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SCHOOL OF GRADUATE STUDIES

FACTORS AFFECTING SHARE OF TAX REVENEUE IN GROWTH DOMESTIC
PRODUCT (GDP) OF ETHIOPIA

BY

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JUNE, 2019

ADDIS ABABA, ETHIOPIA

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PRODUCT (GDP) IN ETHIOPIA

A THESIS SUBMITTED TO SCHOOL OF POST GRADUATE STUDIES (INSTITUTE OF
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DECLERATION

I, undersigned, declared that this my original work, prepared under the guidance of GemorawAdinew. All source of materials used for the thesis have been duly acknowledged. I further confirm that thesis has not been submitted either in part or in full to any other higher learning institutions for the purpose of earning any degree.

Declared be:

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ENDORSMENT

This thesis has been submitted to St, Mary University School of Graduate studies for examination with my approved as a university advisor.

_____   _____

Advisor   Signature

St. Mary University, Addis Ababa   June,2019

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This is to certify that the thesis prepared by Yehualawork Lemma Tirfe, entitled: factors affecting share of tax revenue in growth domestic product (GDP) of Ethiopia, And submitted in partial fulfillment of the requirements for the Degree of Masters in Development Economics complies with the regulations of the St. Mary University and meets the accepted standards with respect to originality and quality.

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ACRONYMS AND AVRIVATION

ERCA	Ethiopian Revenue and Customs Authority
GDP	Gross Domestic Product
VECM	Vector Error Correction Model
VAR	Vector Autoregressive Model
REVENUE	Share of Tax Revenue in growth Domestic Product (GDP)
IMF	International Monetary Fund
MOFEC	Ministry of Finance and Economic Cooperation
NBE	National Bank of Ethiopia
PCI	per Capita Income
SERV	Service share to GDP
WDI	World Development Indicator
SSA	Sub Saharan African
GTP	Growth and Transformation Plan
UN	United Nation
ADF	Augmented Dikey-Fuller
Agri	Agriculture to GDP ratio
MANU	Manufacturing to GDP ratio
DI	Direct Tax
IT	Indirect Tax
IMD	Import Duty

ABSTRACT

This paper identifies the factors affecting share of revenue in growth domestic product (GDP) of Ethiopia from the period 1981 to 2016. Descriptive statics and time series econometrics are used in the model to analyze the data. The study employs Vector Error Correction Model (VECM) model to co-integration in order to investigate the long run relationship and Vector Auto Retrogressive (VAR) for short-run relationship between the share of tax revenue in growth domestic product (GDP) of Ethiopia and macro economic variables share of agriculture sector in GDP, Share of manufacturing to GDP, Share of Service sector to GDP, direct tax to , Indirect tax to GDP, import duty and percapita income.The ADF technique was performed to test for stationary. All the variables were not stationary at levels, but they were stationary at first difference.The long-run empirical result reveals that there is a stable long run relationship between share of revenue to GDP and its factors.Service sector to GD,Share of manufacturing to GDP,Indirect tax to GDP have a positive impact on the share of revenue to GDP during the study period while the other variables have negative effect. Import Duty and Manufacturing to GDP have significant impact to GDP and the other variables have insignificant impact on share of revenue. The descriptive results shows that the increment of tax to GDP ratio is so slight, Agriculture has the largest share of GDP, there is a fluctuation trend of manufacturing to GDP ratio and Even if Share of service to GDP is large next to agricultureit is negatively influence to share of tax revenue GDP. The trend of all tax types are the same. Generally from the study can conclude that there is long run relationship between shares of tax revenue to GDP ratio and the independent variables. Based on the study the government basically, the country's financial institutions should be committed to make modern tax administration and it needs high integration of the stake holders in the country as whole.

Key words:GrowthDomestic Product, Tax Revenue, VAR,VECM, Ethiopia

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the study

Taxation provides government with the funds needed in development, relieve poverty and deliver public service. It offers an antidote to aid dependence in developing countries and provides fiscal reliance and sustainability that is needed to promote growth. Significant progress has been made by many developing countries but weak capacity, corruption and the missing reciprocal link between tax and public and social expenditures remains as challenges (IMF,2011).

Tax revenue is of vital importance for the sustainability of both developed and developingcountries. Firstly, taxation is the main source of central government revenue, since tax collection is mandatory and regular, which can guarantee the stability of income. Secondly, taxation aims to meet the social and public needs by providing public goods and services. Thirdly, government need tax revenue to establish armed forces and judicial systems to ensure the secure and justice of the society. Thus a rapid Increase in domestic revenue and a corresponding increase in public services is a policy priority. However, one needs to be cautious about increased public spending and increased taxation, as distortionary taxes begin to reduce growth when pushed beyond certain levels: tax bases are not simply 'given' to governments: they can be grown or destroyed (Bird, 2008).

GDP includes income earned locally that accrues on on-residents and excludes income received from abroad by residents, whereas GNP excludes the former and includes the latter. .Since local income accruing tonon-residents typically is taxed while remittances abroad typically are not, GDP produces a more accurate measure of taxable capacity(IMF Working paper 1997)What the optimum level of the tax-GDP ratio is as much an ideological as a technical question. Governments of different political perspectives will have different goals in terms of public expenditure, which imply different levels o taxation. Indeed,tax revenue/GDP ratios various widely across regions.

This paper aimed to identify the factors affecting share of tax revenue to growth domestic product by considering tax revenue measured by percentage of tax collected in the year to GDP ratio as dependent variable and share of agriculture sector in GDP, Share of manufacturing to GDP, Share of Service sector to GDP, percapita income, direct tax, Indirect tax, import duty, as independent variables by using past 36 years data.

1.2.Statement of the problem

If countrythatiswillingandabletomobilizeahigherratioofits output in tax revenuesshould have more resources to finance its recurrent and development programs. Many sub-Saharan African countries face difficulty in raising tax revenue to public purpose because of low per capita incomes, an economic base in subsistence agriculture, poorly structured tax system, and weak tax and custom administration all contributed to difficulties in raising tax revenue. (IMF working paper 1997)

Low-income countries typically collect taxes ofbetween 10 to 20 percent of GDP, while the average for high-income countries ismore like 40 percent. Poor countries are poor for certain reasons and these reasons can also help to explain their weakness in raising tax revenue.Timoth B and Torsten .P (2016)

In many poor developing countries, a low tax-revenue GDP ratio prevents the country from undertaking ambitious expenditure programs. Although the economy has been growing at a remarkable rate averaging more than 10 percent, the slow growth in the tax to GDP ratio suggests the growth in tax collection is not commensurate with the economic growth perhaps indicating a huge untaxed potential. (UNDP 2016).

It meansthat the Ethiopia Economy has not contributed significantly to the national expenditure. I also shows that there is enough positional to mop-up extra revenue in taxation by careful planning of the tax.The fiscal policy of government of Ethiopia also has been aimed at generating the required budgetary finance to support the country's development. But the countries only 69% budget is covered with revenue.(MOFEC 2017)

The previous studies had done the determinant of tax revenue, (Tesfaye 2015) Conclude that Foreign direct investment to GDP, Industry sector in percentage of GDP and Per capita income

have significant impact on tax revenue(Tadele2015)Direct and domestic indirect tax revenues were non-buoyant both in short run and in the long run. Foreign trade tax revenue was found non buoyant in the short run, it was buoyant in the long run. The share of service sector value added, import and over all government budget deficits to GDP affects positively. Even though the share of industry value added to GDP has positive effect on the buoyancy of gross tax revenue.But, there is no detail emphasis giving Why not the revenue collection increased as of the economic growth.The objective of this study is to determine the relationship between government revenue and economic growth.

Therefore, the paper tries to identify the factors affecting share of tax revenue to growth domestic product by considering tax revenue measured by percentage of tax collected in the year to GDP ratio as dependent variable and share of agriculture sector in GDP, Share of manufacturing to GDP, Share of Service sector to GDP, percapitaincome,direct tax , Indirect tax to GDP, import duty , federal tax and Regional tax and as independent variables by using past 36 years data.

This study analyses Ethiopia's tax structure, economic characteristics and tax and custom administration capabilities to identify potential inhibitors to raising the country's tax to GDP ratio and recommendations on what must be done to address them.

1.3.Research Questions

The study critically investigates the following questions regarding to the factors affecting share of revenue in growth domestic products.

- What are the factors affecting share of revenue in growth domestic product in Ethiopia
- Is there a long run and short run relationship between share of revenue ingrowth domestic product and the factors

1.4. Objective of the study

1.4.1. General Objective of the study

The main objective of the study is to determine factors affecting share of Taxes revenue in growth domestic product of Ethiopia.

1.4.2. Specific Objectives.

- To analyze the trend of tax revenue of basic sectors to GDP
- To analyze the trend of different types of tax.

1.5. Significance of the Study

The study gives a modest contribution to the body of empirical knowledge by identifying the potential macro economic   factors affecting the share of revenue in growth domestic products (GDP) of Ethiopia. It provides important contribution different stake holders like researchers, policy makers, government, scholars as an input for the purpose they intended to use. It is believed that to provide relevant information for policy makers in considering areas of intervention to promote enhance tax revenue.

1.6. Scope and Limitation of the study

The study focus on identify factors affecting tax share growth domestic product of Ethiopia by taking 36 years past data from 1981 to 2016budget closing year.Nine variables are chosen these are Per Capita income, share of agricultural sector in share GDP, share of manufacturing sector to GDP, shareservice   sector to GDP, direct tax, indirect tax, import duty, federal and state tax.The study is limited to determinant of tax revenue in Ethiopia by taking into account nine dependent variables against tax revenue collection for the past 36 years.Sample period selected in the study covers only thirty six years data from 1981 to 2016 due to unavailability of well-prepared report for some variables under thestudy is as second limitation.

