one economy establishes a lasting interest in and a significant degree of influence over an enterprise resident in another economy. The descriptive statistics for foreign direct investment reveals that its mean value and standard deviation are 14.39 percent and 2.47 respectively with the minimum and maximum value of 11.3 and 21 percent respectively. This value implies the presence of higher variation in the amount of foreign direct investment in Ethiopia during the study period. Ethiopia's FDI is mainly in labor-intensive areas. Although the 32 projects launched there in 2015 accounted for only 4.4% of total investment in Africa, these made up 18.5% of the jobs from the FDI in Africa. Ethiopia has slowly been opening up to foreign investment in the manufacturing and retail sectors ADB (FDI Markets, 2016).

Inflation as measured by annual average rate for 1999/00-2015/16 period found to be 12.04% on average which indicate the overall good acceptable rate in the economy with higher standard deviation of 15.26 percent. There were big difference between the maximum inflation rate 55.24 percent in year 2008/09 due to highly increase of food price

in the year, and Minimum inflation rate equals -10.77 percent in year 2000/01 when the economy performs less. This shows countries inflation rate varies at high amount showing the economy was not stable as it is explained by the higher standard deviation for the sample period WDI (2016).

In case of trade openness measured by import plus export as percentage of GDP at constant market price, of 1999/00-2015/16 period found to be 23.39 percent on average which implies the overall low performance as a result of low movement of internationally traded goods entering into and departing from a country as compared to average of sub-Saharan countries which is 26.86% IMF (2015/16) report. There were high difference between the maximum trade openness in percentage of GDP 51.05 percent in year 2015/16, and Minimum trade openness in percentage of GDP of 7.74 percent in year 2000/01 when the economy performs less. This shows country's performance in international trade was not good.

Figure 4.1 Time series tax revenue share to GDP from 1999/2000 to 2015/16



Source: National Bank of Ethiopia staff computation

As it can be observed from the above table the trend of percentage of tax revenue share to GDP shows ups and downs i.e. not stable during last 17 years. It increases at some years and decreases at some other years. For example it has highly increased during 2003/2004 due to introduction of value added tax (VAT) in 2003 which have increased the tax base and this in turn resulted in generation of higher amount of tax revenue. In addition to this, the country's exports have also been growing strongly, averaging about 25.1 percent per annum since 2003/04. While coffee remains the largest source of merchandize export earnings, non-traditional exports have registered faster growth. Indeed, the continued rapid expansion of both these economies is likely to sustain the growth in Ethiopia's exports in the medium term. Ethiopia has also experienced strong economic growth in recent years with real GDP growth at or near double digit levels since 2003/04 AEO (2016).

However during 2008/2009 tax revenue share to GDP has shown decrement because of global financial crisis which in turn affected cross border import and export of goods and services. This in turn resulted in reduction of the amount of tax to be collected from international trade with the rest of the world. In addition to this the above graph also indicates that tax revenue share to GDP is increasing sharply since 2010/11 because the first GTP has helped to ensure sustainability of Ethiopia's economic development and brought significant changes and improvements particularly in areas of agricultural productivity, industrial development, and expansion of infrastructure ADB (2012/13).

4.2 Assumption tests of the CLRM

This section deals with testing the Classical Linear Regression Models (CLRM) assumptions. Before going further into time series econometric procedure, we should first test the assumption of classical linear regression model (CLRM). Most prior academic literature, as mentioned in literature review, examined determinants of tax revenue performance using different time series data modeling techniques.

The researcher found that the characteristics of the model and proposed variables of this research are not violating the classical assumptions underlying the OLS model. These are checked by testing each assumption as follows.

4.2.1 Heteroskedasticity test

The assumption of homoscedasticity states that the variance of the errors is constant. If the residuals of the regression have systematically changing variability over the sample, that is a sign of heteroscedasticity. White as cited by Brooks (2008) is the most popular test of homoscedasticity. However, for the regression output of the model both Breusch-Pagan/Cook-Weisberg test and white test for Heteroskedasticity were conducted on stata to test for homogeneity of variance and a P-value of greater than 0.05 is acceptable.

Table 4.2 Heteroskedastisity White test

estat imtest, white
White's test for Ho: homoscedasticity
against Ha: unrestricted heteroskedasticity
chi2(16) = 17.00
Prob > chi2 = 0.3856

Source: Heteroskedasticity test of data collected; Stata output

Table 4.3 Heteroskedasticity test Breusch-pagan

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of tr
chi2(1) = 0.23
Prob > chi2 = 0.6332

Source: Heteroskedasticity test output of data collected: Stata output

The result in the above tables revealed that the p value (= 0.3856 and 0.6332) for the model is greater than 0.05 critical value which shows homogeneity of variance across the model. Therefore heteroskedasticity does not appear to exist in this case since we fail to reject the null hypothesis of homoscedasticity at any reasonable level of significance.

4.2.2 Autocorrelation

The second important diagnostic test which is performed in this research is the autocorrelation test. According to Chris brooks (2008), assumption three said that the

CLRM's disturbance terms are the covariance between the error terms over time is zero. In other words, it is assumed that the errors are uncorrelated with one another.

They expressed as; cov (ui ,u j) = 0, this is another assumption that is made of the CLRM's disturbance terms is that the covariance between the error terms over time is zero. If the errors are not uncorrelated with one another, it would be stated that they are 'auto correlated' or that they are 'serially correlated'. The most common test of this assumption is by using the Durbin-Watson test and the Breusch-Godfrey test Brooks, (2008). The researcher used both the Breusch-Godfrey test and Durbin-Watson test in order to detect the problem of autocorrelation.

