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Factors Influencing Tax Revenue in Ethiopia

(Co-integration approach)

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A Thesis Submitted to the Department of Accounting and Finance of Addis Ababa University in Partial Fulfillment of the Requirement for the Degree of Master in Business Administration in Finance

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Statement of Declaration

I, Daniel Regassa Worji, hereby declare that this thesis entitled "Factors Influencing Tax Revenue in Ethiopia (Co-integration approach)" submitted to the Department of Accounting and Finance in partial fulfillment of the requirements for the degree of Master of Business Administration in Finance, Addis Ababa University at Addis Ababa, Ethiopia, is my original work and it has never been presented in any university. I have made it independently with the close advice and guidance of my advisor. All sources and materials used for this thesis have been duly acknowledged.

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This is to certify that the thesis entitled "Factors Influencing Tax Revenue in Ethiopia (Co-integration approach)" was carried out by Daniel Regassa Worji under the supervision of Degefe Duressa (PhD), submitted in partial fulfillment of the requirements for the degree of Master of Business Administration in Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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List of Acronyms and Abbreviations

ADF	Augmented Dickey Fuller
AGR	Agricultural value added (%GDP)
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
CPI	Consumer price index
CSA	Central Statistics Agency
CUSUM	Cumulative Sum of Recursive Residuals
CUSUMSQ	Cumulative Sum of Squares of Recursive Residuals
ECM	Error Correction Model
EPRDF	Ethiopian People's Revolutionary Democratic Front
ERCA	Ethiopian Revenue and Customs Authority
EXH	Exchange rate
GDP	Gross Domestic product
GDPPC	Gross domestic product per capita income
IND	Industrial value added (%GDP)
LAGR	Log of agricultural value added (%GDP)
LCPI	Log of consumer price index
LEXH	Log of the official exchange rate
LGDPPC	Log of gross domestic product per capita income
LIND	Log of industrial value added (%GDP)
LOPN	Log of trade openness
LTR	Log of tax revenue (%GDP)
LURB	Log of urbanization rate
NBE	National Bank of Ethiopia
OECD	Organization for Economic Co-operation and Development.
OPN	Trade openness
TR	Tax revenue (%GDP)
URB	Urbanization rate
VAT	Value Added Tax

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Abstract

The government capacity to mobilize domestic resources is a crucial factor in the courses of poverty reduction and its overall economic development. Ethiopia's actual tax revenue as a share of GDP is low which has been a problem for the economic development. The main objective of this study is to empirically examine the factors influencing tax revenue in Ethiopia for the period ranging from 1981 to 2016, using Auto Regressive Distributed Lag (ARDL) approach to co-integration. A set of factors that can potentially influence tax revenues such as GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate; exchange rate and urbanization rate are considered in the econometric analysis. The result revealed that in the long run real GDP per capita income and exchange rate positively and significantly affect tax revenue for the period selected for this study. However, inflation exerted a negative and significant influence on tax revenue. Whereas, in the short run Real GDP per capita income and urbanization rate have negative effect, whereas agricultural value added share of GDP and exchange rate have positive effect on tax revenue in Ethiopia. The sign of real gross domestic product per capita income and agricultural value added share of GDP are contrary to the priori expectation in the short run. Furthermore, the coefficients of the lagged error correction model (ECM (-1)) is significant and negative as expected, which imply the existence of economic or government forces that restore the long run equilibrium from short run shocks. Finally, the study recommends measures such as controlling the informal sector in the industry through effective administration; assessing the tax incentives procedures to large enterprises (industries) along with the degree of tax evasion; effectively regulating the macroeconomic situation of the country; improving the capability of tax authority in terms of competency of man power and infrastructure in tax system; and creating awareness on the importance of tax revenue for the development of a country.

Keywords: *Tax revenue, time series analysis, ARDL co-integration approach, long run, Ethiopia.*

Chapter 1 : INTRODUCTION

1.1 Background of the Study

Tax is a major source of government revenue all over the world. Government use tax proceeds to render their traditional functions, such as provisions of public goods, maintenance of law and order, defense against external aggression, regulation of trade and business to ensure social and economic maintenance.

One of the most important responsibilities of any government is to manage fiscal policies. A country's government must decide who to tax and how much to tax, in order to raise revenues for government services provided to the public. They must also decide what to spend the tax revenues on, whether it is defense, public infrastructure, or redistribution programs. Spending decisions by the government may affect the livelihood and incomes of millions of state employees and also those that rely on income redistribution programs like unemployment compensation, nutrition programs and state run health care. The provisions of roads, ports and other government facilities through public spending can also indirectly influence the productivity of a nation because the private sector may be able to use these added investments to generate an increase in efficiency or productivity for themselves.

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 (Karagoz, 2013).

The aim of this study is to investigate the determinants of tax revenue in Ethiopia by considering tax revenue measured as percentage of tax collected in the year to GDP ratio as dependent

variable and Per Capita Gross Domestic Product has been used in the conventional tax effort literature as a proxy for the level of development of a country (Chelliah 1971), inflation rate, foreign direct investment, exchange rate, openness (trade) and urbanization as independent variables by using past thirty six years data in the context of Ethiopia.

1.2 Statement of the Problem

In many developing countries it's observed that there is low capacity of tax administration to monitor compliance among rental taxpayers (Tanzi, 1992). Ethiopia, like any other developing countries, faces difficulty in raising revenue to the level required for the promotion of economic growth. Hence, the country has been experiencing a consistent deficit of expenditure over revenue for long period of time. To tackle this problem the government impose tax (direct and indirect), among others; as major and important sources of public revenue. However, this imposition of tax couldn't still bring 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 (Tadele, 2010).

The capacity of any government to mobilize domestic resources is a crucial factor in the process of poverty reduction and its overall economic development. Ethiopia's actual tax revenue as a share of GDP is low compared to that of the average for Sub-Saharan African and low income countries. The share of tax revenue in GDP hardly changed, suggesting that tax revenue (which should rise relative to GDP due to progressive rate structure) has failed to grow as much as expected with the overall economic growth. This situation in the revenue system might be due to such things as poor tax compliance behavior and weak tax administration (World Bank, 2016).

In Ethiopia various efforts aimed at obtaining optimal fiscal policies with emphasis on the role of taxation as an instrument of economic development has been implemented (Alemayehu and Abebe, 2005). General government revenue, including grants reached Birr 243.6 billion in 2015/16 and its GDP ratio remained at 15.1 percent. About 82.3 percent of the total domestic

revenue came from tax sources which recorded 14.8 percent annual growth and owing to improved collection of direct taxes (18.2 percent) and indirect taxes (12.8 percent). Direct taxes contributed 37.5 percent to total tax revenue while that of indirect taxes was 62.5 percent. At the same time, Birr 40.9 billion was collected from non-tax sources which exhibited a 92.2 percent surge largely due to remarkable increase in collection from government investment income and sales of goods and services (NBE 2015/16).

The role of tax revenue is vital in bringing economic development, where its efficiency 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.

Workineh (2016) examined the major determinants of tax revenue in Ethiopia for the period ranging from 1975-2013, using Johansen maximum likelihood co-integration approaches and finds that inflation rate negatively influence on tax revenue and foreign aid positively and significantly affect tax revenue. But Belay (2015) showed inflation rate positively influence tax revenue and foreign aid negatively influence on tax revenue which reveals contrary to Workineh's findings. On the other hand, the results of Workineh's study is congruent with the findings of Ghura (1998), Agbeyegbe et al. (2004), Tanzi (1992), Mahdvi (2008) and Sinbo and Muibi (2013) which resulted tax revenue is negatively affected by inflation, and also consistent with Teera (2003) of Uganda, and Gupta (2007) in that of foreign aid.

These are conflicting results which needs further investigation to identify determinants of tax revenue in Ethiopia. The main focus of this study is to identify the variables which affect tax revenue in Ethiopia. Besides, previous studies in Ethiopia did not incorporate some variables with an implication of social, political, cultural and economic factors and also institutional variables, and therefore, this study extends previous similar studies in Ethiopia by including degree of urbanization and exchange rate stability.

1.3 Objective of the Study

General Objective

The general objective of the study is to examine the factors that influence tax revenue in Ethiopia both in the long run and in short run.

Specific Objectives

In order to achieve the major objective, the researcher developed the following specific objectives:

- **i.** To examine the impact of GDP per capita income on tax revenue.
- **ii.** To examine the effect of Industry value added share of GDP on tax revenue.
- **iii.** To examine the effect of agricultural value added share of GDP on tax revenue.
- **iv.** To examine the effect of trade openness on tax revenue.
- **v.** To investigate the impact of inflation rate on tax revenue.
- **vi.** To examine the impact of exchange rate on tax revenue.
- **vii.** To examine the effect of urbanization on tax revenue.

1.4 Hypotheses Formulation

The following null hypotheses were formulated and tested:

Ho_1: There is no significant relationship between GDP per capita income and tax revenue.

Ho_2: There is no significant relationship between industry value added share of GDP and tax revenue.

Ho_3: There is no significant relationship between agricultural value added share of GDP and tax revenue.

Ho_4: There is no significant relationship between trade openness and tax revenue.

Ho_5: There is no significant relationship between inflation rate and tax revenue.

Ho_6: There is no significant relationship between exchange rate and tax revenue.

Ho_7: There is no significant relationship between urbanization and tax revenue.

1.5 Scope of the study

The study focus on investigating the factors that influence tax revenue in Ethiopia by taking past year data collected from various sources. It was conducted in Ethiopia by taking into account past thirty six years data from 1980/81 to 2015/16 based on annual report budget closing year of Ethiopia (July 7).

Seven variables such as, GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate and urbanization were selected as independent variables from various number of variables studied in the past and tax revenue as dependent variables in this study.

The unit root test and co-integration technique are used to verify the stationarity of data and long run relationships respectively among the variables. Also, Auto Regressive Distributed Lagged (ARDL) Model and Error Correction Model (ECM) are applied to examine the speed of adjustment toward the long run equilibrium. The sources of data are from NBE, MoFED and CSA.

1.6 Limitation of the study

The study is limited to the seven independent variables to investigate the factors that affect tax revenue. The study uses GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate and urbanization as independent variables. The variables are selected owing to their ability to influence the level of tax revenue performance.

The time period selected in the study covers thirty six years data from 1980/81 to 2015/16 due to the unavailability of well-organized report for some variables under the study.

1.7 Significance of the study

Firstly, the study brings out a start for further academic research through examining the factors influencing tax revenue in Ethiopia. This enables to enhance the understanding of academicians

about the gaps, which exist between what known taught and what will observed through empirical study conducted.

Secondly, the empirical evidence of this research will help to expand the knowledge of the predictive results of the country policy makers. Ethiopian government will be benefited in making policy measures under taken; Ethiopian revenue and customs authority will be benefited in increasing its performance in tax collection.

Thirdly, this study will contribute to the conflicting results on determinants of tax revenue in Ethiopia. The organized theoretical and conceptual framework of this study will further help and contribute for better understanding about the factors influencing tax revenue in Ethiopia

1.8 Organization of the study

This study has been structured into five chapters. The current chapter discusses about the background of the study, statement of the problem, objectives of the study, hypotheses formulation, scope of the study, limitation of the study and significance of the study. Chapter two undertakes a review of literature on theoretical and empirical literatures on determinants of tax revenue and related studies. Chapter three deliberates the methodology used for the study. Chapter four presents data discussion and analysis. Chapter five provides conclusions and recommendations.

Chapter 2 : REVIEW OF LITERATURE

In this chapter the theoretical part and empirical parts of past literature was discussed in detail from the introduction of taxation to research conducted on the world and in Ethiopia related to the determinants of tax revenue.

2.1 Theoretical perspectives

The theoretical part of the literature covered topics like Definition of Taxation, Objective of Taxation, Principles of Taxation and Determinants of tax revenue.

2.1.1 Definition of taxation

In the *OECD* classification, the term "taxes" is confined to compulsory, unrequited payments to general government. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments.

The *Oxford Advanced Learner's D*ictionary defines 'tax' as: "Money that has to be paid to the government so that it can pay for public services". People pay tax according to their income and businesses pay tax according to their profits. It is often paid on goods and services.