1.7. Organization of the Study

The paper consists of five Chapters with different sections and sub sections. The rest of the paper is organized as follows: the second chapter presents the theoretical and empirical literature reviews related to taxrevenue.Chapter three gives insight on the methodological aspects of the study. Chapter four consists both descriptive and econometric results;it discusses the results,main findings and interpretation. Finally, chapter five provides the conclusion and policy recommendation based on the main findings.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. Definition of taxation

Taxation is a system of raising revenue by a government through tax. It is a system of collecting money by a government to finance the government operations. It is a compulsory contribution payable by an economic unit to a government without expectation of direct and indirect equivalent return from the government for the contribution made. Misrak(2008).

2.1.2. Theories of Taxation:

The economists have put forward many **theories or principles of taxation** at different times to guide the state as to how justice or equity in taxation can be achieved. The main theories or principles in brief, are:

(i) Benefit Theory:

According to this theory, the state should levy taxes on individuals according to the benefit conferred on them. The more benefits a person derives from the activities of the state, the more he should pay to the government. This principle has been subjected to severe criticism on the following grounds:

Firstly, If the state maintains a certain connection between the benefits conferred and the benefits derived. It will be against the basic principle of the tax. A tax, as we know, is compulsory contribution made to the public authorities to meet the expenses of the government and the provisions of general benefit. There is no direct quid pro quo in the case of a tax.

Secondly, most of the expenditure incurred by the slate is for the general benefit of its citizens, It is not possible to estimate the benefit enjoyed by a particular individual every year.

Thirdly, if we apply this principle in practice, then the poor will have to pay the heaviest taxes, because they benefit more from the services of the state. If we get more from the poor by way of taxes, it is against the principle of justice?

(ii) The Cost of Service Theory:

Some economists were of the opinion that if the state charges actual cost of the service rendered from the people, it will satisfy the idea of equity or justice in taxation. The cost of service principle can no doubt be applied to some extent in those cases where the services are rendered out of prices and are a bit easy to determine, e.g., postal, railway services, supply of electricity, etc., etc. But most of the expenditure incurred by the state cannot be fixed for each individual because it cannot be exactly determined. For instance, how can we measure the cost of service of the police, armed forces, judiciary, etc., to different individuals? Dalton has also rejected this theory on the ground that there s no quid pro qua in a tax.

(iii) Ability to Pay Theory:

The most popular and commonly accepted principle of equity or justice in taxation is that citizens of a country should pay taxes to the government in accordance with their ability to pay. It appears very reasonable and just that taxes should be levied on the basis of the taxable capacity of an individual. For instance, if the taxable capacity of a person A is greater than the person B, the former should be asked to pay more taxes than the latter.

It seems that if the taxes are levied on this principle as stated above, then justice can be achieved. But our difficulties do not end here. The fact is that when we put this theory in practice, our difficulties actually begin. The trouble arises with the definition of ability to pay. The economists are not unanimous as to what should be the exact measure of a person's ability or faculty to pay. The main view points advanced in this connection are as follows:

(a) Ownership of Property: Some economists are of the opinion that ownership of the property is a very good basis of measuring one's ability to pay. This idea is out rightly rejected on the ground that if a persons earns a large income but does not spend on buying any property, he will then escape taxation. On the other hand, another person earning income buys property, he will be subjected to taxation. Is this not absurd and unjustifiable that a person, earning large income is exempted from taxes and another person with small income is taxed?

(b) Tax on the Basis of Expenditure: It is also asserted by some economists that the ability or faculty to pay tax should be judged by the expenditure which a person incurs. The greater the

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expenditure, the higher should be the tax and *vice* versa. The viewpoint is unsound and unfair in every respect. A person having a large family to support has to spend more than a person having a small family. If we make expenditure.as the test of one's ability to pay, the former person who is already burdened with many dependents will have to' pay more taxes than the latter who has a small family. So this is unjustifiable.

(c) Income as the Basics: Most of the economists are of the opinion that income should be the basis of measuring a man's ability to pay. It appears very just and fair that if the income of a person is greater than that of another, the former should be asked to pay more towards the support of the government than the latter. That is why in the modern tax system of the countries of the world, income has been accepted as the best test for measuring the ability to pay of a person.

2.1.3. Principle of Good Tax System

Governments have developed more sophisticated systems and processes for defining who is taxed, what is taxed, how much is taxed and which personal conditions of the taxpayers should be taken into account. But identifying the principles of tax is very important

The principles of good taxation were formulated many years ago. In The Wealth of Nations (1776), Adam He argued that taxation should follow the four principles of fairness, certainty, convenience and efficiency.

Fairness: In that taxation should be compatible with taxpayers' conditions, including their ability to pay in line with personal and family needs.

Certainty: Certanity should mean that taxpayers are clearly informed about why and how taxes are levied. Convenience relates to the ease of compliance for the taxpayers: how simple is the process for collecting or paying taxes?

Efficiency: Ittouches on the collection of taxes: basically put, the administration of tax collection should not negatively affect the allocation and use of resources in the economy, and certainly shouldn't cost more than the taxes themselves.

Even if Adam Smith's principles of good taxation form a sound basis for taxation today, they're not always followed. Sometimes tax systems hit certain categories of taxpayers or kinds of consumption while leaving others relatively untouched. Sometimes tax systems lack transparency, imposing charges on some goods

2.1.4. Determinants of tax revenue

Determinants of tax revenue of countries, as measured by tax to GDP ratio, have been the subject of many researches. The findings of most of the researchers support that the most traditional factors, in conventional literatures indicate that country's economic structure and institutional sophistication explain the variations in tax revenue.(UNDP 2016)

Drummond et al (2011) conducted a panel study covering 28 low income countries on the determinants of revenue in Sub Saharan African (SSA) countries, in line with conventional wisdom, the research found out significant and positive correlation between quality of institutions and revenue mobilization. The finding was also supported by the case study on Mozambique. Mozambique has brought an improvement in revenue collection following the tax policy reforms in 1996 that has focused on broadening the tax base and improving administrative efficiency.

A study by Botlhole (2010) on the determinants of tax effort in sub-Sahara Africa over the period 1990-2007, using panel data covering 46 countries, established, per-capita GDP, openness and share of agricultural output to be the main determinants of tax collection.

Addison and Levin (2008) in their study to identify the determinants of tax revenue in Sub-Saharan Africa found that higher tax to GDP ratios are related to openness of economies, smaller size of agriculture sector, and economic and political stability.Economic, structural and administrative factors determine the size of the tax base and the level of tax efforts. For example, the trade sector has been traditionally a base that is easier to tax. Accordingly, it is a major source of government revenues in SSA and for most developing countries. On the Other hand, subsistence agriculture is often viewed as a signal of difficulty to tax. According to (UNDP 2016) The major determinants of tax revenue are summarized as follows:

Per capita income: as a proxy for the overall economic development and sophistication of the economic structure is expected to positively impact the tax revenue.

The pectoral composition: Structure of an economy is one of the key determinants of tax revenue, because not all sectors are easy to tax. For instance taxing the agriculture sector that is mainly dominated by substance small holder faming is difficult. The same goes for informal services sector in urban areas. On the other hand, a large amount of tax revenue could be secured from a vibrant mining sector dominated by a few large firms.

The degree of trade openness: the degree of trade openness measured by the sum of exports and imports as a share of GDP, is a key for revenue performance. Due to growing trade among countries and the relative ease of the sector to tax, tax revenue from international trade constitutes a large part of tax revenue in developing countries.

Inflation: inflation as a general proxy for macroeconomic stability is believed to have an impact on economic activities and has important implication on tax revenue collection.

2.1.5. The Relationship between Tax Revenue and Economic Growth

Gross domestic product is the market value of all officially recognized final goods and services produced within a country in a given period of time. (Goossens et al. 2007) It includes all of private and public consumption, government outlays, investments and exports less imports that occur within a defined territory. GDP is commonly used as an indicator of the economic health of a country, as well as to gauge a country's standard of living. (Investopedia 2009). Tax is a finance charge or other levy imposed upon a taxpayer (an individual or legal entity) by a state or the functional equivalent of a state such that failure to pay is punishable by law.

(Mutaşcu&Dănuleţiu 2011) The relationship between tax revenue and GDP has become the focus in the economic field. The maximization of tax revenue is incompatible with the maximization of GDP. (Ma 2001)

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the functional equivalent of a state such that failure to pay is punishable by law. (Garner 2009) The tax multiplier is used to measure the change in aggregate production caused by changes in government taxes. It is the negative marginal propensity to consume times one minus the slope of the aggregate expenditures line.

Feng Y and EkoS (2014) Presents an empirical analysis of taxes and economic growth in Serbia and Croatia in the period 2007-2016. In order to identify the impact of tax forms on economic growth and their relationship, the authors decided to set up a panel regression where gross domestic product is the dependent variable, while corporate income tax, value added tax, social security contributions and excises are independent variables. The results of random effect model have shown that corporate income tax, value added tax and social security contributions have a positive impact on the gross domestic product, while excises affect the gross domestic product negatively. However, only value added tax has a statistically significant impact on economic growth in these countries, with each increase in revenue from this tax contributing to the growth of gross domestic product in the observed period.

2.1.6. Taxation Legislative Power in Ethiopia

In the preceding unitary government system, the authority of levying and collecting tax was a task held centrally. But after the country's transition to federal system, the power of levying and administering tax has become the task of both federal and regional governments. In the constitution, the revenue has been divided as federal, regional and common. (The EPRDF constitution Article 98)

2.1.7. Ethiopia's Tax Policy

Ethiopian tax policy is geared towards promoting investment, supporting industrial development; and broadening the tax base and decreasing the tax rate in view of financing the ever-growing needs of government expenditure. On the other hand the policy is designed towards discouraging certain production and consumption activities, which had /and will have negative effects on health, moral, economic and social settings of the community. ERCA report (2000)

2.1.8. Classification of Taxes in Ethiopia
2.1.8.1.Direct Taxes

Direct tax revenue in Ethiopia consists of tax on income from employment, business profit tax, rental income tax, tax on interest income on deposits, dividend income tax, tax on income from

royalty's tax on income games of chance, tax on gain of transfer of certain investment property, rendering of technical service outside Ethiopia and agriculture income tax. Tilahun A.(2014)

2.1.8.2.Indirect Taxes

Indirect tax revenue in Ethiopia consists of turn over tax, excise tax; value added taxand customs duties. Tilahun. (2014)

Value Added Tax: value added tax to define as a consumption tax changed on the value added to goods and service by importers, manufactures and traders at each stage of the production and distribution processes.