Table 4.4 Autocorrelation

bgodfrey			
Breusch-Godfrey LM test for autocorrelation			
lags(p)	chi2	df	Prob > chi2
1	0.001	1	0.9786
H0: no serial correlation			

Source: Stata computed output of data collected

As indicated in the above table the Breusch-Godfrey test implies that there is no problem of serial correlation between errors since we fail to reject the null hypothesis of no serial correlation at any reasonable level of significance.

Gujarati (2004) posited that this assumption can also be tested with the Durbin-Watson test which test for serial correlation between errors. However, unlike the t, F, or $\chi 2$ tests, there is no unique critical value that will lead to the rejection or the acceptance of the null hypothesis that there is no first-order serial correlation in the disturbances u_i.

As a rule of thumb, if d is found to be 2 in an application, one may assume that there is no first-order autocorrelation, either positive or negative.

Therefore since the regression output Durbin-Watson test result shows the value of 1.990 which is highly approached to 2.0 there is no severe autocorrelation among error terms.

4.2.3 Test for Multicollinearity

Multicollinearity exists when there are strong correlations among the predictors and the existence of correlation value between explanatory variable is greater than 0.80, tolerance value below 0.10 and Variance Inflation factor (VIF) greater than 10 in the correlation matrix are the causes for the multicollinearity existence Field, (2009); Myers, (1990); Pallant, (2007). Tolerance is a statistics used to indicate the variability of the specified independent variable that is not explained by the other independent variables in the model. Cooper and Schindler (2009) and Hailer et al (2006) suggested that multi co linearity problem should be corrected when the correlation extent to be above 0.8 and 0.9 respectively.

However in this study two variables i.e. service sector share to GDP and share of External debt to GDP are strongly correlated positively and negatively to each other and other variables with coefficient of correlation which is greater than 0.8 and their tolerance levels were also 0.029 and 0.04 which are lower than 0.1. This in turn implies the presence of near multicollinerity problem.

Brooks, (2008) suggested that near multi co linearity is much more likely to occur in practice, and would arise when there was a non-negligible, but not perfect, relationship between two or more of the explanatory variables. In addition to this if near multi co linearity is present but ignored it will result in the following problem. First, R^2 will be high but the individual coefficients will have high standard errors, so that the regressions 'looks good' as a whole, but the individual variables are not significant. Second, the regression becomes very sensitive to small changes in the specification, so that adding or removing an explanatory variable leads to large changes in the coefficient values or significances of the other variables. Finally, near multi co linearity will thus make confidence intervals for the parameters very wide, and significance tests might therefore give inappropriate conclusions, and so make it difficult to draw sharp inferences.

Even if there is relatively high positive and negative correlation existed between the above listed independent variables, there are methods for dealing with the possible existence of near multi co linearity includes Ignore it, if the model is otherwise adequate, i.e. statistically

and in terms of each coefficient being of a plausible magnitude and having an appropriate sign, Drop one of the collinear variables , transform the highly correlated variables into a ratio and include only the ratio and not the individual variables in the regression and finally if the problem didn't solved collect more additional data as explained by Brooks, (2008). Based on the above theoretical foundation the researcher has taken the following steps.

First dropped variable called share of public debt in GDP percentage since it has the highest p value of 0.3159 which is insignificant variable even at 10% significant level from the regression model including all eight variables. In addition to this the tolerance level before this variable is dropped was 0.029.After this variable is dropped the correlation matrix and collinearity statistics still shows the existence of correlation among other variables, particularly with service sector.

Next dropped variable called service sector share to GDP since it has the highest p value of 0.1160 which is insignificant variable with tolerance level of 0.07 after public debt is dropped. Its tolerance level is still lower than 0.1 from the regression model including seven variables.

Table 4.5 Collinearity statistics of explanatory variables

Variables	**Collinearity Statistics**	
	Tolerance	**VIF**
Agriculture share to GDP	0.45	2.222
Industry share to GDP	0.365	2.742
Annual Inflation rate	0.759	1.317
Trade openness to GDP	0.243	4.124
Per capita income	0.383	2.614
Foreign direct inv't to GDP	0.348	2.874

Source: Data collected from ERCA MOFED and NBE, SPSS output.

Finally as shown in the above Collinearity statistics table, the tolerance levels for all variables were greater than 0.10 and the VIF value are less than 10 after those variables (i.e. public debt and service sector share to GDP) are dropped. In addition to this the

correlation matrix of all the explanatory variables are also less than 0.80 which in turn shows the correlation among predictors were not high .Therefore there are no Multicollinearity problems among variables.

4.2.4 Assessment of Normality

In order to test the normality of data, Kolmogorov-Smirnova and Shapiro-Wilk tests of normality were used and conducted on SPSS 20. According to Field (2009), when the test is non-significant ($p > 0.05$) it shows that the distribution of the sample is not significantly different from a normal distribution.

Table 4.6 Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Tax revenue	.228	17	.119	.899	17	.105
Agriculture share to GDP	.125	17	.200*	.972	17	.854
Inflation rate	.148	17	.200*	.922	17	.161
Industry share to GDP	.206	17	.154	.920	17	.148
Trade openness share to GDP	.182	17	.138	.896	17	.140
Foreign direct inv't share to GDP	.130	17	.200*	.966	17	.753
Per capita income	.117	17	.200*	.929	17	.211

*. This is a lower bound of the true significance.

Accordingly, the result of test showed in the above table indicates that all variables were found to be normal since Shapiro-Wilk statistics is greater than 5% significance level which implies that the distribution of the sample is not significantly different from normal distribution. Hence the presence of normality was accepted at $p > 0.05$.