2.1.2 Objectives of Taxation

The objectives of taxation in developing countries are virtually the same. Unfortunately however, the objectives of the tax system and the relationship between these objectives are hardly clearly stated (Cutt, 1969). This does not only makes tax administration difficult but also give room for tax evasion with the attendant effects on economic development. Cutt (1969) therefore, state that a brief discussion on the objectives of taxation as outline below would be a gainful exercise.

i. ***Raising of Revenue****:* The classical function of a tax system is the raising of the revenue required to meet government expenditure. This income is required to meet the expenditure which is either the provision of goods and services which members of the public cannot provide such as defense law and order to the provision of goods and

services which the federal and state governments feel are better provided by itself such as health services and education.

ii. ***Wealth Redistribution:*** In modern times, great emphasis has come to be placed on the objective of redistribution of wealth. This has two quite distinct forms. The first is the doctrine that taxation should be based on ability to pay and is summarized by the saying that "the greatest burdens should be borne by the broadest backs." The second form presupposes that the present distribution is unjust and concludes that this should therefore be undone. This second principle sees confiscation as a legitimate objective of taxation.

iii. ***Economic Price Stability:*** It has been said that the most fundamental reason a government has for taxing its citizens is to provide a reasonable degree of price stability within the nation (Summerfield, 1980). Most spending by the public and private sectors without taxes generates high demand, which is inflationary. In such a situation, the basic function of taxation is to reduce private expenditure in order to allow government to spend without causing inflation. Thus, taxation is basically a deflationary measure. On the other hand, when aggregate demand is lower than the deserved level, government has two options which are to increase government spending with increasing taxes or to reduce taxes while leaving government spending stable.

iv. ***Economic Growth and Development:*** The overall control or management of the economy rests on the central government and taxation plays an important role in this direction. In addition to maintaining reasonable price stability, governments are determined to promote the near-full employment of all the resources of the country (including human resources i.e. labour) and ensure a satisfactory rate of economic growth. Economic growth and development programmes are geared towards raising the standard of living of the masses of a country through the improvement of their economic and social conditions. Taxation in one way discourages, postpones or reduces consumption and encourages saving for private investments.

This is only possible when the basic necessities of life including security, law and order, education and communication are provided by government, hence, the national development plans of developing countries are considered to be important. This objective will be of great assistance to Nigeria where there is mass unemployment of labour force and economic resources.

According to Soyode and Kajola (2006) the responsibilities or objectives of government using taxation are as follows:

a) ***Revenue Generation:*** The primary objective of a modern tax system is generation of revenue to help the government to finance ever-increasing public sector expenditure.

b) ***Provision of "Merit Goods":*** An important objective of tax system is the promotion of social, economic and good governance through provision of merit goods. Examples of merit goods are health and education. These must not be left entirely to private hands though, private participation should be encouraged. Private enterprises will push the cost of providing education and health services beyond the reach of common people if left entirely in their hands.

c) ***Provision of "Public Goods":*** Provision of commonly consumed goods and services for which an individual cannot be levied the cost of the goods or services consumed are one of the functions of government. Examples of public goods include:

- Internal security through maintenance of law and order by police and other security agencies;
- External security through defence against external aggression by Army, Navy and Air Forces, and
- Provision of street lights and roads.

d) ***Discouraging consumption of "Demerit Goods":*** Tax can be used to discourage consumption of demerit or harmful goods like alcohol and cigarette. This is done to reduce external costs to the society. These external costs include health risks and pollution.

e) ***Redistribution of Income and Wealth****:* Tax system is a means of ensuring the redistribution of income and wealth in order to reduce poverty and promote social welfare. For example, taxation can be used as economic regulator for promotion of economic stability and sustainable growth through fiscal policy. Government also has responsibility for fighting inflation, unemployment and creating a sound infrastructure for business. A tax system is one of the means of achieving this.

f) ***Harmonization of Economic Objective****:* Harmonization of diverse trade or economic objectives of different countries is one of the modern objectives of tax systems. For example, tax system can be used to achieve the philosophy of the single market in ECOWAS or Africa so as to provide for the free movement of goods/services capital and people between members states.

2.1.3 The Principles of Taxation

As cited on Samuel and Tyokoso's (2014) study, Adam (1910) maintained in his book "The Wealth of Nations" gave the most important set of principles, which are also known as the "cannon of taxation" which are still accepted generally by tax administrators all over the world. The principles of taxation are outlined below:

i. ***Equity/Equality of Sacrifices:*** Adam Smith maintained in these principles that each tax payer should contribute to the support of government also referred to as "state" as nearly as possible in proportion to his ability to pay. For example 10 to 20 percent of all income above a certain figure, since there are some citizens whose incomes were so low that they were obviously to pay any taxes. Similarly, Musgrave and Peacock (1984) conceived the principles of equity as equal proportion of taxation on every income that is; in principle everyone should pay the same proportion of his income as tax. This means proportional taxation or some percentage on all incomes and therefore rejected progressive taxation i.e. (higher tax rates on higher incomes). It also means equal taxation of earned and investment incomes, existing private wealth and capital are exempted, taxation is limited to income only. In the same view, Prest and Barr (1985) said, equal amount per head should be levied. It is obviously much easier to run a system under which everybody pays say ten pounds per head than one which the amount due varies according to economic circumstance.

ii. ***The Principle of Certainty***: This principle asserts that the taxpayer should know how much tax he has to pay, and when it is to be paid. Such information should be adequately accurate and clearly stated by the tax regulations. Thus, neither the amount nor the time of payment should be the subject of arbitrary decisions by the tax officials.

iii. ***The Principle of Convenience:*** Taxes should be collected at a time convenient for the taxpayers. For example, the Pay as You Earn income tax on salaries and wages deducted weekly or monthly as the case may be as income is received, is a good example of the principle of convenience. Convenience as a principle of taxation has to do with the enforcement of tax and administration. Eckeston (1983) has said that a good tax should not impose taxes that are impossible to enforce even when people comply to tax laws voluntary, the government should verify the tax payments, if not the tax becomes an invitation to break the law. Adam (1910) has pointed out that every tax ought to be levied at the time or in the manner in which it is likely to be convenient for the contributor to pay it. Using this principle as an example, one can argue that the convenient time for payment of tax for West African farmers is during the harvest time.

iv. ***The Principle of Economy***: The principle emphasizes that the cost of assessing and collecting a tax should be small in relation to the revenue so collected i.e. economy should be the yardstick so that the cost of collecting tax should not be excessive. For example, if the expenses incurred in the course of collecting a tax exceed even 50 percent of the yield, then such taxes do not conform to the principle of economy.

2.1.4 Determinants of Tax Revenue

Researchers have included several variables, some of these are GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate, urbanization rate, corruption and the ratio of foreign aid to GDP as potential determinants of tax revenue performance.

- **GDP per capita income**

Per capita income is considered as the best proxy for the overall development of the economy and 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). A 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 (Chelliah, 1971).

- **Agricultural value added share of GDP**

The share of the agricultural sector in GDP is used for reflecting the ease or difficulty of taxing different structures in the economy. The agricultural sector is big in most low income countries and its activities are subsistence in nature. From a taxation point of view taxing the agricultural sector in low income countries requires reorganizing their activities into small and medium enterprises. Agriculture sector activities are usually exempted from taxes in order to make the tax regimes more progressive to the poor. In addition, the agricultural sector reflects a possible degree of tax evasion in the economy. Thus, the share of agriculture in GDP is expected to be negatively correlated with tax performance (Gupta, 2007).

- **Industry value added share of GDP**

In higher income countries the share of industrial sector in GDP is large compared to other sectors. The industrial sector is relatively easy to tax compared to the agricultural sector, the industrial sector yields a larger amount of tax revenue for developed countries compared to the agricultural sector (Gupta, 2007). Therefore, the industrial sector to GDP is expected to have a positive relation with tax revenue performance.

- **Trade openness**

Openness has largely been considered a fundamental determinant of taxable capacity by different studies. Among the studies that have presented the importance of openness are studies by Lotz and Morss (1970). These studies use the ratio of trade to GDP to estimate the degree of globalization, the level of trade barriers and the extent of a country's foreign trade sector to explain the level of openness among different countries. Although it is quite difficult to assess the direct impact of openness on tax revenues, openness may influence taxation indirectly by affecting many economic variables which in turn affect tax revenue. The study of Agbeyegbe, Stotsky and WoldeMariam (2004) found a strong association between the degree of openness and tax revenue. Given that tax revenues of low income countries, especially from a trade tax perspective, tend to have high dependency on the international trade sector, an increase in the degree of trade openness is expected to bring higher tax revenue.

- **Inflation rate**

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. High inflation rates when combined with payment and collection lags adversely affect tax revenues through several channels. For example, excise taxes on some products may be adversely affected if they do not fully adjust in a timely manner to changes in the inflation rate (Tanzi, 1989). Taxes on income, profits and capital gains may shrink in size to the extent that households try to protect their wealth against the corrosive effect of inflation by substituting towards assets that are less likely to be domestically taxed (for example, jewelry items and balances in overseas bank accounts) and/or postponing investment plans. As a result, inflation is expected to affect tax revenue negatively.

- **Exchange rate**

A depreciation of exchange rate is expected to lead to an increase in import volumes. Since a larger part of low income countries rely on tariff revenue, depreciation is expected to increase tariff revenue. However on the other hand currency appreciation could potentially lead to a lower volume of imports and lower tariff revenue. According to Khattry and Rao (2002) a negative relationship is expected between exchange rates and trade taxes. A recent study by Hisali (2012) finds that exchange rate depreciation and appreciation could lead to an increase tax performance for Uganda. Therefore a positive relationship is expected between tax revenue performance and exchange rate.

- **Urbanization**

Urbanization is important for its social, political, and cultural, as well as economic implications. Urbanization by itself brings new needs and demand for public services. On the other hand, government's ability to collect taxes is enhanced by structural changes, which are associated with urbanization. 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 (Tanzi, 1987). Therefore a positive relationship is expected between tax revenue performance and urbanization rate.

- **Corruption**

Institutional corruption is defined as an unlawful or unauthorized act engaged in by a public official using his or her position to receive a bribe, directly or through a family member or associate, in exchange for making a benefit available to a member of the public (e.g., a taxpayer). Opportunities for corruption in revenue administration are affected by demand from companies and individuals for corrupt actions and the supply by tax officials of corrupt acts. Demand for corruption increases with the complexity of tax systems, for example, if the law gives tax officials excessive discretion (Patrick and Davina, 2007). There is wide agreement among researchers that corruption has a significant negative impact on tax revenues. Studies in developing countries indicate that often more than half of the taxes that should be collected cannot be traced by government treasuries due to corruption and tax evasion. This finding led the IMF to conclude that efforts to lower corruption would increase tax revenues significantly (Ghura 1998).

- **Foreign aid**

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 et al. (2003) point out that net foreign aid has a negative impact on the total tax revenue, which seems to be driven by a negative impact of grants on tax revenue, whereas loans are associated with increased domestic tax revenue. If foreign aid is primarily in the form of loans, then the tax burden of future loan repayment will be higher so that this will give incentive to enhance domestic revenue mobilization (increase domestic tax effort).

2.2 Empirical Literature

In this section, the empirical studies focus on prior academic researchers concerning the determinants of tax revenue. Accordingly, the following studied papers were selected from other countries and from Ethiopia to show the findings and the recommendations that are related to this study.

2.2.1 Similar Study in Other Countries

Gupta (2007) explored *determinants of tax revenue efforts in 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. It is estimated that a one percent increase in the share of agriculture sector could reduce revenue performance by as much as 0.4 percent. The effects indicate that although foreign aid improves revenue performance significantly, debt does not. 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.

Eltony (2002) examined the *determinants of tax revenue shares and constructed an index of tax effort* for the 16 Arab countries. The results submit that the main determinants of the tax share in the GDP for the Arab countries are the per capita income, the share of agriculture in GDP and the share of mining in GDP. These variables are statistically significant and possessed the expected signs. Further 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.

Agbeyegbe et al. (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.

Mahdavi (2008) studies the *level and composition of tax revenue in developing countries* using the advanced estimation techniques with an unbalanced panel data for 43 developing countries over the period 1973-2002. 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.

The study by **Stotsky and WoldeMariam (1997)** on the title *the tax effort in Sub-Saharan Africa* 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 effect; mining share has positive effect while the share of foreign trade and the share of foreign grants and loans have also positive and statistically significant relation.

Karagoz (2013) investigate *the determinants of tax revenue in Turkey*. Time series regression analysis over the period from 1970 to 2010 is used to this study. The findings of the regression equation are in consistent with a priori expectations. The results reveal that tax revenues in Turkey significantly affected by agricultural and industrial sector share in GDP, foreign debt stock, monetization rate of the economy and urbanization rate whereas the sign of the agricultural sector's share is negative as expected while others are positive. Moreover the results suggest that openness to foreign trade has no significant impact on tax revenues in Turkey.

Sinbo and Muibi (2013), attempts to examine the most relevant *macroeconomic determinants of tax revenue in Nigeria.* The study uses secondary data from Nigeria economy for the period 1970 to 2011 and adopted the error correction mechanism to establish both the long run and short run relationships among the variables The main findings from the analysis level and the growth rate of economic activity impacted positively on tax revenue in Nigeria and that exchange rate depreciation and inflation rate have adverse effect of the tax revenue. Trade liberalization policy

seems not to have adversely affected the tax revenue and rather it has positively stimulated revenue generation contrary to expectation. External debt burden also has negative effect on the amount of tax revenue that government can generate. The general conclusion is that macroeconomic instability and level of economic activities are the main drivers of tax buoyancy and tax effort in Nigeria.