Turnover Tax: Turnover tax is an indirect tax imposed not on the value added but on the total turnover on sales value of goods and services. In Ethiopia case it is a tax imposed on goods supplied and services rendered locally by persons not registeredfor VAT.

Excise Tax: Excise Tax is an indirect tax imposed on luxury goods, goods that are hazard outs to health and basic goods.

Custom Duty: Custom duty is tariff imposed by the Custom Authorities directly on the activities of imports and exports of goods and services.

2.2. Empirical evidences on determinants of tax revenue in different countries

Ahsan and Wu (2005) examined the tax share in GDP for developed and developing countries for 1979 - 2002 and found the negative and significant relation of agriculture share, GDP per capita, and population growth to the tax ratio while trade share in GDP has positive and significant relation but corruption has negative and insignificant relation.

The study utilized a model of tax effort that was used by Teera (2002) in establishing the determinants of tax revenue share in Uganda. Annual time series data for the period 1970 - 2005 wereused.The study employed Ordinary Least Squares (OLS) method to estimate the long-run co-integrating equation and also the short run error correction model. The estimated long-run results indicates that tax revenue share in Kenya was determined by the level of per capita income, imports, agriculture, manufacturing, external debt and trade liberalization. In the short run, only variables of manufacturing, terms of trade and tax reform are significant. The main policy implications derived from the study were: that possible future direction of policy in Kenya lies on the above variables that determine the tax revenue share and hence policies should be formulated to influence their impacts. Of particular importance was for the government to use appropriate taxation policies to ensure that tax revenue productivity from imports is always positive.

Abhijit (2007) Used a broad dataset and accounting for some econometric issues that were previously ignored. The results confirm that structural factors such as per capita GDP, agriculture share in GDP, trade openness and foreign aid significantly affect revenue performance of an economy. Other factors include corruption, political stability, share of direct and indirect taxes etc. The paper also makes use of a revenue performance index, and finds that while several Sub Saharan African countries are performing well above their potential, some Latin American economies fall short of their revenue potential.

Tanzi (1992) describe that there is a large gap between tax-to-GDP ratio of developing and developed countries on account of a number of challenges. First, a large sum of working population of developing countries is employed in the informal agricultural sector. Significant amount of earnings remain out of the ambit of income tax. Second, absence of trained tax officials and transparent tax procedures allows tax officials and tax payers to exploit the system.

Third, developing countries find it difficult to develop reliable statistics in presence of an undocumented economy. As a result significant revenue potential remains unrealized

Bilquees (2004) measured the buoyancy and elasticity of tax revenue system in Pakistan over the period 1974 to 2003 by using the Divisia Index Approach and analyzed the factors responsible for the resulting size of elasticity coefficients. Her estimates of buoyancy suggested that tax changes did not lead to significant revenue augmentation. However high coefficient of sales tax with respect to GDP base reflected the inclusion of service sector and utilities in sales tax net, which has serious implications for poor.

Lutfunnahar (2007) identified the determinants of tax share and revenue performance for Bangladesh along with 10 other developing countries for the 15 years through a panel data analysis. The results obtained suggest international trade, broad money, external debt and population growth to be significantly determinants of tax efforts. The study concluded that Bangladesh and other countries have low tax effort (less than unity index) and are not utilizing their full capacity of tax revenue and therefore have the potential for financing budgetary imbalance through raising tax revenue.

Feng Y and EkoS (2014) Presents an empirical analysis of taxes and economic growth in Serbia and Croatia in the period 2007-2016. In order to identify the impact of tax forms on economic growth and their relationship, the authors decided to set up a panel regression where gross domestic product is the dependent variable, while corporate income tax, value added tax, social security contributions and excises are independent variables. The results of random effect model have shown that corporate income tax, value added tax and social security contributions have a positive impact on the gross domestic product, while excises affect the gross domestic product negatively. However, only value added tax has a statistically significant impact on economic growth in these countries, with each increase in revenue from this tax contributing to the growth of gross domestic product in the observed period.

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

The study concludes that there is an inverse relationship between economic growth and Import duty. As import duty increases the economic growth declines and vice versa. With regard to excise duty, this study concludes that as increase in excise duty slows it reduces the rate of economic growth. On Income tax, the study concludes that established Income Tax leads to continuous increase in revenue obtained by government. The study further concludes that there is a direct relationship between Income tax and economic growth. The study concludes that increase in VAT leads to positive effects on the rate of economic growth. Regarding Economic Growth, the study concludes that there has been an increase in the Economic Growth in Kenya over the years. However, the study concludes that the rate of economic growth has been gradual.

Chaudhry I.(2010).conclude that Pakistan economy can generate high tax to GDP ratio by boosting the openness,literacy level, political stability and broadening the tax base and by controlling income inequality, tax evasion and tax exemptions.

Firehiwot H. (20016) identified the relationship between tax revenue, private final consumption, inflation and economic growth in Ethiopia. To achieve this objective co-integrated VAR approach was employed. According to the study Real GDP exert negative and significant effect on real tax revenue in the long run while impact of real private final consumption is positive and insignificant in the long run, there is strong evidence that inflation exert negative impact on real tax revenue, inflation, real private final consumption and real GDP.

According to Kaldore (1963) if a country wants to develop, it requires to collect tax revenue more than other means of financing in developing countries. This is because of taxation is one of

the best instruments to boost the potential for public sector performance, to finance the social insurance program and for the repayment of public debt. A country's revenue generation primarily depends upon its sufficient capacity to tax more in both economic and administrative term. It is compulsory revenue transfers to the central government for public purposes, but certain compulsory transfers such as fines, penalties, and most social security contributions are debarred. Refunds and corrections of mistakenly collected tax revenues are treated as negative revenue.

Belay. Z (2015) investigate the determinant of tax revenue performance in Ethiopia by using time series data from 1992-2013. The variable used was foreign direct investment, public dept, openness, foreign aid, inflation and gross domestic product. The trend of tax collection in Ethiopia is inconsistent, changing upward and downward depending economic condition. The study reveals that growth 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.

Aliye G.(2016). analyze empirically factors influence tax revenue broad money supply, exchange rate, urbanization, import, foreign remittances, and mining share in GDP so as to assess the response of tax revenue to changes in its factors in Ethiopia. According to the results obtained suggest that broad money supply and exchange rate are positively significant in influencing tax effort in Ethiopia. But the results indicate that import in GDP is statistically insignificant factor to influence tax effort in Ethiopia.

Lisa K. (2007) reviews the pros and cons of changes made to the tax system and assessthe extent to which they can solve the deficit dilemma. The study demonstrate that Uganda's approach to tax policy doesnot take into considerationprevailing domestic social phenomena like the HIV/ADS epidemic, the ongoing civil war in North Uganda, the expanding informal sector, and barriers to effective tax administration , all which are rapidly eroding the tax base. Policy solutions that address these system problem are suggested.

Imbaring B., Taufika A. Ismail A.(2013)investigate the long run relationship between the tax structure and economic growth and other economic indicators. Panel unit root tests are carried out to determine the order of integration of panel variables and in order find outlong run

relationship mploy Kao residual cointegrationtest . The result of panel cointegration test reveal that there is no long run relationship between tax structure and both of GDP and gross saving in developing countries and   there is strong cointgration relationship among tax structure and international trade. Conversely, for high-income OECD countries, there is a long run cointgrating relationship between components of tax revenue and GDP and gross saving, while there is no evidence for imported and exported of goods and services.

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CHAPTER THREE

3. RESEARCH METHODOLOGY

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3.1. Research Design

The study employs an explanatory research design in order to achieve its objectives. It is the most appropriate design for identifying the causal relationship between share of revenue in growth domestic product and other macroeconomic variables.

3.2. Data Type and Sources

The study employs secondary data that are collected from Ministry of finance and economic cooperation (MOFEC), World Development Indicator (WDI) and Ethiopia Revenue and Custom Authority (ERCA)

3.3. Methods of Data Analysis

The study uses both the descriptive and econometric methods of data analysis. Graphs are descriptive statistical methods used to explain the macroeconomic performances and trends of variables used in the model. The study used Vector Autoregressive model is used and econometric analysis includes testing of important tests, the estimation of the model and interpretation of economic model results. To analyze the data, the statistical package of E-views software version 9.0 is used.

3.4. Specification of the Model

This model analyzes the effect of number of variables on share of revenue growth domestic product (GDP) of Ethiopia and is presented as follows.

REVENUE = F (X),

Where, REVENUEis the share tax revenue in GDP.

Where X includes share of agriculture to GDP, share of manufacturing to GDP, share of service sector to GDP, Percapita income, Direct tax , Import duty, Indirect tax , Federal and Regional Tax)

REVENUE= F (Agri, MANU,SERV, PERC,DT, IT,IMD,…... (1)

$REVE_t = \alpha + \beta_1\, AGri_t + \beta_2\, MANU_t + \beta_3 SERV_t + \beta_4 PERC_t + \beta_5 DI_t + \beta_6 IT_t +$

$\beta 7IMDt + \beta 8FTt\epsilon t$…………………………………………….……… (2)

The coefficients $\beta 0$, $\beta 1$, $\beta 2$, $\beta 3$ and $\beta 4$ are the parameters of the econometric model, and they describe the directions and strengths of the relationship between REVENUE and the factors that used to determine REVENUE in the model (called Explanatory Variables).