4.2.5 Stationary analysis

The early and pioneering work on testing for a unit root in time series was done by Dickey and Fuller.The Unit Root test or the order of integration of each variable series using the Augmented Dickey-Fuller (ADF) class of Unit Root was used. The ADF test was applied on variables to remove the stochastic trend which is generated due to the time characteristics of the data.

Table 4.7 Stationarity test

Variables	ADF Test statistics	critical value at 5%	critical value at 10%
LPERC	-6.349	-3.000	-2.630
TR	-3.772	3.600	3.24
INFLN	-3.513	-3.000	-2.630
AGRI	-3.019	-1.950	1.600
INDU	-4.423	-3.600	-3.240
OPPS	-4.589	-3.600	-3.240
FDI	-5.697	-3.000	-2.630

Source: Stata Output

As it can observed from the above table the absolute values of test statistics are greater than their respective critical value at 5% which in turn implies that, there is no stationarity problem.

4.3 Multiple Regression Analysis and summary of finding

This section presents over all the empirical results of the regressions. To examine the relationship between TR and independent variables regression analysis and correlation analysis was undertaken.

4.3.1 Correlation analysis between TR and independent variables

The TR share to GDP reflects the amount of tax revenue collected by government as indicated by its proportionate share to GDP is correlated with other independent variables either positively or negatively. In table below, the correlation analysis was undertaken between tax revenue share to GDP and explanatory variables; per capita income, agriculture sector share to GDP, industry sector share to GDP, foreign aid share to GDP, trade openness share to GDP, annual inflation rate and foreign direct investment share to GDP.

Table 4.8 Correlation matrix between TR and independent variables

		TR	AGRI	INDU	INFLN	OPPS	PERC	FDI
Pearson Correlation	**TR**	1						
	AGRI	0.773	1					
	INDU	0.696	-0.686	1				
	INFLN	0.121	0.198	0.198	1			
	OPPS	0.829	-0.423	0.318	0.182	1		
	PERC	0.733	-0.304	0.297	0.11	0.775	1	
	FDI	0.704	-0.508	0.648	-0.212	0.606	0.455	1

Source: Correlation output of data collected

As it can be seen from the above table, there was a positive correlation between TR and industry share, trade openness, per capita income and foreign direct investment while, there is a negative correlation between TR and agriculture share to GDP and inflation rate.

Inflation rate has small association with TR which is -0.121. But, Per capita income and trade openness have highest positive correlation coefficient compared to other variables which is 0.829 and 0.733 respectively. This result shows that the level of trade openness and per capita income is highly correlated with tax revenue as measured by TR share to GDP. This means that as these variables increase TR also will increase.

Table 4.9 Regression analysis results for TR and explanatory variables

R=0.989 Rsquare=0.979 Adj.Rsquare=0.966 Std.Error of Estimate=0.826786						
Durbin-Watson=1.990 F=77.192 P=0.000						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	13.342	5.33		2.503	0.031
	AGRI	-0.404	0.089	-0.311	-4.541	0.001
	INDU	0.466	0.129	0.275	3.618	0.005
	INFLN	-0.04	0.016	-0.137	-2.594	0.027
	PERC	0.63	0.236	0.199	2.672	0.023
	FDI	-0.126	0.142	-0.069	-0.887	0.396
	OPPS	0.146	0.026	0.522	5.596	0.000
a. Dependent Variable: TR						

Source: SPSS output for data collected from NBE, MOFED and ERCA

4.3.2 Model fitness

As shown on the above table the explanatory power of the tax revenue determinants in terms of R^2 is 97.8% which implies that around 98 percent of variation in tax revenue is explained by this model and this is good in time series data as explained by Brook. (2008). In this study, P>F = 0.000 which is less than 0.01. Thus, we can conclude that the model is adequate at the 1% level of significance. That is, there is a significant linear relationship between dependent variable i.e. tax revenue share to GDP and explanatory variables i.e. per capita income, agriculture share to GDP, industry share to GDP, foreign direct investment, annual rate of inflation and trade openness share to GDP. This means based on these explanatory variables we can make valid inferences about tax revenue at 1% level. As expected, the researcher observed differences in the coefficients and the significance of the variables affecting tax revenue.

Therefore, based on the above estimation result, the following estimated regression function is obtained.

$$TR = 13.342 - 0.311 * AGRI + 0.275 * INDU - 0.137 * INFLN + 0.522 * OPPS + 0.199 * PERC - 0.069 * FDI$$

Thus, the above regression equation can be used to predict the value of the dependent variable based on a set of values for the independent variables. For instance, keeping all other variables constant, on average, an increase in share of agriculture to GDP, foreign direct investment by registered capital and inflation rate by 1% reduce the tax revenue to GDP ratio by 31.1%, 6.9% and 13.7% respectively. Similarly, an increase in share of industry to GDP, per capita income and trade openness share to GDP by 1% increase tax revenue to GDP ratio by 27.5%, 19.9% and 52.2% respectively.

It can be also seen from the above table that agriculture sector share to GDP, trade openness share to GDP, and share of industry in GDP has the p value of 0.001, 0.000 and 0.005 respectively which is significant at 1% while per capita income and inflation rate has p value of 0.023 and 0.027 respectively and they are significant at 5%. The remaining variable called foreign direct investment is not significant variable even at 10% significant level. Furthermore the detail analysis of each variables and hypothesis results are discussed below.