Dickson and Rolle (2014) on the title *'The Impact of Tax Reform on Federal Revenue Generation in Nigeria',* the objective of the researchers was to ascertain the impact of tax reforms on tax revenue generation in Nigeria using the annual time series data spanning the years (1981-2011) based on theoretical and empirical evidences. The study employed regression analysis. Total federally collected revenue will be regressed on several tax revenues (petroleum profit tax, value added tax, custom and excise duties). The Partial Stock Adjustment Model shows that the various income taxes were statistically significant and have positive relationship with federally collected revenue (FCR) in Nigeria. The coefficient of the Error correction model showed that 66.29 percent of the deviation of federally collected revenue from its long-run equilibrium value can be reconciled yearly. Coefficient of determination puts at 0.821357, showing that 82.1357 percent of the variation in federally collected revenue (FCR) is explained by the various income taxes. Furthermore, the coefficients of the variables are statistical significant at 5 percent.

Onaolapo et al. (2013) on the title *'Assessment of Value Added Tax and Its Effects on Revenue Generation in Nigeria'*, the objective of the researchers was to examined the impact of value added tax on revenue generation in Nigeria. The study covered the frame of 2001 to 2010 accounting years. The study employed inferential statistical analysis which was stepwise regression analysis. Value added tax, petroleum profit tax, company income tax and education tax were the variables selected on the basis of highest partial correlation to meet the entry probability requirement of less or equal to 0.05 ($\leq$ 0.05). The result depicts the relationship between the dependent variable (total federally collected revenue) and each independent variables (value added tax, petroleum profit tax company income tax and education tax) that meet the entry probability requirement of less or equal to 0.05 ($P \leq 0.05$). The result further showed that the four variables, value added tax, petroleum profit tax company income tax and

education tax had a strong positive correlation of 0.971 with the dependent variable, total federal collected revenue.

2.2.2 Studies in Ethiopia

In Ethiopia there are some studies done on determinants of tax revenue and issues related with tax revenue. Among these some of them are reviewed as follows:

Workineh (2016) examine the major *determinants of tax revenue in Ethiopia* for the period ranging from 1975-2013, using Johansen maximum likelihood co-integration approaches. The result revealed that in the long run real GDP per capita income, foreign aid and industrial value added share of GDP positively and significantly affect tax revenue. However, inflation exerted a negative and significant influence. Whereas, agricultural value added share of GDP and Education are not significant determinants of tax revenue in the long run. In the short run the result shows that real GDP per capita income and Inflation have negative and significant effect on tax revenue and industry value added share of GDP is positive and significant effect on tax revenue.

Belay (2015) investigated the *determinants of tax revenue performance in Ethiopian federal government* by using time series data from 1992-2013. The study reveals that gross domestic product, public debt, foreign direct investment, and openness have significant positive relationship with tax revenue performance. But, foreign aid is negatively related to tax revenue performance. The study has employed both descriptive and time series regression method as well as E-views software for analysis purpose.

Delessa D. (2014) on the research title *'Tax Reforms and Tax Revenues Performance in Ethiopia'*, the purpose of the study was to analyze and compare tax revenues performances of the two governments in power in Ethiopia during the last 39 years. Descriptive analysis is used to compare different categories of tax performance of the Derg and Ethiopian People's Revolutionary Democratic Front (EPRDF) regimes in terms of tax revenues mobilization is tax to GDP ratio. In light of this major tax categories of tax to GDP and total tax revenues ratios over the period of 1974/75 to 1912/13 (39 years) were computed and analyzed. In addition comparison has been made between pre and post-tax reforms to compare tax system flexibility in

terms of raising tax revenues during the EPRDF regime. The period after 2002/03 was considered as post comprehensive tax reforms years. The researcher concluded the comparison of two regimes different categories of tax ratios shows a slight increment from an average 3.77 percent to 9.95 during EPRDF period. Comparing pre and post-tax reforms during the period 1991/92 to 2012/13 the ratios of different category tax revenues show insignificant change for post comprehensive tax reform period. Comparing direct versus indirect tax categories, direct tax shows the tendency of declining contrary to the comprehensive tax reform main objective which gave due attention to increase the share of the direct tax to total revenues. The overall analysis of researcher reveals that tax reforms failed to boost total tax revenues and to bring tax structure change from indirect tax to direct tax.

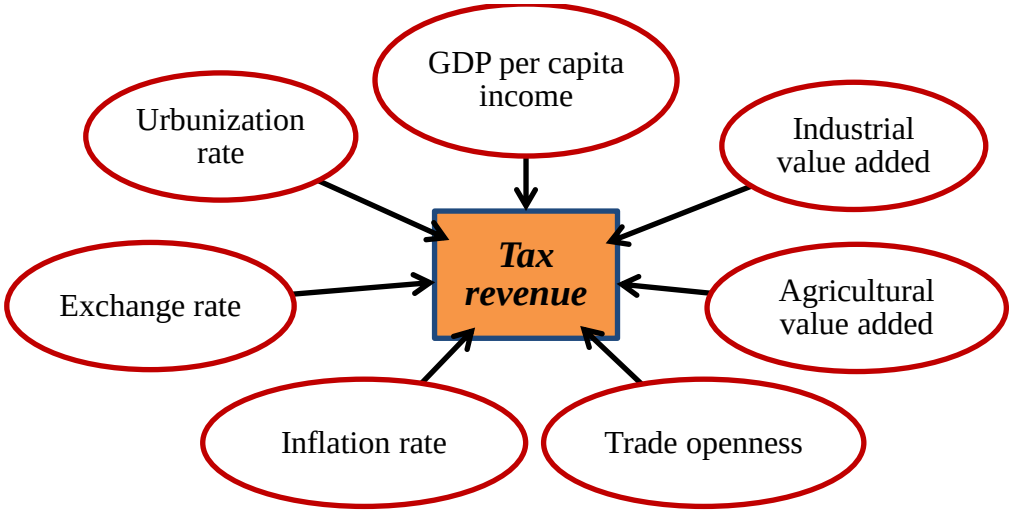
Dasalegn J. (2014) on the title *'The Role of Value Added Tax on Economic Growth of Ethiopia'*, the objective of the researcher was to analyze the role of VAT on economic growth of Ethiopia using the data from 2003 to 2012 based on theoretical and empirical evidences. To meet his objective, he used time series macro-economic data on GDP using VAT, total tax revenue excluding VAT, non-tax revenue and foreign revenue as independent variables. He employed Descriptive statistics and multiple regressions to analyze the data. The finding of the study reveals that as compared to sales tax, VAT boosts the general economic growth of Ethiopia but the issue of regressively resembling to sales tax still continues. During the periods under review, the growth rate of VAT was 66.27% on average. For the periods of sales tax, the average growth rates of GDP were only 2.53%. However after executions of VAT, such growth rate reached about 21.9% on average. The analysis also showed as the average ratio of VAT to GDP becomes 2.95%. The finding also reveals that, VAT, total tax revenue and non-tax revenue except foreign revenue were significant at 5% level of significance but all of them positively contributed for economic growth during the periods under review. However, to be effective, it requires strong administrations and cooperation of the tax payers with taxing authority and the government in general.

Generally, international studies attempt to establish the determinants of tax revenue for developed and developing countries by using panel data methodology while in Ethiopia there are some studies available to find the determinants of tax revenue however, the results are conflicting and need further investigation to identify determinants of tax revenue in Ethiopia.

Moreover, previous studies in Ethiopia did not incorporate some variables with an implication of social, political, cultural, economic and institutional factors; therefore, the present study fills the gap in the literature and addresses this issue in-depth by considering relevant control variables and time series econometric methodology.

2.3 Conceptual Framework

As a result of the theoretical and empirical reviewed above; the study has developed the following schematic representation of the conceptual framework. This conceptual framework describes the relationship of tax revenue with GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate and urbanization.



Source: Author's own construction based on different literatures

Chapter 3 : METHODOLOGY

3.1 Research design

The research design provides a general plan how the research objectives will be achieved and the process for collecting, analyzing, and interpreting the data (Saunders, Lewis, & Thornhill, 2007). The purpose of this study is to examine the factors influencing tax revenue in Ethiopia and examine the relationship between the dependent variable (Tax revenue) and the independent variables (GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate and urbanization).

The research work was in both descriptive and inferential in nature. The study employed a time series data covering a period of 1980/81 to 2015/16 which is not randomly selected. The year 1980/81 is chosen as the base year because data for most macroeconomic variables were not available in well-organized manner.

3.2 Type and Sources of Data

The study mainly uses secondary sources of data from various government offices. The major data sources of the study are found from Ethiopian Revenue and Custom Authority (ERCA), and Ministry of Finance and Economic Development (MoFED), National Bank of Ethiopia (NBE) and Central Statistics Agency (CSA). Data was collected by reviewing different documents, annual reports, financial statements, published and unpublished statistical data from 1981 to 2016 so as to accomplish the objectives of the paper.

3.3 Variables of the Research

To meet what is aimed for; the researcher reviewed the variables used in different studies such as Sinbo and Muibi (2013), Karagoz (2013), Mahdavi (2008), Gupta (2007), Agbeyegbe et al. (2004), Teera (2003), Eltony (2002), Stotsky and WoldeMariam (1997), Tanzi (1981) and Chelliah (1971). However, the variables of this study were adjusted to the variables of the studies conducted by Karagöz (2013), and Sinbo and Muibi (2013) which are the most recent studies.

Karagoz (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. While Sinbo and Muibi (2013) studied the macroeconomic determinants of tax revenue in Nigeria by incorporating; real GDP, openness, exchange rate, inflation and external debt. Therefore, following empirical literatures, this study attempts to empirically investigate the effect of GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate and urbanization on tax revenue percentage of GDP.

Table 1: Summary of variables under investigation, operationalization, descriptions and expected signs

Variable	Operationalization of the variables	Descriptions of the variables	Expected signs of the coefficients
LTR	TR = Tax Revenue/GDP	Log of tax revenue (%GDP)	*Dependent variable*
LGDPPC	GDPPC = Real GDP/Total population	Log of gross domestic product per capita income	**(+)**
LIND	IND = Industrial value added share/GDP	Log of industrial value added (%GDP)	**(+)**
LAGR	AGR = Agricultural value added share/GDP	Log of agricultural value added (%GDP)	**(-)**
LOPN	OPN = Trade openness (Import + Export)/GDP	Log of trade openness	**(+)**
LCPI	Inflation based on Consumer Price Index[1]	Log of consumer price index	**(-)**
LEXH	The official exchange rate	Log of the official exchange rate	**(+)**
LURB	URB = Urban population/Total population	Log of urbanization rate	**(+)**

Source: Author's own construction based on different literatures

[1] In this study inflation is measured in consumer price index, in order to transform the data in logarithm form to better interpret the result as elasticity, which is impossible while using inflation rate as it might be negative.

3.4 Specifications of the Model

Different studies adopted and used some models to examine the determinants of tax revenue in different countries. However, this paper was modified the model used in the study of Karagöz (2013), and Sinbo and Muibi (2013) which are the most recent study. 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. While Sinbo and Muibi (2013) studied the macroeconomic determinants of tax revenue in Nigeria by incorporating; real GDP, openness, exchange rate, inflation and external debt.as independent variables on their regression model. However, this study extends upon them by using the periods from 1981 to 2016, as such it update the analysis and it captures the factors that influence tax revenue in Ethiopia by including some necessary variables which was not studied before in Ethiopia like exchange rate and urbanization and adjusting them based on the objectives of the paper. The model for this study attempts to empirically investigate the effect of GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate and urbanization on tax revenue percentage of GDP. Accordingly, the purposeful relationships and resulting models are specified as follows:

$$\mathbf{TR_t = f\ (GDPPC_t, IND_t, AGRt, OPN_t, CPI_t, EXH_t\ and\ URB_t)} \quad \textbf{(1)}$$

From the above functional relationships, the following stochastic model is specified below:

$$\mathbf{TR_t = \beta_0 + \beta_1\ (GDPPC_t) + \beta_2\ (IND_t) + \beta_3\ (AGR_t) + \beta_4\ (OPN_t) + \beta_5\ (CPI_t) + \beta_6\ (EXH_t) + \beta_7\ (URB_t) + \mu_t} \quad \textbf{(2)}$$

Generally, the working model can be restated in its logarithm form as follows:

$$\mathbf{LTR_t = \beta_0 + \beta_1\ LGDPPC_t + \beta_2\ LIND_t + \beta_3\ LAGR_t + \beta_4\ LOPN_t + \beta_5\ LCPI_t + \beta_6\ LEXH_t + \beta_7\ LURB_t + \mu_t} \quad \textbf{(3)}$$

Where,

LTR_t = Log of tax revenue percentage of GDP at time t:

$LGDPPC_t$ = Log of GDP per capita income at time t:

$LIND_t$ = Log of industry value added share of GDP at time t:

$LAGR_t$ = Log of agricultural value added share of GDP at time t:

$LOPN_t$ = Log of trade openness at time t:

$LCPI_t$ = Log of consumer price index at time t:

$LEXH_t$ = Log of the official exchange rate at time t:

$LURB_t$ = Log of urbanization rate at time t:

β_1, β_2, β_3, β_4 β_5, β_6 and β_7; are model parameters and

μ is the stochastic error term.