4. RESULT AND DISCUSSION

4.1. Descriptive Analysis

4.1.1. Trends of Tax to GDP ratio of Ethiopia 1981 – 2016

According to MOFEC, (from 1982-1986) the average tax to GDP ratio of Ethiopia was 13.8,(from 2005-2010) decline to 9.8and (from 2011-2016) slightly increased and reached 12.9. The highest tax to GDP ratio of was at 2012 which account 12.6.
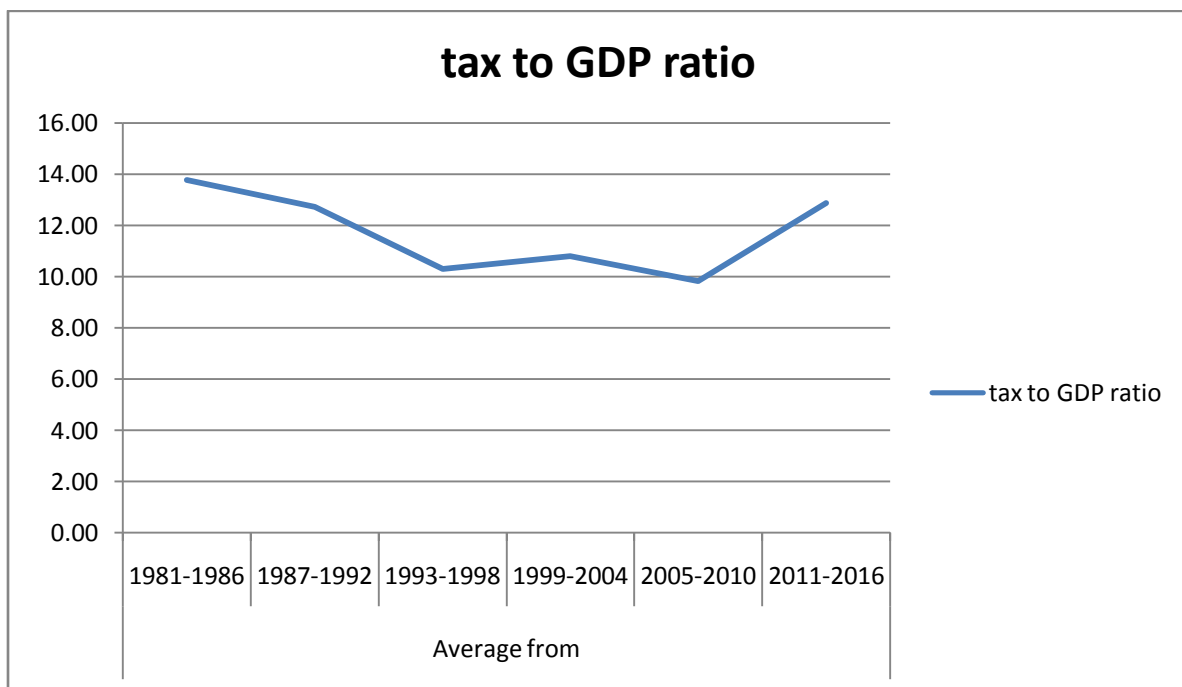
Source: Computed based on MOFEC data

Figure 4.1 Trendsof Tax to GDP ratio of Ethiopia 1981 – 2016

4.1.2. Trends of Main Sectors Contribution To GDP 1981 – 2016

The Main Sectors Contribution to GDP on Avarage Interval Time

- Agri to GDP
- Service to GDP
- Manufacturing to GDP
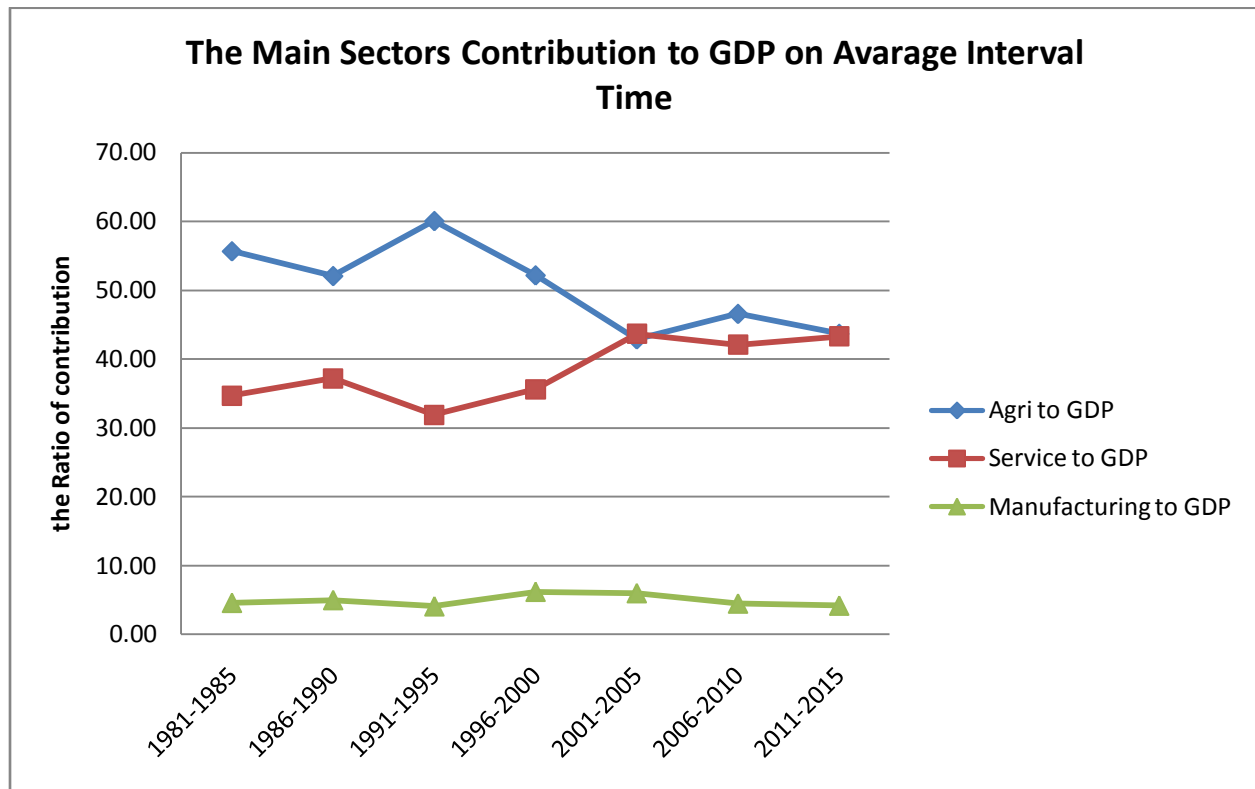
Figure 4.2.Trends of Main sectors contribution to GDP on Average interval time

As showed in the figure 4.2. above, the contribution of Agriculture to GDP ratio is large, The Share of Service is still large next to Agriculture/ But The share of Manufacturing to GDP is Very small.

4.1.3. Trends of Import Duties of Ethiopia 1981 – 2016

The trend of import duties and taxes at the starting period was very low and starts slightly increase until 2010.After 2010 onwards it was increasedby higher rate and it reachedits peak in recentyears.
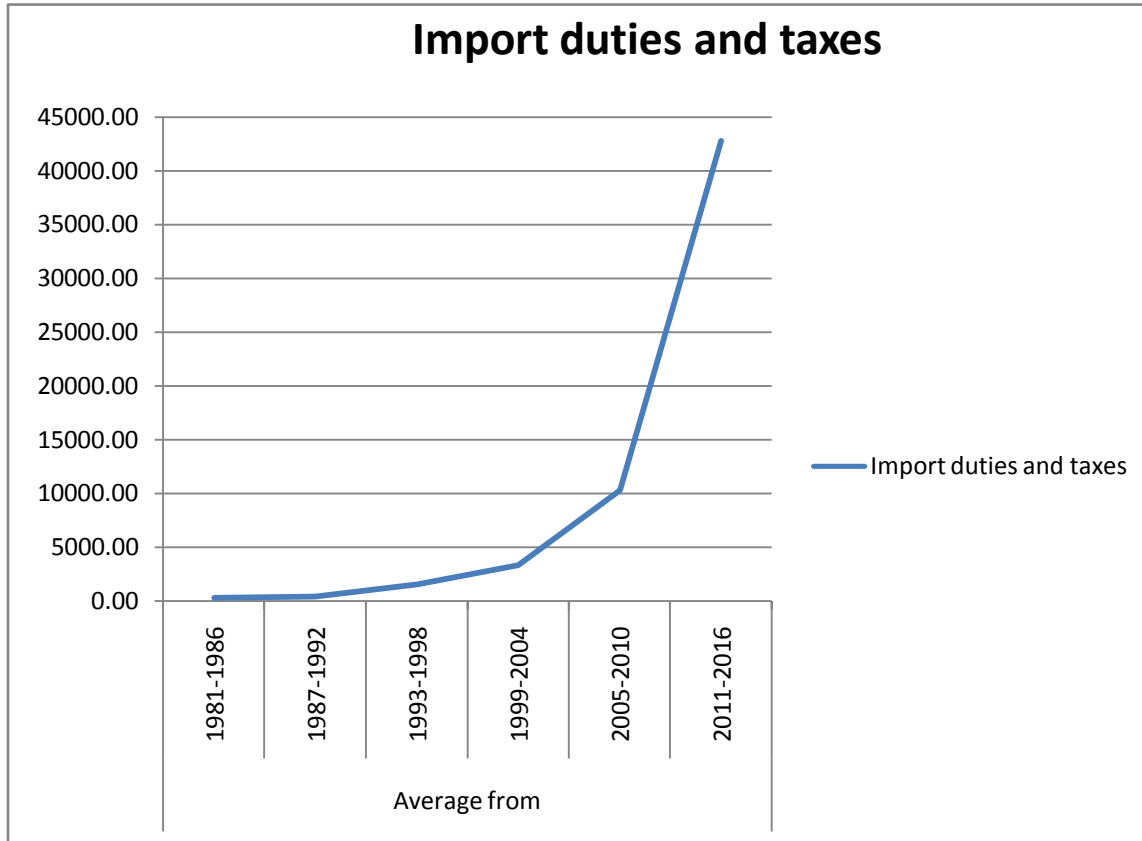
Source: Computed based on MOFEC data