Share of Agriculture Sector to GDP

Agriculture sector share in GDP as depicted in the above regression equation has negative and significant coefficient affecting tax revenue at 1% significance level. The result also depicts the p value of 0.001 and its coefficient result shows negative 0.331. This value implies that 1% increase in agriculture share to GDP results in 0.331 decrease in tax revenue share to GDP keeping other things constant at 1 percent significance level. Therefore, agriculture share in GDP is found to be a significant explanatory variable in the total tax/GDP equations with negative relationships. This is mainly due to the low taxable capacity associated with the bigger agricultural share in GDP. The Ethiopian economy is predominantly based on agriculture, of which a significant proportion is at the subsistence level. In addition to this a bigger agricultural share in GDP is accompanied by low industrial activities. The negative impact of agricultural sector is also reasonable since agricultural production in Ethiopia has decreased dramatically in recent decades while the share of industrial production and service sector in the GDP has increased.

These result is consistent with intuition in the empirical literature, where agriculture share is expected to have an inverse relationship with the tax revenue share to GDP. For instances Gupta (2007) proposed that agriculture sector does not generate large tax revenues and may be difficult to tax, especially if it is dominated by a large number of subsistence farmers. Moreover, a large agriculture sector may reduce the need to spend on public goods and services, which tend to be relatively urban-based. Agbeyegbe *et al.* (2004) also suggested that agricultural activities are difficult to tax, especially in low income countries, where most agricultural activities are organized on a small-scale basis. Moreover, it may be politically infeasible to tax the agriculture sector.

Tanzi (1992), also supported the above literature by suggesting that agriculture, being a salient feature of the economic structure of developing countries, influences the level of taxation from both the demand and supply point of view. Unfortunately, it is difficult to make a separation between demand and supply-side factors. Agricultural societies generally demand lower levels of public services in comparison to those with more advanced industrial structure demand. So, it is very difficult to tax the agricultural sector "explicitly", though it is often heavily taxed in many implicit ways such as import quotas, tariffs, controlled price for output, or overvalued exchange rates. Besides, small farmers are difficult to tax given that a large share of agriculture is subsistence, which does not generate large taxable surpluses, as many countries are unwilling to tax the main foods that are used for subsistence.

Chelliah et al. (1975), using a sample of 47 countries averaged over the 1969-71 period finds that mining is positively related to the tax share while agriculture is negatively related and the export ratio is insignificant. Sixteen years later, Leuthold (1991) uses panel data from Sub-Saharan countries to document a positive impact of trade on tax revenue on the one hand and a negative relationship between agriculture share and tax revenue on the other.

Ghura (1998) also concludes that the tax ratio rises with income and degree of openness, and falls with the share of agriculture in GDP. Tanzi (1992), Workneh (2016) and Eltony (2002) also found significant and negative relationship between agriculture share to GDP

and tax revenue. Therefore the result of this study is in consistent with most of intuition in the empirical literature, where agriculture share is found to have an inverse relationship with the tax revenue share to GDP.

Share of Industry Sector to GDP

Industrial value added share of GDP has positive and significant effect on tax revenue, in the study period. The result is as expected and has the coefficient of 0.275, the result also depicts the p value of 0.005 which can be interpreted as increase in the share of industry to GDP has positive effect on tax revenue which is statistically significant at 1% significance level, other things kept constant. Industrial sector is positively related with tax revenue as predicted in theory because of the fact that manufacturing enterprises are producing items that are easier to tax meanwhile, business owners typically keep better and organized records of their activities. The result lend support to argue that increase in the industrial sector would contribute more to tax revenue through increasing corporate income tax. Moreover, if production is efficient the sector can contribute a large taxable surplus.

The finding is consistent with the results of Eltony (2002) which proposed that since manufacturing enterprises are typically easier to tax than other agriculture activities because business owners typically keep better books and follow better accounting practices and manufacturing can generate larger taxable than agriculture. Mahdavi (2008) used a modified model with a number of explanatory variables based on 43 developing countries over the time period 1973-2002. In this study he founds that total tax revenue was positively related to Industry share to GDP.

Levin (2006) conducted study focuses on exploring the determinants of tax revenue by using a dataset which includes an unbalanced panel data of 39 SSA countries over a time period covering the years from 1980 to 2005. In this paper, the factors that influence the tax revenue performance are divided into three aspects including the tax base, structural factors, and the political environment including conflict. He found that industry share to GDP has significant and positive relationship with tax revenue share to GDP.

The findings of Teera (2003) for Ugandan economy and Basirat et al. (2014) for Iran economy were also in line with the above findings. Prior research like Ahmad (2010), Kadir K. (2013),Tesfaye A.(2014) also found the same result as industry share in the GDP has positive impact on tax revenue. Therefore the result of this study is in line with most intuition in empirical literature which implies the rejection of null hypothesis.

Inflation Rate

Inflation as measured by annual headline rate of inflation and taken as measure of macroeconomic instability is found to have significant effect on tax revenue in Ethiopia. The result is as expected and has the coefficient of negative 0.137, the result also depicts the p value of 0.027. This means that inflation has statistically negative impact on tax revenue at 5% significance level, other things kept constant. The result is also in line with the descriptive result and to the hypothesized sign which is strong effect that could put the government under stress, if inflationary pressure is hiking. This is attributed to the fact that increase in cost of living associated with the loss of purchasing power of money, which could ultimately leads to tax evasion by tax payers and reduce real value of tax collected.

According to Tanzi (1989) there exists a sizable time lag between the actual tax collection and the transaction to be taxed, in developing countries in which tax at time of payment is small in real value as tax obligations become lower (i.e. Olivera -Tanzi effect holds true). Furthermore, with skyrocketing price, tax evasion will increase and informal economy might be expanded, and consumers may switch to spend on items which are less likely to be taxed.