Logarithm has been used to make the data under study to be normal and linear. This is because logarithm is one of the transformations methods that make the data normal if they are not normal with their actual numbers (Workineh, 2016).

3.5 Data analysis and interpretation

To address the objectives of the research and to analyze the data, multiple regression statistical methods of E-view's 9 software package was employed. The researcher used multiple regression methods to regress the independent variables of GDPPC, IND, AGR, OPN, CPI, EXH and URB towards the TR as dependent variable. The time series information (annual data) was used for statistical computations of the study and hence, it can be used for testing the hypotheses. These statistical computations can be employed to explore the inherent relationships among the variables.

3.6 Model Assumption Test

3.6.1 Tests for Stationary (unit root test)

Time series analysis is central to the understanding and empirical modeling of dynamic response of tax revenues to changes in their determinants. Test for stationary is a prerequisite for consistent and valid inference of time series models and co-integration analysis. Unit root implies that the time series data are non-stationary while absence of a unit root shows that the stochastic process is stationary. The results of using non-stationary time series may be spurious.

It may imply as if a relationship is existed among variables, when no relationship is actually existed (Aggrey, 2011).

The formal statistical test for the presence of a unit root was used to detect non-stationary variables in this study. Therefore, the Augmented Dickey Fuller (ADF) test is employed to test the stationarity of the variables.

3.6.2 ARDL (Bounds Test) Approach to Co-integration

The Autoregressive Distributed Lag (ARDL) or Bound Test approach to co-integration developed by Pesaran and Shin (1999) and further extended by Pesaran et al. (2001) is adopted for this study. The procedure is adopted for the following reasons. Firstly, the bounds test procedure is simple. As opposed to other multivariate co-integration techniques such as Johansen and Juselius (1990), it allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified. Secondly, the bounds testing procedure does not require the pre-testing of the variables included in the model for unit roots unlike other techniques such as the Johansen approach. It is applicable irrespective of whether the regressors in the model are purely I(0), purely I(1) or mutually co-integrated. Thirdly, the test is relatively more efficient in small or finite sample data sizes. Estimates derived from Johansen-Juselius method of co-integration are not robust when subjected to small sample sizes as compared to bounds test. With these reasons specified, the researcher adopts the ARDL model for this study.

The co-integration test is based on the F-statistics or Wald statistics. The F-test has a nonstandard distribution. Thus, Pesaran and Pesaran (1997) and Pesaran et al (2001) have provided two sets of critical values for the co-integration test. The lower critical bound assumes that all the variables are I(0), meaning that there is no co-integration among the variables, while the upper bound assumes that all the variables are I(1). If the computed F-statistic is greater than the upper critical bound, then the null hypothesis will be rejected suggesting that there exists a co-integrating relationship among the variables. If the F-statistic falls below the lower critical bounds value, it implies that there is no co-integration relationship.

However, when the F-statistic lies within the lower and upper bounds, then the test is inconclusive. In this context, the unit root test is conducted to ascertain the order of integration of

the variables. If all the variables are found to be I(1), then the decision is taken on the basis of the upper critical value. On the other hand, if all the variables are I (0), then the decision is based on the lower critical bound value.

The ARDL model specified in equation tested using the appropriate lag-length selection criterion. According to (Pesaran & Shin, 1999), as cited in (Narayan, 2004) for the annual data a maximum of two lag lengths are recommended. From this, a lag length that minimize AIC is chosen. In addition to this, we have also used AIC to determine the optimal lag because it is a better choice for smaller sample size data as this study. Apart from this, AIC found to produce the least probability of under estimation among all criteria available. (Liew & Khimsen , 2004)

3.6.3 Diagnostic tests

To check the verifiability of the estimated long run model, some diagnostic test is undertaken prior in doing any analysis. In this study we carried a number of model stability and diagnostic checking, which includes serial correlation test (Brush & Godfray LM test), Hetroskedasticity test (ARCH) and Normality test (Jaque-Bera test). In addition to the above diagnostic tests, the stability of long run estimates has been tested by applying the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. Such tests are recommended by (Pesaran *et al.*2001). In order to reject or accept the null hypothesis, we can decide by looking the p-values associated with the test statistics. That is the null hypothesis is rejected when the p-value are smaller than the standard significance level (i.e. 5%).

Chapter 4 : RESULTS AND DISCUSSION

The previous chapter presented the research methodology applied to meet the objective of the study and to test the research hypothesis. In this chapter, the study analyzes the collected data using statistical tools, and presents the result and discussions accordingly. The chapter is organized in to six sections. Section 4.1 presents descriptive statistics analysis. Then Section 4.2 and 4.3 presents the unit root tests and co-integration test (ARDL approach). Diagnostic test and tests of model stability are in section 4.4 and section 4.5 respectively. Finally, section 4.6 presented the results of regression analysis.

4.1 Descriptive Analysis

Descriptive analysis is the first step in this study. It helped to describe relevant aspects of phenomena of tax revenue and provide detailed information about each relevant variable. E-Views software has been used for analysis of the different variables in this study. Descriptive statistics shows the mean and standard deviation of the different variables used in the study. It also presents the minimum and maximum values of the variables, which help in getting a picture about the maximum and minimum values of the variables.

A national data is collected on the targeted dependent and independent variables that covered for the period from 1981 to 2016. The descriptive summary of these variables which includes the mean, standard deviation, minimum and maximum values of these variables for the period under the study is shown as follows:

As shown in table 2 below, the study had 36 observations from 1981 to 2016. There has one dependent variable TR and seven independent variables (GDPPC, IND, AGR, OPN, CPI, EXC and URB).

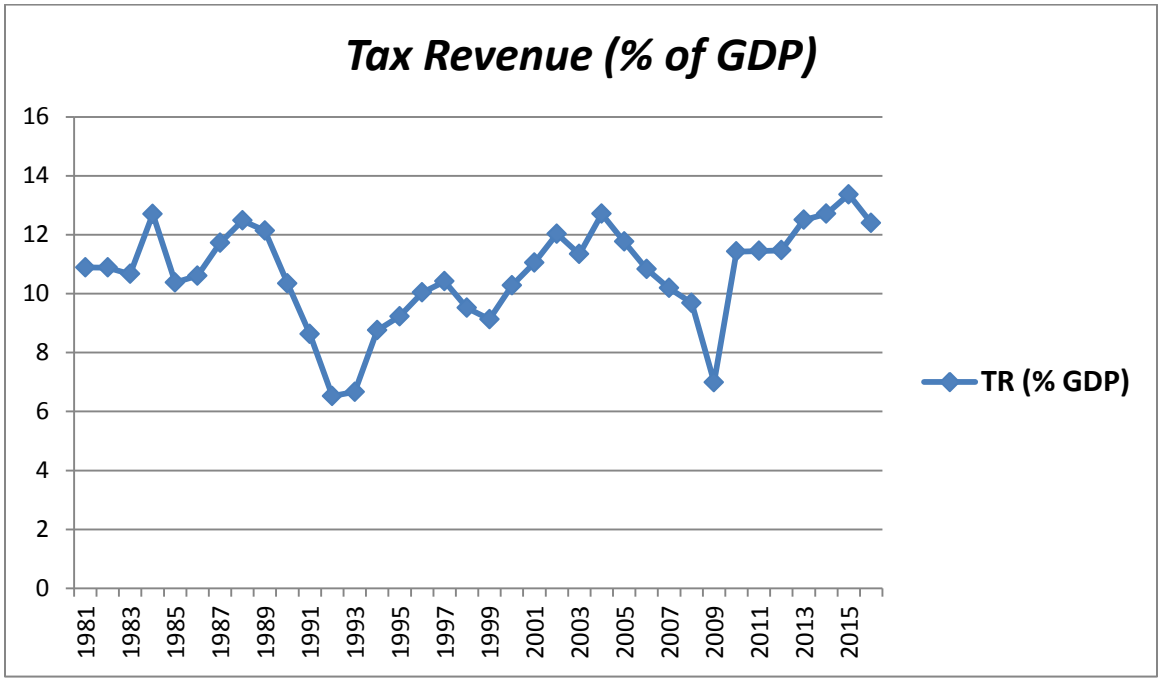
Table 2: Descriptive statistics result (1981-2016)

	TR	*GDPPC*	*IND*	*AGR*	*OPN*	*CPI*	*EXC*	*URB*
Mean	10.66372	4050.008	10.69644	56.41674	14.32274	41.41121	7.767211	14.96815
Median	10.86077	3133.250	10.16089	56.87086	7.532306	23.45217	7.196400	14.61343
Maximum	13.36746	8786.804	16.70000	71.75466	64.42342	154.0455	21.10590	19.87636
Minimum	6.521622	2597.288	7.918724	36.70000	1.605447	9.530191	2.070000	12.16632
Std. Dev.	1.695505	1759.591	1.820515	9.947377	16.75787	41.21950	5.835286	2.318554
Sum	383.8938	145800.3	385.0717	2031.003	515.6186	1490.804	279.6196	538.8535
Sum Sq. Dev.	100.6158	1.08E+08	115.9996	3463.261	9828.920	59466.66	1191.770	188.1492
Observations	36	36	36	36	36	36	36	36

Source: *Author's Computation using E-Views Statistical Package, Version 9.0*

The annual inflow of tax revenue (as a percentage of GDP) ranges between 6.52 and 13.37 indicating the minimum and the maximum inflows, in 1992 and 2015 respectively. The average inflow of TR (as a percentage) is 10.66 and each observation is deviated from this average by the value of 1.695505. In 2015/16 about 82.3 percent of the total domestic revenue came from tax sources which recorded 14.8 percent annual growth (NBE, 2016).

Figure 1: Trend of tax revenue as a percentage of GDP



***Source**: Authors Computation based on NBE data*

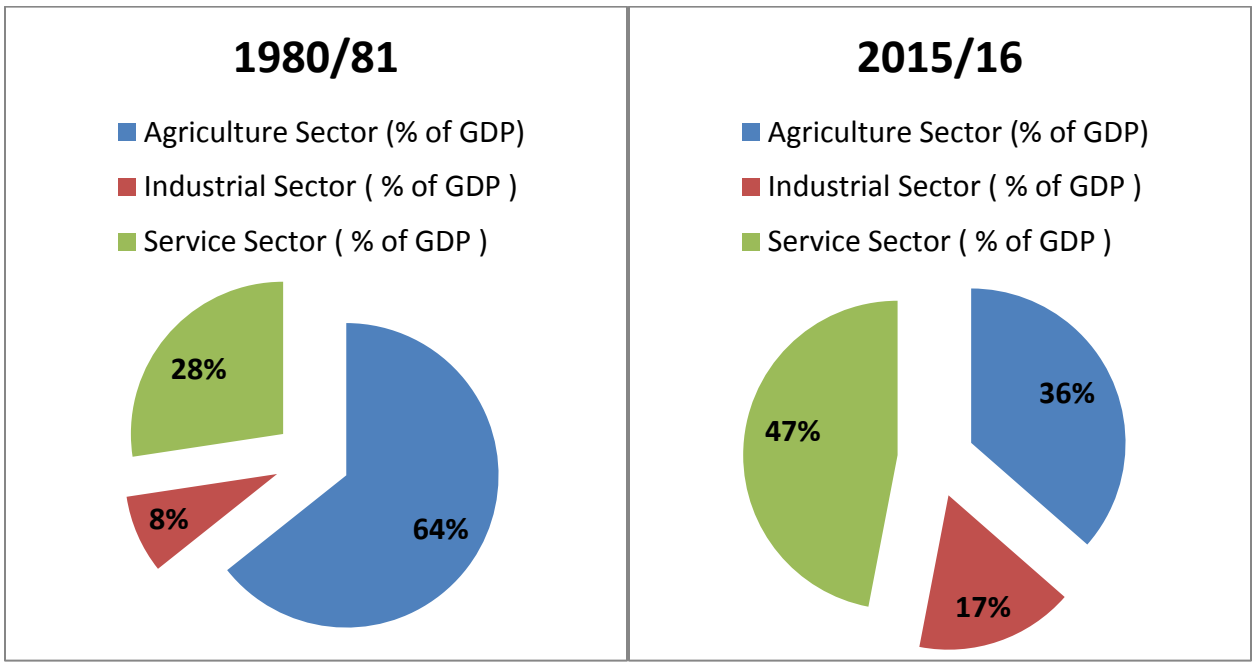
Tax revenues increased in absolute terms between the years 1999 to 2016 in stable way, but as shown in Figure 1 the ratio of Tax Revenue to the GDP was never stable. It was 10.89% in 1981; the sharp rise to 12.70% in the following two years could not be sustained as it fell to 6.52% in 1992. It rose marginally to 12.71% in 2004 and came down to 6.99% in 2009 and got to its peak of 13.367% in 2015 before finally settling down to 12.4% in 2016, this implies that the ratio of Tax Revenue to the GDP was never stable over the period under review.