Figure 4.3 Trends Import Duties of Ethiopia 1981 – 2016

4.1.4. Trendsof Direct Tax of Ethiopia 1981 – 2016

As we clearly observed from figure 6 the trend of direct tax is similar to that of import duty and tax and indirect tax.At the starting period was very low and starts slightly increase until 2010.After 2010 onwards it was increasedby higher rate and it reached s peak in recentyears. The share of direct tax is larger than import duty and indirect taxes.
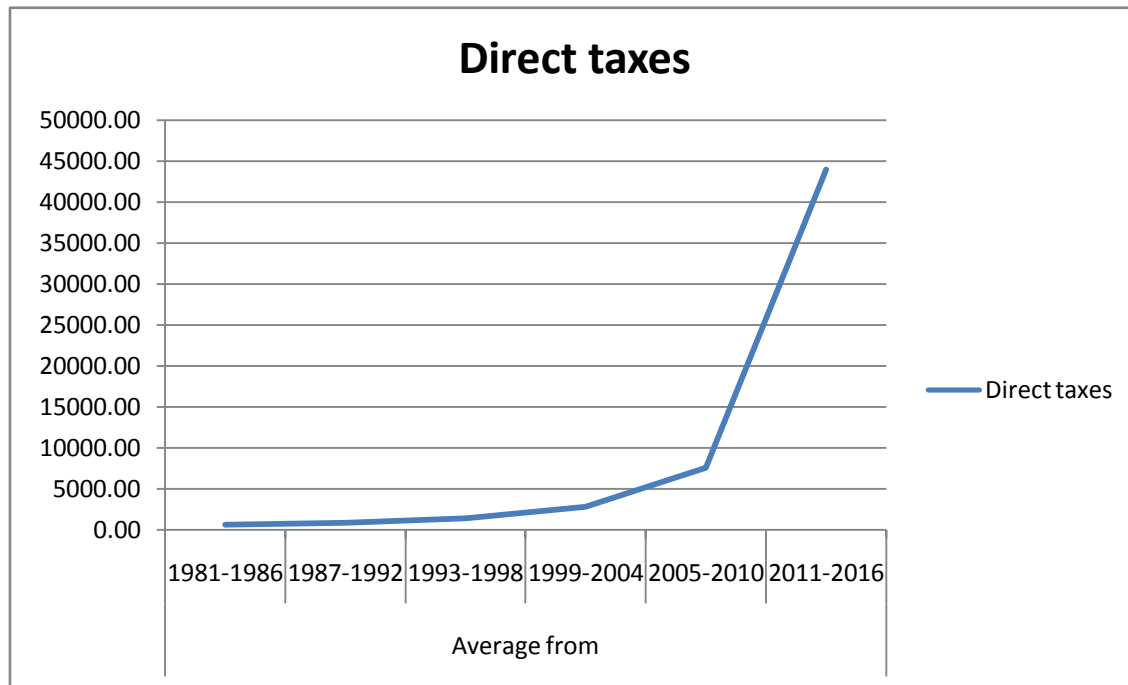
Source: Computed based on MOFEC data

Figure 4.4 Trends Direct Tax of Ethiopia 1981 – 2016

4.1.5. Trends of Domestic Indirect Tax of Ethiopia 1981 – 2016

As the figure 5 indicates that the trend of domestic indirect tax is like that of import duty and direct taxes that at the starting period were very low and starts slightly increased until 2010.After 2010 onwards it was increasedby higher rate and it reachedits peak in recentyears. The share of domestic indirect tax is larger than import duty and taxes.
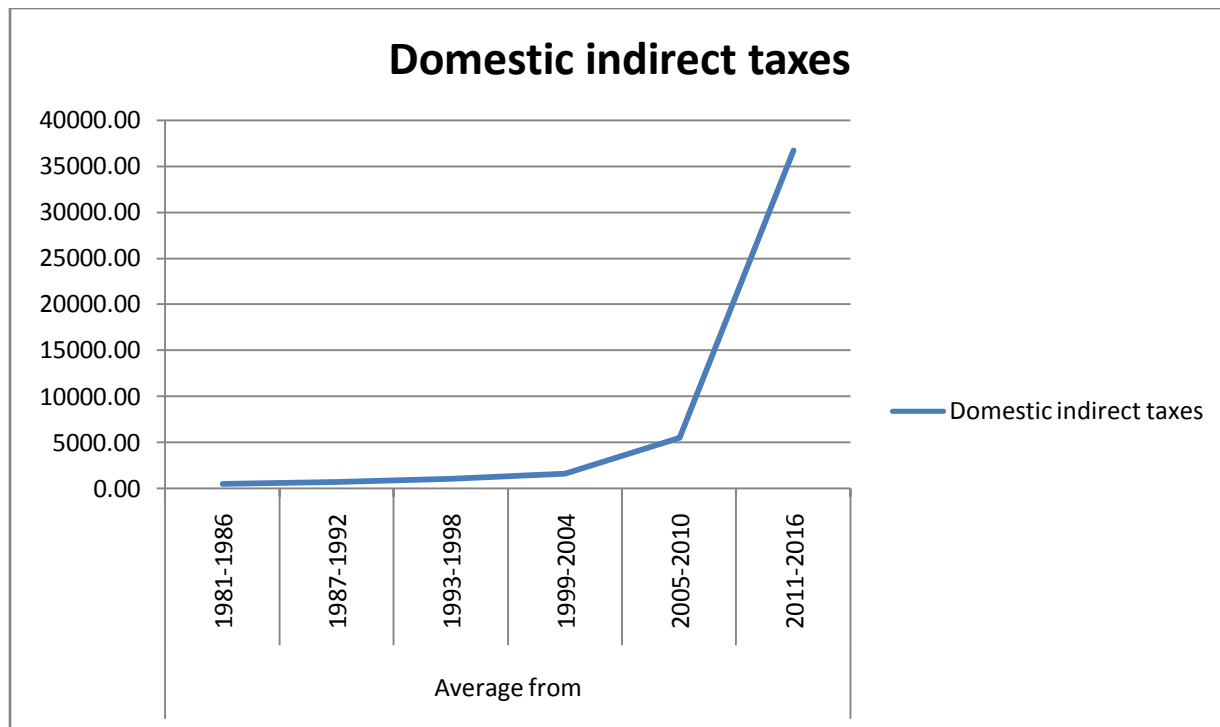
Source: Computed based on MOFEC data

Figure 4.5 TrendsDomestic Indirect Tax of Ethiopia 1981 – 2016

4.1.6. The average contribution of Segregate Tax to GDP Ratio

The avarge contribution of Segragate Tax to GDP Ratio

Legend:
- Direct taxs to GDP Ratio
- Domestic indirect tax to GDP Ratio
- Import duties taxs to GDP Ratio
- Total tax to GDP Ratio

X-axis (Interval year): 1981-1985, 1986-1990, 1991-1995, 1996-2000, 2001-2005, 2006-2010, 2011-2015

Y-axis: Ratio (0.00 to 14.00)
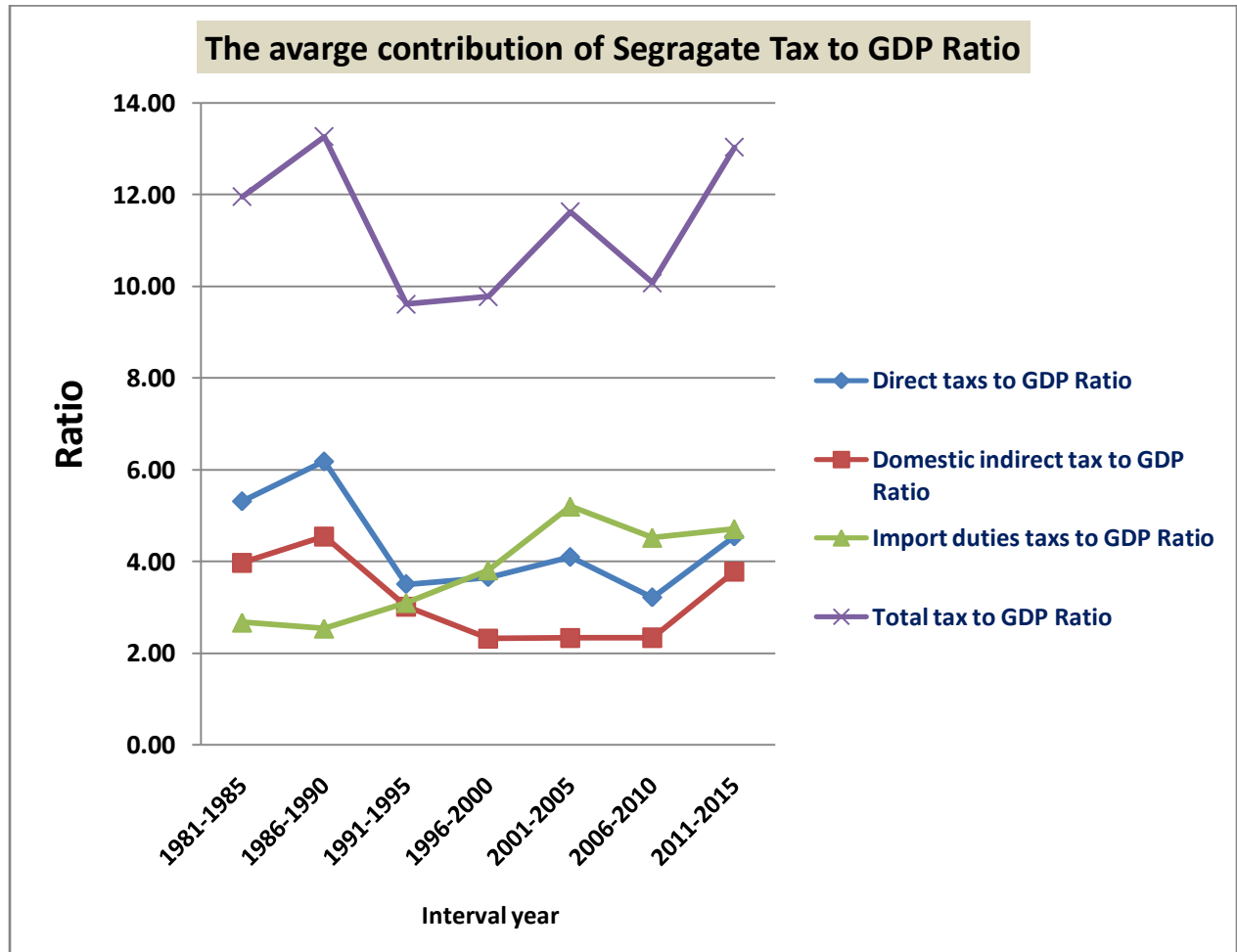
Figure 4.6 the trend of Tax To GDP ratio and   contribution of main tax types of Ethiopia