Madhavi (2008) used the advanced estimation techniques with an unbalanced panel data for 43 developing countries over the period 1973-2002 including Pakistan. His results showed that Population density, monetization and inflation rate remained negatively correlated with tax revenue.The result of this study is also consistent with the findings of Ghura (1998) and Agbeyegbe *et al.* (2004).

Trade Openness Share to GDP

Openness degree, which is measured as the share of the share of exports and imports in GDP, also have a significant impact on tax revenues. It could also be considered as an indicator of liberalization level of the economy. Certain features of international trade make it more amenable to taxation than domestic activities. In developing countries, the international trade sector is typically the most monetized sector of the economy. Entrance and exit to the country takes place in specified locations.

Imports and exports are amenable to tax as they take place at specified locations. Furthermore, most developing countries shifted away from trade taxes in the 1990s, which was largely due to the widespread liberalization of trade undertaken under the Uruguay Round. Ethiopia adopts SAP in 1992 as recommend by World Bank. From that adjustment, Trade liberalization is one policy, which the country adopts with the aim of expanding export, import and GDP of the country. Trade liberalization in Ethiopia can be classified into export promotion and import substitution. Ethiopian government eliminated restriction on exporter to promote the export and have trade surplus. In line with this, study also reveals that openness has positive relationship with tax revenue in Ethiopia and it was also indicated by Rodrik (1998) and Ghura (1998) as well as Baunssgardetal. (2005) as tax revenue and openness has positive relationship.

From the results obtained, it shows that when openness increases by 1 unit, tax revenue will increase by 0.522. Increase in openness will increases total tax revenue collection by government. It shows that this variable have a positive relationship and consistent with the economic theory.

However, the effect of trade liberalization on revenue mobilization may be ambiguous. If this liberalization occurs primarily through reduction in tariffs then one expects losses in tariff revenue. On the other hand, Keen and Simone (2004) argue revenue may increase provided trade liberalization occurs through tariffication of quotas, eliminations of exemptions, reduction in tariff peaks and improvement in customs procedure. Rodrik (1998) also points out that there is a strong positive correlation between trade openness and the size of the government, as societies seem to demand (and receive) an expanded role for

the government in providing social insurance in more open economies subject to external risks.

Per Capita Income

The model shows that tax revenue is positively and significantly influenced by gross domestic product per capita income. The result is interpreted as a 1% increase in real GDP per capita income results in approximately a raise in tax revenue percentage of GDP by 0.20 percent, other things remain constant; i.e., tax revenue as percentage of GDP does not increase as much as the raise in real GDP per capita, which might be due to tax evasion which is significant at 5% significant level.

The regression result indicates that tax to GDP ratio raise with the increase in per capita income as a measure of economic growth. Normally it is expected to have positive impact on per capita income as economic development, government's ability to collect taxes and citizen's ability to pay will increase. Beside to this Ethiopia's tax system is progressive as clearly stated on tax proclamation number 286/2002 which means a person who get high income will pay high tax under different tax schedules like personal income tax, rental income tax, business income tax and other incomes so theoretically an increase in per capita income will leads to high tax revenue.

This finding supports prior study done by Tanzi (1987) who found that per capita income effect on tax revenue as positive and significant by taking the data of only developing countries. Ahsan and Wu (2005) examined the tax share in developing countries for 1979-2002 and found GDP for those countries and GDP per capita has positive and significant relation with tax revenue.

The finding is also in consistent with priori expectations and the findings of Chelliah (1971); Gupta (2007) and Karagöz (2013). Moreover, the empirical result is also in agreement with the descriptive analysis. The result lends support to argue that with economic development especially at the initial stages of development, the demand for public services will increase and as a result, tax revenue will increase to finance the raising

demand for expenditure. However, Madhavi (2008) found GDP per capita was strongly and negatively correlated with the level of taxation.

Clausing (2007), regression analysis shows that the share of the value added of the corporate sector, profit level GDP per capita and GDP growth have a positive impact on tax revenue. Lotz and Morss (1967) find that per capita income and trade share are determinants of the tax share, and this finding has been replicated also by Piancastelli (2001). In addition to this several studies, including Chelliah (1979), Baas and Kelly (1975) and Tait, Grätz and Eichengreen (1979), obtained similar results. Therefore the result of this study is in line with the findings of most studies conducted in many least developed countries, where economic development helps to increase taxpayer's ability to pay tax and improve efficiency of tax authorities in tax collection in the long run. Hence, the null hypothesis will be rejected.

Foreign Direct Investment

Foreign direct investment (FDI) is a category of cross-border investment in which an investor resident in one economy establishes a lasting interest in and a significant degree of influence over an enterprise resident in another economy. As current study shows the relationship between tax revenue and foreign direct investment is positively related and statically significant. This also indicated by Diego (2006), who examined the effect of foreign direct investment (FDI) on tax revenue performance for a group of Latin American countries and FDI exerts a significant positive effect on central government tax revenues. In addition Haider M & A.R Chaudhary (2013) also found that foreign direct investment and gross domestic product per person employed have positive and significant effect on tax revenue.

However the researcher found that in case of Ethiopia the effect of FDI on tax revenue is not as expected and deviates from prior research findings. From the regression result researcher concluded that even if previous researcher didn't support in Ethiopian context foreign direct investment to GDP percentage has negative and insignificant effect on tax revenue even at 10% significance level. Tesfaye (2014) in his study entitle determinants of

tax revenue in Ethiopia using time series data of fifteen years from 1999/00-2013/14 also found as foreign direct investment have significant negative effect on tax revenue.