The GDP per capita ranges between Birr 2,597.28 (minimum in 1992) and Birr 8,786.80 (maximum in 2016). The average GDPPC is Birr 4,050.01 and each observation deviated from this average by the value of Birr 1,759.59. In the period from the year 2004 to 2016 Real GDP increased in line with population growth and the result has consistent growth in Real GDPPC.

The share of industry value added in percentage of GDP ranges between 7.918724 (minimum in 1992) and 16.70 (maximum in 2016). The average share of industry value added (as a percentage of GDP) is 10.69644 and each observation deviated from this average by the value 1.820515.

The share of agriculture value added in percentage of GDP ranges between 36.70 (minimum in 2016) and 71.75466 (maximum in 1981). The average share of agriculture value added (as a percentage of GDP) is 56.41674 and each observation is deviated from this average by the value 9.947377. Starting from the year 2008 the share of agriculture value added in percentage of GDP was declining. Given that it is relatively harder to tax the agricultural sector, it is expected that as the share of agriculture value added in percentage of GDP increases, collected taxes in percentage of GDP drop due to a smaller tax base (Tanzi, 1992).

Figure 2: Sectoral Distribution of GDP in 1980/81 Compared to 2015/16



***Source**: Authors Computation of NBE data*

As shown in figure 2, during the two fiscal years (1980/81 & 2015/16) the economy showed a slight shift from agriculture sector to the service and industrial sector. Accordingly, the share of agriculture declined from 64 percent to 36 percent while the service sectors and industrial sectors increased from 28 percent and 8 percent to 47 percent and 17 percent respectively.

The trade openness (Import plus Export) as a percentage of GDP ranges between 1.605447 (minimum in 1992) and 64.42342 (maximum in 2016). The average trade openness (as a percentage of GDP) is 14.32274 and each observation is deviated from this average by the value

16.75787. In the year 2015/16 33.06 percent was collected as tax revenue from foreign trade tax category (NBE, 2016).

The annual CPI under the study period ranges between 9.530191 (in 1981) and 154.0455 (in 2016) indicating the minimum and the maximum price index. The CPI has the mean value of 41.41121 and each observation is deviated from the average value by 41.21950. During the fiscal year under the study, the country's minimum level general inflation rate (growth in CPI) was negative 10.6 in 2001/02 while the maximum was positive 36.4 in 2008/09.

The official exchange rate (Birr against USD) under the study period ranges between Birr 2.07 and Birr 21.10590 indicating the minimum and the maximum rates. The official exchange rate has the mean value of 7.767211 and each observation is deviated from the average value by 5.835286. In the year 2015/16, the official exchange rate of Birr against USD was depreciated by 919.60 percent compared to the level in the initial fiscal year (1980/81) of this study.

The urbanization rate under the study period ranges between 12.16632 and 19.87636 indicating the minimum and the maximum rates. The urbanization rate has the mean value of 14.96815 and each observation is deviated from the average value by 2.318554. In the year 2015/16, the urbanization rate was increased by 318.70 percent compared to the initial fiscal year (1980/81) of this study.

4.2 Unit Root Test

Unit Roots tests were conducted by utilizing the Augmented Dickey- Fuller (ADF) tests. The time series variables are in log form; LGDPPC, LAGR, LOPN, LCPI, LEXH and LURB. ARDL co-integration approach is based on the assumption that no variable is integrated at I(2) level. Therefore, to avoid spurious results it is necessary to check that all variables are integrated at I(0) and I(1). The underlying models include a constant and time trend. The essence of the Augmented Dickey-Fuller (ADF) tests is to verify the null hypothesis of non-stationary, the rejection of which requires a negative and significant test statistic. The optimal lag length of the lagged differences of the tested variable is determined by minimizing the Akaike Information Criterion (AIC).

Table 3: Augmented Dickey Fuller Unit Root Test

No.	Variables	ADF Statistics (Critical Value) at Level		ADF Statistics (Critical Value) at First Difference		Order of Integration
		Intercept	Trend and Intercept	Intercept	Trend And Intercept	
1	LGDPPC	2.489678	-0.672265	-4.127431*** (-3.639407)	-5.421518*** (-4.252879)	I(1)
2	LIND	-0.963434	-1.34933	-3.405425** (-2.951125)	-3.673379** (-3.54849)	I(1)
3	LAGR	0.969327	-1.510059	-5.346276*** (-3.639407)	-6.029905*** (-4.262735)	I(1)
4	LOPN	0.876905	-2.728224	-3.121061** (-2.95711)	-3.497655* (-3.212361)	I(1)
5	LCPI	1.09579	-1.030477	-5.20379*** (-3.639407)	-5.456978*** (-4.252879)	I(1)
6	LEXC	-0.517111	-2.990549	-3.719456*** (-3.639407)	-3.667675** (-3.54849)	I(1)
7	LURB	3.404722	-1.088292	-4.633005*** (-3.639407)	-6.282048*** (-4.252879)	I(1)

Source: Own estimation using Eviews version 9 *, **, and *** shows 10%, 5% and 1% level of significance respectively; the null hypothesis is that there has a unit root.

Each variable was examined to determine if it is stationary or non-stationary employing the unit roots test. If a time series is found to be non-stationary, subsequently tests were conducted to determine if its first difference is stationary. Using this procedure the order of integration of a time series is determined. Table 3 presents the results of Augmented Dickey-Fuller (ADF) test statistics for the log levels and the first differences of the logs of the annual time series data for the period from 1981 to 2016. All the variables are non-stationary at levels and stationary at first difference. From table 3 it is evident that all-time series are integrated of the order of one I(1) in the first differences based on the Augmented Dickey-Fuller (ADF) test. As a result, Autoregressive Distributed Lag approach to Co-integration is the right technique to apply in this study.

4.3 Co-integration test (ARDL approach)

In the ARDL approach to co-integration, the first step is to test the presence of co-integration or long run relationship among the variables. This test for the long run relationship is done using the ARDL Bounds test F-statistic and the optimal lag was selected by Akaike Information criterion (AIC) method.

The co-integration test is based on the F-statistics or Wald statistics. The F-test has a nonstandard distribution. Thus, Pesaran et al (2001) have provided two sets of critical values for the co-integration test. The lower critical bound assumes that all the variables are I(0), meaning that there is no co-integration among the variables, while the upper bound assumes that all the variables are I(1). If the computed F-statistic is greater than the upper critical bound, then the null hypothesis will be rejected suggesting that there exists a co-integrating relationship among the variables. If the F-statistic falls below the lower critical bounds value, it implies that there is no co-integration relationship. However, when the F-statistic lies within the lower and upper bounds, then the inference is inconclusive and knowledge of the order of the integration of the underlying variables is required before conclusive inferences can be made. In this context, the unit root test is conducted to ascertain the order of integration of the variables. If all the variables are found to be I(1), then the decision is taken on the basis of the upper critical value.

As it can be seen clearly in the co-integration test of ARDL bounds test table 4, the calculated F statistics (3.014916) is between the Pesaran's lower and upper critical values bound in all (1%, 2.5%, 5% and 10) significance level then the test is inconclusive. Therefore, the unit root test is conducted to ascertain the order of integration of the variables as shown in table 4 and the test has shown that all variables are stationary at first difference; i.e., I (1). Therefore, ARDL approach to co-integration can be applied to test the presence of co-integrating relationship among variables.

Table 4: ARDL Bounds Test

ARDL Bounds Test

Date: 05/12/17 Time: 14:15

Sample: 1983 2016

Included observations: 34

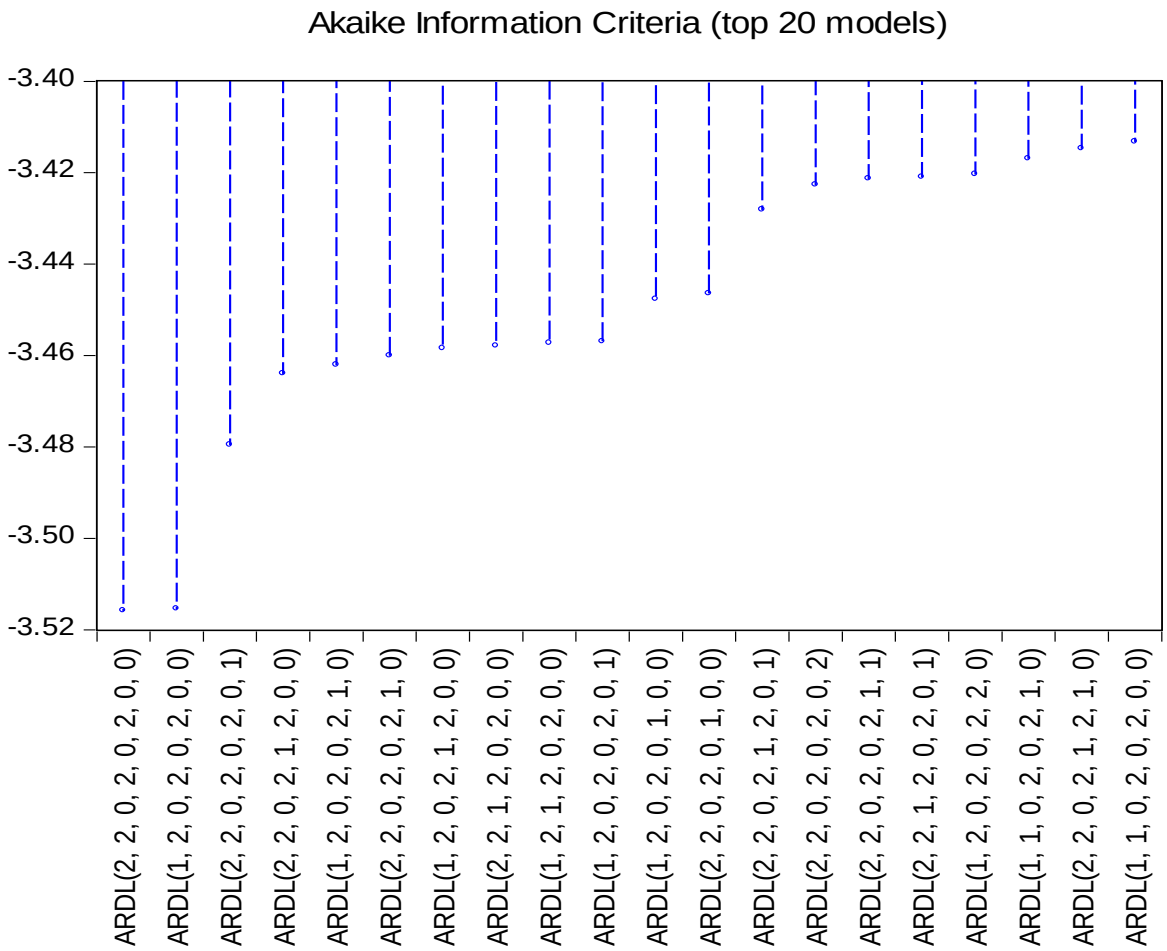
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	3.014916	7
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84
1%	2.96	4.26

Source: Author's computation using E-Views Statistical Package, Version 9.0

The model was estimated by ARDL and the optimal lag was selected by Akaike Information criterion (AIC) method. In this study automatic selection (using the Akaike Information Criterion) was used with a maximum of 2 lags of both the dependent variable and the regressors. Out of the 4,374 models evaluated, the procedure has selected an ARDL (2,2,0,2,0,2,0,0) model (2 lags of the dependent variable, LTR, and 2 lags of LGDPPC, no lag of LIND, 2 lags of IAGR, no lag of LOPN, 2 lags of LCPI, no lag of LEXC and LURB). From 4,374 models the top 20 is presented in the following figure 3.

Figure 3: Akaki Information Criteria



Source: Author's computation using E-Views Statistical Package, Version 9.0

4.4 Diagnostic test

To ascertain the goodness of fit of the estimated model, the diagnostic test was conducted. Diagnostic test suggests that the model passes the test of serial correlation, heteroskedasticity and non-normality of the errors associated with the model.