Source: Own consumption from MOFEC and WDI

As the figure 4.6 indicates the increasing rate of tax to GDP ratio is very small, the ratio of import duty is increasing and the contribution also high. The contribution of Indirect tax is small relatively form others. The contribution of direct tax is highly fluctuated.

4.2. Econometrics Results

4.2.1. Unit root

The following section presents the results of unit root tests of Augmented Dickey-Fuller (ADF)). There is a need to examine the stationarity of the variables under consideration in order to avoid having spurious results and to determine the integration properties of all the variables understudy. Only the Trends and Intercept in the model was tested to confirm stationarity. Specific lag length is used so that serial correlation is removed from the error term. The unit root test results are presented on Tables 1 and 2. The ADF test results presented in Table 4.1 indicate that our variables are non-stationary at levels. They are non stationary at levels and they become stationary at first differences.

Table 4.1: Unit Root Results (ADF test)

Variables	ADF test at level	ADF Test at First Difference
Tax to GDP Ratio	0.1341	0.0000
Percapita Income	1.0000	0.0293
Manufacturing to GDP	0.1499	0.0000
Import Duties	0.3074	0.0000
Indirect Tax	0.5307	0.0001
Direct Tax	0.1316	0.0002
Agri To GDP	0.6217	0.0014
Service to GDP	0.3267	0.0000

The results of ADF unit root test confirm that all variables are stationary at level, that is, it is I(1) All the variables including were non-stationary at level, but became stationary at first difference I(1). The results of the tests indicate that all the series are found to be non stationary; however, the 1st differences of these series lead to stationary. The integration of tax to GDP ratio, service

to GDP ratio, agriculture to GDP ratio percapita income, manufacturing to GDP ratio, import duties and tax, domestic direct tax, domestic indirect tax to GDP ratio is of order one i.e. I(1)

4.2.2. Diagnostic Test of Model

Before any estimation is undertaken, model diagnostic test should be tested. To check the verifiability of the estimated long run model some diagnostic tests are undertaken. These includes autocorrelation (Brush and God fray LM) test, Normality (Jaque-Berra) test and Stability test. From table 2,3 and 4 indicated that Vector Autoregressive (VAR) model estimated in the study passautocorrelation and normality tests.

4.2.3. Lag Length Selection Criteria

Table4.2. Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-513.8881	NA	2970.297	30.69930	31.05844	30.82178
1	-310.3607	299.3049	0.897710	22.49181	25.72410*	23.59411
2	-225.9197	84.44099*	0.535410*	21.28940*	27.39484	23.37153*

NOTE:-

 * indicates lag order selected by the criterion

 LR: sequential modified LR test statistic (each test at 5% level)

 FPE: Final prediction error

 AIC: Akaike   information criterion

SC: Schwarz information criterion

 HQ: Hannan-Quinn information criterion

4.2.4. Johansen Co Integration

The Johannes cointegration test is conducted with the purpose of examining the presence or absence of cointegration among the variables. The presence cointegration will then be an indication or confirmation of a long run economic relationship among the variables

4.2.5. Unrestricted Co integration Rank Test (Trace

Table 4.3. Unrestricted Co integration Rank Test (Trace)

Unrestricted Co integration Rank Test (Trace)

Hypothesized		Trace	0.05 Critical	
No. of CE(s)	Eigenvalue	Statistic	Value	Prob.**
None *	0.918447	229.8025	169.5991	0.0000
At most 1 *	0.775512	144.5816	134.6780	0.0114
At most 2	0.592824	93.78793	103.8473	0.1918
At most 3	0.499427	63.23861	76.97277	0.3486
At most 4	0.364554	39.71055	54.07904	0.4850
At most 5	0.291297	24.29397	35.19275	0.4439
At most 6	0.202468	12.58713	20.26184	0.3977
At most 7	0.134092	4.895188	9.164546	0.2951

NOTE:-

Trace test indicates 2 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

4.2.6. Unrestricted Co integration Rank Test (Maximum Eigen Value

Table 4.4 Unrestricted Co integrationTest(maximum Eigen value)

Unrestricted Co integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.918447	85.22093	53.18784	0.0000
At most 1 *	0.775512	50.79368	47.07897	0.0190
At most 2	0.592824	30.54932	40.95680	0.4441
At most 3	0.499427	23.52806	34.80587	0.5578
At most 4	0.364554	15.41658	28.58808	0.7869
At most 5	0.291297	11.70684	22.29962	0.6833
At most 6	0.202468	7.691942	15.89210	0.5848
At most 7	0.134092	4.895188	9.164546	0.2951

NOTE:-

 Max-eigenvalue test indicates 2 co integrating eqn(s) at the 0.05 level

 * denotes rejection of the hypothesis at the 0.05 level

 **MacKinnon-Haug-Michelis (1999) p-values

Based on these results, I continued to test whether the eight series are cointegrated over the sample period of my study. To answer this question using Johannes cointegration statistical data presentation as shown above one can conclude that both trace and max-eigenvalue tests showed having cointegrated equations, the variables have long run relationships, with intercept (&with no trend) and with no intercept (& with trend).

Moreover , Both the trace and the maximum eigenvalue tests results in Tables 3 and 4 respectively reject the null hypothesis of no cointegration. They indicate the presence of two

cointegrating equations at 5% level of significance. The implication is that there is a long run relationship between the dependent variable REVENUE and its repressors.

4.2.7. Long Run Regression

Table 4.7 long Run Regression

Variables	Coefficients	Standard error	t – statistic
TAX_TO_GDP_RATIO (-1)	2.805620	(1.06318)	[2.63890]
SERVICE_TO_GDP RATIO (-1)	1.676716	(0.68244)	[2.45693]
REGIONAL_TAX_REVENUE(-1)	6.153713	(5.50941)	[1.11695]
PERCAPITA_INCOME (-1)	0.001143	(0.00836)	[0.13665]
MANUFACTURING_TO_GDP (-1)	1.461922	(1.87155)	[0.78113]
IMPORT_DUTIES_ TAXE (-1)	-7.725998	(3.71860)	[-2.07766]
FEDERAL TAX REVENUE(-1)	3.928733	(3.37482)	[1.16413]
DOMESTIC_INDIRECT_TAXES (-1)	-4.352033	(4.79175)	[-0.90823]
DIRECT_TAXES_TO_GDP_RATIO (-1)	-8.281963	(4.22654)	[-1.95952]
AGRI_TO_GDP RATIO (-1)	0.860943	(0.55686)	[1.54606]
C	-106.6811	(63.4596)	[-1.68109]
R-squared	0.881460	**(0.51785)**	**[-1.09587]**
Adj. R-squared	0.712116		
Sum sq. resids	6.232904		
S.E. equation	0.943618		
F-statistic	5.205156		
Log likelihood	-15.99613		
Akaike AIC	2.999570		
Schwarz SC	3.543686		
Mean dependent	11.17370		
S.D. dependent	1.758682		

C= CONSTANT TERM

Standard errors in ( ) & t-statistics in [ ]

Determinant resid covariance (dof adj.)   0.000000

Determinant resid covariance   0.000000

LONGRUN ESTIMATION EQUATION:

TAX_TO_GDP_RATIO = -106.6811 +1.676716 SERVICE_TO_GDP – 0.001143 PERCAPITA_INCOME + 1.461922 MANUFACTURING_TO_GDP -7.725998 IMPORT_DUTIES_AND_TAXES + 4.352033 *DOMESTIC_INDIRECT_TAXES +* 8.281963*DIRECT_TAXES_TO_GDP_RATIO* - 0.860943 *AGRI_TO_GDP +* *3.928733* FEDERAL_TAX_REVENUE - 6.153713 REGIONAL_TAX_REVENUE.

- Finally the results estimated on VECM at lag 1, shows that there is a long run and positive relationship between taxes to GDP RATIO and, service to GDP , regional tax revenue , federal tax revenue , agriculture ,manufacturing to GDP , & per capital income .However, the other variables are negatively related to tax to GDP ratio. The VECM results indicate that there is correlation between GDP and the independent variables. The implication is that there is an existence of a long run economic relationship. The Adjusted R- squared of   0.712116(71.2%) indicates that 71.2% of the model is perfectly fit.meaning that the regression is not spurious as well as 88% of change in dependent variable resulted because of change in independent variable in the long run and the F-statistic also revealed the absence of serial autocorrelation.