Even though investment measured in terms of capital registered in Ethiopia shows an increment in the period covered in the research due to incentives given by government like duty free import of raw materials and machineries, low price of lease land, tax holly day from minimum two years to maximum of six years as investment well explained on investment proclamation number 280/2002, investment regulation number 84/2003 and 270/2012 and related directives issued by Ethiopian investment Agency and Ethiopian Revenue and Customs authority which in turn will relatively reduce the amount tax collected by central government from those investment as compared to their capital investment. In addition to this the researcher also suggest that the effect of foreign direct investment on tax revenue is not immediate and the above indicated tax holly day and duty free incentives provided by Ethiopian government to attract foreign investors affect collection of tax revenue negatively.

Generally the researcher found that foreign direct investment share to GDP affects tax revenue negatively but statically it's insignificant. Therefore the null hypothesis will be not rejected.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

Summary of findings

This is the last chapter of the paper which deals about the conclusion driven from the analysis of the study and possible policy recommendations that are made by researcher based on the major findings of the study.

5.1 Conclusion

This paper analyzes the determinants of tax revenue performance in Ethiopia by using a dataset over a time period covering the years from 2000 to 2016. In countries like Ethiopia, where material and financial resources are in acute shortage so as to carry out various developmental goals, the need to enhance domestic revenue mobilization (i.e., increasing tax effort) is crucial. Hence, the study investigated the determinants of tax revenue in Ethiopia.

As evidenced from different literatures, tax revenue has remained to be the largest contributor of the total government revenue in Ethiopia. However, the share of tax revenue to GDP is very low, which would imply that domestic resource mobilization is at an infant stage in Ethiopia

The results of the regressions considering tax revenue as dependent variable and independent variables which includes share of Industry in GDP, foreign direct investment, inflation rate, share of agriculture sector in GDP, industry share to GDP and per capita income reveals that the explanatory power of the determinants of tax revenue as explained by R^2 is 97.9% which in turn implies that around 98 percent of change in tax revenue is explained by those explanatory variables whereas the remaining 2 percent is explained by other variables that are not incorporated in the model.

From the output annual rate of inflation and agriculture share to GDP were found to have statistically significant and negative effect on tax revenue share to GDP. Foreign direct investment has also negative effect on tax revenue, but it is not significant. In addition to

this trade openness share to GDP, industry sector share to GDP and per capita income were found to have statically significant and positive effect on tax revenue.

The fact that industry value added share, real gross domestic product per capita income, agriculture value added share and trade openness were significant, was sufficiently enough to claim that structural variables contribute much for tax revenue generation. The finding is consistent to economic theory.

Inflation remained significant determinants of tax revenue in Ethiopia. Ethiopia has not been a high inflation country before 1975. Coupled with policy changes and occurrence of natural calamities (worst drought) that has resulted in acute shortage of agricultural food production since recent years the country come to face higher inflation. This made tax payers to put their tax liability a side and began to worry about satisfaction of their daily consumption, owing to loss of purchasing power of money. Therefore, the effect of price instability has been holding back tax revenue collection in Ethiopia. This is exactly what was observed in this study.

To sum up, a number of variables affect tax revenue in Ethiopia as evidenced in the empirical findings presented in this study. This study examined a different relationship between tax revenue and its determinants. These relationships are indicative of the role of policies pursued by the country that have a strong influence on a tax revenue generation. Empirical findings of the study revealed that structural factors, macroeconomic condition and external sector are the main policy instruments for tax revenue in Ethiopia.

The most noteworthy achievement of this study is that the result of sectorial composition of the economy is congruent with the broad and pro poor economic policy of Ethiopia. That means the industrial sector contributes a lot to tax revenue whereas, agriculture sector contributes low to tax revenue. Finally, the study concludes that tax revenue performance in Ethiopia is disappointing; i.e., although, it shows promising trend since a recent past, tax to GDP ratio remained low during the last decade, in which raising tax revenue level shall be at the heart of policy makers.

5.2 Recommendation

Based on the findings of this study the following recommendation and policy implications were forwarded as an alternative to improve the performance of the tax system, having in mind the contributions it makes to the development of the economy in general.

- The taxation of the agricultural sector value-chain inputs may not be a viable alternative at the moment. However the modernization of Peasant agriculture is a step in the right direction since it could not only lead to a reduction in the large subsistence sector component therein but also it would make it possible to maximize tax collection from this the output of the sector by bringing the biggest agricultural share into the tax net – a reduction in the subsistence agriculture will eventually lead to increased tax collection.

- Therefore this study recommends that the Ethiopian government shall take measures to transform and modernize peasant agriculture thereby reducing the large subsistence sector component therein which will in turn grow the agriculture sector to the levels where it can be easily taxed.

- Moreover, due to the significant effect of industrial value added share of GDP on tax revenue, the country has to do with a paradigm shift from the agriculture to the development of the industrial sector, while maintaining the inter relationship between the two sectors. Likewise, the government has to take care of enacting policies that can promote industrial production and it has to strive forward to bring small industries into medium and large industries. The current economic growth performance is also has to be extended.

- Macroeconomic instability erodes the purchasing power of the people and reduce the value of revenue collected in real terms. Hence, individuals may not avail to pay tax; i.e., they attempted to evade from the tax authority and underreport their actual earning which will understate the amount that would otherwise be collected. Even the economy may exhibit large informal sector. Therefore, the government of

Ethiopia shall regulate the macroeconomic situation of the country and find new tax items along with formalizing the underground economy.