4.4.1 Serial correlation test

In using the OLS model, the residuals associated with one observation are not correlated with the residuals of any other observation. Autocorrelation test is conducted by applying Durbin-Watson

Test (d-statistics) and Breusch-Godfrey Serial Correlation LM Test. In this study the Breusch-Godfrey Serial Correlation LM Test is applied and the result shows that there is no serial correlation i.e. we do not reject the null hypothesis of residuals are not serially correlated since the P-values of F-statistic and Obs*R-squared exceeds the 5% critical value as indicated in table 5.

Table 5: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.458220	Prob. F(2,16)	0.2620
Obs*R-squared	5.241946	Prob. Chi-Square(2)	0.0727

Source: Author's computation using E-Views Statistical Package, Version 9.0

4.4.2 Test for Heteroskedasticity

The presence of heteroskedasticity has been checked for the efficiency model to ensure that the standard errors are not wrong and any inferences made could not be misleading. If the variance of the residuals is non-constant then the error variance is said to be heteroskedastic. The null hypothesis of the test is that the errors are homoskedastic and independent of the regressors' and that there is no problem of misspecification. This study carries out both Breusch-Pagan test and ARCH test for heteroskedasticity. The decision rule states that, if the p-value of the test is lower than any of the chosen significance levels, i.e., 1%, 5% and 10% it indicates possible problem of heteroskedasticity; whereas if the p-value of the test is greater than any of the chosen significance levels, i.e., 1%, 5% and 10% indicate no possible problem of heteroskedasticity.

The Breusch-Pagan-Godfrey Test in table 6 shows that the F- statistic and chi-square p-value are more than 10 percent, meaning that, we do not reject the null-hypothesis that the residuals are homoskedastic at 1%, 5% and 10% significance level. Therefore, the residuals of the model have no problem of heteroskedasticity.

Table 6: Heteroskedasticity Test - Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.722607	Prob. F(15,18)	0.7349
Obs*R-squared	12.77881	Prob. Chi-Square(15)	0.6194
Scaled explained SS	2.538185	Prob. Chi-Square(15)	0.9999

Source: Author's computation using E-Views Statistical Package, Version 9.0

In addition, the ARCH heteroskedastic test in table 7 shows that the p-value of both the F-statistic and chi-square are more than 5 percent, meaning we do not reject null hypothesis of no ARCHI affect. Meaning that, we do not reject the null hypothesis that the residuals are homosecdasic at 5% significance level. Therefore, the residuals of the model are found to be homoskedastic.

Table 7: Heteroskedasticity Test – ARCH

Heteroskedasticity Test: ARCH

F-statistic	0.014606	Prob. F(1,31)	0.9046
Obs*R-squared	0.015541	Prob. Chi-Square(1)	0.9008

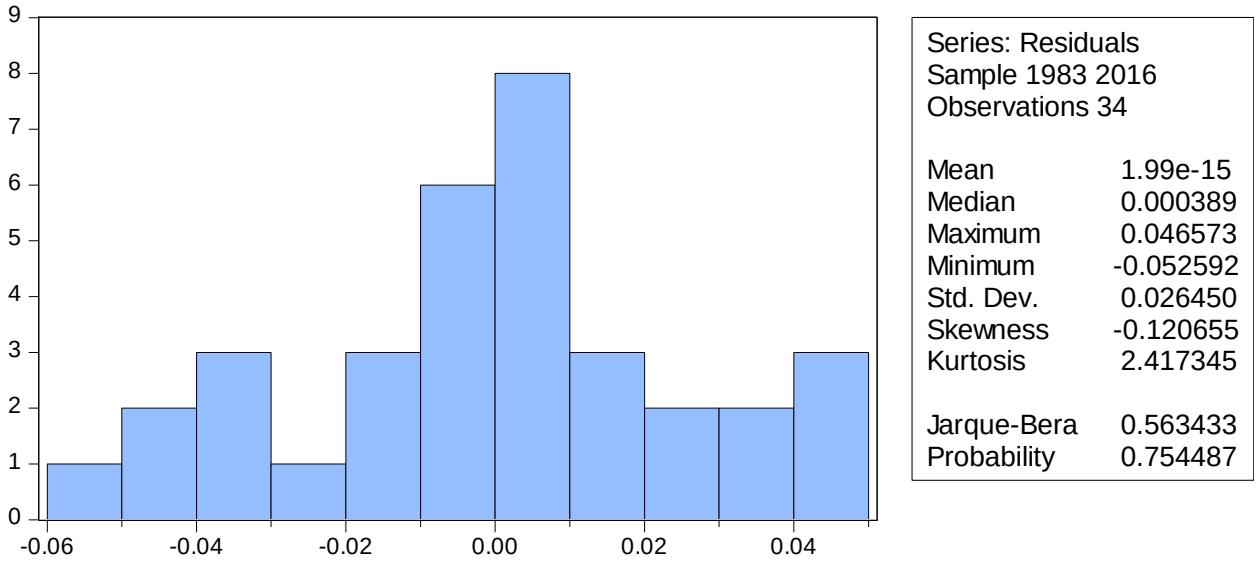
Source: Author's computation using E-Views Statistical Package, Version 9.0

4.4.3 Test for Normality

By using the Jarque-Bera normality test, the study checked whether the residuals are normally distributed or not. If the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant. This means that the p-value given at the bottom of the normality test screen should be greater than 0.05 to not reject the null hypothesis of

normality at the 5% level. As shown in figure 4 since, the histogram is bell-shaped and the Bera-Jarque statistic is not significant, this means the p-value (0.754487) given in the histogram figure of the normality has greater than 0.05, we do not reject the null hypothesis of normality at the 5% level. As a result, we conclude that the error terms of the specified model in this study is found to be normally distributed.

Figure 4: Histogram Normality Test



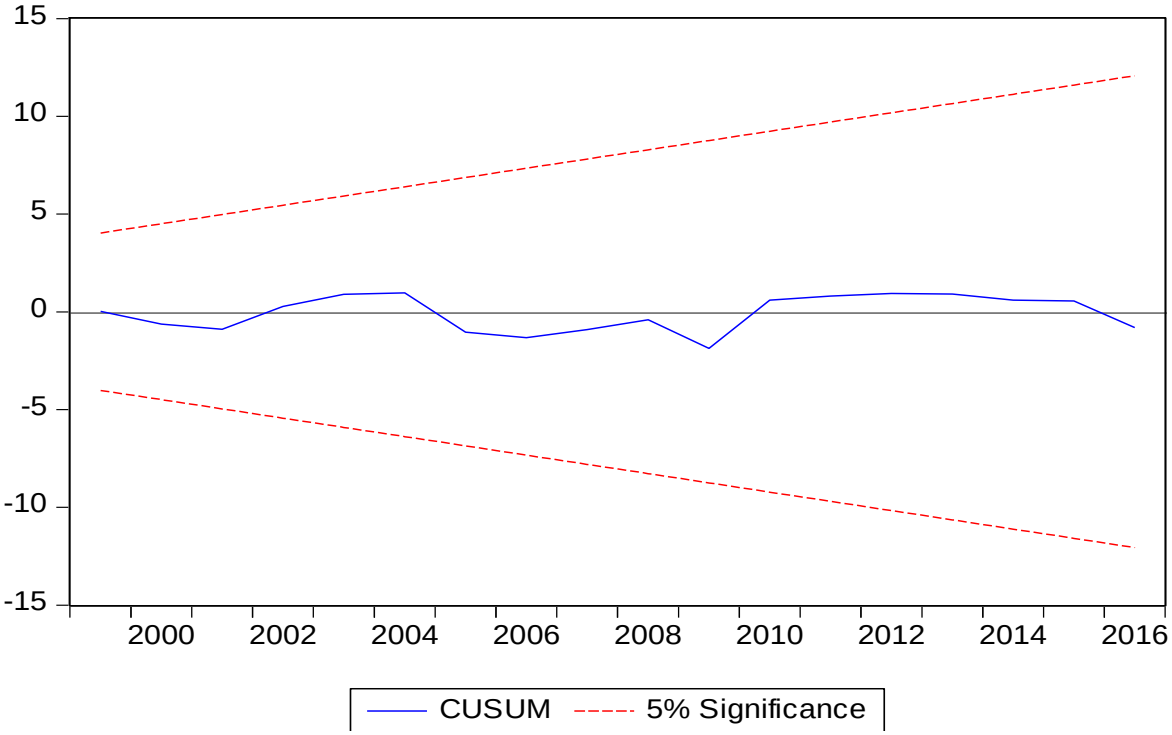
Source: Author's computation using E-Views Statistical Package, Version 9.0

4.5 Test of Model Stability

The stability of long run estimates has been tested by applying the CUSUM test based on the cumulative sum of the recursive residuals and CUSUMSQ test, the cumulative sum of squares of recursive residuals test. Such tests are recommended by Pesaran et al (2001).

The CUSUM test finds parameter instability if the cumulative sum goes outside the area between the two critical lines within the 5% significance lines. As shown in figure 5, the line is well within the confidence bands and the conclusion would be the null hypothesis of stability is not rejected. Therefore, the test clearly indicates stability in the equation during the sample period.

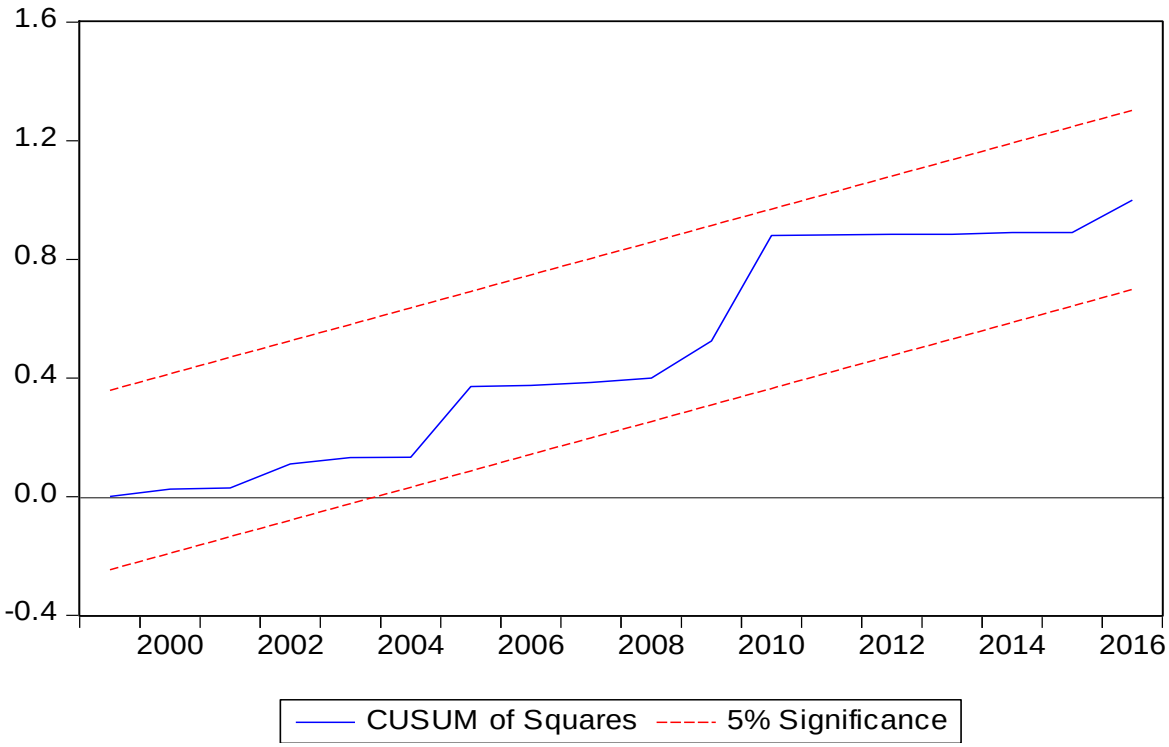
Figure 5: CUSUM test



Source: Author's computation using E-Views Statistical Package, Version 9.0

In addition, the CUSUMQ test finds parameter stability if the cumulative sum of squares is generally within the 5% significance lines, suggesting that the residual variance is stable. As shown in figure 6, the line is well within the confidence bands and the conclusion would be the null hypothesis of stability is not rejected. Therefore, the test clearly suggests that the residual variance is stable in the equation during the sample period.

Figure 6: CUSUMSQ test



Source: Author's computation using E-Views Statistical Package, Version 9.0

4.6 Results of the regression analysis

Once the long run relationship is defined, the next task is to formulate test of significance on the long run parameters. The regression output of the model alongside their respective probability values are reported on table 8. As can be seen in table 8, three variables (real GDP per capita income, inflation (CPI) and exchange rate) have significant effect on tax revenue percentage of GDP in the long run. Whereas, industrial value added share of GDP, agricultural value added share of GDP, trade openness percentage of GDP and urbanization rate are not significant determinants of tax revenue in the long run.