5. CHAPTER FIVE

5.1. CONCLUSION AND RECOMMANDATION

5.1.1. Conclusion

The study analyzed the factors affecting share of tax revenue in growth domestic product (GDP) of Ethiopia with the aim of addressing two objectives; the first one is to analysis the trend of tax revenue of basic sectors to GDP. The second one is To analyze the trend of different types of tax (Domestic direct tax, Custom Duty, Direct tax, Federal tax, Regional tax) to tax to GDP ratio.

This paper employs the VAR model to examine the factors affecting share of tax revenue in growth domestic product (GDP) of Ethiopia. The ADF technique was performed to test for stationarity. All the variables were not stationary at levels, but they were stationary at first difference. The Johannes Cointegration tests, results indicated that all the variables produced a long run relationship. The implication is that the variables have a long run economic relationship as indicated by both the maximumeigenvalue and the trace test statistics which rejected the null hypothesis of no cointegration. The VECM result revealed that the speed of adjustment towards the long run equilibrium is significant, meaning that the dependent variables have a long run relationship with the dependent variables.

The result shows that there is a long run and positive relationship between taxes to GDP RATIO and, service to GDP , regional tax revenue , federal tax revenue , agriculture ,manufacturing to GDP , & per capital income .However, the other variables are negatively related to tax to GDP ratio. The VAR results indicate that there is correlation between GDP and the independent variables. The implication is that there is an existence of a long run economic relationship. The Adjusted R- squared of 0.712116 (71.2%) indicates that 71.2% of the model is perfectly fit.

Tanzi (1992) describe that there is a large gap between tax-to-GDP ratio of developing and developed countries on account of a number of challenges. First, a large sum of working population of developing countries is employed in the informal agricultural sector. Significant amount of earnings remain out of the ambit of income tax. The same is true this study shows that Ethiopia agriculture is the largest share of GDP but negatively related to share of revenue in growth domestic product.

The study showed that the increment of tax to GDP ratio of Ethiopia was slight, the main tax type of the country (direct tax and indirect tax) are negativeinfluence to tax to GDP ratio. So that we can conclude that there is absence of trained tax officials,transparent tax procedures reliable statistics in presence of an undocumented economy. As a result significant revenue potential remains unrealized.

Service andhas long run significant relationship with share of tax revenue to growth domestic Product (GDP) and has second largest share of GDP next to Agriculture but negative influence to share of revenue in growth domestic product (GDP). This indicates that there is a tax collection problem may be luck of documentation, improper tax rate, miss implementation of tax privileges etc.

5.2. Recommendations

- According to the conclusion of this study the increment of tax to GDP ratio is slight. To change and make enough result trained tax officials in tax administration is mandatory, so ministry of revenue, regional tax authorities and public service commission should revise recruitment, selection and training system of tax officials.

- The main tax types (direct and indirect tax) were negatively influence to the share of revenue in growth domestic products (GDP). It is an indication of poor tax administration and narrow tax base, so that the country specially the ministry of technology, ministry of revenue and ministry offinanceshould deploy advanced and compatible technology, transparent tax procedures that allows tax officials and tax payers to exploit the system.

- As direct taxes are charged on directly onthe tax payers' income or wealth nationally there should be a system which can manage income of every person and company and it mainly responsibility of ministry of finance , ministry of revenue and ministry of Technology.

- Agriculture has the largest share of GDP of the country on the other hand large tax exemption on agriculture income, the transition from agriculture to industry must be successful. The investment policy needs revision,political condition of the country should be stable, basically investment commission is responsible but it needs federal and regional states attention and commitment.

- As of the service sector to growth domestic product is the second large share, according the contribution of the government tax revenue should be large. But the result is the revers, so thatclear registration, follow up of the sector and policy revision is important. To doing so strong cooperation and interfaceis needs between Ministry of Trade, Investment Commission, Ministry of Revenue and RegionalStates.

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Appendix A:Real data to the regression

years	tax to GDP ratio	Agri to GDP	Service to GDP	Manufacturing to GDP	Percapita income	Direct taxes to GDP ratio	Domestic indirect taxes to GDP ratio	Import duties and taxes to GDP ratio	Regional tax revenue	Federal tax revenue
1981	13.5	58.08064422	32.64513396	4.66354858	202.7919376	4.9	3.8	2.9		
1982	13.5	56.33285861	34.32358476	4.515612941	207.5479863	5.3	3.7	2.7		
1983	13.2	57.4675953	33.56676113	4.364263224	223.7872069	5.1	3.8	2.6		
1984	15.8	51.17965586	37.98304384	5.288151326	204.8721662	6	4.5	2.9		
1985	12.9	55.37018568	34.96864574	4.275505738	232.3715877	5.3	4	2.2		
1986	13.8	53.92258165	35.81437989	4.650273251	233.8183804	5.6	4.1	2.2		
1987	14.5	51.95200151	36.40981804	5.442233895	242.0451601	6.3	4.3	2.8		
1988	15.5	51.57352265	37.520284	5.170474726	242.7873277	6.8	4.8	2.9		
1989	15.1	51.21277059	37.86770141	5.115273548	247.0265475	6.7	5	2.3		
1990	12.8	52.04077703	38.1760698	4.86344458	253.1929484	5.5	4.5	2.5		
1991	10.7	61.35629685	31.03289368	3.368717014	270.2443935	4.3	3.9	2.3		
1992	7.8	65.97295606	27.72856659	3.217971244	203.1645022	3.2	2.6	2		
1993	8.3	62.37275609	29.87070429	4.106026625	164.9584363	2.8	2.8	2.6		
1994	10.9	55.66025242	35.69652066	4.513721739	124.9830454	3.3	2.9	4.4		
1995	11.4	55.03858231	35.11833023	5.179148938	133.7288539	3.9	2.8	4.2		
1996	12.5	54.30215987	35.31434117	5.531919428	144.5003524	4.6	3	4.5		
1997	9.3	57.72290526	29.24066976	7.800257618	140.8611257	3.3	2.2	3.5		
1998	9.5	52.48803109	35.1335988	5.623975846	124.5056232	3.4	2.1	3.7	1.94	7.5
1999	9.4	48.62737685	38.335475	6.129835504	119.1340818	3.4	2.1	3.7	1.83	7.6
2000	9.2	47.75863921	40.04084652	5.993345571	123.8762057	3.6	2.2	3.8	1.89	7.8
2001	10.9	45.64146015	41.50070407	6.226545353	120.1789279	4	2	4.7	2.04	8.9
2002	11.8	41.66034075	44.62211302	6.208819778	111.3634356	4.7	2.3	4.9	2.18	9.7
2003	11.2	40.11962165	46.00020188	6.208699945	118.8734466	4.1	2.3	4.9	2.13	9.1
2004	12.4	42.30117869	43.82558687	5.851669807	135.7623858	4	2.5	6.1	2.49	10
2005	11.3	44.70227594	42.49883863	5.257899855	161.6266248	3.7	2.6	5.4	2.52	9.1
2006	10.6	45.87827516	41.61506183	5.003541193	193.7949056	3.4	2.4	5	2.16	8.6
2007	9.5	45.46158956	42.07237965	4.926051925	243.3026822	3	2.3	4.8	1.88	8.2
2008	9.1	48.43371358	40.62547224	4.403545312	325.3825543	2.8	2.1	4.7	1.64	7.9
2009	8.4	48.63701309	41.09821122	4.113185918	379.7566385	2.9	2.2	3.5	1.72	6.9

years	tax to GDP ratio	Agri to GDP	Service to GDP	Manufacturing to GDP	Percapita income	Direct taxes to GDP ratio	Domestic indirect taxes to GDP ratio	Import duties and taxes to GDP ratio	Regional tax revenue	Federal tax revenue
2010	10.1	44.74109707	45.07385177	4.289760208	341.3099092	3.9	2.8	4.6	2.09	9.2
2011	11.7	44.66957015	44.8645925	3.987833504	354.8463544	3.9	3.1	4.7	2.02	9.6
2012	15.6	47.98313014	41.76004398	3.701821084	468.5067249	5.3	4.2	6.1	2.85	13
2013	12.3	44.89672031	43.18813406	4.03050769	502.1535887	4.5	3.7	4.4	2.77	9.6
2014	12.5	41.92301248	43.41572291	4.343884338	571.1622759	4.4	3.8	4.3	2.72	9.8
2015	12.7	39.23480716	43.03101566	4.792814168	645.4650067	4.6	4	4.1	3.02	9.7
2016	12.5	37.2304185	41.46114491	4.342126574	706.7574751	4.7	3.7	4.1	3.14	9.3

Data Source: Mistry of Finance and Economic Cooperation (MOFEC) and World Development Indicators (WDI)