- Since the overall tax to GDP ratio is higher in more open economies, because of the reason that they are relatively easier to assess and enforce than domestic taxes, as monitoring the entry and exit of goods into and from the country is generally straightforward, it is advisable for the government of Ethiopia to formulate strategies that will promote international trades. This study also recommends as introduction of new tax bases have to be considered so as to bring efficient tax administration and enhance revenue growth.

- Therefore, improving the efficiency of tax administration, broadening tax bases like, boost in industrial and modernizing agricultural sector, imposing some tax on foreign direct investment by reducing incentives given shall be given due attention by policy makers. Strategies that will increase economic growth should be facilitated. Therefore, along with extending the current fascinating economic growth, factors that would hold back the growth in tax revenue has to be checked. This requires policy makers to put good policies in place, which will ensure that tax collection increases as the economy grows.

5.3 Future Research Direction

The author suggest that since the time period covered under this study is only seventeen years ranging from 1999/00 to 2015/16, due to unavailability of organized data for long period of time , the author forwards that other researchers can expand the study period and include other macroeconomic as well as social variables such as corruption, public awareness, expenditure, urbanization, level of education, monetization administrative issues and so on should be seen by someone else that were not considered in this model. This can help improve tax revenue generation which in turn enhances national development**.**

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Appendix A

Summary of descriptive statistics, regression analysis and test of Classical Linear Regression Model (CLRM) of collected data.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
TR	17	8.7326	23.4657	13.391545	4.4960757
AGRI	17	34.3410	46.7221	41.429546	3.4601924
INDU	17	8.2190	19.6547	12.656908	2.6572812
INFLN	17	-10.7734	55.2413	12.037441	15.2563531
OPPS	17	7.5039	51.8639	25.513671	16.0860243
LPERC	17	12.7267	16.9800	15.044459	1.4174708
FDI	17	11.3000	21.0000	14.390000	2.4674379

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.989[a]	0.979	0.966	0.8267855	0.979	77.192	6	10	0	1.99

a. Predictors: (Constant), FDI, INFLN,L PERC, AGRI, INDU, OPPS

b. Dependent Variable: TAX

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	316.599	6	52.767	77.192	.000[b]
	Residual	6.836	10	0.684		
	Total	323.435	16			

a. Dependent Variable: TR

b. Predictors: (Constant), FDI, INFLN, LPERC, AGRI, INDU, OPPS

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	13.342	5.33		2.503	0.031					
	AGRI	-0.404	0.089	-0.311	-4.541	0.001	-0.773	-0.821	-0.209	0.45	2.222
	INDU	0.466	0.129	0.275	3.618	0.005	0.696	0.753	0.166	0.365	2.742
	INFLN	-0.04	0.016	-0.137	-2.594	0.027	-0.121	-0.634	-0.119	0.759	1.317
	OPPS	0.146	0.026	0.522	5.596	0.0000	0.829	0.871	0.257	0.243	4.124
	LPERC	0.63	0.236	0.199	2.672	0.023	0.733	0.645	0.123	0.383	2.614
	FDI	-0.126	0.142	-0.069	-0.887	0.396	0.704	-0.27	-0.041	0.348	2.874

Coefficient Correlations								
Model			FDI	INFLN	LPERC	AGRI	INDU	OPPS
1	Correlation	FDI	1	0.346	0.134	-0.145	-0.538	-0.531
		INFLN	0.346	1	0.094	-0.221	-0.11	-0.377
		LPERC	0.134	0.094	1	-0.148	-0.187	-0.692
		AGRI	-0.145	-0.221	-0.148	1	0.592	0.345
		INDU	-0.538	-0.11	-0.187	0.592	1	0.324
		OPPS	-0.531	-0.377	-0.692	0.345	0.324	1
Dependent Variable: TR								

Correlation analysis between independent variable

	AGRI	INDU	INFLN	OPPS	LPERC	FDI
AGRI	1					
INDU	-0.686	1				
INFLN	0.198	-0.198	1			
OPPS	-0.423	0.318	0.182	1		
LPERC	-0.304	0.297	0.11	0.775	1	
FDI	-0.508	0.648	-0.212	0.606	0.455	1

```
. estat imtest, white

White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(16)      =     17.00
         Prob > chi2   =    0.3856
```

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of tr

        chi2(1)      =     0.23
        Prob > chi2  =   0.6332
```

```
. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
```

lags(*p*)	chi2	df	Prob > chi2
1	0.001	1	0.9786

H0: no serial correlation

Table 4.7 Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Tax revenue	0.228	17	0.119	0.899	17	0.105
Agriculture share to GDP	0.125	17	.200*	0.972	17	0.854
Inflation rate	0.148	17	.200*	0.922	17	0.161
Industry share to GDP	0.206	17	0.154	0.92	17	0.148
Trade openness share to GDP	0.182	17	0.138	0.896	17	0.14
Foreign direct inv't share to GDP	0.13	17	.200*	0.966	17	0.753
Per capita income	0.117	17	.200*	0.929	17	0.211

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Stationary test

```
. dfuller LPERC, trend lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.204           -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0044


Dickey-Fuller test for unit root                   Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -6.349           -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
. dfuller INFLN, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
———————————————————————————————————————————————————————————————————————————
 Z(t)             -3.513           -3.750            -3.000           -2.630
———————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0077


. dfuller INFLN, trend lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
———————————————————————————————————————————————————————————————————————————
 Z(t)             -5.782           -4.380            -3.600           -3.240
———————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0000