Table 8: ARDL Co-integrating and Long Run Result

ARDL Co-integrating And Long Run Form
Dependent Variable: LTR
Selected Model: ARDL(2, 2, 0, 2, 0, 2, 0, 0)
Date: 05/12/17 Time: 10:05
Sample: 1981 2016
Included observations: 34

Co-integrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTR(-1))	-0.202255	0.192942	-1.048269	0.3084
D(LGDPPC)	-0.173952	0.517803	-0.335942	0.7408
D(LGDPPC(-1))	-1.361572	0.691980	-1.967645	0.0647*
D(LIND)	-0.020266	0.373086	-0.054319	0.9573
D(LAGR)	0.452856	0.794658	0.569876	0.5758
D(LAGR(-1))	2.515801	1.039883	2.419310	0.0264**
D(LOPN)	0.178053	0.179609	0.991334	0.3347
D(LCPI)	-0.017881	0.199285	-0.089724	0.9295
D(LCPI(-1))	-0.333348	0.212435	-1.569177	0.1340
D(LEXC)	0.659826	0.225944	2.920306	0.0091***
D(LURB)	-6.143801	2.650562	-2.317924	0.0324**
CointEq(-1)	-0.740849	0.223853	-3.309528	0.0039

Cointeq = LTR - (1.2866*LGDPPC -0.0274*LIND -2.9896*LAGR + 0.2403 *LOPN -0.5658*LCPI + 0.8906*LEXC -8.2929*LURB + 11.4021)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDPPC	1.286643	0.484001	2.658345	0.0160**
LIND	-0.027354	0.508107	-0.053836	0.9577
LAGR	-2.989557	1.856455	-1.610358	0.1247
LOPN	0.240336	0.264666	0.908071	0.3758
LCPI	-0.565792	0.178094	-3.176935	0.0052***
LEXC	0.890635	0.437970	2.033553	0.0570*
LURB	-8.292920	5.324215	-1.557585	0.1367
C	11.402097	8.257371	1.380839	0.1842

Source: Author's computation using E-Views Statistical Package, Version 9.0 ***(*,*** ***, *** indicates significance at 10%, 5%, and 1% level of significance respectively).*

The normalized long run estimated co-integration results are shown in the following equation.

Long Run Equation:

LTR = 11.4021 + 1.2866*LGDPPC - 0.0274*LIND – 2.9896*LAGR + 0.2403*LOPN – 0.5658*LCPI + 0.8906*LEXC – 8.2929*LURB

This long-run equation shows that tax revenue to ratio of GDP is dependent on real GDP per capita income, industrial value added share of GDP, agricultural value added share of GDP, trade openness (%GDP), inflation (CPI), exchange rate, and urbanization rate.

- ***GDP per capita income***

Ho_1*: There is no significant relationship between GDP per capita income and tax revenue.*

In the long run, the test statistics in table 8 shows that tax revenue is positively and significantly influenced by gross domestic product per capita income. The LGDPPC (real GDP per capita income) implies holding other things constant a 1% increase in real GDP per capita income results in a raise in tax revenue percentage of GDP by 1.2866 percent and the relationship is statistically significant at 5% significance level. A higher per capita income leads to a higher level of development, which ultimately generates a higher capacity to pay taxes as well as a greater capacity to levy and to collect them (Chelliah,1971). In Ethiopia, tax revenue is inelastic to the change in personal income, because income tax rate is constant for incomes greater than 5000 birr per month which is 35%, this means a person who gets high income will pay high tax in absolute value meaning that an increase in per capita income will leads to high tax revenue. The researcher therefore concludes that the null hypothesis which states that there is no significant relationship between GDP per capita income and tax revenue from 1981 to 2016 is hereby rejected and the alternative hypothesis that there is a positive and significant relationship between GDP per capita income and tax revenue for the study period was not rejected. The result is consistent with priori expectations and the findings of Workineh (2016); Gupta (2007); Eltony (2002); Stotsky and WoldeMariam (1997); and.Chelliah (1971).

- **Industrial Value Added Share of GDP**

***Ho$_2$**: There is no significant relationship between industrial value added share of GDP and tax revenue.*

Industrial Value Added Share of GDP (LIND) has a negative and statistically insignificant relationship with tax revenue in the long run. A positive sign is expected for this study as predicted in theory that manufacturing enterprises are producing items that are easier to tax meanwhile, business owners typically keep better and organized records of their activities which contribute to positive tax revenue as found in prior studies by Workineh (2016) and Teera (2003). The reason for the negative sign and insignificancy may be that it is appeared to be more tax incentives are given to large enterprises (industries) and the degree of tax evasion; and also due to highly informal sector in the industrial sectors there is ineffective tax administration and collection in the country. Therefore, the researchers concludes that the null hypothesis which states that there is no significant relationship between industrial value added share of GDP and tax revenue from 1981 to 2016 is hereby not rejected and the alternative hypothesis that there is a significant relationship between industrial value added share of GDP and tax revenue for the study period was rejected.

- **Agricultural Value Added Share of GDP**

***Ho$_3$**: There is no significant relationship between agricultural value added share of GDP and tax revenue.*

The LAGR (agricultural value added share of GDP) has a negative and statistically insignificant relationship with tax revenue in the long run. The sign of the coefficient is as expected but doesn‘t have an impact on proxy of LTR (tax revenue). This result supports prior expected sign of the coefficient as found by Karagoz (2013); Gupta (2007); Agbeyegbe et al. (2004); Eltony (2002); and Stotsky and WoldeMariam (1997). The negative impact of agricultural sector is 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 as indicated in the descriptive analysis (Figure 2). Moreover, in Ethiopia agricultural sector is small-scale

with limited number of taxpayers paying tax on income or profits and a substantial part of the output is consumed and not marketed. So that the researcher concluded as agricultural value added share of GDP affects tax revenue negatively but statically insignificant. Therefore, the researchers concludes that the null hypothesis which states that there is no significant relationship between agricultural value added share of GDP and tax revenue from 1981 to 2016 is hereby not rejected and the alternative hypothesis that there is a significant relationship between agricultural value added share of GDP and tax revenue for the study period was rejected.

- **Trade openness**

***Ho_4**: There is no significant relationship between trade openness and tax revenue.*

The LOPN (trade openness (import plus export share of GDP)) has a positive but statistically insignificant relationship with tax revenue in the long run. The sign of the coefficient is as expected but doesn‘t have an impact on proxy of LTR (tax revenue). This result supports prior expected sign of the coefficient as found by Belay (2015); Mahdavi (2008); Gupta (2007) and Eltony (2002). The reason for its insignificancy may be that in Ethiopia more tax incentives (tax exempted imports) are given to large enterprises and government projects even though the foreign tax revenue as a percentage of total tax revenue was high as indicated in the descriptive analysis (table 2) which supports the positive relationships between trade openness and tax revenue. As a result, the researchers concludes that the null hypothesis which states that there is no significant relationship between trade openness and tax revenue from 1981 to 2016 is hereby not rejected and the alternative hypothesis that there is a significant relationship between trade openness and tax revenue for the study period was rejected.

- **Inflation (Consumer Price Index)**

***Ho_5**: There is no significant relationship between inflation rate and tax revenue.*

The long run model shows that tax revenue is negatively and significantly influenced by Inflation which is measured by consumer price index (CPI) in the long run. The LCPI (Inflation measured by consumer price index) implies holding other things constant a 1% increase in the consumer

price index results in a reduction in tax revenue percentage of GDP by 0.5658 percent and the relationship is statistically significant at 1% significance level. The Consumer Price Index (CPI) measures the average change in the price paid by consumers for a fixed market basket of goods and services and therefore, the increase in cost of living associated with the loss of purchasing power of money, which could ultimately reduce real value of tax collected. The researcher therefore concludes that the null hypothesis which states that there is no significant relationship between inflation and tax revenue from 1981 to 2016 is hereby rejected and the alternative hypothesis that there is a negative and significant relationship between inflation and tax revenue for the study period was not rejected. The result of this study is congruent with the findings of Workineh (2016); Sinbo and Muibi (2013); Mahdavi (2008) and Agbeyegbe *et al.* (2004).

- **Exchange rate**

***Ho_6**: There is no significant relationship between exchange rate and tax revenue.*

Exchange rate (Birr to US dollar) has positive and significant long run effect on tax revenue, in the study period. The LEXC (exchange rate measured by the official Birr to US dollar) implies holding other things constant a 1% increase in the official exchange rate (currency depreciation) results in an increase in tax revenue percentage of GDP by 0.8906 percent and the relationship is statistically significant at 10% significance level. Theory suggests that devaluation of exchange rate typically brought by the contractionary financial policies would be expected to have a favorable effect on overall economic activity and thus to increase tax revenue, and same as, an overvaluation of exchange rate typically brought about by expansionary financial policies would be expected to adversely affect overall economic activity, and thus to lower tax revenue (Chaudhry and Munir, 2010). In Ethiopia a depreciation of exchange rate (devaluation) is expected to lead to an increase in import volumes (absolute value in Birr) which leads to high tax revenue. Therefore, the researcher concludes that the null hypothesis which states that there is no significant relationship between exchange rate and tax revenue from 1981 to 2016 is hereby rejected and the alternative hypothesis that there is a positive and significant relationship between exchange rate and tax revenue for the study period was not rejected. The result of this study is congruent with the findings of Sinbo and Muibi (2013).

- **Urbanization**

***Ho$_7$**: There is no significant relationship between urbanization and tax revenue.*

Urbanization (LURB) as measured by the percentage of urban population in total population has the negative sign and statistically insignificant relationship with tax revenue in the long run. A positive sign is expected for this study to the extent that higher demand for public services citrus paribus requires higher tax revenues as found in prior studies by Karagoz (2013) and Mahdavi (2008). The reason for the negative sign may be that in Ethiopia it is appeared to be insufficient number of skilled and competent man power; less technology and infrastructure to integrate the tax system with tax payers identification number (TIN) and these will limit the capacity of tax authority to administer and collect taxes effectively in line with the increasing rate in urban population. Moreover, due to lack of awareness most tax payers are not volunteers to pay taxes. As a result, the researchers concludes that the null hypothesis which states that there is no significant relationship between urbanization and tax revenue from 1981 to 2016 is hereby not rejected and the alternative hypothesis that there is a significant relationship between urbanization and tax revenue for the study period was rejected.

The error correction model has important implication in linking the short-run periods to the long run period. It denotes that a deviation from the long run equilibrium which is corrected gradually through a series of short run partial adjustments. Its coefficient is negative as expected and less than one in absolute value, which is statistically significant at 1% critical value. The sign and level of the coefficient of the error correction term indicates the direction and speed of adjustment of the dependent variable towards its long run steady state path. Thus, the statistically significant and negative sign of ECM (-1) implies the existence of co-integration among variables and hence, the presence of stable long-run relationship. A stable co-integrating relationship adjusts the short-run deviations by the extent of the error correction term. The result in table 8 shows that the coefficient of ECM t-1 is -0.7408, which is statistically significant at 1 percent level. This shows that the adjustment process back to the long run equilibrium after a shock is 74.08 percent a year. The short run result in the table 8 is interpreted as follows:

- ✓ Unlike to the long run effect, GDP per capita has negative and significant short run effect on tax revenue percentage of GDP in the second difference at 10% significance level. In the short run the LGDPPC implies holding other things constant a 1% increase in the GDP per capita results in a reduction in tax revenue percentage of GDP by 1.36 percent and the relationship is statistically significant at 10% significance level. The result manifested that boost in the real GDP per capita will aggravate the fiscal imbalance in Ethiopia, i.e. at least increase the fiscal gap that would influence the government's ability to finance from within, without resorting to other financing mechanisms (Workineh, 2016). The negative sign might be because theory suggests that an increase in income has a different impact on different categories of taxes. For instance, in developing countries direct tax ratios are lower than indirect taxes and there exists sizable tax evasion (Chaudhry and Munir, 2010).

- ✓ Unlike to the long run effect, agricultural value added share of GDP has positive and significant short run effect on tax revenue percentage of GDP in the second difference at 5% significance level. In the short run the LAGR implies holding other things constant a 1% increase in the agricultural value added share of GDP results in an increase in tax revenue percentage of GDP by 2.52 percent and the relationship is statistically significant at 5% significance level. Currently Ethiopia's economy has in the stage of shifting agricultural based economy to industrial based economy as indicated in the descriptive analysis as a result agriculture sector has a positive and significant impact on tax revenue in the short run.