Vector Autoregression Estimates
Date: 05/29/19   Time: 08:17
Sample (adjusted): 1999 2016
Included observations: 18 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	TAX_TO_GDP_RATIO	SERVICE_TO_GDP	REGIONAL_TAX_REVENUE	PERCAPITA_INCOME	MANUFACTURING_TO_GDP	IMPORT_DUTIES_AND_TAXES_	FEDERAL_TAX_REVENUE	DOMESTIC_INDIRECT_TAXES_	DIRECT_TAXES_TO_GDP_RATI	AGRI_TO_GDP
TAX_TO_GDP_RATIO(-1)	2.805620	0.382384	0.798957	-4.301746	0.183313	1.101593	2.423900	0.897036	1.230195	-0.389438
	(1.06318)	(0.99169)	(0.13783)	(26.4811)	(0.30540)	(0.42097)	(0.75132)	(0.23579)	(0.41830)	(1.19717)
	[2.63890]	[0.38559]	[5.79681]	[-0.16245]	[0.60023]	[2.61683]	[3.22620]	[3.80438]	[2.94097]	[-0.32530]
SERVICE_TO_GDP(-1)	1.676716	1.513543	0.370124	-35.29709	0.029802	0.677114	1.458509	0.410715	0.754077	-0.613738
	(0.68244)	(0.63655)	(0.08847)	(16.9980)	(0.19603)	(0.27021)	(0.48226)	(0.15135)	(0.26850)	(0.76845)
	[2.45693]	[2.37771]	[4.18362]	[-2.07654]	[0.15202]	[2.50585]	[3.02430]	[2.71364]	[2.80848]	[-0.79867]
REGIONAL_TAX_REVENUE(-1)	6.153713	8.212258	1.672575	-386.3671	0.434959	2.157977	5.166298	1.465353	3.163817	-10.64969
	(5.50941)	(5.13895)	(0.71422)	(137.226)	(1.58260)	(2.18145)	(3.89335)	(1.22187)	(2.16762)	(6.20379)
	[1.11695]	[1.59804]	[2.34181]	[-2.81555]	[0.27484]	[0.98924]	[1.32696]	[1.19927]	[1.45958]	[-1.71664]
PERCAPITA_INCOME(-1)	0.001143	0.020991	0.002848	0.496661	-9.34E-05	-0.002866	0.000428	0.001080	0.005736	-0.028110
	(0.00836)	(0.00780)	(0.00108)	(0.20829)	(0.00240)	(0.00331)	(0.00591)	(0.00185)	(0.00329)	(0.00942)
	[0.13665]	[2.69117]	[2.62693]	[2.38451]	[-0.03887]	[-0.86560]	[0.07237]	[0.58257]	[1.74340]	[-2.98528]
MANUFACTURING_TO_GDP(-1)	1.461922	0.760785	0.626732	-55.53556	0.816328	0.385024	0.965274	0.072252	1.139305	-1.250256

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	(1.87155)	(1.74570)	(0.24262)	(46.6158)	(0.53761)	(0.74104)	(1.32257)	(0.41507)	(0.73634)	(2.10743)
	[0.78113]	[0.43580]	[2.58316]	[-1.19135]	[1.51844]	[0.51957]	[0.72985]	[0.17407]	[1.54725]	[-0.59326]
IMPORT_DUTIES_A ND_TAXES_(-1)	-7.725998	-2.927615	-1.570290	188.8056	-0.290711	-2.427026	-6.432829	-2.013359	-3.452111	3.646908
	(3.71860)	(3.46856)	(0.48207)	(92.6214)	(1.06819)	(1.47238)	(2.62783)	(0.82471)	(1.46304)	(4.18728)
	[-2.07766]	[-0.84404]	[-3.25740]	[2.03847]	[-0.27215]	[-1.64837]	[-2.44796]	[-2.44130]	[-2.35954]	[0.87095]
FEDERAL_TAX_RE VENUE(-1)	3.928733	2.279888	0.693951	-172.8701	-0.172533	1.094117	3.108237	0.820123	1.903920	-2.237144
	(3.37482)	(3.14789)	(0.43750)	(84.0585)	(0.96943)	(1.33626)	(2.38489)	(0.74846)	(1.32779)	(3.80016)
	[1.16413]	[0.72426]	[1.58617]	[-2.05655]	[-0.17797]	[0.81879]	[1.30331]	[1.09574]	[1.43391]	[-0.58870]
DOMESTIC_INDIRE CT_TAXES_(-1)	-4.352033	-10.66112	-1.171390	342.6114	-0.460134	-1.331786	-4.107280	-0.988745	-3.059281	11.73368
	(4.79175)	(4.46954)	(0.62119)	(119.351)	(1.37645)	(1.89730)	(3.38619)	(1.06271)	(1.88526)	(5.39568)
	[-0.90823]	[-2.38528]	[-1.88573]	[2.87062]	[-0.33429]	[-0.70194]	[-1.21295]	[-0.93040]	[-1.62273]	[2.17464]
DIRECT_TAXES_TO _GDP_RATI(-1)	-8.281963	0.380454	-2.008134	158.6664	0.435680	-3.343599	-6.943129	-2.140696	-3.407547	-1.472793
	(4.22654)	(3.94233)	(0.54792)	(105.273)	(1.21409)	(1.67350)	(2.98677)	(0.93736)	(1.66289)	(4.75923)
	[-1.95952]	[0.09650]	[-3.66504]	[1.50719]	[0.35885]	[-1.99797]	[-2.32463]	[-2.28375]	[-2.04918]	[-0.30946]
AGRI_TO_GDP(-1)	0.860943	1.004969	0.221549	-33.47880	0.091204	0.277692	0.757737	0.208897	0.506125	-0.182421
	(0.55686)	(0.51942)	(0.07219)	(13.8701)	(0.15996)	(0.22049)	(0.39352)	(0.12350)	(0.21909)	(0.62705)
	[1.54606]	[1.93480]	[3.06898]	[-2.41375]	[0.57017]	[1.25944]	[1.92555]	[1.69147]	[2.31011]	[-0.29092]
C	-106.6811	-78.64149	-27.89860	3509.034	-5.025624	-36.65435	-90.18581	-24.92332	-58.47328	97.96711
	(63.4596)	(59.1925)	(8.22671)	(1580.62)	(18.2291)	(25.1269)	(44.8451)	(14.0740)	(24.9675)	(71.4578)
	[-1.68109]	[-1.32857]	[-3.39122]	[2.22003]	[-0.27569]	[-1.45877]	[-2.01105]	[-1.77087]	[-2.34198]	[1.37098]
R-squared	0.881460	0.916292	0.970849	0.994155	0.962426	0.889258	0.886174	0.969252	0.877608	0.959682
Adj. R-squared	0.712116	0.796709	0.929206	0.985806	0.908748	0.731056	0.723565	0.925326	0.702762	0.902084
Sum sq. resids	6.232904	5.422859	0.104749	3866.814	0.514309	0.977174	3.112617	0.306572	0.964819	7.903051

S.E. equation	0.943618	0.880167	0.122328	23.50323	0.271059	0.373626	0.666828	0.209275	0.371256	1.062548
F-statistic	5.205156	7.662380	23.31324	119.0700	17.92971	5.621023	5.449738	22.06564	5.019329	16.66184
Log likelihood	-15.99613	-14.74316	20.77818	-73.86922	6.456829	0.680269	-9.746723	11.11317	0.794782	-18.13279
Akaike AIC	2.999570	2.860351	-1.086465	9.429914	0.504797	1.146637	2.305191	-0.012574	1.133913	3.236976
Schwarz SC	3.543686	3.404467	-0.542349	9.974030	1.048913	1.690753	2.849308	0.531542	1.678029	3.781093
Mean dependent	11.17370	42.50163	2.282778	312.4030	4.989549	4.647778	9.110000	2.785000	3.936111	44.43890
S.D. dependent	1.758682	1.952116	0.459754	197.2773	0.897308	0.720454	1.268287	0.765831	0.680961	3.395642

Determinant resid covariance (dof adj.)	0.000000
Determinant resid covariance	0.000000

Sources:Eviews 9.0 software result

Appendix C: Diagnostic test of the model

Autocorrelation Test

```
Lagrange-multiplier test

  lag |     chi2     df   Prob > chi2
------+--------------------------------
   1  |   77.6301    64     0.11772
   2  |   80.6338    64     0.07824
   3  |   71.1207    64     0.25274
------+--------------------------------

H0: no autocorrelation at lag order
```

```
Selection-order criteria
Sample:  1985 - 2016                        Number of obs      =        32

  lag |    LL        LR      df    p      FPE        AIC       HQIC       SBIC
------+-----------------------------------------------------------------------
   0  |  -478.21                        2176.01    30.3881    30.5096    30.7545
   1  | -284.091   388.24   64  0.000   .724172    22.2557    23.3488    25.5536
   2  | -194.202   179.78   64  0.000   .334468    20.6376    22.7025     26.867
   3  |  495.728   1379.9   64  0.000   9.3e-17*   -18.483   -15.4464   -9.32213
   4  |  7085.79   13180*   64  0.000        .    -426.862* -422.975* -415.136*
------+-----------------------------------------------------------------------

Endogenous:  taxtoGDPratio AgritoGDP ServicetoGDP ManufacturingtoGDP
             Percapitaincome DirecttaxestoGDPratio
             DomesticindirecttaxestoGDPra ImportdutiesandtaxestoGDPra
 Exogenous:  _cons
```

Normality Test

```
Jarque-Bera test

           Equation           |     chi2    df   Prob > chi2
------------------------------+-------------------------------
          taxtoGDPratio       |    0.285     2     0.86739
             AgritoGDP        |    1.549     2     0.46097
           ServicetoGDP       |   19.847     2     0.00005
     ManufacturingtoGDP       |    1.414     2     0.49303
        Percapitaincome       |    2.247     2     0.32509
    DirecttaxestoGDPratio     |    2.277     2     0.32033
 DomesticindirecttaxestoGDPra |    0.681     2     0.71137
 ImportdutiesandtaxestoGDPra  |    1.097     2     0.57768
                ALL           |   29.397    16     0.02139
------------------------------+-------------------------------
```

Stability Test

```
Eigenvalue stability condition
```

Eigenvalue	Modulus
1.237027	1.23703
1.082636	1.08264
.9212761 + .3512129i	.985951
.9212761 - .3512129i	.985951
.6756513 + .6246273i	.920143
.6756513 - .6246273i	.920143
-.8088249	.808825
-.1761808 + .7466781i	.767182
-.1761808 - .7466781i	.767182
.1244744 + .7558999i	.76608
.1244744 - .7558999i	.76608
-.6436268 + .3767379i	.745779
-.6436268 - .3767379i	.745779
-.4574175 + .5522216i	.717063
-.4574175 - .5522216i	.717063
.3484889 + .6014999i	.695159
.3484889 - .6014999i	.695159
.4975002 + .3817189i	.627069
.4975002 - .3817189i	.627069
-.3676806 + .1829765i	.410694
-.3676806 - .1829765i	.410694

```
At least one eigenvalue is at least 1.0.
VAR does not satisfy stability condition.
```