. dfuller OPPS, noconstant lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
———————————————————————————————————————————————————————————————————————————
 Z(t)              3.069           -2.660            -1.950           -1.600


. dfuller OPPS, trend lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
———————————————————————————————————————————————————————————————————————————
 Z(t)             -4.589           -4.380            -3.600           -3.240
———————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0011
```

```
. dfuller FDI, trend lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -6.327           -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000


. dfuller FDI, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -5.697           -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000


. dfuller TR, trend lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.772           -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0181

. dfuller TR, noconstant lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.411           -2.660            -1.950            -1.600
```

```
. dfuller AGRI, noconstant lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.019            -2.660            -1.950            -1.600
------------------------------------------------------------------------------

. dfuller AGRI, trend lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.154            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0053

. dfuller AGRI, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.309            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0004

. dfuller INDU, regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        16

                                 ---------- Interpolated Dickey-Fuller ----------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.487            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0083
```

```
. dfuller INDU, trend lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        16

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.423            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0020
```

Appendix B

Summary of data used for analysis with their sources (in millions of Birr)

YEAR	GDP	PD	FDI	TR	Import	Export
2000	65,986	52789	8954.3309	6130.571	11438.66	3957.802
2001	67,351	46,268.8	8897.0681	7393.062	12313.96	3866.606
2002	65,895	52,994.3	8981.55	7857.94	14485.29	3864.32
2003	72,703	58,281.5	8215.4074	8194.303	16067.35	4142.356
2004	85,800	63077.5854	12827.105	10770.99	22295.69	5176.644
2005	105,415	51192.8736	13366.624	12397	31434.17	7331.258
2006	130,334	52073.2389	16982.479	14158.75	39873.08	8685.376
2007	170,280	20354.935	25525.033	17353.09	45126.44	10457.62
2008	245,836	25579.0748	32007.883	23802	63146.95	13649.34
2009	332,060	45351.8084	50340.312	28997.54	84677.19	15217.75
2010	379,135	72617.7444	56832.3	43315.36	108956.3	26115.31
2011	515,079	125841.335	61809.425	58980.78	129693.4	44525.57
2012	747,326	153361.212	111874.78	114498.2	191587.1	54494.77
2013	866,921	204194.569	104463.99	149908.1	196871	56014.33
2014	1,060,825	267144.481	159972.47	206951.7	251047.5	62243
2015	1,297,961	383666.401	246612.67	284865.6	330794.2	59860.38
2016	1,528,044	458849.864	320889.29	357813.9	353013.9	59726.3

Source: NBE, ERCA and MOFED

GDP by Economic Activities at Constant Price of 2010/11 (in millions of Birr)

YEAR	AGRI	INDU	SERV
2000	30012.168	7851.413	25070.297
2001	29038.404	8356.272	26141.844
2002	25963.109	8685.353	27042.566
2003	27602.334	9713.214	31081.043
2004	33795.437	11250.798	33844.627
2005	44199.664	12792.32	40806.337
2006	56438.832	15548.359	50173.014
2007	73286.778	20364.092	66141.552
2008	113112.392	25873.562	92139.521
2009	155145.473	32978.982	128491.269
2010	160019.421	27369.585	156376.261
2011	212469.712	49780.498	216616.659
2012	331296.881	70817.69	292194.1

2013	357513.967	94880.672	351826.668
2014	408630.467	142905.746	432935.985
2015	468005.637	211539.077	527822.955
2016	524745.573	300332.584	602482.481

Source: Ministry of Finance and Economic Development (MOFED)

Original Data Used for Analysis

Year	OPPS	INFLN	FDI	TR	AGRI	INDU	LPERC	SERV	PD
2000	7.7384	1.8942	13.57	9.2907	45.4825	11.8986	14.84	34.8839	81
2001	7.5039	-10.7734	13.21	10.9769	43.115	12.407	14.45	33.7881	74.6
2002	8.3837	-1.2219	13.63	11.9249	39.4005	13.1805	13.7246	34.4008	87.2
2003	9.438	17.7734	11.3	11.271	37.966	12.3602	12.7267	37.0968	86.9
2004	11.2811	2.383	14.95	12.5536	39.3886	12.1128	13.91	34.555	81
2005	14.2445	10.7473	12.68	11.7602	41.9292	13.1352	15.8733	34.7615	53
2006	16.1073	10.8199	13.03	10.8635	43.3033	13.9297	13.8293	35.6939	43.42
2007	16.5469	15.1027	14.99	10.1909	43.0389	13.9592	12.9629	36.9483	12.95
2008	20.6434	55.2413	13.02	9.6821	46.0113	11.5247	15.837	38.7267	11.23
2009	24.7058	2.7069	15.16	8.7326	46.7221	9.9316	13.8	40.5472	14.58
2010	29.6509	7.3214	14.99	11.4248	42.2065	8.219	15.87	40.634	18.96
2011	33.8238	38.0441	12	11.4508	41.25	9.6646	14.75	42.0551	24.43
2012	43.9729	20.804	14.97	15.321	44.3309	10.4761	15.654	42.425	20.52
2013	40.8643	7.3937	12.05	17.292	41.2395	11.9446	16.74	41.8249	23.66
2014	45.9129	8.5	15.08	19.5086	38.52	14.4712	16.93	42.8469	25.18
2015	51.8639	10.4	19	21.9471	36.057	16.2978	16.878	43.1532	29.55
2016	51.0508	7.5	21	23.4657	34.341	19.6547	16.98	43.7007	30

Source: Researcher computation using data collected from NBE, MOFED, and ERCA