- ✓ LEXC have a positive short run effect on tax revenue in the first difference which has in line with the relationship existed in the long run model. It shows that holding other things constant a 1% increase in exchange rate (currency depreciation) results in a 0.66% increase in tax revenue percentage of GDP and the relationship is statistically significant at 1% significance level, which implies similar conclusion with the long run results.

- ✓ Similar to the relationship existed in the long run model, LURB have a negative short run effect on tax revenue in the first difference but statistically significant at 5% significance level. It shows that 1% increase in urbanization rate results in a 6.14% reduction in tax revenue percentage of GDP and the relationship is statistically significant at 5% significance level. This implies that in the short run Ethiopia's tax system has more exposed to inefficiency due to weak integration in the tax system and its administration. The reason for the negative sign may be similar with the points mentioned for long run bases.

The most common goodness of fit statistic is known as R^2. One way to define R^2 is to say that it is the square of the correlation coefficient between the values of the dependent variable and the corresponding fitted values from the model. The adjusted R - squared is 0.792025, implying that 79.2% of the variation in the determinant of tax revenue is explained by the independent variables, which is an indication of a good fit. In comparison to the R square, the adjusted R square is better and more precise good fit measure because it allows degree of freedom to sum of squares therefore even after addition of new independent variable(s) the residual variance does not change. The overall equation is statistically significant at 1% significance level as shown by the probability value of the F-statistic (0. 0.000012).

Table 9: Key regression statistics

R-squared	0.886559
Adjusted R-squared	0.792025
Durbin-Watson stat	2.388535
F-statistic	9.378198
Prob(F-statistic)	0.000012

Source: Author's computation using E-Views Statistical Package, Version 9.0

Chapter 5 : CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Ethiopia, like any other developing countries, faces difficulty in raising revenue to the level required for the promotion of economic growth. This study examined the long-run and short-run relationship between the dependent variable (Tax revenue) and the independent variables (GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate and urbanization) in Ethiopia for the period from 1981 to 2016. The study used the Autoregressive distributed lag (ARDL) model and bounds testing procedure to examine the presence of long-run and short-run relationship among dependent and independent variables. The stationary behavior of variables included in the model is tested using ADF test, and the test result showed all variables were stationary at first difference. The long run and short run relationship established between tax revenue and its determinants implied various empirical findings.

Empirical results showed that, three variables (real GDP per capita income, inflation (CPI) and exchange rate) have significant effect on tax revenue percentage of GDP in the long run. Whereas, industrial value added share of GDP, agricultural value added share of GDP, trade openness percentage of GDP and urbanization rate are not significant determinants of tax revenue in the long run.

- ✓ The study result showed that GDP per capita income has a significant positive long run relationship with tax revenue at 5% significance level and this represents a higher per capita income leads to a higher level of development, which ultimately generates a higher capacity to pay taxes.
- ✓ Whereas inflation has a significant and negative long run relationship with tax revenue at 1% significance level this implies that the increase in cost of living associated with the loss of purchasing power of money, which could ultimately reduce real value of tax collected in Ethiopia. According to Workineh (2016) if there is loss of purchasing power of money, the tax payers put their tax liability aside and began to worry about satisfaction of their daily consumption.

- ✓ Moreover this study examined the institutional variable which is exchange rate stability in Ethiopia and the results found that exchange rate depreciation is a significant and positive long run relationship with tax revenue at 10% significance level. In Ethiopia a depreciation of exchange rate (devaluation) is expected to lead to an increase in import volumes (absolute value in Birr) which leads to high tax revenue.

In short run the empirical results showed that, four variables (real GDP per capita income, agricultural value added share of GDP, exchange rate and urbanization rate) have significant effect on tax revenue percentage of GDP. Whereas, industrial value added share of GDP, trade openness percentage of GDP and inflation (CPI) are not significant determinants of tax revenue in the short run.

- ✓ Unlike in the long run effect, GDP per capita has negative and significant short run effect on tax revenue percentage of GDP at 10% significance level.
- ✓ Again also agricultural value added share of GDP has positive and significant short run effect on tax revenue percentage of GDP at 5% significance level which is contrary with the long run.
- ✓ Exchange rate has a positive short run effect on tax revenue in line with the relationship existed in the long run model.
- ✓ Furthermore, this study examines the structural variable which is urbanization rate in Ethiopia and the results shows that urbanization is a significant and negative short run relationship with tax revenue at 5% significance level. This implies that in the short run Ethiopia's tax system has more exposed to inefficiency due to weak integration in the tax system and its administration hence the tax system was not improved in line with the increase in urban population.

5.2 Recommendations

Based on the findings of this study the following recommendations were forwarded as an alternative to improve the development of the economy in general and the tax system in particular.

- As indicated in the descriptive statistics tax revenue has remained to be the largest contributor of the total government revenue in Ethiopia but the share of tax revenue to GDP is very low, which would imply that domestic resource mobilization is at an infant stage in Ethiopia. Therefore, improving the efficiency of tax administration, broadening tax bases like, boost in industrial sector shall be given due attention by policy makers. In addition, it's recommended that Ethiopian government perform well in registering high economic development continuously that improve per capita income and life of a citizen which lead to better collection of tax revenue that bring better financing government activities. Since, GDP per capita income has been found to affect tax revenue positively and significantly in the long run.
- The effect sectoral composition of output on tax revenue results that both the industrial and agricultural sector has negative and insignificant effect on tax revenue in the long run in this study. 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. Therefore, to improve its contribution to tax revenue the tax authority should control the informal sector in the industry through effective administration; and also assesses the tax incentives procedures to large enterprises (industries) along with the degree of tax evasion hence this will improve the tax revenue collection from the industrial sectors.
- Macroeconomic instability like inflation and exchange rate erodes the purchasing power of the money (Birr) and affects the value of revenue collected in real terms. Therefore, the government of Ethiopia shall regulate the macroeconomic situation of the country strongly and find new tax items along with formalizing the underground economy.
- Urbanization in Ethiopia has a negative short run and long run effect on tax revenue. The result has not in line with prior expectation. This is due to the lack of awareness, most tax payers in Ethiopia are not volunteers to pay taxes. Therefore, the government should improve the capability of tax authority in terms of competency of man power and infrastructure in tax system by integrating with tax payers identification number (TIN). Moreover, the government needs to create awareness on the importance of tax revenue for the development of a country; create transparency by performing good corporate

governance and perform fair wealth distribution. This will improved tax payer's attitudes and tax revenue collection in line with the increase in urbanization rate.

5.3 Future research direction

This study examined the factors influencing tax revenue in Ethiopia by using the dependent variable tax revenue; and the independent variables of GDP per capita income, industry value added share of GDP, agricultural value added share of GDP, trade openness, inflation rate, exchange rate and urbanization for the period from 1981 to 2016. Thus, future researchers could extend examining the determinants of tax revenue in Ethiopia by considering other independent variables like institutional variables such as corruption, political stability, economic stability and policy variable by using the country risk index obtained from Intra Country Risk Guide (ICRG). Moreover, structural variables like population characteristics and socio economic variables. The Researcher believes that the research area is uncovered and not sufficiently done in Ethiopia by using model in co-integration approach.

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Appendix A: Summary of dependent and independent variable computation result

YEAR	Tax revenue % of GDP (%)	GDP per capita income (Birr)	Industrial value added share of GDP (%)	Agricultural value added share of GDP (%)	Trade openness share of GDP (%)	Consumer price index	Exchange rate (Birr to USD)	Urbanization rate (%)
1981	10.89	3202.74	9.27	71.75	1.94	9.53	2.07	12.17
1982	10.89	3109.11	10.12	69.00	2.10	10.03	2.07	12.25
1983	10.67	3325.06	9.78	71.18	2.02	10.01	2.07	12.33
1984	12.70	3026.39	11.23	67.04	2.52	10.92	2.07	12.41
1985	10.38	2666.08	13.26	58.15	2.35	13.15	2.07	12.49
1986	10.61	2835.38	12.66	61.38	2.65	11.60	2.07	12.58
1987	11.72	3130.79	11.97	64.43	2.26	11.05	2.07	12.66
1988	12.48	3036.23	11.32	62.98	2.27	11.81	2.07	12.74
1989	12.14	2954.90	10.34	63.16	2.24	13.12	2.07	12.83
1990	10.34	2981.48	9.28	63.77	1.83	13.78	2.07	12.92
1991	8.62	2785.14	8.47	69.15	1.98	19.98	2.07	13.00
1992	6.52	2597.29	7.92	68.84	1.61	20.39	2.07	13.09
1993	6.67	2817.93	9.06	65.68	3.03	21.35	2.80	13.18
1994	8.75	2789.89	9.49	63.25	4.03	22.69	5.77	13.26
1995	9.23	2857.55	9.69	61.85	5.94	26.06	6.25	13.88
1996	10.04	3066.05	9.29	64.41	5.93	23.71	6.32	14.10
1997	10.42	3112.87	9.30	64.03	6.63	23.08	6.50	14.31
1998	9.51	2977.55	9.72	57.34	7.56	23.11	6.88	14.51
1999	9.13	3064.44	9.78	55.99	8.12	25.51	7.51	14.71
2000	10.28	3135.71	9.70	55.30	7.73	25.99	8.14	14.92
2001	11.05	3299.93	9.50	56.40	7.50	23.19	8.33	15.13
2002	12.03	3256.42	10.02	53.67	8.38	22.91	8.54	15.33
2003	11.34	3098.15	10.97	49.45	9.44	26.98	8.58	15.54
2004	12.71	3426.50	10.90	51.57	11.29	27.62	8.62	15.66
2005	11.76	3723.52	10.58	51.89	14.25	30.59	8.65	15.98
2006	10.84	4015.73	10.43	51.53	16.11	33.90	8.68	16.21
2007	10.19	4545.35	10.23	50.49	16.54	39.02	8.79	16.17
2008	9.68	4915.95	10.15	48.82	20.63	60.58	9.24	16.79
2009	6.99	5215.60	10.13	47.29	24.67	62.22	10.42	17.15
2010	11.42	5724.01	10.17	46.13	29.63	66.77	12.89	17.49
2011	11.45	6306.98	10.40	44.37	33.82	92.18	16.12	17.86
2012	11.47	6682.69	11.46	43.10	43.97	111.36	17.25	18.21
2013	12.50	7209.42	13.00	42.00	40.86	119.59	18.19	18.62
2014	12.71	7758.31	13.80	40.20	47.49	129.71	19.07	19.03
2015	13.37	8362.34	15.00	38.70	51.86	143.26	20.10	19.45
2016	12.40	8786.80	16.70	36.70	64.42	154.05	21.11	19.88

Source: Author's computation based on NBE report, MoFED report and CSA

Appendix B: Augmented Dickey Fuller Unit Root Test

1. Null Hypothesis: LGDPPC has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.489678	1.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

2. Null Hypothesis: LGDPPC has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.672265	0.9675
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

3. Null Hypothesis: D(LGDPPC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.127431	0.0028

Test critical values:	1% level	-3.639407
	5% level	-2.951125
	10% level	-2.614300

4. Null Hypothesis: D(LGDPPC) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.421518	0.0005
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

5. Null Hypothesis: LIND has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.963434	0.7549
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

6. Null Hypothesis: LIND has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.349330	0.8577
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

7. Null Hypothesis: D(LIND) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.405425	0.0177
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

8. Null Hypothesis: D(LIND) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.673379	0.0382
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

9. Null Hypothesis: LAGR has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.969327	0.9952
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

10. Null Hypothesis: LAGR has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.510059	0.8069
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

11. Null Hypothesis: D(LAGR) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.346276	0.0001
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

12. Null Hypothesis: D(LAGR) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.029905	0.0001
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

13. Null Hypothesis: LOPN has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.876905	0.9940
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

14. Null Hypothesis: LOPN has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.728224	0.2325
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

15. Null Hypothesis: D(LOPN) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.121061	0.0349
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

16. Null Hypothesis: D(LOPN) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.497655	0.0567
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

17. Null Hypothesis: LCPI has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.095790	0.9967
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

18. Null Hypothesis: LCPI has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.030477	0.9264
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

19. Null Hypothesis: D(LCPI) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.203790	0.0001
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

20. Null Hypothesis: D(LCPI) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.456978	0.0005
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

21. Null Hypothesis: LEXC has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.517111	0.8757
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

22. Null Hypothesis: LEXC has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.990549	0.1494
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

23. Null Hypothesis: D(LEXC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.719456	0.0082
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

24. Null Hypothesis: D(LEXC) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.667675	0.0387
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	

25. Null Hypothesis: LURB has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		3.404722	1.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

26. Null Hypothesis: LURB has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.088292	0.9168
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

27. Null Hypothesis: D(LURB) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.633005	0.0007
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

28. Null Hypothesis: D(LURB) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.282048	0.0000
Test critical values:	1% level	-4.252879	
	5% level	-3.548490	
	10% level	-3.207094	